NATIONAL CONFERENCE ON PUMPS

"ENERGY EFFICIENCY IN PUMPING SYSTEMS"

GREEN SAND CASTINGS FOR PUMPS

PRESENTED BY

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Green-sand moulds

Mixture of sand, clay, and water

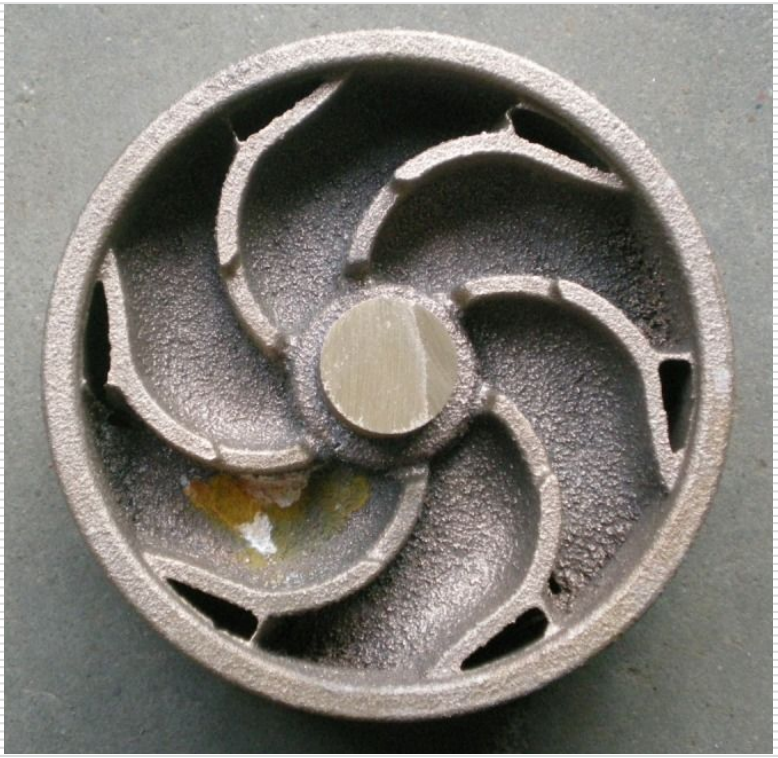
"Green" means mould contains moisture at the time of pouring

Buyers of Pump castings often face poor efficiency and surface finish issues in their products due to problems in the castings procured.

They could be mainly due to

1. **Poor surface finish and sand fusion.**
2. **Dimensional inaccuracies**
3. **Porosity in castings**
4. **Crack**
5. **Rust in painted pumps**

Poor surface finish and sand fusion



Poor surface finish and sand fusion (contd)

Poor surface finish and sand fusion (contd)

Some foundries may produce castings without any mechanised moulding and sand mixing. Such Foundries cannot give good surface quality. In addition, it is advisable that all the Foundries should have at least Moisture and Green Compression Strength checking equipments to ensure good quality of sand for moulding.

Poor surface finish and sand fusion (contd)

Causes:

- Excessive pouring temperature
- High 'dead clay' content in moulding sand
- Improper Gating system
- high moisture content in Moulding Sand.

Poor surface finish and sand fusion (contd)

Causes:

- Insufficiently baked cores
- Excessive binder content
- Improper ramming of moulds and cores
- Improper coating of cores
- Bad condition of patterns

Dimensional inaccuracies

Buyers of castings should always provide to the Foundries good pattern equipments preferably match plated. The practice of asking the foundries to make their own patterns should be avoided. It is preferable to have metallic patterns instead of wood. .

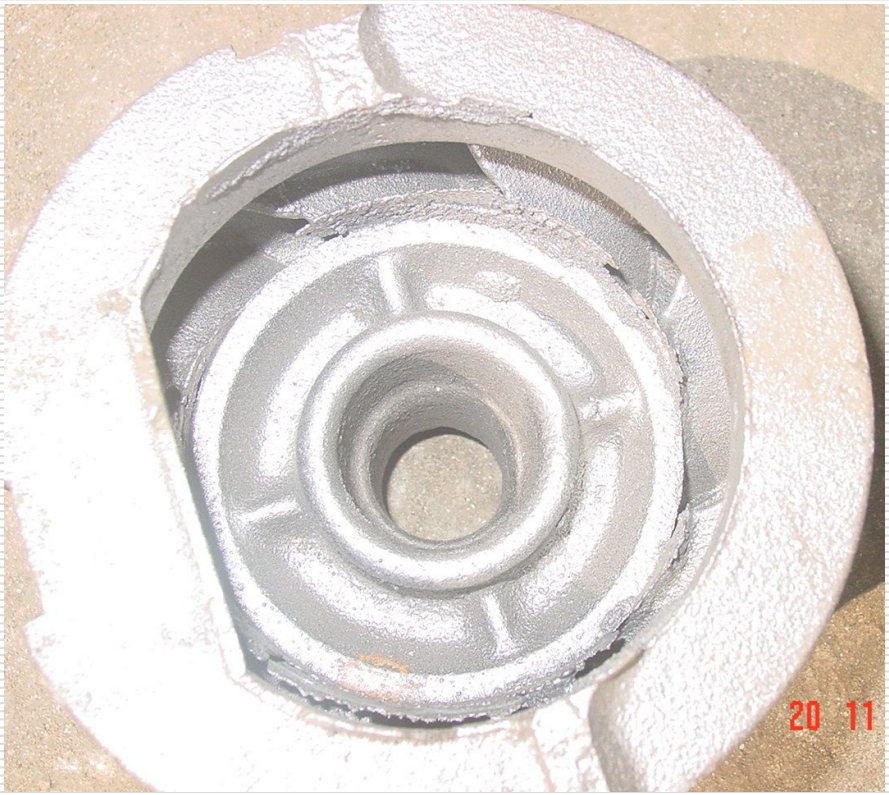
The design of the pattern equipment should be such that no inaccuracies can occur in the castings, be it dimension, core shift, etc.,

Dimensional inaccuracies (Contd)

Particular attention should be given to core box since the efficiency of the pump depends on the accuracy and finish of the inner core area of the castings. There should be no damage of cores and should be properly coated to give a smooth finish.

Impeller cores should preferably be manufactured using Core Shooter machines to improve the efficiency of the pump. The casting buyer can take an initiative of even supplying these cores to the Foundries.

Dimensional inaccuracies (Contd)



Dimensional inaccuracies (Contd)

Causes

- Worn out core boxes
- Worn out dowel pins of core boxes
- Worn out moulding pins and mould box bushes
- Improper mounting of Patterns on match plates
- Rubbing of core prints while placing in the mould

Porosity in castings

Most of the Foundries producing pump castings operate with Cupola melting unit. Many of them may not be adding Ferro Silicon at all in the charge leading to lower Carbon Equivalent. Even the Foundries having electric induction furnace may also avoid using Pig Iron. Foundries should maintain proper Carbon and Silicon levels levels to obtain the right hardness and strength in the castings as per specification. .

Crack

Crack in castings can happen due to

- Improper pattern and core dimensions leading to fins in castings
- Improper handling of castings
- Improper decoring operation

Rust in painted pumps

Some pump manufacturers feel that if they buy castings from smaller foundries, due to improper grade of castings, they get complaints from their customers that the paint is peeling off from the casting surface when the pumps are put to use in open atmosphere. This is not due to the grade of castings what the smaller foundries are producing, but it is something to do with their shot blasting and primer painting.

Rust in painted pumps (contd)

Some Foundries may not have any shot blasting facility or even if they have, they may not be applying rust preventive coating soon after shot blasting. It means that the rust preventive coating is applied over a rusted surface or a surface which has moisture condensed on it. The buyer of castings should ensure proper rust preventive application. He should also ensure that the quality of the rust preventive coating applied is also as per the specification.

Rust in painted pumps (Contd)

If the buyer is procuring the castings directly from the foundry, he can procure the castings in unpainted condition and shot blast it himself before rust preventive coating application. .

If the castings are being procured by a machining subcontractor proper mechanism should be put in place to ensure correct rust preventive coating on the castings before machining.

Tips to Pump Manufacturers for getting quality castings

- Help foundries to prepare Quality Plans for each of your items incorporating important parameters like composition, pouring temperature, etc.,
- Ask them not to change the Quality Plans without your knowledge
- Change the patterns whenever due for replacement

Tips to Pump Manufacturers for getting quality castings

- Carry out periodical audits to ensure compliance of parameters which are critical to quality
- Carry out periodical dimensional inspection of castings
- Inform the foundries even the minor non-conformities

Concluding Remarks

A Pump manufacturer

- should supply well designed and manufactured Pattern equipment.

- Should select a right foundry which can meet the quality requirements.

Concluding Remarks

- Insist on a machine shop vendor to procure castings from designated foundries.
- Should not buy castings only based on price.
- Coordinate with foundries to know the rejections they face in your items.
- You may get a quality for what you pay.

Thank You