

Database of Steel and Alloy (Marochnik)

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Characteristics for grade U9 (Y9).

Grade :	U9 (Y9)
Substitute:	Y7, Y8
Classification :	Carbon tool steel
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Chemical composition in % for grade U9 (Y9)

C	Si	Mn	Ni	S	P	Cr	Cu
0.85 - 0.94	0.17 - 0.33	0.17 - 0.33	max 0.25	max 0.028	max 0.03	max 0.2	max 0.25

Temperature of critical points for grade U9 (Y9).

$A_{c1} = 740$, $A_{c3}(A_{cm}) = 760$, $A_{r1} = 700$, $M_n = 190$
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Mechanical properties under T=20°C for grade U9 (Y9)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Band cold-rolled	to 4		750		10			As-delivered state

Brinell hardness for U9 (Y9) (annealing), GOST 1435-99	HB 10 ⁻¹ = 192 MPa
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Technological properties for grade U9 (Y9)

Weldability:	is not used.
Flakes :	not predisposed
Temper brittleness:	not predisposed

Physical properties for grade U9 (Y9)

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			7745		
100		11.3	49	7726		253
200		12.1	48	7717		329
300		12.9	46	7690		418

400		13.6	43	7686		525
500		14.2	40	7655		646
600		14.7	37	7622		789
700		15.2	33	7586		943
800		14		7568		1155
900				7523		1198
T	$E \cdot 10^{-5}$	$\alpha \cdot 10^6$	λ	ρ	C	$R \cdot 10^9$

Equivalent steels for grade U9 (Y9)

Warning! Indicated both exact and nearest equivalents.

USA	Germany	Japan	France	England	Italy	Bulgaria	Hungary	Poland
-	DIN, WNr	JIS	AFNOR	BS	UNI	BDS	MSZ	PN
W1-8	C80W1 C85W	SK5	C90E2U Y1-80	BW1A	C90KU	U9	S91 S92	N9

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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