FLSmidth Mission Zero

The next chapter in alumina calcination

Drawing from our vast experience in designing alumina Gas Suspension Calciners (GSC), our latest innovations reduce cost, conserve energy and improve product quality.

As the creators of the most advanced alumina calciner systems in the industry, we value staying at the forefront of research and development. Our experts analysed every aspect of our Gas Suspension Calciner (GSC) system and discovered opportunities to address energy efficiency, economy of scale, and particle breakdown.

Minor design changes on our end mean major productivity increases on yours. Our recent developments are a direct result of our customers' desire to maximise throughput, cost efficiency and alumina quality.

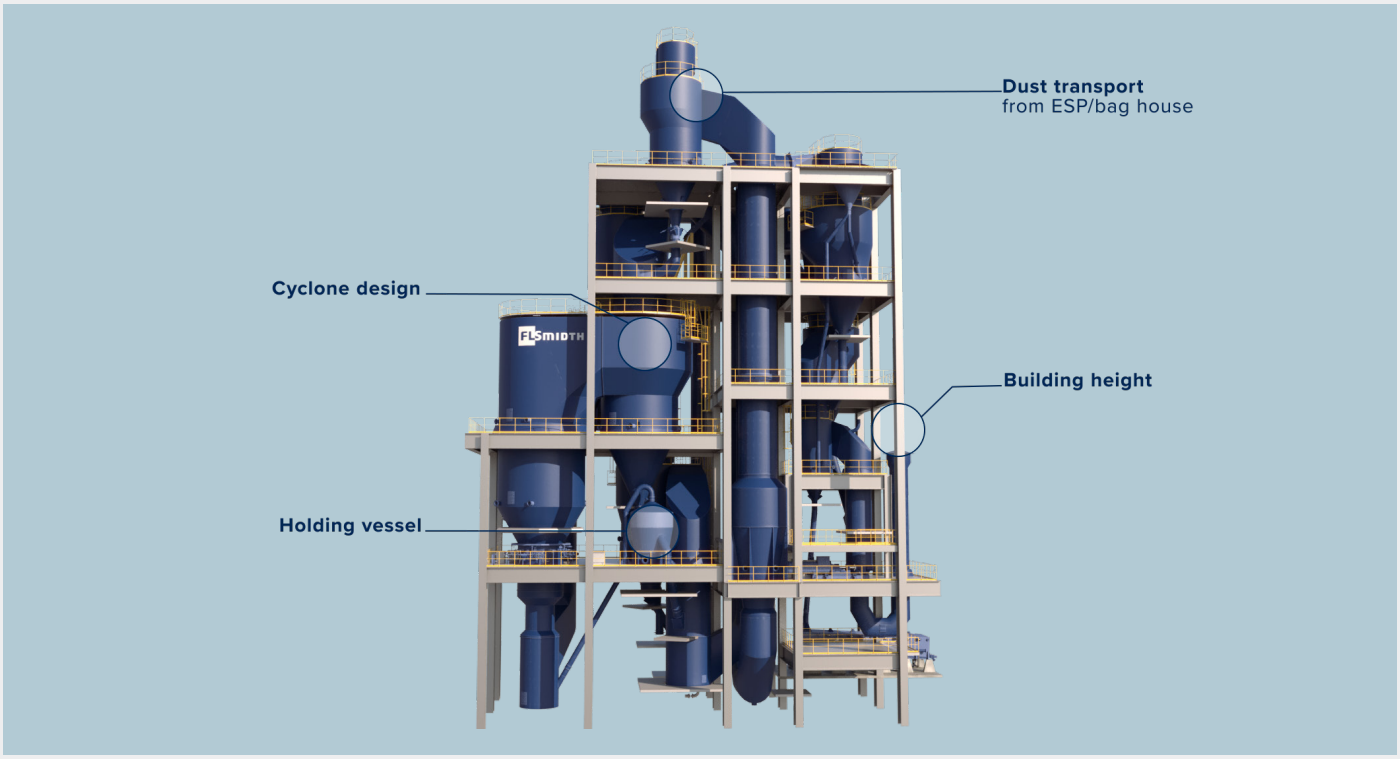
Key benefits:

- Lower CAPEX and OPEX
- Reduced power and fuel consumption
- Better control and productivity
- Longer lifecycle

All GSC solutions are designed according to our customers' unique specifications, ranging from pilot scale to the world's largest alumina calciners.

Building on a world-class design

FLSmidth engineers analysed each step within the alumina calcination process and made numerous enhancements to improve performance while reducing costs. Newer technologies bring you better control and consistent results without a premium price.



New dust transport mode

- Elimination of dense-phase conveying system
- No compressed air requirement
- Reduced particle breakdown
- Reduced wear
- Reduced power consumption
- Lower CAPEX

Improved cyclone design

- Reduced cylindrical height
- Cyclone inlet design change
- Lower pressure drop
- Higher separation efficiency
- Reduced power consumption
- Improved vortex finder life
- Reduced particle breakdown for improved product quality

Efficient holding vessel (HV) design

- More reliable fluidisation
- Less risk of dead zones in HV
- Reduced possibility of over-calcination
- Lower thermal impact to HV refractor

Smarter digital interface

- Advanced process control – ECS/ProcessExpert®
- Dynamic simulation
- Improved control on critical process parameters
- Operator training tool
- Reduced specific fuel consumption
- Increased productivity

Lower building height

- Reduced steel requirements
- Lower carbon footprint
- Reduced fuel consumption

Digital connection for expert operation

The days of manual operation and educated guesses are behind you. With software that makes you work smarter, not harder, the digital component to operating our GSC is a game-changer for productivity and reliability.

What does ‘digitally enabled’ mean for you?

You have the option to connect your plant to our digital ecosystem, providing you with benefits from our technology and experience. We offer a range of services geared towards maintaining asset health and optimising performance – many of which may be executed remotely, saving both time and money.

Maximum reliability

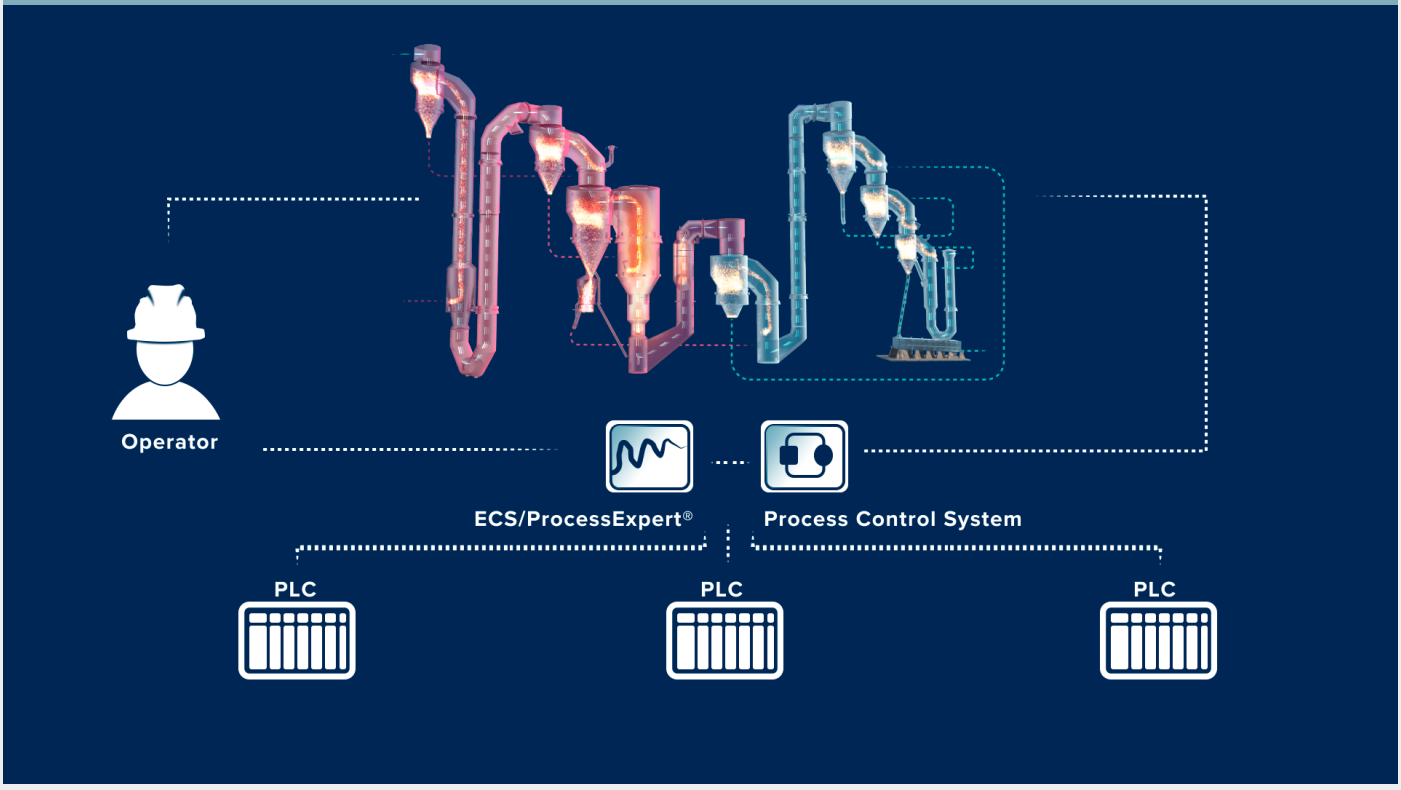
Our renowned process control solution, ECS/ProcessExpert®, is based on years of experience in advanced process control. It uses progressive techniques such as model predictive control and fuzzy logic rules to regularly monitor plant processes and quality parameters. ECS/ProcessExpert continuously computes new control set points, enabling it to fine-tune your processes more frequently and reliably than a human operator can do. Our latest version introduces an innovative way to easily configure, customise and maintain applications.

ECS/ProcessExpert offers a range of unprecedented, industry-specific, intelligent building blocks that represent distinct process equipment. We have standardized these building blocks based on our decades of experience, and they are available for a variety of applications, such as our GSC. Benefits include easy adaption to future plant modifications, resulting in easier maintenance and higher run factor.

The ECS/ProcessExpert KPI dashboard is clear and easy to interpret, enabling you to visualise performance levels at any given moment with a simple touch of a button. And with our mobile app, SiteConnect™, you don’t even have to be onsite to check on your system.

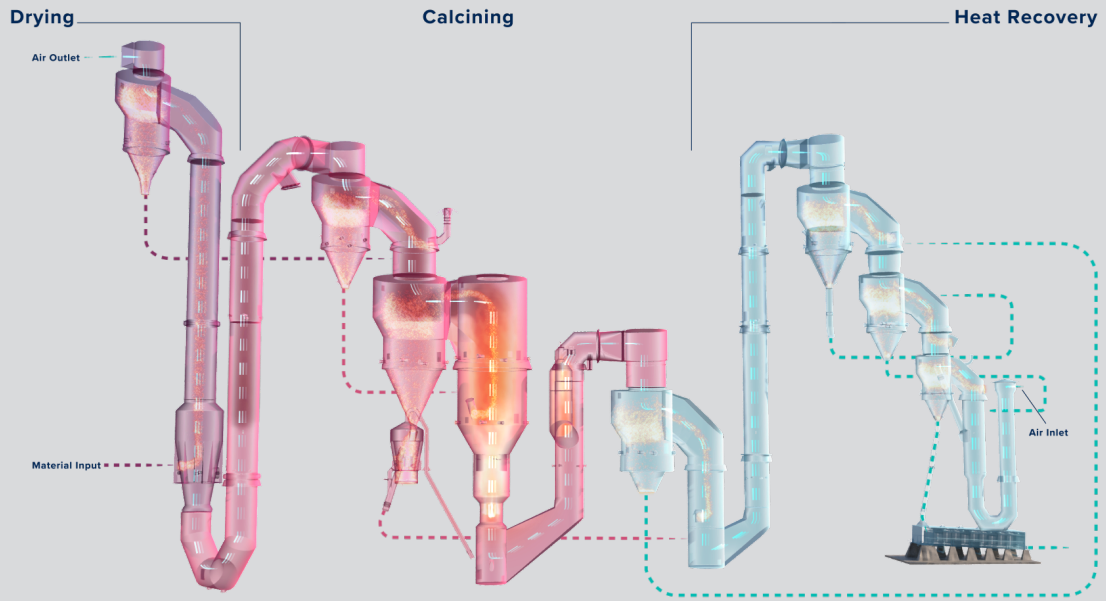
To ensure long-term utilisation of our advanced process control solutions, FLSmidth has also introduced a proactive “PlantLine™ Service" concept that provides remote monitoring of key performance indicators, with FLSmidth 24/7 Global Remote Service Center support as an integral part of the system package – maximising your benefits.

Digital ecosystem



CEMulator® virtual training

Learn how to optimise your calciner system's performance in this online 5-day (4 hrs per day) training seminar that prioritises best practices, reducing operating costs and improving overall productivity of the pyroprocess system.



Measurement (m)
Actuator (a)

Measurments
- Calciner temperature (m)
- Calciner outlet temperature (m)
- System O2 (m)
- System CO (m)

Actuators
- Calciner fuel t/h (a)
- Feed rate t/h (a)
- ID fan speed (a)

Quality
- LOI (m)
- Gibbsite (m)
- Alpha alumina (m)
- BET surface area

Pyroprocess operations and CEMulator® virtual training

The pyroprocess system is considered to be the heart of the aluminum refinery process. It is also where most of the thermal energy is used.

Our pyroprocess operations and simulation seminar offers a thorough study of the design and function of kiln and calciner systems, including but not limited to the latest methods for optimisation and proposals for upgrades and modernisation of your current system.

The seminar focuses on the understanding of how a pyro system works, the influence of the burnability of raw materials, and overall operating strategies. It also details the relationship between the chemistry of the raw materials, fuels, burner settings and operation of the preheater/calciner/kiln/cooler systems.
With the use of FLSmidth's process and operations simulator – CEMulator – basic theoretical concepts will be put into practice, providing the participant with a better understanding of the action/reaction of a pyro system

Efficient holding vessel (HV) design

- Control room operators
- Production managers
- Quality personnel
- Operational personnel
- Process engineers
- Plant managers

Smarter digital interface

- Production rate – controlled by hydrate feed rate
- Alumina quality – controlled by calcination
- Calcination temperature – controlled by fuel flow rate
- Alumina discharge temperature – controlled by cooling water flow rate to fluid-bed cooler
- Excess oxygen – controlled by exhaust gas ID fan

Environmental impact

Ever mindful of the impact we have on the planet, our innovations not only increase efficiency, productivity and cost savings, but we ensure they are always in line with our MissionZero goals.

Shareholders, customers, employees and neighbouring communities increasingly expect miners to not only support global development, but operate profitably and to do so while lessening the industry's environmental footprint, The mining industry now has the opportunity to redefine itself when it comes to environmental impacts and to embrace or develop more sustainable solutions, practices and technologies

We are driven to help miners produce more with fewer resources and to create a smaller footprint – what we call sustainable productivity. With MissionZero, our ambition is to deliver this sustainable productivity by offering solutions that support zero water waste, zero emissions and zero energy waste by 2030.

But what does this look like in reality? It means offering customers the required technological and digital solutions to move towards greener alumina calcination processes:

Fuel consumption
Furnace oil (diesel) per tonne
5%↓

Power consumption
kWH/tonne of calcined alumina
8%↓

CO2 emissions
Annual savings from reduced steel use
7%↓

Especially with advancements in digital technology, conditions remain more stable with an automated process. With ECS/ProcessExpert automation keeping our GSC temperature zones stable and reducing fuel consumption, we offer the most efficient calcination process in the industry — with a marked reduction in CO2 emissions.

State-of-the-art process technology and proprietary equipment combine for an operation that maximises energy, extends lifecycle, and maintains product quality.

FLSmidth Mission Zero

MissionZero comes with the responsibility of pulling the weight of an entire industry, looking for solutions that will not only reduce our environmental impact, but do so without jeopardising profitability and economic growth.

Innovation plays a crucial role in MissionZero because its main purpose is to increase productivity and improve efficiency, which go hand in hand with lowering resource consumption: a key aspect of sustainability.

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