

Cast Iron Casting by V-Process Casting

V-Process Team: Zhang Jianman, Liang Qingmin, Lei Bo



Wuhan Jian Heng Industrial Technology Co., Ltd.



Chinese Technology Association of Lost Foam
Casting and V-Process Casting

Web: www.jianhengid.com Email: admin@jianhengid.com

Phone: +86 13545239290 +86 18771036713

Address: No.1037, Luoyu Road, Hongshan District, Wuhan, Hubei, China

1. Counterweight castings

Counterweight castings by v-process have been used in forklift, crane machine, loader, crane machine, excavator, elevator, farm machinery, oil industry, etc. Now in China almost of the counterweight castings are produced by v-process.

From 1990, all of the Chinese counterweight companies begin to use v-process instead of the old resin process and green sand process. Now there are more than 60 companies producing counterweight castings.



For counterweight castings, v-process has more advantages than other casting process in castings quality, dimensional accurate, etc.





Bathtub

V-process widely been used in bathtub castings' production. Now,there are 3 big foreign-funded enterprises using v-process produce cast iron bathtubs in China,they are Japan—TOTO China Co., Ltd.; Spain—Roca Sanitario, S.A.; America—Kohler China Co.,LTD.



Bathtub



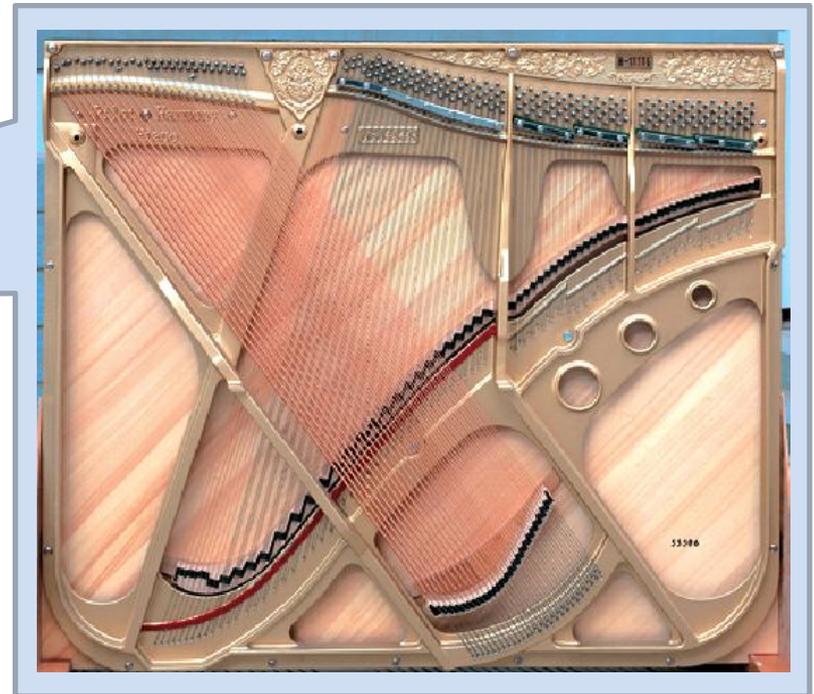
Bathtub



Piano Frame

Piano frame is one of the typical products by V-process technology .The product material is gray iron(HT200),and the thickness of thinnest wall is 8 mm.It belongs to art casting,and any casting defects is allowed on the surface.It requires high mechanical properties,and it's wall thickness and the deformation control is very strict.

We realized the goal of high quality, high efficiency and low consumption when produce this kind of castings by v-process.







Machinery Shell Parts

Casting information:

Material: Gray iron (HT200~300), requires the microstructure graphite shape is A+B-type graphite, C-type graphite is not allowed.

Use the v-process technology, we can get , high dimensional accuracy and good surface finish. Also this process is better for the microstructure graphite shape



Gearbox shell engineering machinery



Gearbox shell engineering machinery



Painting



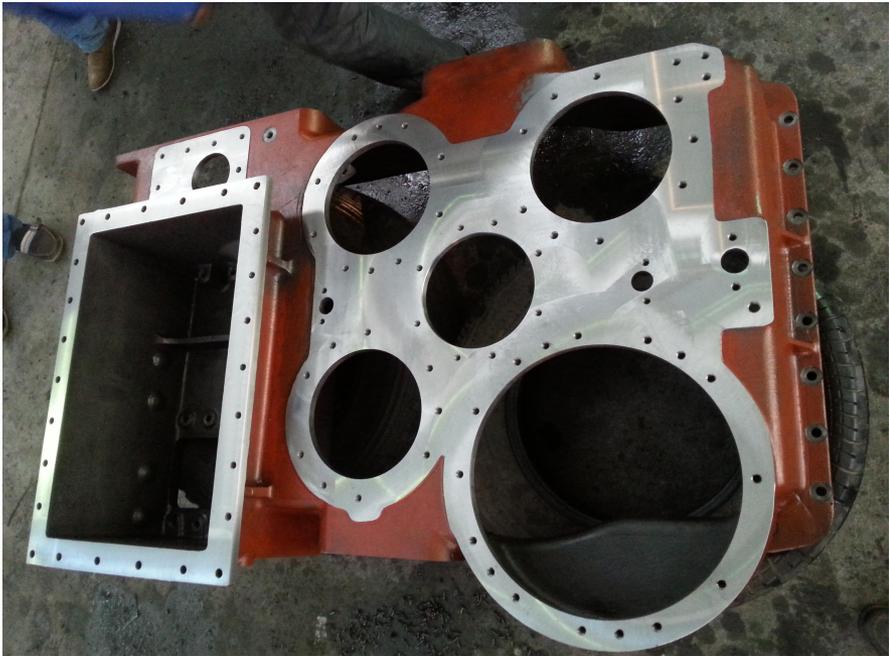
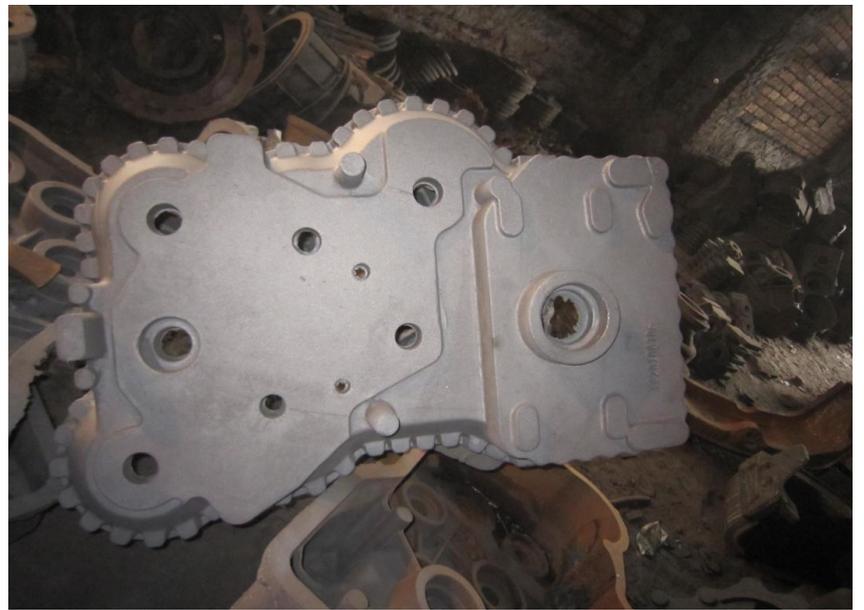
Putting empty flask



Molding



Core setting



Manhole covers

V-process been used in manhole cover production since 1970s' in Japan, and now, it is also used in Chinese foundry firms.

By this process, we can get high surface quality with better dimensional accuracy. It is specially used in special castings with customer made figure, the .



Casting information:

Material: QT500-7(Ductile cast iron),

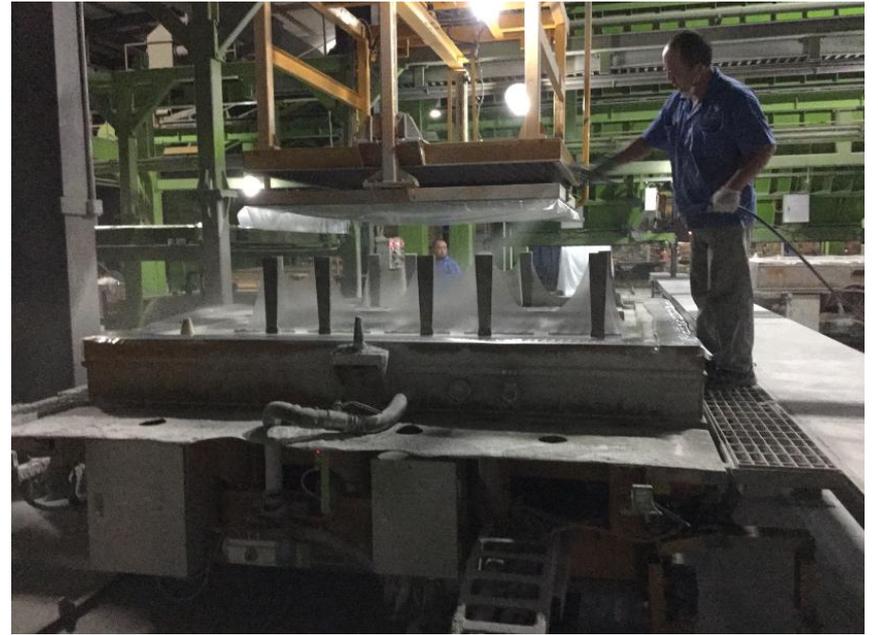
Compressive strength: >500Mpa

Elongation: >7%

Nodularity: >85%

Load Capacity: 40 Tons, 60 Tons, 90 Tons

Working life: >15 Years

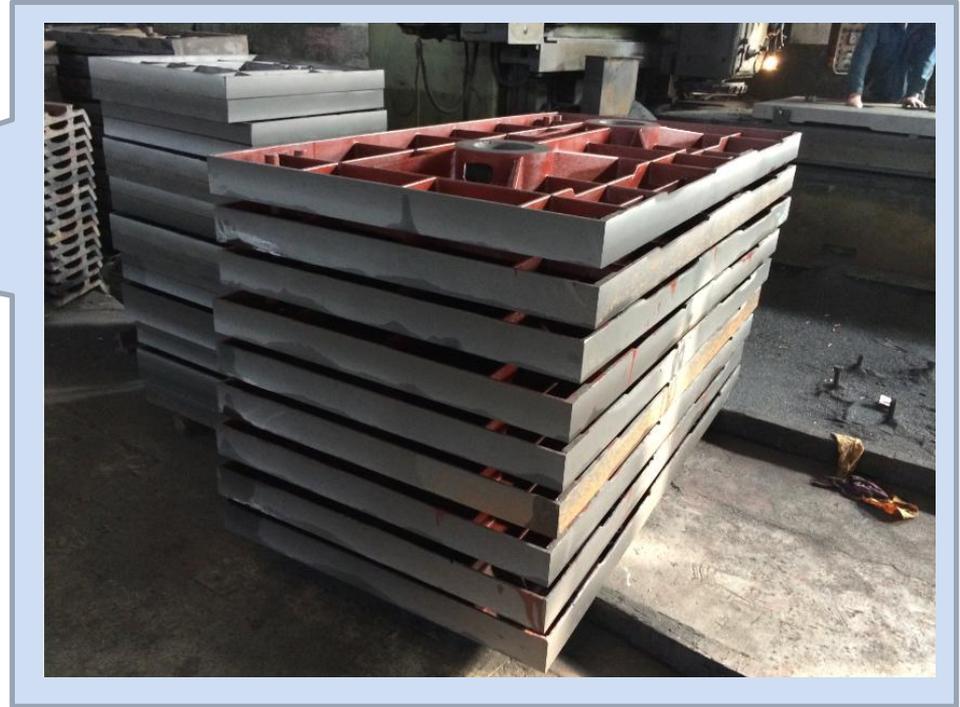




Machinery base plate



Machinery



Foundation bed of woodworker belongs to typical big plane castings. The product material is gray iron(HT200), the casting dimension in the picture is 1800 mm \times 960 mm \times 960 mm, weight 370 kg.

There are many ribbed slabs on the back of the castings. The castings requires high assembly accuracy, so we need to get a clear outline of castings and avoid deformation.

Comparison of old and new process, surface quality of v-process castings is far higher than that of green sand castings. Castings by v-process win the customer's approval.



green sand process



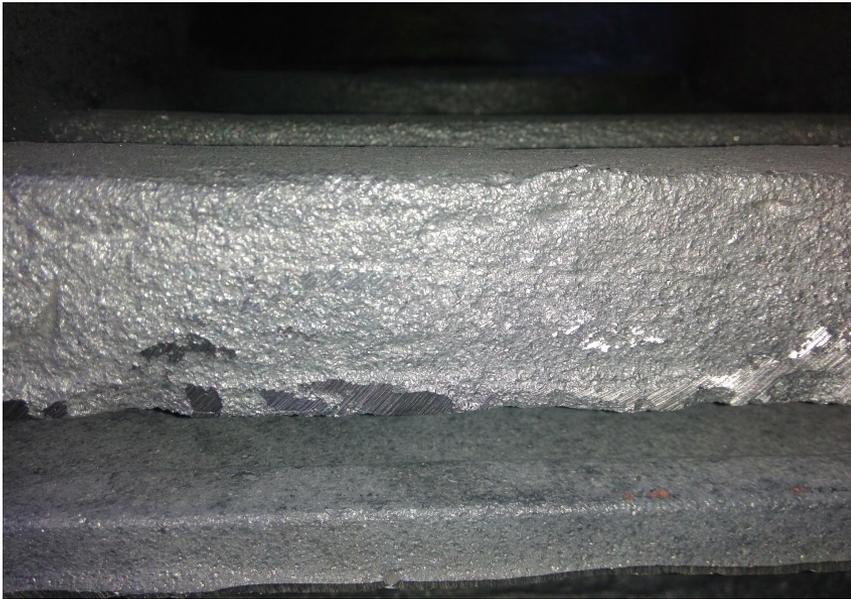
finished product



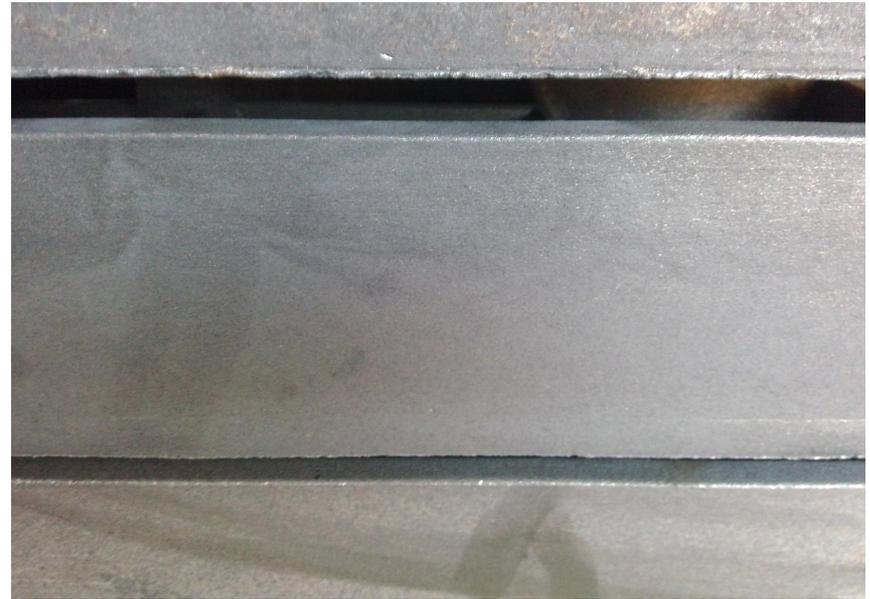
v-process



finished product



surface of green sand castings



surface of v-process castings

Higher dimensional accuracy by v-process, and much lower machine allowance than green sand process.

This kind of castings in v-process may face a series of technical problems, such as film forming problems, abreuvage, deformation, ect. Through the long time experiment, we have find out the production characteristic and technological characteristics of this kind of castings. Through the right process design and production control, we have made the batch production success.

Glass mold

The glass mold is the main technology equipment to produce glass products, with all the surface finish machining and surface treatment .

Material: low alloy cast iron (Mo, V, Ti, etc);

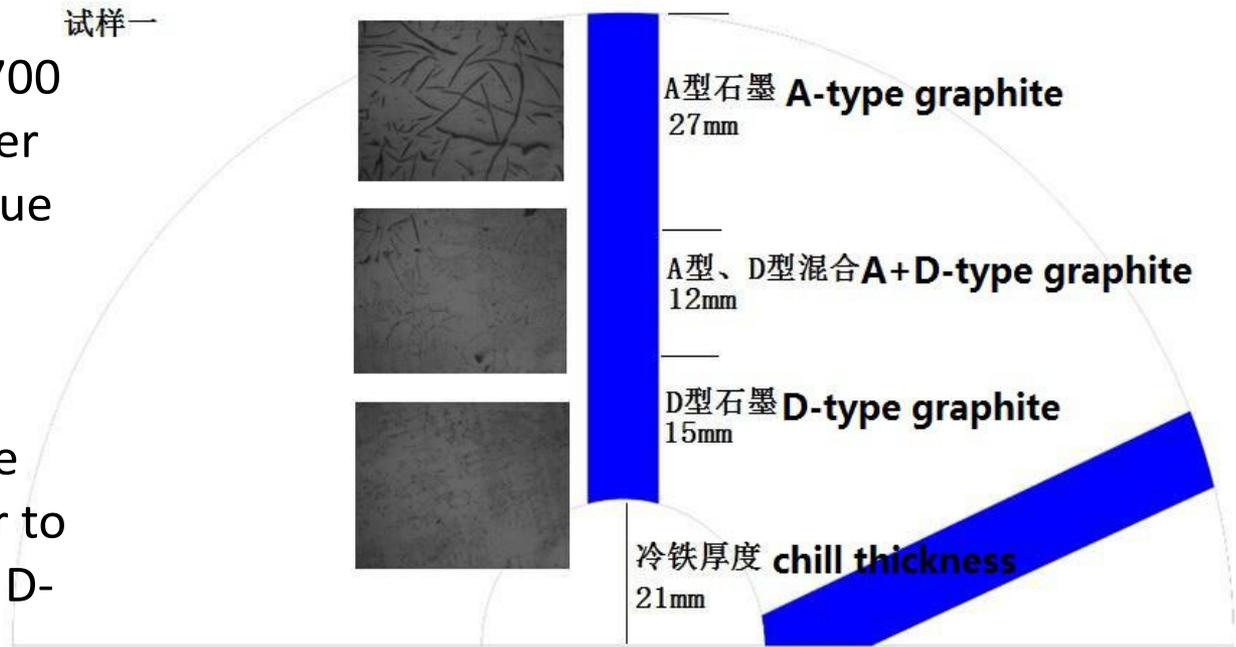
Requirement: good heat-resistant ability; good wear resistant ability; different graphite distribution;

The traditional process to produce glass mould is green sand, and we have achieved the mass production in v-process, which improves the production efficiency and quality of castings.

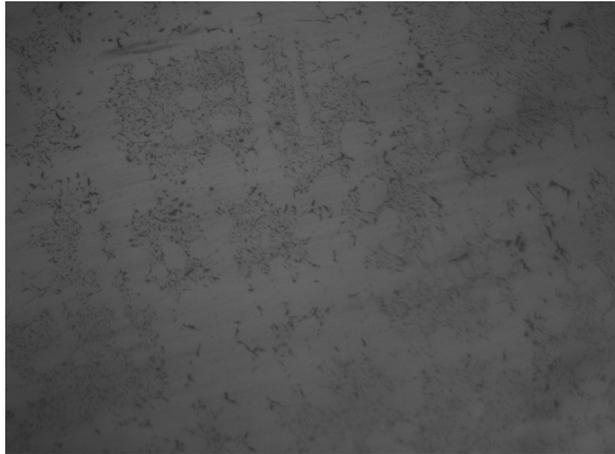


Glass mould's working temperature is between 700 °C ~ 1100 °C, it need higher oxidation resistance, fatigue resistance and wear resistance ability.

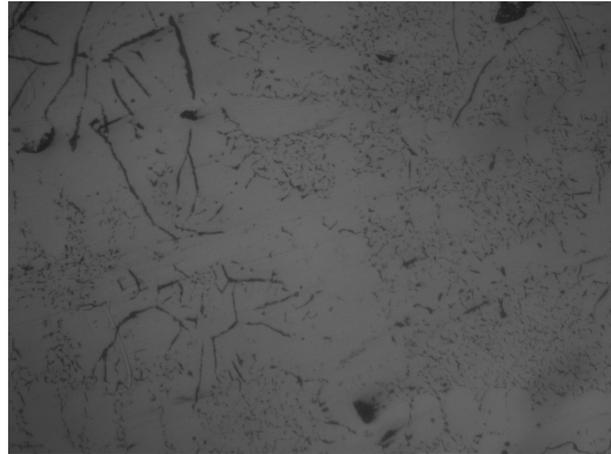
In order to improve the service life, we require the microstructure from inner to the surface changes from D-type graphite to A-type graphite.



Microstructure of the glass mold



D-type graphite



A+D-type graphite



A-type graphite



Cast iron boilers tablets



Cast iron boilers tablets as parts of boiler, belongs to pressure vessel castings.

Casting information:

Dimension: 1980*1180*180mm; Weight: 110-800KG; Material: Gray iron(HT200); Thickness: 9-12mm; Pressure test: 10kgf/cm².

Technical requirement:

Microstructure requires A-type graphite, the length of the graphite is class 3-6, proportion of D-type graphite and C-type graphite should less than 30%, proportion of pearlite should more than 90%.



Finished castings



Blank castings

By v-process casting technique, there will be less pollution caused by foundry materials. The structure property is better than old process, the castings surface quality, dimensional accuracy is better and the cost is lower.

Axle housing



Ductile cast iron axle housing, the material usually are QT400-15, QT450-10 and QT600-5 class, and usually used in heavy trucks.

Use V-process technology produce axle housing is already a mature technology, and the production of the Ductile cast iron axle housing is less than steel axle housing.

There are two main questions we should notice: first, accurately utilize the law of ductile iron casting to prevent shrinkage defects; second, take reasonable measures to prevent the defects caused by coating and dry sand which is typical in v-process.



Sodium silicate sand core



finished product of axle housing



axle housing castings

Brake drum



Brake drum is part of automobile braking system, and the product material usually is gray iron (HT200~300).

The matrix structure is pearlite and a little ferrite and cementite. The graphite shape usually is A-type graphite. The function of brake drum is heat dissipation, increase the friction performance and reduce the brake noise.





Wheel hub

This kind of wheel hub castings are usually used in trucks or passenger cars, and it is made of ductile cast iron.

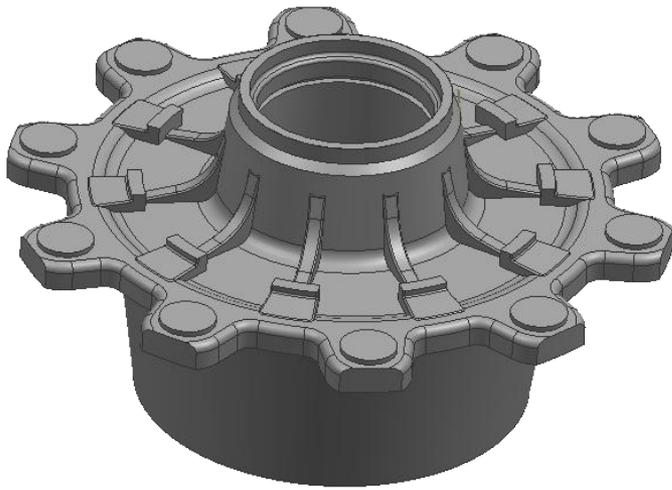
We use v-process to produce this kind of castings, every mold contains 4 castings and pouring from the center of the mold.



Finished product of wheel hub



Wheel hub castings



3D model



Cope



Drag(resin sand core)



Rough casting of wheel hub

Crank for Petroleum Machinery

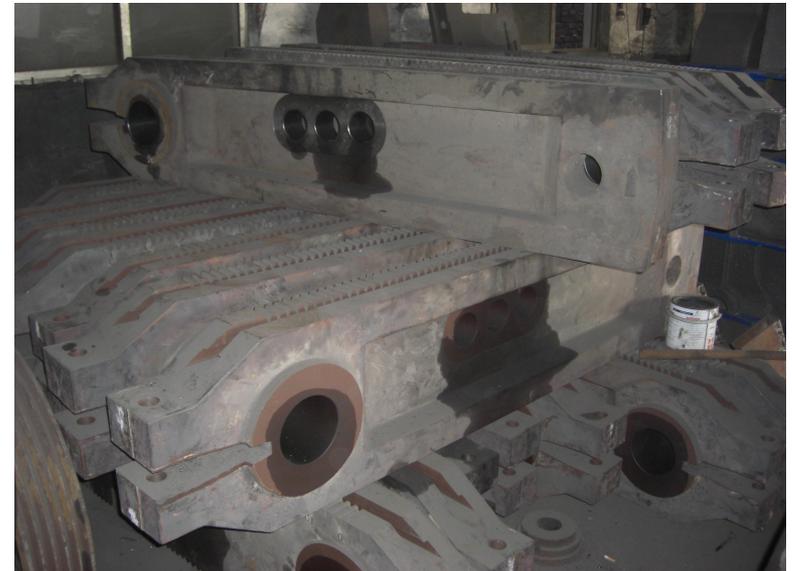
The material of crank and counterweight on the petroleum machinery usually is gray iron(HT200~250). This kind of castings with simple construction withs and high weight,are suitable to produced by v-process.



Petroleum machinery



Counterweight



Crank for petroleum machinery



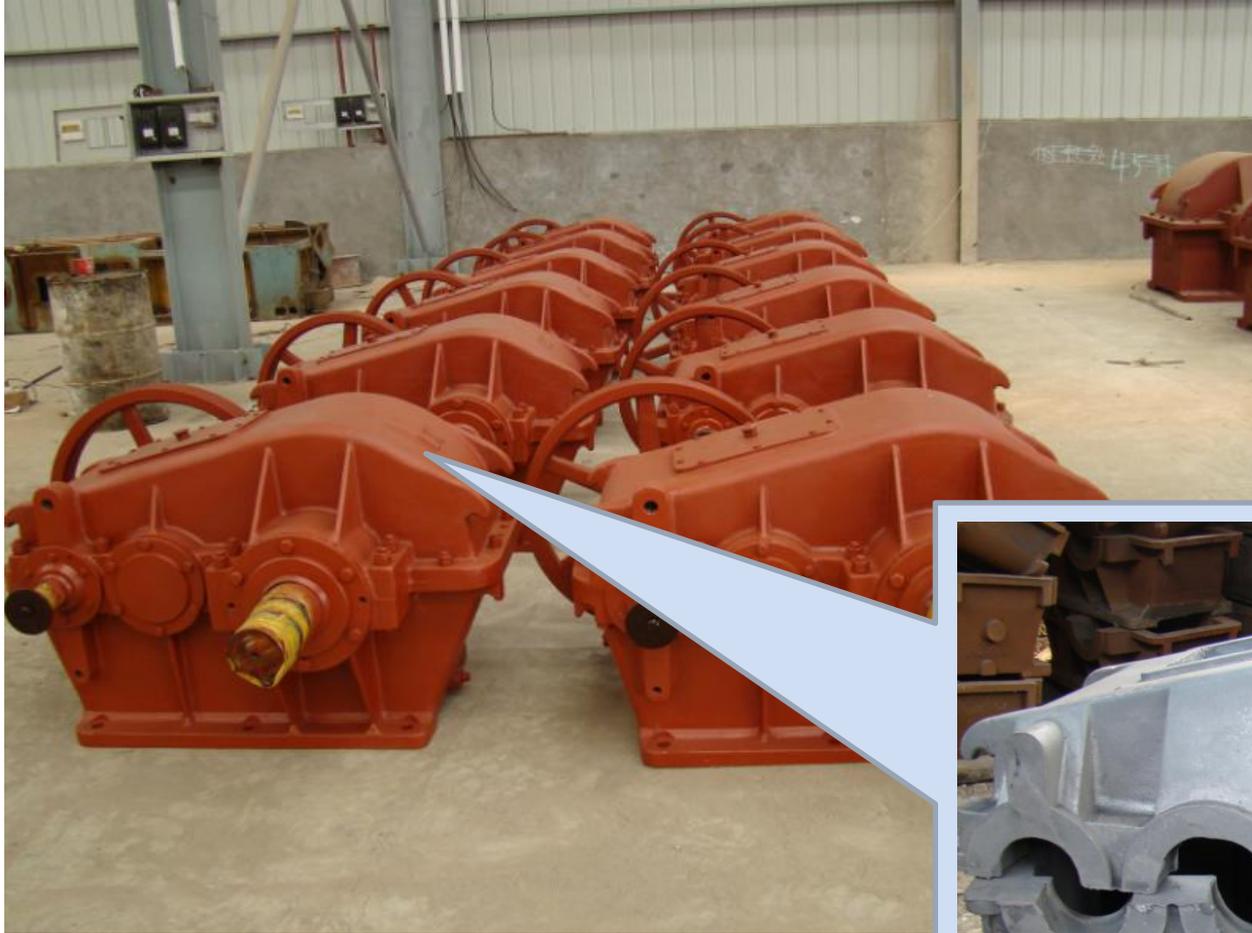
Blank castings



Finished castings

It is very common in China to produce crank and counterweight on the petroleum machinery by v-process, and have got good benefit.

Reduction gear box



Bearing base

Casting information:

Material: Grey iron (HT200); Weight: 3-5 tons;



Finished castings



Finished castings



Pig mold



This kind of castings are special for pig machine, and are made of low alloy cast iron. The internals of casting is tight, with good heat resistance and abrasion resistance ability.

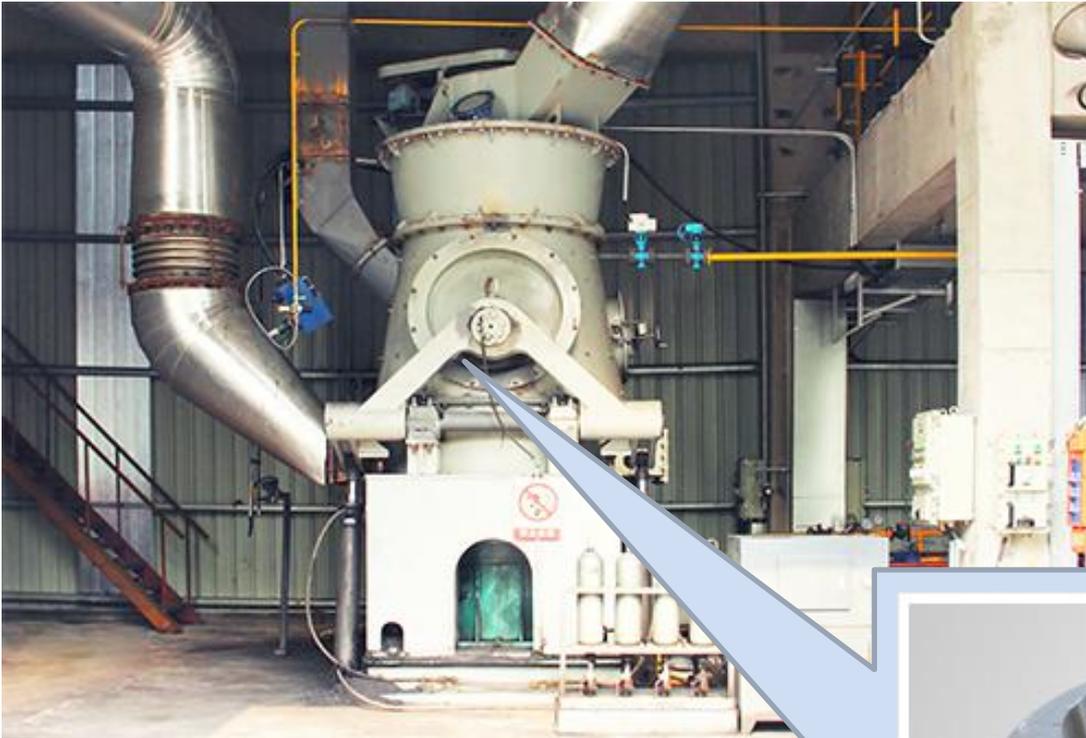
The service life of the pig mold should more than 45 hours. Every good mold should produce more than 200t iron. Use v-process technology, the quality is better.



End cover for elevator



Hi-Cr Iron Roller Shell castings



Vertical mill is a kind of ideal large grinding equipment, widely used in cement, electric power, metallurgy, chemical industry, non-metallic mineral industries.



Other castings



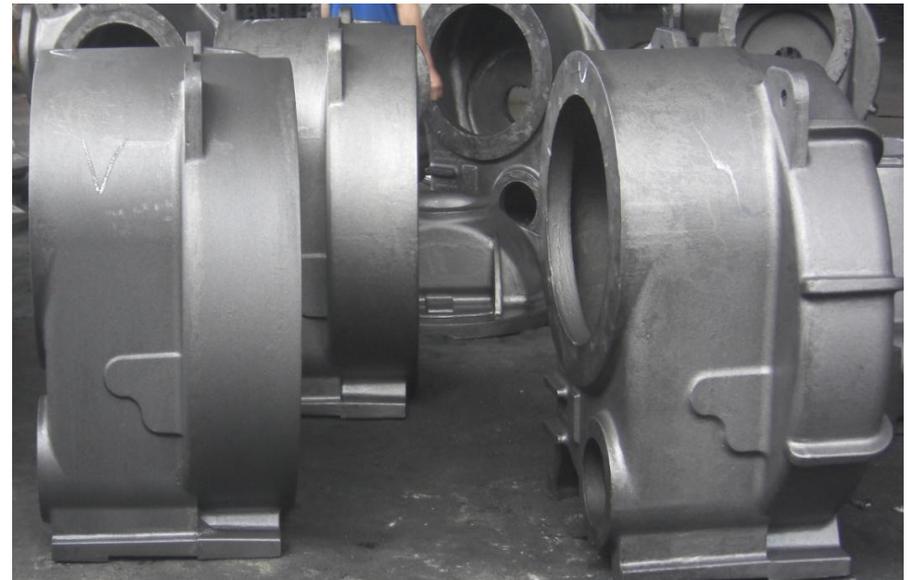
Coke oven parts(malleable cast iron)



Elbow (Gray iron)



Support castings(ductile iron)



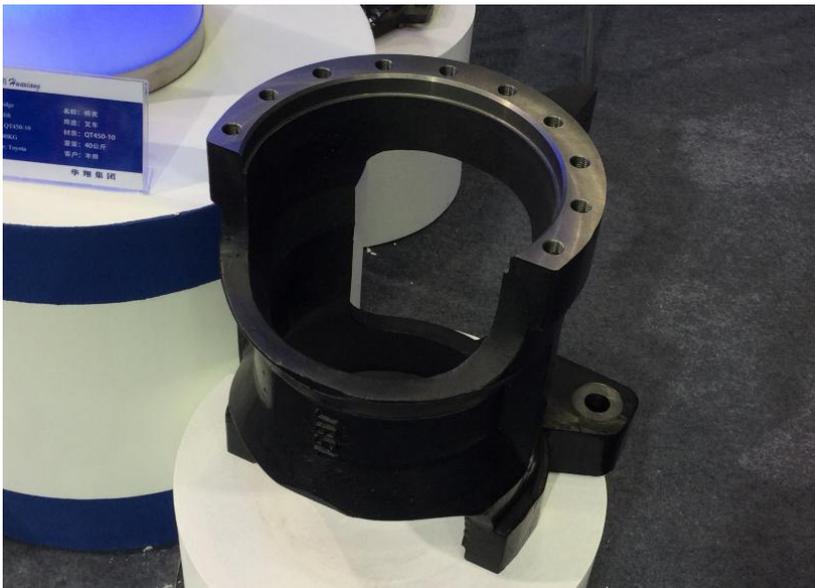
Air-conditioning pump shell



Rope sheave (ductile iron)



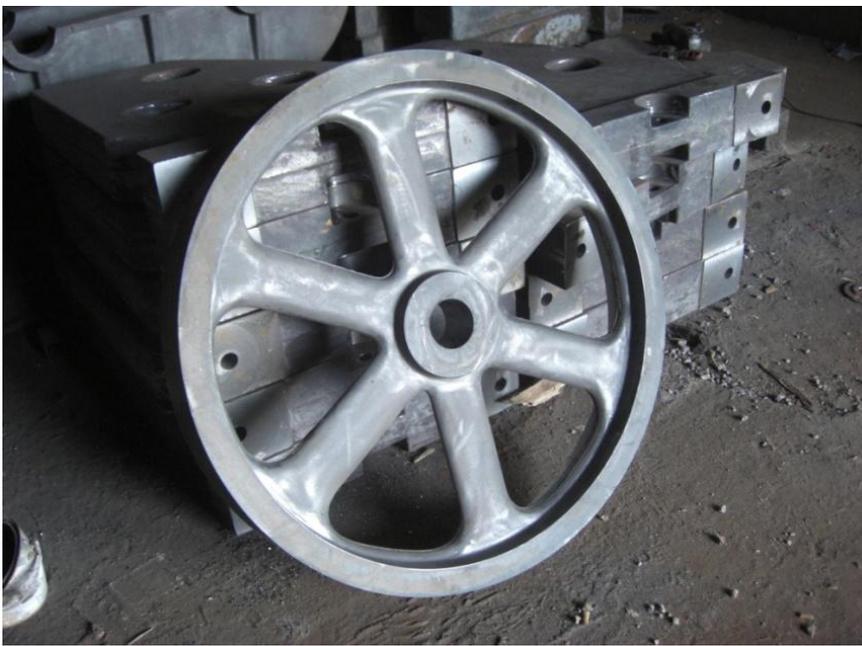
Machine parts(ductile iron)



Machine parts(ductile iron)



Callipers castings(ductile iron)



Wheel casting(Gray iron)



Machinery body (HT 200)

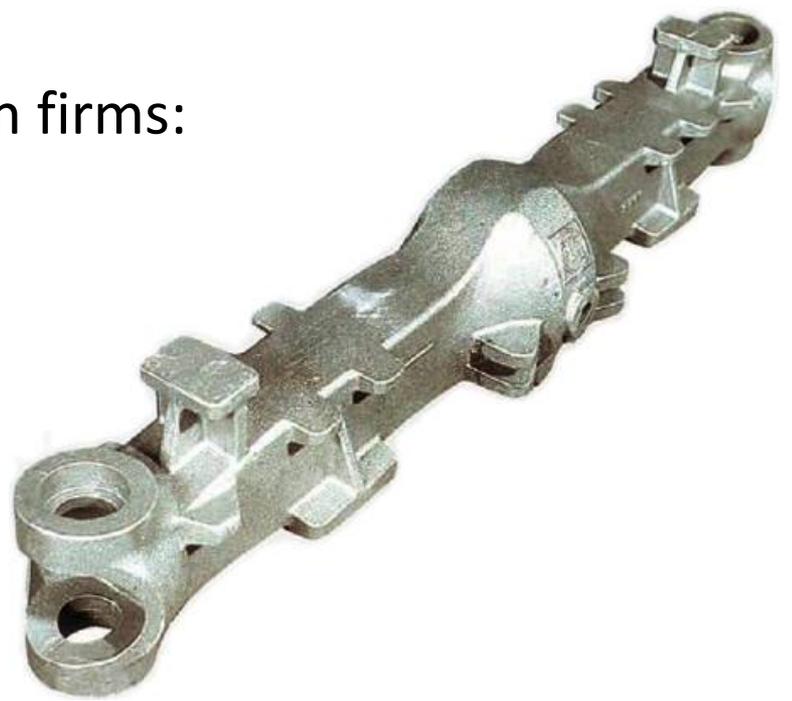


Machinery body (HT 200)



Marine counterweight castings

Some ductile iron castings from foreign firms:





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Why using v-process

1. Lower foundry material consumption and lower energy cost;
2. Higher sand recovery rate and lower waste discharge;

Process	Consumption of foundry materials			Energy consumption standard coal consumption	Sand recovery	waste discharge kg/Ton
	Sand	Bonder	Others			
v-process	40	no	no	<95 kg/Ton	>95%	<40
Resin sand	350	resin	hardener	<230 kg/Ton	80-85%	<370
Static molding line	180	clay	coal powder	<220 kg/Ton	90%	<260
Lost foam	170	no	no	<450 kg/Ton	95%	<180



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Why using v-process

3. Better casting quality, including no pattern draft, higher dimension accuracy, lower weight tolerance and better casting surface quality.

Process	Pattern Draft	Dimension Accuracy	Weight Tolerance	Surface Roughness
v-process	0~0.5°	CT9-11	MT8-10	6.3-12.5um
Resin sand	1°~2°	CT7-9	MT6-8	12.5-50um
Static molding line	0.5~1°	CT6-8	MT4-6	12.5-25um
Lost foam	0~0.5°	CT6-8	MT4-6	6.3-12.5um

4. Lower labor cost and better working environment.

For normal v-process line: 3-4 molds/hour, best v-process line: 6-8 molds/hour(this is data for v-process counterweight)

For good counterweight factories, production usually reach 13-15 tons per people per day (working time according to 8 hours).



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Why using v-process

5. Lower investment cost.

Process	Investment /million RMB	Capacity /Tons	Fixed Cost	Metal cost	Foundry materials	Energy cost	Labor cost	Others
v-process	200	120,000	5%	75%	4%	11%	4%	1%
Resin sand	50	10,000	7%	50%	16%	14%	10%	3%
Static molding line	140	30,000	8%	60%	6%	14%	8%	4%
Lost foam	80	10,000	11%	48%	18%	12%	9%	2%

6. Environment-friendly.

Since there is no chemical binder in the sand, there will be no pollution from v-process plant and the dust will be collected and will be used in the molding process.





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Wuhan Jianheng industrial technology Co.,Ltd

About us

Wuhan Jianheng industrial technology Co.,Ltd is an integrated service company committed to the development of foundry industry. The company owns a team with professional knowledge and rich practical experience in casting technology and management, engaging a number of senior foundry experts as consultant; the company will strive to become a modern service industry enterprises focusing on foundry consulting, research ,technology,production, supplyment,trade,human resources and other service .

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Service scope:

1. V-Process casting process designing and optimization of castings;
2. Designing and manufacturing of V-Process patterns;
3. Analysis and solutions of casting quality problems;
4. Designing and selection of V-Process casting equipment ;
5. Evaluation and improvement of V-Process casting equipment;
6. Procedure instruction and operation guidance of V-Process casting production;
7. Production management and quality controlling of V-Process casting workshop;
- 8.Planning and designing of V-Process casting projects;
9. Guidance and supervising of V-Process casting projects;
10. Technical communication and personnel training of V-Process casting ;
11. Establishing ,optimization and improvement of V-Process production system.
12. Supplying of foundry assistant material on V-process casting production;
- 13.designing and optimization of casting structure and material;

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Email: admin@jianhengid.com

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Wuhan Jianheng industrial technology Co.,Ltd

Contact information

Zhang Jiangman:

Secretary of Chinese Technology Association of Lost Foam Casting and V-process Casting

General Manager of Wuhan Jian Heng Industrial Technology Co.,Ltd

Tel: 0086 135 4523 9290 (whatsapp) Email: zhangjianman@jianhengid.com

Liang Qingmin:

Researcher of Chinese Technology Association of Lost Foam Casting and V-process Casting

Vice Manager of Wuhan Jian Heng Industrial Technology Co.,Ltd

Tel: 0086 187 7103 6713 (whatsapp) Email: liang@jianhengid.com

Lei Bo:

Researcher of Chinese Technology Association of Lost Foam Casting and V-process Casting

Foundry Engineer of Wuhan Jian Heng Industrial Technology Co.,Ltd

Tel: 0086 156 2324 7330 (whatsapp) Email: leibo@jianhengid.com

Web:www.jianhengid.com

Email: admin@jianhengid.com

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