

SIEMENS

Process Instrumentation and Analytics

Providing process control in tough environments

Aggregates



Answers for industry.

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 optimisation and safety, whether you are modernising existing operations or developing new facilities.

Inefficient process control can be very costly in product quality, safety or 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 rigours of aggregate, ready mixed concrete and asphalt production, where extremes of dust, vapour, 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 optimise stock levels whilst avoiding shortages
- Accurate control of energy intensive machinery to increase productivity whilst maintaining or even decreasing costs
- Accurate control of the burning process to keep fuel consumption to a minimum

Manage skilled worker shortage and save skilled labour 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: www.siemens.com/sensors/aggregates

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.

Preferred device:

SITRANS LUT400 and XPS transducers

- Separated controller / transducer protects the electronics from extreme vibration
- High frequency, non-contacting ultrasonic transducer is free of electronic components and fully potted to provide long-term reliability in a harsh environment
- Sonic Intelligence is standard and is proven to provide superior performance in difficult conditions

→ www.siemens.com/sensors/aggregates1

2 Aggregate conveyor flow monitoring

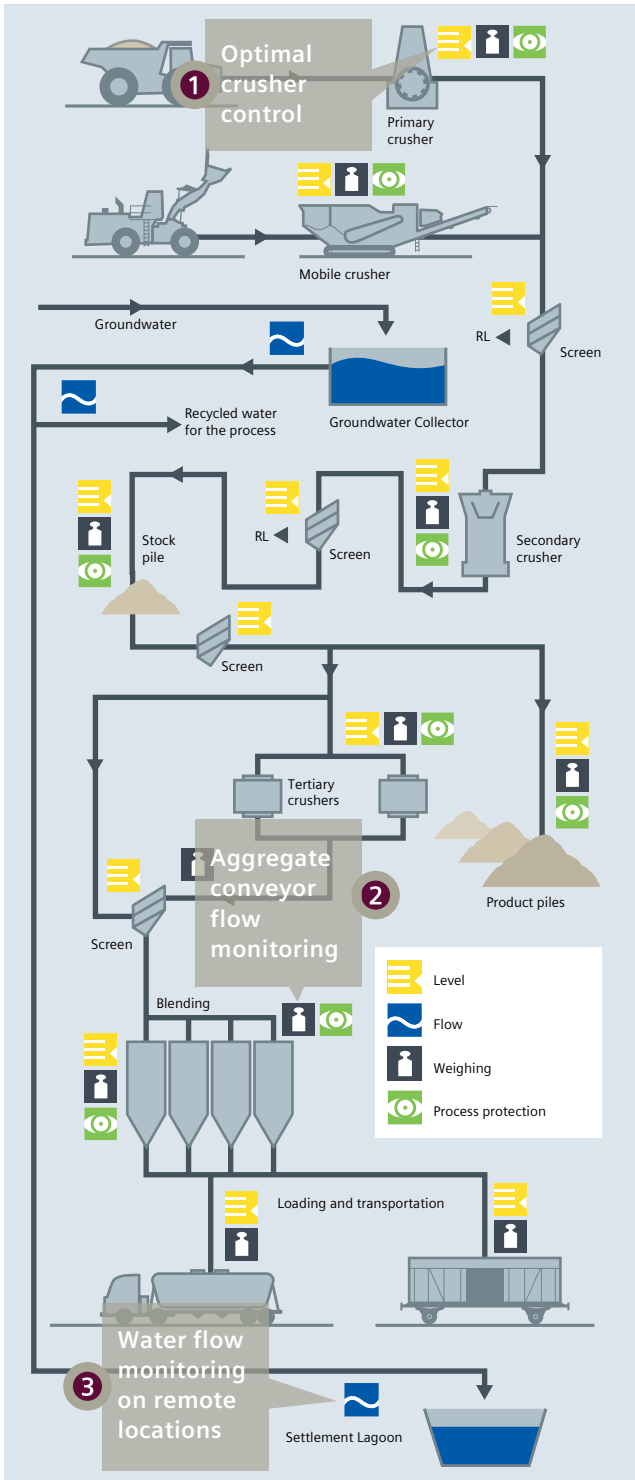
Beltscales are installed throughout the process to monitor the flow of material within the plant and thus control the inventory and identify bottlenecks.

Preferred device: **Milltronics MCS beltscales with SIWAREX FTC integrator**

- With the unique modular design, the MCS beltscale are easy to install on every conveyor in the plant
- Modifications to the existing installations are kept to a minimum, which makes it economically viable for retrofits
- Stand alone integration with BW500 L or direct integration into SIMATIC S7 with the SIWAREX FTC card
- Integration with SIWAREX FTC allows the management of all beltscales on site in the control system, and the management of all the scales centrally on one HMI

→ www.siemens.com/sensors/aggregates2





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 flowmeter, 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.

Preferred device:

SITRANS F M MAG 8000 with GSM module

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

➔ www.siemens.com/sensors/aggregates3

Ready mixed concrete

1 Level measurement in cement silos

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.

Preferred device:

SITRANS LR560 solids radar level device

- High frequency 78 GHz FMCW technology ensures reliable operation in dusty environments, with up to 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

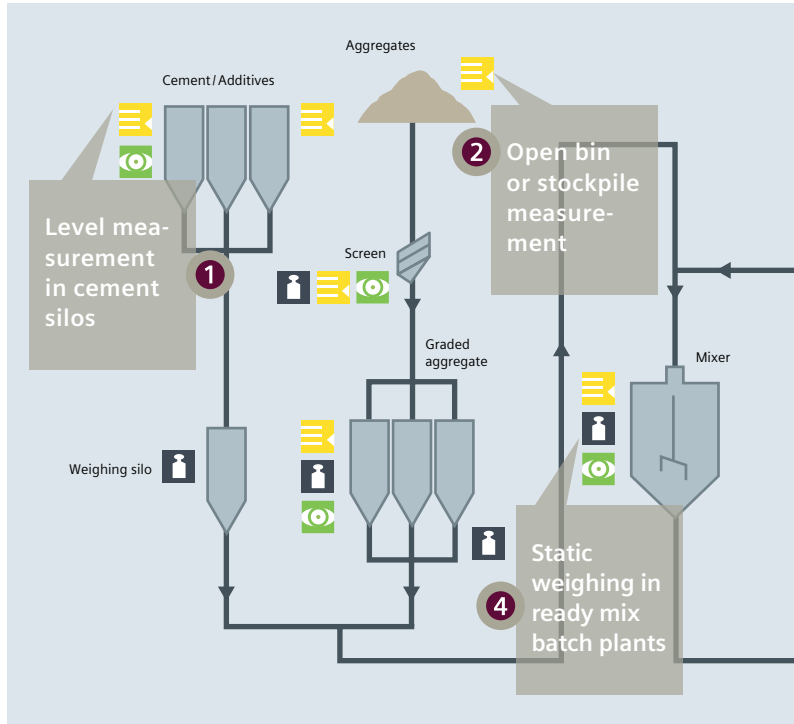
2 Open bin or stockpile measurement

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 one standard controller and an application-specific, remote mounted transducer, provides both reliability and ease of use throughout the quarry.

Preferred device:

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 60 m
- Sonic Intelligence including A-F-E-S ensures easy set up and reliable operation in variable process conditions



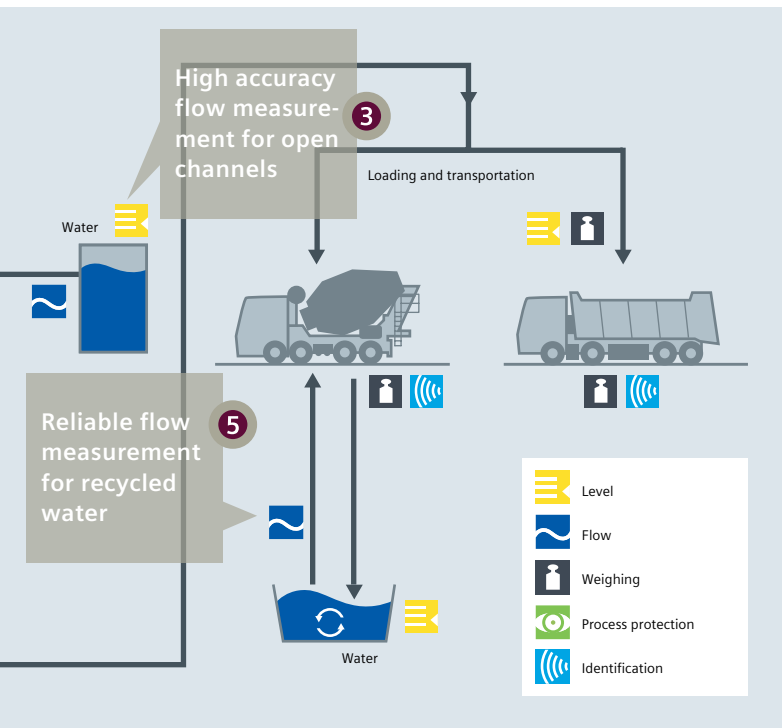
3 High accuracy flow measurement for open channels

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 level sensor.

Preferred device:

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



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.

Preferred device:

SITRANS F M MAG 3100 electromagnetic flowmeter

- 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

4 Static weighing in ready mix batch plants

Blending of the materials in the ready mix batch plant is done by weight, thus 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 negating the need for specialist training and support.

Preferred device:

SIWAREX weighing integrators and load cells

- Complete solution for all weighing requirements across the plant, with modules suitable for static 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

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, irrespective 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.

Preferred device:

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

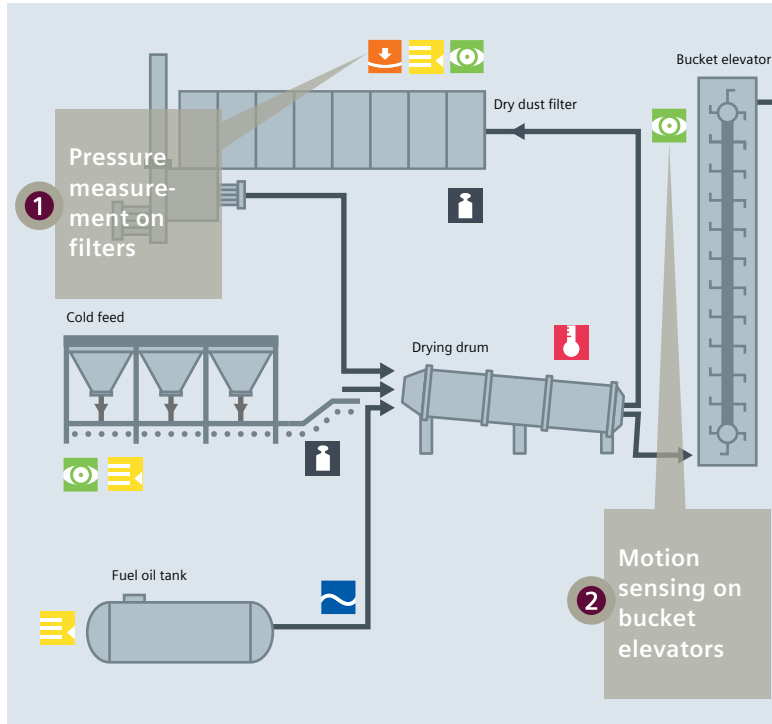
2 Motion sensing on bucket elevators

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, minimising downtime and enabling rapid control and rectification of faults.

Preferred device:

Siemens range of motion sensing probes

- Designed specifically for the primary industries
- 100 mm 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



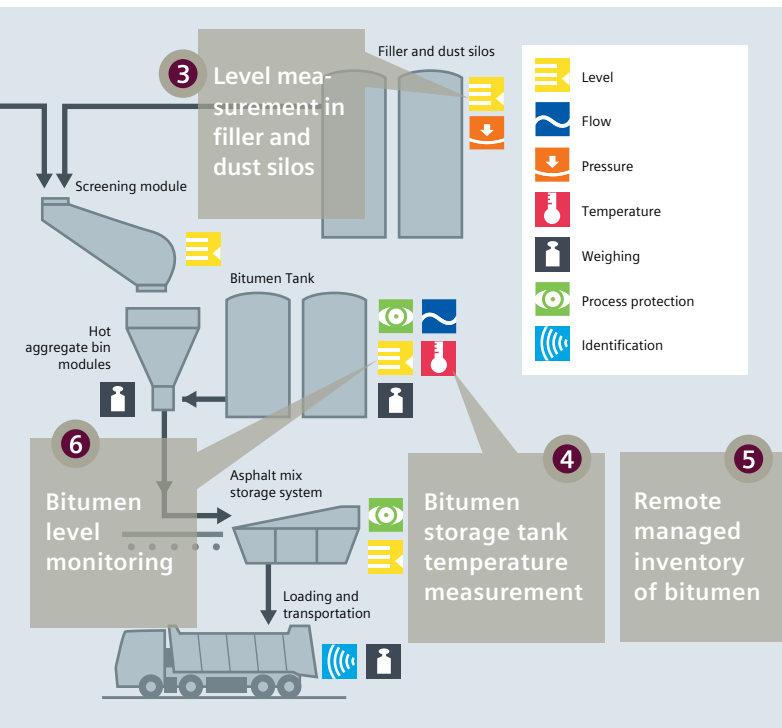
3 Level measurement in filler and dust silos

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.

Preferred device:

SITRANS LR560 solids radar level device

- High frequency 78GHz FMCW technology ensures reliable operation in dusty environments, with up to 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



5 Remote managed inventory of bitumen

Ensuring sufficient bitumen is available whilst 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. Remote data management provides integrated web access, alarm event handling, and data capture for instrumentation. It provides the real time stock levels and the historical usage trends, via the web, to enable the bitumen supplier to effectively manage the bitumen inventory.

Preferred device:

SITRANS RD500 remote data manager

- Supports up to 128 devices with the flexible I/O modules
- Real time data and data logging capability
- Built-in web server, FTP, and email client allows remote monitoring
- Ethernet, GSM/GPRS cellular or landline connectivity
- Alarm notifications are communicated through email and SMS text messages

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.

Preferred device:

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 optimisation of maintenance cycles

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 200 °C make traditional contact technologies unreliable because of high adhesion build-up.

Preferred device: **SITRANS LR200 and Pointek CLS300**

- SITRANS LR200 offers continuous level measurement and Pointek CLS 300 provides the security of a point level device
- Cost-effective solution with high immunity to build-up, condensation, vapour 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. One of our product highlights is the SITRANS LUT400, which, in combination with the Echomax transducers, is the preferred solution for many applications.



Weighing

The comprehensive Siemens weighing portfolio includes belt scales, weigh-feeders, solids flowmeters and static weighing. Our SIWAREX PLC-based weighing electronics also allow direct integration into the Siemens range of PLCs, providing unparalleled flexibility and ease of use. Milltronics MCS belt scales are the ideal solution for raw material flow monitoring on the conveyor.



Flow

Our flowmeters 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 F M MAG 8000 with GSM module is a battery-powered flowmeter with GSM/GPRS communication for flow monitoring in quarries.



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

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 electro-pneumatic valve positioner SIPART PS2 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.



Remote Data Manager

The remote data manager SITRANS RD500 is equipped with ethernet, GSM / GPRS, as well as cellular or landline connectivity. It provides integrated web access, alarm handling and data capture for instrumentation.



Identification

Siemens RFID systems identify safely, quickly and efficiently and are resistant to dusty environments. RFID access control systems support the management of the truck traffic flow through the facility and can significantly improve the efficiency in truck weighing and truck loading operations.

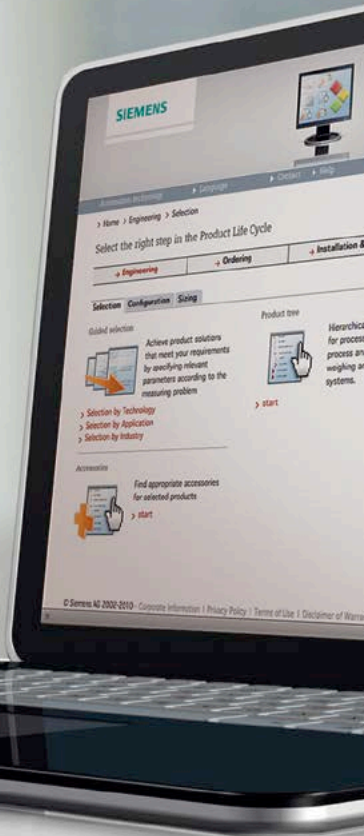


Find out more:

www.siemens.com/pia-portal

Learn more about our process instrumentation products for your industry in the PIA Life Cycle Portal, the tool for engineering, ordering, installation and operation. Just click on “Selection by Industry”.

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