

Database of Steel and Alloy (Marochnik)

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Characteristics for grade 45L (45Л).

Grade :	45L (45Л)
Substitute:	35Л, 55Л, 50Л, 40Л
Classification :	Non-alloy casting steel
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Chemical composition in % for grade 45L (45Л)

C	Si	Mn	S	P
0.42 - 0.5	0.2 - 0.52	0.45 - 0.9	max 0.06	max 0.06

Temperature of critical points for grade 45L (45Л).

$A_{c1} = 725$, $A_{c3}(A_{cm}) = 770$, $A_{r3}(A_{rcm}) = 720$, $A_{r1} = 690$

Mechanical properties under T=20°C for grade 45L (45Л)

Assortment	Dimension	Direct.	σ_B	σ_T	δ_5	ψ	KCU	Heat treatment
-	mm	-	MPa	MPa	%	%	kJ / m ²	-
Casting, GOST 977-88	to 100		540	314	12	20	294	Normalizing 860 - 880°C, Drawing 600 - 630°C,
Casting, GOST 977-88			589	392	10	20	245	

Brinell hardness for 45L (45Л) ,

HB 10 ⁻¹ = 143 - 241 MPa

Technological properties for grade 45L (45Л)

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

Technological properties of the material 45L (45Л) .

Linear shrinkage :	2.2 - 2.3 %
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Heat treatment of the material 45L (45Л)

Normalizing 860 - 880 ° C, Tempering 600 - 630 ° C

Physical properties for grade 45L (45Л)

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				7800		
100		11.6	68		470	
200			55		483	
300						
400			36		525	
500			32			
600					571	
T	E 10 ⁻⁵	α 10 ⁶	λ	ρ	C	R 10 ⁹

Equivalent steels for grade 45L (45Л)

Warning! Indicated both exact and nearest equivalents.

Germany	England	China	Bulgaria	Hungary	Poland	Romania	Czechia	Finland	Norway
DIN,WNr	BS	GB	BDS	MSZ	PN	STAS	CSN	SFS	NS
1.0558 GS-60	A3	ZGD410-620	45LI 45LII	Ao550 Ao550FK	L600 LII600	OT600-1 OT600-3	422660	G-30-57	Sst570

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 - Termal (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 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

(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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