

4. Cold-rolled carbon steel

4.2. LOW-CARBON STEEL FOR COLD STAMPING

Table 4.4. Mechanical properties of steel

| Steel grade, drawing ability | Standard | Tensile strength MPa, (N/mm ²) | Yield point MPa, (N/mm ²) | Elongation, L=80 mm, min,% | Hardness, max | | | Erichsen indent depth, mm ¹⁾ | Application |
|------------------------------|--------------|--|---------------------------------------|----------------------------|---------------|--------|--------|---|-------------|
| | | | | | HRB | HRT 30 | HRT 15 | | |
| 08Yu, 08ps VG | GOST 9045-93 | 250-390 | ... | 28 | ... | ... | ... | 8.6-12.1 | * |
| 08Yu SV | GOST 9045-93 | 250-380 | 205 | 34 | 48 | 53 | 78 | 8.8-12.2 | * |
| 08Yu OSV | GOST 9045-93 | 250-350 | 195 | 36 | 46 | 51 | 76 | 9.0-12.4 | ** |
| 08Yu VOSV | GOST 9045-93 | 250-390 | 185 | 40 | 46 | 51 | 76 | 9.7-12.5 | ** |
| RRSt 13 | DIN 1623 p.1 | 270-370 | 240 | 34 | 55 | 53 | 78 | 9.5-11.8 | * |
| St 14 | DIN 1623 p.1 | 270-350 | 210 | 38 | 50 | 50 | 76 | 9.8-12.1 | |

... — parameter not limited by standard

* — for cold stamping

** — for cold stamping of composite parts, including automotive parts

¹⁾ — depending on strip thickness..

Rolled steel with other dimensional requirements, including those to thickness-to-width relation, may be produced to special order upon additional agreement.

Table 4.5. Mechanical properties of steel

| Steel grade, drawing ability | Standard | Tensile strength min, MPa (N/mm ²) | Yield point min, MPa (N/mm ²) | Elongation, L=80 mm%, min ⁷⁾ | r ₉₀ ³⁾⁴⁾ min | n ₉₀ ³⁾ min |
|---|--------------------------|--|---|---|-------------------------------------|-----------------------------------|
| DC01 (FeP01 [*]) ^{1) 5)} | EN 10130 | 270-410 | 280 | 28 | | |
| DC03 (FeP03 [*]) ^{1) 5)} | EN 10130 | 270-370 | 240 | 34 | 1.3 | |
| DC04 (FeP04 [*]) ^{1) 5)} | EN 10130 | 270-350 | 210 | 38 | 1.6 | 0.180 |
| DS type B (DQSK) | ASTM A 1008 (ASTM A 620) | ... | ... | ... | ... | ... |

... — parameter not limited by standard

* — previous designation. Previous standard and grade designations are given in parenthesis.

1) — mechanical properties apply to skin-passed products only.

2) — with thickness of less or equal to 0.7 mm and more than 0.5 mm the yield point value is increased by 20 N/mm². With thickness of less or equal to 0.5 mm the value is increased by 40 N/mm²

3) — values of r₉₀ and n₉₀ apply to products with thickness equal or more than 0.5 mm.

4) — with thickness of more than 2 mm the value of r₉₀ is decreased by 0.2.

5) — if not stated otherwise at the time of enquiry and order, they may be supplied as alloyed (e.g. with boron or titanium) steel grades.

6) — for design purposes yield point lower limit may be assumed as equal to 140 N/mm².

7) — with thickness of less or equal to 0.7 mm and more than 0.5 mm minimum elongation value is decreased by 2 points. With thickness of less or equal to 0.5 mm the minimum value is decreased by 4 points.

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Table 4.6. Chemical composition of steel

| Steel grade | Fraction of total mass, % | | | | | | | | | |
|-------------|---------------------------|----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|
| | C | Si | Mn | Al | S | P | Cr | Ni | Cu | N |
| 08Yu | 0.07 max | 0.03 max | 0.15–0.35 | 0.02–0.07 | 0.025 max | 0.20 max | 0.04 max | 0.10 max | 0.15 max | 0.006 max |

Table 4.7. Shape and dimension tolerances

| | | | | |
|---|---------------|---------------|----------|-----------------------------|
| Standard for technical specification | GOST 9045–93 | DIN 1623, p.1 | EN 10130 | ASTM A 1008 (ASTM A 620) |
| Standard for product mix, geometry and tolerances | GOST 19904–90 | EN 10131 | EN 10131 | ASTM A 568 |

Figure 4.3. Thickness-to-width relation

| Strip thickness, mm | Strip width, mm | | |
|---------------------|-----------------|------|------|
| | 900 | 1520 | 1800 |
| 0.5 | | | |
| 0.7 | | | |
| 1.5 | | | |
| 2.5 | | | |

Rolled steel with other dimensional requirements, including those to thickness-to-width relation, may be produced to special order upon additional agreement.