

Database of Steel and Alloy (Marochnik)

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Characteristics for grade 22K (22K).

Grade :	22K (22K)
Substitute:	25K
Classification :	High quality structural carbon steel
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Chemical composition in % for grade 22K (22K)

C	Si	Mn	Ni	S	P	Cr	Cu
0.19 - 0.26	0.17 - 0.4	0.7 - 1	max 0.3	max 0.035	max 0.04	max 0.3	max 0.3

Temperature of critical points for grade 22K (22K).

$A_{c1} = 724$, $A_{c3}(A_{cm}) = 845$, $A_{r3}(A_{rcm}) = 815$, $A_{r1} = 682$

Mechanical properties under T=20°C for grade 22K (22K)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Sheet	60 - 90		440				600	Normalizing 940 - 960°C, Drawing 630 - 650°C, Cooling air, 65 °C/h,
Sheet, GOST 5520-79			430-590	255-265	22		590	

Technological properties for grade 22K (22K)

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

Physical properties for grade 22K (22K)

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	2.11		51.7	7859		173
100	2.08	11.75	51	7834	470	219
200	2.05	12.2	48.5	7803	483	292

300	2	12.8	44.4	7770		381
400	1.91	13.2	42.7	7736	525	487
500	1.8	13.5	39.3	7699	571	601
600	1.65	13.85	35.6	7659		758
700		14.6	31.9	7617		925
800		12.7	25.9	7624		1094
900		12.4	26.4	7600		1135
1000		13.4	27.7	7548		1167
1100		14.2	28.5	7496		1194
1200		14.8	29.8			1219
T	$E 10^{-5}$	$\alpha 10^6$	λ	ρ	C	$R 10^9$

Equivalent steels for grade 22K (22K)

Warning! Indicated both exact and nearest equivalents.

USA	Germany	Japan	England
-	DIN,WNr	JIS	BS
1022 K02700	20Mn5	SMnC420	120M19

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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