

Database of Steel and Alloy (Marochnik)

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Characteristics for grade 20KHGR (20XГП).

Grade :	20KHGR (20XГП)
Substitute:	20XH3A, 20XH2M, 12XH3A, 12XH2
Classification :	Alloy structural steel
Equivalent grades:	Is absent

Chemical composition in % for grade 20KHGR (20XГП)

C	Si	Mn	Ni	S	P	Cr	Ti	Cu	B
0.18 - 0.24	0.17 - 0.37	0.7 - 1	max 0.3	max 0.035	max 0.035	0.75 - 1.05	max 0.06	max 0.3	0.001 - 0.005

Temperature of critical points for grade 20KHGR (20XГП).

$Ac_1 = 735$, $Ac_3(Ac_m) = 835$, $Ar_3(Arc_m) = 760$, $Ar_1 = 670$

Mechanical properties under T=20°C for grade 20KHGR (20XГП)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Bar, GOST 4543-71	Ø 15		980	780	9	50	780	Guenching 880°C, oil, Drawing 200°C, air,

Brinell hardness for 20KHGR (20XГП) (annealing), GOST 4543-71

HB 10⁻¹ = 197 MPa

Technological properties for grade 20KHGR (20XГП)

Flakes :	predisposed
Temper brittleness:	predisposed

Physical properties for grade 20KHGR (20XГП)

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	2.07			7800		
100		11.7				

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 / m ²]
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/m ³]
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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