

# Cement and Building Materials Review

No. 94 December 2023



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# Contents



## Articles

### **prepol® SC – step combustor for waste utilization in cement plants**

thyssenKrupp Polysius, Germany

### **Counting carbon in the cement industry**

FLSmidth Inc, USA

### **Plant inefficiency and the impact on CO<sub>2</sub> reduction technology**

Mark Mutter, JAMCEM Consulting, UK

### **Boosting efficiency and decarbonization in cement manufacturing with advanced Organic Rankine Cycle technology**

Andrea De Finis and Sara Milanese, Exergy International srl, Italy

### **Lump formation phenomenon in cement bags**

ASEC, Egypt

### **Lindner's New Komet Series 3: Powerful, Energy Efficient and High-Throughput Shredding for Premium Solid Recovered Fuels**

Lindner-Recyclingtech GmbH, Austria

### **Analytical air classification of kiln burner SRF**

WhiteLabel-TandemProjects e.U., Germany

### **Keeping your open gear up and running**

GRACO, Belgium



## Arab News



## International News



## New Products



## Diary dates

- The magazine editorial staff welcome the contribution of experts to enrich the contents of the magazine.

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### **Editor-in-Chief**

Eng. Ahmad Al-Rousan

### **Managing Editor**

Suha M. Canaan

### **Graphic Designer**

Yousef Ahmad

For advertisement

please contact Editor-in-Chief

### **Email**

[aucbm@scs-net.org](mailto:aucbm@scs-net.org)

[aucbm1977@gmail.com](mailto:aucbm1977@gmail.com)

### **Website**

[www.aucbm.net](http://www.aucbm.net)



## AUCBM's *Quarterly Cement and Building Materials Review (CBMR)*

### EDITORIAL SCHEDULE FOR 2024

| ISSUE                        | THEMES  | EVENTS |
|------------------------------|---|--------|
| <p>March 2024<br/>(# 95)</p> | <ul style="list-style-type: none"> <li>- Pyroprocessing</li> <li>- Process control and optimization</li> <li>- Cement Process Engineering</li> <li>- Cement kilns</li> <li>- (Pre-)processing hazardous waste</li> <li>- Flue gas treatment</li> <li>- Digital transformation</li> <li>- Digitalization in cement industry</li> <li>- Burners and burning processes</li> <li>- Upgrading projects</li> <li>- Modernization and automation</li> <li>- Gas analysis</li> <li>- Testing and analysis</li> <li>- Laboratory equipment</li> </ul>  |        |
| <p>June 2024<br/>(# 96)</p>  | <ul style="list-style-type: none"> <li>- Bagging and packing</li> <li>- Loading/unloading and storage systems</li> <li>- Conveying solutions</li> <li>- Feeding technology</li> <li>- Belt bucket elevators</li> <li>- Materials handling in cement plants, quarries, terminals and ports</li> <li>- Domes, silos and transport</li> <li>- Wear protection</li> <li>- Gears, drives and lubrication</li> <li>- Fire protection systems</li> <li>- Maintenance procedures</li> <li>- Refractories</li> <li>- Quarry rehabilitation</li> <li>- Silo cleanout</li> <li>- Filters, dedusting</li> </ul> |        |

|                                  |   |   |
|----------------------------------|---|---|
| <p>September 2024<br/>(# 97)</p> | <ul style="list-style-type: none"> <li>- White cement manufacturing</li> <li>- Blended cements</li> <li>- Multi-component cements</li> <li>- Slag cements</li> <li>- Green cement production</li> <li>- Cement blends / mixes</li> <li>- Cement additive</li> <li>- Cement composition</li> <li>- Cement chemistry</li> <li>- Zero carbon cement</li> <li>- Producing low-carbon clinker</li> <li>- Raw material for cement additive</li> <li>- Supply chain management</li> <li>- Energy-efficient cement production</li> <li>- Quality assurance and process control in cement plants</li> <li>- Cement Production cost saving</li> </ul>                   | <p style="text-align: center;"><b>TBA</b></p> |
| <p>December 2024<br/>(# 98)</p>  | <ul style="list-style-type: none"> <li>- Coolers</li> <li>- Fans</li> <li>- Air cannons</li> <li>- Occupational health and safety</li> <li>- Comminution</li> <li>- Vertical roller mills</li> <li>- Roller presses</li> <li>- Increasing cement mill output</li> <li>- Crushing</li> <li>- Grinding &amp; grinding aids</li> <li>- Waste heat recovery</li> <li>- Thermal imaging</li> <li>- Thermal recycling</li> <li>- Methods for treating and utilizing bypass dusts</li> <li>- Explosion protection in alternative fuel storage silos</li> <li>- Alternative fuels handling systems</li> <li>- Production and use of Solid Recovered -Fuels</li> </ul> |   |

Deadlines for receiving articles, press releases, or advert materials for 2024 issues are as follows:

March issue: **7<sup>th</sup> March 2024**

June issue: **30<sup>th</sup> May 2024**

September issue: **29<sup>th</sup> August 2024**

December issue: **5<sup>th</sup> December 2024**

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## Grupo Puma Sides with Pidilite to Produce Drymix Mortars in the UAE

Grupo Puma, Córdoba, Spain and Pidilite Industries Limited, Mumbai India, have recently announced they will join forces for the production and marketing of drymix mortars in the United Arab Emirates. They formed Pidilite Puma MEA Chemicals LLC at Dubai Investment Park 2. The new company is determined to produce specialty drymix mortar such as cementitious tile adhesives (CTA) and grouts, self-levelling compounds as well as technical and decorative drymix mortars for the UAE and GCC markets. Both Pidilite and Puma bring their technological knowhow and experience into the new strategic partnership.

[drymix.info](https://drymix.info) 

## Ceramic Sanitaryware and Tableware Technologies: SACMI partner of Koblenz University of Applied Sciences

**SACMI technology books supplied to university students to promote training and grow skills in an enabling sector for applied sustainability.**

«An excellent interface between science and in-the-field experience» is how Pascal Seffern, Professor at the Koblenz University of Applied Sciences, underlines the value of SACMI's books on technologies for the production of ceramic sanitaryware and tableware, recently handed out to students following a partnership established between SACMI and the German university.

The aim of the new partnership is to inspire tomorrow's graduates and teach them the basic principles and practical applications of the ceramics industry. «These books transfer to the reader a wide range of fundamental concepts regarding all areas of the sanitaryware and tableware manufacturing industry» explains the professor.

Underlying the initiative is the transformation of manufacturing towards applied sustainability, especially in the construction industry. «The ceramics industry can still enjoy a growing reputation and relevance as an enabling sector – observes Seffern – but it is essential to foster and develop young specialized talent».

This has brought to the forefront the strategic topic of training and the capacity of the ceramic world to attract young technicians and technologists. The partnership with SACMI promises to stimulate skill and passion for the ceramics sector, combining academic research with SACMI's decades-long in-the-field experience to discover increasingly efficient and sustainable application solutions.

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See us at the MICON stand (H Section)



## Villeroy & Boch takes over Ideal Standard

**On September 18th Villeroy & Boch AG signed binding agreements to acquire operating companies in the Ideal Standard Group.**

The two companies are a strong strategic fit given their regional presence, sales strategies and product and brand portfolios, laying the foundations for a stronger market position and additional growth. In an industry with global growth potential, the integrated company will, after completion of the transaction, join the ranks of Europe's largest manufacturers of bathroom products. The acquisition price is based on a company valuation of approximately € 600 million.

“This merger means that we will now catch up with the largest players on the European market in the bathroom sector in terms of turnover,” explains, CEO of Villeroy & Boch. “Our complementary strengths also make us more competitive and significantly improve our starting position for achieving additional growth.”

### **Regional strengths, sales channels and product ranges interweave**

The merger will create a powerful combination of complementary established brand and sales strategies. Villeroy & Boch has a strong geographical basis in Central and Northern Europe as well as Asia, while Ideal Standard enjoys an excellent reputation with its brand portfolio in the UK, Italy and the Middle East / North Africa region in particular. While Villeroy & Boch's sales strategy focuses primarily on a high-end private customer base, Ideal Standard possesses particular expertise in the project business, including for the public sector, the healthcare sector and for developers of large residential, hotel and commercial properties. In addition, alongside a broad range of ceramic bathroom ware and other products, Ideal Standard comes with an established fittings business, which generated more than a third of its revenue last financial year.

### **New expertise opens up prospects for growth**

With this merger, Villeroy & Boch is not only elevating its bathrooms business to a new level in terms of volume, but is also gaining access to significant additional growth potential. Ideal Standard's manufacturing base in the fittings business, expertise in the project business and strong market positions in the UK, MENA and Italy will grant Villeroy & Boch improved market penetration and coverage of specific regions and product segments. These long-standing brands are now combining their strengths.

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# Prepol® SC – step combustor for waste utilization in cement plants

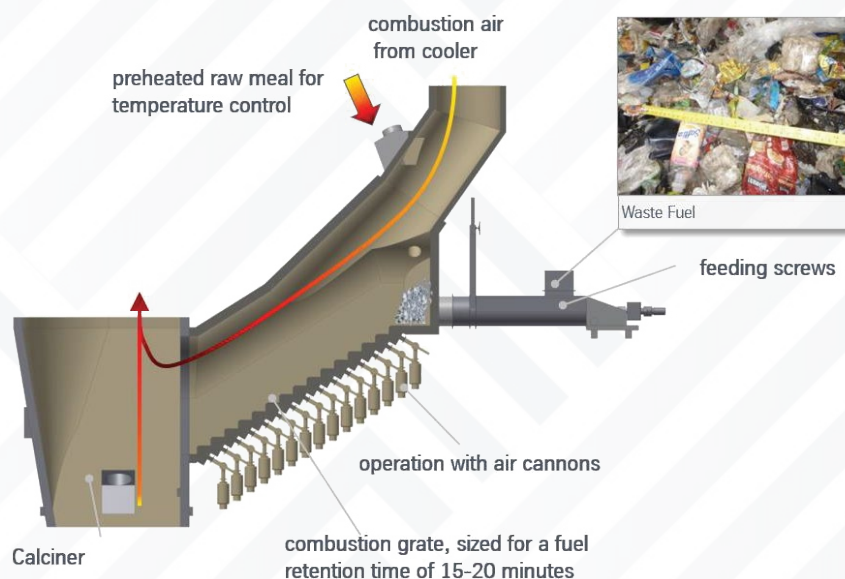
thyssenKrupp Polysius GmbH, Germany

In 2025, according to UN figures, more than 8.1 billion people will live on the earth. The cement industry can be a huge lever for a greener future and to manage upcoming waste challenges regarding resources and waste management: Through the use of the prepol® SC coal, gas and oil as primary energy sources can be replaced 100 percent by alternative fuels. This contributes clearly to the vision of the green polysius® cement plant. thyssenkrupp Polysius is convinced that this is a transformation journey - from #grey2green.

The prepol® SC is an add-on for the prepol® precalciner. On this simple combustion grate, waste can burn for more than 1,000 seconds at high temperatures. Compared to ordinary calciner technology with only up to 7 seconds residence time the prepol® SC opens a new dimension in burning: It provides a high flexibility for a wide variety of wastes that leads to a new level of fuel-cost savings – and paves the way for a more sustainable cement production. Samuel Zühlsdorf, Senior Engineer Products & Quotation, thyssenkrupp Polysius GmbH: “The prepol® SC is a very simple combustion grate, made of several static, non-moving refractory steps, giving the system its name: Step combustor.”

## prepol® SC – the design of the step combustor

The prepol® SC is designed with innovative features to meet the customer demands. As the combustor is connected to the tertiary air channel, the hot air can deliver what is needed for a complete and successful combustion: Heat for drying and ignition, and oxygen for safe and complete combustion. In addition, a regulated meal feed from one of the cyclones above into the combustor ensures an optimum control of the combustion process inside the chamber.

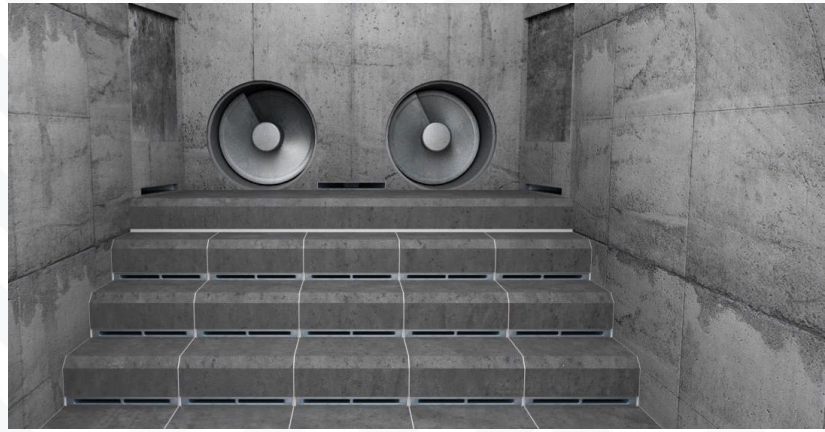


prepol® SC overview

## Modular design, simple maintenance and high availability

The design is modular which leads to an easy integration in nearly every existing plant. Moreover, a simple maintenance and a high availability of the kiln operation is ensured as there are no moving parts in the combustion chamber.

The step-shaped grate can be connected to any kind of precalciner loop and is nothing more than a tube-like extension: small in size but with huge potential in terms of combustion! The grate area of the unit is big enough to offer waste a residence time of more than 1,000 seconds.



Inside of the prepol® SC

## The benefits of the prepol® SC step combustor

### Safe

The thermal process always takes place with an air excess. It is therefore impossible for dangerous carbonization gases such as CO, H<sub>2</sub> and C<sub>x</sub>H<sub>n</sub> to form. Forced feeding of the fuel seals the system off from the environment. In an overpressure situation (e.g. failure of the system fans), ignition of the fuel in the conveyors can be prevented. During a stoppage, the combustor is completely isolated from the conveyors by pneumatically-operated airlock slide valves.

### Effective

The use of air cannons ensures that the fuel is actively transported and turned over. Every air blast brings the fuel into contact with fresh oxygen, and every agitation separates the smaller particles, so that only the large fuel particle fraction remains on the step grate. The prepol® SC thus operates extremely effectively, as the fuel is only processed as far as necessary until it can enter the calciner as gas-stream-entrainable char. Related to the low space requirement of the combustor, very large quantities of fuel can thus be processed effectively.

### Simple & Reliable

The combustor consists entirely of mechanical components that have already thoroughly proven their reliability in the cement industry. Moreover, both the screw conveyors and the air cannons have been specially optimized for the rough conditions of the fuel-handling applications. The outstanding thing is that although both systems actively assist fuel conversion they are not subjected to the thermal and chemical stresses in the combustion space. The mechanically-moved components are located completely outside the combustor, where they can be easily accessed. A further advantage: The simple geometry of the system makes it very easy to implement it at any kind of existing precalciner system, with shortest installation periods.

### Flexible

The prepol® SC is made for all kind of fuels and can be adjusted flexibly in size. Due to its modular design, the prepol® SC technology can be easily integrated into existing cement plants. According to given boundary conditions, the width and length of the unit can be adjusted. For complex retrofits, the grate can be shortened: The shortest possible version, the prepol® SC-S still offers more than 50 times more combustion time compared to existing calciner loops but needs a minimum of space.



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## prepol® SC - advantages at a glance

- **incineration of even large amounts of very coarse and wet alternative fuels** of up to 300 mm
- **Patented air blast** transporting, with no moving parts in the hot zone
- **Highest fuel flexibility** thanks to the fuel separation effect on the grate – “burn what you get”
- **Constant agitation of the fuel** for a superior oxygen supply and fewest CO peaks
- **Complete and safe operation with lowest emissions** due to most suitable combustion conditions
- **Maximum reliability, proven in ten years of operation** with low maintenance costs and several step combustors in operation

## prepol® SC – the working principle of the step combustor

Especially for existing plants that face operation problems when burning alternative fuels, the “suspension” of fuel particles in the gas stream as well as the extension of residence time can be reached with minimum effort: Compared to an extension of the calciner loop, a step combustor offers highest residence times in a significant smaller volume. This is possible as the fuel lies on the grate instead of following the gas stream in the loop. The small volume and the resulting lower weight of the combustion chamber mean that less civil construction reinforcement is required.

The refractory steps of the grate are equipped with nozzles which are connected to air-blast cannons. The air blasts agitate the fuel up and progressively convey it along the grate. Moreover, the swirling-up constantly turns over the fuel and assists the combustion process, ensuring that a very high throughput rate is achieved per unit area of grate. A further advantage is that the light, already-converted char of the fuel particles is quickly blown out of the combustor and entrained in the suspension gas stream of the calciner, while the heavier particles remain on the grate for further thermal processing. The fuel transformation is thus positively assisted by the active fuel conveyance system throughout the entire fuel retention time.



**Separation of fine and coarse fraction of RDF during each air shock blast**

One step in preparation, several steps in combustion. With direct calciner feeding, refuse-derived secondary fuels can only be successfully used if the waste has passed through a multistage mechanical processing plant. The secondary fuel has to be in such small pieces that it can be suspended in the gas stream and totally burns out within a retention time of approx. 5 seconds in the calciner. This demands an edge length of about 50–100 mm. Using the advanced prepol® SC technology, even heavy waste fuels can be used that are non-flyable and that have an edge length of up to 300 mm. Waste preparation is only needed to adjust the heating value and to control contaminations, inert constituents and harmful substances. Instead of multiple shredding and sorting steps in fuel preparation, the fuel is treated on the multiple steps of the combustion grate.

In order to ensure the best combustion performance, the step combustor is equipped with a robust and reliable feeding system. The material is fed by two screw conveyors which push the fuel very defined onto the first step of the grate. The cold fuel protects the conveyors from direct contact with the fire. The first step of the combustion grate is the platform-like ignition table, on which the incoming fuel piles up. The heap of fuel that acts as a seal against false air and prevents hot gas from flowing back into the screw conveyors and avoids overheating. The fuel remains on the ignition table for a few minutes where it is slowly dried, pyrolysed and ignited by contact with the hot air. The heap of fuel buffers also fluctuations in the feed rate and the calorific value of the alternative fuel.



prepol® SC connected to the lower calciner section

## A new type of step combustor – the prepol® SC-S

If boundary conditions of projects require a small chamber size, e.g. due to little available space in the preheater tower or availability of higher quality alternative fuels, it is worth thinking about the short version of the step combustor, the prepol®-SC-S. In this version, the combustor is connected to a small bypass TA duct. It consists only of the ignition table, the first three steps of the grate together with the screw feeding system. The retention time is smaller compared

to the prepol® SC but big compared to ordinary calciner loops: about 150-300 seconds can be achieved – a valuable add-on to boost existing installations. The combustor is integrated into the pre-calciner and does not require a separate tertiary air or meal connection – the radiation heat pyrolyzes the alternative fuel on the grate before the gases and size reduced particles enter the precalciner atmosphere. This makes retrofitting of the system even easier.



prepol® SC connected to the lower calciner section

## Summary

The installation of a prepol SC is specifically designed for the continuous and smooth usage of high amounts of coarse RDF at the calciner. The low preparation required for a wide variety of RDF with different sizes and also high humidity together achieves a very high flexibility for the usage of all different kinds of fuels. Combined with the optimal combustion control of the prepol® SC the influences on the kiln operation and emissions are drastically reduced.

With the flexible sizing adaptable at different installation conditions the prepol® SC is the ideal for the solution for the usage of high RDF in the cement kiln system.

# Counting carbon in the cement industry

FLSmidth Inc, USA

Colleagues from FLSmidth recently discussed the impact of ESG on cement projects, how environmental impact frameworks and reporting tools are used, and what data really matters when proving sustainability.

## Investing in change

“Sustainability did not used to play an important part of project due diligence,” says Tine Bremholm Kokfelt, Senior Project & Export Finance Manager at FLSmidth. “The focus was on proving financial return, how a project would provide jobs and support local development, and some emissions – typically dust. Now, sustainability is at the centre of just about every project we work on. It’s a big change in terms of priorities.”

Tine works in FLSmidth’s finance department, helping to connect our customers with the finance they need to move projects forward. The change she’s describing derives from a growing global consciousness of the dangers posed by global warming, and the ways in which climate change is being addressed through the financial markets.

While socially responsible finance has, to some extent, always been part of the financial scene, the increasing importance of ESG data to investors and lenders, starting with the release of the 2004 UN report ‘Who Cares Wins’ and more widely accepted with the Paris Agreement in 2015, has dramatically shifted the landscape. Now, within the cement industry at least, we have reached a point where nearly every investment is looked at through an ESG lens.

“What we don’t want to see is investors and lenders leaving the cement industry only to achieve their own short-term climate targets,” Tine says. “This doesn’t solve the problem – it just passes it on to other less suitable parties. Fortunately, there are a lot of funds out there actively seeking opportunities to finance projects that reduce carbon emissions – including those from the cement industry. The difficulty for these financiers is how to know which projects will actually perform. That’s where all the frameworks come in.”



Pictured from left to right:

Tine Bremholm Kokfelt,  
Senior Project & Export  
Finance Manager

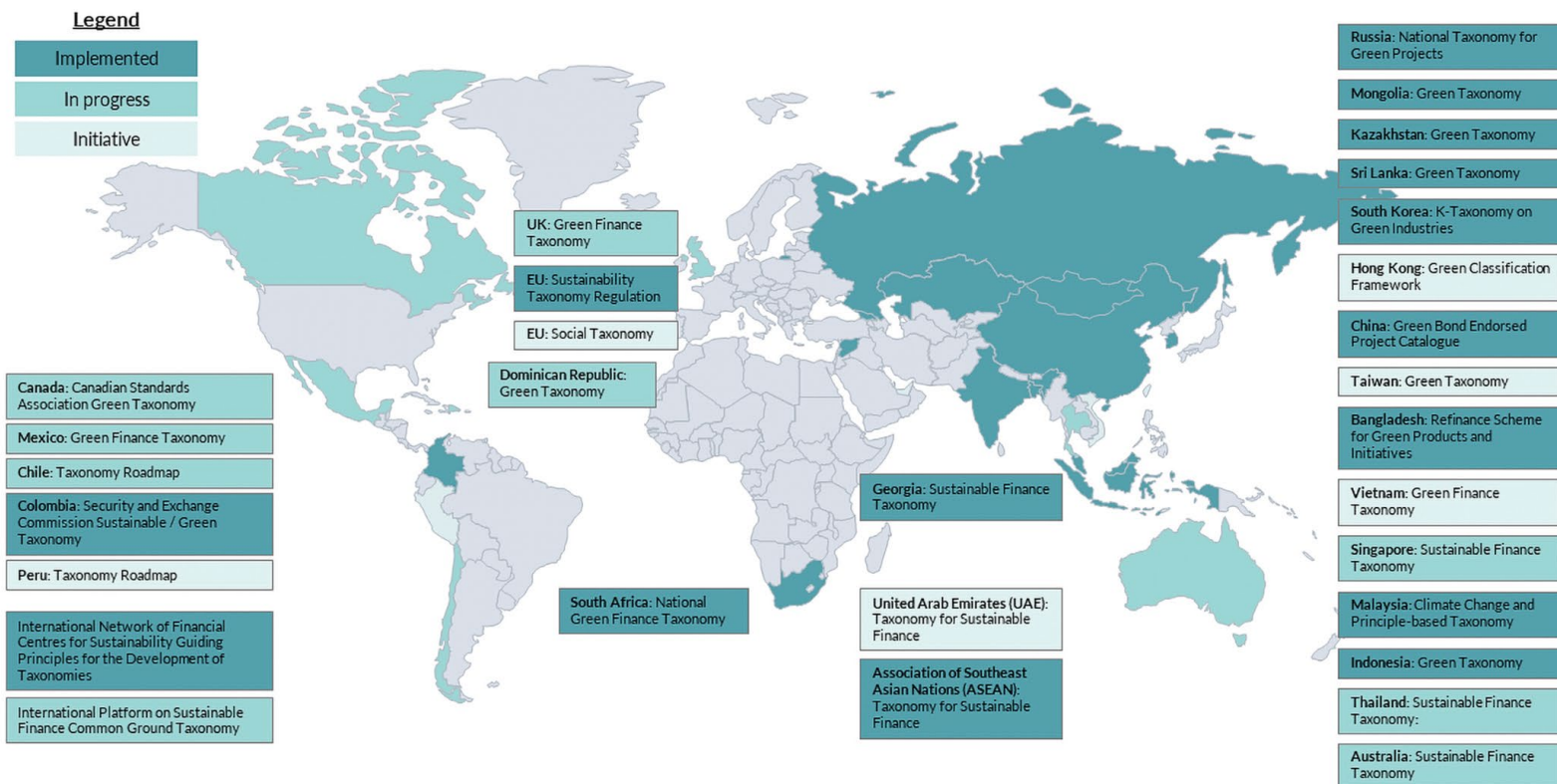
Susanne Vedel Hjuler,  
Sustainability Manager

Sine Bøgh Skaarup, Head  
of Process Design, Lab &  
System Engineering

## How frameworks help prove the credibility of ESG investments

Frameworks such as the EU Taxonomy, a new European classification system, are designed to clarify which projects can be considered environmentally sustainable so as to protect financial stakeholders from greenwashing and help them finance projects that will contribute to protecting our planet. The EU taxonomy takes a ‘do no significant harm’ approach to sustainability, so aims not just for carbon reduction but also a safe working environment, community benefits, etc. The US is expected to develop a similar framework for investors, while many other countries have either started work on their own taxonomy or finalised one.

Figure1 demonstrates just how many frameworks there are to navigate. While the structure of the taxonomies tends to be similar, the objectives, criteria and thresholds can differ. Some include transition activities; some use a traffic light system. If you consider that one project may seek financing from various multinational lenders, it’s evident that the frameworks – though certainly helpful – add an additional layer of complexity to funding bids.



**Figure 1. Overview of green taxonomies and their various stages of development**

In the EU, now, the drive is to become Taxonomy-aligned – meaning your operations meet the EU Taxonomy classification of ‘environmentally sustainable’. This applies as much to our customers as it does to FLSmidth and our competitors. As a result, there are huge incentives to improve performance and reduce environmental impact – and, in turn, provide the data to prove it.

### Demonstrating environmental sustainability

“These frameworks are helpful from an investor and lender standpoint. However, they are often very high level, or include very specific comparisons – for example, how a product performs compared to the ‘next best solution’,” says Susanne Vedel Hjuler, Sustainability Manager at FLSmidth. “We also need to be able to demonstrate environmental credentials of both our products and projects for specific customer cases, as well as impacts across our entire value chain. With the wide – and increasing – range of requests for documenting environmental sustainability performance, within

different scopes and context we make use of different methods and tools. This includes Life Cycle Assessments (LCAs), as well as carbon footprinting. Some tools and methods are more granular than others, and provide the level of detail that the plant wants; others give relevant insights for investors.”

Our own in-house data demand has also increased with our commitment to achieve specific targets and contribute to worldwide efforts to keep global warming below 1.5°C. According to our Science Based Targets (SBTs) pledge, by 2030 FLSmidth will:

- Be carbon-neutral in our own operations by 2030
- Have 30% of our spend with suppliers with Science Based Targets, by 2025
- A 56% reduction in our economic intensity by 2030. (Meaning, if you consider the lifetime use phase of all products we sell in a given year, we need to reduce the ratio of the expected emissions associated with all of these products and their respective order intake. That ratio must reduce 56% by 2030.)





We made this commitment because we believe we have a responsibility to tackle climate change – and the opportunity to make a real difference. As part of our SBT reporting obligations, we collect information on every single energy consuming product that has been sold each year, including the required parameters to estimate the expected lifetime energy consumption. This data is then used to calculate lifetime greenhouse gas emissions from the product, applying greenhouse gas emission factors for all energy types, from external databases.

## Assessment methods and tools definitions and uses

A **Life Cycle Assessment** looks at all the potential environmental impacts of a project or product throughout its life – sometimes referred to as cradle to grave. For example, an LCA on a new clinker cooler project would consider the raw materials used to manufacture the cooler, as well as the construction and ‘use phase’ environmental impact, and ‘end of life’ – i.e. does it become waste, can it be recycled, etc. Even the manner in which the raw materials and finished machinery are shipped is considered. Further, it is also possible to conduct LCAs with a reduced scope, e.g. ‘cradle-to gate’, which includes all potential environmental impacts until the point where the product leaves the producer to be shipped to the customer. The relevant scope depends on the application of the study. LCAs are governed by ISO frameworks and require third party review. They can take hundreds of hours to complete, depending on the project/product being assessed.

**Carbon footprinting** addresses only greenhouse gas emissions, expressed as CO<sub>2</sub>-equivalents, rather than the full range of environmental impacts assessed in an LCA. These can still be made across the entire life cycle of a product, but may also focus on specific phases, such as the use phase.

## Setting performance expectations with carbon calculators

“For decades, we’ve been issuing process guarantees on power, fuel and production, but in 2018 we started work on a specific tool to estimate CO<sub>2</sub> emissions for every project,” says Sine Bøgh Skaarup, Head of Process Design, Lab & System Engineering. “We wanted to be able to estimate environmental impact – not only because we knew our customers

LCAs can be used to produce **Environmental Product Declarations (EPDs)**, which are specifically framed summaries of the LCA studies, excluding confidential information. LCAs are not usually publicly available, whereas an EPD can be a useful tool to show customers how your product performs in accordance with environmental targets. Cement manufacturers use EPDs, and the construction industry rewards the use of products with an EPD under certification schemes such as BREEAM, DGNB and LEED.

An **LCA Light Study** uses the same approach as an LCA, but may be based on more assumptions and less granular data and does not include a full ISO-compliant report and third-party review. Thus, an LCA Light Study can be produced more quickly. The resulting data is still useful for facilitating decision making.

were interested, but also because it helps us identify our ‘hot spots’, which is useful in our product development. This calculation requires additional data about external influences, such as the source of the power, the type of fuel, etc. It’s also the only calculation that considers the equipment within the system as a whole and how it all performs together, which gives us an idea of the opportunities for optimisation.”



The CO<sub>2</sub> calculator is focused on the customer's perspective – the cement making process. It addresses cement's life cycle impacts from cradle to gate – including the operation at the cement plant, upstream impacts from raw materials, and transport. The calculator is built on the wealth of experience and knowledge of our Process Design Engineers about how our products will perform in a given application at customer's cement plants, and further draws upon data from an LCA database, which adds greater depth to the calculation.

"Within our Process Design Department, every calculation we carry out is project-specific," explains Sine. "For example, we'll calculate the potential carbon reduction of clinker substitution or alternative fuel projects."

While we usually provide operational guarantees such as power demand, fuel consumption and capacity, we don't guarantee CO<sub>2</sub> emissions because they are a result of power and fuel

consumption and, of course, much depends on optimising operating parameters and the specific inputs at the plant. For example, we have no control if the electricity is generated from wind power or a coal fired power plant.

"Our ambition is for all proposals to include CO<sub>2</sub> calculations," says Sine. "The more experience we get, the more we can develop these tools, and the easier it becomes to perform the calculations. That's not to say it's simple – obviously, as the business case evolves, so does the calculation. But the tools are becoming more sophisticated. This not only helps steer the plant towards one solution or another, but also sets expectations for what the plant should be able to achieve with that project, in terms of carbon emissions."

"From the lender's perspective, we're able to provide more and more detail to support their decision-making," explains Tine. "And that's become increasingly important as finance parties have to report on the CO<sub>2</sub> coming from their investments."

## The CBI project

In 2022, we signed a contract with CBI Ltd in Ghana for a new calcined clay facility. The project will enable CBI to replace 30% of imported clinker and reduce CO<sub>2</sub> emissions per tonne of cement by up to 20%. The project gained financing from the Danish IFU and Norwegian Norfund, both of which required the project to be EU Taxonomy compliant. Moreover, the Danish export credit agency, EKF extended a green loan financing. They all wanted to see the environmental impact of the project and how that would develop over time. This project required significant efforts from our team, who had to perform the necessary calculations.



Rendering of a calcined clay facility

## The threat of greenwashing remains

Though these reporting and compliance frameworks are intended to protect investors from greenwashing; the threat remains.

"There's no doubt that performing these calculations is incredibly important to help understand which is the right path to take, both from a process and ESG perspective," says Sine. "But it's also important to keep an eye on

the long-term performance of the project. I hope that our customers keep those calculations in mind once their projects are up and running, as a benchmark for what should be achievable in their operation. And I hope that they will call us in to find further opportunities for optimisation. Sustainability is not a box-ticking exercise. It's the performance that counts – that's the data that really matters."



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# Plant inefficiency and the impact on CO<sub>2</sub> reduction technology

Mark Mutter – JAMCEM Consulting Limited

## Introduction

We have previously written a number of articles on process optimisation, with the aim of identifying the most important process parameters which have an effect on the fuel and power consumption of a cement plant. Whilst process efficiency is always important, in countries where fuel and power is cheap, it can become less of a priority when considering which costs should be targeted. This is especially the case where the market is sold out i.e. every tonne that is produced can be sold.

However, regardless of the cost of the fuel, process efficiency becomes vastly more important when we consider the CO<sub>2</sub> emissions associated with poor process efficiency – in particular fuel efficiency, which is the focus of this article. Poor process efficiency will result in unavoidable emissions of CO<sub>2</sub> per tonne of clinker and potential additional costs if the plant is located in a country where carbon emissions are taxed.

Even if the plant is located in a country where there are no CO<sub>2</sub> regulations and taxes, there will be a knock-on effect if the plant is considering reducing their emissions through the installation of a carbon capture and storage/ utilisation system (CCSU). The volume of CO<sub>2</sub> that is generated by the plant and the total gas that has to be treated will dictate the sizing of any CCSU that is installed in the plant and therefore the overall capital cost to the business. Whilst technology is developing over time, the current systems that are at a level which can treat a large proportion of a plant's waste gas are extremely energy intensive and therefore the larger the gas volume that has to be treated, the greater the power requirement.

Therefore within this article we are considering some of the previously covered areas, but focusing on the differences in CO<sub>2</sub> generation and gas volume to be treated for an efficient and inefficient plant.

## Overview of carbon capture technology

Whilst there are a number of different technologies that are being implemented for carbon capture in the cement industry, the main principle is that of separating the different gaseous elements and compounds found in the stack gases and then capturing the CO<sub>2</sub> for either storage or further use. The typical composition of stack gases (on a dry basis) from a cement plant, where inleak is kept to a minimum, are shown below.

| CO <sub>2</sub> | N <sub>2</sub> | O <sub>2</sub> |
|-----------------|----------------|----------------|
| 21%             | 71%            | 8%             |



As can be seen from the analysis, only a relatively small proportion of the total gas stream is CO<sub>2</sub>, so minimising the total volume of gas going to the carbon capture system is a key way of reducing its sizing, thereby reducing the capital cost of the system. A further element of the currently technically ready systems is their energy intensity, with figures of between 275 and 600 kWh/tonne of CO<sub>2</sub> captured, depending upon the technology employed. Therefore a plant capturing 1 million tonnes per annum of CO<sub>2</sub> could require 54 MW of additional power (assuming 400 kWh/tonne of CO<sub>2</sub> captured).

Over the longer term, maintaining a focus on efficiency and inleaking air will be critical, as increasing volumes from the process for a CCSU that has been designed for a specific volume will result in the CCSU becoming the limiting factor the pyro-processing line and therefore clinker production.

## Plant comparison

In order to demonstrate the difference between an efficient and inefficient plant, we have evaluated several key operational parameters which will affect the sizing of the CCSU due to either increases in fuel consumption or total gas volume as follows:

**Kiln output:** Operating the kiln at the maximum output level is the key to minimising kiln fuel consumption – this is due to the fact that many of the system losses such as the kiln shell losses remain relatively constant regardless of the throughput, so on a kcal/kg basis the losses increase as output decreases. In our comparison of plants, we have added 10kcal/kg for the plant that is running at a sub-optimal kiln throughput level, which in most cases will be due to the other factors below making the process inefficient and the plant being fan limited.

**Volatiles bypass:** The use of a volatiles by-pass system is quite widespread in the MENA region due to the nature of the raw materials, with some plants containing high levels of chloride in limestone or clays. However, over time plants often use the by-pass system for the wrong reasons. For example, poor combustion control can lead to volatilisation of sulphates in the burning zone, leading to the plant using the bypass to attempt to remove sulphates from the system as opposed to chlorides. In other situations, where there is significant inleaking air in the system, the by-pass is overused to prevent back-pressure on the ID fan. Regardless of the reason for the over-use of the bypass, each percentage of bypass that is used adds around 2.5kcal/kg to the overall fuel consumption of the plant. In our comparison, we have added 25kcal/kg for a 10% use overuse of the bypass system.

In addition to the increase in fuel consumption in the system due to the losses through the bypass system, it is likely that the gases from the bypass system will also have to be passed through the carbon capture, as the stream will contain the CO<sub>2</sub> from the fuel that is burnt in the kiln as well as the remaining CO<sub>2</sub> from the hot meal passing from the preheater/precalciner into the kiln. This will also increase the size of the CCSU system and this has also been taken into consideration in our calculations in the summary later in the article.

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**Cooler efficiency:** Inefficiency of the clinker cooler is another of the main areas that results in increased fuel consumption. This occurs due to insufficient heat being recuperated from the clinker at the front of the cooler, resulting in a lower secondary and tertiary air temperature. In our comparison of plants, we have added a further fuel penalty of 10 kcal/kg for poor clinker cooler optimisation.

**Kiln feed chemistry:** Maintaining a low variability of kiln feed chemistry – in particular LSF – will result in a lower fuel consumption, avoiding cycling of the kiln burning conditions. A good performance of kiln feed LSF SD is a standard deviation of 1, with best practice being 0.7. In our comparison of plants, we have taken a standard deviation of 1 for the efficient plant and 3 for the inefficient plant, leading to an increase in fuel consumption for the inefficient plant of 8 kcal/kg.

**Inleaking air:** The source of the inleaking air in the process will dictate whether the inefficiency is adding to the fuel consumption of the plant or simply making the gas volume that has to be treated higher than necessary. Inleak in the preheater tower will lead to an increase in the fuel consumption as the cold air that leaks into the tower will cool the gases, requiring further fuel to be added to compensate for the loss of heat. Inleak after the tower will lead to an increase in the overall gas that has to be treated.

In the comparison of the plants, we have modelled for inleak in the tower – adding 15 kcal/kg to the fuel consumption – and then a difference in stack oxygen of 10% for an efficient plant and 14% for an inefficient plant.

### Impact on fuel consumption

The table below shows the comparison of the fuel consumption of the efficient and inefficient plants described above, taking into consideration the effects mentioned above.

| Process factor        | Efficient plant (KCAL/KG clinker) | Inefficient plant (KCAL/KG clinker) |
|-----------------------|-----------------------------------|-------------------------------------|
| Base fuel consumption | 760                               | 760                                 |
| Kiln output           |                                   | +10                                 |
| Volatiles bypass      |                                   | +25                                 |
| Cooler efficiency     |                                   | +10                                 |
| Kiln feed chemistry   |                                   | +8                                  |
| Tower inleak          |                                   | +15                                 |
| <b>Total</b>          | <b>760</b>                        | <b>818</b>                          |

The table shows that the inefficient plant could have a fuel consumption of up to 8% higher than the efficient plant when the above factors are taken into consideration.



## Impact on gas volume

In order to consider how this translates into the sizing of the required CCSU, we have used a JAMCEM pyro-processing gas model to estimate the total volume at the CCSU inlet based on the following:

- Fuel consumption as identified above
- All bypass gas is processed through the CCSU along with the main stack gas
- 10% oxygen at the stack for the efficient plant and 14% oxygen at the stack for the inefficient plant.
- Coal mill not in operation i.e. full gas flow to CCSU.

The result of the analysis are shown below on a Nm<sup>3</sup>/kg clinker basis.

| Process factor  | Efficient plant (nm <sup>3</sup> /kg clinker) | Inefficient plant (nm <sup>3</sup> /kg clinker) |
|-----------------|---|---|
| Volume PH exit  | 1.40  | 1.55  |
| Bypass volume   | 0.04  | 0.09  |
| Stack volume    | 1.84  | 2.90  |
| Volume for CCSU | 1.88  | 2.99  |

### The main points of the analysis are as follows:

- The effect of the higher fuel consumption can be seen on the preheater exit volumes of the two cases.
- The overuse of the bypass will contribute to the higher volume of gas that has to be treated by the CCSU.
- High levels of inleaking air between the preheater exit and the main stack have a significant effect on the volume of gas that needs to be treated.
- In this comparison of best and worst case the difference in gas volume is around 60%.

The case we have presented of the inefficient plant could be considered to be an extreme (although we have visited plants with similar conditions) and therefore the impact of poor efficiency on gas volumes will be somewhere between the two cases presented. If we were to take a 30% increase in gas volume for an inefficient plant, and used a capital cost scaling power of 0.66, the resultant increase in the capital cost for the inefficient plant would be 19% higher than the efficient plant.

Considering recent data for a plant capturing 500k tonnes per annum costing €300 million, this 19% of additional cost would represent an additional €57 million of investment. This order of magnitude of capital cost differential should be enough for any cement producer to consider improving process efficiency and reducing inleaking air.



# Boosting efficiency and decarbonization in cement manufacturing with advanced Organic Rankine Cycle technology

Andrea De Finis and Sara Milanese, Exergy International

Cement is considered one of the most energy intensive and CO<sub>2</sub> hard-to-abate sector. The contribution of the cement sector to the global annual energy consumption and carbon emissions is significant and still on rise, considering that the direct CO<sub>2</sub> intensity of the cement production grew at a rate of 1,8% per year during 2015-2020 whereas it should decline by 3% annually to meet the target of NetZero by 2050.

The difficult challenge ahead for this sector will be to meet a growing demand while limiting CO<sub>2</sub> emissions.

In the last decades cement manufactures have accelerated investments in technologies to increase the efficiency of the cement production process and reduce their carbon footprint. Several technologies can be efficiently employed, even in combined use, to control carbon emissions such as the use of SCMs in substitution to clinker, alternative fuels, waste heat recovery systems (WHR), improved technologies in pyro-process, Carbon Capture Utilization and Storage technologies (CCUS) and green hydrogen.

## Waste heat recovery: a key solution for cement industry decarbonization targets

Waste Heat Recovery (WHR) systems reveal a very effective and market-ready solution to achieve both targets of enhancing energy efficiency and decarbonizing the cement manufacturing through thermal energy exploitation. The enormous potential of heat recovery in the cement sector has stimulated the adoption of WHR systems across cement plants worldwide. A recent market report by Global Market Insight states that the WHR capacity installed in the cement sector reached almost 2,5 GWe in 2022 and is expected to grow at a CAGR of 11.8% in the period 2023 to 2032 to

settle at 7,5 GWe by 2032. In Middle East and Africa region the growth is projected at 10.3% CAGR for a total installed capacity raising from around 80 MWe in 2023 to 187 MWe in 2032.

The move toward installation of heat recovery technologies in cement factories will be further driven by the growing prominence of ORC based systems, which can recover a significant amount of heat even from medium and low-temperature sources.

## ORC WHR systems versus Steam Rankine cycle

Waste heat in cement plants can be recovered from the exhaust flue gases of the kiln preheater and the clinker cooler employing two different technologies: steam Rankine Cycle and Organic Rankine Cycle.

Steam cycle uses water as working fluid while Organic Rankine cycle employs organic fluids such as hydrocarbons or refrigerants instead of water which is vaporized and expanded in a turbine to produce electricity. The organic working fluid has a lower boiling point and higher vapor pressure than water and is therefore able to use low-medium temperature heat sources to produce electricity more efficiently than steam cycle. The organic fluid for the ORC cycle is chosen for best fit with the heat source according to their various thermodynamic properties, thus obtaining higher cycle and expander efficiencies.

Steam cycle have been for years the traditional choice for Waste Heat Recovery in cement plants and they still make up the largest number of WHR installations worldwide. Organic Rankine cycles have been growing in the last decades, gaining momentum over steam due to higher cycle and turbine efficiency for exploitation of low to medium temperature heat sources in addition to several further advantages.



In the chart below characteristics of both systems are compared:

| Features                   | ORC WHR plant  | Steam WHR Plant  |
|----------------------------|--|--|
| Temperature of heat source | Suitable for a wide range of temperatures >150°C for low to medium power sizes | Suitable for high temperatures > 260°C                               |
| Cycle Configuration        | Simple for the ORC cycle more complex considering the whole WHR system         | Complex  |
| Cycle flexibility          | High   | Low  |
| Efficiency                 | High efficiency even in off design conditions                                  | High at design point for large kilns, low efficiency at partial load |
| Water Consumption          | No water consumption with an air-cooled condenser                              | High   |
| Type of Expansion          | Dry expansion with no possibility of blade erosion                             | Risk of steam condensation and consequently of blade erosion.        |
| Personnel Needed           | Automated plant, no need of dedicated personnel onsite                         | Need of highly skilled dedicated operator                            |
| Maintenance                | Low maintenance needs and costs, remote control                                | Complex maintenance and high costs                                   |
| CAPEX                      | Higher capex   | Lower capex  |
| OPEX                       | 150.000 USD/year   | 450.000 USD/year   |

In general, the operational flexibility allowing high efficiency at a varying of load cases, the possibility of no water consumption, the lower maintenance costs of the ORC technology are evaluated as important plus for a WHR installation in cement plants.

### Advancement in ORC technology

In recent years improvement in ORC technology have helped mitigate capex expenditures for these installations while increasing plants' efficiency and profitability.

Exergy International, one of the major ORC providers worldwide, launched in 2009 the innovative Radial Outflow Turbine (ROT) applied to ORC systems. Designed by EXERGY, the Exergy Radial Outflow Turbine is covered by current and pending patents and is the first turbine of its kind to be utilized in an ORC system. The Radial Outflow Turbine can convert the energy that is contained in the fluid into mechanical power with higher efficiency than the competing technologies, the axial and radial inflow turbines.

Using the ROT technology in an ORC system for WHR applications entails additional benefits due to its configuration and characteristics:

- A broader range of applicable fluid conditions thanks to the radial outflow arrangement of turbine stages
- A more flexible and efficient design thanks to straight blades and radial configuration
- Lower noise and vibrations due to direct drive low speed turbine
- Improved maintenance and reduced downtimes. The built-in mechanical group of the turbine containing the bearings, oil lubrication system and seals can be easily removed without need of draining the organic fluid away from the cycle. This also dramatically reduces the downtime of the plant when compared with other technologies.
- High reliability guaranteed thanks to standard mechanical design for each turbine frame
- The best trade-off between performance and competitiveness achievable with the unique multiple pressure admissions on a single disk turbine
- Optimized efficiency achieved with a high number of stages on a single disk turbine

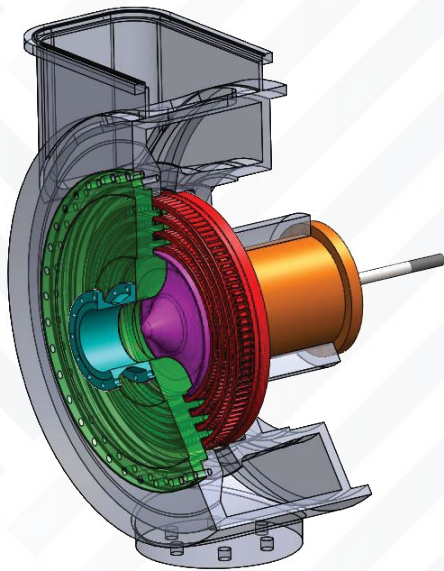


Fig. 1 - 3d Section of Exergy's ROT

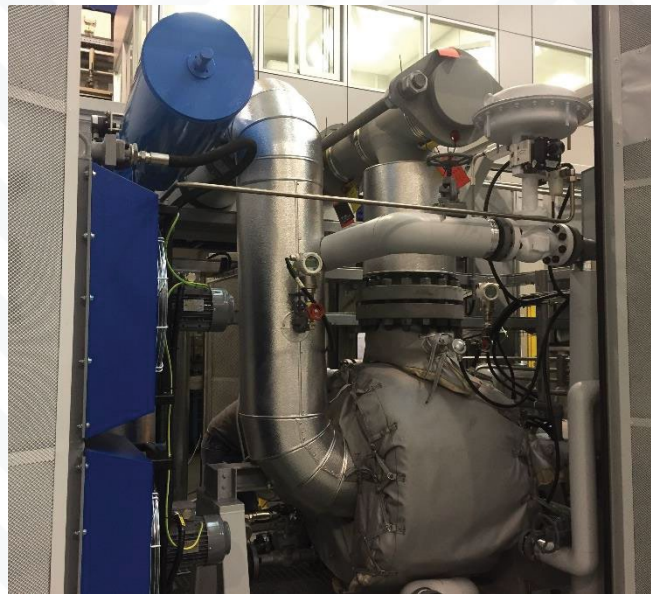


Fig. 2 – Exergy's ROT on a skid for a cement plant application

## ORC WHR system for cement application

ORCs Waste Heat Recovery systems for the cement sector are typically designed with an indirect heat exchange by means of an intermediate loop utilizing a heat transfer fluid (HTF), usually thermal oil, pressurized water or saturated steam.

The power plant consists in a Waste Heat Recovery system and an ORC module. The waste heat recovery system extracts the thermal power from the exhaust gases in the pre-heater and clinker cooler and uses a thermal oil loop to interconnect the Waste Heat Recovery system to the ORC module. The organic fluid in liquid

phase in the ORC closed circuit, is increased in pressure by a pump, heated up and evaporated respectively in the preheater and in the evaporator, receiving heat from the thermal heat transfer fluid and finally expanded in a turbine. Then the exhaust vapour condensates in the regenerator and cools down in the condensing system before restarting the working cycle. The condenser is more often an air-cooled condenser (ACC) which avoid the use of water and it is a more sustainable solution, but as alternative a Water-Cooling Condenser (WCC) can be also employed, when a stable source of water is available for the purpose.

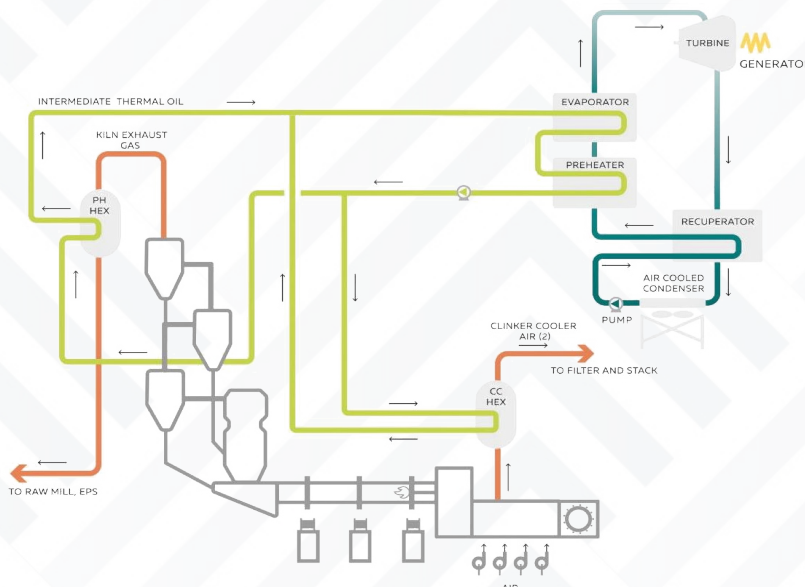


Fig. 3 Example of an ORC WHR cycle in cement plant



## Exergy's case study application: CementiRossi ORC WHR system in Italy

Since its start up in 2010 Exergy has designed and installed more than 50 ORC plants with ROT technology for a total capacity exceeding 500 MWe. Among this, 10 plants are Waste Heat Recovery applications in energy intensive industries such as cement, steel, glass and Oil&Gas processes. A WHR project in the cement sector was delivered in 2020 in Italy at Pederobba, Treviso, Italy for the customer Cementi Rossi.

### The customer need

CementiRossi requested EXERGY a turnkey solution that included design, manufacturing, erection, commissioning, and start-up of the ORC power plant. Heat exchangers were not included in Exergy's scope. The challenges of the project were connected to respecting some requests and limitations agreed with the client, namely site restriction due to the nearby area, which also imposed the respect of strict limits for noise emissions, and the request to choose a non-flammable working fluid in the ORC cycle to totally preserve the safety of the plant operation.

### Exergy's solution

EXERGY designed a customized and compact ORC solution to convert approximately 15 MWth into 3.6 MWe of electrical energy, guaranteeing high performances of the WHR ORC unit and short delivery times.

EXERGY chose to use prefabricated materials to reduce delivery times and positively impact on the final cost of the complete unit. The use of

prefabricated materials, preassembled on skids, allowed Exergy to deliver the complete plant saving half of the usual erection time required.

The Pederobba WHR ORC unit area is about 35m long X 45m wide. EXERGY managed to position all the main components of the plant in a compact solution comprising an air-cooled condensing system, the Radial Outflow Turbine (ROT), evaporator, generator and lube and seal oil unit. Closing the turbines and generator inside a container also allowed noise mitigation and to respect the limit of noise emission imposed by nearby area.

EXERGY's main challenge was to optimize the cycle design to enhance its efficiency that could have been influenced by the need of using a non-flammable working fluid in the ORC cycle. In order to overcome the loss of efficiency when using a non-flammable working fluid EXERGY optimized the cycle design introducing a reheating system in combination to the ORC.

The power plant equipment consists in two radial outflow turbines rotating on the same shaft, one high pressure turbomachinery and one for the low pressure, both connected to the generator, a reheater, an air-cooled condensing system, evaporator, recuperator, lubrication and seal oil units.

Thanks to the use of the ROT turbine and the reheating configuration EXERGY could deliver its customer an efficient design using a non-flammable r1233ZDE refrigerant as working fluid. This configuration resulted in 10% additional cycle efficiency compared to an analogue cycle with the same temperature limit.

**Client name:** CementiRossi SpA

**Plant name:** Pederobba

**Plant Location:** Treviso, Italy

**Cement plant production line capacity:** 2500 t/d clinker

**Thermal power:** 15 MWth

**Heat Source temperature (diathermic oil):** 280 °C – 100°C

**WHR ORC unit power output:** 3.6 MWe

**Efficiency gross:** 22,8%



Figure 4. A view of the ORC power plant in CementiRossi cement factory

## Results

The ORC WHR system was installed in 2020 and in operation since then. The 3,6 MWe of power produced by the ORC unit can cover approximately the 30% of the cement plant energy demand thus reducing the operating costs and increase the profitability of the customer's business. Moreover, the ORC plant contributes to reduce the carbon footprint of the cement manufacturing process allowing to save approximately 5400 tonnes in a year and about 17.000 of CO<sub>2</sub> per year.

## Conclusion

In conclusion, Waste Heat Recovery systems proved a key measure for decarbonizing the cement industry due to several advantages:

- increased efficiency of the process
- reduced operating costs
- reduced energy demand and costs
- reduced carbon footprint
- facilitated access to electricity with independent microgrids for remote or isolated site
- a market-ready, viable and proven solution with a fast time to market useful to accelerate the decarbonization process
- a low maintenance technology, with a long useful life, high availability (+99%) and minimum downtimes

Cement sector is looking to this solution with more and more interest, but a larger implementation of this technology is hampered by the lack of financial support for the initial investments and should be encouraged by policy support from local governments with tax credit and incentives tailored for this application in order to reduce the initial investment and its payback period.

# Lump formation phenomenon in cement bags

N.El-Khashab<sup>1</sup>, T. Fathi<sup>2</sup>, S.M.El-Aryan<sup>3</sup>

<sup>1</sup> ASEC Regional Operation Manager (formerly)

<sup>2</sup> ASEC Technical Center (formerly)

<sup>3</sup> ASEC Technical Center

## Abstract

Lump formation is a partial hydrate produced from the abstraction of moisture and carbon dioxide by Portland cement (Hewlett 2004). This paper explains all the reasons which may lead to lump formation in a cement bag and studies a real case in a cement plant. During the case study, several chemical, physical, and mineralogical tests were performed under the supervision of ASEC technical center. The collected data was analyzed to find the root causes of this phenomenon. This research proposes an action plan to treat the causes of lump formation, and this phenomenon has been solved based on the application of this action plan. The case study presented here can provide guidance for addressing this phenomenon in different plants.

## Keywords

Lump formation; Cement

## 1. Introduction

This research treats lump formation in a cement bag by analyzing the root cause of this phenomenon. Samples were collected from the cement plant and then chemical, physical, and mineralogical tests were carried out in different laboratories and with different techniques. This root cause analysis could be used for other cement plants that have the same problem to find the best way to overcome it.

## 2. Chemical, physical and mineralogical tests

Twelve samples were prepared; weighing was performed using analytical balances with a precision of 0.0001 g. Loss on ignition was performed for the samples at different temperatures using a furnace with a precision of 5°C.

XRF (ARL 9900), a wavelength dispersive X-Ray fluorescence instrument containing X-Ray tube with Rh as anode, 11 fixed channels with goniometer and a 3.6 kV generator, was used to measure SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, CaO, MgO, K<sub>2</sub>O, Na<sub>2</sub>O, TiO<sub>2</sub>, MnO and P<sub>2</sub>O<sub>5</sub> (Rueda, et al. 2012).

XRD (PW 3209), an X-ray diffraction instrument, was used to measure cement phases. The identification of the most probable phases is carried out using Panalytical X'Pert high score software 2006 with the aid of the international center of diffraction database (Ermerich and Opper 2013).

Craft tests were performed in accordance with ES 2253 and ISO 6591-1/1984.

### 3. The main reasons for the lump formation in the cement bag

At the beginning of this work, the main possible factors causing this phenomenon were reviewed. The following potential reasons have been studied:

- Gypsum dehydration in Cement mill
- Gypsum dehydration in Cement silo
- Cement pre-hydration in Packing stage
- Cement pre-hydration in storage stage
- Syngenite formation

#### 3.1. Gypsum dehydration in Cement mill

The heat produced on grinding can cause partial conversion of the gypsum into hemihydrate ( $2\text{CaSO}_4 \cdot \text{H}_2\text{O}$ ) or  $\gamma\text{-CaSO}_4$ . The extent to which this occurs depends on the temperature reached and the relative humidity within the mill. Partial conversion to hemihydrate may be desirable, as the water present in gypsum can cause the particles of cement to adhere during storage, with formation of lumps (Taylor 1990).

On the other hand, too high material temperatures in the mill may cause:

- coating (hampering fluidization of material)
- false set of cement (by dehydration of gypsum to soluble anhydrite and then recrystallization to gypsum)
- cement storage problems in silo (lump formation).

If the cooling by fresh air and radiation/convection is not sufficient, water injection into the mill is necessary (Hills 2006). In this work, the cement temperature inside the mill was evaluated by:

- Determining Loss of ignition (L.O.I) at different temperatures before and after the cement mill.
- Studying the mineral composition of cement using XRD.
- Reviewing the condition of the water spraying system.

#### 3.2. Gypsum dehydration in Cement silo

Lump formation occurs when the water released from the gypsum during the grinding process diffuses from the relatively hot inner part of the silo to the cooler walls where it serves to hydrate the cement (Hewlett 2004). If the cement material temperature has not been controlled in the mill system, the cement might enter the storage silo at too high a temperature causing dehydration of the gypsum (Fuller 2000).

In this work, the temperature of cement inside the silo was evaluated by:

- Determining L.O.I at different temperatures before and after the cement silo.
- Studying the mineral composition of cement using XRD.
- Reviewing the cement temperature trend for the past month.

#### 3.3. Cement Pre-hydration in Packing stage

There are many requirements for cement bags, which aim to ensure that the packed cement is not affected by the surrounding climatic conditions, whether during packing or storage (ISO 1984).

In this work, cement pre-hydration was evaluated by the following methods:

- The craft sample was analyzed according to ES 2253 and ISO 6591-1/1984.
- Studying the mineral composition of cement using XRD.

#### 3.4. Cement Pre-hydration in storage stage

Ideally, cement bags should not be stored for long. Long periods of storing of bags can also cause lumping of cement known as “warehouse pack” (Robinson, Stevenson and Bhatti 2004). When cement is stored in paper sacks under high humidity conditions (>90% relative humidity) for some time, lump formation can occur (Hewlett 2004).

In this work, cement storage conditions were evaluated by

- Determining humidity in cement storage.
- Studying the mineral composition of cement using XRD.



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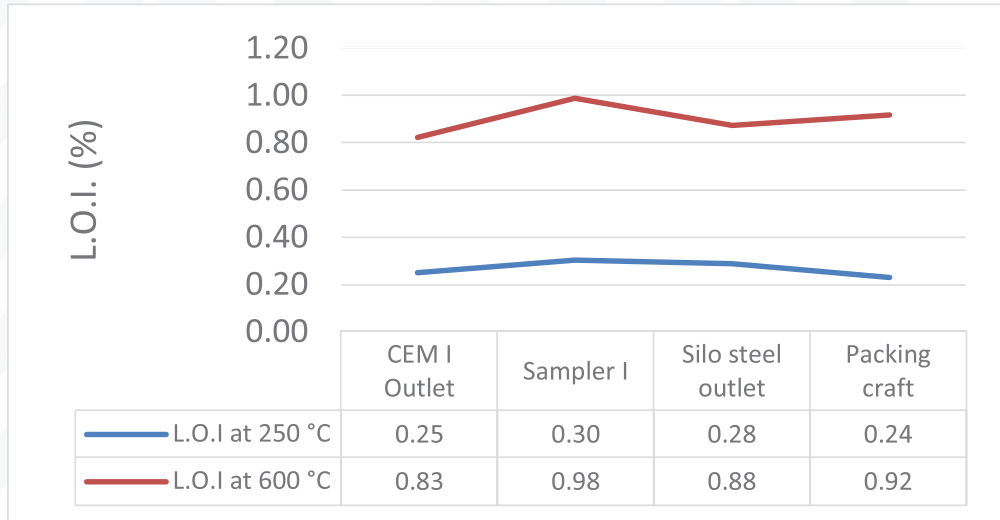
## 3.5. Syngenite formation

Lumpiness on storage can also result from the reaction of gypsum and potassium sulphate to form syngenite ( $\text{CaO} \cdot \text{K}_2\text{O} \cdot 2\text{SO}_3 \cdot \text{H}_2\text{O}$ ) (Taylor 1990). In this work, XRD analysis was performed to investigate the syngenite phase.

## 4. Results & Discussion

In this part of the case study, the results of the tests hereby presented

- a. The results of the temperature trend showed that the Conveyed Cement temperature to the silo was between 80 – 90°C
- b. Loss on ignition tests at 250°C & 600°C were performed for raw materials, cement mill outlet, sampler, silo outlet and packing results were shown as follows



1. Dehydration of cement inside the mill was about 70% with optimal operation of the water spraying system.
  2. The cement pre-hydration process took place inside the silo.
- c. XRD was performed at the cement mill outlet and silo outlet.

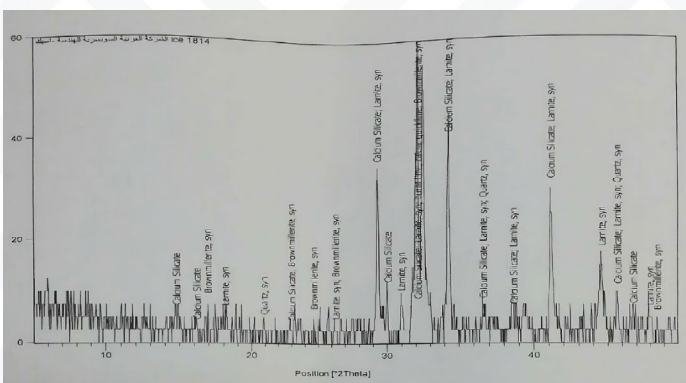


Figure 1: The XRD of cement sample showed that the compounds are normal mineral compounds of ordinary cement.

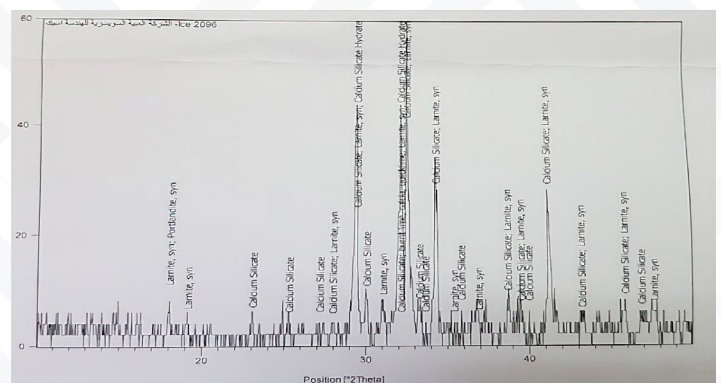


Figure 2: The XRD of the packing sample showed that the presence of hydrated phase (calcium Hydroxide, Calcium Silicate hydrate) in addition to calcium oxide and Calcium silicates, which proves the presence of cement pre-hydration

There's no formation of syngenite  $\text{K}_2\text{SO}_4 \cdot \text{CaSO}_4 \cdot \text{H}_2\text{O}$



- d. Analysis of paper bags for two types of bags in the plant according to ES 2253 and ISO 6591-1/1984.

| Type                                  | CEM II/B-LL 42.5 N |                  | CEM II/B-LL 42.5 N |                  | Reference |
|---------------------------------------|--------------------|------------------|--------------------|------------------|-----------|
| Wt.                                   | 40 Kg              |                  | 50 kg              |                  |           |
| Type of layer                         | outer "White"      | Internal "Brown" | outer "White"      | Internal "Brown" |           |
| Air permeability cm <sup>2</sup> /min | 82                 | 778              | 118                | 688.3            | Min. 200  |
| Water Absorbance g/m <sup>2</sup>     | 40                 | 26.4             | 36.2               | 25.3             | 20-30     |

## 5. Conclusion

According to the results obtained, several reasons contribute to the occurrence of lump phenomenon, including:

- Conveyed cement temperature to silo is greater than 80°. The plant should optimize the cement temperature to 70 -75°C before it enters the silo.
- Although dehydration of gypsum inside the mill is acceptable, based on L.O.I and XRD results, one could observe that pre-hydration of cement takes place inside the silo. The plant should confirm the efficiency of silo ventilation and dedusting filters above the silo (to insure that the temperature inside the silo doesn't rise).
- Paper bags (first layer and second layer) don't comply with ES 2253/2008 with regard to air permeability and water absorbance. The plant should confirm the quality of paper bags, in addition to confirming the good efficiency of compressed air system.

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# Lindner's New Komet Series 3: Powerful, Energy Efficient and High-Throughput Shredding for Premium Solid Recovered Fuels

Lindner-Recyclingtech GmbH, Austria

Spittal an der Drau, Austria/April 2023. Lindner's Komet series has been the benchmark in secondary shredding for decades. It has scored top marks for the new features introduced in 2022, optimising the energy efficiency and throughput as well as ease of maintenance. Innovation at the cutting edge.

The Climate crisis, political upheavals and high energy costs, combined with a general increase in energy demand and greater environmental awareness with a clear focus on a functioning circular economy, CO<sub>2</sub> reductions and an expansion of renewable energy - these are the challenging times in which the waste and recycling industries and the different waste streams play key roles. The aims are to extract as many secondary raw materials as possible from the different material flows and to recycle them, in line with the circular economy. At the same time, efforts are being made to turn non-recyclable materials into high-quality, high-calorific solid recovered fuels as efficiently and while saving as much energy as possible. That is how to substitute primary raw materials such as natural gas, crude oil and coal and make a valuable contribution to improving the carbon footprint of operations.

The increased importance of and demand for high-calorific substitute fuels (SRF) does, however, have a slightly bitter aftertaste for the manufacturers themselves. While the demand for premium SRF is steadily increasing, so too are the challenges within the industry. After all, the waste and recycling industry is also affected by high energy costs. What's more, there is still a shortage of skilled workers who are needed to maintain and service the processing and recycling facilities. The goal – increased production and throughput at reduced operating costs – initially seems contradictory. Yet it is

possible, if one takes into account essential parameters, such as perfectly coordinated machines used in a recycling plant or optimising the integrated shredding solutions. For example, if shredders are consistently run at the optimal operating point, resistant to non-shreddables, and are easy to maintain or low maintenance, it is possible to significantly increase both productivity and energy efficiency.

## Setting new standards in productivity and ease of maintenance

Lindner's Komet Series shredders have been on the market for over twenty years and are still considered to be the benchmark in secondary shredding and granulation. This is based on a number of Komet-specific product characteristics, such as its robust construction, precision, cost-effectiveness, high throughput rates and fast and safe access to the rotor. Lindner specifically addresses industry needs with the Series 3, launched in 2022. 'Because we are so close to our clients, we realised early on that there is a shortage of skilled workers and a demand for greater productivity and energy savings,' explains Stefan Scheiflinger-Ehrenwerth, Head of Product Management at Lindner. 'The Komet Series 3 models are therefore equipped with product features that allow the shredders to be practically maintenance-free and also make optimal use of energy,' he adds.



### New Features

An automatic belt tensioning system, or ATB for short, is at the core of the new products, which also feature a dust-proof drive unit and new software. While the new software features are designed to increase user-friendliness and machine controllability, the ATB ensures the belt tension is continuously monitored. If the tensioning force deviates from defined parameters, the belt is automatically retightened. The consistent belt tension achieved by the ATB ensures that the shredder always runs at the optimum operating point, ideally utilising power transmission and energy. 'This also means that it's no longer necessary to re-tension belts by hand and it's easier to plan belt replacements,' adds Scheiflinger-Ehrenwerth. 'Low maintenance also inevitably leads to minimal downtimes and high uptimes, which is another factor that significantly increases productivity. The ATB can also be retrofitted without any problems.' This makes it possible to reduce maintenance work to a minimum as well as make it as efficient and predictable as possible.

### Pader Entsorgung selects another Lindner Komet 2800 HP

The company Pader Entsorgung GmbH & Co. KG (PEG), a subsidiary of the Lobbe Iserlohn and PreZero (Porta Westfalica) groups, has been operating a high-performance mechanical recovery facility in Paderborn-Elsen, Germany, since 2005. It processes municipal solid waste, commercial waste and mixed construction waste – 24 hours a day, five days a week. Around the clock, valuable materials are returned to the material cycle as secondary raw materials in complex processes, and non-recyclable materials are turned into high-calorific solid recovered fuels. This energy-rich SRF is supplied to the cement and power generation industries in particular. Lindner's Komet 2800 secondary shredder has been part of the team since 2013. 'We opted for a Lindner Komet in 2013, because at the time it was certainly the most powerful and highest-throughput machine on the market thanks to its seven-row rotor and well-dimensioned drive. This is still the case today,' affirms Daniel Vermeulen, Technical Operations Manager at Pader Entsorgung.

While initial production was around 25,000 metric tons of high-calorific SRF annually, the current production target is > 60,000 metric tons per year. 'Since the energy crisis, the market has changed. Companies, including cement plants, are increasingly substituting coal, natural gas and oil with high-calorific SRF. The high demand has made it necessary to expand the facility and shredding equipment. Our machines run continuously for 5 days. This demands good quality and minimal downtimes, which can be achieved mainly with low maintenance. In terms of energy costs, we also have to save. That's why we chose another Komet from Lindner,' Vermeulen explains. The material stream processed at Pader Entsorgung is primarily obtained from municipal solid and household waste. The material is often tough, the composition changes constantly and the residual moisture is also usually very high. 'The shredder has by far the most difficult task in the recovery process. The Komet 2800 HP is extremely powerful and has a high output – usually around 20 t/h. Handling is excellent, maintenance is well thought-out with easy access to the maintenance door and therefore to the rotor. Non-shreddables can be removed easily and with little loss of material. This means complex and time-consuming welding work is a thing of the past and the machine is fully operational again in no time at all.'

For solid recovered fuel to be a genuine alternative to primary fuels such as oil, coal and gas and to be used in the main burner, it must meet high quality standards and possess a range of material properties. In addition to a homogeneous particle size of  $\leq 30$  mm, the water, ash and chlorine contents in particular, are a decisive influence on the calorific value. The output material is therefore continuously tested in-line with near-infrared sensors (NIR technology) installed immediately after the Komet. For quality assurance purposes, automated material samples are also taken for laboratory analysis. If the NIR sensors detect too much chlorine, material containing too much chlorine is diverted to a separate bunker and processed differently. 'Producing high-calorific solid recovered fuels from such diverse fractions is a science in itself. We are known for our high-quality solid recovered fuels and the enormous growth in recent years is proof. That's a result we are also proud of,' confirms Andreas Malinowski, Managing Director at Pader Entsorgung.



## High-throughput secondary shredding – Lindner’s Komet Series 3

The powerful and high-performance Komet Series has been the benchmark in secondary shredding for more than two decades – in particular when it comes to the production of high-calorific solid recovered fuels for the cement and power generation industries. The new features of the Komet Series are the answer to the industries’ challenges and optimise energy efficiency as well as making the machine even more productive and maintenance so much easier.



## High-calorific SRF is in more demand than ever – Pader Entsorgung invests in a second Lindner Komet

Daniel Vermeulen (left), Technical Operations Manager at Pader Entsorgung, and Andreas Malinowski (right), Managing Director at Pader Entsorgung, count on the reliability and superior output performance of Lindner’s Komet Series, which they have been using to produce high-calorific solid recovered fuels (SRF) since 2013. Due to high demand, the company aims to produce > 60,000 metric tons per year, which is why it invested in a second Komet. The automatic belt tensioning system, ATB, is a particular and extremely valuable improvement and one of the newly introduced product features.



## Incredible power in a belt drive – with Lindner’s ATB

The well-dimensioned and powerful drive with automatic safety clutch remains an important feature of the Komet Series and guarantees supreme throughput and performance.

Image: Daniel Vermeulen, Technical Operations Manager, in front of the Komet Series 3 belt drive incl. safety clutch and automatic belt tensioning system (ATB).



## SRF quality control

To be regarded a genuine alternative to primary fuels such as oil, coal or gas, the highest quality criteria must be met. In addition to a particle size of  $\leq 30$  mm, the water, ash and chlorine content crucially impact the calorific value. For this reason, sensors using near-infrared (NIR) technology installed immediately after the Komet continuously test the material in line. If the NIR sensors detect that the chlorine content is too high, material containing too much chlorine is diverted to a separate bunker and processed differently.



## High-calorific and homogeneous SRF

The high-calorific SRF produced as part of the demanding and quality-oriented process is stored in bunkers until the loading. Pader Entsorgung primarily supplies cement and power generation operations.

## About Lindner, Spittal an der Drau/Austria

The Lindner family business has been offering innovative, tried-and-tested recycling solutions for decades. At its production facilities in Spittal/Drau and Feistritz/Drau in Austria, Lindner manufactures using state-of-the-art production machinery shredders, system components and spare parts that are exported to almost one hundred countries. In addition to stationary and mobile shredders for waste processing, the portfolio also includes complete systems for plastics recycling, SRF/RDF and waste wood processing. Applications comprise municipal solid waste, commercial and industrial waste, waste wood, plastics, packaging material, paper and light scrap.

# ЦЕМЕНТ

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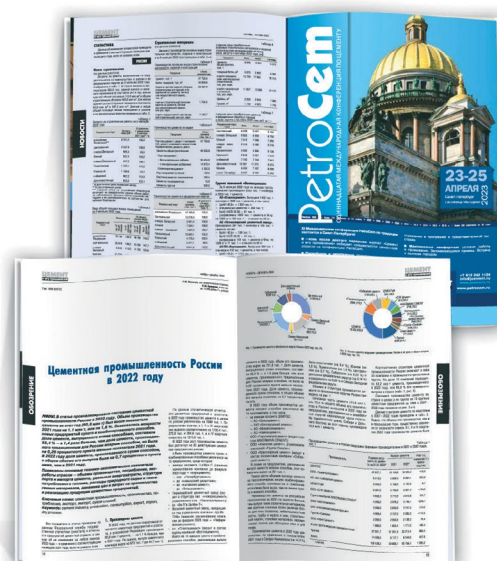
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# Analytical air classification of kiln burner SRF

A practical solution offered by WhiteLabel-TandemProjects

WhiteLabel-TandemProjects e.U., Germany



## Have you experienced reductive burn-out?

When compact fuel particles are not completely burnt before they enter the kiln bed, they are affecting the pyro process by i.e., ring formation as well as the clinker formation by reductive burn-out.

A common grain size distribution will not give you the complete picture of how fuel particles behave in the kiln airflow.

Instead, knowing the actual flight behavior of your fuel particles after leaving the tip of the kiln end burner, becomes a very useful and sometimes necessary analytical tool for you to:

1. Monitor the quality of pre-processing and adjust your fuel specification in accordance to the acceptance.
2. Optimize your burner settings according to the SRF flight behavior and burn-out.
3. Provide data on benefits of installing a robust classifier up-front to your fuel transport.
4. Avoid reductive burn-out and increase your TSR



Fig. 1: Clinker burnt under normal, slightly reduced, and brown clinker caused by reductive burning conditions by incomplete burn-out

WLTP can engineer your solution, and thru the affiliated company ROCKTEQ\*, we offer the entire and adjusted system consisting of the burner unit, dryer and the air classifier.





## We have the solution:

With our analytical air classifier, the SRF will be segregated into several classes with similar flight properties. By using different air velocities, the fuel will be split according to its form, density and its drag coefficient (cw value). For each class the parameters (cw value, density and form) will be derived to simulate the actual trajectories per class and quantity in relation to the given pre-conditions of your particular kiln and burner.



Fig. 2: The analytical air classifier

The resulting classification and simulation provide a very detailed picture of the flight behavior of your SRF. This method is based on physical testing on your actual fuel and simulates the real trajectories due to the particles in the SRF. These ballistic trajectories show where the particle is likely to be found if it has not burnt out completely or before landing in the clinker bed.

Fig. 3 shows the classes of air classifying at different velocities of descent. The measurement starts at the lowest fan speed (top left) and ends at the highest (here 8m/s, right bottom). The obtained light fraction is balanced whilst the heavy fraction is classified again at the next higher speed level. From light to heavy the SRF is going to be separated into classes with the same flight properties, but different form, size, and densities.

The basis for the calculation of the trajectories is the dynamic

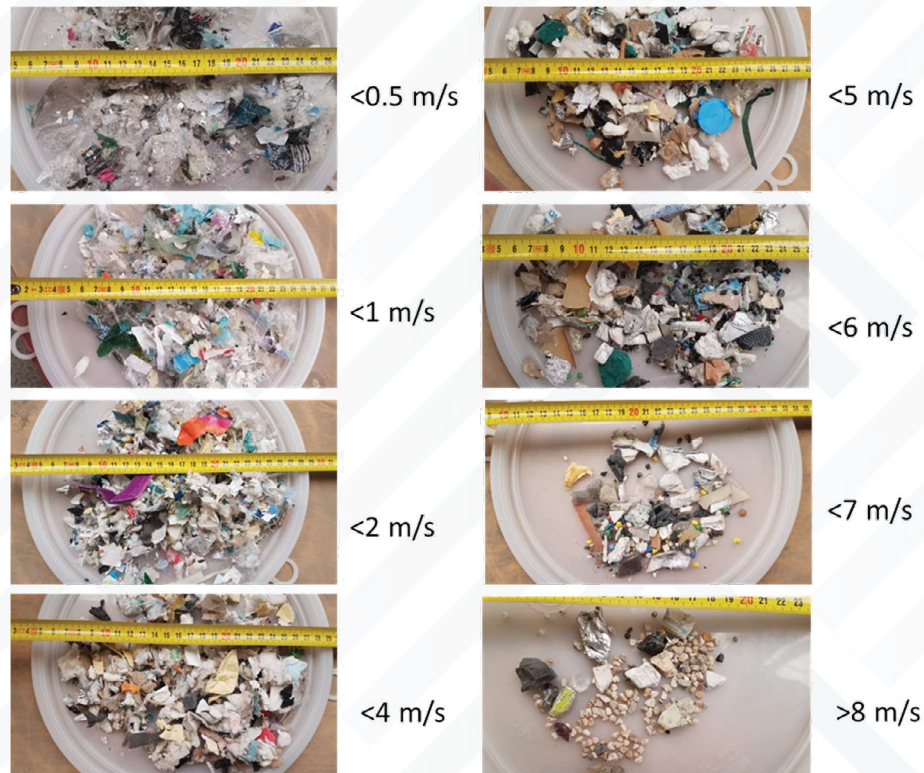
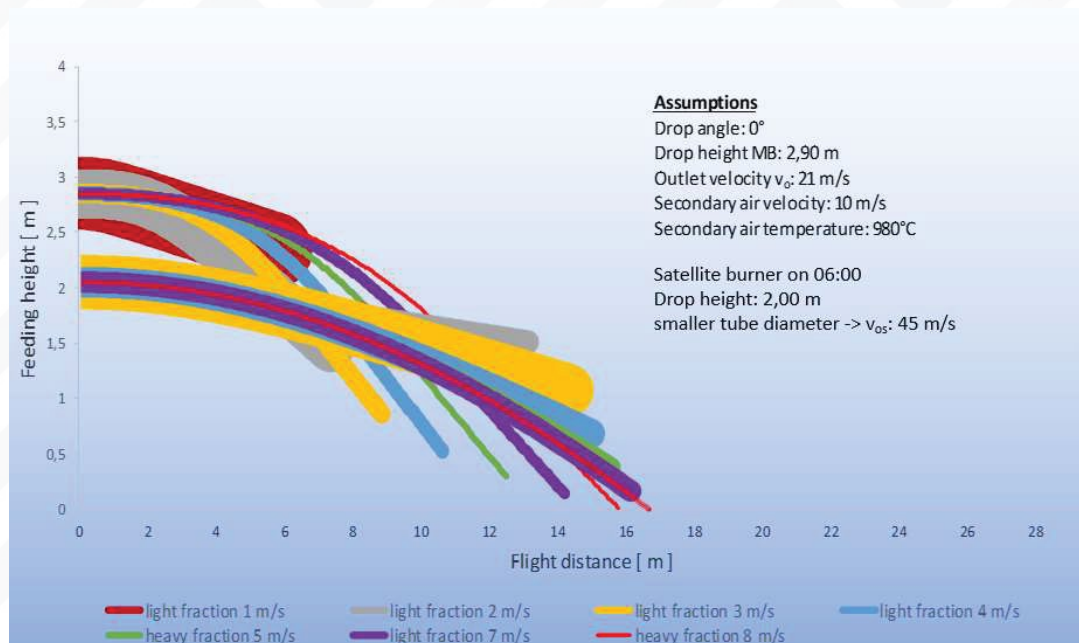


Fig. 3: SRF classes according to its drag co-efficient and velocity of descent

equilibrium of forces on the particle consisting of the force of gravity (g), mass force from initial velocity (vo) when leaving the burner, mass (density, geometry, and shape) and the braking force from the air resistance (cw).



**Fig. 4: Example of simulation of the probability of SRF trajectories per class and their quantity**



**Fig. 5: Amount of the fraction of classified SRF depending on the rate of descent**

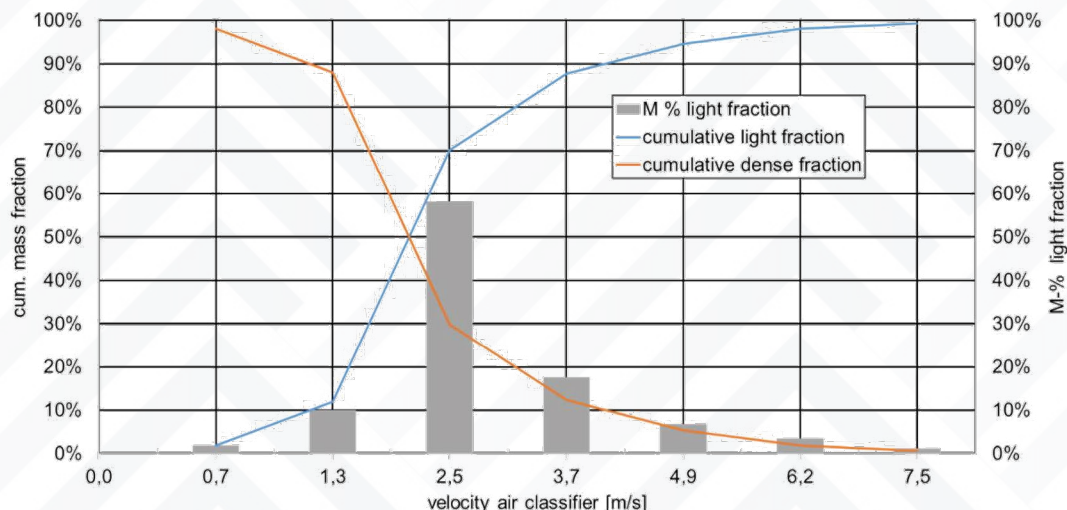


Fig. 5 shows the portion of classified SRF per fraction. Approx. 90% of the light fraction is already separated from heavy (i.e., dense or wet) or 3D material at a velocity of less than 4 m/s.

Depending on the TSR to be achieved, it is highly recommended that these heavy materials are separated beforehand. It can be either used for the calciner or is subsequently prepared by the plant or the fuel supplier.

### Ask for our offer:

Analytical air classification consisting of:

- Air classification of a representative 30L-sample in the range from 0 to max. 10 m/s
- Weighing, documentation of the fractions and determination of each density
- Calculations and simulation per each resulting class
- Evaluation of results
- Test documentation including recommendations for burner and fuel improvements.

**Office:**

WhiteLabel-TandemProjects e.U.

Körnerstr. 44

D – 48151 Münster Germany



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## Keeping your open gear up and running

GRACO, Belgium

**Graco's open gear spray system is designed to lubricate open gears with the right amount of lubrication in the right place at the right time.**

Open gears operate in the most challenging conditions, such as high temperatures, high loads (particularly shock loads), intense vibrations, and dirty environments. Should an open gear experience problems, it can result in expensive downtime. And with an extremely high initial cost and a lead time of six to 12 months, you clearly want to keep your open gear in tip-top condition.

This means keeping an open gear optimally lubricated. Lubrication reduces friction because the lubricant serves as a protective film on gear parts, allowing moving parts to slide smoothly over each other, and avoiding direct metal-to-metal contact. Optimal lubrication is basically a form of preventive maintenance. It avoids expensive and time-consuming unexpected shutdowns, keeps machines running efficiently, and extends machine lifetime.

### **Open gear lubrication: Standards and available technologies**

The industrial gear lubrication standard is AGMA 9005. It stipulates a spraying time of the lubricant equal to the time it takes for one or two revolutions of the open gear, and in this timeframe spraying should ensure complete coverage of the open gear. The maximum interval between lubricant applications should be five minutes, although more frequent application of smaller quantities is even better. The standard also stipulates periodic inspection to monitor dose sufficiency, nozzle efficiency, and spray pattern coverage.

### **Lubrication techniques**

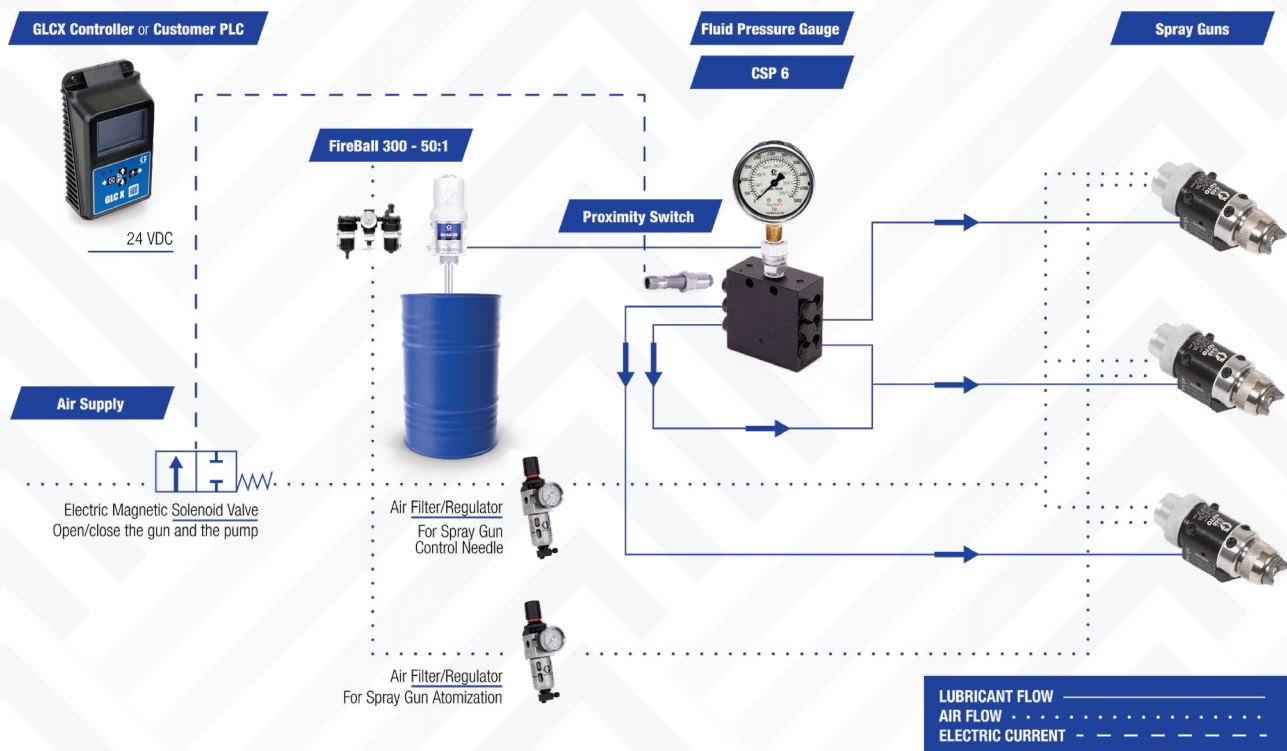
An open gear can be lubricated manually or automatically. Manual lubrication techniques are labor intensive, time-intensive, frequently unsafe to perform, and lead to long downtimes. They can lead to under- or over-lubrication, both of which can result in dire consequences.

Automatic lubrication refers to the automatic application of lubricant while the machine is in operation. Splash lubrication via an oil bath is one such method, although it leads to two main problems. The oil level is difficult to monitor and regulate, again leading to the risk of under- or over-lubrication. And the temperature of the oil bath can easily rise beyond the optimum. A much more efficient approach is continuous or intermittent loop lubrication through spraying the right amount of lubricant at the right time and in the right place.

An evolution in lubricant technologies is also being witnessed. The trend is to move away from graphite oil based lubricants to transparent high-viscosity lubricants, the transparency of which allows periodic inspections. However, high-viscosity lubricants are more challenging to pump and spray, which means using a specialized lubricant spray system.

## The Graco open gear spray system

Over the decades Graco has mastered the art of spraying fluids in industrial settings in all kinds of applications for all kinds of spraying materials and conditions. Together with leading lubricant manufacturer Klüber Lubrication, Graco has developed a total open gear spray system. It provides an open gear with consistent lubrication at the right time, of the right amount in the right place, without over- or under-lubrication.



Graco Open Gear Spray Lubrication System Schematic

### It consists of three main components:

The **GLC-X controller** is programmed in intervals, which are the sum of the off-time and on-time. It adjusts the off-time every time it finishes the lubricant event based on the on-time used.

At the end of the off-time the controller gives an electrical signal to the solenoid valves which release the air supply of the pump to the spray gun solenoids (the needle). The pump starts dispensing lubricant through the divider valve (which measures the dispensed amount) and the lubricant goes to the spray guns equally. At the end of the on-time, the proximity switch sends the signal to the GLC-X controller to stop lubrication by switching off the air supply. The fluid line remains under pressure due to the closed needles at the spray guns, which prevents the lubricant from dripping without control. The GLC-X controller also shows the percentage of

lubricant left in the drum, the remaining time of the next lubrication event, and shows reporting data which are downloadable in Excel format with timeframe selection.

The **Fire-Ball 300 50:1 pump** is designed with few moving parts which means few wear points. This translates into a low cost of ownership, minimal downtime, low repair costs and easy rebuild. The pump has large exhaust ports which eliminate icing and allow efficient air usage. The non metallic poppet valves offer a positive sealing performance and are extremely reliable in dirty air environments. They lead to longer life without repairs and are inexpensive to replace. The pump is extremely robust and can pump high viscosity oils at or even below freezing point. It gives long trouble-free life with a warranty of seven years. Graco also offers an electric pump for the open gear spray system.



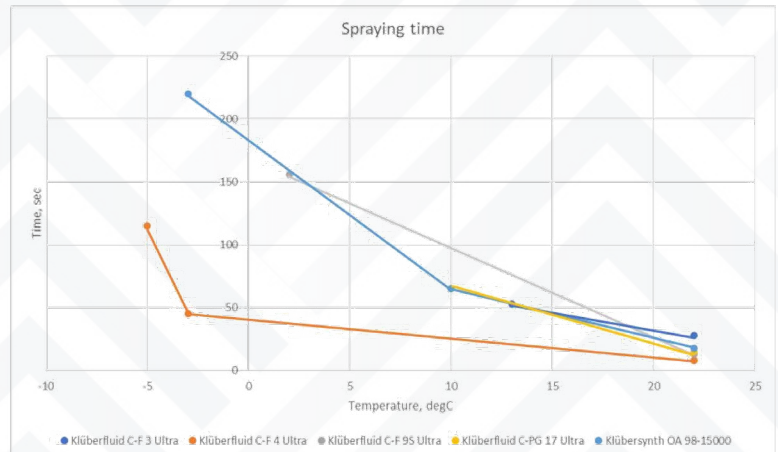
## Spraying time vs. Temperature

Pump air pressure 5 bar

*Spraying width vs atomizing air pressure depends on viscosity of the lubricant.*

*Spraying time should be enough to spray during 2-3 gear rim revolutions which is 10-15 sec for mills.*

An important step during development was testing the system with different lubricants at certain temperatures, as the operation temperature affects the pumpability and sprayability. The chart and table above show the results without additional heating of the lubricant. Even at -3°C, the system in combination with Klüber C-F 4 Ultra provides the open gears with consistent lubrication.



| Pressure, 5 bar    |                           | Temperature, degC |    |    |     |     |     |
|--------------------|---------------------------|-------------------|----|----|-----|-----|-----|
|                    |                           | 22                | 13 | 10 | -2  | -3  | -5  |
| Spraying time, sec | Klüberfluid C-F 3 Ultra   | 28                | 53 |    |     |     |     |
|                    | Klüberfluid C-F 4 Ultra   | 8                 |    |    |     | 45  | 115 |
|                    | Klüberfluid C-F 9S Ultra  | 13                |    |    | 156 |     |     |
|                    | Klüberfluid C-PG 17 Ultra | 15                |    | 65 |     |     |     |
|                    | Klübersynth OA 98-15000   | 18                |    | 65 |     | 220 |     |

Excellent  
ok  
Still acceptable

Each PerformAA Automatic Spray Gun features a pneumatically actuated needle that will hard stop the flow of lubricant once the spray event is finished. This keeps the spray gun clean and avoids clogging. The spray gun dispenses a precise amount of lubricant with no overdose and gives an excellent spray pattern.

## Efficient open gear cleaning kit

Graco also offers an open gear cleaning kit that sprays Klübersustain EZ 2-46 onto open gears. It enables open gears to be cleaned up to twenty times faster than conventional methods. This was proved recently at a leading cement manufacturing plant in Morata, Spain where it was used to clean off a black graphite containing lubricant from the girth gear and pinion in a sump lubrication system. After applying the cleaning lubricant for just four hours, the operational lubricant was completely removed and the girth gear and pinion were perfectly clean. This saved the maintenance team 80 hours of manual cleaning usually required to perform the cleaning job.



Graco open gear cleaning kit

## Practical implementations

The Vicat cement mill in France was running 12 tonnes per day and had only one lubrication system for both open gear and plain bearing. The system was suffering from excessive vibration, wear and tooth pitting. The Graco automatic open gear spray lubrication system was installed. It not only reduced downtime but saved 1700 liters of lubricant per year, which amounts to a saving of around 5500 euros per year.

A **lime mill** in a cement plant in the United Arab Emirates was forced to install a new open gear system due to extreme wear and damage of the existing one, which they had been lubricating manually. For the new open gear they wanted an automatic spray lubrication system and selected the Graco system. Benefits included reduced wear and damages to the open gear, an extended lifespan, and significantly reduced downtime and maintenance cost.



Graco Fire-Ball pump installation at VICAT, France.

## Successful trial for a total solution in Tanzania: Planned commissioning of the project in 2024

One of Graco's most recent projects brings us to East Africa. One of the largest cement producing companies in Tanzania had invested in an automated lubrication system for their four kilns. But the team was facing several issues. The set-up was simply not achieving the results promised. And even worse: nor the integrator, nor the manufacturer, was coming up with solutions to improve the quality of the spraying pattern and the pumpability and overconsumption of lubricants.

The cement plant's team turned to a local supplier for a second opinion. They had already carried out different hydraulic projects on site at the cement plant. As a Graco Authorized Distributor, they advised to replace the current set-up with the Graco open gear spray system.

Graco worked closely together with the local distributor to swap out the old components. Then they configured the system to meet the specific needs of the customer's way of working.

In this particular case the team chose the GLC X locally controlled option (without connection to PLC), including the drum elevator option for safe lubricant drum swaps.

The system is given a certain amount of time to complete all necessary cycles, but decides for each lubrication cycle what the best settings are to deliver the best possible results. For example, it adjusts the intervals between spraying. The system does so based on the input of the proximity switch installed on the CSP Divider Valve. As temperature has a big impact on the viscosity of the lubricant, it is crucial to precisely measure the dispensed volumes. This way the most optimal spray pattern is always guaranteed, in the cold of the night and the heat of the day. And this optimal spray pattern on its turn makes sure there is no over or under consumption of lubricant.

The Graco PerformAA Spray Guns are equipped with a pneumatically actuated solenoid inside. This prevents lubricant dripping from the spray gun. This is a common problem in most systems, as there is still residual pressure in the line. The solenoid is hard stopping the pressure at the exact moment the measured amount is provided, resulting in less grease being used. In this particular case, 5 grams of grease would be just wasted due to the residual pressure in the line. That would be 50% down the drain for this particular cement company.

Graco's open gear system also gives the customer's team an insight on the spraying process. Upon commissioning of the system

they can remotely check in with the Auto Lube app to monitor how much lubricant is being sprayed and how the cycles are being carried out. On top of that, they can also look into the history of lubrication related events and other valuable data.

With the heart of the system in operation, Graco and its distributor also took a closer look at how the oil drums were swapped out. It turned out; this task was still carried out manually. They installed a pneumatic drum elevator to make this job easier. Now the operator can lift the pump with just one push of the button: a lot safer and cleaner than their old way of working with rope and wrenches.

## Graco partners with three other companies to provide a holistic solution

Graco's open gear spray system can be purchased independently, but the company is also cooperating with three other companies in a new and innovative solution for Open gear maintenance. The aim is to provide customers with a trouble-free and cost-effective solution that gives uninterrupted production, absolute open gear protection, minimum operating costs and professional after-sales service support. It encompasses four aspects:

- **Online machine monitoring:** Shift to a predictive and prescriptive maintenance model with DALOG;
- **Lubrication equipment:** Apply the correct lubricant amount in the right place at the right time with Graco.
- **High-performance lubricants:** Increase machine uptime and energy efficiency at lower cost with Klüber Lubrication;
- **Reprofiling:** Extend the lifespan of your gear with reprofiling by NOVEXA.

This complete open gear package increases machine lifetime and reduces operating costs. It enables excellence in service of all components surrounding an open gear, through testing, commissioning, auditing and after-sales support.

### More information

**For further information on the Graco open gear spray system or the Open Gear Beyond Lubrication System, contact Arnaud Debus**



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# The right cutting mill for every application

Powerful comminution with variable rotational speed

The FRITSCH Universal Cutting Mills PULVERISETTE 19 and PULVERISETTE 19 large ensure fast, easy comminution of a wide range of plastics/polymers as well as biological materials in small and large quantities. Its main areas of application include environment and recycling, secondary fuels/RDF in cement production, power generation and other similar contexts, as well as cannabis processing. There is a special stainless steel version for the foodstuffs and pharmaceutical sectors.

The gradually variable rotational speed setting allows optimal adjustment of the cutting speed to any sample material. The well-conceived structural design of the grinding chamber ensures optimized hygienic cleaning.



## Overview of the main features:

- Variable rotational speed from 300 – 3000 rpm or 50 – 700 rpm for optimized torque
- Feed size up to 70x80 resp. 120x85 mm
- Throughput up to 60/85 l/h
- Variable final fineness with sieve cassettes from 0.1 – 20 mm
- Tool-free maintenance due to the three-part housing and plug-in rotor
- Suitable for GMP and RoHS
- Comminution without pre-crushing for long solids like cannabis, straw or foils

## Flexible modular principle

By simply changing the rotor, you can adapt your P-19 or P-19 large Cutting Mill perfectly to any sample material. We have a range of rotors and fixed knives with different cutting geometries in a variety of materials. By choosing the sieve cassettes, you can determine the final fineness of your samples. Different funnels, collecting vessels and stands made of a variety of materials enable further configuration exactly for your applications.

The connection to a FRITSCH high-performance or small volume Cyclone separator ensures simple feeding and cleaning, higher final fineness and faster throughput with minimized thermal load of the samples.

## Contact:

**FRITSCH GmbH • Milling and Sizing**  
 Selina Stemmler  
 Industriestrasse 8 • 55743 Idar-Oberstein • Germany  
 Phone +49 6784 70-155



## New small professional grinder for versatile use

The FRITSCH Mini Cutting Mill PULVERISETTE 29 is the ideal laboratory mill if you regularly grind small sample quantities of materials such as grain, seeds or even plastics and other materials with a low specific density.

The FRITSCH Mini Cutting Mill PULVERISETTE 29 is small & compact as well as absolutely space-saving and of course completely uncomplicated to use and can be cleaned contamination-free in a few simple steps.

Particularly powerful: The rotor with 4 straight cutting edges and fixed knives made of hardened stainless steel enables up to 48,000 cutting processes per minute.



### Overview of the main features:

- Variable rotational speed from 500 – 6000 rpm for optimal cutting speed
- Feed size up to 25 mm diameter, volume up to 100 ml
- Variable final fineness with sieve inserts from 0.25 – 6 mm
- Rotor and fixed knives are simply inserted - adjustment of the cutting gap is not necessary
- Particularly durable - rotor knives and fixed knives are turnable
- Practical design for easiest cleaning with just a few simple steps
- No loss of moisture during sample preparation for determining moisture



Ideal for analysis of moisture, raw fibre and ash as well as for IR and NIR

Thanks to its variable rotational speed, the FRITSCH P-29 comminutes especially grain and other seeds in an optimal way and with almost no loss of moisture. It thus fulfils the essential requirement for analytically correct analysis in the area of feed and raw material sampling.

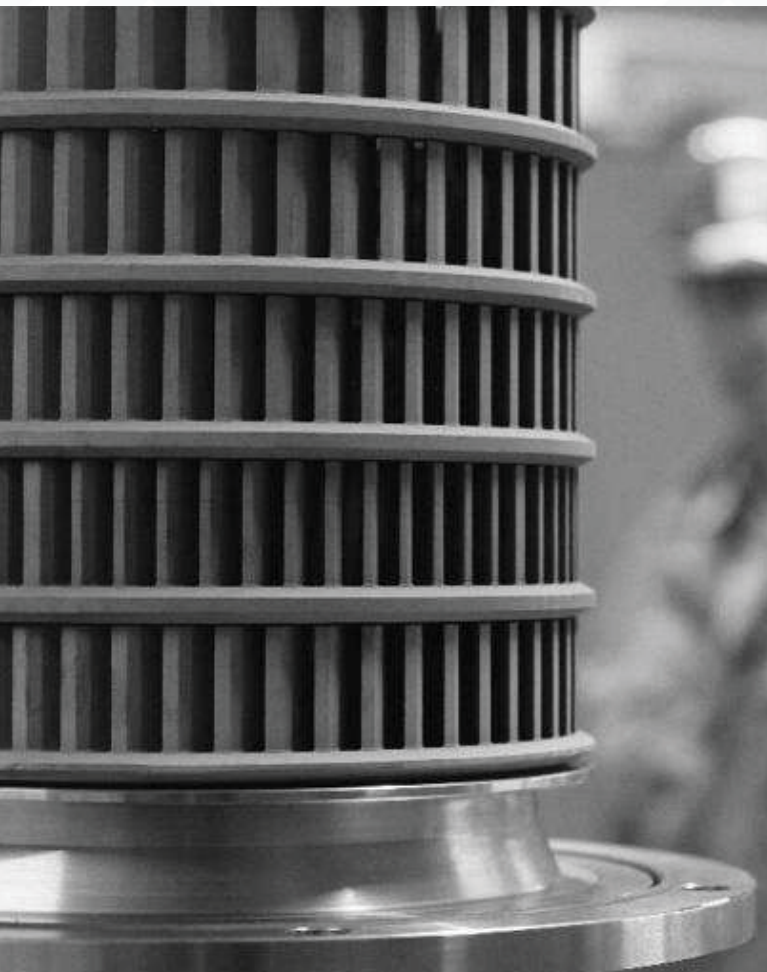
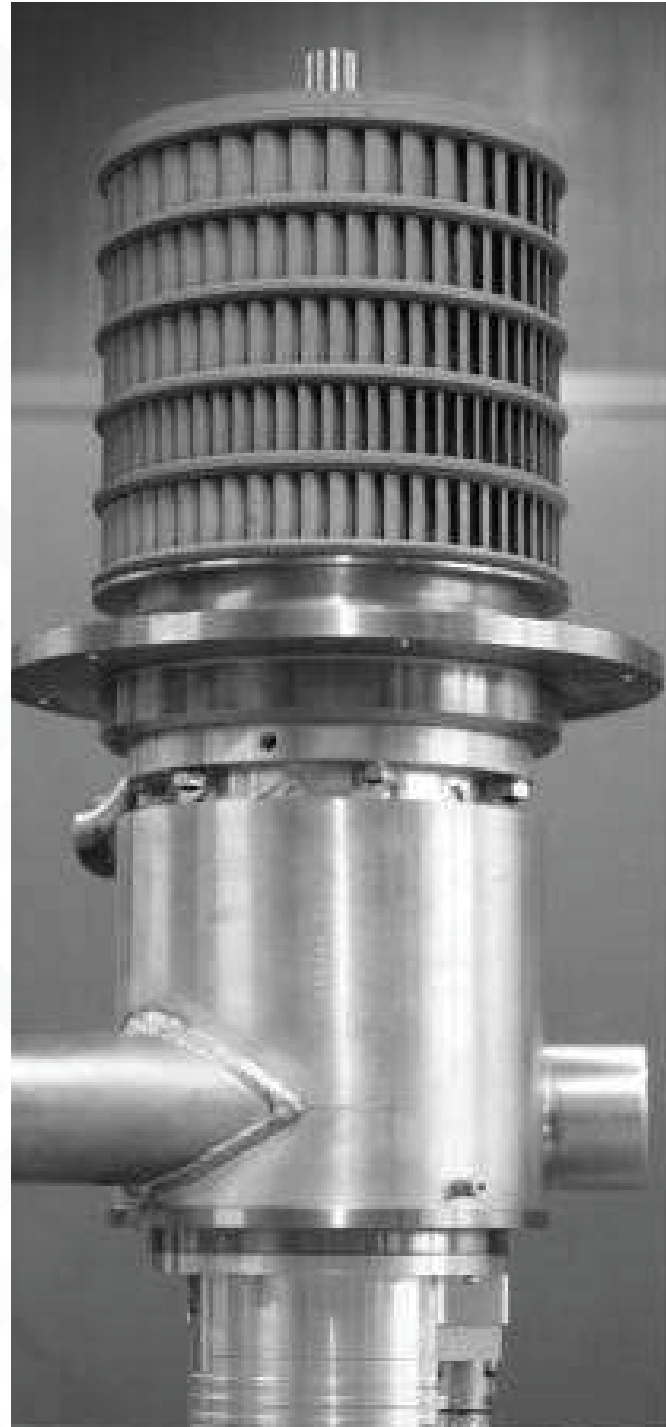
## Highest fineness through circumferential speed up to 190 m/s

The Spiral Type Jetmill of PMT-Jetmill is specialized in optimizing air streams in combination with a so-called rotor-motor-unit.

This combined “rotor-motor-unit” (RMU), built with the highest precision, is the heart of the PMT spiral jetmill. It grants a high operating security, low energy consumption and finest products of PMT’s Jetmills.

The results from aerodynamic research work were implemented into a patented rotor wheel geometry and in a mechanical concept to achieve circumferential speeds of up to 190 m/s.

When used in jetmills with internal fine grinding and classifying circuit, products with a fineness even below 1  $\mu\text{m}$  top cut can be produced. This fineness can be achieved even in industrial scale machines and high content recovery classifiers.



The rotor unit is directly combined with a high-speed motor unit with the advantage of maintenance-free high-speed bearings.



## Laboratory-size agitator bead mills for finest dry-grinding

**NETZSCH SpheRho® lab mill: highest fineness and an optimum degree of efficiency. For the development of new products, process optimization and sample production**

Fine mills and ultra-fine classifiers made by NETZSCH are synonymous with highest fineness and an optimum degree of efficiency. With corresponding laboratory machines, the proven technology can also be used to produce small quantities of product on a laboratory scale. Today, in many industries well-appointed laboratories are a must for the development of new products, for process optimization as well as for the production of small samples.



The NETZSCH SpheRho® 1 is the laboratory version of the SpheRho® Dry Agitator Bead Mill. Compared to conventional ball mills, with this mill type it is possible to obtain extremely fine products combined with very high throughput capacities at low specific energy consumption levels thanks to its operating mode and stress characteristics.

With the laboratory version of the dry agitator bead mill, initial trials for the development of new products can be carried out from a minimum volume of 0.5 l. A subsequent scale-up of the results to production sizes is possible. The SpheRho® 1 is also ideal for processing the smallest quantities as well as for quality control, quality assurance and process optimization. Here, the user can rely on the reproducibility of the results obtained. Further plus points of the NETZSCH SpheRho® 1 are its simple operation and high flexibility. Additionally a low cleaning expenditure at the highest possible product recovery can be guaranteed.

The main field of application of this lab mill is real comminution of various raw materials with typical product fineness  $d_{50}$  in the range of 2  $\mu\text{m}$  to 70  $\mu\text{m}$ . The continuously operating dry agitator bead mill can be used in single pass without classifier as well as in grinding/classifying circuit.



## Netzsch Prophi pre-grinding unit

**Increase product capacity, save energy, shorten production time and ensure reproducibility - all this is possible with the new ProPhi pre-grinding unit from NETZSCH.**

This new technology improves your dispersion process so that all subsequent production steps benefit. With the ProPhi you will reduce your premixing process time by up to 50% and your cleaning effort for large batches. In addition, you can process sedimentation-prone materials and fluctuating raw material qualities without jeopardizing your process reliability.

### Focus on Your Advantages

- High product quality: for stable rheological product properties (no sedimentation after pre-dispersion)
- High process reliability, even with fluctuating raw material qualities
- Sustainable production
- Reduction in energy consumption by up to 30%
- Minimal cleaning effort for large batches
- Reduction in investment costs and spare parts through the use of highly resistant materials
- Smaller grinding beads can be used for fine grinding - conditional energy savings
- High productivity: reduction of the premixing process time by up to 50%

### Challenges the NETZSCH ProPhi can master

The NETZSCH ProPhi crushes difficult-to-handle coarse material with the most effective physical operating principles. Pre-dispersion of agglomerates, which is usually carried out discontinuously or continuously in intensive mixing units, can also be carried out without any problems. This requires prior introduction of the solids into the liquid phase. A major challenge in the continuous preparation of coarse suspensions is their tendency to sedimentation, which can be solved by a correspondingly high flow rate and a high product throughput.

### NETZSCH ProPhi in your production process

- For formulations with crystalline active materials
- For formulations that are often pre-ground with so-called colloid mills and must achieve a fineness of  $<100 \mu\text{m}$
- For abrasive and sedimentary products, that lead to clogging of agitator bead mills during the subsequent fine-grinding process
- For batch sizes up to  $10 \text{ m}^3$



## Metso to launch new Range of Lokotrack Crushers and Screens in Spring 2024

The first products of Metso's new diesel-electric range of Lokotrack® crushers and screens was launched in spring 2024. The launch event, called Lokolaunch, took place at the Nokia Arena in Tampere, Finland.



The new track mounted Lokotrack® range, called EC range, is designed and built on a unique new platform that Metso has been developing since 2020. The Lokotrack EC units feature a next-generation diesel-electric powerline. All process functions are electrically driven and controlled by automation to always perform at the optimal load level. The new Lokotrack will have a robust and distinctive design and it will feature the latest digital tools, making operating and maintaining the units easier than ever.

“The new Lokotrack EC range will be transformational for the mobile crushing and screening of aggregates. This new hybrid equipment with higher efficiency and lower emissions will also significantly contribute to Metso’s Planet Positive offering and the company’s commitment to reach its ambitious climate targets. The new range, along with its related parts and services, has been designed to address the evolving needs of the industry,” says Jarmo Vuorenpää, Director of the new Lokotrack offering at Metso.



In addition to launching the new Lokotrack EC range at the Lokolaunch event, Metso will present the latest advancements of crushing technology, utilization of digital tools, and parts and services designed to significantly enhance the customer's operational efficiency and productivity throughout the entire lifecycle of their equipment.

“Lokolaunch 2024 is more than just an event for customers and other key stakeholders. It signifies a demonstration of our commitment to pushing the boundaries of innovation and sustainability for the aggregates industry. We are excited to gather the

industry's key players to celebrate this great milestone with us,” says Renaud Lapointe, Senior Vice President of Metso Products business line in the Aggregates business area.

The upcoming invitation-only launch event arranged at the Nokia Arena in Tampere, Finland, is the fourth under the Lokolaunch name, carrying a long industrial history with it. Lokolaunch has gained a reputation of being a unique Metso-organized customer event presenting new innovations. Manufacturing of crushing equipment began at Metso's Tampere factory in Finland, which was called Lokomo at the time, already a hundred years ago.

## Dust protection solution thanks to innovative components

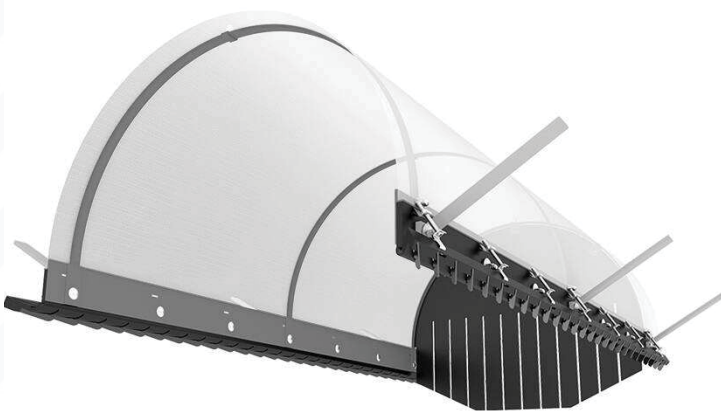
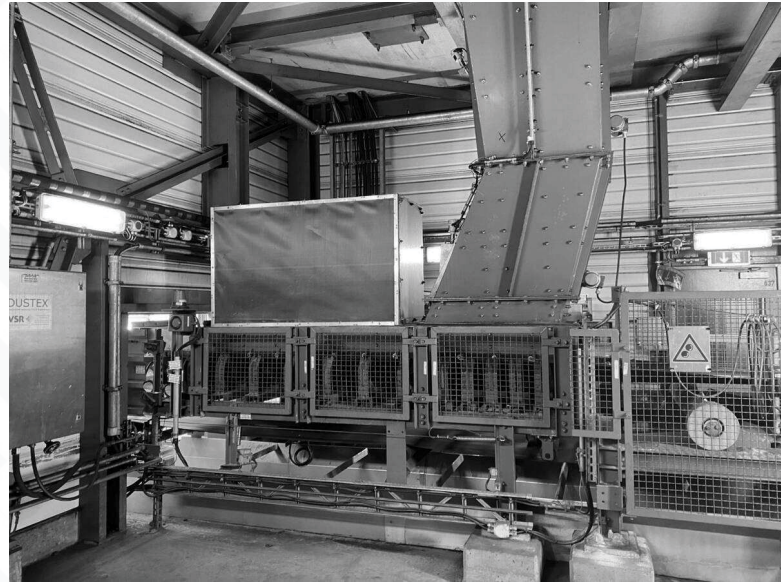
**Operators of bulk material handling systems are always looking for solutions to ensure the safety of their systems and employees and to minimize the risk of explosions.**

Of course, the non-contact side and rear seals from ScrapeTec only work perfectly if the distance to the conveyor belt remains constant. Other solutions ensure this: The SureSupport, for example, stabilizes the belt exactly where the bulk material hits the transfer point and deformations can occur under heavy weight loads. And the PrimeTracker, the conveyor belt tracking assistant, mounted on the lower returning belt, controls and regulates the even belt run and thus also the belt overhang to the AirScrape seal.





This described interaction of the innovative ScrapeTec products is defined by the manufacturer as a dust protection solution. "Transferpoint of conveyor systems are real "dust emitters", which pose a risk to employees and system safety with their enormous dust emissions," says founder and owner Wilfried Dünwald, who is responsible for the development of ScrapeTec products. "My years of working underground as a mining engineer motivated me to develop solutions that avoid dust generation and spills and thereby improve working conditions."



### **ATEX and FRAS requirements are also met**

Of course, ScrapeTec knows that the explosion protection requirements are particularly high in mining and that the ATEX product guidelines and operating guidelines must be met for plants in Europe. For this purpose, in addition to the standard seals for AirScrape and DustScrape, special polyurethane seals are offered whose low flammability and antistatic properties have been tested by TÜV and are ATEX-compliant. As far as the DustScrape is concerned, in this

case special stainless steel filters will be used that meet the requirements for explosion protection. All of the products mentioned can therefore be used in the ATEX-relevant dust zones 20, 21 and 22. In addition to mining, this also applies to conveyor systems in the food sector, where there is a high risk of explosion due to dust - sugar and flour are the most explosive examples here.

But the ScrapeTec dust protection solutions for mining and other particularly explosive conveyor systems can also be used internationally. Because they can also show that the special seals have been tested according to FRAS (Fire Retardant Anti Static), which is the global standard in mining.

With the innovative dust protection solutions from ScrapeTec, one can confidently speak of preventive measures for explosion protection - innovation versus explosion.







## INTERCEM Shipping Forum 2024

NH Roma Villa Carpegna, Rome, Italy

22-23 January 2024



## 2<sup>nd</sup> CemProducer Conference & Exhibition Future-proof process optimisation

Limassol, Cyprus

6-7 March 2024

For more information, please contact:  
**Dr. Robert McCaffrey, Global  
CemProducer Conference convenor**  
Tel.: +44 1372 743837  
Fax: +44 1372 743838



## Industry 5.0 (Online Event)

Your device

06-07 February 2024

For more information, please contact:  
**Industry Link** Tel.: +40726 497 448



## EnviroTech

Hotel Cascais Miragem Health & Spa,  
Lisbon, Portugal

10-13 March 2024



## Cemtech Middle East & Africa 2024 Decarbonising Cement | Sustainable Solutions Across All Continents

Sofitel Dubai The Obelisk, UAE

18-21 February 2024

For more information, please contact:  
**Industry Link** Tel.: +40726 497 448



## Cementitious Materials International Technical and Trade Congress (EMEA and Americas)

Casablanca, Morocco

18-19 April 2024

For more information, please contact:  
**Industry Link** Tel.: +40726 497 448



## INTERCEM Dubai 2024

Jumeirah Emirates Towers,  
Dubai, UAE

27-29 February 2024

For more information, please contact:  
**Ms. Lola Carragher**  
Commercial Sales Manager



## 16<sup>th</sup> Global Slag Conference, Exhibition & Awards

Le Meridien Dubai Hotel &  
Conference Centre, Dubai, UAE

23 – 24 April 2024

For more information, please contact:  
**Dr. Robert McCaffrey**  
Tel.: +44 1372 743837  
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# Training Programme 2024 & 2025

## In-class Training

**Crash Course Process Control**  
19 - 21 February 2024

**Energy Balances and Efficiency**  
18 - 21 March 2024

**Crash Course on Cement Production  
and Use**  
27 - 31 October 2025

## Online Seminars

**Cements of the Future**  
11 April 2024  
31 March 2025

**Grinding Technology in Cement  
Production**  
3 - 7 June 2024

**Burning Technology in Cement  
Production**  
24 - 28 June 2024

**Firing Alternative Fuels**  
23 - 26 September 2024  
15 - 18 September 2025



**More information and registration:**  
[www.vdz-online.de/en/training](http://www.vdz-online.de/en/training)  
[training@vdz-online.de](mailto:training@vdz-online.de)

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Global CemProducer Enquiries

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paul.brown@propubs.com

**Programme and speakers:**  
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10 – 13 MARCH 2024

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## 66<sup>th</sup> IEEE-IAS/PCA Cement Industry Technical Conference

Gaylord Rockies, Denver, USA

5-9 May 2024



## 1<sup>st</sup> Global CemCCUS Conference/ Exhibition/Awards Carbon capture use/storage for cement and lime with Brevik CCS plant visit

Oslo, Norway

14-15 May 2024

For more information, please contact:  
**Dr. Robert McCaffrey**  
Tel.: +44 1372 743837  
Fax: +44 1372 743838



## Women in Cement and Construction International Congress

Dublin, Ireland

15-16 May 2024

For more information, please contact:  
**Industry Link**  
Tel.: +40726 497 448



## CEMENERGY VI international conference

Belmond Grand Hotel Europe, Saint Petersburg, Russia

29-31 May 2024

For more information, please contact:  
Tel.: +7 495 5805436 / +7 812 3350992 (ext. 211)



## CEMENTTECH 2024 The 25<sup>th</sup> China International Cement Industry Exhibition

Wuhan International Expo Center, China

26-28 June 2024

For more information, please contact:  
**Ms. Joanna Long**  
Tel.: +86-10-88083329



## 1<sup>st</sup> Global ash trade, shipping, beneficiation and use in cement and concrete

TBC

June 2024

For more information, please contact:  
**Dr. Robert McCaffrey**  
Tel.: +44 1372 743837  
Fax: +44 1372 743838



## 9<sup>th</sup> International VDZ Congress

Düsseldorf, Germany

6-8 November 2024

For more information, please contact:  
**Ms. Sybille Matthäi**  
Tel. + 49 211 45 78-342



## CarbonZero Global Conference and Exhibition

Madrid, Spain

16-17 October 2024

For more information, please contact:  
**Industry Link**  
Tel.: +40726 497 448



## Sustainability and ESG International Summit

Madrid, Spain

18 October 2024

For more information, please contact:  
**Industry Link**  
Tel.: +40726 497 448





# CEMENERGY

VI INTERNATIONAL CONFERENCE

The conference will be attended by representatives of domestic and foreign industry associations, CEOs of companies specializing in the production and sale of cement and modern binding materials, top managers, leading scientists and technical experts.

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# CEMENTTECH 2024

 June 26-28, 2024

 Wuhan , China.

## Organizer:

 China Building Materials Federation

 China Cement Association

 CCPIT Building Materials Sub-council

## Supported by:



## Media Partners:



**Exhibition/Conference/Plant tour/City walk**  
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## Contact Information:

Joanna Long

Tel: +86-10-88083329

Joannalong@ccpitbm.org

Lucky Li

Tel: +86-10-88083718


Luckyli@ccpitbm.org



## VDZ In-class Training



**Crash Course Process Control**  
 19-21 February 2024

**Energy Balances and Efficiency**  
 18-22 March 2024

## CemNet Training 2024



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(3-Week Online Training)

**Grinding and Milling Systems**  
(6-Week Online Training)

**Alternative Fuels for Firing Cement Kilns**  
(3-Week Online Training)

**Cement Factory Quality Control**  
(6-Week Online Training)

**Cement Manufacturing Technology**  
(6-Week Online Training)

 29<sup>th</sup> January 2024  
22<sup>nd</sup> April 2024  
17<sup>th</sup> July 2024  
21<sup>st</sup> October 2024

**Cement Kiln Process Chemistry**  
(6-Week Online Training)

**Cement Kiln Refractories**  
(6-Week Online Training)

 15<sup>th</sup> January 2024  
15<sup>th</sup> April 2024  
01<sup>st</sup> July 2024  
07<sup>th</sup> October 2024

 22<sup>nd</sup> April 2024  
08<sup>th</sup> July 2024

**Decarbonising Cement Manufacture**  
(6-Week Online Training)

**Calcined Clay Cement**  
(3-Week Online Training)

**Cement Factory Maintenance**  
(6-Week Online Training)

 15<sup>th</sup> January 2024  
15<sup>th</sup> April 2024  
01<sup>st</sup> July 2024  
21<sup>st</sup> October 2024

**Cement Kiln Pyroprocessing**  
(6-Week Online Training)

 22<sup>nd</sup> January 2024  
08<sup>th</sup> April 2024  
08<sup>th</sup> July 2024  
14<sup>th</sup> October 2024

**White Cement Manufacturing**  
(6-Week Online Training)

 29<sup>th</sup> April 2024  
14<sup>th</sup> October 2024



# Ceramic



## 2024 Unicermamics Expo

Foshan, China

18-22 April 2024

Tel: +86 18566021320



## ACHEMA 2024

Frankfurt, Germany

10-24 June 2024



## TECNA 2024

The International Exhibition of Technologies and Supplies for Surface

Rimini Expo Centre, Italy

24-27 September 2024



# General

## STEEL FAB Machinery, Technology, Equipment

Expo Centre Sharjah, UAE

8-11 January 2024

Alroy   
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Adib   
Tel.: +971 55 5337314



## Exposolidos, Polusolidos and Expofluidos 2024

La Farga de L'Hospitalet,  
Barcelona, Spain

6-8 February 2024



## e-drive Türkiye 2024

IFM, Yesilkoy, Istanbul, Türkiye

22-25 February 2024





**2024**



Executive events for business acumen, networking and industry knowledge for cement and construction of the future. Details on programs, dates and locations are available at

**[contact@industrylink.eu](mailto:contact@industrylink.eu)**



## London PropTech Show

ExCeL London, UK

27-28 February 2024



## 14<sup>th</sup> ERBIL BUILD EXPO

14<sup>th</sup> Erbil International Building & Construction & Machinery Exhibition

Erbil International Fairground, Iraq

21-24 May 2024

For more information, please contact:  
International Sales & Marketing  
tel.: +90 506 1269692



## LOGIMAT

Stuttgart, Germany

19-21 March 2024



## International Conference for Dispersion Analysis & Materials Testing 2024

Berlin, Germany

10-11 June 2024



## ANALYTICA 2024

Trade Fair Center Messe München, Germany

9 April 2024



## Big 5 Construct Egypt

Egypt international exhibition center (EIEC), Cairo

25-27 June 2024



## Future Days

Congress Park Hanau, Germany

23-25 April 2024



## InnoTrans 2024

Berlin Exhibition Grounds, Germany

24-27 September 2024



## 12<sup>th</sup> Annual Modular, Prefab & Construction Tech Senate

Manila, Philippines

15-16 May 2024

For more information, please contact:  
Aimi Najwa  
Tel: +60327750000 ext.514



## SOLIDS Dortmund 2024

Berlin Exhibition Grounds, Germany

9-10 October 2024



# الإمارات العربية المتحدة

## التغير المناخي: خارطة طريق لتحقيق الحياد المناخي في صناعة الإسمنت

وأوضحت الوزارة في الدليل الإرشادي لتحقيق الحياد المناخي لمصانع الإسمنت أن انبعاثات الكربون في مصانع الإسمنت في الدولة تشكل 6%، وهناك جهود تقودها وزارة التغير المناخي بالتعاون مع شركائها من السلطات المحلية والهيئات والجهات ذات العلاقة بهدف إحداث التوازن البيئي في العمليات لقياس الأثر البيئية التي تتسبب بها مصانع الإسمنت، وذلك بتفعيل أكبر قدر ممكن من أفضل الممارسات المحلية منها والعالمية، لدعم وتقليل الانبعاثات الكربونية بما لا يعيق النمو الاقتصادي والطلب المتزايد من السوق على الإسمنت ذات الجودة العالية، والتي يتم تصنيعها في الدولة.

وأشارت الوزارة إلى أنها أطلقت مؤخراً خارطة طريق لتحقيق الحياد الكربوني في مصانع الإسمنت، وتقوم مبادئها على الالتزام الجماعي لشركات الإسمنت المساهمة في بناء مستقبل مستدام من خلال تحقيق صافي صفري انبعاثات كربونية للمساعدة في الحد من الاحتراز العالمي إلى 1.5 درجة مئوية، حيث تسلط خارطة الطريق الضوء على تسارع كبير في تدابير الإزالة للكربون لتحقيق الخفض المرتبط بالخرسانة، وكما تدفع نحو تدابير إزالة انبعاثات ثاني أكسيد الكربون المرتبط بالخرسانة 2030 بنسبة 25%.

كشفت وزارة التغير المناخي والبيئة، أن دولة الإمارات تعمل على تحقيق الحياد المناخي في مصانع الإسمنت من خلال خارطة طريق تركز على 5 أهداف رئيسية، وهي تعزيز تنافسية صناعة الإسمنت الأخضر في الأسواق الوطنية والعالمية، وتطبيق تقنيات جديدة مستدامة تساهم في خفض انبعاثات نسب الكربون، وتطبيق معايير التنمية المستدامة في مصانع الإسمنت ضمن مبادرة الطموح المناخي وخطة طريق مصانع الإسمنت نحو الحياد المناخي، وتعزيز الوعي المجتمعي للمحافظة على البيئة وحماية البيئة وتعزيز الاستخدام المستدام.

وأشارت الوزارة إلى أن العمل البيئي مرتبط بشكل كبير ووثيق بالمتغيرات المناخية، لا سيما الانبعاثات المسببة للتلوث.

حيث يعد قطاع الإسمنت مسؤولاً عن 6 – 8% من انبعاثات ثاني أكسيد الكربون عالمياً، والذي يلقي بظلاله على كافة دول العالم، حيث تتفاوت جهود العمل المناخي بينها بشكل ملحوظ، لافتة إلى أن دولة الإمارات تعد من أسرع الدول في العالم استجابة للحد من تداعيات التغير المناخي، وذلك من خلال مبادرة الحياد المناخي بحلول 2050.



## تماشياً مع أهداف دولة الإمارات بالوصول إلى صافي انبعاثات صفرية "حديد الإمارات أركان" تتعاون مع شركة A<sup>3</sup>&Co.® لدعم إزالة الكربون من قطاع الإسمنت

الكربون، وبناء سيناريو وخارطة طريق محددة لإزالة الكربون، والامتثال لمتطلبات اتفاق آلية تعديل حدود الكربون (CBAM)، وتوفير الدعم الاستشاري للحصول على شهادة البصمة الكربونية من مبادرة الأهداف المستندة إلى العلم (SBTi). وباعتباره لاعباً رئيسياً في قطاع الإسمنت بدولة الإمارات، يلعب «مصنع العين للإسمنت» التابع لمجموعة «حديد الإمارات أركان» دوراً محورياً في إنتاج الإسمنت والكلنكر بما يدعم قطاع الإنشاءات المزدهر في الدولة. ومع إنتاجه أكثر من 3.1 مليون طن من الكلنكر وأكثر من 4.6 مليون طن من الإسمنت سنوياً منذ عام 2014، يلعب المصنع دوراً حاسماً في تلبية الطلب المحلي والمساهمة بشكل كبير في تأسيس مجموعة متنوعة من مشاريع البناء في جميع أنحاء الدولة والدول المجاورة.

### Emirates steel arkan

أعلنت مجموعة «حديد الإمارات أركان»، وهي أكبر شركة لإنتاج الحديد ومواد البناء في المنطقة، عن تعاونها الاستراتيجي مع شركة الاستشارات المناخية A<sup>3</sup>&Co.® لدعم مبادرة مبتكرة لإزالة الكربون في «مصنع العين للإسمنت»، وذلك في إطار مساعي المجموعة للمساهمة في المبادرة الاستراتيجية الوطنية لتحقيق الحياد المناخي بحلول 2050. وترسي هذه الشراكة أسس الاستدامة لأعمال الإسمنت في «حديد الإمارات أركان» بما يتماشى مع أهداف المجموعة في إزالة الكربون وتمهيد الطريق للتحويل نحو عملية إنتاج الإسمنت الأخضر.

ويهدف التعاون بين الجانبين إلى تنفيذ خارطة طريق لإزالة الكربون من أعمال الإسمنت للمجموعة مع التركيز بشكل أساسي على تقليل الانبعاثات الكربونية وخفض التكاليف. وتشتمل هذه المبادرة متعددة المراحل على تحديد خط أساس لإزالة

## شراكة بين سيمكس الإمارات وستار للإسمنت لتعزيز الاقتصاد الدوار في صناعة مواد البناء

ومن خلال الشراكة، ستقوم كلا من الشركتين بنشروا إيجاد حلول جديدة لإدارة وإعادة استخدام المخلفات الخرسانية من خلال الممارسات المتطورة والأمنة بيئياً. وعلاوة على ذلك سوف تقوم شركة سيمكس الإمارات بإمداد شركة ستار للإسمنت بالمنتجات الثانوية منخفضة الكربون مما يساهم في الحد من البصمة الكربونية في صناعة البناء.

[cemex.ae](http://cemex.ae)

أعلنت شركة سيمكس الإمارات العربية المتحدة عن توقيع اتفاقية تعاون مع شركة ستار للإسمنت ذ.م.م، وهي إحدى شركات ألترا تك المحدودة للإسمنت بالهند، التابعة لمجموعة أديتيا بيرلا. وتهدف هذه الشراكة إلى إعادة تدوير المخلفات الخرسانية في صناعة البناء والحد من الانبعاثات الكربونية وتقليل التأثير البيئي العام لمشاريع البناء.

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## «عُمان والاتحاد للقطارات» توقع مذكرة تفاهم مع «حديد الإمارات أركان»

بإمارة أبوظبي في دولة الإمارات، الأمر الذي سيدعم «حديد الإمارات أركان» في إنتاج وتصدير 2 - 3 ملايين طن سنوياً من منتجاتها النهائية إلى الأسواق في المنطقة.

كما سيحقق هذا التعاون بين كل من شركة «عُمان والاتحاد للقطارات» وشركة «حديد الإمارات أركان» العديد من المنافع، أهمها تعزيز عوائد قطاع التعدين ورفع حجم الاستثمارات في المحاجر في سلطنة عُمان، كما سيوفر مشروع شبكة السكك الحديدية لشركات المحاجر في سلطنة عُمان حلول شحن مباشرة لتصدير منتجاتها من المواد الخام الطبيعية إلى الأسواق الإقليمية عبر ربط الشبكة مواقع الإنتاج بالموانئ البحرية والمنافذ البرية، الأمر الذي يساهم في تحقيق أهداف رؤية عُمان 2040 في تنمية اقتصاد متنوع ومستدام تكون أطره متكاملة وتنافسية ومواكبة للثورة الصناعية الحديثة.

alwatan.ae

وقعت شركة «عُمان والاتحاد للقطارات»، المطور والمُشغل لشبكة السكك الحديدية التي تربط بين سلطنة عُمان ودولة الإمارات، مذكرة تفاهم مع شركة «حديد الإمارات أركان»، أكبر شركة لإنتاج الحديد ومواد البناء في دولة الإمارات العربية المتحدة، وذلك لتصدير المواد الخام من سلطنة عُمان إلى دولة الإمارات.

وبموجب هذه الاتفاقية، ستتولى «عُمان والاتحاد للقطارات» تقديم الحلول اللوجستية لعمليات نقل الحجر الجيري الخام الذي تعتمزم شركة «حديد الإمارات أركان» استيراده من سلطنة عُمان إلى مصانع الإسمنت التابعة للشركة في مدينة العين بدولة الإمارات.

وستقوم شركة «عُمان والاتحاد للقطارات» بتوفير الدعم اللوجستي وحلول الشحن لخطط شركة «حديد الإمارات أركان» من خلال نقل مواد خام عالية الجودة من سلطنة عُمان بكميات تتراوح بين 4 - 6 ملايين طن سنوياً إلى مدينة العين

## الجزائر

### مؤسسة الإسمنت ومشتقاته بالشلف تحصل على شهادة مطابقة المعايير الأوروبية لمنتج جديد

وتعمل مؤسسة الإسمنت و مشتقاته بالشلف على الاستجابة لطلبات السوق وتصنيع مادة الإسمنت وفق المعايير الأوروبية والعالمية بما يسمح بتسويقها نحو وجهات دولية مستقبلاً، علماً أن أربعة منتجات أخرى حصلت سابقاً على شهادة مطابقة المعايير الأوروبية هي جيكا بيطون (N42.5)، جيكا بنيان (2.5N3)، جيكا إنجازات (N52.5)، و جيكا مضاد (N42.5N-SR5).

وتبلغ طاقة إنتاج مؤسسة الإسمنت ومشتقاته بالشلف التي تتوفر على ثلاثة خطوط للإنتاج، 4,2 مليون طن من الإسمنت و3,6 من الكلنكر، وتنتج حالياً سبعة منتجات، خمسة منها حاصلة على شهادة مطابقة المعايير والمقاييس الأوروبية.

sawtechlef.com

حصلت مؤسسة الإسمنت ومشتقاته بالشلف التابعة للمجمع الصناعي لإسمنت الجزائر «جيكا» على شهادة مطابقة المعايير الأوروبية (CE) لمنتج إسمنت «جيكا بيطون» CEM I 42.5R ليضاف إلى أربعة أنواع أخرى من الإسمنت التي حصلت على ذات الشهادة سابقاً.

وهذا المنتج هو إسمنت بورتلاندي للخرسانة عالية الأداء ذو مقاومة سريعة على المدى القصير مخصص للمناطق ذات الجو البارد لاسيما خلال فصل الشتاء و التي يجب أن تكون فيها مدة نزع القوالب قصيرة، ودرجة تصلب هذا المنتج الجديد تفوق 20 ميغا باسكال خلال يومين.





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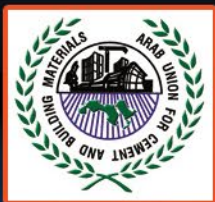
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## هوليسم الجزائر تنجح في أول تجربة تفعيل الكنكر التلقائي بميناء جيجل

و ذكرت هوليسم أنه سيتم تشغيل رافعة السفن هذه بقدرة تحميل اسمية تبلغ 18000 طن يومياً حصرياً من قبل شركة ميناء جن جن لتلبية احتياجات جميع المصدرين في قطاع الإسمنت.

و ذكرت هوليسم الجزائر من المزايا هذه الرافعة، تقليل أوقات انتظار السفن، وبالتالي تجنب توقفها لفترة طويلة، تحسين استغلال الرصيف بفضل استغلال أرضية صغيرة، وتتمتع بمرونة في التحميل تناسب أنواع مختلفة من السفن إضافة إلى حرية التنقل تامة بفضل نظام الجر. أضف إلى ذلك الحفاظ على جودة المنتج طوال عملية التحميل وكذا القضاء على عملية التفريغ المزدوجة، مما يقضي على الحاجة إلى عملية مناولة إضافية، والمساهمة في الحفاظ على البيئة من خلال تقليل فاقد المنتجات وتقليل الانبعاثات الغبارية.

قامت شركة هوليسم الجزائر المختصة في تصنيع الإسمنت بإجراء اختبارات تقنية لأول محمل الكنكر على السفينة في ميناء جن جن (ولاية جيجل) حيث تعد هذه الإنجازات تاريخية في تطوير اللوجستيات الوطنية المخصصة للتصدير .

وأوضحت شركة هوليسم الجزائر إلى أنه بعد سلسلة من الاستثمارات المستدامة في مجال التصدير، مثل المنصة اللوجستية بالشراكة مع شركة ريل لوجيستيك فرع من مجمع SNTF التي تم تدشينها في 2020، وزيادة السعات التخزينية في المصانع، واقتناء ثلاثين شاحنة صهريجية لنقل الإسمنت السائب، باستثمار يفوق 3 مليون يورو لاستكمال المخطط اللوجستي .

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## أمودا تطلق خط لإنتاج الإسمنت البترولي

اعتزم مصنع إسمنت أمودا إطلاق خط جديد لإنتاج الإسمنت البترولي بالأغواط. ويهدف هذا المشروع إلى تلبية الاحتياجات المتزايدة لمشاريع النفط والغاز في المنطقة الجنوبية والتقليل من استيراده من الخارج. ويأتي إطلاق هذا المنتج الجديد داخل مصنع للإسمنت بسبب وجود رواسب الحجر الجيري ذات الجودة الكيميائية الجيدة لتصنيع هذا الإسمنت، وقربها من قواعد ورواسب النفط والغاز بالجنوب (حاسي الرمل حاسي مسعود).

و يقع مصنع إسمنت أمودا ببلدية البيضاء، وهو مجهز بأحدث التقنيات، سيما في مجال حماية البيئة، ويحتوي على خطين لإنتاج الإسمنت، بطاقة تقدر بـ 2.5 مليون طن سنوياً من الإسمنت، بالإضافة إلى الكلنكر .

[ar.aps.dz](http://ar.aps.dz)

## تزويد مصنع بني صاف بمصفاة جديدة

في إطار مجهودات مجمع جيكا للمحافظة على البيئة، تم مؤخراً تزويد مصنع الإسمنت لبني صاف بمصفاة من

الجيل الجديد مطابقة للمقاييس الدولية، من أجل تنقية الغبار المنبعث من مداخل هذا المصنع.

وبالتالي، صارت جميع مصانع الإسمنت التابعة للمجمع مجهزة بهذه المصافي العصرية.

[صفحة جيكا LinkedIn](#)

## شركة الإسمنت عين التوتة: تصدر 300 ألف طن من الإسمنت نهاية 2023

أعلنت شركة الإسمنت عين التوتة التابعة للمجمع الصناعي لإسمنت الجزائر بلوغ صادراتها من مادة الكلنكر 300 ألف طن نهاية عام 2023.

وتبلغ الطاق الإنتاجية السنوية للشركة 1 مليون طن منها 900 ألف طن من الإسمنت وتغطي نسبة هامة من احتياجات السوق الوطنية.

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# المملكة العربية السعودية

## إسمنت المنطقة الشمالية تستثمر نحو 150 مليون دولار لإنشاء خط إنتاج في العراق

وتتوزع أعمال الشركة في السعودية والأردن والعراق، حيث تملك 100% بشكل مباشر وغير مباشر من أسهم «إسمنت الشمالية» في الأردن، و 100% من أسهم شركة «أم قصر الشمالية لصناعة الإسمنت» في العراق، إضافة إلى 6 شركات في الإمارات يتركز نشاطها الرئيسي في التملك في شركتي الإسمنت المذكورتين في الأردن والعراق.

أعلنت شركة إسمنت المنطقة الشمالية السعودية أنها وقعت عقداً مع شركة KHD الألمانية لإنشاء مصنع للإسمنت في العراق بطاقة إنتاجية تبلغ 1.32 مليون طن سنوياً. ومدة العقد 16 شهراً، ويتوقع أن يظهر أثره المالي على نتائج إسمنت المنطقة الشمالية في النصف الثاني من العام 2025.

وتعمل شركة إسمنت الشمالية في إنتاج الإسمنت بأنواعه، إضافة إلى إدارة وتشغيل مصانع الإسمنت البورتلاندي بجميع أنواعه، وتجارة الجملة والتجزئة في منتجات الشركة ومواد البناء، بما في ذلك استيرادها وتصديرها إلى الخارج.



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أعلنت شركة إسمنت الرياض توقيع عقد مع شركة سينوما اينرجي كونزيرفيشن ليمتد لإنشاء مشروع الاستفادة من الحرارة المهدرة لانتاج الكهرباء بطاقة إنتاجية قدرها 12.64 ميغاوات. وتبلغ قيمة العقد 130.5 مليون ريال (34,8 مليون دولار) ومدته 20 شهراً.

**«إسمنت الرياض» توقع عقداً مع  
«سينوما اينرجي كونزيرفيشن» بقيمة  
130.5 مليون ريال**

### شركة إسمنت المدينة تؤسس «شركة البدائل المبتكرة للخدمات البيئية»

ليشتنبرغ الشرق الأوسط للخدمات البيئية. والمملوكة بنسبة 80% من شركة مجموعة العبداللطيف القابضة (طرف ذو علاقة) وبنسبة 20% لشركة ليشتنبرغ القابضة.

وستقوم الشركة الجديدة بإنتاج الوقود البديل من المخلفات وتسويقه محلياً ودولياً، حيث سيساهم المشروع في تقليل الاعتماد على الوقود الأحفوري والحد من الانبعاثات الكربونية والمساهمة في تحول المملكة للاقتصاد الدائري انسجماً مع مخرجات رؤية المملكة 2030 ومبادرة المملكة العربية السعودية لخفض الانبعاثات الكربونية العالمية بنسبة 4% وصولاً للحياد الكربوني بحلول عام 2050.

أعلنت «شركة إسمنت المدينة» من خلال شركتها التابعة «شركة الحلول الخضراء للخدمات البيئية» - والتي تعمل في مجال تقديم الحلول البيئية لإدارة النفايات والتي من ضمنها تقنيات تشغيل مرافق المرادم لمعالجة وتدوير المخلفات بأنواعها في إنتاج الوقود البديل للوقود الأحفوري وتطبيقات تغذيته لتوليد الطاقة في الصناعات ذات الاستخدام الكثيف للوقود والطاقة - بأنها قامت بتأسيس «شركة البدائل المبتكرة للخدمات البيئية» برأسمال يبلغ (6,770,000) ريال سعودي وبنسبة ملكية 29.4% لشركة الحلول الخضراء للخدمات البيئية، وذلك بالشراكة مع شركة تدوير للخدمات البيئية بنسبة 51% والمملوكة للشركة السعودية للاستثمار وإعادة التدوير (سيرك)، إحدى شركات صندوق الاستثمارات العامة وبنسبة ملكية 19.6% لشركة

## مصر

### مجموعة شركات السويس للإسمنت تغير اسمها التجاري إلى هايدلبرج ماتيريالز

وتدعم التزامات الاستدامة لهايدلبرج ماتيريالز لعام 2030 رؤية المجموعة الرامية إلى بناء مستقبل أكثر استدامة يقوم على خفض انبعاثات الغازات الدفيئة، ويتسم بالسلامة والشمول والنظر الإيجابية تجاه الطبيعة، ويراعي استدامة الموارد والقدرة على الصمود.

وبهذا، تستهدف المجموعة الحياد الكربوني وتعتمد أهدافاً لخفض ثاني أكسيد الكربون في صناعة مواد البناء وتوفير منتجات منخفضة الكربون.

أعلنت مجموعة شركات السويس للإسمنت عن تغيير اسمها وعلامتها التجارية إلى هايدلبرج ماتيريالز. وتؤكد العلامة التجارية الجديدة الدور الرائد للمجموعة في سعيها نحو تحقيق الحياد الكربوني والتحول الرقمي في قطاع مواد البناء والتشييد.

## العمل من أجل الاستدامة

تقليل استخدام الطاقة وتكاليفها وانبعاثات ثاني أكسيد الكربون بما يصل إلى 40 كيلو طن سنوياً، مع دعم الاقتصاد الوطني من خلال تقليل الطلب على الغاز الطبيعي ذي القيمة.

وأطلقت المجموعة أيضاً في عام 2021 منتجات إسمنت جديدة ( Pozzolana & Masonry ) البوزولاني والتشطيبات ذات انبعاثات أقل من ثاني أكسيد الكربون. فإن هذه المنتجات تتميز بانخفاض نسبة الكلنكر مما يساهم على خفض انبعاثات ثاني أكسيد الكربون بنسبة كبيرة.

[masrawy.com](http://masrawy.com)

كانت أعلنت هايدلبرج ماتيريالز في مصر، في إطار عملية تغيير العلامة التجارية للشركة، عن الاستثمار في حلول الطاقة الكهربائية البديلة من خلال إنشاء نظام استعادة الطاقة المهدرة في مصنعها في حلوان، ويعمل هذا المشروع الضخم على جمع الحرارة المهدرة الناتجة عن عمليات الإنتاج وتحويلها إلى طاقة كهربائية يمكن أن تدعم 30% من احتياجات المصنع من الكهرباء. وستلعب هذه المبادرة الأولى من نوعها دوراً حاسماً في

## شركة ترانسكارجو توقع اتفاقية مع شركة سيناء للإسمنت لبناء صوامع بميناء العريش

الأسواق الخارجية، مما يؤدي إلى تعزيز الوضع التنافسي للشركة من خلال توفير العديد من التكاليف وعلى رأسها التكاليف اللوجستية، وتكاليف التعبئة والتغليف.

يضم مشروع ميناء العريش 6 صوامع للإسمنت السائب بطاقة تخزينية قدرها 10 آلاف طن للصومعة الواحدة (بإجمالي 60 ألف طن). وقد تم تخصيص اثنين من هذه الصوامع للإسمنت الأبيض البورتلاندي، بالإضافة إلى 4 صوامع للإسمنت الرمادي البورتلاندي.

[transports24.com](http://transports24.com)

وقعت شركة ترانسكارجو إنترناشونال اتفاقية مع شركة سيناء للإسمنت الأبيض بورتلاندي لبناء وتشغيل أول محطة صوامع لتصدير الإسمنت الصب في ميناء العريش، مما يشكل إنجازاً هاماً لصناعة الإسمنت في مصر ويعزز من قدراتها على زيادة الصادرات المصرية من الإسمنت للخارج.

وفقاً لبنود الاتفاقية التجارية، ستقوم ترانسكارجو إنترناشونال ببناء وتشغيل محطة صوامع للإسمنت الأبيض بسعة تخزينية تتخطى 200 ألف طن سنوياً لصالح شركة سيناء للإسمنت الأبيض بورتلاندي، وذلك لتيسير تصدير منتجات الشركة إلى مختلف

## كوريا الجنوبية تفرض رسوماً على الإسمنت الأبيض المصري

وتهدف رسوم مكافحة الإغراق، إلى منع الأضرار المحتملة التي قد تسببها الواردات للصناعة المحلية.

[alyaum.com](http://alyaum.com)

أعلنت كوريا الجنوبية فرض رسوم مكافحة إغراق مؤقتة بنسبة 72.23% الإسمنت البورتلاندي الأبيض المستورد من مصر لمدة أربعة أشهر. وجاء هذا بعد أن أعلنت لجنة التجارة الكورية التابعة لوزارة الصناعة نتائجها الأولية بخصوص مكافحة الإغراق ضد الواردات وأوصت بفرض الرسوم في سبتمبر / أيلول.



## Advertisers: December edition # 94, 2023

|  | Page        |                 |
|--|-------------|-----------------|
| Arab Swiss Engineering<br>Company "ASEC"                     | 30          | Website         |
| AUMUND<br>Fördertechnik GmbH                                 | 5           | Website         |
| CEMENERGY<br>ALIT, group of companies                        | 61          | Website         |
| Cement and its Applications Journal                          | 37          | Website Website |
| CEMENTTECH 2024<br>CCPIT Building Materials Sub Council      | 62          | Website         |
| CemTech MEA2024<br>International Cement Review               | 56          | Website         |
| EnviroTech 2024<br>World Cement Magazine                     | 59          | Website         |
| fives  | 7           | Website         |
| GEBR. PFEIFFER   | 17          | Website         |
| 2 <sup>nd</sup> Global CemProducer<br>Global Cement Magazine | 58          | Website         |
| Graco BVBA   | Front cover | Website         |
| Industrial Angles  | 69          | Website         |
| Industry Link 2024   | 65          | Website         |
| JAMCEM Consulting  | 20          | Website         |
| S.I.G.   | 72          | Website         |
| Siman News – Iran Cement<br>News Agency                      | 74          | Website         |
| thyssenkrupp Polysius GmbH                                   | 10          | Website         |
| UAE Cement Portal Website                                    | 71          | Website         |
| VDZ<br>Training Program 2024 & 2025                          | 57          | Website         |
| ZKG Cement Lime Gypsum                                       | 41          | Website         |