CONCEPT – CREATE – CULMINATE

LIQUID ALTERNATIVE FUEL SYSTEMS

+

SOLID WASTE CO-PROCESSING SYSTEM

ABOUT US

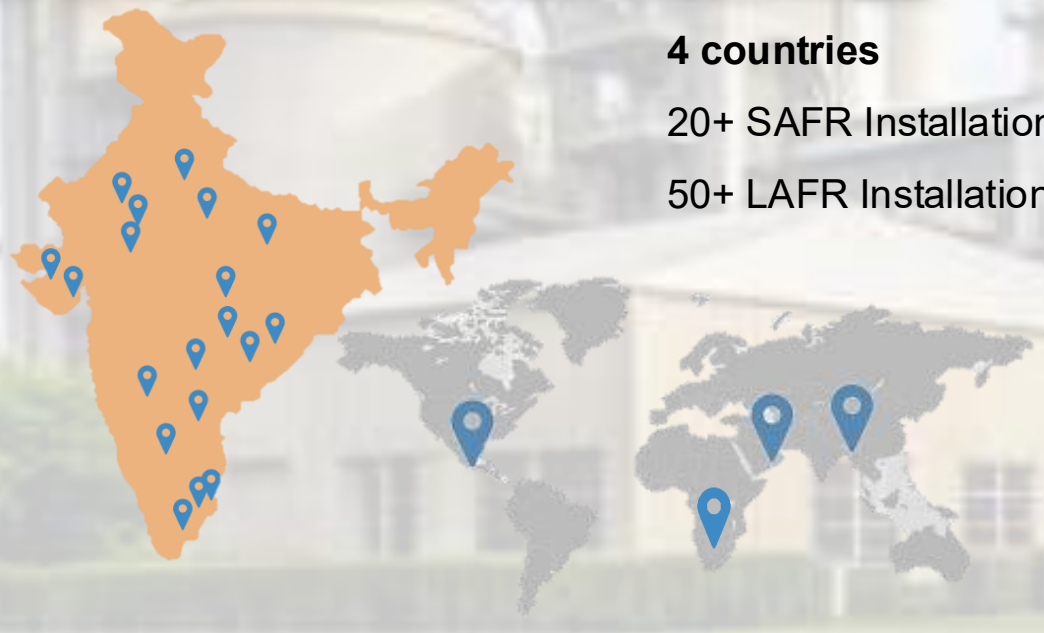
PH1 Industries Pvt Ltd is a leading Engineering and Technology services company based out of Hyderabad, India since 2015

- Leaders in the design, manufacture and supply of Alternate Fuel (RDF/MSW) extraction, handling and firing systems for cement plants.

- Having a legacy of unmatched product quality and service we have processed over 1.2 Mn Tons of solid waste and over 682,000 Tons of liquid waste, underscoring our commitment to sustainable solutions.

- Our expertise has enabled us to execute over 70 AFR projects, expanding our global footprint across four continents.

OUR FOOTPRINT



4 countries

20+ SAFR Installations

50+ LAFR Installations

PRODUCTS & SERVICES

ATEX CERTIFIED

PH1 CONCEPT – CREATE – CULMINATE

- LIQUID ALTERNATE FUEL FIRING SYSTEMS
- SOLID ALTERNATE FUEL FIRING SYSTEMS
- BULK MATERIAL HANDLING
- EMISSION & FIRE CONTROL
- OTHER SYSTEMS
  - CARBON BLACK FEEDING
  - HOT MEAL BYPASS
  - DUST CONTROL

BY CONSIDERING THE HIGHEST SAFETY STANDARD, *we always ensure 100% safety for designing the system. So far We have Commissioned 50+ Numbers of Liquid Alternate Fuel Firing system in INDIA and outside INDIA. Solid AFR Systems around 20+ Numbers worldwide.*

WHY PARTNER WITH PH1?

Specialize in Alternative Fuel Firing Systems :

PH1 has a vast knowledge & understanding of fuel-fired systems process knowledge, feasibility studies and technical solutions, such as receiving, handling, sorting, sizing, storing, transporting, feeding and burning.

Experienced :

PH1 has commissioned more than 60 Alternate Fuel Firing Systems in cement plants in India & around the world during the period of 2009-24.

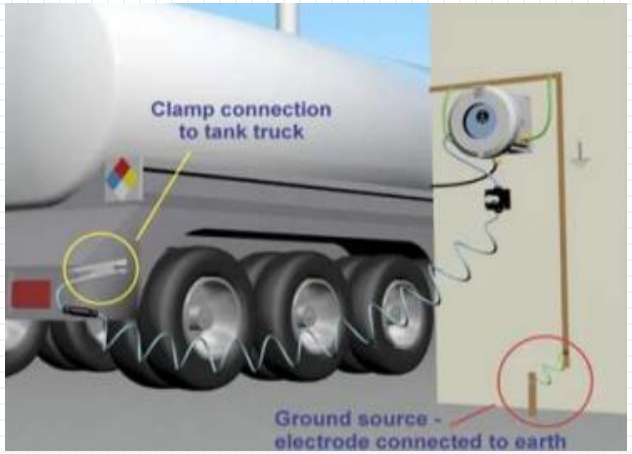
Engineering Design :

Each system is individually designed by PH1 based on the norms of statutory requirements and customer's input.

Customer Service :

PH1 is fully equipped with an experienced operational team to assist the customer to fire the secondary fuel in an efficient and safer way.

LIQUID ALTERNATE FUEL FIRING SYSTEMS



Electronic Grounding System (EGS)

- Advanced Road Tanker Grounding (Earthing) System for protecting personnel and plant assets from static hazards during loading and offloading.
- Ensures product flow is disabled until the system detects connection to a road tanker.
- Confirms connection to a ground capable of dissipating static charges, preventing accumulation on the tanker.

Anti-Corrosive- Anti-Static Lined Pipes

- Anti-Corrosive Pipeline: Designed to handle highly alkaline and acidic liquids (pH range 0-14).
- Antistatic Pipeline: Prevents flow electrification by safely dissipating any charge buildup from low-conductivity fluids.
- PH1's antistatic liners direct charge to the steel pipe, which must be properly earthed using methods like earth bonding clamps, star washers, earthing studs, or lugs.

Pumping Skids

- PH1's Unloading & Firing Pumps feature an intrinsically safe design by eliminating mechanical and gland seals, reducing the need for monitoring or maintenance.
- Ensures safe and efficient feeding to the KILN system.
- Specially designed for handling liquid hazardous wastes.
- Process fluid remains contained within the system, preventing contamination in the workspace.

LIQUID ALTERNATE FUEL FIRING SYSTEMS (contd.)

Storage Tank with Agitators

- Corrosion-resistant lined storage tanks are designed to handle any type of liquid.
- Equipped with additional safety features like flame arrestors and breather/vent valves.
- Liquid reactions in the tank can be monitored such as temperature, pressure, and level transmitters.
- Agitator mechanism ensures proper mixing and homogenization, preventing sedimentation inside the tank.

Automated PLC System

- LAFR system operates through an in-house PLC system, offering user-friendly operation and ensuring the highest safety standards
- Can be monitored and controlled from the PLC to the plant DCS using the latest communication technologies.
- Includes an ATEX-certified online pH meter to monitor acidity and alkalinity levels, allowing feed rate adjustments.

Self Cleaning Filters

- Rugged screen and mechanical backwash mechanism extends service life & clog-resistant straining element minimizes maintenance downtime.
- Adjustable accelerator plate improves cleaning in challenging applications.
- Internal replacement parts made from corrosion-resistant materials.
- Low RPM backwash mechanism ensures efficient cleaning with reduced water consumption.

LIQUID ALTERNATE FUEL FIRING SYSTEMS (contd.)

Flow Control Station

- Ensures accurate dosing of Liquid AFR in the Kiln System
- Fully automated controlling operation from the CCR room as per process requirement.
- Turn down ration 1:10
- Control rail skids allow the direct control of flow rate and other process features like pressure, temperature, pulsation dampener & flame arrestor

AFR Fire Fighting System

- Proper selection of manual fire extinguishers and designing an automated firefighting system is crucial
- Full-fledged firefighting systems, including pumps and equipment, are available.
- Foam-based automatic firefighting systems are recommended for flammable liquids.

Firing Nozzle with Auto Retractor

- Special Duo Pericol nozzle handles low to high viscous liquids up to 500 cps.
- Provides a good spray pattern for improved combustion.
- Firing nozzle features auto retraction when feeding stops and auto insertion when the system is ready for operation.
- Nozzle socket pipe gate automatically opens and closes based on system operation.

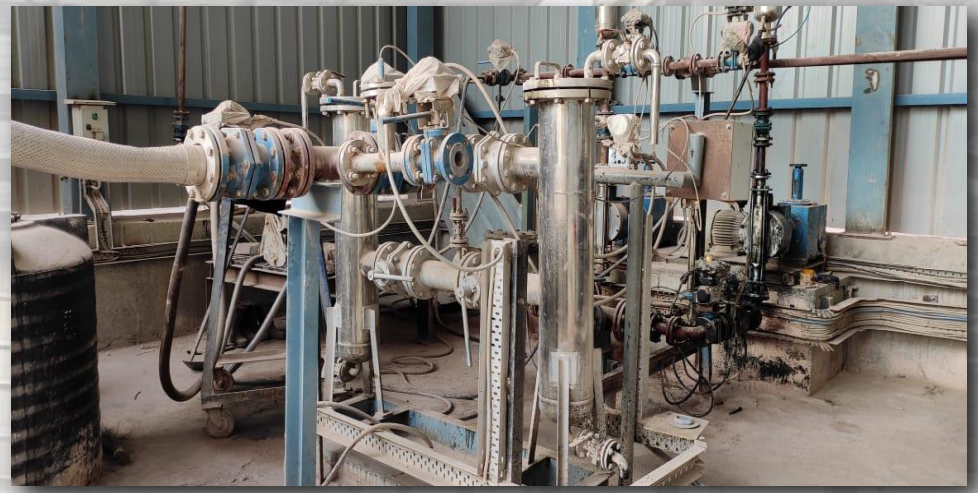
OUR PROJECTS (LAFR)

Ultratech
Dhar Cements Work

Ultratech
Gujarat Cements Work

Bharathi Cements
Kadapara Dist.

OUR PROJECTS (LAFR)



MAHA CEMENT
BUILD IT STRONG

MyHome Cements YCW

WONDER CEMENT
EK PERFECT SHURUAAT

Wonder Cements
Nimbehara

Shree Cement

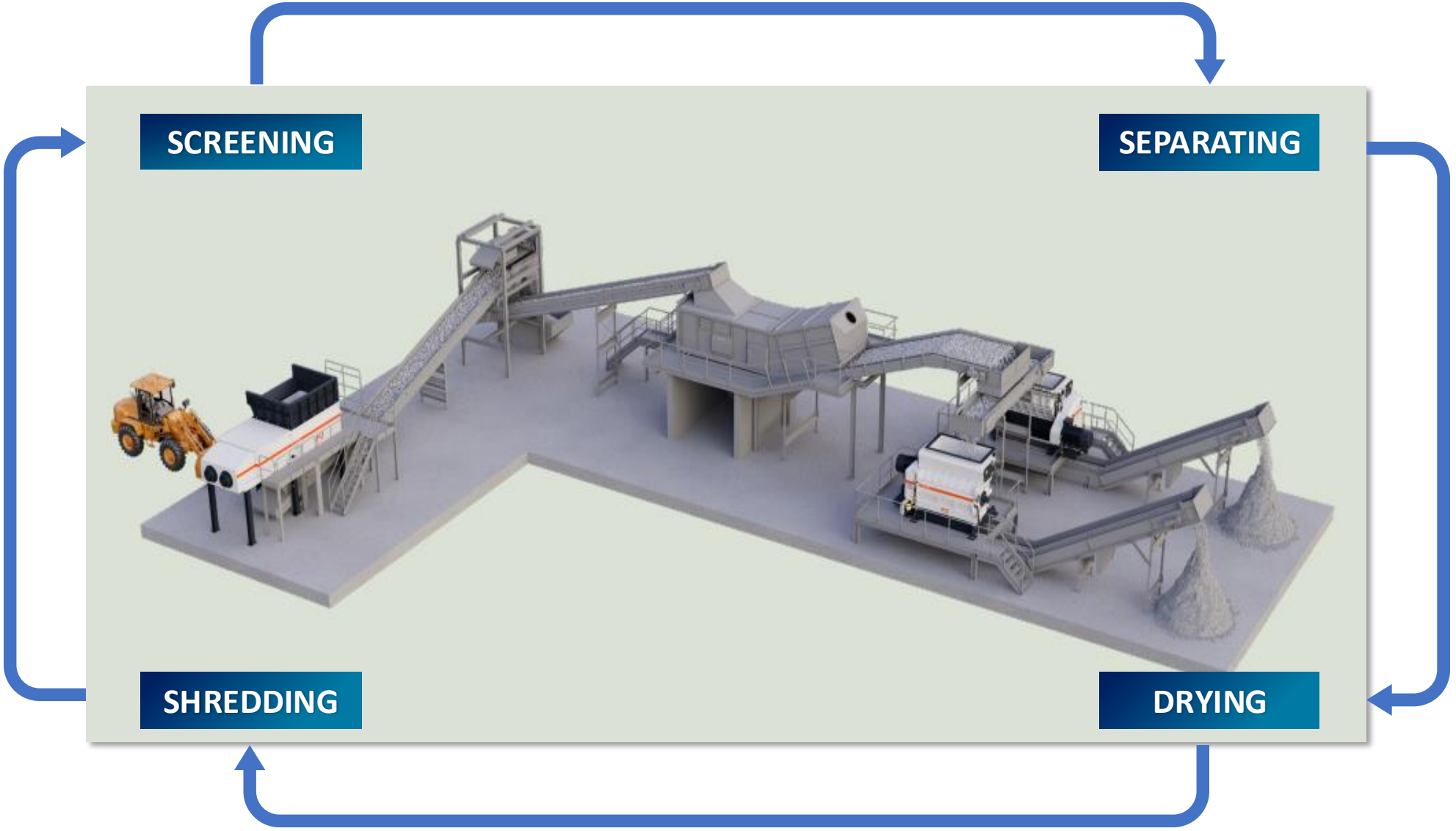
Shree Cements
Ras

OUR PROJECTS (LAFR)

Lafarge Holcim – Ambuja (now Adani)

Lafarge Holcim Bangladesh

SOLID ALTERNATE FUEL FIRING SYSTEMS



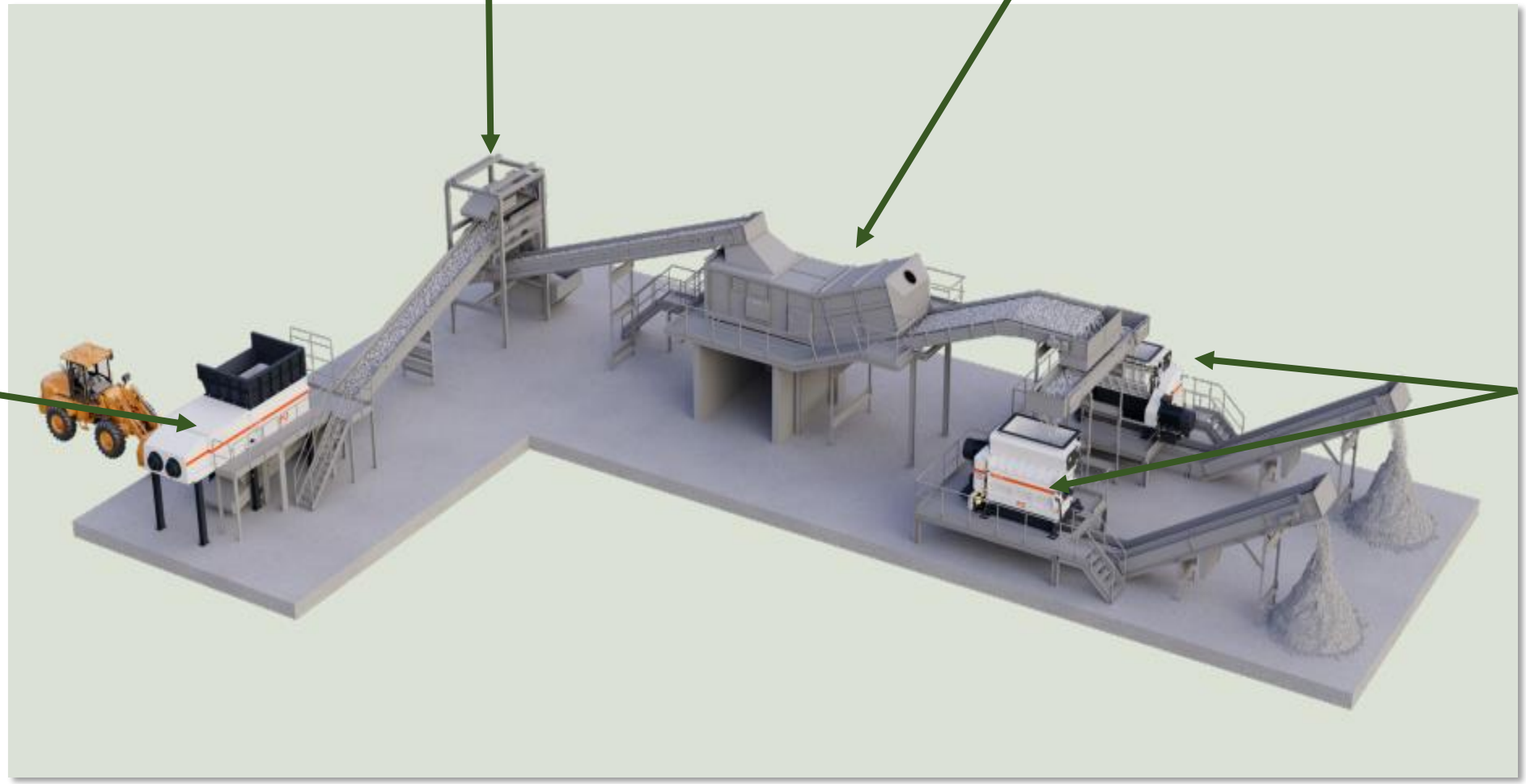
SOLID ALTERNATE FUEL FIRING SYSTEMS

OPTIMAL SHREDDING LINE

SCREEN / SEPARATOR

WIND SHIFTER

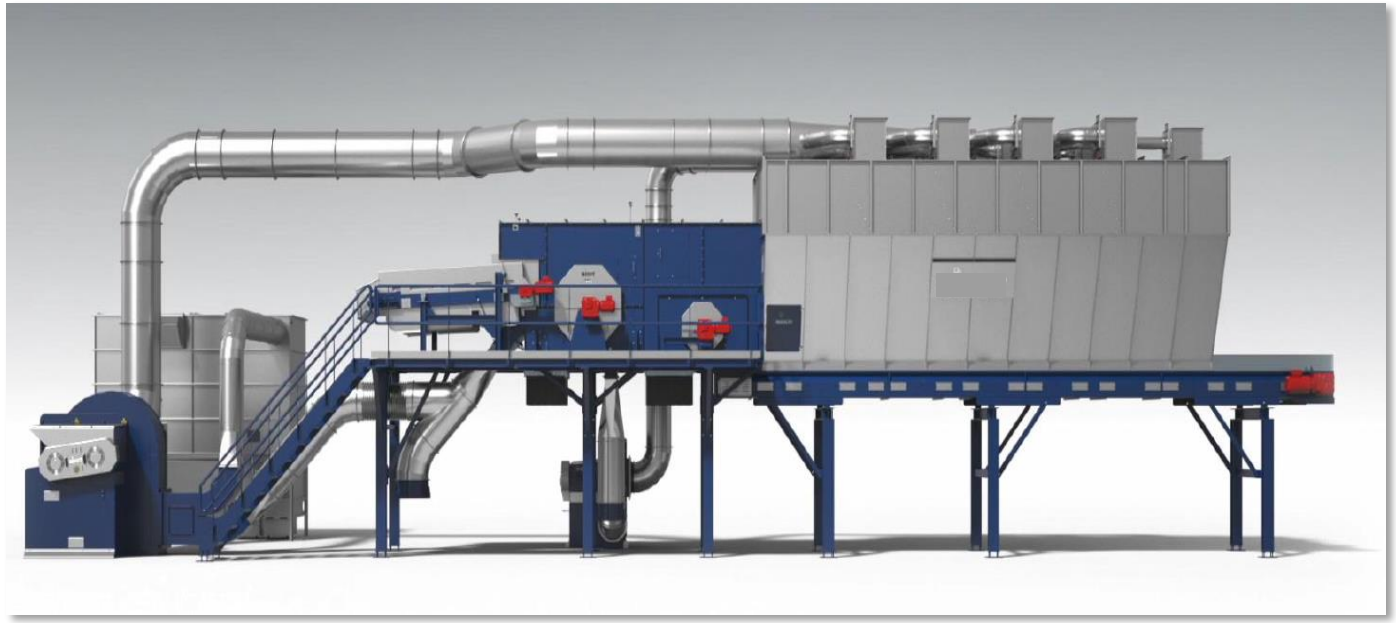
PRIMARY SHREDDER



SECONDARY SHREDDERS

SOLID ALTERNATE FUEL FIRING SYSTEMS

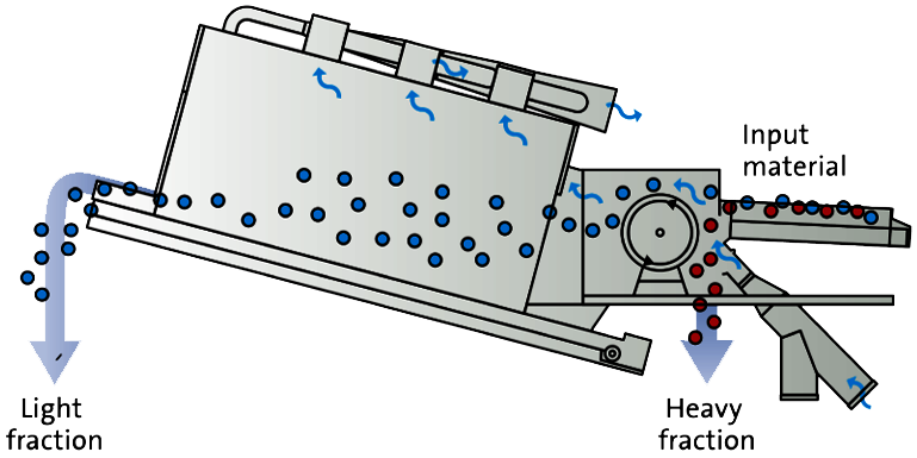
WIND SHIFTER



WIND SHIFTER

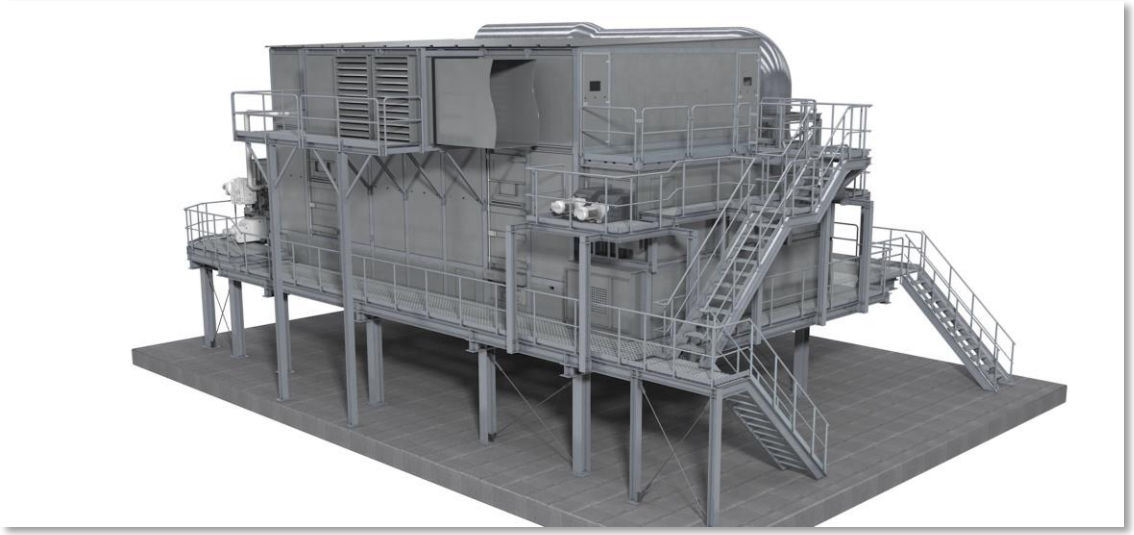
- Dust free operation – positive effect of negative pressure technology
- Low maintenance and very few wearable parts, i.e. reduced downtime, low operational costs

- Processing of abrasive materials (glass, inert, car scrap ,etc.) Handling material sizes up to 600 mm
- Capacity goes up to 200 m3/hour
- 3-in-1 separation at high capacities



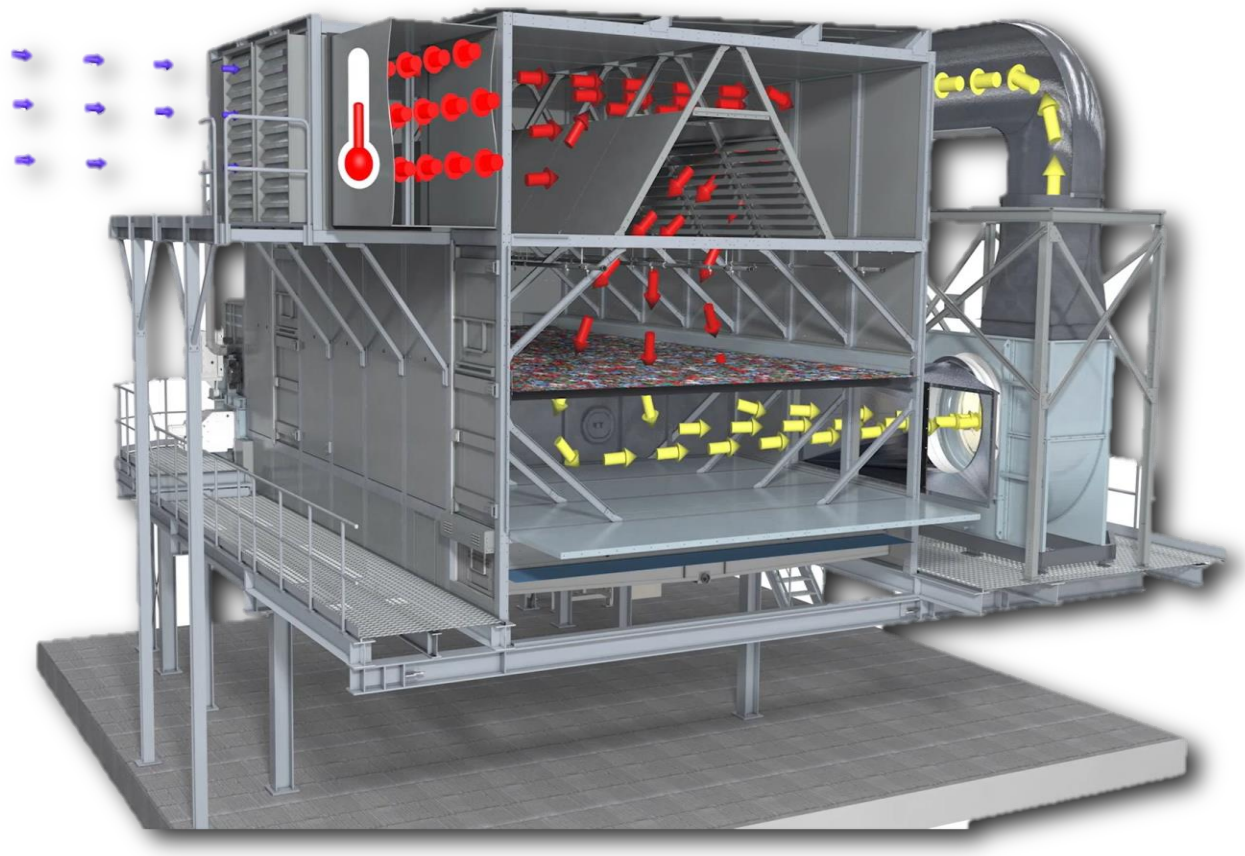
SOLID ALTERNATE FUEL FIRING SYSTEMS

DRYER



AFR DRYER

- Reduces moisture content to as low as 5%
- Useful for humid environment
- With hot air > 120 ˚C
- Reduced specific thermal energy consumption



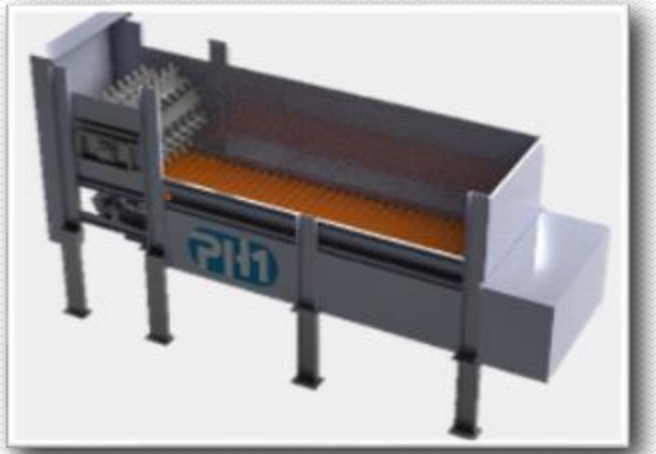
SOLID ALTERNATE FUEL FIRING SYSTEMS - COPROCESSING

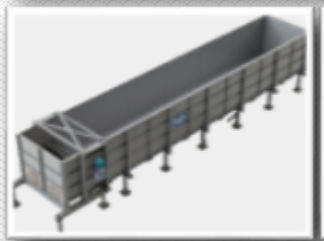
Co-processing of **Solid Alternative Fuels (AFR)** in the cement industry refers to the simultaneous use of waste materials, such as industrial by-products and refuse-derived fuels, as fuel and raw material in the cement manufacturing process.

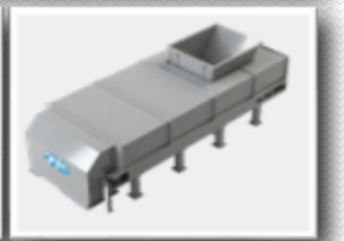
Key Aspects

- Waste Utilization
- Energy Recovery
- Raw Material Replacement
- Economic Advantages
- Environmental Benefits
- Regulatory Compliance

EXTRACTING

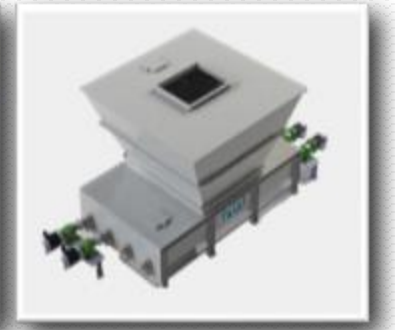


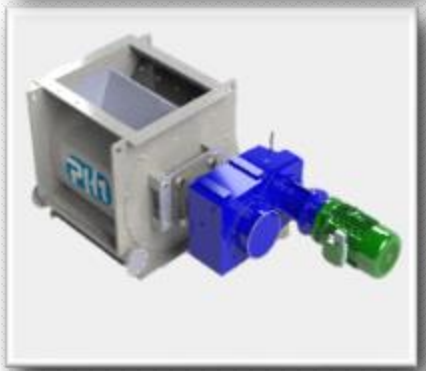




CONVEYING

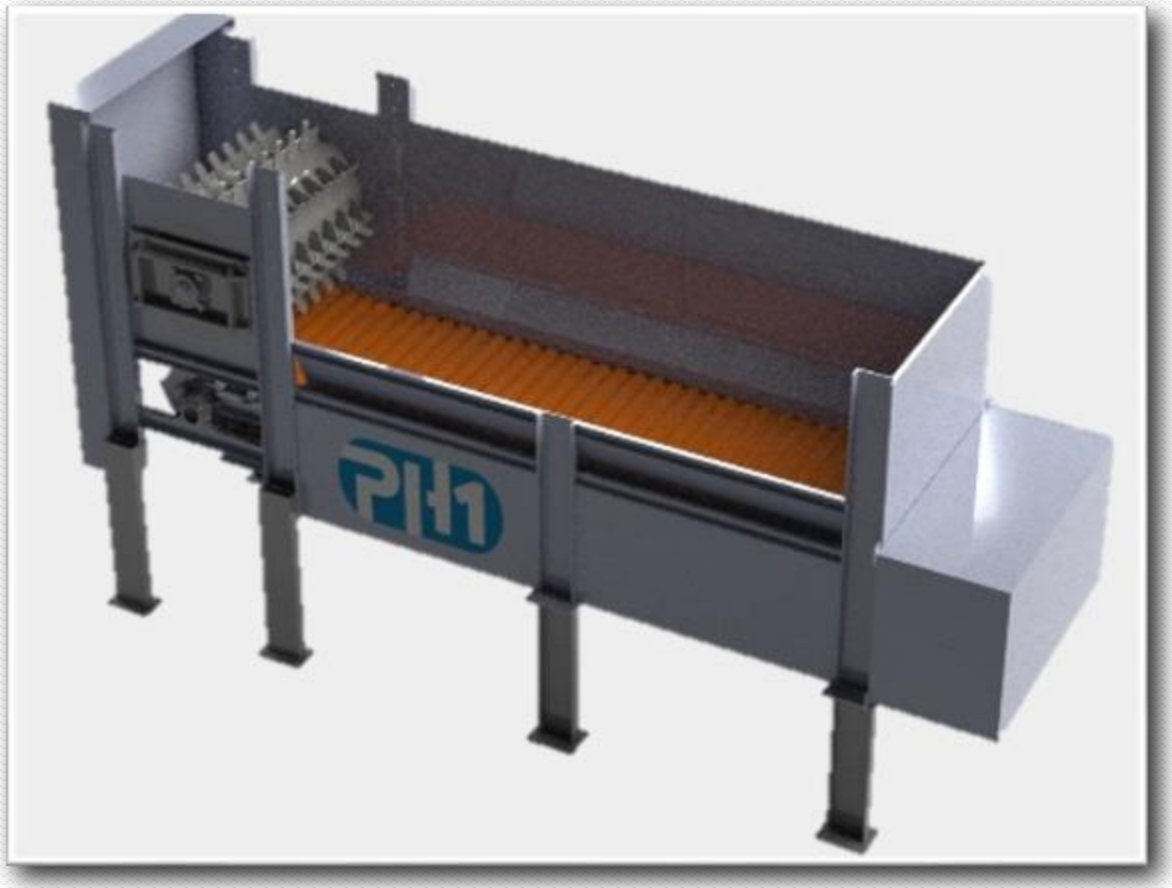
FEEDING





SOLID ALTERNATE FUEL FIRING SYSTEMS - COPROCESSING

EXTRACTING EQUIPMENT



Box Feeder

- Low-capacity solution for AFR feeding. Hopper with apron conveyor and stripping wheel
- Hopper capacity : 5m3 to 15 m3
- Low feeding height normal Loader or JCB can be used for feeding to Box feeder
- Less floor area : required for keeping Box feeder in any AFR Facility
- NO ramp required, which save substantial cost and space

SOLID ALTERNATE FUEL FIRING SYSTEMS - COPROCESSING

EXTRACTING EQUIPMENT

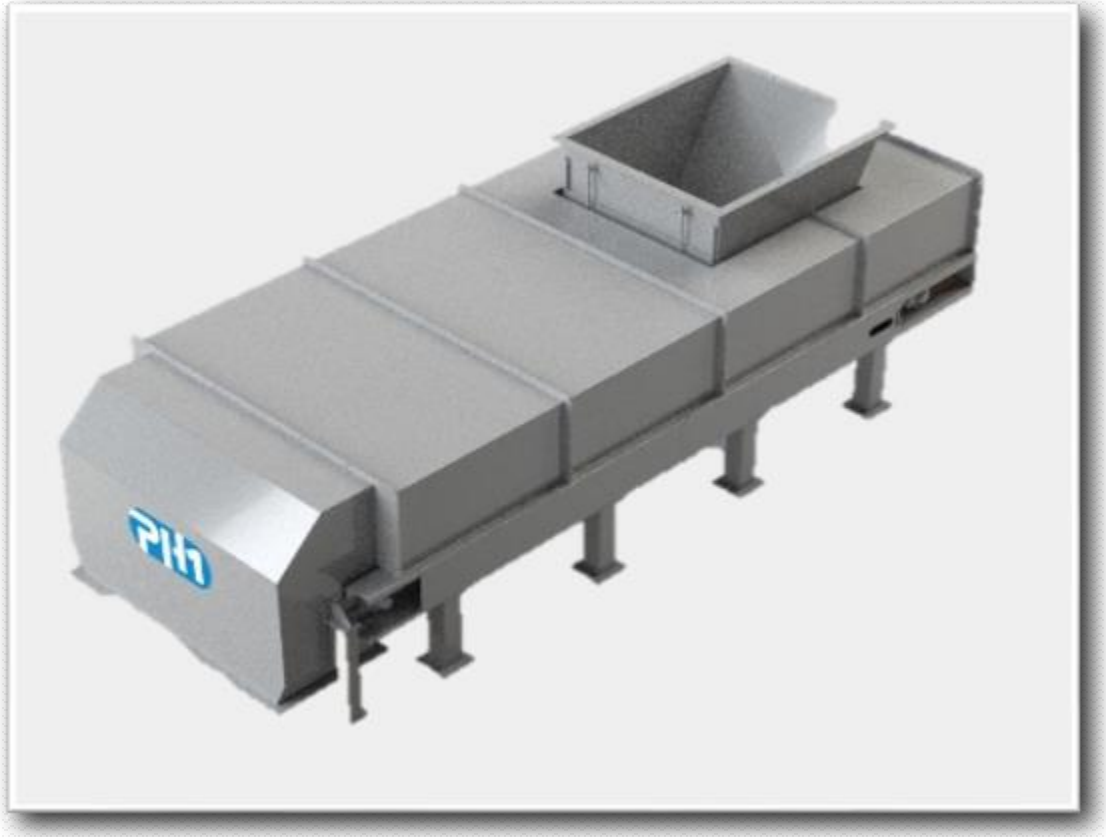
- Activated floor extraction
- Most versatile Extraction equipment used for AFR applications worldwide
- Bunker Storage Volume : 60 M3 to 200 M3
- Keeps more volume for Continuous and Constant material feeding for 100 % perfect volumetric flow

You fill it once and can forget for sometime, Holding capacity 20-25 tons for AFR density of 0.15 t/m3.

Sliding Floor Feeder

SOLID ALTERNATE FUEL FIRING SYSTEMS - COPROCESSING

EXTRACTING EQUIPMENT



Weigh Feeder

- PLC-based weighing and feeding of AFR material is essential for reducing wastage and boosting profits.
- PH1 weigh feeder uses continuous feedback from a sensitive weighing device for precise delivery.
- Requires fewer calibration steps and supports data sharing via Profibus connectivity.

SOLID ALTERNATE FUEL FIRING SYSTEMS - COPROCESSING

CONVEYING EQUIPMENT

Air Assisted Belt Conveyor

- Innovative bulk material transportation using air cushioning to support the belt and load.
- Reduced friction in the tail section minimizes maintenance, energy costs, and parts replacement.
- Reliable sealing system prevents gravel leakage.
- Optional maintenance walkway allows easy access without the need for expensive bridge construction.

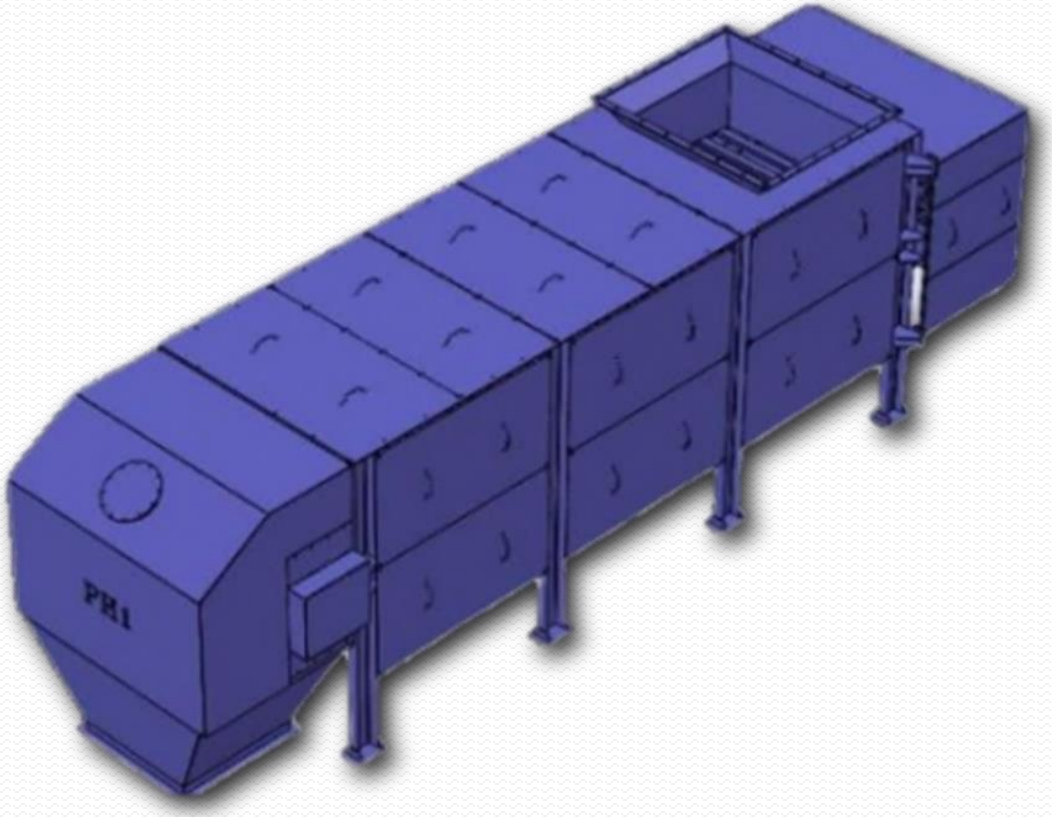
Troughed Belt Conveyors

- PH1 designs and manufactures Troughed Belt conveyors for transporting AFR material from processing sheds.
- Extensive experience in the AFR segment informs the design of components that minimize spillage and fire hazards.
- Features a rain and dustproof hood with maintenance windows.
- Equipped with fire detection and water sprinklers along the entire conveyor length.

Ready to cater needs of core sector industries such as steel, cement, coal, fertilizers, metals & mining, chemicals, food grains, infrastructure and port trusts.

SOLID ALTERNATE FUEL FIRING SYSTEMS - COPROCESSING

FEEDING EQUIPMENT

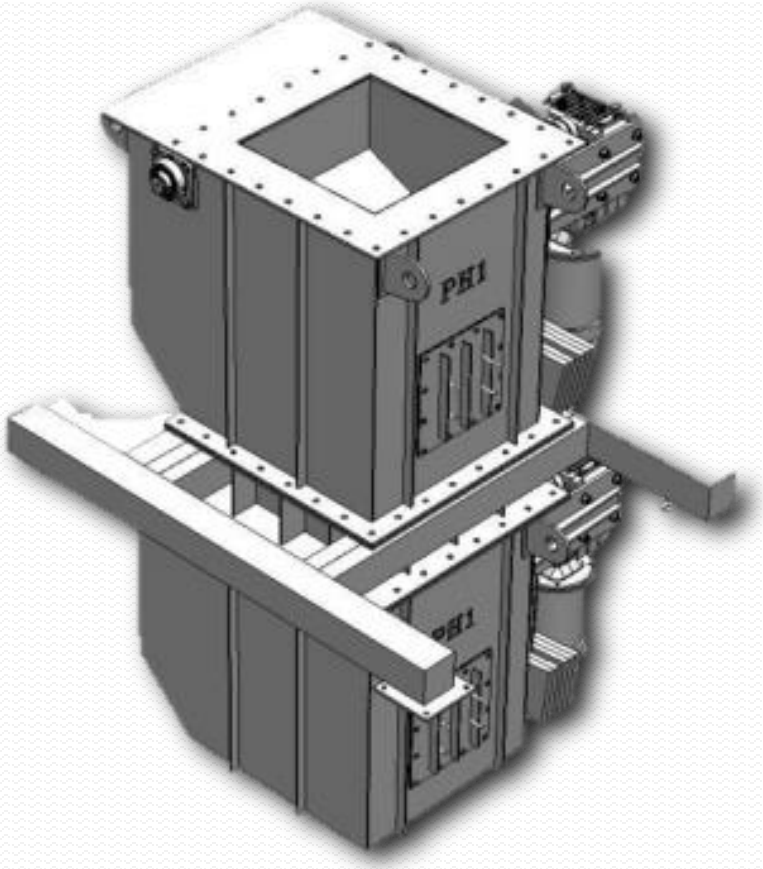


Apron Feeder

- Used near the calciner chutes which is subjected to high temperature
- For applications where conveying distance is relatively short and space requirement is limited to convey any kind of AFR material
- High temperature variants for operation in environments up to 150°C for accurate measurement.

SOLID ALTERNATE FUEL FIRING SYSTEMS - COPROCESSING

FEEDING EQUIPMENT



Double Flap Valve

- Excellent Sealing Efficiency
- Prevents Ingress Air Safety (Superior Safety Std)
- Pressure & Dust-tight construction
- Cleaning of the flap online with water jet is possible
- Cycle time of 6-8 seconds and suitable up to 30Tph

SOLID ALTERNATE FUEL FIRING SYSTEMS - COPROCESSING

FEEDING EQUIPMENT

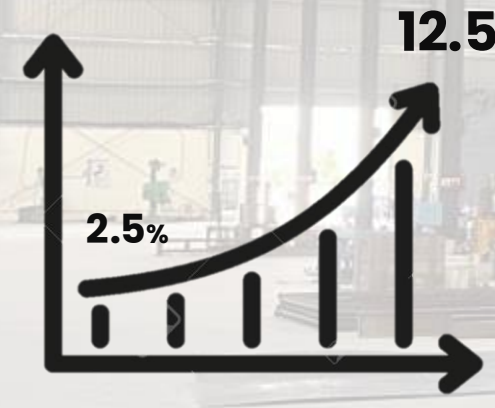
- Robust design
- Higher sealing efficiency
- Cutter Blade design incorporated
- Suitable for Higher Feed Rate more than 25 TPH

++ Emergency refractory lined Shut-Off gate provided

Rotary Air Lock Valve

OUR ACHIEVEMENT

PH1 FACILITATES AFR USAGE from



For JAMUL CEMENTS

udaaan

udaaan @ Manufacturing

Success stories EAST

JAMUL: Continuous Kiln Operation - 154 days

Jamul Kiln (make KHD, 5.6M X 82M, 9000TPD) commissioned in the month of May'2016 and since then it caters the requirement of Clinker for East cluster plants. Jamul Kiln major repair was completed in the month of July'23 for 16 Days as per the planned maintenance schedule and completed within cost target & other KPIs. The entire major planned tasks were completed with quality and timeline, resulted successfully light up in one-go. We are operating Jamul Kiln at 10,000 TPD with usage of AFR (TSR above 15%) on continuous basis and successfully completed operations 150+ days (154 Days) for the very first time since inception (Previous best was in the Year 2018-19 for 126 Days). This is possible through the dedicated WBIs, PMRs, proactive and instant reactive actions in auxiliary circuit repair & maintenance and maintaining proper housekeeping. It can't be possible without smooth operations of entire upward (clinker dispatch & cement grinding) and downward (Roller press, Crusher & Mines) circuit.

JAMUL: Highest AFR Utilization in Kiln

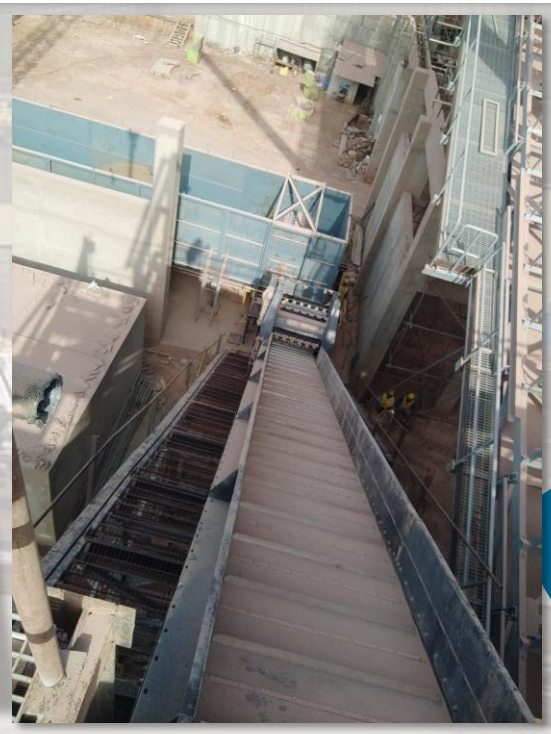
The commissioning of the Jamul Cement Works in 2016 marked a significant milestone with a kiln capacity of 10,000 tons per day (TPD) for Jamul Plant. The adoption of Alternative Fuel (AFR) usage began in 2018 at a modest rate of 0.56% through manual methods. Over the years, the utilization increased to a commendable 2.5% by 2022. However, the real breakthrough occurred in 2023 with the implementation of a mechanized feeding system, leading to a remarkable increase in AFR usage to 12.9%. The plant team now aspires to achieve an ambitious target of surpassing 20% AFR usage while maintaining clinker production volume. Though on day basis plant is achieving 20% TSR, still for consistent higher usage plat strives to put new AFR shredder as well availing at sites adequate volume of AFR.

- **Introduction:** The journey towards optimizing AFR

usage at Jamul Cement Works has been a steady evolution. The plant initially relied on manual methods to introduce AFR, achieving a maximum of 2.5% by 2022. The recent introduction of a mechanized feeding system has catapulted AFR usage to 12.5%, setting the stage for more significant advancements.

- Current AFR composition consists of 60% Refuse Derived Fuel (RDF) and 40% fines. Unfortunately, constraints in availability have hindered the achievement of the targeted AFR usage. To address this bottleneck, the management has initiated efforts to install a shredder on-site, with a projected capacity of up to 400 tons per day. The trend as shown below figure shows consistent growth month wise.

Usage at Jamul Cement Works has been a steady evolution. The plant initially relied on manual methods to introduce AFR, achieving a maximum of 2.5% by 2022. The recent introduction of a mechanized feeding system has catapulted AFR usage to 12.5%, setting the stage for more significant advancements.



OUR ACHIEVEMENT

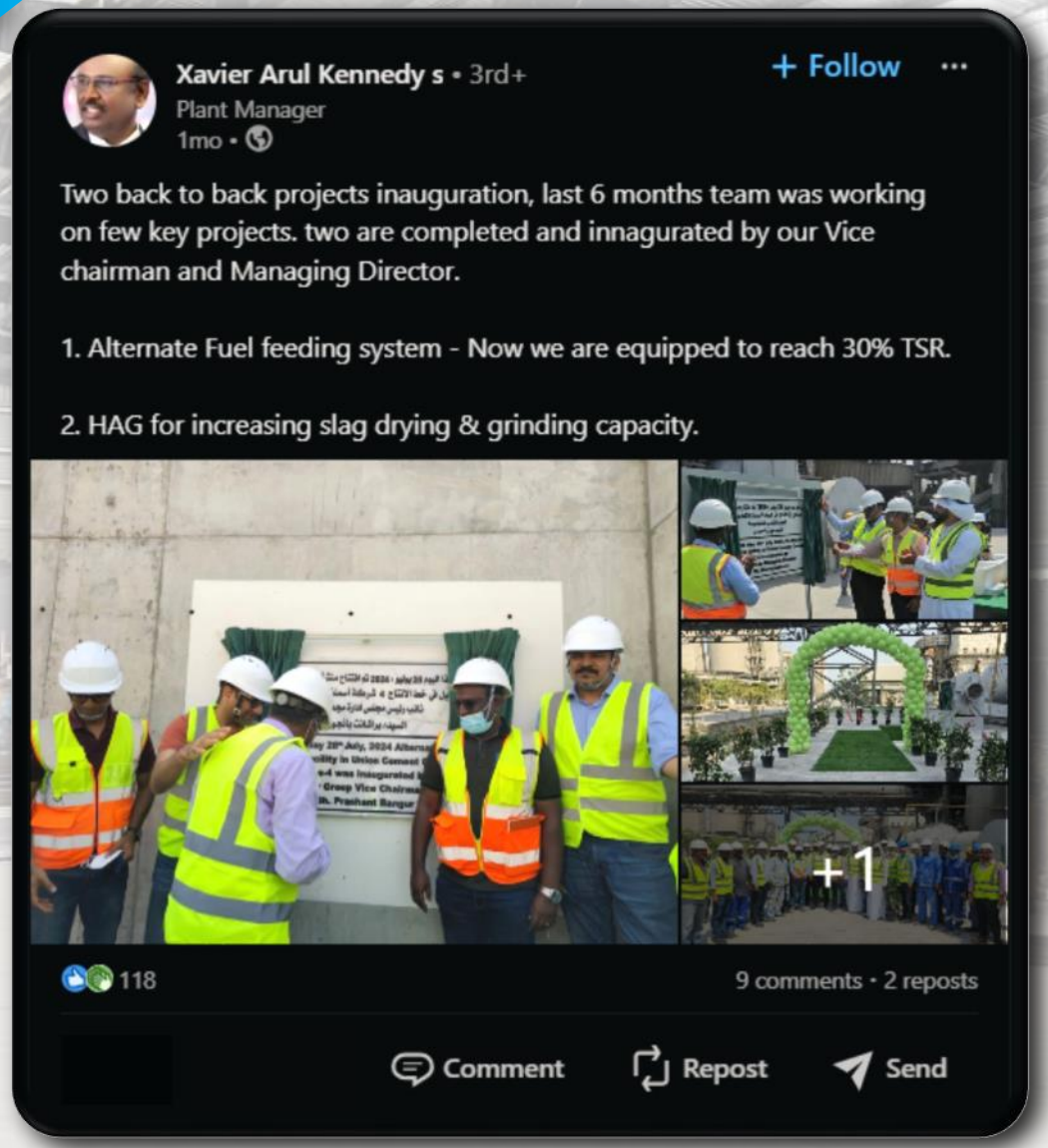
Union Cement Company

RAS AL KHAIMAH, UAE

UPTO

30%

TSR usage



PRECISION &
PERFORMANCE

PH1
CONCEPT – CREATE – CULMINATE

ISO 9001:2015 CERTIFIED COMPANY

TÜV SÜD

PH1 Machinery in Action!

OUR ESTEEMED CLIENTS

PH-1
CONCEPT – CREATE – CULMINATE

ISO 9001:2015 CERTIFIED COMPANY
TÜV SÜD

HOLCIM
adani Cement
JSW Cement
Heidelberg Materials
Union Cement Company
ACC Limited
Shree Cement
Dalmia Bharat Cement
Ambuja Cement
WONDER CEMENT
EK PERFECT SHURUAAT
KAMAL CEMENT
ADITYA BIRLA UltraTech
JK Cement LTD.
Bharathi CEMENT
SUPERIOR QUALITY. GUARANTEED.
PRISM CEMENT
दूर की सोच
Chettinad cement
JK LAKSHMI CEMENT Ltd.
SAGAR CEMENT
MAHA CEMENT
BUILD IT STRONG

OUR RELIABLE PARTNERS -

M&J RECYCLING

NIHOT®

BHS What's next.

ECOSTAR™

ALTERNATE FUEL FEEDING SYSTEM

LIQUIDS & SOLIDS

SAVE THE PLANET WITH US

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THANK YOU