Grey Iron in DIN 1691

Grey Iron castings in DIN 1691 are popular gray iron material in Germany standard. ww.castingqu

Reference Casting Standards:

DIN 1691:1985 Flake graphite cast iron (grey cast iron)

Grey Iron castings can be produced in Casting Quality Industrial:

- Sand Casting
- Shell Casting
- Lost Form Casting

Material Property of Grey Iron:

Density: GG15 7.1kgs/dm3; GG20 7.15kgs/dm3; GG25 7.2kgs/dm3; GG30 7.25kgs/dm3; GG35 7.3kgs/dm3;

Grey Iron Chemical Requirements in DIN 1691:

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 ≤
GG10	-	3.4~3.9	2.1~2.6	0.5~0.8	0.3	0.15
GG15	<30 30~50 >50	3.3~3.5 3.2~3.5 3.2~3.5	2.0~2.4 1.9~2.3 1.8~2.2	0.5~0.8 0.5~0.8 0.6~0.9	0.2 0.2 0.2	0.12 0.12 0.12
GG25	<30 30~50 >50	3.2~3.5 3.1~3.4 3.0~3.3	1.6~2.0 1.5~1.8 1.4~1.6	1.7~0.9 0.8~1.0 0.8~1.0	0.15 0.15 0.15	0.12 0.12 0.12
GG30	<30 30~50 >50	3.0~3.3 2.9~3.2 2.8~3.1	1.4~1.7 1.3~1.6 1.2~1.5	0.8~1.0 0.9~1.1 1.0~1.2	0.15 0.15 0.15	0.12 0.12 0.12
GG35	<30 30~50 >50	2.9~3.2 2.9~3.2 2.8~3.1	1.4~1.7 1.2~1.5 1.1~1.4	0.8~1.0 0.9~1.1 1.0~1.2	0.15 0.15 0.15	0.10 0.10 0.10

DIN 1691 Grey Iron Machinability

Very good, easy for machining such as milling, turning or drilling.

Grey Iron Mechanical Requirements in DIN 1691:

The material can be defined in two methods: a) the tensile strength in separately casting; b) the hardness of material.

Grade		Wall thickness mm		Mechanical Requirements			
				Tensile strength Value to be obtained		Anticipated values in the castings	
Symbol	Number	Over	Up to	In separately casting sample (N/mm2)	In cast-on samples (N/mm2)	Tensile Strength, Rm min, (MPa)	Brinell Hardness (HB 30), max
GG-10	0.6010	5	40	Min 100	-	-	-
GG-15	0.6015	2.5	5	150 to 250	-	180	270
		5	10		-	155	245
		10	20		-	130	225
		20	40		120	110	205
		40	80		110	95	-
		80	150		100	80	-
		150	300		90	-	-
GG-20	0.6020	2.5	5	200 to 300	-	230	285
		5	10		-	205	270
		10	20		-	180	250
		20	40		170	155	235
		40	80		150	130	-
		80	150		140	115	-
		150	300		130	-	-
GG-25	0.6025	5	10	250 to 350	-	250	285
		10	20		-	225	265
		20	40		210	195	250
		40	80		190	170	-
		80	150		170	155	-
		150	300		160	-	-
GG-30	0.6030	10	20	300 to 400	-	270	285
		20	40		250	240	265
		40	80		220	210	-
		80	150		210	195	-
		150	300		190	-	-
GG-35	0.6035	10	20	350 to 450	-	315	285
		20	40		290	280	275
		40	80		260	250	-
		80	150		230	225	-
		150	300		210	-	-

Brinell hardness of castings:

Grade material		Wall thickness (mm)		Brinell hardness (HB 30)	
Symbol	Number	Over	Up to	Min	Max
GG-150HB	0.6012	2.5	5	-	210
		5	10		185
		10	20		170
		20	40		160
		40	80		150
GG-170HB	0.6017	2.5	5	170	260
		5	10	140	225
		10	20	125	205
		20	40	110	185
		40	80	100	170
GG-190HB	0.6022	4	5	190	275
		5	10	170	260
		10	20	150	230
		20	40	135	210
		40	80	120	190
GG-220HB	0.6027	5	10	200	275
		10	20	180	250
		20	40	160	235
		40	80	145	220
GG-240HB	0.6032	10	20	200	275
		20	40	180	255
		40	80	165	240
GG-260HB	0.6037	20	40	200	275
		40	80	185	260

DIN 1691 Grey Iron Equivalent Material:

GG10 equivalent: GB/T 9349 GR HT100; JIS G5501 GR FC100; ASTM A48 Class No.20; ISO 185 GR JL/100

GG15 equivalent: GB/T 9349 GR HT150; JIS G5501 GR FC150; ASTM A48 Class No.25; ISO 185 GR JL/150

GG20 equivalent: GB/T 9349 GR HT200; JIS G5501 GR FC200; ASTM A48 Class No.30; ISO 185 GR JL/200

GG25 equivalent: GB/T 9349 GR HT250; JIS G5501 GR FC250; ASTM A48 Class No.35; ISO 185 GR JL/250

GG30 equivalent: GB/T 9349 GR HT300; JIS G5501 GR FC300; ASTM A48 Class No.45; ISO 185 GR JL/300

GG35 equivalent: GB/T 9349 GR HT350; JIS G5501 GR FC350; ASTM A48 Class No.50; ISO 185 GR JL/350

Gray Iron Heat treatment in DIN 1691:

Generally, the castings are supplied without heat treatment. But the heat treatment shall be agreed at the time of ordering, it can be to reduce internal stress or hardening, quenching and tempering for improving machinability.

Grey Iron castings Weldability:

Very bad. Generally, castings welding require the purchaser's approval. The welding process and the filler metals should be appropriated to the use of the casting in manner intended.

Grey Iron Typical Casting Application:

- Pump and valve
- Machinery bed.
- Machinery parts.

As a professional manufacturer in China, We Casting Quality focus on Metal Parts OEM industry, and provide solutions and services in Metal Casting field as following:

1. **Sand Casting**
2. **Investment Casting, Lost Wax process**
3. **Shell Casting**
4. **Lost Form Casting**
5. **CNC Machining**
6. **CAD Design**
7. **Tools/Mold Design**

Material Supplied

- Cast Iron Castings (Grey Iron, Malleable Iron, Ductile Iron)
- Carbon Steel and Alloy Steel Castings
- Stainless Steel and Duplex Stainless Steel Castings
- Aluminum Castings
- Bronze and Brass Castings
- Titanium and Cobalt Alloy Castings

What We Can Do

- **Design Ability**
  Our engineers will help you to improve the designs based on casting technology, then The simulation software will be processed to verify the casting pouring system. Pro/E, Solidworks, AutoCAD and ProCast are available in Casting Quality Industrial.
- **Saving Cost**
  Some manufacture processes may lead high cost. We will analyze the designs and advise the suitable methods to our customers. The best solution will be adopted.
- **Quality Control**
  From the raw material selecting to bulk production processing, all procedures will follow PPAP program if necessary. The certificates will be provided including chemistry, hardness, mechanical property or NDT testing.
- **Production Capacity**
  The max iron/steel castings can reach 30tons in weight, meanwhile the minus casting is around 1 gram only.
  We also have prototyping and 3D scanning ability for sample plan.
- **Logistic Service**
  The products will be delivered directly to customer's workshop, which will save plenty of work for clients.

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