

KES

Core Molder

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1. Scope of application

This standard shall be applied to the core molder used through the supply from the technology section of a light alloy as the equipment producing the core molding the internal shape of AL` materials Cylinder Head.

2. Definition of terms

2.1 Core

This is the thing to mold the internal shape of CYL` Head and the kind is as follows.

2.1.1 Water Jacket

This is the core to mold the pathway of cooling water.

2.1.2 Oil Jacket

This is the core to mold the pathway of engine oil.

2.1.3 Port

(1) In port

This is the core to mold the shape of inhalation side of mixed gas.

(2) Ex port

This is the core to mold the shape of exhalation side.

2.1.4 CB-6

This is the core to mold the shape of Cam-Journal.

2.1.5 CB-7

This is the core to mold the external shape for molding the 2 Cavity/1 Mold.

2.2 Coated Sand

As the raw material to mold the core, this has the characteristics of being sintered when electrically heating through adding the chemicals to the ordinary sand.

2.3 Metal frame

This is the frame to mold the core and is constituted by the each core.

3. The kind of core molder

3.1 The classification by the congealing heat source

(1) Electric heater type

This sinters by heating through the electric heater.

(2) Gas heater type

This sinters by heating through the gas heater.

(3) Cold box method

This is the method in which to sinter by the chemicals.

3.2 The classification by the molding method

(1) Vertical type

This is the type to move the metal frame to the left and right and produces the port-used core.

(2) Horizontal type

This is the type to move the metal frame up and down and produces the Jackets-used core.

4. The equipment structure and explanation

4.1 Body

(1) Dolly

This is to transport from the place where the assembled products are collected to the place to supply the sand and this is to move by the drive through the air cylinder.

(2) Downturn Eject

This is the equipment to take the products out of the downturn metal frame and to place the products on the upward surface of Pin from the surface of metal frame and to operate the up and downturn motion for placing back after collecting the products, and this is moved by the drive through the air cylinder.

(3) Upward Lifting

This is the equipment for the upward metal frame rising and this is moved by the drive through the air cylinder.

(4) Upward Eject

This is the equipment to prevent the hole from getting clogged because this pushes the

sand supplying hole on the upper metal frame by operating the downturn motion at the time of the upward metal frame rising, and this is moved by the drive through the air cylinder.

(5) Sand supplier

This is the equipment to supply the sand into the inside of assembled metal frame by the Blow V/V.

4.2 Products collector

This is the equipment to collect the products inside the metal frame by Unloader and Belt Conveyor.

4.3 Metal frame exchanger

This is the equipment to equip the metal frame with the core molder and separate the former from the latter and this equips and separates by the Bolt and Clamping equipment by assembling after transporting the metal frame to the Rail for exchanging the equipment with the Hoist.

4.4 Duster

This is the equipment, as Air duster, to get rid of the alien materials left inside the metal frame after collecting the products from the metal frame.

4.5 Sand collector

This is the equipment to collect back the uncongealed sand in the molder and transport it to the Tank on the upper part of equipment.

5. Equipment specification

5.1 Body

5.1.1 Frame

- (1) This should be the structure that can be resistant to the machine weight and motion load.
- (2) This should be strong enough to secure the accuracy of position at the time of the operation of each drive parts when assembled.

- (3) This should have the movable link at the time of transporting and equipping.

5.1.2 Dolly and downturn Eject Part (Used for Jacket core)

- (1) Equip the Shock Absorber and Stopper on the front part at the time of forward and backward movement of dolly.
- (2) The drive of dolly should be air cylinder and oil pressure cylinder drive and the Guide Bar should be mounted on two places.
- (3) Mount grip for the prevention of sand oil pressure on CYL` LOD and Guide Bar.
- (4) The metal frame Clamping and Unclamping should be in an automatic way.
- (5) Use 4 Guide bars to possibly keep the accuracy of motion balance of Push Plate.
- (6) Conduct the thermal process on Rail, Roller and Shaft. (Managing skin pass)
- (7) Mount the Seraper on the dolly and rail.
- (8) Mount the cover, which can be disassembled, on the flank of dolly to enable the internal inspection of dolly.
- (9) The stroke of downturn Eject Cylinder should be 160mm.

5.1.3 Upward Lifting and Eject Part (Jacket core)

- (1) Equip the Lock for the prevention of falling on the upward lifting part.
- (2) When falling, the outbreak motion should not come about.
- (3) In the case of erecting the machine for a long time, there should be no the case in which the Lifter moves down by the Leak and it gets unlocked.
- (4) The up and down motion should consist of two steps as low speed and high speed.
- (5) Upward Eject CYL` stroke should be more than 80mm.
- (6) Mount the Scraper to remove the sand on the upper surface of upper frame and its materials should be heatproof rubbers and it should be moved through up and down drive by the air cylinder.
- (7) Equip the Guide Bar to secure the accuracy of position through up and down drive.
- (8) Conduct the Air Blowing on the Scraper part as well.

5.1.4 Sand Blowing and exhaust part

- (1) After blowing the leftover sand in the Blow head should not fall.
- (2) As for Blowing air, by equipping the air holding tank there should be no pressure falling through moment air and exhaustion.
- (3) At the time of exhaustion there should be no outflow of sand and dust to the air along with air.

5.1.5 Sand supply and press part

(1) Jacket core used

- (a) The sand level detect sensor should be mounted on the Blow Head and the sand supply should be through Counter but the sand supply should stop by the sensor.
- (b) Be careful of air leak.
- (c) Be careful of the Sealing on the combination part of Head and Plate.
- (d) Stick the examination window to check the quantity of sand on the Blow Head.
- (e) Blow Plate Clamp should be automatic and the Clamp equipment should be mounted on the Blow Head.
- (f) As for Press Cylinder, mount the Shock Absorber on the upper part to enable the two steps of speed control.
- (g) There should be no situation in which the sand in the Blow Head falls by the outbreak motion of Press Cylinder.

(2) Port core used

- (a) This should satisfy the specification from (a) to (d) on the (1) clauses.
- (b) Conduct the thermal process for Roller, Rail, and Shaft.
- (c) Prior to Blow Head, conduct the two steps of speed control for the backward movement.
- (d) Prior to Blow Head. Stick the Shock Absorber on the backward part.

5.1.6 Metal frame Clamping and Eject equipment (Port-used)

- (1) Conduct the Cr coat for Tie Bar.
- (2) The accuracy of position, balance and straightness of Tie Bar should be within $\pm 0.1\text{mm}$.
- (3) The repetition accuracy (The accuracy of balance) of fixed and operating Die mounted Plate should be within $\pm 0.1\text{mm}$.
- (4) Conduct the thermal process for Die Clamping Bolt.
- (5) Use FCD45N for cast parts and conduct the annealing removing stress (Submit the result of heating process).
- (6) Mount the separate equipment in order for the electric wire not to be tangled in case of forward and backward movement. (Pipe arrangement and wiring)
- (7) As for the operating metal frame drive, the two steps control of low speed and high speed should be possible as Air drive method.
- (8) Mount the Shock Absorber on the front part in case of forward and backward movement and enable the control of height (balance).

- (9) The forward, backward drive should be the Air Cylinder drive.

5.2 Products collector

5.2.1 Jacket core used

- (1) Collect the products by the forward and backward movement of take-out equipment and use the Starverter to enable the two steps of speed control.
- (2) There should be no damage of core by the impact at the time of collecting products.
- (3) Mount the Shock Absorber on the forward and backward part at each operation.
- (4) Apply the products collecting method by Fork and enable the easy change of position.
- (5) The height of Fork should be $FL + 750\text{mm}$ and in case of measuring the height being impossible enable the height control of $\pm 50\text{mm}$ by adding the up and down motion.
- (6) Mounting 3 ~ 4 Forks should be possible.
- (7) Mount the Scraper for the abrasion resistance of Rail and Roller and conduct the thermal process (more than HRC 45)
- (8) Mount the Chute for collecting the sand and Blow Gate on the lower part of collector.

5.2.2 Port core used

- (1) The product collector should be in belt conveyor method.
- (2) The quality of materials of belt should be heatproof, which should be more than $300\text{ }^{\circ}\text{C}$.
- (3) Equip the Chute for collecting the sand on the front part of belt.
- (4) Take the measure on the slip-out of conveyor.
- (5) Take the measure not to cause the slip-out from the upper part of product conveyor at the part of collecting products.
- (6) The sand fallen on the lower part of collector should be in a structure by which the sand can be removed easily.

5.3 Metal frame exchanger

5.3.1 Jacket core used

- (1) Equip the metal frame exchange rail and minimize it in a structure by which it can be folded.
- (2) Combine the rail and Inter-Lock for the Clamp and Unclamp operation of lower metal frame.