

# ZBGF



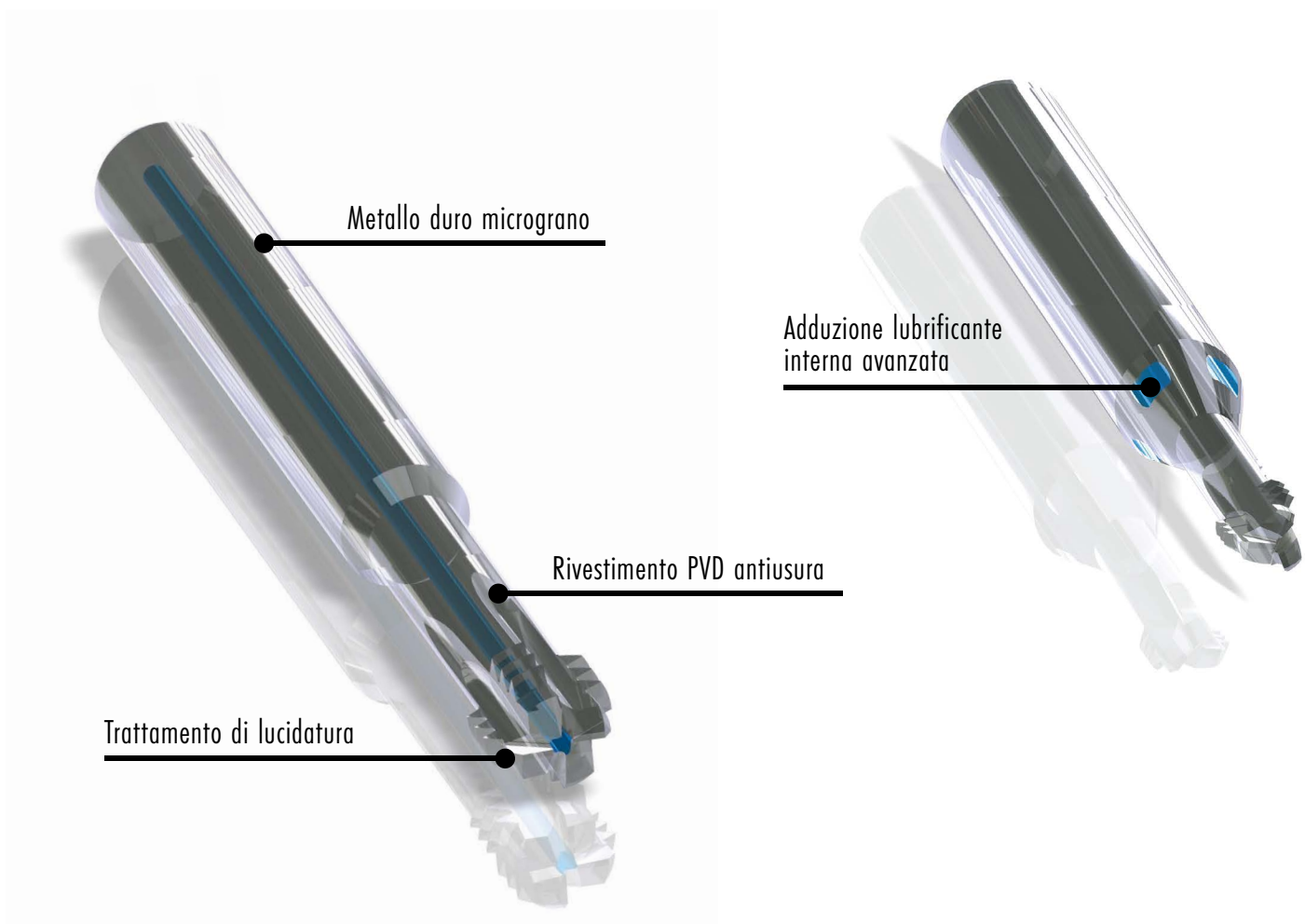
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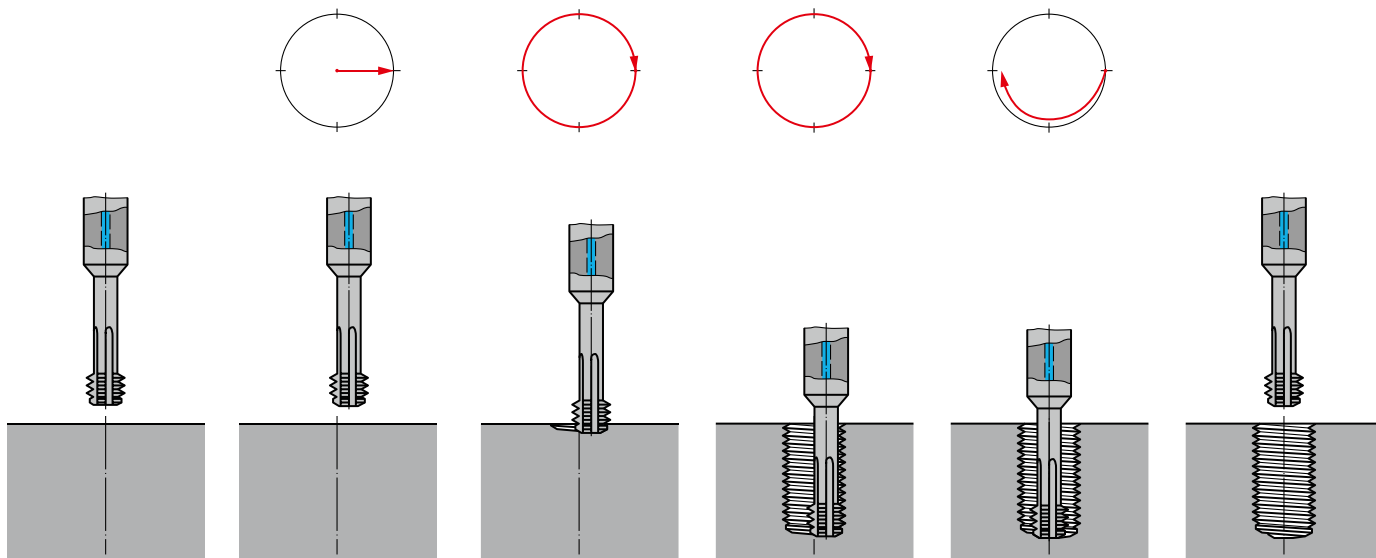
THREADING SOLUTIONS

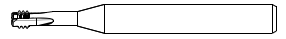
# Fresa a filettare circolare **EVOLUTA**



## Ciclo di programmazione

- Rotazione sinistra (senso antiorario)
- Possibilità di filetto fino a  $3 \times D_1$
- Migliore evacuazione del truciolo grazie al refrigerante interno (min 20 bar)





# ZBGF

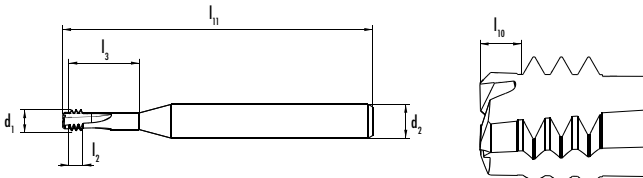
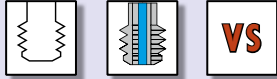
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| $\varnothing D_1$<br>M | P<br>mm | $d_1$<br>mm | $l_{11}$<br>mm | $l_2$<br>mm | $l_3$<br>mm | $d_2$ h6<br>mm | $l_{10}$<br>mm |   |
|------------------------|---------|-------------|----------------|-------------|-------------|----------------|----------------|---|
| 3                      | 0.50    | 2.43        | 55             | 1.5         | 7.5         | 4              | 0.75           | 3 |
| 4                      | 0.70    | 3.05        | 55             | 2.1         | 10.1        | 6              | 1.05           | 3 |
| 5                      | 0.80    | 4.08        | 55             | 2.4         | 12.4        | 6              | 1.20           | 3 |
| 6                      | 1.00    | 4.50        | 64             | 3.0         | 15.0        | 6              | 1.50           | 4 |
| 8                      | 1.25    | 5.95        | 64             | 3.8         | 19.8        | 6              | 1.88           | 4 |
| 10                     | 1.50    | 7.95        | 74             | 4.5         | 24.5        | 8              | 2.25           | 4 |
| 12                     | 1.75    | 9.95        | 80             | 5.3         | 29.3        | 10             | 2.63           | 4 |
| 16                     | 2.00    | 11.95       | 92             | 6.0         | 38.0        | 12             | 3.00           | 4 |

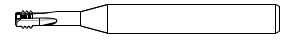
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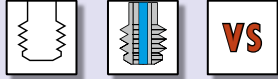
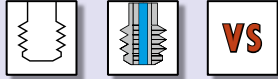
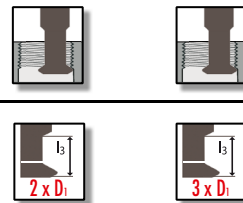
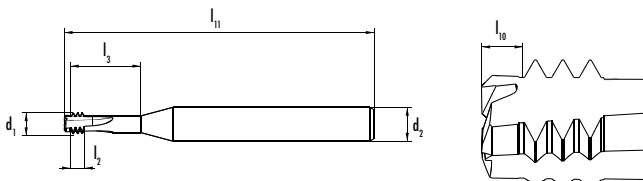
| $\varnothing D_1$<br>M | P<br>mm | $d_1$<br>mm | $l_{11}$<br>mm | $l_2$<br>mm | $l_3$<br>mm | $d_2$ h6<br>mm | $l_{10}$<br>mm |   |
|------------------------|---------|-------------|----------------|-------------|-------------|----------------|----------------|---|
| 3                      | 0.50    | 2.43        | 55             | 1.5         | 10.5        | 4              | 0.75           | 3 |
| 4                      | 0.70    | 3.05        | 55             | 2.1         | 14.1        | 6              | 1.05           | 3 |
| 5                      | 0.80    | 4.08        | 55             | 2.4         | 17.4        | 6              | 1.20           | 3 |
| 6                      | 1.00    | 4.50        | 72             | 3.0         | 21.0        | 6              | 1.50           | 4 |
| 8                      | 1.25    | 5.95        | 72             | 3.8         | 27.8        | 6              | 1.88           | 4 |
| 10                     | 1.50    | 7.95        | 90             | 4.5         | 34.5        | 8              | 2.25           | 4 |
| 12                     | 1.75    | 9.95        | 102            | 5.3         | 41.3        | 10             | 2.63           | 4 |
| 16                     | 2.00    | 11.95       | 115            | 6.0         | 54.0        | 12             | 3.00           | 4 |

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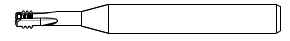
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| $\varnothing D_1$<br>UNCTPI | P<br>mm | $d_1$<br>mm | $l_{11}$<br>mm | $l_2$<br>mm | $l_3$<br>mm | $d_2$ h6<br>mm | $l_{10}$ |   |
|-----------------------------|---------|-------------|----------------|-------------|-------------|----------------|----------|---|
| 4                           | 40      | 2.11        | 55             | 1.9         | 7.6         | 4              | 0.95     | 3 |
| 6                           | 32      | 2.59        | 55             | 2.4         | 9.4         | 4              | 1.19     | 3 |
| 8                           | 32      | 3.10        | 55             | 2.4         | 10.8        | 6              | 1.19     | 3 |
| 10                          | 24      | 3.60        | 55             | 3.2         | 12.9        | 6              | 1.59     | 3 |
| 1/4                         | 20      | 4.80        | 64             | 3.8         | 16.6        | 6              | 1.91     | 4 |
| 5/16                        | 18      | 5.95        | 64             | 4.2         | 20.2        | 6              | 2.12     | 4 |
| 3/8                         | 16      | 7.10        | 74             | 4.8         | 23.9        | 8              | 2.38     | 4 |
| 1/2                         | 13      | 9.95        | 80             | 5.9         | 31.3        | 10             | 2.93     | 4 |
| 5/8                         | 11      | 11.95       | 92             | 6.9         | 38.7        | 12             | 3.46     | 4 |

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| $\varnothing D_1$<br>UNCTPI | P<br>mm | $d_1$<br>mm | $l_{11}$<br>mm | $l_2$<br>mm | $l_3$<br>mm | $d_2$ h6<br>mm | $l_{10}$ |   |
|-----------------------------|---------|-------------|----------------|-------------|-------------|----------------|----------|---|
| 4                           | 40      | 2.11        | 55             | 1.9         | 10.5        | 4              | 0.95     | 3 |
| 6                           | 32      | 2.59        | 55             | 2.4         | 12.9        | 4              | 1.19     | 3 |
| 8                           | 32      | 3.10        | 55             | 2.4         | 14.9        | 6              | 1.19     | 3 |
| 10                          | 24      | 3.60        | 55             | 3.2         | 17.7        | 6              | 1.59     | 3 |
| 1/4                         | 20      | 4.80        | 72             | 3.8         | 22.9        | 6              | 1.91     | 4 |
| 5/16                        | 18      | 5.95        | 72             | 4.2         | 28.1        | 6              | 2.12     | 4 |
| 3/8                         | 16      | 7.10        | 90             | 4.8         | 33.4        | 8              | 2.38     | 4 |
| 1/2                         | 13      | 9.95        | 102            | 5.9         | 44.0        | 10             | 2.93     | 4 |
| 5/8                         | 11      | 11.95       | 115            | 6.9         | 54.6        | 12             | 3.46     | 4 |

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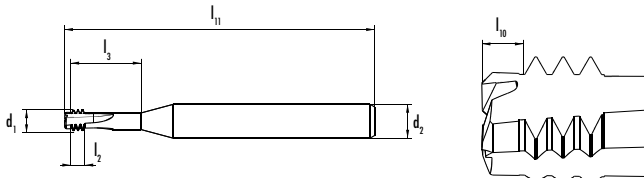
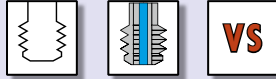
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| $\varnothing D_1$<br>UNFTPI | P<br>mm | $d_1$<br>mm | $l_{11}$<br>mm | $l_2$<br>mm | $l_3$<br>mm | $d_2$ h6<br>mm | $l_{10}$<br>mm |   |
|-----------------------------|---------|-------------|----------------|-------------|-------------|----------------|----------------|---|
| 4                           | 48      | 2.23        | 55             | 1.6         | 7.3         | 4              | 0.79           | 3 |
| 8                           | 36      | 3.10        | 55             | 2.1         | 10.5        | 6              | 1.06           | 3 |
| 10                          | 32      | 3.91        | 55             | 2.4         | 12.1        | 6              | 1.19           | 3 |
| 1/4                         | 28      | 4.80        | 64             | 2.7         | 15.5        | 6              | 1.36           | 4 |
| 5/16                        | 24      | 5.95        | 64             | 3.2         | 19.1        | 6              | 1.59           | 4 |
| 3/8                         | 24      | 7.10        | 74             | 3.2         | 22.3        | 8              | 1.59           | 4 |
| 7/16                        | 20      | 7.95        | 74             | 3.8         | 26.1        | 8              | 1.91           | 4 |
| 1/2                         | 20      | 9.95        | 80             | 3.8         | 29.3        | 10             | 1.91           | 4 |
| 5/8                         | 18      | 11.95       | 92             | 4.2         | 36.0        | 12             | 2.12           | 4 |

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| $\varnothing D_1$<br>UNFTPI | P<br>mm | $d_1$<br>mm | $l_{11}$<br>mm | $l_2$<br>mm | $l_3$<br>mm | $d_2$ h6<br>mm | $l_{10}$<br>mm |   |
|-----------------------------|---------|-------------|----------------|-------------|-------------|----------------|----------------|---|
| 4                           | 48      | 2.23        | 55             | 1.6         | 10.2        | 4              | 0.79           | 3 |
| 8                           | 36      | 3.10        | 55             | 2.1         | 14.7        | 6              | 1.06           | 3 |
| 10                          | 32      | 3.91        | 55             | 2.4         | 16.9        | 6              | 1.19           | 3 |
| 1/4                         | 28      | 4.80        | 72             | 2.7         | 21.8        | 6              | 1.36           | 4 |
| 5/16                        | 24      | 5.95        | 72             | 3.2         | 27.0        | 6              | 1.59           | 4 |
| 3/8                         | 24      | 7.10        | 90             | 3.2         | 31.8        | 8              | 1.59           | 4 |
| 7/16                        | 20      | 7.95        | 90             | 3.8         | 37.2        | 8              | 1.91           | 4 |
| 1/2                         | 20      | 9.95        | 102            | 3.8         | 42.0        | 10             | 1.91           | 4 |
| 5/8                         | 18      | 11.95       | 115            | 4.2         | 51.9        | 12             | 2.12           | 4 |

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# Velocità di taglio ed avanzamenti

| Gruppi di Materiali   | Designazione dei materiali                                 | Durezza (HB) | Resistenza Rm (N/mm <sup>2</sup> ) | Vc (m/min) |           | Avanz. fz (mm/dente) | SFM (f/min) |                 | Avanz. fz (pollice/dente) |
|-----------------------|--|--------------|------------------------------------|------------|-----------|----------------------|-------------|-----------------|---------------------------|
|                       |  |              |                                    | Rivestito  |           |                      | Rivestito   |                 |                           |
| Acciai                | 11 Acciai da tornitura                                     | < 200        | < 700                              | 50 - 100   | 164 - 328 | 0.020 - 0.060        | 164 - 328   | 0.0007 - 0.0023 |                           |
|                       | 12 Acciai da costruzione / da cementazione                 | < 200        | < 700                              | 50 - 100   | 164 - 328 | 0.010 - 0.050        | 164 - 328   | 0.0003 - 0.0019 |                           |
|                       | 13 Acciai al carbonio                                      | < 300        | < 1000                             | 50 - 100   | 164 - 328 | 0.010 - 0.050        | 164 - 328   | 0.0003 - 0.0019 |                           |
|                       | 14 Acciai legati <850 N/mm <sup>2</sup>                    | < 250        | < 850                              | 50 - 100   | 164 - 328 | 0.010 - 0.050        | 164 - 328   | 0.0003 - 0.0019 |                           |
| Acciai inox           | 15 Acciai legati / trattati - <1150 N/mm <sup>2</sup>      | > 250        | > 850                              | 40 - 80    | 131 - 262 | 0.010 - 0.050        | 131 - 262   | 0.0003 - 0.0019 |                           |
|                       | 16 Acciai ad alta resistenza <55 HRC                       | > 250        | > 850                              | 30 - 60    | 98 - 197  | 0.008 - 0.040        | 98 - 197    | 0.0003 - 0.0015 |                           |
|                       | 21 Acciai inox allo zolfo                                  | < 250        | < 850                              | 40 - 80    | 131 - 262 | 0.010 - 0.040        | 131 - 262   | 0.0003 - 0.0015 |                           |
|                       | 22 Acciai inox austenitici                                 | < 250        | < 850                              | 30 - 50    | 98 - 164  | 0.010 - 0.040        | 98 - 164    | 0.0003 - 0.0015 |                           |
| Ghisa                 | 23 Ferritici e martensitici <850 N/mm <sup>2</sup>         | < 250        | < 850                              | 30 - 60    | 98 - 197  | 0.010 - 0.040        | 98 - 197    | 0.0003 - 0.0015 |                           |
|                       | 24 Ferritici e martensitici >850 - <1150 N/mm <sup>2</sup> | > 250        | > 850                              | 30 - 50    | 98 - 164  | 0.010 - 0.030        | 98 - 164    | 0.0003 - 0.0011 |                           |
|                       | 31 Ghisa grigia  | < 250        | < 850                              | 70 - 140   | 230 - 459 | 0.010 - 0.050        | 230 - 459   | 0.0003 - 0.0019 |                           |
|                       | 32 Ghisa grafitica sferoidale e malleabile                 | < 250        | < 850                              | 50 - 100   | 164 - 328 | 0.010 - 0.050        | 164 - 328   | 0.0003 - 0.0019 |                           |
| Titanio               | 41 Titanio puro  | < 250        | < 850                              | 30 - 50    | 98 - 164  | 0.010 - 0.040        | 98 - 164    | 0.0003 - 0.0015 |                           |
|                       | 42 Leghe al titanio  | > 250        | > 850                              | 30 - 50    | 98 - 164  | 0.010 - 0.040        | 98 - 164    | 0.0003 - 0.0015 |                           |
| Nickel                | 51 Leghe al Nickel 1 <850 N/mm <sup>2</sup>                | < 250        | < 850                              | 40 - 60    | 131 - 197 | 0.010 - 0.030        | 131 - 197   | 0.0003 - 0.0011 |                           |
|                       | 52 Leghe al Nickel 2 >850 - <1150 N/mm <sup>2</sup>        | > 250        | > 850                              | 30 - 50    | 98 - 164  | 0.010 - 0.030        | 98 - 164    | 0.0003 - 0.0011 |                           |
|                       | 53 Leghe al Nickel 3 >1150 - ≤1600 N/mm <sup>2</sup>       | > 340        | > 1150                             | 30 - 50    | 98 - 164  | 0.005 - 0.030        | 98 - 164    | 0.0002 - 0.0011 |                           |
| Rame                  | 62 Ottone, bronzo (trucioli corti)                         | < 200        | < 700                              | 100 - 200  | 328 - 656 | 0.010 - 0.050        | 328 - 656   | 0.0003 - 0.0019 |                           |
|                       | 63 Ottone (trucioli lunghi)                                | < 200        | < 700                              | 100 - 200  | 328 - 656 | 0.010 - 0.050        | 328 - 656   | 0.0003 - 0.0019 |                           |
| Alluminio<br>Magnesio | 71 Alluminio non legato                                    | < 100        | < 350                              | 100 - 200  | 328 - 656 | 0.010 - 0.050        | 328 - 656   | 0.0003 - 0.0019 |                           |
|                       | 72 Leghe di alluminio Si < 1.5 %                           | < 150        | < 500                              | 100 - 200  | 328 - 656 | 0.010 - 0.050        | 328 - 656   | 0.0003 - 0.0019 |                           |
|                       | 73 Leghe di alluminio Si > 1.5 % - < 10 %                  | < 120        | < 400                              | 100 - 200  | 328 - 656 | 0.010 - 0.050        | 328 - 656   | 0.0003 - 0.0019 |                           |
|                       | 74 Leghe di all. Si > 10 %, Leghe al magnesio              | < 120        | < 400                              | 70 - 140   | 230 - 459 | 0.010 - 0.050        | 230 - 459   | 0.0003 - 0.0019 |                           |
| Materie Plastiche     | 81 Materie termoplastiche                                  | .            | .                                  | 80 - 180   | 262 - 590 | 0.050 - 0.100        | 262 - 590   | 0.0019 - 0.0039 |                           |
|                       | 82 Materie termoindurenti                                  | .            | .                                  | 80 - 180   | 262 - 590 | 0.020 - 0.080        | 262 - 590   | 0.0007 - 0.0031 |                           |
|                       | 83 Materie plastiche rinforzate con fibre                  | .            | .                                  | 50 - 150   | 164 - 492 | 0.020 - 0.100        | 164 - 492   | 0.0007 - 0.0039 |                           |
| Materiali Non ferrosi | 91 Oro giallo  | .            | .                                  | 80 - 120   | 262 - 394 | 0.020 - 0.080        | 262 - 394   | 0.0007 - 0.0031 |                           |
|                       | 92 Oro rosso   | .            | .                                  | 50 - 100   | 164 - 328 | 0.010 - 0.050        | 164 - 328   | 0.0003 - 0.0019 |                           |
|                       | 93 Oro bianco  | .            | .                                  | 40 - 80    | 131 - 262 | 0.010 - 0.040        | 131 - 262   | 0.0003 - 0.0015 |                           |
|                       | 94 Argento   | .            | .                                  | 50 - 100   | 164 - 328 | 0.010 - 0.050        | 164 - 328   | 0.0003 - 0.0019 |                           |