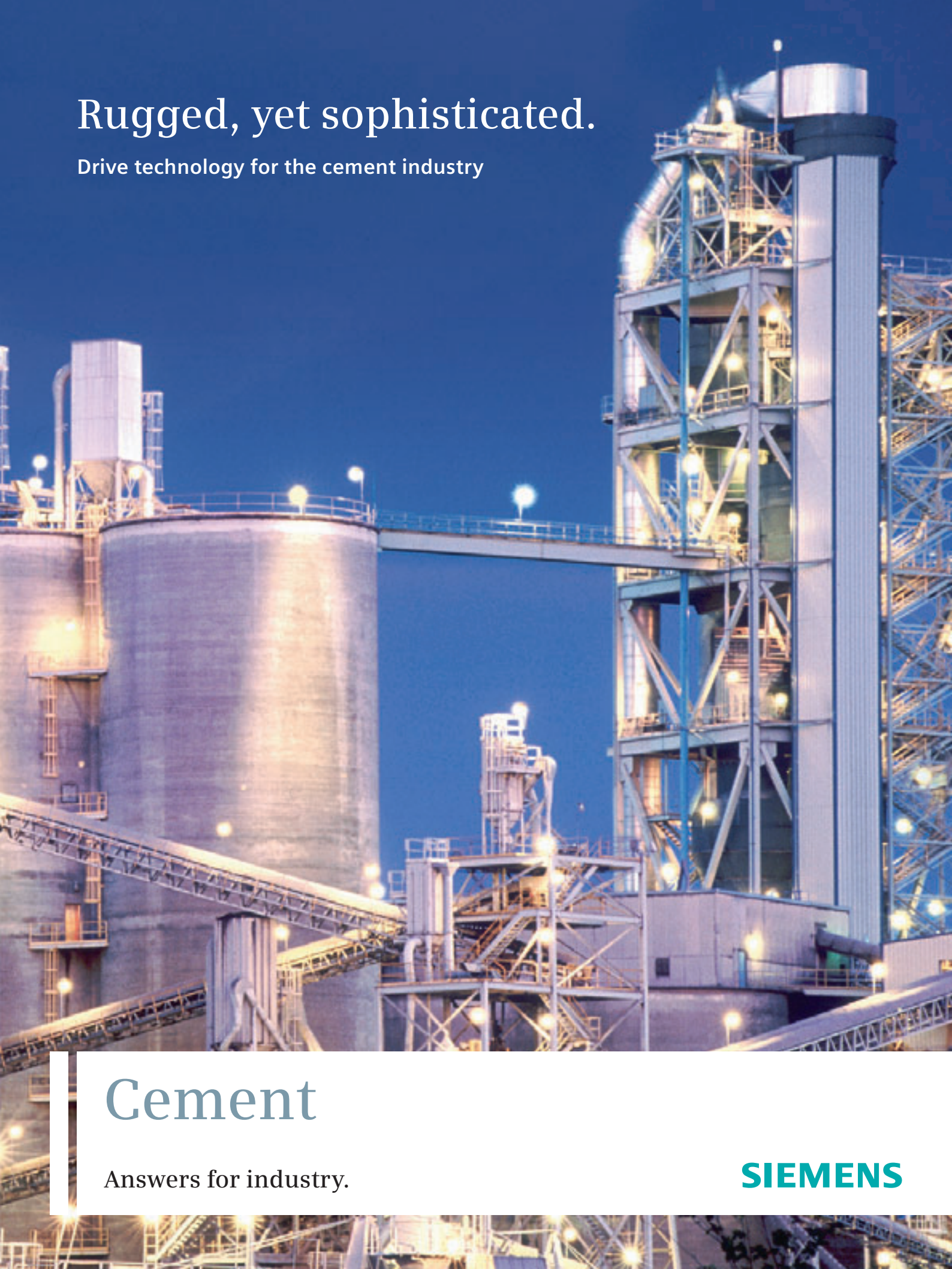


Rugged, yet sophisticated.

Drive technology for the cement industry

Cement

Answers for industry.

SIEMENS

Contents

Sheer power for maximum availability and efficiency

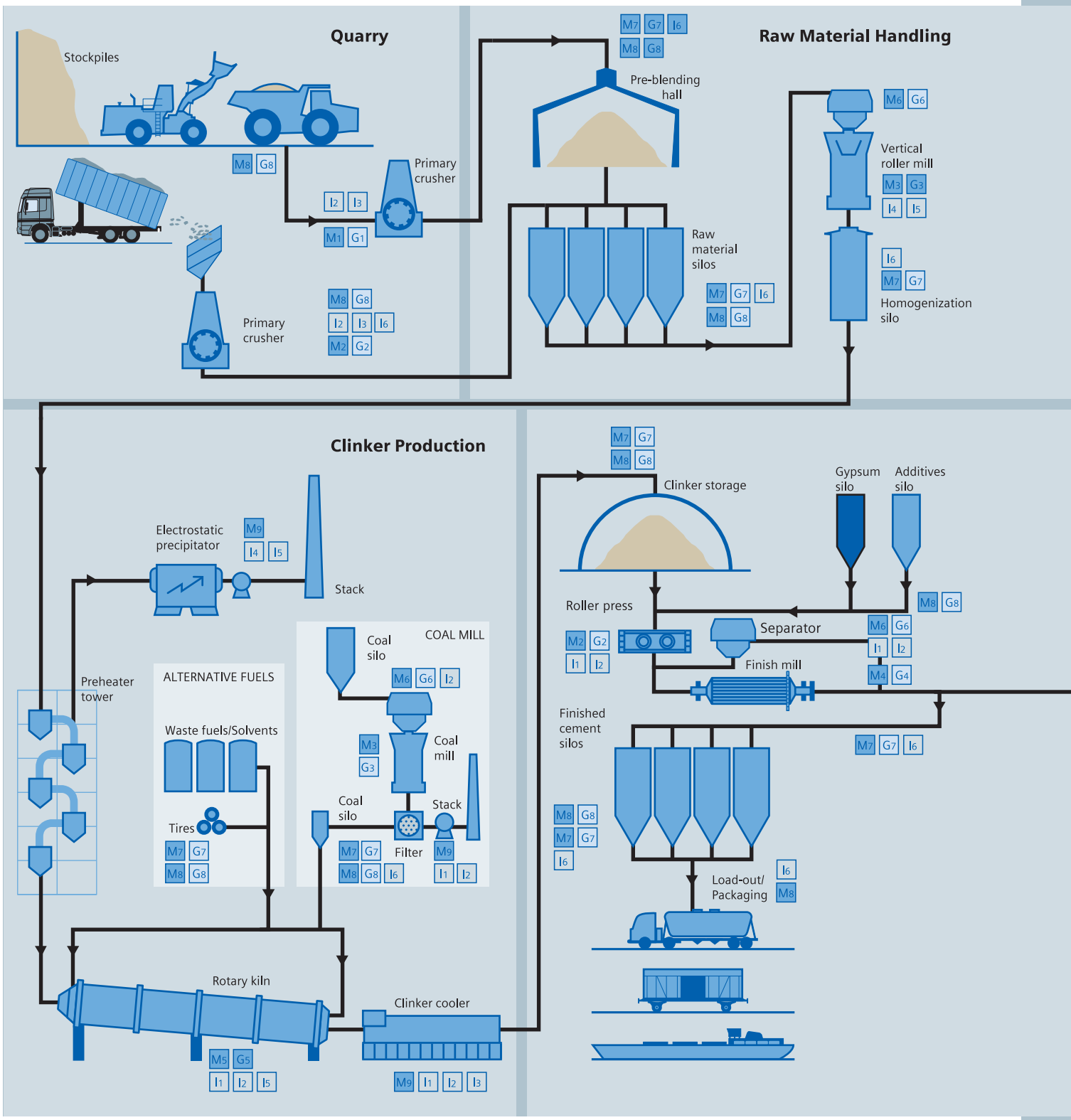
Manufacturing cement, one of the world's oldest building materials, is a complex and energy-intensive operation. In continuous operation, the demanding procedures need to run completely reliably and also economically. Stopped rotary kilns or mills are things of the past. Competitive pressure, environmental protection requirements and energy prices are too high at many cement plants.

The right drive technology plays a key role here. The better it is coordinated with the specific properties of the process, the more reliably and economically the whole process can be set up. With many years of industry know-how and an extended portfolio which, alongside proven Siemens systems, now also integrates the industry-specific services of Flender Heavy Duty and Loher, we deliver bespoke drive systems for all fields of cement production – whether small units or double-digit megawatt installations are required.

In close cooperation with customers in the cement industry, we develop complete drive solutions for maximum performance, operational reliability and high energy utilization. Innovative technologies, experience from applications, engineering know-how and precisely matched components can be combined to form solutions that are perfectly tailored to the respective requirements – in terms of power, torque and dynamics, and also with regard to availability, diagnostics and profitability.

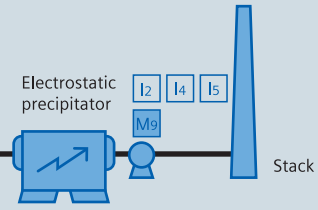
However, the Siemens/Flender team not only supplies solutions for the entire drivetrain, but also supports you throughout the entire life cycle – with prompt service and support thanks to global presence, with foresighted maintenance concepts or with economic modernization.

Drive systems for every process area



From quarry to kiln, from clinker silo to loading – the entire process chain of a cement plant with daily clinker production of up to 12,500 tonnes requires supreme performance and efficiency. The drive technology used not only has to handle continuous operation, sometimes for over 300 days a year, but must also withstand the toughest environmental conditions. Siemens/Flender offers bespoke and highly reliable drive systems for all process areas in cement production. The perfectly matched motors, converters and gearboxes transfer high levels of power and force not only completely reliably, but also particularly efficiently.

Cement Production, Packing, Dispatch



M1 Crusher
- High-voltage slip ring motors

M2 Roller press
- High-voltage slip ring motors
- Low-voltage cast-iron motors
- High-voltage asynchronous motors

M3 Vertical mill
- High-voltage slip ring motors
- High-voltage asynchronous motors

M4 Tube mill, horizontal
- High-voltage slip ring motors
- Ring motor with direct AC converter

M5 Rotary kiln
- Low-voltage cast-iron motors
- High-voltage asynchronous motors

M6 Separator
- Low-voltage cast-iron motors

M7 Bucket elevator
- Low-voltage cast-iron motors

M8 Conveyor belt
- Low-voltage cast-iron motors
- High-voltage asynchronous motors

M9 Fan
- High-voltage slip ring motors
- Low-voltage cast-iron motors
- High-voltage asynchronous motors

G1
- PLANUREX® planetary gearbox
- Flender gear unit

G2
- PLANUREX® planetary gearbox

G3
- Vertical mill gearbox KMP, KMPS, KMPP

G4
- Toothed gearing with power split
- Planetary gearbox for central drive
- Flender gear unit
- DUORED® gearbox with power split
- Single-stage MDSS gearbox with variable distances between the axes

G5
- Flender gear unit
- PLANUREX® planetary gearbox
- DUORED® gearbox with power split

G6
- Flender gear unit
- MOTOX® geared motors
- PLANUREX® planetary gearbox

G7
- Flender gear unit

G8
- Flender belt transmission
- Flender gear unit
- Flender self-aligning system
- MOTOX® geared motors

G9
- Flender gear unit

I1
- SINAMICS S120

I2
- SINAMICS G150/G130/G120

I3
- MICROMASTER 440

I4
- SINAMICS GM150

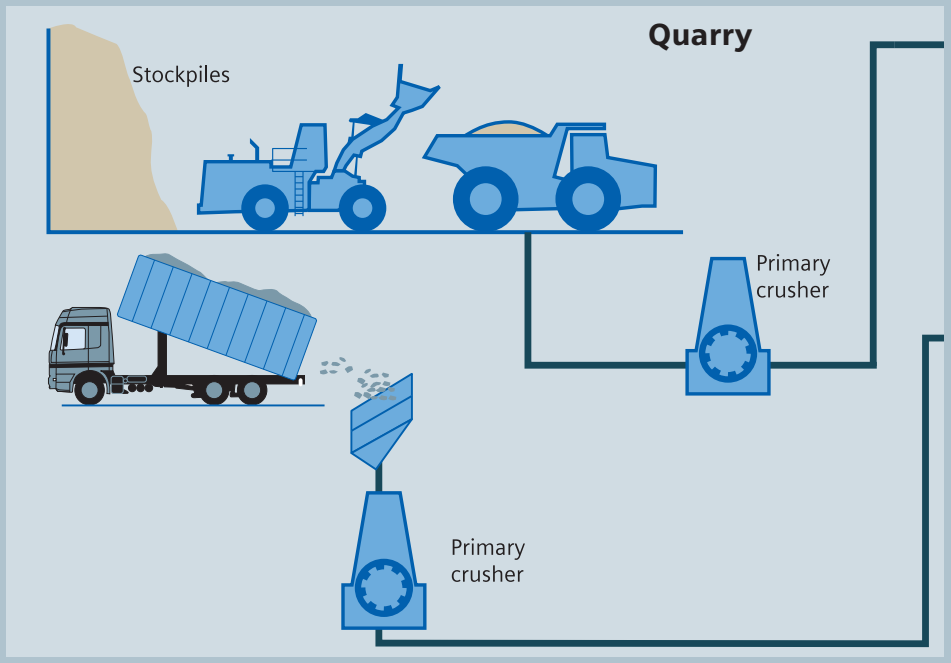
I5
- ROBICON Perfect Harmony

I6
- Soft starter type 3 RW

Perfect crusher drive

Cement is typically produced from limestone, clay, sand and iron ore. Before the raw material is ground, high-powered stationary or mobile crushers reduce the material to a processable size. The drive systems used not only have to handle the significant mass moment of inertia of the crusher rotor during start-up, but also be able to withstand continuously high torque peaks. The use of slipping resistances makes the torque curve of the motor softer.

For perfect drive of all types of crusher, we offer reliable high-voltage slip ring motors as well as industry-specific Flender toothed and PLANUREX planetary gearboxes that have been proven in multiple jaw, conical and roll crusher applications.

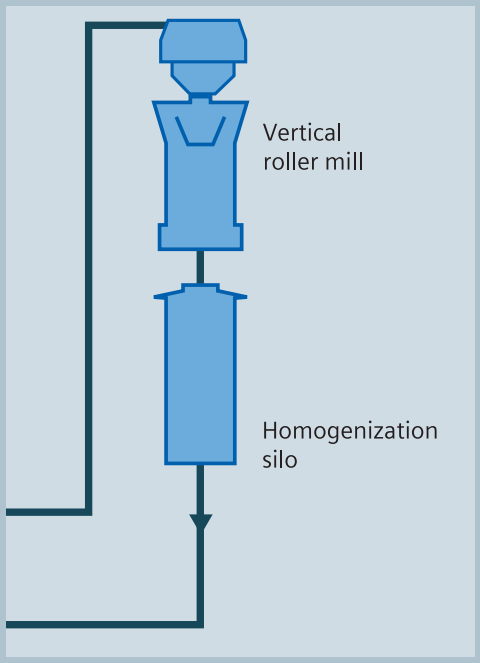


How vertical mills perform fine grinding

Mills which grind raw materials to very fine grain are used at various stages in cement production. Due to their low energy consumption in comparison with conventional horizontal mills, companies often use vertical mills that employ enormous drives. The energy efficiency and performance of the mill are to a large extent dependent on the drive system.

For these drives of a cement facility, Siemens/ Flender offers robust, high-performance drive components and systems that have been proven in many applications in the building materials industry. And when space is at a premium, we can also supply compact solutions from a single source. Alongside common drive versions with asynchronous slip ring motors and liquid starters, we offer innovative systems that ensure greater energy efficiency in your operation. Thanks to their high degree of efficiency, our motors offer a positive energy effect. This effect can be increased through matched medium-voltage converters from our portfolio, such as ROBICON Perfect Harmony or SINAMICS GM150, which ensure efficient and reliable operation using the latest IGB technology.

We also offer the centerpiece of the drive with our compact and reliable KMP, KMPS and KMPP Flender vertical mill gearboxes, which cover a power range up to ~9,000 kW. These bevel gear planetary gearboxes come with special bearings fitted and a special housing to direct the high axial forces directly into the foundations.

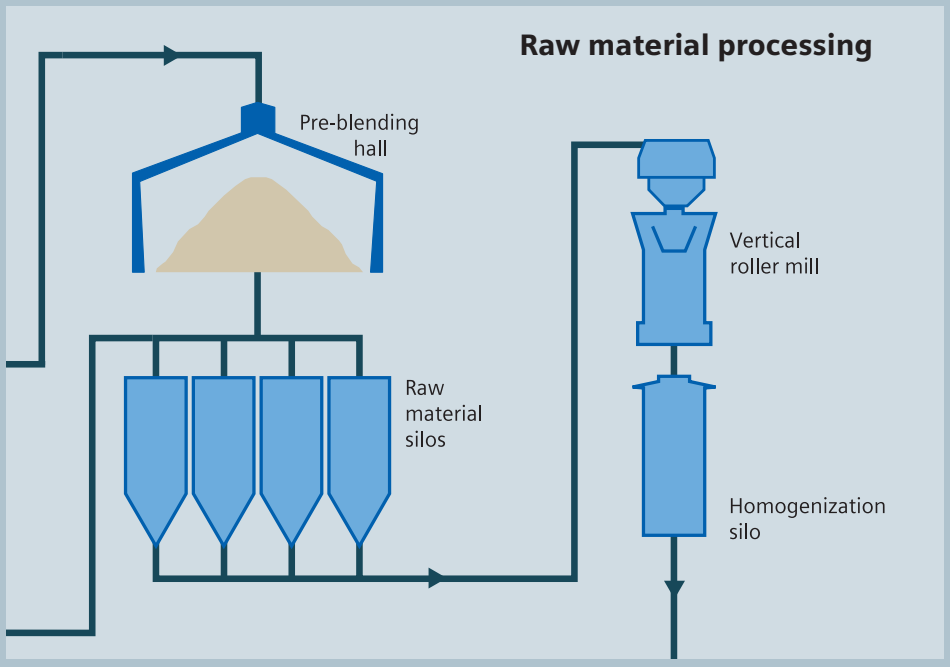


Everything under control in the separator

The quality that raw and broken material mills deliver is decisive for the following process steps. A separator is therefore usually installed downstream of the milling process to sort the milled material by size and, if necessary, feed it back for remilling. Separators are generally equipped with a controlled drive.

Our specific portfolio for the cement industry offers the right solution for any separator: reliable, compact and economic motors, energy-efficient high-performance frequency converters such as the compact low-loss SINAMICS G150, complemented by the proven Flender gear unit system.

We also offer the right solution for applications which require a brake resistor, either as a standardized module or customized for your specific requirements.



Keeping kilns turning continuously

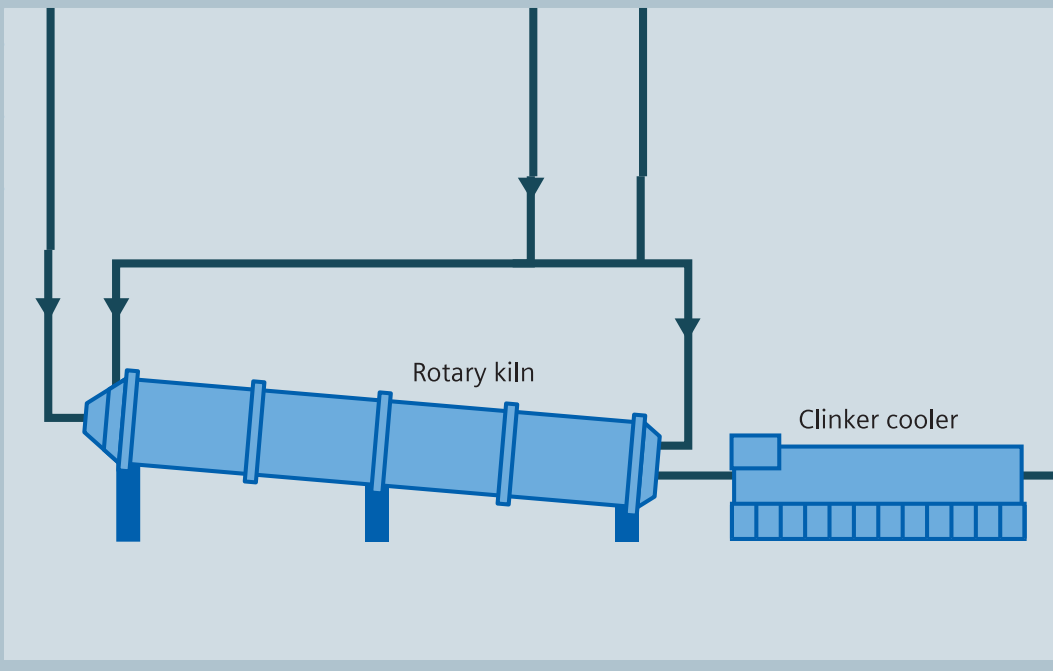
The raw material is heated at up to 1,450 °C in the rotary kiln and burned to form cement clinker. The expensive heart of clinker production runs around the clock throughout the year.

The kiln is only stopped for maintenance purposes. As a sudden standstill can cause permanent deformation and damage due to the high temperature, the kiln must continue to be turned until a suitably low temperature has been reached. This cooling down is generally performed by the auxiliary drive, which is also required for maintenance work. It is, for example, used to approach exact positions when lining the kiln. We satisfy all these requirements for you masterfully with our full range of solutions from a single source.

In addition, the drive system is often equipped with a corresponding emergency device for the event of a power outage. This prevents the risk of deformation damage after a sudden stop. You can of course also purchase this device from us.

Alongside the required emergency running properties, the high start-up torques, large speed ranges and extreme ambient temperatures also place great demands on the drive technology. Our range is accordingly powerful and robust for every type of kiln.

Depending on the size, individual or twin drive systems with load distribution control are used. With our comprehensive portfolio, we can offer you reliable low- and high-voltage asynchronous motors, matching converters from the SINAMICS und ROBICON Perfect Harmony ranges as well as toothed and planetary gearboxes, including auxiliary drives.



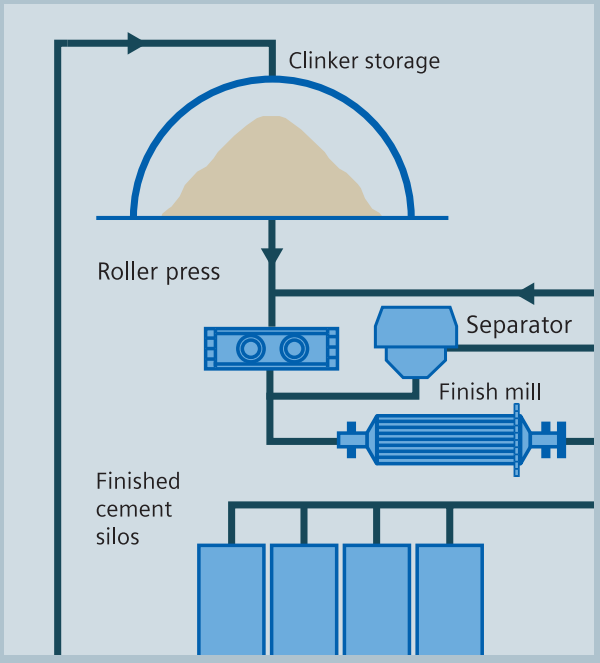
How roller presses crush material so impressively

To increase the throughput of the downstream mills, roller presses are often used. Cement clinker, ore or limestone is ground between two counter-rotating rollers under high pressure. The drive generally consists of electromotors with accompanying control devices and gearboxes that are placed directly onto the rollers.

For optimum driving of roller presses, our portfolio offers two different options on the electrical side. The simple solution is an asynchronous slip ring motor as a fixed speed drive with accompanying starter. More convenient options are offered by systems combining asynchronous and squirrel-cage motors and converters. We can offer you economic motors for these applications which offer impressive efficiency, high power density and compact design.

Our motors can be combined seamlessly with the SINAMICS G150 converters, SINAMICS S120 inverters and corresponding load distribution control. The advantages of this converter solution include controlled, material-saving start-up and the ability to adjust the speed to match the process requirement. For gearboxes with multiple motors, central supply connection and common DC busbar, our portfolio includes a finely scalable solution in the form of the modular SINAMICS S120 Cabinet Modules.

PLANUREX planetary gearboxes with high power density and a low noise level as leading noise output as well as Flender gear unit systems round off the drive spectrum for roller presses.

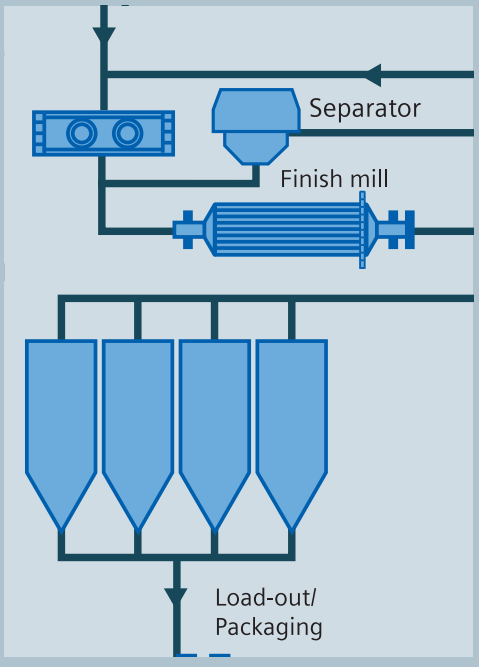


Keeping tube mills working long term

With up to 30 MW, tube mills are among the largest machines in primary industry. They use impact and friction to grind cement clinker into an extremely fine powder.

Instead of the standard version, i.e. driving tube mills with asynchronous slip ring motors, liquid starters and gearboxes, drives with ring motor and direct AC converter, familiar from the field of ore processing, start to make more sense above a power output of around 10 MW.

Alongside the motors and converters, we also supply all components for the complete drive system of a tube mill. The compact and efficient Flender toothed gearing, which uses innovative power splitting to offer perfect load distribution, the Flender gearboxes, DUORED®2 helical and PLANUREX® planetary gearboxes also deserve particular attention. All drives can also be supplied with auxiliary drives.



Materials handling all across the board

Bucket elevators and conveyor belts are used at many points in the cement production process to transport large volumes of bulk materials over complex routes, sometimes horizontally, sometimes vertically, often outdoors or to cover great height differences. The drive systems have to be able to handle these tough conditions and still provide maximum performance, operational reliability and profitability.

A soft start-up of the conveyor belt systems is particularly important. Ideal solutions for achieving this include a hydraulic clutch, for example Flender FLUDEX® clutches, or a soft starter such as our SIRIUS 3RW44. The innovative torque control of the High-Feature soft starter ensures optimum start-up for drives up to 710 kW output with standard switching or 1,200 kW with inside-delta circuit. PROFIBUS also allows the SIRIUS 3RW44 to be integrated in higher-level control systems.

For special or complex transport tasks, our tried and tested converter systems MICROMASTER 440, SINAMICS G150 / S120 / GM150 and ROBICON Perfect Harmony are available.

The familiar Flender range of belt drives with a particularly large surface area and optimum heat dissipation and the MOTOX geared motors round off the whole range.

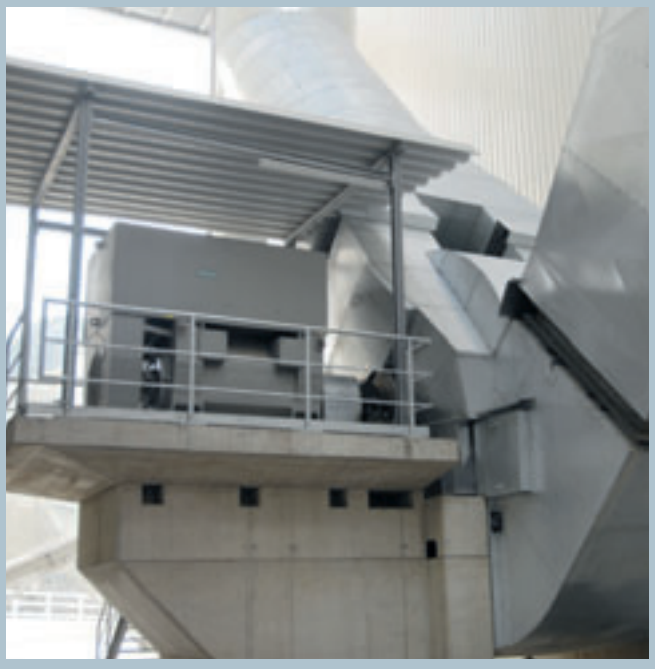
No matter what your conveyor needs: Our solutions cover the entire drivetrain, can be ideally adjusted to the most diverse requirements and ensure the required availability and profitability of your installations.

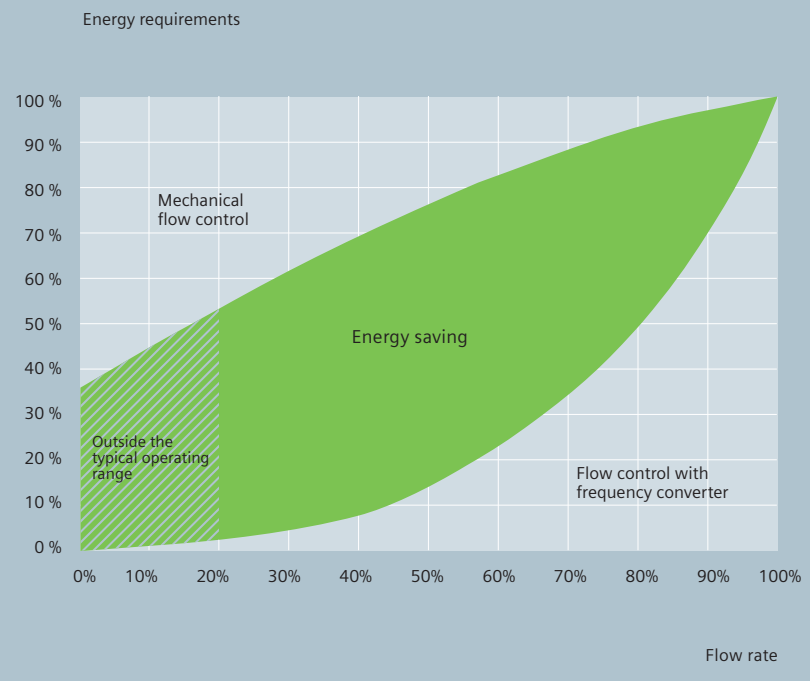
Making sure fans do not run out of breath

Fans of various designs are used in many locations throughout the cement production process, from around 100 kW right up to units with several MW and quadratic characteristics. With a comprehensive range of low- and high-voltage motors, the powerful SIRIUS 3RW44 soft starter, converters from the SINAMICS, ROBICON Perfect Harmony and MICROMASTER ranges, as well as the proven range of Flender gearboxes/drives including accessories, we offer an economic solution for all fan drives.

Our converters have a particularly positive effect on energy consumption at high output. They allow variable speed operation of the fan drives. This allows energy to be saved – depending on the system characteristics up to 70% savings can be achieved in extreme cases. In contrast to traditional control processes, in which the motor always runs at the maximum speed of the conveyor (whereby the conveyor speed is governed by the material being transported) and the excess material is "throttled away" using mechanical actuators, drive systems with frequency converters always adjust the speed and thereby the energy consumption precisely to current operational requirements. In other words: The motor only draws as much power as is actually needed. The overall result is significantly lower energy consumption than with fixed speed drives of similar performance that use mechanical control principles in partial load operation. There is a great energy-saving effect with pumps and fans as here the power consumption is proportional to the cube of the speed.

Even low speeds offer a major energy-saving effect. Conversion of a fixed speed drive in the MW range can be amortized in less than 24 months, in many cases in as few as nine months, and ensures efficient operation from then on. Vast savings potential can also be tapped in clinker cooling through converter operation, as this cooling typically involves 10 to 20 controlled drives to achieve the 75 to 200 kW output requirement. The path to greater efficiency: individual motor converter units on a common DC busbar with redundant supply.



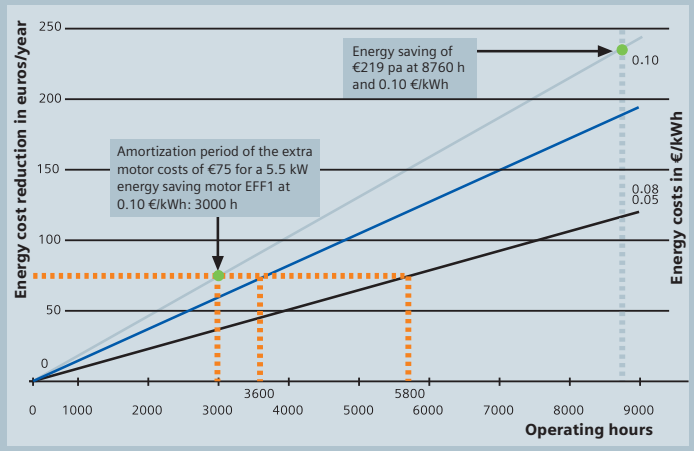


Energy efficiency throughout the entire line

A shortage of resources and the effects of climate change are causing companies to rethink their strategies – especially in energy-intensive industries. The main power consumers are the drive systems. The solution: Targeted use of energy-saving motors and frequency converters allows valuable kilowatt hours to be saved.

The key factors for energy efficiency are optimum design and dimensioning of the installation as well as targeted selection of the drive components. With comprehensive process know-how in cement production and a corresponding portfolio of energy-saving motors and frequency converters, we can help in the design of energy-efficient systems for the cement industry.

And we approach this from all angles. We not only work consistently to increase the efficiency and performance of our drive components, we also place great emphasis on their perfect interplay. The use of energy-efficient drive components always pays for itself. Investments in the right technology can generally be amortized after just a few months and then ensure lasting savings throughout the entire life-cycle. Exactly when the use of energy-saving motors or frequency converters pays for itself and the level of future monthly savings can easily be calculated with the SinaSave software tool using system-specific data.



Energy-saving motors for every application

We are one of the few motor suppliers worldwide that can offer you a full range of high-performance energy-saving motors for virtually every application, all of which are safe for use with converters up to 500 V. Alongside an excellent price-performance ratio and high degree of operational reliability, our energy-saving motors ensure significant reductions in operating costs, up to 40% less power loss and a longer service life. Alongside general efficiency optimization and an improved carbon footprint, our high-efficiency 1LA9/1LG6 motors meet EFF1 standards and are in line with the EPAct values stipulated by US legislation.

Thanks to lower motor temperatures, they offer a longer service life and lower consumption of lubricants. In continuous operation, our energy-saving motors also incorporate high levels of overload reserves (SF 1, 15 for 1LA9/1LG6).

In our portfolio of energy-saving motors you can find:

- Highly efficient energy-saving motors in the highest EU efficiency class EFF1 (High Efficiency),
- Improved efficiency energy-saving motors in the EU efficiency class EFF2 (Improved Efficiency) and
- Energy-saving motors in line with the US federal legislation EPAct (Energy Policy Act of 1992) for 60 Hz operation with CC number.

The new MOTOX range of geared motors

With the new, extremely compact MOTOX geared motor series we have completed our drive portfolio for the 0.12 to 200 kW power range. In comparison with conventional geared motors, the MOTOX range is characterized by greater drive torques up to 20,000 Nm and greater rated gearbox torques. In short: MOTOX provides concentrated power in the smallest space.

A high degree of power in a small space

With all common gearbox types – from helical, through flat-type, helical bevel and helical worm right up to worm geared motors – MOTOX covers all drive tasks and fulfils all of the relevant international regulations.

Our new range of geared motors is characterized by excellent technical performance, in particular when used in materials handling, crane or lifting technology. Drive torques of up to 20,000 Nm and a significantly higher rated torque than our competitors' products ensure consistently efficient operation, increased system availability and operational reliability. Thanks to the special design principle, which allows a higher gear ratio, 4-pin MOTOX standard motors are, for example, an economical alternative to 6- or 8-pin motors.

Highly flexible thanks to modular system

Thanks to the practical modular system, our geared motors can be combined flexibly and can be customized for the respective drive task. All standard market designs and fittings are possible – even subsequent expansions can be carried out quickly: Functional units such as brakes, external fans or encoders can be attached to the modular base motor with additional shafts.

MOTOX geared motors are an integral part of Totally Integrated Automation, our comprehensive range of products and systems for company-wide automation in all industries. They can be easily combined with other components in our comprehensive drive spectrum, e.g. converters in the SINAMICS or MICROMASTER families. The result is end-to-end system solutions with which system productivity can be permanently increased.

The MOTOX range of geared motors includes:
- Standard motors in accordance with IEC/EN
- NAFTA motors with specifications in accordance with NEMA, UL, CSA
- CCC-certified motors for export to China along with GOST-R-certified motors and gearboxes for the Russian market
- Highly efficient geared motors (EFF1 motors) in accordance with CEMEP and EPAct for increased energy efficiency
- Explosion-protected geared motors for Zones 1 and 2 (gas) and 21 and 22 (dust) in accordance with EU Directive 94/9/EU

Bespoke drive solutions

As a partner you can rely on for all aspects of drive technology, we are on hand in each decisive phase of the life cycle. This of course includes retrofitting. Along with Loher GmbH, which has been a part of Siemens since the Flender acquisition, we offer you tailor-made drive solutions for modernization, which are designed to meet your requirements perfectly.

For over a century, Loher GmbH has been supplying perfectly tailored solutions for every thinkable drive task – no matter how specialized. Active around the globe, Loher's key features are its comprehensive know-how of the entire drivetrain and extraordinary creativity and performance during the implementation of customer-specific solutions. Loher drive components can be tailored to the current project in a highly flexible and precise manner on the basis of the tried and tested standard platforms in respect of design and electrical layout along with special monitoring equipment and cooling methods.

DYNAVERT® I: Retrofit for existing SIMOVERT A converters

One of the highlights in Loher's program is the DYNAVERT® I current source DC-link converter. The frequency-controlled 4-quadrant operation with a power rating of 15 to 6,000 kW is ideal for large fans. Fully digitized, it provides low-loss speed control and minimum system perturbations thanks to a 24-pulse mains supply.

Service and support for your drives

Service and support are extremely important to us. Regardless of the time or place, our drive experts are there for you whenever you need support: with competent advice and prompt action in over 130 countries around the globe.

Our experts provide support quickly, simply and competently in any area of drive technology. From the perfectly tailored planning of your drive, through delivery, assembly and commissioning, right up to maintenance and servicing.

You will find fast and prompt support for technical questions at any time on the Internet at:

The Service & Support platform:
http://support.automation.siemens.com

Or speak to us on the phone:
Technical support hotline: 0180 / 50 50 222

We will even assist you quickly and simply in the search for a sales representative. Either via the Internet:

Internet search for sales representative:
http://automation.siemens.com/partner

Or personally:
Sales hotline: 0180 / 50 50 111

Motor overview for the cement industry

		
	Low-voltage cast-iron motors	**High-voltage asynchronous motors**
Applications in the cement industry	Materials handling, fans, etc.	Roller presses, mills, rotary kilns, separators, materials handling, fans
Performance spectrum	0.75–4000 kW	200–15,000 kW
Voltage classes	230–690 V	2–13.8 kV
Axis heights	100–630 mm	315–1000 mm
Number of poles	2–8	4–8
Speed	up to 5000 rpm	up to 1500 rpm
Degree of protection	IP55, IP65	IP55, IP56 optional
Technology	Asynchronous	Asynchronous
Cooling concept	Self-cooling, forced ventilation, water cooling jacket	Self-cooling, forced ventilation, water cooling jacket, air/air cooler, air/water cooler, open-circuit cooling
Standards	IEC, ATEX, NEMA	IEC, ATEX, NEMA
Key features	• Available up to 200 kW in efficiency classes EFF1 and EFF2 • Robust design • Large selection of motors for the most varied applications	• High degree of efficiency at maximum power density • Robust design • Low noise and low maintenance • Large selection of motors for the most varied applications
System partners for converter-related issues	MICROMASTER, SINAMICS G120, G150, S120	ROBICON Perfect Harmony, SINAMICS GM150

High-voltage slip ring motors
Crushers, roller presses, mills, fans
300–7000 kW
3.3–11 kV
450–900 mm
4–10
up to 1500 rpm
IP55
Asynchronous
Air/air cooler, air/water cooler
IEC, EN, DIN, VDE
• Reliable • Low maintenance • Internal slip ring with IP55 protection • With and without brush lifting device
ROBICON Perfect Harmony for modernization

From a comprehensive range of low-voltage motors, through reliable and established high-voltage motors right up to energy-saving and geared motors: We can provide you with the ideal motor for every drive task in the cement industry, in every speed range, whether for low power ratings or several megawatts.

New to our portfolio are customized motors from Loher GmbH.

Converter overview for the cement industry

			
	MICROMASTER 440	**SINAMICS G120**	**SINAMICS G130/G150**
Applications in the cement industry	Separators, conveyor belts, fans	Conveyor belts, fans	Roller presses, rotary kilns, separators, conveyor belts, fans
Performance spectrum	0.12–250 kW	0.37–132 kW	75–1500 kW
Voltage classes	200–600 V	380–480 V	380–690 V
Technical concept	4-quadrant converter, no power recovery	Modular frequency converter with Safety and Efficient Infeed Technology (energy recovery)	Voltage source DC-link converter with vector control or V/f control
Semiconductors used	IGBT	IGBT	IGBT
Cooling method	Air	Air	Air
Degree of protection	IP20	IP20	IP20, optional IP21, IP23, IP54
	• Compact housing • Intelligent vector control for high drive quality, even with sudden load changes • Versatile inputs/outputs • Positioning ramp down • Integrated brake chopper at power ratings up to 90 kW	• Modular and expandable for flexibility • Simple and fast commissioning • Recovery • SINAMICS Safety Integrated • Innovative cooling concept	• Compact and ready for connection as cabinet unit • Modular and expandable for flexibility • Reliable power supply through the unique process of pulse-edge modulation with optimized pulse patterns • Low noise • Simple and fast commissioning
System partners for motor-related issues	**Low-voltage asynchronous motors:** e.g. 1LG4 / 1LA6 / 1LG6 / 1LA8	**Low-voltage asynchronous motors:** e.g. 1LG4 / 1LA6 / 1LG6	**Low-voltage asynchronous motors:** e.g. 1LA9 / 1LG6 / 1LA8 / 1PQ8

		
SINAMICS S120	**ROBICON Perfect Harmony**	**SINAMICS GM150**
Roller presses, rotary kilns, separators, conveyor belts, fans, vertical mills	Vertical mills, rotary kilns, fans	Vertical mills, rotary kilns
1.6–4500 kW	150–120,000 kW	600–27,000 kW
380–690 V	2.3–13.8 kV	2.3–4.16 kV
DC-link converter with vector control or V/f control	Multi-cell DC-link converter	3-point NPC DC-link converter
IGBT	LV-IGBT	HV-IGBT
Air and liquid cooled	Air and liquid cooled	Air and liquid cooled
IP00 / IP20, optional up to IP54	Air cooled IP31, optional IP42, liquid cooled IP52	Air cooled IP22, optional IP42, liquid cooled IP43, optional IP54
• Universal usage, esp. in multi-motor applications • Available as type-tested cabinet unit systems • Modular and flexible • Scalable in terms of power, function, number of axes, performance • Simple and fast commissioning, auto-configuration • Future-proof system architecture • Graduated feed/regenerative concept with the possibility of energy transfer across a shared DC link • Broad motor spectrum • SINAMICS Safety Integrated	• Most compact medium-voltage converter • Integrated input transformer • Highest voltage quality • Simple operation • Highest availability thanks to cell bypass and ProToPS®	• Compact cabinet unit, ready for connection, for MS individual drives without power recovery • Reliable power components and protective measures • Robust control modules • Redundant fans/pumps in the cooling system • Ideal for extreme conditions • Reliable and easy to service • Intelligent maintenance functions
Low-voltage asynchronous motors: e.g. 1LA9 / 1LG6 / 1LA8 / 1PQ8 / 1LA4, low-voltage design	**High-voltage asynchronous motors :** e.g. 1LA4 / 1PQ4 / 1RQ4 / 1RN4 high-voltage slip ring motors can also be used during modernization	**High-voltage asynchronous motors:** e.g. 1LA4 / 1PQ4 / 1RQ4 / 1RN4

Our range of converters is just as comprehensive as our motor portfolio.

With SINAMICS, MICROMASTER and ROBICON Perfect Harmony, we offer a complete and end-to-end drive family, which covers all performance levels.

Industry-specific converters are available for the individual process areas in the cement industry, which can be adjusted for the respective drive tasks. All of our converters are characterized by a high degree of flexibility, functionality and engineering efficiency.

Overview of gearboxes for the cement industry and oil sup

				
	MOTOX geared motors	**CAVEX worm gearboxes**	**Flender gear units**	**PLANUREX planetary gearboxes**
Applications in the cement industry	Conveyor belts, bucket elevators, mixers	Screw conveyors, bucket elevators, platform conveyors	Crushers, roller presses, rotary kilns, separators, bucket elevators	Crushers, rotary kilns, roller presses, tube mills
Power rating	0.12–200 kW	0.55–500 kW	6–4500 kW	30–13,000 kW
Torque	100–20,000 Nm	100–360,000 Nm	Up to 870,000 Nm	22,000–2,600,000 Nm
Ratio	1–60,000	6–60,000	1–450	25–4000
Key features	• Modular system • Tightly-spaced gear ratio • Modular motor blocks • Operational reliability	• Modular system • Angular design • Concave-profile teeth • Low noise emission • High degree of operational reliability	• Modular system • Degressive scaling for a wider selection of sizes • Low noise output thanks to ground bevel gear tooth system and noise-optimized housing	• Modular system (versatile use of the housing and inner parts) • Lightweight and compact, space-saving design thanks to power split • Easily combinable with other gearbox types • Optimum load distribution on the planet wheels thanks to the high production accuracy and finite element calculation (FEM calculation) of the planet carrier
Accessories	• Backstop • Torque arms • Output flange • Status monitoring • ATEX design • Energy-efficient motors • Adapter for IEC and NEMA motors • Braking motors • Complete motor range	• Backstop • Torque arms • Output flange • Status monitoring • ATEX design • Adapter for IEC and NEMA motors • Braking motors • Complete motor range	• Motor rocker arm, seat, console, bell cases • Backstop • Heating rods • Water-oil/air-oil coolers • Speed monitoring • Torque arms • Loose flanges • Housing baseboard • Gearbox rocker arms • Oil level gauges • Oil level limit switch • Integrated overrunning clutches • Auxiliary drives	• Housing with and without fastening supports • Torque arms • Bell cases • Motor consoles • Oil cooling systems • Shrink disks (oil level indicators) • Auxiliary drives • Backstops

ply systems

			
KMP and KMPS bevel gear planetary gearboxes	**Toothed gearing**	**Belt transmission**	**Oil supply systems**
Industry-specific gearbox for vertical mills	Especially for ball tube mill drives	Conveyor belts	All drives
80–9000 kW	1500–18,000 kW	5–2500 kW	---
Up to 3,750,000 Nm	Mill torque up to 12,000,000 Nm	Up to 600,000 Nm	---
30–57	40–88	10–50	---
• Particularly compact • Optimum design and high production quality in connection with bearing selection, tooth geometry and housing rigidity	• Significantly more compact and more economical than conventional pinion ring gearing variants • Internal power split in line with tried and tested principle • High tooth quality (as per DIN 3990 > 6) • Optimum contact patterns of the drive pinion to the gearing even in the case of mill movement or gearing deviations • Optimized housing	• Improved heat dissipation thanks to enlarged surface area • Available with fitted auxiliary drive as an option	• Perfectly matched to the gearbox and ambient conditions • Available with “stand by” circuit as an option • Available with high-pressure circuit for sliding bearings as an option
	• Complete oil supply system for gearbox and gearing (no grease distribution necessary)		

Together with Flender Heavy Duty, Siemens is now also offering a comprehensive range of gearboxes and gearbox components for all drive tasks. Whether helical, helical bevel, bevel gear or planetary gearboxes with the standardized module or highly specialized, industry-specific solutions, Flender’s portfolio covers all tasks.

Thanks to the expansion of our portfolio to include Flender products, we are now able to offer perfectly matched complete drive trains.

You can find further information on our
comprehensive range of products for the cement industry
on our website:
www.siemens.com/cement

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Subject to change without prior notice 08/2008
Order No.: E20001-A10-T113-X-7600
DISPO 27903
2100/13033 MK.CC.CM.XXXX.52.8.01 WS 07082.0
Printed in Germany

www.siemens.com/cement