

STEEL GUIDE

The following is a cross reference guide to steel & stainless grades. It is for informational/identification purposes only and should not be used to plan for high strength/critical application.

GERMANY	EUROPE	U.S.A.	ITALY	GERMANY	EUROPE	U.S.A.	ITALY
(9SMn 23) 9SMnPb 28 -	11SMn 23 11SMnPb 28 -	B 1212 12L 14 11L 37	9SMn 23 "9SMnPb 28" 35SMnPb 10	37Cr 4 41Cr 4 9840	- 41Cr 4 38NiCrMo 4	5135 5140 -	35CrMn 5 40Cr 4 38NiCrMo 4
ST 37 ST42 ST 50	Fe 37 Fe 42 Fe 50	- - -	Fe 37 Fe 42 Fe 50	42CrMo 4 40NiCrMo 6 X12CrNi 188	42CrMo 4 - X10CrNi 1809	4140 4340 302	40CrMo 4 40NiCrMo7 X10CrNi 1809
ST 60 CK 10 CK 22	Fe 60 2C 10 2C 20	- 1010 1020	Fe 60 C 10 C 20	X12CrNi 188 X5CrNi 189 X2CrNi 189	X10CrNiS 1809 X6CrNi 1810 X3CrNi 1811	303 304 304 L	X10CrNiS 1809 X5CrNi 1810 X2CrNi 1811
CK 30 CK 40 CK 45	2C 30 2C 40 -	1030 1040 1042	C 30 C 40 C 43	- X5CrNiMo 1810 X2CrNiMo 1810	X3CrNi 1812 X6CrNiMo 1712 X3CrNiMo 1712	305 316 4404	X8CrNi 1812 X5CrNiMo 1712 X2CrNiMo 1712
CK 50 - 13NiCr 6	2C 50 - -	1050 - A3115	C 50 12NiCr 3 16CrNi 4	X10CrNiTi 189 X8Cr 17 X10Cr 17	X6CrNiTi 1810 X8Cr 17 X10CrS 17	321 430 430 F	X6CrNiTi 1811 X8Cr 17 X10CrS 17
14NiCr 10 - - 25CrMo 4	13NiCr 12 17NiCrMo 5 20CrNi 4 A25CrMo 4	3415 - - 4130	16NiCr 11 18NiCrMo 5 20CrNi 4 25CrMo 4	X10Cr 13 - (X30Cr 13)	X12Cr 13 X12CrS 13 X30Cr 13	410 416 420	X12Cr 13 X12CrS 13 X30Cr 13

HARDNESS TEST FOR STEEL

Hardness test for steel can be obtained by several methods:

1. BRINELL Hardness Test (HB), ISO R 79
2. ROCKWELL Hardness Test (HRC using Cone or HRB using Ball), ISO R 80
3. VICKERS Hardness Test (HV), ISO R 81
4. SHORE'S SCLEROSCOPE Test (HS)

Brinell, Rockwell and Vickers tests consist of applying a determined load (kgf) to the surface of the tested steel for a given time of several seconds. The size or depth of the permanent impression is measured and the corresponding hardness is obtained.

Shore's scleroscope testing method consists of measuring the height of a hammer rebound after it drops on the tested steel surface from a determined height. The scleroscope is a portable instrument. Some are pocket-size, suitable for outdoor use.

TESTING SPECIFICATIONS

- HB - Brinell test applying 10mm Ball, Load 3000 kgf for 10 - 15 seconds.
- HRB - Rockwell test applying 1/16" Ball, Load 10/100 kgf (B-Scale)
- HRC - Rockwell test applying Diamond Cone, Load 10/150 kgf (C-Scale)
- HV - Vickers test applying Pyramidal Indenter, Load 30 kgf for 10 - 15 seconds.
- HS - Shore's testing apparatus

Relation Between Hardness and Tensile Strength

There is no accurate translation from one method of testing to another, or of the hardness number to tensile strength. Approximate relation can be obtained from the following formula:

$$\text{Tensile Strength in Lbs/Sq Inch} = \text{HB} \times 515$$