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Yield Improvement S.G Iron in Shell Moulding

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Abstract: ***In manufacturing sector metal casting is one of the basic principal and most important processes. The casting process is optimized there will be very lesser wastage thus it results in yield improvement. For improving casting yield, optimize the gating system design, optimize mold filling, avoid shrinkage scrap, hot tears etc. The casting produced by foundry improper design of gating frame work and riser system result in internal shrinkage which is a major defecting cast product. So good design of gating system reduces defect. Thus by this analysis increase yield without affecting the quality it would help the company to improve the quality of the product and thereby decreases the rejection level of the product.***
Keywords: Yield improvement, shell molding, reduce defect.

I. INTRODUCTION

Manufacturing Ductile Iron, Grey Iron, SG Iron (Vermicular graphite Iron), ADI, Ni Resist & Steel Castings using shell moulding, has a history of continuous improvement. A concept that has given it a past that it can be proud of and a future it can look forward to with confidence. The vision of Promoter and Managing Director that an illustrious organization should emerge is realized through his hard work and commitment. Today, Shell Moulded SG Iron Castings, Shell Moulded Grey Iron Castings, High, Low Pressure and Gravity Die Castings and exports to leading International Industrial giants. As part of the diversifying plans in related areas, Unique Shell Mould India Private Limited – Sister Concern, was founded in 1983 in response to the growing demand for quality aluminum castings with a focus on emerging technologies that meet client requirements. A diverse and well-structured group that strives to produce quality products that conform to the standards, that would satisfy both domestic and international markets while emphasizing on efficiency in every facet of the operation from manufacturing to marketing. The Surface finish and dimensional accuracy of the shell-moulded casting is superior to the conventional green sand mould castings .It has a strong metallurgical base and experience. Its metallurgical quality of their SG Iron is very much acclaimed by their domestic & overseas customers.

Shell Moulding**:** Semi-Automatic 4 station shell moulding (PLC controlled) machines are capable of producing 15000 moulds everyday which finds its application in casting intricate shaped hydraulic and automobile components ranging from 0.05 Kg's to 15.0Kg's.

II. EXPERIMENTAL SETUP

Riser sleeves act as a reservoir of liquid metal in the sand mould for steel/iron castings in foundry .It keeps the molten form and feed the metal to the casting till solidification of casting gets completed by providing an exothermic reacting along with insulating properties and it solidifies at last.

Types of sleeve:1. Insulative sleeve,2.Exothermic sleeve. Insulative sleeve helps in liberating heat thus increasing the temperature enough to keep the steel in molten state for extended period of time. Exothermic sleeve is High performance to feed castings in iron,steel and all the alloys of these metals ,molded in sand and other systems. These sleeves provide healthly pieces, without porosity and without reaction of the metal with the sleeve.

Filters: Depending on the purpose, Zirconium oxide, silicon carbide and mullite are used as filter materials. The most common filter positions are vertical or horizontal in the gate system runner the upper sprue part or at them bottom of the sprue (see bottom of the sprue).Types of Filters: Ceramic filter ,Foam filter. Ceramic filters are used to remove impurities from molten metal in the casting process at foundries worldwide. filters can be used with all types of cast irons, aluminium and copper based alloys are available in a broad range of sizes shapes and performances levels.

Foam filters are air cleaner filters that use polyurethane foam elements as the filtering material to trap unwanted air contaminants and particulates. foam filters are made up of tiny interlocking cells that prevent the passage of dirt particles and distribute these throughout the entire volume of the foam. this materials are used in many performance air filters for engines on appliances such off-roading , rallying and other motor sports in rugged and high dust environments, foam filters are a popular choice due to their dirt retention capacity.

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TRIAL-1 The sleeve to feed through without affecting the quality of the product

Sleeve size	90*200
Casting weight(Kg)	12.690
Pouring weight (Kg)	20.10
Yield	63.1%
RT report	Found OK
Micro analysis report	Found OK
X-Ray	OK
Number of shells(per 1Ton)	54

TRIAL-2 The sleeve to feed through without affecting the quality of the product

Sleeve size	80*150
Casting weight(Kg)	12.690
Pouring weight (Kg)	16.6
Yield	76%
RT report	Found OK
Micro analysis report	Found OK
X-Ray	OK
Number of shells(per 1Ton)	68

In the calculation of the sleeve size 65*150 pouring weight(kgs) is 13.10 and the wasteage of per piece 0.31 kgs but in this sleeve size can be occur the blow holes. So doesn't move to the huge production and the next sleeve size 70*100 pouring weight is 14.60 and the wasteage of per piece 1.91 kgs but in this sleeve size can be occur the surface shirnkage.so move to the next sleeve size 80*150 pouring weight is 16.60 kgs and the wasteage of per piece 3.91 kgs this sleeve size can be doesn't occur any defects.

III. RESULT & CONCOLUTION

It is cleared that from experimental results and casting simulation that modified gating (sleeve size) system . Initially defects such as micro porosity, blow holes and shrinkage are absent in the casting. Yet initially molten metal required is 20.100 kg and when modified sleeve size is used molten metal required is 16.60 kg and weight of actual casting is 12.690 kg. hence with the modified sleeve size the yield improved is 12.9% that can be increased. Due to yield improvement saving of energy and resources required for melting and recycling is also done. As saving of energy is there productivity increases and as increase the profit

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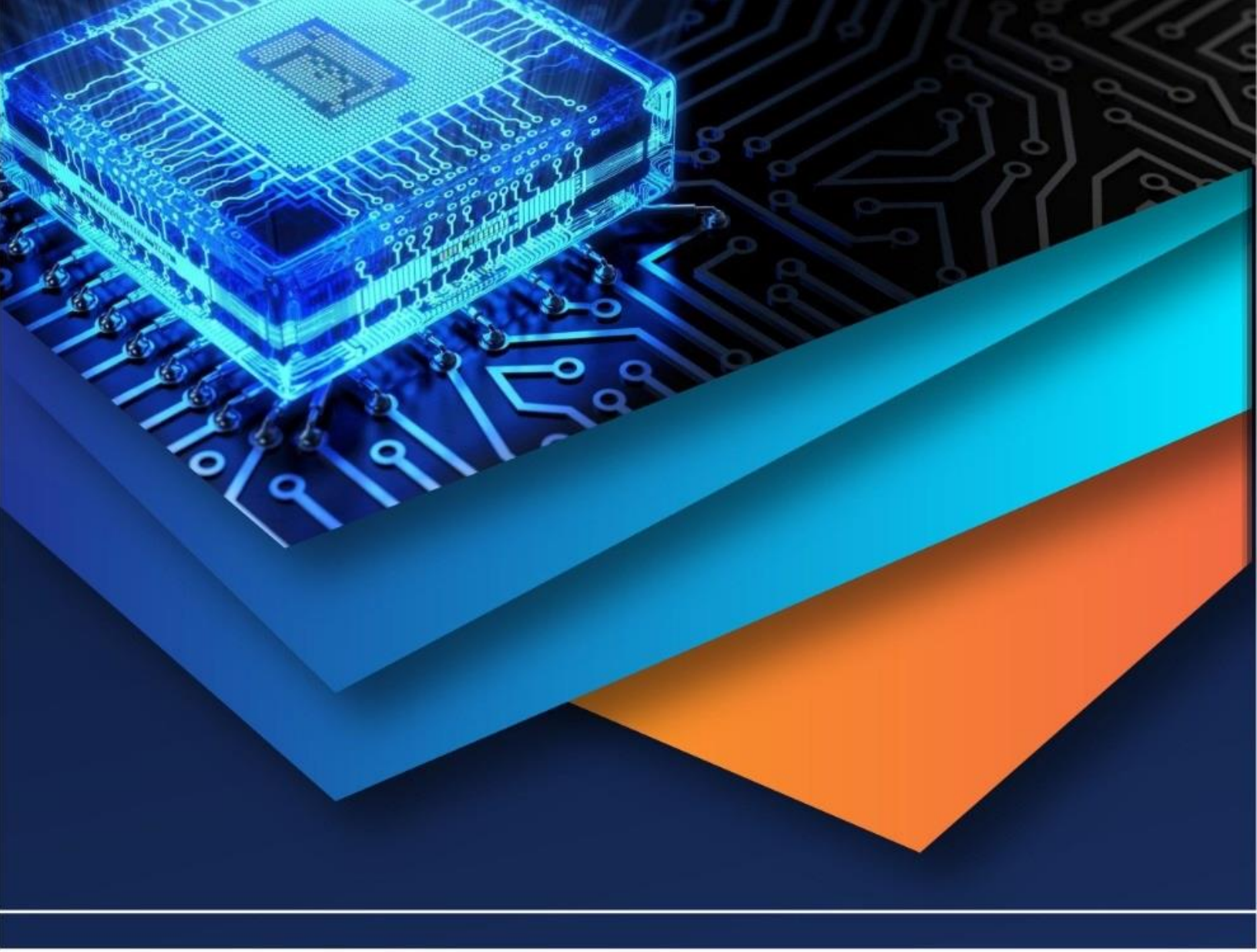

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