

Database of Steel and Alloy (Marochnik)

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Characteristics for grade 20KH13 (20X13).

Grade :	20KH13 (20X13) (2X13)
Substitute:	12X13, 14X17H2
Classification :	Corrosion-resistant high-temperature steel
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Chemical composition in % for grade 20KH13 (20X13)

C	Si	Mn	Ni	S	P	Cr
0.16 - 0.25	max 0.6	max 0.6	max 0.6	max 0.025	max 0.03	12 - 14

Temperature of critical points for grade 20KH13 (20X13).

$A_{c1} = 820$, $A_{c3}(A_{cm}) = 950$, $A_{r1} = 780$

Mechanical properties under T=20°C for grade 20KH13 (20X13)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Sheet, GOST 5582-75	1 - 4	dihedral	490		20			Drawing 740 - 800°C,
Bar, GOST 5949-75			650-830	440-635	10-16	50-55	590-780	Guenching and drawing
Bar, GOST 18907-73			510-780		14			
Bar, GOST 18968-73			670	490-655	18	50	690	Normalizing and drawing
Forging, GOST 25054-81	to 600	longitudinal	647	441	14-16	40-50	390-640	Guenching and drawing
Sheet trick, GOST 7350-77			510	375	20			Normalizing

Brinell hardness for 20KH13 (20X13) (annealing) , Bar GOST 5949-75	HB 10 ⁻¹ = 126 - 197 MPa
Brinell hardness for 20KH13 (20X13) (normalize, tempering) , Bar GOST 18968-73	HB 10 ⁻¹ = 207 - 241 MPa
Brinell hardness for 20KH13 (20X13) , Forging GOST 25054-81	HB 10 ⁻¹ = 197 - 248 MPa

Technological properties for grade 20KH13 (20X13)

Weldability:	limited weldability.
Flakes :	not predisposed
Temper brittleness:	predisposed

Physical properties for grade 20KH13 (20X13)

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	2.18		23	7670		588
100	2.14	10.1	26	7660	461	653
200	2.08	11.2	26	7630	523	730
300	2	11.5	26	7600	565	800
400	1.89	11.9	26	7570	628	884
500	1.81	12.2	27	7540	691	952
600	1.69	12.8	26	7510	775	1022
700		12.8	26	7480	963	1102
800		13	27	7450		
900			28			
T	$E \cdot 10^{-5}$	$\alpha \cdot 10^6$	λ	ρ	C	$R \cdot 10^9$

Equivalent steels for grade 20KH13 (20X13)

Warning! Indicated both exact and nearest equivalents.

USA	Germany	Japan	France	England	European	Italy	Spain	China	Sweden	Poland	Czechia
-	DIN, WNr	JIS	AFNOR	BS	EN	UNI	UNE	GB	SS	PN	CSN
420 S42000	1.4021 X20Cr13 X30Cr13	SUS420J1	X20Cr13 Z20C13	420S29 420S37 En56C	1.4021 X20Cr13	X20Cr13	F.3402 X20Cr13	2Cr13	2303	2H13	17022

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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