

# MILL AND KILN GEAR DRIVES

Custom engineered for peak performance and maximum production

# GEARS AND PINIONS THAT DRIVE PROCESS EFFICIENCY

As an OEM, we understand the critical role gear drive systems have in maintaining mill and kiln uptime and production. That's why we design and supply the highest quality girth gears and pinions, tailored to your application, ensuring maximum uptime, reliability and performance where it matters most.

## KEY BENEFITS

**Reliable, long-lasting,  
heavy-duty gears**

**Maximum uptime and efficiency**

**End-to-end service support**

**Flexible manufacturing  
processes at OEM approved shops**

**Expert design, optimised  
to your application**

# ENGINEERED FOR RELIABILITY

Drawing on over a century of experience supplying kilns and mills, our girth gears set the benchmark for reliability and efficiency. Built to withstand the toughest operating conditions, our gears and pinions not only provide incredible performance but also ensure maximum uptime and production – delivering the dependability your critical path equipment demands.

## More uptime, more cement

If your gear fails, production stops. And replacements or repairs can cost you millions in lost productivity. That's why our priority is always to design the most reliable gear possible, using the highest quality materials and proven design.

Our process is flexible. We work with OEM-approved workshops across the world to supply gears manufactured from fabricated steel, cast steel or ductile iron. Every gear is tailored to your application, ensuring optimal performance every time. And all our gears are guaranteed to meet expectations, with a minimum 5-year warranty.

## Proven technology

FLSmidth Cement can supply a broad range of designs and materials for both gears and pinions enabling us to meet your individual needs.

Although we offer gear materials of cast ductile iron and cast steel, FLSmidth Cement has a long 50+ year history of supplying girth gears constructed of fabricated steel. Fabricated

designs have become our preference due to the cleanliness of the forged rim material and the ability to heat treat it via quenching and tempering. The quality of forged rims guarantee consistent material properties throughout the entire toothing – plus casting defects, like hot tears, porosity or shrinkage, are excluded, resulting in a stronger and more reliable girth gear.

Our manufacturers work closely with world-leading foundries and steel plants to ensure the highest quality materials. We select only the best machine shops meeting FLSmidth Cement's strict manufacturing requirements, ensuring absolute accuracy and optimal performance.

## A rich gear and pinion history

We've been supplying girth gears and pinions for as long as we've been supplying ball mills and kilns. We understand the demands of a ball mill and a kiln, and our gear engineers work side by side with the product engineering teams to deliver gear solutions. Solutions proven by an install base supplied over the last century plus.

As a contributing member of the American Gear Manufacturers Association (AGMA), we are actively involved in defining the standards for ball mill and kiln open gear design calculations, service factor ratings, material requirements and allowable stress limits.

Over its 150+ years, FLSmidth Cement has never stopped pursuing ever greater efficiency, reliability and longevity so that you can get more from your mill and kiln operations.



*Load testing: a fabricated gear undergoes rigorous evaluation at Lehigh University*

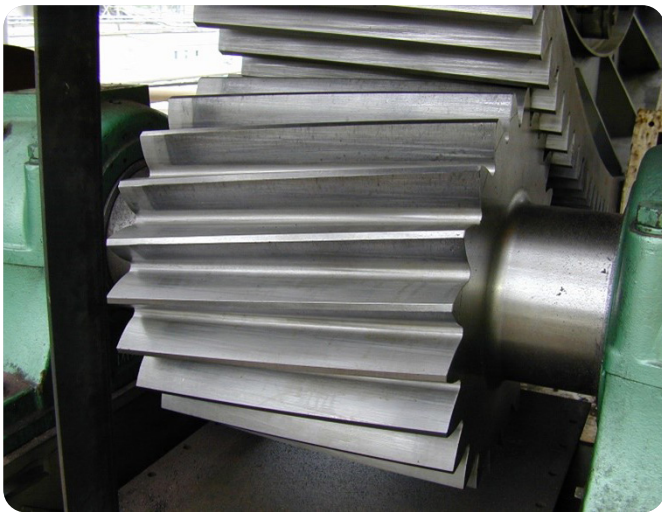
# TAILOR-MADE PINIONS AND GIRTH GEAR ACCESSORIES

Manufactured with maximum precision, our pinions are customised for your mill and kiln drive application and designed to work harmoniously with our girth gears – delivering smooth, reliable operations.

## Designed for longevity

Pinions are the workhorse of the girth gear set seeing many more wear and fatigue cycles than the gear. The correct combination of material, hardness and tooth quality of the pinion and mating gear is crucial in ensuring the installed equipment has a long service life.

If higher production, increase in driver power or change in speed is required, we can supply a custom solution. We will strive to maintain the existing envelope dimensions (facewidth, center distance) to limit time consuming shutdown modifications.



## Tailored solutions

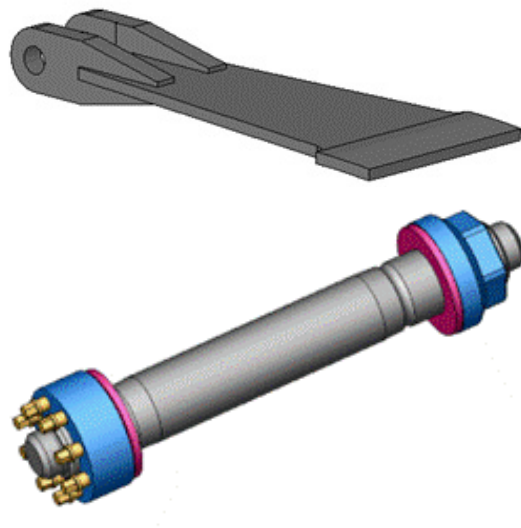
**Pinions are as varied as their applications. Our pinion designs include:**

- Helical and spur
- Bored (shell) or integral one piece
- Self-aligning
- Forged alloy steel
- Through-hardened, quenched and tempered
- Carburised and ground

## Accessory parts including

- Pinion shafts and bearings
- Tangential spring mounts
- Gear guards
- Gear set lubrication systems
- Gear joint hardware
- Complete drive solutions including auxiliary (emergency or inching) drives

Custom designs meeting any Cement application requirement.





## OEM quality

Our commitment to quality starts with choosing the best partners for every job. We work with machine shops around the world to produce high-quality gears and pinions based on our expert design. Every shop is inspected and approved by our quality control department, and all the parts we supply undergo strict material non-destructive testing including ultrasonic, magnetic particle and dye penetrant testing. Critical tooth dimensions are measured to ensure compliance with required quality demands. We comply with the following international standards: UNI EN ISO, AGMA, AWS, ASTM, ASME and DIN.

## Optimisation projects

We don't just supply new gears – we can also propose design improvements to increase production, change operating speeds and accommodate increases in driver power. Our mill, kiln and gear engineers will work together to design and supply a cohesive solution for your production and performance needs. Talk to us about your challenges and let us help develop lasting solutions.

# END TO END SERVICES

From design to installation, and from maintenance to optimisation, our expert service team is with you every step of the way.

## Your partner in productivity

Our work doesn't end with the design of your girth gear. We consider ourselves your partners for life; we want to be there for all your challenges – and successes.

### Installation

Our engineers can be onsite to supervise and advise throughout installation of your girth gear. Proper installation will set you up for long-term success and ensure your warranty is valid.

### Gear inspections

Whether you're facing a problem, or just want the reassurance of an expert eye, our service team is always happy to come to you to carry out audits and inspections of your gear systems.

### Online condition monitoring services

Pre-empt and avoid gear system downtime with our Online condition monitoring services. Our sensors capture data from your gear and run it through specialist software that detects the early warning signs of failure and alerts our 24/7 Remote Global Service Centre, who will identify the cause of the problem and recommend appropriate actions to prevent the issue from escalating. This service goes above and beyond what can be discovered through visual inspection and runs continuously, so you're always a step ahead of your maintenance needs.



### Maintenance

Our engineers are available to carry out onsite maintenance, from basic preventive maintenance measures to more complex repairs. You can contact us for emergency support, scheduled outages, and everything in between.

### Remote services

If you have an urgent query, our service team can support you remotely via your preferred method of communication (video call, phone call, email, etc.). Our remote services are available 24/7 and provide more immediate assistance compared to waiting for a site visit.

### Optimisation

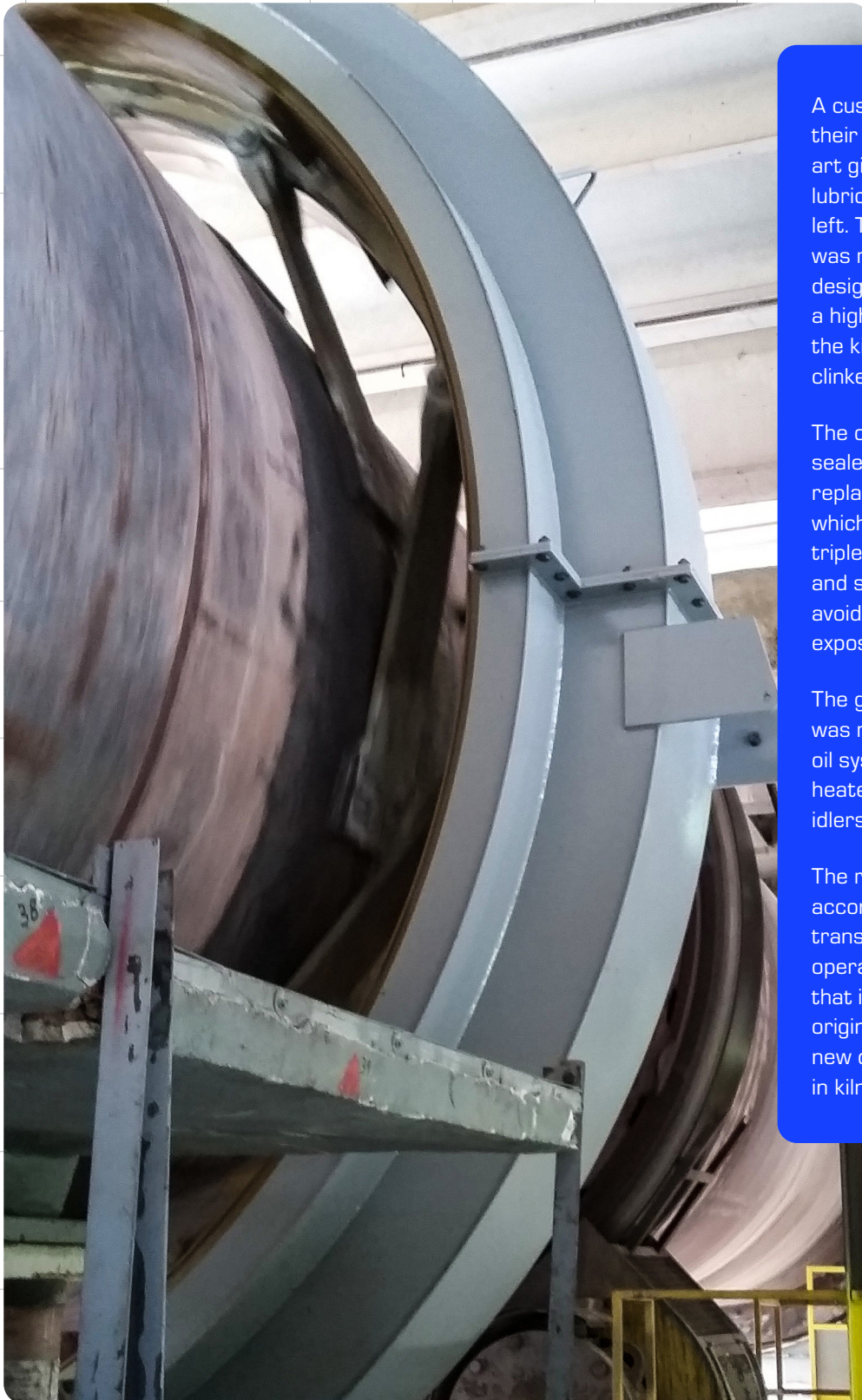
If you're seeking ways to improve performance, call in the experts. We can help identify performance gaps and suggest ways to increase efficiency, reliability and productivity. Our optimisation services are entirely bespoke, but can include audits and inspections, condition monitoring and training, as well as reports and recommendations.

### Training

Benefit from our expertise and upskill your team with tailored training courses from our Education team. We can come to your site to deliver a combination of hands on and classroom training, or else visit us at one of our local service centres.



# REAL-LIFE UPGRADE INCREASES CLINKER PRODUCTION



A customer in the USA modernized their kiln with a state-of-the-art girth gear, gear guard and lubrication system, shown on the left. The 40+ year old spur gear was replaced with a new helical design gear which accommodates a higher motor power and allows the kiln to turn faster for increased clinker production.

The original gear guard which sealed against the kiln shell was replaced with a modern guard which seals against the gear via triple labyrinths making the shell and spring mounts visible and avoiding gear lubricant from direct exposure with the hot shell.

The gear grease spray system was replaced with a circulating oil system which includes filter, heaters and optional back-up oiling idlers.

The replacement gear drive accommodates an increase in transmitted power and faster operating kiln speed with a torque that is more than double the original kiln drive capability. The new drive supports a 60% increase in kiln production.

# FLSMIDTH CEMENT

[www.flsmidth-cement.com](http://www.flsmidth-cement.com)

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