

Steel for forming

Cold-rolled steel for forming and deep drawing is available in a range of qualities, each designed for particular applications.

Typical applications

- automotive components and body panels
- components for building
- domestic appliances
- electrical goods
- furniture
- radiators
- tubes

Standards

Cold-rolled steel for forming complies with European standard EN 10130 : 1999 shown in table 8 below.

Former national standards and nearest related grades are also shown in the table.

Table 8: Standards

European	National			
EN 10130 : 1999	UK	France	Germany	Italy
Grade	BS 1449 part 1	NFA 36-401	DIN 1623 part 1	UNI 5866
DC01	CR4	C	St 12	FeP01
DC03	CR2/3	E	St 13	FeP02
DC04	CR1/2	ES	St 14	FeP04
DC05	–	SES	St 15	–
DC06	–	IF	IF 18 (SEW095)	–

Table 9: Mechanical properties: EN 10130 : 1999

Grade	R _{eL} (N/mm ²)	R _m (N/mm ²)	A ₈₀ (%)	r ₉₀	\bar{r}	n ₉₀	\bar{n}
	Max	Min-max	Min	Min	Min	Min	Min
DC01	280	270-410	28	–	–	–	–
DC03	240	270-370	34	1.3	–	–	–
DC04	210	270-350	38	1.6	–	0.180	–
DC05	180	270-330	40	1.9	–	0.210	–
DC06	180	270-350	38	–	1.8	–	0.220

Notes:

1. For thicknesses greater than 0.5mm and less than or equal to 0.7mm, maximum yield strength is increased by 20N/mm² and minimum elongation after fracture is decreased by 2 units.
2. For thicknesses less than or equal to 0.5mm, maximum yield strength is increased by 40N/mm² and minimum elongation after fracture is decreased by 4 units.
3. The values shown for r and n are for thicknesses greater than or equal to 0.5mm.
4. For thicknesses greater than 2mm, r₉₀ and \bar{r} are decreased by 0.2 units.
5. For design purposes, the minimum yield strength for DC01, DC03, DC04 and DC05 is 140N/mm².
6. For design purposes, the minimum yield strength for DC06 is 120N/mm².

Mechanical properties

The values shown for the mechanical properties in table 9 below are for skin-passed material and are for test pieces taken transverse to the rolling direction.

Chemical composition

Cold-rolled steel for forming meets the requirements of the cast analysis in the standard, as shown in table 10 on page 39.

Dimensions

The width and thickness limits are shown in table 11 on page 39. The minimum width is 750mm.

Table 10: Chemical composition: EN 10130 : 1999

Grade	C	Mn	P	S	Ti
	Max	Max	Max	Max	Max
DC01	0.12	0.60	0.045	0.045	–
DC03	0.10	0.45	0.035	0.035	–
DC04	0.08	0.40	0.030	0.030	–
DC05	0.06	0.35	0.025	0.025	–
DC06	0.02	0.25	0.020	0.020	0.30

Note: Values are in weight percentages.

Table 11: Dimensions: EN 10130 : 1999

Thickness		Width			
		DC01	DC03 DC04	DC05	DC06
>	≤	Max	Max	Max	Max
0.35	0.40	1400	1400	1250	–
0.40	0.43	1650	1650	1550	–
0.43	0.50	1650	1650	1595	1075
0.50	0.60	1850	1850	1700	1850
0.60	0.75	2040	2040	1850	1850
0.75	0.95	2040	2040	2040	1850
0.95	1.10	2040	2040	1810	1850
1.10	1.20	2040	2040	1650	1850
1.20	1.25	2040	2040	1550	1850
1.25	1.40	1900	1900	1525	1850
1.40	1.60	1900	1900	1525	1625
1.60	1.75	1900	1900	1525	1525
1.75	1.80	1850	1850	1525	1525
1.80	1.95	1850	1850	1525	1525
1.95	2.00	1800	1800	1525	1525
2.00	2.05	1800	1800	1525	–
2.05	2.25	1700	1700	1525	–
2.25	2.40	1500	1500	1525	–
2.40	2.65	1300	1300	1525	–
2.65	2.80	1275	1275	–	–
2.80	3.00	1275	1275	–	–
3.00	3.10	1275	–	–	–

Notes:

1. The minimum width is 750mm.
2. Dimensions are in millimetres.