

Reliability and twenty times longer pH electrode lifetime – with automatic cleaning

Södra Cell is a leading producer of pulp, operating a large mill in Mörrum (Sweden). In the past, Södra Cell experienced unreliable pH measurements and unsatisfying lifetimes of their pH electrodes. However, after installing METTLER TOLEDO's EasyClean 350 automated cleaning system, Södra now enjoys consistent and accurate pH values and more than twenty times longer operational life. As a result, operating costs have significantly decreased and Södra will recoup its initial investment several times within the first year.

Södra

The Swedish forestry group, Södra, is one of the world's leading producers of paper pulp, and has a long history dating back to 1926. The group is an economic association, wholly owned by its 34,000 members. Together, the members own 2 million hectares of productive forest land in southern Sweden. Södra's main task is to process and create sales opportunities for all the timber that this forest land produces.

Operations consist of four areas:

Södra Skog trades in forest raw materials and is responsible for supplying the group's industrial companies with raw timber materials.

Södra Skogsenergi is a trading company primarily focused on biofuel in the form of by-products from Södra's industrial companies.

Södra Wood Products is the group's producer and supplier of wood products.

Södra Cell is a world-leading producer of paper pulp. The company produces different grades of pulp including fine paper, magazine paper, tissue and various types of special paper.

Södra Cell Mörrum

One of the most interesting companies in the group is Södra Cell Mörrum, an ideally situated pulp mill on the outskirts of Karlshamn in the southernmost part of Sweden. Mörrum is one of five Södra Cell



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mills, whose business concept is based on providing its owners with attractive sales opportunities for their raw forest materials. The most important aspect for the owners is long-term thinking; not just having a good return on the forest they fell today, but also ensuring that there is a healthy market for future generations of timber. Södra Cell Mörrum is a secure workplace for its 400 employees since the mill is owned by forest owners who plant forests today and harvest them many years later.

The mill was completed in 1962 and had a start-up capacity of 135,000 tonnes of paper pulp per year. Current capacity is approximately 420,000 tonnes. That constitutes approximately one-third of Södra Cell's total capacity. Still today, after more than 40 years, Mörrum is one of the most modern pulp mills in the world.

130 truck loads of pulp timber and chips are processed each day at the mill. This raw material is transformed to pulp during an efficient and well supervised process. In an average week, 3 boats, 38 trucks and 30 rail freight wagons are used to transport the pulp from the mill, with end destinations being paper mills inside and outside Sweden. As opposed to many other pulp manufacturers, the Södra Cell mills do not further process the pulp into paper. In this way, the mills do not compete with their customer, which allows them to

completely focus their efforts on satisfying their customer's pulp needs.

The pulp mill is divided into two fibre-lines up to and including the dryers, as well as a common recovery plant and a separate wood-handling department. "Since the mid-1990s, we mainly manufacture TCF (Total Chlorine Free) pulp," says Åke Karlsson, who is responsible for the technical service of the mill instruments. "However, on one fibre-line, we can still make chlorine dioxide-bleached ECF (Elementary Chlorine Free) pulp, which is sometimes a customer requirement."

Automated pH measurements inline

"Our high and consistent quality is definitely our main competitive advantage," explains Åke. "As such, we have to place great emphasis on reliable measurements." Previously, the mill experienced problems with pH measurements, since the electrodes couldn't cope with the tough environment and became clogged after just a couple of weeks. As a result, sensors often gave unreliable results, which jeopardized automated procedures in the chemical dosage area. Now, three INGOLD EasyClean 350 systems are used in the bleaching plant; two in each bleaching line to control the pH-value in the O₂-bleaching tower, and one in a common measuring place for both lines, measuring



InPro 2000.



the white water. "However, in the new measuring systems, the pH electrodes (METTLER TOLEDO'S InPro 2000) are cleaned automatically inline, which above all gives rise to consistent and reliable measurement results. A positive side effect is that the electrodes also have more than twenty times longer operational life, which of course makes them less expensive," adds Åke with a smile. Åke's colleague, Håkan Karlsson, agrees, "We will be able to recoup the cost of this equipment several times over in just one year, thanks in part to lowered consumption of chemicals and considerably reduced maintenance. But, after all, the most important thing is that the people in the bleaching plant can now rely on the equipment at the three measuring points, since the automatic cleaning facility ensures that the measurements actually serve their purpose, to give correct results."

External purification

Mörum also plays host to the majority of Södra Cell's research and development activities. Close co-operation in development issues also results in interesting pilot projects being carried out at the mill. One example is external purification, where development has moved away from a closed process towards a new, more efficient purification. "In our new biological

purification plant, bacteria consume the contaminants in several stages," explains Magnus Davidsson who is responsible for recovery processes at the mill. "In this way, we have both improved the purification and made it possible to considerably compress the entire plant in a way which was not previously possible. We wanted to make use of the positive experiences of automatic measuring in the production and therefore we conducted a trial phase with METTLER TOLEDO. It turned out well, so we purchased a complete set of equipment for pH measurement." The details relating to the process are, of course, Mörrum's trade secrets, but it is clear that the new measures for purification have considerably reduced emissions of nitrogen, phosphorous and organic matter.

Environment in focus

Commitment to the environment is firmly anchored within Södra Cell, and internal requirements are set even higher than the government's environmental requirements. "An example of this is that although we only manufacture paper pulp at the mill, paper pulp is not the only useful product that is produced," says Åke Karlsson. "Following our aim to make optimal use of all resources at the mill, we also provide the municipality of Karlshamn with district heating from our heat

recovery process. 90% of the municipality's heating provisions come from us. This is enough to supply 6000 households with district heating."

Apart from local and national considerations, Södra is also firmly committed to join in endeavours to protect the world's environment on an international level. Recognizing that transports are also a major source of emissions, Södra, wherever possible, uses environmentally less harmful sea and rail transport instead of road haulage to supply its international clientele with the raw pulp produced at Mörrum. This short and long fiber pulp is refined locally by customers all around the globe in order to produce everything from magazines and labels to catalogues and tea bags.

So when George Taylor is reading his Financial Times in a London pub and Jing Li is browsing through his IKEA catalogue in Shanghai, they are perhaps much closer to the forests of southern Sweden than they ever could imagine!

▶ www.mtpro.com/cleaning

Captions:

Coverpage

Södra Cell Mörrum, one of the world's most modern pulp mills on the outskirts of Karlshamn in southern Sweden.

Åke Karlsson in the well-equipped sampling laborator, for external purification, where we find the pH measuring points with automatic inline cleaning.



Enhanced retractable housing systems

What should you know?

With the aid of retractable housings, sensors can be quickly and safely withdrawn from a process for cleaning and recalibration, then afterwards just as easily reinserted- all without interrupting an active process. This sounds simple enough, but there are a number of issues to consider in order to maximize the performance of a retractable housing system, regardless if it is manually operated or part of an automated system. The new and enhanced retractable housing of METTLER TOLEDO in particular gives attention to the seal design as well as to aspects surrounding operational safety.

Periodic servicing of electro-chemical sensors and physical sensors (turbidity/conductivity) is critical for optimum performance. Regular inspection and cleaning, including (re-)calibration, can be the most cost-effective way to extend sensor life and ensure measuring system accuracy. Proper cleaning and calibration requires the sensor – the most easily damaged component of the system – to be removed from the safety of its process housing and handled in environments where it can be dropped or damaged. By using a manually or pneumatically operated retractable housing, or fully automated system, the risk of damage is avoided and your in-line sensor investment is maximized.

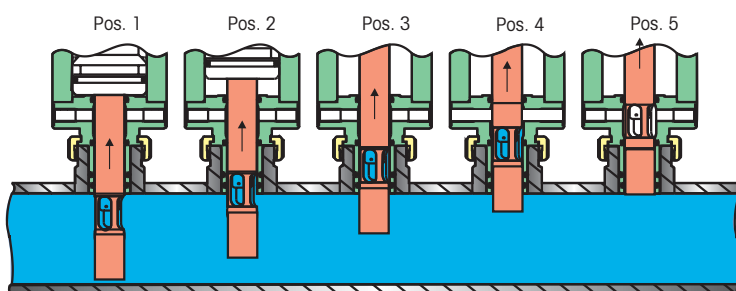
Like pulling a cork from a full barrel, withdrawing a standard sensor connection from an active process leaves a gaping hole and introduces a possible contamination

point. Traditional sensor housings safely seal the process and keep it from leaking, but make it impossible to check sensor performance without first shutting down the process. However, the same level of safety can also be provided by a lock system or retractable housing which allows access to the sensor but prevents any egress of medium.

Suitable retractable housings are now available in a variety of designs. As a rule the process is sealed off by means of a spigot-type closure, which is part of the immersion tube housing the sensor. This principle is simple and due to the double O-ring sealing configuration, also extremely reliable.

It all depends on the position of the O-ring

Attention to detail provides the benefits! Since the O-ring seal is largely responsible for overall correct function and operational safety, the sealing elements have to be carefully protected. In the retractable housings of the series InTrac 7XXe from METTLER TOLEDO, this requirement is particularly well solved by the patented arrangement of the sealing elements, a wiper ring and a complete separation of sealing and bearing functions. Only by adopting an inverted O-ring configuration is it possible to mount the so-called wiper ring for removal of solid particles from the shaft of the immersion tube during its sliding movement (stroke). This feature provides efficient protection of the sealing elements from harm by abrasive media.



The patented arrangement of the O-rings guarantees safe outside separation from the process medium at an immersion depth H100/H200.

In addition to abrasive media, aggressive chemical substances can also be a source of O-ring destruction, resulting in the need for additional maintenance work. When internal O-rings are damaged, it becomes necessary to completely demount the housing. On housing types with the sealing elements on the spigot itself, the seals are continuously exposed to the medium, which clearly increases the need for service attention. However, the METTLER TOLEDO inverted O-ring configuration ensures that, both in the measuring and in the maintenance position of the housing, only one sealing element is in direct contact with the medium. The second O-ring therefore only comes into contact with the medium as a result of major wear and tear, and serves as a safety barrier.



O-rings.



InTrac 776 e.

Safety first

One possibility for error in the operation of a retractable housing is actuating the housing into the measuring position in a process without first inserting a sensor. The result would be an unintentional open passage direct to the medium. Since in many applications, the medium substance is either aggressive or toxic, a special sensor detection system has been developed for the InTrac retractable housings. The InTrac 7XXe safety mechanism locks the housing into a position where the process is sealed unless a sensor is properly fitted within the housing. Since a sensor cannot be removed unless the housing is fully retracted, this safety mechanism creates a fail-safe design, thereby preventing an unintentional open passage between the environment and the process medium. This type of design protects personal and ensures environmental safety. ■

► www.mtpro.com/housings



InTrac 797 e.

Inductive conductivity systems: rugged, reliable, explosion-proof

Regardless of your requirements—hazardous area applications, system integration with HART® Communications, or continuous diagnostics using Sensocheck®— this instrument does it all. A PROFIBUS® version is also available for integrating with PROFIBUS systems. For extreme operating conditions, like those found in the presence of strong acids/alkalis and high temperature, the Cond Ind 7100 e and matched inductive InPro7200/7201 conductivity sensors comprise an ideal solution. Made from PEEK and having a measuring range of 0 to 2000

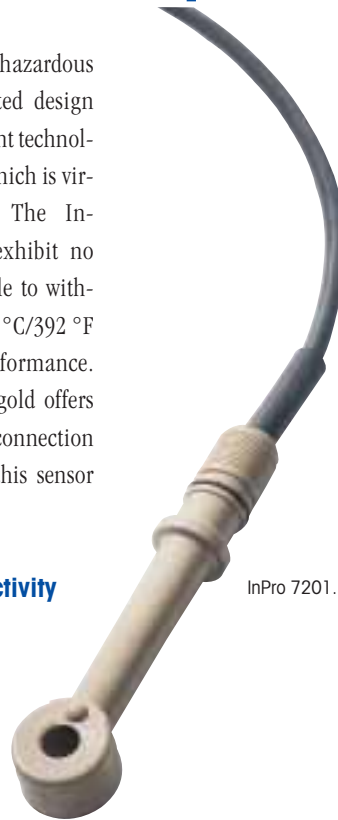
mS/cm, these sensors deliver reliable performance even under the most hazardous conditions. A fully encapsulated design and state-of-the-art measurement technology combine to form a sensor which is virtually immune to fouling. The InPro7200/7201 sensors, also, exhibit no polarization effects and are able to withstand temperatures of up to 200 °C/392 °F without any effect upon performance. Finally, METTLER TOLEDO Ingold offers the widest selection of process connection styles, which guarantees that this sensor will fit your process.

► www.mtpro.com/conductivity

InPro 7201.



Transmitter Cond Ind 7100 e.



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