Cast steel castings by V-process casting

V-process team: Zhang Jianman, Liang Qingmin, Lei Bo
V-process casting Application Field on Cast Steel

railway castings
engineering machinery castings
mining machinery castings
heat treatment equipment castings
coal mine machinery castings
public construction castings
metalurgy field castings
valves industry castings

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railway castings-side frame

casting dimension: $2386 \times 625 \times 440$ mm
casting weight: 480 kg

the design of gating system

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core setting

casting after shaking out
railway castings-bolster

casting dimension: 2429 × 508 × 427
casting weight: 880kg

the design of gating system

setting cores

the casting after shake out

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railway castings-coupler

train coupler casting, weight: 190kg

mold with cores

castings after shaking out

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railway castings-frog

Length: 6300mm
Weight: 1.3t.
Material: Manganese steel

flask size: 7100 × 780 × 300/300mm. the mold which is coated with forsterite sand coating is also made of forsterite sand, and the cores are made of silicate bonded sand.

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Engineering Machinery castings-axle box

machined casting

casting after shaking out

surface after shaking out

gas pressure test

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Engineering Machinery castings-axle box

molding procedure: film covering

molding procedure: core setting

as-cast casting

machining procedure

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Engineering Machinery castings
-Axle box cover

drag mold

machined castings

cope mold

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Engineering Machinery castings - track shoe

Top pattern (single riser)

Bottom pattern (filter screens and cores)

track shoe by V-process are widely used in track-belt engineering machinery; high surface quality contributes its life.
NASA crawler-transporter track shoe

Length: 90 inches, width 25 inches, weight 2100 pound (about 953 Kg)

Chemical component: AISI 4320 (0.17-0.23C, 0.40-0.70 Mn, 0.15-0.30 Si, 0.35-0.65Cr, 1.55-2.00 Ni, 0.20-0.30 Mo and some others)
Mining Machinery castings
-bucket tooth

material: high manganese steel
weight: over 200kg
working condition: mining field

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Electric shovel ZGMn13Cr2-3
weight: 295kg
size: 1052mmx441mmx260mm
This track shoe is applied in mining shovel-trucks.

Track shoes are a kind of quick-wear chassis parts for construction machinery.
Mining Machinery castings
-jaw plate

casting after shaking out

cooling procedure
Mining Machinery castings-concave

working principle diagram
1-rolling mortar wall 2-crushing wall
3-transmission with cone pulley
4-eccentric swing mechanism
Mining Machinery castings-hammer

molding process

working theory

casting after shaking out
Mining Machinery castings
-flat hammer

working theory
The shape of flat hammer is simple so it is easily formed by V-process molding;

flat hammer casting

molding pattern
Mining Machinery castings-liner plate

waiting pouring

different kinds of liner plate
Heat treatment equipment parts-trays & basket

Heat treatment trays casting because of the structure, it is difficult to cover the film. So we need good film and film heater, also should have long distance between casting and flask.

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Heat treatment equipment parts - trays & basket

the castings shall bear frequent heating & cooling shock so the castings have high requirement on the materials and structure. such as the Japanese material standard SCH12, SCH13, SCH21, SCH24.

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Coal Mine Machinery-pillar nest casting

as-cast casting

cope mold molding

core setting

drag mold molding

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Coal Mine Machinery - scraper blade

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pattern for molding

setting cores
public construction
-Bridge support

defining of gating system and chilling

sets of bridge support

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casting after shaking out
metalurgy field-mould
metalurgy field-anode joint

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valves industry-valve body castings
comparision among different casting method

V-process casting

- bad environment; rough casting surface; difficult sand reclamation; heavy labor; Lower production;
- Product limitation; Long process for making mold; Lower production; environment influence;
- medium-big casting
- medium-small casting
- Sodium silica sand
- Resin sand process
- Precision casting
- Green and process
- high cost binders; bad environment; difficult sand reclamation; heavy labor; process limitation;
- product limitation; process limitation; quality control difficulty; Environmental influence;

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## Railway Casting by Different Casting Method

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Reasons for Selection and Application

high quality—— good surface quality
low coarse improve tired life and assembling accuracy

if controlled well, V-process casting surface quality can be good as investment casting

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Reasons for Selection and Application

high quality—— less defects and low casting stress for thin wall cast steel casting with complicated structure

V-process casting offers better solution than resin sand and sodium silica sand comparing all factors for some castings;

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Reasons for Selection and Application

low cost—request of market competition
dry sand no binders ,sand circulation easily and little waste;
low labour strength lead low labour cost;
low wear make pattern cost low;
low environmental cost

fundamental technical equipments for V-process casting
Reasons for Selection and Application

environmental—request of modern industry
no harmful gas and wastes;
dust from dry sand and noise from vaccum pump are main pollution factors, but easily controlled;

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Reasons for Selection and Application
—low labour strength: molding relaxedly and shaking out easily;
Brief introduction:
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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