

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 12KHN3A (12XH3A).

Grade :	12KHN3A (12XH3A)
Substitute:	12XH2, 20XH3A, 25XГТ, 12X2H4A, 20XHP
Classification :	Alloy structural steel
Equivalent grades:	Go here

Chemical composition in % for grade 12KHN3A (12XH3A)

C	Si	Mn	Ni	S	P	Cr	Cu
0.09 - 0.16	0.17 - 0.37	0.3 - 0.6	2.75 - 3.15	max 0.025	max 0.025	0.6 - 0.9	max 0.3

Temperature of critical points for grade 12KHN3A (12XH3A).

$Ac_1 = 715$, $Ac_3(Ac_m) = 773$, $Ar_3(Arc_m) = 726$, $Ar_1 = 659$, $Mn = 380$

Mechanical properties under T=20°C for grade 12KHN3A (12XH3A)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Pipe, GOST 21729-76			490		16			
Bar, GOST 4543-71	Ø 15		930	685	11	55	880	Guenching and drawing

Brinell hardness for 12KHN3A (12XH3A) (annealing) , GOST 4543-71

HB 10⁻¹ = 217 MPa

Technological properties for grade 12KHN3A (12XH3A)

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

Physical properties for grade 12KHN3A (12XH3A)

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			7850		
100		11.8	31	7830		

200		13		7800		
300		14		7760		
400		14.7	26	7720	528	
500		15.3		7680	540	
600		15.6		7640	565	
T	$E \cdot 10^{-5}$	$\alpha \cdot 10^6$	λ	ρ	C	$R \cdot 10^9$

Equivalent steels for grade 12KH3A (12XH3A)

Warning! Indicated both exact and nearest equivalents.

USA	Germany	Japan	France	England	Spain	Bulgaria	Hungary	Poland	Romania	Czechia
-	DIN, WNr	JIS	AFNOR	BS	UNE	BDS	MSZ	PN	STAS	CSN
3415	1.5732 12Ni14 14NiCr10 14NiCr14	SNC815 SNC815H	10NC11 14NC11	655M13	15NiCr11	12ChN3A	BNC2	12HN3A	13CrNi30q	16420

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).
Helpful for specialists in grade technology, structural engineer, mechanical engineer, metallurgy and metal trader

[Top](#)

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