ALUMINIUM GDC TECH GREAT DIE CASTING

GREAT DIECASTING TECHNOLOGY FORUM

JOURNAL FOR ALUMINIUM CASTING TECHNOLOGY

Volume 67 - December 2024

Forace Group

Latest Global Technologies and customized solutions for defect and cost reductions

Long Life High Technology Die Coats for LPDC and GDC from John Winter, U.K.

- Highly insulating Long life Die coat
- Control The metal flow and heat transfer
- Minimum touch up required
- Provide insulation enabling control of cooling and solidification
- Textured to enable enhanced metal flow reducing cold shuts and entrapped gas
- Removes shrinkage defects from castings, gives excellent surface finish

High Performance HPDC Lubricants from Tag Chemicals, GmbH

- Eases the casting release, produce clean and bright castings.
- Protect against soldering of aluminum on the die steel.
- Support the post cast process like painting and coatings
- Eliminates corrosion of the mold surface

Boron Nitride Coating from John Winter, U.K.

- **Granulated Fluxes**
- **Powder Fluxes**
- **Degassing and Grain refining tablets**
- **Master Alloys**
- **Ladle Coats**
- **Degassing and Flux Injector machines**

FORACE GROUP

10th K M Stone, Haridwar-Delhi Road
Haridwar 249402, Uttarakhand, India
Tel: +91-1334-334000, +91-9068907918 / 9068907917
Email: mktg@foracepolymers.in
www.foracepolymers.net

Volume 66 - OCTOBER 2024

ALUMINIUM GDC TECH GREAT DIE CASTING

Contents

Dear Readers,
We always look forward to your Feedback and comments on the Journal. Please do write to us.

Articles for GDCTECH Journal

We invite Expert Articles on technical techno commercial and management aspects of Diecasting Industry, for publishing in GDCTECH Bimonthly Journal. We believe that these articles serve as good source of knowledge for foundry industry people.
Please contact GDCTECH office for any further information.

GREAT DIECASTING TECHNOLOGY FORUM
'Guruprasad', 1st Floor, 37/4/A, 6th Lane, Prabhat Road, Pune 411 004 INDIA
Tel: +91 20 2567 0808, 2567 2555 | Mobile: +91 9764711315
gdctech@arkeycell.com, arkeyconference@arkeycell.com
www.gdctechforum.com

Note: Some images in some articles may not be clear. Interested readers may contact the author

From the Editor's Desk

Dear Readers,

It gives us immense pleasure and a sense of satisfaction that the GDCTECH Bi-monthly Journal has completed eleven years of publication and now this is time to say "Big Thank You" to our authors, readers, advertisers and well wishers, who have throughout our journey encouraged us with valuable suggestions and support.

As we enter the 12th year, a lot is already happening around us - EVs, Industry 4.0, AI with reservations for quick acceptance, fast approaching era of structural diecastings and giga castings, environmental concerns and need to meet regulations, carbon footprint, energy sources such as solar and windmills and so on. All these effectively make an impact on industries and society.

From this December issue, we plan to add more articles touching upon these topics. We trust that you will continue to contribute, encourage and support us as you have always done so far.

Wishing You All a Very Happy New Year 2025, Full of Great Opportunities and Prosperity.

Anand Joshi

ANAND JOSHI

A review of advances in the High Pressure Die Casting technique to produce car structural parts in aluminium alloys

Madhav Athavale, Consultant, athavalemadhav@gmail.com

Part I : Introduction

Lightweighting of car components for minimising carbon foot print has driven the use of Aluminium for drive drain and body structure parts. Part I covers the initial use of HPDC aluminium to replace cast iron drive train components such as housings and engine blocks and later covers some examples of use of HPDC Aluminium castings to replace stamped steel body structural components.

Environmental considerations carbon foot print and light weighting with Aluminium

With emphasis on minimising carbon foot print, light weighting has been the way. An appropriate substitution of steel and iron by aluminium in the body structure and power train in cars has been one of the major developments that enables not only a significant weight reduction, but influences the cost efficiency too. The proper use of extruded (and formed) or die cast products enables the development of new, innovative structural design solutions and, consequently, significant weight and cost savings by parts integration and the incorporation of additional functions.

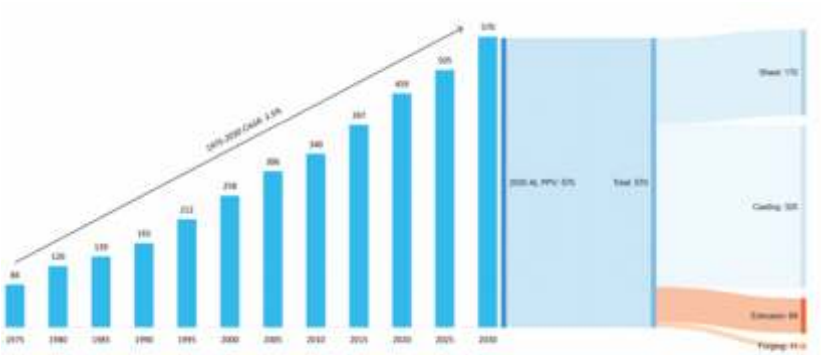
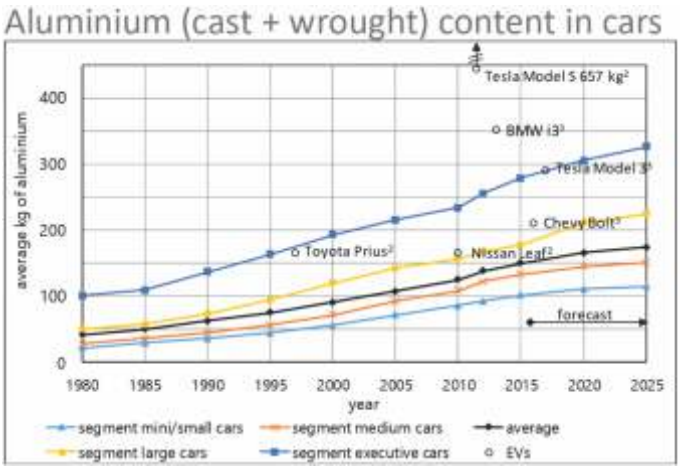


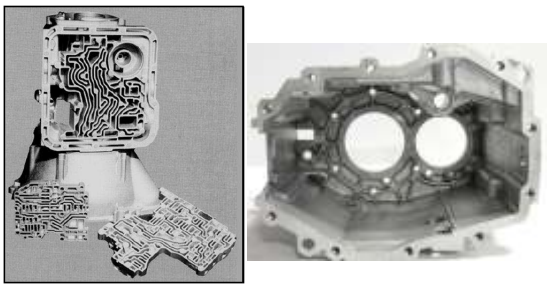
Figure 5. The long term aluminum growth by product forms (Ducker Frontier, 2020).

Graph above shows how overall use of Al alloys expressed as Parts per Vehicle has increased in cars since 1975 and how it is projected to grow well in to 2030. The graph below shows how average weight of Aluminium (Wrought+ Cast) per car has grown since 1980



Aluminium casting applications

Drive train components in an internal combustion engine (ICE) car such as cylinder head, cylinder block, manifolds and transmission case and Al wheels were the first to be converted from iron or steel to Aluminium. Gravity and Low pressure die casting are widely used. HPDC was introduced for making transmission case and for open decked petrol engine blocks with in situ cast iron cylinder liner for some of the cars.



Transmisson Cases made using Al HPDC process

In the conventional high pressure die casting process all unvented, trapped gases are squeezed so effectively during fill and solidification that they are barely visible; even under x-ray examination. For most applications heat treating is not required, so these small gas bubbles cause no quality concerns and go unnoticed.

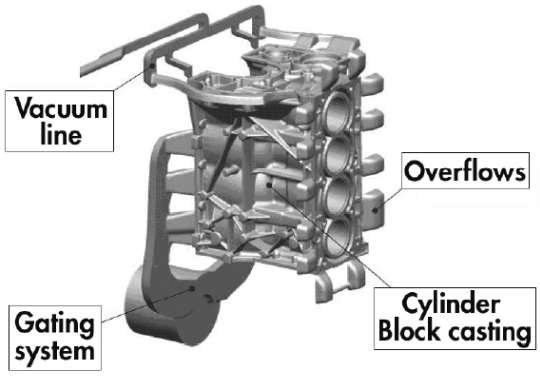
Engine block contributes to the vehicle's structural

integrity. In a crash, it can help maintain the shape of the engine compartment , which can be crucial for protecting the occupants. While not designed specifically for energy absorption, the engine block can absorb some impact energy due to its mass and rigidity.

Standard engines may use non- heat-treated aluminium alloys if the performance requirements are lower and cost savings is a priority. Engine blocks produced by the conventional HPDC process are usually used in the as-cast state. In thin wall areas, the high solidification rate of high pressure die castings leads to significant strength levels. Many high pressure die cast engine blocks are produced with the very common secondary alloy EN AC-46000 (AlSi9Cu3(Fe)). Except for a moderate annealing for the reduction of residual stresses, no further heat treatment can be applied in general.

High pressure die cast deep skirt block of the Daimler A class in-line 4-cylinder engine with cast-in grey iron liners Source: KS ATAG

Use of vacuum can further enhance the properties. It was observed from the research work carried out at Teksid foundry on regular production castings. One of the observations was "Radiographic investigation show a good integrity of the castings and the absence of defects/ porosities with critical size for mechanical properties. This was assured by the vacuum system reducing the gas quantity and, therefore the gas entrapment within the die."



Engineblock produced at Teksid Carmagnola plant in Italy

Typically EN – AC 46000 alloy equivalent to US A 380 is used for these making the engine blocks but with lower Fe levels. It gave 45% weight reduction compared to iron as well all the other advantages of near net shape, high productivity etc. Typical alloy composition is as below –

Alloy	Al	Si	Cu	Fe	Mg	Mn	Ni	Ti	Zn	Cr
EN-AC 46000	bal.	9.2	3.3	0.89	0.19	0.24	0.06	0.037	0.97	0.031

This alloy was controlled to have Fe < 0.9% to minimise the soldering tendency of the casting to the die.In Japan, for a high-performance motor cycle engine block made in hypereutectic Al-20%Si alloy, use of Vacuum HPDC confirmed the potential for significantly reduced heat treatment times, energy consumption, and overall costs. Toyota had developed a highly modified HPDC process for the production of all Aluminium Cylinder Block with Metal Matrix Composite cylinder bore for a high powered compact engine in late 1990s.

Production of structural castings in Al to replace steel

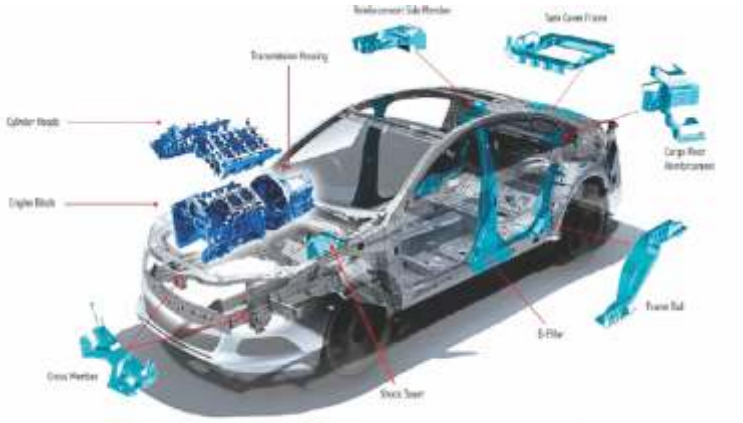


Figure 1. Typical applications of aluminium castings in automotive vehicles [5]. Nemak/American Metal Market Conference, 2015.

2.1 Structure, structural- elements/parts and their purpose

The core element of any car is the body structure. The car body connects all the different components; it houses the drive train and most importantly carries and protects passengers and cargo. The body structure needs to be rigid to support weight and stress and to securely tie together all the components. Furthermore, it must resist and soften the impact of a crash to safely protect the occupants. In addition, it needs to be as light as possible to optimize fuel economy and performance.

Casting is a very effective and economical production technique to produce complex structural parts.

Pictures below show examples of structural cast parts in an automobile such as shock tower, beam, engine cradle, pillar, door frame support etc.


Shock tower


Cross beam


Engine Cradle


Door Support


Pillar

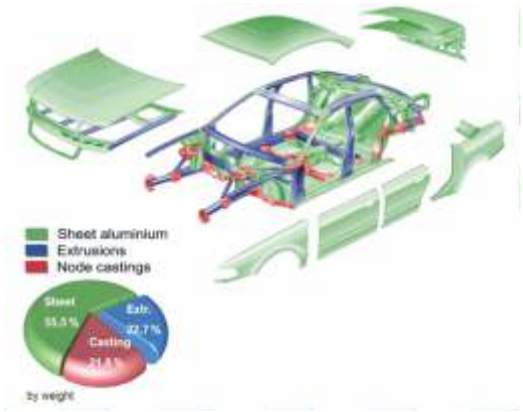
2.2 Examples of increasing use of Aluminium casting in car structures

Use of aluminium castings in car structural assemblies started in early 1990S as a part of the drive for light weighting by replacing steel parts. Given below are examples of growing use of structural castings in cars made by different manufacturers such as Jaguar in UK, Audi, and Mercedes Benz in Germany. The images below are taken from The Aluminium Automotive Manual.

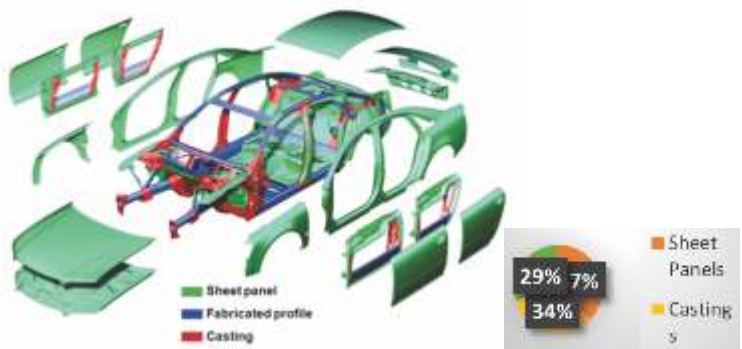
Jaguar

Audi

Exploded view of Audi A8 (D2) space frame and closures (Source: Audi) -1992



Exploded view of Audi A8 (D3) space frame and closures (Source: Audi) - 2002

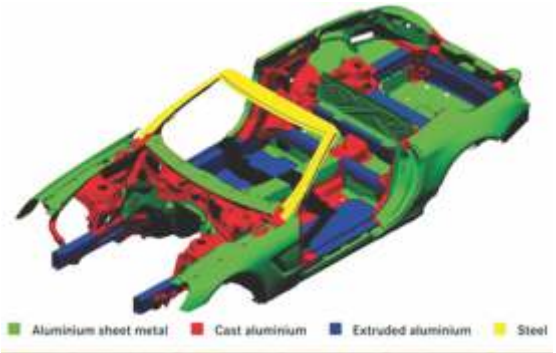


Mercedes-Benz SL (R231) Year 2012

Material forms in the Mercedes-Benz SL (R231) body structure (Source: Mercedes-Benz)

	Number of parts	Weight
Al sheet panels	75	18 %
Al extruded sections	28	29 %
Al castings	33	45 %
Steel	16	8 %
total	152	257 kg

The model had shock towers, front upper fire wall, central member connecting front end with rear sector floor, a single casting integrating - mounting points for the drive shaft, the transmission cross beam, the transmission tunnel braces and the seat bolting points on the tunnel side, hollow cast longitudinal member of rear floor assembly, boot tub as castings



The front wall (upper firewall)

It was the largest aluminium cast component made by using vacuum high pressure die casting technique. This casting integrates six individual components into a single part.

From above examples one can see that proportion of cast parts went up from ~22% in 1992 to 34% in 2003 for Audi. Another example is Mercedes Benz SL (R231) year 2012 model where cast parts made 45% of the structure weight.

Investment Casting - a new era in manufacturing aluminium cast parts

Lalit Kumar Pahwa, Managing Director & CEO, PAHWA METALTECH PVT. LTD., lalit@pahwametaltech.co.in

Abstract:

Conventionally, Aluminum Castings are manufactured by HPDC/LPDC or GDC casting process. These processes are used globally for high volume production parts. When the geometry of the castings become complex - these conventional processes have their limitations, like thickness of various sections of casting.

Further designers make compromises on design considering the limitations of the manufacturing process, which may add to weight, and additional manufacturing process like machining etc.

Be it in automotive, defense Equipment or development of UAVs - OEMs are constantly looking to reduce weight and maximize strength/weight ratio and Investment Casting of Aluminium is a new way to do it!

While development of new products, OEMs require prototype castings in small numbers, but of good quality i.e. the right alloy chemistry, no porosity, good dimensional accuracies. However, this is an uphill task even for many major OEMs and their casting suppliers. What the OEMs ideally look for is:

- Quick Prototype development – with Zero or very small tooling costs
- Reduced lead times and production launch times.
- Fully functional prototype parts meeting all aspects of specified quality.

Pahwa MetalTech has developed a process to meet the above challenges and take away the critical pain areas in prototype development. This marks a break-through in prototype development and can help OEMs test their product and dramatically reduce the time to market with proven products.

The new process also is a boon for designers who can design parts with lower weight but are constrained by conventional manufacturing processes. The other category of parts which need to be manufactured in small volumes, and for which the tooling costs are very high and commercially not viable. The new process can make parts with very complex geometries and in small volumes, thus breaking the status quo of the die casting industry.

The new process approach allows Aluminium Castings (and other alloys) to:

- Reduce Weight of Castings with Generative Designs
- Design freedom for complex parts
- Convert fabricated assemblies in to single piece castings

Introduction

Aluminium, often referred to as the "metal of the future," has become an indispensable part of our modern world. Its lightweight, corrosion resistance, and excellent electrical conductivity make it a versatile material for a wide range of applications, from aerospace and automotive industries to packaging and construction. As the demand for aluminium continues to rise, understanding its production and consumption dynamics on a global scale is important.

Aluminium is the second most important commercially used metal in the world. In volume terms it is second only to Iron & Steel. As per the International Aluminium Alliance primary Aluminium production in 2022 was over 68 MMT with Chine contributing almost two-thirds i.e 40 MMT.

In recent years, there has been a shift towards recycling aluminium to meet sustainability goals. Aluminium is infinitely recyclable, and recycling requires significantly less energy compared to primary production. As environmental awareness grows, industries and consumers alike are increasingly focusing on recycling and sustainable practices.

Aluminium parts fabrication processes:

Aluminium parts are manufactured through various processes depending on the specific requirements and the complexity of the part. Here are some common manufacturing processes used to fabricate aluminium parts:

Extrusion: Extrusion is a process where aluminium billets are heated and forced through a die to create a desired shape. This process is often used for creating complex cross-sectional profiles like rods, bars, tubes, and structural components.

Casting: Aluminium can be cast using various methods, including sand casting, die casting, and

investment casting. Die casting is used for producing complex shapes with high precision and surface finish.

Machining: Aluminium parts can be manufactured using machining processes such as milling, turning, drilling, and grinding. This is especially common for creating precision components and prototypes.

Sheet Metal Fabrication: Thin aluminium sheets can be cut, bent, and formed to create a variety of parts, including panels, enclosures, brackets, and more. Processes like laser cutting, bending, and stamping are often used in sheet metal fabrication.

Welding: Aluminium parts can be joined together using various welding techniques, including TIG (Tungsten Inert Gas), MIG (Metal Inert Gas), and spot welding. Proper welding techniques are essential due to aluminium's high thermal conductivity and susceptibility to distortion.

Forging: Forging involves shaping heated aluminium billets using a die and hammer or press. It is used for creating parts with improved mechanical properties and strength.

Powder Metallurgy: Aluminium powder can be pressed and sintered to create parts with complex geometries. This is often used for producing small, intricate components.

Additive Manufacturing (3D Printing): 3D printing technologies, such as selective laser melting (SLM) and fused deposition modelling (FDM), can be used to create aluminium parts layer by layer. This is useful for rapid prototyping and the production of highly complex, customized components.

After the fabrication process, aluminium parts may undergo surface treatments such as anodizing, electroplating, or powder coating to enhance their appearance, corrosion resistance, and durability.

The choice of manufacturing process depends on factors such as the part's size, complexity, required tolerances, material properties, and the volume of production. Engineers and manufacturers select the most appropriate method to achieve the desired quality, functionality, and cost-effectiveness for the aluminium parts they are producing.

Die Casting – a preferred process.

Die casting is a widely used manufacturing process for producing high-precision aluminium parts with complex shapes. It involves forcing molten aluminium into a reusable metal mold or die under high pressure. Here's an overview of the die casting process for aluminium:

The mold can be reused for multiple cycles, making die casting a cost-effective production method for high-volume production runs.

Die casting offers several advantages for aluminium parts production, including high dimensional accuracy, excellent surface finish, and the ability to produce complex shapes with tight tolerances. It is commonly used in industries such as automotive, aerospace, electronics, and consumer goods where precision and efficiency are critical. Different types of die casting, such as cold chamber and hot chamber die casting, are used depending on the specific aluminium alloy and part requirements.

Aluminium die casting plays a significant role in the automotive industry due to its numerous advantages, including lightweighting, cost-effectiveness, and the ability to produce complex components with high precision. Here's how aluminium die casting is used in the automotive sector:

Overall, aluminium die casting has become integral to the automotive industry's efforts to reduce vehicle weight, improve fuel efficiency, and meet stringent environmental and safety standards. It allows automakers to achieve a balance between lightweighting, performance, and cost-effectiveness in their vehicles.

Some Limitations of Die Casting:

As stated above, Die Casting is a versatile process and has many advantages – but it also has certain limitations, which are enumerated below.

High Initial Tooling Costs: Creating the molds (dies) for die casting can be expensive. This makes die casting less economical for small production runs.

Limited Part Size: Die casting is most effective for small to medium-sized parts. Larger parts can be challenging to produce and may require specialized equipment.

Material Limitations: While die casting can work with a range of materials, it is not suitable for all alloys. Some alloys may have properties that make them difficult to cast.

Surface Imperfections: Although die-cast parts generally have a good surface finish, they can still have minor defects such as porosity or air bubbles.

Not Suitable for Thin Walls: Extremely thin-walled parts can be challenging to produce via die casting due to the high pressures involved.

Limited Design Flexibility: Design changes to the die-cast part can be costly and time-consuming because they require modifying the molds.

Environmental Concerns: The high energy consumption required for melting and casting metals can have environmental implications, especially if the energy source is not sustainable.

Limited Alloy Mixing: Combining different alloys in a single die-casting process is complex and can lead to inconsistent results.

Attempts have been made to overcome the limitations of Die Casting and some manufacturers have used Investment Casting to address the limitations.

Investment Casting – Advantages and Limitations:

Investment casting, also known as the lost-wax casting process, can be used to create complex and precision aluminium parts. While investment casting is more commonly associated with materials like steel, bronze, or stainless steel, it is possible to use this process for aluminium as well. Here's how *investment casting works for aluminium:*

While aluminium investment casting is possible, it's worth noting that aluminium has unique characteristics and properties that can present challenges in the investment casting process. These challenges include its high thermal conductivity, which can affect mould filling and solidification, and the need for proper gating and cooling designs to prevent defects. However, with proper process optimization and expertise, aluminium investment casting can produce high-quality and complex aluminium parts for various applications.

Vacuum investment casting, also known as vacuum-assisted investment casting or vacuum precision casting, is a specialized variation of the investment casting process that uses vacuum technology to improve the quality and consistency of castings. Recent advances in vacuum investment casting have focused on enhancing process control, efficiency, and sustainability. Here are some notable advances:

Improved Casting Quality - Advanced vacuum systems with precise control mechanisms are being used to achieve higher levels of vacuum during the casting process. This results in reduced gas porosity and improved overall casting quality.

Reduced Oxidation and Gas Porosity - Vacuum investment casting helps minimize oxidation of molten metal and the formation of gas porosity by removing air and gases from the mold cavity. Recent advances in vacuum technology have led to more efficient gas removal, resulting in cleaner and more reliable castings.

Enhanced Alloy Capabilities - Vacuum investment casting allows for the production of a wide range of alloys, including those that contain elements which are highly reactive to the environment or are susceptible to oxidation and loss. Such alloys and other high-performance materials used in aerospace, automotive, and medical applications, can be easily melted in vacuum and/or under cover of inert gases, without making any change in the vacuum casting machines. This makes it possible to produce high integrity and precision castings of the most complex alloys of Aluminium and other low temperature alloys via vacuum casting.

Additive Manufacturing Integration - The integration of 3D printing and additive manufacturing techniques with vacuum investment casting has opened up new possibilities. Complex internal geometries, lattice structures, and conformal cooling channels designed via the 3D generative design methodologies and topology optimisation, can be incorporated into patterns, enabling the production of highly customized and optimized parts.

This capability of AM integrated Vacuum Casting process can become a big boon to the automotive and aerospace industry, in its never-ending quest for light-weighting. Some generatively designed parts have proven to be upto 70% lighter than the conventional parts, without any loss of performance or strength. In fact many structural parts can be optimally designed and produced from Aluminium alloys which meet the twin but conflicting demands of light weight and desired structural strength of the part.

Rapid Prototyping - Vacuum investment casting has become more adaptable and is becoming the preferred process for rapid prototyping and short production runs. This allows for quicker turnaround times and cost-effective testing of new designs. The castings produced by this approach are high integrity and production ready castings without any compromise, that is necessary with the current prototyping methods. This process can also be scaled up to meet volume production requirements during the initial product launch stages and improve the time-to-market of the manufacturers.

Environmental Considerations – Vacuum Casting is a

much cleaner process than the conventional die casting processes, as all the melting and casting takes place in closed chambers. Advances in vacuum systems and controls have led to further improvements in energy efficiency, reducing the environmental impact of the casting process. More environmentally friendly foundry practices, such as reduced emissions and waste, are being incorporated.

Process Simulation - Computational modelling and simulation tools have become more advanced and accurate, allowing foundries to predict and optimize the vacuum investment casting process. This helps in reducing defects, improving yield, and minimizing material waste.

Industry-Specific Applications of Vacuum Investment Casting:

Vacuum investment casting is gaining prominence in industries like aerospace, where complex and high-performance parts are required. Recent advances are catering to the specific needs of these industries, including the development of proprietary vacuum casting techniques.

These recent advances in vacuum investment casting are driving innovation and expanding the applications of this technology, making it a valuable method for producing high-quality, precision components for various industries. Manufacturers continue to invest in research and development to further improve the efficiency, sustainability, and capabilities of vacuum investment casting processes.

Prototyping of aluminium parts is a critical step in product development, allowing engineers and designers to test and refine their designs before committing to full-scale production. There are several methods for prototyping aluminium parts, each with its own advantages and limitations.

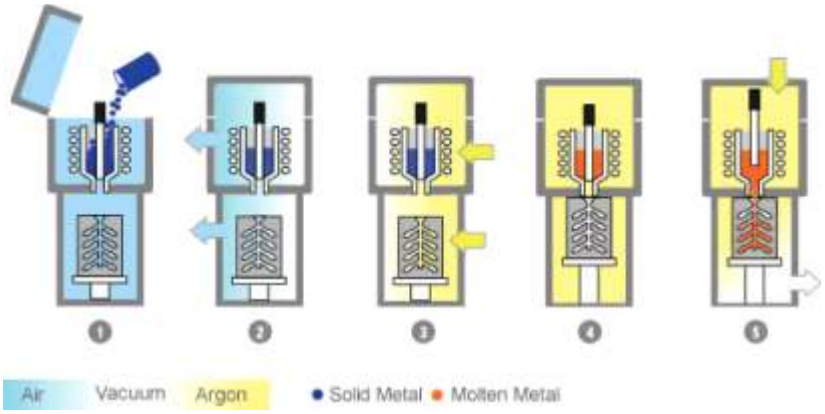
Vacuum Investment Casting is an excellent process to manufacture high integrity precision parts very quickly without investment in expensive tooling. These parts are production-ready, and the designer does not need to make any compromised during prototyping stage. Combined with AM patterns, this process eliminates the need of any tools and just one part can be manufactured quickly. Such parts can be used for fitment and other trials and changes can be incorporated rapidly and modified parts can be made within days rather than months with other conventional processes. This is a huge benefit and can compress the product development cycle manifold. If the designer wishes to use different alloys and desires castings to be evaluated before he makes the final decision, this can be easily achieved by the vacuum investment casting process. This process can produce castings of the same geometry in different alloys, which the designer or product development engineer can use in real applications and field trials before finalising and releasing the part for mass production

Above on the left is a bracket made of A356 alloy by conventional die-casting process. It weighs 383 grams. On the right is a generatively designed bracket, which replaces the existing bracket, with no change in the mounting dimensions and no compromise on the structural strength or performance requirements of the part. The generative design is not possible to manufacture by any conventional die-casting process. The only viable option to manufacture this part is via 3D metal printing. We all know that 3D metal printing has many limitations and is a very expensive process and cannot be scaled up to production volumes. It is unviable for production parts.

The part (as shown above) was successfully manufactured via AM assisted Vacuum Casting process. The final part weighs 122 grams which is a weight saving of a whopping 68% over the original baseline part, which shows the potential that Vacuum Investment Casting integrated with AM for pattern making, has in making significant reductions in weight and material usage. Using this method an excellent quality physical part was made very quickly in the final intended material in order to commence

The part (as shown above) was successfully manufactured via AM assisted Vacuum Casting process. The final part weighs 122 grams which is a weight saving of a whopping 68% over the original baseline part, which shows the potential that Vacuum Investment Casting integrated with AM for pattern making, has in making significant reductions in weight and material usage. Using this method an excellent quality physical part was made very quickly in the final intended material in order to commence some physical testing. This is a different route to get to that physical test part in metal at a fraction of the cost of having it metal additively (3D metal printed) manufactured.

This project has shown how a recently developed design and manufacturing methodology can reinvent a 5,000 year old manufacturing technique (die casting) to deliver potentially huge benefits in weight and material usage.



Schematic of Vacuum Casting Process

UPCOMING TRAINING PROGRAMME

GREAT DIE CASTING TECHNOLOGY FORUM

TWO DAYS TRAINING PROGRAMME ON

Disciplined Problem Solving,
10 Step Methodology, Some Techniques, Case Studies

23-24 December 2024 (Mon-Tue) | **Time: 9.30 am to 5.30 p.m.**

Venue : **Arkey Conference Hall**

'Guruprasad', 2nd Floor, 37/4/A, 6th Lane, Prabhat Road, Pune 411 004

For Details Contact

Mobile: +91 9764711315

gdctech@arkeycell.com, arkeyconference@arkeycell.com

www.gdctechforum.com

When You Think Foundry... Think KELSONS...!

Centralized Software System with All Digital Equipment

KELSONS®
TESTING EQUIPMENT

1994 - 2019 25 YEARS EXCELLENCE
KELSONS GROUP

MAKE IN INDIA

Digital Compactibility Cum Squeezer

Digital Wet Tensile Tester

Digital Moisture Tester

Digital Permeability Tester

Digital AFS Calculator

Digital Universal Strength Machine

Digital Core Gas Determinator

Digital Hot Tensile Tester

KELSONS TESTING EQUIPMENT

G-35, M.I.D.C. Shiroli, Kolhapur - 416 122 Maharashtra. (INDIA)
PH. : +91 230 2469067, 2469079 **Cell :** +91 9422582869
E-mail : sales@kelsonslab.com **www.**kelsonssandtesting.com
www.kelsonsfoundryequipments.com

EXPORTS : Malaysia, ,Syria, Dubai, Iran, Turkey, Saudi Arabia, Thailand, Egypt, Uganda, Oman, Germany, Baharin, South Korea, Bangladesh, Nigeria, South Africa, Croatia, Finland, Vietnam

PRODUCTS RANGE - For Structural Properties Testing, For Mould & Core Testing, For Green Moulding Sand Testing, For Oil Core Sand Testing, For Furan / No-bake Testing, For Hot Box Sand Testing, For Shell Sand Testing, Calibration Kits.

We Also Manufacture Foundry Machinery, Metal Testing Equipment.

When You Think Foundry... Think KELSONS...!

Metal Testing Equipment
Mechanical, Digital, Computerized

KELSONS®
METALLURGICAL EQUIPMENT

MAKE IN INDIA

Brinell Hardness Tester (Digital)
Motorised Loading

Universal Testing
Machine (Electronic)
Digital with Computer Interface

EXPORTS :
Malaysia, ,Syria, Dubai, Iran, Saudi Arabia, Thailand, Egypt, Uganda, Germany, Baharin, Turkey, South Korea, Bangladesh, Nigeria, Oman, South Africa, Croatia, Finland, Vietnam

KELSONS METALLURGICAL EQUIPMENT

G-35, M.I.D.C. Shiroli, Kolhapur - 416 122 Maharashtra. (INDIA)
PH. : +91 230 2469067, 2469079 **Cell :** +91 9422582869
E-mail : sales@kelsonslab.com www.kelsonssandtesting.com / www.kelsonsfoundryequipments.com

We Also Manufacture Foundry Machinery, Metal Testing Equipment.

Design FLASH-99 22 22 7007

Materials Management

Vishwas Kale, Managing Director, Vijayesh Instruments Pvt. Ltd, Pune
sales@vijayesh.net

Materials management is an important organized activity of any business system. It is essential for all manufacturing sectors. A careful planning is required while laying the objectives. The objectives of materials management are set by the top management. In some cases the materials manager himself decides keeping in view corporate policies. The basic of this management is to give efficient service of continuous supply of bought out materials at minimum cost. These can be raw materials or components for production as direct inputs, spare parts or operation supplies. Anything out of stock of any of these may totally disrupt the production causing losses to the organisation.

The objectives set by materials manager in the process of achieving the organizational goals could be summed up:

Procure material at low cost

In a manufacturing unit raw materials play an important role in the process of production They may constitute about half or more of the total cost of production. Therefore, a slight reduction in the cost would certainly reduce the price, This in turn would increase the profits of the company.

Maintain consistent quality

The materials manager should look for quality first, even if material is available at a lower cost. As the procurement of raw materials is done only for production, finally a product is manufactured for selling. The customer looks for a quality product along with price. So, care should be taken to buy the material of determined specifications that would reduce the cost of inspection, degree of defects and also increase the inventory turnover, profitability and brand image of his company.

Ensure continuous supply of material

The materials manager should ensure smooth flow of supply of raw materials from suppliers. If not done it would affect the process of production. This in turn substantially increase the operating costs and the unit production cost.

Minimize the costs of carrying and ordering

The material function also involves incidental costs such as costs of ordering, freight, storage etc. If these are reduced, then there is increase in savings, and finally the profits. Many techniques are available today to minimise these costs.

Maintain a good business relationship with supplier

This aspect helps to some advantages like reasonable price, preference in deliveries etc. This may give a plus point over competitors. It also enhances image of the company in the market.

Efficient data keeping and quick reporting

The managing of materials involves huge data. This may be standardised through various formats in forms. Then speedy information can be given to all departments as needed.

Develop new sources and materials

Research by materials department will lead to new economic and reliable sources who can substitute existing suppliers. This can straightway reduce costs.

Train and develop personnel

Materials department is an integral part of the organisation. If the persons in this area are trained, their morale and qualitative performance would improve and help the company.

Applying Seven Sigma to Materials Management

This is a new and very useful technique. The first step is to develop the metrics that apply to Materials Management's functions. There could be the typical Seven Sigma metrics in three broad areas: yield, cost of poor quality, and capacity.

The use of Seven Sigma has to be started with the collection and management of data and information. There must be a strong emphasis on measurement. Materials Management, along with the other functional areas in the company, needs a well established set of metrics, i.e., defined, reported frequently, reported consistently, and meaningful to both workers and management. The metrics are not highly aggregated. They are very close to the

functions and processes they represent.
Moreover, the metrics selected should include more than just cost; a complete picture may also require measurements of variability, cycle time, timeliness, and defects as well as the metrics such as cost of poor quality, yield, and capacity. Measuring cost alone is often not a useful index. Costs are the result of the variation in other factors. If the TQM emphasis on process improvement is to be maintained, important characteristics, such as cycle time quality, and productivity should be measured. Every process can be measured in terms of its output and the resources used. It is necessary that measurements are tracked over time so that characteristics such as trend and capability can be noted.

The task of the manager is not an easy one. Conflicting nature of issues makes it may be difficult to achieve all at once. As an example, procuring at a low cost may trouble continuous supply of materials. The manager is at the receiving end of many as he has to balance suppliers' payments, deliveries and quality to satisfy many in the organisation.

Sleepless nights for materials manager are now a history with many powerful tools at his command.

Solution to GDCTech Crossword #5

The Cue: Heat is ON

Compiled by: Pramod Gajare (Consultant)

E	Q	U	I	L	I	B	R	I	U	M	D	I	A	G	R	A	M		S					S
	U			A			C	O	O	L	I	N	G	C	U	R	V	E	O	I				O
	E			T				H								T			L	N				L
	N			E				Y							L	I	Q	U	I	D	U	S		U
	C			N				D								F			D	U				T
	H			T				R								I			U	C	T			I
G	I			H				O							C	C			S	T	R			O
R	N			E				C							O	I			U	I	A	H		N
O	G			A				A							O	A			P	O	N	O		H
W				T				R							L	L			E	N	S	T		E
T								B							I	A			R	H	F	Q		A
H								O	V	E	R	A	G	I	N	G			H	E	O	U		T
E								N							G	I			E	A	R	E		T
A									F	T	E	M	P	E	R	N			A	T	M	N		R
T									S	H	R	I	N	K	A	G	E		T	I	A	C		E
T	I	M	E	T	E	M	P	E	R	A	T	U	R	E	T				I	N	T	H		A
R										O	V	E	R	H	E	A	T	I	N	G	I	I		T
E			C	O	N	T	R	O	L	L	E	D	C	O	O	L	I	N	G		O	N		M
A	G	I	N	G	S	O	L	I	D	I	F	I	C	A	T	I	O	N	R	A	N	G		E
T	H	E	R	M	A	L		T	H	E	R	M	A	L	E	X	P	A	N	S	I	O		N
M												M	E	L	T	I	N	G	P	O	I	N		T
E	U	T	E	C	T	I	C	P	O	I	N	T												
N	A	T	U	R	A	L	A	G	I	N	G													
T	H	E	R	M	A	L	C	O	N	D	U	C	T	I	V	I	T	Y						

GDCTECH'S USA DELEGATION 2024

Mr Raju Chinthala handing over the "USA Michigan's Secretary of States" letter to GDCTECH president Shri. Anil Kulkarni

When GDCTECH comes up with something, it has to be an amazing game changing idea! Right after the Chennai MEGA Event in December 2023, preparations began for having a delegation to visit NADCA conference in USA.

As soon as the first flyer went out in January 2024, the 30 seats capacity got filled within just one week. 28th September to 6th October 2024 were the visit dates for our USA delegation. The entire 8 days schedule was jam packed with conferences, meetings, and variety of industry visits.

GDCTECH took extreme care in planning the visits. With personal phone calls, we received inputs from all the delegates regarding what would they like to see in the US and what will be helpful to grow their businesses. With their inputs in mind, we started working on the visits.

The entire travel related arrangements, right from delegate registration, follow ups, booking the flight tickets, hotels, Indian restaurants and transport vehicles were managed by "TWORRLD Tourism Solutions".

The NADCA expo and congress 2024 was a 3 days long event. 170 companies displayed their products/services at the exposition. The Congress had many paper presentations throughout the 3 days. On the 2nd day, NADCA hosted a grand luncheon along with an Awards Ceremony. The luncheon was grand and fabulous. The entire event was organized at Indiana Convention Center, downtown Indianapolis, Indiana State, USA.

Our GDCTECH delegation spent two whole days at the NADCA conference. On both the days, we had interesting activities planned for the delegates. On the 1st day, we visited 'LK Machinery's' plant in Greenwood, Indiana. On the 2nd day, we had a special visit to HTCI - Hindu Temple of Central Indiana. At HTCI we had planned a satvik dinner for all the delegates. The local Indian community leaders joined our delegation for the tasty satvik dinner. The mutual interaction was highly interesting. Our delegates got

Floor tour of BuhlerPrince plant in Holland, Michigan, USA

a lot of new information related to, how the Indian diaspora lives abroad, what are their challenges, how they maintain Indian values and traditions; and propagate those to the 2nd and 3rd generations of the parents who initially migrated from India to USA. All the delegates had very heart touching dialogue, and mind calming darshans at the temple.

From 3rd October onwards the delegation was on a move for industry visits. On that day, day 1 of industry visits, we began with an interactive meeting with "Indiana India Business Council". Mr. Raju Chinthala, from the council, talked about business opportunities, government incentives and many more business growth ideas. The council has bought millions of dollars of investment from USA's Indiana state, to India. Our delegates received good insights on the ways of doing business from India to USA. Right after the meeting, we proceeded for an awesome visit to an OEM, Subaru of Indiana Automotive. The Subaru car plant employees over 6500 people. Visiting the gigantic car manufacturing facility was exciting, but a strenuous 3 hours walk. Amazing assembly processes were witnessed during the visit. Subaru plant is situated in 'West Lafayette' city in the state of Indiana. The same city boasts having one of the top schools in USA, the Purdue University. Our delegation had a planned a visit to the Purdue University. We visited their material science and manufacturing laboratory. At the lab, we got introduced to the futuristic research they are doing in manufacturing field.

The 2nd day of industry visits was a whole day travel through the beautiful plains of Indiana and Michigan states. At half way during this travel, we had planned a visit to Delaware Dynamics. They are into manufacturing HPDC dies. The company was extremely welcoming and gave very helpful insights regarding tooling industry in USA. We could walk through their brand new as well as hundred years old facilities. The day ended with a comfortable stay in Grand Rapids city, Michigan.

The 3rd day of industry visit had a huge bandwidth. In the morning, we visited a small die casting company named Autocast Inc., in Grand Rapids, Michigan; while In the afternoon, we had planned a visit to the gigantic plant of Buhler Prince, a HPDC machine manufacturer. Autocast has only 50-60 employees. When we entered their facility, we were welcomed by a nice 'welcome note' for GDCTECH Delegation posted on a board in the lobby. Autocast's management treated us with a tasty spread of breakfast, filled with local food items. Beginning with mutual introduction, a discussion got kicked off between all the GDCTECH delegates and the Autocast management. It was a fulfilling, heart to heart discussion. The discussion topics ranged from working capital requirements, aluminium casting process details, to how much you pay to the employees right from operator to office staffs. All the differences and similarities were discussed between the two countries, India and USA. Even though it was a small factory, the visit turned out to be the most loved visit.

Later we proceeded to see BuhlerPrince plant in Holland, Michigan. The plant had totally different gigantic scale. Manufacturing 4000, 6000 tonnage high pressure aluminium die casting machines is not a simple task. The horizontal milling machine, lathe Machine, assembly area; everything was on a huge scale.

Summarising, all the companies we visited gave us a very lovely welcome. Not just that, but all of them showed us their entire facility whole heartedly and opened up on many questions that baffled delegates about industries in USA.

In all, the NADCA expo 2024 and the plathora of industry visits, left all the delegates very happy and contented. The travel arrangements made by TWORRLD were spotless and top notch.

The last one and half day was specially kept for relaxation, shopping and sightseeing in the city of Chicago. All delegate had a Gala time. Everyone was charged up on their return flights to India, with lot of new ideas and business plans to be implemented in their companies.

Advait Dattatraya Athavale
GDCTECH coordinator for USA Delgation visit 2024
+91-9373171391
advaitathavale@gmail.com

FRECH

Benchmarks can be observed...

...or re-defined.

FRECH Hot Chamber Die Casting Machines stand for highest reproducibility, maximum productivity and innovative assistance systems that enable semi-autonomous casting.

Everything from a single source: that is the FRECH die casting power family!

www.frech.in

SARU AIKOH CHEMICALS

PRODUCT RANGE

- Fluxes
- Granular Fluxes
- Tablet Grain Refiner
- Tablet Degasser & NT Based
- Master Alloy Ti, B
- Mag Remover
- Phosphoreus Copper
- Coating G.D.C.
- Die Release Agent H.P.D.C.
- Plunger Lubricant
- Copper & Brass Fluxes
- Teeming Compound
- Fluxes of Copper, Brass, Lead, Mg , Ferrous & Non Ferrous Metal

ABOUT US

- Long Term Support
- Strong R & D
- Prompt Delivery
- Consistent Quality
- 80 Years of Experience
- Export to More than 25 Countries

- **Technical Collaborations with M/s Aikoh Co. Japan**
- **Sales & Distribution with M/s JS Chemical INC, USA**
- **Technical Collaborations with M/s NTC Japan**

SARU AIKOH CHEMICALS PVT LTD.

A-2, INDUSTRIAL ESTATE, PARTAPUR, MEERUT - 250 103 INDIA

Tel. :0121-2440636, 0121-2440641, +91-7302000869, Fax : +91-121-2440644

E-mail: info@saruaikoh.com, customer.support@saruaikoh.com, Website :- www.saru.co.in

HOW TO DEAL "A"RELUCTANT TEAM

C. Surianarayanan - Consultant, Email : c.surianarayanan@gmail.com

- Ways to improve conflict resolution:
- Listen actively to the other person's perspective.
- When mediating, be sure you consider each participant's perspective.
- Use critical thinking and problem-solving skills to identify the best way to resolve the issue and make your suggestion.
- Explain your own opinion as objectively and concisely as possible.

ADD ON SHOULD BE THE UPGRADATION OF THE TECHNICAL SKILS AND EXPERTISE OF AS ON DATE TECHNOLOGY

13 areas of improvement for employees

1. **Time management**
2. **Customer service**
3. **Teamwork**
4. **Interpersonal skills**
5. **Integrity**
6. **Leadership**
7. **Communication**
8. **Goal setting and achievement**
9. **Adaptability**
10. **Empathy**
11. **Problem-solving skills**
12. **Creativity**
13. **Conflict resolution**

At the least Highlighted EIGHT points are highly important to make the team against the conflict thinking members

What are problem-solving skills?

Active listening
Analysis
Research
Creativity
Communication
Dependability
Decision-making
Team-building
Self-reliance

How to improve your problem-solving skills

1. Acquire more technical knowledge in your field
2. Seek out opportunities to solve problems
3. Practice problems
4. Observe how others problem solve

TIME MANAGEMENT

Time management is all about making the most of your available time to achieve your goals efficiently and effectively.
Here are some tips to improve your time management skills

- Here are some key tips to help you manage your time effectively:
- Set goals: Define what you want to achieve in the short term and long term. This gives you direction and helps you prioritize tasks.
- Prioritize tasks: Not all tasks are equally important or urgent. Use techniques like the Eisenhower Matrix to distinguish between what's urgent, what's important, what can wait, and what can be delegated or eliminated.
- Create a schedule: Use tools like calendars or planners to allocate time for specific tasks. Break down larger tasks into smaller, manageable chunks and allocate time for each.
- Minimize distractions: Identify common distractions like social media, emails, or noisy environments, and take steps to minimize them. This might involve setting specific times for checking emails or using apps to block distracting websites.

- Set deadlines: Even for tasks without externally imposed deadlines, set your own deadlines to create a sense of urgency and accountability.
- Use time management techniques: Techniques like the Pomodoro Technique (working in short bursts with breaks in between) or time blocking (allocating specific blocks of time for specific tasks) can help improve focus and productivity.
- Learn to say no: Don't overcommit yourself. Learn to decline tasks or requests that don't align with your priorities or that you simply don't have time for.
- Take care of yourself: Ensure you get enough sleep, exercise, and relaxation time. A healthy body and mind are essential for effective time management.
- Review and adjust: Regularly review your schedule and tasks to see what's working and what's not. Adjust your approach as needed to improve efficiency and effectiveness.
- Seek help when needed: Don't be afraid to delegate tasks or ask for help when you need it. Collaboration can often help you accomplish tasks more quickly and effectively.

Customer service

Customer service is all about meeting the needs and expectations of customers in a helpful, efficient, and friendly manner.

Here are some key principles and practices for providing excellent customer service:

- Listen to customers: Actively listen to their concerns, questions, and feedback. This shows that you value their input and are committed to helping them.
- Be empathetic: Put yourself in the customer's shoes and understand their perspective. Show empathy and understanding, especially when dealing with complaints or issues.
- Be responsive: Respond to customer inquiries, concerns, and feedback promptly. Even if you can't immediately solve their problem, acknowledge their issue and let them know that you're working on it.
- Be knowledgeable: Have a thorough understanding of your products or services so that you can provide accurate information and assistance to customers.
- Communicate effectively: Use clear and polite language when interacting with customers, whether it's in person, over the phone, or via email/chat. Avoid jargon and technical language that might confuse them.
- Go the extra mile: Look for ways to exceed customer expectations. This might involve offering personalized recommendations, providing additional support, or following up to ensure their satisfaction.
- Be proactive: Anticipate customer needs and address them before they become problems. This could involve offering proactive assistance, providing relevant information, or making recommendations based on their past behavior or preferences.
- Handle complaints gracefully: When dealing with unhappy customers, remain calm and professional. Apologize for any inconvenience or misunderstanding, take responsibility for resolving the issue, and work towards a satisfactory resolution.
- Seek feedback: Encourage customers to provide feedback on their experience with your products or services. Use this feedback to identify areas for improvement and make necessary adjustments.
- Continuous improvement: Regularly assess and improve your customer service processes and practices. This might involve training staff, updating policies and procedures, or implementing new technologies to better serve your customers.

Teamwork

Teamwork is essential for achieving collective goals and fostering a positive work environment.

Here are some key aspects of effective teamwork

- Clear goals and roles: Ensure that everyone on the team understands the team's objectives and their individual roles and responsibilities in achieving those goals. This clarity helps prevent confusion and duplication of efforts.
- Open communication: Encourage open and honest communication among team members. Create a supportive environment where team

- members feel comfortable sharing ideas, feedback, and concerns.
- Respect and trust: Foster an atmosphere of respect and trust among team members. Respect each other's perspectives, skills, and contributions, and trust each other to fulfill their responsibilities and commitments.
- Collaboration: Emphasize the importance of collaboration and cooperation within the team. Encourage team members to work together, leverage each other's strengths, and support each other to achieve common objectives.
- Conflict resolution: Address conflicts or disagreements within the team constructively and respectfully. Encourage open dialogue to understand different viewpoints and work towards mutually acceptable solutions.
- Accountability: Hold each team member accountable for their actions and commitments. Set clear expectations and follow through on responsibilities, deadlines, and deliverables.
- Recognition and appreciation: Acknowledge and celebrate the achievements and contributions of individual team members and the team as a whole. Recognize efforts, milestones, and successes to boost morale and motivation.
- Flexibility and adaptability: Be open to change and willing to adapt plans or strategies as needed. Encourage creative thinking and problem-solving to overcome challenges and seize opportunities.
- Support and empowerment: Provide support and resources to help team members succeed in their roles. Empower team members to take ownership of their work and make decisions that contribute to the team's success.
- Continuous improvement: Encourage a culture of continuous learning and improvement within the team. Regularly assess team processes, performance, and outcomes, and seek feedback to identify areas for enhancement.

Integrity

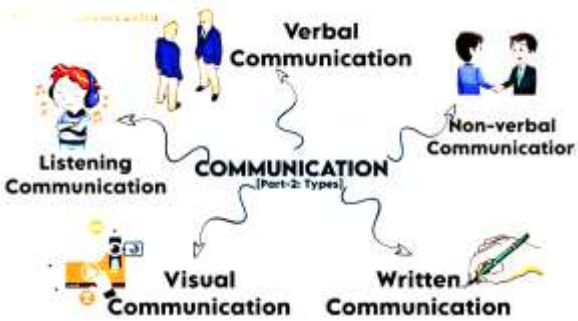
Integrity is the quality of being honest, ethical, and upright in one's actions and behavior.

It's about adhering to moral and ethical principles even when faced with challenges or temptations.

Here's why integrity is important

- Trustworthiness: People with integrity are trusted by others because they consistently demonstrate honesty and reliability. Trust is the foundation of meaningful relationships, whether they're personal or professional.
- Credibility: Individuals and organizations with integrity are seen as credible and reputable. They are more likely to be believed and respected because their actions align with their values and principles.
- Ethical decision-making: Integrity guides individuals to make ethical decisions even when faced with difficult choices. It helps them prioritize doing what is right over what is easy or convenient.
- Consistency: Integrity involves consistency between one's words and actions. People with integrity do what they say they will do and follow through on their commitments.
- Positive reputation: Integrity contributes to building a positive reputation over time. Individuals and organizations known for their integrity are valued and respected within their communities and industries.
- Effective leadership: Leaders who demonstrate integrity inspire trust and loyalty among their followers. They lead by example and set high standards for ethical behavior within their teams and organizations.
- Respect: People with integrity command respect from others because they treat everyone with fairness, dignity, and respect, regardless of their background or status.
- Accountability: Integrity involves taking responsibility for one's actions and their consequences. Individuals with integrity own up to their mistakes and strive to make amends when necessary.
- Long-term success: Integrity is essential for sustainable success in both personal and professional endeavors. It lays the groundwork for building strong relationships, making sound decisions, and achieving lasting results.
- Personal fulfillment: Living with integrity brings a sense of inner peace, satisfaction, and fulfillment. Knowing that one is living in alignment with their values and principles brings a deep sense of purpose and integrity.

Communication



Effective communication is crucial in all aspects of life, whether it's personal relationships, professional settings, or social interactions.

Here are some key aspects of effective communication

- Clarity: Communicate your message clearly and concisely to ensure that others understand your intentions, ideas, and information. Avoid ambiguity or confusion by using simple language and providing relevant context.
- Active listening: Pay attention to what others are saying without interrupting or judging. Practice active listening by focusing on the speaker, asking clarifying questions, and paraphrasing to confirm understanding.
- Empathy: Show empathy and understanding towards others' thoughts, feelings, and perspectives. Acknowledge their emotions and validate their experiences to build trust and rapport.
- Nonverbal cues: Pay attention to nonverbal cues such as body language, facial expressions, and tone of voice, as they often convey more meaning than words alone. Be mindful of your own nonverbal communication to ensure alignment with your message.
- Feedback: Seek and provide constructive feedback to facilitate mutual understanding and growth. Offer specific and actionable feedback, focusing on behaviors or outcomes rather than personal attributes.
- Respect: Treat others with respect and professionalism in your communication, regardless of differences in opinion, background, or role. Avoid language or behavior that may be perceived as disrespectful or offensive.
- Adaptability: Adapt your communication style and approach to suit the preferences and needs of your audience. Tailor your message, tone, and delivery to effectively engage and connect with different individuals or groups.
- Transparency: Be honest and transparent in your communication, especially when sharing important information or addressing sensitive topics. Build trust by being forthcoming about intentions, decisions, and potential consequences.
- Timing: Consider the timing and context of your communication to maximize its impact and relevance. Choose appropriate channels and moments to convey your message effectively and respectfully.
- Follow-up: Follow up on important conversations or exchanges to ensure clarity, address any lingering questions or concerns, and reinforce key points. Demonstrate your commitment to open communication and ongoing collaboration

Adaptability

Adaptability is the ability to adjust to new circumstances, environments, or situations with ease and flexibility.

In today's fast-paced and ever-changing world, adaptability is a valuable skill that allows individuals and organizations to thrive amidst uncertainty and change.

Here are some key aspects of adaptability

- Open-mindedness: Approach new situations with an open mind and a willingness to explore different perspectives and possibilities. Embrace change as an opportunity for growth and learning rather than a threat.
- Flexibility: Be willing to adjust your plans, strategies, or behaviors in response to changing circumstances or unexpected challenges. Adaptability involves being nimble and responsive to evolving situations.
- Resilience: Develop resilience to bounce back from setbacks or failures. View challenges as temporary obstacles rather than insurmountable barriers, and maintain a positive attitude in the face of adversity.

- Problem-solving: Develop strong problem-solving skills to effectively navigate complex or unfamiliar situations. Break down problems into manageable parts, seek creative solutions, and remain adaptable in your approach.
- Continuous learning: Cultivate a mindset of continuous learning and improvement. Stay curious and proactive in seeking out new knowledge, skills, and experiences that will enhance your adaptability and effectiveness.

Emotional intelligence: Develop emotional intelligence to understand and manage your own emotions, as well as the emotions of others, during times of change or uncertainty. Stay calm, composed, and empathetic in challenging situations.

Agility: Develop agility in your thinking and actions to quickly pivot or adjust to changing circumstances. Be prepared to experiment, iterate, and innovate in response to new challenges or opportunities.

Effective communication: Communicate openly and effectively with others during times of change or transition. Keep stakeholders informed, solicit feedback, and collaborate closely to ensure alignment and understanding.

Risk-taking: Be willing to take calculated risks and step outside your comfort zone in pursuit of new opportunities or growth. Embrace uncertainty and be willing to learn from both successes and failures.

Adaptive leadership: Lead by example and inspire others to embrace adaptability and change. Foster a culture of innovation, experimentation, and continuous improvement within your team or organization.

Problem-solving skills

Problem-solving skills are crucial for addressing challenges, overcoming obstacles, and achieving goals in various aspects of life.

Here are some key components of effective problem-solving skills

- Identifying the problem: Clearly define the problem or challenge you're facing. Break it down into smaller, more manageable components to gain a deeper understanding of its root causes and implications.
- Analyzing information: Gather relevant information, data, and resources related to the problem. Analyze this information carefully to identify patterns, trends, and potential solutions.
- Generating alternatives: Brainstorm and explore multiple potential solutions or approaches to solving the problem. Encourage creativity and outside-the-box thinking to generate a diverse range of options.
- Evaluating options: Assess the pros and cons of each potential solution based on factors such as feasibility, effectiveness, cost, and potential risks or consequences. Consider the short-term and long-term implications of each option.
- Making decisions: Select the most viable and effective solution based on your analysis and evaluation. Trust your judgment and intuition, but also be open to feedback and input from others involved in the problem-solving process.
- Implementing the solution: Develop a clear plan of action for implementing the chosen solution. Assign responsibilities, allocate resources, and establish timelines to ensure smooth execution.
- Monitoring progress: Regularly monitor and evaluate the implementation of the solution to track progress and identify any issues or obstacles that arise. Be prepared to make adjustments or revisions as needed to stay on track.
- Learning from outcomes: Reflect on the outcomes of the problem-solving process, regardless of whether the solution was successful or not. Identify lessons learned, insights gained, and areas for improvement to inform future problem-solving efforts.
- Seeking feedback: Solicit feedback from stakeholders, colleagues, or experts to gain different perspectives and insights on the problem and potential solutions. Be open to constructive criticism and alternative viewpoints.
- Iterating and adapting: Recognize that problem-solving is often an iterative process that may require multiple attempts or adjustments to reach a satisfactory solution. Stay flexible and adaptable in your approach, and be willing to iterate and refine your strategies as needed.

Conflict resolution

Conflict resolution is the process of addressing and resolving disagreements or disputes in a constructive and mutually beneficial manner.

Here are some key principles and strategies for effective conflict resolution

- Stay calm: Keep your emotions in check and remain calm, even in the face of conflict. Emotional reactions can escalate tensions and make it difficult to find a resolution.
- Listen actively: Practice active listening by paying attention to the perspectives and concerns of all parties involved in the conflict. Avoid interrupting or dismissing their viewpoints, and show empathy and understanding.
- Seek understanding: Take the time to understand the underlying reasons or interests behind the conflict. Ask open-ended questions to clarify misunderstandings and uncover common ground.
- Communicate effectively: Express your own thoughts and feelings clearly and assertively, using "I" statements to avoid blaming or accusing others. Focus on expressing your needs and concerns rather than attacking or criticizing the other party.
- Focus on interests, not positions: Shift the focus from arguing over specific positions to exploring underlying interests and needs. Look for win-win solutions that address the interests of all parties involved.
- Brainstorm solutions: Encourage collaboration and creativity by brainstorming a variety of potential solutions to the conflict. Consider both short-term and long-term options, and be open to compromise and negotiation.
- Evaluate options: Assess the pros and cons of each potential solution based on feasibility, effectiveness, and the impact on all parties involved. Look for solutions that are mutually beneficial and sustainable.
- Negotiate and compromise: Be willing to negotiate and make concessions in order to reach a resolution that is acceptable to all parties. Focus on finding a middle ground that addresses the core issues of the conflict.
- Document agreements: Once a resolution has been reached, document the terms of the agreement in writing to ensure clarity and accountability. Clearly outline each party's commitments and responsibilities.
- Follow up: Monitor the implementation of the agreed-upon solution and follow up with all parties involved to ensure that the conflict has been fully resolved. Address any lingering issues or concerns promptly to prevent future conflicts.

Training Programme

TWO DAYS TRAINING PROGRAMME ON Six Sigma & Design of Experiment using Artificial Intelligence on 22-23 October 2024 at Pune

Training Programme

IN-HOUSE TRAINING PROGRAMME ON Melting & Metal Treatment and Metallurgy of Aluminium Cast Alloys on 21 September 2024 at Gurgaon

FURNTECK

EFFICIENT | ECONOMICAL | RELIABLE

Furnteck's most trusted
Tower Melting Furnace
is **now**
Extra Efficient

Energy consumption
<575 KWH/TON @ **53** LTRS/Ton of F.O.

with METAL YIELD of
>99.4%

HIGH **Quality**
METAL

LOWER GAS
INCLUSION

Complete Solution for Aluminium Industry under one roof

Direct Bale Out Type

Electrical Holding (Crucible)

Top Heated Holding

Ladle Preheater

Kattle Type
Transfer Laddle

Address: Gat No.244/1, Near Courtyard Marriot, Chakan-Talegaon Road, Khalumbre, Chakan, Pune - 410 501.
Mob: +91 9850 499 663 / +91 9075 020 450
Email: response@furnteck.com | **Website:** www.furnteck.com

ENERGY SYSTECH

ALUMINIUM FURNACES

Sklenar-type Melting Furnace

"Bulk Melting solutions"

Salient Features:

- Rugged construction with smooth & jerk-free tilting.
- Efficient combustion system.
- Easy charging of material into the furnace.
  Manual or Skip Hoist type.
- Easy dross cleaning.
- Long refractory life.
- Rapid & economical melting.
- Low melt loss.

Electrical Stationary Furnaces

Electrical Hydraulic Tilting Furnaces

Nitrogen Degassing Machine (auto)

Density Index Unit

Other Products for the Aluminium Industry

- Electrical Furnaces (Crucible)
- Fuel Fired Furnaces
- Electrical & Fuel Fired Tilting Furnaces
- Heat Treatment Furnaces
- Rotary Degassing Unit
- Density Index Unit

ENERGY SYSTECH

PLOT NO 99, SECTOR 7, PCNTDA, BHOSARI, PUNE - 411 026. ☎ +91 9175955198, 📱 +91 9657715917

info@energysystech.com I www.energysystech.com

UNO MINDA
THINK. INSPIRE. FLOURISH

MINDA INDUSTRIES LTD.

(Alloy Wheel 2W Division)

- FIFO at all stages of production cycle.
- Single piece flow
- Unidirectional flow
- Minimised Material Handling.
- Raw material to finished product in one shed
- Casting movements only through conveyers or AGVs.
- Flexible production set-up for variety of models
- Training room / DOJO room for operators Training
- Implementation of Industry 4.0

- Minda Industries Ltd has set up fully integrated manufacturing facility for Alloy wheel 2 wheeler.
- Facilities include state of art infrastructure for Foundry, Machining and Painting (Powder Coating & Liquid Painting) providing one stop solution
- Flexibility to manufacture a variety of sizes (range 10-19 Inches) & surface coats
- Location: Supa Industrial Area- 86 KM from Pune Airport
- Land: 20 acres
- Built-up: 24000 sq. mtr.
- Capacity: 4 Million Wheels p.a. , expandable up to 6 Mn

Robotic CNC Cells

Smart Conveyers

Auto Storage System

Product Portfolio

AGVs

CNC Robot

Pouring Robot

GDCTech Crossword #6

The Cue: It’s all about Casting

Compiled by: Pramod Gajare (Consultant) pramodgajare2013@gmail.com

5) A piece of solid material usually metal that becomes an integral part of casting.
6) Flow behaviour prone to air entrapment in which the fill front is non uniform and progresses randomly in multiple directions.
7) The size and shape of the grains in a metal.
8) A projection on component that helps to maintain alignment of component for machining operations.
9) The material when added to the molten metal enhances nucleation process and hence modifies the structure and thereby changes the physical and mechanical properties.
10) To push the solidified casting out of the die.
11) Air or other gases that are mixed with the flowing molten metal as the die cavity is filling.
12) A metal injection mechanism is not submerged in molten metal in this process.
13) For castings, the material condition produced by thermal treatment of an as cast condition.
14) Masses of metal cast with a product to aid in the control of filling, porosity and other potential defects.
15) Production of a full-scale model of a proposed design more quickly and inexpensively than by traditional methods like single cavity prototype die casting or machining.
16) Another term for semi-solid metal casting.
17) A process in which the metal is drawn into casting cavity by vacuum pressure applied to the mould cavity.
18) Die sections are fastened to this part of a machine.
19) An excess material attached to a casting along the parting line.
20) This facilitates removal of casting from a die.

Are you looking for an ERP that is configurable to your foundry needs?

i CAST ERP

ERP Developed by Foundrymen

Choose India's

Best Foundry ERP!

- Auto Data Capturing from the devices like Spectro, Furnace, Mold Line, Bio-Metric etc...
- Costing & Casting Profitability Report
- Production Planning & Inventory Control
- Inquiry Feasibility Analysis
- DIY & 'On the Fly' Reporting
- Mobile App & Email Scheduler
- System Generated Intimations
- Integrated Machine Shop Module
- E-Invoice and E-way Bill Integration APIs
- Integration with Tally

"Take a step forward towards 'Industry 4.0' with ICAST ERP"

Developed By:

ellipsis infotech

#MADEININDIA

Email:
info@icasterp.com
www.icasterp.com

Phone:
(+91) 90999 22974,
(+91) 98242 12974

Our other product for modern melt shops:

OPTIMIX ALLOY

Software to Formulate 'Least Cost Charge Recipe'

www.optimixsolution.com | info@optimixsolution.com

Time: 9.30 am to 5.30 pm

GREAT DIE CASTING TECHNOLOGY FORUM

CONFERENCE ON
MAGNESIUM CASTING MANUFACTURING TECHNOLOGY - CHALLENGES AND OPPORTUNITIES

22-23 (WED-THU) JANUARY 2025 | THE PRIDE HOTEL, PUNE - 411005, MAHARASHTRA, INDIA

Chief Guest – Inauguration	Guest of Honour	Keynote Speaker	Chief Guest – Valedictory
Dr. Ing. Martin Tauber	**Mr. Vinay Kumar**	**V. N. Anil Kumar**	**Mr. G. P. Srikanth**
European Representative International Magnesium Association (IMA)	Joint Secretary Dept of Science and Technology Govt. of India	General Manager (F&F) HINDUSTAN AERONAUTICS LTD.	Managing Director HCM IBEX ENGINEERING PVT. LTD.

TECHNICAL PAPERS

Magnesium Poweder and it's Applications
Akshar Ghai, Managing Director & CEO, ALMAMET INDIA PVT. LTD.

Die Casting machine for Magnesium
Kedar Vaidya,Head of Advanced Materials, South Asia,
BUHLER (INDIA) PVT. LTD.

Status of Producing Magnesium in India
Dr. Nagesh, DEFENCE METALLURGICAL RESEARCH LABORATORY

Surface Protection Technology
Srirangam R. Narayanan,
HENKEL ADHESIVES TECHNOLOGIES INDIA PVT. LTD.

Casting Process of Magnesium Alloy to Produce Aero-Engine Components
Sambit Sekhar Swain, HINDUSTAN AERONAUTICS LTD., Engine Division, Koraput, Odisha

Testing
Rajasekar K, HINDUSTAN AERONAUTICS LTD., Engine Division, Koraput, Odisha

Methoding and design aspects
V. Bhargava Reddy, Addl General Manager (Mfg),
HINDUSTAN AERONAUTICS LIMITED

Defect and Remedies
Navin Kumar, Manager (Methods), HINDUSTAN AERONAUTICS LTD.

Furnace, Melting & Metal Handling
Martin Rauch, CEO, ING. RAUCH FERTIGUNGSTECHNIK GES. M.B.H.

Recycling Technology
Martin Rauch, CEO, ING RAUCH FERTIGUNGSTECHNIK GES MBH

Tooling
Ralph Mertens, Director, Sales,
KIND & CO. EDELSTAHLWERK GmbH & CO., KG

*** Safety**
LIMAG

Latest Developments in Magnesium Aerospace Technologies
Dr. Ross Baird, Director of Growth - Magnesium Alloys
LUXFER MEL TECHNOLOGIES

*** Magnesium alloys**
MAGONTEC

Innovations in Impregnation Technology for Magnesium Alloy Castings
Uttam Kumar Sinha, COO, METAL IMPREGNATIONS (I) PVT. LTD.

Alok Marwah, Div. General Manager
PRODUCTION AIDS & CONSULTANTS (P) LTD.

Software
Dr. S. Shamasundar, Managing Director, PROSIM R&D PVT LTD.

Foundry Fluxes and Consumables for Magnesium/Magnesium Alloy Melting
Bhavya Shah, SCOTTISH CHEMICAL INDUSTRIES

Advantages of Magnesium Casting with Over other Metals
Dr. Krishnan Berigai, Principal Technical Advisor
TK VELOCITY WHEELS PVT. LTD.

Thixomolding on conventional Cold Chamber Die Casting Machines & Flame Retardant Magnesium Alloy
TPI [Thixotropic Piston Injection Technology GmbH)

***CONFIRMATION AWAITED**

Panel Discussion on Market & Challenges-
Panelist from

- Automotive - Royal Enfield / TATA MOTORS LTD.
- Aerospace & Defence-HINDUSTAN AERONAUTICS LTD.
- Electronics & Components
- Power Tools

Delegate Registration Fees

Category	Member	Non-Member
Individual	Rs. 9,440/-	Rs. 10,384/-
	US$ 150	US$ 165
Corporate (3 delegates)	Rs. 25,488/-	Rs. 28,037/-
	US$ 405	US$ 445

Inclusive of G.S.T.

Delegate Registration Fee Includes
- Delegate Bag, Pen, Pad, Technical Volume, 2 Lunches & Teas

Technical Volume / Advertisement Tariff

A technical volume is being released on the occasion, containing Technical Papers written by experts. Tariff for advertisement in the Technical Volume is as given below :

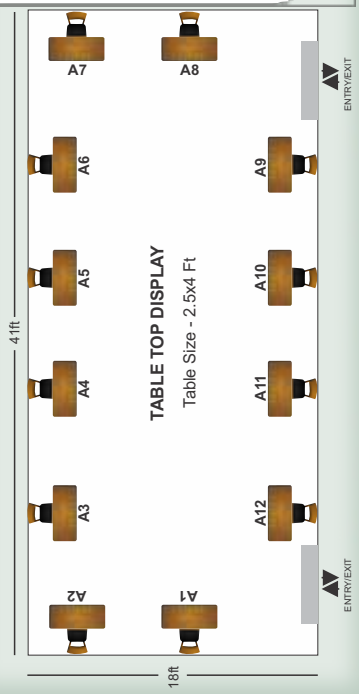
Position	*Size (cm.)*	*Type*	*Rate (Rs.)*
Front Cover	15.5 x 15	Multicolour	23,600.00
Back Cover	17 x 24	Multicolour	17,700.00
Front / Back Inside	17 x 24	Multicolour	11,800.00
Full Page Colour	17 x 24	Multicolour	8,850.00

Inclusive of GST.

CATALOGUE SHOW

CATALOGUE SHOW WITH VIDEO

TABLE TOP DISPLAY



CATALOGUE SHOW

$ 500 USD (inclusive of tax)

Privileges

- One Octonorm Panel (1m W x 2m H) For Catalogue Pasting

CATALOGUE & VIDEO SHOW

$ 1000 USD (inclusive of tax)

Privileges

- One Octonorm Panel (1m W x 2m H) For Catalogue Pasting
- Video Display facility

TABLE TOP DISPLAY

Rs. 40,000 +GST

Privileges

- One Table (Size)-2.5ft x 4ft
- One Chair
- One Delegate & One Attendant

For Details Contact

GREAT DIECASTING TECHNOLOGY FORUM

'Guruprasad', 1st Floor, 37/4/A, 6th Lane, Prabhat Road, Pune 411 004 INDIA

Mobile: +91 9764711315

gdctech@arkeycell.com, arkeyconference@arkeycell.com

www.gdctechforum.com

Partner Association

International Magnesium Association

Associate Association

SAE INDIA Society of Automotive Engineers INDIA

LWT Light Weighting Technologies

"Amazing response to 83rd coffee talk" 26th October 2024

SPEAKER: Nikhil N Chandratre
Scientist-C/Deputy Director
Bureau of Indian Standards

TOPIC:
BIS Standards

Prominent Manufacturer in
Aluminum Foundry Machines

SINCE 2008

J B Engineering and Automation

An ISO 9001:2015 Certified Company

- GDC Machines
- Tilting GDC Machines
- LPDC Machines
- Degassing Units
- Hydraulic Cylinders
- Hydraulic Power Packs

TILT GDC
MACHINE

TILT GDC SHOCK
ABSORBER MACHINE

2 WHEELER ALLOY WHEEL
VERTICAL GDC MACHINE

Authorised Distributor of

O.M.ER

Innovative Solutions

Address : Gat No. 228, Barane Wasti, Behind D-Mart Mall,
Moshi - Dehu Road, Moshi, Pune - 412105. MH. India.
Mobile : +91 93251 96727 / 98236 71338
E-mail : pramod.j@jbengineering.co.in, rahul.b@jbengineering.co.in

Foundry Products for Non-Ferrous Metals

Since 1856, Morgan Molten Metal Systems is a pioneer and a global leader in supplying technically advanced range of foundry products to Non-Ferrous Foundries.

Syncarb Z2e²

Suprex-E Plus

BNI

Transfer Ladle

Degassing Rotor & Baffle Plate

Degassing Tube

Blue Lightning

Complete Degassing Solution

Morgan has introduced a complete solution to degassing needs of the foundries.

Mobile Degassing Unit

Hoist-Able Degassing System

Reduced Pressure Tester

Density Index Measuring System

Morgan Advanced Materials

Morganite Crucible India Ltd.
(ISO 9001 Company)
B-11, M.I.D.C, Waluj, Aurangabad - 431136
Maharashtra, India

Contact:
vikramsinh.nalawade@morganplc.com
+91 937 0591146
Web: www.morganmms.com