



**Solutions to Improve**  
Safety, Quality and Productivity

**METTLER** **TOLEDO**



# Improve Processes & Quality Control Across the Value Chain



## R&D Laboratory

Our precise instruments are the foundation of research labs all over the world. High performance weighing solutions offer a basis for solid R&D results. Pipettes are an essential tool for life science research. Thermal analysis instruments help to improve ingredients and materials. Automated chemistry solutions accelerate the development of new chemical compounds.



## Quality Control Lab

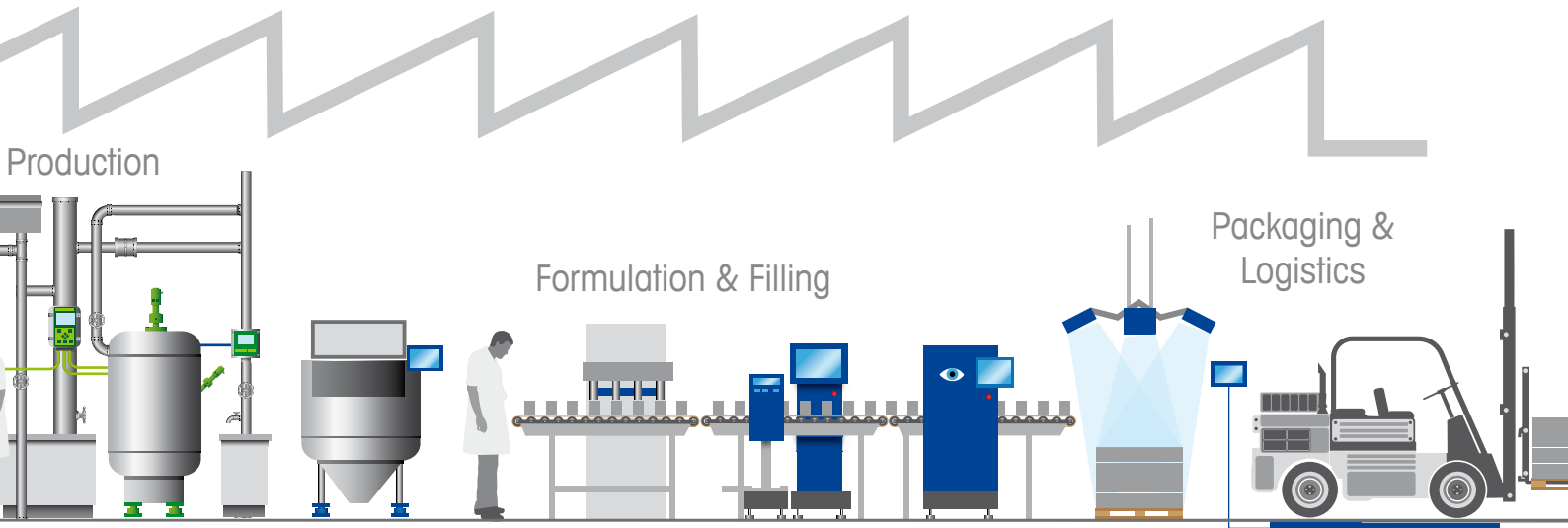
Quality control relies on fast and precise analytical measurement as well as good data management. Our analytical balances, titrators, pH meters, density meters, refractometers, melting point meters, and pipettes, as well as other instruments, can be tailored to each customer's application and provide a fully documented workflow for every quality control lab.



## Scale up, Process Development

Reaction calorimeters and FTIR instruments provide sound results about reaction kinetics. This insight lays ground for scale up and reaction engineering. Particle characterization systems allow the optimization of crystallizations. Our sensors and transmitters for measuring analytical parameters, such as pH, oxygen and resistivity integrate easily into control systems and help ensure product quality.





### Biotech Production

Fermentations are controlled by measuring pH, conductivity, dissolved oxygen and carbon dioxide, and turbidity. METTLER TOLEDO solutions enable tight control of microorganism and cell growth, and close monitoring of the purification process. Our sensors comply with the strictest requirements regarding hygienic production and are global pharmacopeia compliant.

### Chemical Production

Gravimetric level control in tanks and vessels is a very accurate inventory control method. Its high degree of accuracy makes it particularly helpful when dispensing high-value materials. Load cells are placed outside of the tank which is perfect for measuring aggressive, hot or non-self-leveling materials.

### Formulation, Filling

Fully integrated process terminals optimize batch processes with consistent, accurate material transfers, 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

Our product inspection solutions help to safeguard product quality, safety and integrity, both inside and out. The comprehensive product inspection range includes metal detectors and checkweighers as well as X-ray and vision inspection systems. We also offer track & trace and serialisation solutions plus logistics equipment covering weighing and scanning (dimensioning) applications.



# Innovative Solutions for Tasks in Research and Development

**Pushing the boundaries of what is possible is essential for great discoveries. METTLER TOLEDO does not only offer highest precision measurement tools, but also many new innovative techniques to speed up and facilitate research and development work. From fully automated organic synthesis to ergonomic liquid handling to high precision weighing and advanced materials analysis, we provide many essential lab tools for the modern scientist.**

## Chemical Synthesis Made Easy



### **Efficient organic synthesis with EasyMax™ and ReactIR™**

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.

## New Way of Melting Point Determination



### **Easy, efficient, traceable, automatic**

Operate the new MP instruments with One Click® and measure melting points of up to 6 samples fully automated in 1 run. The innovative camera-based measuring technology provides exact results, unprecedented traceability and exemplary documentation opportunities.

## Ergonomic Manual Liquid Handling



### **LTS technology for effortless pipetting**

Pipetting is one of the most repetitive tasks in the laboratory and can lead to fatigue and injuries. The patented LiteTouch system of our pipettes reduces the force needed to eject a pipette tip to a minimum. This therefore makes pipetting much more convenient for the user and in the long run prevents injuries.



## R&D Laboratory Solutions

Analytical Balances

Micro Balances

pH Meters

Pipettes

Karl Fischer Titrators

Thermal Analysis Instruments

Melting Point Analyzers

In-situ FTIR Reaction Analysis

Synthesis Workstations

Reaction Calorimeters

pH and DO Sensors for Bioreactors



Automated  
High Precision Measurement

### **Ultraprecise, fast weighing as an example**

Our analytical and micro balances offer unparalleled weighing performance with readability to as low as 0.1  $\mu\text{g}$ . The ability to weigh very small quantities can result in considerable cost savings when samples are very valuable.

► [www.mt.com/micro](http://www.mt.com/micro)

# Reliable Results for Comprehensive Quality Control

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

## Fast and Reliable Weighing



### **ErgoClips and SmartGrid speed up the weighing process**

Our analytical balances do not only offer highly reliable results, but really excel in smooth and safe operation: ErgoClips help to weigh in almost any shape of container; SmartSens allows to open the balance without touching the draft shield, which prevents contamination; SmartGrid speeds up the weighing and facilitates cleaning of the balance.

## Efficient Multi-Parameter Measurement



### **Mending precision and simple operation with flexibility**

The multi-parameter SevenExcellence™ meter for pH, ORP, conductivity, and ion measuring parameters stands for convenient, simple operation combined with high measurement accuracy and reliability. Truly versatile, the SevenExcellence™ meter can be employed from R&D to QC/QA and production floor. Extensive security functions include e.g. professional user management.

## Full Data Transparency and Compliance



### **Software to support compliance**

Our LabX® instrument control software keeps track of your SOPs and assures accurate execution on different instruments to provide full compliance with regulations. FreeWeigh.Net® is our networked and widely expandable quality assurance system. Statistical Process Control functions allow the systematic acquisition of data, their analysis, documentation and monitoring based on predefined tolerance values.



## Quality Control Lab Solutions

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



### 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](http://www.mt.com/one-click-titration)

► [www.mt.com/titration](http://www.mt.com/titration)

# Analytical Support for Scale up and Process Development

**Reaction calorimeters and FTIR analyzers are indispensable tools to manage scale up, reaction engineering and production processes. METTLER TOLEDO also manufactures robust, high-performance solutions used for measurement and control in liquid industrial processes and pure/ultrapure water applications. Bench, floor, hopper and tank scales follow anytime precisely your scale up. Our systems improve productivity, process reliability and safety.**

## Master Scale up Processes



### Apply automatic reaction calorimeters

The RC1e™ reaction calorimeter is the gold standard in process development and process safety and operates in the liter scale under process-like conditions. A wide range of accessories, including heat flow and real-time calorimetry RTCal™, enable engineers to quickly design economical, robust and safe processes.

## When Samples Get Bigger



### Always the right balance and scale

Extend the weighing capacity from mg and gram to kg and tons. Balances with large platforms are the first choice for high-capacity weighing. Floor and tank scales follow the scale up dimensions further. Rounded edges and flat surfaces make cleaning easy. Hygienic design, ATEX and IP protection open up even more applications of scales and balances.

## Born for a Challenging Environment



### Scales that endure

Stainless steel, elaborated accessories and a special attention to details: METTLER TOLEDO's weighing platforms are easily adaptable to any industrial usage. Wet or humid, hazardous or harsh – the platforms are able to withstand any conditions and guarantee maximum torsion resistance at only 80 mm overall height.





## Solutions for Scale up and Engineering

Reaction Calorimeters

In-situ FTIR Reaction Analyzers

Precision Balances

Floor and Tank Scales

Analytical In- and Off-Line Sensors: pH,  
ORP, Oxygen, Conductivity/Resistivity

Total Organic Carbon

Turbidity

Transmitters and Meters

## Advantages of In-line Measurement

Quality and yield of intermediates and APIs can be greatly improved through the use of measurements from high performance, in-line process analytical instruments. Accurate data also results in reduced consumption of chemicals.

# Comprehensive Measuring Solutions for Production Floors

Industrial solutions and services from METTLER TOLEDO optimize operations from receiving to shipping, with solutions for production, end-of-line product inspection and logistics. We make sure that processes are optimized for maximum efficiency and reliability. Results include improved product quality, accelerated and automated processes, increased productivity and regulatory compliance.

## Fermentation Control



**Maintain optimal conditions**  
pH and dissolved oxygen are critical process parameters during fermentation for maintaining ideal growth conditions for microorganisms and cells. Our pH and DO sensors are specially designed to withstand many sterilization cycles without deterioration in performance.

## Process Safety and Compliance



**Improved production yield and traceability**  
Our formulation solutions combine optimized and efficient weighing procedures along with the centralized database and relevant documentation processes, one of the prerequisite for guaranteed consistent product quality, process safety and stability as well as regulatory compliance.

## Pure & Ultrapure Water Analytics



**Ensuring water quality**  
In many pharmaceutical processes water purity is vital. METTLER TOLEDO's portfolio of pH, ORP, oxygen, ozone, conductivity and total organic carbon sensors provide continuous, real-time water quality assurance to meet the strictest regulatory compliance.



## **Solutions for Primary Production**

Bench Scales  
Compact Scales  
Floor, Pallet, Low Profile Scales  
Tanks and Hopper Weighing  
Weigh Modules and Load Cells  
Analytical In-Line Sensors  
and Transmitters  
Moisture Analyzers  
Hazardous Area Solutions



### **Tank Weighing**

Liquids, powders, solids, and gases are captured, stored, and processed in many types of vessels, tanks, and hoppers.

METTLER TOLEDO offers a full range of load cells and weighing sensors for managing inventory, ensuring product consistency, or eliminating waste.

# Solutions for Formulation and Filling Ensure Correct Manufacturing

**METTLER TOLEDO provides systems and components to manage pharmaceutical formulation and filling processes efficiently and safely. They address the challenges of today's pharmaceutical manufacturing requirements. Our solutions help to safeguard the quality, safety and integrity of products, inside and out.**

## Batching and Filling



### Fully-integrated process terminal

The IND780 batch terminal optimizes batch/formulation 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.

## Automated Weighing



### High speed and high accuracy

Weigh modules of METTLER TOLEDO are tailored to the needs of machine and equipment manufacturers for simple electrical and mechanical integration. Standardized interfaces allow easy communication with control systems. Their stainless steel housings and overload protections ensure reliable operation in automated applications.

## Vigilance to Pharmaceutical Waters



### Safeguarding purity

When used as an excipient, the quality levels of Purified Water and Water for Injection must be maintained and therefore continually monitored to comply with global regulations. Verification of water purity is easily achieved with in-line analysis.



## **Solutions for Formulation and Filling**

Checkweighing  
Weighing Systems for Batching  
and Formulations  
Weigh Modules and Load Cells  
Metal Detection  
X-ray Inspection  
Vision Inspection  
Track & Trace  
Serialisation  
Data Management Solutions  
Analytical In-Line Sensors and  
Transmitters for Conductivity,  
TOC, dissolved oxygen and pH



### **Clear, Intuitive, Efficient Order Processing**

The IND890 Weighing PC provides the latest PC technology with high ingress protection for industrial applications like formulation and recipe weighing. Full graphic 10" or 15" touchscreens greatly facilitate operation. The PC terminal supports error-free and fast processing of the pick-list.

# Neat Packaging and Order Fulfillment for Satisfied 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 order picking/commissioning systems help to process orders quickly and accurately. Our solutions help ensure delivery quality remains high for total customer satisfaction and retention.**

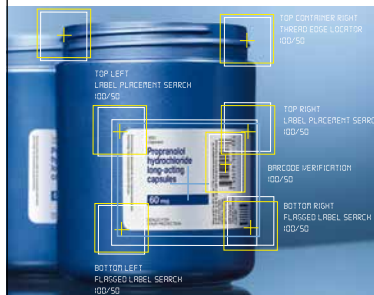
## Contaminant Detection and Integrity Checks



### Detect foreign particles

Whether using metal detection or x-ray inspection technology, Safeline contaminant detection systems help to guarantee the safety of products. X-ray inspection systems are also able to perform a range of in-line quality checks to ensure product and pack integrity. Together they provide total product quality, inside and out.

## Vision Inspection Solutions



### Consistency in labeling

Vision inspection systems ensure that pharmaceutical products consistently meet manufacturers' and consumers exacting quality standards and specifications. Systems are able to inspect a wide variety of packs and products, verifying that human readable, barcode and 2D matrix codes are present and correctly positioned.

## Parcel Weight and Dimension



### Calculate shipping costs by volume and weight

Volume and weight is used to calculate shipping costs. Ensure that transport costs are covered, and avoid back charges that affect your bottom line by automatically weighing and measuring shipments. We have a full range of parcel and pallet measuring systems that ensure accurate size and weight data for proper allocation of transport costs.



## **Solutions for Packaging and Logistics**

Bench, Floor & Pallet Scales  
Pallet Truck Scales  
Case Weighers  
Tracking & Tracing ID Points  
Metal Detection  
X-ray Inspection  
Serialisation & Aggregation Solutions  
Pallet/Parcels Dimensioning  
Truck Scales  
Air Cargo Scales  
Inventory Management Systems



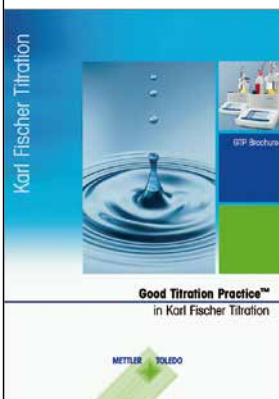
### **Dynamic Checkweighing**

Automated fill-control combined with product monitoring feedback and adjustment technology guarantees product consistency. High speed dynamic weighing ensures every pack contains the correct piece count or components – just the right amount every time. This ensures finished goods comply with industry regulatory requirements and legislation.

# Knowledge and Tools for Effective Solutions

**METTLER TOLEDO provides a wealth of free tools and documentation about the latest techniques, how to optimize applications and for training. Our website [www.mt.com](http://www.mt.com) is a great resource for know-how and best practice.**

## Application Literature

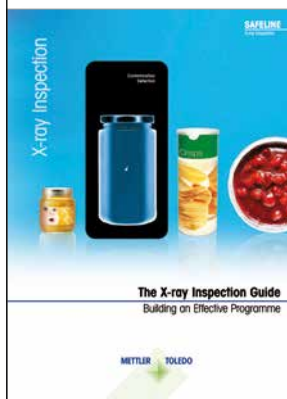


We offer comprehensive application support for all our solutions. For example, our titration application database alone holds over 250 applications for the pharma and life science industries.

e.g. Titration applications:  
▶ [www.mt.com/titration\\_applications](http://www.mt.com/titration_applications)

e.g. Moisture applications:  
▶ [www.mt.com/moisture](http://www.mt.com/moisture)

## Technology Guides



Our authoritative guides provide industry best practice in key areas for process improvement and help you to take informed decisions.

e.g. Metal Detection and X-ray Inspection Guides  
▶ [www.mt.com/pi-guides](http://www.mt.com/pi-guides)

e.g. Bioreactor Process Control  
▶ [www.mt.com/pro-pharma-eBook](http://www.mt.com/pro-pharma-eBook)

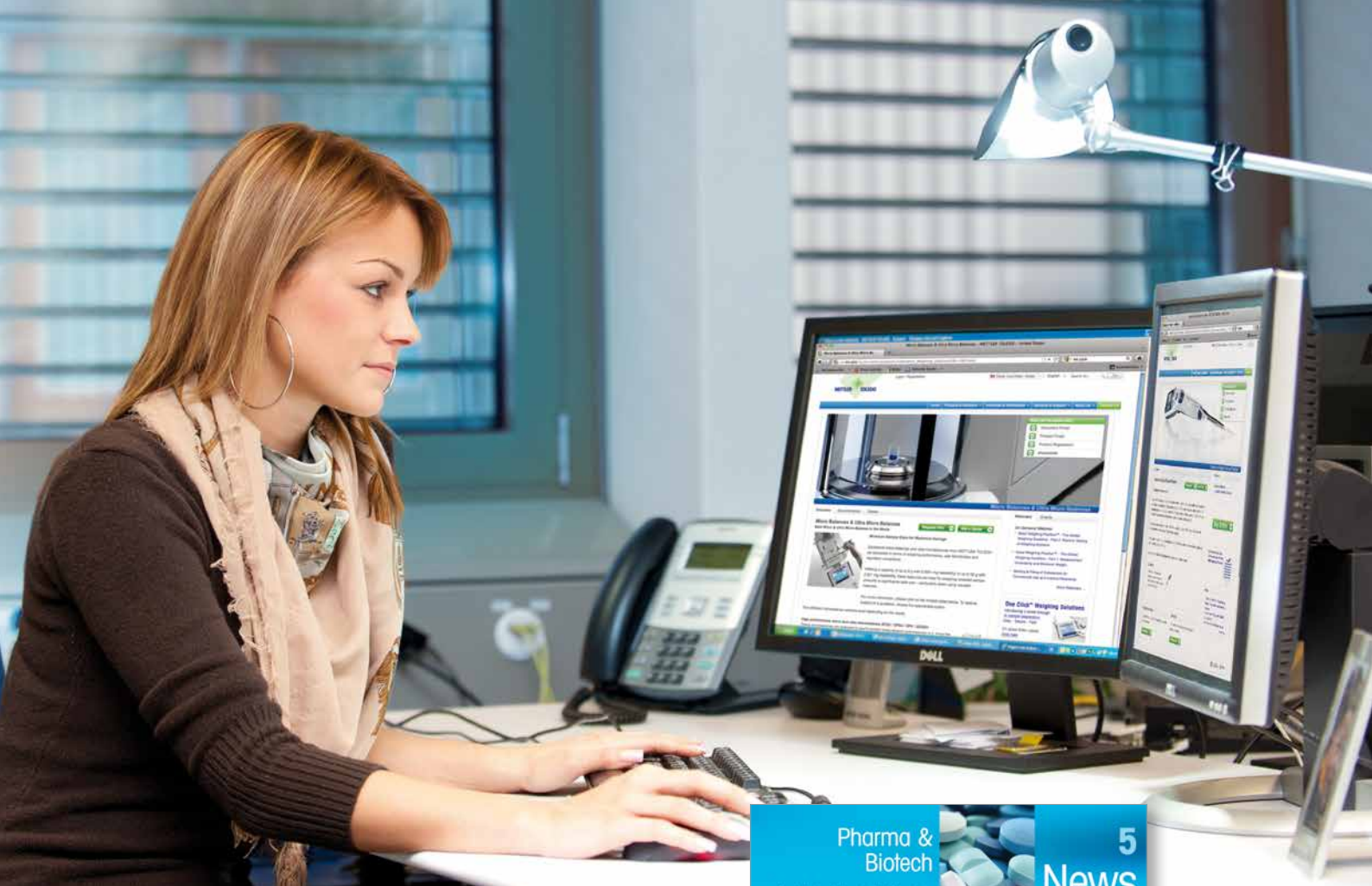
## White Papers



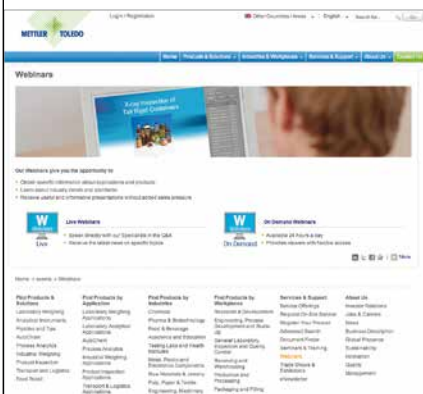
Our growing number of white papers document innovative solutions from R&D to logistics to help you improve productivity.

▶ [www.mt.com/ind-pharma-library](http://www.mt.com/ind-pharma-library)





## Webinars



METTLER TOLEDO offers a wide array of web-based seminars (webinars) about various topics from process optimization, applications to advanced techniques, including presentations from academic and industry leading experts. We offer live webinars as well as on-demand webinars which can be viewed immediately.

METTLER TOLEDO webinar portal:  
[▶ www.mt.com/webinars](http://www.mt.com/webinars)



## Case Studies, Applications and More

We regularly publish newsletters for all major industry segments as well as for specific topics such as Analytical Chemistry or Materials Characterization. Free subscription is available at the webpages listed below.

- ▶ [www.mt.com/lab-pharmanews](http://www.mt.com/lab-pharmanews)
- ▶ [www.mt.com/anachem-usercom](http://www.mt.com/anachem-usercom)
- ▶ [www.mt.com/ta-usercoms](http://www.mt.com/ta-usercoms)

# 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.

Here are a few examples:

- One Click® allows for simple, fast and secure operation.
- PipetLite XLS pipettes with extra low tip ejection force.
- "ColorWeight®" shows if the weight is out-of-spec.

- ▶ [www.mt.com/one-click-titration](http://www.mt.com/one-click-titration)
- ▶ [www.mt.com/rainin](http://www.mt.com/rainin)
- ▶ [www.mt.com/ind-colorweight-calculator](http://www.mt.com/ind-colorweight-calculator)

### 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.
- Never miss a melting point again with the camera-based melting point instruments.

- ▶ [www.mt.com/excellence](http://www.mt.com/excellence)
- ▶ [www.mt.com/ism](http://www.mt.com/ism)
- ▶ [www.mt.com/thermal-values.com](http://www.mt.com/thermal-values.com)

### 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® 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/freeweighnet](http://www.mt.com/freeweighnet)
- ▶ [www.mt.com/prodx](http://www.mt.com/prodx)
- ▶ [www.mt.com/labx](http://www.mt.com/labx)



## Manufacturing Efficiency

In today's economic environment of rising raw material prices and severe global competition, business executives must optimize all aspects of operational manufacturing costs. Key customer benefits resulting from measuring-, weighing- or inspection-based quality control and process optimization include

- minimized out-of-spec-manufacture
- minimized product wastage through precise material transfer and accurate filling solutions.
- maximized inventory turnover

Predictive maintenance programs help reduce equipment downtime and maintenance costs.

# Good Measuring Practices

## Meet Safety & Compliance Standards

**The regulatory and legal pressure on pharma, biotech, Active Pharmaceutical Ingredients (API) and chemicals producers is constantly increasing, forcing manufacturers and industry organizations to take even greater ownership of processes and procedures to achieve product safety and compliance with regulations.**

### Strong Support for Tracking & Tracing



Pharma safety regulations as well as other government and industry standards require pharmaceutical 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. Additionally the right systems and equipment can contribute to production efficiency through better stock management and minimized waste.

► [www.mt.com/traceability](http://www.mt.com/traceability)

### Risk Free Weighing in Hazardous Areas



METTLER TOLEDO's extensive range of hazardous area solutions ensure compliance to national and international legal requirements and industry standards.

Many products are globally certified for environments ranging from ATEX Zone 1 or Class HI, Div 1 up to Zone 22 / Div 2. Our equipment for wet & harsh areas features the highest ingress protection (IP69k) to withstand heavy hose-down cleaning procedures. All to protect your people and assets.

► [www.mt.com/hazardous](http://www.mt.com/hazardous)

### Utilize Advantages of Hygienic Design



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

► [www.mt.com/hygienic-design](http://www.mt.com/hygienic-design)

### 5. Routine Operation

Benefit from tangible recommendations for optimal performance verification, calibration and maintenance.

### 1. Evaluation

Analyze your process flow and associated criteria to consistently assure the highest quality for your application and your data.



### 2. Selection

Choose the ideal combination of instrument and measuring technology to best match your process needs.

### 4. Calibration & Qualification

Trust the METTLER TOLEDO trained Service Team and tools when it comes to calibrating and qualifying your instruments.

### 3. Installation & Training

Enjoy every confidence in your new device and master it with full professional skills right from day one.

## Good Measuring Practices

### GWP<sup>®</sup>

Good Weighing Practice<sup>™</sup>

### GEP<sup>™</sup>

Good Electrochemistry Practice<sup>™</sup>

### GTP<sup>®</sup>

Good Titration Practice<sup>™</sup>

### GTAP<sup>™</sup>

Good Thermal Analysis Practice<sup>™</sup>

### GPP<sup>™</sup>

Good Pipetting Practice<sup>™</sup>

### GDRP<sup>™</sup>

Good Density and Refractometry Practice<sup>™</sup>

Guaranteed better results through performance verification – balances, scales, pipettes and analytical instruments must be inspected, calibrated and tested at regular intervals to ensure the accuracy and precision of measurement results. The METTLER TOLEDO Good Measuring Practices programs provide the right tools, procedures and services and thus give peace of mind to quality, laboratory and production managers and personnel responsible for instrument qualification procedures.

► [www.mt.com/gp](http://www.mt.com/gp)

# Global Services for Uptime, Performance, Compliance & Expertise

**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 know-how 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.



METTLER TOLEDO is represented with Sales & Service Organizations in 36 countries as well as Distribution & Service Partners in most other countries across the globe. In total, our products and services are available in over 100 countries.

## 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](http://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. 5000 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](http://www.mt.com)



## Application Literature

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](http://www.mt.com/ta-applications)
- ▶ [www.mt.com/titration\\_applications](http://www.mt.com/titration_applications)
- ▶ [www.mt.com/moisture](http://www.mt.com/moisture)

## 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](http://www.mt.com/pi-guides)
- ▶ [www.mt.com/pro-pharma-eBook](http://www.mt.com/pro-pharma-eBook)
- ▶ [www.mt.com/ind-cosmetics-productivity-guide](http://www.mt.com/ind-cosmetics-productivity-guide)

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- ▶ [www.mt.com/webinars](http://www.mt.com/webinars)

[www.mt.com](http://www.mt.com)

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