







**P** LEGHE D'ACCIAI E ACCIAI NON LEGATI

| Durezza                            | Gruppo |
|------------------------------------|--------|
| Rm < 450 [N/mm <sup>2</sup> ]      | 1a     |
| Rm 450 - 700 [N/mm <sup>2</sup> ]  | 1b     |
| Rm 700 - 900 [N/mm <sup>2</sup> ]  | 1c     |
| Rm 900 - 1200 [N/mm <sup>2</sup> ] | 1d     |

| 1   | 2                       | 3                          | 4                        |   |
|---|-------------------------|----------------------------|--------------------------|---|
| Lavoro da realizzare  | Gruppo materia p.III-IV | Utensile consigliato       | Parametri di taglio      |   |
|  <p>Fresatura per sgrossare / affioramento</p> | Gruppo Index p. III-IV  | Riferimento consigliato    | Rivestimento consigliato |   |
|   | 1a                      | 115-1                      | Trio                     | V <sub>c</sub> non rivestito [m/min] 80<br>V <sub>c</sub> rivestito [m/min] 140   |
|   | 1b                      | 115-1                      | Trio                     | F <sub>c</sub> Ø 0.25 [mm] 0.003<br>F <sub>c</sub> Ø 0.5 [mm] 0.005<br>F <sub>c</sub> Ø 1 [mm] 0.008<br>F <sub>c</sub> Ø 2 [mm] 0.013<br>F <sub>c</sub> Ø 4 [mm] 0.023<br>F <sub>c</sub> Ø 6 [mm] 0.033<br>F <sub>c</sub> Ø 8 [mm] 0.045<br>F <sub>c</sub> Ø 10 [mm] 0.06<br>F <sub>c</sub> Ø 12 [mm] 0.080<br>F <sub>c</sub> Ø 16 [mm] 0.10<br>F <sub>c</sub> Ø 20 [mm] 0.12 |
|   | 1c                      | 115-1                      | Trio                     |   |
|   | 1d                      | 115-1                      | Trio                     |   |
|  <p>Fresatura per finitura / affioramento</p>  | Gruppo Index p. III-IV  | Riferimento consigliato    | Rivestimento consigliato |   |
|   | 1a                      | 1620                       | Trio                     | V <sub>c</sub> non rivestito [m/min] 130<br>V <sub>c</sub> rivestito [m/min] 150  |
|   | 1b                      | 1620                       | Trio                     | F <sub>c</sub> Ø 0.25 [mm] 0.003<br>F <sub>c</sub> Ø 0.5 [mm] 0.005<br>F <sub>c</sub> Ø 1 [mm] 0.008<br>F <sub>c</sub> Ø 2 [mm] 0.013<br>F <sub>c</sub> Ø 4 [mm] 0.023<br>F <sub>c</sub> Ø 6 [mm] 0.033<br>F <sub>c</sub> Ø 8 [mm] 0.045<br>F <sub>c</sub> Ø 10 [mm] 0.06<br>F <sub>c</sub> Ø 12 [mm] 0.080<br>F <sub>c</sub> Ø 16 [mm] 0.10<br>F <sub>c</sub> Ø 20 [mm] 0.12 |
|   | 1c                      | 1620                       | Trio                     |   |
|   | 1d                      | 1620                       | Trio                     |   |
|  <p>Punteggiatura</p>                         | Gruppo Index p. III-IV  | Riferimento consigliato    | Rivestimento consigliato |   |
|   | 1a                      | 337                        | Trio                     | V <sub>c</sub> non rivestito [m/min] 60<br>V <sub>c</sub> rivestito [m/min] 85  |
|   | 1b                      | 337                        | Trio                     | F [mm] Ø/50<br>Sblocco -  |
|   | 1c                      | 337                        | Trio                     | F [mm] Ø/55<br>Sblocco -  |
|   | 1d                      | 337                        | Trio                     | F [mm] Ø/60<br>Sblocco -  |
|  <p>Perforazione</p>                         | Gruppo Index p. III-IV  | Riferimento consigliato    | Rivestimento consigliato |   |
|   | 1a                      | 339/340/343-6→343-12/352   | Nemo                     | V <sub>c</sub> non rivestito [m/min] 70<br>V <sub>c</sub> rivestito [m/min] 90  |
|   | 1b                      | 340/343-6→343-12/352       | Nemo                     | F [mm] Ø/70<br>Sblocco 1.5xD  |
|   | 1c                      | 340/340-1/343-6→343-12/352 | Nemo                     | F [mm] Ø/70<br>Sblocco 1.5xD  |
|   | 1d                      | 3340/343-6→343-12/348/352  | Nemo                     | F [mm] Ø/70<br>Sblocco 1.5xD  |
|  <p>Taglio</p>                               | Gruppo Index p. III-IV  | Riferimento consigliato    | Rivestimento consigliato |   |
|   | 1a                      | 223→223-2/226/227          | Trio                     | V <sub>c</sub> non rivestito [m/min] 180<br>V <sub>c</sub> rivestito [m/min] 220  |
|   | 1b                      | 223→223-2/226/227          | Trio                     | F <sub>c</sub> [mm] Ø/10000   |
|   | 1c                      | 223→223-2/226/227          | Trio                     | F <sub>c</sub> [mm] Ø/10000   |
|   | 1d                      | 223→223-2/226/227          | Trio                     | F <sub>c</sub> [mm] Ø/10000   |
|  <p>Incisione</p>                            | Gruppo Index p. III-IV  | Riferimento consigliato    | Rivestimento consigliato |   |
|   | 1a                      | 119/119-3/119-4            | Hot                      | n [rpm] 28000<br>F <sub>c</sub> [mm] 0.003<br>F <sub>c</sub> → [mm] 0.007   |
|   | 1b                      | 119/119-3/119-4            | Hot                      | n [rpm] 28000<br>F <sub>c</sub> [mm] 0.003<br>F <sub>c</sub> → [mm] 0.007   |
|   | 1c                      | 119/119-3/119-4            | Hot                      | n [rpm] 28000<br>F <sub>c</sub> [mm] 0.003<br>F <sub>c</sub> → [mm] 0.007   |
|   | 1d                      | 119/119-3/119-4            | Hot                      | n [rpm] 28000<br>F <sub>c</sub> [mm] 0.003<br>F <sub>c</sub> → [mm] 0.007   |

**Formule**

$$F = F_z \cdot Z$$

$$V_c = \frac{\pi \cdot d_1 \cdot n}{1000}$$

$$V_f = F_z \cdot Z \cdot n$$

$$n = \frac{V_c \cdot 1000}{\pi \cdot d_1}$$

$$f_z = \frac{V_f}{Z \cdot n}$$

**Leggenda**

F [mm]: Avanzamento per giro      F<sub>c</sub> [mm]: Avanzamento per dente  
 Z : Numero di denti                      n : Numero di giri al minuto  
 V<sub>c</sub> [mm/min]: Velocità d'avanzamento

**P** Index - Leghe d'acciai e acciai non legati

| N° Wsn | DIN       | AFNOR           | Gr. | N° Wsn | DIN              | AFNOR                     | Gr. |
|--------|-----------|-----------------|-----|--------|------------------|---------------------------|-----|
| 1.0033 | St33 - 1  | C35             | 1a  | 1a673  | C135W            | Y2140                     | 1c  |
| 1.0037 | St37 - 2  | E24 - 2         | 1a  | 1a73   | C45W             | Y342                      | 1b  |
| 1.0038 | RSt37 - 2 | E24 - 2NE       | 1a  | 1a74   | C60W             | Y355                      | 1b  |
| 1.0044 | St44 - 2  | E28 - 2         | 1a  | 1a83   | C85W             | Y390                      | 1b  |
| 1.0050 | St50 - 2  | A50 - 2         | 1b  | 1b067  | 100Cr6           | Y100C6                    | 1c  |
| 1.0060 | St60 - 2  | A60 - 2         | 1b  | 1b08   | X210Cr12         | Z200C12                   | 1d  |
| 1.0070 | St70 - 2  | A70 - 2         | 1c  | 1b162  | 21MnCr5          | 220NC5                    | 1c  |
| 1.0114 | St37 - 3U | E24 - 3         | 1a  | 1b21   | 115CrV3          | 100C3                     | 1c  |
| 1.0116 | St37 - 3  | E24 - 4         | 1a  | 1b33   | 35CrMo4          | 34CD4                     | 1c  |
| 1.0143 | St44 - 3U | E28 - 3         | 1a  | 1b332  | 47CrMo4          | 42CD4                     | 1c  |
| 1.0301 | C10       | AF34C10;XC10    | 1a  | 1b343  | X38CrMoV51       | Z38CDV5                   | 1d  |
| 1.0401 | C15       | AF37C12;XC18    | 1a  | 1b344  | X40CrMoV51       | Z40CDV5                   | 1d  |
| 1.0402 | C22       | AF42C20         | 1b  | 1b363  | X100CrMoV51      | Z100CDV5                  | 1d  |
| 1.0406 | C25       | AF50C30         | 1a  | 1b365  | X32CrMoV33       | Z32CDV28                  | 1d  |
| 1.0501 | C35       | AF55C35         | 1b  | 1b379  | X155CrVmo121     | Z160CDV12                 | 1d  |
| 1.0503 | C45       | CC45 (AF65C45)  | 1c  | 1b419  | 105WCr6          | 105WC13                   | 1c  |
| 1.0511 | C40       | AF60C40         | 1a  | 1b51   | 100MnCrW4        | 90MWCV5                   | 1d  |
| 1.0553 | St52 - 3U | E36 - 2         | 1c  | 1b516  | 120WV4           | 110WC20                   | 1c  |
| 1.0570 | St52 - 3  | E36-3;E36-4     | 1b  | 1b55   | 60WCrV7          | 55WC20                    | 1c  |
| 1.0601 | C60       | CC55            | 1c  | 1b567  | X30WCrV53        | Z32WCV5                   | 1d  |
| 1.0715 | 95Mn28    | S250            | 1b  | 1b581  | X30WCrV93        | Z30WCV9                   | 1d  |
| 1.0718 | 95MnPB28  | S250Pb          | 1b  | 1b706  | X3NiCrMo1885     | E - Z2NKD18               | 1d  |
| 1.0721 | 10520     | 10F1            | 1b  | 1b711  | S4NiCrMoV6       | 55NCDV6                   | 1d  |
| 1.0722 | 105Pb20   | 10PbF2          | 1b  | 1b713  | 55NiCrMoV6       | 55NCDV7                   | 1d  |
| 1.0726 | 35S20     | 35MF4           | 1b  | 1b735  | 15NiCr14         | 10CrNi12 (10CN12)         | 1d  |
| 1.0727 | 45S20     | 45MF4 / 45MF61  | 1b  | 1b767  | X45NiCrMo4       | Y35NCD16                  | 1c  |
| 1.0728 | 60S20     | 60MF4           | 1b  | 1b833  | 100V1            | Y1105V                    | 1c  |
| 1.0736 | 95Mn36    | S300            | 1b  | 1b842  | 90MnCrV8         | 90MV8                     | 1c  |
| 1.0737 | 95MnPB36  | S300Pb          | 1b  | 1c207  | S10 - 4 - 3 - 10 | Z130WKCVDV10 - 10 - 04    | 1d  |
| 1.0904 | 55Si7     | 55S7            | 1b  | 1c243  | S6 - 5 - 2 - 5   | Z85WDCV06-05 - 05 - 05    | 1d  |
| 1.0961 | 60SiCr7   | 60SC7           | 1b  | 1c246  | S7 - 4 - 2 - 5   | Z110WKCVDV07 - 05 - 04    | 1d  |
| 1a121  | XC10      | XC10            | 1a  | 1c247  | S2 - 10 - 1 - 8  | Z110DKWV09 - 08 - 04      | 1d  |
| 1a133  | 20Mn5     | 20M5            | 1a  | 1c255  | S18 - 1 - 2 - 5  | Z80WKCVDV18 - 05 - 04 - 0 | 1d  |
| 1a141  | CK15      | XC12            | 1a  | 1c342  | SC6 - 5 - 2C     | H56 - 5 - 2HC             | 1d  |
| 1a141  | CK15      | XC15;XC18       | 1a  | 1c343  | H56 - 5 - 2      | Z85WDCV06 - 05 - 04 - 0   | 1d  |
| 1a151  | CK22      | XC25;XC18       | 1b  | 1c344  | S6 - 5 - 3       | Z120WDCV06-05 - 04 - 0    | 1d  |
| 1a157  | 40Mn4     | 35M5            | 1b  | 1c346  | S2 - 9 - 1       | Z85DCWV08 - 04 - 02 - 0   | 1d  |
| 1a158  | CK22      | 2C25 (XC25)     | 1b  | 1c348  | S2 - 9 - 2       | Z100DCWV09 - 04 - 02 - 0  | 1d  |
| 1a16   | 22Mn6     | 20M5            | 1b  | 1c355  | S18 - 0 - 1      | Z80WCV18 - 04 - 01        | 1d  |
| 1a165  | 30Mn5     | 35M5            | 1c  | 1d027  | G - X20Cr14      | Z20C13M                   | 1c  |
| 1a167  | 36Mn5     | 35M5            | 1b  | 1d742  | X10CrAl18        | Z10CAS18                  | 1c  |
| 1a17   | 28Mn6     | 20M5            | 1b  | 1d762  | X10CrAl24        | Z10CAS24                  | 1c  |
| 1a178  | CK30      | (XC32)          | 1a  | 1d943  | X4NiCrTi2515     | Z6NCTDV25.15B             | 1d  |
| 1a179  | Cm30      | 2C30 (XC32)     | 1c  | 1.5026 | 55Si7            | 55S7                      | 1b  |
| 1a181  | CK35      | 2C35 (XC38)     | 1b  | 1.5415 | 15Mo3            | 15D3                      | 1c  |
| 1a186  | CK40      | XC42H1          | 1b  | 1.5680 | 12Ni19           | Z18N5                     | 1c  |
| 1a189  | Cm40      | XC38            | 1b  | 1.5710 | 36NiCr6          | 30NiCr6-35NiCr6           | 1c  |
| 1a191  | CK45      | 2C45 (XC42)     | 1c  | 1.5732 | 14NiCr10         | 14NiCr11 (14NC11)         | 1b  |
| 1a193  | CF45      | 2C40T5 (XC42T5) | 1b  | 1.5736 | 36NiCr10         | 30NC11                    | 1c  |
| 1a206  | CK50      | XC50            | 1b  | 1.5736 | 31NiCr14         | 30NiCr11 (30NC11)         | 1b  |
| 1a221  | CK60      | XC60            | 1c  | 1.5752 | 14NiCr14         | 12NiCr12 (12NC12)         | 1b  |
| 1a231  | CK67      | XC68            | 1b  | 1.5755 | 31NiCr14         | 18NC13                    | 1b  |
| 1a248  | CK75      | XC75            | 1b  | 1.5919 | 15CrNi6          | 16NiCr6 (16NC6)           | 1b  |
| 1a274  | H1 dur    | DYN 34CrAlNi7   | 1c  | 1.5920 | 18CrNi8          | 20NiCr6 (20NC6)           | 1b  |
| 1a525  | C80W1     | Y190;Y180       | 1c  | 1.6511 | 36CrNiMo4        | 40NCD3                    | 1c  |
| 1a545  | C105W1    | Y1105           | 1c  | 1.6523 | 21NiCrMo2        | 20NiCr2 (20NCD2)          | 1b  |
| 1a625  | C80W2     | Y180            | 1c  | 1.6526 | 21NiCrMoS2       | 20NCD2                    | 1b  |
| 1a645  | C105W2    | Y1105           | 1c  | 1.6545 | 30NiCrMo22       | 30NiCrMo2 (30NCD2)        | 1b  |
| 1a663  | C125W     | Y2120           | 1c  |        |                  |                           |     |

| N° Wsn                            | DIN         | AFNOR              | Gr. | N° Wsn  | DIN       | AFNOR | Gr. |
|-----------------------------------|-------------|--------------------|-----|---------|-----------|-------|-----|
| 1.6546                            | 40NiCrMo22  | 40NCD2             | 1c  | Böhler  | M200      |       | 1c  |
| 1.6580                            | 30CrNiMo8   | 30CND8             | 1d  | Böhler  | M238      |       | 1c  |
| 1.6582                            | 34CrNiMo6   | 35NCD6             | 1d  | Böhler  | Resist440 |       | 1c  |
| 1.6587                            | 17CrNiMo7   | 18NiCrMo6 (18NCD6) | 1b  | Böhler  | S600      |       | 1d  |
| 1.6746                            | 32NiCrMo145 | 35NCD14            | 1c  | Böhler  | V155      |       | 1d  |
| 1.7003                            | 38Cr2       | 38Cr2 (38C2)       | 1b  | Böhler  | V320      |       | 1d  |
| 1.7006                            | 46Cr2       | 41Cr4 (42C2)       | 1b  | Böhler  | V930      |       | 1c  |
| 1.7033                            | 34Cr4       | 34Cr4 (32C4)       | 1c  | Böhler  | V945      |       | 1c  |
| 1.7034                            | 37Cr4       | 37Cr4 (38C4)       | 1c  | Böhler  | W300      |       | 1d  |
| 1.7035                            | 41Cr4       | 41Cr4 (42C4)       | 1d  | Böhler  | W302      |       | 1d  |
| 1.7039                            | 41CrS4      | (42C4)             | 1b  | Böhler  | W720      |       | 1c  |
| 1.7045                            | 42Cr4       | 41Cr4 (42C4T5)     | 1b  | Haba    | EC80      |       | 1c  |
| 1.7131                            | 16MnCr5     | 16MCS              | 1c  | Matthey | H1 dur    |       | 1c  |
| 1.7139                            | 16MnCr5S    | 16MCS              | 1c  |         |           |       |     |
| 1.7139 Pb                         | 16MnCr5SPb  | 16MCS+Pb           | 1c  |         |           |       |     |
| 1.7147                            | 20MnCr5     | 20MCS              | 1c  |         |           |       |     |
| 1.7176                            | 55Cr3       | 55C3               | 1b  |         |           |       |     |
| 1.7213                            | 25CrMoS4    | 25CD4              | 1c  |         |           |       |     |
| 1.7218                            | 25CrMo4     | 25CrMo4 (25CD4)    | 1c  |         |           |       |     |
| 1.7220                            | 35CrMo4     | 35CrMo4 (35CD4)    | 1c  |         |           |       |     |
| 1.7223                            | 41CrMo4     | 42CD4T5            | 1c  |         |           |       |     |
| 1.7225                            | 42CrMo4     | 42CrMo4 (42CD4)    | 1d  |         |           |       |     |
| 1.7226                            | 34CrMoS4    | 35CD4              | 1c  |         |           |       |     |
| 1.7227                            | 42CrMoS4    | (42CD4)            | 1c  |         |           |       |     |
| 1.7262                            | 15NiCr14    | 10CrNi12 (10CN12)  | 1d  |         |           |       |     |
| 1.7264                            | 20CrMo5     | 18CD4              | 1c  |         |           |       |     |
| 1.7335                            | 13CrMo44    | 15CD3.5            | 1c  |         |           |       |     |
| 1.7337                            | 16CrMo44    | 15CD4.5            | 1c  |         |           |       |     |
| 1.7361                            | 32CrMo12    | 30CD12             | 1c  |         |           |       |     |
| 1.7380                            | 10CrMo9.10  | 10CD9.10           | 1c  |         |           |       |     |
| 1.7709                            | 21CrMoV5.7  | 20CrMoV5.7         | 1c  |         |           |       |     |
| 1.7711                            | 40CrMoV4.7  | 42CrMoV4 (42CDV4)  | 1c  |         |           |       |     |
| 1.7735                            | 14CrMoV69   | 15CDV6             | 1c  |         |           |       |     |
| 1.8159                            | 50CrV4      | 50CrV4 (50CV4)     | 1d  |         |           |       |     |
| 1.8507                            | 34CrAlMo5   | 30CAD6.12          | 1c  |         |           |       |     |
| 1.8509                            | 41CrAlMo7   | 40CAD6.12          | 1c  |         |           |       |     |
| 1.8515                            | 31CrMo12    | 30CD12             | 1c  |         |           |       |     |
| 1.8523                            | 39CrMoV13.9 | 40CrMoV12          | 1d  |         |           |       |     |
| <b>Acciai secondo fabbricante</b> |             |                    |     |         |           |       |     |
| Böhler                            | E110        |                    | 1b  |         |           |       |     |
| Böhler                            | E200        |                    | 1b  |         |           |       |     |
| Böhler                            | E410        |                    | 1b  |         |           |       |     |
| Böhler                            | F550        |                    | 1d  |         |           |       |     |
| Böhler                            | K100        |                    | 1d  |         |           |       |     |
| Böhler                            | K105        |                    | 1d  |         |           |       |     |
| Böhler                            | K107        |                    | 1d  |         |           |       |     |
| Böhler                            | K110        |                    | 1d  |         |           |       |     |
| Böhler                            | K190        |                    | 1d  |         |           |       |     |
| Böhler                            | K245        |                    | 1c  |         |           |       |     |
| Böhler                            | K305        |                    | 1d  |         |           |       |     |
| Böhler                            | K455        |                    | 1c  |         |           |       |     |
| Böhler                            | K460        |                    | 1d  |         |           |       |     |
| Böhler                            | K510        |                    | 1c  |         |           |       |     |
| Böhler                            | K600        |                    | 1c  |         |           |       |     |
| Böhler                            | K720        |                    | 1c  |         |           |       |     |
| Böhler                            | M100        |                    | 1c  |         |           |       |     |
| Böhler                            | M130        |                    | 1c  |         |           |       |     |