

## **Innovative Solutions**

Improve Quality, Productivity & Safety



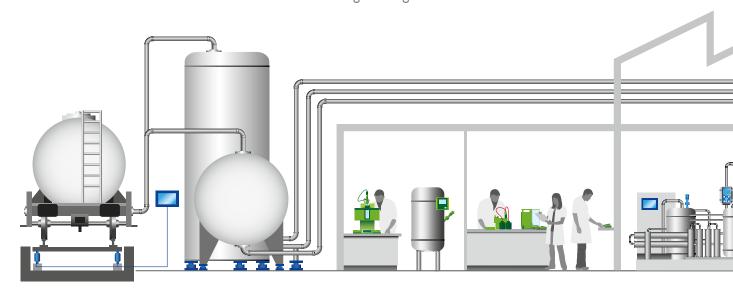
## **Improve Processes & Quality Control**

### Across the Value Chain

Material Receiving

**Tankfarming** 

R&D and Engineering Labs Quality Control Lab



#### Material Receiving Tankfarming

Ensure accurate capture and full transparency of all material received. Optimize your process uptime and performance with innovative vehicle and tank weighing solutions. Guarantee safety during loading and off-loading operations. Tunable diode laser oxygen analyzers are highly reliable in detecting dangerous oxygen levels in vapor recovery systems.

### R&D and Engineering Labs

Our precise instruments are the foundation of many research labs. High performance weighing solutions offer a basis for solid R&D results. Thermal analysis instruments help to improve materials. Automated chemistry solutions accelerate developing of new compounds. Reaction calorimeters and FTIR instruments provide sound reaction kinetics results. Particle characterization systems allow crystallization optimizations.

#### **Quality Control Lab**

Quality control in chemistry relies on fast and precise analyses and safe data management to assure your products meet specifications. Balances, titrators, pH meters, density and refractometers, melting point meters, pipettes and more instruments from METTLER TOLEDO make stringent QC viable. LabX software secures data and results.



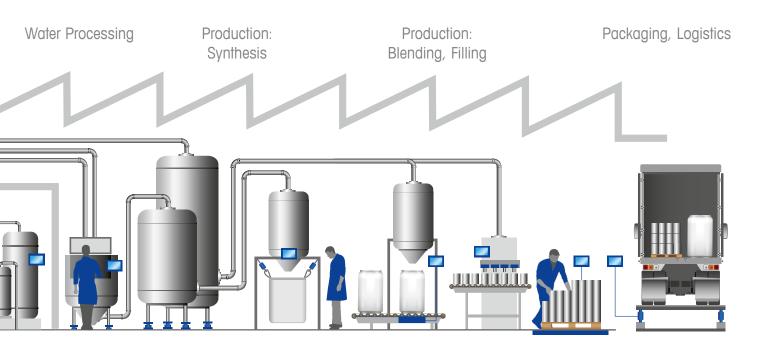








The chemical industry faces several challenges. Increasing safety requirements and regulatory compliance needs, improving productivity while increasing product quality, and responding to market demands quickly are just a few. Thus, when it comes to precise scales, balances and analytical instruments, you need a reliable and powerful partner supporting you with complete weighing solutions, comprehensive analysis systems and reliable services.



#### **Water Processing**

Pure and ultrapure waters are among the most challenging media when conducting inline analysis. Our extensive know-how in understanding water characteristics has led to the development of wide range conductivity sensors of the highest accuracy as well as extremely stable low-conductivity-water pH sensors that require minimal maintenance.

### Production: Synthesis

Gravimetric level control is a very accurate and reliable method for dispensing materials into or out of tanks and vessels. Our range of intelligent sensors for pH, ORP, DO, and conductivity provide continuous performance diagnostics, helping you to avoid any off-spec product or reagent losses.

#### Production: Blending, Filling

Fully integrated process terminals optimize filling and blending processes with consistent, accurate material transfers. They help minimize material waste, and increase profits. Operators are guided firmly through manual formulations to eliminate costly variations. Whether automatically or manually operated, your batch quality is improved.

#### Packaging, Logistics

When it comes to the daily handling of bulky and heavy goods, tough solutions are needed to guarantee precision and reliability. Our line of pallet, low-profile, and floor scales are suitable for daily use in dry and wet areas. Plus, many models are approved for operation in hazardous areas.











# Material Quality and Inventory Under Complete Control

In material receiving both quality and quantity of the raw materials must be ensured. Furthermore, materials increasingly need to be traceable from receiving, through storage and production to the packaged product. Our systems help you control raw material quality and quantity and provide full transparency about all material received. Sustaining safety and avoiding product degradation during storage and transfer is achieved with the help of our oxygen analyzers.

#### Vehicle Weighing



### Truck and rail weighing under complete control

Controlling costs and maximizing productivity are critical in custody transfer operations. Meet these challenges with our industry leading vehicle scales and terminals, configurable unattended solutions, multi-scale traffic management software, and more. From heat in Death Valley to frigid Antarctica, our scales weigh vehicles of all shapes and sizes.

#### Safety First



### Fast in situ oxygen analysis with TDL

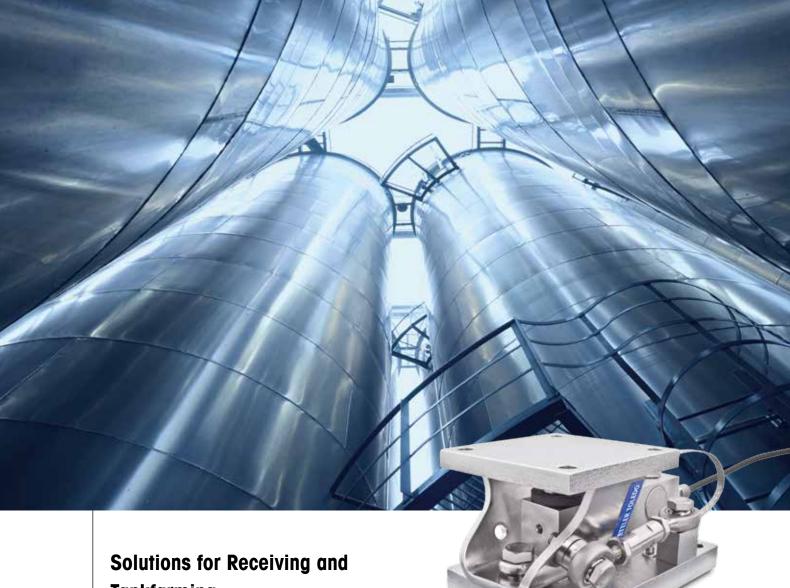
Air ingress in flare systems and in the recovery of vapors of organic solvents from storage tanks is dangerous and needs to be kept below critical levels. This usually involves diluting off-gases with an inert gas. METTLER TOLEDO tunable diode laser (TDL) analyzers provide reliable, in situ oxygen measurement helping to ensure safe oxygen levels at all times.

## Density and Refractive Index



### LiquiPhysics™ instruments replace manual methods

Densitiy and refractometers analyze liquid samples automatically and easily. They are ideal routine testing instruments. Their short time to result makes them well-suited for random spot checks near the line. Measure density, specific gravity, refractive index or concentrations of salt, alcohol and other compounds.



Tankfarming

Moisture Analyzers

**Density Meters** 

Refractometers

**Precision Balances** 

**Bench Scales** 

Floor, Pallet, Low Profile Scales

Tanks and Hopper Weighing

Weigh Modules and Load Cells

Weighing Terminals

**Inventory Management Systems** 

Hazardous Area Solutions

TDL Oxygen Analyzers

Amperometric Oxygen Sensors

#### SWB505 MultiMount® Weigh Module

#### Safe and accurate tank weighing

SWB505 MultiMount is designed for static and dynamic applications with no compromise on safety — including FM and ATEX approvals. The proven rocker pin design and metrologically approved load cells provide the highest level of weighing accuracy at capacities from 5 kg to 4.4 t. Features such as SafeLock $^{\text{\tiny M}}$  ensure safe and easy installation and operation right from the start.

www.mt.com/ind-multimount

# Tasks from Research to Scale up Mastered with Clever Solutions

Pushing boundaries of what is possible is essential for discoveries.

METTLER TOLEDO offers innovative techniques to facilitate research and indispensable tools to manage scale up and reaction engineering. From fully automated organic synthesis to reaction calorimeters to high precision weighing and advanced materials analysis, we provide many essential lab tools for the modern scientist and engineer.

Our systems help improving productivity, process reliability and safety.

#### Fast High Precision Weighing



### Ultraprecise, reliable and fast weighing

Our analytical and microbalances offer unparalleled weighing performance with readability to as low as 0.1 µg. The ability to weigh very small quantities can result in considerable cost savings when samples are very valuable. Precision balances also open the way up to 64 kg. Large platforms, robust construction and metal housings provide long life.

# Thermal Analysis at its Best



### The universal tool for material characterization

The differential scanning calorimetry (DSC) technique is ideal for quality control, material development and research. It determines thermal quantities, analyzes thermal processes and characterizes or compares materials.DSC yields valuable information relating to processing, application, quality defects, identification, stability, reactivity, chemical safety and the purity of materials.

## Reaction Analysis for Lab and Production



### Eliminate grab sampling and measure in situ

Improve R&D and scale-up of chemical compounds and synthetic chemical routes with ReactIR instruments. Study the different phases of chemical reactions under a wide range of conditions — high and low temperature, high pressure, vacuum, acidic, caustic and more. Sampling options for batch or flow reactors enable the monitoring of reactions in labs and production environments.



Analytical and Micro Balances

**Pipettes** 

**Karl Fischer Titrators** 

Thermal Analysis Instruments

Melting Point Analyzers

In-situ FTIR Reaction Analysis

Synthesis Workstations

**Reaction Calorimeters** 

Floor and Tank Scales

Analytical In- and Off-Line Sensors:

pH, ORP, Oxygen, and More

**Total Organic Carbon** 

Transmitters and Meters

#### EasyMax®

### Efficient organic synthesis with EasyMax $^{\circ}$ and ReactIR $^{\sim}$

Our solutions enable innovation efforts in chemistry by helping scientists invent viable synthetic routes for new products. By quickly evaluating various potential routes, starting materials, building blocks, and reaction conditions, chemists can safely generate the desired quantity of the target compound. In short: Chemical synthesis made easy.

### **Reliable Results**

### for Comprehensive Quality Control

Getting reliable results efficiently is key for quality labs. METTLER TOLEDO is focused on providing accurate results and offers solutions which adapt perfectly to customer requirements, make operation easier and faster as well as supporting full compliance with SOPs and regulations.

Balances and analytical instruments from METTLER TOLEDO help you achieve quality targets thanks to reliable and efficient testing.

# Get Water Specifically and Precisely



### Simple and secure One Click® operation of Karl Fischer titrators

Karl Fischer is the standard method for specific water content determination and gives accurate and precise results. Start the volumetric and coulometric titrators pressing one button only and get results within minutes. Completely closed titrator systems prevent operators from any contact with KF reagents.

- Coulometric method: From 1 ppm to 5% water.
- Volumetric method:
   From 100 ppm to 100% water.

#### New Way of Melting Point Analysis



### Easy, efficient, traceable, automatic

Operate the new MP and DP instruments with One Click®.

Achieve highly repeatable fully automated melting and dropping point measurements according to standards. Determine up to six melting samples in one run!

The innovative camera-based measuring technology provides exact results, unprecedented traceability and exemplary documentation opportunities.

# Weighing Samples and Standards



### Reliable, accurate and safe sample preparation

Our balances combine stable and high-resolution measuring cells with an array of features such as ErgoSens, ErgoClip or SmartGrid to make weighing more precise and improve weighing ergonomy. Follow the SOP based guidance on the balance screen and transfer data automatically with LabX software to avoid errors.



Potentiometric Titrators
Karl Fischer Titrators
Analytical Balances
Precision Balances
Density and Refractometers
Moisture Analyzers
Melting/Dropping Point Analyzers
UV/VIS Spectrometers
pH Meters
Pipettes
Thermal Analysis
LabX® Software
FreeWeigh.Net® Software

#### Titration Excellence and InMotion

### One Click® Automation – increased productivity and simple workflows.

Thanks to our One Click user interface and our modular automation solutions, titration can be automated to a very high degree. After placing all the samples in position the only thing an operator has to do is to press one button.

www.mt.com/one-click-titration

www.mt.com/titration

# **Be in Full Control**Of Water Treatment and Quality

Chemical industrial water systems are vulnerable to corrosion, scaling, and fouling. A good water treatment program helps to control the water quality. METTLER TOLEDO is also a leader in stringent deionized water quality measurements. Our products are an accepted standard for water quality in many contract water makeup systems.

# Measuring a Variety of Parameters



### Measure the right values the right way

Meters and instruments for pH, conductivity, salinity, dissolved oxygen, and more all with the same easy way of operation.

Designed for use in chemical plants, they provide stable readings in a short time and offer ruggedness and long life. Serve your lab needs with benchtop meters.

Reach samples at any location in your plant with portable meters.

## pH in Low Conductivity Water



### Stay in control of cycle chemistry

To sustain boiler and turbine integrity pH control is extremely important. However, due to its low conductivity, measurement of pH in ultrapure water is very difficult. The pHure Sensor™ features a pressurized free-flowing reference electrolyte which generates enough conductivity to provide the most accurate pH measurement available for pure waters.

# Stay Ahead of Corrosion and Scaling



### Maximize cooling system efficiency

To prevent corrosion and scaling in cooling water systems, pH needs to be controlled in a narrow range. To prevent excess mineral build-up total dissolved solids concentration must be closely monitored. METTLER TOLEDO provides dependable instrumentation for measurement of both parameters helping you maximize the number of cooling water cycles at low cost.



Process pH/ORP and Conductivity
Measurement
Dissolved Oxygen Measurement
Sodium and Silica Analyzers
Potentiometric Titrators
Benchtop and Portable Meters
for pH and Conductivity
Electrodes and Sensors
Bench and Floor Scales

#### M400 2-Wire Transmitter

### M400 2-wire single-channel multi-parameter transmitter

Featuring HART communication and Intelligent Sensor Management (ISM®) the M400 2-wire transmitter is the ideal loop-powered instrument for measurement of pH, ORP, oxygen and conductivity. Its rugged design and easy operation make the M400 2-wire highly suited to the chemical industries. Continuous access to advanced ISM diagnostics provides outstanding operating reliability and safety.

# **Comprehensive Measuring Solutions**For Production Floors

Immediate control of all production steps, high operational safety level and best-in-class measurement technology are key success factors in achieving manufacturing excellence.

Industrial measuring solutions from METTLER TOLEDO optimize operations and help to accelerate processes, improve product quality and comply with regulations.

# Secure Product Quality and Yield



### Highly reliable pH measurement in reactors

In synthesis steps, whether organic or inorganic, pH is often a critical process parameter.

METTLER TOLEDO pH sensors are very robust and designed to provide continuous dependable measurement performance across the widest range of process conditions.

#### Gravimetric Level Control



#### Convert your reactor to a scale

Liquids, powders, solids, and gases are captured, stored, and processed in many types of vessels, tanks, and hoppers. Gravimetric level control is very accurate and is perfect for measuring aggressive, hot or nonself-leveling materials. METTLER TOLEDO offers a full range of load cells and weighing sensors for managing inventory, ensuring product consistency, and eliminating waste.

#### Moisture Determination



### Guarantee processability, shelf life and stability

Halogen Moisture Analyzers are the ideal solution for fast and simple routine moisture determination. Easily check any sample near-line or off-line whether it is solid, pasty or liquid. Determine moisture along the entire process wherever required.



Moisture Analyzers
Density and Refractometers
Lab pH Meters and Electrodes
Potentiometric Titrators
Bench Scales
Floor, Pallet, Low Profile Scales
Tanks and Hopper Weighing
Weigh Modules and Load Cells
Weighing Terminals
Hazardous Area Solutions
Process pH/ORP, Conductivity and
Turbidity Measurement

pH/ORP Sensor InPro 4800i

#### Highly resistant pH/ORP sensor

The InPro 4800i is a state of the art pH and ORP sensor designed for the harshest of applications. Its long helix—shaped diffusion path and gel reference electrolyte make the sensor extremely resistant against oxidants and solvents. The large, dirt repelling PTFE diaphragm is highly insensitive to clogging, making the sensor ideal for use in media containing hydrocarbons, fibers or particles.

# **Solutions for Blending and Filling**Ensure Correct Manufacturing

METTLER TOLEDO provides systems and components to manage chemical blending, formulation and filling processes efficiently, reproducibly and safely. They address the challenges of today's chemical manufacturing requirements.

Our solutions support safe manufacturing steps and help to safeguard the quality, safety and integrity of products, inside and out.

#### Drum and Gas Filling



### Efficient and versatile filling solutions

Manual and automatic filling of drums and gas bottles requires great accuracy. Whether standalone or integrated into a system, the weighing instrument has to ensure you achieve the target weight quickly and precisely. Our solutions meet all necessary weights and measures approvals and are certified for hazardous area use.

#### **Batch Process Control**



#### Fully integrated filling processes

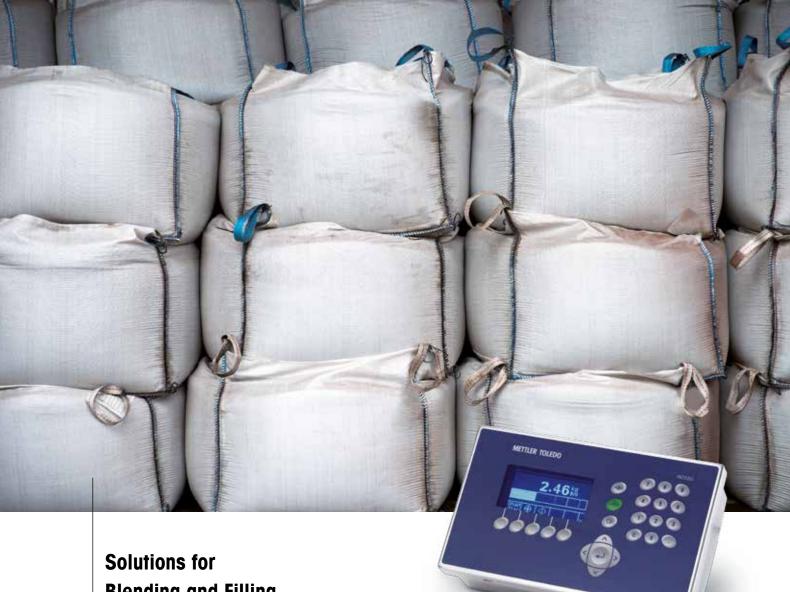
The IND780 batch terminal optimizes batch processes with consistent, accurate material transfers, minimizes material waste and improves batch quality. Tolerance checking, material identification via bar-code input, and operator prompting all help to ensure the operator is guided through each batch.

# Contaminant Detection and Integrity Checks



#### **Detect foreign particles**

Whether using metal detection or X-ray inspection technology, our contaminant detection systems help to guarantee the safety of products. X-ray and vision inspection systems are able to perform a range of in-line quality checks to ensure product and pack integrity. Dynamic checkweighing solutions can be used to ensure correct fill levels. Together they provide total product quality, inside and out.



Solutions for Blending and Filling

Weighing Systems for Batching and Formulating
Weigh Modules and Load Cells Bench and Floor Scales
Check Weighing
Metal Detection
X-ray Inspection
Track & Trace, Serialization
Data Management Solutions
Analytical In-Line Sensors and
Transmitters for pH,
Conductivity, TOC, and More

#### IND560 Weighing Terminal

#### **Smart Filling and Blending Applications**

The versatile IND560 excels in controlling filling and dosing applications. It delivers best-in-class performance for fast, precise, accurate results in manual, semi-automatic, or fully automatic operations. For more advanced filling, the fillplus Application Software adds automated material blending reducing errors and making it easy to obtain process information.

www.mt.com/ind560

# Inspection Solutions to Ensure Quality

### **And Satisfy Customers**

METTLER TOLEDO product inspection, weighing, dimensioning and identification solutions provide maximum operational efficiency, read rate and safety. Advanced inspection systems, accurate scales and easy-to-operate commissioning systems help to process orders quickly and accurately. Our solutions help ensure delivery quality remains high for total customer satisfaction and retention.

# Checkweighing and Vision Inspection



### Automated fill-control with filler feedback technology

Automated fill-control combined with online filler adjustment technology guarantees package fill level consistency. This ensures finished goods comply with regulatory requirements and legislation. Check the integrity of packaging and correct labelling of finished products with vision inspection technology. Integration of metal detectors and X-ray devices add up to a high performance inspection solution.

#### Mobile Weighing



### Mobile, flexible, accurate and robust

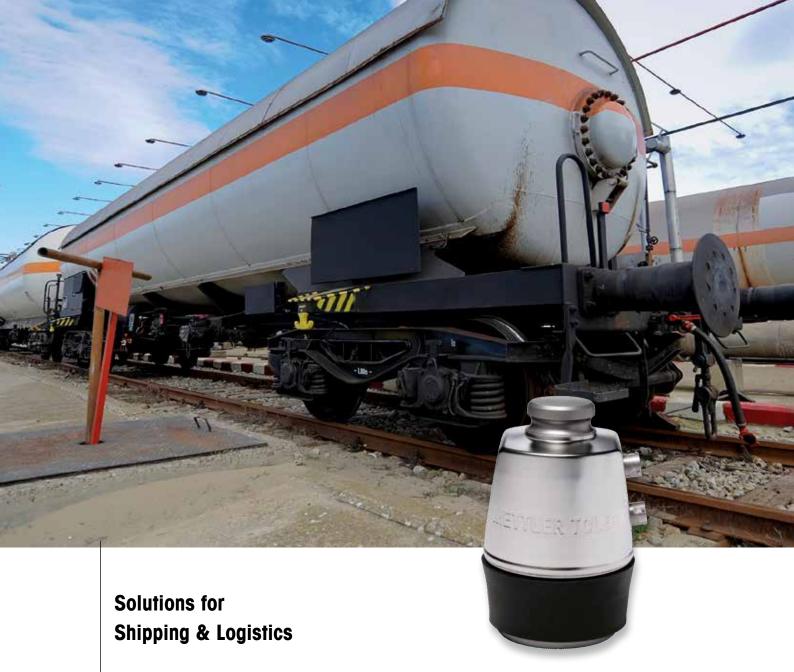
Mobile scales bring the scale to the load instead of moving the load to the scale. This saves time and enhances productivity. Designed for industrial use, these scales deliver reliable weighing results - anywhere. Various battery life options, material finishes and hazardous area classifications mean you can find the right scale for your application and environment.

### Weighing Solutions for Warehouses



### Improve the throughput of your warehouse

Speed up your warehousing and logistics processes with our broad spectrum of bench and floor scales. Whether fixed or mobile, our instruments feature broad weighing ranges and high accuracy to meet your specific requirements. Applications include inventory control, piece counting and completeness checks.



Bench, Floor & Pallet Scales
Pallet Truck Scales
Case Weighers
Tracking & Tracing ID Points
Metal Detection, X-ray Inspection
Vision Inspection
Dynamic Checkweighing
Serialization & Aggregation Solutions
Pallet/Parcels Dimensioning
Truck Scales
Air Cargo Scales

**Inventory Management Systems** 

#### POWERCELL® PDX® Load Cell

### Advanced load cell technology takes reliability to the next level

POWERCELL® load cells are the most accurate and reliable vehicle load cells. They have stood up to the most extreme forces of nature in truck and rail scales for more than 20 years. POWERCELL PDX load cells take this reliability to a new level through predictive diagnostics. They provide unmatched performance and industry leading total cost of ownership.

www.mt.com/powercell

# **Decisive Success Factors**Quality and Productivity

Maximize manufacturing quality, throughput and uptime to protect your profit margins. Our ergonomically designed production and analysis equipment, cutting-edge sensor technology and efficient data acquisition solutions help to speed up production, ensure consistent high product quality and build up your brand image.

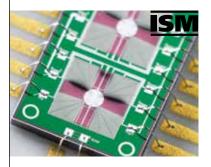
# More Efficient Thanks to Ergonomics



Ergonomic design helps to avoid operating errors and fatigue during routine tasks and improves efficiency. Examples include:

- One Click® for simple, fast and secure operation.
- PipetLite XLS pipettes with extra low tip ejection force.
- ColorWeight® check weighing solution shows tolerances at-a-glance.

## Better Results with Hi-tech Sensors



METTLER TOLEDO is committed to translating innovations into real value for customers:

- 61 million resolution points of XP balances add utmost accuracy and precision to weighing.
- ISM technology simplifies sensor handling and informs users if a sensor can be safely used for the next batch.
- Ultra-fast DSC achieves cooling rates up to 240 000 K/min to study crystallization and reorganization of polymers.

#### Securely Manage Your Quality Data



Efficient data acquisition, analysis functions and storage of all your key attributes from laboratory, plant and packaging line are essential to control quality and profitability. Our software solutions such as FreeWeigh.Net®, LabX, STAR<sup>e</sup> or ProdX easily integrate your measuring equipment such as scales, balances, titrators, pH meters, refractometers, thermal analysis, checkweighers and metal detectors. They provide latest SQC or SPC analysis methods and deliver customized auditproof reports of your KPIs.

- www.mt.com/one-click-titration
- www.mt.com/rainin
- www.mt.com/ind-colorweight-calculator
- www.mt.com/excellence
- www.mt.com/ism
- www.mt.com/mpdp
- www.mt.com/freeweighnet
- www.mt.com/prodx
- www.mt.com/labx



Intelligent Sensor Management



### Securing process uptime and product quality with $\mathsf{ISM}^{\circ}$

Ensuring your production can cope with today's competitive challenges includes the use of highly dependable process analytical instruments. With ISM, METTLER TOLEDO offers a process analyzer platform that uses the power of intelligent digital sensors to increase measurement reliability and reduce maintenance to a minimum.

### **Good Measuring Practices**

### Comply with Standards and Regulations

The regulatory and legal pressure on chemical producers is constantly increasing. Thus, manufacturers and industry organizations are forced to take even greater ownership of manufacturing processes and operational procedures. High product safety levels, safe manufacturing steps and compliance with regulations have to be achieved flawlessly. METTLER TOELDO's solutions and services provide strong support to reach these targets.

# Good Measuring Practices



For better results through performance verification — balances, scales and analytical instruments must be inspected, calibrated and tested at regular intervals to ensure the accuracy and precision. In just 5 steps, the METTLER TOLEDO Good Measuring Practices program provides the right tools, procedures and services to give peace of mind to quality, laboratory and production managers as well as other personnel responsible for instrument qualification procedures.

www.mt.com/gp

# Utilize Advantages of Hygienic Design



Contaminated processing equipment poses an immanent risk for cross contaminating products and exposing operators. Equipment must be designed according to sound sanitary design principles including ingress protection of up to IP69k. Our equipment for hygienically sensitive areas is designed following the latest guidelines of EHEDG, NSF and 3-A standards and allows efficient cleaning and sanitizing, thus reducing the risk of bacteria and cross contamination.

www.mt.com/hygienic-design

# Strong Support for Tracking & Tracing



Safety regulations as well as other government and industry standards require chemical companies to assure traceability on a one-up/one-down principle. A good traceability system not only helps a manufacturer comply with legal and regulatory requirements but helps to protect brand image by minimizing the number and impact of recalls. The right systems and equipment can contribute to production efficiency through better stock management and minimized waste as well.

www.mt.com/traceability



#### Solutions for Hazardous Areas









Hazardous areas require special consideration, but performance need not be compromised. We offer a broad range of intrinsically safe solutions providing full protection and functionality for potentially explosive areas. The rugged design ensures reliable performance even in harsh environments. Our ATEX, FM and IECEx certified solutions ensure compliance to legal requirements and industry standards.

www.mt.com/hazardous

# **Global Services Ready**For Local Reach

Day-to-day laboratory and production processes are highly repetitive yet innovative, characterized by very complex applications and the need for guaranteed data quality and strict control of process risks. It is a world very sensitive to the total cost per data point, demanding the utmost precision and accuracy while constantly complying with legal and industrial regulations and norms.

#### Uptime



Easy access to support knowhow and regular equipment checks according to standard procedures ensure maximum uptime at minimal cost. Your equipment is often subjected to tough environments and high utilization in critical processes, requiring every minute of uptime, guarding against equipment breakdown, parts failure, and 'wear and tear'.

#### Performance



Professional installation and setup of your equipment along with the use of thoroughly tested applications guarantee high performance from day one. Regular preventive maintenance according to manufacturers' procedures ensures efficient and consistent performance throughout the life of your equipment, preventing out-of-spec results at all times.

#### Compliance



Full compliance with your industry's regulatory norms is a must all over the world. This ensures good audit results and provides you with peace of mind. Take advantage of our comprehensive equipment qualification and calibration packages combining standard DQ/IQ/OQ documentation with recommendations for maintenance and routine testing specific to your application.



#### Expertise



Your expertise paired with the know-how of our Service Team are key to maximum uptime, optimum performance and 100% compliance.

Benefit from our large portfolio of optimized applications, scientific publications, SOPs and technical documentation. In our tailored trainings and seminars, your personnel acquire the know-how and skills to run your business.

www.mt.com/service

#### **Global Presence**

With our market organizations operating in most industrialized countries, as well as selected partners in other regions, we are ready to serve you well around the globe. Our geographically focused market organizations and partners are responsible for all aspects of sales, service and support. 6000 factory-trained service and sales specialists worldwide support you.

Products are developed and produced in various locations in the United States, Europe and China.

#### **Access Information and Know-how**

#### On www.mt.com



We offer comprehensive application support for all of our solutions. Our thermal analysis application database alone holds over 600 applications for all kind of samples.

- www.mt.com/ta-applications
- www.mt.com/titration\_applications
- www.mt.com/moisture

#### **Handbooks and Technology Guides**

We provide comprehensive insight information on how our solutions and services help meet regulations and increase safety, quality and productivity.

- www.mt.com/pi-guides
- www.mt.com/ta-handbooks
- www.mt.com/pro-chem-eBook
- www.mt.com/ind-chem-library

#### Webinars

METTLER TOLEDO offers a wide array of live and on-demand web-based seminars (webinars). Obtain specific information about best practice and latest news on applications, products, industry trends and standards.

www.mt.com/webingrs

www.mt.com/chemicals.

For more information

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