



# HSS-PM CUTTING TOOLS

C A T A L O G U E

# **HSS-PM** **CUTTING TOOLS** **C A T A L O G U E**





# WHO WE ARE

**UOP S.p.A.** è un'azienda produttrice di utensili integrali per asportazioni di truciolo. Fondata nel 1966, grazie ad una storia di crescita continua è ora una realtà apprezzata a livello internazionale. Dal 2003 è **Membro del Gruppo IMC**.

La sede centrale di Roncadelle (Brescia) ospita i reparti di progettazione, produzione, R&D, magazzino e logistica, amministrativo, commerciale e marketing. Nel 2015 abbiamo aggiunto **Morse-UOP**, un'unità di produzione e riaffilatura in Helmond, (Olanda).

## Utensili in Metallo Duro Integrale

Unitamente alla nostra linea di utensili in acciaio da polveri e HSS-E, proponiamo un'ampia gamma di utensili in metallo duro integrale:

- **Megatool line** - Massime prestazioni in lavorazioni ad alti parametri di taglio e di materiali difficili da lavorare.
- **HSC Top Class line** - Frese in metallo duro integrale ultrafine per lavorazioni ad alta velocità.
- **Universal line** - Eccellente versatilità per un'ampia gamma di applicazioni.

## Utensili Speciali

Produciamo utensili speciali in metallo duro integrale, con placchette saldo-brasate e in acciaio da polveri e HSS-E, con qualunque profilo e tolleranza. Nella nostra proposta, includiamo i servizi di **Rigenerazione Utensili** e **Rivestimenti PVD**.

*UOP S.p.A. is a company that produces round cutting tools for metalworking.*

*It was founded in 1966 and thanks to its continuous growth, the company is now a reality appreciated on an international level. In 2003 it became a **Member of the IMC Group**. Our headquarters are located in Roncadelle (Brescia), in the north of Italy, where you can find our engineering, production, R&D, warehouse and logistics, commercial and marketing departments. In 2015 we have added a regrounding and production unit, **Morse-UOP** in Helmond (The Netherlands).*

## Solid Carbide Cutting Tools

*In addition to its Powder Metal and HSS-E Tools line, UOP offers a wide range of tools in solid carbide:*

- **Megatool line** - Peak performance with high cutting parameters and in the machining of hard to cut materials.
- **HSC Top Class line** - Ultrafine solid carbide end mills for High Speed Cutting.
- **Universal line** - Excellent versatility for a wide range of applications.

## Special Tools

*We produce special tools in full solid carbide; with carbide brazed tips and in powder metal and HSS-E, with any profile or tolerance that our customers require.*

*We also offer **PDV coatings** and Tools **Regeneration Services**.*

# Indice Generale *General Index*

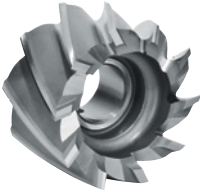
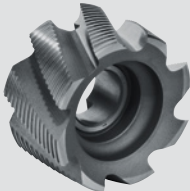
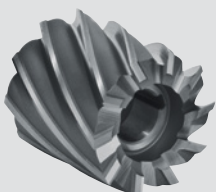
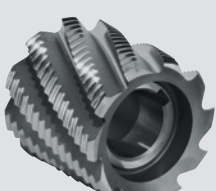
# INDEX

|                                                                               |                 |
|-------------------------------------------------------------------------------|-----------------|
| Indice Articoli<br><i>Item Index</i>                                          | Page<br>06 / 16 |
| Indicazioni di lettura del catalogo<br><i>Catalogue reading guidelines</i>    | 17              |
| Certificazioni Sistema Qualità<br><i>Quality System Certification</i>         | 18 / 19         |
| Materiali/Rivestimenti<br><i>Materials/Coatings</i>                           | 20 / 21         |
| Simboli<br><i>Symbols</i>                                                     | 22 / 23         |
| Abbreviazioni<br><i>Abbreviations</i>                                         | 24              |
| Formule/Suggerimenti di impiego<br><i>Formulas/Recommendations</i>            | 25              |
| HSS-PM <b>HSS-PM Line</b>                                                     | 26 / 117        |
| Parametri tecnici<br><i>Technical parameters</i>                              | 118 / 129       |
| Condizioni di fornitura e spedizione<br><i>Supply and shipment conditions</i> | 130             |
| Annotazioni tecniche<br><i>Technical notes</i>                                | 132             |

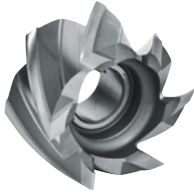
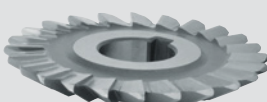
# Indice Articoli *Item Index*



# Serie/Series

|       |                                                                                     | Denti<br>Teeth | Lunghezza<br>Length | Applicazioni consigliate<br>Recommended applications    | Titanio<br>Titanium | HRSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Chiusa<br>Cast iron | Pagina<br>Page |
|-------|-------------------------------------------------------------------------------------|----------------|---------------------|---------------------------------------------------------|---------------------|------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|---------------------|----------------|
| 02105 |    |                |                     |                                                         |                     |      |                                         |                                                |                               |                  |                     |                |
|       |                                                                                     | Z8/16          |                     | contornatura<br>shouldering                             | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 26             |
| 02110 |    |                |                     |                                                         |                     |      |                                         |                                                |                               |                  |                     |                |
|       |                                                                                     | Z6/14<br>NF    |                     | semifinitura; spianatura<br>semi-finishing; facemilling | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 26             |
| 02110 |    |                |                     |                                                         |                     |      |                                         |                                                |                               |                  |                     |                |
|       |                                                                                     | Z6/16<br>NR    |                     | sgrossatura; spianatura<br>roughing; facemilling        | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 27             |
| 02115 |   |                |                     |                                                         |                     |      |                                         |                                                |                               |                  |                     |                |
|       |                                                                                     | Z8/16          |                     | contornatura; spianatura<br>shouldering; facemilling    | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 27             |
| 02120 |  |                |                     |                                                         |                     |      |                                         |                                                |                               |                  |                     |                |
|       |                                                                                     | Z6/14<br>NF    |                     | semifinitura<br>semi-finishing                          | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 28             |
| 02120 |  |                |                     |                                                         |                     |      |                                         |                                                |                               |                  |                     |                |
|       |                                                                                     | Z6/14<br>NR    |                     | sgrossatura<br>roughing                                 | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 28             |
| 02125 |  |                |                     |                                                         |                     |      |                                         |                                                |                               |                  |                     |                |
|       |                                                                                     | Z6/14<br>NR    |                     | sgrossatura<br>roughing                                 | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 29             |
| 02130 |  |                |                     |                                                         |                     |      |                                         |                                                |                               |                  |                     |                |
|       |                                                                                     | Z6/10<br>NR    |                     | sgrossatura<br>roughing                                 | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 29             |

## Serie/Series

|       |                                                                                     | Denti<br>Teeth | Lunghezza<br>Length | Applicazioni consigliate<br>Recommended applications | Titanio<br>Titanium | HRSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Chiusa<br>Cast / Ion | Pagina<br>Page |
|-------|-------------------------------------------------------------------------------------|----------------|---------------------|------------------------------------------------------|---------------------|------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|----------------------|----------------|
| 02135 |    | Z4/6           |                     | contornatura; spianatura<br>shouldering; facemilling | ○                   | ○    | ○                                       | ●                                              | ●                             | ○                | ○                    | 30             |
| 04105 |    | Z16/38         |                     | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                    | 30             |
| 04105 |    | Z18/46         |                     | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                    | 33             |
| 04110 |   | Z32/68         |                     | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                    | 35             |
| 06105 |  | Z20/30         |                     | fresatura di forma<br>form milling                   | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                    | 36             |
| 06110 |  | Z16/26         |                     | fresatura di forma<br>form milling                   | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                    | 36             |
| 06115 |  | Z18/24         |                     | fresatura di forma<br>form milling                   | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                    | 37             |
| 06120 |  | Z24/30         |                     | fresatura di forma<br>form milling                   | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                    | 38             |

# Serie/Series

|                                                                                                                      | Denti<br>Teeth | Lunghezza<br>Length                                                                 | Applicazioni consigliate<br>Recommended applications | Titanio<br>Titanium | HRSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Chiusa<br>Cast iron | Pagina<br>Page |
|----------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------|------------------------------------------------------|---------------------|------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|---------------------|----------------|
| <b>06125</b><br>                    | Z26/30         |                                                                                     | fresatura di forma<br>form milling                   | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 38             |
| <b>06130</b><br>                    | Z10/12         |                                                                                     | fresatura di forma<br>form milling                   | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 39             |
| <b>06145</b><br>                    | Z10/12         |                                                                                     | fresatura di forma<br>form milling                   | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 39             |
| <b>10102</b><br>                    | Z2             |    | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 40             |
| <b>10105</b><br>                    | Z2             |    | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 41             |
| <b>10110 High Performance</b><br> | Z2             |  | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 42             |
| <b>10110</b><br>                  | Z2             |  | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 43             |
| <b>10125</b><br>                  | Z2             |  | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 44             |
| <b>10140</b><br>                  | Z2             |  | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 45             |
| <b>10155</b><br>                  | Z2             |  | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 46             |
| <b>10170</b><br>                  | Z2             |  | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 47             |
| <b>11405</b><br>                  | Z1             |  | apertura cava<br>slotting                            | ○                   | ○    | ○                                       | ●                                              | ●                             | ○                | ○                   | 48             |
| <b>12105</b><br>                  | Z2             |  | apertura cava<br>slotting                            | ○                   | ○    | ●                                       | ●                                              | ●                             | ○                | ○                   | 48             |
| <b>12120</b><br>                  | Z2             |  | apertura cava<br>slotting                            | ○                   | ○    | ●                                       | ●                                              | ●                             | ○                | ○                   | 49             |

# Serie/Series

|                                                                                                                   | Denti<br>Teeth | Lunghezza<br>Length                                                                 | Applicazioni consigliate<br>Recommended applications | Titanio<br>Titanium | HSSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Chiusa<br>Cast Iron | Pagina<br>Page |
|-------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------|------------------------------------------------------|---------------------|------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|---------------------|----------------|
| <b>12505</b><br>                  | Z2             |    | copiatura<br>profiling                               | ○                   | ○    | ●                                       | ●                                              | ●                             | ○                | ○                   | 49             |
| <b>12520</b><br>                  | Z2             |    | copiatura<br>profiling                               | ○                   | ○    | ●                                       | ●                                              | ●                             | ○                | ○                   | 50             |
| <b>14105 High Performance</b><br> | Z3             |    | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 50             |
| <b>14105</b><br>                  | Z3             |    | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 51             |
| <b>14120</b><br>                  | Z3             |    | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 52             |
| <b>14135</b><br>                  | Z3             |    | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 53             |
| <b>14150</b><br>                | Z3             |  | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 54             |
| <b>14155</b><br>                | Z3             |  | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 55             |
| <b>14160</b><br>                | Z3             |  | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 56             |
| <b>TORNADO 14505</b><br>        | Z3/4           |  | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 57             |
| <b>TORNADO 14520</b><br>        | Z3/4           |  | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 57             |
| <b>14805</b><br>                | Z3             |  | contornatura<br>shouldering                          | ○                   | ○    | ○                                       | ●                                              | ●                             | ○                | ○                   | 58             |
| <b>14820</b><br>                | Z3             |  | contornatura<br>shouldering                          | ○                   | ○    | ○                                       | ●                                              | ●                             | ○                | ○                   | 58             |
| <b>14850</b><br>                | Z3             |  | contornatura<br>shouldering                          | ○                   | ○    | ○                                       | ●                                              | ●                             | ○                | ○                   | 59             |
| <b>14855</b><br>                | Z3             |  | contornatura<br>shouldering                          | ○                   | ○    | ○                                       | ●                                              | ●                             | ○                | ○                   | 59             |

# Serie/Series

|                               |                                                                                     | Denti<br>Teeth   | Lunghezza<br>Length                                                                 | Applicazioni consigliate<br>Recommended applications | Titanio<br>Titanium | HRSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Grise<br>Cast iron | Pagina<br>Page |
|-------------------------------|-------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------|------------------------------------------------------|---------------------|------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|--------------------|----------------|
| <b>15105</b>                  |    | <b>Z3<br/>WF</b> |    | semifinitura<br>semi-finishing                       | ○                   | ○    | ○                                       | ●                                              | ●                             | ○                | ○                  | 60             |
| <b>15120</b>                  |    | <b>Z3<br/>WF</b> |    | semifinitura<br>semi-finishing                       | ○                   | ○    | ○                                       | ●                                              | ●                             | ○                | ○                  | 60             |
| <b>17105</b>                  |    | <b>Z4/8</b>      |    | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 61             |
| <b>17120</b>                  |    | <b>Z4/8</b>      |    | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 62             |
| <b>17135</b>                  |    | <b>Z4/6</b>      |    | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 63             |
| <b>17150</b>                  |    | <b>Z4/8</b>      |    | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 64             |
| <b>17155</b>                  |  | <b>Z4/8</b>      |  | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 64             |
| <b>17160</b>                  |  | <b>Z4/8</b>      |  | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 65             |
| <b>17305 High Performance</b> |  | <b>Z4/5</b>      |  | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                  | 66             |
| <b>17305</b>                  |  | <b>Z3/8</b>      |  | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 66             |
| <b>17320</b>                  |  | <b>Z4/8</b>      |  | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 67             |
| <b>17350</b>                  |  | <b>Z4/8</b>      |  | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 68             |
| <b>17355</b>                  |  | <b>Z4/8</b>      |  | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 68             |
| <b>17505</b>                  |  | <b>Z4/8</b>      |  | copiatura<br>profiling                               | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 69             |
| <b>17520</b>                  |  | <b>Z4/8</b>      |  | copiatura<br>profiling                               | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 69             |

# Serie/Series

|                                                                                                                   | Denti<br>Teeth    | Lunghezza<br>Length                                                                 | Applicazioni consigliate<br>Recommended applications | Titanio<br>Titanium | HSSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Chiusa<br>Cast Iron | Pagina<br>Page |
|-------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|------------------------------------------------------|---------------------|------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|---------------------|----------------|
| <b>17550</b><br>                  | Z4/8              |    | copiatura<br>profiling                               | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                   | 70             |
| <b>17555</b><br>                  | Z4/8              |    | copiatura<br>profiling                               | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                   | 70             |
| <b>18105 High Performance</b><br> | Z4                |    | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 71             |
| <b>18105</b><br>                  | Z4                |    | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 71             |
| <b>19105</b><br>                  | Z4<br><b>NF</b>   |    | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 72             |
| <b>20105</b><br>                  | Z3/6<br><b>NF</b> |    | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 73             |
| <b>20105</b><br>                | Z4/6<br><b>NR</b> |  | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 73             |
| <b>20120</b><br>                | Z4/6<br><b>NF</b> |  | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 74             |
| <b>20120</b><br>                | Z4/6<br><b>NR</b> |  | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 74             |
| <b>20150</b><br>                | Z4/6<br><b>NF</b> |  | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 75             |
| <b>20150</b><br>                | Z4/6<br><b>NR</b> |  | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 75             |
| <b>20155</b><br>                | Z4/7<br><b>NF</b> |  | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 76             |
| <b>20155</b><br>                | Z4/7<br><b>NR</b> |  | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 76             |
| <b>20160</b><br>                | Z4/6<br><b>NF</b> |  | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 77             |
| <b>20160</b><br>                | Z4/6<br><b>NR</b> |  | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 77             |

# Serie/Series

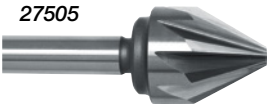
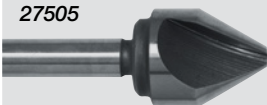
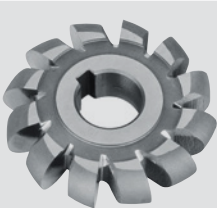
|                               |                                                                                     | Denti<br>Teeth     | Lunghezza<br>Length                                                                 | Applicazioni consigliate<br>Recommended applications | Titanio<br>Titanium | HRSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Chiusa<br>Cast iron | Pagina<br>Page |
|-------------------------------|-------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------|------------------------------------------------------|---------------------|------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|---------------------|----------------|
| <b>21105 High Performance</b> |    | <b>Z3/5<br/>NR</b> |    | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 78             |
| <b>21105</b>                  |    | <b>Z3/7<br/>NF</b> |    | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 78             |
| <b>21105</b>                  |    | <b>Z3/7<br/>NR</b> |    | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 79             |
| <b>21120</b>                  |    | <b>Z4/7<br/>NF</b> |    | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 80             |
| <b>21120</b>                  |    | <b>Z4/7<br/>NR</b> |    | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 80             |
| <b>21150</b>                  |    | <b>Z4/8<br/>NF</b> |    | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 81             |
| <b>21150</b>                  |  | <b>Z4/8<br/>NR</b> |  | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 81             |
| <b>21155</b>                  |  | <b>Z4/8<br/>NF</b> |  | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 82             |
| <b>21155</b>                  |  | <b>Z4/8<br/>NR</b> |  | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 82             |
| <b>21305</b>                  |  | <b>Z3/5<br/>NR</b> |  | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 83             |
| <b>21505</b>                  |  | <b>Z3/7<br/>NF</b> |  | semifinitura<br>semi-finishing                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 84             |
| <b>21505</b>                  |  | <b>Z3/7<br/>NR</b> |  | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 85             |
| <b>21520</b>                  |  | <b>Z4/7<br/>NF</b> |  | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 86             |
| <b>21520</b>                  |  | <b>Z4/7<br/>NR</b> |  | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 86             |
| <b>21550</b>                  |  | <b>Z4/8<br/>NF</b> |  | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 87             |



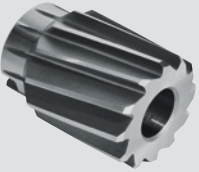
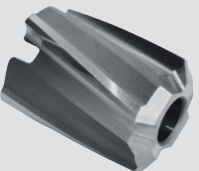
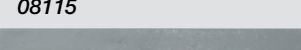
# Serie/Series

|                                                                                                                   | Denti<br>Teeth    | Lunghezza<br>Length                                                                 | Applicazioni consigliate<br>Recommended applications | Titanio<br>Titanium | HSSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Chiusa<br>Cast Iron | Pagina<br>Page |
|-------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|------------------------------------------------------|---------------------|------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|---------------------|----------------|
| <b>21550</b><br>                  | Z4/8<br><b>NR</b> |    | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 87             |
| <b>21555</b><br>                  | Z4/8<br><b>NF</b> |    | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 88             |
| <b>21555</b><br>                  | Z4/8<br><b>NR</b> |    | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 88             |
| <b>22105 High Performance</b><br> | Z3<br><b>NRF</b>  |    | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ●                                              | ○                             | ●                | ●                   | 89             |
| <b>24105</b><br>                  | Z4                |    | contornatura<br>shouldering                          | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 89             |
| <b>24110</b><br>                  | Z4                |    | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 90             |
| <b>24115</b><br>                | Z2                |  | apertura cava<br>slotting                            | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 90             |
| <b>24120</b><br>                | Z2                |  | copiatura<br>profiling                               | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 91             |
| <b>24125</b><br>                | Z2                |  | sgrossatura<br>roughing                              | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 91             |
| <b>25105</b><br>                | Z3/5              |                                                                                     | contornatura<br>shouldering                          | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                   | 92             |
| <b>25120</b><br>                | Z4/5<br><b>NF</b> |                                                                                     | semifinitura<br>semi-finishing                       | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                   | 93             |
| <b>25120</b><br>                | Z4/5<br><b>NR</b> |                                                                                     | sgrossatura<br>roughing                              | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                   | 94             |
| <b>27105</b><br>                | Z8/12             |                                                                                     | Incavatura laterale<br>side slotting                 | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 95             |
| <b>27120</b><br>                | Z6/8              |                                                                                     | apertura cava "T"<br>"t" slotting                    | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 96             |
| <b>27135</b><br>                | Z4/8              |                                                                                     | apertura cava "T"<br>"t" slotting                    | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                   | 96             |

## Serie/Series

|                                                                                                     | Denti<br>Teeth    | Lunghezza<br>Length | Applicazioni consigliate<br>Recommended applications    | Titanio<br>Titanium | HRSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Grise<br>Cast iron | Pagina<br>Page |
|-----------------------------------------------------------------------------------------------------|-------------------|---------------------|---------------------------------------------------------|---------------------|------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|--------------------|----------------|
| <b>27150</b><br>   | Z8/10             |                     | apertura cava "T"<br>"t" slotting                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 97             |
| <b>27155</b><br>   | Z4/8<br><b>NF</b> |                     | apertura cava "T"<br>"t" slotting                       | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 97             |
| <b>27505</b><br>   | Z5/11             |                     | svasatura<br>countersinking                             | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 98             |
| <b>27505</b><br>   | Z1                |                     | svasatura<br>countersinking                             | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 98             |
| <b>27505</b><br>   | Z3                |                     | svasatura<br>countersinking                             | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 99             |
| <b>28105</b><br>   | Z2                |                     | fresatura sedi viti<br>counterboring                    | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 100            |
| <b>28105</b><br> | Z4                |                     | fresatura sedi viti<br>counterboring                    | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 100            |
| <b>28150</b><br> | Z2                |                     | fresatura sedi viti<br>counterboring                    | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 101            |
| <b>28150</b><br> | Z4                |                     | fresatura sedi viti<br>counterboring                    | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 101            |
| <b>28505</b><br> | Z4/6              |                     | raccordatura<br>corner rounding                         | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 102            |
| <b>29105</b><br> | Z12/14            |                     | fresatura di forma<br>form milling                      | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 103            |
| <b>29110</b><br> | Z12/14            |                     | fresatura di forma<br>form milling                      | ●                   | ●    | ●                                       | ○                                              | ○                             | ●                | ●                  | 104            |
| <b>30150</b><br> | Z3/6              |                     | alesatura<br>per fori passanti<br>through holes reaming | ○                   | ○    | ●                                       | ○                                              | ○                             | ●                | ●                  | 105            |

# Serie/Series

|                                                                                                     | Denti<br>Teeth | Lunghezza<br>Length                                                                 | Applicazioni consigliate<br>Recommended applications                           | Titanio<br>Titanium | HFRSA | Acciai inossidabili<br>Stainless steels | Materiali non ferrosi<br>Non ferrous materials | Leghe leggere<br>Light alloys | Acciai<br>Steels | Chiusa<br>Cast Iron | Pagina<br>Page |
|-----------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------|-------|-----------------------------------------|------------------------------------------------|-------------------------------|------------------|---------------------|----------------|
| <b>30502</b><br>    | Z3/4           |                                                                                     | alesatura<br>per fori passanti<br>through holes reaming                        | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 106            |
| <b>30505</b><br>    | Z3             |                                                                                     | alesatura<br>per fori passanti<br>through holes reaming                        | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 106            |
| <b>30508</b><br>    | Z3             |                                                                                     | alesatura<br>per fori passanti<br>through holes reaming                        | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 107            |
| <b>30510</b><br>    | Z3             |                                                                                     | alesatura<br>per fori passanti<br>through holes reaming                        | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 107            |
| <b>31105</b><br>    | Z4/12          |                                                                                     | alesatura<br>per fori passanti<br>through holes reaming                        | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 108            |
| <b>32105</b><br>    | Z3/7           |                                                                                     | alesatura<br>per fori passanti<br>through holes reaming                        | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 109            |
| <b>32150</b><br>  | Z5/10          |                                                                                     | alesatura<br>per fori passanti<br>through holes reaming                        | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 111            |
| <b>33105</b><br> | Z8/20          |                                                                                     | alesatura<br>per fori passanti<br>through holes reaming                        | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 112            |
| <b>33105</b><br> | Z5/14          |                                                                                     | alesatura<br>per fori passanti<br>through holes reaming                        | ○                   | ○     | ○                                       | ○                                              | ○                             | ●                | ●                   | 113            |
| <b>34105</b><br> | Z4             |                                                                                     | allargatura per fori<br>ciechi e passanti<br>through and blind<br>holes boring | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 114            |
| <b>34150</b><br>  | Z4             |                                                                                     | allargatura per fori<br>ciechi e passanti<br>through and blind<br>holes boring | ○                   | ○     | ●                                       | ○                                              | ○                             | ●                | ●                   | 115            |
| <b>08105</b><br>  |                |  | —                                                                              | —                   | —     | —                                       | —                                              | —                             | —                | —                   | 116            |
| <b>08110</b><br>  |                |  | —                                                                              | —                   | —     | —                                       | —                                              | —                             | —                | —                   | 117            |
| <b>08115</b><br>  |                |  | —                                                                              | —                   | —     | —                                       | —                                              | —                             | —                | —                   | 117            |

# Indicazioni di lettura Reading guidelines

**1** HSS-PM  
**HSS-PM Line**

**2** Serie/Series  
**10102**  
Free a due taglienti in tolleranza H7  
Two flute slot drills in tolerance H7

**3**

**4**

**5**

**6**

| Cod. Art.    | X-45 | COATED | DR-17 | I   | L  | d1 | Z |
|--------------|------|--------|-------|-----|----|----|---|
| 101020100 CM | CMX  | 1      | 3     | 47  | 6  | 2  |   |
| 101020150 CM | CMX  | 1,5    | 3     | 47  | 6  | 2  |   |
| 101020200 CM | CMX  | 2      | 4     | 48  | 6  | 2  |   |
| 101020250 CM | CMX  | 2,5    | 5     | 49  | 6  | 2  |   |
| 101020300 CM | CMX  | 3      | 5     | 49  | 6  | 2  |   |
| 101020350 CM | CMX  | 3,5    | 6     | 50  | 6  | 2  |   |
| 101020400 CM | CMX  | 4      | 7     | 51  | 6  | 2  |   |
| 101020450 CM | CMX  | 4,5    | 7     | 51  | 6  | 2  |   |
| 101020500 CM | CMX  | 5      | 8     | 52  | 6  | 2  |   |
| 101020550 CM | CMX  | 5,5    | 8     | 52  | 6  | 2  |   |
| 101020600 CM | CMX  | 6      | 8     | 52  | 6  | 2  |   |
| 101020650 CM | CMX  | 6,5    | 10    | 60  | 10 | 2  |   |
| 101020700 CM | CMX  | 7      | 10    | 60  | 10 | 2  |   |
| 101020750 CM | CMX  | 7,5    | 10    | 60  | 10 | 2  |   |
| 101020800 CM | CMX  | 8      | 11    | 61  | 10 | 2  |   |
| 101020850 CM | CMX  | 8,5    | 11    | 61  | 10 | 2  |   |
| 101020900 CM | CMX  | 9      | 11    | 61  | 10 | 2  |   |
| 101020950 CM | CMX  | 9,5    | 13    | 63  | 10 | 2  |   |
| 101021000 CM | CMX  | 10     | 13    | 63  | 10 | 2  |   |
| 101021050 CM | CMX  | 10,5   | 13    | 70  | 12 | 2  |   |
| 101021100 CM | CMX  | 11     | 13    | 70  | 12 | 2  |   |
| 101021200 CM | CMX  | 12     | 16    | 73  | 12 | 2  |   |
| 101021300 CM | CMX  | 13     | 16    | 73  | 12 | 2  |   |
| 101021400 CM | CMX  | 14     | 16    | 73  | 12 | 2  |   |
| 101021500 CM | CMX  | 15     | 19    | 79  | 16 | 2  |   |
| 101021600 CM | CMX  | 16     | 19    | 79  | 16 | 2  |   |
| 101021700 CM | CMX  | 17     | 19    | 79  | 16 | 2  |   |
| 101021800 CM | CMX  | 18     | 19    | 79  | 16 | 2  |   |
| 101021900 CM | CMX  | 19     | 22    | 82  | 16 | 2  |   |
| 101022000 CM | CMX  | 20     | 22    | 82  | 16 | 2  |   |
| 101022001 CM | CMX  | 20     | 22    | 88  | 20 | 2  |   |
| 101022100 CM | CMX  | 21     | 22    | 88  | 20 | 2  |   |
| 101022200 CM | CMX  | 22     | 22    | 88  | 20 | 2  |   |
| 101022300 CM | CMX  | 23     | 22    | 88  | 20 | 2  |   |
| 101022400 CM | CMX  | 24     | 26    | 102 | 25 | 2  |   |
| 101022500 CM | CMX  | 25     | 26    | 102 | 25 | 2  |   |
| 101022600 CM | CMX  | 26     | 26    | 102 | 25 | 2  |   |
| 101022800 CM | CMX  | 28     | 26    | 102 | 25 | 2  |   |
| 101023000 CM | CMX  | 30     | 26    | 102 | 25 | 2  |   |
| 101023200 CM | CMX  | 32     | 32    | 112 | 32 | 2  |   |
| 101023400 CM | CMX  | 34     | 32    | 112 | 32 | 2  |   |
| 101023500 CM | CMX  | 35     | 32    | 112 | 32 | 2  |   |
| 101023600 CM | CMX  | 36     | 32    | 112 | 32 | 2  |   |

**7**

**8**

**12**

**10** Parametri di taglio/Cutting parameters

| Materiali<br>Materials | 10102 - 10105<br>10110 - 10125*            | 10140 - 10155*                             | 12505 - 12520*                             |
|------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|
|                        | <br>Cava Slotting<br>$ap = 0,5a$ $ps = 1a$ | <br>Sgrossatura<br>$ap = 0,4a$ $ps = 0,5a$ | <br>Sgrossatura<br>$ap = 0,4a$ $ps = 0,5a$ |

| Gruppo e descrizione<br>Group and description      | Vc (mt./min.)                      |              | Vc (mt./min.)                      |              | Vc (mt./min.)                      |              |
|----------------------------------------------------|------------------------------------|--------------|------------------------------------|--------------|------------------------------------|--------------|
|                                                    | X-45<br>NON TRATTATO<br>UNFINISHED | X-45<br>Skin | X-45<br>NON TRATTATO<br>UNFINISHED | X-45<br>Skin | X-45<br>NON TRATTATO<br>UNFINISHED | X-45<br>Skin |
| Griglia e sfere<br>Grid and spheres                | 20 - 25                            | 45 - 50      | 20 - 25                            | 45 - 50      | -                                  | -            |
| Base contenuta di C<br>Low carbon content          | 30 - 35                            | 60 - 70      | 30 - 35                            | 60 - 70      | -                                  | -            |
| Medio contenuto di C<br>Medium carbon content      | 25 - 30                            | 50 - 60      | 25 - 30                            | 50 - 60      | -                                  | -            |
| Base legato<br>Low alloyed                         | 25 - 30                            | 50 - 60      | 25 - 30                            | 50 - 60      | -                                  | -            |
| Alta legato<br>High alloyed                        | 20 - 25                            | 40 - 50      | 20 - 25                            | 40 - 50      | -                                  | -            |
| Acciaio da stampi e utensili<br>Die/Tool steel     | 15 - 20                            | 30 - 40      | 15 - 20                            | 30 - 40      | -                                  | -            |
| Aluminio non legato<br>Unalloyed aluminum          | -                                  | -            | -                                  | -            | 110 - 120                          | 250 - 260    |
| Aluminio Si < 6%<br>Aluminum Si < 6%               | -                                  | -            | -                                  | -            | 70 - 80                            | 170 - 180    |
| Materiali termoplastici<br>Thermoplastic materials | -                                  | -            | -                                  | -            | 130 - 140                          | 270 - 280    |
| Rame/Oro<br>Copper/Gold                            | 30 - 35                            | 75 - 80      | 30 - 35                            | 75 - 80      | 30 - 35                            | 75 - 80      |

|    | Avanzamento fz mm/giro FEED mm/rpm |       |
|----|------------------------------------|-------|
| 3  | 0,009                              | 0,009 |
| 4  | 0,013                              | 0,012 |
| 5  | 0,015                              | 0,016 |
| 6  | 0,018                              | 0,018 |
| 8  | 0,025                              | 0,025 |
| 10 | 0,030                              | 0,035 |
| 12 | 0,040                              | 0,050 |
| 16 | 0,065                              | 0,090 |
| 20 | 0,090                              | 0,110 |

\* serie 10125; series 10155; series 12520 fz consigliato | recommended -50%

- 1** Categoria di prestazione  
Performance category
- 2** Denominazione serie  
Series name
- 3** Numero denti  
Number of teeth
- 4** Rappresentazione fotografica della serie  
Picture representing the series
- 5** Rappresentazione tecnica della serie  
Technical drawing
- 6** Informazioni aggiuntive (lunghezza, codolo, rivestimento, norma di riferimento, etc.)  
Additional data (length, shank, coating, standards, etc.)
- 7** Tabella dimensionale articoli  
Items dimensional table
- 8** Applicazioni  
Application
- 10** Parametri di taglio  
Cutting parameters
- 11** Avanzamento fz mm/tagliente  
Feed mm/tooth
- 12** Materiali lavorabili  
Workpiece materials

# Certificazioni *Certification*

# QUALITY ASSURANCE MANAGEMENT SYSTEM

Consapevoli che la completa soddisfazione del cliente è requisito essenziale per il successo dell'azienda, nel 1997 UOP S.p.A. ha ottenuto la certificazione per il **Sistema di Qualità ISO 9001** e nel giugno 2008 quella del Sistema di gestione per la Qualità – **Serie Aerospaziale AS9100**, standard di eccellenza riconosciuto a livello globale ed ulteriore conferma del nostro impegno verso la nostra clientela.

*Knowing that complete customer satisfaction is essential for the success of the Company, in 1997, the certification of the **Quality Assurance System ISO 9001** was awarded.*

*In June 2008, we obtained the **AS 9100 Aerospace** Quality Management System certification, of which the Standard of Excellence is world renowned, further confirming our commitment to our customers.*



# Materiali/Rivestimenti *Materials/Coatings*



## HSS-PM HSS-PM Line

Qualità di acciaio super rapido e da polveri utilizzati nella nostra produzione:  
*High Speed Steel and Powder Metal grades used in our production:*

| M-TK      | X-85       | X-105       |
|-----------|------------|-------------|
| HSS Co 5% | PM Co 8,5% | PM Co 10,5% |

UOP sviluppa i propri rivestimenti PVD, testandoli nel reparto di ricerca e sviluppo, mantenendo una particolare attenzione ai materiali da lavorare per i quali consiglia la soluzione più indicata.

*We develop our PVD coatings by testing them in our R&D dept; proposing the best solutions for the workpiece materials and required applications.*

| RIVESTIMENTI<br>COATINGS   | BASE<br>COMPOSITION                                                    | DUREZZA (HV)<br>HARDNESS | RESISTENZA<br>ALL'OSSIDAZIONE (°C)<br>OXIDATION RESISTANCE | COEFFICIENTE DI ATTRITO<br>COEFFICIENT OF FRICTION | APPLICAZIONI<br>APPLICATIONS                                                                                                                                 |
|----------------------------|------------------------------------------------------------------------|--------------------------|------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Skin</b>                | BASE TITANIO<br>E ALLUMINO<br><i>TITANIUM AND<br/>ALLUMINIUM BASED</i> | 3700                     | 800°                                                       | 0,5                                                | LAVORAZIONI DI ACCIAI, GHISE, ACCIAI<br>INOSSIDABILI, TITANIO, HRSA®<br><i>MILLING OF STEELS, CAST IRON,<br/>STAINLESS STEELS, TITANIUM, HRSA</i>            |
| <b>Skin<sup>Alu</sup></b>  | BASE TITANIO<br>E ALLUMINO<br><i>TITANIUM AND<br/>ALLUMINIUM BASED</i> | 3700                     | 800°                                                       | 0,1                                                | LAVORAZIONI LEGHE LEGGERE,<br>MATERIE PLASTICHE,<br>MATERIALI NON FERROSI<br><i>MACHINING FOR LIGHT ALLOYS, PLASTIC<br/>MATERIALS, NON FERROUS MATERIALS</i> |
| <b>Skin<sup>Inox</sup></b> | BASE TITANIO<br>E ALLUMINO<br><i>TITANIUM AND<br/>ALLUMINIUM BASED</i> | 3500                     | 800°                                                       | 0,05                                               | FRESATURA<br>ACCIAI INOSSIDABILI<br><i>STAINLESS STEEL MILLING</i>                                                                                           |

### Rivestimenti a richiesta / Coatings on request



BISOLFURO DI MOLIBDENO  
*MOLYBDENUM DISULFIDE*



CARBONITRURIO DI TITANIO  
*TITANIUM CARBONITRIDE*



NITRURIO DI TITANIO  
*TITANIUM NITRIDE*



NITRURIO DI CROMO  
*CHROMIUM NITRIDE*



NITRURIO DI ZIRCONIO  
*ZIRCONIUM NITRIDE*



CARBONIO  
*CARBONIUM*

# Simboli *Symbols*

## Esecuzione / Execution

|    |     |   |                                                                                                      |
|----|-----|---|------------------------------------------------------------------------------------------------------|
| N  | H   | W | Taglienti a <b>FINIRE</b><br>FINISHING CUTTING EDGE PROFILE                                          |
| NR | NRF |   | Taglienti a <b>SGROSSARE</b><br>ROUGHING CUTTING EDGE PROFILE                                        |
| NF | WF  |   | Taglienti a <b>SGROSSARE</b> e <b>SEMIFINIRE</b><br>ROUGHING AND SEMI-FINISHING CUTTING EDGE PROFILE |

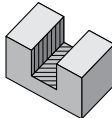
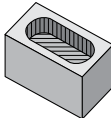
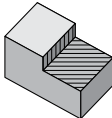
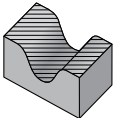
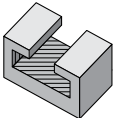
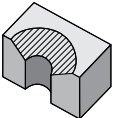
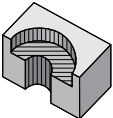
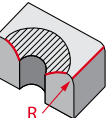
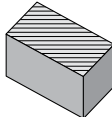
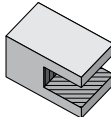
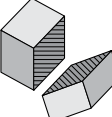
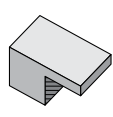
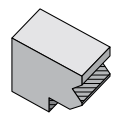
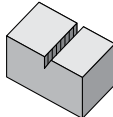
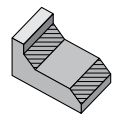
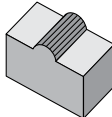
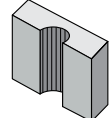
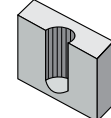
## Lunghezze / Lengths

|                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|  |  |  |  |  |
| CORTA<br>SHORT                                                                    | NORMALE<br>NORMAL                                                                 | LUNGA<br>LONG                                                                     | EXTRALUNGA<br>EXTRALONG                                                           | TUTTE LE LUNGHEZZE<br>ALL LENGTHS                                                 |

## Codoli / Shanks

|                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                            |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------|
|  |  |  |  |  | MORSE<br>TAPER             |
| CILINDRICO<br>STRAIGHT<br>(DIN1835A)                                                | WELDON<br>(DIN6535HB)                                                               | FILETTATO<br>THREADED<br>(DIN1835D)                                                 | CON TENONE<br>WITH TANG                                                             | CON QUADRO<br>WITH FLAT SQUARE<br>(DIN10)                                           | MORSE<br>MORSE<br>(DIN228) |

## Applicazioni / Application

|                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |  |  |  |  |
| CAVA<br>SLOTTING                                                                    | TASCA<br>POCKETING                                                                  | CONTORNATURA<br>SHOULDERING                                                         | COPIATURA<br>PROFILING                                                              | CAVE A "T"<br>"T" SLOTTING                                                          | SVASATURA<br>COUNTERSINKING                                                           | SVASATURA<br>COUNTERBORING                                                            | 1/4 DI RAGGIO<br>CORNER<br>ROUNDING                                                   |
|  |  |  |  |  |  |  |  |
| SPIANATURA<br>FACING                                                                | INCASTRATURA LATERALE<br>SIDE SLOTTING                                              | TRONCATURA<br>SLITTING                                                              | SPALLAMENTO<br>SUL FONDO<br>BOTTOM<br>SHOULDERING                                   | SBASATURA E<br>SOTTOSQUADRI<br>BOTTOM<br>DEBURRING AND<br>UNDERCUTTING              | INCISIONE<br>ENGRAVING                                                                | PARETI INCLINATE<br>E SMUSSI<br>SLANTED<br>SHOULDER AND<br>CHAMFER                    | FRESATURA DI<br>FORMA<br>FORM MILLING                                                 |
|  |  |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| ALESATURA<br>FORI CIECHI<br>BLIND HOLES<br>REAMING                                  | ALESATURA<br>FORI PASSANTI<br>THROUGH HOLES<br>REAMING                              |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |

# Abbreviazioni

## Abbreviations

|                      |            |                                                                               |                                                          |
|----------------------|------------|-------------------------------------------------------------------------------|----------------------------------------------------------|
| <b>D</b>             | [mm]       | DIAMETRO DEL TAGLIENTE                                                        | CUTTING DIAMETER                                         |
| <b>d</b>             | [mm]       | DIAMETRO DEL GAMBO                                                            | SHANK DIAMETER                                           |
| <b>ds</b>            | [mm]       | DIAMETRO DELLO SCARICO                                                        | NECK DIAMETER                                            |
| <b>L</b>             | [mm]       | LUNGHEZZA TOTALE DELL'UTENSILE                                                | TOTAL LENGTH OF TOOL                                     |
| <b>l</b>             | [mm]       | LUNGHEZZA DEL TAGLIENTE                                                       | LENGTH OF CUT                                            |
| <b>l1</b>            | [mm]       | LUNGHEZZA TRA LA PARTE FRONTALE DELL'UTENSILE FINO ALLA FINE DELLO SCARICO    | LENGTH FROM THE FRONT OF THE TOOL TO THE END OF THE NECK |
| <b>l2</b>            | [mm]       | LUNGHEZZA DALLA TESTA DELL'UTENSILE FINO ALL'INIZIO DELLA RASTREMATURA CONICA | LENGTH FROM THE FRONT OF THE TOOL TO THE TAPERING        |
| <b>Z</b>             |            | NUMERO DEI DENTI                                                              | NUMBER OF TEETH                                          |
| <b>R</b>             | [mm]       | RAGGIO                                                                        | RADIUS                                                   |
| <b>S</b>             |            | SPESSORE                                                                      | WIDTH                                                    |
| <b>Vc</b>            | [m/min.]   | VELOCITÀ DI TAGLIO                                                            | CUTTING SPEED                                            |
| <b>F</b>             | [mm/min.]  | VELOCITÀ DI AVANZAMENTO                                                       | FEED RATE                                                |
| <b>fz</b>            | [mm]       | AVANZAMENTO PER DENTE                                                         | FEED PER TOOTH                                           |
| <b>n</b>             | [rpm]      | NUMERO DI GIRI                                                                | TOOL REVOLUTION                                          |
| <b>a<sub>p</sub></b> | [mm]       | PROFONDITÀ ASSIALE                                                            | AXIAL DEPTH                                              |
| <b>a<sub>e</sub></b> | [mm]       | PROFONDITÀ RADIALE                                                            | RADIAL DEPTH                                             |
| <b>Q</b>             | [cm³/min.] | VOLUME DI TRUCIOLATURA                                                        | MATERIAL REMOVAL RATE                                    |

# Formule *Formulas*

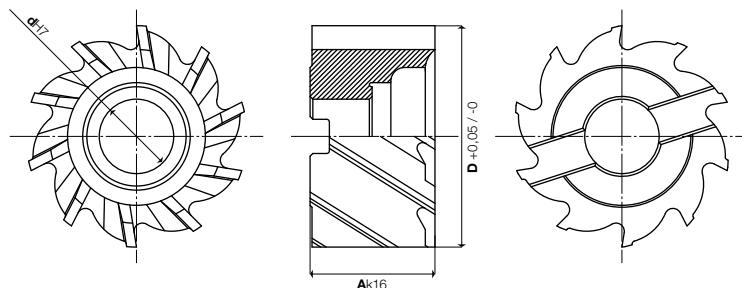
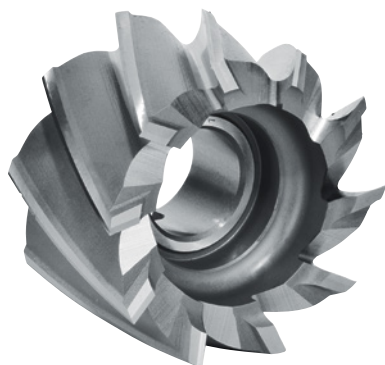
|                                                        |       |                                           |                         |
|--------------------------------------------------------|-------|-------------------------------------------|-------------------------|
| NUMERO DI GIRI<br><i>TOOL REVOLUTION</i>               | $n$   | $= \frac{V_c \times 1000}{3,14 \times D}$ | (rpm)                   |
| VELOCITÀ DI TAGLIO<br><i>CUTTING SPEED</i>             | $V_c$ | $= \frac{D \times n \times 3,14}{1000}$   | (m/min.)                |
| VELOCITÀ DI AVANZAMENTO<br><i>FEED RATE</i>            | $F$   | $= f_z \times z \times n$                 | (mm/min.)               |
| AVANZAMENTO PER DENTE<br><i>FEED PER TOOTH</i>         | $f_z$ | $= \frac{F}{z \times n}$                  | (mm)                    |
| VOLUME DI TRUCIOLATURA<br><i>MATERIAL REMOVAL RATE</i> | $Q$   | $= \frac{a_p \times a_e \times F}{1000}$  | (cm <sup>3</sup> /min.) |

# Suggerimenti di impiego *Recommendations*

|   |                 |                        |
|---|-----------------|------------------------|
| ● | CONSIGLIATA     | <i>RECOMMENDED</i>     |
| ◐ | ACCETTABILE     | <i>ACCEPTABLE</i>      |
| ○ | NON CONSIGLIATA | <i>NOT RECOMMENDED</i> |

## Serie/Series 02105

Frese a **FINIRE** con cava di trascinamento trasversale  
Finishing milling with transversal driving slot



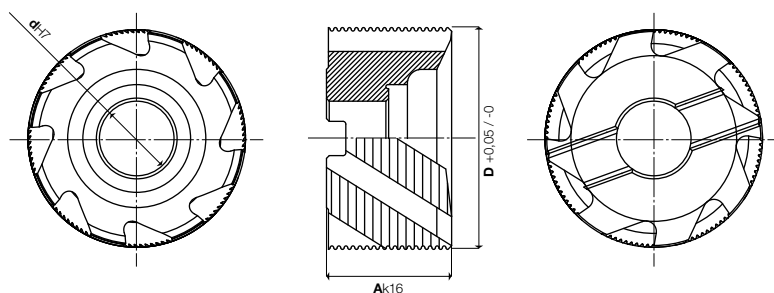
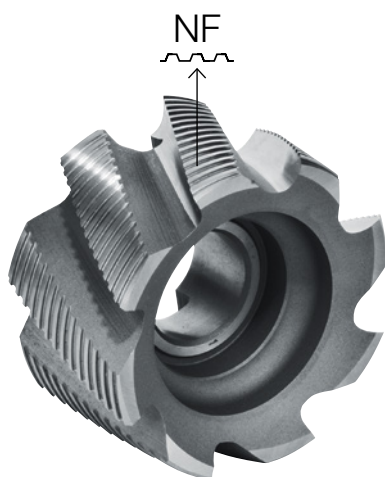
|                        |                                 |   |                                  |       |
|------------------------|---------------------------------|---|----------------------------------|-------|
| COATING<br><b>Skin</b> | $\lambda^{\circ}\text{S}$<br>32 | N | UNI 3903<br>DIN 1880<br>ISO 2586 | Z8÷16 |
|------------------------|---------------------------------|---|----------------------------------|-------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Ak16 | dh7 | Z  |
|--------------|----------------------|--------|---------------|------|-----|----|
| 021050400 CM | CMX                  |        | 40            | 32   | 16  | 8  |
| 021050500 CM | CMX                  |        | 50            | 36   | 22  | 8  |
| 021050630 CM | CMX                  |        | 63            | 40   | 27  | 8  |
| 021050800 CM | CMX                  |        | 80            | 45   | 27  | 10 |
| 021051000 CM | CMX                  |        | 100           | 50   | 32  | 12 |
| 021051250 CM | CMX                  |        | 125           | 56   | 40  | 14 |
| 021051600 CM | CMX                  |        | 160           | 63   | 50  | 16 |



## Serie/Series 02110

Frese a **SEMIFINIRE** con cava di trascinamento trasversale  
Semifinishing cutters end mills with transversal driving slot



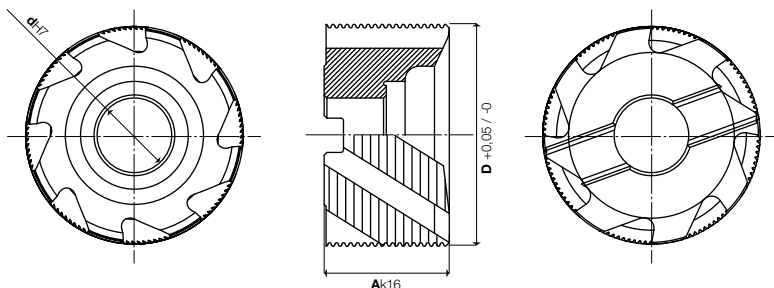
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|------------------------|---------------------------------|----|----------------------------------|-------|
| COATING<br><b>Skin</b> | $\lambda^{\circ}\text{S}$<br>28 | NF | UNI 3903<br>DIN 1880<br>ISO 2586 | Z6÷14 |
|------------------------|---------------------------------|----|----------------------------------|-------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Ak16 | dh7 | Z  |
|--------------|----------------------|--------|---------------|------|-----|----|
| 021100400 CM | CMX                  |        | 40            | 32   | 16  | 6  |
| 021100500 CM | CMX                  |        | 50            | 36   | 22  | 6  |
| 021100630 CM | CMX                  |        | 63            | 40   | 27  | 8  |
| 021100800 CM | CMX                  |        | 80            | 45   | 27  | 8  |
| 021101000 CM | CMX                  |        | 100           | 50   | 32  | 10 |
| 021101250 CM | CMX                  |        | 125           | 56   | 40  | 12 |
| 021101600 CM | CMX                  |        | 160           | 63   | 50  | 14 |



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 02105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 02110           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



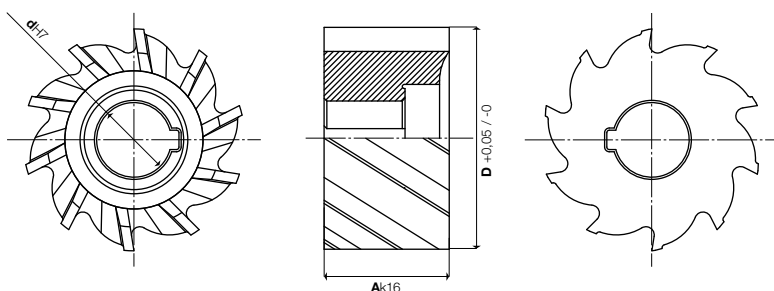
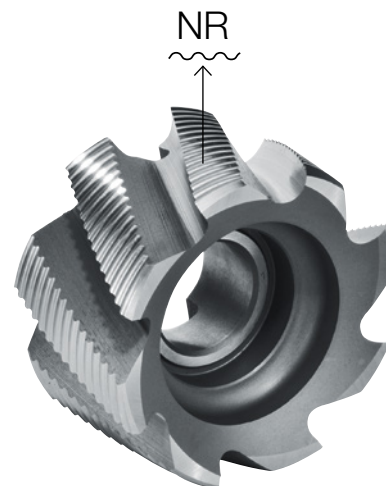
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|------------------------|---------------------------|----|----------------------------------|-------|
| COATING<br><b>Skin</b> | $\lambda^{\circ}$ S<br>28 | NR | UNI 3903<br>DIN 1880<br>ISO 2586 | Z6÷14 |
|------------------------|---------------------------|----|----------------------------------|-------|

| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Ak16 | dH7 | Z  |
|-----------|----------------------|--------|---------------|------|-----|----|
| 021100401 | CM                   | CMX    | 40            | 32   | 16  | 6  |
| 021100501 | CM                   | CMX    | 50            | 36   | 22  | 6  |
| 021100631 | CM                   | CMX    | 63            | 40   | 27  | 8  |
| 021100801 | CM                   | CMX    | 80            | 45   | 27  | 8  |
| 021101001 | CM                   | CMX    | 100           | 50   | 32  | 10 |
| 021101251 | CM                   | CMX    | 125           | 56   | 40  | 12 |
| 021101601 | CM                   | CMX    | 160           | 63   | 50  | 14 |



Serie/Series  
**02110**

Frese a **SGROSSARE**  
con cava di trascinamento trasversale  
Roughing cutters with transversal driving slot



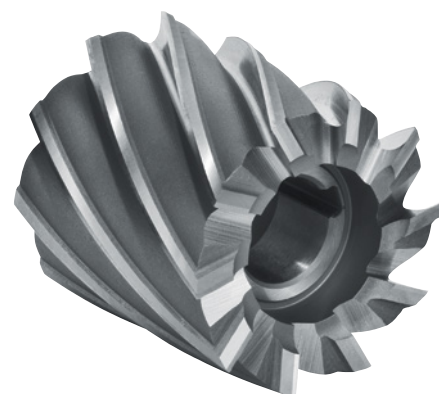
|                        |                           |   |                     |       |
|------------------------|---------------------------|---|---------------------|-------|
| COATING<br><b>Skin</b> | $\lambda^{\circ}$ S<br>32 | N | DIN 841<br>ISO 2586 | Z8÷16 |
|------------------------|---------------------------|---|---------------------|-------|

| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Ak16 | dH7 | Z  |
|-----------|----------------------|--------|---------------|------|-----|----|
| 021150300 | CM                   | CMX    | 30            | 30   | 13  | 8  |
| 021150350 | CM                   | CMX    | 35            | 35   | 16  | 8  |
| 021150400 | CM                   | CMX    | 40            | 20   | 16  | 8  |
| 021150401 | CM                   | CMX    | 40            | 40   | 16  | 8  |
| 021150500 | CM                   | CMX    | 50            | 25   | 22  | 8  |
| 021150501 | CM                   | CMX    | 50            | 50   | 22  | 8  |
| 021150600 | CM                   | CMX    | 60            | 30   | 27  | 8  |
| 021150601 | CM                   | CMX    | 60            | 60   | 27  | 8  |
| 021150750 | CM                   | CMX    | 75            | 35   | 27  | 10 |
| 021150751 | CM                   | CMX    | 75            | 75   | 27  | 10 |
| 021150900 | CM                   | CMX    | 90            | 35   | 27  | 12 |
| 021151100 | CM                   | CMX    | 110           | 35   | 32  | 14 |
| 021151300 | CM                   | CMX    | 130           | 35   | 40  | 14 |
| 021151500 | CM                   | CMX    | 150           | 40   | 40  | 16 |



Serie/Series  
**02115**

Frese a **FINIRE** con spacco longitudinale  
Finishing milling cutters with transversal driving slot



## MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 02110           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 02115           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

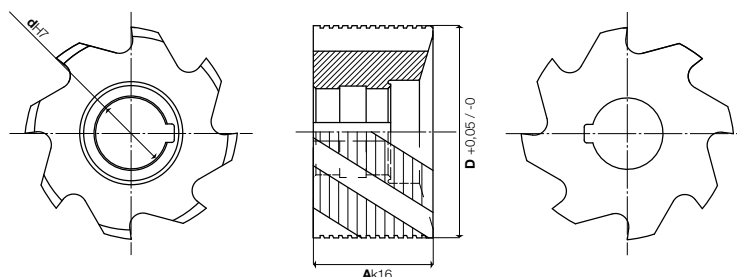
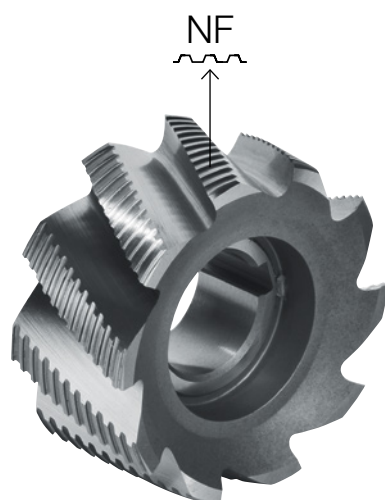
● accettabile/acceptable

○ non consigliata/not recommended



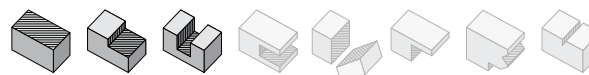
## Serie/Series 02120

Frese a **SEMIFINIRE** con spacco longitudinale  
Semi-finishing cutters with longitudinal keyway



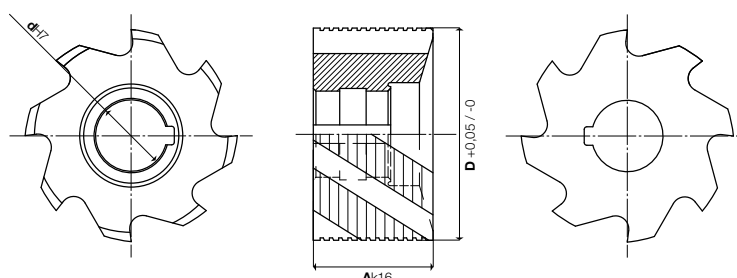
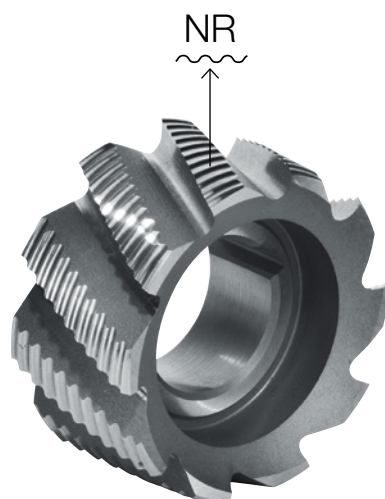
|                        |                           |        |                     |              |
|------------------------|---------------------------|--------|---------------------|--------------|
| COATING<br><b>Skin</b> | $\lambda^{\circ}$ S<br>28 | NF<br> | DIN 841<br>ISO 2586 | <b>Z6÷14</b> |
|------------------------|---------------------------|--------|---------------------|--------------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Ak16 | dH7 | Z  |
|--------------|----------------------|--------|---------------|------|-----|----|
| 021200300 CM |                      | CMX    | 30            | 30   | 13  | 6  |
| 021200350 CM |                      | CMX    | 35            | 35   | 16  | 6  |
| 021200400 CM |                      | CMX    | 40            | 20   | 16  | 8  |
| 021200402 CM |                      | CMX    | 40            | 40   | 16  | 6  |
| 021200500 CM |                      | CMX    | 50            | 25   | 22  | 8  |
| 021200502 CM |                      | CMX    | 50            | 50   | 22  | 8  |
| 021200600 CM |                      | CMX    | 60            | 30   | 27  | 10 |
| 021200602 CM |                      | CMX    | 60            | 60   | 27  | 10 |
| 021200750 CM |                      | CMX    | 75            | 35   | 27  | 10 |
| 021200752 CM |                      | CMX    | 75            | 75   | 27  | 10 |
| 021200900 CM |                      | CMX    | 90            | 35   | 27  | 12 |
| 021201100 CM |                      | CMX    | 110           | 35   | 32  | 12 |
| 021201300 CM |                      | CMX    | 130           | 35   | 40  | 14 |
| 021201500 CM |                      | CMX    | 150           | 40   | 40  | 14 |



## Serie/Series 02120

Frese a **SGROSSARE** con spacco longitudinale  
Roughing cutters with longitudinal keyway



|                        |                           |        |                     |              |
|------------------------|---------------------------|--------|---------------------|--------------|
| COATING<br><b>Skin</b> | $\lambda^{\circ}$ S<br>28 | NR<br> | DIN 841<br>ISO 2586 | <b>Z6÷14</b> |
|------------------------|---------------------------|--------|---------------------|--------------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Ak16 | dH7 | Z  |
|--------------|----------------------|--------|---------------|------|-----|----|
| 021200301 CM |                      | CMX    | 30            | 30   | 13  | 6  |
| 021200351 CM |                      | CMX    | 35            | 35   | 16  | 6  |
| 021200401 CM |                      | CMX    | 40            | 20   | 16  | 8  |
| 021200403 CM |                      | CMX    | 40            | 40   | 16  | 6  |
| 021200501 CM |                      | CMX    | 50            | 25   | 22  | 8  |
| 021200503 CM |                      | CMX    | 50            | 50   | 22  | 8  |
| 021200601 CM |                      | CMX    | 60            | 30   | 27  | 10 |
| 021200603 CM |                      | CMX    | 60            | 60   | 27  | 10 |
| 021200751 CM |                      | CMX    | 75            | 35   | 27  | 10 |
| 021200753 CM |                      | CMX    | 75            | 75   | 27  | 10 |
| 021200901 CM |                      | CMX    | 90            | 35   | 27  | 12 |
| 021201101 CM |                      | CMX    | 110           | 35   | 32  | 12 |
| 021201301 CM |                      | CMX    | 130           | 35   | 40  | 14 |
| 021201501 CM |                      | CMX    | 150           | 40   | 40  | 14 |

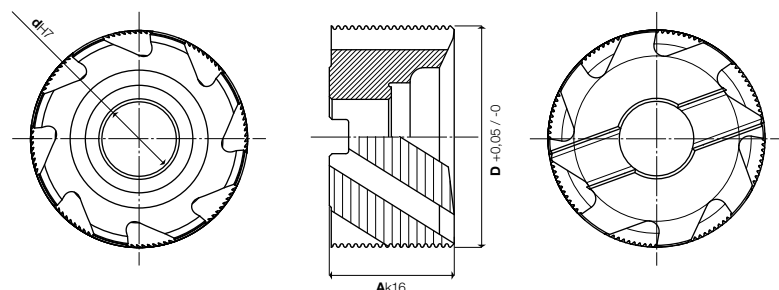


### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 02120           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 02120           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

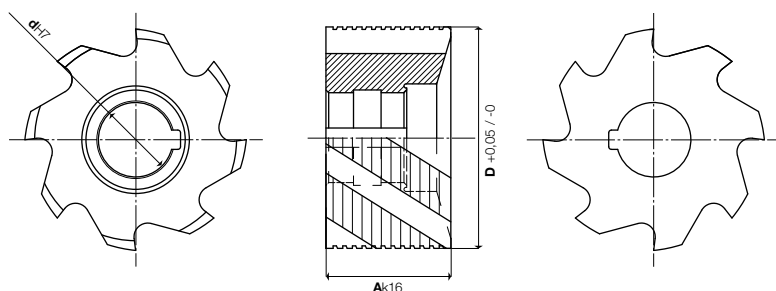
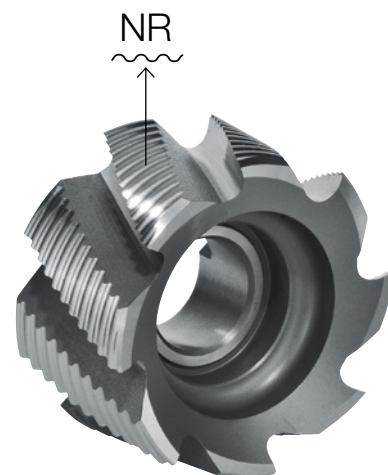
## Serie/Series 02125

Frese a **SGROSSARE** con cava di trascinamento trasversale  
Roughing cutters with transversal driving slot



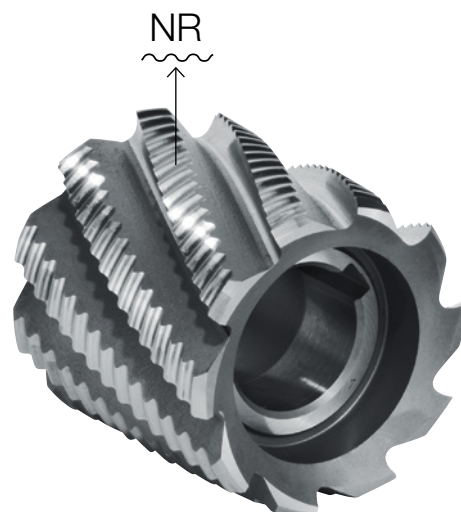
|                                |                                 |    |                                  |              |
|--------------------------------|---------------------------------|----|----------------------------------|--------------|
| COATING<br><b>Skin</b><br>Inox | $\lambda^{\circ}\text{s}$<br>28 | NR | UNI 3903<br>DIN 1880<br>ISO 2586 | <b>Z6÷14</b> |
|--------------------------------|---------------------------------|----|----------------------------------|--------------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Ak16 | dH7 | Z  |
|--------------|----------------------|--------|---------------|------|-----|----|
| 021250401 CM |                      | CMX    | 40            | 32   | 16  | 6  |
| 021250501 CM |                      | CMX    | 50            | 36   | 22  | 6  |
| 021250631 CM |                      | CMX    | 63            | 40   | 27  | 8  |
| 021250801 CM |                      | CMX    | 80            | 45   | 27  | 8  |
| 021251001 CM |                      | CMX    | 100           | 50   | 32  | 10 |
| 021251251 CM |                      | CMX    | 125           | 56   | 40  | 12 |
| 021251601 CM |                      | CMX    | 160           | 63   | 50  | 14 |



|                                |                                 |    |                     |              |
|--------------------------------|---------------------------------|----|---------------------|--------------|
| COATING<br><b>Skin</b><br>Inox | $\lambda^{\circ}\text{s}$<br>28 | NR | DIN 841<br>ISO 2586 | <b>Z6÷10</b> |
|--------------------------------|---------------------------------|----|---------------------|--------------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Ak16 | dH7 | Z  |
|--------------|----------------------|--------|---------------|------|-----|----|
| 021300401 CM |                      | CMX    | 40            | 40   | 16  | 6  |
| 021300501 CM |                      | CMX    | 50            | 50   | 22  | 8  |
| 021300601 CM |                      | CMX    | 60            | 60   | 27  | 8  |
| 021300751 CM |                      | CMX    | 75            | 75   | 27  | 10 |



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 02125           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 02130           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

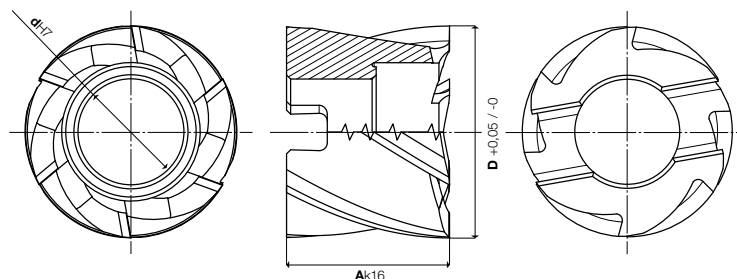
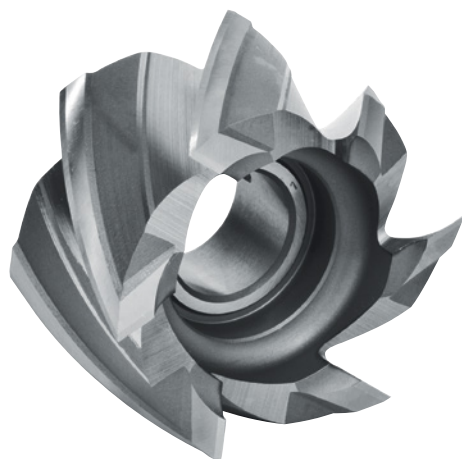
● accettabile/acceptable

○ non consigliata/not recommended

# HSS-PM HSS-PM Line

## Serie/Series 02135

Frese a **FINIRE** con cava di trascinamento trasversale  
Finishing milling cutters with transversal driving slot



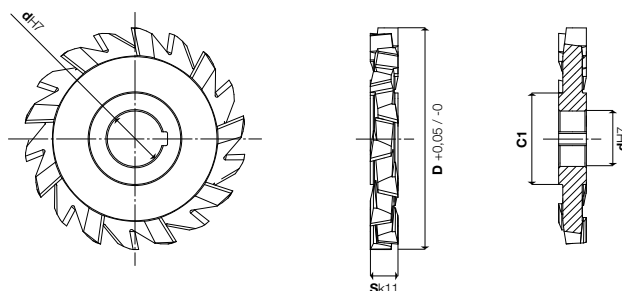
|                               |                              |   |                                  |      |
|-------------------------------|------------------------------|---|----------------------------------|------|
| COATING<br><b>Skin</b><br>Alu | $\lambda^\circ \sigma$<br>40 | W | UNI 3903<br>DIN 1880<br>ISO 2586 | Z4÷6 |
|-------------------------------|------------------------------|---|----------------------------------|------|

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Ak16 | dH7 | Z |
|--------------|-----------------|----------------------|--------|---------------|------|-----|---|
| 021350400 AM |                 | CM                   | CMX    | 40            | 32   | 16  | 4 |
| 021350500 AM |                 | CM                   | CMX    | 50            | 36   | 22  | 4 |
| 021350630 AM |                 | CM                   | CMX    | 63            | 40   | 27  | 4 |
| 021350800 AM |                 | CM                   | CMX    | 80            | 45   | 27  | 6 |
| 021351000 AM |                 | CM                   | CMX    | 100           | 50   | 32  | 6 |



## Serie/Series 04105

Frese a disco a tre tagli elicoidali alternati  
Side and face milling cutters **Staggered teeth**



|                        |   |                                   |        |
|------------------------|---|-----------------------------------|--------|
| COATING<br><b>Skin</b> | H | UNI 3905A<br>DIN 885A<br>ISO 2587 | Z16÷38 |
|------------------------|---|-----------------------------------|--------|

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Sk<br>11 | C1 | dH7 | $\lambda^\circ s$ | Z  |
|--------------|-----------------|----------------------|--------|---------------|----------|----|-----|-------------------|----|
| 041051040 AM |                 | CM                   | CMX    | 50            | 4        | 26 | 16  | 20                | 16 |
| 041051050 AM |                 | CM                   | CMX    | 50            | 5        | 26 | 16  | 20                | 16 |
| 041051060 AM |                 | CM                   | CMX    | 50            | 6        | 26 | 16  | 20                | 16 |
| 041051070 AM |                 | CM                   | CMX    | 50            | 7        | 26 | 16  | 15                | 16 |
| 041051080 AM |                 | CM                   | CMX    | 50            | 8        | 26 | 16  | 15                | 16 |
| 041051090 AM |                 | CM                   | CMX    | 50            | 9        | 26 | 16  | 15                | 16 |
| 041051100 AM |                 | CM                   | CMX    | 50            | 10       | 26 | 16  | 15                | 16 |
| 041052040 AM |                 | CM                   | CMX    | 63            | 4        | 33 | 22  | 20                | 18 |
| 041052050 AM |                 | CM                   | CMX    | 63            | 5        | 33 | 22  | 15                | 18 |
| 041052060 AM |                 | CM                   | CMX    | 63            | 6        | 33 | 22  | 15                | 18 |

→ continua alla pagina successiva / continued on next page

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 02135           | ○                   | ○            | ○                                             | ●                                                    | ○                                | ○                | ○                  |
| 04105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended ○ accettabile/acceptable ○ non consigliata/not recommended

Serie/Series

04105

Frese a disco a tre tagli elicoidali alternati  
Side and face milling cutters **Staggered teeth**

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D <sub>+0,05<br/>-0</sub> | Sk<br>11 | C1 | dH7 | λ°s | Z  |
|--------------|-----------------|----------------------|--------|---------------------------|----------|----|-----|-----|----|
| 041052070 AM | CM              | CMX                  |        | 63                        | 7        | 33 | 22  | 15  | 18 |
| 041052080 AM | CM              | CMX                  |        | 63                        | 8        | 33 | 22  | 15  | 18 |
| 041052090 AM | CM              | CMX                  |        | 63                        | 9        | 33 | 22  | 15  | 18 |
| 041052100 AM | CM              | CMX                  |        | 63                        | 10       | 33 | 22  | 15  | 18 |
| 041052120 AM | CM              | CMX                  |        | 63                        | 12       | 33 | 22  | 10  | 18 |
| 041052140 AM | CM              | CMX                  |        | 63                        | 14       | 33 | 22  | 10  | 18 |
| 041052160 AM | CM              | CMX                  |        | 63                        | 16       | 33 | 22  | 10  | 16 |
| 041052180 AM | CM              | CMX                  |        | 63                        | 18       | 33 | 22  | 10  | 16 |
| 041052200 AM | CM              | CMX                  |        | 63                        | 20       | 33 | 22  | 10  | 16 |
| 041053040 AM | CM              | CMX                  |        | 80                        | 4        | 36 | 22  | 20  | 20 |
| 041053041 AM | CM              | CMX                  |        | 80                        | 4        | 40 | 27  | 20  | 20 |
| 041053050 AM | CM              | CMX                  |        | 80                        | 5        | 36 | 22  | 15  | 20 |
| 041053051 AM | CM              | CMX                  |        | 80                        | 5        | 40 | 27  | 15  | 20 |
| 041053060 AM | CM              | CMX                  |        | 80                        | 6        | 36 | 22  | 15  | 20 |
| 041053061 AM | CM              | CMX                  |        | 80                        | 6        | 40 | 27  | 15  | 20 |
| 041053070 AM | CM              | CMX                  |        | 80                        | 7        | 36 | 22  | 15  | 20 |
| 041053071 AM | CM              | CMX                  |        | 80                        | 7        | 40 | 27  | 15  | 20 |
| 041053080 AM | CM              | CMX                  |        | 80                        | 8        | 36 | 22  | 15  | 20 |
| 041053081 AM | CM              | CMX                  |        | 80                        | 8        | 40 | 27  | 15  | 20 |
| 041053090 AM | CM              | CMX                  |        | 80                        | 9        | 36 | 22  | 15  | 20 |
| 041053091 AM | CM              | CMX                  |        | 80                        | 9        | 40 | 27  | 15  | 20 |
| 041053100 AM | CM              | CMX                  |        | 80                        | 10       | 36 | 22  | 15  | 18 |
| 041053101 AM | CM              | CMX                  |        | 80                        | 10       | 40 | 27  | 15  | 18 |
| 041053120 AM | CM              | CMX                  |        | 80                        | 12       | 36 | 22  | 15  | 18 |
| 041053121 AM | CM              | CMX                  |        | 80                        | 12       | 40 | 27  | 15  | 18 |
| 041053140 AM | CM              | CMX                  |        | 80                        | 14       | 36 | 22  | 10  | 18 |
| 041053141 AM | CM              | CMX                  |        | 80                        | 14       | 40 | 27  | 10  | 18 |
| 041053160 AM | CM              | CMX                  |        | 80                        | 16       | 36 | 22  | 15  | 18 |
| 041053161 AM | CM              | CMX                  |        | 80                        | 16       | 40 | 27  | 15  | 18 |
| 041053180 AM | CM              | CMX                  |        | 80                        | 18       | 36 | 22  | 15  | 18 |
| 041053181 AM | CM              | CMX                  |        | 80                        | 18       | 40 | 27  | 15  | 18 |
| 041054040 AM | CM              | CMX                  |        | 100                       | 4        | 46 | 27  | 15  | 24 |
| 041054041 AM | CM              | CMX                  |        | 100                       | 4        | 50 | 32  | 15  | 24 |
| 041054050 AM | CM              | CMX                  |        | 100                       | 5        | 46 | 27  | 15  | 24 |
| 041054051 AM | CM              | CMX                  |        | 100                       | 5        | 50 | 32  | 15  | 24 |
| 041054060 AM | CM              | CMX                  |        | 100                       | 6        | 46 | 27  | 15  | 24 |
| 041054061 AM | CM              | CMX                  |        | 100                       | 6        | 50 | 32  | 15  | 24 |
| 041054070 AM | CM              | CMX                  |        | 100                       | 7        | 46 | 27  | 15  | 24 |
| 041054071 AM | CM              | CMX                  |        | 100                       | 7        | 50 | 32  | 15  | 24 |
| 041054080 AM | CM              | CMX                  |        | 100                       | 8        | 46 | 27  | 15  | 22 |
| 041054081 AM | CM              | CMX                  |        | 100                       | 8        | 50 | 32  | 15  | 22 |
| 041054090 AM | CM              | CMX                  |        | 100                       | 9        | 46 | 27  | 15  | 22 |
| 041054091 AM | CM              | CMX                  |        | 100                       | 9        | 50 | 32  | 15  | 22 |
| 041054100 AM | CM              | CMX                  |        | 100                       | 10       | 46 | 27  | 15  | 22 |
| 041054101 AM | CM              | CMX                  |        | 100                       | 10       | 50 | 32  | 15  | 22 |
| 041054120 AM | CM              | CMX                  |        | 100                       | 12       | 46 | 27  | 15  | 20 |
| 041054121 AM | CM              | CMX                  |        | 100                       | 12       | 50 | 32  | 15  | 20 |
| 041054140 AM | CM              | CMX                  |        | 100                       | 14       | 46 | 27  | 15  | 20 |
| 041054141 AM | CM              | CMX                  |        | 100                       | 14       | 50 | 32  | 15  | 20 |
| 041054150 AM | CM              | CMX                  |        | 100                       | 15       | 46 | 27  | 15  | 20 |
| 041054151 AM | CM              | CMX                  |        | 100                       | 15       | 50 | 32  | 15  | 20 |
| 041054160 AM | CM              | CMX                  |        | 100                       | 16       | 46 | 27  | 15  | 20 |
| 041054161 AM | CM              | CMX                  |        | 100                       | 16       | 50 | 32  | 15  | 20 |
| 041054180 AM | CM              | CMX                  |        | 100                       | 18       | 46 | 27  | 13  | 20 |
| 041054181 AM | CM              | CMX                  |        | 100                       | 18       | 50 | 32  | 13  | 20 |
| 041054200 AM | CM              | CMX                  |        | 100                       | 20       | 46 | 27  | 13  | 20 |
| 041054201 AM | CM              | CMX                  |        | 100                       | 20       | 50 | 32  | 13  | 20 |
| 041054220 AM | CM              | CMX                  |        | 100                       | 22       | 46 | 27  | 10  | 20 |

→ continua alla pagina successiva / continued on next page



## MATERIALI LAVORABILI / WORKPIECE MATERIALS

serie  
series  
04105

TITANIO  
TITANIUM

HRSA  
HRSA

ACCIAI  
INOSSIDABILI  
STAINLESS  
STEELS

MATERIALI  
NON FERROSI  
NON FERROUS  
MATERIALS

LEGHE  
LEGGERE  
LIGHT ALLOYS

ACCIAI  
STEELS

GHISE  
CAST IRON

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

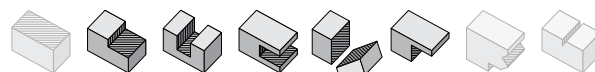
## Serie/Series 04105

Frese a disco a tre tagli elicoidali alternati  
Side and face milling cutters **Staggered teeth**



→ continuazione della pagina precedente / continuation of the previous page

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D<br>+0,05<br>-0 | Sk<br>11 | C1 | dH7 | λ°s | Z  |
|--------------|-----------------|----------------------|--------|------------------|----------|----|-----|-----|----|
| 041054221 AM | CM              | CMX                  |        | 100              | 22       | 50 | 32  | 10  | 20 |
| 041054250 AM | CM              | CMX                  |        | 100              | 25       | 46 | 27  | 10  | 20 |
| 041054251 AM | CM              | CMX                  |        | 100              | 25       | 50 | 32  | 10  | 20 |
| 041055050 AM | CM              | CMX                  |        | 125              | 5        | 52 | 32  | 15  | 26 |
| 041055060 AM | CM              | CMX                  |        | 125              | 6        | 52 | 32  | 15  | 26 |
| 041055080 AM | CM              | CMX                  |        | 125              | 8        | 52 | 32  | 15  | 26 |
| 041055100 AM | CM              | CMX                  |        | 125              | 10       | 52 | 32  | 15  | 24 |
| 041055120 AM | CM              | CMX                  |        | 125              | 12       | 52 | 32  | 15  | 22 |
| 041055140 AM | CM              | CMX                  |        | 125              | 14       | 52 | 32  | 15  | 22 |
| 041055160 AM | CM              | CMX                  |        | 125              | 16       | 52 | 32  | 15  | 22 |
| 041055180 AM | CM              | CMX                  |        | 125              | 18       | 52 | 32  | 15  | 22 |
| 041055200 AM | CM              | CMX                  |        | 125              | 20       | 52 | 32  | 10  | 22 |
| 041055220 AM | CM              | CMX                  |        | 125              | 22       | 52 | 32  | 10  | 22 |
| 041055250 AM | CM              | CMX                  |        | 125              | 25       | 52 | 32  | 10  | 22 |
| 041055280 AM | CM              | CMX                  |        | 125              | 28       | 52 | 32  | 10  | 22 |
| 041056060 AM | CM              | CMX                  |        | 160              | 6        | 58 | 32  | 15  | 28 |
| 041056061 AM | CM              | CMX                  |        | 160              | 6        | 66 | 40  | 15  | 28 |
| 041056080 AM | CM              | CMX                  |        | 160              | 8        | 58 | 32  | 15  | 28 |
| 041056081 AM | CM              | CMX                  |        | 160              | 8        | 66 | 40  | 15  | 28 |
| 041056100 AM | CM              | CMX                  |        | 160              | 10       | 58 | 32  | 15  | 26 |
| 041056101 AM | CM              | CMX                  |        | 160              | 10       | 66 | 40  | 15  | 26 |
| 041056120 AM | CM              | CMX                  |        | 160              | 12       | 58 | 32  | 15  | 26 |
| 041056121 AM | CM              | CMX                  |        | 160              | 12       | 66 | 40  | 15  | 26 |
| 041056140 AM | CM              | CMX                  |        | 160              | 14       | 58 | 32  | 15  | 24 |
| 041056141 AM | CM              | CMX                  |        | 160              | 14       | 66 | 40  | 15  | 24 |
| 041056160 AM | CM              | CMX                  |        | 160              | 16       | 58 | 32  | 15  | 24 |
| 041056161 AM | CM              | CMX                  |        | 160              | 16       | 66 | 40  | 15  | 24 |
| 041056180 AM | CM              | CMX                  |        | 160              | 18       | 58 | 32  | 15  | 24 |
| 041056181 AM | CM              | CMX                  |        | 160              | 18       | 66 | 40  | 15  | 24 |
| 041056200 AM | CM              | CMX                  |        | 160              | 20       | 58 | 32  | 15  | 24 |
| 041056201 AM | CM              | CMX                  |        | 160              | 20       | 66 | 40  | 15  | 24 |
| 041056220 AM | CM              | CMX                  |        | 160              | 22       | 58 | 32  | 13  | 24 |
| 041056221 AM | CM              | CMX                  |        | 160              | 22       | 66 | 40  | 13  | 24 |
| 041056250 AM | CM              | CMX                  |        | 160              | 25       | 58 | 32  | 13  | 24 |
| 041056251 AM | CM              | CMX                  |        | 160              | 25       | 66 | 40  | 13  | 24 |
| 041056280 AM | CM              | CMX                  |        | 160              | 28       | 58 | 32  | 10  | 24 |
| 041056281 AM | CM              | CMX                  |        | 160              | 28       | 66 | 40  | 10  | 24 |
| 041056320 AM | CM              | CMX                  |        | 160              | 32       | 58 | 32  | 10  | 24 |
| 041056321 AM | CM              | CMX                  |        | 160              | 32       | 66 | 40  | 10  | 24 |
| 041057080 AM | CM              | CMX                  |        | 200              | 8        | 80 | 40  | 16  | 34 |
| 041057100 AM | CM              | CMX                  |        | 200              | 10       | 80 | 40  | 16  | 32 |
| 041057120 AM | CM              | CMX                  |        | 200              | 12       | 80 | 40  | 16  | 30 |
| 041057140 AM | CM              | CMX                  |        | 200              | 14       | 80 | 40  | 16  | 30 |
| 041057160 AM | CM              | CMX                  |        | 200              | 16       | 80 | 40  | 16  | 30 |
| 041057180 AM | CM              | CMX                  |        | 200              | 18       | 80 | 40  | 16  | 30 |
| 041057200 AM | CM              | CMX                  |        | 200              | 20       | 80 | 40  | 16  | 30 |
| 041057220 AM | CM              | CMX                  |        | 200              | 22       | 80 | 40  | 16  | 30 |
| 041057250 AM | CM              | CMX                  |        | 200              | 25       | 80 | 40  | 16  | 30 |
| 041057280 AM | CM              | CMX                  |        | 200              | 28       | 80 | 40  | 14  | 30 |
| 041057320 AM | CM              | CMX                  |        | 200              | 32       | 80 | 40  | 14  | 30 |
| 041058140 AM | CM              | CMX                  |        | 250              | 14       | 90 | 50  | 15  | 38 |
| 041058160 AM | CM              | CMX                  |        | 250              | 16       | 90 | 50  | 15  | 36 |
| 041058180 AM | CM              | CMX                  |        | 250              | 18       | 90 | 50  | 15  | 34 |
| 041058200 AM | CM              | CMX                  |        | 250              | 20       | 90 | 50  | 15  | 34 |
| 041058250 AM | CM              | CMX                  |        | 250              | 25       | 90 | 50  | 15  | 30 |
| 041058280 AM | CM              | CMX                  |        | 250              | 28       | 90 | 50  | 15  | 28 |
| 041058300 AM | CM              | CMX                  |        | 250              | 30       | 90 | 50  | 15  | 26 |
| 041058320 AM | CM              | CMX                  |        | 250              | 32       | 90 | 50  | 15  | 26 |



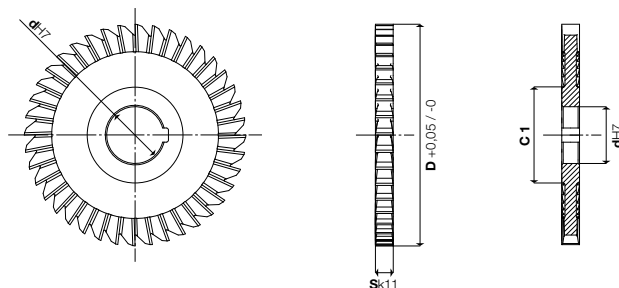
parametri tecnici a pag. 1 / for technical parameters see page 128

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 04105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



Serie/Series  
**04105**

Frese a disco a tre taglienti diritti  
Side and face milling cutters **Straight teeth**


|             |   |                                   |        |
|-------------|---|-----------------------------------|--------|
| COATING     | H | UNI 3905B<br>DIN 885B<br>ISO 2587 | Z18÷46 |
| <b>Skin</b> |   |                                   |        |

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Sk<br>11 | C1 | dH7 | Z  |
|--------------|-----------------|----------------------|--------|---------------|----------|----|-----|----|
| 041051042 AM |                 | CM                   | CMX    | 50            | 4        | 26 | 16  | 20 |
| 041051052 AM |                 | CM                   | CMX    | 50            | 5        | 26 | 16  | 20 |
| 041051062 AM |                 | CM                   | CMX    | 50            | 6        | 26 | 16  | 20 |
| 041051072 AM |                 | CM                   | CMX    | 50            | 7        | 26 | 16  | 18 |
| 041051082 AM |                 | CM                   | CMX    | 50            | 8        | 26 | 16  | 18 |
| 041051092 AM |                 | CM                   | CMX    | 50            | 9        | 26 | 16  | 18 |
| 041051102 AM |                 | CM                   | CMX    | 50            | 10       | 26 | 16  | 18 |
| 041052042 AM |                 | CM                   | CMX    | 63            | 4        | 33 | 22  | 20 |
| 041052052 AM |                 | CM                   | CMX    | 63            | 5        | 33 | 22  | 20 |
| 041052062 AM |                 | CM                   | CMX    | 63            | 6        | 33 | 22  | 20 |
| 041052072 AM |                 | CM                   | CMX    | 63            | 7        | 33 | 22  | 20 |
| 041052082 AM |                 | CM                   | CMX    | 63            | 8        | 33 | 22  | 20 |
| 041052092 AM |                 | CM                   | CMX    | 63            | 9        | 33 | 22  | 20 |
| 041052102 AM |                 | CM                   | CMX    | 63            | 10       | 33 | 22  | 18 |
| 041052122 AM |                 | CM                   | CMX    | 63            | 12       | 33 | 22  | 18 |
| 041052142 AM |                 | CM                   | CMX    | 63            | 14       | 33 | 22  | 18 |
| 041052162 AM |                 | CM                   | CMX    | 63            | 16       | 33 | 22  | 18 |
| 041052182 AM |                 | CM                   | CMX    | 63            | 18       | 33 | 22  | 18 |
| 041052202 AM |                 | CM                   | CMX    | 63            | 20       | 33 | 22  | 18 |
| 041053042 AM |                 | CM                   | CMX    | 80            | 4        | 36 | 22  | 24 |
| 041053043 AM |                 | CM                   | CMX    | 80            | 4        | 40 | 27  | 24 |
| 041053052 AM |                 | CM                   | CMX    | 80            | 5        | 36 | 22  | 24 |
| 041053053 AM |                 | CM                   | CMX    | 80            | 5        | 40 | 27  | 24 |
| 041053062 AM |                 | CM                   | CMX    | 80            | 6        | 36 | 22  | 24 |
| 041053063 AM |                 | CM                   | CMX    | 80            | 6        | 40 | 27  | 24 |
| 041053072 AM |                 | CM                   | CMX    | 80            | 7        | 36 | 22  | 22 |
| 041053073 AM |                 | CM                   | CMX    | 80            | 7        | 40 | 27  | 22 |
| 041053082 AM |                 | CM                   | CMX    | 80            | 8        | 36 | 22  | 22 |
| 041053083 AM |                 | CM                   | CMX    | 80            | 8        | 40 | 27  | 22 |
| 041053092 AM |                 | CM                   | CMX    | 80            | 9        | 36 | 22  | 22 |
| 041053093 AM |                 | CM                   | CMX    | 80            | 9        | 40 | 27  | 22 |
| 041053102 AM |                 | CM                   | CMX    | 80            | 10       | 36 | 22  | 20 |
| 041053103 AM |                 | CM                   | CMX    | 80            | 10       | 40 | 27  | 20 |
| 041053122 AM |                 | CM                   | CMX    | 80            | 12       | 36 | 22  | 20 |
| 041053123 AM |                 | CM                   | CMX    | 80            | 12       | 40 | 27  | 20 |
| 041053142 AM |                 | CM                   | CMX    | 80            | 14       | 36 | 22  | 20 |
| 041053143 AM |                 | CM                   | CMX    | 80            | 14       | 40 | 27  | 20 |
| 041053162 AM |                 | CM                   | CMX    | 80            | 16       | 36 | 22  | 20 |
| 041053163 AM |                 | CM                   | CMX    | 80            | 16       | 40 | 27  | 20 |
| 041053182 AM |                 | CM                   | CMX    | 80            | 18       | 36 | 22  | 20 |
| 041053183 AM |                 | CM                   | CMX    | 80            | 18       | 40 | 27  | 20 |
| 041053202 AM |                 | CM                   | CMX    | 80            | 20       | 36 | 22  | 20 |
| 041053203 AM |                 | CM                   | CMX    | 80            | 20       | 40 | 27  | 20 |
| 041054042 AM |                 | CM                   | CMX    | 100           | 4        | 46 | 27  | 26 |
| 041054043 AM |                 | CM                   | CMX    | 100           | 4        | 50 | 32  | 26 |
| 041054052 AM |                 | CM                   | CMX    | 100           | 5        | 46 | 27  | 26 |
| 041054053 AM |                 | CM                   | CMX    | 100           | 5        | 50 | 32  | 26 |
| 041054062 AM |                 | CM                   | CMX    | 100           | 6        | 46 | 27  | 24 |
| 041054063 AM |                 | CM                   | CMX    | 100           | 6        | 50 | 32  | 24 |
| 041054072 AM |                 | CM                   | CMX    | 100           | 7        | 46 | 27  | 24 |
| 041054073 AM |                 | CM                   | CMX    | 100           | 7        | 50 | 32  | 24 |
| 041054082 AM |                 | CM                   | CMX    | 100           | 8        | 46 | 27  | 22 |
| 041054083 AM |                 | CM                   | CMX    | 100           | 8        | 50 | 32  | 22 |
| 041054092 AM |                 | CM                   | CMX    | 100           | 9        | 46 | 27  | 22 |

→ continua alla pagina successiva / continued on next page



## MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI<br>INOSSIDABILI | MATERIALI<br>NON FERROSI | LEGHE<br>LEGGERE | ACCIAI | GHISE     |
|--------|----------|------|------------------------|--------------------------|------------------|--------|-----------|
| series | TITANIUM | HRSA | STAINLESS<br>STEELS    | NON FERROUS<br>MATERIALS | LIGHT ALLOYS     | STEELS | CAST IRON |
| 04105  | ●        | ●    | ●                      | ○                        | ○                | ●      | ●         |

● consigliata/recommended

● accettabile/acceptable

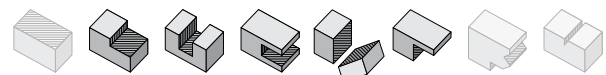
○ non consigliata/not recommended

# Serie/Series 04105

Frese a disco a tre taglienti dritti  
Side and face milling cutters **Straight teeth**



| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Sk<br>11 | C1 | dH7 | Z |
|--------------|-----------------|----------------------|--------|---------------|----------|----|-----|---|
| 041054093 AM | CM              | CMX                  | 100    | 9             | 50       | 32 | 22  |   |
| 041054102 AM | CM              | CMX                  | 100    | 10            | 46       | 27 | 22  |   |
| 041054103 AM | CM              | CMX                  | 100    | 10            | 50       | 32 | 22  |   |
| 041054122 AM | CM              | CMX                  | 100    | 12            | 46       | 27 | 22  |   |
| 041054123 AM | CM              | CMX                  | 100    | 12            | 50       | 32 | 22  |   |
| 041054142 AM | CM              | CMX                  | 100    | 14            | 46       | 27 | 22  |   |
| 041054143 AM | CM              | CMX                  | 100    | 14            | 50       | 32 | 22  |   |
| 041054152 AM | CM              | CMX                  | 100    | 15            | 46       | 27 | 22  |   |
| 041054153 AM | CM              | CMX                  | 100    | 15            | 50       | 32 | 22  |   |
| 041054162 AM | CM              | CMX                  | 100    | 16            | 46       | 27 | 22  |   |
| 041054163 AM | CM              | CMX                  | 100    | 16            | 50       | 32 | 22  |   |
| 041054182 AM | CM              | CMX                  | 100    | 18            | 46       | 27 | 22  |   |
| 041054183 AM | CM              | CMX                  | 100    | 18            | 50       | 32 | 22  |   |
| 041054202 AM | CM              | CMX                  | 100    | 20            | 46       | 27 | 20  |   |
| 041054203 AM | CM              | CMX                  | 100    | 20            | 50       | 32 | 20  |   |
| 041054222 AM | CM              | CMX                  | 100    | 22            | 46       | 27 | 20  |   |
| 041054223 AM | CM              | CMX                  | 100    | 22            | 50       | 32 | 20  |   |
| 041054252 AM | CM              | CMX                  | 100    | 25            | 46       | 27 | 20  |   |
| 041054253 AM | CM              | CMX                  | 100    | 25            | 50       | 32 | 20  |   |
| 041055052 AM | CM              | CMX                  | 125    | 5             | 52       | 32 | 30  |   |
| 041055062 AM | CM              | CMX                  | 125    | 6             | 52       | 32 | 30  |   |
| 041055082 AM | CM              | CMX                  | 125    | 8             | 52       | 32 | 28  |   |
| 041055102 AM | CM              | CMX                  | 125    | 10            | 52       | 32 | 28  |   |
| 041055122 AM | CM              | CMX                  | 125    | 12            | 52       | 32 | 28  |   |
| 041055142 AM | CM              | CMX                  | 125    | 14            | 52       | 32 | 26  |   |
| 041055162 AM | CM              | CMX                  | 125    | 16            | 52       | 32 | 26  |   |
| 041055182 AM | CM              | CMX                  | 125    | 18            | 52       | 32 | 26  |   |
| 041055202 AM | CM              | CMX                  | 125    | 20            | 52       | 32 | 26  |   |
| 041055222 AM | CM              | CMX                  | 125    | 22            | 52       | 32 | 26  |   |
| 041055252 AM | CM              | CMX                  | 125    | 25            | 52       | 32 | 26  |   |
| 041055282 AM | CM              | CMX                  | 125    | 28            | 52       | 32 | 26  |   |
| 041056062 AM | CM              | CMX                  | 160    | 6             | 58       | 32 | 40  |   |
| 041056063 AM | CM              | CMX                  | 160    | 6             | 66       | 40 | 40  |   |
| 041056082 AM | CM              | CMX                  | 160    | 8             | 58       | 32 | 36  |   |
| 041056083 AM | CM              | CMX                  | 160    | 8             | 66       | 40 | 36  |   |
| 041056102 AM | CM              | CMX                  | 160    | 10            | 58       | 32 | 36  |   |
| 041056103 AM | CM              | CMX                  | 160    | 10            | 66       | 40 | 36  |   |
| 041056122 AM | CM              | CMX                  | 160    | 12            | 58       | 32 | 36  |   |
| 041056123 AM | CM              | CMX                  | 160    | 12            | 66       | 40 | 36  |   |
| 041056142 AM | CM              | CMX                  | 160    | 14            | 58       | 32 | 36  |   |
| 041056143 AM | CM              | CMX                  | 160    | 14            | 66       | 40 | 36  |   |
| 041056162 AM | CM              | CMX                  | 160    | 16            | 58       | 32 | 36  |   |
| 041056163 AM | CM              | CMX                  | 160    | 16            | 66       | 40 | 36  |   |
| 041056182 AM | CM              | CMX                  | 160    | 18            | 58       | 32 | 34  |   |
| 041056183 AM | CM              | CMX                  | 160    | 18            | 66       | 40 | 34  |   |
| 041056202 AM | CM              | CMX                  | 160    | 20            | 58       | 32 | 34  |   |
| 041056203 AM | CM              | CMX                  | 160    | 20            | 66       | 40 | 34  |   |
| 041056222 AM | CM              | CMX                  | 160    | 22            | 58       | 32 | 34  |   |
| 041056223 AM | CM              | CMX                  | 160    | 22            | 66       | 40 | 34  |   |
| 041056252 AM | CM              | CMX                  | 160    | 25            | 58       | 32 | 34  |   |
| 041056253 AM | CM              | CMX                  | 160    | 25            | 66       | 40 | 34  |   |
| 041056282 AM | CM              | CMX                  | 160    | 28            | 58       | 32 | 34  |   |
| 041056283 AM | CM              | CMX                  | 160    | 28            | 66       | 40 | 34  |   |
| 041056322 AM | CM              | CMX                  | 160    | 32            | 58       | 32 | 34  |   |
| 041056323 AM | CM              | CMX                  | 160    | 32            | 66       | 40 | 34  |   |
| 041057082 AM | CM              | CMX                  | 200    | 8             | 80       | 40 | 42  |   |
| 041057102 AM | CM              | CMX                  | 200    | 10            | 80       | 40 | 40  |   |
| 041057122 AM | CM              | CMX                  | 200    | 12            | 80       | 40 | 40  |   |
| 041057142 AM | CM              | CMX                  | 200    | 14            | 80       | 40 | 40  |   |
| 041057162 AM | CM              | CMX                  | 200    | 16            | 80       | 40 | 38  |   |
| 041057182 AM | CM              | CMX                  | 200    | 18            | 80       | 40 | 38  |   |
| 041057202 AM | CM              | CMX                  | 200    | 20            | 80       | 40 | 38  |   |
| 041057222 AM | CM              | CMX                  | 200    | 22            | 80       | 40 | 38  |   |
| 041057252 AM | CM              | CMX                  | 200    | 25            | 80       | 40 | 38  |   |
| 041057282 AM | CM              | CMX                  | 200    | 28            | 80       | 40 | 38  |   |
| 041057322 AM | CM              | CMX                  | 200    | 32            | 80       | 40 | 38  |   |
| 041058142 AM | CM              | CMX                  | 250    | 14            | 90       | 50 | 46  |   |
| 041058162 AM | CM              | CMX                  | 250    | 16            | 90       | 50 | 46  |   |
| 041058182 AM | CM              | CMX                  | 250    | 18            | 90       | 50 | 46  |   |
| 041058202 AM | CM              | CMX                  | 250    | 20            | 90       | 50 | 46  |   |
| 041058252 AM | CM              | CMX                  | 250    | 25            | 90       | 50 | 46  |   |
| 041058282 AM | CM              | CMX                  | 250    | 28            | 90       | 50 | 46  |   |
| 041058302 AM | CM              | CMX                  | 250    | 30            | 90       | 50 | 46  |   |
| 041058322 AM | CM              | CMX                  | 250    | 32            | 90       | 50 | 46  |   |



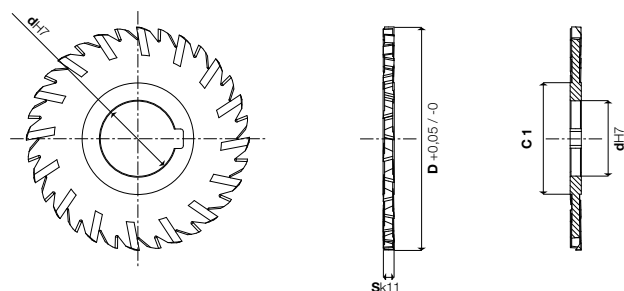
MATERIALI LAVORABILI / WORKPIECE MATERIALS

parametri tecnici a pag. 1 / for technical parameters see page 128

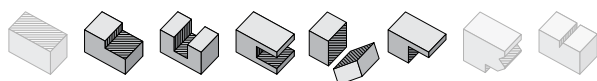
| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 04105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

Serie/Series  
**04110**

Seghe circolari a tre tagli elicoidali alternati  
Slitting saws **Staggered teeth**



| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | Sk11 | C1 | dH7 | λ° | Z  |
|-----------|----------------------|--------|---------------|------|----|-----|----|----|
| 041102016 | CM                   | CMX    | 63            | 1,6  | 33 | 22  | 20 | 32 |
| 041102020 | CM                   | CMX    | 63            | 2    | 33 | 22  | 20 | 32 |
| 041102025 | CM                   | CMX    | 63            | 2,5  | 33 | 22  | 20 | 32 |
| 041102030 | CM                   | CMX    | 63            | 3    | 33 | 22  | 20 | 28 |
| 041102035 | CM                   | CMX    | 63            | 3,5  | 33 | 22  | 20 | 28 |
| 041103020 | CM                   | CMX    | 80            | 2    | 36 | 22  | 20 | 36 |
| 041103025 | CM                   | CMX    | 80            | 2,5  | 36 | 22  | 20 | 36 |
| 041103030 | CM                   | CMX    | 80            | 3    | 36 | 22  | 20 | 32 |
| 041103035 | CM                   | CMX    | 80            | 3,5  | 36 | 22  | 20 | 32 |
| 041104020 | CM                   | CMX    | 100           | 2    | 46 | 27  | 20 | 44 |
| 041104025 | CM                   | CMX    | 100           | 2,5  | 46 | 27  | 20 | 44 |
| 041104030 | CM                   | CMX    | 100           | 3    | 46 | 27  | 20 | 40 |
| 041104035 | CM                   | CMX    | 100           | 3,5  | 46 | 27  | 20 | 40 |
| 041105020 | CM                   | CMX    | 125           | 2    | 52 | 32  | 20 | 44 |
| 041105025 | CM                   | CMX    | 125           | 2,5  | 52 | 32  | 20 | 44 |
| 041105030 | CM                   | CMX    | 125           | 3    | 52 | 32  | 20 | 44 |
| 041105035 | CM                   | CMX    | 125           | 3,5  | 52 | 32  | 20 | 40 |
| 041105040 | CM                   | CMX    | 125           | 4    | 52 | 32  | 20 | 40 |
| 041106030 | CM                   | CMX    | 160           | 3    | 58 | 32  | 20 | 50 |
| 041106040 | CM                   | CMX    | 160           | 4    | 58 | 32  | 20 | 50 |
| 041106050 | CM                   | CMX    | 160           | 5    | 58 | 32  | 20 | 50 |
| 041107040 | CM                   | CMX    | 200           | 4    | 80 | 40  | 20 | 60 |
| 041107050 | CM                   | CMX    | 200           | 5    | 80 | 40  | 20 | 60 |
| 041107060 | CM                   | CMX    | 200           | 6    | 80 | 40  | 20 | 60 |
| 041108060 | CM                   | CMX    | 250           | 6    | 90 | 50  | 15 | 68 |
| 041108080 | CM                   | CMX    | 250           | 8    | 90 | 50  | 15 | 68 |
| 041108100 | CM                   | CMX    | 250           | 10   | 90 | 50  | 15 | 68 |
| 041108120 | CM                   | CMX    | 250           | 12   | 90 | 50  | 15 | 68 |



parametri tecnici a pag. / for technical parameters see page 128



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 04110           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

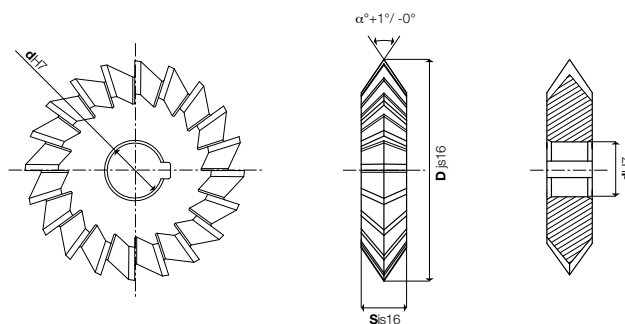
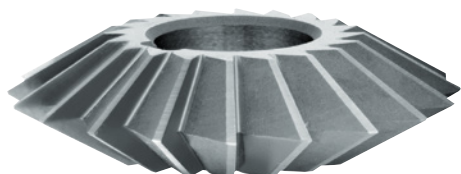
○ non consigliata/not recommended



# HSS-PM HSS-PM Line

## Serie/Series 06105

Frese ad angolo prismatiche  
Double equal angle cutters



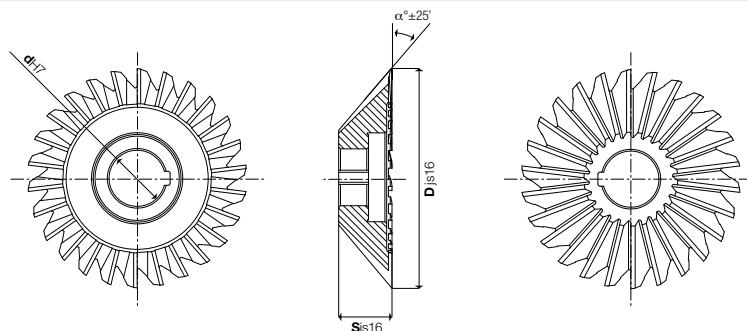
|                        |   |                                 |         |
|------------------------|---|---------------------------------|---------|
| COATING<br><b>Skin</b> | H | UNI 3907<br>DIN 847<br>ISO 6108 | Z 20÷30 |
|------------------------|---|---------------------------------|---------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs16 | $\alpha^\circ$<br>+1°/-0° | Sjs16 | dH7 | Z  |
|--------------|----------------------|--------|-------|---------------------------|-------|-----|----|
| 061054056 CM | CMX                  | CMX    | 56    | 45                        | 10    | 16  | 24 |
| 061054063 CM | CMX                  | CMX    | 63    | 45                        | 12    | 22  | 22 |
| 061054080 CM | CMX                  | CMX    | 80    | 45                        | 16    | 22  | 26 |
| 061054100 CM | CMX                  | CMX    | 100   | 45                        | 18    | 27  | 30 |
| 061056056 CM | CMX                  | CMX    | 56    | 60                        | 12    | 16  | 22 |
| 061056063 CM | CMX                  | CMX    | 63    | 60                        | 16    | 22  | 20 |
| 061056080 CM | CMX                  | CMX    | 80    | 60                        | 20    | 22  | 24 |
| 061056100 CM | CMX                  | CMX    | 100   | 60                        | 25    | 27  | 26 |
| 061059056 CM | CMX                  | CMX    | 56    | 90                        | 14    | 16  | 22 |
| 061059063 CM | CMX                  | CMX    | 63    | 90                        | 18    | 22  | 20 |
| 061059080 CM | CMX                  | CMX    | 80    | 90                        | 22    | 22  | 22 |
| 061059100 CM | CMX                  | CMX    | 100   | 90                        | 28    | 27  | 24 |



## Serie/Series 06110

Frese ad angolo  
Angular cutters



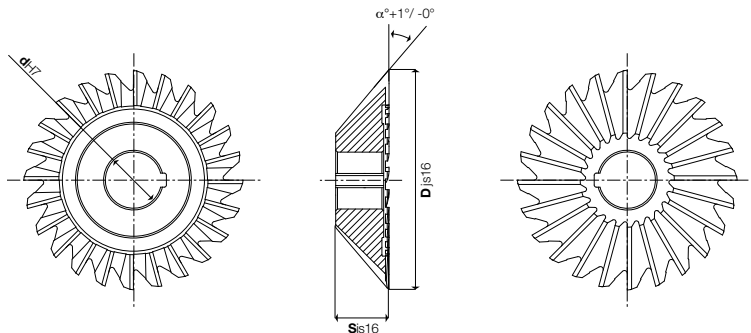
|                        |   |                             |        |
|------------------------|---|-----------------------------|--------|
| COATING<br><b>Skin</b> | H | UNI 3908<br>DIN 842A<br>ISO | Z16÷26 |
|------------------------|---|-----------------------------|--------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs16 | $\alpha^\circ$<br>$\pm 25^\circ$ | Sjs16 | dH7 | Z  |
|--------------|----------------------|--------|-------|----------------------------------|-------|-----|----|
| 061104040 CM | CMX                  | CMX    | 40    | 45                               | 12    | 10  | 18 |
| 061104050 CM | CMX                  | CMX    | 50    | 45                               | 15    | 13  | 20 |
| 061104063 CM | CMX                  | CMX    | 63    | 45                               | 18    | 16  | 20 |
| 061104080 CM | CMX                  | CMX    | 80    | 45                               | 23    | 22  | 24 |
| 061104100 CM | CMX                  | CMX    | 100   | 45                               | 30    | 27  | 24 |
| 061104125 CM | CMX                  | CMX    | 125   | 45                               | 38    | 32  | 26 |
| 061104160 CM | CMX                  | CMX    | 160   | 45                               | 45    | 40  | 26 |
| 061105040 CM | CMX                  | CMX    | 40    | 50                               | 13    | 10  | 16 |
| 061105050 CM | CMX                  | CMX    | 50    | 50                               | 16    | 13  | 18 |
| 061105063 CM | CMX                  | CMX    | 63    | 50                               | 20    | 16  | 20 |
| 061105080 CM | CMX                  | CMX    | 80    | 50                               | 25    | 22  | 22 |
| 061105100 CM | CMX                  | CMX    | 100   | 50                               | 32    | 27  | 26 |
| 061105125 CM | CMX                  | CMX    | 125   | 50                               | 40    | 32  | 26 |
| 061105160 CM | CMX                  | CMX    | 160   | 50                               | 50    | 40  | 26 |
| 061106040 CM | CMX                  | CMX    | 40    | 60                               | 13    | 10  | 18 |
| 061106050 CM | CMX                  | CMX    | 50    | 60                               | 16    | 13  | 18 |
| 061106063 CM | CMX                  | CMX    | 63    | 60                               | 20    | 16  | 18 |
| 061106080 CM | CMX                  | CMX    | 80    | 60                               | 25    | 22  | 20 |
| 061106100 CM | CMX                  | CMX    | 100   | 60                               | 32    | 27  | 22 |
| 061106125 CM | CMX                  | CMX    | 125   | 60                               | 40    | 32  | 24 |
| 061106160 CM | CMX                  | CMX    | 160   | 60                               | 50    | 40  | 26 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 06105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 06110           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



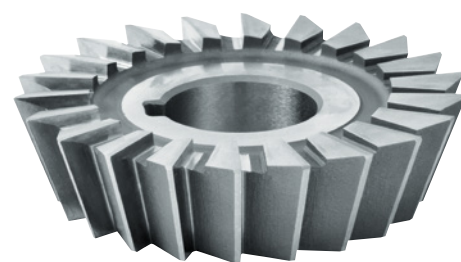
HSS-PM  
**HSS-PM Line**

Serie/Series  
**06115**

Frese ad angolo  
Angular cutters

|                        |          |                               |               |
|------------------------|----------|-------------------------------|---------------|
| COATING<br><b>Skin</b> | <b>H</b> | UNI 3909A<br>DIN 1823A<br>ISO | <b>Z18÷24</b> |
|------------------------|----------|-------------------------------|---------------|

| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | Djs16 | $\alpha^\circ$<br>+1° - 0° | Sjs16 | dH7 | Z  |
|-----------|----------------------|--------|-------|----------------------------|-------|-----|----|
| 061154550 | CM                   | CMX    | 50    | 45                         | 10    | 16  | 22 |
| 061154563 | CM                   | CMX    | 63    | 45                         | 13    | 22  | 22 |
| 061154580 | CM                   | CMX    | 80    | 45                         | 15    | 27  | 24 |
| 061155050 | CM                   | CMX    | 50    | 50                         | 11    | 16  | 22 |
| 061155063 | CM                   | CMX    | 63    | 50                         | 15    | 22  | 22 |
| 061155080 | CM                   | CMX    | 80    | 50                         | 16    | 27  | 24 |
| 061155550 | CM                   | CMX    | 50    | 55                         | 12    | 16  | 20 |
| 061155563 | CM                   | CMX    | 63    | 55                         | 16    | 22  | 22 |
| 061155580 | CM                   | CMX    | 80    | 55                         | 18    | 27  | 22 |
| 061156050 | CM                   | CMX    | 50    | 60                         | 12    | 16  | 20 |
| 061156063 | CM                   | CMX    | 63    | 60                         | 18    | 22  | 20 |
| 061156080 | CM                   | CMX    | 80    | 60                         | 18    | 27  | 22 |
| 061156550 | CM                   | CMX    | 50    | 65                         | 12    | 16  | 20 |
| 061156563 | CM                   | CMX    | 63    | 65                         | 18    | 22  | 20 |
| 061156580 | CM                   | CMX    | 80    | 65                         | 20    | 27  | 22 |
| 061157050 | CM                   | CMX    | 50    | 70                         | 12    | 16  | 20 |
| 061157063 | CM                   | CMX    | 63    | 70                         | 18    | 22  | 20 |
| 061157064 | CM                   | CMX    | 63    | 70                         | 28    | 22  | 20 |
| 061157080 | CM                   | CMX    | 80    | 70                         | 20    | 27  | 22 |
| 061157550 | CM                   | CMX    | 50    | 75                         | 12    | 16  | 18 |
| 061157563 | CM                   | CMX    | 63    | 75                         | 18    | 22  | 20 |
| 061157564 | CM                   | CMX    | 63    | 75                         | 28    | 22  | 20 |
| 061157580 | CM                   | CMX    | 80    | 75                         | 22    | 27  | 20 |
| 061158050 | CM                   | CMX    | 50    | 80                         | 12    | 16  | 18 |
| 061158063 | CM                   | CMX    | 63    | 80                         | 18    | 22  | 20 |
| 061158064 | CM                   | CMX    | 63    | 80                         | 28    | 22  | 20 |
| 061158080 | CM                   | CMX    | 80    | 80                         | 24    | 27  | 20 |
| 061158550 | CM                   | CMX    | 50    | 85                         | 12    | 16  | 18 |
| 061158563 | CM                   | CMX    | 63    | 85                         | 18    | 22  | 20 |
| 061158580 | CM                   | CMX    | 80    | 85                         | 24    | 27  | 20 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 06115           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

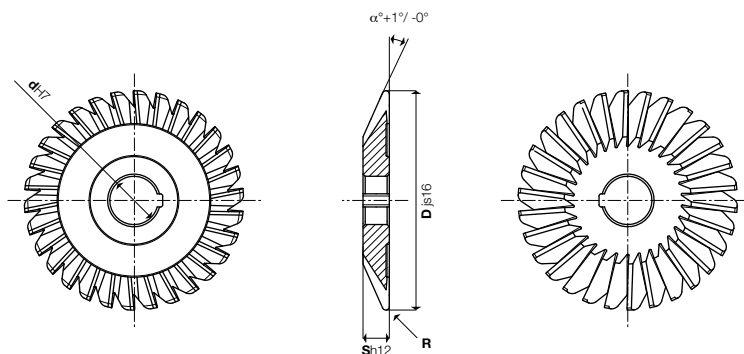
○ non consigliata/not recommended

WWW.UOP.IT

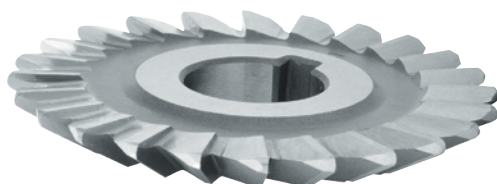
37

## Serie/Series 06120

Frese ad angolo per utensili  
Angular cutters for toolmaking



|                        |   |                               |        |
|------------------------|---|-------------------------------|--------|
| COATING<br><b>Skin</b> | H | UNI 3910A<br>DIN 1824A<br>ISO | Z24÷30 |
|------------------------|---|-------------------------------|--------|

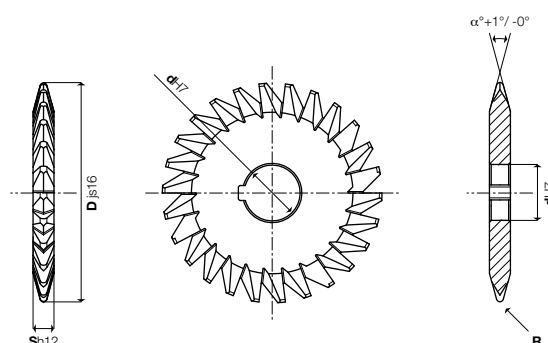


| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D js16 | $\alpha^\circ$<br>+1°/-0° | Sh12 | dH7 | R   | Z  |
|--------------|----------------------|--------|--------|---------------------------|------|-----|-----|----|
| 061201056 CM | CMX                  |        | 56     | 18                        | 6    | 16  | 1   | 26 |
| 061201080 CM | CMX                  |        | 80     | 18                        | 9    | 22  | 1,2 | 26 |
| 061201100 CM | CMX                  |        | 100    | 18                        | 12   | 22  | 1,6 | 30 |
| 061202056 CM | CMX                  |        | 56     | 24                        | 6    | 16  | 1   | 24 |
| 061202080 CM | CMX                  |        | 80     | 24                        | 9    | 22  | 1,2 | 26 |
| 061202100 CM | CMX                  |        | 100    | 24                        | 12   | 22  | 1,6 | 30 |
| 061203056 CM | CMX                  |        | 56     | 30                        | 6    | 16  | 1   | 24 |
| 061203080 CM | CMX                  |        | 80     | 30                        | 9    | 22  | 1,2 | 26 |
| 061203100 CM | CMX                  |        | 100    | 30                        | 12   | 22  | 1,6 | 30 |



## Serie/Series 06125

Frese ad angolo per utensili  
Angular cutters for toolmaking



|                        |   |                                    |        |
|------------------------|---|------------------------------------|--------|
| COATING<br><b>Skin</b> | H | UNI 3910B<br>DIN 1824B<br>ISO 2586 | Z26÷30 |
|------------------------|---|------------------------------------|--------|



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D js16 | $\alpha^\circ$<br>+1°/-0° | Sh12 | dH7 | R   | Z  |
|--------------|----------------------|--------|--------|---------------------------|------|-----|-----|----|
| 061251863 CM | CMX                  |        | 63     | 18                        | 6    | 16  | 1   | 26 |
| 061251890 CM | CMX                  |        | 90     | 18                        | 10   | 22  | 1,6 | 30 |
| 061252463 CM | CMX                  |        | 63     | 24                        | 6    | 16  | 1   | 26 |
| 061252490 CM | CMX                  |        | 90     | 24                        | 10   | 22  | 1,6 | 30 |
| 061253063 CM | CMX                  |        | 63     | 30                        | 6    | 16  | 1   | 26 |
| 061253090 CM | CMX                  |        | 90     | 30                        | 10   | 22  | 1,6 | 30 |

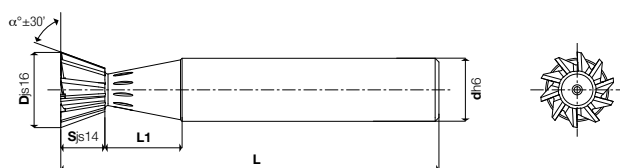


### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 06120           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 06125           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

## Serie/Series 06130

Frese ad angolo divergente  
Dovetail cutters



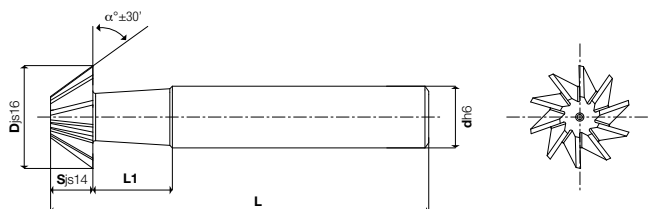
|                        |                                |                                |   |                                    |        |
|------------------------|--------------------------------|--------------------------------|---|------------------------------------|--------|
| COATING<br><b>Skin</b> | W<br>A RICHIESTA<br>ON REQUEST | F<br>A RICHIESTA<br>ON REQUEST | N | UNI 8262A<br>DIN 1833A<br>ISO 3959 | Z10÷12 |
|------------------------|--------------------------------|--------------------------------|---|------------------------------------|--------|

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | Djs16 | α°<br>± 30' | Sjs14 | L1   | L  | dh6 | Z  |
|--------------|-----------------|----------------------|--------|-------|-------------|-------|------|----|-----|----|
| 061304516 AM | CM              | CMX                  |        | 16    | 45          | 4     | 11,3 | 60 | 12  | 10 |
| 061304520 AM | CM              | CMX                  |        | 20    | 45          | 5     | 13,5 | 63 | 12  | 10 |
| 061304525 AM | CM              | CMX                  |        | 25    | 45          | 6,3   | 13   | 67 | 12  | 10 |
| 061304532 AM | CM              | CMX                  |        | 32    | 45          | 8     | 14   | 71 | 16  | 12 |
| 061306016 AM | CM              | CMX                  |        | 16    | 60          | 6,3   | 11   | 60 | 12  | 10 |
| 061306020 AM | CM              | CMX                  |        | 20    | 60          | 8     | 10   | 63 | 12  | 10 |
| 061306025 AM | CM              | CMX                  |        | 25    | 60          | 10    | 11,5 | 67 | 12  | 10 |
| 061306032 AM | CM              | CMX                  |        | 32    | 60          | 12,5  | 10   | 71 | 16  | 12 |
| 061307016 AM | CM              | CMX                  |        | 16    | 70          | 7     | 10   | 60 | 12  | 10 |
| 061307020 AM | CM              | CMX                  |        | 20    | 70          | 9     | 10   | 63 | 12  | 10 |
| 061307025 AM | CM              | CMX                  |        | 25    | 70          | 11    | 8,7  | 67 | 16  | 10 |



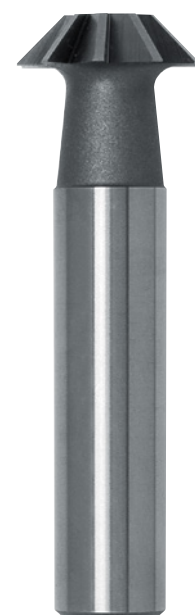
## Serie/Series 06145

Frese ad angolo convergente  
Inverted dovetail cutters



|                        |                                |                                |   |                                    |        |
|------------------------|--------------------------------|--------------------------------|---|------------------------------------|--------|
| COATING<br><b>Skin</b> | W<br>A RICHIESTA<br>ON REQUEST | F<br>A RICHIESTA<br>ON REQUEST | N | UNI 8262B<br>DIN 1833B<br>ISO 3959 | Z10÷12 |
|------------------------|--------------------------------|--------------------------------|---|------------------------------------|--------|

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | Djs16 | α°<br>± 30' | Sjs14 | L1   | L  | dh6 | Z  |
|--------------|-----------------|----------------------|--------|-------|-------------|-------|------|----|-----|----|
| 061454516 AM | CM              | CMX                  |        | 16    | 45          | 4     | 11,3 | 60 | 12  | 10 |
| 061454520 AM | CM              | CMX                  |        | 20    | 45          | 5     | 13,5 | 63 | 12  | 10 |
| 061454525 AM | CM              | CMX                  |        | 25    | 45          | 6,3   | 13   | 67 | 12  | 10 |
| 061454532 AM | CM              | CMX                  |        | 32    | 45          | 8     | 14   | 71 | 16  | 12 |
| 061456016 AM | CM              | CMX                  |        | 16    | 60          | 6,3   | 11   | 60 | 12  | 10 |
| 061456020 AM | CM              | CMX                  |        | 20    | 60          | 8     | 10   | 63 | 12  | 10 |
| 061456025 AM | CM              | CMX                  |        | 25    | 60          | 10    | 11,5 | 67 | 12  | 10 |
| 061456032 AM | CM              | CMX                  |        | 32    | 60          | 12,5  | 10   | 71 | 16  | 12 |
| 061457016 AM | CM              | CMX                  |        | 16    | 70          | 7     | 10   | 60 | 12  | 10 |
| 061457020 AM | CM              | CMX                  |        | 20    | 70          | 9     | 10   | 63 | 12  | 10 |
| 061457025 AM | CM              | CMX                  |        | 25    | 70          | 11    | 8,7  | 67 | 16  | 10 |



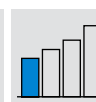
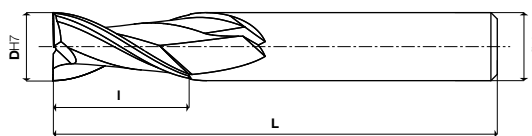
### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 06130           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 06145           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

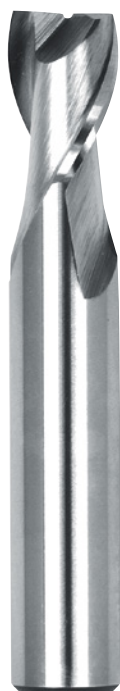
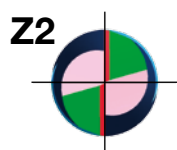
● consigliata/recommended ● accettabile/acceptable ○ non consigliata/not recommended

Serie/Series  
**10102**

Frese a due taglienti in tolleranza H7  
Two flute slot drills in tolerance H7



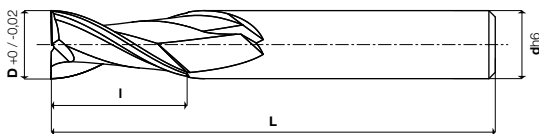
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | DH7  | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------|----|-----|-----|---|
| 101020100 CM | CMX                  |        | 1    | 3  | 47  | 6   | 2 |
| 101020150 CM | CMX                  |        | 1,5  | 3  | 47  | 6   | 2 |
| 101020200 CM | CMX                  |        | 2    | 4  | 48  | 6   | 2 |
| 101020250 CM | CMX                  |        | 2,5  | 5  | 49  | 6   | 2 |
| 101020300 CM | CMX                  |        | 3    | 5  | 49  | 6   | 2 |
| 101020350 CM | CMX                  |        | 3,5  | 6  | 50  | 6   | 2 |
| 101020400 CM | CMX                  |        | 4    | 7  | 51  | 6   | 2 |
| 101020450 CM | CMX                  |        | 4,5  | 7  | 51  | 6   | 2 |
| 101020500 CM | CMX                  |        | 5    | 8  | 52  | 6   | 2 |
| 101020550 CM | CMX                  |        | 5,5  | 8  | 52  | 6   | 2 |
| 101020600 CM | CMX                  |        | 6    | 8  | 52  | 6   | 2 |
| 101020650 CM | CMX                  |        | 6,5  | 10 | 60  | 10  | 2 |
| 101020700 CM | CMX                  |        | 7    | 10 | 60  | 10  | 2 |
| 101020750 CM | CMX                  |        | 7,5  | 10 | 60  | 10  | 2 |
| 101020800 CM | CMX                  |        | 8    | 11 | 61  | 10  | 2 |
| 101020850 CM | CMX                  |        | 8,5  | 11 | 61  | 10  | 2 |
| 101020900 CM | CMX                  |        | 9    | 11 | 61  | 10  | 2 |
| 101020950 CM | CMX                  |        | 9,5  | 13 | 63  | 10  | 2 |
| 101021000 CM | CMX                  |        | 10   | 13 | 63  | 10  | 2 |
| 101021050 CM | CMX                  |        | 10,5 | 13 | 70  | 12  | 2 |
| 101021100 CM | CMX                  |        | 11   | 13 | 70  | 12  | 2 |
| 101021200 CM | CMX                  |        | 12   | 16 | 73  | 12  | 2 |
| 101021300 CM | CMX                  |        | 13   | 16 | 73  | 12  | 2 |
| 101021400 CM | CMX                  |        | 14   | 16 | 73  | 12  | 2 |
| 101021500 CM | CMX                  |        | 15   | 19 | 79  | 16  | 2 |
| 101021600 CM | CMX                  |        | 16   | 19 | 79  | 16  | 2 |
| 101021700 CM | CMX                  |        | 17   | 19 | 79  | 16  | 2 |
| 101021800 CM | CMX                  |        | 18   | 19 | 79  | 16  | 2 |
| 101021900 CM | CMX                  |        | 19   | 22 | 82  | 16  | 2 |
| 101022000 CM | CMX                  |        | 20   | 22 | 82  | 16  | 2 |
| 101022001 CM | CMX                  |        | 20   | 22 | 88  | 20  | 2 |
| 101022100 CM | CMX                  |        | 21   | 22 | 88  | 20  | 2 |
| 101022200 CM | CMX                  |        | 22   | 22 | 88  | 20  | 2 |
| 101022300 CM | CMX                  |        | 23   | 22 | 88  | 20  | 2 |
| 101022400 CM | CMX                  |        | 24   | 26 | 102 | 25  | 2 |
| 101022500 CM | CMX                  |        | 25   | 26 | 102 | 25  | 2 |
| 101022600 CM | CMX                  |        | 26   | 26 | 102 | 25  | 2 |
| 101022800 CM | CMX                  |        | 28   | 26 | 102 | 25  | 2 |
| 101023000 CM | CMX                  |        | 30   | 26 | 102 | 25  | 2 |
| 101023200 CM | CMX                  |        | 32   | 32 | 112 | 32  | 2 |
| 101023400 CM | CMX                  |        | 34   | 32 | 112 | 32  | 2 |
| 101023500 CM | CMX                  |        | 35   | 32 | 112 | 32  | 2 |
| 101023600 CM | CMX                  |        | 36   | 32 | 112 | 32  | 2 |



parametri tecnici a pag. / for technical parameters see page 119

MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI INOSSIDABILI | MATERIALI NON FERROSI | LEGHE LEGGERE | ACCIAI | GHISE     |
|--------|----------|------|---------------------|-----------------------|---------------|--------|-----------|
| series | TITANIUM | HRSA | STAINLESS STEELS    | NON FERROUS MATERIALS | LIGHT ALLOYS  | STEELS | CAST IRON |
| 10102  | ●        | ●    | ●                   | ●                     | ○             | ●      | ●         |



HSS-PM  
**HSS-PM Line**

Serie/Series  
**10105**

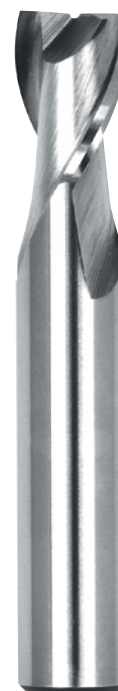
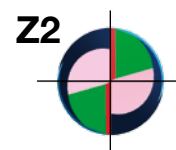
Frese a due taglienti  
Two flute slot drills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D <sup>+0</sup><br>-0,02 | I   | L  | dh6 | Z |
|--------------|----------------------|--------|--------------------------|-----|----|-----|---|
| 101050200 CM | CMX                  | 2      | 5                        | 36  | 4  | 2   |   |
| 101050250 CM | CMX                  | 2,5    | 5                        | 36  | 4  | 2   |   |
| 101050300 CM | CMX                  | 3      | 8                        | 40  | 4  | 2   |   |
| 101050350 CM | CMX                  | 3,5    | 8                        | 40  | 4  | 2   |   |
| 101050400 CM | CMX                  | 4      | 8                        | 40  | 4  | 2   |   |
| 101050450 CM | CMX                  | 4,5    | 10                       | 45  | 6  | 2   |   |
| 101050500 CM | CMX                  | 5      | 10                       | 45  | 6  | 2   |   |
| 101050600 CM | CMX                  | 6      | 10                       | 45  | 6  | 2   |   |
| 101050700 CM | CMX                  | 7      | 12                       | 50  | 8  | 2   |   |
| 101050800 CM | CMX                  | 8      | 12                       | 50  | 8  | 2   |   |
| 101050900 CM | CMX                  | 9      | 12                       | 50  | 8  | 2   |   |
| 101051000 CM | CMX                  | 10     | 16                       | 56  | 10 | 2   |   |
| 101051100 CM | CMX                  | 11     | 16                       | 56  | 10 | 2   |   |
| 101051200 CM | CMX                  | 12     | 20                       | 65  | 12 | 2   |   |
| 101051300 CM | CMX                  | 13     | 20                       | 65  | 12 | 2   |   |
| 101051400 CM | CMX                  | 14     | 20                       | 65  | 12 | 2   |   |
| 101051500 CM | CMX                  | 15     | 20                       | 65  | 12 | 2   |   |
| 101051600 CM | CMX                  | 16     | 25                       | 78  | 16 | 2   |   |
| 101051700 CM | CMX                  | 17     | 25                       | 78  | 16 | 2   |   |
| 101051800 CM | CMX                  | 18     | 25                       | 78  | 16 | 2   |   |
| 101051900 CM | CMX                  | 19     | 28                       | 86  | 20 | 2   |   |
| 101052000 CM | CMX                  | 20     | 28                       | 86  | 20 | 2   |   |
| 101052200 CM | CMX                  | 22     | 32                       | 90  | 20 | 2   |   |
| 101052400 CM | CMX                  | 24     | 36                       | 100 | 25 | 2   |   |
| 101052500 CM | CMX                  | 25     | 36                       | 100 | 25 | 2   |   |
| 101052600 CM | CMX                  | 26     | 36                       | 100 | 25 | 2   |   |
| 101052800 CM | CMX                  | 28     | 36                       | 100 | 25 | 2   |   |
| 101053000 CM | CMX                  | 30     | 40                       | 110 | 25 | 2   |   |
| 101053200 CM | CMX                  | 32     | 40                       | 110 | 25 | 2   |   |



parametri tecnici a pag. / for technical parameters see page 119



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 10105           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

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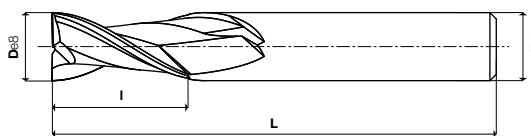


Serie/Series

**10110**

Frese a due taglienti  
Two flute end mills

**ALTE PRESTAZIONI**  
**HIGH PERFORMANCE**



COATING

**Skin**

**W**  
A RICHIESTA  
ON REQUEST

**F**  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}$ s  
32

**N**

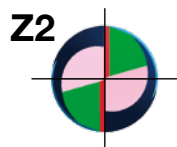
UNI 8254  
DIN 327B  
ISO 1641/1



| Cod. Art.            | X-105<br>(PM Co 10,5%) | De8 | I  | L   | dh6 | Z |
|----------------------|------------------------|-----|----|-----|-----|---|
| <b>101100600 EMX</b> |                        | 6   | 8  | 52  | 6   | 2 |
| <b>101100800 EMX</b> |                        | 8   | 11 | 61  | 10  | 2 |
| <b>101101000 EMX</b> |                        | 10  | 13 | 63  | 10  | 2 |
| <b>101101200 EMX</b> |                        | 12  | 16 | 73  | 12  | 2 |
| <b>101101400 EMX</b> |                        | 14  | 16 | 73  | 12  | 2 |
| <b>101101600 EMX</b> |                        | 16  | 19 | 79  | 16  | 2 |
| <b>101101800 EMX</b> |                        | 18  | 19 | 79  | 16  | 2 |
| <b>101102001 EMX</b> |                        | 20  | 22 | 88  | 20  | 2 |
| <b>101102200 EMX</b> |                        | 22  | 22 | 88  | 20  | 2 |
| <b>101102500 EMX</b> |                        | 25  | 26 | 102 | 25  | 2 |
| <b>101102800 EMX</b> |                        | 28  | 26 | 102 | 25  | 2 |
| <b>101103000 EMX</b> |                        | 30  | 26 | 102 | 25  | 2 |
| <b>101103200 EMX</b> |                        | 32  | 32 | 112 | 32  | 2 |



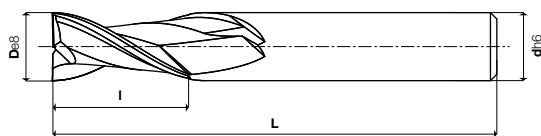
parametri tecnici a pag. 1 / for technical parameters see page 126



**MATERIALI LAVORABILI / WORKPIECE MATERIALS**

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 10110           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |





HSS-PM  
**HSS-PM Line**

Serie/Series  
**10110**

Frese a due taglienti in tolleranza e8  
Two flute slot drills in tolerance e8



| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | De8  | I  | L   | dh6 | Z |
|--------------|-----------------|----------------------|--------|------|----|-----|-----|---|
| 101100100 -  | CM              | CMX                  |        | 1    | 3  | 47  | 6   | 2 |
| 101100150 -  | CM              | CMX                  |        | 1,5  | 3  | 47  | 6   | 2 |
| 101100200 -  | CM              | CMX                  |        | 2    | 4  | 48  | 6   | 2 |
| 101100250 -  | CM              | CMX                  |        | 2,5  | 5  | 49  | 6   | 2 |
| 101100300 -  | CM              | CMX                  |        | 3    | 5  | 49  | 6   | 2 |
| 101100350 -  | CM              | CMX                  |        | 3,5  | 6  | 50  | 6   | 2 |
| 101100400 -  | CM              | CMX                  |        | 4    | 7  | 51  | 6   | 2 |
| 101100450 -  | CM              | CMX                  |        | 4,5  | 7  | 51  | 6   | 2 |
| 101100500 -  | CM              | CMX                  |        | 5    | 8  | 52  | 6   | 2 |
| 101100550 -  | CM              | CMX                  |        | 5,5  | 8  | 52  | 6   | 2 |
| 101100600 AM | CM              | CMX                  |        | 6    | 8  | 52  | 6   | 2 |
| 101100650 AM | CM              | CMX                  |        | 6,5  | 10 | 60  | 10  | 2 |
| 101100700 AM | CM              | CMX                  |        | 7    | 10 | 60  | 10  | 2 |
| 101100750 AM | CM              | CMX                  |        | 7,5  | 10 | 60  | 10  | 2 |
| 101100800 AM | CM              | CMX                  |        | 8    | 11 | 61  | 10  | 2 |
| 101100850 AM | CM              | CMX                  |        | 8,5  | 11 | 61  | 10  | 2 |
| 101100900 AM | CM              | CMX                  |        | 9    | 11 | 61  | 10  | 2 |
| 101100950 AM | CM              | CMX                  |        | 9,5  | 13 | 63  | 10  | 2 |
| 101101000 AM | CM              | CMX                  |        | 10   | 13 | 63  | 10  | 2 |
| 101101050 AM | CM              | CMX                  |        | 10,5 | 13 | 70  | 12  | 2 |
| 101101100 AM | CM              | CMX                  |        | 11   | 13 | 70  | 12  | 2 |
| 101101200 AM | CM              | CMX                  |        | 12   | 16 | 73  | 12  | 2 |
| 101101300 AM | CM              | CMX                  |        | 13   | 16 | 73  | 12  | 2 |
| 101101400 AM | CM              | CMX                  |        | 14   | 16 | 73  | 12  | 2 |
| 101101500 AM | CM              | CMX                  |        | 15   | 19 | 79  | 16  | 2 |
| 101101600 AM | CM              | CMX                  |        | 16   | 19 | 79  | 16  | 2 |
| 101101700 AM | CM              | CMX                  |        | 17   | 19 | 79  | 16  | 2 |
| 101101800 AM | CM              | CMX                  |        | 18   | 19 | 79  | 16  | 2 |
| 101101801 AM | CM              | CMX                  |        | 18   | 19 | 85  | 20  | 2 |
| 101101900 AM | CM              | CMX                  |        | 19   | 22 | 82  | 16  | 2 |
| 101101901 AM | CM              | CMX                  |        | 19   | 22 | 88  | 20  | 2 |
| 101102000 AM | CM              | CMX                  |        | 20   | 22 | 82  | 16  | 2 |
| 101102001 AM | CM              | CMX                  |        | 20   | 22 | 88  | 20  | 2 |
| 101102100 AM | CM              | CMX                  |        | 21   | 22 | 88  | 20  | 2 |
| 101102200 AM | CM              | CMX                  |        | 22   | 22 | 88  | 20  | 2 |
| 101102201 AM | CM              | CMX                  |        | 22   | 22 | 98  | 25  | 2 |
| 101102300 AM | CM              | CMX                  |        | 23   | 22 | 88  | 20  | 2 |
| 101102400 AM | CM              | CMX                  |        | 24   | 26 | 102 | 25  | 2 |
| 101102500 AM | CM              | CMX                  |        | 25   | 26 | 102 | 25  | 2 |
| 101102600 AM | CM              | CMX                  |        | 26   | 26 | 102 | 25  | 2 |
| 101102800 AM | CM              | CMX                  |        | 28   | 26 | 102 | 25  | 2 |
| 101103000 AM | CM              | CMX                  |        | 30   | 26 | 102 | 25  | 2 |
| 101103200 AM | CM              | CMX                  |        | 32   | 32 | 112 | 32  | 2 |
| 101103400 AM | CM              | CMX                  |        | 34   | 32 | 112 | 32  | 2 |
| 101103500 AM | CM              | CMX                  |        | 35   | 32 | 112 | 32  | 2 |
| 101103600 AM | CM              | CMX                  |        | 36   | 32 | 112 | 32  | 2 |
| 101103800 AM | CM              | CMX                  |        | 38   | 38 | 118 | 32  | 2 |
| 101104000 AM | CM              | CMX                  |        | 40   | 38 | 118 | 32  | 2 |
| 101104500 AM | CM              | CMX                  |        | 45   | 38 | 118 | 32  | 2 |
| 101105000 AM | CM              | CMX                  |        | 50   | 45 | 125 | 32  | 2 |



parametri tecnici a pag. / for technical parameters see page 119

MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 10110           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |

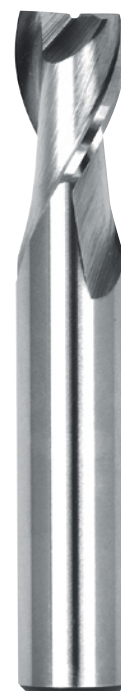
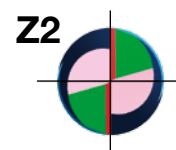
● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

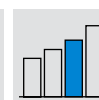
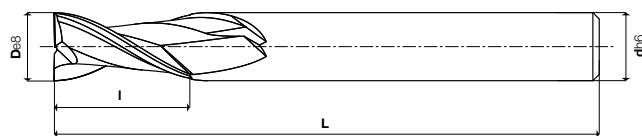
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43

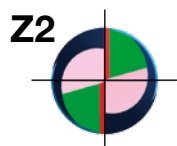


Serie/Series  
**10125**

Frese a due taglienti in tolleranza e8  
Two flute slot drills in tolerance e8



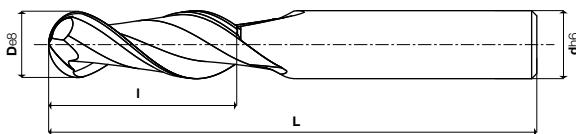
| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | De8  | I  | L   | dh6 | Z |
|--------------|-----------------|----------------------|--------|------|----|-----|-----|---|
| 101250300 -  | CM              | CMX                  |        | 3    | 9  | 60  | 6   | 2 |
| 101250350 -  | CM              | CMX                  |        | 3,5  | 13 | 67  | 6   | 2 |
| 101250400 -  | CM              | CMX                  |        | 4    | 13 | 67  | 6   | 2 |
| 101250450 -  | CM              | CMX                  |        | 4,5  | 13 | 70  | 6   | 2 |
| 101250500 -  | CM              | CMX                  |        | 5    | 16 | 70  | 6   | 2 |
| 101250550 -  | CM              | CMX                  |        | 5,5  | 16 | 76  | 6   | 2 |
| 101250600 AM | CM              | CMX                  |        | 6    | 16 | 76  | 6   | 2 |
| 101250650 AM | CM              | CMX                  |        | 6,5  | 16 | 76  | 10  | 2 |
| 101250700 AM | CM              | CMX                  |        | 7    | 19 | 79  | 10  | 2 |
| 101250750 AM | CM              | CMX                  |        | 7,5  | 19 | 79  | 10  | 2 |
| 101250800 AM | CM              | CMX                  |        | 8    | 19 | 79  | 10  | 2 |
| 101250850 AM | CM              | CMX                  |        | 8,5  | 22 | 83  | 10  | 2 |
| 101250900 AM | CM              | CMX                  |        | 9    | 22 | 83  | 10  | 2 |
| 101250950 AM | CM              | CMX                  |        | 9,5  | 22 | 83  | 10  | 2 |
| 101251000 AM | CM              | CMX                  |        | 10   | 22 | 83  | 10  | 2 |
| 101251050 AM | CM              | CMX                  |        | 10,5 | 25 | 95  | 12  | 2 |
| 101251100 AM | CM              | CMX                  |        | 11   | 25 | 95  | 12  | 2 |
| 101251200 AM | CM              | CMX                  |        | 12   | 28 | 98  | 12  | 2 |
| 101251300 AM | CM              | CMX                  |        | 13   | 28 | 98  | 12  | 2 |
| 101251400 AM | CM              | CMX                  |        | 14   | 32 | 102 | 12  | 2 |
| 101251500 AM | CM              | CMX                  |        | 15   | 32 | 108 | 16  | 2 |
| 101251600 AM | CM              | CMX                  |        | 16   | 32 | 108 | 16  | 2 |
| 101251700 AM | CM              | CMX                  |        | 17   | 35 | 114 | 16  | 2 |
| 101251800 AM | CM              | CMX                  |        | 18   | 35 | 114 | 16  | 2 |
| 101251900 AM | CM              | CMX                  |        | 19   | 38 | 117 | 16  | 2 |
| 101252000 AM | CM              | CMX                  |        | 20   | 38 | 117 | 16  | 2 |
| 101252100 -  | CM              | CMX                  |        | 21   | 38 | 132 | 20  | 2 |
| 101252200 AM | CM              | CMX                  |        | 22   | 41 | 135 | 20  | 2 |
| 101252300 -  | CM              | CMX                  |        | 23   | 41 | 135 | 20  | 2 |
| 101252400 AM | CM              | CMX                  |        | 24   | 41 | 152 | 25  | 2 |
| 101252500 AM | CM              | CMX                  |        | 25   | 44 | 159 | 25  | 2 |
| 101252600 AM | CM              | CMX                  |        | 26   | 44 | 159 | 25  | 2 |
| 101252800 AM | CM              | CMX                  |        | 28   | 44 | 159 | 25  | 2 |
| 101253000 AM | CM              | CMX                  |        | 30   | 50 | 159 | 25  | 2 |
| 101253200 AM | CM              | CMX                  |        | 32   | 52 | 165 | 32  | 2 |
| 101253400 AM | CM              | CMX                  |        | 34   | 54 | 167 | 32  | 2 |
| 101253500 AM | CM              | CMX                  |        | 35   | 54 | 167 | 32  | 2 |
| 101253600 AM | CM              | CMX                  |        | 36   | 54 | 167 | 32  | 2 |
| 101253800 AM | CM              | CMX                  |        | 38   | 56 | 169 | 32  | 2 |
| 101254000 AM | CM              | CMX                  |        | 40   | 56 | 174 | 32  | 2 |
| 101254500 AM | CM              | CMX                  |        | 45   | 60 | 180 | 32  | 2 |
| 101255000 AM | CM              | CMX                  |        | 50   | 65 | 185 | 32  | 2 |



parametri tecnici a pag. 1 / for technical parameters see page 119

MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 10125           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |



HSS-PM  
**HSS-PM Line**

Serie/Series  
**10140**

Frese a due taglienti a testa semisferica  
Ball nosed two flute slot drills



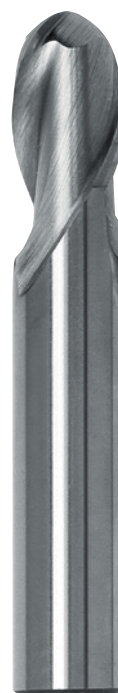
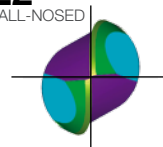
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | De8 | I   | L  | dh6 | Z |
|--------------|----------------------|--------|-----|-----|----|-----|---|
| 101400100 CM | CMX                  | 1      | 3   | 47  | 6  | 2   |   |
| 101400150 CM | CMX                  | 1,5    | 3   | 47  | 6  | 2   |   |
| 101400200 CM | CMX                  | 2      | 4   | 48  | 6  | 2   |   |
| 101400300 CM | CMX                  | 3      | 5   | 49  | 6  | 2   |   |
| 101400400 CM | CMX                  | 4      | 7   | 51  | 6  | 2   |   |
| 101400500 CM | CMX                  | 5      | 8   | 52  | 6  | 2   |   |
| 101400600 CM | CMX                  | 6      | 8   | 52  | 6  | 2   |   |
| 101400700 CM | CMX                  | 7      | 10  | 60  | 10 | 2   |   |
| 101400800 CM | CMX                  | 8      | 11  | 61  | 10 | 2   |   |
| 101400900 CM | CMX                  | 9      | 11  | 61  | 10 | 2   |   |
| 101401000 CM | CMX                  | 10     | 13  | 63  | 10 | 2   |   |
| 101401100 CM | CMX                  | 11     | 13  | 70  | 12 | 2   |   |
| 101401200 CM | CMX                  | 12     | 16  | 73  | 12 | 2   |   |
| 101401300 CM | CMX                  | 13     | 16  | 73  | 12 | 2   |   |
| 101401400 CM | CMX                  | 14     | 16  | 73  | 12 | 2   |   |
| 101401500 CM | CMX                  | 15     | 19  | 79  | 16 | 2   |   |
| 101401600 CM | CMX                  | 16     | 19  | 79  | 16 | 2   |   |
| 101401700 CM | CMX                  | 17     | 19  | 79  | 16 | 2   |   |
| 101401800 CM | CMX                  | 18     | 19  | 79  | 16 | 2   |   |
| 101401900 CM | CMX                  | 19     | 22  | 88  | 20 | 2   |   |
| 101402000 CM | CMX                  | 20     | 22  | 88  | 20 | 2   |   |
| 101402200 CM | CMX                  | 22     | 22  | 88  | 20 | 2   |   |
| 101402500 CM | CMX                  | 25     | 26  | 102 | 25 | 2   |   |
| 101402800 CM | CMX                  | 28     | 26  | 102 | 25 | 2   |   |
| 101403000 CM | CMX                  | 30     | 26  | 102 | 25 | 2   |   |
| 101403200 CM | CMX                  | 32     | 32  | 112 | 32 | 2   |   |



parametri tecnici a pag. / for technical parameters see page 119

**Z2**

BALL-NOSED



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 10140           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

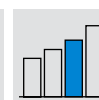
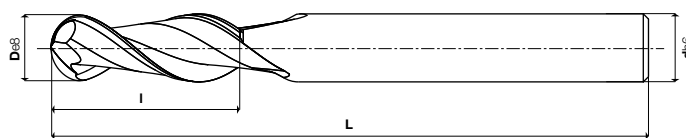
WWW.UOP.IT

45

Serie/Series

## 10155

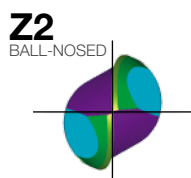
Frese a due taglienti a testa semisferica  
Ball nosed two flute slot drills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | De8 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|-----|----|-----|-----|---|
| 101550300 CM | CMX                  |        | 3   | 9  | 60  | 6   | 2 |
| 101550400 CM | CMX                  |        | 4   | 13 | 67  | 6   | 2 |
| 101550500 CM | CMX                  |        | 5   | 16 | 70  | 6   | 2 |
| 101550600 CM | CMX                  |        | 6   | 16 | 76  | 6   | 2 |
| 101550700 CM | CMX                  |        | 7   | 19 | 79  | 10  | 2 |
| 101550800 CM | CMX                  |        | 8   | 19 | 79  | 10  | 2 |
| 101550900 CM | CMX                  |        | 9   | 22 | 83  | 10  | 2 |
| 101551000 CM | CMX                  |        | 10  | 22 | 83  | 10  | 2 |
| 101551100 CM | CMX                  |        | 11  | 25 | 95  | 12  | 2 |
| 101551200 CM | CMX                  |        | 12  | 28 | 98  | 12  | 2 |
| 101551300 CM | CMX                  |        | 13  | 28 | 98  | 12  | 2 |
| 101551400 CM | CMX                  |        | 14  | 32 | 102 | 12  | 2 |
| 101551500 CM | CMX                  |        | 15  | 32 | 108 | 16  | 2 |
| 101551600 CM | CMX                  |        | 16  | 32 | 108 | 16  | 2 |
| 101551700 CM | CMX                  |        | 17  | 35 | 114 | 16  | 2 |
| 101551800 CM | CMX                  |        | 18  | 35 | 114 | 16  | 2 |
| 101551900 CM | CMX                  |        | 19  | 38 | 132 | 20  | 2 |
| 101552000 CM | CMX                  |        | 20  | 38 | 132 | 20  | 2 |
| 101552200 CM | CMX                  |        | 22  | 41 | 135 | 20  | 2 |
| 101552500 CM | CMX                  |        | 25  | 44 | 159 | 25  | 2 |
| 101552800 CM | CMX                  |        | 28  | 44 | 159 | 25  | 2 |
| 101553000 CM | CMX                  |        | 30  | 50 | 159 | 25  | 2 |
| 101553200 CM | CMX                  |        | 32  | 52 | 165 | 32  | 2 |

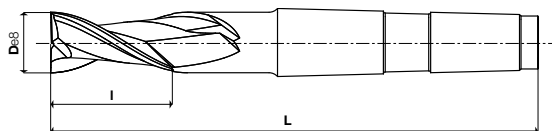


parametri tecnici a pag. / for technical parameters see page 119



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 10155           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |



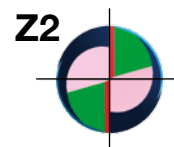
HSS-PM  
**HSS-PM Line**

Serie/Series  
**10170**

Frese a due taglienti  
Two flute end mills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | De8 | I   | L | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|-----|-----|---|----------------|---|
| 101701000 CM | CMX                  | 10     | 13  | 83  | 1 | 2              |   |
| 101701200 CM | CMX                  | 12     | 16  | 86  | 1 | 2              |   |
| 101701400 CM | CMX                  | 14     | 16  | 101 | 2 | 2              |   |
| 101701600 CM | CMX                  | 16     | 19  | 104 | 2 | 2              |   |
| 101701800 CM | CMX                  | 18     | 19  | 104 | 2 | 2              |   |
| 101702000 CM | CMX                  | 20     | 22  | 124 | 3 | 2              |   |
| 101702200 CM | CMX                  | 22     | 22  | 124 | 3 | 2              |   |
| 101702400 CM | CMX                  | 24     | 26  | 128 | 3 | 2              |   |
| 101702500 CM | CMX                  | 25     | 26  | 128 | 3 | 2              |   |
| 101702600 CM | CMX                  | 26     | 26  | 128 | 3 | 2              |   |
| 101702800 CM | CMX                  | 28     | 26  | 128 | 3 | 2              |   |
| 101703000 CM | CMX                  | 30     | 32  | 134 | 3 | 2              |   |
| 101703200 CM | CMX                  | 32     | 32  | 157 | 4 | 2              |   |
| 101703400 CM | CMX                  | 34     | 32  | 157 | 4 | 2              |   |
| 101703500 CM | CMX                  | 35     | 32  | 157 | 4 | 2              |   |
| 101703600 CM | CMX                  | 36     | 32  | 157 | 4 | 2              |   |
| 101703800 CM | CMX                  | 38     | 38  | 163 | 4 | 2              |   |
| 101704000 CM | CMX                  | 40     | 38  | 163 | 4 | 2              |   |
| 101704500 CM | CMX                  | 45     | 38  | 163 | 4 | 2              |   |
| 101705000 CM | CMX                  | 50     | 45  | 170 | 4 | 2              |   |



Cono Morse  
Morse Taper



MATERIALI LAVORABILI / WORKPIECE MATERIALS



● consigliata/recommended    ● accettabile/acceptable    ○ non consigliata/not recommended

WWW.UOP.IT

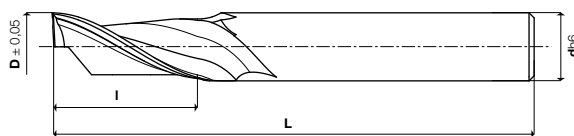
# HSS-PM HSS-PM Line

## Serie/Series 11405

Frese a un tagliente elicoidale  
Single flute end mills

## 12105

Frese a due taglienti  
Two flute end mills



COATING

**Skin**  
Alu

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

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32

W

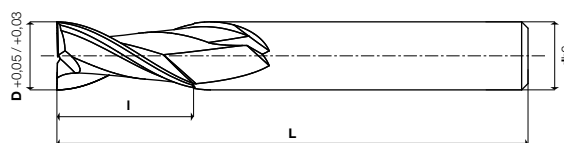
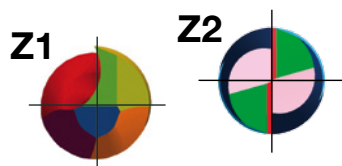
QUALITY  
STANDARD  
UOP



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0,05 | D II  | I  | L  | dh6  | Z |
|--------------|----------------------|--------|------------------|-------|----|----|------|---|
| 114050317 CM | CMX                  |        | 3,17             | 1/8   | 11 | 55 | 6,35 | 1 |
| 114050400 CM | CMX                  |        | 4                |       | 11 | 55 | 6    | 1 |
| 114050476 CM | CMX                  |        | 4,76             | 3/16  | 13 | 60 | 6,35 | 1 |
| 114050500 CM | CMX                  |        | 5                |       | 13 | 60 | 6    | 1 |
| 114050555 CM | CMX                  |        | 5,55             | 7/32  | 13 | 60 | 6,35 | 1 |
| 114050600 CM | CMX                  |        | 6                |       | 13 | 60 | 6    | 1 |
| 114050635 CM | CMX                  |        | 6,35             | 1/4   | 13 | 60 | 6,35 | 1 |
| 114050700 CM | CMX                  |        | 7                |       | 16 | 65 | 10   | 1 |
| 114050754 CM | CMX                  |        | 7,54             | 19/64 | 16 | 65 | 9,52 | 1 |
| 114050800 CM | CMX                  |        | 8                |       | 19 | 70 | 10   | 1 |
| 114050873 CM | CMX                  |        | 8,73             | 11/32 | 22 | 75 | 9,52 | 1 |
| 114050952 CM | CMX                  |        | 9,52             | 3/8   | 22 | 75 | 9,52 | 1 |
| 114051000 CM | CMX                  |        | 10               |       | 22 | 75 | 10   | 1 |
| 114051111 CM | CMX                  |        | 11,11            | 7/16  | 25 | 80 | 12,7 | 1 |
| 114051200 CM | CMX                  |        | 12               |       | 25 | 80 | 12   | 1 |
| 114051270 CM | CMX                  |        | 12,7             | 1/2   | 25 | 80 | 12,7 | 1 |



parametri tecnici a pag. 1 / for technical parameters see page 120



COATING

**Skin**  
Alu

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

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W

UNI 8244  
DIN 844A  
ISO 1641/I



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|----|-----|-----|---|
| 121050200 CM | CMX                  |        | 2                | 7  | 51  | 6   | 2 |
| 121050300 CM | CMX                  |        | 3                | 8  | 52  | 6   | 2 |
| 121050400 CM | CMX                  |        | 4                | 11 | 55  | 6   | 2 |
| 121050500 CM | CMX                  |        | 5                | 13 | 57  | 6   | 2 |
| 121050600 CM | CMX                  |        | 6                | 13 | 57  | 6   | 2 |
| 121050700 CM | CMX                  |        | 7                | 16 | 66  | 10  | 2 |
| 121050800 CM | CMX                  |        | 8                | 19 | 69  | 10  | 2 |
| 121050900 CM | CMX                  |        | 9                | 19 | 69  | 10  | 2 |
| 121051000 CM | CMX                  |        | 10               | 22 | 72  | 10  | 2 |
| 121051100 CM | CMX                  |        | 11               | 22 | 79  | 12  | 2 |
| 121051200 CM | CMX                  |        | 12               | 26 | 83  | 12  | 2 |
| 121051300 CM | CMX                  |        | 13               | 26 | 83  | 12  | 2 |
| 121051400 CM | CMX                  |        | 14               | 26 | 83  | 12  | 2 |
| 121051500 CM | CMX                  |        | 15               | 32 | 92  | 16  | 2 |
| 121051600 CM | CMX                  |        | 16               | 32 | 92  | 16  | 2 |
| 121051800 CM | CMX                  |        | 18               | 32 | 92  | 16  | 2 |
| 121052000 CM | CMX                  |        | 20               | 38 | 104 | 20  | 2 |
| 121052200 CM | CMX                  |        | 22               | 38 | 104 | 20  | 2 |
| 121052500 CM | CMX                  |        | 25               | 45 | 121 | 25  | 2 |
| 121052800 CM | CMX                  |        | 28               | 45 | 121 | 25  | 2 |
| 121053000 CM | CMX                  |        | 30               | 45 | 121 | 25  | 2 |
| 121053200 CM | CMX                  |        | 32               | 53 | 133 | 32  | 2 |



parametri tecnici a pag. 1 / for technical parameters see page 120

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

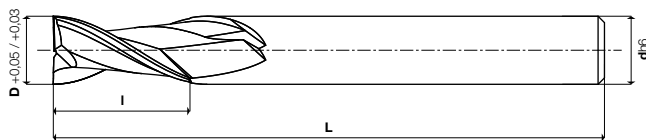
| serie | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 11405 | ○                   | ○            | ○                                             | ●                                                    | ●                                | ○                | ○                  |
| 12105 | ○                   | ○            | ●                                             | ●                                                    | ●                                | ○                | ○                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended





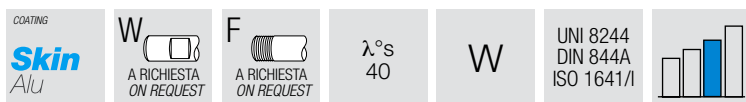
# HSS-PM HSS-PM Line

Serie/Series  
**12120**

Frese a due taglienti  
Two flute end mills

**12505**

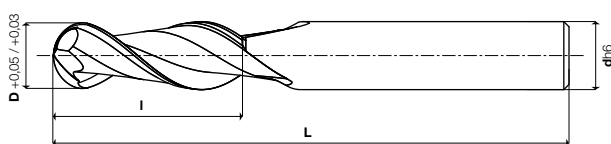
Frese a due taglienti a testa semisferica  
Ball nosed two flute end drills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|-----|-----|-----|---|
| 121200300 CM | CMX                  |        | 3                | 12  | 56  | 6   | 2 |
| 121200400 CM | CMX                  |        | 4                | 19  | 63  | 6   | 2 |
| 121200500 CM | CMX                  |        | 5                | 24  | 68  | 6   | 2 |
| 121200600 CM | CMX                  |        | 6                | 24  | 68  | 6   | 2 |
| 121200700 CM | CMX                  |        | 7                | 30  | 80  | 10  | 2 |
| 121200800 CM | CMX                  |        | 8                | 38  | 88  | 10  | 2 |
| 121200900 CM | CMX                  |        | 9                | 38  | 88  | 10  | 2 |
| 121201000 CM | CMX                  |        | 10               | 45  | 95  | 10  | 2 |
| 121201100 CM | CMX                  |        | 11               | 45  | 102 | 12  | 2 |
| 121201200 CM | CMX                  |        | 12               | 53  | 110 | 12  | 2 |
| 121201300 CM | CMX                  |        | 13               | 53  | 110 | 12  | 2 |
| 121201400 CM | CMX                  |        | 14               | 53  | 110 | 12  | 2 |
| 121201500 CM | CMX                  |        | 15               | 63  | 123 | 16  | 2 |
| 121201600 CM | CMX                  |        | 16               | 63  | 123 | 16  | 2 |
| 121201800 CM | CMX                  |        | 18               | 63  | 123 | 16  | 2 |
| 121202000 CM | CMX                  |        | 20               | 75  | 141 | 20  | 2 |
| 121202200 CM | CMX                  |        | 22               | 75  | 141 | 20  | 2 |
| 121202500 CM | CMX                  |        | 25               | 90  | 166 | 25  | 2 |
| 121202800 CM | CMX                  |        | 28               | 90  | 166 | 25  | 2 |
| 121203000 CM | CMX                  |        | 30               | 90  | 166 | 25  | 2 |
| 121203200 CM | CMX                  |        | 32               | 106 | 186 | 32  | 2 |



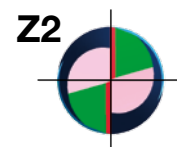
parametri tecnici a pag. / for technical parameters see page 120



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|----|-----|-----|---|
| 125050200 CM | CMX                  |        | 2                | 7  | 51  | 6   | 2 |
| 125050300 CM | CMX                  |        | 3                | 8  | 52  | 6   | 2 |
| 125050400 CM | CMX                  |        | 4                | 11 | 55  | 6   | 2 |
| 125050500 CM | CMX                  |        | 5                | 13 | 57  | 6   | 2 |
| 125050600 CM | CMX                  |        | 6                | 13 | 57  | 6   | 2 |
| 125050800 CM | CMX                  |        | 8                | 19 | 69  | 10  | 2 |
| 125051000 CM | CMX                  |        | 10               | 22 | 72  | 10  | 2 |
| 125051200 CM | CMX                  |        | 12               | 26 | 83  | 12  | 2 |
| 125051400 CM | CMX                  |        | 14               | 26 | 83  | 12  | 2 |
| 125051500 CM | CMX                  |        | 15               | 32 | 92  | 16  | 2 |
| 125051600 CM | CMX                  |        | 16               | 32 | 92  | 16  | 2 |
| 125051800 CM | CMX                  |        | 18               | 32 | 92  | 16  | 2 |
| 125052000 CM | CMX                  |        | 20               | 38 | 104 | 20  | 2 |
| 125052200 CM | CMX                  |        | 22               | 38 | 104 | 20  | 2 |
| 125052500 CM | CMX                  |        | 25               | 45 | 121 | 25  | 2 |
| 125052800 CM | CMX                  |        | 28               | 45 | 121 | 25  | 2 |
| 125053000 CM | CMX                  |        | 30               | 45 | 121 | 25  | 2 |
| 125053200 CM | CMX                  |        | 32               | 53 | 133 | 32  | 2 |

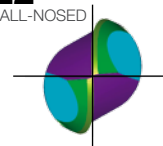


parametri tecnici a pag. / for technical parameters see page 119



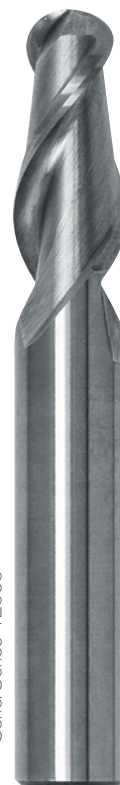
**Z2**

BALL-NOSED



Serie/Series 12120

Serie/Series 12505



## MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 12120           | ○                   | ○            | ●                                             | ●                                                    | ●                                | ○                | ○                  |
| 12505           | ○                   | ○            | ●                                             | ●                                                    | ●                                | ○                | ○                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

WWW.UOP.IT



# HSS-PM HSS-PM Line

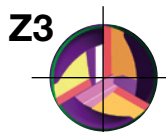
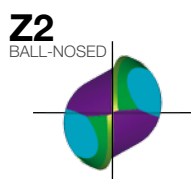
## Serie/Series 12520

Frese a due taglienti a testa emisferica  
Ball nosed two flute end drills

## 14105

Frese a tre taglienti ad alte prestazioni  
Three flute end mills

ALTE PRESTAZIONI  
HIGH PERFORMANCE



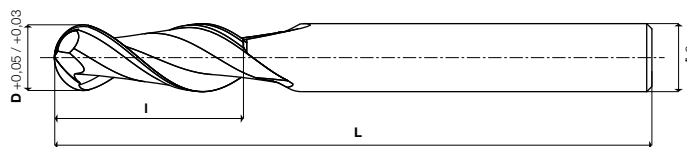
**Skin**  
Rivestimento/Coating



Serie/Series 12520



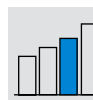
Serie/Series 14105



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W

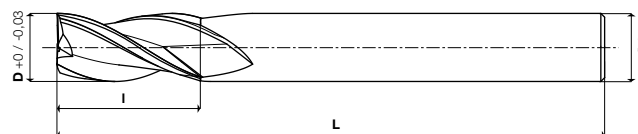
ISO 1641/I



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|-----|-----|-----|---|
| 125200300 CM | CMX                  |        | 3                | 12  | 56  | 6   | 2 |
| 125200400 CM | CMX                  |        | 4                | 19  | 63  | 6   | 2 |
| 125200500 CM | CMX                  |        | 5                | 24  | 68  | 6   | 2 |
| 125200600 CM | CMX                  |        | 6                | 24  | 68  | 6   | 2 |
| 125200800 CM | CMX                  |        | 8                | 38  | 88  | 10  | 2 |
| 125201000 CM | CMX                  |        | 10               | 45  | 95  | 10  | 2 |
| 125201200 CM | CMX                  |        | 12               | 53  | 110 | 12  | 2 |
| 125201400 CM | CMX                  |        | 14               | 53  | 110 | 12  | 2 |
| 125201500 CM | CMX                  |        | 15               | 63  | 123 | 16  | 2 |
| 125201600 CM | CMX                  |        | 16               | 63  | 123 | 16  | 2 |
| 125201800 CM | CMX                  |        | 18               | 63  | 123 | 16  | 2 |
| 125202000 CM | CMX                  |        | 20               | 75  | 141 | 20  | 2 |
| 125202200 CM | CMX                  |        | 22               | 75  | 141 | 20  | 2 |
| 125202500 CM | CMX                  |        | 25               | 90  | 166 | 25  | 2 |
| 125202800 CM | CMX                  |        | 28               | 90  | 166 | 25  | 2 |
| 125203000 CM | CMX                  |        | 30               | 90  | 166 | 25  | 2 |
| 125203200 CM | CMX                  |        | 32               | 106 | 186 | 32  | 2 |



parametri tecnici a pag. 1 for technical parameters see page 119



$\lambda^\circ s$   
32

N

UNI 8244  
DIN 844A  
ISO 1641/I

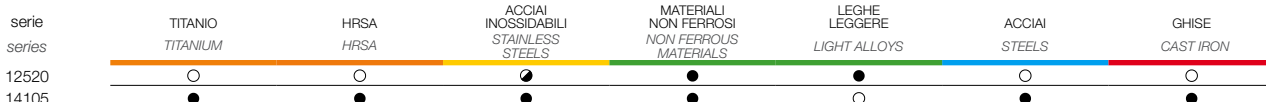


| Cod. Art.     | X-105<br>(PM Co 10,5%) | D +0<br>-0,03 | I  | L   | dh6 | Z |
|---------------|------------------------|---------------|----|-----|-----|---|
| 141050600 EMX |                        | 6             | 13 | 57  | 6   | 3 |
| 141050800 EMX |                        | 8             | 19 | 69  | 10  | 3 |
| 141051000 EMX |                        | 10            | 22 | 72  | 10  | 3 |
| 141051200 EMX |                        | 12            | 26 | 83  | 12  | 3 |
| 141051400 EMX |                        | 14            | 26 | 83  | 12  | 3 |
| 141051600 EMX |                        | 16            | 32 | 92  | 16  | 3 |
| 141051800 EMX |                        | 18            | 32 | 92  | 16  | 3 |
| 141052001 EMX |                        | 20            | 38 | 104 | 20  | 3 |



parametri tecnici a pag. 1 for technical parameters see page 126

### MATERIALI LAVORABILI / WORKPIECE MATERIALS



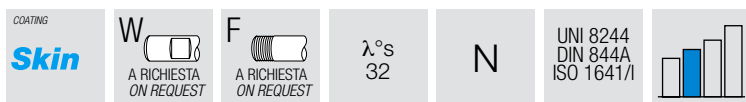
● consigliata/recommended ○ accettabile/acceptable ○ non consigliata/not recommended



HSS-PM  
**HSS-PM Line**

Serie/Series  
**14105**

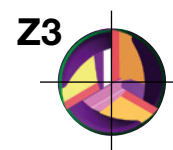
Frese a tre taglienti  
Three flute end mills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0<br>-0,03 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|---------------|----|-----|-----|---|
| 141050200 CM | CMX                  |        | 2             | 7  | 51  | 6   | 3 |
| 141050250 CM | CMX                  |        | 2,5           | 8  | 52  | 6   | 3 |
| 141050300 CM | CMX                  |        | 3             | 8  | 52  | 6   | 3 |
| 141050350 CM | CMX                  |        | 3,5           | 10 | 54  | 6   | 3 |
| 141050400 CM | CMX                  |        | 4             | 11 | 55  | 6   | 3 |
| 141050450 CM | CMX                  |        | 4,5           | 11 | 55  | 6   | 3 |
| 141050500 CM | CMX                  |        | 5             | 13 | 57  | 6   | 3 |
| 141050550 CM | CMX                  |        | 5,5           | 13 | 57  | 6   | 3 |
| 141050600 CM | CMX                  |        | 6             | 13 | 57  | 6   | 3 |
| 141050650 CM | CMX                  |        | 6,5           | 16 | 66  | 10  | 3 |
| 141050700 CM | CMX                  |        | 7             | 16 | 66  | 10  | 3 |
| 141050800 CM | CMX                  |        | 8             | 19 | 69  | 10  | 3 |
| 141050900 CM | CMX                  |        | 9             | 19 | 69  | 10  | 3 |
| 141051000 CM | CMX                  |        | 10            | 22 | 72  | 10  | 3 |
| 141051100 CM | CMX                  |        | 11            | 22 | 79  | 12  | 3 |
| 141051200 CM | CMX                  |        | 12            | 26 | 83  | 12  | 3 |
| 141051300 CM | CMX                  |        | 13            | 26 | 83  | 12  | 3 |
| 141051400 CM | CMX                  |        | 14            | 26 | 83  | 12  | 3 |
| 141051500 CM | CMX                  |        | 15            | 32 | 92  | 16  | 3 |
| 141051600 CM | CMX                  |        | 16            | 32 | 92  | 16  | 3 |
| 141051700 CM | CMX                  |        | 17            | 32 | 92  | 16  | 3 |
| 141051800 CM | CMX                  |        | 18            | 32 | 92  | 16  | 3 |
| 141051900 CM | CMX                  |        | 19            | 38 | 98  | 16  | 3 |
| 141052000 CM | CMX                  |        | 20            | 38 | 98  | 16  | 3 |
| 141052200 CM | CMX                  |        | 22            | 38 | 104 | 20  | 3 |
| 141052400 CM | CMX                  |        | 24            | 45 | 121 | 25  | 3 |
| 141052500 CM | CMX                  |        | 25            | 45 | 121 | 25  | 3 |
| 141052600 CM | CMX                  |        | 26            | 45 | 121 | 25  | 3 |
| 141052800 CM | CMX                  |        | 28            | 45 | 121 | 25  | 3 |
| 141053000 CM | CMX                  |        | 30            | 45 | 121 | 25  | 3 |
| 141053200 CM | CMX                  |        | 32            | 53 | 133 | 32  | 3 |
| 141053400 CM | CMX                  |        | 34            | 53 | 133 | 32  | 3 |
| 141053500 CM | CMX                  |        | 35            | 53 | 133 | 32  | 3 |
| 141053600 CM | CMX                  |        | 36            | 53 | 133 | 32  | 3 |
| 141053800 CM | CMX                  |        | 38            | 63 | 143 | 32  | 3 |
| 141054000 CM | CMX                  |        | 40            | 63 | 143 | 32  | 3 |
| 141054500 CM | CMX                  |        | 45            | 63 | 143 | 32  | 3 |
| 141054800 CM | CMX                  |        | 48            | 75 | 155 | 32  | 3 |
| 141055000 CM | CMX                  |        | 50            | 75 | 155 | 32  | 3 |



parametri tecnici a pag. / for technical parameters see page 121



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 14105           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

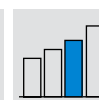
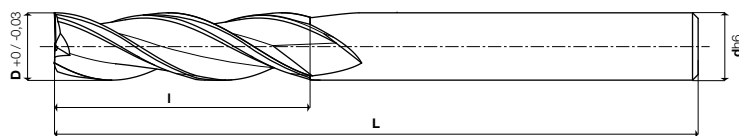
○ non consigliata/not recommended

WWW.UOP.IT

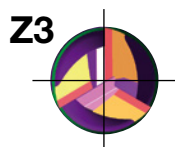
51

## Serie/Series 14120

Frese a tre taglienti  
Three flute end mills



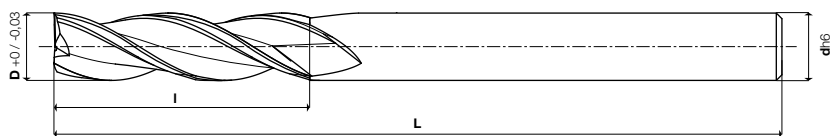
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0<br>-0,03 | I   | L   | dh6 | Z |
|--------------|----------------------|--------|---------------|-----|-----|-----|---|
| 141200200 CM | CMX                  |        | 2             | 10  | 54  | 6   | 3 |
| 141200300 CM | CMX                  |        | 3             | 12  | 56  | 6   | 3 |
| 141200400 CM | CMX                  |        | 4             | 19  | 63  | 6   | 3 |
| 141200500 CM | CMX                  |        | 5             | 24  | 68  | 6   | 3 |
| 141200600 CM | CMX                  |        | 6             | 24  | 68  | 6   | 3 |
| 141200700 CM | CMX                  |        | 7             | 30  | 80  | 10  | 3 |
| 141200800 CM | CMX                  |        | 8             | 38  | 88  | 10  | 3 |
| 141200900 CM | CMX                  |        | 9             | 38  | 88  | 10  | 3 |
| 141201000 CM | CMX                  |        | 10            | 45  | 95  | 10  | 3 |
| 141201100 CM | CMX                  |        | 11            | 45  | 102 | 12  | 3 |
| 141201200 CM | CMX                  |        | 12            | 53  | 110 | 12  | 3 |
| 141201300 CM | CMX                  |        | 13            | 53  | 110 | 12  | 3 |
| 141201400 CM | CMX                  |        | 14            | 53  | 110 | 12  | 3 |
| 141201500 CM | CMX                  |        | 15            | 63  | 123 | 16  | 3 |
| 141201600 CM | CMX                  |        | 16            | 63  | 123 | 16  | 3 |
| 141201700 CM | CMX                  |        | 17            | 63  | 123 | 16  | 3 |
| 141201800 CM | CMX                  |        | 18            | 63  | 123 | 16  | 3 |
| 141201900 CM | CMX                  |        | 19            | 75  | 135 | 16  | 3 |
| 141202000 CM | CMX                  |        | 20            | 75  | 135 | 16  | 3 |
| 141202200 CM | CMX                  |        | 22            | 75  | 141 | 20  | 3 |
| 141202400 CM | CMX                  |        | 24            | 90  | 166 | 25  | 3 |
| 141202500 CM | CMX                  |        | 25            | 90  | 166 | 25  | 3 |
| 141202600 CM | CMX                  |        | 26            | 90  | 166 | 25  | 3 |
| 141202800 CM | CMX                  |        | 28            | 90  | 166 | 25  | 3 |
| 141203000 CM | CMX                  |        | 30            | 90  | 166 | 25  | 3 |
| 141203200 CM | CMX                  |        | 32            | 106 | 186 | 32  | 3 |
| 141203400 CM | CMX                  |        | 34            | 106 | 186 | 32  | 3 |
| 141203500 CM | CMX                  |        | 35            | 106 | 186 | 32  | 3 |
| 141203600 CM | CMX                  |        | 36            | 106 | 186 | 32  | 3 |
| 141203800 CM | CMX                  |        | 38            | 125 | 205 | 32  | 3 |
| 141204000 CM | CMX                  |        | 40            | 125 | 205 | 32  | 3 |



parametri tecnici a pag. 1 / for technical parameters see page 121

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

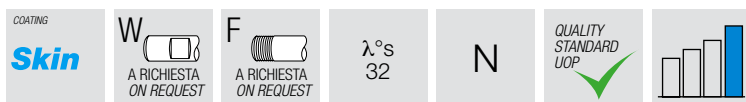
| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 14120           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |



HSS-PM  
**HSS-PM Line**

Serie/Series  
**14135**

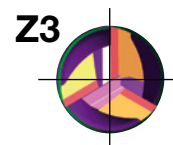
Frese a tre taglienti  
Three flute end mills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D <sup>+0</sup> <sub>-0,03</sub> | I   | L   | dh6 | Z |
|--------------|----------------------|--------|----------------------------------|-----|-----|-----|---|
| 141350600 CM | CMX                  |        | 6                                | 56  | 106 | 10  | 3 |
| 141350700 CM | CMX                  |        | 7                                | 63  | 113 | 10  | 3 |
| 141350800 CM | CMX                  |        | 8                                | 63  | 113 | 10  | 3 |
| 141350900 CM | CMX                  |        | 9                                | 70  | 120 | 10  | 3 |
| 141351000 CM | CMX                  |        | 10                               | 70  | 120 | 10  | 3 |
| 141351100 CM | CMX                  |        | 11                               | 80  | 137 | 12  | 3 |
| 141351200 CM | CMX                  |        | 12                               | 80  | 137 | 12  | 3 |
| 141351300 CM | CMX                  |        | 13                               | 80  | 137 | 12  | 3 |
| 141351400 CM | CMX                  |        | 14                               | 80  | 137 | 12  | 3 |
| 141351500 CM | CMX                  |        | 15                               | 90  | 150 | 16  | 3 |
| 141351600 CM | CMX                  |        | 16                               | 90  | 150 | 16  | 3 |
| 141351700 CM | CMX                  |        | 17                               | 90  | 150 | 16  | 3 |
| 141351800 CM | CMX                  |        | 18                               | 100 | 166 | 20  | 3 |
| 141351900 CM | CMX                  |        | 19                               | 110 | 176 | 20  | 3 |
| 141352000 CM | CMX                  |        | 20                               | 110 | 176 | 20  | 3 |
| 141352200 CM | CMX                  |        | 22                               | 110 | 176 | 20  | 3 |
| 141352500 CM | CMX                  |        | 25                               | 125 | 201 | 25  | 3 |
| 141352800 CM | CMX                  |        | 28                               | 135 | 211 | 25  | 3 |
| 141353000 CM | CMX                  |        | 30                               | 140 | 216 | 25  | 3 |
| 141353200 CM | CMX                  |        | 32                               | 150 | 230 | 32  | 3 |



parametri tecnici a pag. / for technical parameters see page 121



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 14135           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

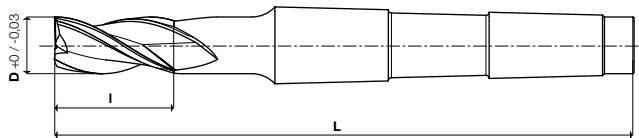
○ non consigliata/not recommended

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Serie/Series

**14150**

Frese a tre taglienti  
Three flute end mills



COATING  
**Skin**

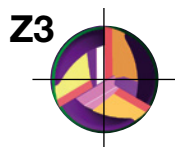
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32

N

UNI 8250  
DIN 845B  
ISO 1641/II



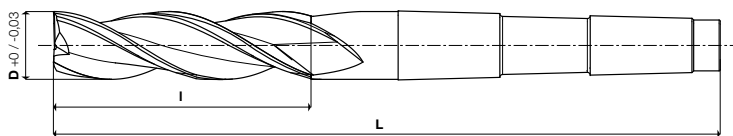
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0<br>-0,03 | I  | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|----|-----|----------------|---|
| 141501000 CM | CMX                  |        | 10            | 22 | 92  | 1              | 3 |
| 141501200 CM | CMX                  |        | 12            | 26 | 96  | 1              | 3 |
| 141501400 CM | CMX                  |        | 14            | 26 | 111 | 2              | 3 |
| 141501500 CM | CMX                  |        | 15            | 32 | 117 | 2              | 3 |
| 141501600 CM | CMX                  |        | 16            | 32 | 117 | 2              | 3 |
| 141501800 CM | CMX                  |        | 18            | 32 | 117 | 2              | 3 |
| 141502000 CM | CMX                  |        | 20            | 38 | 140 | 3              | 3 |
| 141502200 CM | CMX                  |        | 22            | 38 | 140 | 3              | 3 |
| 141502400 CM | CMX                  |        | 24            | 45 | 147 | 3              | 3 |
| 141502500 CM | CMX                  |        | 25            | 45 | 147 | 3              | 3 |
| 141502600 CM | CMX                  |        | 26            | 45 | 147 | 3              | 3 |
| 141502800 CM | CMX                  |        | 28            | 45 | 147 | 3              | 3 |
| 141503000 CM | CMX                  |        | 30            | 53 | 155 | 3              | 3 |
| 141503200 CM | CMX                  |        | 32            | 53 | 178 | 4              | 3 |
| 141503400 CM | CMX                  |        | 34            | 53 | 178 | 4              | 3 |
| 141503500 CM | CMX                  |        | 35            | 53 | 178 | 4              | 3 |
| 141503600 CM | CMX                  |        | 36            | 53 | 178 | 4              | 3 |
| 141503800 CM | CMX                  |        | 38            | 63 | 188 | 4              | 3 |
| 141504000 CM | CMX                  |        | 40            | 63 | 188 | 4              | 3 |
| 141504500 CM | CMX                  |        | 45            | 63 | 188 | 4              | 3 |
| 141505000 CM | CMX                  |        | 50            | 75 | 200 | 4              | 3 |



Cono Morse  
Morse Taper

MATERIALI LAVORABILI / WORKPIECE MATERIALS





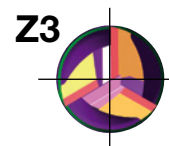
HSS-PM  
**HSS-PM Line**

Serie/Series  
**14155**

Frese a tre taglienti  
Three flute end mills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0<br>-0,03 | I   | L | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|---|----------------|---|
| 141551000 CM | CMX                  | 10     | 45            | 115 | 1 | 3              |   |
| 141551200 CM | CMX                  | 12     | 53            | 123 | 1 | 3              |   |
| 141551400 CM | CMX                  | 14     | 53            | 138 | 2 | 3              |   |
| 141551500 CM | CMX                  | 15     | 63            | 148 | 2 | 3              |   |
| 141551600 CM | CMX                  | 16     | 63            | 148 | 2 | 3              |   |
| 141551800 CM | CMX                  | 18     | 63            | 148 | 2 | 3              |   |
| 141552000 CM | CMX                  | 20     | 75            | 177 | 3 | 3              |   |
| 141552200 CM | CMX                  | 22     | 75            | 177 | 3 | 3              |   |
| 141552400 CM | CMX                  | 24     | 90            | 192 | 3 | 3              |   |
| 141552500 CM | CMX                  | 25     | 90            | 192 | 3 | 3              |   |
| 141552600 CM | CMX                  | 26     | 90            | 192 | 3 | 3              |   |
| 141552800 CM | CMX                  | 28     | 90            | 192 | 3 | 3              |   |
| 141553000 CM | CMX                  | 30     | 90            | 192 | 3 | 3              |   |
| 141553200 CM | CMX                  | 32     | 106           | 231 | 4 | 3              |   |
| 141553400 CM | CMX                  | 34     | 106           | 231 | 4 | 3              |   |
| 141553500 CM | CMX                  | 35     | 106           | 231 | 4 | 3              |   |
| 141553600 CM | CMX                  | 36     | 106           | 231 | 4 | 3              |   |
| 141553800 CM | CMX                  | 38     | 125           | 250 | 4 | 3              |   |
| 141554000 CM | CMX                  | 40     | 125           | 250 | 4 | 3              |   |
| 141554500 CM | CMX                  | 45     | 125           | 250 | 4 | 3              |   |
| 141555000 CM | CMX                  | 50     | 150           | 275 | 4 | 3              |   |



Cono Morse  
Morse Taper

MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 14155           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

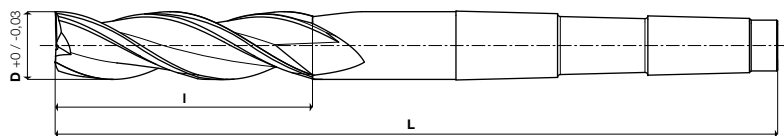
○ non consigliata/not recommended

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55

## Serie/Series 14160

Frese a tre taglienti  
Three flute end mills



COATING  
**Skin**

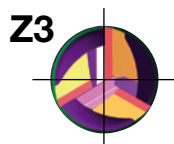
$\lambda^\circ$ s  
32

N

QUALITY  
STANDARD  
UOP



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0<br>-0,03 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|-----|----------------|---|
| 141601000 CM | CMX                  |        | 10            | 70  | 155 | 2              | 3 |
| 141601200 CM | CMX                  |        | 12            | 80  | 165 | 2              | 3 |
| 141601400 CM | CMX                  |        | 14            | 80  | 165 | 2              | 3 |
| 141601500 CM | CMX                  |        | 15            | 90  | 175 | 2              | 3 |
| 141601600 CM | CMX                  |        | 16            | 90  | 175 | 2              | 3 |
| 141601800 CM | CMX                  |        | 18            | 100 | 202 | 3              | 3 |
| 141602000 CM | CMX                  |        | 20            | 110 | 212 | 3              | 3 |
| 141602200 CM | CMX                  |        | 22            | 110 | 212 | 3              | 3 |
| 141602400 CM | CMX                  |        | 24            | 125 | 227 | 3              | 3 |
| 141602500 CM | CMX                  |        | 25            | 125 | 250 | 4              | 3 |
| 141602600 CM | CMX                  |        | 26            | 125 | 250 | 4              | 3 |
| 141602800 CM | CMX                  |        | 28            | 135 | 260 | 4              | 3 |
| 141603000 CM | CMX                  |        | 30            | 140 | 265 | 4              | 3 |
| 141603200 CM | CMX                  |        | 32            | 150 | 275 | 4              | 3 |
| 141603400 CM | CMX                  |        | 34            | 150 | 275 | 4              | 3 |
| 141603500 CM | CMX                  |        | 35            | 150 | 275 | 4              | 3 |
| 141603600 CM | CMX                  |        | 36            | 150 | 275 | 4              | 3 |
| 141603800 CM | CMX                  |        | 38            | 180 | 305 | 4              | 3 |
| 141604000 CM | CMX                  |        | 40            | 180 | 305 | 4              | 3 |
| 141604500 CM | CMX                  |        | 45            | 190 | 315 | 4              | 3 |
| 141605000 CM | CMX                  |        | 50            | 200 | 325 | 4              | 3 |



Cono Morse  
Morse Taper

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 14160           | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |



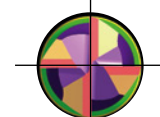
## Serie/Series TORNADO 14505

Frese "Tornado"  
"Tornado" end mills

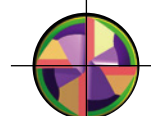
## 14520

Frese "Tornado"  
"Tornado" end mills

Z3÷4



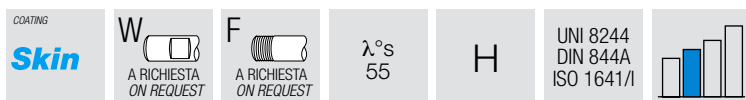
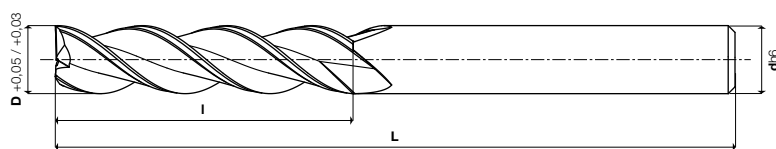
Z3÷4



Serie/Series 14505



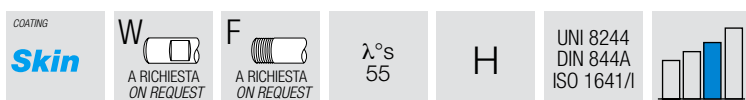
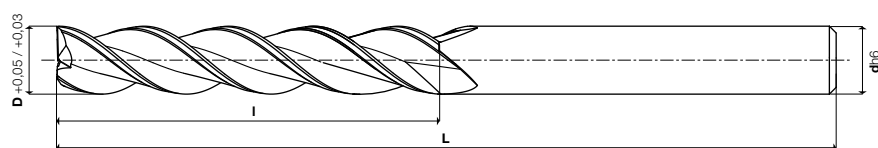
Serie/Series 14520



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|----|-----|-----|---|
| 145050300 CM | CMX                  |        | 3                | 8  | 52  | 6   | 3 |
| 145050400 CM | CMX                  |        | 4                | 11 | 55  | 6   | 3 |
| 145050500 CM | CMX                  |        | 5                | 13 | 57  | 6   | 3 |
| 145050600 CM | CMX                  |        | 6                | 13 | 57  | 6   | 3 |
| 145050700 CM | CMX                  |        | 7                | 16 | 66  | 10  | 3 |
| 145050800 CM | CMX                  |        | 8                | 19 | 69  | 10  | 3 |
| 145050900 CM | CMX                  |        | 9                | 19 | 69  | 10  | 3 |
| 145051000 CM | CMX                  |        | 10               | 22 | 72  | 10  | 3 |
| 145051200 CM | CMX                  |        | 12               | 26 | 83  | 12  | 3 |
| 145051400 CM | CMX                  |        | 14               | 26 | 83  | 12  | 3 |
| 145051500 CM | CMX                  |        | 15               | 32 | 92  | 16  | 3 |
| 145051600 CM | CMX                  |        | 16               | 32 | 92  | 16  | 3 |
| 145051800 CM | CMX                  |        | 18               | 32 | 92  | 16  | 3 |
| 145052000 CM | CMX                  |        | 20               | 38 | 104 | 20  | 3 |
| 145052200 CM | CMX                  |        | 22               | 38 | 104 | 20  | 3 |
| 145052500 CM | CMX                  |        | 25               | 45 | 121 | 25  | 4 |



parametri tecnici a pag. / for technical parameters see page 121



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|----|-----|-----|---|
| 145200300 CM | CMX                  |        | 3                | 12 | 56  | 6   | 3 |
| 145200400 CM | CMX                  |        | 4                | 19 | 63  | 6   | 3 |
| 145200500 CM | CMX                  |        | 5                | 24 | 68  | 6   | 3 |
| 145200600 CM | CMX                  |        | 6                | 24 | 68  | 6   | 3 |
| 145200700 CM | CMX                  |        | 7                | 30 | 80  | 10  | 3 |
| 145200800 CM | CMX                  |        | 8                | 38 | 88  | 10  | 3 |
| 145200900 CM | CMX                  |        | 9                | 38 | 88  | 10  | 3 |
| 145201000 CM | CMX                  |        | 10               | 45 | 95  | 10  | 3 |
| 145201200 CM | CMX                  |        | 12               | 53 | 110 | 12  | 3 |
| 145201400 CM | CMX                  |        | 14               | 53 | 110 | 12  | 3 |
| 145201500 CM | CMX                  |        | 15               | 63 | 123 | 16  | 3 |
| 145201600 CM | CMX                  |        | 16               | 63 | 123 | 16  | 3 |
| 145201800 CM | CMX                  |        | 18               | 63 | 123 | 16  | 3 |
| 145202000 CM | CMX                  |        | 20               | 75 | 141 | 20  | 3 |
| 145202200 CM | CMX                  |        | 22               | 75 | 141 | 20  | 3 |
| 145202500 CM | CMX                  |        | 25               | 90 | 166 | 25  | 4 |



parametri tecnici a pag. / for technical parameters see page 121

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 14505           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 14520           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

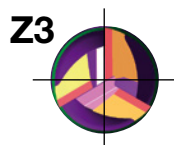
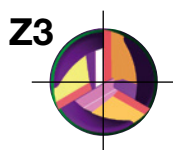
# HSS-PM HSS-PM Line

## Serie/Series 14805

Frese a tre taglienti  
Three flute end mills

## 14820

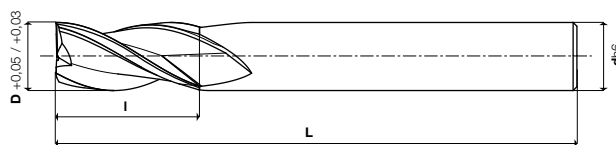
Frese a tre taglienti  
Three flute end mills



Serie/Series 14805



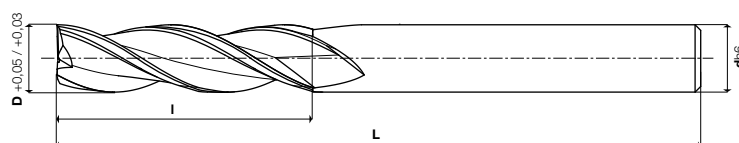
Serie/Series 14820



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|----|-----|-----|---|
| 148050300 CM | CMX                  | CMX    | 3                | 14 | 58  | 6   | 3 |
| 148050400 CM | CMX                  | CMX    | 4                | 18 | 62  | 6   | 3 |
| 148050500 CM | CMX                  | CMX    | 5                | 20 | 64  | 6   | 3 |
| 148050600 CM | CMX                  | CMX    | 6                | 22 | 66  | 6   | 3 |
| 148050700 CM | CMX                  | CMX    | 7                | 22 | 72  | 10  | 3 |
| 148050800 CM | CMX                  | CMX    | 8                | 25 | 75  | 10  | 3 |
| 148050900 CM | CMX                  | CMX    | 9                | 25 | 75  | 10  | 3 |
| 148051000 CM | CMX                  | CMX    | 10               | 28 | 78  | 10  | 3 |
| 148051200 CM | CMX                  | CMX    | 12               | 32 | 89  | 12  | 3 |
| 148051400 CM | CMX                  | CMX    | 14               | 32 | 89  | 12  | 3 |
| 148051600 CM | CMX                  | CMX    | 16               | 36 | 96  | 16  | 3 |
| 148051800 CM | CMX                  | CMX    | 18               | 40 | 100 | 16  | 3 |
| 148052000 CM | CMX                  | CMX    | 20               | 45 | 110 | 20  | 3 |
| 148052200 CM | CMX                  | CMX    | 22               | 45 | 110 | 20  | 3 |
| 148052500 CM | CMX                  | CMX    | 25               | 50 | 125 | 25  | 3 |
| 148052800 CM | CMX                  | CMX    | 28               | 56 | 132 | 25  | 3 |
| 148053000 CM | CMX                  | CMX    | 30               | 63 | 140 | 25  | 3 |
| 148053200 CM | CMX                  | CMX    | 32               | 63 | 143 | 32  | 3 |
| 148053600 CM | CMX                  | CMX    | 36               | 70 | 150 | 32  | 3 |
| 148054000 CM | CMX                  | CMX    | 40               | 70 | 150 | 32  | 3 |



parametri tecnici a pag. 1 for technical parameters see page 122



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|-----|-----|-----|---|
| 148200300 CM | CMX                  | CMX    | 3                | 18  | 62  | 6   | 3 |
| 148200400 CM | CMX                  | CMX    | 4                | 22  | 65  | 6   | 3 |
| 148200500 CM | CMX                  | CMX    | 5                | 26  | 70  | 6   | 3 |
| 148200600 CM | CMX                  | CMX    | 6                | 30  | 75  | 6   | 3 |
| 148200700 CM | CMX                  | CMX    | 7                | 34  | 84  | 10  | 3 |
| 148200800 CM | CMX                  | CMX    | 8                | 34  | 84  | 10  | 3 |
| 148200900 CM | CMX                  | CMX    | 9                | 40  | 90  | 10  | 3 |
| 148201000 CM | CMX                  | CMX    | 10               | 40  | 90  | 10  | 3 |
| 148201200 CM | CMX                  | CMX    | 12               | 56  | 113 | 12  | 3 |
| 148201400 CM | CMX                  | CMX    | 14               | 63  | 120 | 12  | 3 |
| 148201600 CM | CMX                  | CMX    | 16               | 63  | 123 | 16  | 3 |
| 148201800 CM | CMX                  | CMX    | 18               | 71  | 131 | 16  | 3 |
| 148202000 CM | CMX                  | CMX    | 20               | 71  | 137 | 20  | 3 |
| 148202200 CM | CMX                  | CMX    | 22               | 80  | 146 | 20  | 3 |
| 148202500 CM | CMX                  | CMX    | 25               | 80  | 156 | 25  | 3 |
| 148202800 CM | CMX                  | CMX    | 28               | 90  | 166 | 25  | 3 |
| 148203000 CM | CMX                  | CMX    | 30               | 90  | 166 | 25  | 3 |
| 148203200 CM | CMX                  | CMX    | 32               | 90  | 170 | 32  | 3 |
| 148203600 CM | CMX                  | CMX    | 36               | 100 | 180 | 32  | 3 |
| 148204000 CM | CMX                  | CMX    | 40               | 100 | 180 | 32  | 3 |



parametri tecnici a pag. 1 for technical parameters see page 122

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 14805 | ○                   | ○            | ○                                             | ●                                                    | ●                                | ○                | ○                  |
| 14820 | ○                   | ○            | ○                                             | ●                                                    | ●                                | ○                | ○                  |

Serie/Series  
**14850**

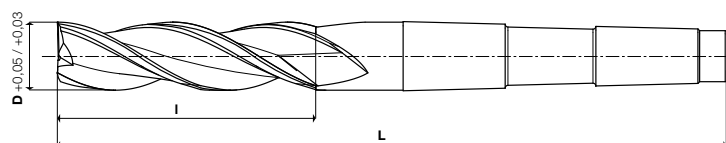
Frese a tre taglienti  
Three flute end mills

**14855**

Frese a tre taglienti  
Three flute end mills



| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | MORSE<br>TAPER | Z |
|-----------|----------------------|--------|------------------|----|-----|----------------|---|
| 148501000 | CM                   | CMX    | 10               | 28 | 98  | 1              | 3 |
| 148501200 | CM                   | CMX    | 12               | 32 | 102 | 1              | 3 |
| 148501400 | CM                   | CMX    | 14               | 32 | 117 | 2              | 3 |
| 148501500 | CM                   | CMX    | 15               | 35 | 120 | 2              | 3 |
| 148501600 | CM                   | CMX    | 16               | 35 | 120 | 2              | 3 |
| 148501800 | CM                   | CMX    | 18               | 40 | 125 | 2              | 3 |
| 148502000 | CM                   | CMX    | 20               | 45 | 147 | 3              | 3 |
| 148502200 | CM                   | CMX    | 22               | 45 | 147 | 3              | 3 |
| 148502400 | CM                   | CMX    | 24               | 50 | 152 | 3              | 3 |
| 148502500 | CM                   | CMX    | 25               | 50 | 152 | 3              | 3 |
| 148502600 | CM                   | CMX    | 26               | 56 | 158 | 3              | 3 |
| 148502800 | CM                   | CMX    | 28               | 56 | 158 | 3              | 3 |
| 148503000 | CM                   | CMX    | 30               | 63 | 165 | 3              | 3 |
| 148503200 | CM                   | CMX    | 32               | 63 | 188 | 4              | 3 |
| 148503400 | CM                   | CMX    | 34               | 70 | 195 | 4              | 3 |
| 148503500 | CM                   | CMX    | 35               | 70 | 195 | 4              | 3 |
| 148503600 | CM                   | CMX    | 36               | 70 | 195 | 4              | 3 |
| 148503800 | CM                   | CMX    | 38               | 70 | 195 | 4              | 3 |
| 148504000 | CM                   | CMX    | 40               | 70 | 195 | 4              | 3 |
| 148504500 | CM                   | CMX    | 45               | 80 | 205 | 4              | 3 |
| 148505000 | CM                   | CMX    | 50               | 90 | 215 | 4              | 3 |



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|------------------|-----|---|----------------|---|
| 148551000 CM | CMX                  | 10     | 45               | 115 | 1 | 3              |   |
| 148551200 CM | CMX                  | 12     | 50               | 120 | 1 | 3              |   |
| 148551400 CM | CMX                  | 14     | 50               | 135 | 2 | 3              |   |
| 148551500 CM | CMX                  | 15     | 50               | 135 | 2 | 3              |   |
| 148551600 CM | CMX                  | 16     | 56               | 141 | 2 | 3              |   |
| 148551800 CM | CMX                  | 18     | 63               | 148 | 2 | 3              |   |
| 148552000 CM | CMX                  | 20     | 70               | 172 | 3 | 3              |   |
| 148552200 CM | CMX                  | 22     | 70               | 172 | 3 | 3              |   |
| 148552400 CM | CMX                  | 24     | 80               | 182 | 3 | 3              |   |
| 148552500 CM | CMX                  | 25     | 80               | 182 | 3 | 3              |   |
| 148552600 CM | CMX                  | 26     | 80               | 182 | 3 | 3              |   |
| 148552800 CM | CMX                  | 28     | 90               | 192 | 3 | 3              |   |
| 148553000 CM | CMX                  | 30     | 90               | 192 | 3 | 3              |   |
| 148553200 CM | CMX                  | 32     | 100              | 225 | 4 | 3              |   |
| 148553400 CM | CMX                  | 34     | 110              | 235 | 4 | 3              |   |
| 148553500 CM | CMX                  | 35     | 110              | 235 | 4 | 3              |   |
| 148553600 CM | CMX                  | 36     | 110              | 235 | 4 | 3              |   |
| 148553800 CM | CMX                  | 38     | 110              | 235 | 4 | 3              |   |
| 148554000 CM | CMX                  | 40     | 110              | 235 | 4 | 3              |   |
| 148554500 CM | CMX                  | 45     | 120              | 245 | 4 | 3              |   |
| 148555000 CM | CMX                  | 50     | 130              | 255 | 4 | 3              |   |



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 14850 | ○                   | ○            | ○                                             | ●                                                    | ●                                | ○                | ○                  |
| 14855 | ○                   | ○            | ○                                             | ●                                                    | ●                                | ○                | ○                  |

● consigliata/recommended ● accettabile/acceptable ○ non consigliata/not recommended



# HSS-PM HSS-PM Line

Serie/Series

## 15105

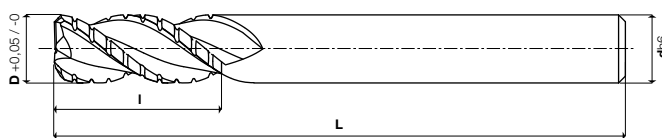
Frese a tre taglienti a **SEMIFINIRE**

Three flute roughing and semi-finishing end mills

## 15120

Frese a tre taglienti a **SEMIFINIRE**

Three flute roughing and semi-finishing end mills



COATING

**Skin**  
Alu

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}s$   
40

WF

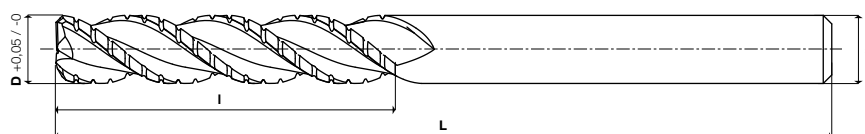
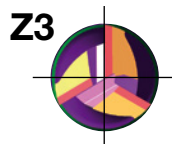
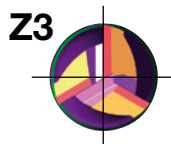
UNI 8244  
DIN 844A  
ISO 1641/I



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|---------------|----|-----|-----|---|
| 151050600 CM | CMX                  |        | 6             | 13 | 57  | 6   | 3 |
| 151050800 CM | CMX                  |        | 8             | 19 | 69  | 10  | 3 |
| 151051000 CM | CMX                  |        | 10            | 22 | 72  | 10  | 3 |
| 151051200 CM | CMX                  |        | 12            | 26 | 83  | 12  | 3 |
| 151051400 CM | CMX                  |        | 14            | 26 | 83  | 12  | 3 |
| 151051500 CM | CMX                  |        | 15            | 32 | 92  | 16  | 3 |
| 151051600 CM | CMX                  |        | 16            | 32 | 92  | 16  | 3 |
| 151051800 CM | CMX                  |        | 18            | 32 | 92  | 16  | 3 |
| 151052000 CM | CMX                  |        | 20            | 38 | 104 | 20  | 3 |
| 151052200 CM | CMX                  |        | 22            | 38 | 104 | 20  | 3 |
| 151052500 CM | CMX                  |        | 25            | 45 | 121 | 25  | 3 |
| 151052800 CM | CMX                  |        | 28            | 45 | 121 | 25  | 3 |
| 151053000 CM | CMX                  |        | 30            | 45 | 121 | 25  | 3 |
| 151053200 CM | CMX                  |        | 32            | 53 | 133 | 32  | 3 |
| 151053600 CM | CMX                  |        | 36            | 53 | 133 | 32  | 3 |
| 151054000 CM | CMX                  |        | 40            | 63 | 143 | 32  | 3 |



parametri tecnici a pag. 1 / for technical parameters see page 124



COATING

**Skin**  
Alu

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}s$   
40

WF

UNI 8244  
DIN 844A  
ISO 1641/I



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | dh6 | Z |
|--------------|----------------------|--------|---------------|-----|-----|-----|---|
| 151200600 CM | CMX                  |        | 6             | 24  | 68  | 6   | 3 |
| 151200800 CM | CMX                  |        | 8             | 38  | 88  | 10  | 3 |
| 151201000 CM | CMX                  |        | 10            | 45  | 95  | 10  | 3 |
| 151201200 CM | CMX                  |        | 12            | 53  | 110 | 12  | 3 |
| 151201400 CM | CMX                  |        | 14            | 53  | 110 | 12  | 3 |
| 151201500 CM | CMX                  |        | 15            | 63  | 123 | 16  | 3 |
| 151201600 CM | CMX                  |        | 16            | 63  | 123 | 16  | 3 |
| 151201800 CM | CMX                  |        | 18            | 63  | 123 | 16  | 3 |
| 151202000 CM | CMX                  |        | 20            | 75  | 141 | 20  | 3 |
| 151202200 CM | CMX                  |        | 22            | 75  | 141 | 20  | 3 |
| 151202500 CM | CMX                  |        | 25            | 90  | 166 | 25  | 3 |
| 151202800 CM | CMX                  |        | 28            | 90  | 166 | 25  | 3 |
| 151203000 CM | CMX                  |        | 30            | 90  | 166 | 32  | 3 |
| 151203200 CM | CMX                  |        | 32            | 106 | 186 | 32  | 3 |
| 151203600 CM | CMX                  |        | 36            | 106 | 186 | 32  | 3 |
| 151204000 CM | CMX                  |        | 40            | 125 | 205 | 32  | 3 |

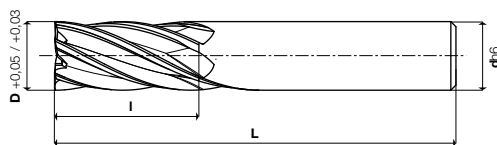


parametri tecnici a pag. 1 / for technical parameters see page 124

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 15105 | ○                   | ○            | ○                                             | ●                                                    | ●                                | ○                | ○                  |
| 15120 | ○                   | ○            | ○                                             | ●                                                    | ●                                | ○                | ○                  |





HSS-PM  
**HSS-PM Line**

Serie/Series  
**17105**

Frese a **FINIRE**  
Finishing end mills

COATING

**Skin**

W

A RICHIESTA  
ON REQUEST

F

A RICHIESTA  
ON REQUEST

$\lambda^{\circ}\text{S}$   
32

N

UNI 8244  
DIN 844A  
ISO 1641/1

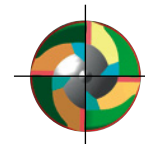


| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | dh6 | Z |
|-----------|----------------------|--------|------------------|----|-----|-----|---|
| 171050200 | CM                   | CMX    | 2                | 7  | 51  | 6   | 4 |
| 171050250 | CM                   | CMX    | 2,5              | 8  | 52  | 6   | 4 |
| 171050300 | CM                   | CMX    | 3                | 8  | 52  | 6   | 4 |
| 171050350 | CM                   | CMX    | 3,5              | 10 | 54  | 6   | 4 |
| 171050400 | CM                   | CMX    | 4                | 11 | 55  | 6   | 4 |
| 171050450 | CM                   | CMX    | 4,5              | 11 | 55  | 6   | 4 |
| 171050500 | CM                   | CMX    | 5                | 13 | 57  | 6   | 4 |
| 171050550 | CM                   | CMX    | 5,5              | 13 | 57  | 6   | 4 |
| 171050600 | CM                   | CMX    | 6                | 13 | 57  | 6   | 4 |
| 171050650 | CM                   | CMX    | 6,5              | 16 | 66  | 10  | 4 |
| 171050700 | CM                   | CMX    | 7                | 16 | 66  | 10  | 4 |
| 171050800 | CM                   | CMX    | 8                | 19 | 69  | 10  | 4 |
| 171050900 | CM                   | CMX    | 9                | 19 | 69  | 10  | 4 |
| 171051000 | CM                   | CMX    | 10               | 22 | 72  | 10  | 4 |
| 171051100 | CM                   | CMX    | 11               | 22 | 79  | 12  | 4 |
| 171051200 | CM                   | CMX    | 12               | 26 | 83  | 12  | 4 |
| 171051300 | CM                   | CMX    | 13               | 26 | 83  | 12  | 4 |
| 171051400 | CM                   | CMX    | 14               | 26 | 83  | 12  | 4 |
| 171051500 | CM                   | CMX    | 15               | 32 | 92  | 16  | 4 |
| 171051600 | CM                   | CMX    | 16               | 32 | 92  | 16  | 4 |
| 171051700 | CM                   | CMX    | 17               | 32 | 92  | 16  | 4 |
| 171051800 | CM                   | CMX    | 18               | 32 | 92  | 16  | 4 |
| 171051900 | CM                   | CMX    | 19               | 38 | 98  | 16  | 4 |
| 171052000 | CM                   | CMX    | 20               | 38 | 98  | 16  | 4 |
| 171052001 | CM                   | CMX    | 20               | 38 | 104 | 20  | 4 |
| 171052200 | CM                   | CMX    | 22               | 38 | 104 | 20  | 4 |
| 171052400 | CM                   | CMX    | 24               | 45 | 121 | 25  | 5 |
| 171052500 | CM                   | CMX    | 25               | 45 | 121 | 25  | 5 |
| 171052600 | CM                   | CMX    | 26               | 45 | 121 | 25  | 5 |
| 171052800 | CM                   | CMX    | 28               | 45 | 121 | 25  | 5 |
| 171053000 | CM                   | CMX    | 30               | 45 | 121 | 25  | 6 |
| 171053200 | CM                   | CMX    | 32               | 53 | 133 | 32  | 6 |
| 171053400 | CM                   | CMX    | 34               | 53 | 133 | 32  | 6 |
| 171053500 | CM                   | CMX    | 35               | 53 | 133 | 32  | 6 |
| 171053600 | CM                   | CMX    | 36               | 53 | 133 | 32  | 6 |
| 171053800 | CM                   | CMX    | 38               | 63 | 143 | 32  | 6 |
| 171054000 | CM                   | CMX    | 40               | 63 | 143 | 32  | 8 |
| 171054500 | CM                   | CMX    | 45               | 63 | 143 | 32  | 8 |
| 171054800 | CM                   | CMX    | 48               | 75 | 155 | 32  | 8 |
| 171055000 | CM                   | CMX    | 50               | 75 | 155 | 32  | 8 |



parametri tecnici a pag. / for technical parameters see page 123

**Z4÷8**



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 17105           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

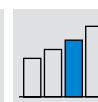
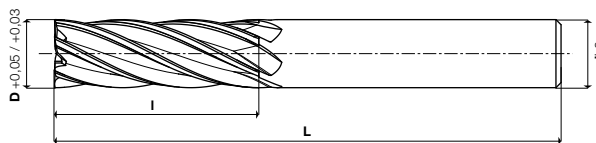
○ non consigliata/not recommended

WWW.UOP.IT

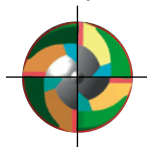
61

Serie/Series  
**17120**

Frese a **FINIRE**  
Finishing end mills



**Z4÷8**



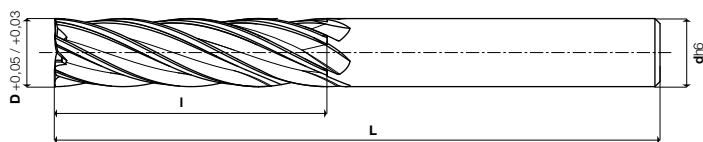
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|-----|-----|-----|---|
| 171200200 CM | CMX                  |        | 2                | 10  | 54  | 6   | 4 |
| 171200300 CM | CMX                  |        | 3                | 12  | 56  | 6   | 4 |
| 171200400 CM | CMX                  |        | 4                | 19  | 63  | 6   | 4 |
| 171200500 CM | CMX                  |        | 5                | 24  | 68  | 6   | 4 |
| 171200600 CM | CMX                  |        | 6                | 24  | 68  | 6   | 4 |
| 171200700 CM | CMX                  |        | 7                | 30  | 80  | 10  | 4 |
| 171200800 CM | CMX                  |        | 8                | 38  | 88  | 10  | 4 |
| 171200900 CM | CMX                  |        | 9                | 38  | 88  | 10  | 4 |
| 171201000 CM | CMX                  |        | 10               | 45  | 95  | 10  | 4 |
| 171201100 CM | CMX                  |        | 11               | 45  | 102 | 12  | 4 |
| 171201200 CM | CMX                  |        | 12               | 53  | 110 | 12  | 4 |
| 171201300 CM | CMX                  |        | 13               | 53  | 110 | 12  | 4 |
| 171201400 CM | CMX                  |        | 14               | 53  | 110 | 12  | 4 |
| 171201500 CM | CMX                  |        | 15               | 63  | 123 | 16  | 4 |
| 171201600 CM | CMX                  |        | 16               | 63  | 123 | 16  | 4 |
| 171201700 CM | CMX                  |        | 17               | 63  | 123 | 16  | 4 |
| 171201800 CM | CMX                  |        | 18               | 63  | 123 | 16  | 4 |
| 171201900 CM | CMX                  |        | 19               | 75  | 135 | 16  | 4 |
| 171202000 CM | CMX                  |        | 20               | 75  | 135 | 16  | 4 |
| 171202001 CM | CMX                  |        | 20               | 75  | 141 | 20  | 4 |
| 171202200 CM | CMX                  |        | 22               | 75  | 141 | 20  | 4 |
| 171202400 CM | CMX                  |        | 24               | 90  | 166 | 25  | 5 |
| 171202500 CM | CMX                  |        | 25               | 90  | 166 | 25  | 5 |
| 171202600 CM | CMX                  |        | 26               | 90  | 166 | 25  | 5 |
| 171202800 CM | CMX                  |        | 28               | 90  | 166 | 25  | 5 |
| 171203000 CM | CMX                  |        | 30               | 90  | 166 | 25  | 6 |
| 171203200 CM | CMX                  |        | 32               | 106 | 186 | 32  | 6 |
| 171203400 CM | CMX                  |        | 34               | 106 | 186 | 32  | 6 |
| 171203500 CM | CMX                  |        | 35               | 106 | 186 | 32  | 6 |
| 171203600 CM | CMX                  |        | 36               | 106 | 186 | 32  | 6 |
| 171203800 CM | CMX                  |        | 38               | 125 | 205 | 32  | 6 |
| 171204000 CM | CMX                  |        | 40               | 125 | 205 | 32  | 8 |



parametri tecnici a pag. / for technical parameters see page 123

**MATERIALI LAVORABILI / WORKPIECE MATERIALS**

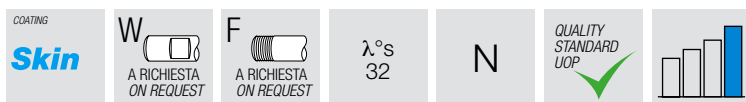
| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 17120           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



HSS-PM  
**HSS-PM Line**

Serie/Series  
**17135**

Frese a **FINIRE**  
Finishing end mills

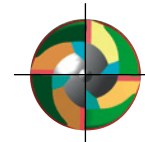


| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|-----|-----|-----|---|
| 171350600 CM | CMX                  |        | 6                | 56  | 106 | 10  | 4 |
| 171350700 CM | CMX                  |        | 7                | 63  | 113 | 10  | 4 |
| 171350800 CM | CMX                  |        | 8                | 63  | 113 | 10  | 4 |
| 171350900 CM | CMX                  |        | 9                | 70  | 120 | 10  | 4 |
| 171351000 CM | CMX                  |        | 10               | 70  | 120 | 10  | 4 |
| 171351200 CM | CMX                  |        | 12               | 80  | 137 | 12  | 4 |
| 171351400 CM | CMX                  |        | 14               | 80  | 137 | 12  | 4 |
| 171351500 CM | CMX                  |        | 15               | 90  | 150 | 16  | 4 |
| 171351600 CM | CMX                  |        | 16               | 90  | 150 | 16  | 4 |
| 171351800 CM | CMX                  |        | 18               | 100 | 166 | 20  | 4 |
| 171352000 CM | CMX                  |        | 20               | 110 | 176 | 20  | 4 |
| 171352200 CM | CMX                  |        | 22               | 110 | 176 | 20  | 4 |
| 171352500 CM | CMX                  |        | 25               | 125 | 201 | 25  | 5 |
| 171352800 CM | CMX                  |        | 28               | 135 | 211 | 25  | 5 |
| 171353000 CM | CMX                  |        | 30               | 140 | 216 | 25  | 6 |
| 171353200 CM | CMX                  |        | 32               | 150 | 230 | 32  | 6 |



parametri tecnici a pag. / for technical parameters see page 123

**Z4÷6**



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 17135           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

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63



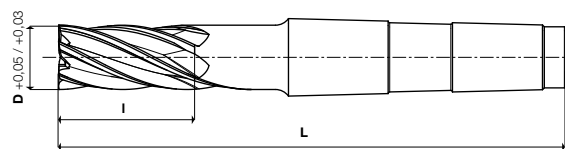
# HSS-PM HSS-PM Line

Serie/Series  
**17150**

Frese a **FINIRE**  
Finishing end mills

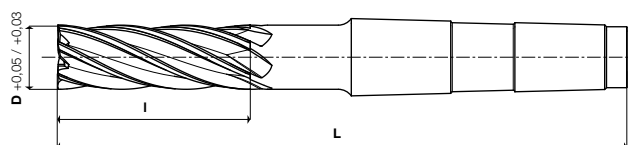
**17155**

Frese a **FINIRE**  
Finishing end mills



|                        |                           |   |                                     |  |
|------------------------|---------------------------|---|-------------------------------------|--|
| COATING<br><b>Skin</b> | $\lambda^{\circ}$ s<br>32 | N | UNI 8250<br>DIN 845B<br>ISO 1641/II |  |
|------------------------|---------------------------|---|-------------------------------------|--|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|------------------|----|-----|----------------|---|
| 171501000 CM | CMX                  |        | 10               | 22 | 92  | 1              | 4 |
| 171501200 CM | CMX                  |        | 12               | 26 | 96  | 1              | 4 |
| 171501400 CM | CMX                  |        | 14               | 26 | 111 | 2              | 4 |
| 171501600 CM | CMX                  |        | 16               | 32 | 117 | 2              | 4 |
| 171501800 CM | CMX                  |        | 18               | 32 | 117 | 2              | 4 |
| 171502000 CM | CMX                  |        | 20               | 38 | 140 | 3              | 4 |
| 171502200 CM | CMX                  |        | 22               | 38 | 140 | 3              | 4 |
| 171502400 CM | CMX                  |        | 24               | 45 | 147 | 3              | 5 |
| 171502500 CM | CMX                  |        | 25               | 45 | 147 | 3              | 5 |
| 171502600 CM | CMX                  |        | 26               | 45 | 147 | 3              | 5 |
| 171502800 CM | CMX                  |        | 28               | 45 | 147 | 3              | 5 |
| 171503000 CM | CMX                  |        | 30               | 53 | 155 | 3              | 6 |
| 171503200 CM | CMX                  |        | 32               | 53 | 178 | 4              | 6 |
| 171503400 CM | CMX                  |        | 34               | 53 | 178 | 4              | 6 |
| 171503500 CM | CMX                  |        | 35               | 53 | 178 | 4              | 6 |
| 171503600 CM | CMX                  |        | 36               | 53 | 178 | 4              | 6 |
| 171503800 CM | CMX                  |        | 38               | 63 | 188 | 4              | 6 |
| 171504000 CM | CMX                  |        | 40               | 63 | 188 | 4              | 8 |
| 171504500 CM | CMX                  |        | 45               | 63 | 188 | 4              | 8 |
| 171505001 CM | CMX                  |        | 50               | 75 | 233 | 5              | 8 |



|                        |                           |   |                                     |  |
|------------------------|---------------------------|---|-------------------------------------|--|
| COATING<br><b>Skin</b> | $\lambda^{\circ}$ s<br>32 | N | UNI 8250<br>DIN 845B<br>ISO 1641/II |  |
|------------------------|---------------------------|---|-------------------------------------|--|

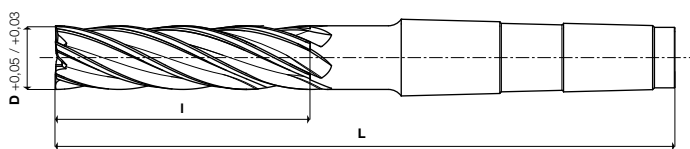
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|------------------|-----|-----|----------------|---|
| 171551000 CM | CMX                  |        | 10               | 45  | 115 | 1              | 4 |
| 171551200 CM | CMX                  |        | 12               | 53  | 123 | 1              | 4 |
| 171551400 CM | CMX                  |        | 14               | 53  | 138 | 2              | 4 |
| 171551600 CM | CMX                  |        | 16               | 63  | 148 | 2              | 4 |
| 171551800 CM | CMX                  |        | 18               | 63  | 148 | 2              | 4 |
| 171552000 CM | CMX                  |        | 20               | 75  | 177 | 3              | 4 |
| 171552200 CM | CMX                  |        | 22               | 75  | 177 | 3              | 4 |
| 171552400 CM | CMX                  |        | 24               | 90  | 192 | 3              | 5 |
| 171552500 CM | CMX                  |        | 25               | 90  | 192 | 3              | 5 |
| 171552600 CM | CMX                  |        | 26               | 90  | 192 | 3              | 5 |
| 171552800 CM | CMX                  |        | 28               | 90  | 192 | 3              | 5 |
| 171553000 CM | CMX                  |        | 30               | 90  | 192 | 3              | 6 |
| 171553200 CM | CMX                  |        | 32               | 106 | 231 | 4              | 6 |
| 171553400 CM | CMX                  |        | 34               | 106 | 231 | 4              | 6 |
| 171553500 CM | CMX                  |        | 35               | 106 | 231 | 4              | 6 |
| 171553600 CM | CMX                  |        | 36               | 106 | 231 | 4              | 6 |
| 171553800 CM | CMX                  |        | 38               | 125 | 250 | 4              | 8 |
| 171554000 CM | CMX                  |        | 40               | 125 | 250 | 4              | 8 |
| 171554500 CM | CMX                  |        | 45               | 125 | 250 | 4              | 8 |
| 171555000 CM | CMX                  |        | 50               | 150 | 308 | 5              | 8 |



## MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 17150           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 17155           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended    ● accettabile/acceptable    ○ non consigliata/not recommended



HSS-PM  
**HSS-PM Line**

Serie/Series  
**17160**

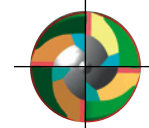
Frese a FINIRE  
Finishing end mills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|------------------|-----|---|----------------|---|
| 171601000 CM | CMX                  | 10     | 70               | 155 | 2 | 4              |   |
| 171601200 CM | CMX                  | 12     | 80               | 165 | 2 | 4              |   |
| 171601400 CM | CMX                  | 14     | 80               | 165 | 2 | 4              |   |
| 171601600 CM | CMX                  | 16     | 90               | 175 | 2 | 4              |   |
| 171601800 CM | CMX                  | 18     | 100              | 202 | 3 | 4              |   |
| 171602000 CM | CMX                  | 20     | 110              | 212 | 3 | 4              |   |
| 171602200 CM | CMX                  | 22     | 110              | 212 | 3 | 4              |   |
| 171602400 CM | CMX                  | 24     | 125              | 227 | 3 | 5              |   |
| 171602500 CM | CMX                  | 25     | 125              | 250 | 4 | 5              |   |
| 171602600 CM | CMX                  | 26     | 125              | 250 | 4 | 5              |   |
| 171602800 CM | CMX                  | 28     | 135              | 260 | 4 | 5              |   |
| 171603000 CM | CMX                  | 30     | 140              | 265 | 4 | 6              |   |
| 171603200 CM | CMX                  | 32     | 150              | 275 | 4 | 6              |   |
| 171603400 CM | CMX                  | 34     | 150              | 275 | 4 | 6              |   |
| 171603500 CM | CMX                  | 35     | 150              | 275 | 4 | 6              |   |
| 171603600 CM | CMX                  | 36     | 150              | 275 | 4 | 6              |   |
| 171603800 CM | CMX                  | 38     | 180              | 305 | 4 | 8              |   |
| 171604000 CM | CMX                  | 40     | 180              | 305 | 4 | 8              |   |
| 171604500 CM | CMX                  | 45     | 190              | 315 | 4 | 8              |   |
| 171605000 CM | CMX                  | 50     | 200              | 360 | 5 | 8              |   |



**Z4÷8**



Cono Morse  
Morse Taper

MATERIALI LAVORABILI / WORKPIECE MATERIALS



● consigliata/recommended ● accettabile/acceptable ○ non consigliata/not recommended

WWW.UOP.IT

65

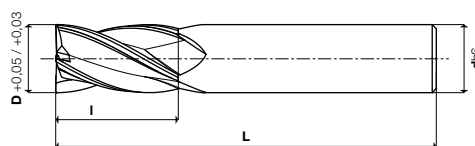
## Serie/Series 17305

Frese a **FINIRE** con tagliente al centro  
Finishing end mills center cutting

**ALTE PRESTAZIONI**  
**HIGH PERFORMANCE**

## 17305

Frese a **FINIRE** con tagliente al centro  
Finishing end mills center cutting



COATING  
**Skin**

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}s$   
32

N

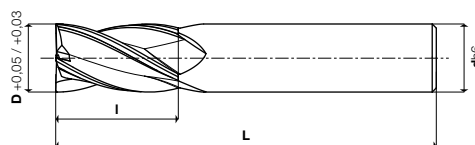
UNI 8244  
DIN 844A  
ISO 1641/I



| Cod. Art.     | X-105<br>(PM Co 10,5%) | D +0,05<br>+0,03 | I  | L   | dh6 | Z |
|---------------|------------------------|------------------|----|-----|-----|---|
| 173050600 EMX |                        | 6                | 13 | 57  | 6   | 4 |
| 173050800 EMX |                        | 8                | 19 | 69  | 10  | 4 |
| 173051000 EMX |                        | 10               | 22 | 72  | 10  | 4 |
| 173051200 EMX |                        | 12               | 26 | 83  | 12  | 4 |
| 173051400 EMX |                        | 14               | 26 | 83  | 12  | 4 |
| 173051600 EMX |                        | 16               | 32 | 92  | 16  | 4 |
| 173051800 EMX |                        | 18               | 32 | 92  | 16  | 4 |
| 173052001 EMX |                        | 20               | 38 | 104 | 20  | 4 |
| 173052200 EMX |                        | 22               | 38 | 104 | 20  | 4 |
| 173052500 EMX |                        | 25               | 45 | 121 | 25  | 5 |



parametri tecnici a pag. 1 / for technical parameters see page 123



COATING  
**Skin**

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}s$   
32

N

UNI 8244  
DIN 844A  
ISO 1641/I



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|----|-----|-----|---|
| 173050200 CM |                      | CMX    | 2                | 7  | 51  | 6   | 4 |
| 173050300 CM |                      | CMX    | 3                | 8  | 52  | 6   | 4 |
| 173050400 CM |                      | CMX    | 4                | 11 | 55  | 6   | 4 |
| 173050500 CM |                      | CMX    | 5                | 13 | 57  | 6   | 4 |
| 173050600 CM |                      | CMX    | 6                | 13 | 57  | 6   | 4 |
| 173050800 CM |                      | CMX    | 8                | 19 | 69  | 10  | 4 |
| 173051000 CM |                      | CMX    | 10               | 22 | 72  | 10  | 4 |
| 173051200 CM |                      | CMX    | 12               | 26 | 83  | 12  | 4 |
| 173051400 CM |                      | CMX    | 14               | 26 | 83  | 12  | 4 |
| 173051500 CM |                      | CMX    | 15               | 32 | 92  | 16  | 4 |
| 173051600 CM |                      | CMX    | 16               | 32 | 92  | 16  | 4 |
| 173051800 CM |                      | CMX    | 18               | 32 | 92  | 16  | 4 |
| 173052000 CM |                      | CMX    | 20               | 38 | 98  | 16  | 4 |
| 173052001 CM |                      | CMX    | 20               | 38 | 104 | 20  | 4 |
| 173052200 CM |                      | CMX    | 22               | 38 | 104 | 20  | 4 |
| 173052400 CM |                      | CMX    | 24               | 45 | 121 | 25  | 5 |
| 173052500 CM |                      | CMX    | 25               | 45 | 121 | 25  | 5 |
| 173052600 CM |                      | CMX    | 26               | 45 | 121 | 25  | 5 |
| 173052800 CM |                      | CMX    | 28               | 45 | 121 | 25  | 5 |
| 173053000 CM |                      | CMX    | 30               | 45 | 121 | 25  | 6 |
| 173053200 CM |                      | CMX    | 32               | 53 | 133 | 32  | 6 |
| 173053600 CM |                      | CMX    | 36               | 53 | 133 | 32  | 6 |
| 173054000 CM |                      | CMX    | 40               | 63 | 143 | 32  | 8 |
| 173055000 CM |                      | CMX    | 50               | 75 | 155 | 32  | 8 |

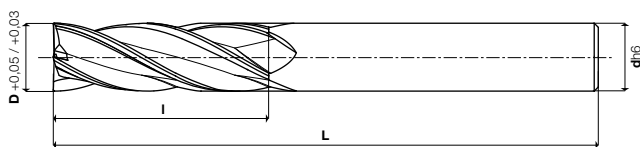


parametri tecnici a pag. 1 / for technical parameters see page 123

MATERIALI LAVORABILI / WORKPIECE MATERIALS



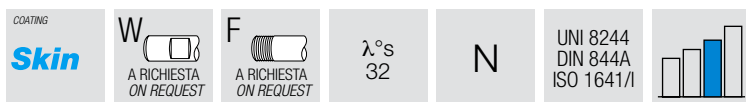
| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 17305 EMX       | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |
| 17305 CM/CMX    | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



HSS-PM  
**HSS-PM Line**

Serie/Series  
**17320**

Frese a **FINIRE** con tagliente al centro  
Finishing end mills center cutting

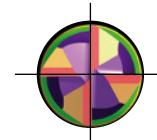


| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|-----|-----|-----|---|
| 173200200 CM | CMX                  |        | 2                | 10  | 54  | 6   | 4 |
| 173200300 CM | CMX                  |        | 3                | 12  | 56  | 6   | 4 |
| 173200400 CM | CMX                  |        | 4                | 19  | 63  | 6   | 4 |
| 173200500 CM | CMX                  |        | 5                | 24  | 68  | 6   | 4 |
| 173200600 CM | CMX                  |        | 6                | 24  | 68  | 6   | 4 |
| 173200800 CM | CMX                  |        | 8                | 38  | 88  | 10  | 4 |
| 173201000 CM | CMX                  |        | 10               | 45  | 95  | 10  | 4 |
| 173201200 CM | CMX                  |        | 12               | 53  | 110 | 12  | 4 |
| 173201400 CM | CMX                  |        | 14               | 53  | 110 | 12  | 4 |
| 173201500 CM | CMX                  |        | 15               | 63  | 123 | 16  | 4 |
| 173201600 CM | CMX                  |        | 16               | 63  | 123 | 16  | 4 |
| 173201800 CM | CMX                  |        | 18               | 63  | 123 | 16  | 4 |
| 173202000 CM | CMX                  |        | 20               | 75  | 135 | 16  | 4 |
| 173202001 CM | CMX                  |        | 20               | 75  | 141 | 20  | 4 |
| 173202200 CM | CMX                  |        | 22               | 75  | 141 | 20  | 4 |
| 173202400 CM | CMX                  |        | 24               | 90  | 166 | 25  | 5 |
| 173202500 CM | CMX                  |        | 25               | 90  | 166 | 25  | 5 |
| 173202600 CM | CMX                  |        | 26               | 90  | 166 | 25  | 5 |
| 173202800 CM | CMX                  |        | 28               | 90  | 166 | 25  | 5 |
| 173203000 CM | CMX                  |        | 30               | 90  | 166 | 25  | 6 |
| 173203200 CM | CMX                  |        | 32               | 106 | 186 | 32  | 6 |
| 173203600 CM | CMX                  |        | 36               | 106 | 186 | 32  | 6 |
| 173204000 CM | CMX                  |        | 40               | 125 | 205 | 32  | 8 |



parametri tecnici a pag. / for technical parameters see page 123

**Z4÷8**



MATERIALI LAVORABILI / WORKPIECE MATERIALS



● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

WWW.UOP.IT

67

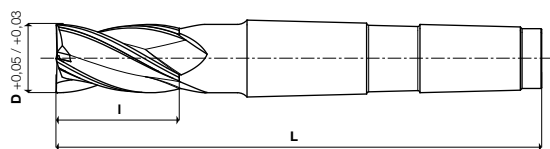
# HSS-PM HSS-PM Line

## Serie/Series 17350

Frese a **FINIRE** con tagliente al centro  
Finishing end mills center cutting

## 17355

Frese a **FINIRE** con tagliente al centro  
Finishing end mills center cutting



COATING

**Skin**

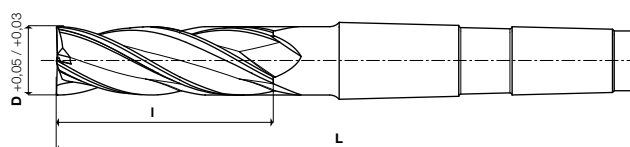
$\lambda^{\circ}$ s  
32

N

UNI 8244  
DIN 844A  
ISO 1641/I



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|------------------|----|-----|----------------|---|
| 173501000 CM | CMX                  |        | 10               | 22 | 92  | 1              | 4 |
| 173501200 CM | CMX                  |        | 12               | 26 | 96  | 1              | 4 |
| 173501400 CM | CMX                  |        | 14               | 26 | 111 | 2              | 4 |
| 173501500 CM | CMX                  |        | 15               | 32 | 117 | 2              | 4 |
| 173501600 CM | CMX                  |        | 16               | 32 | 117 | 2              | 4 |
| 173501800 CM | CMX                  |        | 18               | 32 | 117 | 2              | 4 |
| 173502000 CM | CMX                  |        | 20               | 38 | 140 | 3              | 4 |
| 173502200 CM | CMX                  |        | 22               | 38 | 140 | 3              | 4 |
| 173502400 CM | CMX                  |        | 24               | 45 | 147 | 3              | 5 |
| 173502500 CM | CMX                  |        | 25               | 45 | 147 | 3              | 5 |
| 173502600 CM | CMX                  |        | 26               | 45 | 147 | 3              | 5 |
| 173502800 CM | CMX                  |        | 28               | 45 | 147 | 3              | 5 |
| 173503000 CM | CMX                  |        | 30               | 53 | 155 | 3              | 6 |
| 173503200 CM | CMX                  |        | 32               | 53 | 178 | 4              | 6 |
| 173503400 CM | CMX                  |        | 34               | 53 | 178 | 4              | 6 |
| 173503500 CM | CMX                  |        | 35               | 53 | 178 | 4              | 6 |
| 173503600 CM | CMX                  |        | 36               | 53 | 178 | 4              | 6 |
| 173503800 CM | CMX                  |        | 38               | 63 | 188 | 4              | 6 |
| 173504000 CM | CMX                  |        | 40               | 63 | 188 | 4              | 8 |
| 173504500 CM | CMX                  |        | 45               | 63 | 188 | 4              | 8 |
| 173505000 CM | CMX                  |        | 50               | 75 | 200 | 4              | 8 |
| 173505001 CM | CMX                  |        | 50               | 75 | 233 | 5              | 8 |



COATING

**Skin**

$\lambda^{\circ}$ s  
32

N

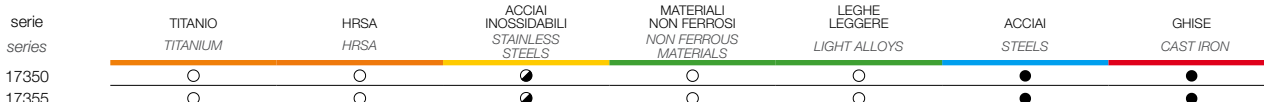
UNI 8250  
DIN 845B  
ISO 1641/II



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|------------------|-----|-----|----------------|---|
| 173551000 CM | CMX                  |        | 10               | 45  | 115 | 1              | 4 |
| 173551200 CM | CMX                  |        | 12               | 53  | 123 | 1              | 4 |
| 173551400 CM | CMX                  |        | 14               | 53  | 138 | 2              | 4 |
| 173551500 CM | CMX                  |        | 15               | 63  | 148 | 2              | 4 |
| 173551600 CM | CMX                  |        | 16               | 63  | 148 | 2              | 4 |
| 173551800 CM | CMX                  |        | 18               | 63  | 148 | 2              | 4 |
| 173552000 CM | CMX                  |        | 20               | 75  | 177 | 3              | 4 |
| 173552200 CM | CMX                  |        | 22               | 75  | 177 | 3              | 4 |
| 173552400 CM | CMX                  |        | 24               | 90  | 192 | 3              | 5 |
| 173552500 CM | CMX                  |        | 25               | 90  | 192 | 3              | 5 |
| 173552600 CM | CMX                  |        | 26               | 90  | 192 | 3              | 5 |
| 173552800 CM | CMX                  |        | 28               | 90  | 192 | 3              | 5 |
| 173553000 CM | CMX                  |        | 30               | 90  | 192 | 3              | 6 |
| 173553200 CM | CMX                  |        | 32               | 106 | 231 | 4              | 6 |
| 173553400 CM | CMX                  |        | 34               | 106 | 231 | 4              | 6 |
| 173553500 CM | CMX                  |        | 35               | 106 | 231 | 4              | 6 |
| 173553600 CM | CMX                  |        | 36               | 106 | 231 | 4              | 6 |
| 173553800 CM | CMX                  |        | 38               | 125 | 250 | 4              | 6 |
| 173554000 CM | CMX                  |        | 40               | 125 | 250 | 4              | 8 |
| 173554500 CM | CMX                  |        | 45               | 125 | 250 | 4              | 8 |
| 173555000 CM | CMX                  |        | 50               | 150 | 308 | 5              | 8 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS





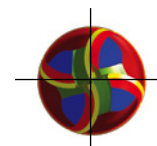
Serie/Series  
**17505**

Frese a testa semisferica  
Ball nosed end mills

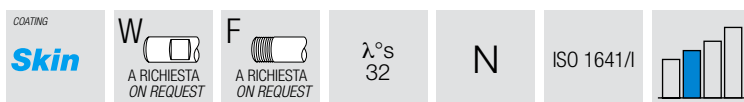
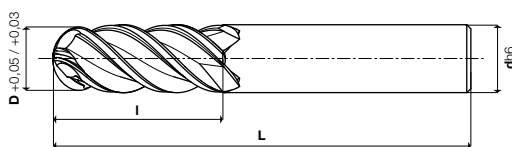
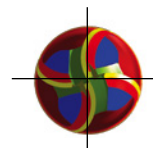
**17520**

Frese a testa semisferica  
Ball nosed end mills

**Z4÷8**  
BALL-NOSED



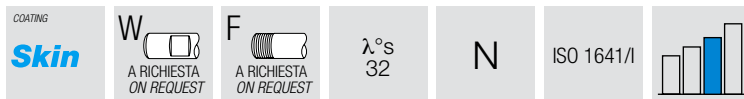
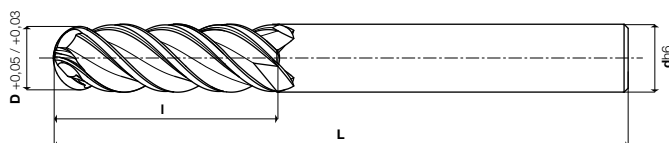
**Z4÷8**  
BALL-NOSED



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|----|-----|-----|---|
| 175050200 CM |                      | CMX    | 2                | 7  | 51  | 6   | 4 |
| 175050300 CM |                      | CMX    | 3                | 8  | 52  | 6   | 4 |
| 175050400 CM |                      | CMX    | 4                | 11 | 55  | 6   | 4 |
| 175050500 CM |                      | CMX    | 5                | 13 | 57  | 6   | 4 |
| 175050600 CM |                      | CMX    | 6                | 13 | 57  | 6   | 4 |
| 175050800 CM |                      | CMX    | 8                | 19 | 69  | 10  | 4 |
| 175051000 CM |                      | CMX    | 10               | 22 | 72  | 10  | 4 |
| 175051200 CM |                      | CMX    | 12               | 26 | 83  | 12  | 4 |
| 175051400 CM |                      | CMX    | 14               | 26 | 83  | 12  | 4 |
| 175051500 CM |                      | CMX    | 15               | 32 | 92  | 16  | 4 |
| 175051600 CM |                      | CMX    | 16               | 32 | 92  | 16  | 4 |
| 175051800 CM |                      | CMX    | 18               | 32 | 92  | 16  | 4 |
| 175052000 CM |                      | CMX    | 20               | 38 | 98  | 16  | 4 |
| 175052001 CM |                      | CMX    | 20               | 38 | 104 | 20  | 4 |
| 175052200 CM |                      | CMX    | 22               | 38 | 104 | 20  | 4 |
| 175052400 CM |                      | CMX    | 24               | 45 | 121 | 25  | 5 |
| 175052500 CM |                      | CMX    | 25               | 45 | 121 | 25  | 5 |
| 175052600 CM |                      | CMX    | 26               | 45 | 121 | 25  | 5 |
| 175052800 CM |                      | CMX    | 28               | 45 | 121 | 25  | 5 |
| 175053000 CM |                      | CMX    | 30               | 45 | 121 | 25  | 6 |
| 175053200 CM |                      | CMX    | 32               | 53 | 133 | 32  | 6 |
| 175053600 CM |                      | CMX    | 36               | 53 | 133 | 32  | 6 |
| 175054000 CM |                      | CMX    | 40               | 63 | 143 | 32  | 8 |
| 175055000 CM |                      | CMX    | 50               | 75 | 155 | 32  | 8 |



parametri tecnici a pag. / for technical parameters see page 123



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | dh6 | Z |
|--------------|----------------------|--------|------------------|-----|-----|-----|---|
| 175200200 CM |                      | CMX    | 2                | 10  | 54  | 6   | 4 |
| 175200300 CM |                      | CMX    | 3                | 12  | 56  | 6   | 4 |
| 175200400 CM |                      | CMX    | 4                | 19  | 63  | 6   | 4 |
| 175200500 CM |                      | CMX    | 5                | 24  | 68  | 6   | 4 |
| 175200600 CM |                      | CMX    | 6                | 24  | 68  | 6   | 4 |
| 175200800 CM |                      | CMX    | 8                | 38  | 88  | 6   | 4 |
| 175201000 CM |                      | CMX    | 10               | 45  | 95  | 10  | 4 |
| 175201200 CM |                      | CMX    | 12               | 53  | 110 | 12  | 4 |
| 175201400 CM |                      | CMX    | 14               | 53  | 110 | 12  | 4 |
| 175201500 CM |                      | CMX    | 15               | 63  | 123 | 16  | 4 |
| 175201600 CM |                      | CMX    | 16               | 63  | 123 | 16  | 4 |
| 175201800 CM |                      | CMX    | 18               | 63  | 123 | 16  | 4 |
| 175202000 CM |                      | CMX    | 20               | 75  | 135 | 16  | 4 |
| 175202001 CM |                      | CMX    | 20               | 75  | 141 | 20  | 4 |
| 175202200 CM |                      | CMX    | 22               | 75  | 141 | 20  | 4 |
| 175202400 CM |                      | CMX    | 24               | 90  | 166 | 25  | 5 |
| 175202500 CM |                      | CMX    | 25               | 90  | 166 | 25  | 5 |
| 175202600 CM |                      | CMX    | 26               | 90  | 166 | 25  | 5 |
| 175202800 CM |                      | CMX    | 28               | 90  | 166 | 25  | 5 |
| 175203000 CM |                      | CMX    | 30               | 90  | 166 | 25  | 6 |
| 175203200 CM |                      | CMX    | 32               | 106 | 186 | 32  | 6 |
| 175203600 CM |                      | CMX    | 36               | 106 | 186 | 32  | 6 |
| 175204000 CM |                      | CMX    | 40               | 125 | 205 | 32  | 8 |



parametri tecnici a pag. / for technical parameters see page 123

MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 17505 | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 17520 | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended ● accettabile/acceptable ○ non consigliata/not recommended



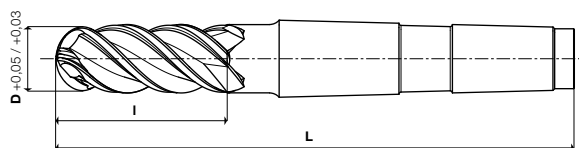
# HSS-PM HSS-PM Line

## Serie/Series 17550

Frese a testa semisferica  
Ball nosed end mills

## 17555

Frese a testa semisferica  
Ball nosed end mills

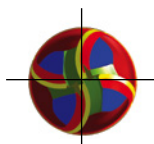


|                        |                         |   |            |  |
|------------------------|-------------------------|---|------------|--|
| COATING<br><b>Skin</b> | $\lambda^\circ$ s<br>32 | N | ISO 1641/I |  |
|------------------------|-------------------------|---|------------|--|

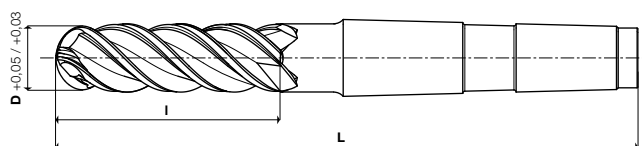
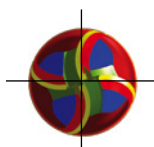
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I  | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|------------------|----|-----|----------------|---|
| 175501600 CM | CMX                  |        | 16               | 32 | 117 | 2              | 4 |
| 175502000 CM | CMX                  |        | 20               | 38 | 140 | 3              | 4 |
| 175502200 CM | CMX                  |        | 22               | 38 | 140 | 3              | 4 |
| 175502400 CM | CMX                  |        | 24               | 45 | 147 | 3              | 5 |
| 175502500 CM | CMX                  |        | 25               | 45 | 147 | 3              | 5 |
| 175502800 CM | CMX                  |        | 28               | 45 | 147 | 3              | 5 |
| 175503000 CM | CMX                  |        | 30               | 53 | 155 | 3              | 6 |
| 175503200 CM | CMX                  |        | 32               | 53 | 178 | 4              | 6 |
| 175503600 CM | CMX                  |        | 36               | 53 | 178 | 4              | 6 |
| 175504000 CM | CMX                  |        | 40               | 63 | 188 | 4              | 8 |
| 175505000 CM | CMX                  |        | 50               | 75 | 233 | 5              | 8 |



**Z4÷8**  
BALL-NOSED



**Z4÷8**  
BALL-NOSED



|                        |                         |   |                           |  |
|------------------------|-------------------------|---|---------------------------|--|
| COATING<br><b>Skin</b> | $\lambda^\circ$ s<br>32 | N | UNI<br>DIN<br>ISO 1641/II |  |
|------------------------|-------------------------|---|---------------------------|--|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>+0,03 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|------------------|-----|-----|----------------|---|
| 175551600 CM | CMX                  |        | 16               | 63  | 148 | 2              | 4 |
| 175552000 CM | CMX                  |        | 20               | 75  | 177 | 3              | 4 |
| 175552200 CM | CMX                  |        | 22               | 75  | 177 | 3              | 4 |
| 175552400 CM | CMX                  |        | 24               | 90  | 192 | 3              | 5 |
| 175552500 CM | CMX                  |        | 25               | 90  | 192 | 3              | 5 |
| 175552800 CM | CMX                  |        | 28               | 90  | 192 | 3              | 5 |
| 175553000 CM | CMX                  |        | 30               | 90  | 192 | 3              | 6 |
| 175553200 CM | CMX                  |        | 32               | 106 | 231 | 4              | 6 |
| 175553600 CM | CMX                  |        | 36               | 106 | 231 | 4              | 6 |
| 175554000 CM | CMX                  |        | 40               | 125 | 250 | 4              | 8 |
| 175555000 CM | CMX                  |        | 50               | 150 | 308 | 5              | 8 |



Cono Morse  
Morse Taper

Serie/Series 17550

Serie/Series 17555

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 17550           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 17555           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

## Serie/Series 18105

Frese per finitura  
Finishing end mills

ALTE PRESTAZIONI  
HIGH PERFORMANCE

## 18105

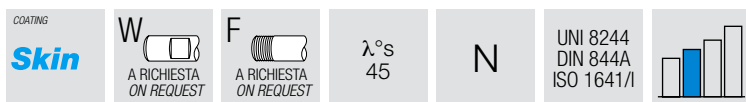
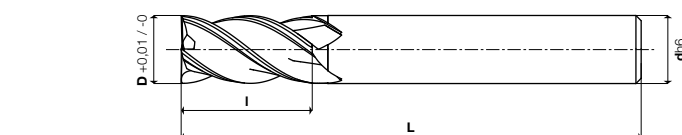
Frese per finitura  
Finishing end mills



| Cod. Art.     | X-105<br>(PM Co 10,5%) | D +0,01<br>-0 | I  | L   | dh6 | Z |
|---------------|------------------------|---------------|----|-----|-----|---|
| 181050600 EMX |                        | 6             | 13 | 57  | 6   | 4 |
| 181050800 EMX |                        | 8             | 19 | 69  | 10  | 4 |
| 181051000 EMX |                        | 10            | 22 | 72  | 10  | 4 |
| 181051200 EMX |                        | 12            | 26 | 83  | 12  | 4 |
| 181051400 EMX |                        | 14            | 26 | 83  | 12  | 4 |
| 181051600 EMX |                        | 16            | 32 | 92  | 16  | 4 |
| 181051800 EMX |                        | 18            | 32 | 92  | 16  | 4 |
| 181052000 EMX |                        | 20            | 38 | 104 | 20  | 4 |
| 181052200 EMX |                        | 22            | 38 | 104 | 20  | 4 |



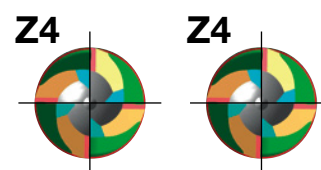
parametri tecnici a pag. / for technical parameters see page 127



| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,01<br>-0 | I  | L   | dh6 | Z |
|-----------|----------------------|--------|---------------|----|-----|-----|---|
| 181050200 | CM                   | CMX    | 2             | 7  | 51  | 6   | 4 |
| 181050300 | CM                   | CMX    | 3             | 8  | 52  | 6   | 4 |
| 181050400 | CM                   | CMX    | 4             | 11 | 55  | 6   | 4 |
| 181050500 | CM                   | CMX    | 5             | 13 | 57  | 6   | 4 |
| 181050600 | CM                   | CMX    | 6             | 13 | 57  | 6   | 4 |
| 181050800 | CM                   | CMX    | 8             | 19 | 69  | 10  | 4 |
| 181051000 | CM                   | CMX    | 10            | 22 | 72  | 10  | 4 |
| 181051200 | CM                   | CMX    | 12            | 26 | 83  | 12  | 4 |
| 181051400 | CM                   | CMX    | 14            | 26 | 83  | 12  | 4 |
| 181051500 | CM                   | CMX    | 15            | 32 | 92  | 16  | 4 |
| 181051600 | CM                   | CMX    | 16            | 32 | 92  | 16  | 4 |
| 181051800 | CM                   | CMX    | 18            | 32 | 92  | 16  | 4 |
| 181052000 | CM                   | CMX    | 20            | 38 | 104 | 20  | 4 |
| 181052200 | CM                   | CMX    | 22            | 38 | 104 | 20  | 4 |



parametri tecnici a pag. / for technical parameters see page 123



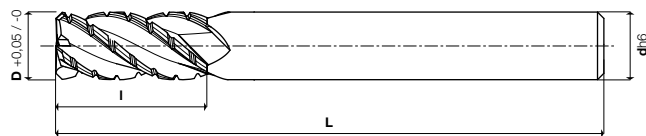
### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 18105 EMX       | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |
| 18105 CM/CMX    | ●                   | ●            | ●                                             | ●                                                    | ○                                | ●                | ●                  |

● consigliata/recommended ● accettabile/acceptable ○ non consigliata/not recommended

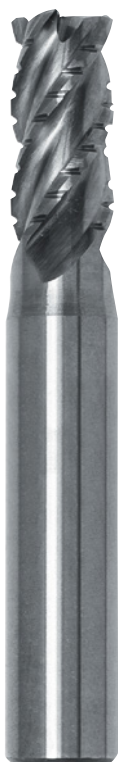
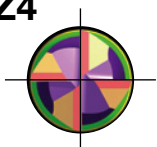
## Serie/Series 19105

Frese a **SEMIFINIRE** tagliente interrotto  
Semi-finishing end mills Interrupted cutting edge



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,01<br>-0 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|---------------|----|-----|-----|---|
| 191050600 CM | CMX                  |        | 6             | 13 | 57  | 6   | 4 |
| 191050700 CM | CMX                  |        | 7             | 16 | 66  | 10  | 4 |
| 191050800 CM | CMX                  |        | 8             | 19 | 69  | 10  | 4 |
| 191050900 CM | CMX                  |        | 9             | 19 | 69  | 10  | 4 |
| 191051000 CM | CMX                  |        | 10            | 22 | 72  | 10  | 4 |
| 191051100 CM | CMX                  |        | 11            | 22 | 79  | 12  | 4 |
| 191051200 CM | CMX                  |        | 12            | 26 | 83  | 12  | 4 |
| 191051300 CM | CMX                  |        | 13            | 26 | 83  | 12  | 4 |
| 191051400 CM | CMX                  |        | 14            | 26 | 83  | 12  | 4 |
| 191051500 CM | CMX                  |        | 15            | 32 | 92  | 16  | 4 |
| 191051600 CM | CMX                  |        | 16            | 32 | 92  | 16  | 4 |
| 191051700 CM | CMX                  |        | 17            | 32 | 92  | 16  | 4 |
| 191051800 CM | CMX                  |        | 18            | 32 | 92  | 16  | 4 |
| 191051900 CM | CMX                  |        | 19            | 38 | 104 | 20  | 4 |
| 191052000 CM | CMX                  |        | 20            | 38 | 104 | 20  | 4 |
| 191052200 CM | CMX                  |        | 22            | 38 | 104 | 20  | 4 |
| 191052400 CM | CMX                  |        | 24            | 45 | 121 | 25  | 4 |
| 191052500 CM | CMX                  |        | 25            | 45 | 121 | 25  | 4 |

Z4



NF



parametri tecnici a pag. 1 / for technical parameters see page 124

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI INOSSIDABILI | MATERIALI NON FERROSI | LEGHE LEGGERE | ACCIAI | GHISE     |
|--------|----------|------|---------------------|-----------------------|---------------|--------|-----------|
| series | TITANIUM | HRSA | STAINLESS STEELS    | NON FERROUS MATERIALS | LIGHT ALLOYS  | STEELS | CAST IRON |
| 19105  | ●        | ●    | ●                   | ○                     | ○             | ●      | ●         |

Serie/Series  
**20105**

Frese a **SEMIFINIRE**  
Semi-finishing end mills

**20105**

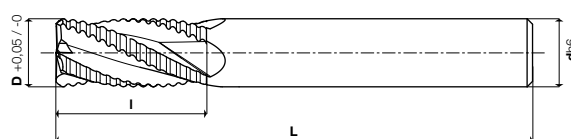
Frese a **SGROSSARE**  
Roughing end mills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D <sup>+0,05<br/>-0</sup> | I  | L   | dh6 | Z |
|--------------|----------------------|--------|---------------------------|----|-----|-----|---|
| 201050601 CM | CMX                  |        | 6                         | 16 | 60  | 6   | 3 |
| 201050801 CM | CMX                  |        | 8                         | 22 | 64  | 10  | 4 |
| 201051001 CM | CMX                  |        | 10                        | 28 | 70  | 10  | 4 |
| 201051201 CM | CMX                  |        | 12                        | 32 | 80  | 12  | 4 |
| 201051401 CM | CMX                  |        | 14                        | 32 | 80  | 12  | 4 |
| 201051601 CM | CMX                  |        | 16                        | 36 | 90  | 16  | 4 |
| 201051801 CM | CMX                  |        | 18                        | 40 | 100 | 16  | 4 |
| 201052001 CM | CMX                  |        | 20                        | 45 | 110 | 20  | 4 |
| 201052501 CM | CMX                  |        | 25                        | 50 | 125 | 25  | 5 |
| 201053201 CM | CMX                  |        | 32                        | 63 | 140 | 25  | 5 |
| 201053601 CM | CMX                  |        | 36                        | 70 | 150 | 32  | 6 |
| 201054001 CM | CMX                  |        | 40                        | 70 | 150 | 32  | 6 |



parametri tecnici a pag. / for technical parameters see page 124



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D <sup>+0,05<br/>-0</sup> | I  | L   | dh6 | Z |
|--------------|----------------------|--------|---------------------------|----|-----|-----|---|
| 201050603 CM | CMX                  |        | 6                         | 16 | 60  | 6   | 3 |
| 201050803 CM | CMX                  |        | 8                         | 22 | 64  | 10  | 4 |
| 201051003 CM | CMX                  |        | 10                        | 28 | 70  | 10  | 4 |
| 201051203 CM | CMX                  |        | 12                        | 32 | 80  | 12  | 4 |
| 201051403 CM | CMX                  |        | 14                        | 32 | 80  | 12  | 4 |
| 201051603 CM | CMX                  |        | 16                        | 36 | 90  | 16  | 4 |
| 201051803 CM | CMX                  |        | 18                        | 40 | 100 | 16  | 4 |
| 201052003 CM | CMX                  |        | 20                        | 45 | 110 | 20  | 4 |
| 201052503 CM | CMX                  |        | 25                        | 50 | 125 | 25  | 5 |
| 201053203 CM | CMX                  |        | 32                        | 63 | 140 | 25  | 5 |
| 201053603 CM | CMX                  |        | 36                        | 70 | 150 | 32  | 6 |
| 201054003 CM | CMX                  |        | 40                        | 70 | 150 | 32  | 6 |



parametri tecnici a pag. / for technical parameters see page 124

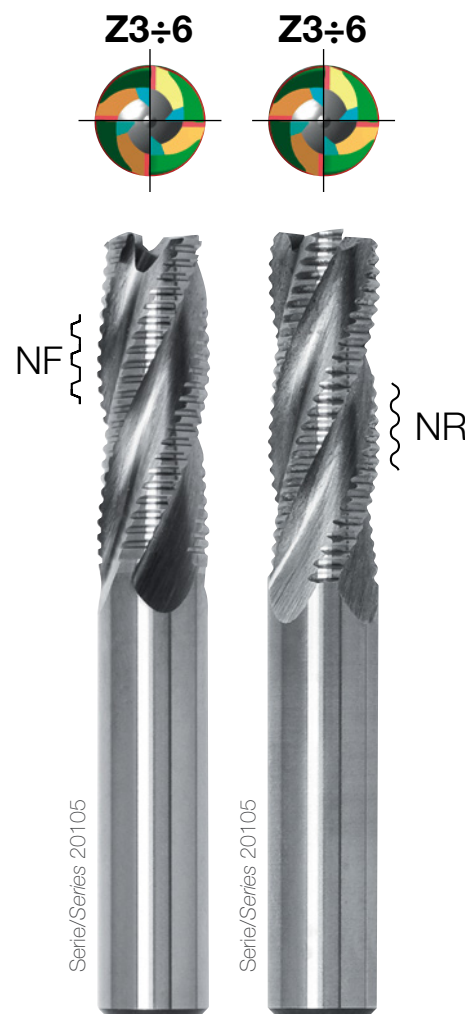
## MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 20105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 20105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

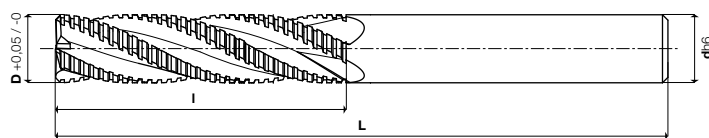


## Serie/Series 20120

Frese a **SEMIFINIRE**  
Semi-finishing end mills

## 20120

Frese a **SGROSSARE**  
Roughing end mills



COATING  
**Skin**

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}s$   
28

NF

QUALITY  
STANDARD  
UOP



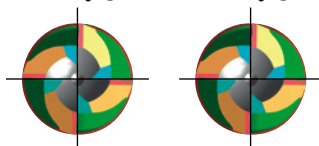
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|---------------|----|-----|-----|---|
| 201200801 CM | CMX                  |        | 8             | 35 | 85  | 10  | 4 |
| 201201001 CM | CMX                  |        | 10            | 42 | 90  | 10  | 4 |
| 201201201 CM | CMX                  |        | 12            | 48 | 95  | 12  | 4 |
| 201201401 CM | CMX                  |        | 14            | 48 | 100 | 16  | 4 |
| 201201601 CM | CMX                  |        | 16            | 54 | 104 | 16  | 4 |
| 201201801 CM | CMX                  |        | 18            | 60 | 120 | 16  | 4 |
| 201202001 CM | CMX                  |        | 20            | 62 | 128 | 20  | 4 |
| 201202501 CM | CMX                  |        | 25            | 70 | 145 | 25  | 5 |
| 201203201 CM | CMX                  |        | 32            | 80 | 160 | 32  | 5 |
| 201203601 CM | CMX                  |        | 36            | 90 | 170 | 32  | 6 |
| 201204001 CM | CMX                  |        | 40            | 90 | 170 | 32  | 6 |



parametri tecnici a pag. 1 / for technical parameters see page 124

Z4÷6

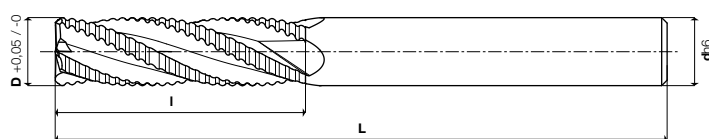
Z4÷6



Serie/Series 20120



Serie/Series 20120



COATING  
**Skin**

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}s$   
28

NR

QUALITY  
STANDARD  
UOP



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|---------------|----|-----|-----|---|
| 201200803 CM | CMX                  |        | 8             | 35 | 85  | 10  | 4 |
| 201201003 CM | CMX                  |        | 10            | 42 | 90  | 10  | 4 |
| 201201203 CM | CMX                  |        | 12            | 48 | 95  | 12  | 4 |
| 201201403 CM | CMX                  |        | 14            | 48 | 100 | 16  | 4 |
| 201201603 CM | CMX                  |        | 16            | 54 | 104 | 16  | 4 |
| 201201803 CM | CMX                  |        | 18            | 60 | 120 | 16  | 4 |
| 201202003 CM | CMX                  |        | 20            | 62 | 128 | 20  | 4 |
| 201202503 CM | CMX                  |        | 25            | 70 | 145 | 25  | 5 |
| 201203203 CM | CMX                  |        | 32            | 80 | 160 | 32  | 5 |
| 201203603 CM | CMX                  |        | 36            | 90 | 170 | 32  | 6 |
| 201204003 CM | CMX                  |        | 40            | 90 | 170 | 32  | 6 |



parametri tecnici a pag. 1 / for technical parameters see page 124

### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 20120           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 20120           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended



Serie/Series  
**20150**

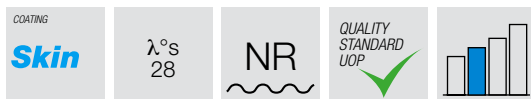
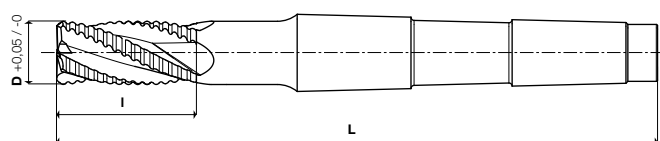
Frese a **SEMIFINIRE**  
Semi-finishing end mills

**20150**

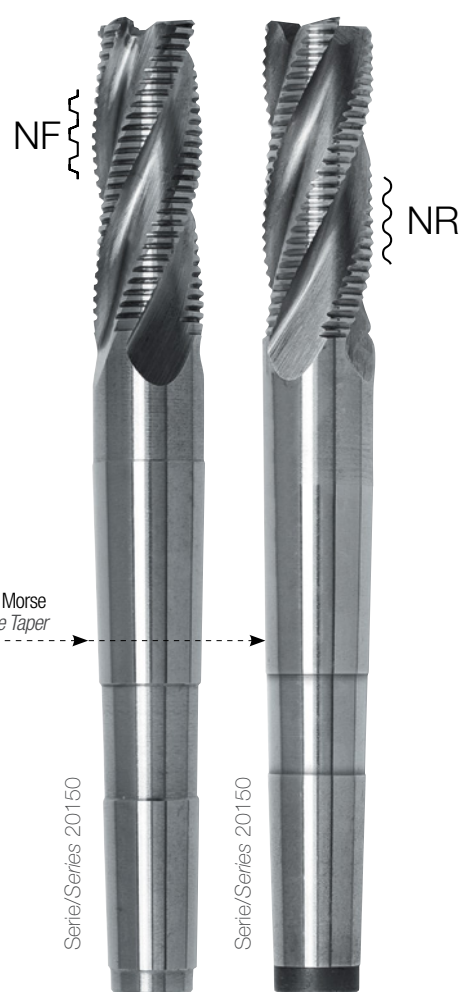
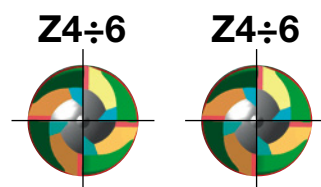
Frese a **SGROSSARE**  
Roughing end mills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|----|-----|----------------|---|
| 201502001 CM | CMX                  |        | 20            | 45 | 125 | 2              | 4 |
| 201502501 CM | CMX                  |        | 25            | 50 | 150 | 3              | 5 |
| 201502601 CM | CMX                  |        | 26            | 56 | 155 | 3              | 5 |
| 201502801 CM | CMX                  |        | 28            | 56 | 155 | 3              | 5 |
| 201503001 CM | CMX                  |        | 30            | 63 | 165 | 3              | 5 |
| 201503201 CM | CMX                  |        | 32            | 63 | 188 | 4              | 5 |
| 201503601 CM | CMX                  |        | 36            | 70 | 195 | 4              | 6 |
| 201504001 CM | CMX                  |        | 40            | 70 | 195 | 4              | 6 |
| 201504501 CM | CMX                  |        | 45            | 80 | 205 | 4              | 6 |



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|----|-----|----------------|---|
| 201502003 CM | CMX                  |        | 20            | 45 | 125 | 2              | 4 |
| 201502503 CM | CMX                  |        | 25            | 50 | 150 | 3              | 5 |
| 201502603 CM | CMX                  |        | 26            | 56 | 155 | 3              | 5 |
| 201502803 CM | CMX                  |        | 28            | 56 | 155 | 3              | 5 |
| 201503003 CM | CMX                  |        | 30            | 63 | 165 | 3              | 5 |
| 201503203 CM | CMX                  |        | 32            | 63 | 188 | 4              | 5 |
| 201503603 CM | CMX                  |        | 36            | 70 | 195 | 4              | 6 |
| 201504003 CM | CMX                  |        | 40            | 70 | 195 | 4              | 6 |
| 201504503 CM | CMX                  |        | 45            | 80 | 205 | 4              | 6 |



## MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 20150           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 20150           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



# HSS-PM HSS-PM Line

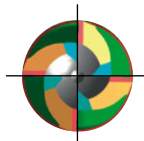
## Serie/Series 20155

Frese a **SEMIFINIRE**  
Semi-finishing end mills

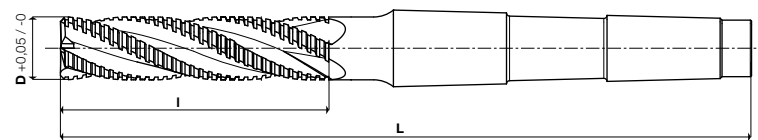
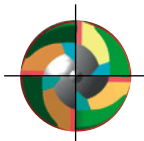
## 20155

Frese a **SGROSSARE**  
Roughing end mills

Z4÷7



Z4÷7



COATING

**Skin**

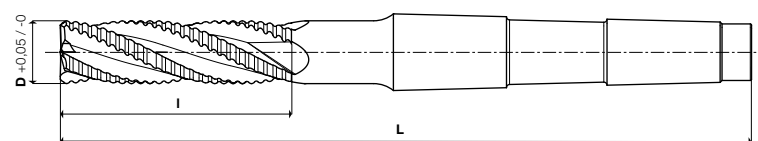
$\lambda^\circ$ s  
28

NF

QUALITY  
STANDARD  
UOP



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|-----|----------------|---|
| 201552001 CM | CMX                  | CMX    | 20            | 65  | 148 | 2              | 4 |
| 201552501 CM | CMX                  | CMX    | 25            | 70  | 171 | 3              | 5 |
| 201552601 CM | CMX                  | CMX    | 26            | 70  | 176 | 3              | 5 |
| 201552801 CM | CMX                  | CMX    | 28            | 80  | 186 | 3              | 5 |
| 201553001 CM | CMX                  | CMX    | 30            | 85  | 210 | 4              | 5 |
| 201553201 CM | CMX                  | CMX    | 32            | 90  | 215 | 4              | 5 |
| 201553601 CM | CMX                  | CMX    | 36            | 90  | 215 | 4              | 6 |
| 201554001 CM | CMX                  | CMX    | 40            | 95  | 220 | 4              | 6 |
| 201555001 CM | CMX                  | CMX    | 50            | 110 | 235 | 4              | 7 |



COATING

**Skin**

$\lambda^\circ$ s  
28

NR

QUALITY  
STANDARD  
UOP



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|-----|----------------|---|
| 201552003 CM | CMX                  | CMX    | 20            | 65  | 148 | 2              | 4 |
| 201552503 CM | CMX                  | CMX    | 25            | 70  | 171 | 3              | 5 |
| 201552603 CM | CMX                  | CMX    | 26            | 70  | 176 | 3              | 5 |
| 201552803 CM | CMX                  | CMX    | 28            | 80  | 186 | 3              | 5 |
| 201553003 CM | CMX                  | CMX    | 30            | 85  | 210 | 4              | 5 |
| 201553203 CM | CMX                  | CMX    | 32            | 90  | 215 | 4              | 5 |
| 201553603 CM | CMX                  | CMX    | 36            | 90  | 215 | 4              | 6 |
| 201554003 CM | CMX                  | CMX    | 40            | 95  | 220 | 4              | 6 |
| 201555003 CM | CMX                  | CMX    | 50            | 110 | 235 | 4              | 7 |



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 20155           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 20155           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

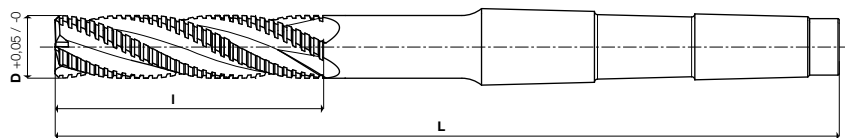
○ non consigliata/not recommended

Serie/Series  
**20160**

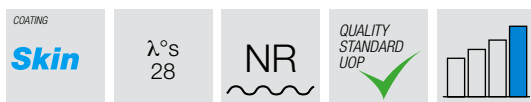
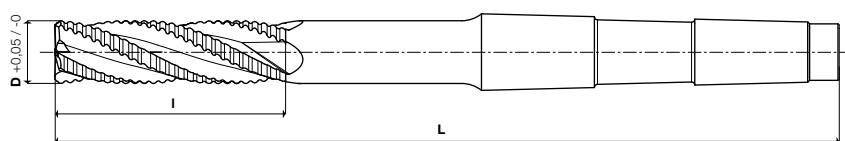
Frese a **SEMIFINIRE**  
Semi-finishing end mills

**20160**

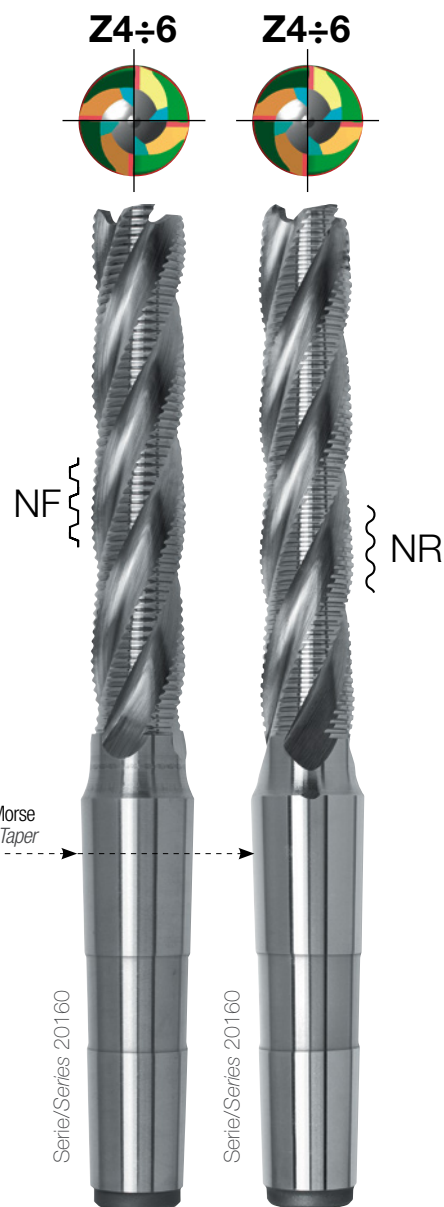
Frese a **SGROSSARE**  
Roughing end mills



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|---|----------------|---|
| 201602001 CM | CMX                  | 20     | 110           | 212 | 3 | 4              |   |
| 201602501 CM | CMX                  | 25     | 125           | 250 | 4 | 5              |   |
| 201603001 CM | CMX                  | 30     | 140           | 265 | 4 | 5              |   |
| 201603201 CM | CMX                  | 32     | 150           | 275 | 4 | 6              |   |
| 201603601 CM | CMX                  | 36     | 150           | 275 | 4 | 6              |   |
| 201604001 CM | CMX                  | 40     | 180           | 305 | 4 | 6              |   |



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|---|----------------|---|
| 201602003 CM | CMX                  | 20     | 110           | 212 | 3 | 4              |   |
| 201602503 CM | CMX                  | 25     | 125           | 250 | 4 | 5              |   |
| 201603003 CM | CMX                  | 30     | 140           | 265 | 4 | 5              |   |
| 201603203 CM | CMX                  | 32     | 150           | 275 | 4 | 6              |   |
| 201603603 CM | CMX                  | 36     | 150           | 275 | 4 | 6              |   |
| 201604003 CM | CMX                  | 40     | 180           | 305 | 4 | 6              |   |



## MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 20160           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 20160           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

# HSS-PM HSS-PM Line

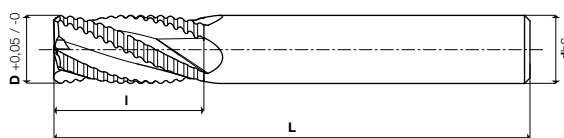
## Serie/Series 21105

Frese a **SGROSSARE**  
Roughing end mills

ALTE PRESTAZIONI  
HIGH PERFORMANCE

## 21105

Frese a **SEMIFINIRE** tagliente al centro  
Semi-finishing end mills center cutting



COATING  
**Skin**

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}s$   
28

NR

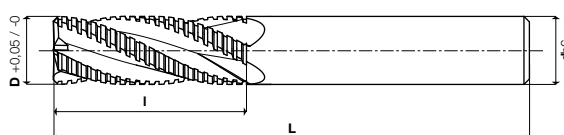
UNI 8244  
DIN 844A  
ISO 1641/I



| Cod. Art. | X-105<br>(PM Co 10,5%) | D +0,05<br>-0 | I  | L   | dh6 | Z |
|-----------|------------------------|---------------|----|-----|-----|---|
| 211050603 | EMX                    | 6             | 13 | 57  | 6   | 3 |
| 211050803 | EMX                    | 8             | 19 | 69  | 10  | 4 |
| 211051003 | EMX                    | 10            | 22 | 72  | 10  | 4 |
| 211051203 | EMX                    | 12            | 26 | 83  | 12  | 4 |
| 211051403 | EMX                    | 14            | 26 | 83  | 12  | 4 |
| 211051603 | EMX                    | 16            | 32 | 92  | 16  | 4 |
| 211051803 | EMX                    | 18            | 32 | 92  | 16  | 4 |
| 211052007 | EMX                    | 20            | 38 | 104 | 20  | 4 |
| 211052203 | EMX                    | 22            | 38 | 104 | 20  | 4 |
| 211052503 | EMX                    | 25            | 45 | 121 | 25  | 5 |
| 211052603 | EMX                    | 26            | 45 | 121 | 25  | 5 |
| 211052803 | EMX                    | 28            | 45 | 121 | 25  | 5 |
| 211053003 | EMX                    | 30            | 45 | 121 | 25  | 5 |
| 211053203 | EMX                    | 32            | 53 | 133 | 32  | 5 |



parametri tecnici a pag. 1 for technical parameters see page 127



COATING  
**Skin**

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}s$   
28

NF

UNI 8244  
DIN 844A  
ISO 1641/I

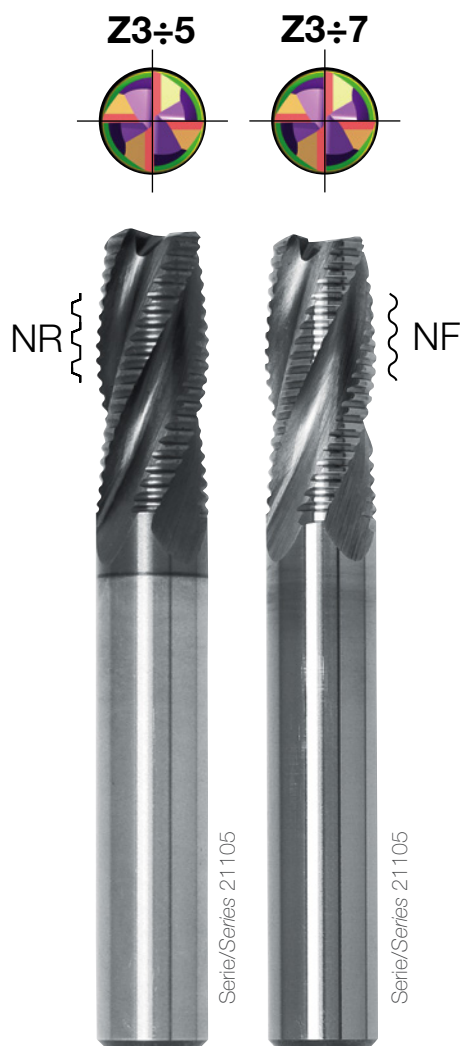


| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | dh6 | Z |
|-----------|----------------------|--------|---------------|----|-----|-----|---|
| 211050601 | CM                   | CMX    | 6             | 13 | 57  | 6   | 3 |
| 211050701 | CM                   | CMX    | 7             | 16 | 66  | 10  | 3 |
| 211050801 | CM                   | CMX    | 8             | 19 | 69  | 10  | 4 |
| 211050901 | CM                   | CMX    | 9             | 19 | 69  | 10  | 4 |
| 211051001 | CM                   | CMX    | 10            | 22 | 72  | 10  | 4 |
| 211051101 | CM                   | CMX    | 11            | 22 | 79  | 12  | 4 |
| 211051201 | CM                   | CMX    | 12            | 26 | 83  | 12  | 4 |
| 211051301 | CM                   | CMX    | 13            | 26 | 83  | 12  | 4 |
| 211051401 | CM                   | CMX    | 14            | 26 | 83  | 12  | 4 |
| 211051501 | CM                   | CMX    | 15            | 32 | 92  | 16  | 4 |
| 211051601 | CM                   | CMX    | 16            | 32 | 92  | 16  | 4 |
| 211051701 | CM                   | CMX    | 17            | 32 | 92  | 16  | 4 |
| 211051801 | CM                   | CMX    | 18            | 32 | 92  | 16  | 4 |
| 211051805 | CM                   | CMX    | 18            | 32 | 98  | 20  | 4 |
| 211052001 | CM                   | CMX    | 20            | 38 | 98  | 16  | 4 |
| 211052005 | CM                   | CMX    | 20            | 38 | 104 | 20  | 4 |
| 211052201 | CM                   | CMX    | 22            | 38 | 104 | 20  | 4 |
| 211052205 | CM                   | CMX    | 22            | 38 | 114 | 25  | 4 |
| 211052401 | CM                   | CMX    | 24            | 45 | 121 | 25  | 5 |
| 211052501 | CM                   | CMX    | 25            | 45 | 121 | 25  | 5 |
| 211052601 | CM                   | CMX    | 26            | 45 | 121 | 25  | 5 |
| 211052801 | CM                   | CMX    | 28            | 45 | 121 | 25  | 5 |
| 211053001 | CM                   | CMX    | 30            | 45 | 121 | 25  | 5 |
| 211053201 | CM                   | CMX    | 32            | 53 | 133 | 32  | 5 |
| 211053601 | CM                   | CMX    | 36            | 53 | 133 | 32  | 6 |
| 211054001 | CM                   | CMX    | 40            | 63 | 143 | 32  | 6 |
| 211054501 | CM                   | CMX    | 45            | 63 | 143 | 32  | 6 |
| 211055001 | CM                   | CMX    | 50            | 75 | 155 | 32  | 7 |



parametri tecnici a pag. 1 for technical parameters see page 124

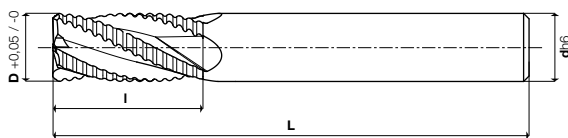
MATERIALI LAVORABILI / WORKPIECE MATERIALS



Serie/Series 21105

Serie/Series 21105

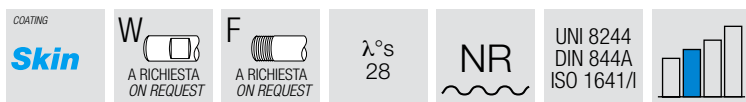
| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 21105 EMX       | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 21105 CM/CMX    | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



HSS-PM  
**HSS-PM Line**

Serie/Series  
**21105**

Frese a **SGROSSARE** tagliente al centro  
Roughing end mills center cutting

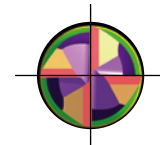


| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|---------------|----|-----|-----|---|
| 211050603 CM | CMX                  |        | 6             | 13 | 57  | 6   | 3 |
| 211050703 CM | CMX                  |        | 7             | 16 | 66  | 10  | 3 |
| 211050803 CM | CMX                  |        | 8             | 19 | 69  | 10  | 4 |
| 211050903 CM | CMX                  |        | 9             | 19 | 69  | 10  | 4 |
| 211051003 CM | CMX                  |        | 10            | 22 | 72  | 10  | 4 |
| 211051103 CM | CMX                  |        | 11            | 22 | 79  | 12  | 4 |
| 211051203 CM | CMX                  |        | 12            | 26 | 83  | 12  | 4 |
| 211051303 CM | CMX                  |        | 13            | 26 | 83  | 12  | 4 |
| 211051403 CM | CMX                  |        | 14            | 26 | 83  | 12  | 4 |
| 211051503 CM | CMX                  |        | 15            | 32 | 92  | 16  | 4 |
| 211051603 CM | CMX                  |        | 16            | 32 | 92  | 16  | 4 |
| 211051703 CM | CMX                  |        | 17            | 32 | 92  | 16  | 4 |
| 211051803 CM | CMX                  |        | 18            | 32 | 92  | 16  | 4 |
| 211051807 CM | CMX                  |        | 18            | 32 | 98  | 20  | 4 |
| 211052003 CM | CMX                  |        | 20            | 38 | 98  | 16  | 4 |
| 211052007 CM | CMX                  |        | 20            | 38 | 104 | 20  | 4 |
| 211052203 CM | CMX                  |        | 22            | 38 | 104 | 20  | 4 |
| 211052207 CM | CMX                  |        | 22            | 38 | 114 | 25  | 4 |
| 211052403 CM | CMX                  |        | 24            | 45 | 121 | 25  | 5 |
| 211052503 CM | CMX                  |        | 25            | 45 | 121 | 25  | 5 |
| 211052603 CM | CMX                  |        | 26            | 45 | 121 | 25  | 5 |
| 211052803 CM | CMX                  |        | 28            | 45 | 121 | 25  | 5 |
| 211053003 CM | CMX                  |        | 30            | 45 | 121 | 25  | 5 |
| 211053203 CM | CMX                  |        | 32            | 53 | 133 | 32  | 5 |
| 211053603 CM | CMX                  |        | 36            | 53 | 133 | 32  | 6 |
| 211054003 CM | CMX                  |        | 40            | 63 | 143 | 32  | 6 |
| 211054503 CM | CMX                  |        | 45            | 63 | 143 | 32  | 6 |
| 211055003 CM | CMX                  |        | 50            | 75 | 155 | 32  | 7 |



parametri tecnici a pag. / for technical parameters see page 124

**Z3÷7**



MATERIALI LAVORABILI / WORKPIECE MATERIALS



● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

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79

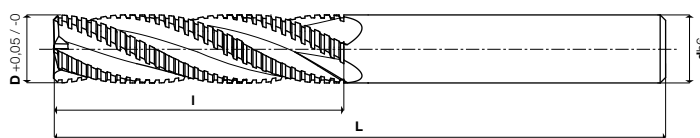
Serie/Series

## 21120

Frese a **SEMIFINIRE** tagliente al centro  
Semi-finishing end mills center cutting

## 21120

Frese a **SGROSSARE** tagliente al centro  
Roughing end mills center cutting



COATING  
**Skin**

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

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28

NF

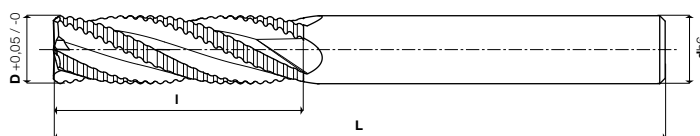
UNI 8244  
DIN 844A  
ISO 1641/I



| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | dh6 | Z |
|-----------|----------------------|--------|---------------|-----|-----|-----|---|
| 211200801 | CM                   | CMX    | 8             | 38  | 88  | 10  | 4 |
| 211201001 | CM                   | CMX    | 10            | 45  | 95  | 10  | 4 |
| 211201201 | CM                   | CMX    | 12            | 53  | 110 | 12  | 4 |
| 211201401 | CM                   | CMX    | 14            | 53  | 110 | 12  | 4 |
| 211201501 | CM                   | CMX    | 15            | 63  | 123 | 16  | 4 |
| 211201601 | CM                   | CMX    | 16            | 63  | 123 | 16  | 4 |
| 211201801 | CM                   | CMX    | 18            | 63  | 123 | 16  | 4 |
| 211201805 | CM                   | CMX    | 18            | 63  | 129 | 20  | 4 |
| 211202001 | CM                   | CMX    | 20            | 75  | 135 | 16  | 4 |
| 211202005 | CM                   | CMX    | 20            | 75  | 141 | 20  | 4 |
| 211202201 | CM                   | CMX    | 22            | 75  | 141 | 20  | 4 |
| 211202205 | CM                   | CMX    | 22            | 75  | 151 | 25  | 4 |
| 211202401 | CM                   | CMX    | 24            | 90  | 166 | 25  | 5 |
| 211202501 | CM                   | CMX    | 25            | 90  | 166 | 25  | 5 |
| 211202801 | CM                   | CMX    | 28            | 90  | 166 | 25  | 5 |
| 211203001 | CM                   | CMX    | 30            | 90  | 166 | 25  | 5 |
| 211203201 | CM                   | CMX    | 32            | 106 | 186 | 32  | 5 |
| 211203601 | CM                   | CMX    | 36            | 106 | 186 | 32  | 6 |
| 211204001 | CM                   | CMX    | 40            | 125 | 205 | 32  | 6 |
| 211204501 | CM                   | CMX    | 45            | 125 | 205 | 32  | 6 |
| 211205001 | CM                   | CMX    | 50            | 150 | 230 | 32  | 7 |



parametri tecnici a pag. 1 for technical parameters see page 124



COATING  
**Skin**

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ON REQUEST

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UNI 8244  
DIN 844A  
ISO 1641/I



| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | dh6 | Z |
|-----------|----------------------|--------|---------------|-----|-----|-----|---|
| 211200803 | CM                   | CMX    | 8             | 38  | 88  | 10  | 4 |
| 211201003 | CM                   | CMX    | 10            | 45  | 95  | 10  | 4 |
| 211201203 | CM                   | CMX    | 12            | 53  | 110 | 12  | 4 |
| 211201403 | CM                   | CMX    | 14            | 53  | 110 | 12  | 4 |
| 211201503 | CM                   | CMX    | 15            | 63  | 123 | 16  | 4 |
| 211201603 | CM                   | CMX    | 16            | 63  | 123 | 16  | 4 |
| 211201803 | CM                   | CMX    | 18            | 63  | 123 | 16  | 4 |
| 211201807 | CM                   | CMX    | 18            | 63  | 129 | 20  | 4 |
| 211202003 | CM                   | CMX    | 20            | 75  | 135 | 16  | 4 |
| 211202007 | CM                   | CMX    | 20            | 75  | 141 | 20  | 4 |
| 211202203 | CM                   | CMX    | 22            | 75  | 141 | 20  | 4 |
| 211202207 | CM                   | CMX    | 22            | 75  | 151 | 25  | 4 |
| 211202403 | CM                   | CMX    | 24            | 90  | 166 | 25  | 5 |
| 211202503 | CM                   | CMX    | 25            | 90  | 166 | 25  | 5 |
| 211202803 | CM                   | CMX    | 28            | 90  | 166 | 25  | 5 |
| 211203003 | CM                   | CMX    | 30            | 90  | 166 | 25  | 5 |
| 211203203 | CM                   | CMX    | 32            | 106 | 186 | 32  | 5 |
| 211203603 | CM                   | CMX    | 36            | 106 | 186 | 32  | 6 |
| 211204003 | CM                   | CMX    | 40            | 125 | 205 | 32  | 6 |
| 211204503 | CM                   | CMX    | 45            | 125 | 205 | 32  | 6 |
| 211205003 | CM                   | CMX    | 50            | 150 | 230 | 32  | 7 |

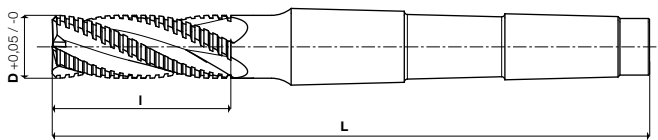


parametri tecnici a pag. 1 for technical parameters see page 124

MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 21120 | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 21120 | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |





HSS-PM  
**HSS-PM Line**

Serie/Series

**21150**

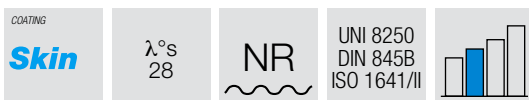
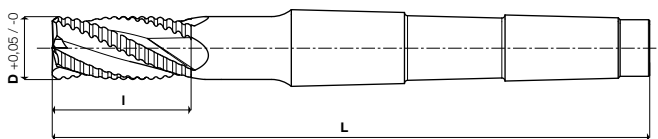
Frese a **SEMIFINIRE** tagliente al centro  
Semi-finishing end mills center cutting

**21150**

Frese a **SGROSSARE** tagliente al centro  
Roughing end mills center cutting



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|----|-----|----------------|---|
| 211501601 CM | CMX                  | CMX    | 16            | 32 | 117 | 2              | 4 |
| 211501801 CM | CMX                  | CMX    | 18            | 32 | 117 | 2              | 4 |
| 211502001 CM | CMX                  | CMX    | 20            | 38 | 140 | 3              | 4 |
| 211502201 CM | CMX                  | CMX    | 22            | 38 | 140 | 3              | 4 |
| 211502401 CM | CMX                  | CMX    | 24            | 45 | 147 | 3              | 5 |
| 211502501 CM | CMX                  | CMX    | 25            | 45 | 147 | 3              | 5 |
| 211502601 CM | CMX                  | CMX    | 26            | 45 | 147 | 3              | 5 |
| 211502801 CM | CMX                  | CMX    | 28            | 45 | 147 | 3              | 5 |
| 211503001 CM | CMX                  | CMX    | 30            | 53 | 155 | 3              | 5 |
| 211503201 CM | CMX                  | CMX    | 32            | 53 | 178 | 4              | 5 |
| 211503401 CM | CMX                  | CMX    | 34            | 53 | 178 | 4              | 5 |
| 211503501 CM | CMX                  | CMX    | 35            | 53 | 178 | 4              | 6 |
| 211503601 CM | CMX                  | CMX    | 36            | 53 | 178 | 4              | 6 |
| 211503801 CM | CMX                  | CMX    | 38            | 63 | 188 | 4              | 6 |
| 211504001 CM | CMX                  | CMX    | 40            | 63 | 188 | 4              | 6 |
| 211504501 CM | CMX                  | CMX    | 45            | 63 | 188 | 4              | 6 |
| 211505001 CM | CMX                  | CMX    | 50            | 75 | 200 | 4              | 7 |
| 211505005 CM | CMX                  | CMX    | 50            | 75 | 233 | 5              | 7 |
| 211505601 CM | CMX                  | CMX    | 56            | 75 | 233 | 5              | 7 |
| 211506301 CM | CMX                  | CMX    | 63            | 90 | 248 | 5              | 8 |



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|----|-----|----------------|---|
| 211501603 CM | CMX                  | CMX    | 16            | 32 | 117 | 2              | 4 |
| 211501803 CM | CMX                  | CMX    | 18            | 32 | 117 | 2              | 4 |
| 211502003 CM | CMX                  | CMX    | 20            | 38 | 140 | 3              | 4 |
| 211502203 CM | CMX                  | CMX    | 22            | 38 | 140 | 3              | 4 |
| 211502403 CM | CMX                  | CMX    | 24            | 45 | 147 | 3              | 5 |
| 211502503 CM | CMX                  | CMX    | 25            | 45 | 147 | 3              | 5 |
| 211502603 CM | CMX                  | CMX    | 26            | 45 | 147 | 3              | 5 |
| 211502803 CM | CMX                  | CMX    | 28            | 45 | 147 | 3              | 5 |
| 211503003 CM | CMX                  | CMX    | 30            | 53 | 155 | 3              | 5 |
| 211503203 CM | CMX                  | CMX    | 32            | 53 | 178 | 4              | 5 |
| 211503403 CM | CMX                  | CMX    | 34            | 53 | 178 | 4              | 5 |
| 211503503 CM | CMX                  | CMX    | 35            | 53 | 178 | 4              | 6 |
| 211503603 CM | CMX                  | CMX    | 36            | 53 | 178 | 4              | 6 |
| 211503803 CM | CMX                  | CMX    | 38            | 63 | 188 | 4              | 6 |
| 211504003 CM | CMX                  | CMX    | 40            | 63 | 188 | 4              | 6 |
| 211504503 CM | CMX                  | CMX    | 45            | 63 | 188 | 4              | 6 |
| 211505003 CM | CMX                  | CMX    | 50            | 75 | 200 | 4              | 7 |
| 211505007 CM | CMX                  | CMX    | 50            | 75 | 233 | 5              | 7 |
| 211505603 CM | CMX                  | CMX    | 56            | 75 | 233 | 5              | 7 |
| 211506303 CM | CMX                  | CMX    | 63            | 90 | 248 | 5              | 8 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 21150           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 21150           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

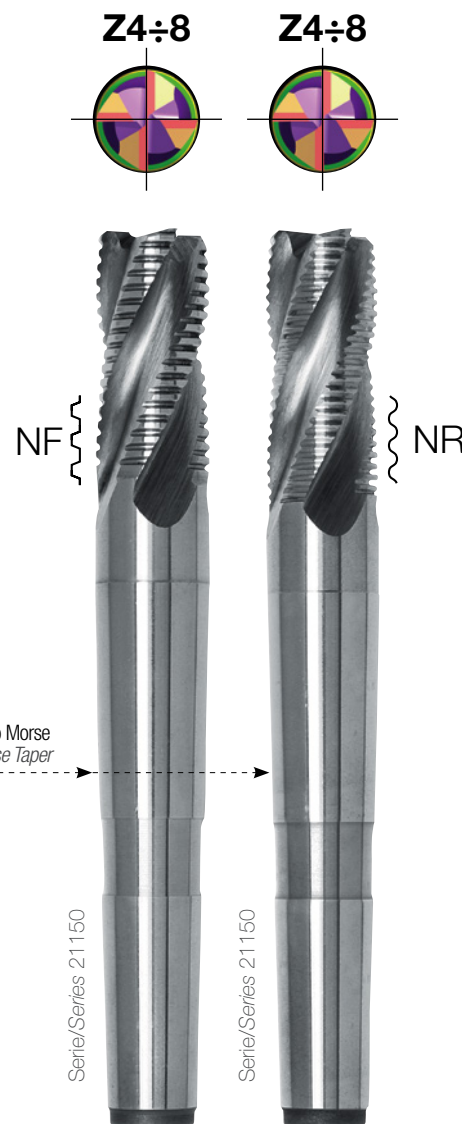
● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

WWW.UOP.IT

81





# HSS-PM HSS-PM Line

## Serie/Series 21155

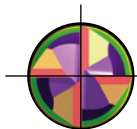
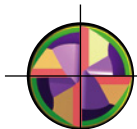
Frese a **SEMIFINIRE** tagliente al centro  
Semi-finishing end mills center cutting

## 21155

Frese a **SGROSSARE** tagliente al centro  
Roughing end mills center cutting

Z4÷8

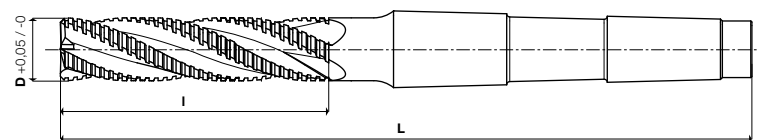
Z4÷8



Cono Morse  
Morse Taper

Serie/Series 21155

Serie/Series 21155



COATING

**Skin**

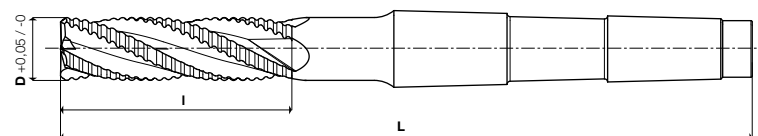
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28

**NF**

UNI 8250  
DIN 845B  
ISO 1641/II



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|-----|----------------|---|
| 211551601 CM | CMX                  | CMX    | 16            | 63  | 148 | 2              | 4 |
| 211551801 CM | CMX                  | CMX    | 18            | 63  | 148 | 2              | 4 |
| 211552001 CM | CMX                  | CMX    | 20            | 75  | 177 | 3              | 4 |
| 211552201 CM | CMX                  | CMX    | 22            | 75  | 177 | 3              | 4 |
| 211552401 CM | CMX                  | CMX    | 24            | 90  | 192 | 3              | 5 |
| 211552501 CM | CMX                  | CMX    | 25            | 90  | 192 | 3              | 5 |
| 211552601 CM | CMX                  | CMX    | 26            | 90  | 192 | 3              | 5 |
| 211552801 CM | CMX                  | CMX    | 28            | 90  | 192 | 3              | 5 |
| 211553001 CM | CMX                  | CMX    | 30            | 90  | 192 | 3              | 5 |
| 211553201 CM | CMX                  | CMX    | 32            | 106 | 231 | 4              | 5 |
| 211553401 CM | CMX                  | CMX    | 34            | 106 | 231 | 4              | 5 |
| 211553501 CM | CMX                  | CMX    | 35            | 106 | 231 | 4              | 6 |
| 211553601 CM | CMX                  | CMX    | 36            | 106 | 231 | 4              | 6 |
| 211553801 CM | CMX                  | CMX    | 38            | 125 | 250 | 4              | 6 |
| 211554001 CM | CMX                  | CMX    | 40            | 125 | 250 | 4              | 6 |
| 211554501 CM | CMX                  | CMX    | 45            | 125 | 250 | 4              | 6 |
| 211555001 CM | CMX                  | CMX    | 50            | 150 | 275 | 4              | 7 |
| 211555005 CM | CMX                  | CMX    | 50            | 150 | 308 | 5              | 7 |
| 211555601 CM | CMX                  | CMX    | 56            | 150 | 308 | 5              | 7 |
| 211556301 CM | CMX                  | CMX    | 63            | 180 | 338 | 5              | 8 |



COATING

**Skin**

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28

**NR**

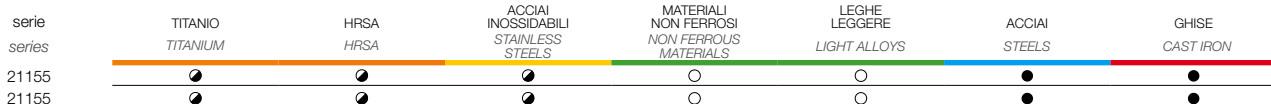
UNI 8250  
DIN 845B  
ISO 1641/II

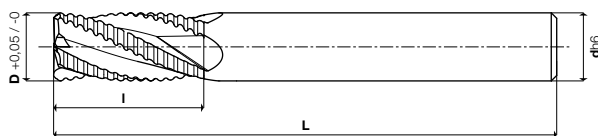


| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|-----|----------------|---|
| 211551603 CM | CMX                  | CMX    | 16            | 63  | 148 | 2              | 4 |
| 211551803 CM | CMX                  | CMX    | 18            | 63  | 148 | 2              | 4 |
| 211552003 CM | CMX                  | CMX    | 20            | 75  | 177 | 3              | 4 |
| 211552203 CM | CMX                  | CMX    | 22            | 75  | 177 | 3              | 4 |
| 211552403 CM | CMX                  | CMX    | 24            | 90  | 192 | 3              | 5 |
| 211552503 CM | CMX                  | CMX    | 25            | 90  | 192 | 3              | 5 |
| 211552603 CM | CMX                  | CMX    | 26            | 90  | 192 | 3              | 5 |
| 211552803 CM | CMX                  | CMX    | 28            | 90  | 192 | 3              | 5 |
| 211553003 CM | CMX                  | CMX    | 30            | 90  | 192 | 3              | 5 |
| 211553203 CM | CMX                  | CMX    | 32            | 106 | 231 | 4              | 5 |
| 211553403 CM | CMX                  | CMX    | 34            | 106 | 231 | 4              | 5 |
| 211553503 CM | CMX                  | CMX    | 35            | 106 | 231 | 4              | 6 |
| 211553603 CM | CMX                  | CMX    | 36            | 106 | 231 | 4              | 6 |
| 211553803 CM | CMX                  | CMX    | 38            | 125 | 250 | 4              | 6 |
| 211554003 CM | CMX                  | CMX    | 40            | 125 | 250 | 4              | 6 |
| 211554503 CM | CMX                  | CMX    | 45            | 125 | 250 | 4              | 6 |
| 211555003 CM | CMX                  | CMX    | 50            | 150 | 275 | 4              | 7 |
| 211555007 CM | CMX                  | CMX    | 50            | 150 | 308 | 5              | 7 |
| 211555603 CM | CMX                  | CMX    | 56            | 150 | 308 | 5              | 7 |
| 211556303 CM | CMX                  | CMX    | 63            | 180 | 338 | 5              | 8 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS





COATING  
**Skin**  
Inox

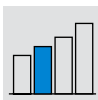
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ON REQUEST

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A RICHIESTA  
ON REQUEST

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32

NR

UNI 8244  
DIN 844A  
ISO 1641/I



HSS-PM  
**HSS-PM Line**

Serie/Series  
**21305**

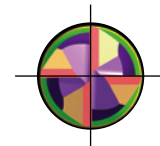
Frese a **SGROSSARE**  
Roughing end mills

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|---------------|----|-----|-----|---|
| 213050503 CM |                      | CMX    | 5             | 13 | 57  | 6   | 3 |
| 213050603 CM |                      | CMX    | 6             | 13 | 57  | 6   | 3 |
| 213050803 CM |                      | CMX    | 8             | 19 | 69  | 10  | 4 |
| 213051003 CM |                      | CMX    | 10            | 22 | 72  | 10  | 4 |
| 213051203 CM |                      | CMX    | 12            | 26 | 83  | 12  | 4 |
| 213051403 CM |                      | CMX    | 14            | 26 | 83  | 12  | 4 |
| 213051503 CM |                      | CMX    | 15            | 32 | 92  | 16  | 4 |
| 213051603 CM |                      | CMX    | 16            | 32 | 92  | 16  | 4 |
| 213051803 CM |                      | CMX    | 18            | 32 | 92  | 16  | 4 |
| 213052007 CM |                      | CMX    | 20            | 38 | 104 | 20  | 4 |
| 213052203 CM |                      | CMX    | 22            | 38 | 104 | 20  | 4 |
| 213052503 CM |                      | CMX    | 25            | 45 | 121 | 25  | 5 |



parametri tecnici a pag. / for technical parameters see page 125

**Z3÷5**



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 21305           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

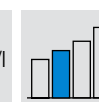
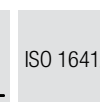
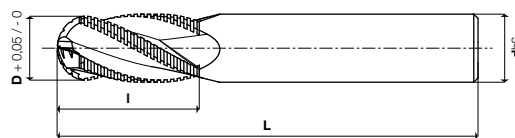
○ non consigliata/not recommended

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83

## Serie/Series 21505

Fresa a **SEMIFINIRE**, testa semisferica  
Ball nosed semi-finishing end mills

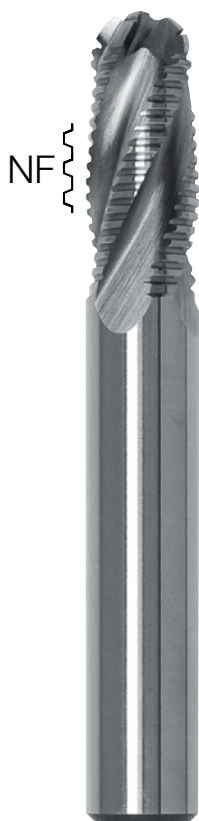
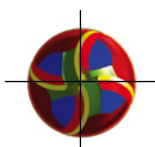


| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D <sup>+0,05</sup><br>-0 | I  | L   | dh6 | Z |
|-----------|----------------------|--------|--------------------------|----|-----|-----|---|
| 215050601 | CM                   | CMX    | 6                        | 13 | 57  | 6   | 3 |
| 215050701 | CM                   | CMX    | 7                        | 16 | 66  | 10  | 3 |
| 215050801 | CM                   | CMX    | 8                        | 19 | 69  | 10  | 4 |
| 215050901 | CM                   | CMX    | 9                        | 19 | 69  | 10  | 4 |
| 215051001 | CM                   | CMX    | 10                       | 22 | 72  | 10  | 4 |
| 215051101 | CM                   | CMX    | 11                       | 22 | 79  | 12  | 4 |
| 215051201 | CM                   | CMX    | 12                       | 26 | 83  | 12  | 4 |
| 215051301 | CM                   | CMX    | 13                       | 26 | 83  | 12  | 4 |
| 215051401 | CM                   | CMX    | 14                       | 26 | 83  | 12  | 4 |
| 215051501 | CM                   | CMX    | 15                       | 32 | 92  | 16  | 4 |
| 215051601 | CM                   | CMX    | 16                       | 32 | 92  | 16  | 4 |
| 215051801 | CM                   | CMX    | 18                       | 32 | 92  | 16  | 4 |
| 215051805 | CM                   | CMX    | 18                       | 32 | 98  | 20  | 4 |
| 215052001 | CM                   | CMX    | 20                       | 38 | 98  | 16  | 4 |
| 215052005 | CM                   | CMX    | 20                       | 38 | 104 | 20  | 4 |
| 215052201 | CM                   | CMX    | 22                       | 38 | 104 | 20  | 4 |
| 215052205 | CM                   | CMX    | 22                       | 38 | 114 | 25  | 4 |
| 215052401 | CM                   | CMX    | 24                       | 45 | 121 | 25  | 5 |
| 215052501 | CM                   | CMX    | 25                       | 45 | 121 | 25  | 5 |
| 215052601 | CM                   | CMX    | 26                       | 45 | 121 | 25  | 5 |
| 215052801 | CM                   | CMX    | 28                       | 45 | 121 | 25  | 5 |
| 215053001 | CM                   | CMX    | 30                       | 45 | 121 | 25  | 5 |
| 215053201 | CM                   | CMX    | 32                       | 53 | 133 | 32  | 5 |
| 215053601 | CM                   | CMX    | 36                       | 53 | 133 | 32  | 6 |
| 215054001 | CM                   | CMX    | 40                       | 63 | 143 | 32  | 6 |
| 215054501 | CM                   | CMX    | 45                       | 63 | 143 | 32  | 6 |
| 215055001 | CM                   | CMX    | 50                       | 75 | 155 | 32  | 7 |



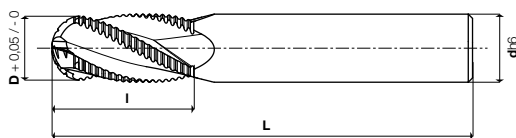
parametri tecnici a pag. 1 / for technical parameters see page 125

**Z3÷7**  
BALL-NOSED



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI       | MATERIALI   | LEGHE   | ACCIAI | GHISE     |
|--------|----------|------|--------------|-------------|---------|--------|-----------|
| series | TITANIUM | HRSA | INOSSIDABILI | NON FERROSI | LEGGERE | STEELS | CAST IRON |
| 21505  | ●        | ●    | ●            | ○           | ○       | ●      | ●         |



HSS-PM  
**HSS-PM Line**

Serie/Series  
**21505**

Frese a **SGROSSARE**, testa semisferica  
Ball nosed roughing end mills

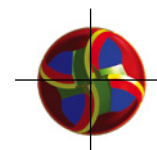


| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D <sup>+0,05</sup><br>-0 | I  | L   | dh6 | Z |
|-----------|----------------------|--------|--------------------------|----|-----|-----|---|
| 215050603 | CM                   | CMX    | 6                        | 13 | 57  | 6   | 3 |
| 215050703 | CM                   | CMX    | 7                        | 16 | 66  | 10  | 3 |
| 215050803 | CM                   | CMX    | 8                        | 19 | 69  | 10  | 4 |
| 215050903 | CM                   | CMX    | 9                        | 19 | 69  | 10  | 4 |
| 215051003 | CM                   | CMX    | 10                       | 22 | 72  | 10  | 4 |
| 215051103 | CM                   | CMX    | 11                       | 22 | 79  | 12  | 4 |
| 215051203 | CM                   | CMX    | 12                       | 26 | 83  | 12  | 4 |
| 215051303 | CM                   | CMX    | 13                       | 26 | 83  | 12  | 4 |
| 215051403 | CM                   | CMX    | 14                       | 26 | 83  | 12  | 4 |
| 215051503 | CM                   | CMX    | 15                       | 32 | 92  | 16  | 4 |
| 215051603 | CM                   | CMX    | 16                       | 32 | 92  | 16  | 4 |
| 215051803 | CM                   | CMX    | 18                       | 32 | 92  | 16  | 4 |
| 215051807 | CM                   | CMX    | 18                       | 32 | 98  | 20  | 4 |
| 215052003 | CM                   | CMX    | 20                       | 38 | 98  | 16  | 4 |
| 215052007 | CM                   | CMX    | 20                       | 38 | 104 | 20  | 4 |
| 215052203 | CM                   | CMX    | 22                       | 38 | 104 | 20  | 4 |
| 215052207 | CM                   | CMX    | 22                       | 38 | 114 | 25  | 4 |
| 215052403 | CM                   | CMX    | 24                       | 45 | 121 | 25  | 5 |
| 215052503 | CM                   | CMX    | 25                       | 45 | 121 | 25  | 5 |
| 215052603 | CM                   | CMX    | 26                       | 45 | 121 | 25  | 5 |
| 215052803 | CM                   | CMX    | 28                       | 45 | 121 | 25  | 5 |
| 215053003 | CM                   | CMX    | 30                       | 45 | 121 | 25  | 5 |
| 215053203 | CM                   | CMX    | 32                       | 53 | 133 | 32  | 5 |
| 215053603 | CM                   | CMX    | 36                       | 53 | 133 | 32  | 6 |
| 215054003 | CM                   | CMX    | 40                       | 63 | 143 | 32  | 6 |
| 215054503 | CM                   | CMX    | 45                       | 63 | 143 | 32  | 6 |
| 215055003 | CM                   | CMX    | 50                       | 75 | 155 | 32  | 7 |



parametri tecnici a pag. / for technical parameters see page 125

**Z3÷7**  
BALL-NOSED



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 21505           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

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85

## Serie/Series 21520

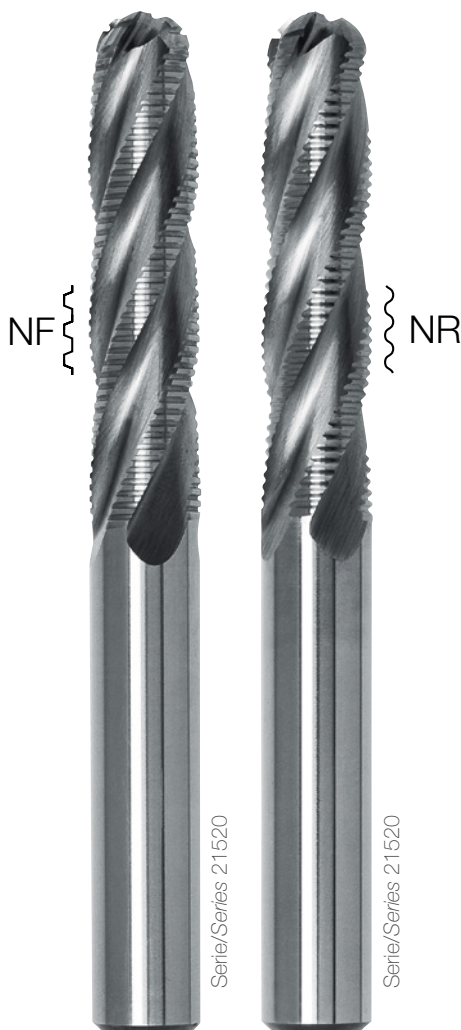
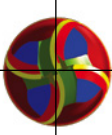
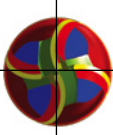
Frese a **SEMIFINIRE**, testa semisferica  
Ball nosed semi-finishing end mills

## 21520

Frese a **SGROSSARE**, testa semisferica  
Ball nosed roughing end mills

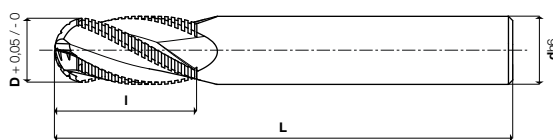
**Z4÷7**  
BALL-NOSED

**Z4÷7**  
BALL-NOSED



Serie/Series 21520

Serie/Series 21520



COATING  
**Skin**

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ON REQUEST

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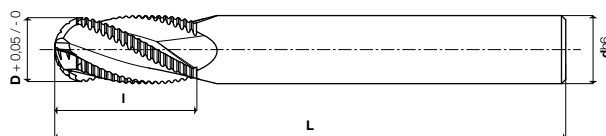
ISO 1641/I



| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | dh6 | Z |
|-----------|----------------------|--------|---------------|-----|-----|-----|---|
| 215200801 | CM                   | CMX    | 8             | 38  | 88  | 10  | 4 |
| 215201001 | CM                   | CMX    | 10            | 45  | 95  | 10  | 4 |
| 215201201 | CM                   | CMX    | 12            | 53  | 110 | 12  | 4 |
| 215201401 | CM                   | CMX    | 14            | 53  | 110 | 12  | 4 |
| 215201501 | CM                   | CMX    | 15            | 63  | 123 | 16  | 4 |
| 215201601 | CM                   | CMX    | 16            | 63  | 123 | 16  | 4 |
| 215201801 | CM                   | CMX    | 18            | 63  | 123 | 16  | 4 |
| 215201805 | CM                   | CMX    | 18            | 63  | 129 | 20  | 4 |
| 215202001 | CM                   | CMX    | 20            | 75  | 135 | 16  | 4 |
| 215202005 | CM                   | CMX    | 20            | 75  | 141 | 20  | 4 |
| 215202201 | CM                   | CMX    | 22            | 75  | 141 | 20  | 4 |
| 215202205 | CM                   | CMX    | 22            | 75  | 151 | 25  | 4 |
| 215202401 | CM                   | CMX    | 24            | 90  | 166 | 25  | 5 |
| 215202501 | CM                   | CMX    | 25            | 90  | 166 | 25  | 5 |
| 215202801 | CM                   | CMX    | 28            | 90  | 166 | 25  | 5 |
| 215203001 | CM                   | CMX    | 30            | 90  | 166 | 25  | 5 |
| 215203201 | CM                   | CMX    | 32            | 106 | 186 | 32  | 5 |
| 215203601 | CM                   | CMX    | 36            | 106 | 186 | 32  | 6 |
| 215204001 | CM                   | CMX    | 40            | 125 | 205 | 32  | 6 |
| 215204501 | CM                   | CMX    | 45            | 125 | 205 | 32  | 6 |
| 215205001 | CM                   | CMX    | 50            | 150 | 230 | 32  | 7 |



parametri tecnici a pag. 1 for technical parameters see page 125



COATING  
**Skin**

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ISO 1641/I



| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | dh6 | Z |
|-----------|----------------------|--------|---------------|-----|-----|-----|---|
| 215200803 | CM                   | CMX    | 8             | 38  | 88  | 10  | 4 |
| 215201003 | CM                   | CMX    | 10            | 45  | 95  | 10  | 4 |
| 215201203 | CM                   | CMX    | 12            | 53  | 110 | 12  | 4 |
| 215201403 | CM                   | CMX    | 14            | 53  | 110 | 12  | 4 |
| 215201503 | CM                   | CMX    | 15            | 63  | 123 | 16  | 4 |
| 215201603 | CM                   | CMX    | 16            | 63  | 123 | 16  | 4 |
| 215201803 | CM                   | CMX    | 18            | 63  | 123 | 16  | 4 |
| 215201807 | CM                   | CMX    | 18            | 63  | 129 | 20  | 4 |
| 215202003 | CM                   | CMX    | 20            | 75  | 135 | 16  | 4 |
| 215202007 | CM                   | CMX    | 20            | 75  | 141 | 20  | 4 |
| 215202203 | CM                   | CMX    | 22            | 75  | 141 | 20  | 4 |
| 215202207 | CM                   | CMX    | 22            | 75  | 151 | 25  | 4 |
| 215202403 | CM                   | CMX    | 24            | 90  | 166 | 25  | 5 |
| 215202503 | CM                   | CMX    | 25            | 90  | 166 | 25  | 5 |
| 215202803 | CM                   | CMX    | 28            | 90  | 166 | 25  | 5 |
| 215203003 | CM                   | CMX    | 30            | 90  | 166 | 25  | 5 |
| 215203203 | CM                   | CMX    | 32            | 106 | 186 | 32  | 5 |
| 215203603 | CM                   | CMX    | 36            | 106 | 186 | 32  | 6 |
| 215204003 | CM                   | CMX    | 40            | 125 | 205 | 32  | 6 |
| 215204503 | CM                   | CMX    | 45            | 125 | 205 | 32  | 6 |
| 215205003 | CM                   | CMX    | 50            | 150 | 230 | 32  | 7 |



parametri tecnici a pag. 1 for technical parameters see page 125

MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 21520 | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 21520 | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



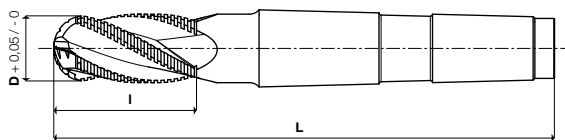
Serie/Series

## 21550

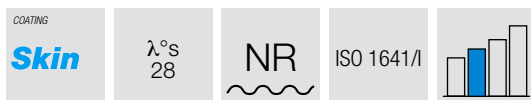
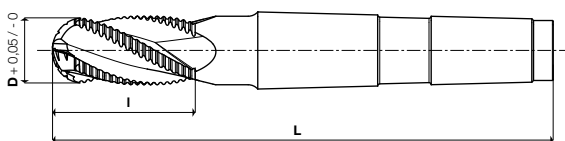
Frese a **SEMIFINIRE**, testa semisferica  
Ball nosed semi-finishing end mills

## 21550

Frese a **SGROSSARE**, testa semisferica  
Ball nosed roughing end mills



| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I  | L   | MORSE<br>TAPER | Z |
|-----------|----------------------|--------|---------------|----|-----|----------------|---|
| 215501601 | CM                   | CMX    | 16            | 32 | 117 | 2              | 4 |
| 215501801 | CM                   | CMX    | 18            | 32 | 117 | 2              | 4 |
| 215502001 | CM                   | CMX    | 20            | 38 | 140 | 3              | 4 |
| 215502201 | CM                   | CMX    | 22            | 38 | 140 | 3              | 4 |
| 215502401 | CM                   | CMX    | 24            | 45 | 147 | 3              | 5 |
| 215502501 | CM                   | CMX    | 25            | 45 | 147 | 3              | 5 |
| 215502601 | CM                   | CMX    | 26            | 45 | 147 | 3              | 5 |
| 215502801 | CM                   | CMX    | 28            | 45 | 147 | 3              | 5 |
| 215503001 | CM                   | CMX    | 30            | 53 | 155 | 3              | 5 |
| 215503201 | CM                   | CMX    | 32            | 53 | 178 | 4              | 5 |
| 215503401 | CM                   | CMX    | 34            | 53 | 178 | 4              | 5 |
| 215503501 | CM                   | CMX    | 35            | 53 | 178 | 4              | 6 |
| 215503601 | CM                   | CMX    | 36            | 53 | 178 | 4              | 6 |
| 215503801 | CM                   | CMX    | 38            | 63 | 188 | 4              | 6 |
| 215504001 | CM                   | CMX    | 40            | 63 | 188 | 4              | 6 |
| 215504501 | CM                   | CMX    | 45            | 63 | 188 | 4              | 6 |
| 215505001 | CM                   | CMX    | 50            | 75 | 233 | 5              | 7 |
| 215505601 | CM                   | CMX    | 56            | 75 | 233 | 5              | 7 |
| 215506301 | CM                   | CMX    | 63            | 90 | 248 | 5              | 8 |

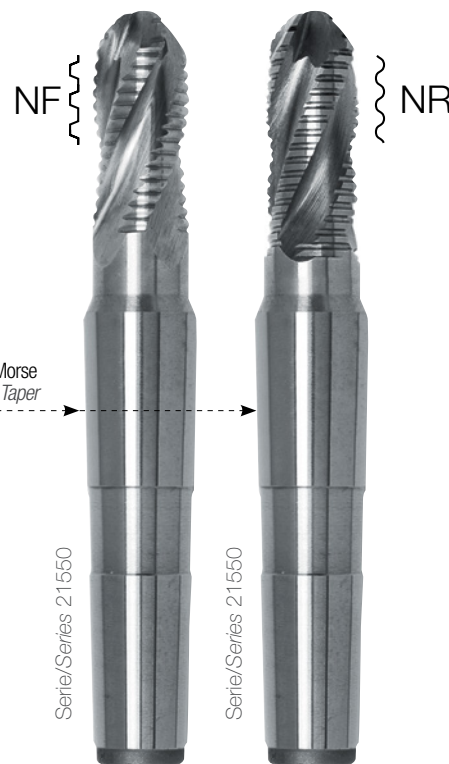
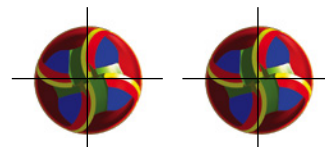


| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | D <sup>+0,05</sup><br>-0 | I  | L   | MORSE<br>TAPER | Z |
|-----------|----------------------|--------|--------------------------|----|-----|----------------|---|
| 215501603 | CM                   | CMX    | 16                       | 32 | 117 | 2              | 4 |
| 215501803 | CM                   | CMX    | 18                       | 32 | 117 | 2              | 4 |
| 215502003 | CM                   | CMX    | 20                       | 38 | 140 | 3              | 4 |
| 215502203 | CM                   | CMX    | 22                       | 38 | 140 | 3              | 4 |
| 215502403 | CM                   | CMX    | 24                       | 45 | 147 | 3              | 5 |
| 215502503 | CM                   | CMX    | 25                       | 45 | 147 | 3              | 5 |
| 215502603 | CM                   | CMX    | 26                       | 45 | 147 | 3              | 5 |
| 215502803 | CM                   | CMX    | 28                       | 45 | 147 | 3              | 5 |
| 215503003 | CM                   | CMX    | 30                       | 53 | 155 | 3              | 5 |
| 215503203 | CM                   | CMX    | 32                       | 53 | 178 | 4              | 5 |
| 215503403 | CM                   | CMX    | 34                       | 53 | 178 | 4              | 5 |
| 215503503 | CM                   | CMX    | 35                       | 53 | 178 | 4              | 6 |
| 215503603 | CM                   | CMX    | 36                       | 53 | 178 | 4              | 6 |
| 215503803 | CM                   | CMX    | 38                       | 63 | 188 | 4              | 6 |
| 215504003 | CM                   | CMX    | 40                       | 63 | 188 | 4              | 6 |
| 215504503 | CM                   | CMX    | 45                       | 63 | 188 | 4              | 6 |
| 215505003 | CM                   | CMX    | 50                       | 75 | 233 | 5              | 7 |
| 215505603 | CM                   | CMX    | 56                       | 75 | 233 | 5              | 7 |
| 215506303 | CM                   | CMX    | 63                       | 90 | 248 | 5              | 8 |



Z4÷8  
BALL-NOSED

Z4÷8  
BALL-NOSED



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 21550           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 21550           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended



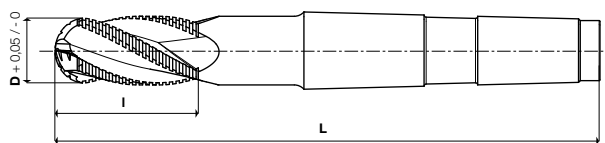
# HSS-PM HSS-PM Line

## Serie/Series 21555

Fresa a **SEMIFINIRE**, testa semisferica  
Ball nosed semi-finishing end mills

## 21555

Fresa a **SGROSSARE**, testa semisferica  
Ball nosed roughing end mills



COATING  
**Skin**

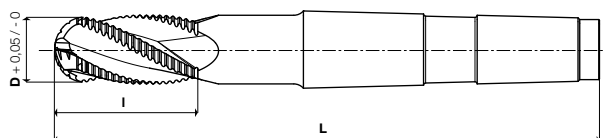
$\lambda^{\circ}\text{s}$   
28

NF

ISO 1641/II



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|-----|----------------|---|
| 215551601 CM | CMX                  | CMX    | 16            | 63  | 148 | 2              | 4 |
| 215551801 CM | CMX                  | CMX    | 18            | 63  | 148 | 2              | 4 |
| 215552001 CM | CMX                  | CMX    | 20            | 75  | 177 | 3              | 4 |
| 215552201 CM | CMX                  | CMX    | 22            | 75  | 177 | 3              | 4 |
| 215552401 CM | CMX                  | CMX    | 24            | 90  | 192 | 3              | 5 |
| 215552501 CM | CMX                  | CMX    | 25            | 90  | 192 | 3              | 5 |
| 215552601 CM | CMX                  | CMX    | 26            | 90  | 192 | 3              | 5 |
| 215552801 CM | CMX                  | CMX    | 28            | 90  | 192 | 3              | 5 |
| 215553001 CM | CMX                  | CMX    | 30            | 90  | 192 | 3              | 5 |
| 215553201 CM | CMX                  | CMX    | 32            | 106 | 231 | 4              | 5 |
| 215553401 CM | CMX                  | CMX    | 34            | 106 | 231 | 4              | 5 |
| 215553501 CM | CMX                  | CMX    | 35            | 106 | 231 | 4              | 6 |
| 215553601 CM | CMX                  | CMX    | 36            | 106 | 231 | 4              | 6 |
| 215553801 CM | CMX                  | CMX    | 38            | 125 | 250 | 4              | 6 |
| 215554001 CM | CMX                  | CMX    | 40            | 125 | 250 | 4              | 6 |
| 215554501 CM | CMX                  | CMX    | 45            | 125 | 250 | 4              | 6 |
| 215555001 CM | CMX                  | CMX    | 50            | 150 | 308 | 5              | 7 |
| 215555601 CM | CMX                  | CMX    | 56            | 150 | 308 | 5              | 7 |
| 215556301 CM | CMX                  | CMX    | 63            | 180 | 338 | 5              | 8 |



COATING  
**Skin**

$\lambda^{\circ}\text{s}$   
28

NR

ISO 1641/II



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | I   | L   | MORSE<br>TAPER | Z |
|--------------|----------------------|--------|---------------|-----|-----|----------------|---|
| 215551603 CM | CMX                  | CMX    | 16            | 63  | 148 | 2              | 4 |
| 215551803 CM | CMX                  | CMX    | 18            | 63  | 148 | 2              | 4 |
| 215552003 CM | CMX                  | CMX    | 20            | 75  | 177 | 3              | 4 |
| 215552203 CM | CMX                  | CMX    | 22            | 75  | 177 | 3              | 4 |
| 215552403 CM | CMX                  | CMX    | 24            | 90  | 192 | 3              | 5 |
| 215552503 CM | CMX                  | CMX    | 25            | 90  | 192 | 3              | 5 |
| 215552603 CM | CMX                  | CMX    | 26            | 90  | 192 | 3              | 5 |
| 215552803 CM | CMX                  | CMX    | 28            | 90  | 192 | 3              | 5 |
| 215553003 CM | CMX                  | CMX    | 30            | 90  | 192 | 3              | 5 |
| 215553203 CM | CMX                  | CMX    | 32            | 106 | 231 | 4              | 5 |
| 215553403 CM | CMX                  | CMX    | 34            | 106 | 231 | 4              | 5 |
| 215553503 CM | CMX                  | CMX    | 35            | 106 | 231 | 4              | 6 |
| 215553603 CM | CMX                  | CMX    | 36            | 106 | 231 | 4              | 6 |
| 215553803 CM | CMX                  | CMX    | 38            | 125 | 250 | 4              | 6 |
| 215554003 CM | CMX                  | CMX    | 40            | 125 | 250 | 4              | 6 |
| 215554503 CM | CMX                  | CMX    | 45            | 125 | 250 | 4              | 6 |
| 215555003 CM | CMX                  | CMX    | 50            | 150 | 308 | 5              | 7 |
| 215555603 CM | CMX                  | CMX    | 56            | 150 | 308 | 5              | 7 |
| 215556303 CM | CMX                  | CMX    | 63            | 180 | 338 | 5              | 8 |



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 21555           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 21555           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

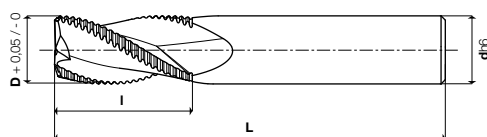
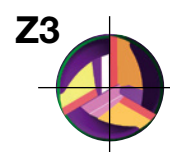
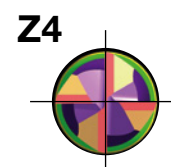
## Serie/Series 22105

Frese a **SGROSSARE**  
Roughing end mills

**ALTE PRESTAZIONI**  
**HIGH PERFORMANCE**

## 24105

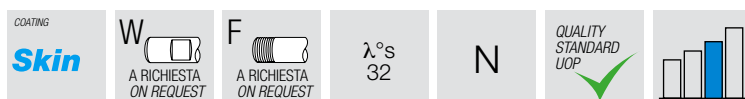
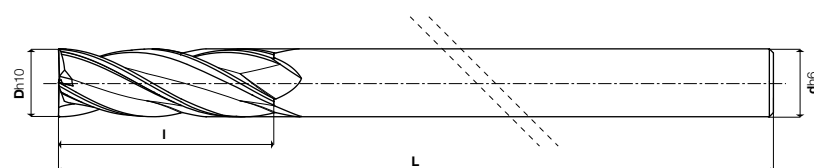
Frese a quattro taglienti  
Four flutes end mills



| Cod. Art. | X-105<br>(PM Co 10,5%) | D +0,05<br>-0 | I  | L   | dh6 | Z |
|-----------|------------------------|---------------|----|-----|-----|---|
| 221050602 | EMX                    | 6             | 8  | 52  | 6   | 3 |
| 221050802 | EMX                    | 8             | 11 | 61  | 10  | 3 |
| 221051002 | EMX                    | 10            | 13 | 63  | 10  | 3 |
| 221051202 | EMX                    | 12            | 13 | 73  | 12  | 3 |
| 221051402 | EMX                    | 14            | 16 | 73  | 12  | 3 |
| 221051602 | EMX                    | 16            | 19 | 79  | 16  | 3 |
| 221051802 | EMX                    | 18            | 19 | 79  | 16  | 3 |
| 221052002 | EMX                    | 20            | 22 | 88  | 20  | 3 |
| 221052202 | EMX                    | 22            | 22 | 88  | 20  | 3 |
| 221052502 | EMX                    | 25            | 26 | 102 | 25  | 3 |
| 221052802 | EMX                    | 28            | 26 | 102 | 25  | 3 |
| 221053002 | EMX                    | 30            | 26 | 102 | 25  | 3 |
| 221053202 | EMX                    | 32            | 32 | 112 | 32  | 3 |



parametri tecnici a pag. I for technical parameters see page 127



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Dh10 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------|----|-----|-----|---|
| 241051000 CM | CMX                  |        | 10   | 30 | 200 | 10  | 4 |
| 241051200 CM | CMX                  |        | 12   | 30 | 200 | 12  | 4 |
| 241051600 CM | CMX                  |        | 16   | 35 | 200 | 16  | 4 |
| 241052000 CM | CMX                  |        | 20   | 35 | 200 | 20  | 4 |
| 241052500 CM | CMX                  |        | 25   | 40 | 200 | 25  | 4 |



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 22105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 24105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended ○ accettabile/acceptable ○ non consigliata/not recommended

Serie/Series

## 24110

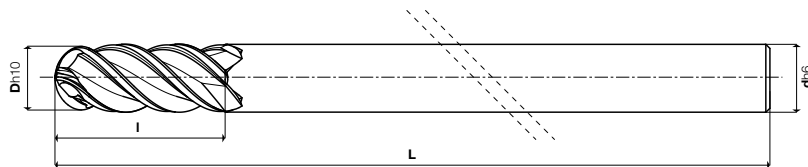
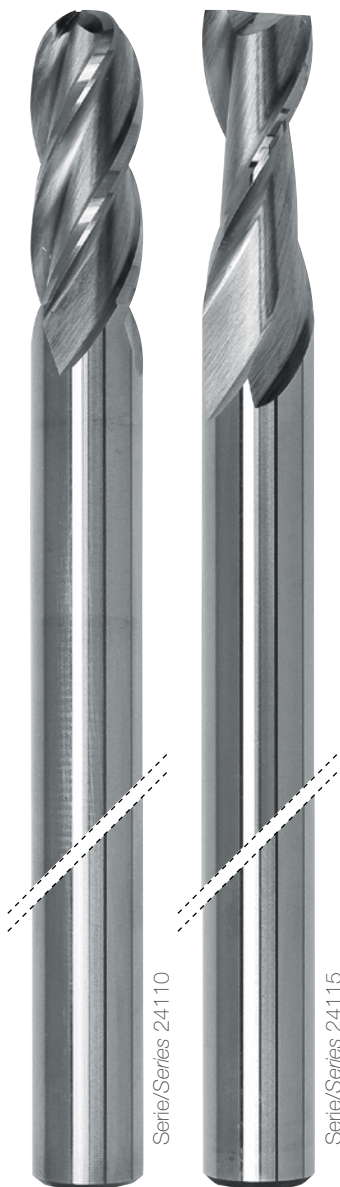
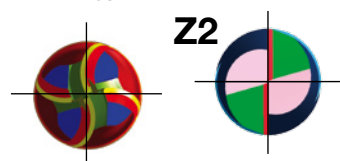
Frese a quattro taglienti a testa semisferica  
Ball nosed end mills

## 24115

Frese a due taglienti  
Two flute end mills

**Z4**  
BALL-NOSED

**Z2**



COATING

**Skin**

W

A RICHIESTA  
ON REQUEST

F

A RICHIESTA  
ON REQUEST

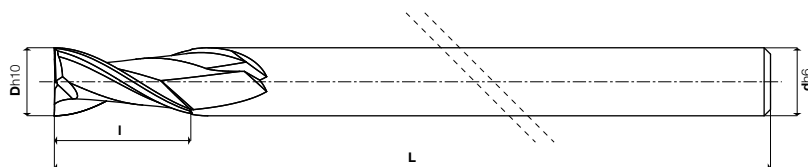
$\lambda^\circ$ s  
32

N

QUALITY  
STANDARD  
UOP



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Dh10 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------|----|-----|-----|---|
| 241101000 CM | CMX                  |        | 10   | 30 | 200 | 10  | 4 |
| 241101200 CM | CMX                  |        | 12   | 30 | 200 | 12  | 4 |
| 241101600 CM | CMX                  |        | 16   | 35 | 200 | 16  | 4 |
| 241102000 CM | CMX                  |        | 20   | 35 | 200 | 20  | 4 |
| 241102500 CM | CMX                  |        | 25   | 40 | 200 | 25  | 4 |



COATING

**Skin**

W

A RICHIESTA  
ON REQUEST

F

A RICHIESTA  
ON REQUEST

$\lambda^\circ$ s  
32

N

QUALITY  
STANDARD  
UOP

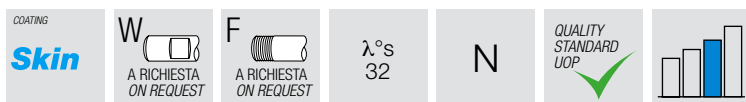
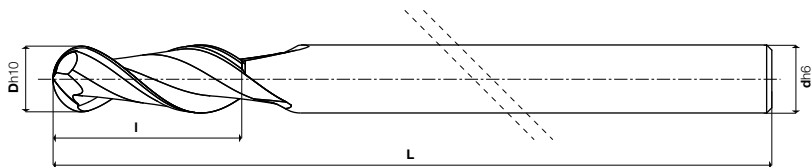


| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Dh10 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------|----|-----|-----|---|
| 241151000 CM | CMX                  |        | 10   | 30 | 200 | 10  | 2 |
| 241151200 CM | CMX                  |        | 12   | 30 | 200 | 12  | 2 |
| 241151600 CM | CMX                  |        | 16   | 35 | 200 | 16  | 2 |
| 241152000 CM | CMX                  |        | 20   | 35 | 200 | 20  | 2 |
| 241152500 CM | CMX                  |        | 25   | 40 | 200 | 25  | 2 |

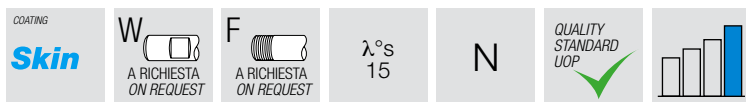
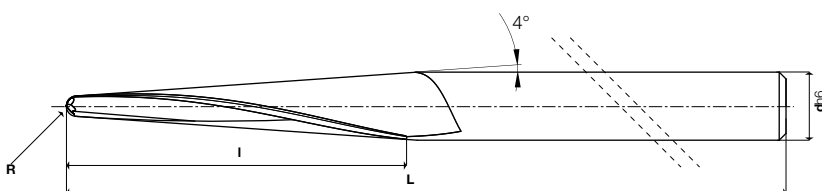


### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 24110           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 24115           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Dh10 | I  | L   | dh6 | Z |
|--------------|----------------------|--------|------|----|-----|-----|---|
| 241201000 CM | CMX                  |        | 10   | 30 | 200 | 10  | 2 |
| 241201200 CM | CMX                  |        | 12   | 30 | 200 | 12  | 2 |
| 241201600 CM | CMX                  |        | 16   | 35 | 200 | 16  | 2 |
| 241202000 CM | CMX                  |        | 20   | 35 | 200 | 20  | 2 |
| 241202500 CM | CMX                  |        | 25   | 40 | 200 | 25  | 2 |



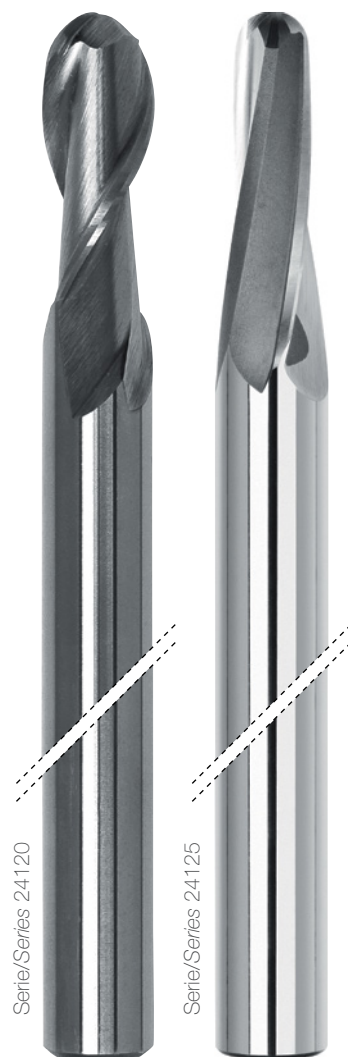
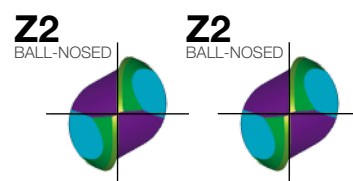
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | R   | I  | L   | dh6 | Z |
|--------------|----------------------|--------|-----|----|-----|-----|---|
| 241250150 CM | CMX                  |        | 1,5 | 50 | 180 | 10  | 2 |
| 241250200 CM | CMX                  |        | 2   | 45 | 180 | 10  | 2 |
| 241250250 CM | CMX                  |        | 2,5 | 38 | 180 | 10  | 2 |
| 241250300 CM | CMX                  |        | 3   | 45 | 200 | 12  | 2 |
| 241250350 CM | CMX                  |        | 3,5 | 40 | 200 | 12  | 2 |
| 241250400 CM | CMX                  |        | 4   | 47 | 200 | 14  | 2 |
| 241250500 CM | CMX                  |        | 5   | 47 | 200 | 16  | 2 |
| 241250600 CM | CMX                  |        | 6   | 63 | 200 | 20  | 2 |
| 241250800 CM | CMX                  |        | 8   | 72 | 200 | 25  | 2 |



HSS-PM  
**HSS-PM Line**

Serie/Series  
**24120**  
Frese a due taglienti a testa semisferica  
Ball-nosed two flute slot drills

**24125**  
Frese coniche a due taglienti a testa semisferica  
Conicità 4° laterali  
Ball nosed milling cutters Taper 4°



MATERIALI LAVORABILI / WORKPIECE MATERIALS

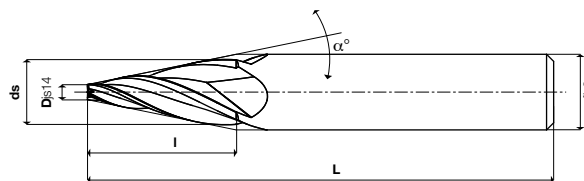
| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 24120           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 24125           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended ● accettabile/acceptable ○ non consigliata/not recommended

WWW.UOP.IT

## Serie/Series 25105

Frese coniche per stampi  
Conicità 9° 28' - 5° 43' - 2° 52'  
Tapered end mills



$\lambda^{\circ}$ s  
25

N

UNI 8265  
DIN 1889EA  
ISO

### $\alpha^{\circ}$ 9° 28' conicità 1/3

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs14 | ds   | I    | L   | dh6 | Z |
|--------------|----------------------|--------|-------|------|------|-----|-----|---|
| 251051050 CM | CMX                  |        | 2,5   | 13   | 31,5 | 85  | 12  | 3 |
| 251051100 CM | CMX                  |        | 4     | 16   | 36   | 96  | 16  | 4 |
| 251051150 CM | CMX                  |        | 4     | 22,7 | 56   | 116 | 16  | 4 |
| 251051200 CM | CMX                  |        | 4     | 34   | 90   | 170 | 32  | 4 |
| 251051250 CM | CMX                  |        | 6     | 20   | 42   | 100 | 16  | 4 |
| 251051300 CM | CMX                  |        | 6     | 27   | 63   | 138 | 25  | 4 |
| 251051350 CM | CMX                  |        | 6     | 40   | 102  | 182 | 32  | 4 |
| 251051400 CM | CMX                  |        | 8     | 25   | 50   | 125 | 25  | 4 |
| 251051450 CM | CMX                  |        | 8     | 32   | 72   | 152 | 32  | 4 |
| 251051500 CM | CMX                  |        | 8     | 45,5 | 112  | 192 | 32  | 4 |
| 251051550 CM | CMX                  |        | 12    | 32   | 60   | 140 | 32  | 4 |

### $\alpha^{\circ}$ 5° 43' conicità 1/5

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs14 | ds   | I    | L   | dh6 | Z |
|--------------|----------------------|--------|-------|------|------|-----|-----|---|
| 251052050 CM | CMX                  |        | 2,5   | 10   | 37,5 | 88  | 10  | 3 |
| 251052100 CM | CMX                  |        | 4     | 12   | 40   | 97  | 12  | 4 |
| 251052150 CM | CMX                  |        | 4     | 16   | 60   | 120 | 16  | 4 |
| 251052200 CM | CMX                  |        | 4     | 22   | 90   | 150 | 16  | 4 |
| 251052250 CM | CMX                  |        | 6     | 14   | 40   | 97  | 12  | 4 |
| 251052300 CM | CMX                  |        | 6     | 18   | 60   | 120 | 16  | 4 |
| 251052350 CM | CMX                  |        | 6     | 26   | 100  | 175 | 25  | 4 |
| 251052400 CM | CMX                  |        | 8     | 17   | 45   | 105 | 16  | 4 |
| 251052450 CM | CMX                  |        | 8     | 22   | 70   | 130 | 16  | 4 |
| 251052500 CM | CMX                  |        | 8     | 28   | 100  | 175 | 25  | 4 |
| 251052550 CM | CMX                  |        | 12    | 21   | 45   | 105 | 16  | 4 |
| 251052600 CM | CMX                  |        | 12    | 26,2 | 71   | 146 | 25  | 4 |
| 251052650 CM | CMX                  |        | 12    | 37   | 125  | 205 | 32  | 5 |
| 251052700 CM | CMX                  |        | 16    | 26   | 50   | 125 | 25  | 4 |
| 251052750 CM | CMX                  |        | 16    | 32   | 80   | 160 | 32  | 4 |
| 251052800 CM | CMX                  |        | 16    | 41   | 125  | 205 | 32  | 5 |
| 251052850 CM | CMX                  |        | 20    | 32,6 | 63   | 143 | 32  | 5 |
| 251052900 CM | CMX                  |        | 20    | 40   | 100  | 180 | 32  | 5 |
| 251052950 CM | CMX                  |        | 20    | 52   | 160  | 240 | 32  | 5 |

### $\alpha^{\circ}$ 2° 52' conicità 1/10

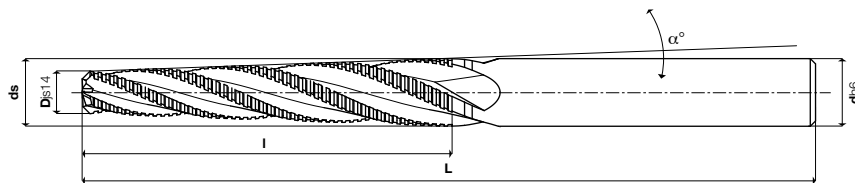
| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs14 | ds   | I   | L   | dh6 | Z |
|--------------|----------------------|--------|-------|------|-----|-----|-----|---|
| 251053050 CM | CMX                  |        | 4     | 8    | 40  | 90  | 10  | 4 |
| 251053100 CM | CMX                  |        | 6     | 10   | 40  | 90  | 10  | 4 |
| 251053150 CM | CMX                  |        | 6     | 12   | 60  | 117 | 12  | 4 |
| 251053200 CM | CMX                  |        | 8     | 12,5 | 45  | 95  | 12  | 4 |
| 251053250 CM | CMX                  |        | 8     | 16   | 80  | 140 | 16  | 4 |
| 251053300 CM | CMX                  |        | 12    | 17   | 50  | 110 | 16  | 4 |
| 251053350 CM | CMX                  |        | 12    | 20   | 80  | 140 | 16  | 4 |
| 251053400 CM | CMX                  |        | 12    | 25   | 130 | 205 | 25  | 4 |
| 251053450 CM | CMX                  |        | 16    | 21,6 | 56  | 116 | 16  | 4 |
| 251053500 CM | CMX                  |        | 16    | 25   | 90  | 165 | 25  | 4 |
| 251053550 CM | CMX                  |        | 16    | 32   | 160 | 240 | 32  | 4 |
| 251053600 CM | CMX                  |        | 20    | 26,3 | 63  | 138 | 25  | 5 |
| 251053650 CM | CMX                  |        | 20    | 30   | 100 | 175 | 32  | 5 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS







HSS-PM  
**HSS-PM Line**

Serie/Series  
**25120**

Frese coniche a **SEMIFINIRE** per stampi  
Conicità 9° 28' - 5° 43' - 2° 52'  
*Tapered end mills*



$\alpha^\circ 9^\circ 28'$  conicità 1/3

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs14 | ds   | I   | L   | dh6 | Z |
|--------------|----------------------|--------|-------|------|-----|-----|-----|---|
| 251201401 CM | CMX                  |        | 8     | 25   | 50  | 125 | 25  | 4 |
| 251201451 CM | CMX                  |        | 8     | 32   | 72  | 152 | 32  | 4 |
| 251201501 CM | CMX                  |        | 8     | 45,5 | 112 | 192 | 32  | 4 |
| 251201551 CM | CMX                  |        | 12    | 32   | 60  | 140 | 32  | 4 |

$\alpha^\circ 5^\circ 43'$  conicità 1/5

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs14 | ds   | I   | L   | dh6 | Z |
|--------------|----------------------|--------|-------|------|-----|-----|-----|---|
| 251202301 CM | CMX                  |        | 6     | 18   | 60  | 120 | 16  | 4 |
| 251202401 CM | CMX                  |        | 8     | 17   | 45  | 105 | 16  | 4 |
| 251202451 CM | CMX                  |        | 8     | 22   | 70  | 130 | 16  | 4 |
| 251202501 CM | CMX                  |        | 8     | 28   | 100 | 175 | 25  | 4 |
| 251202551 CM | CMX                  |        | 12    | 21   | 45  | 105 | 16  | 4 |
| 251202601 CM | CMX                  |        | 12    | 26,2 | 71  | 146 | 25  | 4 |
| 251202651 CM | CMX                  |        | 12    | 37   | 125 | 205 | 32  | 4 |
| 251202701 CM | CMX                  |        | 16    | 26   | 50  | 125 | 25  | 4 |
| 251202751 CM | CMX                  |        | 16    | 32   | 80  | 160 | 32  | 4 |
| 251202801 CM | CMX                  |        | 16    | 41   | 125 | 205 | 32  | 4 |
| 251202851 CM | CMX                  |        | 20    | 32,6 | 63  | 143 | 32  | 5 |
| 251202901 CM | CMX                  |        | 20    | 40   | 100 | 180 | 32  | 5 |
| 251202951 CM | CMX                  |        | 20    | 52   | 160 | 240 | 32  | 5 |

$\alpha^\circ 2^\circ 52'$  conicità 1/10

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs14 | ds   | I   | L   | dh6 | Z |
|--------------|----------------------|--------|-------|------|-----|-----|-----|---|
| 251203201 CM | CMX                  |        | 8     | 12,5 | 45  | 102 | 12  | 4 |
| 251203251 CM | CMX                  |        | 8     | 16   | 80  | 140 | 16  | 4 |
| 251203301 CM | CMX                  |        | 12    | 17   | 50  | 110 | 16  | 4 |
| 251203351 CM | CMX                  |        | 12    | 20   | 80  | 140 | 16  | 4 |
| 251203401 CM | CMX                  |        | 12    | 25   | 130 | 205 | 25  | 4 |
| 251203451 CM | CMX                  |        | 16    | 21,6 | 56  | 116 | 16  | 4 |
| 251203501 CM | CMX                  |        | 16    | 25   | 90  | 165 | 25  | 4 |
| 251203551 CM | CMX                  |        | 16    | 32   | 160 | 240 | 32  | 4 |
| 251203601 CM | CMX                  |        | 20    | 26,3 | 63  | 138 | 25  | 5 |
| 251203651 CM | CMX                  |        | 20    | 30   | 100 | 175 | 25  | 5 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 25120           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

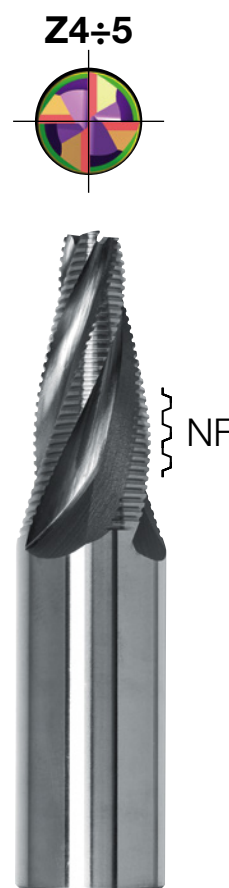
● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

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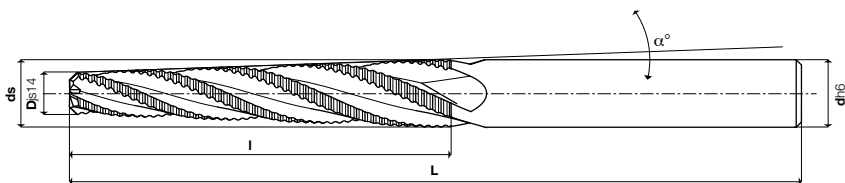
93





Serie/Series  
**25120**

Frese coniche a **SGROSSARE** per stampi  
Conicità 9° 28' - 5° 43' - 2° 52'  
Tapered end mills



COATING  
**Skin**

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

$\lambda^{\circ}s$   
25

NR

UNI 8265  
DIN 1889EA  
ISO

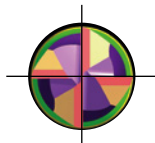
$\alpha^{\circ} 9^{\circ} 28'$  conicità 1/3

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs14 | ds   | I   | L   | dh6 | Z |
|--------------|----------------------|--------|-------|------|-----|-----|-----|---|
| 251201402 CM | CMX                  |        | 8     | 25   | 50  | 125 | 25  | 4 |
| 251201452 CM | CMX                  |        | 8     | 32   | 72  | 152 | 32  | 4 |
| 251201502 CM | CMX                  |        | 8     | 45,5 | 112 | 192 | 32  | 4 |
| 251201552 CM | CMX                  |        | 12    | 32   | 60  | 140 | 32  | 4 |

$\alpha^{\circ} 5^{\circ} 43'$  conicità 1/5

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs14 | ds   | I   | L   | dh6 | Z |
|--------------|----------------------|--------|-------|------|-----|-----|-----|---|
| 251202302 CM | CMX                  |        | 6     | 18   | 60  | 120 | 16  | 4 |
| 251202402 CM | CMX                  |        | 8     | 17   | 45  | 105 | 16  | 4 |
| 251202452 CM | CMX                  |        | 8     | 22   | 70  | 130 | 16  | 4 |
| 251202502 CM | CMX                  |        | 8     | 28   | 100 | 175 | 25  | 4 |
| 251202552 CM | CMX                  |        | 12    | 21   | 45  | 105 | 16  | 4 |
| 251202602 CM | CMX                  |        | 12    | 26,2 | 71  | 146 | 25  | 4 |
| 251202652 CM | CMX                  |        | 12    | 37   | 125 | 205 | 32  | 4 |
| 251202702 CM | CMX                  |        | 16    | 26   | 50  | 125 | 25  | 4 |
| 251202752 CM | CMX                  |        | 16    | 32   | 80  | 160 | 32  | 4 |
| 251202802 CM | CMX                  |        | 16    | 41   | 125 | 205 | 32  | 4 |
| 251202852 CM | CMX                  |        | 20    | 32,6 | 63  | 143 | 32  | 5 |
| 251202902 CM | CMX                  |        | 20    | 40   | 100 | 180 | 32  | 5 |
| 251202952 CM | CMX                  |        | 20    | 52   | 160 | 240 | 32  | 5 |

Z4÷5



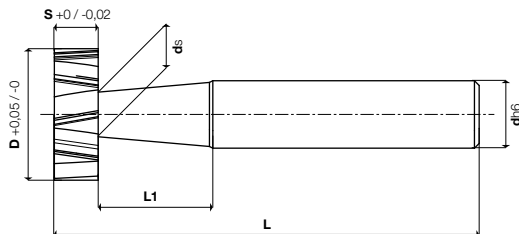
$\alpha^{\circ} 2^{\circ} 52'$  conicità 1/10

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | Djs14 | ds   | I   | L   | dh6 | Z |
|--------------|----------------------|--------|-------|------|-----|-----|-----|---|
| 251203202 CM | CMX                  |        | 8     | 12,5 | 45  | 102 | 12  | 4 |
| 251203252 CM | CMX                  |        | 8     | 16   | 80  | 140 | 16  | 4 |
| 251203302 CM | CMX                  |        | 12    | 17   | 50  | 110 | 16  | 4 |
| 251203352 CM | CMX                  |        | 12    | 20   | 80  | 140 | 16  | 4 |
| 251203402 CM | CMX                  |        | 12    | 25   | 130 | 205 | 25  | 4 |
| 251203452 CM | CMX                  |        | 16    | 21,6 | 56  | 116 | 16  | 4 |
| 251203502 CM | CMX                  |        | 16    | 25   | 90  | 165 | 25  | 4 |
| 251203552 CM | CMX                  |        | 16    | 32   | 160 | 240 | 32  | 4 |
| 251203602 CM | CMX                  |        | 20    | 26,3 | 63  | 138 | 25  | 5 |
| 251203652 CM | CMX                  |        | 20    | 30   | 100 | 175 | 25  | 5 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI INOSSIDABILI | MATERIALI NON FERROSI | LEGHE LEGGERE | ACCIAI | GHISE     |
|--------|----------|------|---------------------|-----------------------|---------------|--------|-----------|
| series | TITANIUM | HRSA | STAINLESS STEELS    | NON FERROUS MATERIALS | LIGHT ALLOYS  | STEELS | CAST IRON |
| 25120  | ○        | ○    | ●                   | ○                     | ○             | ●      | ●         |



HSS-PM  
**HSS-PM Line**

Serie/Series  
**27105**

Frese per sedi di linghetta americane (Woodruff)  
Woodruff cutters

COATING

**Skin**

W

A RICHIESTA  
ON REQUEST

F

A RICHIESTA  
ON REQUEST

H

UNI 8263  
DIN 850B  
ISO

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | S +0<br>-0,02 | ds  | L1   | L  | dh6 | $\lambda^\circ$ | Z  |
|--------------|-----------------|----------------------|--------|---------------|---------------|-----|------|----|-----|-----------------|----|
| 271051020 AM | CM              | CMX                  |        | 10,5          | 2             | 4   | 9    | 50 | 6   | 13              | 8  |
| 271051025 AM | CM              | CMX                  |        | 10,5          | 2,5           | 4   | 9    | 50 | 6   | 13              | 8  |
| 271051030 AM | CM              | CMX                  |        | 10,5          | 3             | 4,2 | 8    | 50 | 6   | 13              | 8  |
| 271051302 AM | CM              | CMX                  |        | 13,5          | 2             | 4,6 | 12   | 56 | 10  | 15              | 8  |
| 271051303 AM | CM              | CMX                  |        | 13,5          | 3             | 4,6 | 12   | 56 | 10  | 15              | 8  |
| 271051304 AM | CM              | CMX                  |        | 13,5          | 4             | 4,6 | 12   | 56 | 10  | 15              | 8  |
| 271051603 AM | CM              | CMX                  |        | 16,5          | 3             | 4,6 | 12   | 56 | 10  | 15              | 8  |
| 271051604 AM | CM              | CMX                  |        | 16,5          | 4             | 4,6 | 12   | 56 | 10  | 15              | 8  |
| 271051605 AM | CM              | CMX                  |        | 16,5          | 5             | 5   | 9,5  | 56 | 10  | 15              | 8  |
| 271051606 AM | CM              | CMX                  |        | 16,5          | 6             | 5   | 9,5  | 56 | 10  | 15              | 8  |
| 271051903 AM | CM              | CMX                  |        | 19,5          | 3             | 5,6 | 17,5 | 63 | 10  | 15              | 10 |
| 271051904 AM | CM              | CMX                  |        | 19,5          | 4             | 5,6 | 17,5 | 63 | 10  | 15              | 10 |
| 271051905 AM | CM              | CMX                  |        | 19,5          | 5             | 6   | 16   | 63 | 10  | 15              | 10 |
| 271051906 AM | CM              | CMX                  |        | 19,5          | 6             | 6,5 | 15   | 63 | 10  | 15              | 10 |
| 271052204 AM | CM              | CMX                  |        | 22,5          | 4             | 6   | 17   | 63 | 10  | 13              | 10 |
| 271052205 AM | CM              | CMX                  |        | 22,5          | 5             | 6   | 17   | 63 | 10  | 13              | 10 |
| 271052206 AM | CM              | CMX                  |        | 22,5          | 6             | 6,5 | 13   | 63 | 10  | 13              | 10 |
| 271052208 AM | CM              | CMX                  |        | 22,5          | 8             | 6,5 | 13   | 63 | 10  | 13              | 10 |
| 271052505 AM | CM              | CMX                  |        | 25,5          | 5             | 7,5 | 12   | 63 | 10  | 15              | 12 |
| 271052506 AM | CM              | CMX                  |        | 25,5          | 6             | 7,5 | 12   | 63 | 10  | 15              | 12 |
| 271052507 AM | CM              | CMX                  |        | 25,5          | 7             | 7,5 | 12   | 63 | 10  | 15              | 12 |
| 271052508 AM | CM              | CMX                  |        | 25,5          | 8             | 7,5 | 12   | 63 | 10  | 15              | 12 |
| 271052806 AM | CM              | CMX                  |        | 28,5          | 6             | 8,5 | 10   | 63 | 10  | 13              | 12 |
| 271052807 AM | CM              | CMX                  |        | 28,5          | 7             | 8,5 | 10   | 63 | 10  | 13              | 12 |
| 271052808 AM | CM              | CMX                  |        | 28,5          | 8             | 8,5 | 10   | 63 | 10  | 13              | 12 |
| 271052810 AM | CM              | CMX                  |        | 28,5          | 10            | 9,3 | 13   | 71 | 12  | 13              | 12 |
| 271053206 AM | CM              | CMX                  |        | 32,5          | 6             | 8,5 | 16   | 71 | 12  | 15              | 12 |
| 271053207 AM | CM              | CMX                  |        | 32,5          | 7             | 8,5 | 16   | 71 | 12  | 15              | 12 |
| 271053208 AM | CM              | CMX                  |        | 32,5          | 8             | 8,5 | 16   | 71 | 12  | 15              | 12 |
| 271053210 AM | CM              | CMX                  |        | 32,5          | 10            | 9,3 | 13   | 71 | 12  | 15              | 12 |
| 271054510 AM | CM              | CMX                  |        | 45,5          | 10            | 11  | 13   | 71 | 12  | 13              | 12 |



**Z8÷12**



MATERIALI LAVORABILI / WORKPIECE MATERIALS

serie  
series  
27105

TITANIO  
TITANIUM

HRSA  
HRSA

ACCIAI  
INOSSIDABILI  
STAINLESS  
STEELS

MATERIALI  
NON FERROSI  
NON FERROUS  
MATERIALS

LEGHE  
LEGGERE  
LIGHT ALLOYS

ACCIAI  
STEELS

GHISE  
CAST IRON

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

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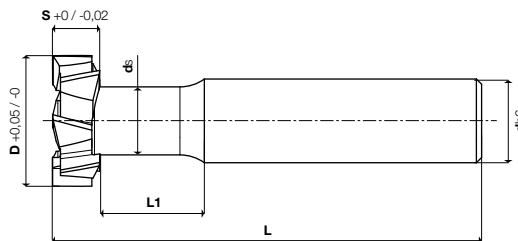
95

## Serie/Series 27120

Frese per scanalature a T  
T-slot cutters

## 27135

Frese per scanalature a T  
T-slot cutters



COATING  
**Skin**

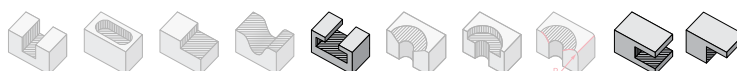
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ON REQUEST

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ON REQUEST

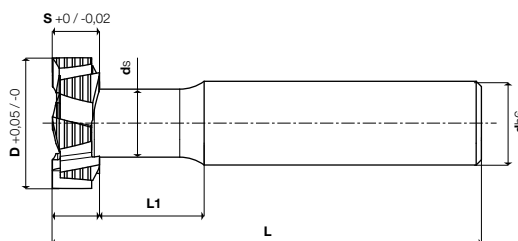
N

UNI 7339A  
DIN 851  
ISO 3337

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | S +0<br>-0,02 | ds | L1 | L  | dh6 | $\lambda^\circ$ | Z |
|--------------|-----------------|----------------------|--------|---------------|---------------|----|----|----|-----|-----------------|---|
| 271201256 AM | CM              | CMX                  |        | 12,5          | 6             | 5  | 11 | 57 | 10  | 12              | 6 |
| 271201608 AM | CM              | CMX                  |        | 16            | 8             | 7  | 14 | 62 | 10  | 12              | 6 |
| 271201808 AM | CM              | CMX                  |        | 18            | 8             | 8  | 15 | 70 | 12  | 15              | 6 |
| 271201909 AM | CM              | CMX                  |        | 19            | 9             | 8  | 15 | 70 | 12  | 15              | 8 |
| 271202109 AM | CM              | CMX                  |        | 21            | 9             | 10 | 18 | 74 | 12  | 15              | 8 |
| 271202210 AM | CM              | CMX                  |        | 22            | 10            | 10 | 17 | 74 | 12  | 15              | 8 |
| 271202511 AM | CM              | CMX                  |        | 25            | 11            | 12 | 20 | 82 | 16  | 15              | 8 |
| 271202812 AM | CM              | CMX                  |        | 28            | 12            | 13 | 22 | 85 | 16  | 15              | 8 |
| 271203214 AM | CM              | CMX                  |        | 32            | 14            | 15 | 25 | 90 | 16  | 15              | 8 |



parametri tecnici a pag. / for technical parameters see page 129



COATING  
**Skin**

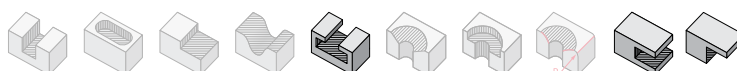
W  
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ON REQUEST

F  
A RICHIESTA  
ON REQUEST

NF

UNI 7339A  
DIN 851  
ISO 3337

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | S +0<br>-0,02 | ds | L1 | L  | dh6 | Z |
|--------------|-----------------|----------------------|--------|---------------|---------------|----|----|----|-----|---|
| 271351256 AM | CM              | CMX                  |        | 12,5          | 6             | 5  | 11 | 57 | 10  | 4 |
| 271351608 AM | CM              | CMX                  |        | 16            | 8             | 7  | 14 | 62 | 10  | 6 |
| 271351808 AM | CM              | CMX                  |        | 18            | 8             | 8  | 15 | 70 | 12  | 6 |
| 271351909 AM | CM              | CMX                  |        | 19            | 9             | 8  | 15 | 70 | 12  | 6 |
| 271352109 AM | CM              | CMX                  |        | 21            | 9             | 10 | 18 | 74 | 12  | 6 |
| 271352210 AM | CM              | CMX                  |        | 22            | 10            | 10 | 17 | 74 | 12  | 6 |
| 271352511 AM | CM              | CMX                  |        | 25            | 11            | 12 | 20 | 82 | 16  | 8 |
| 271352812 AM | CM              | CMX                  |        | 28            | 12            | 13 | 22 | 85 | 16  | 8 |
| 271353214 AM | CM              | CMX                  |        | 32            | 14            | 15 | 25 | 90 | 16  | 8 |



parametri tecnici a pag. / for technical parameters see page 129



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 27120           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 27135           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

Serie/Series  
**27150**

Frese per scanalature a T  
T-slot cutters

**27155**

Frese per scanalature a T  
T-slot cutters

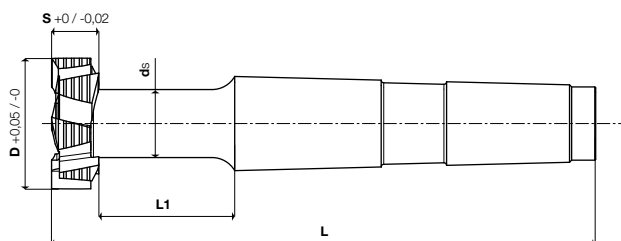
COATING

**Skin**

**N**

UNI 7339B  
DIN 851B  
ISO 3337

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | S +0<br>-0,02 | d <sub>S</sub> | L <sub>1</sub> | L   | MORSE<br>TAPER | λ° | Z  |
|--------------|-----------------|----------------------|--------|---------------|---------------|----------------|----------------|-----|----------------|----|----|
| 271501256 AM | CM              | CMX                  |        | 12,5          | 6             | 5              | 9              | 72  | 1              | 12 | 8  |
| 271501608 AM | CM              | CMX                  |        | 16            | 8             | 7              | 12             | 77  | 1              | 12 | 8  |
| 271501808 AM | CM              | CMX                  |        | 18            | 8             | 8              | 17             | 82  | 1              | 15 | 8  |
| 271501909 AM | CM              | CMX                  |        | 19            | 9             | 8              | 16             | 82  | 1              | 15 | 8  |
| 271502109 AM | CM              | CMX                  |        | 21            | 9             | 10             | 24             | 102 | 2              | 15 | 8  |
| 271502210 AM | CM              | CMX                  |        | 22            | 10            | 10             | 23             | 102 | 2              | 15 | 8  |
| 271502511 AM | CM              | CMX                  |        | 25            | 11            | 12             | 24             | 104 | 2              | 15 | 8  |
| 271502812 AM | CM              | CMX                  |        | 28            | 12            | 13             | 25             | 106 | 2              | 15 | 8  |
| 271503214 AM | CM              | CMX                  |        | 32            | 14            | 15             | 28             | 111 | 2              | 15 | 8  |
| 271503616 AM | CM              | CMX                  |        | 36            | 16            | 17             | 31             | 133 | 3              | 15 | 8  |
| 271504018 AM | CM              | CMX                  |        | 40            | 18            | 19             | 36             | 140 | 3              | 15 | 8  |
| 271504520 AM | CM              | CMX                  |        | 45            | 20            | 20             | 37             | 143 | 3              | 15 | 8  |
| 271505022 AM | CM              | CMX                  |        | 50            | 22            | 25             | 46             | 177 | 4              | 10 | 10 |
| 271505624 AM | CM              | CMX                  |        | 56            | 24            | 27             | 49             | 182 | 4              | 10 | 10 |



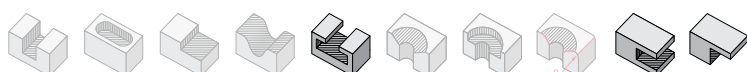
COATING

**Skin**

**NF**

UNI 7339B  
DIN 851B  
ISO 3337

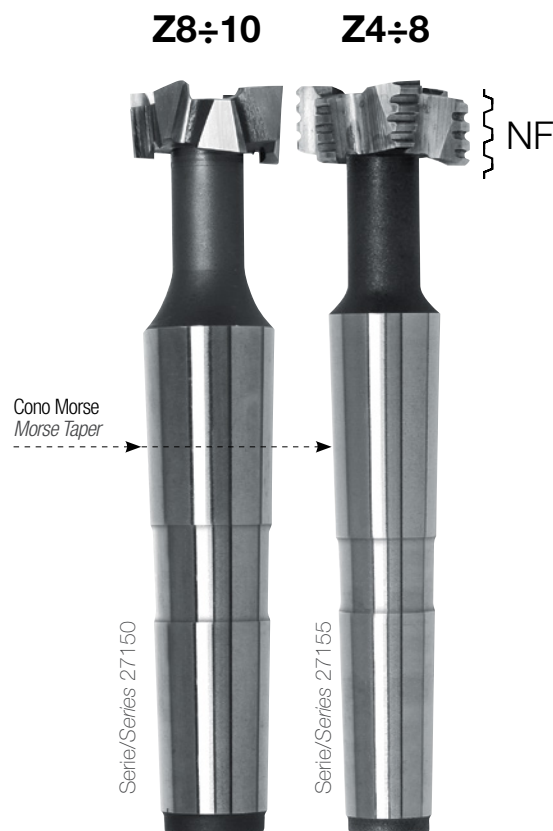
| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | D +0,05<br>-0 | S +0<br>-0,02 | d <sub>S</sub> | L <sub>1</sub> | L   | MORSE<br>TAPER | Z |
|--------------|-----------------|----------------------|--------|---------------|---------------|----------------|----------------|-----|----------------|---|
| 271551256 AM | CM              | CMX                  |        | 12,5          | 6             | 5              | 9              | 72  | 1              | 4 |
| 271551608 AM | CM              | CMX                  |        | 16            | 8             | 7              | 12             | 77  | 1              | 6 |
| 271551808 AM | CM              | CMX                  |        | 18            | 8             | 8              | 17             | 82  | 1              | 6 |
| 271551909 AM | CM              | CMX                  |        | 19            | 9             | 8              | 16             | 82  | 1              | 6 |
| 271552109 AM | CM              | CMX                  |        | 21            | 9             | 10             | 24             | 102 | 2              | 6 |
| 271552210 AM | CM              | CMX                  |        | 22            | 10            | 10             | 23             | 102 | 2              | 6 |
| 271552511 AM | CM              | CMX                  |        | 25            | 11            | 12             | 24             | 104 | 2              | 8 |
| 271552812 AM | CM              | CMX                  |        | 28            | 12            | 13             | 25             | 106 | 2              | 8 |
| 271553214 AM | CM              | CMX                  |        | 32            | 14            | 15             | 28             | 111 | 2              | 8 |
| 271553616 AM | CM              | CMX                  |        | 36            | 16            | 17             | 31             | 133 | 3              | 8 |
| 271554018 AM | CM              | CMX                  |        | 40            | 18            | 19             | 36             | 140 | 3              | 8 |
| 271554520 AM | CM              | CMX                  |        | 45            | 20            | 20             | 37             | 143 | 3              | 8 |
| 271555022 AM | CM              | CMX                  |        | 50            | 22            | 25             | 46             | 177 | 4              | 8 |
| 271555624 AM | CM              | CMX                  |        | 56            | 24            | 27             | 49             | 182 | 4              | 8 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 27150           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 27155           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended ● accettabile/acceptable ○ non consigliata/not recommended



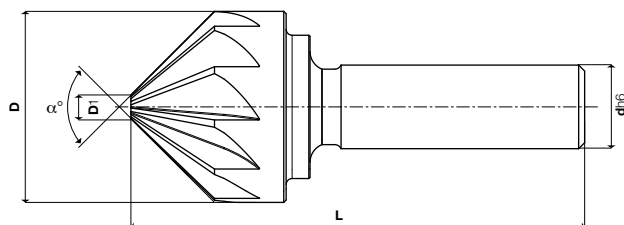
# HSS-PM HSS-PM Line

## Serie/Series 27505

Frese coniche a svasare  
Countersinks



**Z5÷11**



COATING

**Skin**

**N**

UNI 6847  
DIN  
334-335  
ISO

| Cod. Art.    | M-TK<br>(HSS-E) | COATED | D    | D1  | $\alpha^\circ$ | L   | dh6 | Z  |
|--------------|-----------------|--------|------|-----|----------------|-----|-----|----|
| 275051060 AM | AMX             | AMX    | 6,3  | 1,6 | 60             | 45  | 5   | 5  |
| 275051080 AM | AMX             | AMX    | 8,4  | 2   | 60             | 50  | 6   | 5  |
| 275051120 AM | AMX             | AMX    | 12,5 | 2   | 60             | 50  | 8   | 5  |
| 275051160 AM | AMX             | AMX    | 16   | 3,2 | 60             | 60  | 10  | 7  |
| 275051200 AM | AMX             | AMX    | 20   | 5   | 60             | 63  | 10  | 7  |
| 275051250 AM | AMX             | AMX    | 25   | 5   | 60             | 72  | 10  | 9  |
| 275051300 AM | AMX             | AMX    | 30   | 7   | 60             | 80  | 12  | 9  |
| 275051350 AM | AMX             | AMX    | 35   | 7   | 60             | 85  | 12  | 9  |
| 275051500 AM | AMX             | AMX    | 50   | 10  | 60             | 100 | 16  | 11 |
| 275052060 AM | AMX             | AMX    | 6,3  | 1,6 | 90             | 45  | 5   | 5  |
| 275052080 AM | AMX             | AMX    | 8,4  | 2   | 90             | 50  | 6   | 5  |
| 275052120 AM | AMX             | AMX    | 12,5 | 2   | 90             | 48  | 8   | 5  |
| 275052160 AM | AMX             | AMX    | 16   | 3,2 | 90             | 56  | 10  | 7  |
| 275052200 AM | AMX             | AMX    | 20   | 5   | 90             | 60  | 10  | 7  |
| 275052250 AM | AMX             | AMX    | 25   | 5   | 90             | 70  | 10  | 9  |
| 275052300 AM | AMX             | AMX    | 30   | 7   | 90             | 78  | 12  | 9  |
| 275052450 AM | AMX             | AMX    | 45   | 9   | 90             | 92  | 16  | 11 |

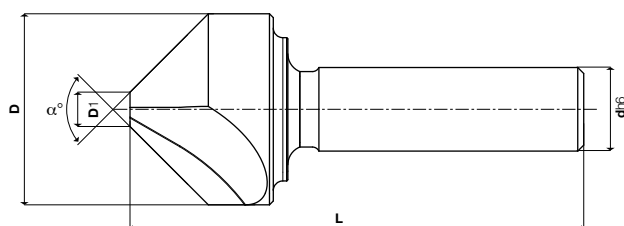


## Serie/Series 27505

Frese coniche a svasare  
Countersinks



**Z1**



COATING

**Skin**

**N**

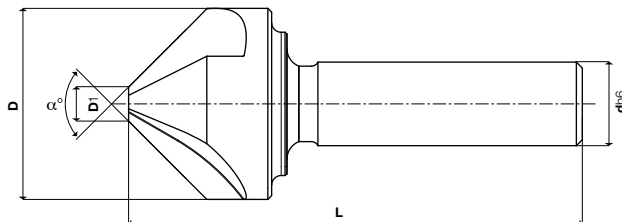
UNI 6847  
DIN  
334-335  
ISO

| Cod. Art.    | M-TK<br>(HSS-E) | COATED | D    | D1  | $\alpha^\circ$ | L   | dh6 | Z |
|--------------|-----------------|--------|------|-----|----------------|-----|-----|---|
| 275051061 AM | AMX             | AMX    | 6,3  | 1,6 | 60             | 45  | 5   | 1 |
| 275051081 AM | AMX             | AMX    | 8,1  | 2   | 60             | 50  | 6   | 1 |
| 275051121 AM | AMX             | AMX    | 12,5 | 2   | 60             | 50  | 8   | 1 |
| 275051161 AM | AMX             | AMX    | 16   | 3,2 | 60             | 60  | 10  | 1 |
| 275051201 AM | AMX             | AMX    | 20   | 5   | 60             | 63  | 10  | 1 |
| 275051251 AM | AMX             | AMX    | 25   | 5   | 60             | 72  | 10  | 1 |
| 275051301 AM | AMX             | AMX    | 30   | 7   | 60             | 80  | 12  | 1 |
| 275051351 AM | AMX             | AMX    | 35   | 7   | 60             | 85  | 12  | 1 |
| 275051501 AM | AMX             | AMX    | 50   | 10  | 60             | 100 | 16  | 1 |
| 275052061 AM | AMX             | AMX    | 6,3  | 1,6 | 90             | 45  | 5   | 1 |
| 275052081 AM | AMX             | AMX    | 8,4  | 2   | 90             | 50  | 6   | 1 |
| 275052121 AM | AMX             | AMX    | 12,5 | 2   | 90             | 48  | 8   | 1 |
| 275052161 AM | AMX             | AMX    | 16   | 3,2 | 90             | 56  | 10  | 1 |
| 275052201 AM | AMX             | AMX    | 20   | 5   | 90             | 60  | 10  | 1 |
| 275052251 AM | AMX             | AMX    | 25   | 5   | 90             | 70  | 10  | 1 |
| 275052301 AM | AMX             | AMX    | 30   | 7   | 90             | 78  | 12  | 1 |
| 275052451 AM | AMX             | AMX    | 45   | 9   | 90             | 92  | 16  | 1 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI INOSSIDABILI | MATERIALI NON FERROSI | LEGHE LEGGERE | ACCIAI | GHISE     |
|--------|----------|------|---------------------|-----------------------|---------------|--------|-----------|
| series | TITANIUM | HRSA | STAINLESS STEELS    | NON FERROUS MATERIALS | LIGHT ALLOYS  | STEELS | CAST IRON |
| 27505  | ●        | ●    | ●                   | ○                     | ○             | ●      | ●         |
| 27505  | ●        | ●    | ●                   | ○                     | ○             | ●      | ●         |



COATING

**Skin**

**N**

UNI 6847  
DIN  
334-335  
ISO

HSS-PM  
**HSS-PM Line**

Serie/Series  
**27505**

Frese coniche a svasare  
Countersinks

| Cod. Art.    | M-TK<br>(HSS-E) | COATED | D    | D1  | $\alpha^\circ$ | L   | dh6 | Z |
|--------------|-----------------|--------|------|-----|----------------|-----|-----|---|
| 275051063 AM | AMX             |        | 6,3  | 1,6 | 60             | 45  | 5   | 3 |
| 275051083 AM | AMX             |        | 8,4  | 2   | 60             | 50  | 6   | 3 |
| 275051123 AM | AMX             |        | 12,5 | 2   | 60             | 50  | 8   | 3 |
| 275051163 AM | AMX             |        | 16   | 3,2 | 60             | 60  | 10  | 3 |
| 275051203 AM | AMX             |        | 20   | 5   | 60             | 63  | 10  | 3 |
| 275051253 AM | AMX             |        | 25   | 5   | 60             | 72  | 10  | 3 |
| 275051303 AM | AMX             |        | 30   | 7   | 60             | 80  | 12  | 3 |
| 275051353 AM | AMX             |        | 35   | 7   | 60             | 85  | 12  | 3 |
| 275051503 AM | AMX             |        | 50   | 10  | 60             | 100 | 16  | 3 |
| 275052063 AM | AMX             |        | 6,3  | 1,6 | 90             | 45  | 5   | 3 |
| 275052083 AM | AMX             |        | 8,4  | 2   | 90             | 50  | 6   | 3 |
| 275052123 AM | AMX             |        | 12,5 | 2   | 90             | 48  | 8   | 3 |
| 275052163 AM | AMX             |        | 16   | 3,2 | 90             | 56  | 10  | 3 |
| 275052203 AM | AMX             |        | 20   | 5   | 90             | 60  | 10  | 3 |
| 275052253 AM | AMX             |        | 25   | 5   | 90             | 70  | 10  | 3 |
| 275052303 AM | AMX             |        | 30   | 7   | 90             | 78  | 12  | 3 |
| 275052453 AM | AMX             |        | 45   | 9   | 90             | 92  | 16  | 3 |
| 275053103 AM | AMX             |        | 10,5 | 1,6 | 90             | 50  | 8   | 3 |
| 275053123 AM | AMX             |        | 12,5 | 1,8 | 120            | 60  | 8   | 3 |
| 275053163 AM | AMX             |        | 16,5 | 2,2 | 120            | 65  | 8   | 3 |
| 275053203 AM | AMX             |        | 20,5 | 2,4 | 120            | 65  | 10  | 3 |
| 275053253 AM | AMX             |        | 25   | 2,7 | 120            | 70  | 10  | 3 |



**Z3**



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 27505           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

WWW.UOP.IT

99

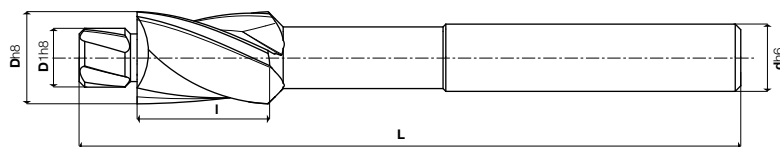


## Serie/Series 28105

Frese per sedi di viti  
Counterbores

## 28105

Frese per sedi di viti  
Counterbores



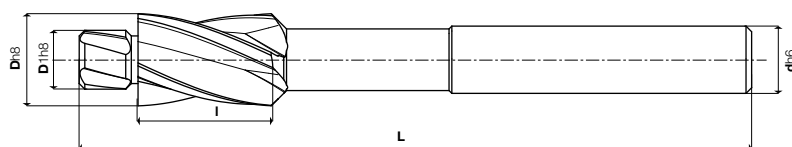
COATING

**Skin**

N

UNI 6841

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | SCREW | Dh8  | D1h8 | I   | L  | dh6 | Z |
|--------------|-----------------|----------------------|--------|-------|------|------|-----|----|-----|---|
| 281050302 AM | CM              | CMX                  | M3     | 5,9   | 3,2  | 12   | 70  | 6  | 2   |   |
| 281050402 AM | CM              | CMX                  | M4     | 7,4   | 4,3  | 12   | 70  | 8  | 2   |   |
| 281050502 AM | CM              | CMX                  | M5     | 9,4   | 5,3  | 14   | 90  | 10 | 2   |   |
| 281050602 AM | CM              | CMX                  | M6     | 10,4  | 6,4  | 16   | 100 | 10 | 2   |   |
| 281050802 AM | CM              | CMX                  | M8     | 13,5  | 8,4  | 20   | 115 | 12 | 2   |   |
| 281051002 AM | CM              | CMX                  | M10    | 16,5  | 10,5 | 25   | 120 | 12 | 2   |   |
| 281051202 AM | CM              | CMX                  | M12    | 19    | 13   | 25   | 120 | 16 | 2   |   |
| 281051402 AM | CM              | CMX                  | M14    | 23    | 15   | 30   | 130 | 16 | 2   |   |
| 281051602 AM | CM              | CMX                  | M16    | 25    | 17   | 35   | 155 | 20 | 2   |   |
| 281051802 AM | CM              | CMX                  | M18    | 28    | 19   | 40   | 160 | 20 | 2   |   |
| 281052002 AM | CM              | CMX                  | M20    | 31    | 21   | 50   | 180 | 20 | 2   |   |
| 281052202 AM | CM              | CMX                  | M22    | 34    | 23   | 50   | 185 | 22 | 2   |   |
| 281052402 AM | CM              | CMX                  | M24    | 37    | 25   | 50   | 200 | 22 | 2   |   |



COATING

**Skin**

N

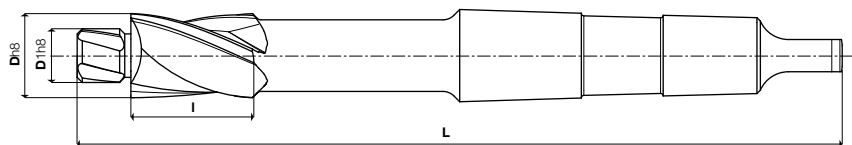
UNI 6841

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | SCREW | Dh8  | D1h8 | I   | L  | dh6 | Z |
|--------------|-----------------|----------------------|--------|-------|------|------|-----|----|-----|---|
| 281050304 AM | CM              | CMX                  | M3     | 5,9   | 3,2  | 12   | 70  | 6  | 4   |   |
| 281050404 AM | CM              | CMX                  | M4     | 7,4   | 4,3  | 12   | 70  | 8  | 4   |   |
| 281050504 AM | CM              | CMX                  | M5     | 9,4   | 5,3  | 14   | 90  | 10 | 4   |   |
| 281050604 AM | CM              | CMX                  | M6     | 10,4  | 6,4  | 16   | 100 | 10 | 4   |   |
| 281050804 AM | CM              | CMX                  | M8     | 13,5  | 8,4  | 20   | 115 | 12 | 4   |   |
| 281051004 AM | CM              | CMX                  | M10    | 16,5  | 10,5 | 25   | 120 | 12 | 4   |   |
| 281051204 AM | CM              | CMX                  | M12    | 19    | 13   | 25   | 120 | 16 | 4   |   |
| 281051404 AM | CM              | CMX                  | M14    | 23    | 15   | 30   | 130 | 16 | 4   |   |
| 281051604 AM | CM              | CMX                  | M16    | 25    | 17   | 35   | 155 | 20 | 4   |   |
| 281051804 AM | CM              | CMX                  | M18    | 28    | 19   | 40   | 160 | 20 | 4   |   |
| 281052004 AM | CM              | CMX                  | M20    | 31    | 21   | 50   | 180 | 20 | 4   |   |
| 281052204 AM | CM              | CMX                  | M22    | 34    | 23   | 50   | 185 | 22 | 4   |   |
| 281052404 AM | CM              | CMX                  | M24    | 37    | 25   | 50   | 200 | 22 | 4   |   |



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 28105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 28105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



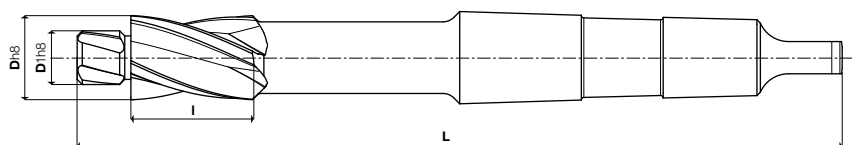
COATING

**Skin**

**N**

UNI 6842

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | SCREW | Dh8  | D1h8 | I  | L   | MORSE<br>TAPER | Z |
|--------------|-----------------|----------------------|--------|-------|------|------|----|-----|----------------|---|
| 281500302 AM |                 | CM                   | CMX    | M3    | 5,9  | 3,2  | 12 | 105 | 1              | 2 |
| 281500402 AM |                 | CM                   | CMX    | M4    | 7,4  | 4,3  | 12 | 105 | 1              | 2 |
| 281500502 AM |                 | CM                   | CMX    | M5    | 9,4  | 5,3  | 13 | 118 | 1              | 2 |
| 281500602 AM |                 | CM                   | CMX    | M6    | 10,4 | 6,4  | 16 | 125 | 1              | 2 |
| 281500802 AM |                 | CM                   | CMX    | M8    | 13,5 | 8,4  | 20 | 140 | 1              | 2 |
| 281501002 AM |                 | CM                   | CMX    | M10   | 16,5 | 10,5 | 25 | 160 | 2              | 2 |
| 281501202 AM |                 | CM                   | CMX    | M12   | 19   | 13   | 25 | 160 | 2              | 2 |
| 281501402 AM |                 | CM                   | CMX    | M14   | 23   | 15   | 32 | 170 | 2              | 2 |
| 281501602 AM |                 | CM                   | CMX    | M16   | 25   | 17   | 35 | 180 | 2              | 2 |
| 281501802 AM |                 | CM                   | CMX    | M18   | 28   | 19   | 40 | 180 | 2              | 2 |
| 281502002 AM |                 | CM                   | CMX    | M20   | 31   | 21   | 50 | 215 | 3              | 2 |
| 281502202 AM |                 | CM                   | CMX    | M22   | 34   | 23   | 50 | 220 | 3              | 2 |
| 281502402 AM |                 | CM                   | CMX    | M24   | 37   | 25   | 50 | 230 | 3              | 2 |



COATING

**Skin**

**N**

UNI 6842

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | SCREW | Dh8  | D1h8 | I  | L   | MORSE<br>TAPER | Z |
|--------------|-----------------|----------------------|--------|-------|------|------|----|-----|----------------|---|
| 281500304 AM |                 | CM                   | CMX    | M3    | 5,9  | 3,2  | 12 | 105 | 1              | 4 |
| 281500404 AM |                 | CM                   | CMX    | M4    | 7,4  | 4,3  | 12 | 105 | 1              | 4 |
| 281500504 AM |                 | CM                   | CMX    | M5    | 9,4  | 5,3  | 13 | 118 | 1              | 4 |
| 281500604 AM |                 | CM                   | CMX    | M6    | 10,4 | 6,4  | 16 | 125 | 1              | 4 |
| 281500804 AM |                 | CM                   | CMX    | M8    | 13,5 | 8,4  | 20 | 140 | 1              | 4 |
| 281501004 AM |                 | CM                   | CMX    | M10   | 16,5 | 10,5 | 25 | 160 | 2              | 4 |
| 281501204 AM |                 | CM                   | CMX    | M12   | 19   | 13   | 25 | 160 | 2              | 4 |
| 281501404 AM |                 | CM                   | CMX    | M14   | 23   | 15   | 32 | 170 | 2              | 4 |
| 281501604 AM |                 | CM                   | CMX    | M16   | 25   | 17   | 35 | 180 | 2              | 4 |
| 281501804 AM |                 | CM                   | CMX    | M18   | 28   | 19   | 40 | 180 | 2              | 4 |
| 281502004 AM |                 | CM                   | CMX    | M20   | 31   | 21   | 50 | 215 | 3              | 4 |
| 281502204 AM |                 | CM                   | CMX    | M22   | 34   | 23   | 50 | 220 | 3              | 4 |
| 281502404 AM |                 | CM                   | CMX    | M24   | 37   | 25   | 50 | 230 | 3              | 4 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 28150           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 28150           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

HSS-PM  
**HSS-PM Line**

Serie/Series  
**28150**

Frese per sedi di viti  
Counterbores

**28150**

Frese per sedi di viti  
Counterbores

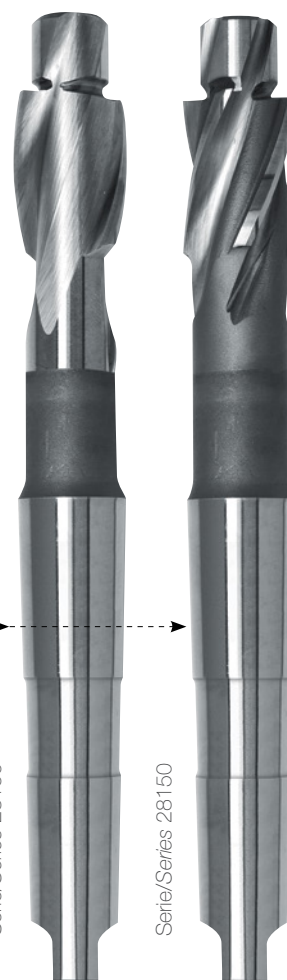
**Z2**

**Z4**

Cono Morse  
Morse Taper

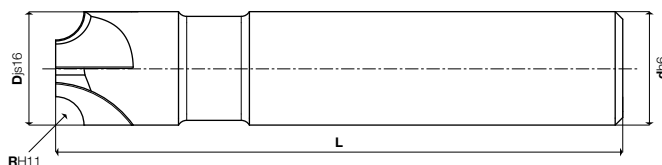
Serie/Series 28150

Serie/Series 28150



Serie/Series  
**28505**

Frese di forma ad un quarto di cerchio concavo  
Corner-rounding cutters



COATING  
**Skin**

W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

N

UNI 8264  
DIN 6518A  
ISO

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | RH11 | Ds16 | L   | dh6 | Z |
|--------------|-----------------|----------------------|--------|------|------|-----|-----|---|
| 285050100 AM |                 | CM                   | CMX    | 1    | 10   | 60  | 10  | 4 |
| 285050150 AM |                 | CM                   | CMX    | 1,5  | 10   | 60  | 10  | 4 |
| 285050200 AM |                 | CM                   | CMX    | 2    | 10   | 60  | 10  | 4 |
| 285050250 AM |                 | CM                   | CMX    | 2,5  | 10   | 60  | 10  | 4 |
| 285050300 AM |                 | CM                   | CMX    | 3    | 12   | 60  | 12  | 4 |
| 285050400 AM |                 | CM                   | CMX    | 4    | 15   | 60  | 12  | 4 |
| 285050500 AM |                 | CM                   | CMX    | 5    | 18   | 70  | 16  | 4 |
| 285050600 AM |                 | CM                   | CMX    | 6    | 21   | 70  | 16  | 4 |
| 285050700 AM |                 | CM                   | CMX    | 7    | 24   | 70  | 16  | 4 |
| 285050800 AM |                 | CM                   | CMX    | 8    | 24   | 70  | 16  | 4 |
| 285050900 AM |                 | CM                   | CMX    | 9    | 28   | 85  | 20  | 4 |
| 285050901 AM |                 | CM                   | CMX    | 9    | 28   | 85  | 25  | 4 |
| 285051000 AM |                 | CM                   | CMX    | 10   | 28   | 85  | 20  | 4 |
| 285051001 AM |                 | CM                   | CMX    | 10   | 28   | 85  | 25  | 4 |
| 285051100 AM |                 | CM                   | CMX    | 11   | 35   | 90  | 20  | 4 |
| 285051101 AM |                 | CM                   | CMX    | 11   | 35   | 90  | 25  | 4 |
| 285051200 AM |                 | CM                   | CMX    | 12   | 35   | 100 | 20  | 4 |
| 285051201 AM |                 | CM                   | CMX    | 12   | 35   | 100 | 25  | 4 |
| 285051250 AM |                 | CM                   | CMX    | 12,5 | 35   | 100 | 20  | 4 |
| 285051251 AM |                 | CM                   | CMX    | 12,5 | 35   | 100 | 25  | 4 |
| 285051300 AM |                 | CM                   | CMX    | 13   | 42   | 100 | 25  | 4 |
| 285051400 AM |                 | CM                   | CMX    | 14   | 42   | 100 | 25  | 4 |
| 285051500 AM |                 | CM                   | CMX    | 15   | 48   | 105 | 25  | 5 |
| 285051600 AM |                 | CM                   | CMX    | 16   | 48   | 105 | 25  | 5 |
| 285051800 AM |                 | CM                   | CMX    | 18   | 52   | 115 | 32  | 5 |
| 285052000 AM |                 | CM                   | CMX    | 20   | 60   | 115 | 32  | 6 |



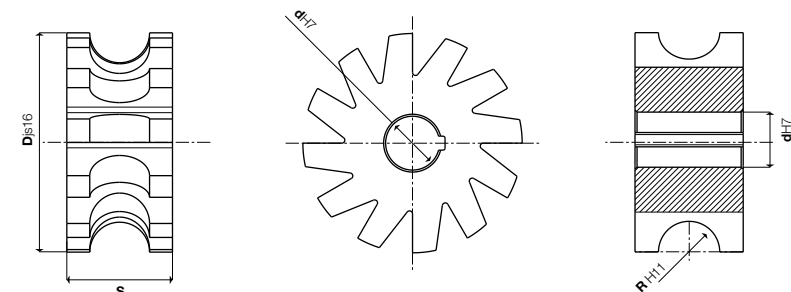
**Z4÷6**



MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI INOSSIDABILI | MATERIALI NON FERROSI | LEGHE LEGGERE | ACCIAI | GHISE     |
|--------|----------|------|---------------------|-----------------------|---------------|--------|-----------|
| series | TITANIUM | HRSA | STAINLESS STEELS    | NON FERROUS MATERIALS | LIGHT ALLOYS  | STEELS | CAST IRON |
| 28505  | ●        | ●    | ●                   | ○                     | ○             | ●      | ●         |

Serie/Series  
**29105**

Frese a profilo costante concavo  
*Form relieved concave milling cutters*


| Cod. Art.    | M-TK<br>(HSS-E) | COATED | R H11 | Djs16 | S  | dH7 | Z  |
|--------------|-----------------|--------|-------|-------|----|-----|----|
| 291050100 AM | AMX             |        | 1     | 56    | 8  | 22  | 14 |
| 291050150 AM | AMX             |        | 1,5   | 56    | 8  | 22  | 14 |
| 291050200 AM | AMX             |        | 2     | 56    | 9  | 22  | 14 |
| 291050250 AM | AMX             |        | 2,5   | 56    | 10 | 22  | 14 |
| 291050300 AM | AMX             |        | 3     | 63    | 12 | 22  | 14 |
| 291050350 AM | AMX             |        | 3,5   | 63    | 14 | 22  | 14 |
| 291050400 AM | AMX             |        | 4     | 63    | 16 | 22  | 14 |
| 291050450 AM | AMX             |        | 4,5   | 63    | 18 | 22  | 12 |
| 291050500 AM | AMX             |        | 5     | 63    | 20 | 22  | 12 |
| 291050550 AM | AMX             |        | 5,5   | 63    | 22 | 22  | 12 |
| 291050600 AM | AMX             |        | 6     | 70    | 24 | 22  | 12 |
| 291050650 AM | AMX             |        | 6,5   | 70    | 26 | 22  | 12 |
| 291050700 AM | AMX             |        | 7     | 70    | 28 | 22  | 12 |
| 291050750 AM | AMX             |        | 7,5   | 80    | 30 | 27  | 12 |
| 291050800 AM | AMX             |        | 8     | 80    | 32 | 27  | 12 |
| 291050850 AM | AMX             |        | 8,5   | 80    | 34 | 27  | 12 |
| 291050900 AM | AMX             |        | 9     | 90    | 36 | 27  | 12 |
| 291050950 AM | AMX             |        | 9,5   | 90    | 38 | 27  | 12 |
| 291051000 AM | AMX             |        | 10    | 90    | 40 | 27  | 12 |
| 291051100 AM | AMX             |        | 11    | 100   | 42 | 27  | 12 |
| 291051200 AM | AMX             |        | 12    | 100   | 44 | 27  | 12 |
| 291051250 AM | AMX             |        | 12,5  | 100   | 46 | 27  | 12 |
| 291051300 AM | AMX             |        | 13    | 100   | 48 | 27  | 12 |
| 291051400 AM | AMX             |        | 14    | 100   | 50 | 27  | 12 |
| 291051500 AM | AMX             |        | 15    | 110   | 53 | 32  | 12 |
| 291051600 AM | AMX             |        | 16    | 110   | 56 | 32  | 12 |
| 291051700 AM | AMX             |        | 17    | 110   | 59 | 32  | 12 |
| 291051800 AM | AMX             |        | 18    | 125   | 62 | 32  | 12 |
| 291051900 AM | AMX             |        | 19    | 125   | 66 | 32  | 12 |
| 291052000 AM | AMX             |        | 20    | 125   | 70 | 32  | 12 |

**Z12÷14**


## MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 29105           | ●                   | ●            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

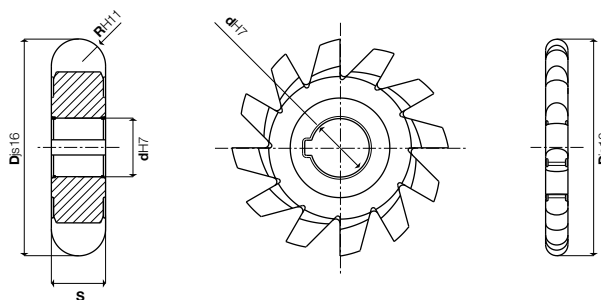
● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

Serie/Series  
**29110**

Frese a profilo costante convesso  
Form relieved convex milling cutters

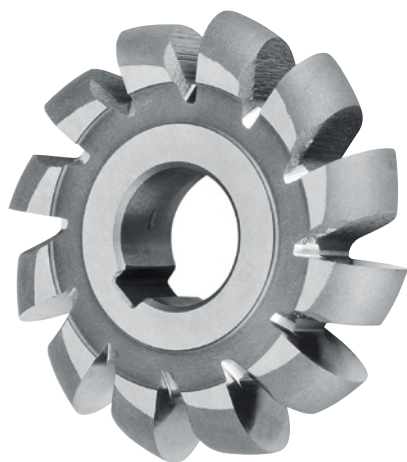


COATING  
**Skin**

**N**

UNI 4498  
DIN 856  
ISO

**Z12÷14**

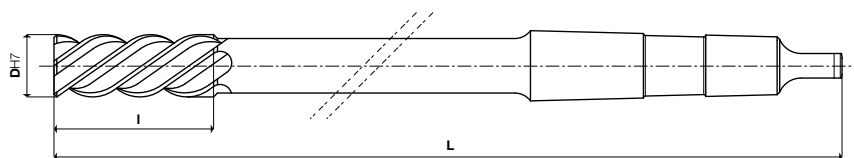


| Cod. Art.    | M-TK<br>(HSS-E) | COATED | RH11 | Ds16 | S  | dH7 | Z  |
|--------------|-----------------|--------|------|------|----|-----|----|
| 291100100 AM | AMX             |        | 1    | 50   | 2  | 22  | 14 |
| 291100150 AM | AMX             |        | 1,5  | 50   | 3  | 22  | 14 |
| 291100200 AM | AMX             |        | 2    | 50   | 4  | 22  | 14 |
| 291100250 AM | AMX             |        | 2,5  | 56   | 5  | 22  | 14 |
| 291100300 AM | AMX             |        | 3    | 56   | 6  | 22  | 14 |
| 291100350 AM | AMX             |        | 3,5  | 63   | 7  | 22  | 14 |
| 291100400 AM | AMX             |        | 4    | 63   | 8  | 22  | 14 |
| 291100450 AM | AMX             |        | 4,5  | 63   | 9  | 22  | 14 |
| 291100500 AM | AMX             |        | 5    | 63   | 10 | 22  | 14 |
| 291100550 AM | AMX             |        | 5,5  | 70   | 11 | 22  | 14 |
| 291100600 AM | AMX             |        | 6    | 70   | 12 | 22  | 14 |
| 291100650 AM | AMX             |        | 6,5  | 70   | 13 | 22  | 14 |
| 291100700 AM | AMX             |        | 7    | 70   | 14 | 22  | 14 |
| 291100750 AM | AMX             |        | 7,5  | 70   | 15 | 22  | 12 |
| 291100800 AM | AMX             |        | 8    | 70   | 16 | 22  | 12 |
| 291100850 AM | AMX             |        | 8,5  | 90   | 17 | 27  | 12 |
| 291100900 AM | AMX             |        | 9    | 90   | 18 | 27  | 12 |
| 291100950 AM | AMX             |        | 9,5  | 90   | 19 | 27  | 12 |
| 291101000 AM | AMX             |        | 10   | 90   | 20 | 27  | 12 |
| 291101100 AM | AMX             |        | 11   | 90   | 22 | 27  | 12 |
| 291101200 AM | AMX             |        | 12   | 90   | 24 | 27  | 12 |
| 291101250 AM | AMX             |        | 12,5 | 100  | 25 | 27  | 12 |
| 291101300 AM | AMX             |        | 13   | 100  | 26 | 27  | 12 |
| 291101400 AM | AMX             |        | 14   | 100  | 28 | 27  | 12 |
| 291101500 AM | AMX             |        | 15   | 110  | 30 | 32  | 12 |
| 291101600 AM | AMX             |        | 16   | 110  | 32 | 32  | 12 |
| 291101700 AM | AMX             |        | 17   | 110  | 34 | 32  | 12 |
| 291101800 AM | AMX             |        | 18   | 110  | 36 | 32  | 12 |
| 291101900 AM | AMX             |        | 19   | 125  | 38 | 32  | 12 |
| 291102000 AM | AMX             |        | 20   | 125  | 40 | 32  | 12 |



MATERIALI LAVORABILI / WORKPIECE MATERIALS





COATING

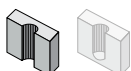
**Skin**

$\lambda^\circ$ S  
45

N

UNI  
DIN208C  
ISO 521

| Cod. Art. | X-85<br>(PM Co 8,5%) | COATED | DH7 | I  | L   | MORSE<br>TAPER | Z |
|-----------|----------------------|--------|-----|----|-----|----------------|---|
| 301500500 | CM                   | CMX    | 5   | 23 | 133 | 1              | 3 |
| 301500600 | CM                   | CMX    | 6   | 26 | 138 | 1              | 3 |
| 301500700 | CM                   | CMX    | 7   | 31 | 150 | 1              | 3 |
| 301500800 | CM                   | CMX    | 8   | 33 | 156 | 1              | 3 |
| 301500900 | CM                   | CMX    | 9   | 36 | 162 | 1              | 3 |
| 301501000 | CM                   | CMX    | 10  | 38 | 168 | 1              | 4 |
| 301501100 | CM                   | CMX    | 11  | 41 | 175 | 1              | 4 |
| 301501200 | CM                   | CMX    | 12  | 44 | 182 | 1              | 4 |
| 301501300 | CM                   | CMX    | 13  | 44 | 182 | 1              | 4 |
| 301501400 | CM                   | CMX    | 14  | 47 | 189 | 1              | 4 |
| 301501500 | CM                   | CMX    | 15  | 50 | 204 | 2              | 4 |
| 301501600 | CM                   | CMX    | 16  | 52 | 210 | 2              | 4 |
| 301501700 | CM                   | CMX    | 17  | 54 | 214 | 2              | 4 |
| 301501800 | CM                   | CMX    | 18  | 56 | 219 | 2              | 4 |
| 301501900 | CM                   | CMX    | 19  | 58 | 223 | 2              | 4 |
| 301502000 | CM                   | CMX    | 20  | 60 | 228 | 2              | 4 |
| 301502100 | CM                   | CMX    | 21  | 62 | 232 | 2              | 4 |
| 301502200 | CM                   | CMX    | 22  | 64 | 237 | 2              | 4 |
| 301502300 | CM                   | CMX    | 23  | 66 | 241 | 2              | 4 |
| 301502400 | CM                   | CMX    | 24  | 68 | 268 | 3              | 4 |
| 301502500 | CM                   | CMX    | 25  | 68 | 268 | 3              | 5 |
| 301502600 | CM                   | CMX    | 26  | 70 | 273 | 3              | 5 |
| 301502700 | CM                   | CMX    | 27  | 71 | 277 | 3              | 5 |
| 301502800 | CM                   | CMX    | 28  | 71 | 277 | 3              | 5 |
| 301502900 | CM                   | CMX    | 29  | 73 | 281 | 3              | 5 |
| 301503000 | CM                   | CMX    | 30  | 73 | 281 | 3              | 5 |
| 301503100 | CM                   | CMX    | 31  | 75 | 285 | 3              | 5 |
| 301503200 | CM                   | CMX    | 32  | 77 | 317 | 4              | 5 |
| 301503300 | CM                   | CMX    | 33  | 77 | 317 | 4              | 5 |
| 301503400 | CM                   | CMX    | 34  | 78 | 321 | 4              | 5 |
| 301503500 | CM                   | CMX    | 35  | 78 | 321 | 4              | 6 |
| 301503600 | CM                   | CMX    | 36  | 79 | 325 | 4              | 6 |
| 301503700 | CM                   | CMX    | 37  | 79 | 325 | 4              | 6 |
| 301503800 | CM                   | CMX    | 38  | 81 | 329 | 4              | 6 |
| 301503900 | CM                   | CMX    | 39  | 81 | 329 | 4              | 6 |
| 301504000 | CM                   | CMX    | 40  | 81 | 329 | 4              | 6 |



HSS-PM  
**HSS-PM Line**

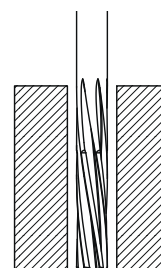
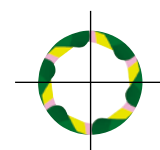
Serie/Series  
**30150**

Alesatori a macchina  
Machine reamers

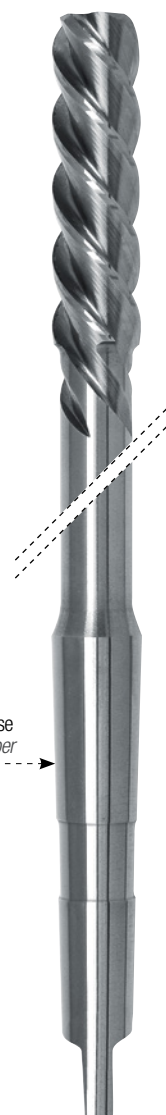
Diametri intermedi e tolleranze  
diverse da H7 si forniscono a richiesta

*In-between diameters and tolerances  
different from H7 are supplied on request*

**Z3÷6**



Cono Morse  
Morse Taper



MATERIALI LAVORABILI / WORKPIECE MATERIALS

serie  
series  
30150

TITANIO  
TITANIUM

HRSA  
HRSA

ACCIAI  
INOSSIDABILI  
STAINLESS  
STEELS

MATERIALI  
NON FERROSI  
NON FERROUS  
MATERIALS

LEGHE  
LEGGERE  
LIGHT ALLOYS

ACCIAI  
STEELS

GHISE  
CAST IRON

● consigliata/recommended

● accettabile/acceptable

○ non consigliata/not recommended

WWW.UOP.IT

105

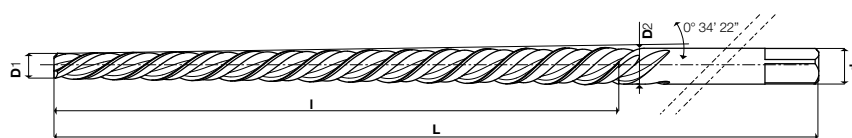
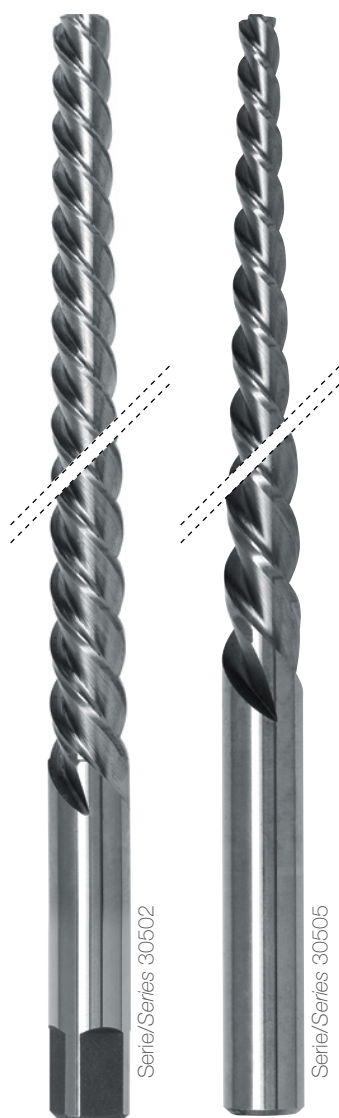
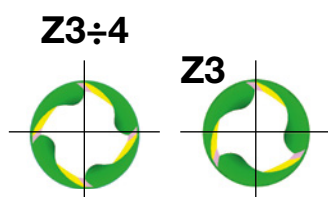


## Serie/Series 30502

Alesatori conici, conicità 2%  
Tapered reamers, taper 2%

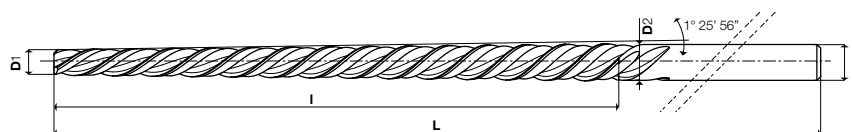
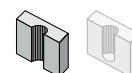
## 30505

Alesatori conici, conicità 5%  
Tapered reamers, taper 5%



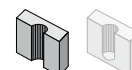
|                        |  |                         |   |                        |
|------------------------|--|-------------------------|---|------------------------|
| COATING<br><b>Skin</b> |  | $\lambda^\circ s$<br>45 | N | UNI 6857<br>DIN<br>ISO |
|------------------------|--|-------------------------|---|------------------------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D <sub>nom</sub> | D <sub>1</sub> | D <sub>2</sub> | I   | L   | d    | Z |
|--------------|----------------------|--------|------------------|----------------|----------------|-----|-----|------|---|
| 305020200 CM | CMX                  |        | 2                | 1,9            | 2,86           | 48  | 65  | 3,5  | 3 |
| 305020250 CM | CMX                  |        | 2,5              | 2,4            | 3,46           | 53  | 75  | 3,5  | 3 |
| 305020300 CM | CMX                  |        | 3                | 2,9            | 4,16           | 63  | 100 | 4    | 3 |
| 305020400 CM | CMX                  |        | 4                | 3,9            | 5,40           | 75  | 115 | 5    | 3 |
| 305020500 CM | CMX                  |        | 5                | 4,9            | 6,64           | 87  | 135 | 6,5  | 3 |
| 305020600 CM | CMX                  |        | 6                | 5,9            | 8,28           | 119 | 170 | 8,5  | 3 |
| 305020800 CM | CMX                  |        | 8                | 7,9            | 10,72          | 141 | 205 | 10,5 | 3 |
| 305021000 CM | CMX                  |        | 10               | 9,9            | 13,16          | 163 | 230 | 14   | 4 |
| 305021200 CM | CMX                  |        | 12               | 11,86          | 15,74          | 194 | 275 | 18   | 4 |
| 305021600 CM | CMX                  |        | 16               | 15,84          | 21,12          | 264 | 355 | 18   | 4 |
| 305022000 CM | CMX                  |        | 20               | 19,8           | 25,20          | 270 | 370 | 25   | 4 |



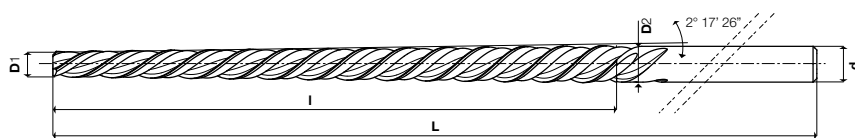
|                        |                         |                                |                                |   |                            |
|------------------------|-------------------------|--------------------------------|--------------------------------|---|----------------------------|
| COATING<br><b>Skin</b> | $\lambda^\circ s$<br>45 | W<br>A RICHIESTA<br>ON REQUEST | F<br>A RICHIESTA<br>ON REQUEST | N | QUALITY<br>STANDARD<br>UOP |
|------------------------|-------------------------|--------------------------------|--------------------------------|---|----------------------------|

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | D <sub>nom</sub> | D <sub>1</sub> | D <sub>2</sub> | I   | L   | d  | Z |
|--------------|----------------------|--------|------------------|----------------|----------------|-----|-----|----|---|
| 305050600 CM | CMX                  |        | 6                | 3              | 6              | 60  | 110 | 6  | 3 |
| 305050800 CM | CMX                  |        | 8                | 4              | 8              | 80  | 130 | 8  | 3 |
| 305051000 CM | CMX                  |        | 10               | 5              | 10             | 100 | 155 | 10 | 3 |
| 305051200 CM | CMX                  |        | 12               | 6              | 12             | 120 | 180 | 12 | 3 |



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 30502           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 30505           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



COATING  
**Skin**

$\lambda^\circ$ S  
45

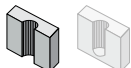
W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

N

QUALITY  
STANDARD  
UOP

| Cod. Art.    | X-85<br>(P/M Co 8,5%) | COATED | Dnom | D1  | D2 | I    | L   | d  | Z |
|--------------|-----------------------|--------|------|-----|----|------|-----|----|---|
| 305080600 CM | CMX                   |        | 6    | 2   | 6  | 50   | 100 | 6  | 3 |
| 305080800 CM | CMX                   |        | 8    | 3   | 8  | 62,5 | 110 | 8  | 3 |
| 305081000 CM | CMX                   |        | 10   | 4   | 10 | 75   | 130 | 10 | 3 |
| 305081200 CM | CMX                   |        | 12   | 4,8 | 12 | 90   | 150 | 12 | 3 |



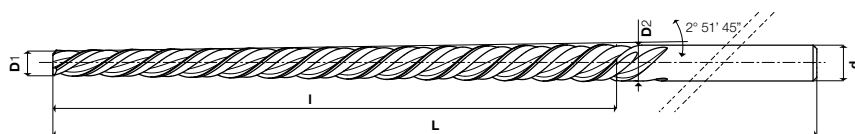
HSS-PM  
**HSS-PM Line**

Serie/Series  
**30508**

Alesatori conici, conicità 8%  
Tapered reamers, taper 8%

**30510**

Alesatori conici, conicità 10%  
Tapered reamers, taper 10%



COATING  
**Skin**

$\lambda^\circ$ S  
45

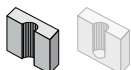
W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

N

QUALITY  
STANDARD  
UOP

| Cod. Art.    | X-85<br>(P/M Co 8,5%) | COATED | Dnom | D1 | D2 | I  | L   | d  | Z |
|--------------|-----------------------|--------|------|----|----|----|-----|----|---|
| 305100600 CM | CMX                   |        | 6    | 2  | 6  | 40 | 90  | 6  | 3 |
| 305100800 CM | CMX                   |        | 8    | 3  | 8  | 50 | 100 | 8  | 3 |
| 305101000 CM | CMX                   |        | 10   | 4  | 10 | 60 | 115 | 10 | 3 |
| 305101200 CM | CMX                   |        | 12   | 5  | 12 | 70 | 130 | 12 | 3 |



**Z3**



**Z3**



Serie/Series 30508

Serie/Series 30510

MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 30508           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |
| 30510           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

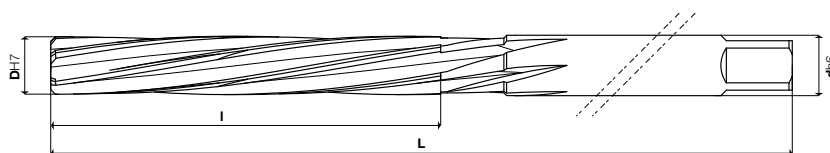
○ non consigliata/not recommended

WWW.UOP.IT

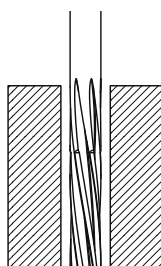
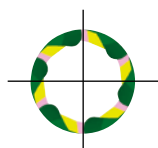
107

Serie/Series  
**31105**

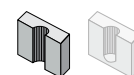
Alesatori fissi a mano  
Tapered reamers



**Z4÷12**



| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | DH7 | I   | L   | dH6 | Z  |
|--------------|-----------------|----------------------|--------|-----|-----|-----|-----|----|
| 311050300 AM | CM              | CMX                  |        | 3   | 31  | 62  | 3   | 4  |
| 311050400 AM | CM              | CMX                  |        | 4   | 38  | 76  | 4   | 5  |
| 311050500 AM | CM              | CMX                  |        | 5   | 44  | 87  | 5   | 5  |
| 311050600 AM | CM              | CMX                  |        | 6   | 47  | 93  | 6   | 5  |
| 311050700 AM | CM              | CMX                  |        | 7   | 54  | 107 | 7   | 5  |
| 311050800 AM | CM              | CMX                  |        | 8   | 58  | 115 | 8   | 6  |
| 311050900 AM | CM              | CMX                  |        | 9   | 62  | 124 | 9   | 6  |
| 311051000 AM | CM              | CMX                  |        | 10  | 66  | 133 | 10  | 6  |
| 311051100 AM | CM              | CMX                  |        | 11  | 71  | 142 | 11  | 7  |
| 311051200 AM | CM              | CMX                  |        | 12  | 76  | 152 | 12  | 7  |
| 311051300 AM | CM              | CMX                  |        | 13  | 76  | 152 | 13  | 7  |
| 311051400 AM | CM              | CMX                  |        | 14  | 81  | 163 | 14  | 7  |
| 311051500 AM | CM              | CMX                  |        | 15  | 81  | 163 | 15  | 7  |
| 311051600 AM | CM              | CMX                  |        | 16  | 87  | 175 | 16  | 7  |
| 311051700 AM | CM              | CMX                  |        | 17  | 87  | 175 | 17  | 7  |
| 311051800 AM | CM              | CMX                  |        | 18  | 93  | 188 | 18  | 8  |
| 311051900 AM | CM              | CMX                  |        | 19  | 93  | 188 | 19  | 8  |
| 311052000 AM | CM              | CMX                  |        | 20  | 100 | 201 | 20  | 8  |
| 311052100 AM | -               | -                    |        | 21  | 100 | 201 | 21  | 8  |
| 311052200 AM | -               | -                    |        | 22  | 107 | 215 | 22  | 8  |
| 311052300 AM | -               | -                    |        | 23  | 107 | 215 | 23  | 8  |
| 311052400 AM | -               | -                    |        | 24  | 115 | 231 | 24  | 8  |
| 311052500 AM | -               | -                    |        | 25  | 115 | 231 | 25  | 8  |
| 311052600 AM | -               | -                    |        | 26  | 115 | 231 | 26  | 8  |
| 311052700 AM | -               | -                    |        | 27  | 124 | 247 | 27  | 10 |
| 311052800 AM | -               | -                    |        | 28  | 124 | 247 | 28  | 10 |
| 311052900 AM | -               | -                    |        | 29  | 124 | 247 | 29  | 10 |
| 311053000 AM | -               | -                    |        | 30  | 124 | 247 | 30  | 10 |
| 311053200 AM | -               | -                    |        | 32  | 133 | 265 | 32  | 10 |
| 311053400 AM | -               | -                    |        | 34  | 142 | 284 | 34  | 10 |
| 311053500 AM | -               | -                    |        | 35  | 142 | 284 | 35  | 10 |
| 311053600 AM | -               | -                    |        | 36  | 142 | 284 | 36  | 10 |
| 311053800 AM | -               | -                    |        | 38  | 152 | 305 | 38  | 10 |
| 311054000 AM | -               | -                    |        | 40  | 152 | 305 | 40  | 10 |
| 311054500 AM | -               | -                    |        | 45  | 163 | 326 | 45  | 12 |
| 311055000 AM | -               | -                    |        | 50  | 174 | 347 | 50  | 12 |

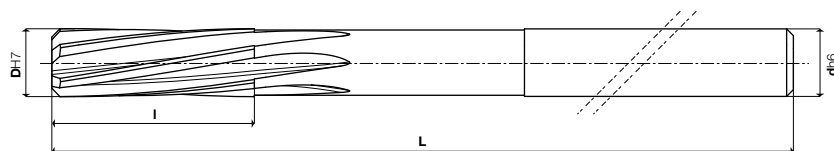


Diametri intermedi e tolleranze diverse da H7 si forniscono a richiesta  
In-between diameters and tolerances different from H7 are supplied on request

**MATERIALI LAVORABILI / WORKPIECE MATERIALS**

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 31105           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

Serie/Series  
**32105**

Alesatori a macchina  
Machine reamers

COATING  
**Skin**

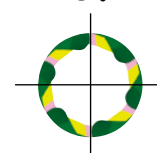
W  
A RICHIESTA  
ON REQUEST

F  
A RICHIESTA  
ON REQUEST

N

UNI 6853  
DIN 212D  
ISO 521

| Cod. Art.    | X-85<br>(PM Co B,5%) | COATED | DH7 | I  | L   | dh6 | λ° | Z |
|--------------|----------------------|--------|-----|----|-----|-----|----|---|
| 321050100 CM | CMX                  | 1      | 5   | 37 | 1   | 30  | 3  |   |
| 321050110 CM | CMX                  | 1,1    | 7   | 40 | 1,1 | 30  | 3  |   |
| 321050120 CM | CMX                  | 1,2    | 7   | 40 | 1,2 | 30  | 3  |   |
| 321050130 CM | CMX                  | 1,3    | 7   | 40 | 1,3 | 30  | 3  |   |
| 321050140 CM | CMX                  | 1,4    | 8   | 40 | 1,4 | 30  | 3  |   |
| 321050150 CM | CMX                  | 1,5    | 8   | 40 | 1,5 | 30  | 3  |   |
| 321050160 CM | CMX                  | 1,6    | 9   | 43 | 1,6 | 30  | 3  |   |
| 321050170 CM | CMX                  | 1,7    | 9   | 43 | 1,7 | 30  | 3  |   |
| 321050180 CM | CMX                  | 1,8    | 10  | 46 | 1,8 | 30  | 3  |   |
| 321050190 CM | CMX                  | 1,9    | 10  | 46 | 1,9 | 30  | 3  |   |
| 321050200 CM | CMX                  | 2      | 11  | 49 | 2   | 10  | 5  |   |
| 321050210 CM | CMX                  | 2,1    | 11  | 49 | 2,1 | 10  | 5  |   |
| 321050220 CM | CMX                  | 2,2    | 12  | 53 | 2,2 | 10  | 5  |   |
| 321050230 CM | CMX                  | 2,3    | 12  | 53 | 2,3 | 10  | 5  |   |
| 321050240 CM | CMX                  | 2,4    | 14  | 57 | 2,4 | 10  | 5  |   |
| 321050250 CM | CMX                  | 2,5    | 14  | 57 | 2,5 | 10  | 5  |   |
| 321050260 CM | CMX                  | 2,6    | 14  | 57 | 2,6 | 10  | 5  |   |
| 321050270 CM | CMX                  | 2,7    | 15  | 61 | 2,7 | 10  | 5  |   |
| 321050280 CM | CMX                  | 2,8    | 15  | 61 | 2,8 | 10  | 5  |   |
| 321050290 CM | CMX                  | 2,9    | 15  | 61 | 2,9 | 10  | 5  |   |
| 321050300 CM | CMX                  | 3      | 15  | 61 | 3   | 10  | 5  |   |
| 321050310 CM | CMX                  | 3,1    | 16  | 65 | 3,1 | 10  | 5  |   |
| 321050320 CM | CMX                  | 3,2    | 16  | 65 | 3,2 | 10  | 5  |   |
| 321050330 CM | CMX                  | 3,3    | 16  | 65 | 3,3 | 10  | 5  |   |
| 321050340 CM | CMX                  | 3,4    | 18  | 70 | 3,4 | 10  | 5  |   |
| 321050350 CM | CMX                  | 3,5    | 18  | 70 | 3,5 | 10  | 5  |   |
| 321050360 CM | CMX                  | 3,6    | 18  | 70 | 3,6 | 10  | 5  |   |
| 321050370 CM | CMX                  | 3,7    | 18  | 70 | 3,7 | 10  | 5  |   |
| 321050380 CM | CMX                  | 3,8    | 19  | 75 | 3,8 | 10  | 5  |   |
| 321050390 CM | CMX                  | 3,9    | 19  | 75 | 3,9 | 10  | 5  |   |
| 321050400 CM | CMX                  | 4      | 19  | 75 | 4   | 10  | 5  |   |
| 321050410 CM | CMX                  | 4,1    | 19  | 75 | 4,1 | 10  | 5  |   |
| 321050420 CM | CMX                  | 4,2    | 19  | 75 | 4,2 | 10  | 5  |   |
| 321050430 CM | CMX                  | 4,3    | 21  | 80 | 4,3 | 10  | 5  |   |
| 321050440 CM | CMX                  | 4,4    | 21  | 80 | 4,4 | 10  | 5  |   |
| 321050450 CM | CMX                  | 4,5    | 21  | 80 | 4,5 | 10  | 5  |   |
| 321050460 CM | CMX                  | 4,6    | 21  | 80 | 4,6 | 10  | 5  |   |
| 321050470 CM | CMX                  | 4,7    | 21  | 80 | 4,7 | 10  | 5  |   |
| 321050480 CM | CMX                  | 4,8    | 23  | 86 | 4,8 | 10  | 5  |   |
| 321050490 CM | CMX                  | 4,9    | 23  | 86 | 4,9 | 10  | 5  |   |
| 321050500 CM | CMX                  | 5      | 23  | 86 | 5   | 10  | 5  |   |
| 321050510 CM | CMX                  | 5,1    | 23  | 86 | 5,1 | 10  | 5  |   |
| 321050520 CM | CMX                  | 5,2    | 23  | 86 | 5,2 | 10  | 5  |   |
| 321050530 CM | CMX                  | 5,3    | 26  | 93 | 5,3 | 10  | 5  |   |
| 321050540 CM | CMX                  | 5,4    | 26  | 93 | 5,4 | 10  | 5  |   |
| 321050550 CM | CMX                  | 5,5    | 26  | 93 | 5,5 | 10  | 6  |   |
| 321050560 CM | CMX                  | 5,6    | 26  | 93 | 5,6 | 10  | 6  |   |
| 321050570 CM | CMX                  | 5,7    | 26  | 93 | 5,7 | 10  | 6  |   |
| 321050580 CM | CMX                  | 5,8    | 26  | 93 | 5,8 | 10  | 6  |   |
| 321050590 CM | CMX                  | 5,9    | 26  | 93 | 5,9 | 10  | 6  |   |
| 321050600 CM | CMX                  | 6      | 26  | 93 | 6   | 10  | 6  |   |

**Z3÷7**


→ continua alla pagina successiva / continued on next page

MATERIALI LAVORABILI / WORKPIECE MATERIALS

serie  
series  
32105

TITANIO  
TITANIUM

HRSA  
HRSA

ACCIAI  
INOSSIDABILI  
STAINLESS  
STEELS

MATERIALI  
NON FERROSI  
NON FERROUS  
MATERIALS

LEGHE  
LEGGERE  
LIGHT ALLOYS

ACCIAI  
STEELS

GHISE  
CAST IRON

● consigliata/recommended

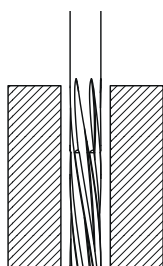
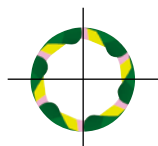
● accettabile/acceptable

○ non consigliata/not recommended

## Serie/Series 32105

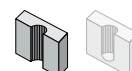
Alesatori a macchina  
Machine reamers

Z3÷7



→ continuazione della pagina precedente / continuation of the previous page

| Cod. Art.    | X-85<br>(PM Co 8,5%) | COATED | DH7  | I  | L   | dh6  | λ° | Z |
|--------------|----------------------|--------|------|----|-----|------|----|---|
| 321050610 CM | CMX                  |        | 6,1  | 28 | 101 | 6,1  | 10 | 6 |
| 321050620 CM | CMX                  |        | 6,2  | 28 | 101 | 6,2  | 10 | 6 |
| 321050630 CM | CMX                  |        | 6,3  | 28 | 101 | 6,3  | 10 | 6 |
| 321050640 CM | CMX                  |        | 6,4  | 28 | 101 | 6,4  | 10 | 6 |
| 321050650 CM | CMX                  |        | 6,5  | 28 | 101 | 6,5  | 10 | 6 |
| 321050660 CM | CMX                  |        | 6,6  | 28 | 101 | 6,6  | 10 | 6 |
| 321050670 CM | CMX                  |        | 6,7  | 31 | 109 | 6,7  | 10 | 6 |
| 321050680 CM | CMX                  |        | 6,8  | 31 | 109 | 6,8  | 10 | 6 |
| 321050690 CM | CMX                  |        | 6,9  | 31 | 109 | 6,9  | 10 | 6 |
| 321050700 CM | CMX                  |        | 7    | 31 | 109 | 7    | 10 | 6 |
| 321050710 CM | CMX                  |        | 7,1  | 31 | 109 | 7,1  | 10 | 6 |
| 321050720 CM | CMX                  |        | 7,2  | 31 | 109 | 7,2  | 10 | 6 |
| 321050730 CM | CMX                  |        | 7,3  | 31 | 109 | 7,3  | 10 | 6 |
| 321050740 CM | CMX                  |        | 7,4  | 31 | 109 | 7,4  | 10 | 6 |
| 321050750 CM | CMX                  |        | 7,5  | 33 | 117 | 7,5  | 10 | 6 |
| 321050760 CM | CMX                  |        | 7,6  | 33 | 117 | 7,6  | 10 | 6 |
| 321050770 CM | CMX                  |        | 7,7  | 33 | 117 | 7,7  | 10 | 6 |
| 321050780 CM | CMX                  |        | 7,8  | 33 | 117 | 7,8  | 10 | 6 |
| 321050790 CM | CMX                  |        | 7,9  | 33 | 117 | 7,9  | 10 | 6 |
| 321050800 CM | CMX                  |        | 8    | 33 | 117 | 8    | 10 | 6 |
| 321050810 CM | CMX                  |        | 8,1  | 33 | 117 | 8,1  | 10 | 6 |
| 321050820 CM | CMX                  |        | 8,2  | 33 | 117 | 8,2  | 10 | 6 |
| 321050830 CM | CMX                  |        | 8,3  | 33 | 117 | 8,3  | 10 | 6 |
| 321050840 CM | CMX                  |        | 8,4  | 33 | 117 | 8,4  | 10 | 6 |
| 321050850 CM | CMX                  |        | 8,5  | 36 | 125 | 8,5  | 10 | 6 |
| 321050860 CM | CMX                  |        | 8,6  | 36 | 125 | 8,6  | 10 | 6 |
| 321050870 CM | CMX                  |        | 8,7  | 36 | 125 | 8,7  | 10 | 6 |
| 321050880 CM | CMX                  |        | 8,8  | 36 | 125 | 8,8  | 10 | 6 |
| 321050890 CM | CMX                  |        | 8,9  | 36 | 125 | 8,9  | 10 | 6 |
| 321050900 CM | CMX                  |        | 9    | 36 | 125 | 9    | 10 | 6 |
| 321050910 CM | CMX                  |        | 9,1  | 36 | 125 | 9,1  | 10 | 6 |
| 321050920 CM | CMX                  |        | 9,2  | 36 | 125 | 9,2  | 10 | 6 |
| 321050930 CM | CMX                  |        | 9,3  | 36 | 125 | 9,3  | 10 | 6 |
| 321050940 CM | CMX                  |        | 9,4  | 36 | 125 | 9,4  | 10 | 6 |
| 321050950 CM | CMX                  |        | 9,5  | 38 | 133 | 9,5  | 10 | 6 |
| 321050960 CM | CMX                  |        | 9,6  | 38 | 133 | 9,6  | 10 | 6 |
| 321050970 CM | CMX                  |        | 9,7  | 38 | 133 | 9,7  | 10 | 6 |
| 321050980 CM | CMX                  |        | 9,8  | 38 | 133 | 9,8  | 10 | 6 |
| 321050990 CM | CMX                  |        | 9,9  | 38 | 133 | 9,9  | 10 | 6 |
| 321051000 CM | CMX                  |        | 10   | 38 | 133 | 10   | 10 | 6 |
| 321051050 CM | CMX                  |        | 10,5 | 41 | 142 | 10,5 | 10 | 7 |
| 321051100 CM | CMX                  |        | 11   | 41 | 142 | 11   | 10 | 7 |
| 321051150 CM | CMX                  |        | 11,5 | 44 | 151 | 11,5 | 10 | 7 |
| 321051200 CM | CMX                  |        | 12   | 44 | 151 | 12   | 10 | 7 |
| 321051250 CM | CMX                  |        | 12,5 | 44 | 151 | 12,5 | 10 | 7 |
| 321051300 CM | CMX                  |        | 13   | 44 | 151 | 13   | 10 | 7 |
| 321051350 CM | CMX                  |        | 13,5 | 47 | 160 | 13,5 | 10 | 7 |
| 321051400 CM | CMX                  |        | 14   | 47 | 160 | 14   | 10 | 7 |
| 321051450 CM | CMX                  |        | 14,5 | 50 | 162 | 14,5 | 10 | 7 |
| 321051500 CM | CMX                  |        | 15   | 50 | 162 | 15   | 10 | 7 |
| 321051550 CM | CMX                  |        | 15,5 | 52 | 170 | 15,5 | 10 | 7 |
| 321051600 CM | CMX                  |        | 16   | 52 | 170 | 16   | 10 | 7 |



Diametri intermedi e tolleranze diverse da H7 si forniscono a richiesta  
In-between diameters and tolerances different from H7 are supplied on request

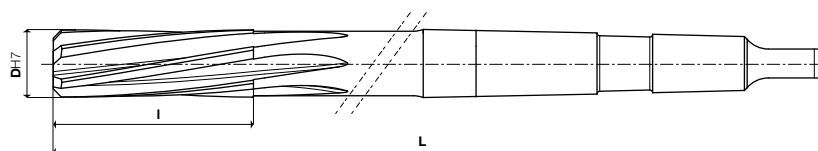
### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 32105           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



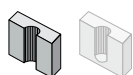
Serie/Series  
**32150**

Alesatori a macchina  
Machine reamers

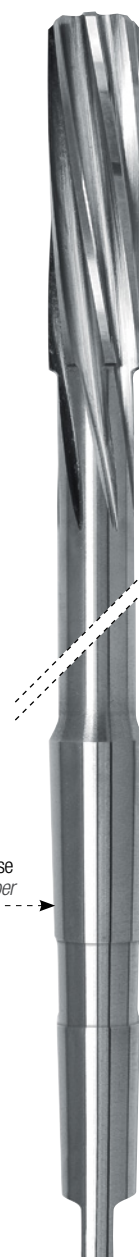
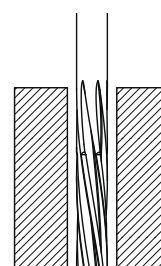
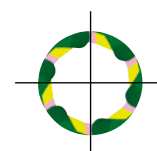


|                        |                                 |   |                                 |
|------------------------|---------------------------------|---|---------------------------------|
| COATING<br><b>Skin</b> | $\lambda^{\circ}\text{s}$<br>10 | N | UNI 6854<br>DIN 208B<br>ISO 521 |
|------------------------|---------------------------------|---|---------------------------------|

| Cod. Art.    | M-TK<br>(HSS-E) | X-85<br>(PM Co 8,5%) | COATED | DH7 | I  | L   | MORSE<br>TAPER | Z  |
|--------------|-----------------|----------------------|--------|-----|----|-----|----------------|----|
| 321500500 AM |                 | CM                   | CMX    | 5   | 23 | 133 | 1              | 5  |
| 321500600 AM |                 | CM                   | CMX    | 6   | 26 | 138 | 1              | 6  |
| 321500700 AM |                 | CM                   | CMX    | 7   | 31 | 150 | 1              | 6  |
| 321500800 AM |                 | CM                   | CMX    | 8   | 33 | 156 | 1              | 6  |
| 321500900 AM |                 | CM                   | CMX    | 9   | 36 | 162 | 1              | 6  |
| 321501000 AM |                 | CM                   | CMX    | 10  | 38 | 168 | 1              | 6  |
| 321501100 AM |                 | CM                   | CMX    | 11  | 41 | 175 | 1              | 7  |
| 321501200 AM |                 | CM                   | CMX    | 12  | 44 | 182 | 1              | 7  |
| 321501300 AM |                 | CM                   | CMX    | 13  | 44 | 182 | 1              | 7  |
| 321501400 AM |                 | CM                   | CMX    | 14  | 47 | 189 | 1              | 7  |
| 321501500 AM |                 | CM                   | CMX    | 15  | 50 | 204 | 2              | 7  |
| 321501600 AM |                 | CM                   | CMX    | 16  | 52 | 210 | 2              | 7  |
| 321501700 AM |                 | CM                   | CMX    | 17  | 54 | 214 | 2              | 8  |
| 321501800 AM |                 | CM                   | CMX    | 18  | 56 | 219 | 2              | 8  |
| 321501900 AM |                 | CM                   | CMX    | 19  | 58 | 223 | 2              | 8  |
| 321502000 AM |                 | CM                   | CMX    | 20  | 60 | 228 | 2              | 8  |
| 321502100 AM |                 | CM                   | CMX    | 21  | 62 | 232 | 2              | 8  |
| 321502200 AM |                 | CM                   | CMX    | 22  | 64 | 237 | 2              | 8  |
| 321502300 AM |                 | CM                   | CMX    | 23  | 66 | 241 | 2              | 8  |
| 321502400 AM |                 | CM                   | CMX    | 24  | 68 | 268 | 3              | 8  |
| 321502500 AM |                 | CM                   | CMX    | 25  | 68 | 268 | 3              | 8  |
| 321502600 AM |                 | CM                   | CMX    | 26  | 70 | 273 | 3              | 8  |
| 321502700 AM |                 | CM                   | CMX    | 27  | 71 | 277 | 3              | 10 |
| 321502800 AM |                 | CM                   | CMX    | 28  | 71 | 277 | 3              | 10 |
| 321502900 AM |                 | CM                   | CMX    | 29  | 73 | 281 | 3              | 10 |
| 321503000 AM |                 | CM                   | CMX    | 30  | 73 | 281 | 3              | 10 |
| 321503100 AM |                 | CM                   | CMX    | 31  | 75 | 285 | 3              | 10 |
| 321503200 AM |                 | CM                   | CMX    | 32  | 77 | 317 | 4              | 10 |
| 321503300 AM |                 | CM                   | CMX    | 33  | 77 | 317 | 4              | 10 |
| 321503400 AM |                 | CM                   | CMX    | 34  | 78 | 321 | 4              | 10 |
| 321503500 AM |                 | CM                   | CMX    | 35  | 78 | 321 | 4              | 10 |
| 321503600 AM |                 | CM                   | CMX    | 36  | 79 | 325 | 4              | 10 |
| 321503700 AM |                 | CM                   | CMX    | 37  | 79 | 325 | 4              | 10 |
| 321503800 AM |                 | CM                   | CMX    | 38  | 81 | 329 | 4              | 10 |
| 321503900 AM |                 | CM                   | CMX    | 39  | 81 | 329 | 4              | 10 |
| 321504000 AM |                 | CM                   | CMX    | 40  | 81 | 329 | 4              | 10 |



**Z5÷10**



Cono Morse  
Morse Taper

Diametri intermedi e tolleranze diverse da H7 si forniscono a richiesta  
In-between diameters and tolerances different from H7 are supplied on request

## MATERIALI LAVORABILI / WORKPIECE MATERIALS

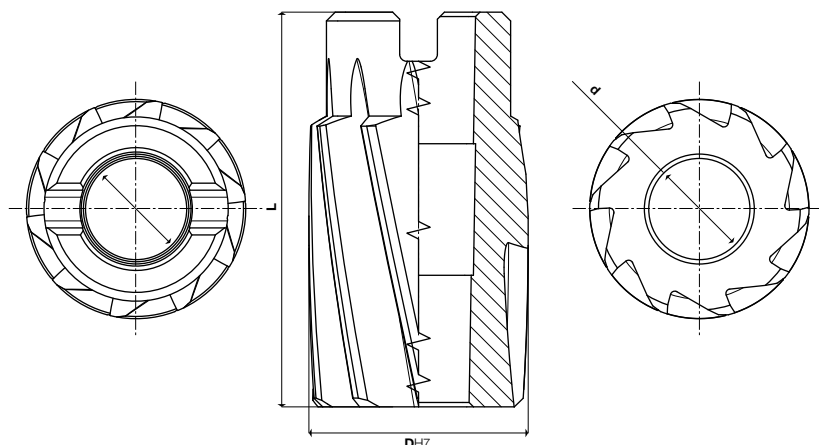
| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 32150           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |



## Serie/Series 33105

Alesatori a macchina tipo manicotto foro conico 1:30  
Shell reamers taper hole 1:30

Diametri intermedi e tolleranze diverse da H7 si forniscono a richiesta  
In-between diameters and tolerances different from H7 are supplied on request



COATING  
**Skin**

$\lambda^{\circ}$ s  
10

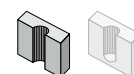
N

UNI 6855  
DIN 219B  
ISO 2402

Z8÷20



| Cod. Art.    | M-TK<br>(HSS-E) | COATED | DH7 | L   | d  | Z  |
|--------------|-----------------|--------|-----|-----|----|----|
| 331050200 AM |                 | AMX    | 20  | 40  | 10 | 8  |
| 331050210 AM |                 | AMX    | 21  | 40  | 10 | 8  |
| 331050220 AM |                 | AMX    | 22  | 40  | 10 | 8  |
| 331050230 AM |                 | AMX    | 23  | 40  | 10 | 8  |
| 331050240 AM |                 | AMX    | 24  | 45  | 13 | 10 |
| 331050250 AM |                 | AMX    | 25  | 45  | 13 | 10 |
| 331050260 AM |                 | AMX    | 26  | 45  | 13 | 10 |
| 331050270 AM |                 | AMX    | 27  | 45  | 13 | 10 |
| 331050280 AM |                 | AMX    | 28  | 45  | 13 | 10 |
| 331050290 AM |                 | AMX    | 29  | 45  | 13 | 10 |
| 331050300 AM |                 | AMX    | 30  | 45  | 13 | 10 |
| 331050310 AM |                 | AMX    | 31  | 50  | 16 | 10 |
| 331050320 AM |                 | AMX    | 32  | 50  | 16 | 10 |
| 331050330 AM |                 | AMX    | 33  | 50  | 16 | 10 |
| 331050340 AM |                 | AMX    | 34  | 50  | 16 | 10 |
| 331050350 AM |                 | AMX    | 35  | 50  | 16 | 10 |
| 331050360 AM |                 | AMX    | 36  | 56  | 19 | 12 |
| 331050370 AM |                 | AMX    | 37  | 56  | 19 | 12 |
| 331050380 AM |                 | AMX    | 38  | 56  | 19 | 12 |
| 331050390 AM |                 | AMX    | 39  | 56  | 19 | 12 |
| 331050400 AM |                 | AMX    | 40  | 56  | 19 | 12 |
| 331050420 AM |                 | AMX    | 42  | 56  | 19 | 12 |
| 331050440 AM |                 | AMX    | 44  | 63  | 22 | 12 |
| 331050450 AM |                 | AMX    | 45  | 63  | 22 | 12 |
| 331050460 AM |                 | AMX    | 46  | 63  | 22 | 14 |
| 331050470 AM |                 | AMX    | 47  | 63  | 22 | 14 |
| 331050480 AM |                 | AMX    | 48  | 63  | 22 | 14 |
| 331050490 AM |                 | AMX    | 49  | 63  | 22 | 14 |
| 331050500 AM |                 | AMX    | 50  | 63  | 22 | 14 |
| 331050520 AM |                 | AMX    | 52  | 71  | 27 | 14 |
| 331050550 AM |                 | AMX    | 55  | 71  | 27 | 14 |
| 331050580 AM |                 | AMX    | 58  | 71  | 27 | 14 |
| 331050600 AM |                 | AMX    | 60  | 71  | 27 | 16 |
| 331050620 AM |                 | AMX    | 62  | 80  | 32 | 16 |
| 331050650 AM |                 | AMX    | 65  | 80  | 32 | 16 |
| 331050680 AM |                 | AMX    | 68  | 80  | 32 | 16 |
| 331050700 AM |                 | AMX    | 70  | 80  | 32 | 16 |
| 331050720 AM |                 | AMX    | 72  | 90  | 40 | 16 |
| 331050750 AM |                 | AMX    | 75  | 90  | 40 | 16 |
| 331050780 AM |                 | AMX    | 78  | 90  | 40 | 16 |
| 331050800 AM |                 | AMX    | 80  | 90  | 40 | 20 |
| 331050820 AM |                 | AMX    | 82  | 90  | 40 | 20 |
| 331050850 AM |                 | AMX    | 85  | 90  | 40 | 20 |
| 331050880 AM |                 | AMX    | 88  | 100 | 50 | 20 |
| 331050900 AM |                 | AMX    | 90  | 100 | 50 | 20 |
| 331050920 AM |                 | AMX    | 92  | 100 | 50 | 20 |
| 331050950 AM |                 | AMX    | 95  | 100 | 50 | 20 |
| 331050980 AM |                 | AMX    | 98  | 100 | 50 | 20 |
| 331051000 AM |                 | AMX    | 100 | 100 | 50 | 20 |

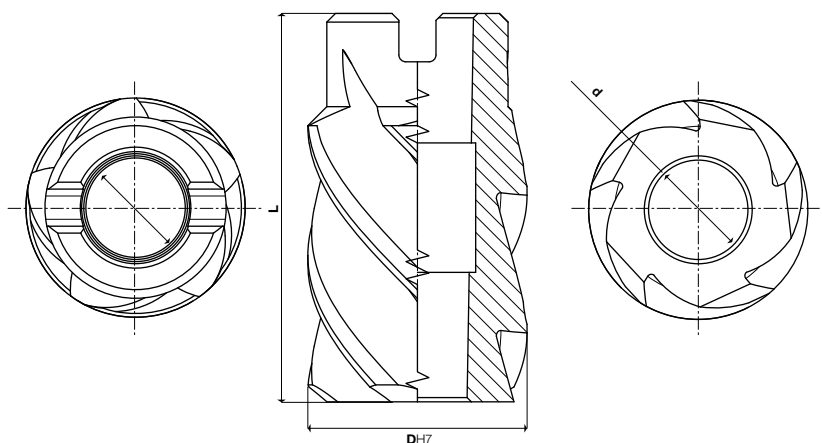


### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI INOSSIDABILI | MATERIALI NON FERROSI | LEGHE LEGGERE | ACCIAI | GHISE     |
|--------|----------|------|---------------------|-----------------------|---------------|--------|-----------|
| series | TITANIUM | HRSA | STAINLESS STEELS    | NON FERROUS MATERIALS | LIGHT ALLOYS  | STEELS | CAST IRON |
| 33105  | ○        | ○    | ●                   | ○                     | ○             | ●      | ●         |

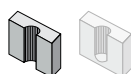
Serie/Series  
**33105**

Alesatori a macchina tipo manicotto foro conico **1:30**  
Shell reamers taper hole **1:30**

Diametri intermedi e tolleranze diverse da H7 si forniscono a richiesta  
In-between diameters and tolerances different from H7 are supplied on request


|             |                   |   |                                  |
|-------------|-------------------|---|----------------------------------|
| COATING     | $\lambda^\circ$ s | N | UNI 6855<br>DIN 219B<br>ISO 2402 |
| <b>Skin</b> | 45                |   |                                  |

| Cod. Art.    | M-TK<br>(HSS-E) | COATED | DH7 | L   | d  | Z  |
|--------------|-----------------|--------|-----|-----|----|----|
| 331050201 AM |                 | AMX    | 20  | 40  | 10 | 5  |
| 331050211 AM |                 | AMX    | 21  | 40  | 10 | 5  |
| 331050221 AM |                 | AMX    | 22  | 40  | 10 | 5  |
| 331050231 AM |                 | AMX    | 23  | 40  | 10 | 5  |
| 331050241 AM |                 | AMX    | 24  | 45  | 13 | 5  |
| 331050251 AM |                 | AMX    | 25  | 45  | 13 | 5  |
| 331050261 AM |                 | AMX    | 26  | 45  | 13 | 5  |
| 331050271 AM |                 | AMX    | 27  | 45  | 13 | 5  |
| 331050281 AM |                 | AMX    | 28  | 45  | 13 | 5  |
| 331050291 AM |                 | AMX    | 29  | 45  | 13 | 6  |
| 331050301 AM |                 | AMX    | 30  | 45  | 13 | 6  |
| 331050311 AM |                 | AMX    | 31  | 50  | 16 | 6  |
| 331050321 AM |                 | AMX    | 32  | 50  | 16 | 6  |
| 331050331 AM |                 | AMX    | 33  | 50  | 16 | 7  |
| 331050341 AM |                 | AMX    | 34  | 50  | 16 | 7  |
| 331050351 AM |                 | AMX    | 35  | 50  | 16 | 7  |
| 331050361 AM |                 | AMX    | 36  | 56  | 19 | 8  |
| 331050371 AM |                 | AMX    | 37  | 56  | 19 | 8  |
| 331050381 AM |                 | AMX    | 38  | 56  | 19 | 8  |
| 331050391 AM |                 | AMX    | 39  | 56  | 19 | 8  |
| 331050401 AM |                 | AMX    | 40  | 56  | 19 | 8  |
| 331050421 AM |                 | AMX    | 42  | 56  | 19 | 8  |
| 331050441 AM |                 | AMX    | 44  | 63  | 22 | 8  |
| 331050451 AM |                 | AMX    | 45  | 63  | 22 | 8  |
| 331050461 AM |                 | AMX    | 46  | 63  | 22 | 8  |
| 331050471 AM |                 | AMX    | 47  | 63  | 22 | 8  |
| 331050481 AM |                 | AMX    | 48  | 63  | 22 | 8  |
| 331050491 AM |                 | AMX    | 49  | 63  | 22 | 8  |
| 331050501 AM |                 | AMX    | 50  | 63  | 22 | 8  |
| 331050521 AM |                 | AMX    | 52  | 71  | 27 | 8  |
| 331050551 AM |                 | AMX    | 55  | 71  | 27 | 8  |
| 331050581 AM |                 | AMX    | 58  | 71  | 27 | 10 |
| 331050601 AM |                 | AMX    | 60  | 71  | 27 | 10 |
| 331050621 AM |                 | AMX    | 62  | 80  | 32 | 10 |
| 331050651 AM |                 | AMX    | 65  | 80  | 32 | 10 |
| 331050681 AM |                 | AMX    | 68  | 80  | 32 | 10 |
| 331050701 AM |                 | AMX    | 70  | 80  | 32 | 10 |
| 331050721 AM |                 | AMX    | 72  | 90  | 40 | 10 |
| 331050751 AM |                 | AMX    | 75  | 90  | 40 | 10 |
| 331050781 AM |                 | AMX    | 78  | 90  | 40 | 10 |
| 331050801 AM |                 | AMX    | 80  | 90  | 40 | 12 |
| 331050821 AM |                 | AMX    | 82  | 90  | 40 | 12 |
| 331050851 AM |                 | AMX    | 85  | 90  | 40 | 12 |
| 331050881 AM |                 | AMX    | 88  | 100 | 50 | 12 |
| 331050901 AM |                 | AMX    | 90  | 100 | 50 | 14 |
| 331050921 AM |                 | AMX    | 92  | 100 | 50 | 14 |
| 331050951 AM |                 | AMX    | 95  | 100 | 50 | 14 |
| 331050981 AM |                 | AMX    | 98  | 100 | 50 | 14 |
| 331051001 AM |                 | AMX    | 100 | 100 | 50 | 14 |


**Z5÷14**


## MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI INOSSIDABILI | MATERIALI NON FERROSI | LEGHE LEGGERE | ACCIAI | GHISE     |
|--------|----------|------|---------------------|-----------------------|---------------|--------|-----------|
| series | TITANIUM | HRSA | STAINLESS STEELS    | NON FERROUS MATERIALS | LIGHT ALLOYS  | STEELS | CAST IRON |
| 33105  | ○        | ○    | ○                   | ○                     | ○             | ●      | ●         |

● consigliata/recommended

● accettabile/acceptable

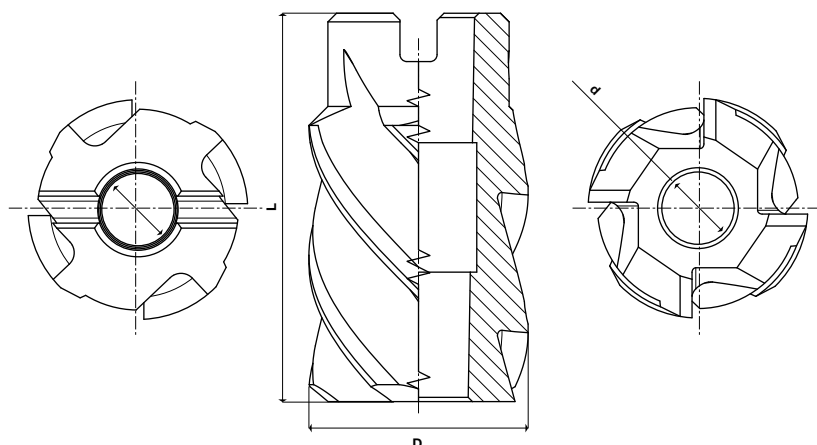
○ non consigliata/not recommended

## Serie/Series 34105

Allargatori a manicotto foro conico 1:30  
Shell drills taper hole 1:30

\*Il diametro è nominale ed è ridotto  
in rapporto alle dimensioni precisamente:  
da 20÷30: -0,3 mm  
da 30÷60: -0,4 mm  
da 62÷100: -0,5 mm

\*Dimension D is reduced as follows:  
from 20÷30: -0,3 mm  
from 30÷60: -0,4 mm  
from 62÷100: -0,5 mm



COATING  
**Skin**

$\lambda^{\circ}\text{s}$   
15

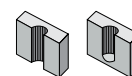
N

UNI 6840  
DIN 222  
ISO 3314

**Z4**

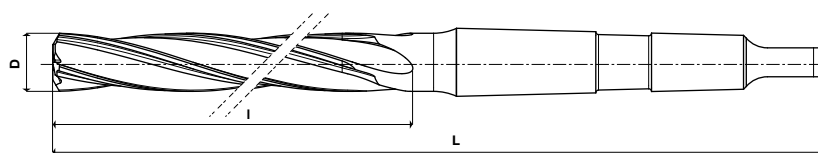


| Cod. Art.    | M-TK<br>(HSS-E) | COATED | D*  | L  | d  | Z |
|--------------|-----------------|--------|-----|----|----|---|
| 341050200 AM |                 | AMX    | 20  | 40 | 10 | 4 |
| 341050210 AM |                 | AMX    | 21  | 40 | 10 | 4 |
| 341050220 AM |                 | AMX    | 22  | 40 | 10 | 4 |
| 341050230 AM |                 | AMX    | 23  | 40 | 10 | 4 |
| 341050240 AM |                 | AMX    | 24  | 45 | 13 | 4 |
| 341050250 AM |                 | AMX    | 25  | 45 | 13 | 4 |
| 341050260 AM |                 | AMX    | 26  | 45 | 13 | 4 |
| 341050270 AM |                 | AMX    | 27  | 45 | 13 | 4 |
| 341050280 AM |                 | AMX    | 28  | 45 | 13 | 4 |
| 341050290 AM |                 | AMX    | 29  | 45 | 13 | 4 |
| 341050300 AM |                 | AMX    | 30  | 45 | 13 | 4 |
| 341050310 AM |                 | AMX    | 31  | 45 | 13 | 4 |
| 341050320 AM |                 | AMX    | 32  | 45 | 13 | 4 |
| 341050330 AM |                 | AMX    | 33  | 45 | 13 | 4 |
| 341050340 AM |                 | AMX    | 34  | 45 | 13 | 4 |
| 341050350 AM |                 | AMX    | 35  | 45 | 13 | 4 |
| 341050360 AM |                 | AMX    | 36  | 50 | 16 | 4 |
| 341050370 AM |                 | AMX    | 37  | 50 | 16 | 4 |
| 341050380 AM |                 | AMX    | 38  | 50 | 16 | 4 |
| 341050390 AM |                 | AMX    | 39  | 50 | 16 | 4 |
| 341050400 AM |                 | AMX    | 40  | 50 | 16 | 4 |
| 341050420 AM |                 | AMX    | 42  | 50 | 16 | 4 |
| 341050440 AM |                 | AMX    | 44  | 50 | 16 | 4 |
| 341050450 AM |                 | AMX    | 45  | 50 | 16 | 4 |
| 341050460 AM |                 | AMX    | 46  | 56 | 19 | 4 |
| 341050470 AM |                 | AMX    | 47  | 56 | 19 | 4 |
| 341050480 AM |                 | AMX    | 48  | 56 | 19 | 4 |
| 341050490 AM |                 | AMX    | 49  | 56 | 19 | 4 |
| 341050500 AM |                 | AMX    | 50  | 56 | 19 | 4 |
| 341050520 AM |                 | AMX    | 52  | 56 | 19 | 4 |
| 341050550 AM |                 | AMX    | 55  | 63 | 22 | 4 |
| 341050580 AM |                 | AMX    | 58  | 63 | 22 | 4 |
| 341050600 AM |                 | AMX    | 60  | 63 | 22 | 4 |
| 341050620 AM |                 | AMX    | 62  | 63 | 22 | 4 |
| 341050650 AM |                 | AMX    | 65  | 71 | 27 | 4 |
| 341050680 AM |                 | AMX    | 68  | 71 | 27 | 4 |
| 341050700 AM |                 | AMX    | 70  | 71 | 27 | 4 |
| 341050720 AM |                 | AMX    | 72  | 71 | 27 | 4 |
| 341050750 AM |                 | AMX    | 75  | 71 | 27 | 4 |
| 341050780 AM |                 | AMX    | 78  | 80 | 32 | 4 |
| 341050800 AM |                 | AMX    | 80  | 80 | 32 | 4 |
| 341050820 AM |                 | AMX    | 82  | 80 | 32 | 4 |
| 341050850 AM |                 | AMX    | 85  | 80 | 32 | 4 |
| 341050880 AM |                 | AMX    | 88  | 80 | 32 | 4 |
| 341050900 AM |                 | AMX    | 90  | 80 | 32 | 4 |
| 341050920 AM |                 | AMX    | 92  | 90 | 40 | 4 |
| 341050950 AM |                 | AMX    | 95  | 90 | 40 | 4 |
| 341050980 AM |                 | AMX    | 98  | 90 | 40 | 4 |
| 341051000 AM |                 | AMX    | 100 | 90 | 40 | 4 |



### MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie  | TITANIO  | HRSA | ACCIAI INOSSIDABILI | MATERIALI NON FERROSI | LEGHE LEGGERE | ACCIAI | GHISE     |
|--------|----------|------|---------------------|-----------------------|---------------|--------|-----------|
| series | TITANIUM | HRSA | STAINLESS STEELS    | NON FERROUS MATERIALS | LIGHT ALLOYS  | STEELS | CAST IRON |
| 34105  | ○        | ○    | ●                   | ○                     | ○             | ●      | ●         |



COATING

**Skin**

$\lambda^{\circ}\text{S}$   
20

N

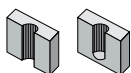
UNI 6829  
DIN 343  
ISO 7079

HSS-PM  
**HSS-PM Line**

Serie/Series  
**34150**

Allargatori  
Core drills

| Cod. Art.    | M-TK<br>(HSS-E) | COATED | D* | I   | L   | MORSE<br>TAPER | Z |
|--------------|-----------------|--------|----|-----|-----|----------------|---|
| 341500900 AM | AMX             |        | 9  | 81  | 162 | 1              | 4 |
| 341501000 AM | AMX             |        | 10 | 87  | 168 | 1              | 4 |
| 341501100 AM | AMX             |        | 11 | 94  | 175 | 1              | 4 |
| 341501200 AM | AMX             |        | 12 | 101 | 182 | 1              | 4 |
| 341501300 AM | AMX             |        | 13 | 101 | 182 | 1              | 4 |
| 341501400 AM | AMX             |        | 14 | 108 | 189 | 1              | 4 |
| 341501500 AM | AMX             |        | 15 | 114 | 212 | 2              | 4 |
| 341501600 AM | AMX             |        | 16 | 120 | 218 | 2              | 4 |
| 341501700 AM | AMX             |        | 17 | 125 | 223 | 2              | 4 |
| 341501800 AM | AMX             |        | 18 | 130 | 228 | 2              | 4 |
| 341501900 AM | AMX             |        | 19 | 135 | 233 | 2              | 4 |
| 341502000 AM | AMX             |        | 20 | 140 | 238 | 2              | 4 |
| 341502100 AM | AMX             |        | 21 | 145 | 243 | 2              | 4 |
| 341502200 AM | AMX             |        | 22 | 150 | 248 | 2              | 4 |
| 341502300 AM | AMX             |        | 23 | 155 | 253 | 2              | 4 |
| 341502400 AM | AMX             |        | 24 | 160 | 281 | 3              | 4 |
| 341502500 AM | AMX             |        | 25 | 160 | 281 | 3              | 4 |
| 341502600 AM | AMX             |        | 26 | 165 | 286 | 3              | 4 |
| 341502700 AM | AMX             |        | 27 | 170 | 291 | 3              | 4 |
| 341502800 AM | AMX             |        | 28 | 170 | 291 | 3              | 4 |
| 341502900 AM | AMX             |        | 29 | 175 | 296 | 3              | 4 |
| 341503000 AM | AMX             |        | 30 | 175 | 296 | 3              | 4 |
| 341503100 AM | AMX             |        | 31 | 180 | 301 | 3              | 4 |
| 341503200 AM | AMX             |        | 32 | 185 | 334 | 4              | 4 |
| 341503300 AM | AMX             |        | 33 | 185 | 334 | 4              | 4 |
| 341503400 AM | AMX             |        | 34 | 190 | 339 | 4              | 4 |
| 341503500 AM | AMX             |        | 35 | 190 | 339 | 4              | 4 |
| 341503600 AM | AMX             |        | 36 | 195 | 344 | 4              | 4 |
| 341503700 AM | AMX             |        | 37 | 195 | 344 | 4              | 4 |
| 341503800 AM | AMX             |        | 38 | 200 | 349 | 4              | 4 |
| 341503900 AM | AMX             |        | 39 | 200 | 349 | 4              | 4 |
| 341504000 AM | AMX             |        | 40 | 200 | 349 | 4              | 4 |



\*Il diametro è nominale ed è ridotto in rapporto alle dimensioni precisamente:

da 9÷12: -0,2 mm  
da 13÷19: -0,25 mm  
da 20÷30: -0,3 mm  
da 31÷40: -0,4 mm

\*Dimension D is reduced as follows:

from 9÷12: -0,2 mm  
from 13÷19: -0,25 mm  
from 20÷30: -0,3 mm  
from 31÷40: -0,4 mm  
from 62÷100: -0,5 mm

**Z4**

Cono Morse  
Morse Taper

MATERIALI LAVORABILI / WORKPIECE MATERIALS

| serie<br>series | TITANIO<br>TITANIUM | HRSA<br>HRSA | ACCIAI<br>INOSSIDABILI<br>STAINLESS<br>STEELS | MATERIALI<br>NON FERROSI<br>NON FERROUS<br>MATERIALS | LEGHE<br>LEGGERE<br>LIGHT ALLOYS | ACCIAI<br>STEELS | GHISE<br>CAST IRON |
|-----------------|---------------------|--------------|-----------------------------------------------|------------------------------------------------------|----------------------------------|------------------|--------------------|
| 34150           | ○                   | ○            | ●                                             | ○                                                    | ○                                | ●                | ●                  |

● consigliata/recommended

● accettabile/acceptable

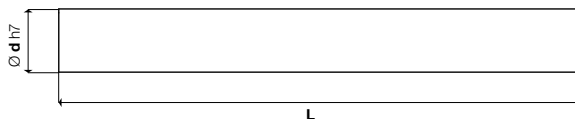
○ non consigliata/not recommended

WWW.UOP.IT

115

Serie/Series  
**08105**

Barrette tonde  
Round toolbits



UNI 3868  
DIN  
ISO

QUALITY  
STANDARD  
UOP



| Cod. Art. | X-85<br>(PM Co 8,5%) | X-105<br>(PM Co 10,5%) | dh7 | L   |
|-----------|----------------------|------------------------|-----|-----|
| 081050310 | CM                   | -                      | 3   | 100 |
| 081050410 | CM                   | -                      | 4   | 100 |
| 081050415 | CM                   | -                      | 4   | 150 |
| 081050420 | CM                   | -                      | 4   | 200 |
| 081050510 | CM                   | -                      | 5   | 100 |
| 081050515 | CM                   | -                      | 5   | 150 |
| 081050520 | CM                   | -                      | 5   | 200 |
| 081050610 | CM                   | EM                     | 6   | 100 |
| 081050615 | CM                   | EM                     | 6   | 150 |
| 081050620 | CM                   | EM                     | 6   | 200 |
| 081050810 | CM                   | EM                     | 8   | 100 |
| 081050815 | CM                   | EM                     | 8   | 150 |
| 081050820 | CM                   | EM                     | 8   | 200 |
| 081051010 | CM                   | EM                     | 10  | 100 |
| 081051015 | CM                   | EM                     | 10  | 150 |
| 081051020 | CM                   | EM                     | 10  | 200 |
| 081051210 | CM                   | EM                     | 12  | 100 |
| 081051215 | CM                   | EM                     | 12  | 150 |
| 081051220 | CM                   | EM                     | 12  | 200 |
| 081051410 | CM                   | EM                     | 14  | 100 |
| 081051415 | CM                   | EM                     | 14  | 150 |
| 081051420 | CM                   | EM                     | 14  | 200 |
| 081051610 | CM                   | EM                     | 16  | 100 |
| 081051615 | CM                   | EM                     | 16  | 150 |
| 081051620 | CM                   | EM                     | 16  | 200 |
| 081051810 | CM                   | EM                     | 18  | 100 |
| 081051815 | CM                   | EM                     | 18  | 150 |
| 081051820 | CM                   | EM                     | 18  | 200 |
| 081052010 | CM                   | EM                     | 20  | 100 |
| 081052015 | CM                   | EM                     | 20  | 150 |
| 081052020 | CM                   | EM                     | 20  | 200 |
| 081052510 | CM                   | EM                     | 25  | 100 |
| 081052515 | CM                   | EM                     | 25  | 150 |
| 081052520 | CM                   | EM                     | 25  | 200 |
| 081053010 | CM                   | EM                     | 30  | 100 |
| 081053015 | CM                   | EM                     | 30  | 150 |
| 081053020 | CM                   | EM                     | 30  | 200 |
| 081053030 | CM                   | EM                     | 30  | 300 |





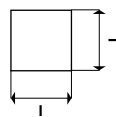
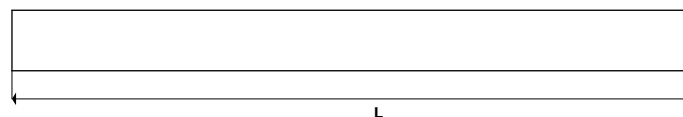
Serie/Series

**08110**

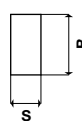
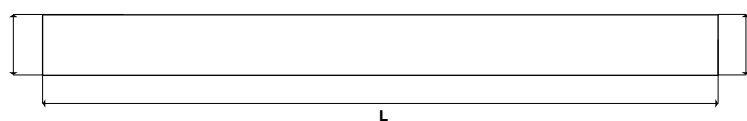
Barrette quadre  
Square toolbits

**08115**

Barrette rettangolari  
Flat toolbits



| Cod. Art. | X-105<br>(PM Co 10,5%) | I h14 | L   |
|-----------|------------------------|-------|-----|
| 081100615 | EM                     | 6     | 150 |
| 081100620 | EM                     | 6     | 200 |
| 081100715 | EM                     | 7     | 150 |
| 081100720 | EM                     | 7     | 200 |
| 081100815 | EM                     | 8     | 150 |
| 081100820 | EM                     | 8     | 200 |
| 081101015 | EM                     | 10    | 150 |
| 081101020 | EM                     | 10    | 200 |
| 081101215 | EM                     | 12    | 150 |
| 081101220 | EM                     | 12    | 200 |
| 081101420 | EM                     | 14    | 200 |
| 081101520 | EM                     | 15    | 200 |
| 081101620 | EM                     | 16    | 200 |
| 081101820 | EM                     | 18    | 200 |
| 081102020 | EM                     | 20    | 200 |
| 081102520 | EM                     | 25    | 200 |

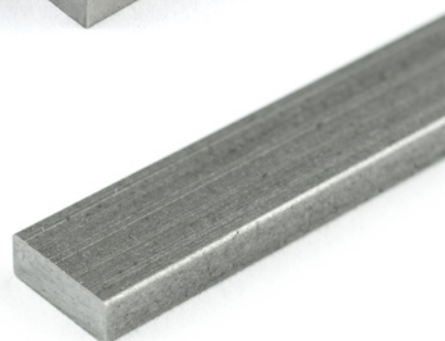


| Cod. Art. | X-105<br>(PM Co 10,5%) | B h14 | S h14 | L   |
|-----------|------------------------|-------|-------|-----|
| 081151208 | EM                     | 12    | 8     | 200 |
| 081151503 | EM                     | 15    | 3     | 200 |
| 081151610 | EM                     | 16    | 10    | 200 |
| 081151804 | EM                     | 18    | 4     | 200 |
| 081152003 | EM                     | 20    | 3     | 200 |
| 081152004 | EM                     | 20    | 4     | 200 |
| 081152012 | EM                     | 20    | 12    | 200 |
| 081152504 | EM                     | 25    | 4     | 200 |
| 081152515 | EM                     | 25    | 15    | 200 |

Serie/Series 08110



Serie/Series 08115

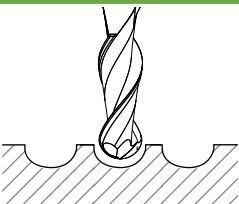
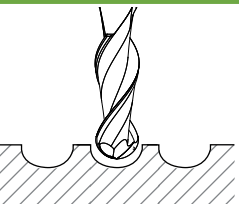




# Parametri tecnici

## *Technical parameters*

# Parametri di taglio/Cutting parameters

|                                                                                 |                                                    |                                                                                   |                                                                                    |                                   |                                                                                     |                                   |                         |
|---------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|-----------------------------------|-------------------------|
|                                                                                 |                                                    | 10102 - 10105<br>10110 - 10125*                                                   | 10140 - 10155*                                                                     |                                   | 12505 - 12520*                                                                      |                                   |                         |
| Materiali<br>Materials                                                          |                                                    | Cava<br>Slotting<br>$ap = 0,5\phi$ $ae = 1\phi$                                   | Sgrossatura<br>Roughing<br>$ap = 0,4\phi$ $ae = 0,9\phi$                           |                                   | Sgrossatura<br>Roughing<br>$ap = 0,4\phi$ $ae = 0,9\phi$                            |                                   |                         |
|                                                                                 |                                                    |  |  |                                   |  |                                   |                         |
| Gruppo e descrizione<br>Group and description                                   |                                                    | Vc (mt /min.)                                                                     |                                                                                    | Vc (mt /min.)                     |                                                                                     | Vc (mt /min.)                     |                         |
|                                                                                 |                                                    | X-85<br>NON RIVESTITA<br>UNCOATED                                                 | X-85<br><b>Skin</b>                                                                | X-85<br>NON RIVESTITA<br>UNCOATED | X-85<br><b>Skin</b>                                                                 | X-85<br>NON RIVESTITA<br>UNCOATED | X-85<br><b>Skin</b> Alu |
| Ghisa<br>Cast Iron                                                              | Grigia e sferoidale<br>Grey and spheroidal         | 20 - 25                                                                           | 45 - 50                                                                            | 20 - 25                           | 45 - 50                                                                             | —                                 | —                       |
|                                                                                 | Basso contenuto di C<br>Low carbon content         | 30 - 35                                                                           | 60 - 70                                                                            | 30 - 35                           | 60 - 70                                                                             | —                                 | —                       |
|                                                                                 | Medio contenuto di C<br>Medium carbon content      | 25 - 30                                                                           | 50 - 60                                                                            | 25 - 30                           | 50 - 60                                                                             | —                                 | —                       |
| Acciaio<br>Steel                                                                | Basso legato<br>Low alloyed                        | 25 - 30                                                                           | 50 - 60                                                                            | 25 - 30                           | 50 - 60                                                                             | —                                 | —                       |
|                                                                                 | Alto legato<br>High alloyed                        | 20 - 25                                                                           | 40 - 50                                                                            | 20 - 25                           | 40 - 50                                                                             | —                                 | —                       |
|                                                                                 | Acciaio da stampi e utensili<br>Die/tool steel     | 15 - 20                                                                           | 30 - 40                                                                            | 15 - 20                           | 30 - 40                                                                             | —                                 | —                       |
| Materiali non ferrosi<br>Leghe leggere<br>Non ferrous materials<br>Light alloys | Alluminio non legato<br>Unalloyed aluminium        | —                                                                                 | —                                                                                  | —                                 | —                                                                                   | 110 - 120                         | 250 - 260               |
|                                                                                 | Alluminio Si < 6%<br>si < 6% aluminium             | —                                                                                 | —                                                                                  | —                                 | —                                                                                   | 70 - 80                           | 170 - 180               |
|                                                                                 | Materiali termoplastici<br>Thermoplastic materials | —                                                                                 | —                                                                                  | —                                 | —                                                                                   | 130 - 140                         | 270 - 280               |
|                                                                                 | Rame/Ottone<br>Copper/Brass                        | 30 - 35                                                                           | 75 - 80                                                                            | 30 - 35                           | 75 - 80                                                                             | 30 - 35                           | 75 - 80                 |

|    |                                    |       |       |
|----|------------------------------------|-------|-------|
| D  | Avanzamento fz mm/giro FEED mm/rpm |       |       |
| 3  | 0,009                              | 0,009 | 0,006 |
| 4  | 0,013                              | 0,012 | 0,010 |
| 5  | 0,015                              | 0,016 | 0,015 |
| 6  | 0,018                              | 0,018 | 0,020 |
| 8  | 0,025                              | 0,025 | 0,035 |
| 10 | 0,030                              | 0,035 | 0,050 |
| 12 | 0,040                              | 0,050 | 0,070 |
| 16 | 0,065                              | 0,090 | 0,120 |
| 20 | 0,090                              | 0,110 | 0,145 |

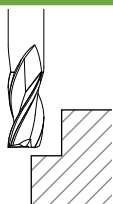
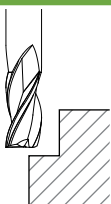
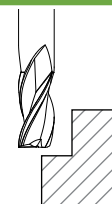
\* series 10125; series 10155; series 12520 fz consigliato | RECOMMENDED -50%

# Parametri di taglio/Cutting parameters

|                                                                  |                                                                                   |                                                                                   |                                                                                     |                                                                                               |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
|                                                                  | 11405<br>12105<br>12120*                                                          | 11405<br>12105<br>12120*                                                          | 11405<br>12105<br>12120*                                                            | 11405<br>12105<br>12120*                                                                      |
| <b>Materiali</b><br><i>Materials</i>                             | <b>Cava</b><br><i>Slotting</i><br>$ap = 1\phi \quad ae = 1\phi$                   | <b>Sgrossatura</b><br><i>Roughing</i><br>$ap = 0,5\phi \quad ae = 0,1\phi$        | <b>Sgrossatura</b><br><i>Roughing</i><br>$ap = 1,5\phi \quad ae = 0,5\phi$          | <b>Contornatura leggera</b><br><i>Light shouldering</i><br>$ap = 1,5\phi \quad ae = 0,15\phi$ |
|                                                                  |  |  |  |            |
| <b>Gruppo e descrizione</b><br><i>Group and description</i>      | <b>Vc (mt/min.)</b>                                                               |                                                                                   | <b>Vc (mt/min.)</b>                                                                 |                                                                                               |
|                                                                  | <b>X-85</b><br>NON RIVESTITA<br>UNCOATED                                          | <b>X-85</b><br><i>Skin Alu</i>                                                    | <b>X-85</b><br>NON RIVESTITA<br>UNCOATED                                            | <b>X-85</b><br><i>Skin Alu</i>                                                                |
| <b>Alluminio non legato</b><br><i>Unalloyed aluminium</i>        | 110 - 120                                                                         | 250 - 260                                                                         | 110 - 120                                                                           | 250 - 260                                                                                     |
| <b>Alluminio Si &lt; 6%</b><br><i>si &lt; 6% aluminium</i>       | 70 - 80                                                                           | 170 - 180                                                                         | 70 - 80                                                                             | 170 - 180                                                                                     |
| <b>Materiali termoplastici</b><br><i>Thermoplastic materials</i> | 130 - 140                                                                         | 270 - 280                                                                         | 130 - 140                                                                           | 270 - 280                                                                                     |
| <b>Rame/Ottone</b><br><i>Copper/Brass</i>                        | 30 - 35                                                                           | 75 - 80                                                                           | 30 - 35                                                                             | 75 - 80                                                                                       |
| <b>Avanzamento fz mm/giro FEED mm/rpm</b>                        |                                                                                   |                                                                                   |                                                                                     |                                                                                               |
| <b>D</b>                                                         |                                                                                   |                                                                                   |                                                                                     |                                                                                               |
| 3                                                                | 0,007                                                                             | 0,007                                                                             | 0,007                                                                               | 0,007                                                                                         |
| 4                                                                | 0,008                                                                             | 0,010                                                                             | 0,008                                                                               | 0,010                                                                                         |
| 5                                                                | 0,010                                                                             | 0,016                                                                             | 0,010                                                                               | 0,016                                                                                         |
| 6                                                                | 0,012                                                                             | 0,020                                                                             | 0,012                                                                               | 0,020                                                                                         |
| 8                                                                | 0,016                                                                             | 0,032                                                                             | 0,016                                                                               | 0,030                                                                                         |
| 10                                                               | 0,022                                                                             | 0,045                                                                             | 0,022                                                                               | 0,040                                                                                         |
| 12                                                               | 0,030                                                                             | 0,060                                                                             | 0,024                                                                               | 0,050                                                                                         |
| 16                                                               | 0,036                                                                             | 0,100                                                                             | 0,030                                                                               | 0,080                                                                                         |
| 20                                                               | 0,045                                                                             | 0,120                                                                             | 0,036                                                                               | 0,105                                                                                         |

\* series **12120** fz consigliato | RECOMMENDED -50%

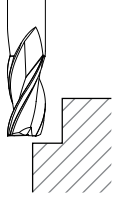
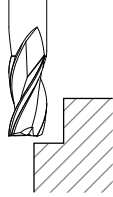
# Parametri di taglio/Cutting parameters

|                                                                                 |                                                    |                                                                                   |                     |                                                                                    |                     |                                                                                     |                     |
|---------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------|---------------------|
|                                                                                 |                                                    | 14105<br>14120*<br>14135**                                                        |                     | 14505<br>14520*                                                                    |                     | 14505<br>14520*                                                                     |                     |
|                                                                                 |                                                    | Contornatura<br>Shouldering<br><i>ap = 1,5ø ae = 0,15ø</i>                        |                     | Contornatura<br>Shouldering<br><i>ap = 1,5ø ae = 0,15ø</i>                         |                     | Contornatura<br>Shouldering<br><i>ap = 1,5ø ae = 0,5ø</i>                           |                     |
|                                                                                 |                                                    |  |                     |  |                     |  |                     |
|                                                                                 |                                                    | Vc (mt /min.)                                                                     |                     | Vc (mt /min.)                                                                      |                     | Vc (mt /min.)                                                                       |                     |
|                                                                                 |                                                    | X-85<br>NON RIVESTITA<br>UNCOATED                                                 | X-85<br><b>Skin</b> | X-85<br>NON RIVESTITA<br>UNCOATED                                                  | X-85<br><b>Skin</b> | X-85<br>NON RIVESTITA<br>UNCOATED                                                   | X-85<br><b>Skin</b> |
| Ghisa<br>Cast Iron                                                              | Grigia e sferoidale<br>Grey and spheroidal         | 20 - 25                                                                           | 45 - 50             | 20 - 25                                                                            | 45 - 50             | 20 - 25                                                                             | 45 - 50             |
|                                                                                 | Basso contenuto di C<br>Low carbon content         | 30 - 35                                                                           | 60 - 70             | 30 - 35                                                                            | 60 - 70             | 30 - 35                                                                             | 60 - 70             |
|                                                                                 | Medio contenuto di C<br>Medium carbon content      | 25 - 30                                                                           | 50 - 60             | 25 - 30                                                                            | 50 - 60             | 25 - 30                                                                             | 50 - 60             |
| Acciaio<br>Steel                                                                | Basso legato<br>Low alloyed                        | 25 - 30                                                                           | 50 - 60             | 25 - 30                                                                            | 50 - 60             | 25 - 30                                                                             | 50 - 60             |
|                                                                                 | Alto legato<br>High alloyed                        | 20 - 25                                                                           | 40 - 50             | 20 - 25                                                                            | 40 - 50             | 20 - 25                                                                             | 40 - 50             |
|                                                                                 | Acciaio da stampi e utensili<br>Die/tool steel     | 15 - 20                                                                           | 30 - 40             | 15 - 20                                                                            | 30 - 40             | 15 - 20                                                                             | 30 - 40             |
| Materiali non ferrosi<br>Leghe leggere<br>Non ferrous materials<br>Light alloys | Alluminio non legato<br>Unalloyed aluminium        | —                                                                                 | —                   | —                                                                                  | —                   | —                                                                                   | —                   |
|                                                                                 | Alluminio Si < 6%<br>si < 6% aluminium             | —                                                                                 | —                   | —                                                                                  | —                   | —                                                                                   | —                   |
|                                                                                 | Materiali termoplastici<br>Thermoplastic materials | —                                                                                 | —                   | —                                                                                  | —                   | —                                                                                   | —                   |
|                                                                                 | Rame/Ottone<br>Copper/Brass                        | 30 - 35                                                                           | 75 - 80             | 30 - 35                                                                            | 75 - 80             | 30 - 35                                                                             | 75 - 80             |
|                                                                                 | D                                                  | Avanzamento fz mm/giro FEED mm/rpm                                                |                     |                                                                                    |                     |                                                                                     |                     |
|                                                                                 | 3                                                  | 0,010                                                                             |                     |                                                                                    |                     | 0,010                                                                               |                     |
|                                                                                 | 4                                                  | 0,015                                                                             |                     |                                                                                    |                     | 0,015                                                                               |                     |
|                                                                                 | 5                                                  | 0,020                                                                             |                     |                                                                                    |                     | 0,020                                                                               |                     |
|                                                                                 | 6                                                  | 0,025                                                                             |                     |                                                                                    |                     | 0,023                                                                               |                     |
|                                                                                 | 8                                                  | 0,035                                                                             |                     |                                                                                    |                     | 0,024                                                                               |                     |
|                                                                                 | 10                                                 | 0,045                                                                             |                     |                                                                                    |                     | 0,030                                                                               |                     |
|                                                                                 | 12                                                 | 0,056                                                                             |                     |                                                                                    |                     | 0,035                                                                               |                     |
|                                                                                 | 16                                                 | 0,090                                                                             |                     |                                                                                    |                     | 0,054                                                                               |                     |
|                                                                                 | 20                                                 | 0,120                                                                             |                     |                                                                                    |                     | 0,070                                                                               |                     |

\* series **14120**; series **14120** fz consigliato | RECOMMENDED -30%

\*\* series **14135** fz consigliato | RECOMMENDED -50%

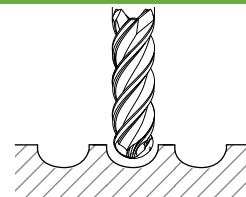
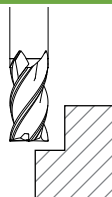
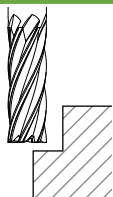
# Parametri di taglio/Cutting parameters

|                                                                  |                                                                                   |                                |                                                                                   |                                |                                                                                     |                                |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|--------------------------------|
|                                                                  | 14805<br>14820*                                                                   |                                | 14805<br>14820*                                                                   |                                | 14805<br>14820*                                                                     |                                |
| <b>Materiali</b><br><i>Materials</i>                             | <b>Cava</b><br><i>Shouldering</i><br>$ap = 1\phi \quad ae = 1\phi$                |                                | <b>Contornatura</b><br><i>Shouldering</i><br>$ap = 1,5\phi \quad ae = 0,15\phi$   |                                | <b>Contornatura</b><br><i>Shouldering</i><br>$ap = 1,5\phi \quad ae = 0,5\phi$      |                                |
|                                                                  |  |                                |  |                                |  |                                |
| <b>Gruppo e descrizione</b><br><i>Group and description</i>      | <b>Vc (mt /min.)</b>                                                              |                                | <b>Vc (mt /min.)</b>                                                              |                                | <b>Vc (mt /min.)</b>                                                                |                                |
|                                                                  | <b>X-85</b><br>NON RIVESTITA<br>UNCOATED                                          | <b>X-85</b><br><i>Skin Alu</i> | <b>X-85</b><br>NON RIVESTITA<br>UNCOATED                                          | <b>X-85</b><br><i>Skin Alu</i> | <b>X-85</b><br>NON RIVESTITA<br>UNCOATED                                            | <b>X-85</b><br><i>Skin Alu</i> |
| <b>Alluminio non legato</b><br><i>Unalloyed aluminium</i>        | 110 - 120                                                                         | 250 - 260                      | 110 - 120                                                                         | 250 - 260                      | 110 - 120                                                                           | 250 - 260                      |
| <b>Alluminio Si &lt; 6%</b><br><i>si &lt; 6% aluminium</i>       | 70 - 80                                                                           | 170 - 180                      | 70 - 80                                                                           | 170 - 180                      | 70 - 80                                                                             | 170 - 180                      |
| <b>Materiali termoplastici</b><br><i>Thermoplastic materials</i> | 130 - 140                                                                         | 270 - 280                      | 130 - 140                                                                         | 270 - 280                      | 130 - 140                                                                           | 270 - 280                      |
| <b>Rame/Ottone</b><br><i>Copper/Brass</i>                        | 30 - 35                                                                           | 75 - 80                        | 30 - 35                                                                           | 75 - 80                        | 30 - 35                                                                             | 75 - 80                        |
| <b>Avanzamento fz mm/giro FEED mm/rpm</b>                        |                                                                                   |                                |                                                                                   |                                |                                                                                     |                                |
| <b>D</b>                                                         |                                                                                   |                                |                                                                                   |                                |                                                                                     |                                |
| <b>3</b>                                                         | 0,007                                                                             |                                | 0,007                                                                             |                                | 0,007                                                                               |                                |
| <b>4</b>                                                         | 0,008                                                                             |                                | 0,008                                                                             |                                | 0,010                                                                               |                                |
| <b>5</b>                                                         | 0,010                                                                             |                                | 0,010                                                                             |                                | 0,016                                                                               |                                |
| <b>6</b>                                                         | 0,012                                                                             |                                | 0,012                                                                             |                                | 0,020                                                                               |                                |
| <b>8</b>                                                         | 0,016                                                                             |                                | 0,016                                                                             |                                | 0,030                                                                               |                                |
| <b>10</b>                                                        | 0,022                                                                             |                                | 0,022                                                                             |                                | 0,040                                                                               |                                |
| <b>12</b>                                                        | 0,030                                                                             |                                | 0,024                                                                             |                                | 0,050                                                                               |                                |
| <b>16</b>                                                        | 0,036                                                                             |                                | 0,030                                                                             |                                | 0,080                                                                               |                                |
| <b>20</b>                                                        | 0,045                                                                             |                                | 0,036                                                                             |                                | 0,105                                                                               |                                |

\* series **14820** fz consigliato | RECOMMENDED -50%

# Parametri di taglio/Cutting parameters

|                                      |                                                                             |                                                                             |                                                                        |
|--------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|
|                                      | 17105 - 17120*<br>17135** - 17305<br>17320                                  | 18105                                                                       | 17505<br>17520*                                                        |
| <b>Materiali</b><br><i>Materials</i> | <b>Contornatura</b><br><i>Shouldering</i><br>$ap = 1,5\phi$ $ae = 0,15\phi$ | <b>Contornatura</b><br><i>Shouldering</i><br>$ap = 1,5\phi$ $ae = 0,15\phi$ | <b>Sgrossatura</b><br><i>Roughing</i><br>$ap = 0,4\phi$ $ae = 0,9\phi$ |



| Gruppo e descrizione<br><i>Group and description</i>         | Vc (mt/min.)                      |                     | Vc (mt/min.)                      |                     | Vc (mt/min.)                      |                     |
|--------------------------------------------------------------|-----------------------------------|---------------------|-----------------------------------|---------------------|-----------------------------------|---------------------|
|                                                              | X-85<br>NON RIVESTITA<br>UNCOATED | X-85<br><b>Skin</b> | X-85<br>NON RIVESTITA<br>UNCOATED | X-85<br><b>Skin</b> | X-85<br>NON RIVESTITA<br>UNCOATED | X-85<br><b>Skin</b> |
| <b>Griglia e sferoidale</b><br><i>Grey and spheroidal</i>    | 20 - 25                           | 45 - 50             | 20 - 25                           | 45 - 50             | 20 - 25                           | 45 - 50             |
| <b>Basso contenuto di C</b><br><i>Low carbon content</i>     | 30 - 35                           | 60 - 70             | 30 - 35                           | 60 - 70             | 30 - 35                           | 60 - 70             |
| <b>Medio contenuto di C</b><br><i>Medium carbon content</i>  | 25 - 30                           | 50 - 60             | 25 - 30                           | 50 - 60             | 25 - 30                           | 50 - 60             |
| <b>Basso legato</b><br><i>Low alloyed</i>                    | 25 - 30                           | 50 - 60             | 25 - 30                           | 50 - 60             | 25 - 30                           | 50 - 60             |
| <b>Alto legato</b><br><i>High alloyed</i>                    | 20 - 25                           | 40 - 50             | 20 - 25                           | 40 - 50             | 20 - 25                           | 40 - 50             |
| <b>Acciaio da stampi e utensili</b><br><i>Die/tool steel</i> | 15 - 20                           | 30 - 40             | 15 - 20                           | 30 - 40             | 15 - 20                           | 30 - 40             |
| <b>AISI 304 - 416 - 420</b>                                  | -                                 | -                   | -                                 | 15 - 20             | -                                 | -                   |
| <b>AISI 316 - 440</b>                                        | -                                 | -                   | -                                 | 15 - 20             | -                                 | -                   |
| <b>17-4 ph 15-5 ph</b>                                       | -                                 | -                   | -                                 | 10 - 15             | -                                 | -                   |
| <b>Leghe Cr - Co</b><br><i>Cr - Co alloys</i>                | -                                 | -                   | -                                 | 10 - 15             | -                                 | -                   |
| <b>Duplex F51</b>                                            | -                                 | -                   | -                                 | 5 - 10              | -                                 | -                   |
| <b>Super Duplex F55</b>                                      | -                                 | -                   | -                                 | 5 - 10              | -                                 | -                   |
| <b>HRSA Hastelloy</b>                                        | -                                 | -                   | -                                 | 5 - 10              | -                                 | -                   |
| <b>HRSA Inconel 625</b>                                      | -                                 | -                   | -                                 | 5 - 10              | -                                 | -                   |
| <b>HRSA Inconel 718</b>                                      | -                                 | -                   | -                                 | 5 - 10              | -                                 | -                   |
| <b>HRSA Nimonic</b>                                          | -                                 | -                   | -                                 | 5 - 10              | -                                 | -                   |
| <b>Titanio - Titanium</b>                                    | -                                 | -                   | -                                 | 10 - 15             | -                                 | -                   |
| <b>Leghe di titanio</b><br><i>Titanium alloys</i>            | -                                 | -                   | -                                 | 10 - 15             | -                                 | -                   |

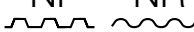
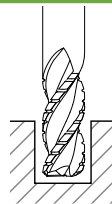
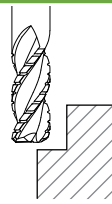
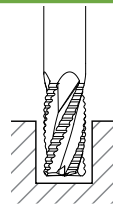
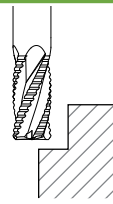
| D  | Avanzamento fz mm/giro FEED mm/rpm |       |
|----|------------------------------------|-------|
| 3  | 0,010                              | 0,007 |
| 4  | 0,015                              | 0,009 |
| 5  | 0,020                              | 0,012 |
| 6  | 0,025                              | 0,014 |
| 8  | 0,035                              | 0,021 |
| 10 | 0,045                              | 0,028 |
| 12 | 0,056                              | 0,038 |
| 16 | 0,090                              | 0,065 |
| 20 | 0,120                              | 0,090 |

\* series **17120**; series **17520** **fz** consigliato | *RECOMMENDED* -30%

\*\* series **17135** **fz** consigliato | *RECOMMENDED* -50%

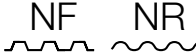
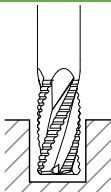
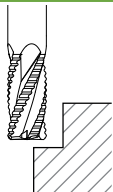
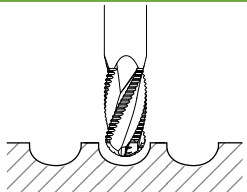


# Parametri di taglio/Cutting parameters

|                                                                                 |                                                    | 15105<br>15120*<br>WF<br> | 15105<br>15120*<br>WF<br> | 21105<br>21120*<br>NF NR<br> | 19105 - 20105<br>20120* - 21105<br>21120*<br>NF NR<br> |                                   |                         |
|---------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------|
| Materiali<br>Materials                                                          |                                                    | Cava<br>Slotting<br>$ap = 1\phi \quad ae = 1\phi$                                                          | Sgrossatura<br>Roughing<br>$ap = 1,5\phi \quad ae = 0,5\phi$                                               | Cava<br>Slotting<br>$ap = 1\phi \quad ae = 1\phi$                                                              | Sgrossatura<br>Roughing<br>$ap = 1,5\phi \quad ae = 0,5\phi$                                                                              |                                   |                         |
|                                                                                 |                                                    |                           |                           |                             |                                                        |                                   |                         |
| Gruppo e descrizione<br>Group and description                                   |                                                    | Vc (mt /min.)                                                                                              |                                                                                                            | Vc (mt /min.)                                                                                                  |                                                                                                                                           | Vc (mt /min.)                     |                         |
|                                                                                 |                                                    | X-85<br>NON RIVESTITA<br>UNCOATED                                                                          | X-85<br><b>Skin</b> Alu                                                                                    | X-85<br>NON RIVESTITA<br>UNCOATED                                                                              | X-85<br><b>Skin</b> Alu                                                                                                                   | X-85<br>NON RIVESTITA<br>UNCOATED | X-85<br><b>Skin</b> Alu |
| Ghisa<br>Cast Iron                                                              | Grigia e sferoidale<br>Grey and spheroidal         | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | 20 - 25                           | 45 - 50                 |
|                                                                                 | Basso contenuto di C<br>Low carbon content         | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | 30 - 35                           | 60 - 70                 |
|                                                                                 | Medio contenuto di C<br>Medium carbon content      | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | 30 - 35                           | 50 - 60                 |
| Acciaio<br>Steel                                                                | Basso legato<br>Low alloyed                        | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | 25 - 30                           | 50 - 60                 |
|                                                                                 | Alto legato<br>High alloyed                        | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | 20 - 30                           | 40 - 50                 |
|                                                                                 | Acciaio da stampi e utensili<br>Die/tool steel     | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | 15 - 20                           | 30 - 40                 |
| Acciaio Inossidabile<br>Stainless Steel                                         | AISI 304 - 416 - 420                               | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 15 - 20                 |
|                                                                                 | AISI 316 - 440                                     | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 15 - 20                 |
|                                                                                 | 17-4 ph 15-5 ph                                    | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 10 - 15                 |
|                                                                                 | Leghe Cr - Co<br>Cr - Co alloys                    | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 10 - 15                 |
|                                                                                 | Duplex F51                                         | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 5 - 10                  |
| Superleghe<br>resistenti al calore<br>Heat Resistant<br>Super Alloys            | Super Duplex F55                                   | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 5 - 10                  |
|                                                                                 | HRSA Hastelloy                                     | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 5 - 10                  |
|                                                                                 | HRSA Inconel 625                                   | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 5 - 10                  |
|                                                                                 | HRSA Inconel 718                                   | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 5 - 10                  |
|                                                                                 | HRSA Nimonic                                       | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 5 - 10                  |
| Ti                                                                              | Titanio - Titanium                                 | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 10 - 15                 |
|                                                                                 | Leghe di titanio<br>Titanium alloys                | —                                                                                                          | —                                                                                                          | —                                                                                                              | —                                                                                                                                         | —                                 | 10 - 15                 |
| Materiali non ferrosi<br>Leghe leggere<br>Non ferrous materials<br>Light alloys | Alluminio non legato<br>Unalloyed aluminium        | 110 - 120                                                                                                  | 250 - 260                                                                                                  | 110 - 120                                                                                                      | 250 - 260                                                                                                                                 | —                                 | —                       |
|                                                                                 | Alluminio Si < 6%<br>si < 6% aluminium             | 70 - 80                                                                                                    | 170 - 180                                                                                                  | 70 - 80                                                                                                        | 170 - 180                                                                                                                                 | —                                 | —                       |
|                                                                                 | Materiali termoplastici<br>Thermoplastic materials | 130 - 140                                                                                                  | 270 - 280                                                                                                  | 130 - 140                                                                                                      | 270 - 280                                                                                                                                 | —                                 | —                       |
|                                                                                 | Rame/Ottone<br>Copper/Brass                        | 30 - 35                                                                                                    | 75 - 80                                                                                                    | 30 - 35                                                                                                        | 75 - 80                                                                                                                                   | —                                 | —                       |
|                                                                                 |                                                    |                                                                                                            |                                                                                                            |                                                                                                                |                                                                                                                                           |                                   |                         |
| D                                                                               |                                                    | Avanzamento fz mm/giro FEED mm/rpm                                                                         |                                                                                                            |                                                                                                                |                                                                                                                                           |                                   |                         |
| 6                                                                               |                                                    | 0,012                                                                                                      |                                                                                                            | 0,025                                                                                                          |                                                                                                                                           | 0,012                             |                         |
| 8                                                                               |                                                    | 0,016                                                                                                      |                                                                                                            | 0,035                                                                                                          |                                                                                                                                           | 0,016                             |                         |
| 10                                                                              |                                                    | 0,022                                                                                                      |                                                                                                            | 0,045                                                                                                          |                                                                                                                                           | 0,022                             |                         |
| 12                                                                              |                                                    | 0,026                                                                                                      |                                                                                                            | 0,055                                                                                                          |                                                                                                                                           | 0,026                             |                         |
| 16                                                                              |                                                    | 0,036                                                                                                      |                                                                                                            | 0,070                                                                                                          |                                                                                                                                           | 0,036                             |                         |
| 20                                                                              |                                                    | 0,045                                                                                                      |                                                                                                            | 0,085                                                                                                          |                                                                                                                                           | 0,045                             |                         |

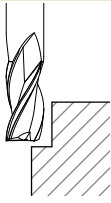
\* series **fz** consigliato | RECOMMENDED -50%

# Parametri di taglio/Cutting parameters

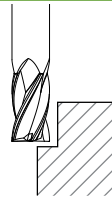
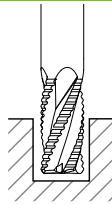
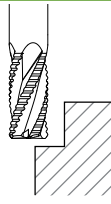
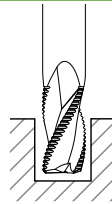
|                                                                                 |                                                    | 21305<br>NR<br>                                       | 21305<br>NR<br>                                                  | 21505<br>21520*<br>NF NR<br>                                     |                         |                                   |                     |
|---------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------|---------------------|
| Materiali<br>Materials                                                          |                                                    | Cava<br>Slotting<br>$ap = 1\phi \quad ae = 1\phi$<br> | Sgrossatura<br>Roughing<br>$ap = 1,5\phi \quad ae = 0,5\phi$<br> | Sgrossatura<br>Roughing<br>$ap = 0,4\phi \quad ae = 0,9\phi$<br> |                         |                                   |                     |
| Gruppo e descrizione<br>Group and description                                   |                                                    | Vc (mt /min.)                                                                                                                          |                                                                                                                                                    | Vc (mt /min.)                                                                                                                                       |                         |                                   |                     |
|                                                                                 |                                                    | X-85<br>NON RIVESTITA<br>UNCOATED                                                                                                      | X-85<br><b>SkinInox</b>                                                                                                                            | X-85<br>NON RIVESTITA<br>UNCOATED                                                                                                                   | X-85<br><b>SkinInox</b> | X-85<br>NON RIVESTITA<br>UNCOATED | X-85<br><b>Skin</b> |
| Ghisa<br>Cast Iron                                                              | Grigia e sferoidale<br>Grey and spheroidal         | 20 - 25                                                                                                                                | 45 - 50                                                                                                                                            | 20 - 25                                                                                                                                             | 45 - 50                 | 20 - 25                           | 45 - 50             |
|                                                                                 | Basso contenuto di C<br>Low carbon content         | 30 - 35                                                                                                                                | 60 - 70                                                                                                                                            | 30 - 35                                                                                                                                             | 60 - 70                 | 30 - 35                           | 60 - 70             |
| Acciaio<br>Steel                                                                | Medio contenuto di C<br>Medium carbon content      | 30 - 35                                                                                                                                | 50 - 60                                                                                                                                            | 30 - 35                                                                                                                                             | 50 - 60                 | 30 - 35                           | 50 - 60             |
|                                                                                 | Basso legato<br>Low alloyed                        | 25 - 30                                                                                                                                | 50 - 60                                                                                                                                            | 25 - 30                                                                                                                                             | 50 - 60                 | 25 - 30                           | 50 - 60             |
|                                                                                 | Alto legato<br>High alloyed                        | 20 - 30                                                                                                                                | 40 - 50                                                                                                                                            | 20 - 30                                                                                                                                             | 40 - 50                 | 20 - 30                           | 40 - 50             |
|                                                                                 | Acciaio da stampi e utensili<br>Die/tool steel     | 15 - 20                                                                                                                                | 30 - 40                                                                                                                                            | 15 - 20                                                                                                                                             | 30 - 40                 | 15 - 20                           | 30 - 40             |
| Acciaio inossidabile<br>Stainless Steel                                         | AISI 304 - 416 - 420                               | —                                                                                                                                      | 15 - 20                                                                                                                                            | —                                                                                                                                                   | 15 - 20                 | —                                 | 15 - 20             |
|                                                                                 | AISI 316 - 440                                     | —                                                                                                                                      | 15 - 20                                                                                                                                            | —                                                                                                                                                   | 15 - 20                 | —                                 | 15 - 20             |
|                                                                                 | 17-4 ph 15-5 ph                                    | —                                                                                                                                      | 10 - 15                                                                                                                                            | —                                                                                                                                                   | 10 - 15                 | —                                 | 10 - 15             |
|                                                                                 | Leghe Cr - Co<br>Cr - Co alloys                    | —                                                                                                                                      | 10 - 15                                                                                                                                            | —                                                                                                                                                   | 10 - 15                 | —                                 | 10 - 15             |
|                                                                                 | Duplex F51                                         | —                                                                                                                                      | 5 - 10                                                                                                                                             | —                                                                                                                                                   | 5 - 10                  | —                                 | 5 - 10              |
|                                                                                 | Super Duplex F55                                   | —                                                                                                                                      | 5 - 10                                                                                                                                             | —                                                                                                                                                   | 5 - 10                  | —                                 | 5 - 10              |
| Superleghe<br>resistenti al calore<br>Heat Resistant<br>Super Alloys            | HRSA Hastelloy                                     | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | 5 - 10              |
|                                                                                 | HRSA Inconel 625                                   | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | 5 - 10              |
|                                                                                 | HRSA Inconel 718                                   | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | 5 - 10              |
|                                                                                 | HRSA Nimonic                                       | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | 5 - 10              |
| Ti                                                                              | Titanio - Titanium                                 | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | 10 - 15             |
|                                                                                 | Leghe di titanio<br>Titanium alloys                | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | 10 - 15             |
| Materiali non ferrosi<br>Leghe leggere<br>Non ferrous materials<br>Light alloys | Alluminio non legato<br>Unalloyed aluminium        | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | —                   |
|                                                                                 | Alluminio Si < 6%<br>si < 6% aluminium             | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | —                   |
|                                                                                 | Materiali termoplastici<br>Thermoplastic materials | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | —                   |
|                                                                                 | Rame/Ottone<br>Copper/Brass                        | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | —                   |
|                                                                                 |                                                    | —                                                                                                                                      | —                                                                                                                                                  | —                                                                                                                                                   | —                       | —                                 | —                   |
| D                                                                               |                                                    | Avanzamento fz mm/giro FEED mm/rpm                                                                                                     |                                                                                                                                                    |                                                                                                                                                     |                         |                                   |                     |
| 6                                                                               |                                                    | 0,013                                                                                                                                  |                                                                                                                                                    | 0,022                                                                                                                                               |                         | 0,014                             |                     |
| 8                                                                               |                                                    | 0,016                                                                                                                                  |                                                                                                                                                    | 0,028                                                                                                                                               |                         | 0,020                             |                     |
| 10                                                                              |                                                    | 0,022                                                                                                                                  |                                                                                                                                                    | 0,035                                                                                                                                               |                         | 0,030                             |                     |
| 12                                                                              |                                                    | 0,026                                                                                                                                  |                                                                                                                                                    | 0,045                                                                                                                                               |                         | 0,040                             |                     |
| 16                                                                              |                                                    | 0,038                                                                                                                                  |                                                                                                                                                    | 0,070                                                                                                                                               |                         | 0,065                             |                     |
| 20                                                                              |                                                    | 0,050                                                                                                                                  |                                                                                                                                                    | 0,090                                                                                                                                               |                         | 0,090                             |                     |

\* series **fz** consigliato | RECOMMENDED -50%

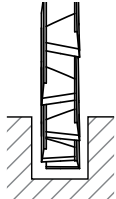
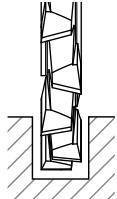
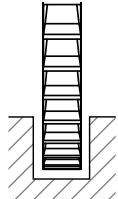
# Parametri di taglio/Cutting parameters

|                                                                                 |                                                    | 10110                                                                             | 14105                                                                               |
|---------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Materiali<br>Materials                                                          |                                                    | Cava<br>Slotting<br>$ap = 0,5\phi$ $ae = 1\phi$                                   | Contornatura<br>Shouldering<br>$ap = 1,5\phi$ $ae = 0,15\phi$                       |
|                                                                                 |                                                    |  |  |
| Gruppo e descrizione<br>Group and description                                   |                                                    | Vc (mt /min.)                                                                     | Vc (mt /min.)                                                                       |
|                                                                                 |                                                    | X-105<br><b>Skin</b>                                                              | X-105<br><b>Skin</b>                                                                |
| Grisa<br>Cast Iron                                                              | Grigia e sferoidale<br>Grey and spheroidal         | 45 - 50                                                                           | 45 - 50                                                                             |
|                                                                                 | Basso contenuto di C<br>Low carbon content         | 70 - 80                                                                           | 70 - 80                                                                             |
| Acciaio<br>Steel                                                                | Medio contenuto di C<br>Medium carbon content      | 70 - 80                                                                           | 70 - 80                                                                             |
|                                                                                 | Basso legato<br>Low alloyed                        | 65 - 75                                                                           | 65 - 75                                                                             |
|                                                                                 | Alto legato<br>High alloyed                        | 50 - 60                                                                           | 50 - 60                                                                             |
|                                                                                 | Acciaio da stampi e utensili<br>Die/tool steel     | 30 - 40                                                                           | 30 - 40                                                                             |
| Acciaio inossidabile<br>Stainless Steel                                         | AISI 304 - 416 - 420                               | 15 - 20                                                                           | 15 - 20                                                                             |
|                                                                                 | AISI 316 - 440                                     | 15 - 20                                                                           | 15 - 20                                                                             |
|                                                                                 | 17-4 ph 15-5 ph                                    | 10 - 15                                                                           | 10 - 15                                                                             |
|                                                                                 | Leghe Cr - Co<br>Cr - Co alloys                    | 10 - 15                                                                           | 10 - 15                                                                             |
|                                                                                 | Duplex F51                                         | 5 - 10                                                                            | 5 - 10                                                                              |
| Superleghe<br>Heat Resistant<br>Super Alloys                                    | Super Duplex F55                                   | 5 - 10                                                                            | 5 - 10                                                                              |
|                                                                                 | HRSA Hastelloy                                     | 5 - 10                                                                            | 5 - 10                                                                              |
|                                                                                 | HRSA Inconel 625                                   | 5 - 10                                                                            | 5 - 10                                                                              |
|                                                                                 | HRSA Inconel 718                                   | 5 - 10                                                                            | 5 - 10                                                                              |
|                                                                                 | HRSA Nimonic                                       | 5 - 10                                                                            | 5 - 10                                                                              |
| Ti                                                                              | Titanio - Titanium                                 | 15 - 20                                                                           | 15 - 20                                                                             |
|                                                                                 | Leghe di titanio<br>Titanium alloys                | 15 - 20                                                                           | 15 - 20                                                                             |
| Materiali non ferrosi<br>Leghe leggere<br>Non ferrous materials<br>Light alloys | Alluminio non legato<br>Unalloyed aluminium        | -                                                                                 | -                                                                                   |
|                                                                                 | Alluminio Si < 6%<br>si < 6% aluminium             | -                                                                                 | -                                                                                   |
|                                                                                 | Materiali termoplastici<br>Thermoplastic materials | -                                                                                 | -                                                                                   |
|                                                                                 | Rame/Ottone<br>Copper/Brass                        | 75 - 85                                                                           | 75 - 85                                                                             |
| D                                                                               |                                                    | Avanzamento fz mm/giro FEED mm/rpm                                                |                                                                                     |
| 6                                                                               |                                                    | 0,018                                                                             | 0,025                                                                               |
| 8                                                                               |                                                    | 0,024                                                                             | 0,035                                                                               |
| 10                                                                              |                                                    | 0,030                                                                             | 0,045                                                                               |
| 12                                                                              |                                                    | 0,040                                                                             | 0,060                                                                               |
| 16                                                                              |                                                    | 0,066                                                                             | 0,090                                                                               |
| 20                                                                              |                                                    | 0,090                                                                             | 0,120                                                                               |

# Parametri di taglio/Cutting parameters

|                                                                                 |                                                    | 17305                                                                             | 18105                                                                             | 21105<br>NR<br> | 21105<br>NR<br> | 22105<br>NRF<br> |
|---------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|                                                                                 | Materiali<br>Materials                             | Contornatura<br>Shouldering<br>$ap = 1,5\phi$<br>$ae = 0,15\phi$                  | Contornatura<br>Shouldering<br>$ap = 1,5\phi$<br>$ae = 0,15\phi$                  | Cava<br>Slotting<br>$ap = 1\phi$<br>$ae = 1\phi$                                                  | Sgrossatura<br>Roughing<br>$ap = 1,5\phi$<br>$ae = 0,5\phi$                                        | Cava<br>Slotting<br>$ap = 1\phi$<br>$ae = 1\phi$                                                    |
|                                                                                 |                                                    |  |  |                 |                 |                  |
|                                                                                 | Gruppo e descrizione<br>Group and description      | Vc (mt /min.)                                                                     | Vc (mt /min.)                                                                     | Vc (mt /min.)                                                                                     | Vc (mt /min.)                                                                                      | Vc (mt /min.)                                                                                       |
|                                                                                 |                                                    | X-105<br><b>Skin</b>                                                              | X-105<br><b>Skin</b>                                                              | X-105<br><b>Skin</b>                                                                              | X-105<br><b>Skin</b>                                                                               | X-105<br><b>Skin</b>                                                                                |
| Ghisa<br>Cast Iron                                                              | Grigia e sferoidale<br>Grey and spheroidal         | 45 - 50                                                                           | 45 - 50                                                                           | 45 - 50                                                                                           | 45 - 50                                                                                            | 45 - 50                                                                                             |
|                                                                                 | Basso contenuto di C<br>Low carbon content         | 70 - 80                                                                           | 70 - 80                                                                           | 70 - 80                                                                                           | 70 - 80                                                                                            | 70 - 80                                                                                             |
|                                                                                 | Medio contenuto di C<br>Medium carbon content      | 70 - 80                                                                           | 70 - 80                                                                           | 70 - 80                                                                                           | 70 - 80                                                                                            | 70 - 80                                                                                             |
| Acciaio<br>Steel                                                                | Basso legato<br>Low alloyed                        | 65 - 75                                                                           | 65 - 75                                                                           | 65 - 75                                                                                           | 65 - 75                                                                                            | 65 - 75                                                                                             |
|                                                                                 | Alto legato<br>High alloyed                        | 50 - 60                                                                           | 50 - 60                                                                           | 50 - 60                                                                                           | 50 - 60                                                                                            | 50 - 60                                                                                             |
|                                                                                 | Acciaio da stampi e utensili<br>Die/tool steel     | 30 - 40                                                                           | 30 - 40                                                                           | 30 - 40                                                                                           | 30 - 40                                                                                            | 30 - 40                                                                                             |
|                                                                                 |                                                    |                                                                                   |                                                                                   |                                                                                                   |                                                                                                    |                                                                                                     |
| Acciaio inossidabile<br>Stainless Steel                                         | AISI 304 - 416 - 420                               | 15 - 20                                                                           | 15 - 20                                                                           | 15 - 20                                                                                           | 15 - 20                                                                                            | 15 - 20                                                                                             |
|                                                                                 | AISI 316 - 440                                     | 15 - 20                                                                           | 15 - 20                                                                           | 15 - 20                                                                                           | 15 - 20                                                                                            | 15 - 20                                                                                             |
|                                                                                 | 17-4 ph 15-5 ph                                    | 10 - 15                                                                           | 10 - 15                                                                           | 10 - 15                                                                                           | 10 - 15                                                                                            | 10 - 15                                                                                             |
|                                                                                 | Leghe Cr - Co<br>Cr - Co alloys                    | 10 - 15                                                                           | 10 - 15                                                                           | 10 - 15                                                                                           | 10 - 15                                                                                            | 10 - 15                                                                                             |
|                                                                                 | Duplex F51                                         | 5 - 10                                                                            | 5 - 10                                                                            | 5 - 10                                                                                            | 5 - 10                                                                                             | 5 - 10                                                                                              |
|                                                                                 | Super Duplex F55                                   | 5 - 10                                                                            | 5 - 10                                                                            | 5 - 10                                                                                            | 5 - 10                                                                                             | 5 - 10                                                                                              |
| Superleghe<br>resistenti al calore<br>Heat Resistant<br>Super Alloys            | HRSA Hastelloy                                     | 5 - 10                                                                            | 5 - 10                                                                            | 5 - 10                                                                                            | 5 - 10                                                                                             | 5 - 10                                                                                              |
|                                                                                 | HRSA Inconel 625                                   | 5 - 10                                                                            | 5 - 10                                                                            | 5 - 10                                                                                            | 5 - 10                                                                                             | 5 - 10                                                                                              |
|                                                                                 | HRSA Inconel 718                                   | 5 - 10                                                                            | 5 - 10                                                                            | 5 - 10                                                                                            | 5 - 10                                                                                             | 5 - 10                                                                                              |
|                                                                                 | HRSA Nimonic                                       | 5 - 10                                                                            | 5 - 10                                                                            | 5 - 10                                                                                            | 5 - 10                                                                                             | 5 - 10                                                                                              |
| Ti                                                                              | Titanio - Titanium                                 | 15 - 20                                                                           | 15 - 20                                                                           | 15 - 20                                                                                           | 15 - 20                                                                                            | 15 - 20                                                                                             |
|                                                                                 | Leghe di titanio<br>Titanium alloys                | 15 - 20                                                                           | 15 - 20                                                                           | 15 - 20                                                                                           | 15 - 20                                                                                            | 15 - 20                                                                                             |
| Materiali non ferrosi<br>Leghe leggere<br>Non ferrous materials<br>Light alloys | Alluminio non legato<br>Unalloyed aluminium        | -                                                                                 | -                                                                                 | -                                                                                                 | -                                                                                                  | -                                                                                                   |
|                                                                                 | Alluminio Si < 6%<br>si < 6% aluminium             | -                                                                                 | -                                                                                 | -                                                                                                 | -                                                                                                  | -                                                                                                   |
|                                                                                 | Materiali termoplastici<br>Thermoplastic materials | -                                                                                 | -                                                                                 | -                                                                                                 | -                                                                                                  | -                                                                                                   |
|                                                                                 | Rame/Ottone<br>Copper/Brass                        | 75 - 85                                                                           | 75 - 85                                                                           | 75 - 85                                                                                           | 75 - 85                                                                                            | 75 - 85                                                                                             |
|                                                                                 |                                                    |                                                                                   |                                                                                   |                                                                                                   |                                                                                                    |                                                                                                     |
| D                                                                               |                                                    | Avanzamento fz mm/giro FEED mm/rpm                                                |                                                                                   |                                                                                                   |                                                                                                    |                                                                                                     |
|                                                                                 | 6                                                  | 0,025                                                                             | 0,025                                                                             | 0,012                                                                                             | 0,025                                                                                              | 0,015                                                                                               |
|                                                                                 | 8                                                  | 0,035                                                                             | 0,035                                                                             | 0,016                                                                                             | 0,035                                                                                              | 0,020                                                                                               |
|                                                                                 | 10                                                 | 0,045                                                                             | 0,045                                                                             | 0,022                                                                                             | 0,045                                                                                              | 0,025                                                                                               |
|                                                                                 | 12                                                 | 0,060                                                                             | 0,060                                                                             | 0,026                                                                                             | 0,055                                                                                              | 0,030                                                                                               |
|                                                                                 | 16                                                 | 0,090                                                                             | 0,090                                                                             | 0,036                                                                                             | 0,070                                                                                              | 0,040                                                                                               |
|                                                                                 | 20                                                 | 0,120                                                                             | 0,120                                                                             | 0,045                                                                                             | 0,085                                                                                              | 0,050                                                                                               |

# Parametri di taglio/Cutting parameters

|                                               |                                                | 04110*                                                                            |                     | 04105*                                                                            |                     | 04105**                                                                             |                     |
|-----------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------|---------------------|
| Materiali<br>Materials                        |                                                | Cava<br>Slotting<br>$ap = 0,1\sigma \quad ae = S$                                 |                     | Cava<br>Slotting<br>$ap = 0,1\sigma \quad ae = S$                                 |                     | Cava<br>Slotting<br>$ap = 0,1\sigma \quad ae = S$                                   |                     |
|                                               |                                                |  |                     |  |                     |  |                     |
| Gruppo e descrizione<br>Group and description |                                                | Vc (mt /min.)                                                                     |                     | Vc (mt /min.)                                                                     |                     | Vc (mt /min.)                                                                       |                     |
|                                               |                                                | X-85<br>NON RIVESTITA<br>UNCOATED                                                 | X-85<br><b>Skin</b> | X-85<br>NON RIVESTITA<br>UNCOATED                                                 | X-85<br><b>Skin</b> | X-85<br>NON RIVESTITA<br>UNCOATED                                                   | X-85<br><b>Skin</b> |
| Ghisa<br>Cast Iron                            | Grigia e sferoidale<br>Grey and spheroidal     | 20 - 25                                                                           | 45 - 50             | 20 - 25                                                                           | 45 - 50             | 20 - 25                                                                             | 45 - 50             |
|                                               | Basso contenuto di C<br>Low carbon content     | 30 - 35                                                                           | 70 - 80             | 30 - 35                                                                           | 70 - 80             | 30 - 35                                                                             | 70 - 80             |
|                                               | Medio contenuto di C<br>Medium carbon content  | 30 - 35                                                                           | 70 - 80             | 30 - 35                                                                           | 70 - 80             | 30 - 35                                                                             | 70 - 80             |
|                                               | Basso legato<br>Low alloyed                    | 25 - 30                                                                           | 70 - 75             | 25 - 30                                                                           | 70 - 75             | 25 - 30                                                                             | 70 - 75             |
|                                               | Alto legato<br>High alloyed                    | 20 - 30                                                                           | 60 - 70             | 20 - 30                                                                           | 60 - 70             | 20 - 30                                                                             | 60 - 70             |
| Acciaio<br>Steel                              | Acciaio da stampi e utensili<br>Die/tool steel | 15 - 20                                                                           | 30 - 40             | 15 - 20                                                                           | 30 - 40             | 15 - 20                                                                             | 30 - 40             |
|                                               | AISI 304 - 416 - 420                           | —                                                                                 | 15 - 20             | —                                                                                 | 15 - 20             | —                                                                                   | 15 - 20             |
|                                               | AISI 316 - 440                                 | —                                                                                 | 15 - 20             | —                                                                                 | 15 - 20             | —                                                                                   | 15 - 20             |
|                                               | 17-4 ph 15-5 ph                                | —                                                                                 | 10 - 15             | —                                                                                 | 10 - 15             | —                                                                                   | 10 - 15             |
|                                               | Leghe Cr - Co<br>Cr - Co alloys                | —                                                                                 | 10 - 15             | —                                                                                 | 10 - 15             | —                                                                                   | 10 - 15             |
| Acciaio inossidabile<br>Stainless Steel       | Duplex F51                                     | —                                                                                 | 5 - 10              | —                                                                                 | 5 - 10              | —                                                                                   | 5 - 10              |
|                                               | Super Duplex F55                               | —                                                                                 | 5 - 10              | —                                                                                 | 5 - 10              | —                                                                                   | 5 - 10              |

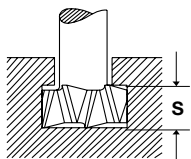
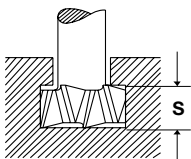
  

| AVANZAMENTO fz mm/tagliente<br>FEED mm/tooth | D   | S       | Avanzamento fz mm/giro FEED mm/rpm |               |               |               |               |               |
|----------------------------------------------|-----|---------|------------------------------------|---------------|---------------|---------------|---------------|---------------|
|                                              | 63  | 1,6÷3,5 | 0,035 ÷ 0,038                      | 0,035 ÷ 0,038 | —             | —             | —             | —             |
|                                              | 80  | 2÷3,5   | 0,041 ÷ 0,044                      | 0,041 ÷ 0,044 | —             | —             | —             | —             |
|                                              | 100 | 2÷3,5   | 0,047 ÷ 0,050                      | 0,047 ÷ 0,050 | —             | —             | —             | —             |
|                                              | 125 | 2÷4     | 0,055 ÷ 0,060                      | 0,055 ÷ 0,060 | —             | —             | —             | —             |
|                                              | 160 | 3÷5     | 0,065                              | 0,065         | —             | —             | —             | —             |
|                                              | 200 | ÷6      | 0,070                              | 0,070         | —             | —             | —             | —             |
|                                              | 250 | 6÷12    | 0,075                              | 0,075         | —             | —             | —             | —             |
|                                              | 50  | 4÷10    | —                                  | —             | 0,040         | 0,040         | 0,025 ÷ 0,030 | 0,025 ÷ 0,030 |
|                                              | 63  | 4÷20    | —                                  | —             | 0,050 ÷ 0,060 | 0,050 ÷ 0,060 | 0,035 ÷ 0,040 | 0,035 ÷ 0,040 |
|                                              | 80  | 4÷20    | —                                  | —             | 0,065 ÷ 0,070 | 0,065 ÷ 0,070 | 0,042 ÷ 0,046 | 0,042 ÷ 0,046 |
|                                              | 100 | 4÷25    | —                                  | —             | 0,075 ÷ 0,085 | 0,075 ÷ 0,085 | 0,048 ÷ 0,054 | 0,048 ÷ 0,054 |
|                                              | 125 | 5÷28    | —                                  | —             | 0,090 ÷ 0,100 | 0,090 ÷ 0,100 | 0,056 ÷ 0,060 | 0,056 ÷ 0,060 |
|                                              | 160 | 6÷32    | —                                  | —             | 0,105 ÷ 0,115 | 0,105 ÷ 0,115 | 0,066 ÷ 0,078 | 0,066 ÷ 0,078 |
|                                              | 200 | 8÷32    | —                                  | —             | 0,120 ÷ 0,125 | 0,120 ÷ 0,125 | 0,084 ÷ 0,096 | 0,084 ÷ 0,096 |
|                                              | 250 | 14÷32   | —                                  | —             | 0,128 ÷ 0,140 | 0,128 ÷ 0,140 | 0,105         | 0,105         |

\* frese a disco a 3 tagli elicoidali alternati | SIDE AND FACE MILLING CUTTERS STAGGERED TEETH

\*\* frese a disco a 3 tagli dritti | SIDE AND FACE MILLING CUTTERS STRAIGHT TEETH

# Parametri di taglio/Cutting parameters

|                                               |                                                | 27120                                                                             | 27135                                                                               |
|-----------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                               |                                                |                                                                                   | NF                                                                                  |
|                                               |                                                |                                                                                   |  |
| Materiali<br>Materials                        |                                                | Cava<br>Slotting<br>$ap = S \quad ae = 1a$                                        | Cava<br>Slotting<br>$ap = S \quad ae = 1a$                                          |
|                                               |                                                |  |  |
| Gruppo e descrizione<br>Group and description |                                                | Vc (mt /min.)                                                                     |                                                                                     |
|                                               |                                                | X-85<br>NON RIVESTITA<br>UNCOATED                                                 | X-85<br><b>Skin</b>                                                                 |
| Ghisa<br>Cast Iron                            | Grigia e sferoidale<br>Grey and spheroidal     | 20 - 25                                                                           | 45 - 50                                                                             |
|                                               | Basso contenuto di C<br>Low carbon content     | 30 - 35                                                                           | 70 - 80                                                                             |
|                                               | Medio contenuto di C<br>Medium carbon content  | 30 - 35                                                                           | 70 - 80                                                                             |
| Acciaio<br>Steel                              | Basso legato<br>Low alloyed                    | 25 - 30                                                                           | 70 - 75                                                                             |
|                                               | Alto legato<br>High alloyed                    | 20 - 30                                                                           | 60 - 70                                                                             |
|                                               | Acciaio da stampi e utensili<br>Die/tool steel | 15 - 20                                                                           | 30 - 40                                                                             |
| Acciaio Inossidabile<br>Stainless Steel       | AISI 304 - 416 - 420                           | —                                                                                 | 15 - 20                                                                             |
|                                               | AISI 316 - 440                                 | —                                                                                 | 15 - 20                                                                             |
|                                               | 17-4 ph 15-5 ph                                | —                                                                                 | 10 - 15                                                                             |
|                                               | Leghe Cr - Co<br>Cr - Co alloys                | —                                                                                 | 10 - 15                                                                             |
|                                               | Duplex F51                                     | —                                                                                 | 5 - 10                                                                              |
|                                               | Super Duplex F55                               | —                                                                                 | 5 - 10                                                                              |

| AVANZAMENTO fz mm/tagliente<br>FEED mm/tooth | D    | S  | Avanzamento fz mm/giro FEED mm/rpm |       |       |       |
|----------------------------------------------|------|----|------------------------------------|-------|-------|-------|
|                                              | 12,5 | 6  | 0,035                              | 0,035 | 0,039 | 0,039 |
|                                              | 16   | 8  | 0,040                              | 0,040 | 0,045 | 0,045 |
|                                              | 18   | 8  | 0,045                              | 0,045 | 0,050 | 0,050 |
|                                              | 19   | 9  | 0,050                              | 0,050 | 0,056 | 0,056 |
|                                              | 21   | 9  | 0,055                              | 0,055 | 0,062 | 0,062 |
|                                              | 22   | 10 | 0,060                              | 0,060 | 0,067 | 0,067 |
|                                              | 25   | 11 | 0,064                              | 0,064 | 0,072 | 0,072 |
|                                              | 28   | 12 | 0,068                              | 0,068 | 0,076 | 0,076 |
|                                              | 32   | 14 | 0,072                              | 0,072 | 0,081 | 0,081 |
|                                              | 36   | 16 | 0,076                              | 0,076 | 0,085 | 0,085 |
|                                              | 40   | 18 | 0,080                              | 0,080 | 0,090 | 0,090 |
|                                              | 45   | 20 | 0,083                              | 0,083 | 0,093 | 0,093 |
|                                              | 50   | 22 | 0,086                              | 0,086 | 0,096 | 0,096 |
|                                              | 56   | 24 | 0,090                              | 0,090 | 0,101 | 0,101 |



# Condizioni di fornitura e spedizione

## *Supply and shipment conditions*

Gli utensili sono confezionati in contenitori in P.P. singoli o multipli, o mediante l'impiego di materiale plastico termoindurente.  
Le spedizioni vengono effettuate in scatole di cartone atte a preservare l'integrità dei prodotti durante il trasporto.

*Tools are packed in individual or multiple polypropylene containers, or using thermoset plastic. Shipments are made in cardboard boxes designed to protect the products against damage in transit.*

# Annotazioni tecniche

## *Technical notes*

I parametri tecnici contenuti nel presente catalogo sono indicativi. UOP S.p.A. si riserva la possibilità di modificarli senza doverne dare avviso.

La responsabilità di eventuali danni causati nell'impiego dei parametri tecnici consigliati non potrà essere attribuita ad UOP S.p.A..

*The technical parameters suggested in this catalogue are guidelines. UOP S.p.A. reserves the right to modify them, without prior notification.*

*UOP S.p.A. does not accept the responsibility for any damage caused by the use of the suggested technical parameters.*







***UOP Companies:***

*Our headquarters*



*Our subsidiary for Benelux*

