

Database of Steel and Alloy (Marochnik)

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[Home](#)
 [European steel grades](#)
 [Steel and Alloy](#)
 [Search](#)
 [Equivalent grades](#)
 [Grading](#)
 [GOST Standard](#)
 [Contacts](#)

YOU HERE: [Steel and Alloy](#) -> [Tool steel](#)

Characteristics for grade R18 (P18).

Grade :	R18 (P18)
Substitute:	P12
Classification :	High speed tool steel
Equivalent grades:	Go here

Chemical composition in % for grade R18 (P18)

C	Si	Mn	Ni	S	P	Cr	Mo	W	V	Co	Cu
0.73 - 0.83	0.2 - 0.5	0.2 - 0.5	max 0.6	max 0.03	max 0.03	3.8 - 4.4	max 1	17 - 18.5	1 - 1.4	max 0.5	max 0.25

Temperature of critical points for grade R18 (P18).

$Ac_1 = 820$, $Ac_3(Ac_m) = 860$, $Ar_3(Arc_m) = 770$, $Ar_1 = 725$
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Mechanical properties under T=20°C for grade R18 (P18)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
			840	510	8	10	190	As-delivered state

Brinell hardness for R18 (P18) (annealing), GOST 19265-73	HB 10 ⁻¹ = 255 MPa
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Technological properties for grade R18 (P18)

Weldability:	without limitations.
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Physical properties for grade R18 (P18)

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	2.28			8800		419
100	2.23		26			472
200	2.19		27			544
300	2.1		28			627
400	2.01		29			718
500	1.92		28			815
600	1.81		27			922
700			27			1037
800						1152
900						1173
T	E 10 ⁻⁵	α 10 ⁶	λ	ρ	C	R 10 ⁹

Equivalent steels for grade R18 (P18)

Warning! Indicated both exact and nearest equivalents.

USA	Germany	Japan	France	England	European	Italy	Spain	China	Sweden	Bulgaria	Hungary	Poland	Romania	Czechia	Austria	South Korea
-	DIN, WNr	JIS	AFNOR	BS	EN	UNI	UNE	GB	SS	BDS	MSZ	PN	STAS	CSN	ONORM	KS
T1 T12001	1.3355 HS18-0-1 S18-0-1 X75WCrV18-4-1	SKH2	18-04-01 HS18-0-1 Z80WCV Z80WCV18-04-01	3355 BT1	1.3355 HS18-0-1 HSv18-0-1 X75WCrV18-4-1	HS18-0-1 X75WCrV18	18-0-1 ET1 HS18-0-1	W18Cr4V	2750	HS18-0-1 R18	R3	SW18	Rp3	19824	BOHLERS200 S200	SKH2

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 / m ²]
HB	- Brinell hardness , [MPa]

Physical properties :

T	- Test temperature , [Grade]
E	- Young modulus , [MPa]
α	- Coefficient of linear expansion (range 20 ^o - T) , [1/Grade]
λ	- Thermal (heat) condition coefficient , [Watt/(m·Grade)]
ρ	- Density , [kg/m ³]
C	- Specific heat (range 20 ^o - T) , [J/(kg·Grade)]
R	- Electrical resistance , [Ohm·m]

Weldability :

without limitations	- welding is done without heating and subsequent heat treeting
limited weldability	- welding is possible under heating up to 100-120 grade and subsequent heat treeting
hard weldability	- obtaining the quality welding needs the additional operations:heating up to 200-300 grade; the heat treeting 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

[Top](#)

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