THE INSTITUTE OF INDIAN FOUNDRYMEN
WESTERN REGION

FOUNDRY TALKS

Foundry E-Magazine

For The Foundrymen By The Foundrymen

Edition : August 2022
By : IIF - Western Region

INNOVATE TO ELEVATE
IIF-WESTERN REGION 2022-23

Innovation Article By

J. K. FOUNDRY ENGINEERS

SHREE NARAYAN GREENTEK

MESSAGE FROM CHAIRPERSON

Believe in Blue Ocean Strategy

Anuja Sharma
Chairperson, IIF-Western Region
Dir.-Mrkt.-Shamlax MetaChem Pvt. Ltd.

Dear Fellow Foundrymen,

The concept of Blue ocean strategy is to have a new market without competitors or very few competitors and trying to create a new demand. But Value Innovation is one more important characteristic of Blue Ocean Strategy. Trying different techniques over conventional one, using innovative ideas, digitization, automation are also a Part of this strategy. Our August edition is based on suchless prevalent technology of Lost Foam Casting Process, which would be future practise in most of the foundries.

Compete in existing market and technology is Red Ocean Strategy so It's time to creating your new Blue Ocean and ride the wave till it becomes red.

I hope this edition will help to give a good insight about Lost Foam Casting Process.

This month we have celebrated 73rd National Foundry Day with all zeal and enthusiasm in all chapters in every region in India. My best wishes to all of them. And thanks to all the readers for the appreciation and encouragement on the launch of E- Magazine **Foundry Talk.**

Thanks.

MESSAGE FROM THE EDITOR

Anant Bam
Editor Foundry Talk
Foundry Consultant
& Energy Auditor

Dear Readers,

It's really pleasant to hear good about this new e- magazine of IIF-WR from eminent foundrymen. Some of the feedbacks are a part of this magazine.

The desire of our team is to make this platform interactive, hence I appeal to all of you to kindly write to us your expectations, queries, suggestions, comments – good or bad; we are here to cater to your needs.

We are planning our calendar in such a way that each issue will be dedicated for certain key topic. This August issue is dedicated to upcoming technology of Lost Foam Castings (LFC). This rising sun is surely a boon for foundries to go greener, with maximum recycling of depleting natural resources like Silica Sand. Also, the cost benefits of LFC are substantial. Some critical components can best be made in LFC technology only.

Enjoy the magazine, write to us and help us serve you better.

Thanks and Regards.

LETTER TO EDITOR

Dear Editor,

"Congratulations to the WR Team for bringing out a very classy Bulletin which is presented very well. I would request them and NOB to work on providing equally good material for our National Foundry Journal from authors and technocrats of the Western Region.

Magazine is presented very well. Communication is the key to involvement and growth of Membership and I truly appreciate the efforts of Ms. Anuja Sharma, Ms. Shyamal Aroskar and the WR Team in strengthening the visibility of IIF through this magazine"

From
Mr. Ravi Sehgal
Past President, IIF

Dear Editor,

"It has good Coverage of IIF chapters Activities & selected but important subjects which are needed for Practical use to the Foundryman & Allied industries. The Chairlady Mrs. Anuja Sharma has shared very Positive thoughts in her Editorial & have selected a very Perfect Person Mr. Anat Bam as Editor, he is well studied and is very Straightforward person who will give true justice to the contents of this magazine.

Secondly, you have Rationally touched the present very crucial & important subject of Raw material Prices for reference to all Foundrymen. The practical Tips for Foundrymen is a very important chapter which every Foundrymen will love to read & implement first. Your article on Al Melting by Inductotherm is very informative with Practical tips & thanks for giving priority to Aluminium (Non-Ferrous) in this very first issue.

Last but not the least thanks for stating the very important chapter of "ASK THE EXPERT". This will be beneficial to many foundrymen. They will be able to deploy these suggestions / troubleshooting hits in many ways.

From
Mr. Vilas Jadhav
Director, Ceraflux India Pvt Ltd

We truly welcome your feedback or suggestions for WR E-magazine. Please feel free to write to us at **wr@indianfoundry.org** with subject "Letter to Editor".

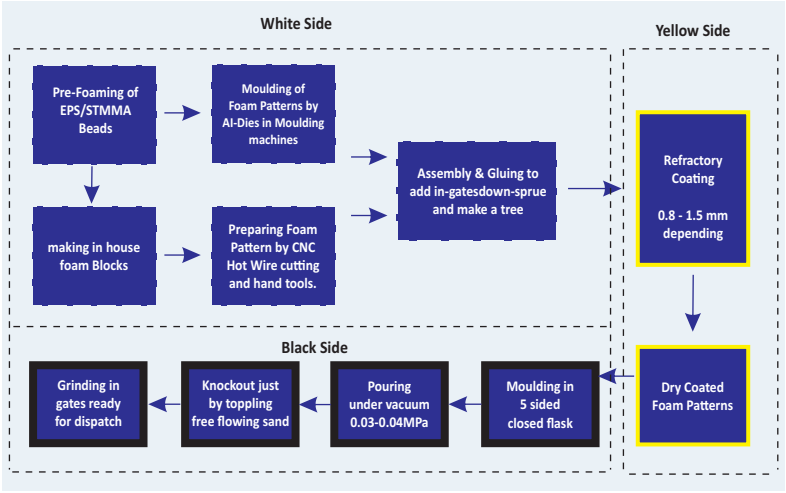
FOUNDRY TIPS

Important Process Parameters & Typical Features for Lost Foam Casting Process

By Mr. Praveen Sinha

Vacuum assisted Lost foam casting process , a novelty in India, is more than a half a century old practice for manufacturing of iron and steel casting components. A method which began in Europe but became a commercialised and economically viable process in China.

Vacuum assisted process is quite simple and economically cheap and eco friendly provided the process controls be followed stringently. A detailed flowchart of the process is given as below:



Process Parameters

Moulding Sand: Selection criteria is based on dry sand having good permeability, moisture- nil if possible and clay percentage not exceeding 0.5% with low level of attrition during operations. AFS 25 to 35 with low thermal expansion. Preference given to round ceramic sand

Raw material selection: Selection of EPS, STMMA-FD OR STMMA along with the bead size and pentane gas in it, plays a very crucial role in the quality of the castings.

Vibration of Compaction Table: Frequency - 20Hz to 120Hz., compaction should be three dimensional on X, Y, Z plain. Time, frequency, and orientation of compaction is dependent on the mould geometry and placement and size.

Vacuum: Degree of vacuum varies from 0.02 to 0.04MPa again dependent on type and size of mould and importantly material grade.

Pouring: Pouring time should be around 5 to 7 kg per second.

Pattern: Size of the beads is dependent on the sectional thickness of the casting. Density of the mould should be kept low to avoid carbon defects. Normally it ranges between 19 Gms / ltr to 23 Gms/ltr.

Coating: Need to take account of material of slurry, thickness&permeability.

Typical features:

1. Linear Tolerance of +/- 0.005 inches/inch is standard for the Lost Foam process. This tolerance will vary depending on part size, complexity and geometry. Subsequent straightening or coining procedures will often enable even tighter tolerances to be held on critical dimensions.
2. Generally Lost Foam castings have a Surface Finish within the 60-250 RMS range. If surface finish, due to cosmetic requirements, is a critical issue then surfaces can be targeted to maintain an exceptionally smooth finish.
3. Lost Foam castings are used in many critical applications, including engine heads, marine motors, high-pressure pumps and valves. X-ray and soundness testing on Lost Foam castings shows characteristics better than green sand .
4. Weight Reduction on account of use of disposable moulds, which helps in almost zero draft.
5. No need to keep casting inventory as Turn Around Time from pouring to despatch in as cast condition is hardly 12 hours.
6. Cost Benefit of around 20-25% in case of simple casting up to 45% in case of Complex castings but highly dependent on case to case basis. And cost of establishing plant of 1000MT per month casting is almost one third of the traditional foundry with its HPML, sand system, knock out etc.

Mahesh Date

Raw Material Price Index

Movement In Foundry Raw Material Prices

As per IIF data, there are nearly 7,000 foundries across India. The Indian foundry industry is ranked second globally with a production of 10 million tons per annum. It is catering to the automotive, tractor, power train, railways, energy and engineering sectors in domestic as well as overseas markets. Directly and indirectly,

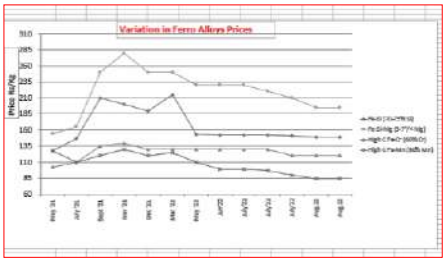
There was sudden spike observed in April 2022 and continued due to various reasons, but in June 2022 prices start little bit declining Now Prices ruling in Kolhapur during second week of August, 2022. Prices are somehow stable with little variations which is given in column 14 in the Table below. Also given in Table are the Prices since July 2020, Presented in past 13 issues of FOUNDRY. These prices are collected from Kolhapur Market. These are approximate, ruling during the Month & week Indicated in the Table below.

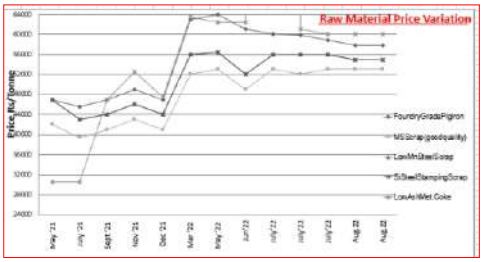
In the Prices indicated below, Transportation cost is included in most Items. Only applicable GST is to be added. Prices of many materials are on the basis of 'Immediate Payment'

Graphical presentations of price Movement of some of these materials / alloys appear below in two graphs.

Movement Of Prices of Raw Materials over a Period 24 Months

(A) Major Ferrous Metallic Raw Materials, Low Ash Metallurgical Coke, and Electro-Graphite Fines {Rs / Tonne}														
	Feb '21	May '21	July '21	Sept'21	Nov'21	Dec'21	Mar'22	May'22	Jun'22	July'22	July'22	July'22	Aug.22	Aug.22
	2nd Week	3rd Week	4th Week	5th Week	4th Week	5th Week	4th Week	3rd Week	3rd Week	2nd Week	3rd Week	4th Week	1st Week	2nd Week
Foundry Grade Piglron	40000	47000	45500	47000	49000	47000	63000	64000	61000	60000	59850	58850	57850	57850
MS Scrap (good quality)	31000	42000	39500	41000	43000	41000	52000	53000	49000	53000	52000	53000	53000	53000
Low Mn Steel Scrap	35000	47000	43000	44000	46000	44000	56000	56500	52000	56000	56000	56000	55000	55000
Si Steel Stamping Scrap	35000	47000	43000	44000	46000	44000	56000	56500	52000	56000	56000	56000	55000	55000
Low Ash Met. Coke	30500	30500	30500	47000	52500	47500	63500	62500	62500	610000	61000	60000	60000	60000
Electro-Graphite Fines	70000	-	80000	95000	105000	100000	100000	110000	110000	110000	110000	110000	105000	105000
(B) Major Ferro-Alloys {Rs / Kg}														
Fe-Si (70-75% Si)	110	128	147	210	200	190	215	153	152	152	152	151	149	149
Fe-Si-Mg (5-7%< Mg)	133	155	165	250	280	250	250	230	230	230	220	210	195	195
Fe-Si-Mg (5-7%< Mg)	133±5	155±5	165±5	250	280±5	250±5	250±5	230±5	230±5	230±5	230±5	230±5	230±5	230±5
Fe-Si-Mg (8-10% Mg)	139±5	160±5	170±5	255	286±5	256±5	265±5	240±5	240±5	240±5	240±5	215±5	215±5	215±5
High C Fe-Cr (60% Cr)	102	102	110	135	140	130	130	130	130	130	130	120	120	120
High C Fe-Mn (60% Mn)	77	128	110	120	130	120	125	110	99	99	97	90	84	84
Ferro-Moly (60% Mo)	1300	1325	2000	2070	2150	2050	2150	2160	2160	2160	2160	2150	2150	2150





1. Above Prices are Excluding Taxes, GST Extra as Applicable.
2. Phenol Price: Rs. 140 / kg during 2nd Week of August, 2022.

(Info collected during 2nd week August 2022. Readers are requested to check the market prices)

Disclaimer: Rates represented here are as per the data collected from the reliable sources based in Kolhapur and it may vary based on the supplier, location, payment terms & other conditions.

Innovation Article

By M/s. Shree Narayan Greentek

Innovation Article is sponsored article to promote the innovation done by the company. To showcase your company product / innovation, please write to **wr@indianfoundry.org.**

PATTERN MAKING IN LOST FOAM CASTING

Lost foam casting

For the lost foam casting process, the making of foamed mould is very important to link. To choose the suitable raw material for your foam-pattern mould making will decide the quality of your castings. They specially produce STMMA copolymer resin beads for pattern making in lost foam casting (white side, foam mould), it has the below advantages compares with EPS:

- Reduces carbon defects in castings,
- Reduces carburization defects on the surface of steel/ductile iron castings,
- Reduces smoke carbon, improves the surface finish of castings,
- Reduce the productions cost.

We **SHREE NARAYAN GREENTEK PVT LTD** are Official Exclusive Dealers/ Stockiest of STMMA series in Indian Market. **CASTCHEM (HANGZHOU), INC.** is an American company located in the Hangzhou Tangqi Industrial Park. In India we have dedicate cold warehouse to continuously stock the STMMA beads and Blocks for our Indian Clients.

STMMA (70% MMA & 30% Styrene)

STMMA series is focused on carbon rising defect in castings and with fewer residues, low dissolution temperature. Typical application includes Aluminium, Copper Alloy, Grey Cast Iron, Nodular Iron, Alloy Steel, Mild Steel and Stainless Steel.

STMMA FD (90% Styrene & 10% MMA)

The STMMA-FD series have great advantages in solving fold defect by aluminium casting and applications in iron castings having excessive lustrous carbon, porosity defect solved. Typical application includes Aluminium Alloy and Grey Cast Iron.

STMMA BLOCKS

STMMA block was developed to be used in full mould casting especially for auto die mould casting. Compared with EPS Block, STMMA Block has the following advantages:

1. Low carbon and little residues, reduce carbon defects
2. Reduce the repairing and machining costs
3. Reduce secondary machining, save costs.
4. After using STMMA blocks, the casting quality and the finished product rate is greatly improved.
5. Short the mould's delivery time.
6. Reduce environmental pollution.

COMPARISON BETWEEN STMMA V/S STMMA FD V/S EPS

ITEM	Unit	STMMA	EPS	STMMA - FD
Carbon content	%	63	92	82
Temp of Foaming	°C	95 ~105	80 ~ 85	85 ~95
Temp of Decomposition	°C	700	912	900
Gas Volume (9 0 0 °C)	m l / g	900	600	700
Pouring Temp (Gray Iron)	°C	1420 ~ 1450	1460 ~1500	1450 ~ 1480
Residues after foam mold	%	4.5%	30%	65%
Pattern quality		Even beads and constant structure	Beads and density not always even	Even beads and constant structure
Shrinkage rate	%	0.1 ~ 0.3	0.3 ~ 0.8	0.2 ~ 0.4
Yield (Best quality)	%	≥98%	80 ~ 92%	≥93%

The residues content after degradation of the foam pattern:

Item	Weight of pattern	Weight of residues	Percentage of residues	Density of residues
EPS	3.37g	2.22g	65.90%	21g /L
STMMA - FD	3.37g	1.03g	30.60%	19g /L
STMMA	3.37g	0.15g	04.45%	20g /L

BURNING OF STMMA AND STMMA FD

STMMA FD Better than EPS

STMMA Perfect Burning

SHREE NARAYAN GREENTEK PVT LTD
7-5-134 JAWAHAR NAGAR, RAICHUR, KA. 584102
+91 9035932030, +91 9951507666, +91 7899830066
info@sngreentek.com, www.sngreentek.com.

Innovation Article

By M/s. J K Foundry Engineers

Innovation Article is sponsored article to promote the innovation done by the company. To showcase your company product / innovation, please write to **wr@indianfoundry.org.**

THE LOST FOAM CASTING

TECHNOLOGY OF THE FUTURE

Looking to current market scenario of scarcity of sand availability and its disposal to reach out mass production.

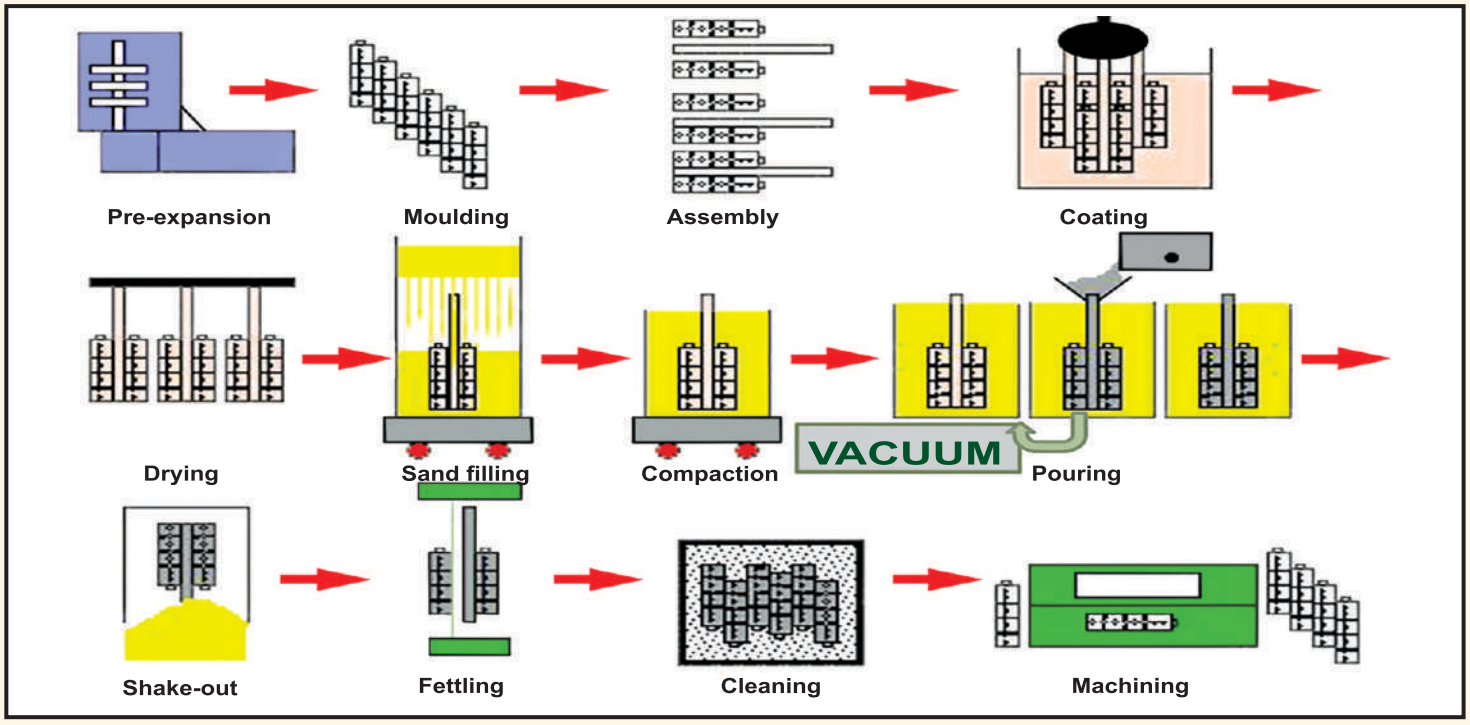
JKFE focussing on to new **Lost Foam Casting Technology** replacing conventional casting process which will reduce process cost for casting manufacturing.

JKFE is providing Hi-tech solution for LFC process raw material-tool making-process equipment-process implementation.

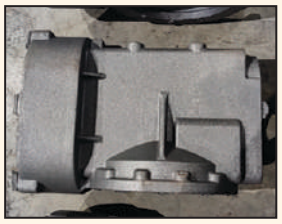
Lost Foam Casting Technology is widely applied in producing Steel Casting, Iron Casting, Copper Casting and Aluminium Casting. The versatility of the lost foam casting process opens up count-less new possibilities for the production of castings and it the perfect complement to the other casting process.

LFC process consists of three stages which assures your final casting.

White Area - The making of polymer foam pattern
Coating Area - The coating of the pattern
Black Area - Compaction of dry coated cluster foam pattern & pouring under vacuum





THE LOST FOAM CASTING

TECHNOLOGY OF THE FUTURE

"Lost Foam" casting grants the freedom to create cost-effective precision designs, not feasible by conventional methods

Benefits of Lost Foam Casting Process:

- Now a days Indian foundry industry is facing very big problem because of sand scarcity & its disposal, In this process Sand reused with almost nil wastage.
- Lost foam process is environment friendly processes with more than 95 % sand reusable in process.
- Most favourable process for mass production.
- Most economical moulding process.
- Simple process with high automation.
- Imparts very good surface finish than Green Sand Moulding system.
- Complex casting can be done in LFC, we can easily cast very complex internal features of casting which is not easy in green sand process.
- Dimensional tolerances and accuracy are much more in LFC compared to green sand Arpa moulding line.

We can provide turnkey base solution for LFC Plant as well as LFC pattern development and product development.

- LFC Die Development
- LFC Plant Layout & Design
- LFC Machine Manufacturer
- LFC Process Implementation
- Raw Material of LFC
- Imported-EPS, STMMA
- Glue-Hot & Cold
- Coating Material

" Words From Our Client "


GALAXY TECHNOCAST

Testimonial

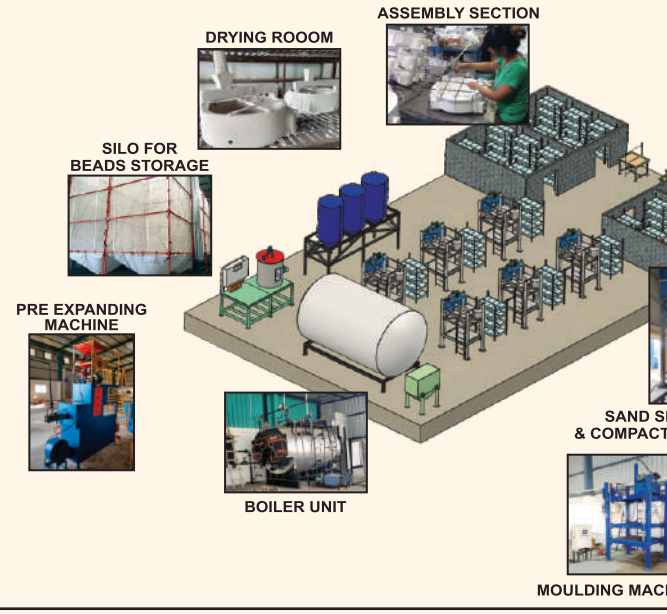
The LOST FOAM PLANT Designed, Manufactured & Installed on turnkey basis by J. K. Foundry Engineers meet our requirements and successfully operate at our Rajkot unit.

We would advise " J. K. Foundry Engineers" as highly experienced, qualified and trust worthy manufacturer of equipments for lost foam process.

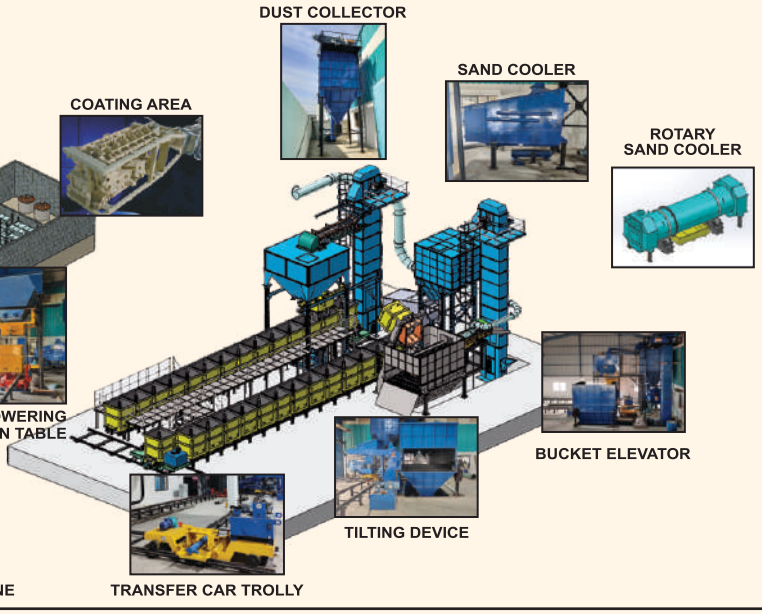
Director of Galaxy Technocast, Rajkot

"I May Not, But, We Will"

WHITE FOAM PATTERN & COATING AREA



SAND HANDLING & RECYCLING PLANT



Ask The Expert

Q: What is the thinnest wall thickness that can be cast with LFC Process?

A: With LFC Process it can be casted up to 3mm if supported by higher thickness of 5 mm at a distance of 10 mm.

Answered By Mr. G D Mishra

Q: What should be target Density of Foam Pattern in Vacuum Lost Foam Casting Process& Ideal Pouring Temperature?

A: It largely depends on the grade of the casting and to some extent to the size of casting too. Below is the typical values given for the density of foam pattern based on the material to be casted.

Alloy Type	Pouring Temperature °C	Density of Foam Pattern Kg / m^3
Aluminium Alloys	790-700	22-24
Copper Alloys	1260-1040	20-21
Grey Iron	1410-1340	≤21
Ductile Iron	1455-1425	≤21
Cast Steel	1650-1595	≤18

Answered By Mr. G D Mishra

Q : While making C I castings by LFC process following issues arise

a. The deformation of the casting, which makes it difficult to guarantee the dimensional accuracy of the casting;
b. The second is that iron-clad sand is easily formed in the inner cavity of the casting, which increases the difficulty of cleaning;
c. The third is the surface of the casting. Carbon black defects are generated, causing the casting to be scrapped during processing.

Answered By Mr. Sushil Sharma

First of all the Foam-patterns should be made of polystyrene and methyl methacrylate copolymers (STMMA), polystyrenes (EPS) and their mixtures and not simply EPS. There are many factors that cause the above casting defects, but the coating plays a vital role in the entire LFC process.

1. **Excellent Wettability** - The paint used in the LFC process is water-based paint and should have good wettability. If the pattern is made of polystyrene foam, it is not easy to be wetted giving poor wettability, poor coating, and the paint cannot hang on the surface of the white mould. This will cause the pattern to be coated multiple times increasing tendency of the white mould to deform during multiple coating and drying processes. Also, it will cause uneven coating thickness/discontinuous coating, and exposure of the white mould will cause sand sticking defects.
2. **Higher Strength**- The strength of the coating should be very high. For the white mould which has large volume, thin wall and low density, it does not have inherent rigidity. The adhesive strength of the coating at room temperature is not high, causing the coating to peel off/damage during the drying and handling of the pattern. Also, Pattern may not have sufficient resistance to deformation during the sand filling and compaction process, resulting in deformation.Under the high-temperature,if strength of the coating is not High & it is impossible to prevent the damage of the coating during the casting and forming process of the molten metal, causing collapse, sand sticking and other defects.
3. **Excellent Permeability** - The air permeability of the coating should be high. At the pouring temperature of metal the material of the white mould begins to crack rapidly, burns and vaporizes, and a large amount of hydrogen and free carbon are precipitated. If the air permeability of the coating is poor, a large amount of pyrolysis products cannot be smoothly exported through the coating, which will cause pores in the casting and if the coating cannot absorb the residue generated, the casting is prone to residual carbon inclusion defects.

To ask your question or get the suggestions, please write your problem with detailed description to **wr@indianfoundry.org** with subject "Ask the Experts". Identity of the Questioner will be kept confidential.

Message from IIF Greater Mumbai Chapter Chairperson

Ruma Rao
Chairperson
IIF Greater Mumbai Chapter

It's my privilege to be part of IIF and am glad that I have been given this opportunity to express my views in the Foundry Talk magazine on behalf of our industry. August is a month of celebration for us - from celebrating Azadi Ka Amrit Mahotsav to National Foundry Day& from Janmasthtmi to Ganesh Chaturthi, - it's a significant month that needs special mention.

The Covid pandemic certainly took a toll on Foundry Industry plus other external factors like rising prices of raw materials are causing blockade to our growth. However the month of August is a reminder that collectively we have the power to overcome tough times and together scale to new heights. Foundry industry is the mother of all industries and so despite the challenges and roadblocks we will continue to be a force to reckon with and play a pivotal role in nation building. Our Industry will play an important role in the growth of the manufacturing sector that is expected to rise by 25% by 2031 from the current 15%. Let us all believe in our Prime Minister Modiji's mantra of "Sabka Saath, Sabka Vikas" and achieve new heights and be an active part of nation building.

I want to offer my best wishes to the entire foundry industry to strive hard to scale upwards.I also wish Western Region Chairperson Mrs. Anuja Sharma and her team great success in future projects.

National Foundry Day

Western Region & Nagpur Chapter

Ahmedabad Chapter

GMC Chapter

Indore Chapter

Kolhapur Chapter

Pune Chapter

Rajkot Chapter

Vadodara Chapter

IIF Kolhapur Chapter Presents

Wescon

IIF Western Regional Conference

Digitalization... 2022

New Era of Change

Digitalization is the greatest transformational force of today's society, which has radically, fundamentally and globally changed the ways of society and will continue to do so. It affects how people interact and relate to each other, how we perceive things, how we take on tasks and how we find solutions. Digitalization leads to a transformation of society's most important elements - Growth, Innovation, Welfare, Sustainability and Security.

This situation provides opportunities as well as challenges for the Foundry Industry. To meet these challenges and create a sustainable future, we require knowledge through close collaboration between the various experts in society. The Institute of Indian Foundrymen, Kolhapur Chapter has felt the need to provide direction of this transformation, potential opportunities & challenges for growth through a well-defined roadmap which will help to effectively benchmark & cast our foundry industry to reach new levels of success in future through Digitalization.

'WESCON - 2022' a two day Conference is being arranged on **Sat. 15th & Sun. 16th Oct. 2022 at Hotel Sayaji, Kolhapur,** with the theme **'Digitalization - New Era of Change'.**

Sponsorship Slots:

Category	Sponsorship Amount
Platinum	5,00,000
Diamond	3,00,000
Gold	2,00,000
Silver	1,00,000
Bronze	50,000

(Excluding GST)

15 - 16 October 2022

Hotel Sayaji, Kolhapur

Delegate Fee :

For IIF Members - 4,000/-

Non IIF Members - 4,500/-

(Including GST)

For Further Information & Details please contact

Mr. Samir Parikh - 982 205 6315

Mr. Malhar Bhandurge - 992 293 0788

Mr. Jaykumar Parikh - 989 044 8840

Mr. Vinay Khobare - 989 009 7962

Mr. Abhijeet Naik - 797 293 1113

Email: kolhapur@indianfoundry.org

Chief Guest :

Mr. B.P.Kalyani
Executive Director
Bharat Forge Ltd.,
Pune.

Guest of Honor :

Mr. V Narasimhan
Executive Director,
Brakes India Ltd.
Chennai.

Key Note Speaker :

Mr. J Ganesh Kumar
Managing Director
Indo Shell Cast Pvt. Ltd,.
Coimbatore.

Meet our Speakers :

Mr. Prakash Rathod
Chairman & MD
Caspro Group of Companies,
Kolhapur.

Meet our Speakers :

Mr. Vijay Menon
Manging Director
Menon & Menon Ltd.,
Kolhapur.

Mr. Raju Ketkale
Executive Vice President
Toyota Kirloskar Motors,
Pune.

Mr. Milind Kank,
Managing Director
Yeshshree Press Comps. P.L.
Aurangabad.

Ms. Tejashree Joshi
General Manager
Environmental Sustainability
Godrej & Boyce Mfg. Co. Ltd.
Pune.

Mr. Mukund Kulkarni
Director
Expert Global Solutions,
Aurangabad.

Mrs. Nital Raval
Founder
Biorthythm India,
Pune.

Mr. Goutam Gouthi
Leadership Facilitator
Brahma HR Consultants,
Ahemdabad.

Mr. Ulhas Chandratre
HRM Expert,
Pune.

Mr. Robin Banerjee
Managing Director
Caprihans India Ltd.,
Mumbai.

Mr. V Srinivasa Reddy
Executive Director
Synergy Green Industries,
Kolhapur.

Organised by

THE INSTITUTE OF INDIAN FOUNDRYMEN
KOLHAPUR CHAPTER

Jointly with

THE INSTITUTE OF INDIAN FOUNDRYMEN
WESTERN REGION