

Database of Steel and Alloy (Marochnik)

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Characteristics for grade 12KH1MF (12X1MΦ).

Grade :	12KH1MF (12X1MΦ) (12XMΦ)
Classification :	Low alloy high-temperature steel
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Chemical composition in % for grade 12KH1MF (12X1MΦ)

C	Si	Mn	Ni	S	P	Cr	Mo	V	Cu
0.1 - 0.15	0.17 - 0.37	0.4 - 0.7	max 0.3	max 0.025	max 0.03	0.9 - 1.2	0.25 - 0.35	0.15 - 0.3	max 0.2

Temperature of critical points for grade 12KH1MF (12X1MΦ).

$Ac_1 = 760$, $Ac_3(Ac_m) = 890$, $Ar_3(Arc_m) = 825$, $Ar_1 = 730$, $Mn = 430$

Mechanical properties under T=20°C for grade 12KH1MF (12X1MΦ)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Sheet, GOST 5520-79			440-640	295	21		790	
Bar, GOST 20072-74		longitudinal	470	255	21	55	980	Normalizing 960 - 980°C, Drawing 740 - 760°C,
Forging		longitudinal	480	260	20	50	600	Normalizing and high drawing

Brinell hardness for 12KH1MF (12X1MΦ) (normalize) ,	HB 10 ⁻¹ = 123 - 179 MPa
Brinell hardness for 12KH1MF (12X1MΦ) (hot-rolled, annealing) , GOST 20072-74	HB 10 ⁻¹ = 217 MPa

Technological properties for grade 12KH1MF (12X1MΦ)

Weldability:	limited weldability.
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Physical properties for grade 12KH1MF (12X1MΦ)

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	1.98			7800		230
100	1.93	12.4	44	7780		278
200	1.88	13	44	7750		343
300	1.83	13.6	42	7720		430
400	1.75	14	40	7680		532
500	1.67	14.4	37	7640		647
600	1.57	14.7	35	7600		775

700	1.51	14.9	32	7570		962
800		14.8	28	7540		1087
900		12	28	7560		1130
T	$E \cdot 10^{-5}$	$\alpha \cdot 10^6$	λ	ρ	C	$R \cdot 10^9$

Equivalent steels for grade 12KH1MF (12X1MΦ)

Warning! Indicated both exact and nearest equivalents.

Germany	England	Spain
DIN, WNr	BS	UNE
1.7715 14MoV6-3	1503-660-440	13MoCrV6

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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