Dedicated to Diecasting Industry

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RTNER IN PROGRESS R ALUMINIUM AND CASTING INDUSTRY

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CONSUMABLES FOR DIE CASTING

Degassing Simulation

Use of Metallurgical Chemicals, Ceramic Refractories and Aluminium Based Master Alloys for the Treatment and Handling of Molten Aluminium

ALUCAST 2023 - Technical Conference and Table Top Display

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Overseas	9			9				
Pune	18	68	24	110				
TOTAL	68	184	56	308				

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EDITORIAL



N. Ganeshan Editor Dear Readers,

According to a recent report from ACMA, Indian Auto Component production's cumulative growth in the last five years has touched 4.1 percent, with the rate of growth (5.7%) in exports being double that of imports, thereby helping reduce the trade deficit, which, in FY19 was pegged at US\$ 2.5 billion. However, with the aggressive push of global automakers to de-risk their supplies

and look for alternative sourcing destinations beyond China, broadly termed as the industry's 'China+1' strategy, India is gaining strong momentum and is witnessing a heightened interest in demand for Made-in-India components and as result, is poised to become the global hub in automotive component manufacturing for the world. The technology implementation in manufacturing in terms of automation and Industry 4.0 solutions will strengthen the industry for catering to the demand from the global markets. The interest in India from a perspective of adapting to technology is huge, and that is the reason why companies from other countries are first looking at India when they are scouting to source their components. The India Auto Components Inc's FY23 exports turnover was pegged at US\$ 20.1 billion, up from US\$ 19.1 billion a year ago. While the US and European Union, at around 32 percent contribution each, remained the top destinations for components exports from India, robust growth of 27 percent was also witnessed in exports of components to Latin America. In terms of parts, Indian auto components Inc exports drive and transmission, steering, and engine components among others.

Aluminium Caster's Association conducts series of well planned & designed seminars, technical conferences and training programs for Aluminium casting industries as a whole with an aim to assist die casters to improve their manufacturing capabilities to produce cost effective, defect free castings and components to international standards. This is an important aspect for any Die caster or component manufacturer. Controlling and reducing scrap rates in casting industries is of paramount importance for several reasons. One of the most immediate benefits of reducing scrap rates is cost savings. Scrap represents wasted materials, labour, raw material and energy, all of which contribute to higher production costs. By minimizing scrap, companies can improve their profitability and competitiveness. High scrap rates are often a sign of inefficiencies in the manufacturing process. Identifying and addressing the root causes of scrap can lead to process improvements, streamlined workflows, and greater overall efficiency. Further, Lower scrap rates typically correlate with higher product quality. When fewer products are discarded due to defects or errors, it means that a greater proportion

of finished products meets quality standards, reducing customer complaints and warranty claims. Manufacturing processes that generate high levels of scrap also tend to have a larger environmental footprint. Reducing scrap rates can lead to reduced waste, energy consumption, and emissions, contributing to a company's sustainability efforts.

Companies that can consistently produce high-quality products with minimal waste are more likely to gain a competitive advantage. Customers often prefer suppliers who can deliver reliable, defect-free products. Reducing scrap rates can lead to more consistent and predictable production. This is particularly important in industries where precision and reliability are critical, such as aerospace, automotive, and healthcare. When scrap rates are high, companies must allocate more resources (raw materials, labour, equipment) to compensate for the losses. Lowering scrap rates allows for better resource allocation and capacity utilization. In some industries, there may be regulatory requirements related to waste reduction and environmental impact. Lowering scrap rates can help companies meet these requirements and avoid potential fines or penalties.

High scrap rates can lead to delays in product delivery, which can frustrate customers. Reducing scrap rates helps in meeting delivery timelines and enhancing customer satisfaction. Focusing on reducing scrap rates encourages a culture of continuous improvement within an organization. This mindset can lead to ongoing innovation and optimization in various aspects of the business. In conclusion, controlling and reducing scrap rates in manufacturing industries is not only about cost savings but also about improving product quality, environmental responsibility, competitiveness, and overall operational excellence. It's an essential aspect of modern manufacturing technique that can have a far-reaching impact on a company's bottom line and its reputation.

Keeping our association's main focus of spreading the best practices in making Aluminium Castings, we are planning to conduct "ALUCAST 2023 "at Baroda, on 24th & 25th of November 2023. The theme of this Annual Event is "Integrated Approach to Fundamentals & Advanced Technology in Die casting". This two-day event will host Technical Conference and Table-Top Display. The Technical Conference will have Technical Papers & few Product Presentations that would cover wide range of topics. The Table-Top Display would be an opportunity for the equipment manufactures and other service providers to Die Casting foundries to display and showcase their latest innovations. You can find a detailed information on this somewhere else in this issue of ALUCAST Journal. All the die casting practitioners and supporting industries are welcome to part take in this event.

Degassing Simulation

Shrikant Bhat, Head, Non-Ferrous Foundry, Foseco India Limited

Degassing of Aluminium: Why Degass?

The trouble with Hydrogen in Aluminium is not just because it is the only gas soluble in liquid Aluminium, but essentially more because it is insoluble in Solid Aluminium.

While the very obvious effects of Hydrogen are Porosity defects and post treatment defects like blisters, it also has a significant effect on the Tensile Strength and the Fatigue life (Figure 1).



What affects the Hydrogen pick up?

I. Ambient Conditions: The degassing of melt in its simplest form is a process of driving the equilibrium of Hydrogen in the atmosphere and that in the melt. The Water vapor pressure in the atmosphere (Relative Humidity) therefore, has an important effect on the Hydrogen pick up. (Figure 2)



II. Exposure of Metal to Atmosphere: For similar reasons as stated above, the surface area of the furnace or the ladle also has an effect on the Hydrogen pick up: The more the exposure, more will be the pickup.

III. Alloying Elements: Individual alloying elements have their effects on the Solubility of Hydrogen in Aluminium. Some elements like Magnesium, Strontium and Titanium increase the solubility, while Silicon, Iron, Copper and Zinc reduce it. (Figure 3)



How do we remove Hydrogen?

Rotary Degassing: In Rotary Degassing thousands of small bubbles of inert gas are flushed through the liquid metal to facilitate removal of Hydrogen by floatation. (Figure 4)



So, what affects Hydrogen Removal?

Practically, the efficiency of a degassing process is decided by various factors: some of them can be controlled, and some can not, though they will still have their individual and collective impacts on the Hydrogen equilibrium. I. Degassing Process Parameters: Efficiency of degassing is directly proportional to the speed of the rotor and pressure of inert gas up to a limit, since they reduce the size of the bubble and increase their numbers, thereby reducing the Hydrogen gas rapidly (Figure 5)



II. Degassing Time: Degassing for a longer time would also reduce the Hydrogen further for similar reasons as above.

III. Presence of a Baffle: A Baffle helps in breaking the inert gas bubble diameter and thus improves the efficiency of degassing by creating smaller bubbles.

IV. Rotor: The Power of the Rotor is a direct function of the Rotor geometry and its rotational speed. The larger the rotor more is the power. Another factor that decides the power of the rotor is its design. All Foseco Rotors are designed to produce a patented Pumping Action, thus giving more power and better mixing. (Figure 6)





Figure 6

Every design has a different power and hence efficiency of creating a designated size of inert gas bubbles.

So, what is the collective effect?

All of these parameters act simultaneously as the degassing process is progressing. Through seasons and for various alloys, different furnace sizes and designs; and not to forget, through the life of the rotor, (the geometry changes due to erosion) the degassing efficiency will vary.

To summarize:

Atmospheric humidity, temperature (atmospheric and melting), presence of alloying elements and crucible designs will have an effect on how much Hydrogen will be picked up, while the rotor design, rotor size, rotational speed, flow and pressure of inert gas and treatment time will have an effect on how much of Hydrogen is removed.

It is practically difficult to interpret the collective impact and the foundries then have to resort to trials and errors and rely on experience and experiments.

Many may choose the option of playing it extra safe by adopting higher levels of parameters and possibly run a risk of over degassing and hence shrinkages, apart from the risk of compromising on productivity and optimum use of consumables.

When the equilibrium condition is understood precisely and the Power on the rotor is known, one can decide how much of degassing will happen as a function of time, speed and given geometry of Rotor.

FOSECO Degasser Model is a mathematical model that simulates this equilibrium process of Hydrogen pick up and removal by degassing process, while taking into consideration all the above parameters.

It is based on the first principles and provides the user with a plot of the degassing time against the Hydrogen level, allowing them to decide upon the best combination of productivity and desired gas levels. A typical screen shot of the output of the simulation is as given in Figure 7:

0.15

Rotor diameter (m)

0.2

0.25

0.3

0.1

10

5

0 0

0.05





Application of the Model:

The FOSECO Batch Degasser helps the foundry in various ways such as:

- 1. Defining a new degassing Process for a given foundry and alloy
- 2. Bench marking to avoid under or over degassing in various seasons or with the type of the Rotors.
- 3. Development of a new casting
- 4. Optimization of the existing degassing process
- 5. Process control and audit

These exercises are undertaken by using the measurement of Density Index, before and after the process. The necessary support for simulation is also provided from the back end once the base data is ready.



Head, Non-Ferrous Foundry, Foseco India Limited

Use of Metallurgical Chemicals, Ceramic Refractories and Aluminium Based Master Alloys for the Treatment and Handling of Molten Aluminium

Amar Gharmode, GM - Technical, Ceraflux India Pvt. Ltd.

Aluminum is an essential material for modern manufacturing. It is a lightweight, high-strength, corrosion-resistant metal with high electrical and thermal conductivity, and it is easy to recycle. Aluminium is a chemical element in the Boron group with symbol Al and atomic number 13. It is a silvery-white, soft, nonmagnetic, ductile metal. It can't be used as it is for commercial usage, require alloying with other alloying element. Aluminium is very reactive; in molten stage immediately react with atmospheric moisture and forms Al2O3 and H2. Hydrogen gas remain in molten metal and during solidification try to expel out, this raise to micro porosity sometimes blow holes. Inclusion of oxides leads to failure of finish product. To achieve Mechanical properties like Tensile, Elongation, Hardness etc., metallurgical chemical treatment is a must.

Flux:

Fluxes are inorganic compounds, available in Powder and Granular form. They can be added manually or can be automatically injected.



Powder Fluxes



Granular Fluxes

1. Melting Flux:



These fluxes are usually mixture of chloride and fluoride salts. Melting point of flux is in the range of 600 – 620°C. Forms a liquid layer over molten aluminium, avoids exposure of

molten metal to atmosphere. Protects the melt from oxidation and hydrogen pickup.

2. Drossing Flux: Drossing-off fluxes agglomerate the oxides allowing easy removal from the surface of the melt. Exothermic fluxes ensure that liquid aluminium trapped in the dross layer is returned to the melt. Fluoride compoundscontribute to metal separation owing to their high wetting capacity. When the melt is ready for drossing-off, the flux is spread over the molten metal surface, allowed to stand for a few minutes and then rabbled into the dross for several minutes with a skimmer. For best results the melt should preferably in the range 690-760°C. The dross is then pulled to the door, allowed to drain and transferred to a dross bogie. If the dross in the bogie is raked, further metal will collect in the bottom. Untreated dross may contain 60 to 85% Aluminium metal. However with effective drossing flux treatment the aluminium content of dross can be reduced to 25-40%.

3. Refining Flux: Refining fluxes (Calcium and Magnesium removal): These fluxes are in powder and Tablet form. Used to remove alkali metals from the molten Aluminium.

4. Furnace Wall Cleaning Flux: Wall cleaning fluxes contain compounds that help to soften the oxide build-up that occurs on furnace walls. These fluxes applied by sprinkling manually over the oxide build-up in the furnace area. Flux reacts exothermically with the oxide, Aluminium entrapped in the oxide trickle down in to furnace. Oxide layer get softens and easily get removed by scraping tool.

5. Injection Flux: It is a relatively new process in which fluxing compounds are introduced into the molten metal by mechanical device using an inert gas carrier.

6. Dross Metal Recovery Flux: The dross removed after cleaning the molten metal still contain some quantity of Al trapped in it. This flux contains appropriate mix of inorganic chlorides and fluorides salts. The exothermic reaction due to fluorides salts with dross enables the recovery of Al.

7. Turning Boring Reclamation Flux: These fluxes are recommended for reclaiming Turnings/Borings. Preheat the turning and borings to remove oil, moisture, dirt etc. Add flux in to furnace and melt down to prepare pool of molten flux. Add turning/ boring in to the pool of molten flux. As density of turning and boring is more than molten flux, it goes down into the pool and get melted. Temperature of the melt is kept about 680-710°C.

With this process melting loss can be controlled as low as 5-10%.

8. Magnesium Remover Flux: Magnesium removal from molten Aluminium scrap is one of the cast shop practices that are evolving continuously, due to its technological importance. Many different technologies as well as many different products have been developed, so it is possible to establish that this area constitutes a noticeable research field of the Aluminium metallurgy. These fluxes are available in Powder and Tablet form. It is used to remove excess Mg from molten Aluminium. For best result temp. of molten metal to be maintained in the range of 740-760°C. To remove 1 kg Mg from molten metal it is recommended to use 5-8 kg of Tableted product and 8-12 kg of Powder flux.

Powder flux generates very low smoke during usage compared to tableted product.



Magremover-60



Magremover Powder

Granular Fluxes: By using fluxes in granular form rather than as conventional powders, the effectiveness of the flux can be greatly increased, the handling improved and the undesirable, hazardous emissions can be significantly reduced. The higher cost of granulated fluxes (arising from the additional manufacturing process involved) is compensated by the much reduced quantities needed.

Advantage of Granular Flux over Powder Flux:

- 1. The dose is 1/3rd approx.
- 2. Smoke level is much less.
- 3. Attack on furnace refractory is much less.
- 4. Working condition is better.
- 5. Uniformity in chemical composition.

PRODUCT	APPLICATION
CERAFLUX GR-2515	Melting and covering flux. Metal temp. 610-620°C.
CERAFLUX GR-510	Drossing flux, suitable for all Aluminium alloys except Al-Mg alloys having Mg >3%. Central melting system using thick section scrap and ingots. Metal temp. 690-720°C.
CERAFLUX GR-510E	Drossing flux, suitable for all Aluminium alloys except Al-Mg alloys having Mg >3%. Holding furnace in GDC and PDC. Metal temp. 700-720°C.
CERAFLUX GR-510 W	Drossing flux, suitable for all Aluminium alloys except Al-Mg alloys having Mg >3%. Tower furnace. Metal temp. 730-760°C.
CERAFLUX GR-540	Drossing flux, suitable for all Aluminium alloys except Al-Mg alloys having Mg >3%. Skelner furnace using thin section,oily,litho,twitch,trump type scrap. Metal temp. 700-740°C.
CERAFLUX GR-2516	General purpose drossing flux, suitable for all Aluminium alloys except Al-Mg alloys having Mg >3%. Metal temp. 730-770°C.
CERAFLUX GR-6512	Sodium & Calcium free cleaning and drossing flux. Metal temp. 700-760°C
CERAFLUX GR-2815	Grain refining granular flux. Metal temp. 680-770°C.
CERAFLUX GR-2712	Sodium base modifier for Hypo-eutectic alloy temp.>740°C
CERAFLUX GR-2715	Sodium base modifier for Eutectic alloy temp.< 740°C
CERAFLUX GR-60	Na,Ca,Li (Alkali Metal) Remover flux. Metal temp. 650°C and above.

ARTICLE

Degassing of Al Alloys:



$2AI + 3H_2O - AI2O3 + 3H_2$ H₂O (Moisture from Atmosphere)

Hydrogen(H₂) has a high solubility in molten Al which increase with melt temperature but the solubility in solid Al is very low. As the alloy freezes, H₂ gas is expelled forming gas pores in the casting. The maximum conc. of dissolved hydrogen possible in Al Alloys can be as high as 0.8ml H₂/100gm. By careful attention to melting practices this can be reduced but with the best practice, remelted foundry alloys may be expected to contain 0.06-0.1ml H₂/100gm Al.

Degassing of aluminium is done by:

- 1. Hexachloroethane base tablets.
- 2. Nitrogen gas evolving tablets.
- 3. Nitrogen gas passing through lance for reverberatory furnaces.
- 4. On line degassing by using mix. of Nitrogen and Argon.

5. MDU / Rotary Degassing- Dry Nitrogen gas is purged in to molten metal using rotary degassing system which produce well dispersed small bubbles. These bubbles will ensure effective removal of hydrogen gas.

Hydrogen Removal Efficiency (Test Results)



Grain Refining of Aluminium Alloys:

A fine uniform grain structure is desired in Aluminium castings. The type and size of grains formed are determined by alloy composition, solidification rate and the addition of master alloys (grain refiners) containing inter metallic phase particles, which provide sites for heterogeneous grain nucleation.

Addition of certain elements to Aluminium alloys melts can provide nuclei for grain growth. Titanium, particularly in as-

sociation with boron, has a powerful nucleating effect and is the most commonly used grain refiner.



Effects of grain refinement:

- Increased tear resistance.
- Increased pressure tightness.
- Improved response to thermal treatment.
- Improved feeding characteristics.
- Improved appearance after surface treatments, such as anodising, electrochemical and mechanical finishing.

GRAIN REFINER: ALUMINIUM TIB 5:1

COILED ROD: 9.5mm dia. rod in standard 200 ±20 kgs coils.

PRODUCT:CERALOY TIB 5:1

Ti Content: 4.5-5.5% B Content: 0.8 – 1.2% Si Content: 0.2% Max. Fe Content: 0.3% Max. Other Impurities each <0.05% Remainder: Aluminium Mean Particle Size of TiAl3: <50 Microns Mean Particle Size of TiB2: <2 Microns

These are developed for addition in to the metal transfer launder in continuous or semi-continuous casting operations enabling continuous grain refinement. Due to its properties rod is suited for start –stop semi continuous addition in automated castings lines.





CUT ROD: 9.5mm rod cut in to 50 cm (100gms) or 100 cm (200gms) pieces.

Ideally suited for foundries to make accurate grain refiner

addition to ladle and crucibles. Combining easy handling with superior metallurgical products. Exact additions are made by simply stirring the required nos. of rods in to the melt.







CAST BAR 200 GMS

WAFFLE INGOTS 200GMS

For Furnace additions Cast bar or Waffle ingot is added as the melt treatment is completed, usually within 20 minutes prior to casting ensuring reliable grain refinement of ingots.

Modification Of AI-SI Alloys:

Sand cast and gravity die cast alloys cool relatively slowly, resulting in a coarse lamellar eutectic Silicon structure which reduces the strength of the castings.

Changing the chemical composition to alter the microstructure of eutectic Silicon Needle to rounded shape is called "modification". This phenomenon is concern only with Si structure of Al-Si alloys (Si up to 12%).

Benefits with modification: The remarkable improvement in the mechanical properties of the castings.

If not modified? Silicon will form needles which will acts as notches or internal stress points with damaging results on tensile properties.

What are the modifiers? These are the chemical compounds or pure form of sodium, strontium, antimony, barium & calcium. Last three don't have commercial importance.

Process of modification. Silicon wetting & growth of needle is restricted by covering of sodium, strontium. (Sodium, strontium gets adsorbed on silicon particles and restricts its growth).

SODIUM AS MODIFIER	STRONTIUM AS MODIFIER
Sodium Salt base Products	Aluminium base product
Having more affinity for moisture.	Affinity towards moisture is nil.
Reduces life of crucible and furnace lining with chemical reaction.	No adverse reaction.
Recovery is maximum 60-70% considering standard melting practice.	Minimum recovery is 95%.
Not advisable to use in alloys where Mg is more than 1%	Advisable to use in alloys where Mg is more than 1%.
Fluidity of melt is slightly dropped.	Fluidity of melt is maintained.
Fading effect limitation. Effective up to 40 minutes of treatment.	Useful for longer time of treatment, up to 5hrs.
Volatile	Burn off- 1/10th of sodium.
No effect after remelting	Effect is even after remelting.

Aluminium Master Alloys

The mechanical and physical properties of pure Aluminium can be enhanced with the use of alloying elements. Additions of these alloying elements can be made using elemental metals. Density differences between the alloying elements and Aluminium frequently results in segregation, with high density elements sinking to the bottom of the furnace unless the melts is actively stirred.

ALUCAST[®] 2023

TECHNICAL CONFERENCE & TABLE TOP DISPLAY - ALUMINIUM DIE-CASTING HOTEL TAJ VIVANTA, VADODARA | 24th & 25th NOVEMBER 2023

THEME: INTEGRATED APPROACH TO FUNDAMENTALS & ADVANCED TECHNOLOGY IN DIE CASTING

S. No.	Suggested Topics for Technical Papers
1	Recent developments in Aluminium Alloys & expectations
2	Die Coating – latest developments
3	Post casting operations
4	Light weighting & structural Castings for EV
5	Surface Coating – Aesthetics of Castings
6	Research & Development in die casting
7	Recent developments in thermal management of dies
8	Energy conservation & management in die casting
9	Zinc die casting
10	Data analytics & management for die casting
11	Heat Treatment
12	Squeeze Pin Technology
13	Use of Vacuum & High Vacuum in the Production of Structural & Load Bearing Parts in Die Casting.

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The detailed brochure will follow soon. For more information, please contact:



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Addition of alloys in base form to Aluminium will be having following problems,

Dissolution
 Consistency
 Low raw material and hidden cost.

ADVANTAGES OF USING MASTER ALLOYS:

- 1. Less dissolution time.
- 2. Consistency in recovery.
- 3. Increased Productivity.

ALUMINIUM BORON MASTER ALLOY:

Presence of Cr,V,Ti,Zr as impurities in Aluminium conductor alloys reduces electrical conductivity. It can be improved by using Al-B Master alloys. Boron reacts with these metals and forms respective borides. As density of these borides are more than molten metal, sinks down as boride sludge.



Conductivity = 63.50 - 6.9x - 83y

where electrical conductivity is in percent IACS (International Copper Annealed Standard), x = iron + silicon (in weight percent), and y = titanium + vanadium +manganese + chromium (in weight percent). Available as: CERALOY B-3% CERALOY B-3% CERALOY B-4% CERALOY B-8% CERALOY B-10%

ALUMINIUM ZIRCONIUM MASTER ALLOY:

Zirconium is a specified minor addition to a number of high strength wrought Aluminum alloys.

The presence of Zirconium in Aluminum alloys:

- Inhibits recrystallization and grain growth at elevated temperatures.
- Reduces susceptibility to stress corrosion
- Reduces sensitivity to quenching rate from solution temperatures.
- Enhances weldability by resisting grain coarsening in the heat sensitive zones close to welded joints.

Available as:

CERALOY Zr- 5% CERALOY Zr- 10%

ALUMINIUM VANADIUM MASTER ALLOY:

This alloy is used for addition of Vanadium in Aluminium alloys. The vanadium addition is done to improve the thermal stability and strength. Due to their excellent corrosion resistance they are considered ideal for implant application.

Available as:

CERALOY V- 5% CERALOY V- 10%

Import substitute highly insulating and non-wetting to molten aluminium Calcium Silicate based Ceramic Shapes.

CERAMIC SLEEVES:



In Aluminium gravity die casting yield of casting is varies from 40-60% due to chunky riser part. Use of highly insulating sleeves helps to improve on the yield by 10-15%, providing improved feeding rate that of riser. Life of Sleeves varies from 1000 cycles to 2500 cycles. High cost of ceramic sleeves is

compensated by the increased yield of castings.

Runners and risers are remelted during production; increase in yield indirectly reduces remelting cost of Aluminium. Ceramic sleeves can be casted through slurry process or precisely machined through Ceramic fiber or Carbon fiber reinforced high density boards. Carbon fiber reinforced ceramic shapes gives extended service life.

Properties of CERAMIC Sleeves:

Nature	White coloured pre-cast Shapes
Density	1.3 gm. / c.c.
C.C.S.	95.00+/-5.00 Kg. / cm2
Temp. for continuous use	800°C
Reaction with lubricating oil	Resistant
Wet-ability to molten Aluminium	Non- Wetable
Thermal Conductivity	0.48+/-0.1 W/mK at 800°C
Linear Thermal Expansion	0.27+/-0.03 %

Advantages:

- Non-Wettable to molten Aluminium and its alloys.
- Withstand thermal shocks from 800°C to room temperature.
- Cut or machined easily, so that lining of any curvature or critical shape is easy.
- Highly insulating, temp. drop is very less.
- Pre heating is not required.

CERAMIC SLEEVES FOR STALKTUBE USED IN LPDC:

In low pressure die casting, the die is filled with metal from a pressurised furnace, with pressures typically around 0.7 -2.0 bars. The holding furnace is positioned in the lower part of the vertical die casting machine, with the molten metal injected upwards directly into the bottom of the mould. The pressure holds the metal in the die until it solidifies. One of the main advantages of this process is the precise control of die cavity filling.

Molten metal flows quickly and smoothly through the feeding conduits (CERAL STALKTUBE), reducing oxide formation and preventing porosity.

STALK TUBES are made from Ceramic and Cast iron materials. Ceramic Material includes Aluminium Titanate (AITi), Silicon Nitride (SiN), Dense Fused Silica. **Ceramics are chosen for their insulation and long service life. These are highly expensive.**

Cast iron Stalk tubes are less expensive with high mechanical strength, can be designed as per customer specifications. Inside the stalk tubes Ceramic sleeves are fitted and outside fixed with special lining material to avoid the iron pickup from cast iron stalk tube.



LPDC Machine Sketch



CERAL Stalk Tube



Ceramic Sleeve inside CI Stalk tube

HIGHLY INSULATING DIECOATES AND RISER COATING:

INSULATING DIECOAT FOR GDC:

The sound casting is achieved by controlled directional solidification. Solidification of the cast metal should be in one direction – generally areas remote from the risers and moving the solidification toward the risers or source of feed metal. In permanent mould casting, this is done by controlling the rate of heat extraction in various parts of the die using different filler materials having various thermal conductivity ratings. Heat flow rates are proportional to the thickness of the insulating material, using different materials and different thicknesses of coating in the die can regulate the rate of heat extraction and promote directional solidification.

DIEDRESS-140ESS:

Water base Refractory cum Insulating Diecoat. Special binding and insulating property of Diecoat influence easy striping and excellent finish to the aluminium casting. Mix the product in can uniformly before taking for dilution. Dilute the diecoat in the ratio 1:3-4 (Product: Water). Clean the die; it should be free from rust, grease etc. Pre-heat the die surface at a Temp.175°C -200°C, apply the coating by spraying application. Heat the coated die surface using gas burner at a Temp. 250 \pm 10°C to remove the moisture and form firm bond.

Apply very thin and uniform layer in each stage. After completion of coating raise temp. of die to 350° C. Colour of diecoat will change from white to light brick red. Check for peel off and start for production. For touch-up application maintain temp. of die 250 ± 10°C.

Advantages:

- Non Wetting to Aluminium.
- Protects metallic dies with critical geometry/ Design.
- Reduces Maintenance cost.
- Good life of coating, intermittent touch up is suggested to get extended coating life.



Alloy Wheel Die Coated



Alloy Wheel casting



Product: DIEDRESS-140ESS

DIEDRESS-1400:

Water based Boron Nitride Diecoat. Special binding and insulating property of Diecoat influence easy striping and excellent finish to the aluminium casting. Mix. the product in can uniformly before taking for dilution. Dilute the diecoat in the ratio 1:4 (Product: Water). Clean the die it should be free from rust, grease etc. Pre-heat the die surface at a Temp.175°C -200°C, apply the coating by spraying application. Heat the coated die surface using gas burner at a Temp. 250 \pm 10°C to remove the moisture and form firm bond. Apply very thin and uniform layer in each stage. After completion of coating raise temp. of die to 350°C. Colour of diecoat will change from white to light brick red. Check for peel off and start for production. For touch-up application maintain temp. of die 250 \pm 10°C.

Advantages:

- Non Wetting to Aluminium.
- Protects metallic dies with critical geometry/ design
- Reduces Maintenance cost.
- Life of Coating is more compare to conventional diecoats.
- Proper applied coating on Die will remain for 24 hrs to one week.



Before Application



After Application



Product DIEDRESS-1400

DIEDRESS-7029:

Water base highly insulating Riser coat. Special binding and insulating property of Riser coating provides longer life with better feeding effect to runner and risers of aluminium castings. Mix it thoroughly in can. Dilute @ 1:0.25-0.5 (Product: water). Clean the Tools i.e. should be free from rust, grease etc. Pre-heat the die surface at a temp.90 -100°C. Apply the coating by brushing application to the runner and riser of the die. Heat the coated die surface at a Temp. 250 \pm 10°C to remove the moisture and form firm bond. Ensure complete drying of coating before taking for casting.

Advantages:

- Improved metal flow and filling of the intricate casting.
- Longer life of riser coating.
- Increased Productivity.



Coating applied on the riser



Casting with improved feeding



Product DIEDRESS-7029

DIEDRESS-MS 11

DIEDRESS -MS 11 is titanium oxide and oil base dressing Diecoat recommended for M.S. tools, M.S. Spoons, Auto Pour Ladles for GDC as well as PDC.

Advantages:

- Extended life of M.S. tools
- Reduce chances of iron pick-up
- Reduce breakdown time
- Non-wetting to molten Aluminium & its alloys

Apply the coating by brush/swabbing application on preheated to 90-100°C MS tools/spoons/ladles. Coated M.S. Tools should either be heated up to 400-600° C by portable burner or dip in untreated molten Aluminium for ensuring strongly adhere of coating before continuous use.



DIEDRESS-MS 11



CONCLUSION:

- Metallurgical Chemicals / Master Alloys used in Recycling & Melt Treatment of Aluminium Alloys plays very vital role by,
- Achieving Desirable Microstructure.
- Achieving Desirable Mechanical properties such as Tensile Strength, Elongation, Hardness etc.
- Making Aluminium alloys castings more popular for Auto Industries due to high Strength to weight ratio as compared to ferrous castings.



Amar R. Gharmode GM-Technical, Ceraflux India Pvt. Ltd.



Mr. Bakul Shah, Hon. Secretary at the ALUCAST Chennai Zonal Centre has resigned due to personal engagements & health reasons. After contributing actively at the ALUCAST Chennai Zonal Centre for more than a decade, he continues to be associated with ALUCAST as a Committee Member at the ALUCAST Chennai Zonal Centre.

Mr. H. Giri, CEO, ASWINI Enterprises, Maraimalai Nagar has taken over as the Hon. Secretary at the ALUCAST Chennai Zonal Centre w.e.f. 01 August 2023.

Mr. E. Prabakaran, Partner, Shreyas Hi-Tek Associates, Chennai has been appointed as the Hon. Treasurer at the ALUCAST Chennai Zonal Centre w.e.f. 01 August 2023.

ALUCAST



ALUCAST EVENTS / TRAININGS / WEBINARS LED BY THE ALUCAST HEAD OFFICE: AUGUST-SEPTEMBER 2023

1. ALUCAST – NADCA Training Programme 2023 on DIE CASTING TECHNOLOGY – LATEST TRENDS, PRACTICES & TECHNOLOGIES from 27th July 2023 to 12th August 2023 @ Delhi, Pune & Chennai

The objective of the training programme was to provide an exclusive learning opportunity to the die casters in India about the latest global trends, practices & technologies in die casting. The Training Programme focused on the following key points:

- 1. Metallurgy of Aluminium Die Casting Alloys
- 2. Structural and EV Casting Alloys and Vacuum Die Casting for Structural Casting
- 3. New Die Materials, Die Surface Treatments, and Die Life Improvement
- 4. Additive Manufacturing of Die Casting Dies
- 5. Die Casting Defects

The Expert Trainer for the Training Programme was internationally renowned die casting expert – Dr. Stephen Midson, President, The Midson Group, Denver, USA

The Training Programme received a very good response from the industry. **118 participants from 40 industries across India participated in the training programme.** The training sessions conducted by Dr. Midson were value adding & relevant with the changing global scenario in the field of die casting.

The Ducker Study Report discussed by Dr. Midson helped the participants understand & interact on the disruptions occurred due to COVID-19 & the impact on the industry, Corporate average fuel economy (CAFE) standards driving change in the USA, present & future of EV, increase in demand of Aluminium Castings, growing demand for light weighting & structural die casting components.

The Case Studies discussed during the Training Programme made the session more engaging & interactive and was very much appreciated by the participants.

The participants were presented with the Certificate of Completion of the training programme jointly from ALUCAST & NADCA after the successful completion of the Training Programme.

2. Webinar on 'PREPAREDNESS & CHALLENGES FOR DIE CASTING OF EV PARTS IN INDIA' on Friday, 22nd September 2023 from 3.00 pm to 5.00 pm IST

The Webinar focused on the following key points:

- The current scenario of the EV market in India
- The various Aluminium / Magnesium Alloys being used in the manufacturing of EV parts in High Pressure, Low Pressure Die Casting processes
- The various Die Casting processes applicable in the production of EV parts
- The challenges in the mass production of EV parts in India today and the way forward to overcome the challenges

The Expert Speaker for the Webinar was Mr. Tej Bambra, Chief Sales & Marketing Officer, Rockman Industries Ltd. & Chairperson, ALUCAST Delhi Zonal Centre.



The Webinar received an overwhelming participation from 193 delegates representing several industry players from the die casting industry ecosystem. The technical talk by Mr. Bambra was information – rich & engaging. The session involved very good interactive discussion on the future of die casting & the need for moving forward with the transformation taking place globally in the automotive as well as the non-automotive sector.

3. Webinar on DRIVING THE DIGITAL TRANSFORMATION IN HIGH PRESSURE DIE CASTING on Wednesday, 27th September 2023 from 3.00 pm to 5.00 pm IST

The Webinar focused on the following key points:

- A. Foundry Business Models: HPDC
- 1. Service Provider.
- BTP;
- a. As-cast parts.
- b. Cast and machined parts.

• Surface treatment, some amount of test and subassembly.

- HMLV. (special alloy capability)
- Incoterm: Ex-work.
- 2. Vertically Integrated Solution Provider.
- End- to-End BTP.
 - a. Product Development; Turnkey.
 - b. Tool Design & Fabrication.
 - c. Complete cast & machined parts.
- Value Added Processes; Clean Room Service, FIP, Laser

Marking & Test.

- Box Built.
- LMHV. (common alloy)

• Hub Distribution Service at POU.

B. The Fundamental Business Questions:

1. How do you manage your ABC and strike the balance to achieve your financial obj?

- Defined Value Stream; identify VA from NVA. Customers do not pay for NVA. Lean Process.
- \bullet Measure your VA. Define the Value by LEAD TIME (LT) and LT = Business Value.
- Connect the LT to your Actual Base Cost as in your Financial.
- It sounds logical and easy, but, without connecting the RIGHT VA process data and the Actual Base Cost from your financial, you can only be guessing most time.

• The Hand-Shake between VA and the Actual Base Cost is made easy and accurate with DIGITAL TWIN.

2. How to put all onto ONE integrated platform and looking beyond just ERP?

- 3. Understanding the 5 levels of business digital integration
- 4. The DIGITAL TWIN GENERATOR a new and innovative concept to answer a RFQ in minutes rather than days.

5. Knowing the benefits of Digitalization and knowing its misconceptions too to prevent any misalignment.

The Expert Speakers for the Webinar were Mr. Harry U Chang Eng, Expert Consulting in Die Casting & Mr. Christian Kleeberg, Founder and Managing Partner of RGU ASIA PTE LTD.

The Webinar received a very good participation from 168 delegates representing several industry players from the die casting industry & the allied industry. The presentation by Mr. Chang & Mr. Kleeberg was very interesting & engaging. The presentation focused on how Industry 4.0 solutions could help the die casting industry to implement better control, execution, tracking & management of the die casting processes & operations & enhance quality of products & minimize production time. The session involved very good interactive discussion on the Digital Twin Technology.

ALUCAST EVENTS / TRAININGS / WEBINARS LED BY THE ALUCAST ZONAL CENTRES: AUGUST-SEPTEMBER 2023

1. Technical Talk on 'INDUSTRY 4.0 TO THE ADVANTAGE OF QUALITY CONTROL' on Wednesday, 9th of August 2023 – 3.50 pm to 5.30 pm IST at the Chennai Zonal Centre

The programme received good participation from the MSME organizations as well as the other larger organizations in Chennai. The training was conducted by Mr. G Duraiarasan, Vice President (Operations) at Ashley Alteams India Limited & Exceutive Committee Member at the ALUCAST Chennai Zonal Centre.

The training focused on the following points:

- 1. Automation & Industry 4.0.
- 2. How low cost automation can help in improving the quality of your casting components.
- 3. Additional device on the existing CNC machine for better control on tool wear & machine maintenance.
- 4. Calculating effective tool touch time.
- 5. Low cost sensors used on machine interface into the display unit / dashboard.



2. Two-days Training Programme on "Innovations in Die Casting: Unleashing Future Possibilities" on Thursday, 7th September 2023 & 8th September 2023 at ALUCAST Delhi Zonal Centre

The Alucast Delhi Zone Training Program 2023, held on September 7th and 8th, was an exceptional gathering of industry experts and stakeholders from across India and beyond. This two-day event, themed "Innovations in Die Casting: Unleashing Future Possibilities," was a testament to ALUCAST's commitment to fostering knowledge exchange, innovation, and industry growth. The training programme was a remarkable event that celebrated collaboration, knowledge sharing, and the spirit of innovation within the die casting industry. It served as a platform for networking, idea exchange, and the exploration of future possibilities in die casting.

The programme received a very good response with participation from 62 delegates from Delhi, Mumbai, Pune, Coimbatore & Chennai representing different industries from the die casting ecosystem. The diverse group of attendees represented various sectors of the industry, enriching the event with a wide range of perspectives and experiences. OEMs like Maruti Suzuki India Limited, Honda Motorcycle & Scooter India Pvt. Ltd., Bajaj Auto Ltd, Godrej & Boyce Mfg. Co. Ltd. and Tier-1s actively participated.

Mr. Kaushik Manna, CEO of Rockman Industries Ltd., inaugurated the event with his insightful remarks. Mr. Kaushik Manna emphasised the industry's need to be predictive in time, quality, and costs.

Mr. Pankaj Tandon, Operating Officer at Honda Motorcycle & Scooters India Ltd., delivered the closing address at the valedictory session, leaving attendees inspired by his thoughts on sustainability and industry sensitization. Mr. Pankaj Tandon highlighted the importance of sustainability, underlining the need to conserve energy and resources to drive profitability.

Expert Speakers and Their Topics:

1. Kazuhiro Yazaki - Die Design & Maintenance Best Practices

- Effective die maintenance techniques, preventive maintenance, troubleshooting, and optimizing die lifespan.
- · Longevity and efficiency of dies, a crucial aspect of the die casting process.

2. Ken Yamada - Emerging Welding Technology for Dies and Injection Systems

- Cutting-edge welding technologies applicable to dies and injection systems.
- Latest advancements in welding processes and their implications for enhancing die casting efficiency and quality.

3. Tej Bambra - Preparedness and Challenges for Die Casting of EV Parts in India

- The current scenario of the EV market in India
- The various Aluminium / Magnesium Alloys being used in the manufacturing of EV parts in High Pressure, Low Pressure Die Casting processes
- The various Die Casting processes applicable in the production of EV parts
- The challenges in the mass production of EV parts in India today and the way forward to overcome the challenges

4. Sanjeev Prabhakar - Application and Calculation of PQ2 in the HPDC Engineering and Development Process

- Critical aspects of PQ2
- Application of PQ2 in High-Pressure Die Casting (HPDC) engineering and development.
- Ensuring product and process excellence.

5. Sandeep Tandon - Casting Finish-Feed System Design in Zinc and Its Application to Aluminium

- Intricacies of designing finish-feed systems, primarily in Zinc casting
- · Applying the principles to Aluminium casting
- Optimizing casting processes.

6. Amit Pal - Post Process Automation

- Automation of post-casting processes
- Latest trends and innovations
- · How automation can enhance efficiency and product quality in die casting.

Mr. Deepak Vyas from **Maruti Suzuki India Limited** graciously coordinated the training sessions of the Japanese Expert Trainers Yazaki San and Yamada San helping interaction between them & the participants through English-Japanese-English translation. His active involvement in technical discussions and Q&A sessions during presentations enhanced the learning experience for all the attendees.





The training event was sponsored by Rockman Industries Ltd. (Principal Sponsor), ASK Automotive Ltd., Lubrikote Specialties Pvt. Ltd., and SXKH Automation India Pvt. Ltd.





ALUCAST in collaboration with the North American Die Casting Association (NADCA) had organized an exclusive in person Certificate Training Programme for the Die Casters in India on DIE CASTING TECHNOLOGY – Latest Trends, Practices & Technologies. The training programme comprised of five trainings, each of 2.5 - days duration conducted from 27th July 2023 to 12th August 2023 across three Zonal Centers of ALUCAST – Delhi, Pune & Chennai. Special training sessions were organized for Jaya Hind Industries Private Ltd. at Pune & Sundaram Clayton Ltd. at Chennai.

Key Highlights of the Training Programme:

- The training was organized by the largest Association of Aluminium Die Casters in India Aluminium Casters' Association (ALUCAST)®, India
- Training Partner The North American Die Casting Association (NADCA)
- The Training was led by the internationally renowned die casting expert Dr. Stephen Midson, President, The Midson Group, Denver, USA
- The objective of the training programme was to provide an exclusive learning opportunity to the die casters in India about the latest global trends, practices & technologies in die casting
- 118 participants from 40 industries across India participated in the training programme -

Jaya Hind Industries Pvt. Ltd. Sundaram Clayton Ltd. Rockman Industries Ltd. ASK Automotive Minda Corporation Ltd. Mahindra & Mahindra Ltd. Bajaj Auto Ltd. Bharat Forge Ltd. Maxop Engineering Modi Minerals Udyog Motocast Power Alloys Quaker Houghton Yanmar Engineering S N Castings Ltd. Rane (Madras) Ltd. - Light Metal Castings DANA TM4 India Pvt. Ltd. Frech India Aakar Foundry Ltd. Eaton India Innovation Centre Advik Hi Tech Ltd. Pooja Engineers Dietech India Pricol Caparo Engg India Ashwini Enterprises Matrix Castings EQIC Dies & Moulds Ather Energy Tenonyx Precision Technologies Ashley Alteams Asiaan Metals & Aluminium Casting Nemak Aluminum Castings Tekzen Machines Bonfiglioli Uno Minda Tyche Cast Tech Ningbo Beilum Yubang Mould Voestalpine

- The training programme focused on the latest trends, practices and technologies in Die Casting with a special focus on Structural Die Casting EV Structural Parts, Vacuum Die Casting and Aluminium Alloys for EV parts.
- The Ducker Study Report discussed by Dr. Midson helped the participants understand & interact on the disruptions occurred due to COVID-19 & the impact on the industry, Corporate Average Fuel Economy (CAFE) standards driving change in the USA, present & future of EV, increase in demand of Aluminium Castings, growing demand for light weighting & structural die casting components.
- Real time industry problems & solutions were discussed.
- The participants were presented with the Certificate of Completion of the training jointly from ALUCAST & NADCA after the successful completion of the Training Programme.

Training Areas covered in the Training Programme:

- Metallurgy of Aluminium Die Casting Alloys
- Structural and EV Casting Alloys and Vacuum Die Casting for Structural Casting
- New Die Materials, Die Surface Treatments, and Die Life Improvement
- Additive Manufacturing of Die Casting Dies
- Die Casting Defects

ALUCAST - NADCA TRAINING 2023 : GLIMPSES

















India's CV sales growth outlook moderates amid rising costs and economic factors, Fitch Ratings reports. India's commercial vehicle (CV) sales volume is expected to experience a slowdown in growth, projected to reach lowto-mid single digits, according to Fitch Ratings.

The rating agency attributes this deceleration to increasing ownership costs, driven by additional regulatory requirements, as well as the impact of elevated inflation and interest rates. These factors have which have exerted pressure on purchase decision, it goes on to add. Despite these challenges, underlying trends continue to support demand in the sector. It is noteworthy that the previous financial year, ending in March 2023 (FY23), witnessed a commendable 34% growth.

According to the Society of Indian Automobile Manufacturers (SIAM), India's wholesale volume of commercial vehicles increased significantly from the 5,69,000 units recorded in FY20 to nearly 9,62,000 units in the financial year ending March 2023 (FY23). This notable growth brings the industry close to its previous cyclical peak of approximately 10,00,000 units achieved in FY19, underscoring a robust recovery, following the challenges posed by the COVID-19 pandemic. These challenges encompassed multiple factors such as an excess of systemwide capacity resulting from revised axle-load norms, reduced availability of financing since 2018, and heightened vehicle costs attributed to the implementation of more stringent BS6 emission norms in April 2020.

According to the Fitch Ratings report, India's robust economic development and increased infrastructure construction activity enhanced fleet utilisation levels and improved freight economics in FY23. Despite rising fuel and commodity prices and an increase in borrowing rates following the commencement of the Russia-Ukraine war, this fueled a rebound in replacement demand. However, a slowdown in 2Q23 confirms their forecast of weaker growth, as the full effects of price and interest rate hikes, as well as further price hikes linked with BS6 Phase 2 regulations, take effect.

The new standards require real-time emissions testing, resulting in a 5% rise in commercial vehicle pricing starting in April 2023. Aside from that, further standards are proposed to improve driver safety and comfort in the future. The 3.3% year-over-year drop in commercial-vehicle wholesale volume in 2Q23 marked the first year-over-year decline since 4Q20. The decline was in part caused by

pre-buying ahead of the price hikes and vehicle availability issues in the initial months after the adoption of BS6 Phase 2 norms. Nonetheless, volume growth in subsequent months, particularly in retail sales, has been muted. Retail commercial-vehicle volume rose by 2% year over year in July 2023 and by 3% year over year in August, the report adds, citing data from the Federation of Automobile Dealers Associations.

Offering its concluding take, the report suggests that despite the downturn, India's consistent GDP growth and significant infrastructure spending should support commercial vehicle sales volume growth. Because newer vehicles offer improved productivity, replacement demand should persist even after years of deferred purchasing decisions. The rating agency anticipates higher volumes for medium and heavy commercial vehicles than for light commercial vehicles, owing to India's increasing infrastructure initiatives and light commercial vehicles' sensitivity to potentially lower rural demand due to inconsistent rainfall.

Vedanta Aluminium helps EV makers with lightweight solution.

Lightweight but strong vehicle construction is one of the tools that enable increased travel range to electric vehicles and Vedanta Aluminium, India's largest producer of aluminium, is among the companies which have been the growth drivers of zero-emission vehicles. The company's cutting-edge product portfolio already includes primary foundry alloys for wheels, engine blocks and cylinder-head applications, billets for battery casings, HVAC (Heating, Ventilation, and Air-Conditioning) systems and EV frames. Together, they enable the automotive industry to access best-in-class value-added products backed by a lower carbon footprint and enhanced supply-chain reliability.

Aluminium's unique properties, such as its high strengthto-weight ratio, superb corrosion resistance, exceptional design flexibility, anodising ability, thermal and electrical conductivity, and 100% recyclability have made it the goto metal for automakers worldwide.Greater usage of aluminium in EVs extends their driving range by offsetting battery weight, thereby reducing the total cost of ownership even with the addition of extra safety features.

Research suggests that every kilogram of aluminium used in a car reduces its overall weight by 1kg, and consequently, 100kg saved on an EV's weight translates into a potential 10-15% increase in its range. This attribute is of immense significance towards driving higher EV adoption amongst consumers, especially in a geographically vast nation like India. Aluminium is also a critical element in the development of an extensive EV charging infrastructure, given its proven applications in deploying electrical transmission and distribution networks.

Vedanta Aluminium states that is the first in India to offer low carbon, 'green' aluminium - branded Restora and Restora Ultra - for its global customer base, many of whom are focused on ensuring the sustainable provenance of their materials and decarbonising their entire value chain. Extensively utilising Restora in their own product range offers automotive manufacturers the potential to significantly lower the carbon footprint across their value chains.Reiterating the commitment of Vedanta Aluminium to supporting the EV industry, Sunil Gupta, COO, Vedanta Ltd - Aluminium Business said, "EVs are poised to play a pivotal role in steering the planet towards a more environmentally sustainable future. Aluminium is key to advancing this endeavour, thanks to its remarkable versatility. We are a trusted partner to the automotive sector, focused on developing world-class products to meet their specific requirements and help them reduce their carbon footprint. Our products are also certified with several leading global certifications that underscore their excellent quality and sustainability standards."

Rajesh Kumar, CEO and whole-time director, BALCO said, "With our extensive portfolio of products developed using best-in-class technologies, Vedanta Aluminium is well positioned to cater to the rapidly evolving demands of the EV industry. We have established a Centre of Excellence (CoE) in aluminium to bring together deep R&D, innovation and global technical expertise to co-create the next big thing in aluminium." Vedanta Aluminium's product range is Bureau of Indian Standards (BIS)-certified for demonstrating high quality. The company's products have also been verified as environmentally sustainable by the globally recognized Environmental Product Declaration (EPD), after undergoing a rigorous Life Cycle Assessment (LCA), performing well on the parameters of energy consumption, greenhouse gas emissions, water usage, and waste generation. Additionally, the Aluminium Stewardship Initiative (ASI), has also certified the company's plant located at Jharsuguda, Odisha for showcasing high sustainability performance, an indicator of sustainability worldwide. In addition to catering to the raw material needs of the EV industry, Vedanta Aluminium is itself a leader in the adoption of EV technology. The company hosts India's largest fleet of electric lithium-ion forklifts, with a total of 44 units now deployed across its operations in Odisha and Chhattisgarh. The company also aims to decarbonise 100% of its Light Motor Vehicle fleet by 2030, and 75% of its mining fleet by 2035.

ALUMINIUM CASTERS' ASSOCIATION (ALUCAST) - MEMBERSHIP FEE Structure w.e.f 16 December 2016 (Tax updated w.e.f. 01 July 2017)								
Membership Category	Admission Fees (₹)	Annual Fees (₹)	Total (₹)	Final Amount with GST (₹)	Admission Fee (₹)	Life Member- ship (₹) - Annual Fees X 15	Total (₹)	Final Amount with GST (₹)
Ordinary Member	500	1500	2000	2360	500	22500	23000	27140
Ordinary Member (MSME)	1000	3000	4000	4720	1000	45000	46000	54280
Corporate Member	1000	15000	16000	18880	1000	225000	226000	266680
Coporate Member (Overseas)	US \$50	US \$150	US \$200	US \$236	US \$50	US \$2500	US \$2550	US \$3009

Please send cheques in the name of Aluminium Casters' Association (ALUCAST) payable at Pune along with the membership form. **Membership form and details of membership are available on our website: www.alucast.co.in**

Please send cheques in the name of Aluminium Casters' Association (ALUCAST) payable at Pune to:

Aluminium Casters' Association (ALUCAST)

702, AMar Neptune, Baner Road, S. No. 6/1/1, Plot No. 45, 46A, 46B Pune 411045 T: +91 20 27290014 / E: alucastindia@alucast.co.in

Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of April - July 2023							
Report I - Number of Vehicles							
Category	Produ	uction	Domestic Sales		Exp	orts	
	April	- July	April - July		April - July		
Segment/Subsegment	2022-2023	2023-2024	2022-2023	2023-2024	2022-2023	2023-2024	
Passenger Vehicles (PVs)*							
Passenger Cars	6,90,895	6,67,659	5,55,029	5,23,582	1,40,039	1,33,429	
Utility Vehicles(UVs)	6,82,648	8,14,514	6,01,660	7,27,228	73,816	75,644	
Vans	48,044	48,114	47,671	47,685	169	2,677	
Total Passenger Vehicles (PVs)	14,21,587	15,30,287	12,04,360	12,98,495	2,14,024	2,11,750	
Three Wheelers							
Passenger Carrier	2,03,577	2,55,441	73,090	1,58,403	1,33,712	99,448	
Goods Carrier	30,213	33,421	28,013	30,566	1,606	684	
E-Rickshaw	4,981	8,839	5,381	10,305	-	-	
E-Cart	1,122	958	1,133	1,235	-	-	
Total Three Wheelers	2,39,893	2,98,659	1,07,617	2,00,509	1,35,318	1,00,132	
Two Wheelers							
Scooter/ Scooterettee	18,28,730	18,71,295	16,87,062	17,26,995	1,47,266	1,70,719	
Motorcycle/Step-Throughs	46,34,028	44,88,817	32,75,256	35,54,554	13,57,782	9,21,513	
Mopeds	1,42,383	1,46,744	1,43,518	1,41,469	1,044	600	
Total Two Wheelers	66,05,141	65,06,856	51,05,836	54,23,018	15,06,092	10,92,832	
Quadricycle							
Quadricycle	687	1,464	154	261	540	1,244	
Grand Total of All Categories	82,67,308	83,37,266	64,17,967	69,22,283	18,55,974	14,05,958	

* BMW, Mercedes, Volvo Auto data is not available and Tata Motors data is available for April - June only. Society of Indian Automobile Manufacturers (10/08/2023)

Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of April - August 2023								
Report I - Number of Vehicles								
Category	Prod	uction	Domes	tic Sales	Exports			
Seament/Subservent	April -	August	April -	August	April - August			
Segment/Subsegment	2022-2023	2023-2024	2022-2023	2023-2024	2022-2023	2023-2024		
Passenger Vehicles (PVs)*								
Passenger Cars	8,51,603	8,23,465	6,88,506	6,43,613	1,70,448	1,73,356		
Utility Vehicles(UVs)	8,43,905	10,20,880	7,37,157	9,09,053	98,096	98,896		
Vans	60,177	59,960	59,907	59,544	178	3,381		
Total Passenger Vehicles (PVs)	17,55,685	19,04,305	14,85,570	16,12,210	2,68,722	2,75,633		
Three Wheelers								
Passenger Carrier	2,75,086	3,38,000	1,02,195	2,10,719	1,77,642	1,25,260		
Goods Carrier	37,329	42,332	35,020	39,698	1,842	842		
E-Rickshaw	7,214	11,949	7,476	13,421	-	-		
E-Cart	1,300	1,168	1,295	1,434	-	-		
Total Three Wheelers	3,20,929	3,93,449	1,45,986	2,65,272	1,79,484	1,26,102		
Two Wheelers								
Scooter/ Scooterettee	23,81,290	24,73,088	21,91,208	22,76,285	1,92,844	2,14,527		
Motorcycle/Step-Throughs	59,04,931	57,61,386	42,92,050	45,35,363	16,15,830	11,68,494		
Mopeds	1,79,697	1,89,171	1,80,007	1,77,964	1,110	666		
Total Two Wheelers	84,65,918	84,23,645	66,63,265	69,89,612	18,09,784	13,83,687		
Quadricycle								
Quadricycle	817	1,768	218	371	642	1,412		
Grand Total of All Categories	1,05,43,349	1,07,23,167	82,95,039	88,67,465	22,58,632	17,86,834		
* BMW. Mercedes. JLR. Volvo Auto data is not available and Tata Motors data is available for April-June only. Society of Indian Automobile Manufacturers (11/09/2023)								

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Bühler celebrates 30 years in India with expanded manufacturing capacity

Bengaluru (India), September 5, 2023 – Swiss technology group Bühler celebrates the 30th anniversary of establishing its business in India and announces the expansion of its manufacturing capabilities in the country. In the coming months, Bühler India will begin producing a wider variety of core product portfolios for the grain milling, food, feed, and advanced materials industries, addressing the demands of a flourishing domestic market and customers abroad.

The decision to expand investments in the country is another milestone in Bühler Group's long and fruitful relationship with India. It is a journey that started 30 years ago when Bühler India was founded in Bengaluru in the presence of the then Swiss Ambassador to India and Bühler's then CFO, Philipp Müller. Over this time, Bühler India has become one of Bühler Group's leading global technology centers with manufacturing infrastructure, research and development teams, application centers, and training facilities. Bühler India, which employes 600 people today, is manufacturing high-quality grain and food processing equipment for customers across the country and abroad. In future it will further expand its core product portfolio for the feed and advanced materials industries. Bühler India's business has been growing by more than 10% over the past three years.

In August 2022, Bühler India took a major step in expanding its local production by manufacturing Sortex color sorters. This move enables the grains and food industries in the country to have easy access to this key technology, which contributes to food quality and safety. The company also





provides retrofitting and refurbishing services for existing Sortex machines.

Robust business case

Bühler is taking its business in India to the next level by expanding the range of products it manufactures to include equipment for the country's growing milling industry. The company has already started the production of its Plansifter Arenit[™] & Purifier Norit[™], a key component in the flour production process that sifts and sorts grist and flour in wheat, rye, maize, and durum mills. Other core machines such as purifiers and roller mills are also in the pipeline and scheduled to be available to customers in 2024. Bühler India will continue to expand its core product portfolios going forward to include the feed and advanced materials industries. With this plan, Bühler India aims to strengthen its position as a leading provider of state-ofthe-art solutions for the grain milling industry. Currently, Bühler India's 32,000 square meter premises in Bengaluru comprise the company's headquarters, a manufacturing hub, and an Application & Training Center (ATC) which covers multiple industrial applications. The ATC provides a platform for customers to conduct product and equipment trials, optimize processes, and conduct training across all operational levels - for mill proprietors, managers, and operators.

"With these new solutions produced in India, customers will benefit in multiple ways: shorter delivery times, increased supply chain efficiency, and an improved CO2e footprint for their equipment," says Johannes Wick, CEO Grains & Food at Bühler Group. Prashant Gokhale, Managing Director, Bühler India, says: "We are celebrating the 30th anniversary of Bühler India with a strong business case. We plan to invest about CHF 21 million (INR 200 crores) over the next 2 to 3 years to support the success of our customers in the region and overseas. It will accelerate new business opportunities and create new jobs, while contributing solutions to address global challenges such as food security and food safety. This investment is not only about growth; it is about combining Bühler's state-of-the-art technologies with local expertise to offer the most sustainable processes and solutions to our customers."

Investing in talent development

For this journey, Bühler not only counts on the expertise and engagement of its teams but supports the development of its talents in a consistent and pragmatic way. The company has more than 100 years of history of vocational training, preparing young adults for a career in a global company such as Bühler or beyond. Bühler India adopted an apprenticeship program in 2009.



The Bühler Academy in Bengaluru develops young talent with high-quality vocational training. To date, about 200 apprentices have graduated from the Academy and around 80 are currently in training. Five different base programs (from entry level to graduate apprentice), along with the Swiss Vocational Education and Training (VET) program, and an Apprentice Exchange Program are offered to the apprentices. All these programs comprise a carefully evaluated course module and follow a combination of theoretical knowledge and practical training. The growth plans also include investments in new talents for Bühler India. There is a program in place to hire about 300 employees over the next 2 to 3 years.

"Without our employees we could not have achieved this new milestone in manufacturing in India for India. Therefore, we sincerely thank our teams for the 30 years of engagement and hard work. We move ahead with energy and commitment to keep adding value to our customers, teams, partners, and the country," says Prashant Gokhale.

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