

Guidance on the use of plain washers











Table 21 | Guidance on the use of plain washers with screws and nuts

| Washer | Hardness washer | min. 100 HV | min. 200 HV | min. 300 HV |
|--|-----------------|-------------|-------------|-------------|
| Screw | Property class | ≤ 6.8 | yes | yes |
| | | 8.8 | no | yes |
| | | 9.8 | no | yes |
| | | 10.9 | no | yes |
| | | 12.9 | no | no |
| Nut | Property class | ≤ 6 | yes | yes |
| | | 8 | no | yes |
| | | 9 | no | yes |
| | | 10 | no | yes |
| | | 12 | no | no |
| Case-hardened thread rolling screws | | yes | yes | yes |
| Stainless steel bolts, screws and nuts | | — | yes | — |

Shearing forces for different pins



Table 29

| | | | | Force F in Newton (N) | | | | | | | | | | | Diameter | | | | | | | | | |
|---|---|--|---|------------------------------------|---|-----|-----|-----|------|------|------|------|-------|-----|----------|-------|-------|-------|-------|--------|--------|-------|--------|--------|
| Material | Permitted Shearing force T to in N/mm² | Standard | | 0,6 | 0,8 | 1 | 1,2 | 1,5 | 2 | 2,5 | 3 | 3,5 | 4 | 4,5 | 5 | 6 | 8 | 10 | 12 | 13 | 14 | 16 | 18 | 20 |
| 95 Mn Pb 28 K Free cutting steel 1.0718 | <Ø 10~400 Ø 10-16~360 >Ø 16~320 | CP ISO 2338 DIN 7 |  | 110 | 220 | 350 | 500 | 800 | 1400 | 2100 | 3050 | | 5050 | | 8250 | 11400 | 20250 | 31600 | 45000 | 49000 | 62000 | 78000 | | 110000 |
| | | KP turned ISO 2339 DIN 1 |  | | | | | | | | | | | | | | | | | | | | | |
| | | Grooved pin DIN 1470/1471/ 1472/1473/1474/ 1475 |  | | | | | | | | | | | | | | | | | | | | | |
| St 60-2K 1.0060 | <Ø 5~560 Ø 5-10~520 >Ø 10~490 | KP grinded ISO 2339 DIN 1 |  | | | 440 | | 990 | 1750 | 2750 | 3950 | | 7030 | | 10200 | 14700 | 26100 | 40820 | 55370 | | | | | |
| | | DIN 258 GKP |  | | | | | | | | | | | | 10200 | 14700 | 26100 | 40820 | 55370 | | | 98500 | | 153800 |
| | | DIN 7977 GKP |  | | | | | | | | | | | | 10200 | 14700 | 26100 | 40820 | 55370 | | | 98500 | | 153800 |
| | | DIN 7978 KPIG |  | | | | | | | | | | | | | 14700 | 26100 | 40820 | 55370 | | | 98500 | | 153800 |
| | | Hardened steel HRC 58-62 | ~1500 | DIN 6325 CPK |  | | | | | 2650 | 4710 | 7360 | 10600 | | 18840 | | 29400 | 42400 | 75300 | 117700 | 169500 | | 230800 | 301500 |
| Stainless 1.4305 | | CP ISO 2338 DIN 7 |  | See resp. material (9 S Mn Pb 28K) | | | | | | | | | | | | | | | | | | | | |
| | | KP ISO 2339 DIN 1 |  | | | | | | | | | | | | | | | | | | | | | |