

Database of Steel and Alloy (Marochnik)

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Characteristics for grade 16GS (16ГC).

Grade :	16GS (16ГC)
Substitute:	17ГC, 15ГC, 20Г2C, 20ГC, 18Г2C
Classification :	Low alloy structural steel for welding construct
Equivalent grades:	Go here

Chemical composition in % for grade 16GS (16ГC)

C	Si	Mn	Ni	S	P	Cr	N	Cu	As
0.12 - 0.18	0.4 - 0.7	0.9 - 1.2	max 0.3	max 0.04	max 0.035	max 0.3	max 0.008	max 0.3	max 0.08

Temperature of critical points for grade 16GS (16ГC).

$A_{c1} = 736 - 745$, $A_{c3}(A_{cm}) = 920 - 927$, $A_{r3}(A_{rcm}) = 791 - 820$, $A_{r1} = 641 - 735$
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Mechanical properties under T=20°C for grade 16GS (16ГC)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Sheet, GOST 5520-79			450-490	275-325	21		590	
Pipe hotrolled	Ø 325 x 30	tangent	480	280	28	57	1000	
Pipe hotrolled	Ø 325 x 30	longitudinal	480	260	27	65	1200	

Technological properties for grade 16GS (16ГC)

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

Physical properties for grade 16GS (16ГC)

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				7850		
100		13			470	
200		14				
300	1.81	15.3				

400	1.72	16.2				
500	1.62	16.1				
600		16.2				
T	$E \cdot 10^{-5}$	$\alpha \cdot 10^6$	λ	ρ	C	$R \cdot 10^9$

Equivalent steels for grade 16GS (16ГC)

Warning! Indicated both exact and nearest equivalents.

USA	Germany	Japan	France	England	European	Italy	Bulgaria	Poland	Romania	Czechia	Inter
-	DIN, WNr	JIS	AFNOR	BS	EN	UNI	BDS	PN	STAS	CSN	ISO
Gr.F K01803	1.0445 H4 P295GH StE315 TStE255	SLA325A	A48CP	223-490	P295NH	Fe460-1KG	16GS	15GA	16SiMn4	11474	P11

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).
Helpful for specialists in grade technology, structural engineer, mechanical engineer, metallurgy and metal trader

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