Material properties

Material **Ck 45 (Germany / DIN)**

Group Structural and constructional steels

Subgroup DIN 17200 Quenched and tempered steels

Comment Quality specifications; DIN 17200 was superseded by EN 10083-1 and EN 10083-2

Application -

Yield Stress[MPa]			
Dimension	**Min**	**Max**	**Approx**
Quenched and tempered; <= 16 mm	490	-	-
Quenched and tempered; > 16 <= 40 mm	420	-	-
Quenched and tempered; > 40 <= 100 mm	380	-	-
Normalized; > 16 <= 100 mm	340	-	-

Tensile Stress[MPa]			
Dimension	**Min**	**Max**	**Approx**
Quenched and tempered; <= 16 mm	710	860	-
Quenched and tempered; > 16 <= 40 mm	670	820	-
Quenched and tempered; > 40 <= 100 mm	630	780	-
Normalized; > 16 <= 100 mm	600	750	-

Elongation A5 [%]			
Dimension	**Min**	**Max**	**Approx**
Quenched and tempered; <= 16 mm	14.0	-	-
Note: Lo = 5 x do; (long.)			
Quenched and tempered; > 16 <= 40 mm	16.0	-	-
Note: Lo = 5 x do; (long.)			
Quenched and tempered; > 40 <= 100 mm	17.0	-	-
Note: Lo = 5 x do; (long.)			
Normalized; > 16 <= 100 mm	17.0	-	-
Note: Lo = 5 x do; (long.)			

Impact [J]

Dimension	Min	Max	Approx
Quenched and tempered; <= 16 mm **Impact Test:** DVM	40	-	-
Quenched and tempered; > 16 <= 40 mm **Impact Test:** DVM	40	-	-
Quenched and tempered; > 40 <= 100 mm **Impact Test:** DVM	40	-	-

Hardness

Dimension	Hardness
Soft annealed (G)	<= 207 HB 30
Heat treated to achieve a given tensile strength (BF)	>= 163 <= 217 HB 30

Chemical Composition [%]

Criterion	Min	Max	Approx
C	0.4200	0.5000	-
Si	0.1500	0.3500	-
Mn	0.5000	0.8000	-
P	-	0.0350	-
S	-	0.0350	-

Heat Treatment

Hot working: 1100-850 C;
Soft annealing: 650-700 C;
Normalizing: 840-870 C;
Hardening in water: 820-850 C;
Hardening in oil: 830-860 C;
Tempering: 550-660 C

Cross Reference Table

Material	Standard	Country

Cross Reference Table

Material	Standard	Country
080 M 46	**B.S.**	United Kingdom
1 C 45	**B.S.**	United Kingdom
HS 50	**B.S.**	United Kingdom
C 45	**B.S.**	United Kingdom
C 45 E	**B.S.**	United Kingdom
CS 50	**B.S.**	United Kingdom
12050	**CSN**	Czech Republic
45	**GB**	China
ZG310-570 (ZG 45)	**GB**	China
1.0503	**WN**	Germany
1.1191	**WN**	Germany
C 45	**DIN**	Germany
C45E	**DIN**	Germany
GS-C 45	**DIN**	Germany
GS-Ck 45	**DIN**	Germany
C 45	**EN**	European Union
C 45 E	**EN**	European Union
2 C 45	**EN**	European Union
1 C 45	**EN**	European Union
1.1191	**EN**	European Union
1.0503	**EN**	European Union
2 C 45	**AFNOR NF**	France
AF 65	**AFNOR NF**	France
C 45	**AFNOR NF**	France
C 45 E	**AFNOR NF**	France
C 45 RR	**AFNOR NF**	France
XC 45	**AFNOR NF**	France
1 C 45	**UNI**	Italy
C 45	**UNI**	Italy
C 45 E	**UNI**	Italy
S 45 C	**JIS**	Japan
S 48 C	**JIS**	Japan
45	**GOST**	Russia
45G	**GOST**	Russia
1650	**SS**	Sweden

Cross Reference Table

Material	Standard	Country
1672	**SS**	Sweden
C 45	**SNV**	Switzerland
Ck 45	**SNV**	Switzerland
SA-29 1045	**ASME**	USA
SA-311 1045	**ASME**	USA
45	**PN**	Poland
1045	**AS**	Australia
C 45 (1 C 45)	**UNE**	Spain
C 45 E (2 C 45)	**UNE**	Spain
F.114	**UNE**	Spain
C 45	**NBN**	Belgium
C 45 E	**NBN**	Belgium
C 45	**NS**	Norway
C 45 E	**NS**	Norway
C 45 SW	**ONORM**	Austria
A 3	**MSZ**	Hungary
1045	**SAE**	USA
G10450	**UNS**	USA
1045	**AISI**	USA
A 576 1045	**ASTM**	USA
A 108 1045	**ASTM**	USA
A 29 1045	**ASTM**	USA
A 311 1045	**ASTM**	USA
A 29 10L45	**ASTM**	USA
A 183 Grade 2 Nuts	**ASTM**	USA
A 519 1045	**ASTM**	USA
A 510 1045	**ASTM**	USA
A 682 Grade 1045	**ASTM**	USA
OLC 35	**STAS**	Romania
OLC 45	**STAS**	Romania
OLC 45 X	**STAS**	Romania
OLC 45 q	**STAS**	Romania
45	**BDS**	Bulgaria
C 1530	**JUS**	Yugoslavia
C 1531	**JUS**	Yugoslavia