The State Standard of USSR

Cast iron with flake graphite for casting

Grades

GOST 1412-85

(CT C3B 4560-84)

Official publication

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Moscow

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STATE STANDARD OF USSR

Cast iron with flake graphite for casting Grades

GOST 1412-85 [СТ СЭВ 4560-84]

Supersedes GOST 1412-79 In parts of grade of cast iron

ОКП 41 1120

Set by the decision of the state committee of USSR on standards dated 24 September 1985 No. 3009., validity period is established

From 01.01.87

Non observance of standard is dealt as per rules

This standard pertains to cast iron with flake graphite for castings and establish its grade, determined on the basis of ultimate tensile strength (UTS) of cast iron during stretching.

This Standard completely corresponds to СТ СЭВ 4560-84.

1. Grades

1.1. For manufacturing the castings following grades of cast iron are provided СЧ10; СЧ15; СЧ20; СЧ25; СЧ30; СЧ35.

On demand of customer following grades of cast iron are permitted for manufacturing: СЧ18, СЧ21 and СЧ24.

1.2. Conventional code of grade includes letters СЧ- gray cast iron and digital code of value of minimum Ultimate tensile strength at MPa. 10^{-1}.

Example of conventional code: СЧ15 GOST 1412-85.

2. Mechanical properties

2.1. Ultimate tensile strength of cast iron as cast or after heat treatment should correspond to values in table.

Grade of cast iron	Grade of cast iron as per CT CЭB 4560-83	Ultimate tensile strength σ_B, MPa (kgf/ mm^2) is not less than
СЧ 10	31110	100 (10)
СЧ 15	31115	150 (15)
СЧ 18	-	180 (18)
СЧ 20	31120	200 (20)
СЧ 21	-	210 (21)
СЧ 24	-	240 (24)
СЧ 25	31125	250 (25)
СЧ 30	31130	300 (30)
СЧ 35	31135	350 (35)

Note:- If in technical – normative documents on castings there are no other limitations then it is permitted to increase the minimum value of Ultimate tensile strength to 100MPa.

Ultimate tensile strength of cast iron of grade СЧ10 is determined on demand of customer.

2.2. Mechanical properties of cast iron on walls of casting in different cross sections are given in reference annexure 1.

Additional information about the physical properties of cast iron is given in reference annexure 2.

Chemical composition is given in reference annexure 3.

3. Method for testing

3.1. Tensile test is carried out according to GOST 24806-81 on one sample.

3.2. Hardness test is conducted according to GOST 24805-81.

3.3. Blanks for determining the mechanical properties of cast iron casting as per GOST 24648-81.

3.4. While carrying out heat treatment of castings, blanks for determining the mechanical properties should pass the heat treatment together with castings.

It is permitted to use blanks as cast (with out heat treatment) for carrying out low temperature heat treatment for relieving of casting stresses in castings.

3.5. On obtaining of unsatisfactory results of test, carry out repeated tests on two samples.

Samples are considered to withstand the testing, if mechanical properties of each of them correspond to the requirements of this standard.

Annexure 1

Reference

Tentative data about the Ultimate tensile strength and hardness on walls of casting in different cross sections

Grade of cast iron	Thickness of walls of casting in mm.						
	4	8	15	30	50	80	150
Ultimate tensile strength, MPa, minimum							
СЧ10	140	120	100	80	75	70	65
СЧ15	220	180	150	110	105	90	80
СЧ20	270	220	200	160	140	130	120
СЧ25	310	270	250	210	180	165	150
СЧ30	—	330	300	260	220	195	180
СЧ35	—	380	350	310	260	225	205
Hardness HB, maximum							
СЧ10	205	200	190	185	156	149	120
СЧ15	241	224	210	201	163	156	130
СЧ20	255	240	230	216	170	163	143
СЧ25	260	255	245	238	187	170	156
СЧ30	—	270	260	250	197	187	163
СЧ35	—	290	275	270	229	201	179

Note:

1. Values of Ultimate tensile strength and hardness in real castings can differ from those given in table.
2. Values of Ultimate tensile strength and hardness on wall of casting with thickness 15 mm approximately corresponds to analogous values on standard blank with diameter 30 mm.

Annexure 2
Reference

Physical properties of cast iron with flake graphite

Grade of cast iron	Density ρ in kgf / m^3	Linear shrinkage, ε in %	Modulus of elasticity during stretching E · 10^{-2} MPa	Specific heat at temperature from 20 up to 200 °C, C, J (kg. K)	Coefficient of linear expansion at temperature from 20 up to 200 °C, α 1/°C	Thermal conductivity at 20 °C, λ, W (m . K)
СЧ10	$6,8 \cdot 10^3$	1,0	from 700 upto 1100	460	$8,0 \cdot 10^{-6}$	60
СЧ15	$7,0 \cdot 10^3$	1,1	» 700 » 1100	460	$9,0 \cdot 10^{-6}$	59
СЧ20	$7,1 \cdot 10^3$	1,2	» 850 » 1100	480	$9,5 \cdot 10^{-6}$	54
СЧ25	$7,2 \cdot 10^3$	1,2	» 900 » 1100	500	$10,0 \cdot 10^{-6}$	50
СЧ30	$7,3 \cdot 10^3$	1,3	» 1200 » 1450	525	$10,5 \cdot 10^{-6}$	46
СЧ35	$7,4 \cdot 10^3$	1,3	» 1300 » 1550	545	$11,0 \cdot 10^{-6}$	42

Annexure 3
Reference

Grade of cast iron	Mass fraction of elements in %				
	Carbon	Silicon	Manganese	Phosphorus	Sulphur
				Not more than	
СЧ10	3,5—3,7	2,2—2,6	0,5—0,8	0,3	0,15
СЧ15	3,5—3,7	2,0—2,4	0,5—0,8	0,2	0,15
СЧ20	3,3—3,5	1,4—2,4	0,7—1,0	0,2	0,15
СЧ25	3,2—3,4	1,4—2,2	0,7—1,0	0,2	0,15
СЧ30	3,0—3,2	1,3—1,9	0,7—1,0	0,2	0,12
СЧ35	2,9—3,0	1,2—1,5	0,7—1,1	0,2	0,12

Note. Low alloying of cast iron by different elements (chromium, nickel, copper, Phosphorus etc.) is permitted.

Value	Units		
	Name	Code	
		International	Russian
MAIN UNITS SI			
Length	Meter	M	M
Weight	Kilogram	Kg	Кг
Time	Second	S	C
Current intensity	Ampere	A	A
Thermodynamic temperature	Kelvin	K	K
Number of substance	Mole	Mol	Моль
Luminous	Candela	Cd	Кд
ADDITIONAL UNITS SI			
Plane angle	Radian	Rad	Рад
Solid angle	Steradian	Sr	Ср

DERIVED UNITS OF SI, WHICH HAVE SPECIAL NAME

Value	Unit			Expression through the fundamental and additional unit of SI
	Name	Code		
		International	Russian	
Frequency	Hertz	Hz	Гц	$с^{-1}$
Force	Newton	N	Н	$М. кг. с^{-2}$
Pressure	Pascal	Pa	Па	$м^{-1} кг. с^{-2}$
Energy	Joule	J	Дж	$м^{2} кг. с^{-2}$
Power	Watt	W	Вт	$м^{2} кг. с^{-3}$
Charge of electricity	Coulomb	C	Кл	с. А
Voltage	Volts	V	Б	$м^{2} кг. с^{-3}.А^{-1}$
Electrical capacitance	Farads	F	Ф	$м^{-2} кг^{-1}. с^{-4}. А^{2}$
Electrical resistance	Ohm	Ω	Ом	$м^{2} кг. с^{-3}. А^{-2}$
Electrical conductivity	Siemens	S	См	$м^{-2} кг^{-1}. с^{-3}. А^{2}$
Flow of magnetic	Weber	Wb	Вб	$м^{2} кг. с^{-2}.А^{-1}$
Magnetic induction	Tesla	T	Тл	$кг. с^{-2}. А^{-1}$
Inductivity	Henry	H	Гн	$м^{2} кг. с^{-2}.А^{-2}$
Luminous flux	Lumen	Im	Лм	кд. ср
Illumination	Lux	Ix	Лк	$м^{-2}$ кд. ср
Radio activity	Becquerel	Bq	Бк	$с^{-1}$
Absorbed dose of radiation	Gray	Gy	Гр	$м^{2} с^{-2}$
Equivalent radiation dose	Ziwert	Sy	Зв	$м^{2} с^{-3}$