

Automatenstähle, vergütet (nach DIN EN 10087, DIN 1651)

| | | | | | | | | | |
|-----|-----|--------|----------------------|-----|---------|-------|-------|-----------|---------|
| 980 | 290 | 1.0726 | 35S20 / 35 S 20 | *** | MULTI | | S / E | 10° - 12° | 20 - 30 |
| 980 | 290 | 1.0727 | 45S20 / 45 S 20 | ** | UNI-TIN | | S / E | 10° - 14° | 15 - 25 |
| 980 | 290 | 1.0728 | 60S22 / 60 S 20 | ** | UNI | + TIN | S / E | 12° - 16° | 15 - 25 |
| 980 | 290 | 1.0756 | 35SPb20 / 30 SPb 20 | * | VA | | S / E | 10° - 14° | 8 - 12 |
| 980 | 290 | 1.0757 | 45SPb 20 / 45 SPb 20 | | | | | | |
| 980 | 290 | 1.0758 | 60SPb22 / 60 SPb 20 | | | | | | |

Einsatzstähle, unbehandelt (im Lieferzustand) (nach DIN EN 10084, DIN 17210)

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|-----|-----|--------|----------------------------|-----|---------|------------------|--------------|-----------|---------|
| 445 | 131 | 1.1121 | C10E / Ck 10 | *** | MULTI | | S + Add. / E | 10° - 12° | 30 - 40 |
| 445 | 131 | 1.0301 | C10 / C 10 | *** | UNI-TIN | | S + Add. / E | 10° - 14° | 20 - 30 |
| 485 | 143 | 1.0401 | C15 / C 15 | *** | UNI | + TIN | S + Add. / E | 12° - 16° | 20 - 30 |
| 485 | 143 | 1.1140 | C15R / Cm 15 | ** | UNI | | S + Add. / E | 12° - 16° | 10 - 15 |
| 485 | 143 | 1.1141 | C15E / Ck 15 | ** | UNI | | S + Add. / E | 12° - 16° | 10 - 15 |
| 575 | 170 | 1.7012 | 13Cr2 / EC30 (13 Cr 2) | *** | MULTI | | S + Add. / E | 10° - 12° | 20 - 30 |
| 590 | 174 | 1.7015 | 15Cr3 / EC60 (15 Cr 3) | *** | UNI-TIN | | S + Add. / E | 10° - 14° | 15 - 25 |
| 590 | 174 | 1.7016 | 17Cr3 / 17 Cr 3 | *** | UNI | + α + TIN | S + Add. / E | 10° - 12° | 15 - 25 |
| 665 | 197 | 1.7027 | 20Cr4 / 20 Cr 4 | ** | VA | | S + Add. / E | 10° - 14° | 8 - 12 |
| 700 | 207 | 1.7131 | 16MnCr5 / EC80 (16 MnCr 5) | *** | MULTI | | S + Add. / E | 10° - 12° | 20 - 30 |
| 730 | 217 | 1.7147 | G20MnCr5 / 20 MnCr 5 | *** | UNI-TIN | | S + Add. / E | 10° - 14° | 15 - 25 |
| 770 | 229 | 1.6587 | 17CrNiMo6 (18CrNiMo7-6) | *** | UNI | | S + Add. / E | 10° - 12° | 15 - 25 |
| 825 | 245 | 1.5860 | 14NiCr18 / 14 NiCr 18 | ** | VA | | S + Add. / E | 10° - 14° | 8 - 12 |

Einsatzstähle, einsatzgehärtet (nach DIN EN 10084, DIN 17210)

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|------|-----|--------|-----------------------------|-----|---------|-----------------------|----------|-----------|---------|
| 780 | 231 | 1.1121 | C10E / Ck 10 | *** | MULTI | | S + Add. | 10° - 12° | 30 - 40 |
| 800 | 238 | 1.0301 | C10 / C 10 | *** | UNI-TIN | | S + Add. | 10° - 14° | 20 - 30 |
| 880 | 261 | 1.0401 | C15 / C 15 | *** | UNI | + TIN | S + Add. | 12° - 16° | 20 - 30 |
| 880 | 261 | 1.1140 | C15R / Cm 15 | * | UNI | | S + Add. | 12° - 16° | 10 - 15 |
| 880 | 261 | 1.1141 | C15E / Ck 15 | * | UNI | | S + Add. | 12° - 16° | 10 - 15 |
| 930 | 276 | 1.7012 | 13Cr2 / EC30 (13 Cr 2) | *** | MULTI | | S + Add. | 10° - 12° | 20 - 30 |
| 1030 | 304 | 1.7015 | 15Cr3 / EC60 (15 Cr 3) | ** | UNI-TIN | | S + Add. | 10° - 14° | 15 - 25 |
| 1030 | 304 | 1.7016 | 17Cr3 / 17 Cr 3 | ** | UNI | + TIN | S + Add. | 12° - 16° | 15 - 25 |
| 1030 | 304 | 1.7027 | 20Cr4 / 20 Cr 4 | * | VA | | S + Add. | 10° - 14° | 8 - 12 |
| 1180 | 350 | 1.7131 | 16MnCr5 / EC80n (16 MnCr 5) | *** | MULTI | | S + Add. | 10° - 12° | 20 - 30 |
| 1320 | 390 | 1.6587 | 17CrNiMo6 (18CrNiMo7-6) | *** | VHM | a.A./on spec. Request | S + Add. | 6° - 8° | 4 - 25 |
| 1370 | 405 | 1.7147 | G20MnCr5 / 20 MnCr 5 | *** | UNI-TIN | | S + Add. | 10° - 14° | 15 - 25 |
| 1420 | 418 | 1.5860 | 14NiCr18 / 14 NiCr 18 | ** | VA | | S + Add. | 10° - 14° | 8 - 12 |

Kalttauch- und Kaltfließpress-Stähle, Tiefziehbleche (nach DIN 1654, ISO 4954)

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|-----|-----|--------|---------------------|-----|---------|-------|-------|-----------|---------|
| 490 | 145 | 1.1132 | C15C / Cq 15 | *** | UNI-TIN | | S / E | 10° - 14° | 20 - 30 |
| 540 | 160 | 1.1152 | C22C / Cq22 | ** | UNI | + TIN | S / E | 12° - 16° | 20 - 30 |
| 590 | 175 | 1.1172 | C35C / Cq 35 | ** | UNI | | S / E | 12° - 16° | 10 - 15 |
| 600 | 178 | 1.1192 | C45C / Cq 45 | ** | UNI | | S / E | 12° - 16° | 10 - 15 |
| 610 | 181 | 1.5919 | 15CrNi6 / 15 CrNi 6 | ** | UNI | | S / E | 12° - 16° | 10 - 15 |

Kohlenstoffstähle, weichgeglüht, unlegierte Vergütungsstähle, weichgeglüht (nach DIN EN 10083-1+2, DIN 17200)

| | | | | | | | | | |
|-----|-----|--------|--------------|-----|---------|-------|-------|-----------|---------|
| 525 | 156 | 1.0402 | C22 / C 22 | *** | UNI-TIN | | S / E | 10° - 14° | 25 - 35 |
| 525 | 156 | 1.1151 | C22E / Ck 22 | *** | UNI | + TIN | S / E | 12° - 16° | 25 - 35 |
| 570 | 170 | 1.0528 | C30 / C 30 | *** | UNI | | S / E | 12° - 16° | 12 - 18 |
| 570 | 170 | 1.1178 | C30E / Ck 30 | ** | UNI | | S / E | 12° - 16° | 12 - 18 |
| 615 | 183 | 1.0501 | C35 / C 35 | *** | UNI-TIN | | S / E | 10° - 14° | 30 - 40 |
| 615 | 183 | 1.1180 | C35R / Cm 35 | ** | UNI | | S / E | 10° - 14° | 25 - 35 |
| 615 | 183 | 1.1181 | C35E / Ck 35 | * | UNI | + TIN | S / E | 12° - 16° | 25 - 35 |
| 700 | 207 | 1.0503 | C45 / C 45 | *** | MULTI | | S / E | 10° - 12° | 30 - 40 |
| 700 | 207 | 1.1191 | C45E / Ck 45 | ** | UNI-TIN | | S / E | 10° - 14° | 25 - 35 |
| 770 | 229 | 1.0535 | C55 / C 55 | * | UNI | + TIN | S / E | 12° - 16° | 25 - 35 |
| 815 | 241 | 1.0601 | C60 / C 60 | * | UNI | | S / E | 10° - 14° | 10 - 15 |
| 815 | 241 | 1.1221 | C60E / Ck 60 | * | VA | | S / E | 10° - 14° | 10 - 15 |

Kohlenstoffstähle, vergütet, unlegierte Vergütungsstähle, vergütet (nach DIN EN 10083-1+2, DIN 17200)

| | | | | | | | | | |
|------|-----|--------|--------------|-----|---------|------------------|-------|-----------|---------|
| 700 | 207 | 1.0402 | C22 / C 22 | *** | MULTI | | S / E | 10° - 12° | 30 - 40 |
| 700 | 207 | 1.1151 | C22E / Ck 22 | *** | UNI-TIN | | S / E | 10° - 14° | 25 - 35 |
| 750 | 222 | 1.0528 | C30 / C 30 | *** | UNI | + TIN | S / E | 12° - 16° | 25 - 35 |
| 750 | 222 | 1.1178 | C30E / Ck 30 | ** | UNI | | S / E | 12° - 16° | 10 - 15 |
| 780 | 231 | 1.0501 | C35 / C 35 | *** | UNI | | S / E | 10° - 12° | 20 - 30 |
| 780 | 231 | 1.1180 | C35R / Cm 35 | ** | UNI-TIN | | S / E | 10° - 14° | 15 - 20 |
| 780 | 231 | 1.1181 | C35E / Ck 35 | * | VA | + α + TIN | S / E | 10° - 12° | 15 - 20 |
| 850 | 252 | 1.0503 | C45 / C 45 | *** | MULTI | | S / E | 10° - 12° | 20 - 30 |
| 850 | 252 | 1.1191 | C45E / Ck 45 | ** | UNI-TIN | | S / E | 10° - 14° | 15 - 20 |
| 900 | 266 | 1.0535 | C55 / C 55 | ** | UNI | | S / E | 10° - 12° | 15 - 20 |
| 1000 | 296 | 1.0601 | C60 / C 60 | * | UNI | | S / E | 10° - 12° | 15 - 20 |
| 1000 | 296 | 1.1221 | C60E / Ck 60 | * | VA | | S / E | 10° - 14° | 10 - 15 |

Vergütungsstähle, legiert, weichgeglüht (nach DIN EN 10083-1+2, DIN 17200)

| | | | | | | | | | |
|-----|-----|--------|-------------------------|-----|---------|-------|--------------|-----------|---------|
| 750 | 222 | 1.1170 | 28Mn6 / 28 Mn 6 | *** | MULTI | | S + Add. / E | 10° - 12° | 20 - 30 |
| 750 | 222 | 1.7006 | 46Cr2 / 46 Cr 2 | *** | UNI-TIN | | S + Add. / E | 10° - 14° | 15 - 25 |
| 810 | 240 | 1.7035 | 41Cr4 / 41 Cr 4 | ** | UNI | + TIN | S + Add. / E | 12° - 16° | 15 - 25 |
| 810 | 240 | 1.7218 | G25CrMo4 / GS-25 CrMo 4 | ** | UNI | | S + Add. / E | 12° - 16° | 15 - 25 |
| 810 | 240 | 1.7220 | 34CrMo4 / GS-26 CrMo4 | ** | UNI | | S + Add. / E | 12° - 16° | 15 - 25 |
| 810 | 240 | 1.7225 | 42CrMo4 / 42 CrMo 4 | ** | UNI | | S + Add. / E | 12° - 16° | 15 - 25 |
| 835 | 247 | 1.7228 | 50CrMo4 / 50 CrMo 4 | ** | UNI | | S + Add. / E | 12° - 16° | 15 - 25 |
| 835 | 247 | 1.7361 | 32CrMo12 / 32 CrMo 12 | * | VA | | S + Add. / E | 10° - 14° | 8 - 12 |
| 835 | 247 | 1.6580 | 30CrNiMo8 / 30 CrNiMo 8 | * | VA | | S + Add. / E | 10° - 14° | 8 - 12 |
| 835 | 247 | 1.7707 | 30CrMoV9 / 30 CrMoV 9 | * | VA | | S + Add. / E | 10° - 14° | 8 - 12 |
| 835 | 247 | 1.5864 | 35NiCr18 / 35 NiCr 18 | * | VA | | S + Add. / E | 10° - 14° | 8 - 12 |
| 835 | 247 | 1.8161 | 58CrV4 / 58 CrV 4 | * | VA | | S + Add. / E | 10° - 14° | 8 - 12 |

Vergütungsstähle, legiert, vergütet (nach DIN EN 10083-1+2, DIN 17200)

| | | | | | | | | | |
|------|-----|--------|-------------------------|-----|-----|--------------------|---------------|---------|---------|
| 950 | 280 | 1.1170 | 28Mn6 / 28 Mn 6 | *** | UNI | + α + TiAlN | S + Add. / PA | 6° - 8° | 15 - 20 |
| 1000 | 296 | 1.7006 | 46Cr2 / 46 Cr 2 | ** | UNI | + α + TiCN | S + Add. / PA | 6° - 8° | 12 - 18 |
| 1100 | 326 | 1.7035 | 41Cr4 / 41 Cr 4 | * | UNI | + α | S + Add. / PA | 6° - 8° | 6 - 10 |
| 1100 | 326 | 1.7218 | G25CrMo4 / GS-25 CrMo 4 | * | UNI | | S + Add. / PA | 6° - 8° | 6 - 10 |

Legierte Werkzeugstähle für Kaltarbeit, ungehärtet, weichgeglüht (nach DIN 17350, ISO 4957)

| | | | | | | | | | |
|-----|-----|--------|----------------------------------|-----|----------|-------------|---------------|-----------|---------|
| 780 | 231 | 1.2303 | 100CrMo5 / 100 CrMo 5 | *** | MULTI | | S + Add. / E | 10° - 12° | 20 - 25 |
| 780 | 231 | 1.2312 | 40CrMnMoS8-6 / 40 CrMnMoS 8 6 | ** | UNI-TINI | | S / E | 10° - 14° | 15 - 20 |
| 780 | 231 | 1.2363 | X100CrMoV5-1 / X 100 CrMoV 5 1 | ** | UNI | + α + TiN | S / E | 10° - 12° | 15 - 20 |
| 780 | 231 | 1.2510 | 100MnCr4 / 100 MnCr 4 | ** | VA | | S + Add. / E | 10° - 14° | 10 - 15 |
| 810 | 240 | 1.2319 | X64CrMo14 | | | | | | |
| 820 | 242 | 1.2823 | 70Si7 / 70 Si 7 | | | | | | |
| 850 | 252 | 1.2080 | X210Cr12 / X 210 Cr 12 | | | | | | |
| 850 | 252 | 1.2316 | X36CrMo17 / X 36 CrMo 17 | | | | | | |
| 850 | 252 | 1.2379 | X155CrVMo12-1 / X 155 CrVMo 12 1 | *** | UNI | + α + TiAlN | S + Add. / PA | 6° - 8° | 15 - 20 |
| 850 | 252 | 1.2436 | X210CrW12 / X 210 CrW 12 | | | | | | |
| 850 | 252 | 1.2601 | X165CrMoV12 / X 165 CrMoV 12 | ** | UNI | + α + TiCN | S + Add. / PA | 6° - 8° | 5 - 10 |
| 850 | 252 | 1.2745 | 14NiCr18 / 14 NiCr 18 | | | | | | |
| 880 | 261 | 1.2767 | X45NiCrMo4 / X 45 NiCrMo 4 | | | | | | |
| 880 | 261 | 1.2880 | X165CrCoMo12 / G-X 165 CrCoMo 12 | | | | | | |
| 880 | 261 | 1.2884 | X210CrCoW12 / X 210 CrCoW 12 | | | | | | |
| 900 | 266 | 1.2361 | X91CrMoV18 | | | | | | |
| 900 | 266 | 1.2562 | 142WV13 / 142 WV 13 | | | | | | |

Legierte Werkzeugstähle für Kaltarbeit, gehärtet bis 62 HRC (nach DIN 17350, ISO 4957)

| | | | | | | | | | |
|---------|--------|-------------------------------|---|-----|-----------------------|---------------|----------|---------|--|
| (49HRC) | 1.2316 | X36CrMo17 / X 36 CrMo 17 | | | | | | | |
| (51HRC) | 1.2312 | 40CrMnMoS8-6 / 40 CrMnMoS 8 6 | | | | | | | |
| (55HRC) | 1.2303 | 100CrMo5 / 100 CrMo 5 | * | VHM | a.A./on spec. Request | S + Add. / PA | -3° - 0° | 1,5 - 3 | |
| (56HRC) | 1.2083 | X42Cr13 / X 42 Cr 13 | | | | | | | |
| (59HRC) | 1.2823 | 70Si7 / 70 Si 7 | | | | | | | |
| (61HRC) | 1.2745 | 14NiCr18 / 14 NiCr 18 | | | | | | | |
| (62HRC) | 1.2162 | 21MnCr5 / 21 MnCr 5 | | | | | | | |

Legierte Werkzeugstähle für Kaltarbeit, gehärtet und angelassen auf min.200°C, oder höher (max.62 HRC) (nach DIN 17350, ISO 49)

| | | | | | | | | | |
|---------|--------|----------------------------------|---|-----|-----------------------|---------------|----------|---------|--|
| (60HRC) | 1.2842 | 90MnCrV8 / 90 MnCrV 8 | | | | | | | |
| (61HRC) | 1.2379 | X155CrVMo12-1 / X 155 CrVMo 12 1 | | | | | | | |
| (61HRC) | 1.2601 | X165CrMoV12 / X 165 CrMoV 12 | | | | | | | |
| (62HRC) | 1.2056 | 90Cr3 / 90 Cr 3 | | | | | | | |
| (62HRC) | 1.2080 | X210Cr12 / X 210 Cr 12 | | | | | | | |
| (62HRC) | 1.2109 | 125CrSi5 / 125 CrSi 5 | | | | | | | |
| (62HRC) | 1.2127 | 105MnCr4 / 105 MnCr 4 | * | VHM | a.A./on spec. Request | S + Add. / PA | -3° - 0° | 1,5 - 3 | |
| (62HRC) | 1.2363 | X100CrMoV5-1 / X 100 CrMoV 5 1 | | | | | | | |
| (62HRC) | 1.2436 | X210CrW12 / X 210 CrW 12 | | | | | | | |
| (62HRC) | 1.2510 | 100MnCr4 / 100 MnCr 4 | | | | | | | |
| (62HRC) | 1.2519 | 110WCrV5 / 110 WCrV 5 | | | | | | | |
| (62HRC) | 1.2880 | X165CrCoMo12 / G-X 165 CrCoMo 12 | | | | | | | |
| (62HRC) | 1.2201 | G-X 165 CrV12 / X 165 CrV 12 | | | | | | | |
| (62HRC) | 1.2562 | 142WV13 / 142 WV 13 | | | | | | | |
| (62HRC) | 1.2884 | X210CrCoW12 / X 210 CrCoW 12 | | | | | | | |

nur bei Anlasstemperatur von mind. 300° C
nur bei Anlasstemperatur von mind. 300° C
nur bei Anlasstemperatur von mind. 300° C

Werkzeugstähle für Warmarbeit, ungehärtet, weichgeglüht (nach DIN 17350, ISO 4957)

| | | | | | | | | | |
|-----|-----|--------|--------------------------------------|-----|-------|-------------|---------------|-----------|---------|
| 680 | 201 | 1.2082 | X20Cr13 / X 20 Cr 13 | | | | | | |
| 780 | 231 | 1.2311 | 40CrMnMo7 / 40 CrMnMo 7 | | | | | | |
| 790 | 234 | 1.2343 | X38CrMoV5-1 / X 38 CrMoV 5 1 | *** | MULTI | | S + Add. / PA | 10° - 12° | 15 - 20 |
| 790 | 234 | 1.2344 | X40CrMoV5-1 / X 40 CrMoV 5 1 | | | | | | |
| 790 | 234 | 1.2367 | X38CrMoV5-3 / X 38 CrMoV 5 3 | ** | VG | + TiN | S + Add. / PA | 10° - 12° | 10 - 15 |
| 790 | 234 | 1.2743 | 60NiCrMoV12-4 / 60 NiCrMoV 12 4 | | | | | | |
| 810 | 240 | 1.2567 | 30WCrV17-2 / X 30 WCrV 5 3 | | | | | | |
| 810 | 240 | 2713 | G55NiCrMoV6 / 55 NiCrMoV 6 | * | VA | | S + Add. / PA | 10° - 14° | 6 - 10 |
| 810 | 240 | 1.2889 | X45CoCrMoV5-5-3 / X 45 CoCrMoV 5 5 3 | | | | | | |
| 850 | 252 | 1.2714 | 56NiCrMoV7 / G-56 NiCrMoV 7 | *** | UNI | + α + TiAlN | S + Add. / PA | 6° - 8° | 10 - 20 |
| 880 | 261 | 1.2678 | X45CoCrWV5-5-5 / X 45 CoCrWV 5 5 5 | | | | | | |
| 880 | 261 | 1.2766 | 35NiCrMo16 / 35 NiCrMo 16 | ** | UNI | + α + TiCN | S + Add. / PA | 6° - 8° | 5 - 10 |
| 910 | 269 | 1.2622 | X60WCrMoV9-4 / X 60 WCrMoV 9 4 | | | | | | |

Werkzeugstähle für Warmarbeit, gehärtet (nach DIN 17350, ISO 4957)

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|------|-----|--------|-------------------------------------|---|-----|-----------------------|----------|----------|---------|
| 1370 | 404 | 1.2082 | X20Cr13 / X 20 Cr 13 | | | | | | |
| 1420 | 418 | 1.2713 | 55NiCrMoV6 / 55 NiCrMoV 6 | | | | | | |
| 1470 | 433 | 1.2311 | 40CrMnMo7 / 40 CrMnMo 7 | | | | | | |
| 1570 | 460 | 1.2743 | 60NiCrMoV12-4 / 60 NiCrMoV 12 4 | | | | | | |
| 1620 | 470 | 1.2766 | 35NiCrMo16 / 35 NiCrMo 16 | | | | | | |
| 1620 | 470 | 1.2889 | X45CoCrMoV5-5-3 / X 45 CoCrMV 5 5 3 | | | | | | |
| 1670 | 486 | 1.2567 | 30WCrV17-2 / X 30 WCrV 5 3 | * | VHM | a.A./on spec. Request | S + Add. | -3° - 0° | 1,5 - 3 |
| 1670 | 486 | 1.2678 | X45CoCrWV5-5-5 / X 45 CoCrWV 5 5 5 | | | | | | |
| 1770 | 511 | 1.2343 | X38CrMoV5-1 / X 38 CrMoV 5 1 | | | | | | |
| 1770 | 511 | 1.2344 | X40CrMoV5-1 / X 40 CrMoV 5 1 | | | | | | |
| 1770 | 511 | 1.2367 | X38CrMoV5-3 / X 38 CrMoV 5 3 | | | | | | |
| 1770 | 511 | 1.2714 | 56NiCrMoV7 / 56 NiCrMoV 7 | | | | | | |
| 2060 | 587 | 1.2622 | X60WCrMoV9-4 / X 60 WCrMoV 9 4 | | | | | | |

Schnellarbeitsstähle, ungehärtet (nach DIN 17350, ISO 4957)

| | | | | | | | | | |
|------|-----|--------|-------------------------------------|-----|-----|-------------|---------------|----------|---------|
| 950 | 280 | 1.3333 | S 3-3-2 (HS3-3-2) (ABCIII) | *** | UNI | + α + TiAlN | S + Add. / PA | 7° - 10° | 10 - 20 |
| 950 | 280 | 1.3343 | S 6-5-2 (HS6-5-2) (DMo5) | | | | | | |
| 950 | 280 | 1.3344 | S 6-5-3 (HS6-5-3) (EMo5V3) | ** | UNI | + α + TiCN | S + Add. / PA | 7° - 10° | 5 - 10 |
| 950 | 280 | 1.3346 | S 2-9-1 (HS2-9-1) (BMo9) | | | | | | |
| 950 | 280 | 1.3348 | S 2-9-2 (HS2-9-2) (BMo9V) | | | | | | |
| 1020 | 302 | 1.3207 | S 10-4-3-10 (HS10-4-3-10) (EW9Co10) | | | | | | |
| 1020 | 302 | 1.3243 | S 6-5-2-5 (HS6-5-2-5) (EMo5Co5) | | | | | | |

Schnellarbeitsstähle, gehärtet Stahl, gehärtet (50 HRC - 62 HRC) Werkzeugstähle für Kaltarbeit, gehärtet

| | | | | | | | | | |
|---------|--------|----------------------------|---|-----|-----------------------|---------------|----------|---------|--|
| (52HRC) | 1.2208 | 31CrV2 / 31 CrV 3 | | | | | | | |
| (55HRC) | 1.2248 | 38SiCrV6 | | | | | | | |
| (56HRC) | 1.2241 | 51 CrV4 / 51 CrMnV 4 | | | | | | | |
| (56HRC) | 1.2767 | X45NiCrMo4 / X 45 NiCrMo 4 | * | VHM | a.A./on spec. Request | S + Add. / PA | -3° - 0° | 1,5 - 3 | |
| (58HRC) | 1.2103 | 58SiCr8 | | | | | | | |
| (58HRC) | 1.2249 | 45SiCrV6 | | | | | | | |
| (59HRC) | 1.2319 | X64CrMo14 | | | | | | | |

Schnellarbeitsstähle, gehärtet Stahl, gehärtet (50 HRC - 62 HRC) Werkzeugstähle für Kaltarbeit, gehärtet

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|--|---------|--------|---------------------------------|---|-----|-----------------------|---------------|----------|---------|
| | (59HRC) | 1.2361 | X91CrMoV18 | | | | | | |
| | (61HRC) | 1.2101 | 62SiMnCr4 | | | | | | |
| | (61HRC) | 1.2242 | 59CrV4 | | | | | | |
| | (62HRC) | 1.2243 | 61CrSiV5 | | | | | | |
| | (62HRC) | 1.3343 | HS6-5-2 / S 6-5-2 (DMo5) | * | VHM | a.A./on spec. Request | S + Add. / PA | -3° - 0° | 1,5 - 3 |
| | (64HRC) | 1.3344 | HS6-5-3 / S 6-5-3 (EMo5V3) | | | | | | |
| | (64HRC) | 1.3243 | HS6-5-2-5 / S 6-5-2-5 (EMo5Co5) | | | | | | |
| | (64HRC) | 1.3344 | ASP 2023 PM | | | | | | |

Warmfeste Baustähle (nach DIN EN 10216-2, DIN 17175)

| | | | | | | | | | |
|------|-----|--------|--------------------------------|-----|-------|-------|--------------|-----------|---------|
| 590 | 175 | 1.5419 | 22Mo4 / 22 Mo 4 | *** | MULTI | | S + Add. / E | 10° - 12° | 25 - 35 |
| 610 | 181 | 1.0482 | 19Mn5 / 19 Mn 5 | | | | | | |
| 690 | 204 | 1.5404 | 21MoV5-3 / 21 MoV 5 3 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 15 - 20 |
| 690 | 204 | 1.7242 | 16CrMo4 / 16 CrMo 4 | | | | | | |
| 690 | 204 | 1.7337 | 16CrMo4-4 / 16 CrMo 4 4 | * | VA | | S + Add. / E | 10° - 14° | 10 - 15 |
| 830 | 246 | 1.4922 | X20CrMoV12-1 / X 20 CrMoV 12 1 | *** | MULTI | | S + Add. / E | 10° - 12° | 15 - 25 |
| 830 | 246 | 1.5406 | 17MoV8-4 / 17 MoV 8 4 | | | | | | |
| 830 | 246 | 1.8070 | 21CrMoV5-11 / 21 CrMoV 5 11 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 10 - 15 |
| 880 | 261 | 1.6513 | 28NiCrMo4 / 28 NiCrMo 4 | | | | | | |
| 1000 | 296 | 1.7711 | 40CrMoV4-7 / 40 CrMoV 4 7 | * | VA | | S + Add. / E | 10° - 14° | 8 - 12 |

Kaltzähle Baustähle (nach DIN EN 10272, DIN 17440)

| | | | | | | | | | |
|-----|-----|--------|------------------------------------|-----|-------|-------|-------|-----------|---------|
| 640 | 190 | 1.5622 | 14Ni6 / 14 Ni 6 | *** | MULTI | | S / E | 10° - 12° | 20 - 30 |
| 690 | 204 | 1.1169 | 20Mn6 / 20 Mn 6 | | | | | | |
| 740 | 219 | 1.4311 | X2CrNiN18-10 / X 2 CrNiN 18 10 | | | | | | |
| 740 | 219 | 1.5633 | 24Ni8 / 24 Ni 8 | ** | VG | + TiN | S / E | 10° - 12° | 10 - 15 |
| 740 | 219 | 1.6903 | X10CrNiTi18-10 / X 10 CrNiTi 18 10 | | | | | | |
| 740 | 219 | 1.7219 | 26CrMo4 / 26 CrMo 4 | * | VA | | S / E | 10° - 14° | 8 - 12 |
| 780 | 231 | 1.4406 | X2CrNiMoN17-12-2 | | | | | | |

Ventilstähle, vergütet (nach DIN 17480, DIN EN 10090)

| | | | | | | | | | |
|------|-----|--------|----------------------------------|-----|-----|-------------|---------------|----------|---------|
| 930 | 276 | 1.5122 | 37MnSi5 / 37 MnSi 5 | *** | UNI | + α + TiCN | S + Add. / PA | 8° - 11° | 12 - 18 |
| 950 | 280 | 1.3817 | X40MnCr18 / X 40 MnCr 18 | | | | | | |
| 980 | 290 | 1.2731 | X50NiCrWV13-13 | ** | UNI | | S + Add. / PA | 8° - 11° | 6 - 10 |
| 1000 | 296 | 1.4873 | X45CrNiW18-9 / X 45 CrNiW 18 9 | | | | | | |
| 1100 | 326 | 1.4718 | X45CrSi9-3 / X 45 CrSi 9 3 | *** | UNI | + α + TiAlN | S + Add. / PA | 6° - 8° | 10 - 15 |
| 1100 | 326 | 1.4731 | X40CrSiMo10-2 / X 40 CrSiMo 10 2 | | | | | | |
| 1130 | 334 | 1.4747 | X80CrNiSi20 / X 80 Cr NiSi 20 | | | | | | |
| 1150 | 340 | 1.4875 | X55CrMnNiN20-8 | ** | UNI | + α + TiCN | S + Add. / PA | 6° - 8° | 8 - 12 |
| 1200 | 355 | 1.4748 | X85CrMoV18-2 | | | | | | |
| 1200 | 355 | 1.4871 | X53CrMnNiN21-9 | * | VG | | PA | 6° - 8° | 3 - 5 |
| 1250 | 368 | 1.4785 | X60CrMnMoVNbN21-10 | | | | | | |

Federstähle, naturhart (weichgeglüht) (nach DIN 17221, 17222, DIN EN 10132-4, ISO 683-14)

| | | | | | | | | | |
|------|-----|--------|-----------------------|-----|-----|------------|---------------|----------|---------|
| 860 | 255 | 1.0900 | 38Si6 / 38 Si 6 | | | | | | |
| 860 | 255 | 1.5024 | 46Si7 / 46 Si 7 | | | | | | |
| 910 | 270 | 1.5028 | 65Si7 / 66 Si 7 | | | | | | |
| 980 | 290 | 1.0908 | 60SiMn5 / 60 SiMn 5 | *** | UNI | + α + TiCN | S + Add. / PA | 8° - 11° | 12 - 18 |
| 980 | 290 | 1.5026 | 55Si7 / 55 Si 7 | | | | | | |
| 1010 | 300 | 1.1231 | Ck 67 (C67E) | | | | | | |
| 1045 | 310 | 1.8159 | 51CrV4 / 50 CrV 4 | ** | UNI | + α | S + Add. / PA | 8° - 11° | 6 - 10 |
| 1045 | 310 | 1.7701 | 51CrMoV4 / 51 CrMoV 4 | | | | | | |
| 1045 | 310 | 1.7176 | 55Cr3 / 55 Cr 3 | | | | | | |
| 1080 | 320 | 1.7138 | 52MnCrB3 / 52 MnCrB 3 | | | | | | |

Federstähle, federhart (gehärtet) (nach DIN 17221, 17222, DIN EN 10132-4, ISO 683-14)

| | | | | | | | | | |
|------|-----|--------|-----------------------|---|-----|-----------------------|----------|----------|---------|
| 1370 | 403 | 1.0900 | 38Si6 / 38 Si 6 | | | | | | |
| 1470 | 432 | 1.5024 | 46Si7 / 46 Si 7 | | | | | | |
| 1520 | 447 | 1.5028 | 60SiMn5 / 60 SiMn 5 | | | | | | |
| 1570 | 457 | 1.0908 | 65Si7 / 66 Si 7 | | | | | | |
| 1620 | 470 | 1.5026 | 51CrV4 / 50 CrV 4 | * | VHM | a.A./on spec. Request | S + Add. | -3° - 0° | 1,5 - 3 |
| 1670 | 486 | 1.1231 | 55Si7 / 55 Si 7 | | | | | | |
| 1670 | 486 | 1.8159 | 51CrMoV4 / 51 CrMoV 4 | | | | | | |
| 1720 | 500 | 1.7701 | 52MnCrB3 / 52 MnCrB 3 | | | | | | |
| 1720 | 500 | 1.7176 | 55Cr3 / 55 Cr 3 | | | | | | |
| 1770 | 512 | 1.7138 | Ck 67 (C67E) | | | | | | |

Nichtmagnetisierbare Stähle (nach SEW 390)

| | | | | | | | | | |
|------|-----|--------|-----------------------|-----|-------|------------|---------------|-----------|---------|
| 690 | 207 | 1.3952 | X2CrNiMoN18-14-3 | *** | Multi | | S + Add. | 10° - 12° | 10 - 15 |
| 690 | 207 | 1.3953 | X2CrNiMo18-15 | ** | VG | + TiN | S + Add. | 10° - 12° | 8 - 12 |
| 690 | 207 | 1.3958 | X5CrNi18-11 | * | VA | | S + Add. | 10° - 14° | 6 - 8 |
| 830 | 249 | 1.3941 | X4CrNi18-13 | | | | | | |
| 830 | 249 | 1.3962 | X15CrNiMn12-10 | *** | UNI | + α + TiCN | S + Add. / PA | 8° - 11° | 12 - 16 |
| 900 | 270 | 1.3805 | X35Mn18 | | | | | | |
| 930 | 279 | 1.3964 | X2CrNiMnMoNb21-16-5-3 | ** | UNI | + α + TiN | S + Add. / PA | 8° - 11° | 8 - 12 |
| 980 | 294 | 1.3949 | X50MnCrNiN18-13 | | | | | | |
| 1030 | 309 | 1.3813 | X40MnCrN19 | * | VA | | S + Add. / PA | 10° - 14° | 4 - 6 |
| 1180 | 354 | 1.3819 | X50MnCrV20-14 | | | | | | |

Hitzebeständige Stähle (nach DIN EN 10095)

| | | | | | | | | | |
|-----|-----|--------|----------------------------|-----|---------|-------|--------------|-----------|---------|
| 500 | 148 | 1.5310 | 8SiTi4 / 8 SiTi 4 | *** | MULTI | | S + Add. / E | 10° - 12° | 10 - 15 |
| 620 | 184 | 1.4713 | X10CrAl17 (X10CrAlSi17) | | | | | | |
| 640 | 190 | 1.4700 | 8CrSi7-7 / 8 CrSi 7 7 | | | | | | |
| 650 | 192 | 1.4724 | X10CrAl13 / X 10 CrAlSi 13 | ** | UNI-TIN | | S + Add. / E | 10° - 14° | 8 - 12 |
| 690 | 204 | 1.4712 | X10CrSi6 / X 10 CrSi 6 | | | | | | |
| 690 | 204 | 1.4722 | X10CrSi13 / X 10 CrSi 13 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 8 - 12 |
| 690 | 204 | 1.4741 | X10CrSi18 / X 10 CrSi 18 | | | | | | |
| 700 | 207 | 1.4742 | X10CrAl18 / X10 CrAlSi 18 | ** | VA | | S + Add. / E | 10° - 14° | 6 - 8 |
| 720 | 214 | 1.4762 | X10CrAl24 / X 10 CrAlSi 25 | | | | | | |

Hitzbeständige Stähle, austenitisch (nach DIN EN 10095)

| | | | | | | | | | |
|-----|-----|--------|------------------------------------|----|-----|-------------------|---------------|---------|-------|
| 750 | 222 | 1.4828 | X15CrNiSi20-12 / X 15 CrNiSi 20 12 | | | | | | |
| 750 | 222 | 1.4833 | X7CrNi23-14 / X 12 CrNi 24 12 | | | | | | |
| 750 | 222 | 1.4845 | X12CrNi25-21 / X 12 CrNi 25 21 | | | | | | |
| 750 | 222 | 1.4861 | X10NiCr32-20 / X 10 NiCr 32 20 | ** | UNI | + α + TiCN | S + Add. / PA | 4° - 8° | 6 - 8 |
| 750 | 222 | 1.4861 | X10NiCr32-20 / X 10 NiCr 32 20 | | | | | | |
| 750 | 222 | 1.4876 | X10NiCrAlTi32-20 / (Incoloy 800) | | | | | | |
| 750 | 222 | 1.4878 | X12CrNiTi18-9 / X 10 CrNiTi 18 10 | ** | UNI | + α + TiN | S + Add. / PA | 4° - 8° | 4 - 6 |
| 750 | 222 | 1.4885 | X12CrNiMoNb20-15 | | | | | | |
| 800 | 238 | 1.4841 | X15CrNiSi25-20 / X 15 CrNiSi 25 21 | | | | | | |
| 800 | 238 | 1.4864 | X12NiCrSi36-16 / X 12 NiCrSi 35 16 | | | | | | |
| 850 | 252 | 1.4821 | X20CrNiSi25-4 / X 20CrNiSi 25 4 | | | | | | |

Rost- und säurebeständige Stähle (INOX, NIROSTA) ferritisch, Chromanteil 13 - 18%, C-Gehalt <0,1% (nach DIN EN 10088-2+3, DIN 17440)

| | | | | | | | | | |
|-----|-----|--------|--|-----|-------|-------|--------------|-----------|---------|
| 560 | 166 | 1.4512 | X6CrTi12 / X 6 CrTi 12 | | | | | | |
| 600 | 178 | 1.4510 | X6CrTi17 / X 6 CrTi 17 | | | | | | |
| 600 | 178 | 1.4511 | X6CrNb17 / X 6 CrNb 17 | *** | MULTI | | S + Add. / E | 10° - 12° | 10 - 15 |
| 630 | 186 | 1.4000 | X6Cr13 / X 6 Cr 13 | | | | | | |
| 630 | 186 | 1.4016 | X6Cr17 / X 6 Cr 17 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 8 - 12 |
| 630 | 186 | 1.4105 | X6CrMoS17 / X 4 CrMoS 18 (geschwefelt) | | | | | | |
| 650 | 192 | 1.4521 | X2CrMoTi18-2 / X 2 CrMoTi 18 2 | ** | VA | | S + Add. / E | 10° - 14° | 6 - 8 |
| 660 | 195 | 1.4113 | X6CrMo17-1 / X 6 CrMo 17 1 | | | | | | |
| 700 | 207 | 1.4002 | X6CrAl13 / X 6 CrAl 13 | | | | | | |
| 720 | 214 | 1.4024 | X15Cr13 / X 15 Cr 13 | | | | | | |
| 730 | 216 | 1.4006 | X10Cr13 / X 10 Cr 13 | | | | | | |
| 730 | 216 | 1.4104 | X12CrMoS17 / X 12 CrMoS 17 (geschwefelt) | | | | | | |

Rost- und säurebeständige Stähle, ferritisch, vergütet

| | | | | | | | | | |
|-----|-----|--------|------------------------|-----|-----|-------------------|---------------|----------|-------|
| 700 | 207 | 1.4000 | X6Cr13 / X 6 Cr 13 | *** | UNI | + α + TiCN | S + Add. / PA | 8° - 10° | 6 - 8 |
| 850 | 252 | 1.4006 | X10Cr13 / X 10 Cr 13 | ** | UNI | + α + TiN | S + Add. / PA | 8° - 10° | 6 - 8 |
| 850 | 252 | 1.4005 | X12CrS13 / X 12 CrS 13 | | | | | | |

Rost- und säurebeständige Stähle (INOX, NIROSTA) martensitisch, Ni-Gehalt 0,5 - 2,5%, C-Gehalt 0,15 - 1,2% (nach DIN EN 10088-2+3, DIN 17440)

| | | | | | | | | | |
|-----|-----|--------|------------------------------|-----|-------|------------------|--------------|-----------|---------|
| 760 | 225 | 1.4021 | X20Cr13 / X 20 Cr 13 | | | | | | |
| 800 | 238 | 1.4028 | X30Cr13 / X 30 Cr 13 | | | | | | |
| 800 | 238 | 1.4031 | X39Cr13 / X 39 Cr 13 | *** | MULTI | | S + Add. / E | 10° - 12° | 12 - 16 |
| 800 | 238 | 1.4034 | X46Cr13 / X 46 Cr 13 | | | | | | |
| 840 | 252 | 1.4037 | X65Cr13 / X 65 Cr 13 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 8 - 12 |
| 880 | 261 | 1.4112 | X90CrMoV18 / X 90 CrMoV 18 | | | | | | |
| 900 | 266 | 1.4109 | X70CrMo15 / X 65 CrMo 14 | ** | UNI | + α + TiN | S + Add. / E | 10° - 12° | 6 - 8 |
| 900 | 266 | 1.4116 | X45CrMoV15 / X 45 CrMoV 15 | | | | | | |
| 950 | 281 | 1.4057 | X17CrNi16-2 / X 20 CrNi 17 2 | | | | | | |
| 960 | 284 | 1.4125 | X105CrMo17 / X 105 CrMo 17 | | | | | | |

Rost- und säurebeständige martensitisch, vergütet

| | | | | | | | | | |
|------|-----|--------|--------------------------|-----|-------|------------------|--------------|-----------|---------|
| 800 | 238 | 1.4024 | X15Cr13 | *** | MULTI | | S + Add. / E | 10° - 12° | 12 - 14 |
| 850 | 252 | 1.4104 | X14CrMoS17 | | | | | | |
| 950 | 281 | 1.4021 | X20Cr13 / X 20 Cr 13 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 10 - 12 |
| 950 | 281 | 1.4122 | X35CrMo17 / X 35 CrMo 17 | | | | | | |
| 1000 | 296 | 1.4028 | X30Cr13 / X 30 Cr 13 | ** | UNI | + α + TiN | S + Add. / E | 10° - 12° | 8 - 10 |

Rost- und säurebeständige Stähle (VA, INOX, NIROSTA) austenitisch, Ni-Gehalt 7 - 26%, C-Gehalt <0,12% (nach DIN EN 10088-2+3, DIN 17440)

| | | | | | | | | | |
|-----|-----|--------|---|-----|-------|------------------|---------------|-----------|---------|
| 680 | 201 | 1.4306 | X2CrNi19-11 / X 2CrNi 18 9 | | | | | | |
| 690 | 204 | 1.4433 | X2CrNiMo18-14 | | | | | | |
| 700 | 207 | 1.4435 | X2CrNiMo18-14-3 | | | | | | |
| 700 | 207 | 1.4300 | X12CrNi18-8 (V2A Normal) | | | | | | |
| 700 | 207 | 1.4301 | X5CrNi18-10 (V2A Supra) | | | | | | |
| 700 | 207 | 1.4541 | X6CrNiTi18-10 (V2A Extra) | | | | | | |
| 700 | 207 | 1.4404 | X2CrNiMo17-12-2 (316L) | *** | MULTI | | S + Add. / PA | 10° - 12° | 12 - 16 |
| 700 | 207 | 1.4436 | X3CrNiMo17-13-3 (316) | | | | | | |
| 700 | 207 | 1.4303 | X4CrNi18-12 | | | | | | |
| 700 | 207 | 1.4401 | X5CrNiMo17-12-2 (V4A-Supra, 316) | | | | | | |
| 700 | 207 | 1.4571 | X6CrNiMoTi17-12-2 (V4A-Extra) | ** | VG | + TiN | S + Add. / PA | 10° - 12° | 8 - 12 |
| 730 | 216 | 1.4539 | X2NiCrMoCu25-20-5 | | | | | | |
| 740 | 219 | 1.4505 | X4NiCrMoCuNb20-18-2 | | | | | | |
| 740 | 219 | 1.4550 | X6CrNiNb18-10 (347) | | | | | | |
| 740 | 219 | 1.4573 | X10CrNiMoTi18-12 | ** | UNI | + α + TiN | S + Add. / PA | 10° - 12° | 6 - 8 |
| 740 | 219 | 1.4580 | X6CrNiMoNb17-12-2 (V4A X-Extra) | | | | | | |
| 750 | 222 | 1.4305 | X8CrNiS18-9 / X 10 CrNiS 18 9 (geschwefelt) | | | | | | |
| 750 | 222 | 1.4310 | X10CrNi18-8 / X 12 CrNi 17 7 | | | | | | |
| 760 | 225 | 1.4311 | X2CrNiN18-10 (V2A Nitro) | | | | | | |
| 800 | 238 | 1.4406 | X2CrNiMoN17-11-2 (V4A-Nitro, 316LN) | | | | | | |
| 850 | 252 | 1.4529 | X1CrNiMoCuN25-20-7 | | | | | | |
| 880 | 261 | 1.4462 | X2CrNiMoN22-5-3 (ferrit.-austen.) | | | | | | |
| 880 | 261 | 1.4460 | X3CrNiMoN27-5-2 (ferrit.-austen.) | | | | | | |
| 900 | 266 | 1.4582 | X4CrNiMoNb25-7 (ferrit.-austen.) | | | | | | |

Rost- und säurebeständige Stähle hoher Festigkeit Hinweis: schwer zerspanbar

| | | | | | | | | | |
|------|-----|--------|---|----|-----|-------------------|---------------|---------|---------|
| 1100 | 316 | 1.4418 | X4CrNiMo16-5-1 | ** | UNI | + α + TiCN | S + Add. / PA | 6° - 8° | 10 - 12 |
| 1100 | 326 | 1.4313 | X3CrNiMo13-4 / X 4 CrNi 13 4 (vergütet) | ** | UNI | + α + TiN | S + Add. / PA | 6° - 8° | 7 - 10 |
| 1270 | 376 | 1.4542 | X5CrNiCuNb16-4 (gehärtet) | | | | | | |

Stahlguss

| | | | | | | | | | |
|------|-----|--------|---------------------------|-----|---------|--|---------------|-----------|---------|
| 450 | 133 | 1.0420 | GS-38 (GE200) | | | | | | |
| 500 | 148 | 1.0446 | GS-45 (GE240) | *** | MULTI | | S + Add. / E | 10° - 12° | 25 - 35 |
| 600 | 178 | 1.0552 | GS-52 (GE260) | | | | | | |
| 650 | 192 | 1.0558 | GS-60 (GE300) | ** | UNI-TIN | | S + Add. / E | 10° - 14° | 18 - 23 |
| 650 | 192 | 1.5919 | GS-15CrNi6 / GS-15 CrNi 6 | | | | | | |
| 650 | 192 | 1.1131 | G17Mn5 / GS-16Mn5 | ** | UNI | | S + Add. / E | 12° - 16° | 10 - 15 |
| 700 | 207 | 1.1120 | G20Mn5 / GS-20 Mn 5 | | | | | | |
| 1100 | 326 | 1.7218 | GS-25CrMo4 / GS-25 CrMo 4 | *** | MULTI | | S + Add. / PA | 10° - 12° | 20-25 |
| 1200 | 355 | 1.7220 | GS-34CrMo4 / GS-34 CrMo 4 | *** | MULTI | | S + Add. / PA | 10° - 12° | 20-25 |

Warmfester ferritischer Stahlguss (nach DIN EN 10213-1+2, DIN 17245)

| | | | | | | | | | |
|-----|-----|--------|---------------------------------|-----|-------|-------|--------------|-----------|---------|
| 650 | 192 | 1.0619 | GP240GH / GS-C 25 | *** | Multi | | S + Add. / E | 10° - 12° | 15 - 25 |
| 650 | 192 | 1.5419 | G20Mo5 / GS-22 Mo 4 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 12 - 18 |
| 700 | 207 | 1.7357 | G17CrMo5-5 / GS-17 CrMo 5 5 | ** | VA | | S + Add. / E | 10° - 14° | 8 - 12 |
| 750 | 222 | 1.4107 | GX8CrNi12 / G-X 8 CrNi 12 | *** | Multi | | S + Add. / E | 10° - 12° | 15 - 25 |
| 800 | 237 | 1.7379 | G17CrMo9-10 / GS-18CrMo 9 10 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 12 - 18 |
| 850 | 252 | 1.7706 | G17CrMoV5-10 / GS-17 CrMoV 5 11 | ** | VA | | S + Add. / E | 10° - 14° | 8 - 12 |
| 950 | 281 | 1.4931 | G-X23CrMoV12-1 | | | | | | |

Rost- und säurebeständiger Stahlguss (nach DIN EN 10213-1+4, DIN 17445)

| | | | | | | | | | |
|------|-----|--------|--------------------------------------|-----|-------|------------------|--------------|-----------|---------|
| 780 | 231 | 1.4008 | GX8CrNi14 / GX7CrNiMo12-1 (ferrit.) | *** | MULTI | | S + Add. / E | 10° - 12° | 18 - 22 |
| 790 | 234 | 1.4027 | GX20Cr14 / G-X 20 Cr 14 (ferritisch) | ** | VG | + TiN | S + Add. / E | 10° - 12° | 10 - 15 |
| 980 | 290 | 1.4059 | GX22CrNi17 (ferritisch) | ** | UNI | + α + TiN | S + Add. / E | 10° - 12° | 10 - 15 |
| 980 | 290 | 1.4085 | GX70Cr29 (SEW 410) | ** | UNI | | S + Add. / E | 10° - 12° | 10 - 15 |
| 980 | 290 | 1.4136 | GX70CrMo29-2 (martensitisch) | * | VA | | S + Add. / E | 10° - 14° | 6 - 8 |
| 1030 | 304 | 1.4106 | X2CrMoSi18-2-1 (martensitisch) | ** | VG | + TiN | S + Add. / E | 10° - 12° | 20 - 25 |
| 1080 | 320 | 1.4086 | GX120Cr29 (martensitisch) | ** | VG | | S + Add. / E | 10° - 12° | 6 - 10 |
| 1080 | 320 | 1.4138 | GX120CrMo29-2 (martensitisch) | ** | VG | + TiN | S + Add. / E | 10° - 12° | 20 - 25 |
| 1100 | 326 | 1.4313 | GX5CrNi13-4 / G-X 5 CrNi 13 4 | | | | | | |

Rost- und Säurebeständiger Stahlguss, austenitisch (nach DIN EN 10213-1+4, DIN 17445)

| | | | | | | | | | |
|-----|-----|--------|--------------------------------------|-----|-------|-------|--------------|-----------|---------|
| 640 | 190 | 1.4306 | GX2CrNiN18-9 | *** | MULTI | | S + Add. / E | 10° - 12° | 10 - 15 |
| 640 | 190 | 1.4308 | GX5CrNi19-10 / G-X 6 CrNi 18 9 | *** | MULTI | | S + Add. / E | 10° - 12° | 10 - 15 |
| 640 | 190 | 1.4312 | GX10CrNi18-8 | *** | MULTI | | S + Add. / E | 10° - 12° | 10 - 15 |
| 640 | 190 | 1.4408 | GX5CrNiMo19-11-2 / G-X6CrNiMo18-10 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 8 - 12 |
| 640 | 190 | 1.4410 | X2CrNiMoN25-7-4 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 8 - 12 |
| 640 | 190 | 1.4536 | GX2NiCrMoCuN25-20 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 8 - 12 |
| 640 | 190 | 1.4552 | GX5CrNiNb19-11 / G-X 5 CrNiNb 18 9 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 8 - 12 |
| 640 | 190 | 1.4581 | GX5CrNiMoNb19-11-2 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 8 - 12 |
| 690 | 200 | 1.4439 | GX3CrNiMoN17-13-5 | * | VA | | S + Add. / E | 10° - 14° | 3 - 5 |
| 790 | 234 | 1.4347 | GXCrNiN26-7 / GX6CrNiN26-7 | | | | | | |
| 800 | 240 | 1.4569 | GX2CrNiMnMoNb21-15-4-3 | | | | | | |
| 850 | 252 | 1.4469 | GX2CrNiMoN26-7-4 / G-X2CrNiMoN25-7-4 | | | | | | |

Hitzebeständiger Stahlguss (nach DIN 17465)

| | | | | | | | | | |
|-----|-----|--------|-----------------------------|-----|-------|-------|--------------|-----------|---------|
| 640 | 190 | 1.4825 | GX25CrNiSi18-9 | *** | Multi | | S + Add. / E | 10° - 12° | 15 - 20 |
| 640 | 190 | 1.4848 | GX40CrNiSi25-20 | *** | Multi | | S + Add. / E | 10° - 12° | 15 - 20 |
| 740 | 280 | 1.4710 | GX30CrSi6 / G-X 30 CrSi 6 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 10 - 15 |
| 780 | 300 | 1.4729 | GX40CrSi13 / G-X 40 CrSi 13 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 10 - 15 |
| 780 | 300 | 1.4740 | GX40CrSi17 / G-X 40 CrSi 17 | ** | VG | + TiN | S + Add. / E | 10° - 12° | 10 - 15 |
| 780 | 300 | 1.4823 | GX40CrNiSi27-4 | ** | VA | | S + Add. / E | 10° - 14° | 6 - 8 |

Temperguss, kurzspanend (nach DIN 1692, ISO5922)

| | | | | | | | | | |
|------|-----|--------|-----------------------|-----|---------|--------|---------------|-----------|---------|
| 400 | 150 | 0.8135 | GTS-35-10 / GTS-35 | *** | MULTI | | S / E | 10° - 12° | 20 - 25 |
| 400 | 230 | 0.8035 | GTW-35-04 / GTW-35 | *** | MULTI | | S / E | 10° - 12° | 20 - 25 |
| 450 | 200 | 0.8038 | GTW-S38-12 / GTW-S 38 | *** | MULTI | | S / E | 10° - 12° | 20 - 25 |
| 450 | 220 | 0.8040 | GTW-40-05 / GTW-40 | *** | UNI-TIN | | S / E | 10° - 14° | 15 - 20 |
| 500 | 220 | 0.8045 | GTW-45-07 / GTW-45 | *** | UNI-TIN | | S / E | 10° - 14° | 15 - 20 |
| 500 | 200 | 0.8145 | GTS-45-06 / GTS-45 | *** | VG | + TiN | S / E | 10° - 12° | 15 - 20 |
| 600 | 230 | 0.8055 | GTW-55 | *** | VG | + TiN | S / E | 10° - 12° | 15 - 20 |
| 600 | 230 | 0.8155 | GTS-55-04 / GTS-55 | * | VA | | S / E | 10° - 14° | 6 - 10 |
| 700 | 260 | 0.8065 | GTW-65 | | | | | | |
| 700 | 260 | 0.8165 | GTS-65-02 / GTS-65 | | | | | | |
| 750 | 290 | 0.8170 | GTS-70-02 / GTS-70 | | | | | | |
| 1000 | 310 | 0.8170 | GTS-70-02 (vergütet) | *** | VG | + TiCN | S + Add. / PA | 10° - 12° | 15 - 20 |

Grauguss, lamellar, extra-kurzspanend (Gusseisen mit Lamellengraphit nach DIN 1691, ISO/DIS 185)

| | | | | | | | | | |
|-----|-----|--------|-------|-----|-----|-----------------------------|--------------|---------|---------|
| 200 | 190 | 0.6010 | GG-10 | *** | GG | | S + Add. / E | 6° | 8 - 12 |
| 250 | 205 | 0.6015 | GG-15 | *** | GG | | S + Add. / E | 6° | 8 - 12 |
| 300 | 230 | 0.6020 | GG-20 | *** | GG | | S + Add. / E | 6° | 8 - 12 |
| 350 | 250 | 0.6025 | GG-25 | *** | UNI | + α + TiN | S + Add. / E | 4° - 6° | 15 - 20 |
| 400 | 275 | 0.6030 | GG-30 | *** | UNI | + α + TiN | S + Add. / E | 4° - 6° | 15 - 20 |
| 450 | 290 | 0.6035 | GG-35 | *** | UNI | + α + nitr./nitrided | S + Add. / E | 4° - 6° | 15 - 20 |
| 550 | 300 | 0.6040 | GG-40 | *** | UNI | + α + nitr./nitrided | S + Add. / E | 4° - 6° | 15 - 20 |

Grauguss, vergütet, extra-kurzspanend

| | | | | | | | | | |
|------|-----|--------|-------|-----|-----|-----------------------------|--------------|----|---------|
| 700 | 270 | 0.6010 | GG-10 | *** | GG | | S + Add. / E | 6° | 4 - 6 |
| 700 | 280 | 0.6015 | GG-15 | *** | GG | | S + Add. / E | 6° | 4 - 6 |
| 800 | 290 | 0.6020 | GG-20 | *** | GG | | S + Add. / E | 6° | 4 - 6 |
| 800 | 290 | 0.6025 | GG-25 | *** | UNI | + α + TiN | S + Add. / E | 6° | 15 - 20 |
| 900 | 300 | 0.6030 | GG-30 | *** | UNI | + α + TiN | S + Add. / E | 6° | 15 - 20 |
| 1000 | 310 | 0.6035 | GG-35 | *** | UNI | + α + nitr./nitrided | S + Add. / E | 6° | 15 - 20 |
| 1000 | 310 | 0.6040 | GG-40 | *** | UNI | + α + nitr./nitrided | S + Add. / E | 6° | 15 - 20 |

Grauguss, austenitisch (Austenitisches Gusseisen mit Lamellengraphit nach DIN 1694, ISO 2892)

| | | | | | | | | | |
|-----|-----|--------|------------------|-----|-----|-----------------------------|--------------|----|---------|
| 220 | 150 | 0.6652 | GGL-NiMn13-7 | *** | GG | | S + Add. / E | 6° | 4 - 6 |
| 220 | 215 | 0.6655 | GGL-NiCuCr15-6-2 | *** | GG | | S + Add. / E | 6° | 4 - 6 |
| 220 | 215 | 0.6660 | GGL-NiCr20-2 | *** | GG | | S + Add. / E | 6° | 4 - 6 |
| 240 | 215 | 0.6676 | GGL-NiCr30-3 | *** | UNI | + α + TiN | S + Add. / E | 6° | 15 - 20 |
| 260 | 220 | 0.6678 | GGL-NiCr35-2 | *** | UNI | + α + TiN | S + Add. / E | 6° | 15 - 20 |
| 280 | 250 | 0.6667 | GGL-NiSiCr20-5-3 | *** | UNI | + α + nitr./nitrided | S + Add. / E | 6° | 15 - 20 |
| 280 | 250 | 0.6680 | GGL-NiSiCr30-5-5 | *** | UNI | + α + nitr./nitrided | S + Add. / E | 6° | 15 - 20 |

Kugelgraphitguss, Sphäroguss, kurzspanend (nach DIN 1693)

| | | | | | | | | | |
|------|-----|--------|-------------------|-----|-----|-------------------|--------------|----|---------|
| 400 | 119 | 0.7033 | GGG-35.3 | *** | UNI | + α + TiCN | S + Add. / E | 6° | 20 - 25 |
| 500 | 148 | 0.7040 | GGG-40 | *** | UNI | + α + TiCN | S + Add. / E | 6° | 15 - 20 |
| 500 | 148 | 0.7043 | GGG-40.3 | *** | UNI | + α + TiCN | S + Add. / E | 6° | 15 - 20 |
| 600 | 178 | 0.7050 | GGG-50 | *** | UNI | + α + TiCN | S + Add. / E | 6° | 15 - 20 |
| 700 | 207 | 0.7060 | GGG-60 | *** | UNI | + α + TiCN | S + Add. / E | 6° | 15 - 20 |
| 750 | 222 | 0.7070 | GGG-70 | *** | GG | | S + Add. / E | 6° | 6 - 10 |
| 850 | 252 | 0.7080 | GGG-80 | *** | GG | | S + Add. / E | 6° | 6 - 10 |
| 1000 | 296 | 0.7070 | GGG-70 (vergütet) | *** | UNI | + α + TiCN | S + Add. / E | 6° | 12 - 18 |
| 1000 | 296 | 0.7080 | GGG-80 (vergütet) | ** | UNI | + α + TiCN | S + Add. / E | 6° | 8 - 12 |

Kugelgraphitguss, austenitisch (nach DIN 1694, ISO 2892)

| | | | | | | | | | |
|-----|-----|--------|----------|-----|-----|-------------------|--------------|----|---------|
| 420 | 180 | 0.7683 | GGG-Ni35 | *** | UNI | + α + TiCN | S + Add. / E | 6° | 15 - 25 |
| 450 | 170 | 0.7670 | GGG-Ni22 | *** | GG | | S + Add. / E | 6° | 5 - 8 |

Kugelgraphitguss, austenitisch (nach DIN 1694, ISO 2892)

| | | | | | | | | | |
|-----|-----|--------|------------------|-----|-----|------------------|--------------|----|---------|
| 470 | 150 | 0.7652 | GGG-NiMn13-7 | | | | | | |
| 480 | 180 | 0.7673 | GGG-NiMn23-4 | | | | | | |
| 480 | 200 | 0.7659 | GGG-NiCrNb20-2 | *** | UNI | + α + TiN | S + Add. / E | 6° | 10 - 15 |
| 480 | 200 | 0.7660 | GGG-NiCr20-2 | | | | | | |
| 480 | 200 | 0.7676 | GGG-NiCr30-3 | | | | | | |
| 500 | 170 | 0.7688 | GGG-NiSiCr35-5-2 | *** | GG | | S + Add. / E | 6° | 5 - 8 |
| 500 | 230 | 0.7665 | GGG-NiSiCr20-5-2 | | | | | | |
| 500 | 250 | 0.7680 | GGG-NiSiCr30-5-5 | | | | | | |

Meehanite-Guss

| | | | | | | | | | |
|------|-----|--|---------|-----|-----|-------------------|--------------|----|---------|
| 500 | 148 | | GD-260 | | | | | | |
| 500 | 148 | | GF-150 | *** | UNI | + α + TiCN | S + Add. / E | 6° | 10 - 15 |
| 700 | 207 | | SF-400 | | | | | | |
| 700 | 207 | | SPF-600 | *** | UNI | + α + TiN | S + Add. / E | 6° | 8 - 12 |
| 1000 | 296 | | SH-800 | | | | | | |
| 1000 | 296 | | SH-1000 | *** | GG | | S + Add. / E | 6° | 4 - 6 |

Kupfer, unlegiert/niedriglegiert, extra-langspanend (nach DIN 1708, ISO 431)

| | | | | | | | | | |
|-----|-----|-----------|------------------------------|-----|--------|-----|-----------|-----------|---------|
| 250 | 75 | 2.0060 | E-Cu57 | | | | | | |
| 250 | 75 | 2.0065 | E-Cu58 | | | | | | |
| 300 | 89 | 2.0061 | E1-Cu58 (Cu-ETP ISO/R 431) | *** | Former | CrN | Öl für NE | - | 25 - 30 |
| 300 | 89 | 2.0062 | E2-Cu58 (Cu-FRHC ISO/R 1428) | | | | | | |
| 300 | 89 | 2.0070 | SE-Cu | *** | UNI | CrN | Öl für NE | 12° - 16° | 20 - 25 |
| 350 | 105 | 2.0080 | F-Cu (Cu-FRPT ISO/R 1429) | | | | | | |
| 400 | 105 | 2.0076 | SW-Cu (Cu-DLP ISO/R 1430) | ** | UNI | | Öl für NE | 12° - 16° | 10-12 |
| 420 | 110 | 2.0090 | SF-Cu (Cu-DHP ISO/R 1430) | | | | | | |
| 420 | 120 | 2.0060.32 | E-Cu57-F37 | | | | | | |
| 420 | 120 | 2.0065.32 | E-Cu58-F37 | | | | | | |
| 420 | 120 | 2.0070.32 | SE-Cu-F37 | | | | | | |

Elektrolyt-Kupfer, Kathodenkupfer

| | | | | | | | | | |
|-----|-----|--------|-----------------------------|-----|--------|-----|-----------|-----------|---------|
| 400 | 115 | 2.0050 | KE-Cu (Cu-CATH ISO/DR 2311) | *** | Former | CrN | Öl für NE | - | 25 - 30 |
| 400 | 115 | 2.0040 | OF-Cu | *** | Multi | | Öl für NE | 10° - 12° | 12 - 18 |

Kupfer-Knetlegierungen, niedriglegiert (Nicht aushärtbar) (nach DIN 17666, ISO 1336)

| | | | | | | | | | |
|-----|-----|--------|---------------|-----|---------|-------|---------------|-----------|---------|
| 350 | 105 | 2.1356 | CuMn3 | | | | | | |
| 350 | 105 | 2.1522 | CuSi2Mn | | | | | | |
| 350 | 105 | 2.1525 | CuSi3Mn | *** | Former | + CrN | Öl für NE | - | 25 - 30 |
| 400 | 115 | 2.1265 | CuCd0,5 | | | | | | |
| 400 | 115 | 2.1491 | CuAsP (SB-Cu) | | | | | | |
| 400 | 115 | 2.1160 | CuPb1P | | | | | | |
| 400 | 115 | 2.1498 | CuSP | *** | UNI-TIN | | Öl für NE / E | 10° - 14° | 20 - 25 |

Kupfer-Knetlegierungen, niedriglegiert (Nicht aushärtbar) (nach DIN 17666, ISO 1336)

| | | | | | | | | | |
|-----|-----|--------|-----------------|-----|-----|-------|---------------|-----------|---------|
| 400 | 115 | 2.1546 | CuTeP (SF-CuTe) | | | | | | |
| 420 | 120 | 2.1203 | CuAg0,1 | | | | | | |
| 420 | 120 | 2.1191 | CuAg0,1P | *** | UNI | + CrN | Öl für NE / E | 12° - 16° | 15 - 20 |
| 420 | 120 | 2.1192 | CuAg0,03P | | | | | | |
| 420 | 120 | 2.1322 | CuMg0,4 | | | | | | |
| 460 | 120 | 2.0205 | CuZn0,5 | | | | | | |
| 600 | 160 | 2.1310 | CuFe2P | | | | | | |

Kupfer-Knetlegierungen, niedriglegiert aushärtbar, nicht ausgehärtet (nach DIN 17666, ISO 1336)

| | | | | | | | | | |
|-----|-----|--------|-------------------------------|-----|---------|-------|---------------|-----------|---------|
| 400 | 115 | 2.1580 | CuZr (nicht ausgehärtet) | | | | | | |
| 470 | 139 | 2.1293 | CuCrZr (nicht ausgehärtet) | | | | | | |
| 520 | 145 | 2.0853 | CuNi1,5Si (nicht ausgehärtet) | ** | MULTI | | Öl für NE / E | 10° - 12° | 20 - 30 |
| 700 | 200 | 2.0850 | CuNi2Be (nicht ausgehärtet) | | | | | | |
| 700 | 200 | 2.1285 | CuCo2Be (nicht ausgehärtet) | *** | UNI-TIN | | Öl für NE / E | 10° - 14° | 15 - 20 |
| 750 | 210 | 2.0857 | CuNi3Si (nicht ausgehärtet) | *** | UNI | + TiN | Öl für NE / E | 12° - 16° | 15 - 20 |
| 830 | 245 | 2.1245 | CuBe1,7 (nicht ausgehärtet) | | | | | | |
| 830 | 245 | 2.1247 | CuBe2 (nicht ausgehärtet) | *** | UNI | + CrN | Öl für NE / E | 12° - 16° | 15 - 20 |
| 830 | 245 | 2.1248 | CuBe2Pb (nicht ausgehärtet) | | | | | | |

Kupfer-Knetlegierungen, niedriglegiert, ausgehärtet (nach DIN 17666, ISO 1336)

| | | | | | | | | | |
|------|-----|--------|-------------------------|-----|-------|-----------------------|---------------|-----------|---------|
| 500 | 140 | 2.1580 | CuZr (ausgehärtet) | *** | MULTI | | Öl für NE / E | 10° - 12° | 20 - 30 |
| 700 | 190 | 2.1293 | CuCrZr (ausgehärtet) | *** | UNI | + CrN | Öl für NE / E | 12° - 16° | 15 - 20 |
| 720 | 180 | 2.0853 | CuNi1,5Si (ausgehärtet) | | | | | | |
| 950 | 260 | 2.0857 | CuNi3Si (ausgehärtet) | *** | MS | | Öl für NE / E | 6° - 8° | 15 - 20 |
| 1000 | 290 | 2.0850 | CuNi2Be (ausgehärtet) | ** | UNI | + α + CrN | Öl für NE / E | 6° - 8° | 10 - 15 |
| 1000 | 290 | 2.1285 | CuCo2Be (ausgehärtet) | | | | | | |
| 1380 | 400 | 2.1245 | CuBe1,7 (ausgehärtet) | | | | | | |
| 1480 | 430 | 2.1247 | CuBe2 (ausgehärtet) | *** | VHM | a.A./on spec. Request | Öl für NE / E | 6° - 8° | 4 - 25 |
| 1480 | 430 | 2.1248 | CuBe2Pb (ausgehärtet) | | | | | | |

Messing, kurzspanend (spröde) Kupfer-Zink-Legierungen (nach DIN 17660, ISO 426-1, -2)

| | | | | | | | | | |
|-----|-----|--------|-------------------------|-----|-----|------------------|---------------|---------|---------|
| 600 | 140 | 2.0360 | Ms 60: CuZn40 | | | | | | |
| 650 | 160 | 2.0370 | Ms 60Pb1: CuZn38Pb1 | *** | MS | | Öl für NE / E | 4° - 6° | 20 - 25 |
| 650 | 160 | 2.0371 | Ms 60Pb1,5: CuZn38Pb1,5 | | | | | | |
| 650 | 160 | 2.0372 | Ms 60Pb: CuZn39Pb0,5 | *** | UNI | + α + CrN | Öl für NE / E | 4° - 6° | 30 - 40 |
| 650 | 192 | 2.0550 | CuZn40Al2 | | | | | | |
| 700 | 170 | 2.0380 | Ms 58: CuZn39Pb2 | ** | UNI | + α | Öl für NE / E | 4° - 6° | 20 - 25 |
| 700 | 170 | 2.0401 | (A-)Ms 58: CuZn39Pb3 | | | | | | |
| 700 | 207 | 2.0410 | Ms 56: CuZn44Pb2 | *** | MS | | Öl für NE / E | 4° - 6° | 20 - 25 |
| 700 | 170 | 2.0525 | CuZn38SnAl | *** | UNI | + α + CrN | Öl für NE / E | 4° - 6° | 30 - 40 |

Messing, kurzspanend (spröde) Kupfer-Zink-Legierungen (nach DIN 17660, ISO 426-1, -2)

| | | | | | | | | | |
|-----|-----|--------|--------------------|----|-----|------------|---------------|---------|---------|
| 700 | 207 | 2.0561 | CuZn40Al1 | ** | UNI | + α | Öl für NE / E | 4° - 6° | 20 - 25 |
| 710 | 175 | 2.0402 | (Ms 58): CuZn40Pb2 | | | | | | |

Messing, langspanend (zäh) Kupfer-Zink-Legierungen (nach DIN 17660, ISO 426-1, -2)

| | | | | | | | | | |
|-----|-----|--------|--------------------|-----|--------------|-------|---------------|-----------|---------|
| 420 | 105 | 2.0220 | Ms 95: CuZn5 | | | | | | |
| 450 | 110 | 2.0230 | Ms 90: CuZn10 | | | | | | |
| 550 | 140 | 2.0240 | Ms 85: CuZn15 | *** | MULTI | | Öl für NE / E | 10° - 12° | 20 - 30 |
| 600 | 145 | 2.0250 | Ms 80: CuZn20 | | | | | | |
| 620 | 150 | 2.0261 | Ms 72: CuZn28 | | | | | | |
| 620 | 150 | 2.0265 | Ms 70: CuZn30 | *** | Multi-Former | | Öl für NE | - | 20 - 25 |
| 650 | 160 | 2.0280 | Ms 67: CuZn33 | | | | | | |
| 650 | 160 | 2.0330 | Ms 63Pb: CuZn36Pb1 | | | | | | |
| 650 | 160 | 2.0331 | CuZn36Pb1,5 | ** | UNI | + CrN | Öl für NE / E | 12° - 16° | 30 - 40 |
| 650 | 160 | 2.0375 | CuZn36Pb3 | | | | | | |
| 650 | 160 | 2.0332 | CuZn37Pb0,5 | | | | | | |
| 700 | 190 | 2.0335 | (Ms 63): CuZn36 | * | UNI | | Öl für NE / E | 12° - 16° | 12 - 18 |
| 700 | 190 | 2.0321 | Ms 63: CuZn37 | | | | | | |

Guss-Messing, Guss-Sondermessing Kupfer-Zink-Gusslegierungen (nach DIN 1709, ISO 1338)

| | | | | | | | | | |
|-----|------|-----------|--------------|-----|-----|-----------|---------------|---------|---------|
| 340 | 102 | 2.0241.01 | G-CuZn15 | | | | | | |
| 360 | 108 | 2.0290.01 | G-CuZn33Pb | | | | | | |
| 500 | 1150 | 2.0340.02 | GK-CuZn37Pb | *** | MS | | Öl für NE / E | 4° - 6° | 30 - 40 |
| 500 | 150 | 2.0340.05 | GD-CuZn37Pb | | | | | | |
| 500 | 150 | 2.0590.01 | G-CuZn40Fe | *** | UNI | + α + CrN | Öl für NE / E | 4° - 6° | 30 - 40 |
| 530 | 159 | 2.0590.03 | GZ-CuZn40Fe | | | | | | |
| 580 | 174 | 2.0591.02 | GK-CuZn38Al | *** | UNI | | Öl für NE / E | 4° - 6° | 30 - 40 |
| 700 | 210 | 2.0492.02 | GK-CuZn15Si4 | ** | UNI | + α | Öl für NE / E | 4° - 6° | 10 - 15 |
| 750 | 222 | 2.0492.05 | GD-CuZn15Si4 | | | | | | |
| 800 | 240 | 2.0596.01 | G-CuZn34Al2 | | | | | | |
| 900 | 270 | 2.0598.01 | G-CuZn25Al5 | | | | | | |
| 900 | 270 | 2.0598.02 | GK-CuZn25Al5 | | | | | | |
| 900 | 270 | 2.0598.03 | GZ-CuZn25Al5 | | | | | | |

Hinweis:
G = Sandguss
GD = Druckguss
GK = Kokillenguss
GZ = Schleuderguss

Sondermessing (zäh) Kupfer-Zink-Sonderlegierung (nach DIN 17660, ISO 426)

| | | | | | | | | | |
|-----|-----|--------|-------------------------------|-----|-----|-----------|---------------|---------|---------|
| 550 | 140 | 2.0530 | CuZn39Sn | | | | | | |
| 580 | 145 | 2.0515 | CuZn30Al | | | | | | |
| 580 | 145 | 2.0525 | CuZn38SnAl | | | | | | |
| 600 | 145 | 2.0460 | CuZn20Al2 (SoMs76) | *** | MS | | Öl für NE / E | 4° - 6° | 25 - 35 |
| 620 | 150 | 2.0510 | CuZn37Al1 (SoMs58Al1) | | | | | | |
| 650 | 160 | 2.0490 | CuZn31Sn1 (SoMs68) | | | | | | |
| 650 | 160 | 2.0540 | CuZn35Ni2 (SoMs59) | | | | | | |
| 650 | 160 | 2.0561 | CuZn40Al1 (SoMs58Al1) | *** | UNI | + α + CrN | Öl für NE / E | 4° - 6° | 15 - 25 |
| 650 | 160 | 2.0572 | CuZn40Mn2 | | | | | | |
| 650 | 160 | 2.0580 | CuZn40Mn1Pb (SoMs58Pb) | | | | | | |
| 700 | 190 | 2.0470 | CuZn28Sn1 (SoMs71) | | | | | | |
| 700 | 170 | 2.0530 | CuZn38Sn1, CuZn39Sn (SoMs 60) | ** | UNI | + α | Öl für NE / E | 4° - 6° | 10 - 15 |
| 700 | 170 | 2.0550 | CuZn40Al2 (SoMs58Al2) | | | | | | |
| 700 | 170 | 2.0571 | CuZn40Ni (SoMs58) | | | | | | |
| 700 | 200 | 2.0730 | CuNi12Zn24 | | | | | | |
| 800 | 220 | 2.0790 | CuNi18Zn19Pb1 | | | | | | |
| 900 | 200 | 2.0500 | CuZn23Al6Mn4Fe3 | | | | | | |

Kupfer-Nickel-Zink-Legierungen Neusilber (nach DIN 17663, ISO 430)

| | | | | | | | | | |
|-----|-----|--------|---------------------|-----|-----|------------|----------------|---------|---------|
| 650 | 160 | 2.0780 | CuNi12Zn30Pb1 | *** | UNI | + α + TiCN | Öl für NE / E | 6° - 8° | 15 - 20 |
| 700 | 170 | 2.0790 | CuNi18Zn19Pb1 | | | | | | |
| 720 | 180 | 2.0771 | CuNi7Zn39Mn5Pb3 | *** | UNI | + α + CrN | Öl für NE / E | 6° - 8° | 10 - 15 |
| 750 | 200 | 2.0730 | CuNi12Zn24 (Ns6512) | | | | | | |
| 800 | 215 | 2.0740 | CuNi18Zn20 (Ns6218) | | | | | | |
| 820 | 220 | 2.0742 | CuNi18Zn27 | * | UNI | + α | Öl für NE / PA | 6° - 8° | 4 - 8 |
| 900 | 250 | 2.0798 | CuNi25Zn15 | | | | | | |

Kupfer-Nickel-Legierungen (nach DIN 17664, ISO 429)

| | | | | | | | | | |
|-----|-----|--------|--------------|-----|---------|------------|----------------|-----------|---------|
| 350 | 90 | 2.0802 | CuNi2 | *** | MULTI | | Öl für NE / E | 10° - 12° | 20 - 30 |
| 500 | 115 | 2.0855 | CuNi2Si | *** | UNI-TIN | | Öl für NE / E | 10° - 14° | 15 - 20 |
| 500 | 115 | 2.0857 | CuNi3Si | *** | UNI | + TIN | Öl für NE / E | 12° - 16° | 15 - 20 |
| 500 | 115 | 2.0862 | CuNi5Fe | ** | UNI | + CrN | Öl für NE / E | 12° - 16° | 15 - 20 |
| 480 | 100 | 2.0830 | CuNi25 | | | | | | |
| 500 | 115 | 2.0881 | CuNi23Mn | *** | UNI | + α + TiCN | Öl für NE / E | 6° - 8° | 15 - 20 |
| 500 | 115 | 2.0872 | CuNi10Fe1Mn | | | | | | |
| 550 | 120 | 2.0890 | CuNi30Mn | *** | UNI | + α + CrN | Öl für NE / E | 6° - 8° | 10 - 15 |
| 550 | 120 | 2.0882 | CuNi30Mn1Fe | | | | | | |
| 600 | 130 | 2.0883 | CuNi30Fe2Mn2 | * | UNI | + α | Öl für NE / PA | 6° - 8° | 4 - 8 |
| 600 | 130 | 2.0842 | CuNi44Mn1 | | | | | | |
| 760 | 210 | 2.0875 | CuNi9Sn2 | | | | | | |

Rotguss, kurzspanend (nach DIN 1705) Kupfer-Zinn-Zink-Gusslegierungen

| | | | | | | | | | |
|-----|-----|-----------|-------------------|-----|-----|-----------|---------------|---------|---------|
| 280 | 84 | 2.1098.01 | G-CuSn2ZnPb | *** | MS | | Öl für NE / E | 4° - 6° | 4 - 8 |
| 280 | 84 | 2.1096.01 | Rg 5: G-CuSn5ZnPb | *** | UNI | + α + CrN | Öl für NE / E | 4° - 6° | 20 - 30 |
| 350 | 105 | 2.1093 | Rg 6: G-CuSn6ZnNi | ** | UNI | + α | Öl für NE / E | 4° - 6° | 4 - 8 |
| 350 | 105 | 2.1090.01 | Rg 7: G-CuSn7ZnPb | | | | | | |

Rotguss, langspanend (nach DIN 1705)

| | | | | | | | | | |
|-----|----|-----------|-------------------|----|---------|-------|---------------|-----------|---------|
| 300 | 89 | 2.1086.01 | Rg 10: G-CuSn10Zn | ** | UNI-TIN | | Öl für NE / E | 10° - 14° | 10 - 15 |
| | | | | ** | UNI | + TIN | Öl für NE / E | 10° - 16° | 10 - 15 |

Zinnbronze, langspanend (zäh) Kupfer-Zinn-Knetlegierungen (nach DIN 17662, ISO 427)

| | | | | | | | | | |
|-----|-----|-----------|-------------------|-----|-----|-----------|----------------|---------|---------|
| 610 | 155 | 2.1020.30 | CuSn6-F49 | | | | | | |
| 650 | 170 | 2.1030.30 | CuSn8-F54 | *** | MS | | Öl für NE / E | 6° - 8° | 20 - 30 |
| 700 | 190 | 2.1016 | CuSn4 (SnBz4) | | | | | | |
| 750 | 200 | 2.1020 | CuSn6 (SnBz6) | ** | UNI | + α + CrN | Öl für NE / E | 6° - 8° | 10 - 15 |
| 780 | 220 | 2.1030 | CuSn8 (SnBz8) | | | | | | |
| 880 | 230 | 2.1080 | CuSn6Zn6 (MSnBz6) | *** | MS | | Öl für NE / PA | 6° - 8° | 15 - 20 |
| 900 | 250 | 2.1020.34 | CuSn6-F80 | | | | | | |
| 950 | 270 | 2.1030.34 | CuSn8-F85 | ** | UNI | + α + CrN | Öl für NE / PA | 6° - 8° | 10 - 12 |

Guss-Zinnbronze (nach DIN 1705, ISO 1338) Kupfer-Zinn-Gusslegierungen

| | | | | | | | | | |
|-----|-----|-----------|---------------------------|-----|-----|-------------------|----------------|---------|---------|
| 520 | 156 | 2.1052.01 | G-CuSn12 (G-SnBz12) | | | | | | |
| 520 | 156 | 2.1056.01 | G-CuSn14 (G-SnBz14) | *** | UNI | + α + TiCN | Öl für NE / E | 6° - 8° | 15 - 20 |
| 520 | 156 | 2.1061.01 | G-CuSn12Pb | | | | | | |
| 540 | 162 | 2.1050.01 | G-CuSn10 (G-SnBz10) | | | | | | |
| 560 | 168 | 2.1060.01 | G-CuSn12Ni | *** | UNI | + α + CrN | Öl für NE / PA | 6° - 8° | 10 - 15 |
| 560 | 168 | PAN-Bz10 | PAN-Bronze, weich, Sn 10% | | | | | | |
| 560 | 168 | PAN-Bz12 | PAN-Bronze, weich, Sn 12% | * | UNI | + α | Öl für NE / PA | 6° - 8° | 4 - 8 |
| 560 | 168 | PAN-Bz14 | PAN-Bronze, weich, Sn 14% | | | | | | |

Bronze, kurzspanend (hart) Kupfer-Aluminium-Legierungen, Aluminiumbronze (nach DIN 17665, ISO 428)

| | | | | | | | | | |
|-----|-----|--------|-------------------------|-----|-----|------------------|----------------|---------|---------|
| 650 | 140 | 2.0916 | CuAl5 (AlBz5) | | | | | | |
| 650 | 140 | 2.0918 | CuAl5As | | | | | | |
| 650 | 140 | 2.0920 | CuAl8 (AlBz8) | | | | | | |
| 700 | 170 | 2.0932 | CuAl8Fe3 (AlBz8Fe) | *** | MS | | Öl für NE / PA | 4° - 6° | 15 - 20 |
| 700 | 170 | 2.0960 | CuAl9Mn2 (AlBz9Mn) | | | | | | |
| 800 | 190 | 2.0971 | CuAl9Ni3Fe2 | *** | UNI | + α + CrN | Öl für NE / PA | 4° - 6° | 15 - 20 |
| 800 | 190 | 2.0936 | CuAl10Fe3Mn2 (AlBz10Fe) | | | | | | |
| 850 | 220 | 2.0966 | CuAl10Ni5Fe4 (AlBz10Ni) | | | | | | |
| 950 | 260 | 2.0978 | CuAl11Ni6Fe5 (AlBz11Ni) | | | | | | |

Guss-Aluminium-Bronze Kupfer-Aluminium-Gusslegierungen (nach DIN 1714, ISO 1338)

| | | | | | | | | | |
|-----|-----|-----------|-------------|-----|-----|------------------|----------------|---------|---------|
| 600 | 180 | 2.0962.02 | GK-CuAl8Mn | | | | | | |
| 650 | 195 | 2.0940.01 | G-CuAl10Fe | | | | | | |
| 700 | 207 | 2.0970.02 | GK-CuAl9Ni | *** | MS | | Öl für NE / PA | 4° - 6° | 15 - 20 |
| 700 | 207 | 2.0975.02 | G-CuAl10Ni | | | | | | |
| 800 | 207 | 2.0980.01 | G-CuAl11Ni | *** | UNI | + α + CrN | Öl für NE / PA | 4° - 6° | 15 - 20 |
| 800 | 238 | 2.0980.02 | GK-CuAl11Ni | | | | | | |
| 850 | 255 | 2.0980.03 | GZ-CuAl11Ni | | | | | | |

Guss-Zinn-Blei-Bronze Kupfer-Blei-Zinn-Gusslegierungen (nach DIN 1716, ISO 1338)

| | | | | | | | | | |
|-----|----|-----------|------------------------|-----|---------|-------|---------------|-----------|---------|
| 240 | 50 | 2.1166.09 | G-CuPb22Sn (G-PbBz25) | | | | | | |
| 250 | 55 | 2.1188 | CuPb20Sn5 (ISO 1338) | *** | Multi | | Öl für NE / E | 10° - 12° | 20 - 30 |
| 260 | 60 | 2.1170 | CuPb9Sn5 (ISO 1338) | | | | | | |
| 270 | 65 | 2.1182 | CuPb15Sn8 (ISO 1338) | *** | UNI-TIN | | Öl für NE / E | 10° - 14° | 15 - 20 |
| 280 | 70 | 2.1176 | CuPb10Sn10 (ISO 1338) | | | | | | |
| 280 | 70 | 2.1188.01 | G-CuPb20Sn (G-SnBz20) | *** | VG | + TIN | Öl für NE / E | 10° - 12° | 15 - 20 |
| 320 | 85 | 2.1182.03 | GZ-CuPb15Sn (G-SnBz15) | | | | | | |
| 340 | 90 | 2.1176.04 | GC-CuPb10Sn (G-SnBz10) | *** | VG | + CrN | Öl für NE / E | 10° - 12° | 15 - 20 |
| 350 | 90 | 2.1170.01 | G-CuPb5Sn (G-SnBz5) | | | | | | |

Mehrstoffbronze, hart, kurzspanend (Aeterna-, Caro-, PAN-, Zollernbronze)

| | | | | | | | | | |
|------|-----|------------|-----------------------------------|----|-----|-----------------------|----------------|---------|---------|
| 800 | 238 | 3740 | Aeterna-Bronze 3740 | | | | | | |
| 800 | 238 | 3745 | Aeterna-Bronze 3745 | | | | | | |
| 850 | 255 | 3805 | Aeterna-Bronze 3805 | | | | | | |
| 700 | 207 | hh | Caro-Bronze halbhart | ** | MS | | Öl für NE / PA | 4° - 6° | 15 - 20 |
| 800 | 238 | hh | Caro-Bronze hart | | | | | | |
| 850 | 255 | xh | Caro-Bronze extra hart | | | | | | |
| 850 | 255 | PAN-SoBz | PAN-Sonder-Gussbronze | ** | UNI | + α + CrN | Öl für NE / PA | 4° - 6° | 15 - 20 |
| 600 | 140 | -SoMs140 | PAN-Sondermessing, Gussleg. Cu-Zn | | | | | | |
| 700 | 207 | -Blei-Bz15 | PAN-Blei-Gussbronze mit 15% Pb | | | | | | |
| 800 | 210 | -SoMs210 | PAN-Sondermessing, Gussleg. Cu-Zn | | | | | | |
| 900 | 220 | -AlMBz220 | PAN-Gussbronze Cu-Al | | | | | | |
| 900 | 260 | Ebz | Zollern-Bronze ähnl. 2.0971 | ** | VHM | a.A./on spec. Request | Öl für NE / PA | 6° - 8° | 4 - 25 |
| 900 | 260 | EBG2 | Zollern-Bronze ähnl. G-CuAl9Ni7 | | | | | | |
| 1000 | 300 | TZB28 | Zollern-Bronze Cu-Al-Fe-Leg | * | VHM | a.A./on spec. Request | Öl für NE / PA | 6° - 8° | 4 - 25 |
| 1250 | 380 | TZB36 | Zollern-Bronze Cu-Al-Fe-Leg | | | | | | |

Amppo-Metalle (Cu-Al-Fe-Legierungen), kurzspanend

| | | | | | | | | | |
|------|-----|--------|----------|----|--------|-----------------------|----------------|----------|--------|
| 650 | 185 | A-Bz8 | AMPCO 8 | | | | | | |
| 700 | 207 | A-Bz12 | AMPCO 12 | ** | MS | | Öl für NE / PA | 4° - 6° | 10-15 |
| 730 | 216 | A-Bz15 | AMPCO 15 | | | | | | |
| 750 | 222 | A-Bz16 | AMPCO 16 | * | HGB-VA | | PA | 4° - 6° | - |
| 800 | 225 | A-Bz18 | AMPCO 18 | | | | | | |
| 900 | 266 | A-Bz20 | AMPCO 20 | ** | VHM | a.A./on spec. Request | Öl für NE / PA | 0° - 3° | 8 - 10 |
| 1050 | 311 | A-Bz21 | AMPCO 21 | * | UNI | + α + TiAlN | Öl für NE / PA | 0° - 3° | 3 - 5 |
| 1130 | 340 | A-Bz22 | AMPCO 22 | | | | | | |
| 1280 | 385 | A-Bz25 | AMPCO 25 | ** | VHM | a.A./on spec. Request | Öl für NE / PA | -2° - 1° | 3 - 5 |
| 1450 | 426 | A-Bz26 | AMPCO 26 | | | | | | |

Aluminium, extra langspanend; Reinaluminium (R), Hüttenaluminium (H) (nach DIN 1712)

| | | | | | | | | | |
|-----|----|--------|-------------|-----|-----|------------------|---------------|-----------|---------|
| 100 | 30 | 3.0280 | Al99,8H | | | | | | |
| 120 | 36 | 3.0400 | Al99,99R | | | | | | |
| 120 | 36 | 3.0305 | Al99,9 | *** | ALU | | Öl für NE / E | 20° - 25° | 30 - 40 |
| 130 | 39 | 3.0250 | Al99,5H | | | | | | |
| 140 | 41 | 3.0255 | Al99,5 | *** | UNI | + α + CrN | Öl für NE / E | 20° - 25° | 20 - 30 |
| 140 | 41 | 3.0256 | E-AlH | | | | | | |
| 300 | 89 | 3.3308 | Al99,9Mg0,5 | | | | | | |

Alu-Knetlegierungen, langspanend (nach DIN 1725)

| | | | | | | | | | |
|-----|-----|--------|------------|-----|-----|------------------|---------------|-----------|---------|
| 160 | 48 | 3.0515 | AlMn1 | | | | | | |
| 210 | 63 | 3.0517 | AlMnCu | | | | | | |
| 210 | 63 | 3.3315 | AlMg1 | | | | | | |
| 240 | 72 | 3.3316 | AlMg1,5 | | | | | | |
| 250 | 75 | 3.3527 | AlMg2Mn0,8 | *** | UNI | + α + CrN | S + Add. / E | 20° - 25° | 40 - 50 |
| 290 | 87 | 3.3211 | AlMg1SiCu | | | | | | |
| 290 | 87 | 3.3523 | AlMg2,5 | | | | | | |
| 300 | 90 | 3.3535 | AlMg3 | | | | | | |
| 320 | 95 | 3.5555 | AlMg5 | *** | ALU | | Öl für NE / E | 20° - 25° | 20 - 30 |
| 350 | 105 | 3.2315 | AlMgSi1 | | | | | | |
| 350 | 105 | 3.3206 | AlMgSi0,5 | | | | | | |
| 400 | 119 | 3.1325 | AlCuMg1 | | | | | | |

Alu-Knetlegierungen, langspanend (nach DIN 1725)

| | | | | | | | | | |
|-----|-----|--------|-------------|-----|-----|------------------|---------------|-----------|---------|
| 400 | 119 | 3.1645 | AlCuMgPb | *** | UNI | + α + CrN | S + Add. / E | 20° - 25° | 40 - 50 |
| 450 | 133 | 3.1355 | AlCuMg2 | | | | | | |
| 460 | 136 | 3.4345 | AlZnMgCu0,5 | | | | | | |
| 500 | 148 | 3.0516 | S-AlMn | | | | | | |
| 500 | 148 | 3.0615 | AlMgSiPb | *** | ALU | | Öl für NE / E | 20° - 25° | 20 - 30 |
| 520 | 154 | 3.4365 | AlZnMgCu1,5 | | | | | | |
| 600 | 178 | 3.0525 | AlMn1Mg0,5 | | | | | | |

Alu-Gusslegierungen (mittelspanend) und Al-Si-Legierungen bis 0,5% Si (nach DIN 1725, ISO/DIS 3522)

| | | | | | | | | | |
|-----|-----|-----------|----------|-----|-----|-------|---------------|-----------|---------|
| 190 | 60 | 3.3541.01 | G-AlMg3 | *** | UNI | + CrN | Öl für NE / E | 12° - 16° | 30 - 40 |
| 200 | 70 | 3.3541.02 | GK-AlMg3 | | | | | | |
| 200 | 80 | 3.3541.09 | GF-AlMg3 | | | | | | |
| 200 | 70 | 3.3542 | GB-AlMg3 | | | | | | |
| 220 | 70 | 3.3562 | GB-AlMg5 | ** | UNI | | Öl für NE / E | 12° - 16° | 15 - 20 |
| 220 | 70 | 3.3561.01 | G-AlMg5 | | | | | | |
| 240 | 75 | 3.3561.02 | GK-AlMg5 | | | | | | |
| 300 | 100 | 3.3292.05 | GD-AlMg9 | | | | | | |

Alu-Gusslegierungen (kurzspanend) Al-Si-Legierungen 0,5 bis 10% Si (nach DIN 1725, ISO/DIS 3522)

| | | | | | | | | | |
|-----|-----|-----------|---------------|--|-------|-------|---------------|-----------|---------|
| 190 | 65 | 3.3241.01 | G-AlMg3Si | *** | Multi | | Öl für NE / E | 10° - 12° | 30 - 40 |
| 200 | 70 | 3.3241.02 | GK-AlMg3Si | | | | | | |
| 200 | 75 | 3.2341.01 | G-AlSi5Mg | | | | | | |
| 230 | 80 | 3.2131 | G-AlSi5Cu1 | | | | | | |
| 240 | 110 | 3.2151.02 | GK-AlSi6Cu4 | ** | UNI | + CrN | Öl für NE / E | 12° - 16° | 20 - 30 |
| 240 | 110 | 3.2152 | GD-AlSi6Cu4 | | | | | | |
| 240 | 110 | 3.2163.02 | GK-AlSi9Cu3 | | | | | | |
| 240 | 110 | 3.2134 | G-AlSi5Cu1Mg | | | | | | |
| 280 | 80 | 3.3241.63 | GF-AlMg3Si-wa | Hinweis: G = Sandguss GD = Druckguss GF = Feinguss GK = Kokillenguss wa = warmausgehärtet ka = kaltausgehärtet ta = teilausgehärtet | | | | | |
| 300 | 100 | 3.2153 | G-AlSi7Cu3 | | | | | | |
| 300 | 100 | 3.2161 | G-AlSi8Cu3 | | | | | | |
| 300 | 100 | 3.2382.05 | GD-AlSi10Mg | | | | | | |
| 310 | 105 | 3.2162 | GD-AlSi8Cu3 | | | | | | |
| 320 | 110 | 3.2341.62 | GK-AlSi5Mg-wa | | | | | | |
| 310 | 105 | 3.2163.05 | GD-AlSi9Cu3 | | | | | | |
| 340 | 115 | 3.2371.63 | GF-AlSi7Mg-wa | | | | | | |
| 340 | 115 | 3.2373.61 | G-AlSi9Mg-wa | | | | | | |

Alu-Gusslegierungen (kurzspanend) Al-Si-Legierungen 10 bis 15% Si (nach DIN 1725, ISO/DIS 3522)

| | | | | | | | | | |
|-----|-----|-----------|-----------------|-----|---------|-------|---------------|-----------|---------|
| 200 | 60 | 3.2581.01 | G-AlSi12 | *** | MULTI | | Öl für NE / E | 10° - 12° | 20 - 30 |
| 230 | 65 | 3.2581.02 | GK-AlSi12 | | | | | | |
| 230 | 65 | 3.2383.01 | G-AlSi10Mg (Cu) | | | | | | |
| 230 | 65 | 3.2211.02 | GK-AlSi11 | ** | UNI-TIN | | Öl für NE / E | 10° - 14° | 15 - 20 |
| 240 | 65 | 3.2583.01 | G-AlSi12 (Cu) | | | | | | |
| 240 | 80 | 3.2381.01 | G-AlSi10Mg | | | | | | |
| 280 | 100 | 3.2582.05 | GD-AlSi12 | ** | VG | + TIN | Öl für NE / E | 10° - 12° | 8 - 12 |
| 300 | 100 | 3.2982.05 | GD-AlSi12 (Cu) | | | | | | |
| 320 | 110 | 3.2381.61 | G-AlSi10Mg-wa | | | | | | |

Alu-Gusslegierungen (kurzspanend) Al-Si-Legierungen über 15% Si, (Kolbenleg., Zylinderblockleg.) Nicht genormte Sonderlegierungen

| | | | | | | | | | |
|-----|-----|-------------|---|-----|-----|------------------|---------------|----------|---------|
| 350 | 115 | | GK-AlZn10Si8Mg | *** | UNI | + α + CrN | Öl für NE / E | 8° - 11° | 10 - 15 |
| 400 | 120 | | G-AlSi12CuNiMg | | | | | | |
| 400 | 120 | | G-AlSi17Cu4Mg | | | | | | |
| 400 | 120 | | G-AlSi18 | | | | | | |
| 450 | 130 | | GK-AlSi18CuNiMg | ** | UNI | + α + TIN | Öl für NE / E | 8° - 10° | 8 - 10 |
| 500 | 150 | | G-AlSi21CuNiMg | | | | | | |
| 500 | 150 | | GK-AlMg5Si(Cu,Mn) | | | | | | |
| 500 | 150 | Y-Legierung | GK-AlSi25CuNiMg | | | | | | |
| 500 | 150 | 3.1754 | GK-AlCu4Ni2Mg | | | | | | |
| 500 | 150 | | GK-AlCu5Ni1,5 | | | | | | |
| 700 | 207 | | Titanal, Duralcan (Alu-Sonderleg., abrasiv) | | | | | | |

Alu-Gusslegierungen (kurzspanend) hochfest, (nach DIN 1725, ISO/DIS 3522)

| | | | | | | | | | |
|-----|-----|-----------|---------------|-----|---------|-------|---------------|-----------|---------|
| 380 | 105 | 3.1841.63 | G-AlCu4Ti-ta | *** | Multi | | Öl für NE / E | 10° - 12° | 20 - 30 |
| 380 | 110 | 3.1841.61 | G-AlCu4Ti-wa | *** | UNI-TIN | | Öl für NE / E | 10° - 14° | 15 + 20 |
| 400 | 110 | 3.1841.62 | GK-AlCu4Ti-wa | ** | UNI | + TIN | Öl für NE / E | 12° - 16° | 15 - 20 |

Alu-Gusslegierungen (kurzspanend) hochfest, (nach DIN 1725, ISO/DIS 3522)

| | | | | | | | | | |
|-----|-----|-----------|-----------------|--|--|--|--|--|--|
| 400 | 110 | 3.1841.64 | GK-AlCu4Ti-ta | Hinweis: wa = warmausgehärtet ka = kaltausgehärtet ta = teilausgehärtet | | | | | |
| 400 | 115 | 3.1371.41 | G-AlCu4TiMg-ka | | | | | | |
| 420 | 120 | 3.1371.42 | GK-AlCu4TiMg-ka | | | | | | |
| 420 | 120 | 3.1371.45 | GF-AlCu4TiMg-ka | | | | | | |

Magnesium-Gusslegierungen, Elektron (nach DIN 1729 Teil 2, ISO/R 121-122)

| | | | | | | | | | |
|-----|----|-----------|----------------------|-----|-----|------------------|----------------------|---------|---------|
| 220 | 65 | 3.5812.01 | G-MgAl8Zn1 (AZ 81) | *** | MS | | Öl spez. / Oil spec. | 4° - 6° | 20 - 30 |
| 220 | 65 | 3.5912.01 | G-MgAl9Zn1 (AZ 91) | | | | | | |
| 230 | 65 | 3.5662.05 | GD-MgAl6 | | | | | | |
| 240 | 65 | 3.5662.01 | G-MgAl6 (A 6) | | | | | | |
| 240 | 70 | 3.5612.05 | GD-MgAl6Zn1 (AZ 61) | *** | UNI | + α + CrN | Öl spez. / Oil spec. | 4° - 6° | 15 - 25 |
| 240 | 60 | 3.5105.91 | G-MgTh3Zn2Zr1 (ZT 1) | | | | | | |
| 240 | 80 | 3.5101.91 | G-MgZn4SE1Zr1 (RZ 5) | | | | | | |
| 250 | 85 | 3.5912.05 | GD-MgAl9Zn1 | | | | | | |
| 250 | 90 | 3.5470.05 | GD-MgAlSi1 (AS 41) | ** | UNI | + α | Öl spez. / Oil spec. | 4° - 6° | 12 - 15 |
| 280 | 65 | 3.5812.92 | GK-MgAl8Zn1-ho | | | | | | |
| 280 | 85 | 3.5106.61 | G-MgAg3SE2Zr1 (MSR) | | | | | | |
| 290 | 85 | 3.5102.91 | G-MgZn5Th2Zr1 (TZ 6) | | | | | | |
| 300 | 90 | 3.5912.62 | GK-MgAl9Zn1-wa | | | | | | |

Magnesium-Knetlegierungen (nach DIN 1729 Teil 1, DIN 9715)

| | | | | | | | | | |
|-----|----|-----------|-------------|-----|-----|------------------|----------------------|---------|---------|
| 220 | 40 | 3.5200.08 | MgMn2 F22 | *** | MS | | Öl spez. / Oil spec. | 4° - 6° | 20 - 30 |
| 240 | 65 | 3.5200 | MgMn2 | *** | UNI | + α + CrN | Öl spez. / Oil spec. | 4° - 6° | 15 - 25 |
| 240 | 45 | 3.5312.08 | MgAl3Zn F24 | ** | UNI | + α | Öl spez. / Oil spec. | 4° - 6° | 12 - 15 |
| 240 | 65 | 3.5312 | MgAl3Zn | | | | | | |

Magnesium-Knetlegierungen (nach DIN 1729 Teil 1, DIN 9715)

| | | | | | | | | | |
|-----|----|-----------|-------------|-----|-----|------------------|----------------------|---------|---------|
| 250 | 85 | 3.5612 | MgAl6Zn | | | | | | |
| 270 | 55 | 3.5612.08 | MgAl6Zn F27 | *** | MS | | Öl spez. / Oil spec. | 4° - 6° | 20 - 30 |
| 290 | 60 | 3.5812.08 | MgAl8Zn F29 | *** | UNI | + α + CrN | Öl spez. / Oil spec. | 4° - 6° | 15 - 25 |
| 290 | 85 | 3.5812 | MgAl8Zn | ** | UNI | + α | Öl spez. / Oil spec. | 4° - 6° | 15 - 20 |
| 310 | 65 | 3.5812.66 | MgAl8Zn F31 | | | | | | |

Zinn-Legierungen, Zinn-Druckguss (nach DIN 1742)

| | | | | | | | | | |
|-----|----|--------|-------------|-----|---------|-------|---------------|-----------|---------|
| 80 | 26 | 2.3732 | GD-Sn50SbPb | *** | Multi | | Öl für NE / E | 10° - 12° | 20 - 30 |
| 90 | 28 | 2.3722 | GD-Sn60SbPb | ** | UNI-TIN | | Öl für NE / E | 10° - 14° | 10 - 15 |
| 115 | 30 | 2.3752 | GD-Sn80Sb | ** | UNI | + TIN | Öl für NE / E | 12° - 16° | 10 - 15 |

Zink-Legierungen; Zink-Druckguss (Zamak) (nach DIN 1743)

| | | | | | | | | | |
|-----|-----|-----------|---------------------------|-----|---------|-------|--------------|-----------|---------|
| 230 | 90 | 2.2161.01 | G-ZnAl6Cu1 (Zamak Z610) | *** | Multi | | S + Add. / E | 10° - 12° | 25 - 35 |
| 260 | 90 | 2.2161.02 | GK-ZnAl5Cu1 (Zamak Z610) | | | | | | |
| 260 | 100 | 2.2143.01 | G-ZnAl4Cu3 (Zamak Z430) | *** | UNI-TIN | | S + Add. / E | 10° - 14° | 20 - 30 |
| 280 | 110 | 2.2143.02 | GK-ZnAl 4Cu3 (Zamak Z430) | | | | | | |
| 300 | 90 | 2.2140.05 | GD-ZnAl4 (Zamak Z400) | *** | UNI | + CrN | S + Add. / E | 12° - 16° | 20 - 30 |
| 350 | 105 | 2.2141.05 | GD-ZnAl4Cu1 (Zamak Z410) | | | | | | |
| 400 | 119 | 2.2143.05 | GD-ZnAl4Cu3 | ** | UNI | | S + Add. / E | 12° - 16° | 15 - 20 |

Nickel (unlegiert), Reinnickel, extra-langspanend (nach DIN 1701, DIN 17740)

| | | | | | | | | | |
|-----|-----|-----------|------------|-----|--------------|--|----------|-----------|---------|
| 490 | 146 | 2.4066 | Ni99,2 | | | | | | |
| 500 | 148 | 2.4017 | H-Ni99,95 | *** | Multi-Former | | S + Add. | - | 40 - 50 |
| 500 | 148 | 2.4025 | H-Ni99 | | | | | | |
| 500 | 148 | 2.4042 | Ni99CSi | *** | Uni-Former | | S + Add. | - | 30 - 40 |
| 500 | 148 | 2.4052 | Ni99,7Mg | | | | | | |
| 500 | 148 | 2.4060 | Ni99,6 | ** | Multi | | S + Add. | 10° - 12° | 20 - 25 |
| 500 | 148 | 2.4068 | LC-Ni99 | | | | | | |
| 500 | 148 | 2.4061 | LC-Ni99,6 | ** | UNI-TIN | | S + Add. | 10° - 14° | 15 - 20 |
| 650 | 190 | 2.4060.30 | Ni99,6-F59 | | | | | | |
| 700 | 205 | 2.4066.30 | Ni99,2-F60 | * | UNI | | S + Add. | 12° - 16° | 8 - 12 |

Nickel-Knetlegierungen, niedriglegiert, langspanend (nach DIN 17741)

| | | | | | | | | | |
|-----|-----|-----------|-----------|-----|-----|------------------|----------|---------|--------|
| 500 | 148 | 2.4062 | Ni99,4Fe | | | | | | |
| 500 | 148 | 2.4106 | NiMn1 | *** | MS | | S + Add. | 4° - 6° | 8 - 12 |
| 500 | 148 | 2.4110 | NiMn2 | | | | | | |
| 500 | 148 | 2.4122 | NiMn3Al | *** | UNI | + α + CrN | S + Add. | 4° - 6° | 8 - 12 |
| 500 | 148 | 2.4116 | NiMn5 | | | | | | |
| 500 | 148 | 2.1504 LN | NiAlBz | ** | UNI | + α | S + Add. | 4° - 6° | 4 - 6 |
| 800 | 238 | 2.4110.30 | NiMn2-F74 | | | | | | |

Nickel-Legierungen, wärmefest, Ni-Legierungen mit Cr, Cu (nach DIN 17742, 17743)

| | | | | | | | | | |
|-----|-----|-----------|-----------------------------|-----|-----|------------------|----------|---------|--------|
| 650 | 190 | 2.4366.10 | LC-NiCu30Fe-F43 | | | | | | |
| 700 | 205 | 2.4816 | Inconel-600, NiCr15Fe8 | | | | | | |
| 800 | 238 | 2.4360 | Monel-400, (S-)NiCu30Fe | *** | MS | | S + Add. | 4° - 6° | 8 - 12 |
| 850 | 252 | 2.4851.40 | Inconel 601, NiCr23Fe-F60 | | | | | | |
| 900 | 266 | 2.4951.40 | Nicrofer 7520, NiCr20Ti-F65 | *** | UNI | + α + CrN | S + Add. | 4° - 6° | 8 - 12 |
| 900 | 266 | 2.4375 | Monel-K-500, NiCu30Al | | | | | | |
| 900 | 266 | 2.4630 | Nimonic-75, NiCr20Ti | ** | UNI | + α | S + Add. | 4° - 6° | 4 - 6 |
| 900 | 266 | 2.4646 | Haynes No.214, NiCr16Al | | | | | | |
| 900 | 266 | 2.4665 | Hastelloy-X, NiCr22Fe18Mo | | | | | | |

Nickel-Legierungen, hochwärmefest, Ni-Legierungen mit Mo, Cr, Co (nach DIN 17744, DIN EN 10095)

| | | | | | | | | | |
|------|-----|-----------|-------------------------------------|-----|-----|-----------------------|----------------|----------|-------|
| 800 | 238 | 2.4858.10 | Incoloy 825, NiCr21Mo-F55 | | | | | | |
| 800 | 238 | 2.4641.10 | NiC 42M, NiCr21Mo6Cu-F60 | ** | UNI | + α + TiAlN | Öl für NE / PA | 1° - 3° | 5 - 8 |
| 850 | 252 | 2.4618.40 | INCO G, NiCr22Mo6Cu-F62 | | | | | | |
| 900 | 266 | 2.4819.40 | INCO C-276, NiMo16Cr15W-F70 | | | | | | |
| 900 | 266 | 2.4610.40 | Nicrofer 6125 GT, NiMo16Cr16Ti-F70 | ** | UNI | + α + TiCN | Öl für NE / PA | 1° - 3° | 3 - 5 |
| 900 | 266 | 2.4617 | HastelloyB2, NiMo28 | | | | | | |
| 900 | 266 | 2.4812 | Hastelloy-C, NiCr20Mo15 | | | | | | |
| 900 | 266 | 2.4856 | Inconel-625, NiCr22Mo9Nb | * | UNI | + α + TIN | Öl für NE / PA | 1° - 3° | 1 - 3 |
| 900 | 266 | 2.4811 | NiCr20Mo15 | | | | | | |
| 950 | 280 | 2.4810 | Hastelloy-B, NiMo30 | | | | | | |
| 1180 | 350 | 2.4976 | NiCr20Mo | | | | | | |
| 1200 | 355 | 2.4654 | Waspaloy, NiCr19Co14Mo4Ti | | | | | | |
| 1200 | 355 | 2.4669 | Inconel-X-750, NiCr15Fe7TiAl | | | | | | |
| 1200 | 355 | 2.4670 | Inconel-713, G-NiCr13Al6MoNb | *** | VHM | a.A./on spec. Request | Öl für NE / PA | -2° - 1° | 3 - 5 |
| 1230 | 364 | 2.4982 | NiCr20CoMo | | | | | | |
| 1320 | 390 | 2.4983 | Udimet-500, NiCr18Co | | | | | | |
| 1400 | 414 | 2.4631 | Nimonic-80A, NiCr20TiAl | ** | UNI | + α + TiAlN | Öl für NE / PA | -2° - 1° | 2 - 4 |
| 1400 | 414 | 2.4632 | Nimonic-90, NiCr20Co18Ti | | | | | | |
| 1400 | 414 | 2.4634 | Nimonic-105, NiCo20Cr15MoAlTi | | | | | | |
| 1400 | 414 | 2.4636 | Udimet-700, NiCo15Cr15MoAlTi | ** | UNI | + α + TiCN | Öl für NE / PA | -2° - 1° | 2 - 4 |
| 1400 | 414 | 2.4662 | Nimonic-901, NiCr13Mo6Ti3 | | | | | | |
| 1400 | 414 | 2.4668 | Inconel-718, Udimet-630, NiCr19NbMo | | | | | | |
| 1400 | 414 | 2.4670 LN | Nimocast-713, G-NiCr13Al6MoNb | | | | | | |
| 1400 | 414 | 2.4674 LN | Nimocast-PK24, G-NiCo15Cr10AlTiMo | | | | | | |
| 1400 | 414 | 2.4952.60 | Nicrofer 7520Ti, NiCr20TiAl-F100 | | | | | | |
| 1400 | 414 | 2.4969.60 | Nimonic-alloy-90, NiCr20Co18Ti-F110 | | | | | | |
| 1400 | 414 | 2.4979 | Stellite-21, CoCr28MoNi | | | | | | |

Titan (unlegiert), Reintitan, extra-langspanend (nach DIN 17850)

| | | | | | | | | | |
|-----|-----|-------------|---------------|-----|--------------|-------|----------|-----------|---------|
| 410 | 120 | 3.7025 | Ti1 / Ti gr.1 | | | | | | |
| 540 | 150 | 3.7035 | Ti2 | *** | Multi-Former | | S + Add. | - | 30 - 40 |
| 590 | 170 | 3.7055 | Ti3 / Ti99,4 | | | | | | |
| 700 | 207 | 3.7024.1 LN | Ti99,5 | ** | UNI-Former | | S + Add. | - | 20 - 25 |
| 700 | 207 | 3.7034.1 LN | Ti99,7 | | | | | | |
| 700 | 207 | 3.7064.1 LN | Ti99,2 | * | UNI | + CrN | S + Add. | 12° - 16° | 8 - 10 |
| 740 | 200 | 3.7065 | Ti4 | | | | | | |

Titan-Legierungen, gegläht, niedriglegiert, mittelfest (nach DIN 17850 / 17851, ISO 5832-2)

| | | | | | | | | | |
|------|-----|-----------|-----------------|-----|-----|-----------|--------------|---------|--------|
| 410 | 120 | 3.7225 | Ti1Pd / Ti gr.7 | | | | | | |
| 540 | 150 | 3.7235 | Ti2Pd | | | | | | |
| 590 | 170 | 3.7255 | Ti3Pd | *** | MS | | S + Add. / E | 4° - 6° | 6 - 10 |
| 700 | 207 | 3.7105 | TiNi0,8Mo0,3 | | | | | | |
| 800 | 235 | 3.7195.1 | TiAl3V2,5 | *** | UNI | + α + CrN | S + Add. / E | 4° - 6° | 6 - 10 |
| 900 | 266 | 3.7124 LN | TiCu2 | | | | | | |
| 980 | 290 | 3.7114 LN | TiAl5Sn2 | | | | | | |
| 980 | 290 | 3.7115 | TiAl5Sn2,5 | | | | | | |
| 1000 | 296 | 3.7252 | Ti gr.5 eli | | | | | | |

Titan-Legierungen > 1000 N/mm², hochlegiert, hochfest, (nach DIN 17851 / 17862, ISO 5832-2) Hinweis: schwer zersp., mittel- bis kurzspanend

| | | | | | | | | | |
|------|-----|-----------|------------------------|----|-----|-----------|--------------|---------|-------|
| 1050 | 310 | 3.7110 | TiAl5Fe2,5 | | | | | | |
| 1050 | 310 | 3.7145.7 | TiAl6Sn2Zr4Mo2Si | | | | | | |
| 1140 | 337 | 3.7164 LN | TiAl6V4-LN | | | | | | |
| 1140 | 337 | 3.7165 | TiAl6V4 | | | | | | |
| 1200 | 355 | 3.7175 | TiAl6V6Sn2 | | | | | | |
| 1300 | 385 | 3.7144 LN | TiAl6Sn2Zr4Mo2 | | | | | | |
| 1300 | 385 | 3.7154 LN | TiAl6Zr5 | ** | UNI | + α + CrN | S + Add. / E | 3° - 6° | 4 - 6 |
| 1300 | 385 | 3.7174 LN | TiAl6V6Sn2-LN | | | | | | |
| 1300 | 385 | 3.7184 LN | TiAl4Mo4Sn2-LN | | | | | | |
| 1300 | 385 | 3.7185 | TiAl4Mo4Sn2 | | | | | | |
| 1300 | 385 | 3.7194 | TiAl5V2,5 | | | | | | |
| 1400 | 410 | 3.7175.7 | TiAl6V6Sn2 (6 - 25 mm) | | | | | | |

Thermoplaste (Kunststoffe, weich, langspanend) (nach DIN 7728)

| | | | | | | | | | |
|-----|--|------|---|-----|-----|-----|-------------|-----------|---------|
| 30 | | PE | Polyethylen (Baylon, Hostalen) | *** | ALU | | Formtrennöl | 20° - 25° | 10 - 25 |
| 40 | | PP | Polypropylen (Meraklon, Novolen) | | | | | | |
| 40 | | PTFE | Polytetrafluoräthylen (Teflon, Hostafion) | | | | | | |
| 60 | | PS | Polystyrol (Hostyren, Vestyron) | *** | UNI | + α | Formtrennöl | 20° - 25° | 10 - 25 |
| 60 | | PVC | Polyvinylchlorid (Hostalit, Vinoflex) | | | | | | |
| 70 | | PC | Polycarbonat (Makrolon) | | | | | | |
| 70 | | PMMA | Polymethyl. (Plexiglas, Resorit) | | | | | | |
| 70 | | POM | Polyformaldehyd (Delrin, Hostaform) | | | | | | |
| 100 | | PA | Polyamid (Ultramid, Durethan) | | | | | | |

Duroplaste (Kunststoffe, hart, kurzspanend) (DIN 7708)

| | | | | | | | | | |
|-----|--|-----|----------------------------|----|-----|---------------------|---|----|--------|
| 110 | | UP | Ungesättigte Polyester | ** | GG | | T | 6° | 5 - 10 |
| 120 | | | Pertinax, Resopal, Resitex | | | | | | |
| 130 | | EP | Epoxidharze | | | | | | |
| 140 | | PUR | Polyurethan, Gießharze | ** | UNI | + α+ nitr./nitrided | T | 6° | 5 - 10 |
| 300 | | | Albanit, Ferrozell | | | | | | |
| 300 | | Bak | Bakelit | | | | | | |

Schichtpress-Stoffe (nach DIN 7735)

| | | | | | | | | | |
|-----|--|---------|-----------------------|----|-----|---------------------|---|----|--------|
| 300 | | PF CP 4 | Hp 2063 (Hartpapier) | ** | GG | | | 6° | 5 - 10 |
| 350 | | EP GC 1 | Hgw 2372 (Hartgewebe) | ** | UNI | + α+ nitr./nitrided | T | 6° | 5 - 10 |

Kunststoffe, faserverstärkt (nach DIN 18820 und 16948)

| | | | | | | | | | |
|------|--|----------|-----------------------------|-----|-----|-----------------------|----------|----------|--------|
| 300 | | | CFK (kohlefaserverstärkt) | | | | | | |
| 700 | | EP-GF 65 | GFK (glasfaserverstärkt) | ** | GG | | | 6° | 5 - 10 |
| 700 | | UP-GF 70 | GFK (glasfaserverstärkt) | ** | UNI | + α+ nitr./nitrided | T | 6° | 5 - 10 |
| 900 | | UP-GF 90 | GFK (glasfaserverstärkt) | | | | | | |
| 1700 | | EP-GF 78 | GFK (glasfaserverstärkt) | | | | | | |
| 2000 | | | AFK (aramidfaserverstärkt) | *** | VHM | a.A./on spec. Request | S + Add. | -3° - 0° | 5 - 8 |
| 3000 | | AF-HM | AFK (Kevlar, Kermel, Nomex) | | | | | | |

Mangan-Hartstahl

| | | | | | | | | | |
|------|-----|--------|----------|-----|-----|-----------------------|----------|----------|-------|
| 1400 | 414 | 1.3401 | X120Mn12 | | | | | | |
| 1400 | 414 | 1.3402 | X110Mn14 | *** | VHM | a.A./on spec. Request | S + Add. | -3° - 0° | 2 - 8 |
| 1400 | 414 | 1.3405 | X90Mn18 | | | | | | |

Titankarbid-Hartstoffe

| | | | | | | | | | |
|------|-----|--|---------------|-----|-----|-----------------------|----------|----------|-------|
| 1700 | 494 | | Ferro-Tic | | | | | | |
| 1700 | 494 | | Ferro-Titanit | *** | VHM | a.A./on spec. Request | S + Add. | -3° - 0° | 2 - 8 |

Wolfram, Hartguss, Metallkeramik

| | | | | | | | | | |
|------|-----|--|------------------------|-----|-----|-----------------------|----------|----------|-------|
| 1500 | 444 | | Wolfram | | | | | | |
| 1500 | 444 | | Hartguss | *** | VHM | a.A./on spec. Request | S + Add. | -3° - 0° | 2 - 8 |
| 1700 | 494 | | Metallkeramik, Cermets | | | | | | |

Metallische Verbundwerkstoffe

| | | | | | | | | | |
|--|--|--|---|-----|-----|-----------------------|----------|----------|-------|
| | | | Al-, Ti-Legierungen, faserverstärkt mit Silizium-Karbid | *** | VHM | a.A./on spec. Request | S + Add. | -3° - 0° | 2 - 8 |
|--|--|--|---|-----|-----|-----------------------|----------|----------|-------|

Graphit

| | | | | | | | | | |
|--|--|--|--|-----|-----|-----------------------|----------|----------|-------|
| | | | | *** | VHM | a.A./on spec. Request | S + Add. | -3° - 0° | 2 - 8 |
|--|--|--|--|-----|-----|-----------------------|----------|----------|-------|