The information provided in this brochure contains merely general information and has been compiled with due diligence. The applicability of the information is subject to change depending on the final use of the products. In case of research, development, and production, the information may change without prior notice.

Our services help you use your energy sources more efficiently and make conducting energy audits easier.

A partner for the cement industry
The Siemens Cement Team supports cement producers throughout the world with a comprehensive, innovative product portfolio, coordinated solutions based on Totally Integrated Automation, backed up by specialist knowledge of the cement industry and an extensive range of services for the entire plant life cycle.

Let’s tackle today’s challenges together!

Siemens AG
Industry Sector
Cemat
Frauenauracher Str. 85
91056 Erlangen
GERMANY
www.siemens.com/cemat

Subject to change without prior notice
Order no.: E20001-A20-T113-X-7600
DISpO 27903
WÜ/21949 GC.GC.93.YCMT.52.9.01 WS 09093.0
printed in Germany
© Siemens AG 2009

How does cement production become energy efficient and environmentally friendly?

Sustainable solutions optimize production processes and reduce CO₂ emissions.

Answers for industry.
Increasing competitive pressures, rising raw-material and energy prices coupled with new, stricter environmental protection regulations are making efficient, sustainable use of resources a top priority issue in the cement industry.

The Siemens Cement Team would like to introduce you to its range of products and solutions on the following pages. Discover how we can help you make more efficient use of energy in your production processes.
Economical and ecologically advantageous use of resources

Increasing competitive pressures, rising raw-material and energy prices coupled with new, stricter environmental protection regulations are making efficient, sustainable use of resources a top priority issue in the cement industry.

The Siemens Cement Team would like to introduce you to its range of products and solutions on the following pages. Discover how we can help you make more efficient use of energy in your production processes.
A partner for all energy efficiency issues

As a partner to industry, we also have energy efficiency in focus. We offer competent advice and goal-oriented solutions to help the cement industry reduce its raw-material and energy costs, and minimize pollutant emissions so that the production process becomes just as energy efficient and environmentally acceptable as the end product itself.

Deep and detailed knowledge of the industry and its technology

There is enormous potential for saving money in the cement industry. The world’s cement industry consumes a total of more than 300 TWh of electricity, of which the German industry’s share is some 3 TWh. Realizing an energy-saving potential of over 20 percent would save enough electricity to supply more than 150,000 German private homes. Scaled up to world level, the quantity of energy saved would be enough to supply a major metropolis such as London or Moscow.

Effective levers for increasing efficiency

- CEMAT – our innovative process control system based on SIMATIC PCS 7 – enables processes to be continually optimized, and that includes the use of energy. A typical example is the combustion process in a rotary kiln.
- Power Management: Intelligent Power Management – integrated in SIMATIC PCS 7 – determines exactly how much energy each unit is using. That reveals the “energy wasters” so that they can be replaced by more efficient systems.
- Heat recovery: The waste heat produced during the manufacture of cement can be used to generate electricity for internal consumption.
- Efficient products and systems: Replacing obsolete and inefficient units by state-of-the-art equipment offers enormous potential for saving money.

Another important factor is the supervision of energy reference values agreed and keeping within contractual limits by, for example, selectively switching off defined sections of the plant.

To find out where these potential savings lie hidden, we analyze individual processes by way of energy audits. We apply our wide experience and comprehensive knowledge of the industry and its technologies to point out ways in which the consumption of all types of energy could be significantly reduced.
As a partner to industry, we also have energy efficiency in focus. We offer competent advice and goal-oriented solutions to help the cement industry reduce its raw-material and energy costs, and minimize pollutant emissions so that the production process becomes just as energy efficient and environmentally acceptable as the end product itself.

Deep and detailed knowledge of the industry and its technology

There is enormous potential for saving money in the cement industry. The world’s cement industry consumes a total of more than 300 TWh of electricity, of which the German industry’s share is some 3 TWh. Realizing an energy-saving potential of over 20 percent would save enough electricity to supply more than 150,000 German private homes. Scaled up to world level, the quantity of energy saved would be enough to supply a major metropolis such as London or Moscow.

To find out where these potential savings lie hidden, we analyze individual processes by way of energy audits. We apply our wide experience and comprehensive knowledge of the industry and its technologies to point out ways in which the consumption of all types of energy could be significantly reduced.

Effective levers for increasing efficiency

- **CEMAT** – our innovative process control system based on SIMATIC PCS 7 – enables processes to be continually optimized, and that includes the use of energy. A typical example is the combustion process in a rotary kiln.
- **Power Management**: Intelligent Power Management – integrated in SIMATIC PCS 7 – determines exactly how much energy each unit is using. That reveals the „energy wasters” so that they can be replaced by more efficient systems.

Another important factor is the supervision of energy reference values agreed and keeping within contractual limits by, for example, selectively switching off defined sections of the plant.

- **Heat recovery**: The waste heat produced during the manufacture of cement can be used to generate electricity for internal consumption.
- **Efficient products and systems**: Replacing obsolete and inefficient units by state-of-the-art equipment offers enormous potential for saving money.
Advanced Process Control: to specifically reduce energy and raw-material consumption

Advanced Process Control (APC) opens up completely new opportunities for intelligent process control. Energy and raw-material consumption can be reduced substantially, quality requirements maintained at a constantly high level, and production organized more flexibly.

The key to greater efficiency

Our innovative CEMAT process control system masters even highly demanding process optimization tasks. The necessary function blocks are already integrated in the system. They facilitate look-ahead process control, which automatically achieves a higher throughput accompanied by consistently high product quality. Specific areas of application which bring great benefits include optimizing the mills and the kiln fuel feed – whether with fossil or alternative fuels.
Advanced Process Control: to specifically reduce energy and raw-material consumption

Advanced Process Control (APC) opens up completely new opportunities for intelligent process control. Energy and raw-material consumption can be reduced substantially, quality requirements maintained at a constantly high level, and production organized more flexibly.

The key to greater efficiency

Our innovative CEMAT process control system masters even highly demanding process optimization tasks. The necessary function blocks are already integrated in the system.

They facilitate look-ahead process control, which automatically achieves a higher throughput accompanied by consistently high product quality. Specific areas of application which bring great benefits include optimizing the mills and the kiln fuel feed – whether with fossil or alternative fuels.
Totally Integrated Power: customized power distribution

A reliable, demand-oriented electricity supply is the basic requirement for uninterrupted operations. Not only the availability but also the economical distribution of electric power are becoming ever more important.

Switchgear for high and medium voltages

We supply a wide selection of different types of almost maintenance-free switchgear for all voltage levels and applications within the high- and medium-voltage ranges. For example: SF6 gas-insulated switchgear and highly versatile, air-insulated switchgear equipped with vacuum circuit-breakers. The switchgear is complemented by a wide range of PROFIBUS DP-compatible, multifunction measuring and protection devices.

Exploiting the potential savings systematically

With Totally Integrated Power, we offer a comprehensive range of products and systems – optimally matched to one another – for the entire distribution of electric power within a cement works: from high-, medium- and low-voltage switchgear down to the consumers. The standardization extends throughout all phases of a power distribution project, and offers considerable potential for making savings in planning, configuration, construction and operation. Our SIMARIS planning software can be of enormous help, right from the draft planning stage.

Customized low-voltage power distribution

Our portfolio covers the complete low-voltage power distribution – everything from one source. It includes switchgear, busbar trunking systems, protection, switching and measuring devices, complemented by intelligent Power Management solutions. Two highlights of our range are the new SIVACON® S8 switchgear for the highest standards of personal and plant safety up to 7,000 A, and the compact, high-precision SENTRON pAC multifunction measuring device. This device displays all the relevant, measured electrical data, and transmits them via a PROFIBUS DP to the CEMAT process control system or the integrated Power Management System.

Reduce operating costs with Power Management

Our Power Management System is based on SIMATIC technology and helps you optimize your energy consumption and reduce your costs. Energy savings of up to 20 percent are feasible. To achieve this, the energy data collected by communication-capable switching, protection and measuring devices are processed appropriately in the higher-level Power Management System. The Power Management is fully integrated in Totally Integrated Automation and SIMATIC PCS 7 (CEMAT). It displays the energy values clearly and evaluates them appropriately. The end results are a transparent representation of your energy consumption, a correct assignment of costs to their causes, and automatic load management.

Energy efficiency is improved by:

- Identifying energy-intensive loads and processes
- Designing efficient processes
- Assessing consumption and costs
- Keeping within contractual power limits
Totally Integrated Power: customized power distribution

A reliable, demand-oriented electricity supply is the basic requirement for uninterrupted operations. Not only the availability but also the economical distribution of electric power are becoming ever more important.

Switchgear for high and medium voltages

We supply a wide selection of different types of almost maintenance-free switchgear for all voltage levels and applications within the high- and medium-voltage ranges. For example: SF6 gas-insulated switchgear and highly versatile, air-insulated switchgear equipped with vacuum circuit-breakers. The switchgear is complemented by a wide range of PROFIBUS DP-compatible, multifunction measuring and protection devices.

Exploiting the potential savings systematically

With Totally Integrated Power, we offer a comprehensive range of products and systems – optimally matched to one another – for the entire distribution of electric power within a cement works: from high-, medium- and low-voltage switchgear down to the consumers. The standardization extends throughout all phases of a power distribution project, and offers considerable potential for making savings in planning, configuration, construction and operation. Our SIMARIS planning software can be of enormous help, right from the draft planning stage.

Customized low-voltage power distribution

Our portfolio covers the complete low-voltage power distribution – everything from one source. It includes switchgear, busbar trunking systems, protection, switching and measuring devices, complemented by intelligent Power Management solutions. Two highlights of our range are the new SIVACON® S8 switchgear for the highest standards of personal and plant safety up to 7,000 A, and the compact, high-precision SENTRON PAC multifunction measuring device. This device displays all the relevant, measured electrical data, and transmits them via a PROFIBUS DP to the CEMAT process control system or the integrated Power Management System.

Reduce operating costs with Power Management

Our Power Management System is based on SIMATIC technology and helps you optimize your energy consumption and reduce your costs. Energy savings of up to 20 percent are feasible. To achieve this, the energy data collected by communication-capable switching, protection and measuring devices are processed appropriately in the higher-level Power Management System. The Power Management is fully integrated in Totally Integrated Automation and SIMATIC PCS 7 (CEMAT). It displays the energy values clearly and evaluates them appropriately. The end results are a transparent representation of your energy consumption, a correct assignment of costs to their causes, and automatic load management.

Energy efficiency is improved by:

- Identifying energy-intensive loads and processes
- Designing efficient processes
- Assessing consumption and costs
- Keeping within contractual power limits
Reducing energy costs by using waste heat

The waste heat arising during cement production can be used to generate power. This reduces not only energy costs but also environmental impact.

Integration into the process control system

Together with other well-known plant constructors, we assist the cement industry with the planning and construction of innovative heat recovery plants, which pay for themselves within a very short time. We make a contribution toward optimizing the operation of your plant by supplying the right measuring and automation equipment.

Plants are monitored and controlled directly from a central control room by the SIMATIC PCS 7/CEMAT process control system without requiring additional operating personnel. This provides integrated automation throughout the entire plant.
Reducing energy costs by using waste heat

The waste heat arising during cement production can be used to generate power. This reduces not only energy costs but also environmental impact.

Integration into the process control system

Together with other well-known plant constructors, we assist the cement industry with the planning and construction of innovative heat recovery plants, which pay for themselves within a very short time. We make a contribution toward optimizing the operation of your plant by supplying the right measuring and automation equipment.

Plants are monitored and controlled directly from a central control room by the SIMATIC PCS 7/CEMAT process control system without requiring additional operating personnel. This provides integrated automation throughout the entire plant.
Energy-efficient drive technology

The drive technology consumes more than 90 percent of a cement works’ energy requirements. Here, there is obviously a sizable potential for making savings, which can be realized by using energy-efficient drive technology.

A trendsetting offer

You can benefit in many ways by installing energy-efficient drive systems. They contribute to reducing production costs and CO₂ emissions, while at the same time increasing the return on your investment. A change to energy-saving systems starts paying off immediately. Investments are recouped within the shortest time, often within a few months.

As one of the world’s leading suppliers of drive systems, we offer a very extensive portfolio of energy-efficient drive technology. In addition to the products themselves, we also offer advice and services that help you make the most out of the potential for savings in your plant.
Energy-efficient drive technology

The drive technology consumes more than 90 percent of a cement works’ energy requirements. Here, there is obviously a sizable potential for making savings, which can be realized by using energy-efficient drive technology.

A trendsetting offer

You can benefit in many ways by installing energy-efficient drive systems. They contribute to reducing production costs and CO₂ emissions, while at the same time increasing the return on your investment. A change to energy-saving systems starts paying off immediately. Investments are recouped within the shortest time, often within a few months.

As one of the world’s leading suppliers of drive systems, we offer a very extensive portfolio of energy-efficient drive technology. In addition to the products themselves, we also offer advice and services that help you make the most out of the potential for savings in your plant.
Motors for every application

Our efficient motors are designed for the worldwide market, and offer up to 40 percent lower power loss. Our portfolio covers every requirement in the cement industry from a few watts up to the MW range.

Speed-controlled operation

This is the cost-effective alternative to mechanical control processes, in which the motor runs constantly at the rated speed required to handle the maximum rate of flow. Instead, variable-speed drives are used with frequency converters, which adjust the rate of flow to the actual need. That can achieve savings of up to 70 percent. We offer this type of solution with our SINAMICS and Robicon Perfect Harmony converter lines.

All the models in our drive lines are characterized by a clear, minimalist design that provides maximum ruggedness and reliability. All SINAMICS drives feature standard engineering, lower commissioning and operating costs, compact design, lower noise levels and PROFIBUS interfaces integrated as standard, plus numerous analog and digital interfaces for easy integration into automation architectures.

Calculate the potential savings in advance

Our SinaSave software tool lets you calculate how quickly an investment in an energy-saving motor or frequency converter will pay for itself. On the basis of the specific plant parameters, SinaSave calculates the possible savings potential for the specific application. The program compares the total monthly saving with the purchase price of the motor or frequency converter to calculate the pay-back period.

Sensor systems: precise measuring results and reliable monitoring

On the basis of our thorough knowledge of the technology and the industry, we develop sensor systems that set the standards for precision and reliability. They provide precise measuring results and reliably monitor every step in the cement production process.

Temperature measurement

Our extensive SITRANS T range covers the most precise temperature measurements – even under extreme conditions. The devices are characterized by their absolute reliability, the smallest possible mounting effort, ease of use and extreme ruggedness.

Level measurement

Our range covers not only point-level detection but also continuous processes: capacitive, electromechanical, gravimetric, the SITRANS LR radar processes, guided microwave and ultrasonic.

Flow measurement

Our SITRANS F line offers an extensive range of devices based on various measuring principles: magnetic-inductive, coriolis, ultrasonic (in-line or clamp-on), rotary piston meters, vortex and differential pressure flow meters.

Weighing and dosing systems

Our SIWAREX load cells and electronic modules for weighing systems used in combination with Milltronics belt scales, weigh feeders and solid flow meters ensure the highest precision.

Gas analysis

Continual analysis of oxygen, carbon monoxide and nitrogen oxides is the basic requirement for precisely controlling the slag quality, fuel consumption and emissions. However, the efficiency of conventional gas analyzers reaches its limit when they have to deal with temperatures of up to 1,400 degrees Celsius and high dust, alkali and sulfate concentrations. The Siemens FLK Probe enables gas to be taken directly from the intake area of the rotary kiln. The gas sample is then prepared in the probe, and fed to the analyzers at a temperature of approx. 200 degrees Celsius. Further areas of application for gas analysis are the monitoring of coal combustion and the emissions monitoring in the stacks.
The information provided in this brochure contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the requested features shall only exist if expressly agreed in the terms of the contract.

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.
Motors for every application

Our efficient motors are designed for the world market, and offer up to 40 percent lower power loss. Our portfolio covers every requirement in the cement industry from a few watts up to the MW range.

Speed-controlled operation

This is the cost-effective alternative to mechanical control processes, in which the motor runs constantly at the rated speed required to handle the maximum rate of flow. Instead, variable-speed drives are used with frequency converters, which adjust the rate of flow to the actual need. That can achieve savings of up to 70 percent. We offer this type of solution with our SINAMICS and Robicon Perfect Harmony converter lines.

All the models in our drive lines are characterized by a clear, minimalist design that provides maximum reliability. A broad range of standardization, lower commissioning and operating costs, compact design, lower noise levels, and PROFIBUS interfaces integrated as standard, plus numerous analog and digital interfaces for easy integration into automation architectures.

Calculate the potential savings in advance

Our SinaSave software tool lets you calculate how quickly an investment in an energy-saving motor or frequency converter will pay for itself. On the basis of the specific plant parameters, SinaSave calculates the possible savings potential for the specific application. The program compares the total monthly saving with the purchase price of the motor or frequency converter to calculate the pay-back period.

Temperature measurement

Our extensive SITRANS T range covers the most precise temperature measurement—direct, contactless, and remote sensing. The SITRANS T transmitters impress not only by their absolute reliability but also by their particular safety concept, great ease of use and extreme ruggedness.

Level measurement

Our range covers not only point-level detection but also continuous processes: capacitive, electromechanical, gravimetric, the SITRANS LR radar processes, guided microwave and ultrasonic.

Flow measurement

Our SITRANS F line offers an extensive range of devices based on various measuring principles: magnetic-inductive, coriolis, ultrasonic (in-line or clamp-on), rotary piston meters, vortex and differential pressure flow meters.

Gas analysis

Controlling analysis of oxygen, carbon monoxide and nitrogen oxides is the basic requirement for precisely controlling the slag quality, fuel consumption and emissions. However, the efficiency of conventional gas analyzers reaches its limit when they have to deal with temperatures of up to 1,400 degrees Celsius and high dust, alkali and sulfate concentrations. The Siemens FLK Probe enables gas to be taken directly from the intake area of the rotary kiln. The gas sample is then prepared in the probe, and fed to the analyzers at a temperature of approx. 200 degrees Celsius. Further areas of application for gas analysis are the supervision of coal silos and the emissions monitoring in the stacks.

Motors and converters

Sensor systems: precise measuring results and reliable monitoring

On the basis of our thorough knowledge of the technology and the industry, we develop sensor systems that set the standards for precision and reliability. They provide precise measuring results and reliably monitor every step in the cement production process.
Motors for every application

Our efficient motors are designed for the world market, and offer up to 40 percent lower power loss. Our portfolio covers every requirement in the cement industry from a few watts up to the MW range.

Speed-controlled operation

This is the cost-effective alternative to mechanical control processes, in which the motor runs constantly at the rated speed required to handle the maximum rate of flow. Instead, variable-speed drives are used with frequency converters, which adjust the rate of flow to the actual need. That can achieve savings of up to 70 percent. We offer this type of solution with our SINAMICS and Robicon PerfectHarmony converter lines.

All the models in our drive lines are characterized by a clear, minimalist design that provides maximum ruggedness and reliability. All models are based on a modular system for easy integration into existing architectures.

Calculate the potential savings in advance

Our SinaSave software tool lets you calculate how quickly an investment in an energy-saving motor or frequency converter will pay for itself. On the basis of the specific plant parameters, SinaSave calculates the possible savings potential for the specific application. The program compares the total monthly saving with the purchase price of the motor or frequency converter to calculate the pay-back period.

Sensor systems: precise measuring results and reliable monitoring

On the basis of our thorough knowledge of the technology and the industry, we develop sensor systems that set the standards for precision and reliability. They provide precise measuring results and reliably monitor every step in the cement production process.

Temperature measurement

Our reference SITRANS T range covers the most precise temperature measurements – even under extreme conditions. All the sensors impress not only by their absolute reliability but also by their particulate safety concept, ease of use and extreme ruggedness.

Level measurement

Our range covers not only point level detection but also continuous processes: capacitive, electromechanical, gravimetric, the SITRANS LR radar processes, guided microwave and ultrasonic.

Flow measurement

Our SITRANS F line offers an extensive range of devices based on various measuring principles: magnetic-inductive, coriolis, ultrasonic (in-line or clamp-on), rotary-piston meters, vortex and differential pressure flow meters.

Weighing and dosing systems

Our SIWAREX load cells and electronic modules for weighing systems used in combination with Milltronics belt scales, weigh feeders and solid flow meters ensure the highest precision.

Gas analysis

Continuous analysis of oxygen, carbon monoxide and nitrogen oxides is the basic requirement for precisely controlling the slag quality, fuel consumption and emissions. However, the efficiency of conventional gas analyzers reaches its limit when they have to deal with temperatures of up to 1,400 degrees Celsius and high dust, alkali and sulfate concentrations. The Siemens FLK Probe enables gas to be taken directly from the intake area of the rotary kiln. The gas sample is then prepared in the probe, and fed to the analyzers at a temperature of approx. 200 degrees Celsius. Further areas of application for gas analysis are the monitoring of coal ovens and the emissions monitoring in the stacks.
The information provided in this brochure contains merely general information. It cannot be considered as representing a contractual offer or a recommendation for use. If the actual situation requires special consideration, the customer must prove the requested features if expressly agreed in the terms of the contract.

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.

Sustainable solutions optimize production processes and reduce CO₂ emissions.

Answers for industry.