

Database of Steel and Alloy (Marochnik)

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Characteristics for grade 20ps (20nc).

Grade :	20ps (20nc)
Substitute:	15кп
Classification :	High quality structural carbon steel
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Chemical composition in % for grade 20ps (20nc)

C	Si	Mn	Ni	S	P	Cr	Cu	As
0.17 - 0.24	0.05 - 0.17	0.35 - 0.65	max 0.3	max 0.04	max 0.035	max 0.25	max 0.3	max 0.08

Temperature of critical points for grade 20ps (20nc).

$Ac_1 = 735$, $Ac_3(Ac_m) = 850$, $Ar_3(Arc_m) = 835$, $Ar_1 = 680$

Mechanical properties under T=20°C for grade 20ps (20nc)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Sheet heat-treatment, GOST 4041-71	4 - 14		340-490		28			
Pipe, GOST 10705-80			372	225	22			
Pipe, GOST 10705-80			412	245	21			
Band annealed , GOST 2284-79			310-540		18			
Band cold-worked , GOST 2284-79			490-830					
Steel cold-drawn , GOST 10702-78			490		7	45		
Strip, GOST 1577-93	6 - 60		380	225	27	55		Normalizing

Brinell hardness for 20ps (20nc) , Sheet GOST 4041-71	HB 10 ⁻¹ = 127 MPa
Brinell hardness for 20ps (20nc) , Sheet trick GOST 1577-93	HB 10 ⁻¹ = 156 MPa

Technological properties for grade 20ps (20nc)

Weldability:	without limitations.
Flakes :	not predisposed
Temper brittleness:	not predisposed

Physical properties for grade 20ps (20nc)

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	2.12					
100	2.08	12.3	51	7834	486	219
200	2.03	13.1	49	7803	498	292
300	1.97	13.8	44	7770	514	381
400	1.89	14.3	43	7736	533	487
500	1.77	14.8	39	7699	555	601
600	1.63	15.1	36	7659	584	758
700	1.4	15.2	32	7617	636	925
800			26	7624	703	1094
900			26	7600	703	1135
1000					695	
T	E 10 ⁻⁵	α 10 ⁶	λ	ρ	C	R 10 ⁹

Equivalent steels for grade 20ps (20nc)

Warning! Indicated both exact and nearest equivalents.

USA	Japan	France	China	Bulgaria	Poland	Czechia
-	JIS	AFNOR	GB	BDS	PN	CSN
1020 1023 G10200 G10230 M1020 M1023	SWRCH17R	FR20 XC18	ML20	20ps	20Y	12024

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 ia annealing

Database of steels and alloys (Marochnik) contains information about chemical composition and properties more then 2500 steels and alloys (stainless steel, alloy steel, carbone 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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