



PROCESS INSTRUMENTATION

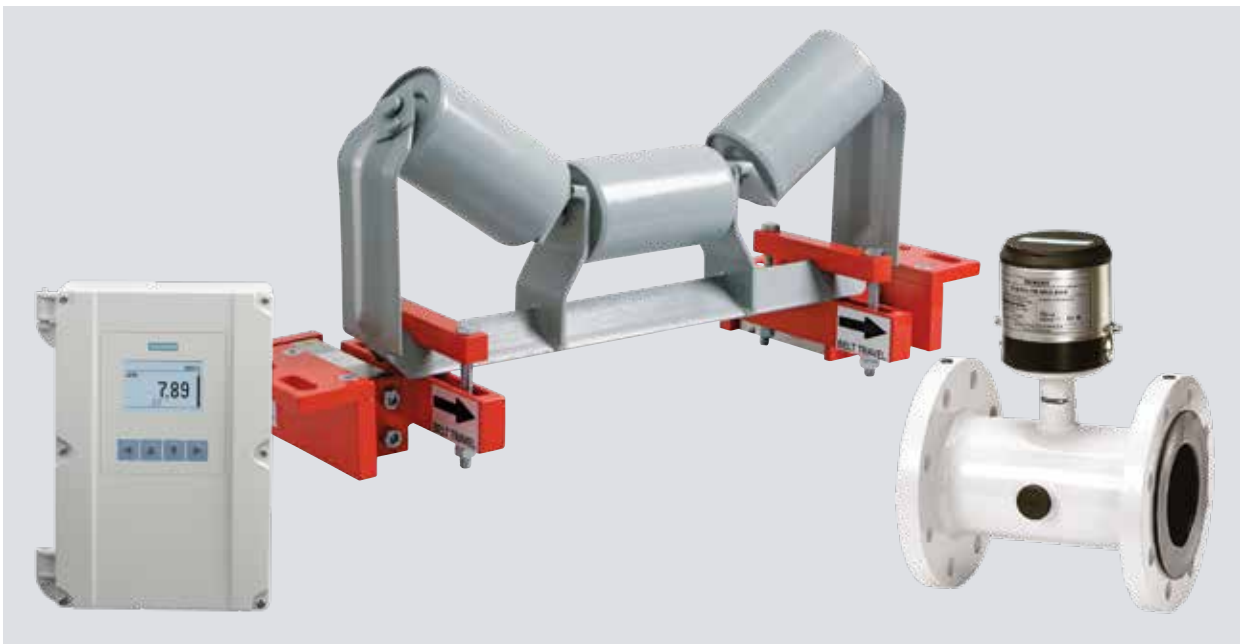
Aggregates

Providing process control in tough environments
usa.siemens.com/mac

SIEMENS

Providing process control in tough environments

Siemens has extensive and in-depth experience of the aggregate industry's needs. Our process instrumentation portfolio gives you the precise, integrated automation you need to deliver the best production efficiency, energy optimization and safety, whether you are modernizing existing operations or developing new facilities.



Inefficient process control can be very costly in product quality, safety and environmental terms. Partnering with Siemens provides the reassurance of best-in-class products, and the precision, integration and reliability in process automation to help you deliver optimum efficiency and productivity.

Our technology provides solutions to the rigors of aggregate, ready-mix concrete and asphalt production, where extremes of dust, vapor, temperature and remote locations are common place. Reliability in arduous applications is paramount, and Siemens products are designed to meet that challenge.

Reduce downtime and decrease energy costs through:

- Precise measurement of inventory to optimize stock levels while avoiding shortages
- Accurate control of energy-intensive machinery to increase productivity while maintaining or even decreasing costs
- Accurate control of the burning process to minimize fuel consumption



Manage the skilled worker shortage and save skilled labor hours with:

- Quick, easy installation and fast commissioning for workers
- High availability products with low-to-no maintenance
- Products that are easily integrated into your control system

Comply with environmental regulations and limit environmental impact by:

- Emissions and discharge monitoring
- Accurately monitoring water consumption, quality and recycling

Keep workers safe by:

- Installing products that can handle extreme conditions and applications such as remote-mounted transmitters, heavy duty dust-tight enclosures and non-contacting sensors. This reduces the need for contact with instruments in hazardous and remote locations.

Solutions to match your needs

From the quarry to finished construction products, we have the process instrumentation and analytics solution to meet your application needs. The following pages give you some guidance on the right device for your application. You can also find out more on our website at: usa.siemens.com/mac



Aggregates

1 Optimal crusher control

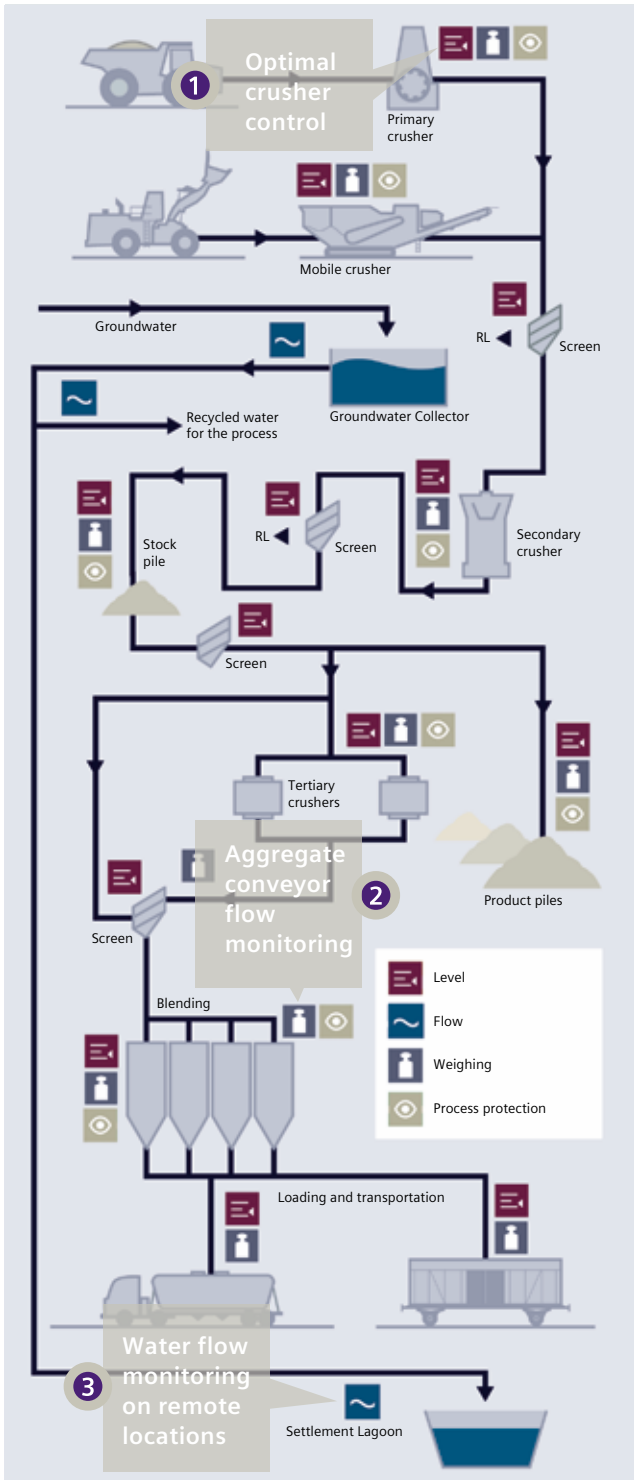
The level of material in the crushers is critical for plant efficiency. Any variation directly affects the material size and product quality, so accurate level measurement is vital. Instrumentation has to cope with high levels of noise, vibration and dust.

Siemens solution:

SITRANS LT500MultiRanger level controller and SITRANS LR110 /LR120 sensor

- Separated controller/sensor protects the electronics from dusty, noisy environments and extreme vibration
- High frequency, non-contacting sensor is and fully potted to provide long-term reliability in a harsh environment
- Process Intelligence is proven to provide superior performance in difficult conditions

usa.siemens.com/level



2 Aggregate conveyor flow monitoring

Belt scales are installed throughout the process to monitor the flow of material within the plant and thus control the inventory and identify bottlenecks.

Siemens solution: **Siemens MUS belt scales with Siemens BW500L electronics**

- With the unique modular design, the MUS belt scales are easy to install on every conveyor in the plant
- Belt scales designed for easy installation, calibration and low maintenance
- Modifications to the existing installations are kept to a minimum, which makes it economically viable for retrofits
- Stand-alone integration, integration into SIMATIC or various industrial communications available
- Options available with NTEP certification for custody transfer applications
- Onboard alarm relays can be configured for rate, load, speed or diagnostic error

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3 Water flow monitoring in remote locations

Quarries need to monitor the water flow in remote locations. Often power is not available and installing a new cable run can be cost-prohibitive. A battery-powered flow meter, with built in data logging, is an ideal solution. With the addition of the optional GSM/GPRS wireless communication module, data can be wirelessly transmitted back to the control room.

Siemens solution:

SITRANS F M MAG 8000 flow meter with GSM module

- Simple meter placement anywhere, even buried underground – with IP68/NEMA 6P robust design
- Simply bolt into place before operation with minimized inlet and outlet requirements
- Zero maintenance, no moving parts and up to 10 years of battery life
- Intelligent meter, capable of leak detection, data logging and error self-detection

→ usa.siemens.com/flow

Ready-mix concrete

1 Optimal crusher control

Non-contact, high-frequency radar technology offers a reliable and accurate solution for level measurement with a high amount of dust and disturbance in the silo.

Siemens solution:

SITRANS LR560 solids radar level device

- High-frequency 78 GHz FMCW technology ensures reliable operation in dusty environments, with up to 328 ft (100 m) range
- Lens antenna eliminates large parabolic or horn antennas, providing a narrow 4° beam angle
- Integrated purge connection as standard for easy cleaning of heavy buildup without removing the sensor

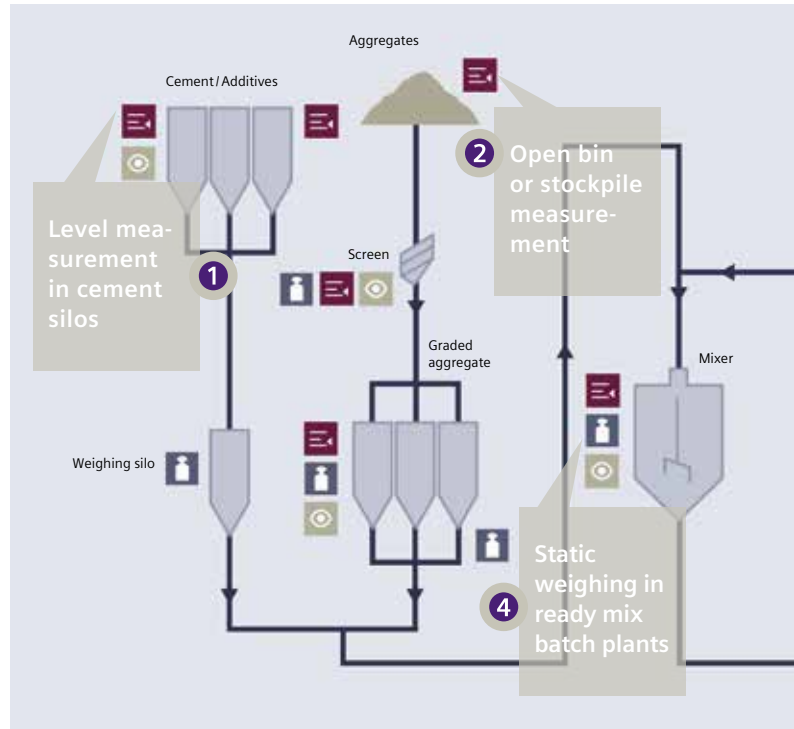
2 Open bin or stockpile measurement

Many material storage applications within the aggregates industry are open-topped bins or stockpiles. Ultrasonic measurement technology is ideal for these types of installations. The ability to use a controller and an application-specific, remote-mounted sensor provides both reliability and ease of use throughout the quarry.

Siemens solution:

SITRANS LUT430 ultrasonic level controller

- Separate controller and transducer overcome problems from extreme vibration or impact
- High-frequency, non-contacting ultrasonic transducer is free of additional electronics and fully potted to provide long-term reliability
- Vessels of differing size and shape, containing liquids, solids or a combination of both, can all be measured at ranges of up to 197 ft (60 m)
- Sonic Intelligence including A-F-E-S ensures easy setup and reliable operation in variable process conditions



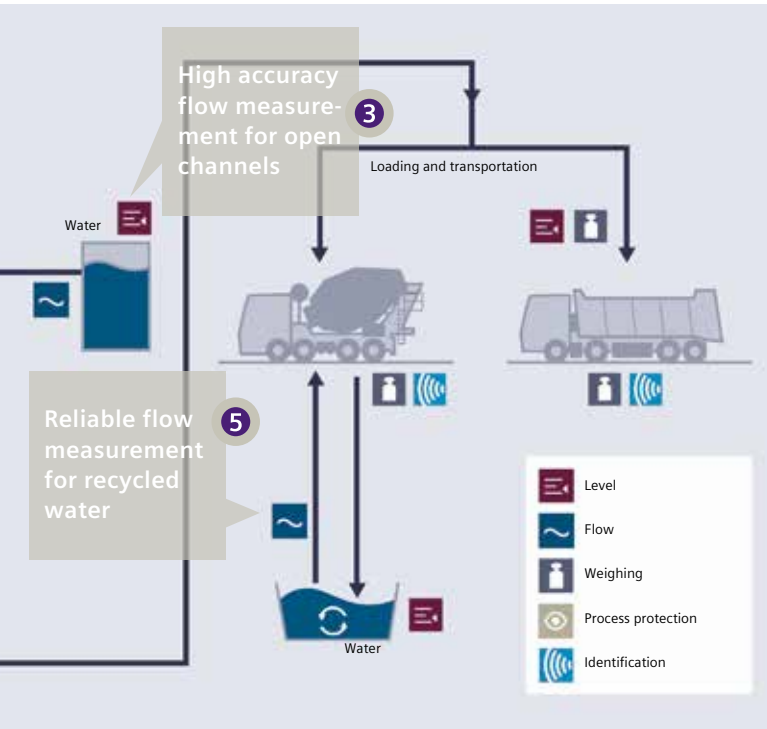
3 High-accuracy flow measurement for open channels

Increasing environmental awareness and governmental legislation are accelerating the need for accurate, reliable and often approved discharge monitoring. Open channel flow measurements can be monitored by Siemens high-accuracy ultrasonic open channel flow and level controllers.

Siemens solution:

SITRANS LUT440 open channel flow meter

- Compatible with all standard weirs and flumes
- Programmable head versus flow curve
- Configurable onboard data logging records daily minimum/maximum temperatures and flow rates, as well as flow totals
- 1 mm high accuracy coupled with Process Intelligence, giving superior performance in arduous applications



4 High-accuracy flow measurement for open channels

Blending of the materials in the ready-mix batch plant is done by weight, so accurate and reliable weighing is critical to final product quality. For plants operating the SIMATIC S7 range, SIWAREX offers an alternative to vendor-specific weighing integrators. SIWAREX can integrate with any weighing system, regardless of manufacturer, thus offering a single uniform weighing interface and negating the need for specialist training and support.

Siemens solution:

SIWAREX weighing electronics and load cells

- Complete solution for all weighing requirements across the plant, with modules suitable for static, batching, belt scales and loss-in-weight
- Easy integration into existing SIMATIC-based control systems
- Can be supplied as a complete weighing system including load cells and associated mounting hardware

5 Reliable flow measurement for recycled water

Increasing utility costs and environmental awareness mean both process water and wash water are often recycled. Reliable and accurate flow monitoring of dirty process water, often with entrained abrasive materials, is paramount.

Siemens solution:

SITRANS F M MAG 3100 electromagnetic flow meter

- Configurable sensor design with a wide range of pipe dimensions available and additional liner and electrode options
- Wide range of approvals for accuracy and environmental use
- Designed to allow patented MAG in-situ verification using the SENSORPROM fingerprints
- Fully welded construction provides a ruggedness that fits almost every flow application

Asphalt

1 Pressure measurement on filters



Exhaust air filtration systems depend on regular cleaning in order to remain effective. Most dust collectors clean or backwash the filters at predetermined times, regardless of whether the filters need cleaning. This wastes plant air and leads to higher energy costs, as well as causing unnecessary strain on the filter. Indeed, a certain amount of caking can increase filter effectiveness by trapping the finer particles passing through.

Siemens solution:

SITRANS P pressure transmitter

- Provides data for an intelligent cleaning cycle by measuring the pressure differential between the clean and dirty side of the bag filter, enabling cleaning to be based on process requirements
- Local display and programming capabilities
- Predictive maintenance functions enable maintenance prior to device failure

2 Motion sensing on bucket elevators

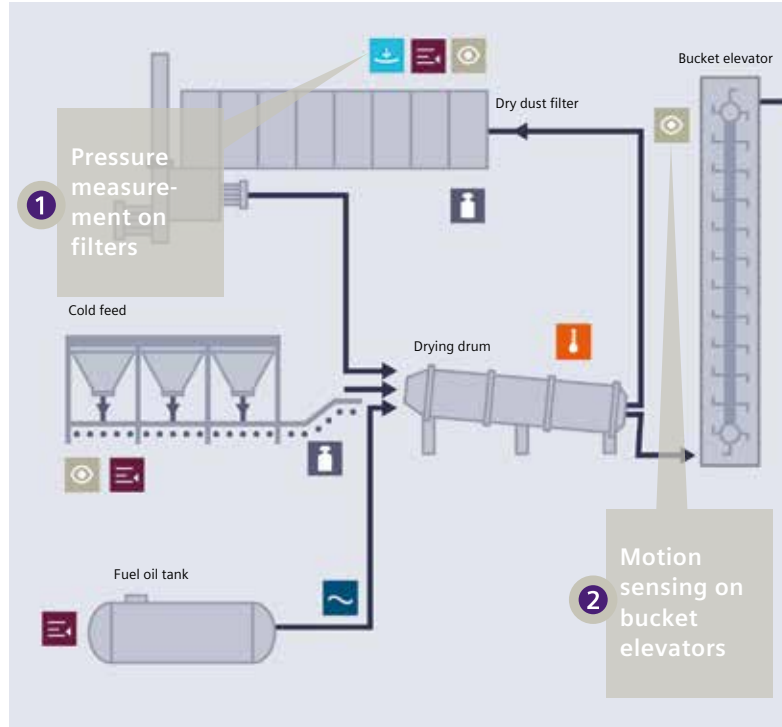


It is important that events such as conveyor slowdown, stoppage, bucket loss or chain breakdown are immediately communicated to the control room. Motion sensing probes enable faults to be detected in their infancy, minimizing downtime and enabling rapid control and rectification of faults.

Siemens solution:

Siemens range of motion sensing probes

- Designed specifically for the primary industries
- 4" sensing range allows detection on machinery with poor tolerances, such as bucket elevators
- Sensor is capable of penetrating stainless steel and detecting a ferrous target behind, which is particularly suited to screw conveyor applications
- Detection of conveyor or screw slowdown, a common indicator that the mechanical elevator is overloaded



3 Level measurement in filler and dust silos

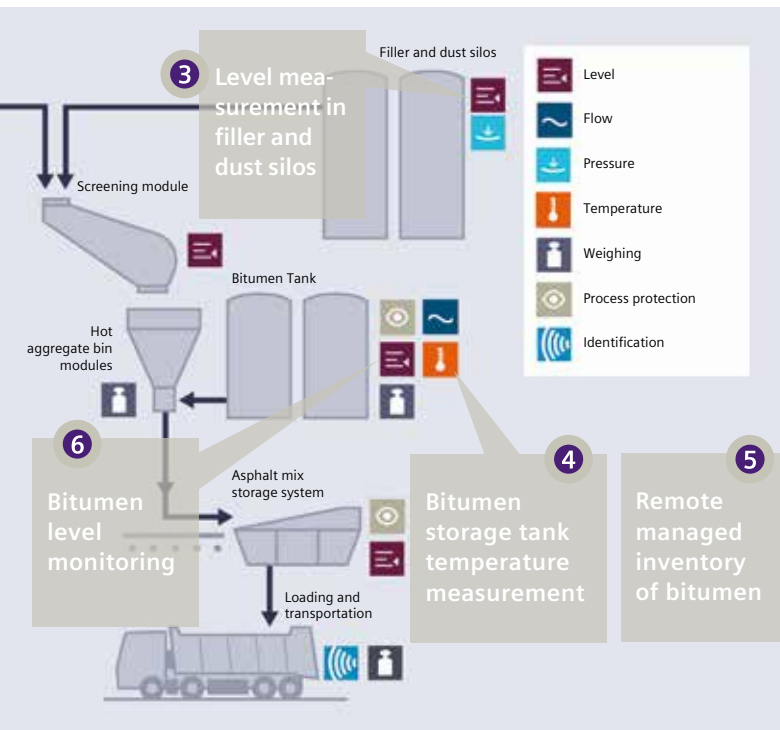


The discharge process of delivered cementitious materials by bulk tankers is often controlled by the tanker driver, and hence information on the silo level is critical to both the driver and the site. The pneumatic transfer method generates a significant amount of dust and disturbance within the silo. Non-contact, high frequency radar technology offers a reliable and accurate solution.

Siemens solution:

SITRANS LR560 solids radar level device

- High-frequency 78 GHz FMCW technology ensures reliable operation in dusty environments, with up to 328 ft (100 m) range
- Lens antenna eliminates large parabolic or horn antennas, providing a narrow 4° beam angle
- Integrated purge connection as standard for particularly difficult installations



4 Bitumen storage tank temperature measurement

Accurate and reliable temperature measurement is critical for the safe operation of asphalt plants. Safe handling of bitumen requires multiple temperature measuring devices in each storage tank, as temperatures can vary throughout the vessel. Both local and remote displays are required in addition to automatic control loops for items such as the tank's internal heating elements.

Siemens solution:

SITRANS T temperature measurement devices

- Remote mounted transmitters allow isolation from high temperatures and vibration sources
- Local display and local programming
- Advanced communications and predictive maintenance functions enable optimization of maintenance cycles

5 Remote managed inventory of bitumen

Ensuring sufficient bitumen is available while not over-investing in stock is a difficult balance. Passing the management of stock levels over to the supplier (or an intermediary logistics company) has significant advantages. Siemens smart level monitoring solution is designed around the measurement requirements of tank farms and silos. The SITRANS store IQ app can monitor the status of assets, confirm inventory levels and coordinate delivery and retrieval of material on the phones, tablets or PCs of designated users. In conjunction with Siemens Mindsphere, information can then be uploaded to the cloud and used to retrieve real-time data from multiple remote sites for your user group, anywhere and anytime.

Siemens solution: **SITRANS store IQ** app

- Reduction in operation / maintenance cost
- Improved operator safety
- Accessibility to remote process variables
- User configurable alarms and notifications
- Backup of all monitored data in cloud

6 Bitumen level monitoring

Asphalt production requires continuous monitoring of the quantity of bitumen on site. The thick viscous nature of bitumen and delivery temperatures close to 392 °F (200 °C) make traditional contact technologies unreliable because of high adhesion build-up.

Siemens solution: **SITRANS LR200 and Pointek CLS300**

- SITRANS LR200 offers continuous level measurement and Pointek CLS300 provides the security of a point level device
- Cost-effective solution with high immunity to build-up, condensation, vapor and steam
- Process Intelligence and Auto False-Echo Suppression as standard, giving superior performance in process vessels
- The digital version of the CLS300 provides an integral LCD display for standalone use, with PROFIBUS PA communication

A comprehensive portfolio for all applications

Siemens process instrumentation has a comprehensive, proven product portfolio suitable for arduous environments. This overview shows the entire spectrum of our process instrumentation and analytics portfolio for the aggregates industry.



Level

Whether you are measuring liquids, slurries or bulk solids, Siemens provides the right level measuring technology for both continuous and point level measurements. Regardless of the application, we provide the optimum solution, whether the technology is radar, ultrasonic, capacitance, electro-mechanical or hydrostatic pressure.



Weighing

The comprehensive Siemens weighing portfolio includes belt scales, weighfeeders, solids flow meters and static weighing. Our SIWAREX PLC-based weighing electronics also allow direct integration into the Siemens range of control systems, providing unparalleled flexibility and ease of use. Siemens MUS belt scales are the ideal solution for raw material flow monitoring on the conveyor.



Flow

Our flow meters meet the toughest challenges and are available for a wide variety of applications. Highly accurate and reliable, they measure and monitor flow rates of liquids with varying consistencies. Technologies include electromagnetic, ultrasonic, Coriolis and vortex. SITRANS FM MAG 8000 with GSM module is a battery-powered flow meter with GSM / GPRS communication for flow monitoring in quarries. SITRANS FM MAG3100 offers a fully industrial design for flow measurement of recycled water.



Pressure

Siemens offers a comprehensive range of solutions for pressure measurement – relative, differential and absolute. The outstanding accuracy, robustness and ease-of-use make these instruments the preferred choice.





Temperature

Siemens temperature measurement devices offer you a comprehensive solution. They are designed to support all common RTDs, thermocouples, resistance and millivolt sensors. The range covers head, rail and field transmitters and includes industry-specific sensors to match all common applications such as bitumen storage tank temperature measurement.



Process protection

Siemens offers a wide range of rugged and reliable process protection devices, specifically developed for the demands of the aggregate industries. SITRANS AS100 acoustic sensors help operators detect blockages in pneumatic conveying systems, while our motion sensor range ensures that mechanical conveying systems maintain their set speed – informing operators in the case of breakdown or failure and helping to increase availability.



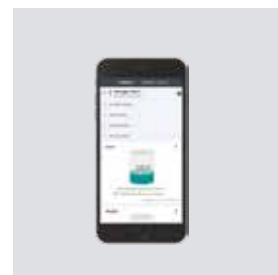
Positioner

The SIPART PS2 electropneumatic valve positioner offers easy integration, on-board diagnostic functions and minimum loss of process air by only using air when required. This enables operators to gain cost-effective and accurate control over typical applications.



SITRANS mobile IQ

The SITRANS mobile IQ app gives you easy access to field instrumentation from your smartphone or tablet. Via a Bluetooth connection, supported field devices in the environment can be easily and quickly commissioned, parameterized and monitored.



SITRANS store IQ

Inventory monitoring and management is complex and error-prone. With SITRANS store IQ, you can easily implement cloud-based real-time monitoring and provide a basis for effective inventory management.



Find out more:

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Valuable industry experience. 24/7 global support network. Versatile portfolio of products and solutions. With Siemens, you truly can have it all.

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information



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