Lean Process Flow
with Optimized Automation and Control
Real Benefits for Each of Your Applications

Streamline your production line, improve equipment efficiency, increase functionality with no additional cost, reduce waste, no more trade-off between accuracy and throughput. These are your challenges... and ours as well.

We support you in every step of your production

Your Application

Page 4–9
Integration, communication, and control fully compliant with your industry’s specific requirements

Page 10
Tank weighing for raw material storage

Page 11
Tank weighing for temporary storage and/or material transfer

Your Benefits

Seamless integration of weighing solutions into your industry’s specific processes

We understand your business and offer you tailored solutions

Easy integration and process control with broad connectivity

Inventory Management
- Full transparency of stock material
- Accurate planning of stock material
- Minimized material waste
- Integration with ERP

Material Transfer
- Real-time stock data availability
- Avoiding material shortages
- Optimized material usage
- Reduced maintenance cost
Sequential or simultaneous addition of multiple raw materials by weight to produce a specified product

Gain-in-Weight applications

Checkweighing applications, integration of Product Inspection equipment and Weighbridges into the production line

**Processing**

Batching, Filling, Dispensing
- Increased productivity and yield
- Simultaneous material batching
- Automatic Material Transfer Control
- Minimized cross-contamination
- Minimized production costs

Filling
- High-speed of execution
- Maximized accuracy and throughput
- Automated tracking and tracing
- Minimized human intervention
- Minimized material waste

**Packaging**

Vehicle Solutions
- Highly accurate inventory management
- Minimal downtime thanks to predictive diagnostic and sturdy design

**Dispatch and Goods-out**

Feeding
- Highest accuracy
- Maximized productivity

Checkweighing/Product Inspection
- Highest throughput and accuracy
- Easy and quick product changeover
- Compliance with net content legislation
How do You Integrate Weighing into Your Process?

Getting the design and operational specifications right and selecting the proper equipment for your process are essential steps for success.

Easy-to-operate for End-users
Your brand is related to high-quality products. We help you deliver predictable and consistent quality in compliance with the latest regulations. No compromises on safety and productivity.

Easy-to-integrate for OEM / System Integrators / Engineering Companies
From equipment selection to installation, operation, and maintenance, we provide you with a competent consultation package. Our technical expertise and leading-edge weighing technology offer you state-of-the-art weighing solutions tailored to your processes.

Petrochemicals & Bulk Chemicals
Keep up with market demands by boosting production, reducing waste and maintaining continuous uptime in demanding environments (harsh, risk of explosion, extreme operating conditions).

Fine & Specialty Chemicals
Create value through differentiation. Innovation makes your products globally competitive and your company flourish. Your industry requires higher efficiency and lower costs.

Our Solutions
Weighing equipment with high functionality combined with rugged industrial design, high ingress protection and hazardous area approvals.

State-of-the-art technology that empowers you to develop high-performance and reliable processes. These are essential to achieve cost reduction and to increase your return on investment.
Pharmaceuticals & Biotechnology

Heavily regulated environments need special consideration! GMP and GAMP compliance set the pace of your process. Accuracy and hygiene are critical to quality.

Food & Beverage

Traceable automatic, semi-automatic and manual batching, dosing, filling and portioning in wet areas with HACCP requirements, while minimizing overfilling and complying with strict underfilling requirements.

Formulation software with reporting tools and central data management. High-resolution scales and platforms, monitoring features and service tools guarantee that you are delivering consistent high quality.

Accurate weighing equipment, developed strictly according to EHEDG, NSF and GMP guidelines. Statistical quality control solutions monitor quality, compliance, and costs.
We Understand Your Business and Offer You Tailored Solutions

A process weighing solution is ideally complemented with industry-specific knowledge. We are your reliable partner, understanding your needs and working with you to elaborate cost-effective and quality-compliant solutions, anywhere around the globe.

### Your Requirements

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<th>Safety</th>
<th>Compliance</th>
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<td>• Safety and attention to the environment are legally enforced</td>
<td>• Compliant/qualified equipment</td>
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<td>• Global/local approvals, e.g. ATEX, FM, UL, NEPSI, TIIS</td>
<td>• Optimal validated process</td>
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<td>• Seamless integration into the process</td>
<td>• Sterile or harsh environments</td>
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<td>• Same functionality and performance regardless the Zone/Div.</td>
<td>• Quality Assurance</td>
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<td>• Tracking and Tracing</td>
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**Uncompromised safety and performance**

- A comprehensive range of certified products
- Compliance to the most recent global and local regulations

**Minimization of the audit risk**

- Legal for trade solutions
- Design applying HACCP, EHEDG, NSF and GMP
- Equipment qualification tools
- Statistical Quality Control software
- Automatic data collection and reporting tools
Global Partnership
Ensures Your Success

Our global distribution, sales and service are nearby in Europe, the Americas and Asia. This ensures that you can receive support and services according to your needs everywhere around the globe.

Productivity
- Equipment functionality
- Production speed
- Adaptability to changes
- Reliability for maximized uptime
- Minimized costs and waste

Connectivity
- Real-time data availability
- Communication via multiple protocols
- Reliable connectivity in harsh environments

Service
- Lower out-of-specification product liability
- Reliable operation and managed maintenance expense
- Minimized maintenance downtime and costs
- Easy installation, calibration and qualification of equipment

Global partnership means:
- Application Consulting
- Quality and Compliance
- Customization Service
- Installation and Integration
- Uptime Assurance
- Global Export Service Support
- Calibration and Maintenance
- Global Parts Support

Efficient and reliable equipment
- Rugged stainless steel design
- High-speed filling and material transfer control
- High-speed data processing
- Multiple-speed capabilities
- Self-diagnostic and predictive maintenance

Flexible communication for easy control
- Broad connectivity using all major global protocols
- Direct control of valves and other discrete I/O devices
- Direct connectivity to PLC and PCs

Preventive/predictive maintenance and qualified installation
- Calibration specific to process, industry and regulatory requirements
- Minimum weight determination and certification
- Preventative and Predictive maintenance services
- Equipment installation, calibration and qualification

GMP
EHEDG
NSF
Easy Integration and Process Control with Broad Connectivity

Enterprise Level (Plant Network, Ethernet)

Production Management Level (Ethernet IP, Profinet)

Control Level (Profinet®, Allen-Bradley® RIO, ControlNet™, Modbus TCP)

Sensor Level (DeviceNet®)

Dedicated solutions for fast communication and real-time process control.

Weigh Modules, Load Cells, Platforms

State-of-the-art weighing technologies to meet most quality standards. Weighing ranges from few grams to several hundred tons.

IND110 Weight Transmitter

The IND110 provides an economical way to connect an analog strain gauge scale or weigh module via 4–20mA to process control equipment.

IND131 Process Transmitters

Ultra-fast A/D conversion and digital filtering with a compact footprint. A crisp OLED display makes configuration very convenient.
**Speed and flexibility in process control**

Choose between direct PLC or PC communication interfaces and/or digital I/O control for direct control of valves without the need of an additional PLC. The weighing terminal provides target/setpoint control. METTLER TOLEDO process terminals update weight measurement at the frequency of 366Hz and PLC and DIO updates of up to 50Hz. Your operations can be controlled faster and more reliably.

**IND331 Process Terminals**

Offer the same functionality of an IND131, but with an additional panel-mount display. The design allows for remote installation of the display, separated from the electronics.

**IND560 Process and Conveyor Terminal**

Dedicated software for process weighing, dosing, filling and in-motion weighing in conveyors.

**IND690 Application Terminal**

Controls up to 4 scales for formulation, dosing, filling, totalizing, classifying and counting. The IND690 can also be customized to fit any special requirements.

**IND780 High End Process Terminal**

Controls up to 4 scales with ultrafast A/D conversion and I/O update rate. Software packs for batching, formulation, vehicle weighing and customized applications.

Order your free catalog:

Lean Inventory Control
No More Than Needed to Get the Job Done!

Effective inventory control is vital for your business performance. Very often CEOs and CFOs believe that their companies carry 25 to 40 percent excess inventory. Weighing makes you lean!

An efficient inventory monitoring strategy utilizes the right hardware to ensure that the stocked materials such as solids, liquids, and gases are quantified accurately. This means reliable weighing, whether they are stored in tanks, big bags, or barrels. With our solutions, i.e. weigh modules and data transmitters combined to expert weighing systems, you are laying the foundation for an efficient inventory monitoring strategy.

> www.mt.com/weigh_modules

Weigh Modules

Convert any structure, tank, or conveyor into a robust and accurate scale. From 5kg up to 300 tons, for dynamic or static applications, in tension or in compression.

Also benefit from:
- Sturdy component design
- No cross-contamination
- Accurate measurement of material inside vessels with nonstandard shape or uneven accumulation

Accurate and reliable measurements also with:
- Slurries
- Gases
- Fluids with fluctuating density
- Aggressive chemical materials
- Foaming materials
Real-time data, speed, and flexibility for optimal inventory planning

Accurate measuring, flexible communications, real-time data transfer with PLCs and direct control of the system elements: each process requires dedicated solutions. The equipment needs to be rugged to withstand any industrial environment. Expectations from process equipment are therefore very high. The new IND131 and IND331 compact terminals bring unrivaled versatility and uncompromised speed and accuracy to the basic weighing applications in process control.

- Direct connectivity to PLC and DCS via all commonly used standard communication protocols.
- SD memory card for saving user configurations and ensuring fast restoration or duplication of settings on replacement terminals.

www.mt.com/ind131

IND131/331: Four versions, one family

The IND131 terminal unit is DIN rail mounted. The IND331 terminal consists of an IND131 unit and a detachable panel display with scale function keys.

The IND131 junction box scale terminal features an IND131 DIN unit and a load cell summing board mounted in a robust stainless steel IP69K-rated enclosure.

The IND331 terminal, desk or wall mounted, is housed in a stainless steel enclosure with an IP66 rating for harsh environments.

Accurate, reliable, and traceable results with the appropriate calibration method

Besides the traditional calibration method with independent zero and span calibration, step calibration uses a combination of certified weights and mass substitution. Additionally, METTLER TOLEDO offers CalFREE™. This is our electronic calibration method without test weights for large tanks or silos where the use of test weights is not practical.

www.mt.com/calfree

Tips and Tricks

Consult also our “Weigh Module Systems Handbook” to read more about tank weighing applications.

www.mt.com/ind-system-handbook
Your Formulation Task
Plug-and-Play or Freely Programmable

Every weighing task has its own special conditions and requires a specialist’s knowledge and experience. This is why experts in the industry and our development department have created the application-specific software pacs to configure the weighing terminal with total flexibility to your specific requirements.

**Fill-560**

With the Fill-560 application, the IND560 becomes capable of handling combinations of complex, multi-material filling and dosing sequences. Fill with one material or blend up to four materials in the weigh-in cycle. Dump the entire contents or dose out multiple times into containers. Any specific application can be easily configured and customized precisely to your needs.

- [www.mt.com/IND560fill](http://www.mt.com/IND560fill)
- [www.mt.com/IND560](http://www.mt.com/IND560)

**Fill-560 and FormWeigh.Net®**

The Fill-560 can work together with the FormWeigh.Net® Dispensing module for automatically dosing different components. The quantities are automatically dispensed and controlled by the recipe stored in FormWeigh.Net®. Automated and manual dosing can be easily combined for the highest accuracy, speed, and flexibility of your formulation processes.

- Expandable with more than 4 valves per IND560 and with several IND560-fill stations

**FormWeigh.Net®**

FormWeigh.Net® is a formulation system. It consists of a weighing terminal, weighing platforms, a barcode reader, and a printer. It allows for central data management and full traceable paper-free formulation for easy compliance with your quality assurance system.

Dispensing ingredients sequentially into, for example, a container on a platform and/or into a tank on weigh modules.
Batch-690
Fully automatic multi-component dispensing. The compact solution allows to store up to 50 formulas with up to 32 components each. Easy to install and user-friendly, it offers fast precision dispensing with the flexibility of accommodating to your changing needs.

www.mt.com/IND690

Batch-780
The new Batch-780 application pac is specifically designed to meet any process-based application maximizing productivity and minimizing operating costs. Batch-780 is capable of handling and controlling multi-scale batching and any combination of multi-material filling, manual formulation, blending, or dosing simultaneously on 4 scales without the need of an additional PLC.

www.mt.com/IND780

TaskExpert®: configure standard applications or develop your customized task.
TaskExpert® is the easy way to configure complex applications by graphical programming with function blocks. It also helps create databases to keep track of the batching operations and manage weighing measurements. TaskExpert® is compatible with the IND560 and IND780 weighing terminals.

www.mt.com/ind-taskexpert

Unique terminals for countless applications ... Yours!

Fill-690
Fast and reliable industrial dispensing of single components. Speed up your production line while avoiding wasting time and materials. Just specify the target and the IND690fill automatically switches from one component to another with extremely precise cut-offs.
Fast Batching at Minimal Rejection Rate

Multiple functions, self-diagnostic tools, digital filtering and real-time process control ensure that your batching processes deliver consistent quality – day-in, day-out – at the highest accuracy and without unexpected failure.

Self diagnostics for maximized uptime
The IND780 weighing terminal features a virtual embedded maintenance technician or TraxEMT™. TraxEMT™, together with POWERCELL® PDX technology or a RAAD box connected to analog load cells, allows the weighing terminal to monitor continuously the condition of each individual load cell and to predict failures before they occur. In the rare case of a failing load cell, the faulty load cell is virtually replaced. The production process can continue to function until the service technician is on-site to repair the faulty cell.

Total noise control filters out any difficult environment
TraxDSP™ Digital Signal Processing is a combination of multi-stage filters that clean out background noises and vibrations introduced by nearby machinery and/or the vessel agitation. Data are transferred at high speed while maintaining the same high degree of accuracy.
The manufacturing challenge: accuracy or throughput?

The Q.iMPACT’s answer: No trade-off between accuracy and throughput! Feed the exact amount of material in the shortest possible time… every time! By removing the slow-feed control step of the usual multi-speed control systems, Q.i™ provides significantly shorter material transfer time. Manufacturing throughput increases, precision of the material transfer cut-off improves dramatically while raw material waste is reduced. Q.i™ also minimizes design engineering, equipment maintenance, spare parts inventory and overall capital costs.

Q.iMPACT is the innovative material feed measurement and cut-off control system for batching, blending, filling, dosing or formulation processes. Q.i™ is a real-time, predictive, adaptive optimization of filling and batching processes. The algorithm builds a real-time mathematical model for each material transfer, learning and compensating automatically for natural process variations in every operation.

➤ www.mt.com/qi

The IND780Q.iMPACT controller works together with PLC or DCS systems. As many as 20 terminals can be clustered to control up to 198 measurements. Each IND780Q.i works simultaneously with up to 4 scales, load cell systems and flow meters.
Simpler Design – More Performance
for Feeding Bulk Solids

Loss in Weight Feeders are commonly used in continuous processes for accurately dispensing solids and liquids. Accuracy factors such as reproducibility, linearity, stability, and drift are maximized by using METTLER TOLEDO weigh modules.

Key requirements for bulk solids feeders
A characteristic of Loss in Weight Feeders is the cyclical change between controlled gravimetric dispensing and uncontrolled volumetric dispensing during refilling. Uncontrolled volumetric dispensing during the refilling cycle is as brief as possible to achieve accurate results.

Highest accuracy in the production
METTLER TOLEDO offers weigh modules with Mono-bloc technology for Loss in Weight Feeders. Their very high weighing capacity combined with the highest resolution and fast signal processing allows to meet the above mentioned requirements without compromise. These modules can typically carry larger feeders, hoppers and metering devices and still dispense with the same high-accuracy of lower range scales.

www.mt.com/apw

Loss in Weight Feeders:
Material stock in the hopper over time
WMH platforms allow for faster refill cycles and longer dispensing modes.
Fast, Accurate, Automatic with Maximum Protection

In a closed sterile environment, a meticulous series of automated checks and controls must assure total compliance for each step of the process. When handling potent harmful agents there is no room for mistakes. A failure can have dramatic consequences: unplanned shortfall of workers, costs increase, and, worst of all, lawsuits. Set up your process with best-in-class technology.

Born for automation
The high-speed high-precision WM weigh modules are the core elements for a reliable dispensing system. With a very fast update rate, the WM weigh modules are able to measure in the milligram range in a fraction of a second. These sensors are able to communicate with PLCs for the extremely fast and accurate control of the dosing valve.

Totally Integrated Automation
The WM and WMH products can be directly connected to a Siemens PLC for a variety of automated applications. This solution is jointly certified from Siemens Weighing and Batch ing System and METTLER TOLEDO under “Totally Integrated Automation”.

Formulation of cytostatic medication in vials, syringes and bags by Cytocare; the totally automated robot developed by the Loccioni Group.
Performance and Productivity in Classified Areas

Intrinsically safe design, high-speed process control and internal active/active valve controllers set the benchmark for weighing and control in potentially explosive areas.

Face any challenge in classified areas
The IND560x combines performance and high functionality into the Zone 1/21 and Div. 1 classified areas. Many direct PLC and PC communication interfaces and digital I/O make controlling most processes in hazardous areas practical.

Easy data transfer: ACM500 communication module
- High volume data transfer with an ultra-fast communication rate of up to 115 kbaud.
- Connect to multiple devices using 3 different protocols simultaneously: PLC, Ethernet TCP/IP, and serial.

www.mt.com/ind560x
Would your plant pass an inspection by your local authorities?
A certain number of analyses must be carried out and the results properly documented. Don’t wait until you have a surprise during an inspection or even worse dramatic consequences after an accident. Address the hazardous area risk proactively in your facility at:
▶ www.mt.com/ind-hazrisk

How do you know your plant complies with the regulations?
Join our online webinars free of charge, namely ‘Hazardous – The Basics’ and ‘Hazardous – Advanced’, and learn more about the applicable regulations in your country, the mechanisms of explosion protection and the technologies available. Please log onto:
▶ www.mt.com/webinars

Know-how
METTLER TOLEDO has been providing intrinsically safe weighing equipment for over 20 years. Find the full solution portfolio in our hazardous catalog as well as case studies and application stories in our competence brochure.

Order your free catalog:
▶ www.mt.com/ind-hazcat
▶ www.mt.com/ind-hazbrochure
Obtain Significant Revenues with High Precision Weighing

Fast update rates and multiple speed capabilities allow for precise cut-offs. This way, filling regulations are fully matched and over-filling is minimized. Waste and associated costs are drastically reduced. Our weighing terminals provide control over quality, compliance and costs.

Filling application by weighing on a platform

No need for a PLC: the IND560 provides direct control of the filling valve at high speed until the final target is reached precisely. This is how costly overfilling is minimized and the whole system works faster, more efficiently, with a higher degree of flexibility. Plus, the investment costs related to installation and wiring are drastically reduced. Finally, the system easily complies with the regulation for automatic gravimetric filling instruments according to MID (EC directive 2004/22/EC) and the related OIML Recommendation R61-1.
**Filling application by weighing on the weigh cell**
The IND780 controls up to 4 filling devices simultaneously. High-speed filling, fast update rates and multiple speed capabilities ensure that the target weights are achieved quickly and accurately. The digital I/O allows for direct valve control for highly precise cut-offs while the PLC takes command of the operation’s sequence and start-up.

**Checkweighing application to adjust filling heads for filling operations**
The direct connectivity to PLC and PC makes this platform unique. The PLC gives feedback to the two filling valves to adjust their opening and closing time and target the final weight with extremely high speed and accuracy.
Correctly Checked Dispatch Quantities
Protects your Company’s Reputation

Integrate scales or load cells into your conveyor systems to ensure transparent and cost-effective production, accurate classification and dispatch procedures.

Scales controller for reliable in-motion weighing

The IND560dyn controller provides a robust and reliable interface to conveyor scales for in-motion weighing. Items can be weighed at speeds up to 100m per minute. Exceptional performance even in tough applications.

Enhanced checkweighing and classification control

The user-friendly IND690-control software pac optimises your production flow with fully automatic weighing. The Control-690 pac adds efficiency, automation, and accuracy to the industrial conveyor systems for goods-in, production, and dispatch. Connectable to up to 4 scales for measuring ranges from milligrams to tons.

Product inspection maximizes quality and safety with leading-edge technology

Consult our authoritative guides and technical papers about the full range of solutions for your automated product inspection and select the right solution for your process.

> www.mt.com/pi-guides
Productivity in Vehicle Weighing
Enhances your Profits

Quickly and reliably control your inbound and outbound vehicle traffic while ensuring accuracy for compliance with the law and minimizing goods give-away.

Keep vehicle traffic moving over your scales

OverDrive™ is designed to fully control inbound/outbound vehicle transactions at your facility. An RFID interface allows for quick identification at the entry or exit gate. OverDrive™ logs each transaction in a detailed database, providing you with a wealth of information for administration, billing, inventory control and compliance.

Speed up filling and eliminate product give-away

Turn your vehicle scale into a stand alone, high-accuracy filling system. After the vehicle stops on the weighbridge, a weight target is selected from storage tables. The terminal tares the scale, manages the material delivery system, fills the vehicle and logs all relevant data for the transaction. Easy integration into higher level systems makes this information available for further processing.

Unequaled durability and performance

- No more junction box wiring: the POWERCELL® PDX load cells are networked in series. This minimizes wiring, simplifies installation and reduces investment.
- Proven lightning protection: the StrikeShield™ system prevents costly downtime by safeguarding the entire scale network: cells, cables, and terminals.
- Built-in predictive diagnostics: self-monitoring capability enables proactive service and alert to potential problems.

www.mt.com/powercell
www.mt.com/powercellpdx

The POWERCELL® PDX sets new standards in vehicle weighing.
**Process Performance**

when Service is Precise

Obtaining your expected short and long-term results also depends on precise installation, setup, calibration, and maintenance: equipment and service together deliver performance, reliability, security, and longevity.

We have designed weighing solutions for efficient service and will tailor and schedule our services to your process, production, and business needs. We help you obtain and sustain accurate, dependable, legal, and accountable weighing results.

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<td>Consultation</td>
<td>• Correct equipment selection to meet process weighing needs</td>
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<td>• Application consulting ensures production meets specification</td>
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<td></td>
<td>• Recommendations to ensure compliance with regulations</td>
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<tr>
<td>Installation &amp; Setup</td>
<td>• Proper installation for accurate, repeatable weighing results</td>
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<td>• Functions configured to meet process requirements</td>
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<td>• Installation that meets local regulatory requirements</td>
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<td></td>
<td>• Interfaces to other systems configured and tested for reliability</td>
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<td>• Ensures precise, efficient, and on-time process start-up</td>
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<td>Equipment Qualification</td>
<td>• Documents that performance meets process requirements</td>
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<td>• Provides procedures for periodic testing in production</td>
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<td>• Reduces the risk of non-compliance with regulations</td>
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<td>Calibration</td>
<td>• Concise and regulatory-compliant calibration certificates</td>
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<td>• Digital certificate archival for trustworthy audit retrieval</td>
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<td>• Application of industry and regulatory tolerance standards</td>
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<td>• Reduces product give-away and/or over-charges</td>
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<td>• Improves production quality and inventory accounting accuracy</td>
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<td>• Lower out-of-specification product liability</td>
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<td>Preventative Maintenance</td>
<td>• Checks critical components to identify &amp; eliminate potential failure</td>
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<td>• Examines audit and error logs to avoid unexpected downtime</td>
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<td>• Tests operation for weighing and application performance</td>
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<td>• Ensures reliable operation and avoids unexpected expenditures</td>
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<td>• Increases the longevity of equipment and your return on investment</td>
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www.mt.com/ind-process-weighing