Pulp & Paper News 4
Perspectives in Liquid Process Analytics

Lower costs and higher efficiency at Stora Enso Sachsen through automated pH measurement

The paper industry uses vast amounts of water which has to be cleaned before final discharge in order avoid placing an undue burden on the environment. A major contribution towards efficiency and cost-savings in the relative treatment processes is provided by the METTLER TOLEDO pH measuring system with automated electrode cleaning.

The modern paper factory of Stora Enso Sachsen GmbH, in Germany, is one of nine paper mills worldwide belonging to the Stora Enso Group, engaged in the production of newsprint. On one of the most technically advanced paper machines in the world, newsprint is made from 100% recovered (waste) paper. In the manufacture of new paper from waste paper, the economical use of water and the later treatment and monitoring of the final process water prior to discharge (ecological compatibility) are both factors of great importance. From an annual basic feedstock of 500'000 t of waste paper, the Sachsen mill produces 330'000 t of newsprint and 60'000 t of de-inked market pulp.

Automated pH measuring system in the anaerobic, biological treatment stage.

The large volumes of water streams involved in the production of new paper from waste paper is made up of fresh water, process water, and wastewater streams. The fresh water is first conditioned by passing it through a grit chamber, followed by preoxidation, precipitation, clarification and filtration. The conditioned water is used in the paper machine to thin down the raw recovered paper, and in the de-inking plant, after the addition of de-inking chemicals, to remove printing ink and unwanted sticky substances. In the power plant, water serves as boiler feed water and heating water. In the wastewater treatment plant, at the heart of the mill, all effluents from production are treated prior to

METTLER TOLEDO

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Imprint

Publisher
Mettler-Toledo GmbH
Process Analytics
CH-8902 Urdorf, Switzerland

Editorial office
process.marketing@mt.com
Production
Marcom
CH-8902 Urdorf, Switzerland

Illustrations
Archives of
Mettler-Toledo GmbH, Urdorf (CH)
Stora Enso Sachsen (D)

discharge, some 15.000 m³ daily. The effluent treatment involves mechanical, biological and chemical process stages. After passing through a preliminary mechanical sedimentation phase, the wastewater is fed to the biological treatment stages. Firstly, anaerobic treatment is carried out in so-called IC (internal circulation) reactors, and then followed by a second step in a mechanically mixed and aerated tank. The next step is chemical-based cleaning involving precipitation and flotation. In a final, mechanical stage, the effluent is passed through continuous sand filters. (Residues)

pH measuring systems

The following pH measurement points were installed within the aerobic, biological treatment stage at the

- Inlet: automated pH measurement system using the retractable housing InTrac 777, pH electrode InPro 4250, Transmitter pH 2500 as well as an integrated electrode cleaning system.
- Outlets: Four IC anaerobic reactors operated n parallel, each with a pH measuring section consisting of a static housing InFlow 751, pH electrode InPro 4250, and a Transmitter pH 2100.

pH measurement is applied in order to monitor and control neutralization of the raw effluent. Through appropriate regulation of the chemical dosing pumps for NaOH and H_2SO_4, the pH value of the process can be maintained within a certain tolerance range, safely protecting the downstream biological cleaning stages.

Automated electrode cleaning

The high fiber load in the feed to the reactors rapidly leads to deposits forming on the tip of the electrode, making it necessary to carry out regular cleaning of the electrode. The integrated electrode cleaning system is controlled by the Transmitter pH 2500, and at set intervals sucks cleaning agent from a reservoir, delivering this directly to the flushing chamber of the retractable housing InTrac 777.

In the outlets of the four IC reactors, the pH value is measured in order to be able to determine the biological conversion rate (COD) in the reactors, which allows important technological conclusions on the status of the process to be drawn.

Automated cleaning saves costs and ensures process stability

Until recently, servicing of the pH measuring point at the inlet to the effluent treatment plant had been carried out with substantial effort by hand. Now, this service work is realized fully automatically, the sequence controlled by the associated transmitter unit. Every 3 hours, the pH electrode InPro 4250 retracts from the process into the housing InTrac 777 and is flushed for several seconds with clear water. Subsequently, the electrode is reinserted into the process.

Commissioning of the automatic cleaning system EasyClean from METTLER TOLEDO provides a guarantee for regular cleaning of the electrode, and consequently optimal control of the effluent neutralization process. Direct control of the dosing pumps has led to lower process costs. Also, a lot of valuable time is being saved! ■

Transmitter pH 2100 with InFlow® 751 and InPro® 4250

Highest process measurement
reliability despite fibrous components

The retractable housing InTrac 787 from METTLER TOLEDO used in conjunction with a specially developed pH electrode InPro 4801 SG for fibrous process media guarantees highly reliable pH measurements.

Housing InTrac 787.

Safe operation in pulping processes

The retractable housing InTrac 787 is especially suitable for use in the harsh process conditions common to the paper industry. This housing incorporates a ball valve which safely isolates the process medium from the environment and allows work on the measuring electrode to be carried out without interrupting the ongoing process. As additional security, the ball valve is firmly secured during process operation by a chain link. The housing is designed to suit a variety of process adaption methods and can be safely integrated into the paper manufacturing process as and when required.

Special electrode for fibrous media

From bleaching of the ground wood pulp through to control of dewatering, this retractable housing offers the ideal possibility to use all METTLER TOLEDO electrodes/sensors of length 120 mm. Adaption of the pH electrode InPro 4801 SG with flat membrane, especially designed for applications involving abrasive and fibrous process media, can be ideally accomplished by using the appropriate, specially constructed Adapter Set. This Adapter-Set ensures that fibers do not become wound around the housing or the sensitive parts of the electrode/sensor, thereby guaranteeing reliable measurement values.

Housing allows electrode cleaning during ongoing process

Reliable pH measurement at elevated temperature and pressure, in acid or caustic solutions, is crucial for process control in the aim to obtain fibers of the greatest length and suppleness possible and with high mechanical strength. Dependency on the electrode therefore takes on great importance. In the flushing chamber of the housing, the sensitive part of the electrode can be efficiently cleaned without process interruption. Measurement reliability and operational life of the electrode are thereby substantially extended, and the cost of ownership of the measuring point profitably lowered. ■

Advantages of the retractable housing InTrac 787:

- safe process sealing through use of a ball valve closure (hot-tap design)
- maximum operational safety, ball valve secured by mechanical safety chain
- integrated flushing chamber – rinsing of the electrode/sensor without deinstallation
- variable insertion depth as standard option (100/300 mm)
- protective (anti-blowout) lip on immersion tube of housing

Advantages of the pH-Electrode InPro 4801SG

- unsusceptible to fouling
- automatic temperature compensation
- high resistance to aggressive media
- safe installation in housing via special adapter set

High-performance pH electrode InPro 4801 SG.

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Know-how for your daily operations

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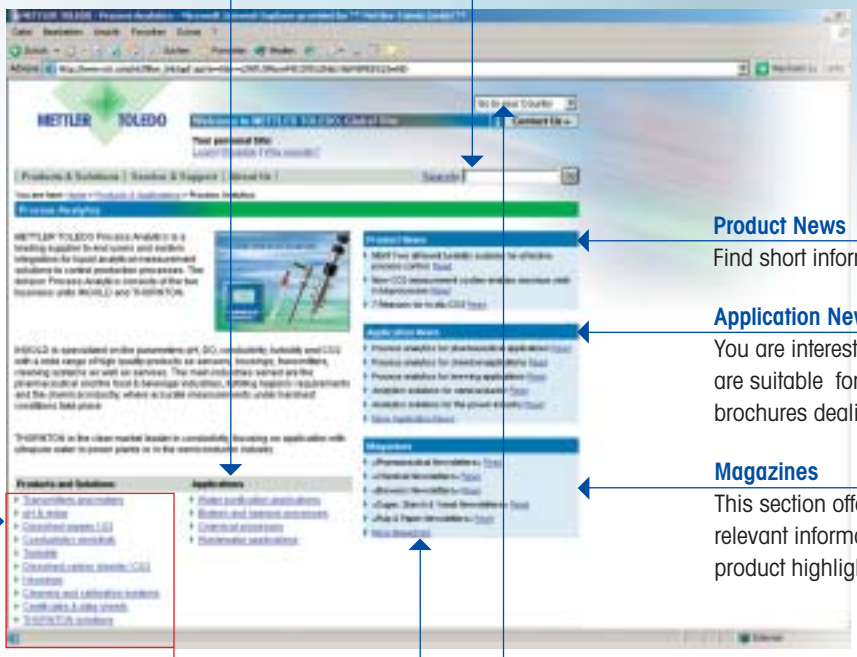

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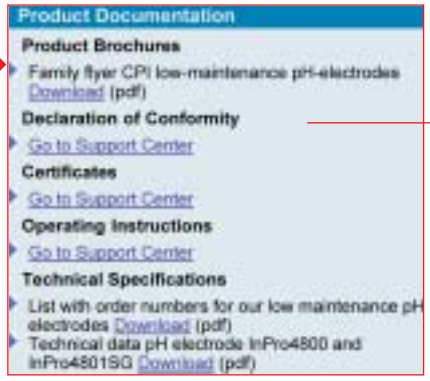


New Premium Line Transmitter M 700

The new M 700 transmitter line is based on a completely new concept. So far, conventional inline measuring systems for analytical parameters consisted of a transmitter and the corresponding sensor. The M 700 is different, and based on a modular concept allowing the simultaneous measurement of up to three parameters.

Versatile Transmitter with PROFIBUS concept

The basic unit of the M 700 transmitter is designed to accept modules for pH, conductivity and dissolved oxygen. A special high-resolution module for dissolved oxygen is offered to enable measurements to be taken at ppb level. Additional modules for PID control, output and limit contacts, as well as a PROFIBUS® communication module complete the M 700 concept. This remarkably versatile transmitter line guarantees an elevated standard of measurement together with optimal safety in the management of your process.

Wide range of operating and maintenance functions

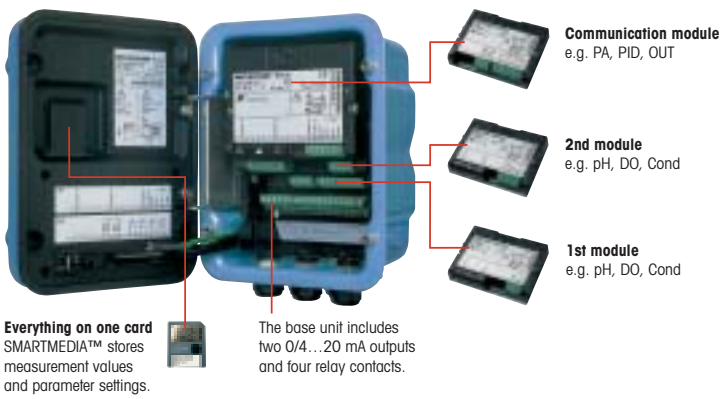
The instruments offer a range of powerful features through a menu-driven setup program supported by graphical pictograms. The large and clear backlit LC display shows 2 process parameters. The display can be configured to show process temperature, sensor-related data, differential measurement and much other important information. Special attention has been paid to the many maintenance functions and sensor diagnostic tools implemented in the basic unit of the M 700.

SmartMedia™ data storage feature

A variety of options, such as an extended logbook, a 2-channel measuring recorder, a service scope function, and others, are available to optimize the functionality of the M 700 according to customer needs. All data and configurations are stored on a SmartMedia™ card. This storage medium is used worldwide as standard and allows easy data processing in peripheral computer systems.

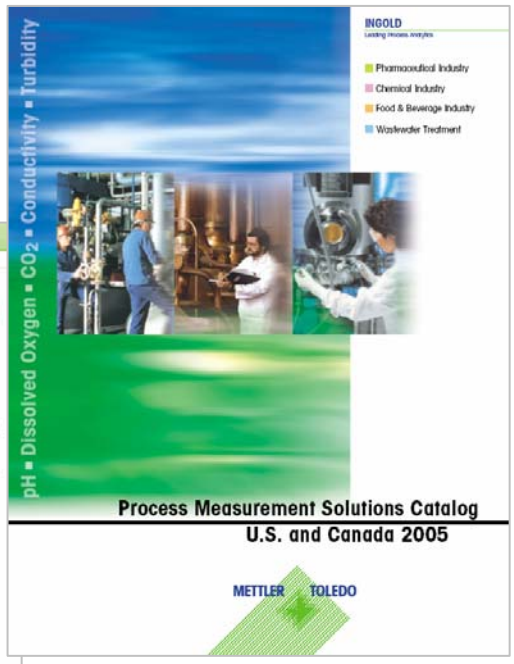
Basic and Ex versions available

The M 700 system comes in two designs. One version features a coated stainless steel enclosure which is mainly used in harsh process applications like in sugar production. The enclosure is available for standard power supply, is intrinsically safe and with ATEX approval as Ex versions for use in hazardous areas. ■



Comprehensive Product Catalog for 2005

The new 2005 Mettler-Toledo Ingold product catalog is a comprehensive guide for products, markets and services in the INGOLD product portfolio. All product pages have full color photos along with detailed specifications and ordering information. The process solutions catalog offers the end user the opportunity to quickly and easily choose the proper product solution for their demanding process analytic requirements.



Six parameter sections including:

- pH
- Dissolved Oxygen
- Dissolved CO_2
- Conductivity
- Turbidity
- Automation

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