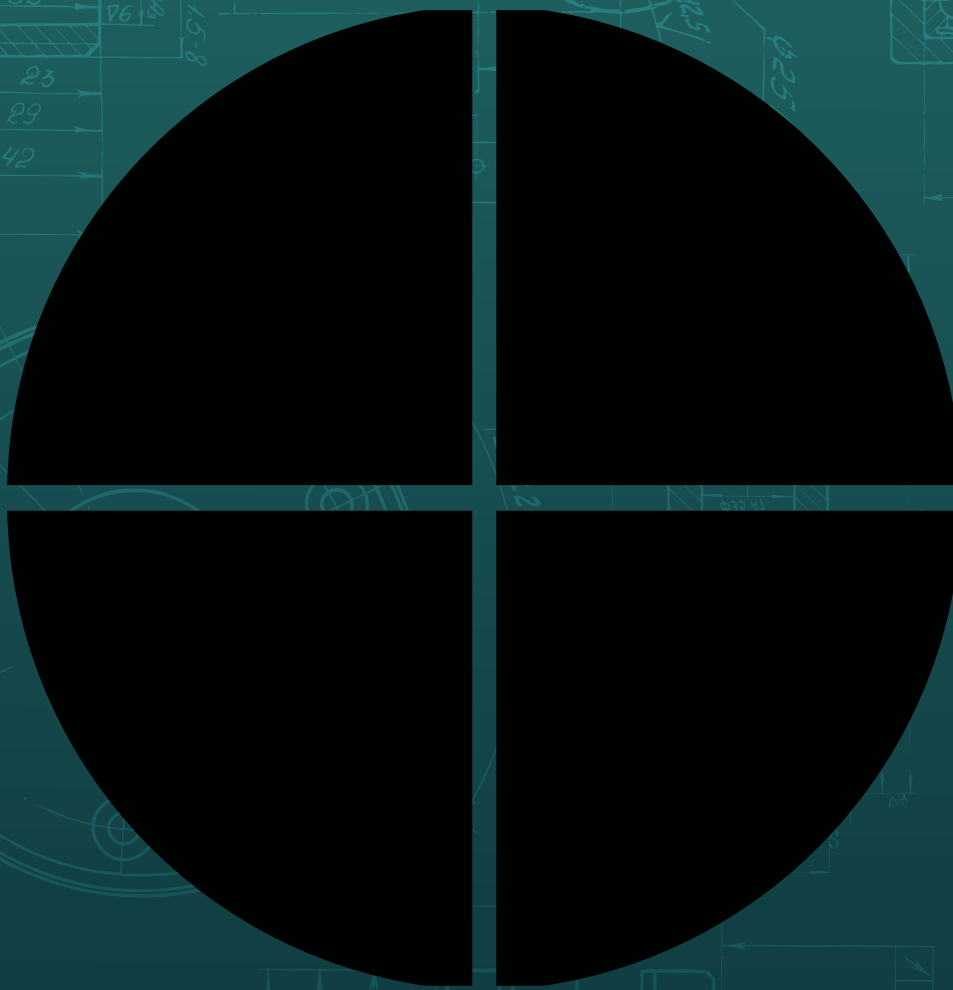


REFRACTORY SOLUTIONS FOR IRON AND STEEL



SUPER REFRACTORIES

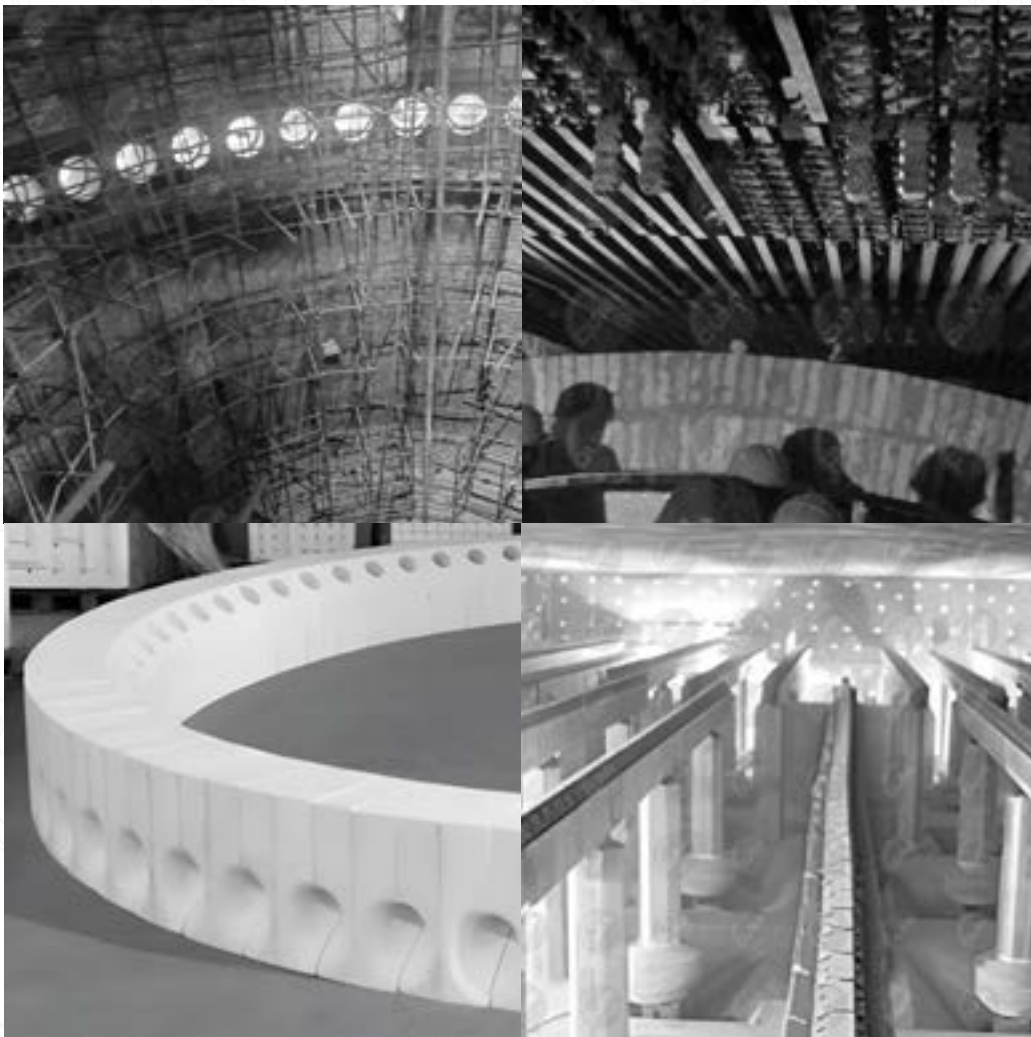


Disclaimer

Schematic shown in this brochure are not to scale and not to be considered as true representation of actual equipment. Refractory products recommended for various application area may vary. Kindly contact CUMI's representative for relevant information as and when required.

Engineered thermal solutions for high quality Iron and Steel.

CUMI Super Refractories offers superior refractory products and services tailored to meet the demanding needs of the industry.



With a focus on innovation and quality, ensuring optimal performance and durability in severe environments.





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murugappa

A legacy of value built responsively over a hundred years.

Founded in 1900, the Murugappa Group is one of India's leading business conglomerates. The Group has ten listed Companies traded in NSE & BSE. Headquartered in Chennai, the major Companies of the Group include Carborundum Universal Ltd., CG Power and Industrial Solutions Ltd., Cholamandalam Financial Holdings Ltd., Cholamandalam Investment and Finance Company Ltd., Cholamandalam MS General Insurance Company Ltd., Coromandel International Ltd., Coromandel Engineering Company Ltd., E.I.D. Parry (India) Ltd., Parry Agro Industries Ltd., Shanthi Gears Ltd., Tube Investments of India Ltd. and Wendt (India) Ltd. The Group's businesses hold leadership positions in several product lines including Abrasives, Technical Ceramics, Electro Minerals, Auto Components & Systems, Power Conversion

Equipment, Transformers & Reactors for the Power T&D segment, Solutions for Railways in Rolling Stock & Signalling Equipment, Bicycles, Fertilisers, Sugar, Tea and Spirulina (Nutraceuticals). The Group has forged strong alliances with leading international companies such as Groupe Chimique Tunisien, Foskor, Mitsui Sumitomo, Morgan Advanced Materials, Yanmar & Co. and Compagnie Des Phosphat De Gafsa (CPG). The Group's businesses serve customers across the length and breadth of India and in over 50 countries. Renowned brands like BSA, Hercules, Montra, Mach City, Ballmaster, Ajax, Rhodius, Parry's, Chola, Gromor, Shanthi Gears and Paramfos are from the Murugappa stable. The Group fosters an environment of professionalism and has a workforce of over 83,500 employees.





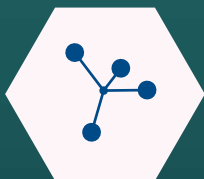
Making a Material Difference

Carborundum Universal Limited (CUMI) was established in 1954 as a collaborative venture between the Murugappa Group, The Carborundum Co., USA, and the Universal Grinding Wheel Co. Ltd., U.K. The company played a pioneering role in introducing the manufacturing of Coated Abrasives and Bonded Abrasives in India. It

also specializes in the production of Super Refractories, Electro Minerals, Industrial Ceramics, and Ceramic Fibers. Today, CUMI offers an extensive range of over 20,000 varieties of abrasives, refractory products, industrial ceramics, and electro-minerals, all produced at multiple locations worldwide.



Leading Specialty Refractory Manufacturer in the World



One of the largest manufacturers of silicon carbide grains worldwide



One among the top three abrasives manufacturers in the world



One of the largest manufacturers of the full range of electrominerals worldwide

Established as a tripartite joint venture in 1954

Over 6 decades in business

Presence in 6 continents

Listed on NSE and BSE India

SUPER REFRACTORIES

CUMI Super Refractories is a market leader in India's specialty refractory product manufacturing since 1965. We have leveraged technical expertise from the former Carborundum USA and developed numerous fired and monolithic products in-house. With a range of over 100 fired and 500 monolithic products, CUMI Super Refractories serves a wide array of critical, high-temperature applications across various industries. Being at the forefront of delivering specialized refractory solutions in India, we proudly serve global customers spanning the MENA region, Asia Pacific, Europe, and the Americas.

Ranipet



Serkadu



Jabalpur

GLOBAL LEADER IN SUPER REFRACTORIES



Decades



Product types
fired & Monolithic



Serving Industry
Verticals

USER INDUSTRIES



Iron and Steel

Iron Making
Steel Making
Ferro Alloys
Reheating Furnace
Galvanizing



Ceramic Industry

Ceramic Wall & Floor Tiles
Abrasives
Dinnerware
Refractories
H.T. Insulators
Potteries
Sanitary wares
Technical Ceramics
Electro Ceramics
Wear Resistant Ceramics



Heat Treatment

Heat Treatment of Metals
Forging
Mineral Calcination
Carbon & Graphite Products Sintering
Lithium Battery – CAM Processing



Cement

Kiln Lining



Energy/Power

Waste-To-Energy
Flue Gas Desulphurisation



Glass

Container Glass
Flat Glass
Speciality Glass



Carbon Black

Reactors
Captive Power Plant



Chemical Process Industries

Oil & Gas
Petrochem
Fertilizer
Incineration



Non-Ferrous

Aluminium
Copper
Zinc
Precious Metals



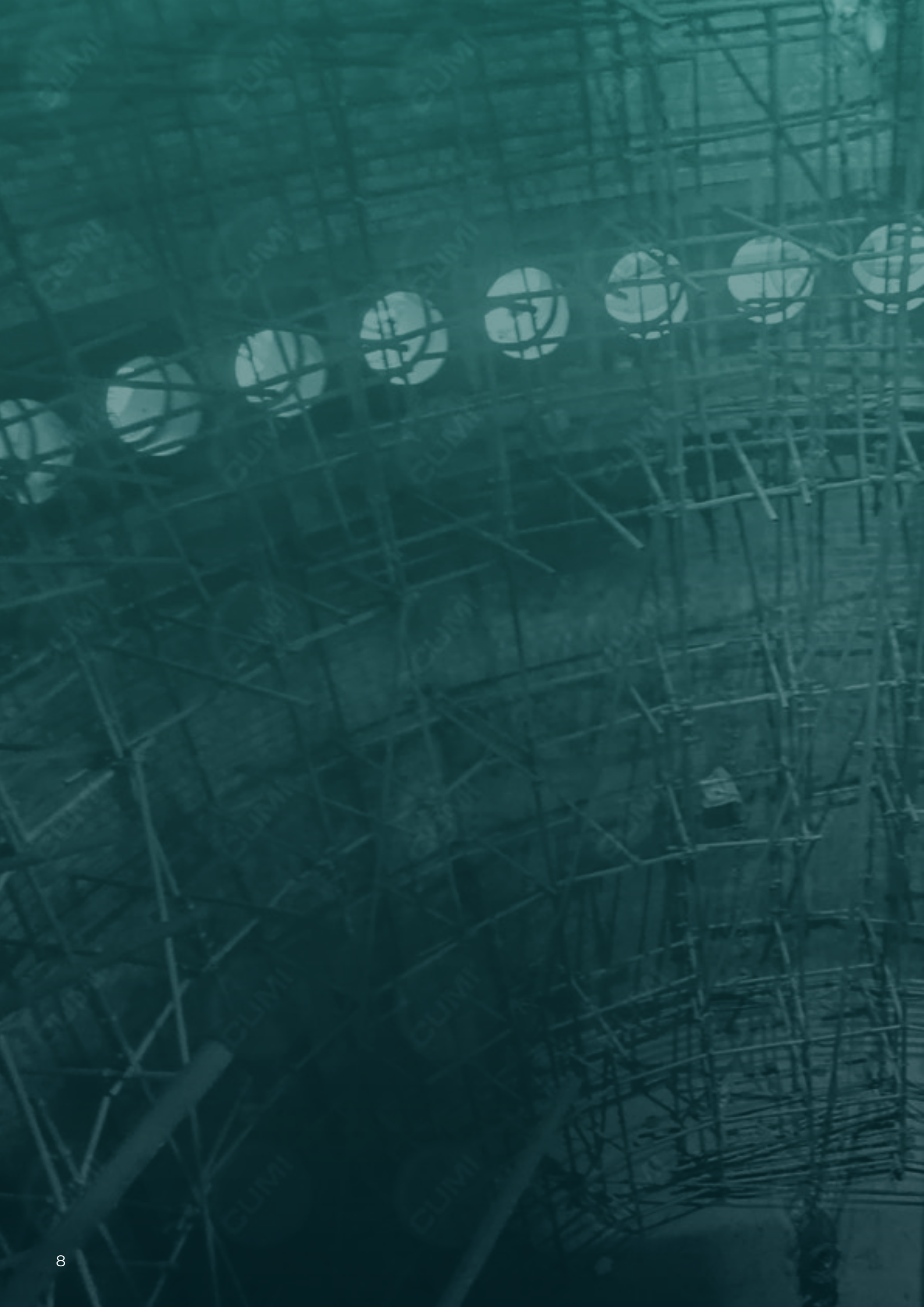
Aerospace & Defence

Super Alloy
Launch Pad

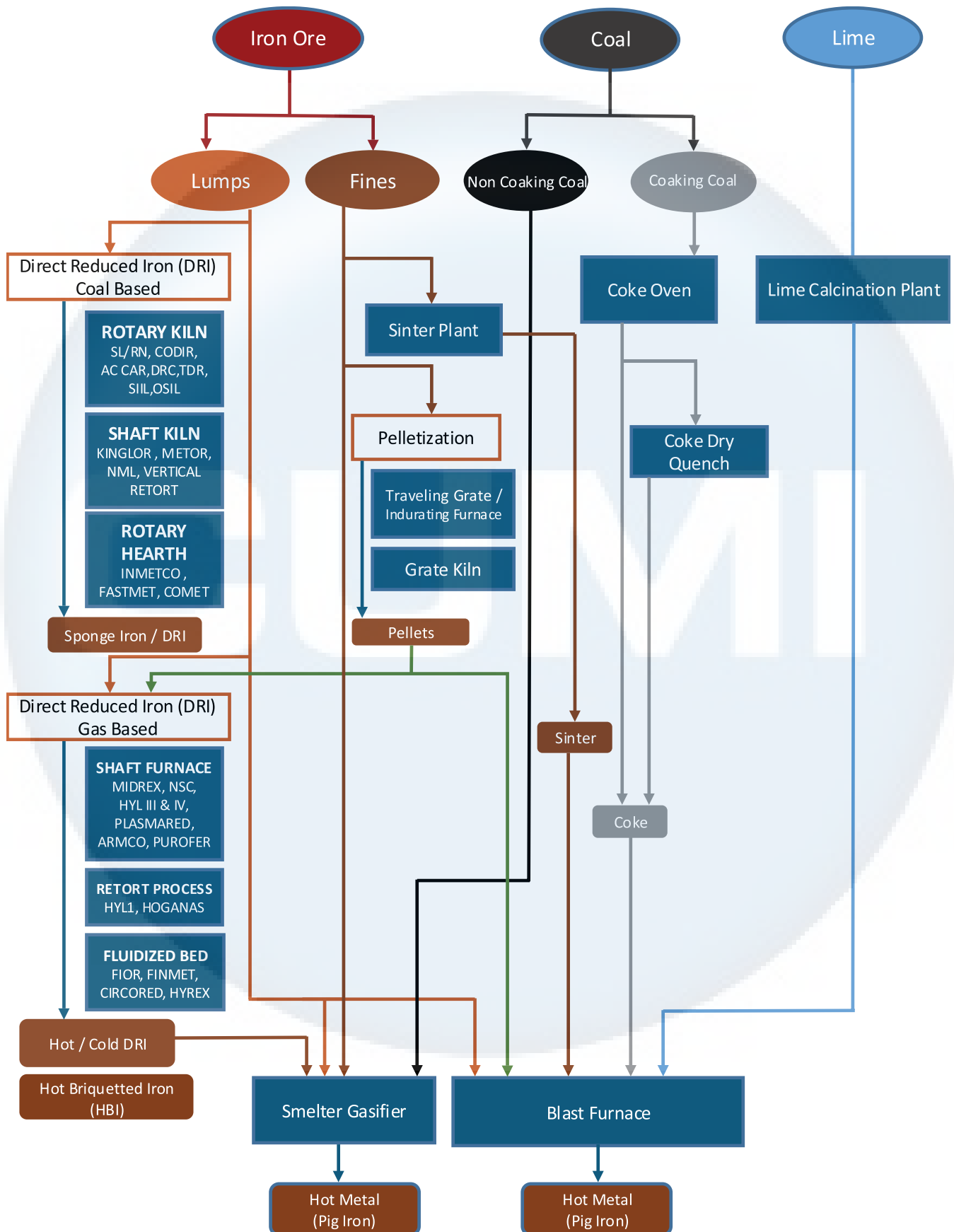


Foundry

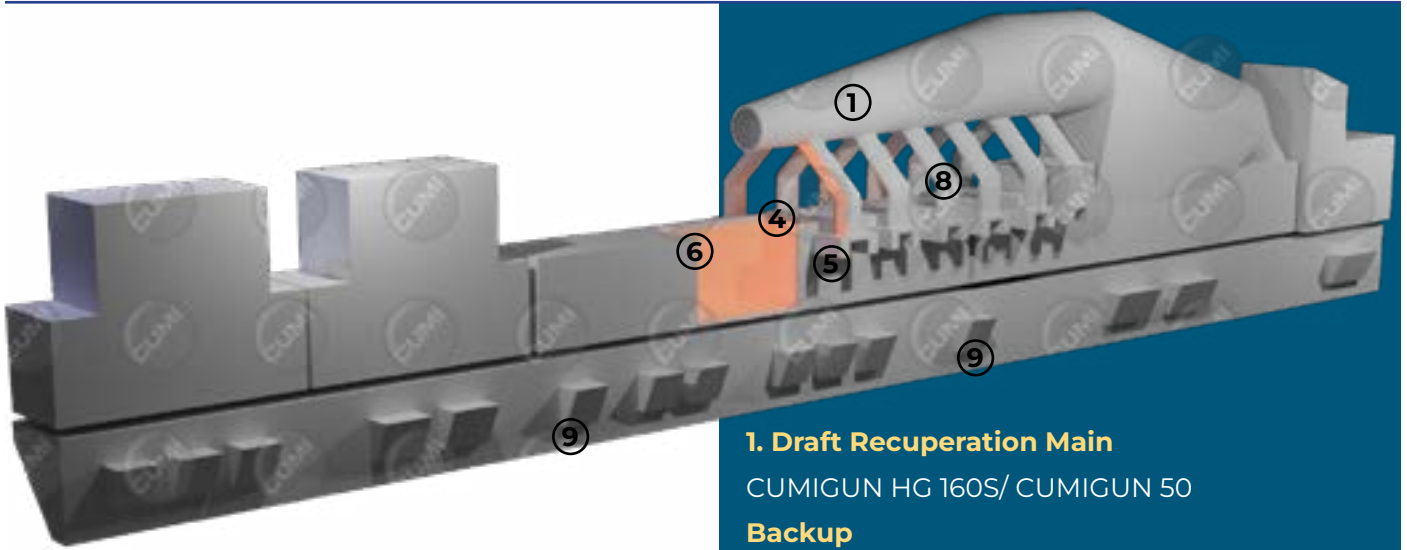
Ferrous
Non - Ferrous



IRON MAKING



PELLET PLANT - TRAVELING GRATE / INDURATING FURNACE



Iron ore fines are beneficiated in form of pellets to make them suitable for iron making. Green pellets are made by mixing the fines with binders and then dried, followed by sintering in indurating furnace at temperature of around 1350 °C. The resulting pellets serve as a high-quality feedstock for blast furnaces, DRI Kilns and smelter gasifiers for the enriched metallisation process.



1. Draft Recuperation Main

CUMIGUN HG 160S/ CUMIGUN 50

Backup

CF1 - CUMICRETE CII 104

CF2 - CUMICRETE CIV 101

2. Baffle Wall

PCPF CUMIHICAST 80 JS

CUMIFLOW 50 JS

CUMIGUN 50 JS

CUMILITE 60A SPL / HEAT 62D /

HEAT 60/45/42S / CUMILOX 45

Top Lintel

CUMILITE 65A SPL / CUMILITE 60A

CUMIHICAST 60A

4. Suspended Roof Brick

CUMILOX 85R / CUMILITE 60A SPL

5. Burner Port

PCPF CUMIHICAST EXTRA /

PCPF CUMI HICAST 90 LW/

PCPF CUMIHAST 70 LI

6. Side Wall

CUMILITE 65A SPL / CUMILITE 60A

Bullnose

CUMILITE 65A SPL / CUMILITE 60A,

CUMICRETE M40 F, CUMICRETE CIV 650P

8. Down Comer

CUMILITE 65A SPL, CUMILAG 26 HS,

CUMILAG 23

9. Windbox

CUMIGUN 50 JS

CUMICRETE CIV 650 G JS

PCPF CUMICRETE CIP 103 JS

PELLET PLANT - GRATE KILN

TRAVELING GRATE

1.Suspended Roof

CUMILITE 60A SPL

2.Upper Enclosure Refractory

PCPF CUMIHICAST 60 JS

CUMIHICAST 60 JS

CUMIGUN 50 JS

CUMICRETE CIP 103 G-JS

CUMICRETE CIV 650 G JS

3.Wind Box

PCPF CUMICRETE CIP 103 - JS

CUMIGUN 50 JS

CUMICRETE CIV 650 G JS

4.Baffle Wall

PCPF CUMIHICAST 80 JS

CUMIFLOW 50 JS

CUMIGUN 50 JS

HEAT 42S

5.Transfer Chute

PCPF CUMIHICAST 70 JS

6. ROTARY KILN

Kiln Lining

PCPF CUMIHICAST 70 JS

CUMIHICAST 70 JS

CUMICRETE CIP 103 JS

Firing Hood

CUMIGUN 50 JS

Burner

CUMIHICAST 70 JS

7. ANNULAR COOLER

Load Zone - Screed Wall

PCPF CUMIHICAST 80 JS

PCPF CUMIHICAST 70 JS

CUMIGUN 50 JS

Cooling Zone

PCPF CUMI HICAST 80 JS + PCPF CUMICRETE CIP 103-JS

CUMILOX 85R

CUMIGUN 50 JS

Suspended Roof

CUMILITE 60A SPL

8. Duct

CUMI HICAST 60 JS

CUMIFLOW 50 JS

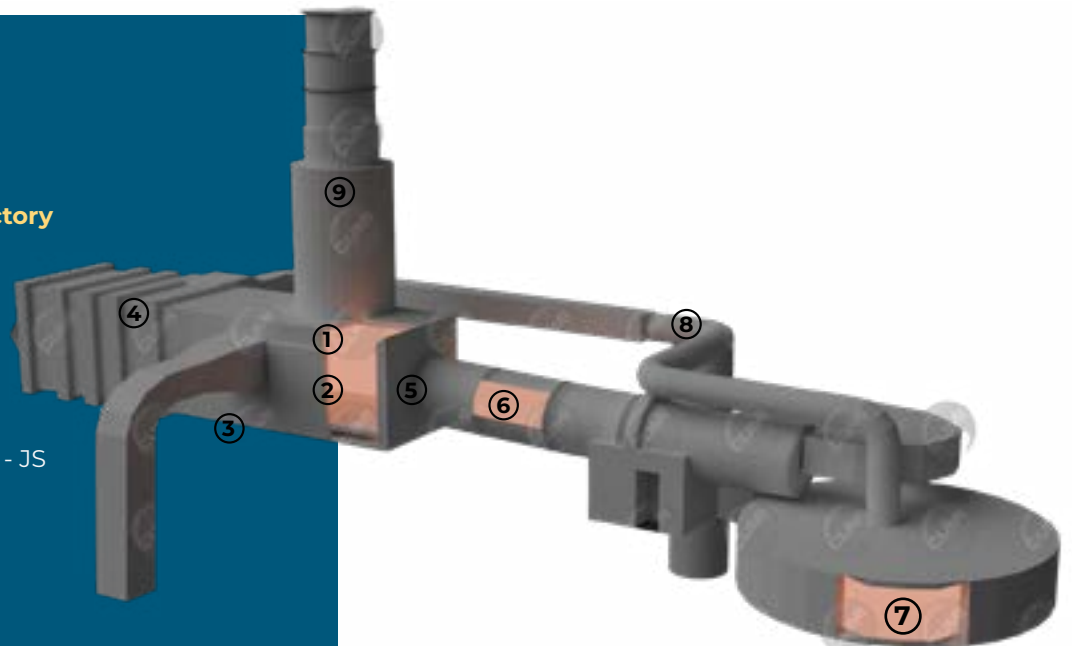
CUMIGUN 50 JS

CUMICRETE CIV 650 G JS

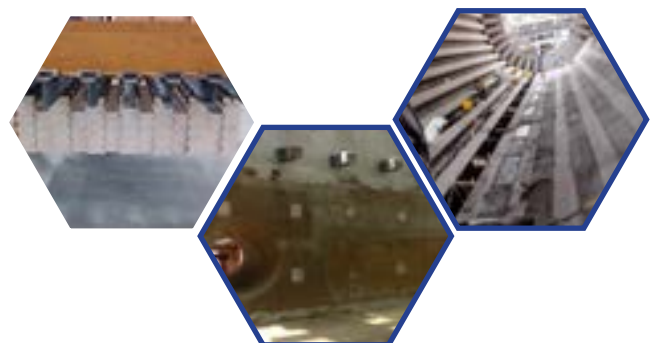
9. Chimney

HEAT 40S

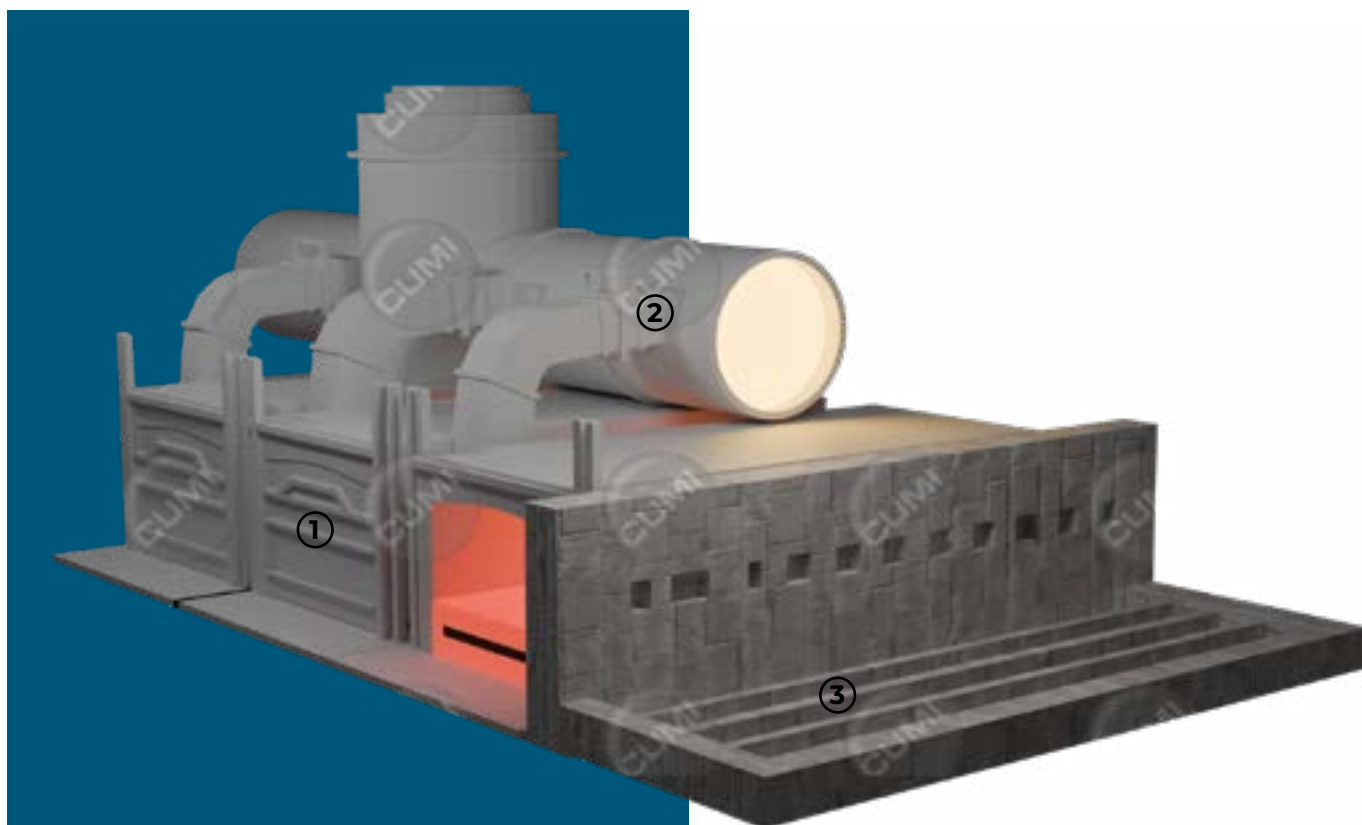
AR Brick IS 4860 Class II



The grate kiln process is a unique process that evenly indurate pellets to increase their mechanical properties. It involves a conventional short Straight Grate followed by a Rotary Kiln. The rotary kiln having a process temperature around 1300 °C, churns the pellets to increase even heating and avoid fragmentation in transportation.



COKE OVEN [NON RECOVERY]



1. Door

CUMIHICAST SUPER
CUMIHICAST 45
CUMIGUN CP (for repair)

2. Damper

TRIMOR FUSED SILICA LC

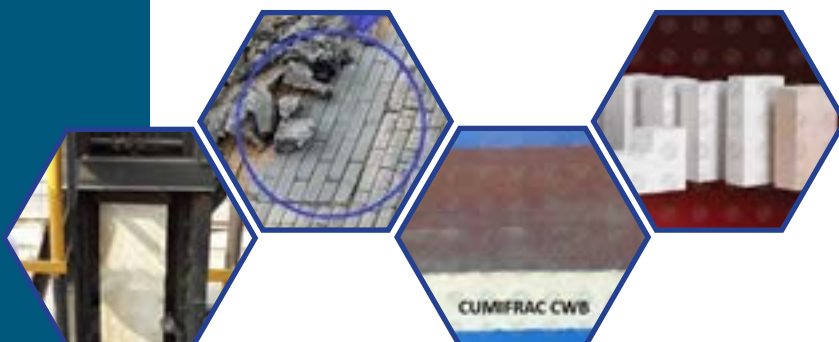
3. Floor

CUMILAG 29

Wharf

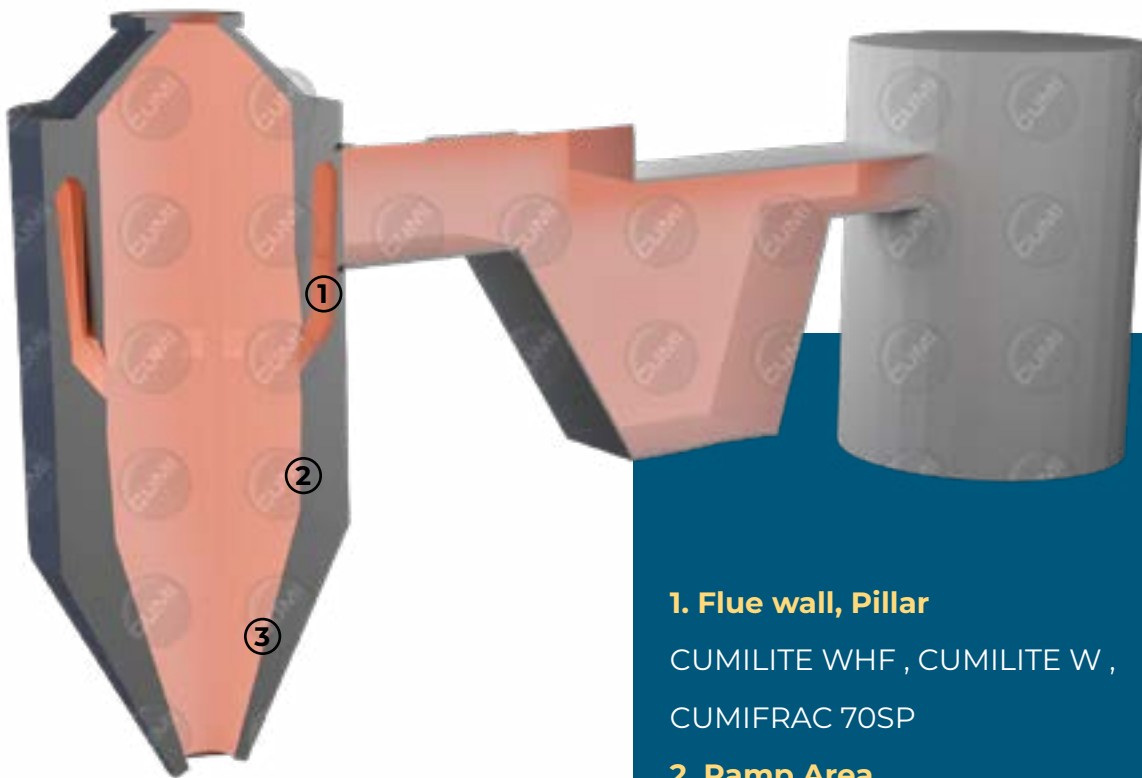
CUMIFRAC CWB / HEAT 42D

In a non-recovery coke oven, coal is heated in the absence of air to produce coke. The process involves charging coal into the oven, sealing it, and heating it at high temperatures (around 1,100 to 1,200 degrees Celsius) for several hours. This drives off volatile components, leaving behind coke, which is porous and has high carbon content. The coke produced is used in blast furnaces to smelt iron ore and produce Pig Iron.



COKE DRY QUENCH

Red hot coke from a coke oven at around 1000 deg C is transferred to a Coke Dry Quench (CDQ) unit with inert gas. The hot coke is quenched by the circulated cool inert gas, producing coke with high mechanical strength and very low moisture content. This process enhances energy efficiency, reduces environmental impact, and recovers valuable heat from the coke.



1. Flue wall, Pillar

CUMILITE WHF , CUMILITE W ,
CUMIFRAC 70SP

2. Ramp Area

CUMIREX, CUMILITE 70A,
CUMILITE 40SP

3. Quenching Cooling Zone

CUMILITE WHF, CUMILITE W,
CUMILITE 40SP



LIME CALCINATION PLANT

In a Lime Calcination Plant for iron making, beneficiated limestone undergoes calcination at temperatures exceeding 900 deg C. During calcination, carbon dioxide is released, resulting in the transformation of limestone into quicklime (calcium oxide). Quicklime serves a vital role in iron and steel production by facilitating desulfurization and forming slag. This additive enhances the efficiency of various metallurgical processes, contributing to the production of high-quality iron and steel.



1. Roof

CUMICRETE CII 104 G , 106 G

For Repair

CUMIGUN HG 160S, CUMIGUN 30 SiC

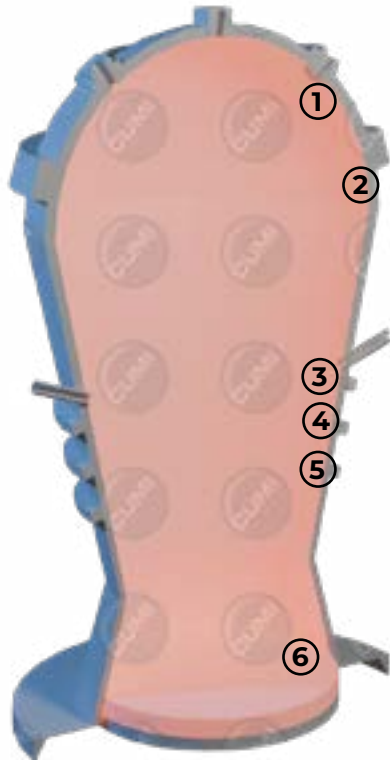
2. Inlet Zone Sidewall

HEAT 45S , CUMILAG 29 /
CUMILAG 26HS , CUMILAG 23

3. Cross Over Channel

CUMILOX 201 HF / CUMILOX 90 ,
HEAT 45S , CUMILAG 29 / CUMILAG
26HS , CUMICRETE CIV 531

SMELTER GASIFIER



In Smelting gasification process e.g. COREX , the DRI received from reduction shaft gets converted into liquid iron through further reduction and temperature rise of around 1450 °C by the carbon monoxide generated from the non coking coal alongwith oxygen injected in smelter gasifier through surrounding tuyeres. The Carbon monoxide generated in smelter gasifier is recycled in reduction shaft to get DRI from Iron ore / Pellets. This process is known for its environmental efficiency and reduced reliance on coking coal.

1. Dome With Nozzles

CUMILITE 65 A SPL , CUMILOX 45 , CUMILAG 25 HS , CUMIREX , CUMIGUN HG 160S , CUMICRETE CII 104 Li G

2. Calming Zone

CUMIREX ZBA , CUMILAG 25

3. Above Tuyere Band and Char Bed Zone

CUMIREX ZBS, CUMIREX ZBA , CUMIHICAST 80 SIC - B , CUMIRAM RS 40 , CUMISRFLO 50

4. Stave Inserts , Radio Active Source Dust Burner Bricks / Blocks

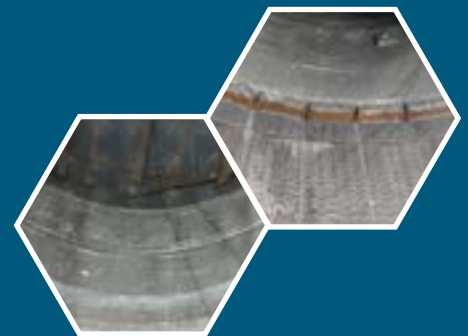
CUMIREX ZBS , CAST CUMIREX , PCPF CUMIHICAST 50 - LI SF

5. Tuyere Band

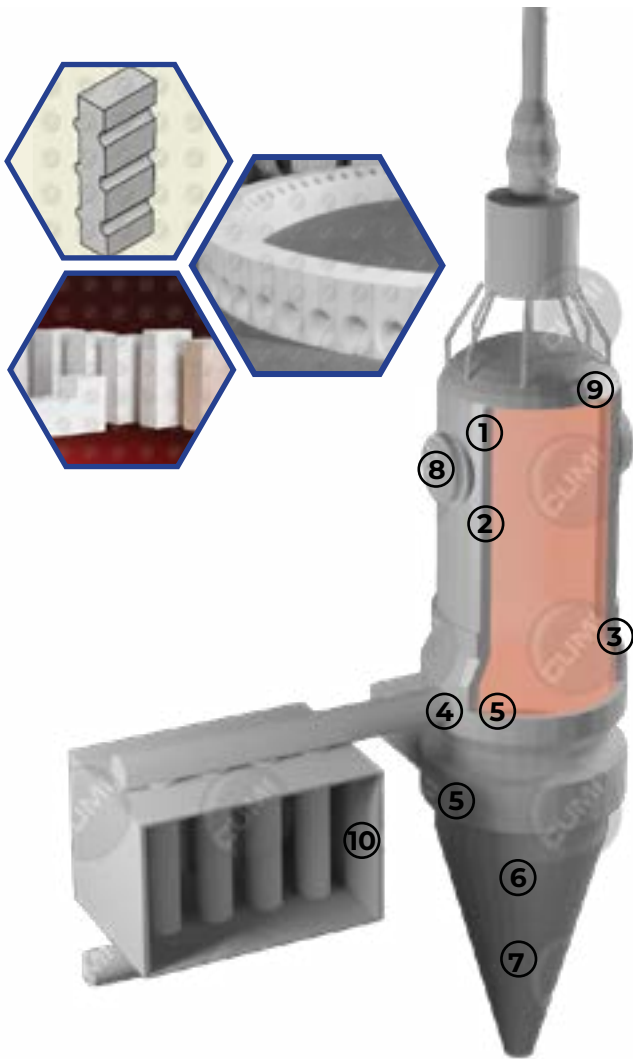
CUMIREX ZBS , CUMIHICAST 80 SIC - B

6. Hearth Ceramic Pad

CUMILITE WHF , CUMILOX 90C SPL , CUMIHICAST 90W



GAS BASED DRI



In a Gas-Based Direct Reduced Iron (DRI) plant, reducing gas(CO+H₂) is used to reduce iron ore pellets or lump ore into metallic iron through a chemical reaction in a shaft furnace. The reduction process involves removing oxygen from the iron ore, producing DRI that can be used in steelmaking processes for producing steel.

1. Upper Side Wall above stock line

HEAT 55M , CUMICRETE CII 104 ,
CUMIGUN HG 160S

2. Upper Side Wall

HEAT 55M , CUMILOX K313W /
CUMILOX 75P , CUMILAG 23 /
CUMILAG 23M

3. Upper Transition above Bustle block

CUMILOX K313W / CUMILOX 75P ,
CUMILAG 23 / CUMILAG 23M ,
CUMIHICAST 60A

4. Bustle Inlet

CUMILOX K313W / CUMILOX 75P ,
HEAT 55M , CUMILAG 28 , CUMILAG 23 /
CUMILAG 23M

5. Bustle

CUMILITE 90 HF

6. Lower Transition and Bustle Support

CUMILOX K313W, CUMILOX 75P ,
CUMILAG 23 , CUMICRETE CIP 104

7. Lower Side wall UBF area

CUMICRETE CUMILOX K313W,
CUMILOX 75P ,CUMILAG 23 /
CUMILAG 23M , CUMICRETE CIP 104 ,
CUMIHICAST 60A , FUSED CAST AZS

8. Cooling gas Duct

HEAT 55M , CUMIHICAST 60A

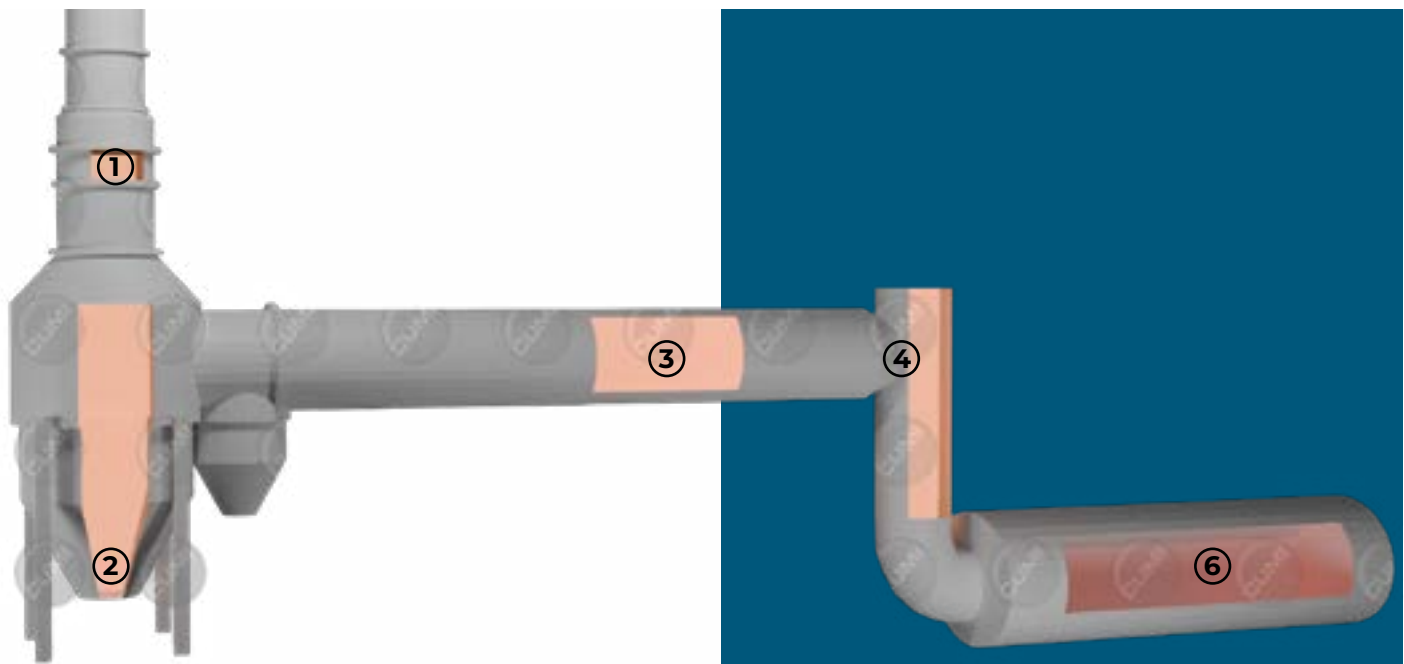
9. Roof

CUMICRETE CII 104 , CUMIGUN HG 160S

10. Reformer

CUMILAG 28 / 29 Feed Gas Duct
CUMILAG 29 , 26 HS, 25, 23

COAL BASED DRI - Rotary Kiln



In a Coal-Based Direct Reduced Iron (DRI) plant, iron ore pellets or lump ores are reduced to metallic iron using a mixture of coal and gases in a rotary kiln. The reduction process involves removing oxygen from the iron ore, producing DRI that serves as a valuable feedstock in steelmaking processes.



1. Gas Handling System [After Burning Chamber (ABC), Emergency Stack , Stack Cap, Elbow Duct]

CUMICRETE M45 ,
Calcium Silicate Board

2. Dust Settling Chamber (DSC)

CUMICRETE M45 / HEAT 42D ,
Calcium Silicate Board

3. Rotary Kiln

CUMIHICAST 80 / CUMIHICAST 80SI /
CUMIHICAST 60A, CUMIHICAST SUPER /
CUMIHICAST 45 SI

4. Discharge Hood

CUMICRETE M45 ,
Calcium Silicate Board

5. Transfer Chute

CUMIHICAST 80 ,
Calcium Silicate Board

6. Cooler

CUMIHICAST 80

Combination Lining (Precast)

CUMIHICAST 80 / CUMIHICAST 75M +
CUMICRETE CII 107

BLAST FURNACE



Blast furnace remains the primary and major equipment for liquid iron making. Iron ore, coke and limestone are fed from the top and countered by hot air blast fed through tuyere at the lower part of the furnace. The intense heat generated by the combustion of coke creates a reduction zone where iron ore is reduced to molten iron. Molten iron and slag are tapped out periodically.

1. Top Cone, Top Gas Ducts & Crude Gas Main

CUMIGUN 45 PW, CUMIGUN 55 PW

2. Stack

HEAT 42D, HEAT 62D

3. Belly

CUMIREX

4. Bosh

CUMIREX, CUMIREX ZBS, CUMIRAM RS 85

Stave Cooler

CUMIRAM RS 5

5. Hot Blast Main

CUMICRETE CK 51 PW , CUMILAG 26 HS ,
CUMILAG 23E, CUMICRETE CIP 105 HS PW

Hot Bustle Pipe

CUMILAG 26 HS , CUMILAG 23 E,
CUMICRETE CIP 105 HS PW

6. Tuyere

CUMIREX ZBS

Tuyere Blow Pipes

CUMIFLOW 60S , CUMIFLOW 60 SPL,
CUMIFLOW 50

Blow Pipe Sleeve

CAST CUMIREX AR, CUMIREX ZBS

7. Tap hole Block

CUMIREX

8. Hearth Pad

CUMILITE WHF, CUMILITE 77A

Hearth and Stack Grouting

CUMIGROUT HG SPL & SG SPL ,
CUMIGROUT GR 55

9. Protective Layer in the Hearth

HEAT 62D

10. Foundation Castable

CUMIFLOW 50
CUMIFLOW 65 SiC

11. Trough Lining

CUMI TRFCAST 15, PCPF CUMICAST EF 701

Cast House - Heat Protection Plate

CUMICRETE M 41 G PW

Cast House - Tap Hole hoods, Flanges & Lateral Protection Plate

CUMICRETE M 41 G PW

12. Cast House - Runner Cover

CUMIHICAST 70 LI

BLAST FURNACE STOVES



Blast furnace stoves generate hot air blast, either through internal or external combustion, for the blast furnace. This hot air is injected through tuyeres into the blast furnace to react with coke and produce carbon monoxide, which smelts iron ore into liquid iron.



1. Side wall Insulation

CUMILAG 23, CUMILAG 25 HS, CUMILAG 26, CUMILAG 26 HS, CUMILAG 28, CUMILAG 29, CUMILAG 29 HS, CUMILAG 30, CUMILAG 32

2. Back Filling [By pumping]

CUMI SR FLO 50

3. Dividing Wall

PCPF CUMI HICAST 50 + CUMILAG 26 HS

Relieving Arch

CUMILITE W

Compensator

CUMILITE 60A SPL, CUMILAG 29, CUMILAG 23

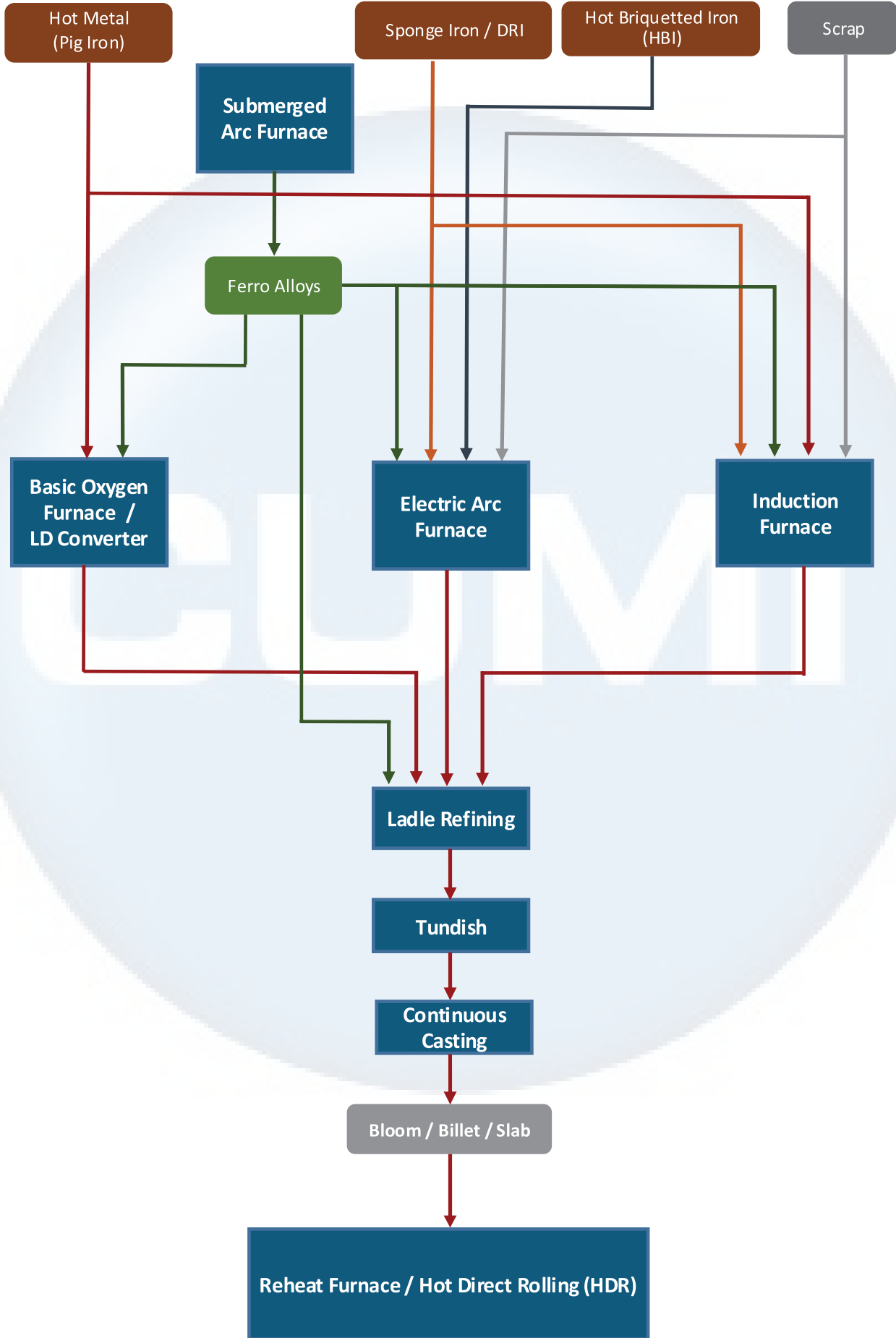
Downcomer

CUMILITE 60A

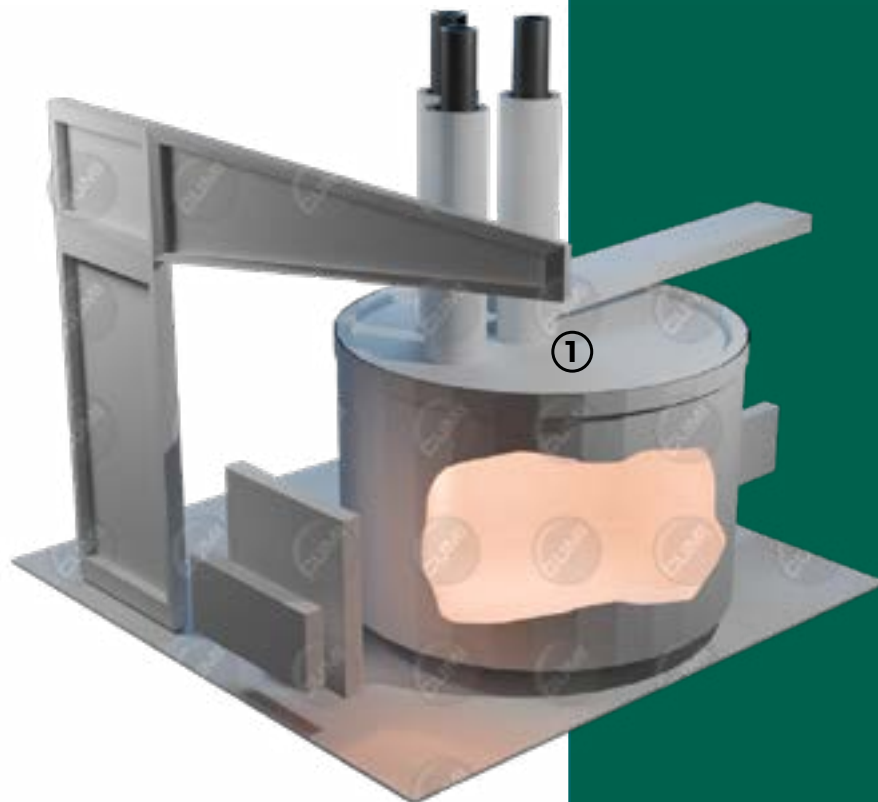
Hot Blast Stove-Waste Heat Duct & Chimney

CUMIGUN M 35 DC-G

STEEL MAKING



ELECTRIC ARC FURNACE



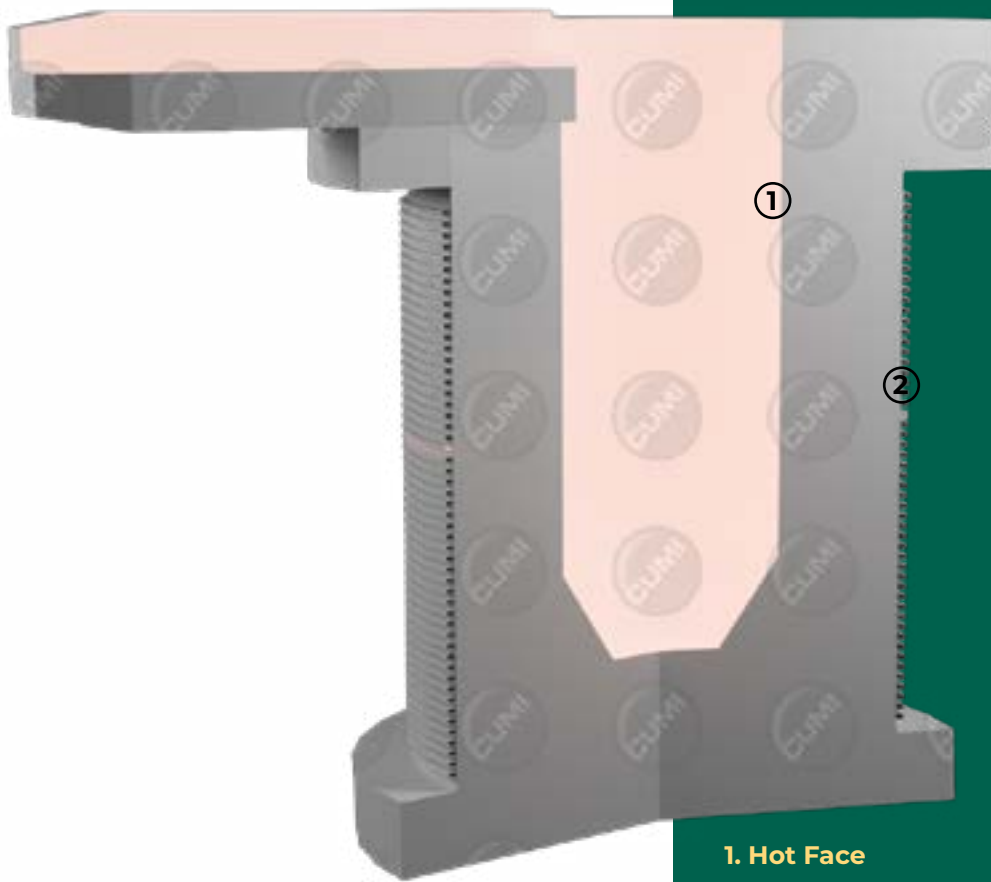
In an Electric Arc Furnace (EAF), scrap steel and DRI are charged into the furnace vessel. Iron gets melted through heat generated by electric arcing among the graphite electrodes inserted in the vessel. Fluxes are added to aid in slag formation and impurity removal. Once the desired composition is achieved, the molten steel is tapped from bottom and slag is tapped through slag door above the liquid metal level. The EAF process is known for its flexibility and energy efficiency in steel production.

1. Roof Delta

PCPD CUMIHICAST 90 GCR,
PCPD CUMIHICAST 85 XC ,
PCPD CUMIHICAST 80 XC,
PCPD CUMIHICAST 90 CR



INDUCTION FURNACE



In an Induction Furnace, high-frequency alternating current induces an electromagnetic field in a melting zone / crucible, creating eddy currents in the charged metal. This results in rapid and efficient heating, melting the metal. Induction furnaces are widely used for melting and refining metals, offering precision, energy efficiency, and control in metallurgical processes.

1. Hot Face

CUMIRAM DV 87A

Patching and Repair

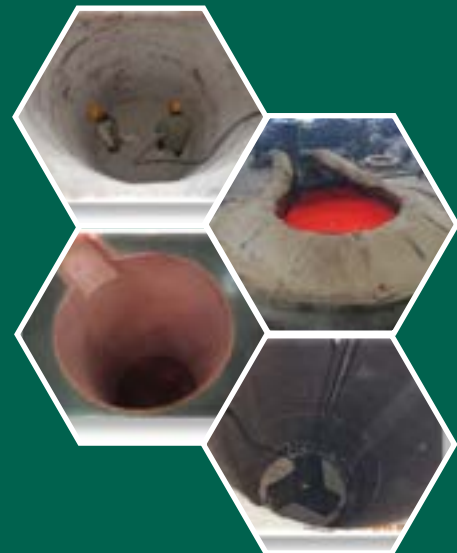
CUMIRAM DV 87PM

2. Coil Coating

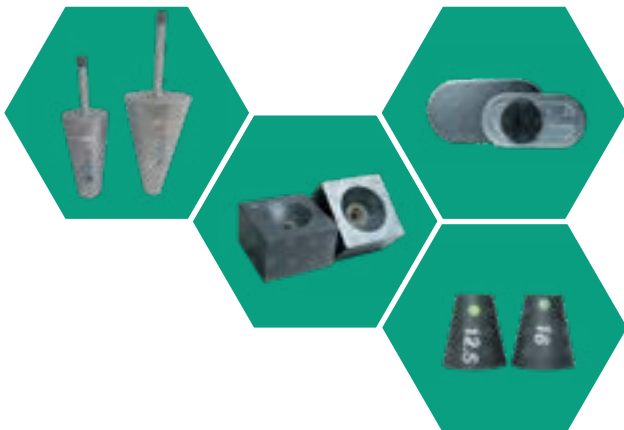
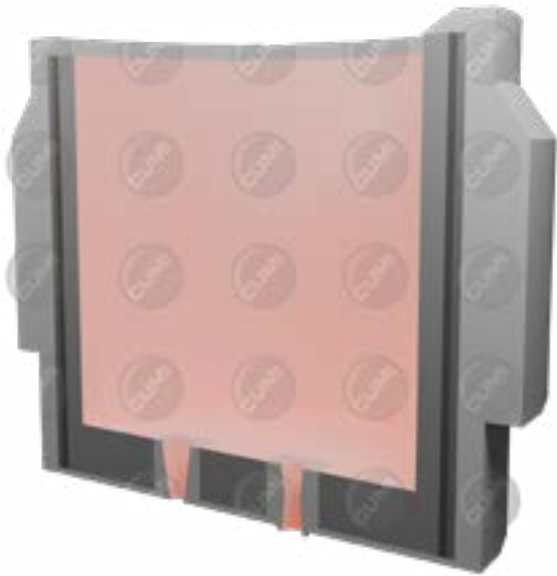
CUMICRETE CA 392S

3. Crucible for Steel Alloys

CAST CUMILITE HF / CUMILOX MA 10C

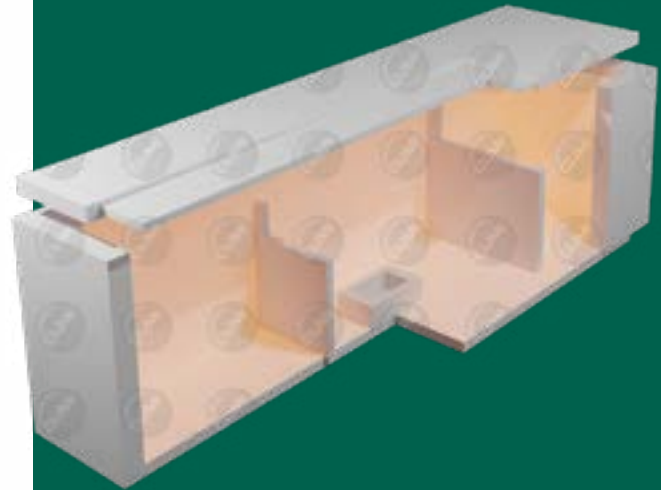


STEEL LADLE & TUNDISH



A **ladle** transports molten metal and also used for refinement and alloying ensuring precise pouring and efficient production.

The **tundish** in both integrated and mini steel plants serves to regulate the flow of molten steel from the ladle to the continuous casting machine, ensuring a continuous casting process. It also helps in temperature stabilization, inclusion management, and uniform distribution of molten steel to the casting molds, contributing to the efficiency and quality of steel production.



LARGE OR INTEGRATED STEEL PLANT

Ladle Free board

CUMICRETE CK14/ CA60

Ladle Side wall

CUMICRETE CA 85M

Ladle Well-Block Fixing Mass

CUMICRETE CA 95/ CA92 / CA85M

Tundish Back-up

CUMIHICAST 60LW, CUMIHICAST 70,
CUMIHICAST 70Li

Tundish Furniture

(Dams and Weir, Impact Pad)

PCPF CUMIHICAST 70 , PCPF CUMIHICAST 80

MINI STEEL PLANT

Ladle Porous Plug

Ladle Porous Plug Seating Block

Flow Control System

Ladle Well-Block

Ladle Nozzle

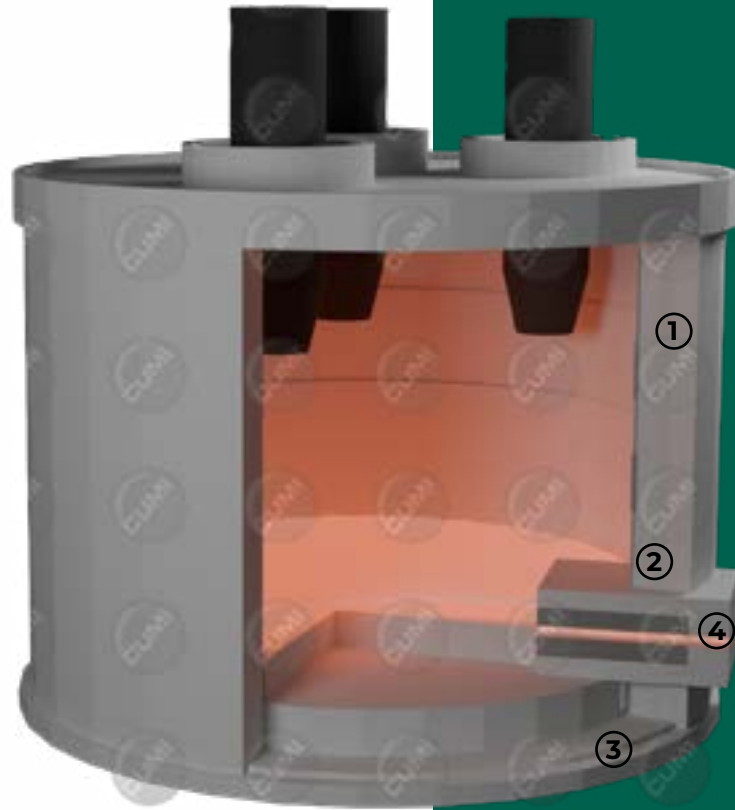
Slide Gate Plate

Collector Nozzle

Tundish Well-Block

Tundish Nozzle

SUBMERGED ARC FURNACE FOR FERRO ALLOYS



Most ferroalloys are produced in submerged arc furnaces, which are large, closed, electrically powered furnaces. The furnace is filled with a bed of raw materials, and an electric arc is established above the material. Fluxes, such as limestone, and reducing agents, usually carbon in the form of coke or coal, are added to the furnace. Fluxes help in the formation of slag, while reducing agents aid in the reduction of metal oxides.

Most Common Ferro Alloys

Ferro Chrome , Ferro Nickel , Ferro Silicon , Ferro Manganese etc.

1. Side Wall Lining

HEAT 45S
HEAT 60

2. Side Wall Lining - Near Tap Hole

CUMIFRAC R1
CUMIFRAC A24
CUMIFRAC 90

3. Hearth

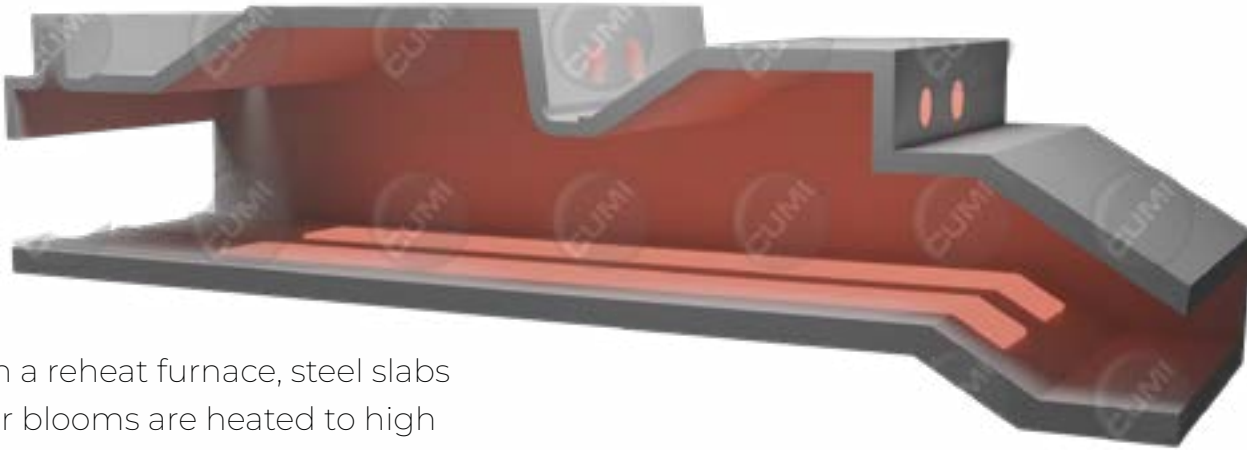
HEAT 45S
HEAT 60
CUMILOX 85R
CUMICRETE CII 106 Li

4. Tap Hole Block

CAST CUMIREX AR
PCPF CUMIHICAST 95

REHEATING FURNACE

Pusher Type Furnace



In a reheat furnace, steel slabs or blooms are heated to high temperatures (up to 1,200°C) before entering the rolling mill / forging. This process enhances material ductility and facilitates further shaping. Strict temperature control and uniform heating are essential for optimal metallurgical properties in the final steel product, necessitating rigorous conditions.



Hearth (Soaking Zone) - Pusher type

PCPF CUMIHICAST 90 , PCPF CUMICAST EF 951M

Hearth - Walking Hearth furnace

CUMIPLASCAST 60

Inclined burner wall - Pusher type / Walking Beam / Walking Hearth furnace

CUMIHICAST 70

Skid & Post for Pusher / Walking Beam / Walking Hearth type furnace - burner zone

PCPF CUMIHICAST 60A

Skid & Post for Pusher / Walking Beam / Walking hearth type furnace - other zone

PCPF CUMIHICAST 60, 70 L, CUMIPLAST 80, 60, CUMIRAM RA 90 SPL, CUMIRAM RA 60 (Repair)

Side Wall for Pusher / Walking Beam / Walking hearth type furnace

CUMIHICAST 60A, 70 L, CUMIPLAST 80, 60, CUMIRAM RA 60 , Ceramic Anchor (CUMILITE 65 A SPL)

Hearth - Walking beam furnace

CUMIHICAST 70

Rollers - Tunnel Furnace

CUMIFLOW 50

Roof - Rotary Hearth Furnace

CUMI PLASCAST EXTRA / 60

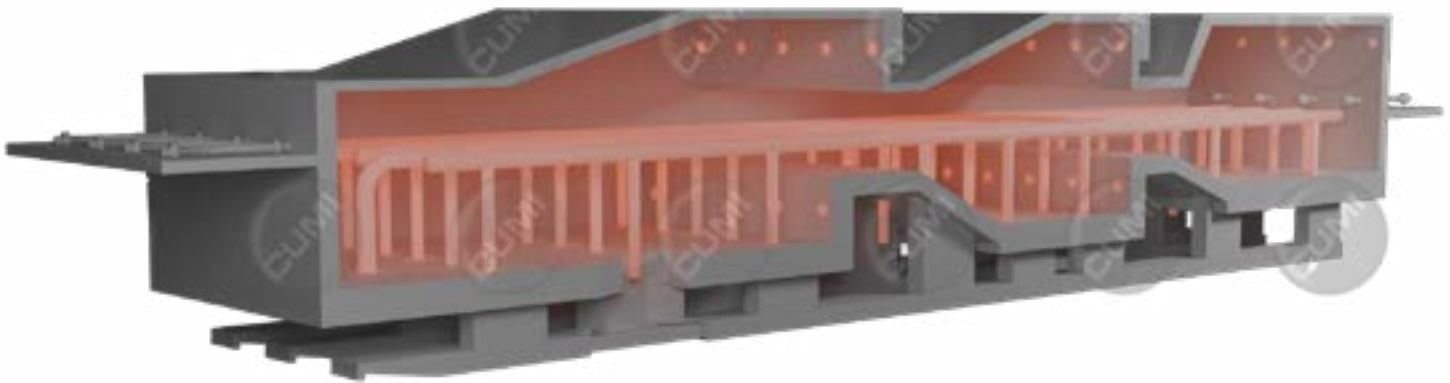
Hearth - Rotary Hearth Furnace

CUMIHICAST 60 / 60A

Walking Hearth Furnace



Walking Beam Furnace



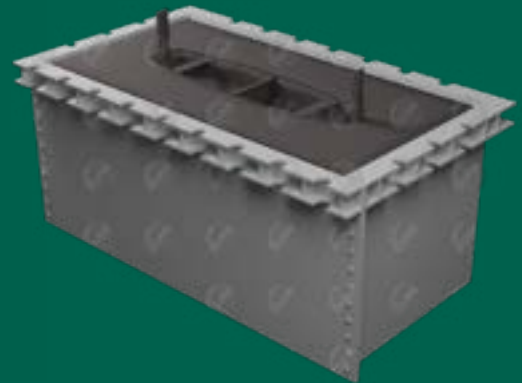
Rotary Hearth Furnace



GALVANIZING FURNACE



In the galvanizing process, steel or iron products are immersed in a molten zinc bath in a galvanizing furnace at temperatures of 435 - 470 °C. The high heat facilitates the formation of a metallurgical bond between the zinc and metal, creating a corrosion-resistant coating.



GALVANIZING FURNACE - ZINC

1. Floor

CUMIHICAST 45 AL ,
CUMILAG 29 HS

2. Sidewall

CUMILOX 45, CUMILAG 29 HS

3. Throat / Inductor

CUMIHICAST 45 AL

GALVANIZING FURNACE - ZAM

1. Floor

CUMIHICAST 90 AL , CUMILAG 29 HS

2. Sidewall

CUMILOX 85 R , CUMILAG 29 HS

3. Throat / Inductor

CUMIHICAST 90 AL

GALVANIZING FURNACE - GALVALUME

1. Floor

CUMIHICAST 90 AL , CUMILAG 29 HS

2. Sidewall

CUMILOX 85 R , CUMILAG 29 HS

3. Throat / Inductor

CUMIHICAST 90 AL

MANUFACTURING AND TESTING CAPABILITIES



Firing Capabilities upto 1750 °C



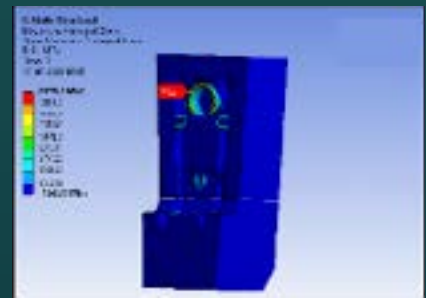
Refractoriness under Load & Creep resistance under Compression test



X-ray Fluorescence Spectroscopy



Reversible Thermal Expansion Test



Thermo-Structural Analysis



TPM Excellence Award



CUMI's Worldwide Network at Your Service

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