

Production Specification for Grey Cast Iron Casting for Capola Furnace: -

Casting of Grey Cast Iron fully maintained as per specification required by customer

IS-210 - 93 IS6331 - 87	ASTM A-48- 94a	BS 1452- 90	DIN-1691- 85	GOST 1412-85	ISO-185- 88	JIS-G5501- 89	SAE J431- 93ASTM A159-83
FG 150	25B	150	GG-15	C415	150	FC150	G2500
FG 200	30B	200	GG-20	C420	200	FC200	G3000
FG 220	35B	220	-	C424	-	-	G3500
FG 260	40B	250	GG-25	C425	250	FC250	G4000

Specification sheet for chemical composition of Diff Grades of Cast Iron: -

GRADE	100	150	200	260
% C	3.5 - 3.8	3.4 - 3.7	3.2 - 3.5	3.1 - 3.4
% SI	2.3 - 2.8	2.1 - 2.6	1.8 - 2.3	1.6 - 2.1
% MN	0.4 - 0.8	0.5 - 0.8	0.6 - 0.8	0.6 - 0.8
% P	MAX 0.2	MAX 0.2	MAX 0.2	MAX 0.15
% S	0.06 - 0.15	0.06 - 0.15	0.06 - 0.15	0.06 - 0.12
C EQV.	4.2 - 4.6	4.0 - 4.3	3.8 - 4.1	3.6 - 3.9
BHN	120 - 140	130 - 150	140 - 170	170 - 220
TENSILE STRENGTH	12 kg/mm2	15 kg/mm2	20 kg/mm2	25 kg/mm2



Grey Cast Iron Composition and Property

Grey Cast Iron (Gray iron) is so called because of the colour of the fracture face. It contains 1.5-4.3% carbon and 0.3-5% silicon plus manganese, sulphur and phosphorus. It is brittle with low tensile strength, but is easy to cast.

The all data in this documents is referred to Chinese standard of GB/T 9439-1988.

Single Casting Specimen Tensile Strength Property

Gray Iron Grade	Single Specimen Tensile Strength $\sigma_b \geq / \text{Mpa}$	Gray iron Castings	
		Wall Thickness /mm	Tensile Strength $\sigma_b \geq / \text{Mpa}$
HT100	100	>2.5~10	130
		>10~20	100
		>20~30	90
		>30~40	80
HT150	150	>2.5~10	175
		>10~20	145
		>20~30	130
		>30~40	120
HT200	200	>2.5~10	220
		>10~20	195
		>20~30	170
		>30~40	160
HT250	250	>4.0~10	270
		>10~20	240
		>20~30	220
		>30~50	200
HT300	300	>10~20	290
		>20~30	250
		>30~50	230
HT350	350	>10~20	340
		>20~30	290 260



Centrifugal Casting



Grey Cast Iron Composition

Castings Attached Specimen Tensile Strength Property

Gray Iron Grade	Wall Thickness /mm	Tensile Strength $\sigma_b \geq$ Mpa				Tensile Strength (reference)
		Attached Test Coupon		Attached Test Block		
		$\phi 30$ mm	$\phi 50$ mm	R15mm	R25mm	$\sigma_b \geq$ Mpa
HT150	>20~40	130	-	120	-	120
	>40~80	115	(115)	110	-	105
	>80~150	-	105	-	100	90
	>150~300	-	100	-	90	80
HT200	>20~40	180	-	170	-	165
	>40~80	160	(155)	150	-	145
	>80~150	-	145	-	140	130
	>150~300	-	135	-	130	120
HT250	>20~40	220	-	(210)	-	205
	>40~80	200	(190)	190	-	180
	>80~150	-	180	-	170	165
	>150~300	-	165	-	160	150
HT300	>20~40	260	-	(250)	-	245
	>40~80	235	(230)	225	-	215
	>80~150	-	210	-	200	195
	>150~300	-	195	-	185	180
HT350	>20~40	300	-	(290)	-	285
	>40~80	270	(265)	260	-	255
	>80~150	-	240	-	230	225
	>150~300	-	215	-	210	205

Grey Iron Castings' other mechanical property

Grade	Compressive Strength σ_{bc} /MPa	Shearing Strength τ_b /Mpa	Impact Testing α_{KV} /(J/cm ²)	Safe Range of stress σ_{-1} /MPa	Modulus of Elasticity E/GPa
HT150	500~700	150~250	-	60~90	70~90
HT200	600~800	200~300	2~5	80~90	80~110
HT250	800~1000	250~350	4~8	100~140	100~130
HT300	1000~1200	300~450	7~10	120~160	120~140
HT350	1100~1300	350~500	9~11	140~180	130~160



Grey Cast Iron Composition

Grey Iron Castings Hardness

Gray Iron Grade	Hardness Grade	Hardness Range HBS	Metallography
HT100	H145	≤170	Ferrite
HT150	H175	150~200	Ferrite + Pearlite
HT200	H195	170~220	Pearlite
HT250	H215	190~240	Pearlite
HT300	H235	210~260	Pearlite (Inoculated Cast)
HT350	H255	230~280	Pearlite (Inoculated Cast Iron)

Gray Iron Casting heat treatment

Casting Unit Weight kg	Starting Temperature /oC	Heating Speed / (oC/h)	Preservation Tempera-		Heat Preser- vation Time /h	Cooling Speed / (oC/h)	Final Temperature /oC
			Cast Iron	Low Alloy Cast Iron			
Simple Castings							
<200	≤200	≤100	500~550	550~570	4~6	30	200
200~2500	≤200	≤80	500~550	550~570	6~8	30	200
>2500	≤200	≤60	500~550	550~570	8	30	200
Precision Castings							
<200	≤200	≤100	500~550	550~570	4~6	20	200
200~2500	≤200	≤80	500~550	550~570	6~8	20	200

Gray Iron Casting, no any standard mentioned the chemistry composition, so we only suggest the following chemistry based on actual production.

Grade	Wall Thickness /mm	C	Si	Mn	P ≤	S ≤
HT100	-	3.4~3.9	2.1~2.6	0.5~0.8	0.3	0.15
HT150	<30	3.3~3.5	2.0~2.4	0.5~0.8	0.2	0.12
	30~50	3.2~3.5	1.9~2.3	0.5~0.8	0.2	0.12
	>50	3.2~3.5	1.8~2.2	0.6~0.9	0.2	0.12
HT200	<30	3.2~3.5	1.6~2.0	1.7~0.9	0.15	0.12
	30~50	3.1~3.4	1.5~1.8	0.8~1.0	0.15	0.12
	>50	3.0~3.3	1.4~1.6	0.8~1.0	0.15	0.12
HT250	<30	3.0~3.3	1.4~1.7	0.8~1.0	0.15	0.12
	30~50	2.9~3.2	1.3~1.6	0.9~1.1	0.15	0.12
	>50	2.8~3.1	1.2~1.5	1.0~1.2	0.15	0.12
HT300	<30	2.9~3.2	1.4~1.7	0.8~1.0	0.15	0.10
	30~50	2.9~3.2	1.2~1.5	0.9~1.1	0.15	0.10
	>50	2.8~3.1	1.1~1.4	1.0~1.2	0.15	0.10



Grey Cast Iron Compare

Index	Country	Grey Iron Grade						
1	China	—	HT350	HT300	HT250	HT200	HT150	HT100
2	Japanese	—	FC350	FC300	FC250	FC200	FC150	FC100
3	USA	NO.60	NO.50	NO.45	NO.35/ NO.40	NO.30	NO.25	NO.20
4	Russia	C440	C435	C430	C424/C425	C418/C420/ C421	C415	C410
5	Germany	GG40	GG35	GG30	GG25	GG20	GG15	GG10
6	Italy	—	G35	G30	G25	G20	G15	G10
7	France	FGL400	FGL350	FGL300	FGL250	FGL200	FGL150	—
8	England	400	350	300	260	180/220	150	100
9	Poland	Z140	Z135	Z130	Z125	Z120	Z115	—
10	India	FG400	FG350	FG300	FG260	FG200	FG150	—
11	Romania	FC400	FC350	FC300	FC250	FC200	FC150	—
12	Spanish	—	FG35	FG30	FG25	FG20	FG15	—
13	Belgium	FGG40	FGG35	FGG30	FGG25	FGG20	FGG15	FGG10
14	Australia	T400	T350	T300	T260	T220	T150	—
15	Sweden	O140	O135	O130	O125	O120	O115	O110
16	Hungary	OV40	OV35	OV30	OV25	OV20	OV15	—
17	Bulgaria	—	Vch35	Vch30	Vch25	Vch20	Vch15	—
18	ISO	—	350	300	250	200	150	100
19	COPANT	FG400	FG350	FG300	FG250	FG200	FG150	FG100
20	Taiwan (China)	—	—	FC300	FC250	FC200	FC150	FC100
21	Holland	—	GG35	GG30	GG25	GG20	GG15	—
22	Luxemburg	FGG40	FGG35	FGG30	FGG25	FGG20	FGG15	—
23	Austria	—	GG35	GG30	GG25	GG20	GG15	—
24	Europa- Norm		EN-GJL- 350	EN-GJL-300	EN-GJL-250	EN-GJL-200	EN-GJL-150	



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