

Database of Steel and Alloy (Marochnik)

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[Home](#) [European steel grades](#) [Steel and Alloy](#) [Search](#) [Equivalent grades](#) [Grading](#) [GOST Standard](#) [Contacts](#)

YOU HERE: [Steel and Alloy](#) -> [Structural steel](#)

Characteristics for grade 45KH (45X).

Grade :	45KH (45X)
Substitute:	40X, 50X, 45XЛ, 40XГТ, 40XΦ, 40X2AΦE
Classification :	Alloy structural steel
Equivalent grades:	Go here

Chemical composition in % for grade 45KH (45X)

C	Si	Mn	Ni	S	P	Cr	Cu
0.41 - 0.49	0.17 - 0.37	0.5 - 0.8	max 0.3	max 0.035	max 0.035	0.8 - 1.1	max 0.3

Temperature of critical points for grade 45KH (45X).

$A_{c1} = 735$, $A_{c3}(A_{cm}) = 770$, $A_{r3}(A_{rcm}) = 690$, $A_{r1} = 660$, $M_n = 355$

Mechanical properties under T=20°C for grade 45KH (45X)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Bar, GOST 4543-71	Ø 25		1030	835	9	45	490	Guenching 840°C, oil, Drawing 520°C, water,

Brinell hardness for 45KH (45X) (annealing) , GOST 4543-71	HB 10 ⁻¹ = 229 MPa
Brinell hardness for 45KH (45X) , Bar GOST 10702-78	HB 10 ⁻¹ = 179 MPa

Technological properties for grade 45KH (45X)

Weldability:	hard weldability.
Flakes :	predisposed
Temper brittleness:	predisposed

Physical properties for grade 45KH (45X)

T	E 10 ⁻⁵	α 10 ⁶	λ	ρ	C	R 10 ⁹
Grade	MPa	1/Grade	Watt/(m·Grade)	kg/m ³	J/(kg·Grade)	Ohm·m
20	2.06			7820		
100		12.8				

200		13				
300		13.7				
T	E 10⁻⁵	α 10⁶	λ	ρ	C	R 10⁹

Equivalent steels for grade 45KH (45X)

Warning! Indicated both exact and nearest equivalents.

USA	Germany	Japan	France	European	Italy	Sweden	Bulgaria	Poland	Inter
-	DIN,WNr	JIS	AFNOR	EN	UNI	SS	BDS	PN	ISO
5145 5145H G51450 H51450	41Cr4	SCr445	41Cr4 42C4 42C4FF 45C4	1.7035 41Cr4	41Cr4	2245	45Ch	45H	41Cr4

Specification :**Mechanical properties :**

- σ_B - Tensile strength , [MPa]
 σ_T - Yield stress , [MPa]
 δ_5 - Specific elongation at fracture , [%]
 ψ - Reduction of area , [%]
KCU - Impact strength , [kJ / m²]
HB - Brinell hardness , [MPa]

Physical properties :

- T** - Test temperature , [Grade]
E - Young modulus , [MPa]
 α - Coefficient of linear expansion (range 20° - T) , [1/Grade]
 λ - Thermal (heat) condition coefficient , [Watt/(m·Grade)]
 ρ - Density , [kg/m³]
C - Specific heat (range 20° - T) , [J/(kg·Grade)]
R - Electrical resistance , [Ohm·m]

Weldability :

- without limitations** - welding is done without heating and subsequent heat treating
limited weldability - welding is possible under heating up to 100-120 grade and subsequent heat treating
hard weldability - obtaining the quality welding needs the additional operations: heating up to 200-300 grade; the heat treating is annealing

Database of steels and alloys (Marochnik) contains information about chemical composition and properties more than 2500 steels and alloys (stainless steel, alloy steel, carbon steel, structural steel, tool steel, cast iron, aluminum alloy, titanium alloy, copper alloy, nickel alloy, magnesium alloy and others).
 Helpfull for specialists in grade technology, structural engineer, mechanical engineer, metallurgy and metal trader

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