Plastics

Guide to Industrial Weighing

For the Plastics Industry

METTLER TOLEDO

Optimized Weighing Solutions
More Productivity and Quality Control

Material Receiving

Ensure your suppliers meet your specifications. Verify the amount of incoming goods quickly and accurately with floor and bench scales. Feed the information into your resource planning or warehouse-management system.

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Quality Control & Product Development

Quality control, failure analysis and new product development require reliable and powerful analytical instruments. Determining water content of polymers and resins is a key application. Karl Fischer titrators determine water contents down to 1ppm.

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Warehousing and Order-Picking

Counting solutions keep track of stock movements, ensure flawless goods storage and help avoid out-of-stock situations through direct integration into ERP systems. For correct order-picking, high-resolution bench scales ensure correct kits or packages for the smallest parts under time pressure.

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Data Collection and Integration

Yield Analysis

Data collection starts at the receiving department. With easy-to-integrate weighing devices, you can keep track of the material flow in your factory. With weighing devices at key points in your value chain, you can the follow your products easily from incoming goods through warehousing to production and packaging.

Collect warehouse data when commissioning and order-picking with scales for reduced inventories and a lean warehouse.

In the plastics parts and components industry, every piece counts for your profit. Weighing solutions help you achieve process reliability and traceability while improving productivity. Save time and money with speedy processes and better quality control. METTLER TOLEDO provides complete weighing and measuring solutions and services.

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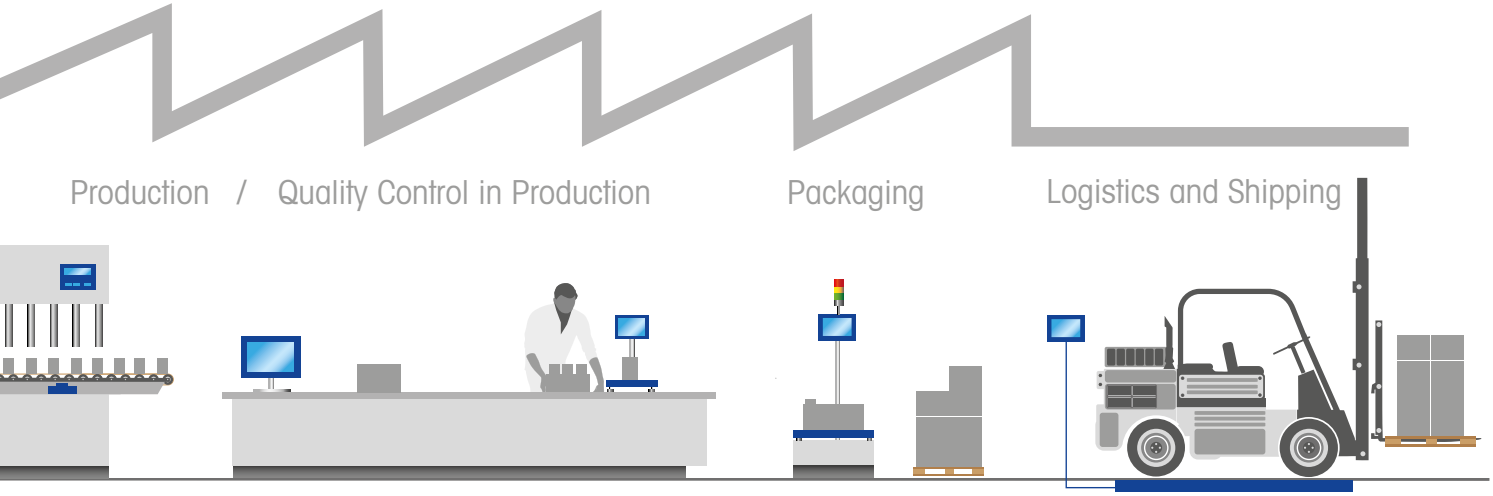

Production

Process automation and fast user guidance in manual processes are essential to increase production efficiency and consistency. Verify your plastics production with weighing platforms and counting scales.

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Collect the weighing data to achieve a comprehensive yield analysis. Simply visualize output or calculate daily production quantities.

At-line Quality Checks

Process reliability is indispensable for high-quality products and to ensure customer satisfaction. Damaged or incomplete products are discovered through manual over/under checkweighing or integrated high-precision weighing modules in production machines.

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Keep track of your quality data. Check the ratio of in- and out-of-spec products for better quality insights.

Packaging

Make sure you pack the correct amount of parts and ensure correct packaging and labeling. Counting scales ensure correct packaging and labeling. Create labels from simple printouts to automotive industry compliant labels and complete customized versions.

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Identify the packages leaving your factory. Keep weighing data for audits or faster reactions in case of recalls. Review efficiency of your production process and check final products vs. material input.

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Logistics & Shipping

Prior to shipping, orders must be complete, on time and properly documented for tracking and tracing. METTLER TOLEDO weighing and labeling solutions make sure you pay the right transportation fees, meet freight regulations and fulfill your customers' requirements.

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Material Receiving

Ensure your suppliers meet your specifications. Verify the amount of incoming goods quickly and accurately with floor and bench scales. Make sure you are not receiving fewer parts than expected. Verify raw materials or break shipments accurately for warehousing and production. Feed the information into your resource planning or warehouse-management system.

Fast and flexible verification of incoming goods
Check completeness of incoming goods with rugged bench, floor or pallet scales. Count parts of all sizes or volumes with bench and floor scales. Verify bulk, small lightweight parts with two-scale counting solutions. Monitor fill levels of tanks and bins. Start data acquisition right at this point. Send the data from your weighing station directly into your MES or ERP or use barcode scanners to identify parts and components. Weigh your incoming material and create labels. Scan the label and enter data into your systems. This enables you to follow your material flow from raw material to final product. Mobile weighing solutions and scales mounted on carts make weighing in receiving departments fast and flexible.

Check incoming bulk deliveries for completeness.

Measure accurate quantities for shipment and create labels for production with counting scales.

Verify tank and bin levels with weigh modules.

Quality Control & Product Development

Quality control, failure analysis and new product development require reliable and powerful analytical instruments. Determining water content of polymers and resins is a key application. Karl Fischer titrators determine water contents down to 1ppm. Exact analyses are crucial for long-term market success.

Moisture determination
Moisture plays a crucial role in many manufacturing processes. For example, polymer granules for injection molding should not exceed the permissible water level to avoid processing problems, poor surface quality or reduced mechanical properties of the molded parts. Karl Fischer titration is the standard method for the specific water-content determination. It provides accurate and precise results within minutes. The coulometric technique applies from 1 ppm to 5 percent. The volumetric technique is designed for a range of 100 ppm to 100 percent.

Thermal analysis at its best
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.

Thermal analysis and moisture determination are essential for quality of plastics products.

Warehousing and Order-Picking

Counting solutions keep track of stock movements, ensure flawless goods storage and help avoid out-of-stock situations through direct integration into ERP systems. For correct order-picking, high-resolution bench scales ensure correct kits or packages for the smallest parts under time pressure. Mobile set-ups facilitate and speed up operations in big warehouses.

Error free and fast picking
Achieve error-free order picking all of the time. Sort samples of more than one component, compile materials for an assembly or gather products ordered by customers, according to a pick list. Speed up the picking procedure with a compact scale, while eliminating missing parts and customer complaints. METTLER TOLEDO MonoBloc technology delivers accurate results with even the lightest parts. Smart display functions and user profiles facilitate error-free handling and fast operation.

Remote inventory
Benefit from efficient and transparent stock control with integrated smart-shelf weighing systems.The quantity of every bin is checked remotely, giving you full stock control, accountability and the opportunity to optimize your supply chain.Smart shelves in a warehouse.

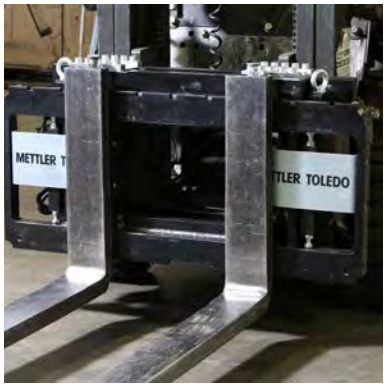
Count the smallest parts accurately for order-picking.


Smart shelves in a warehouse.

Mobile weighing

Often weighing workstations are situated on one end of the warehouse and products are spread across the corridors. That causes warehouse workers to walk long distances between shelves, transporting goods to and from the workstations. That transportation time does not benefit business. Mobile weighing solutions offer time-saving flexibility to make your production lean. With those, even counting and checkweighing many different articles is no longer a time-consuming task.

Use a palette truck scale to move and checkweigh goods at the same time.



Weight and load or unload simultaneously with robust forklift scales.

Tips and Tricks

Calibration Intervalls

The interval of calibration depends on how critical the weighing process is in your production. Manufacturers have to define how much monetary loss or reputational damage would be caused if piece counts are inaccurate. The interval can differ from daily calibration schedules to a calibration every couple of months or once a year. Except when manufacturing plastic parts for the automotive industry. That industry has higher requirements regarding calibration than others. To be on the safe side in any plastics segment, request an individual consultation by our Good Weighing Practice™ (GWP®) team. This unique risk-based service provides you with all the information and guidance needed to support your equipment's accuracy over time.

www.mt.com/gwp

Production

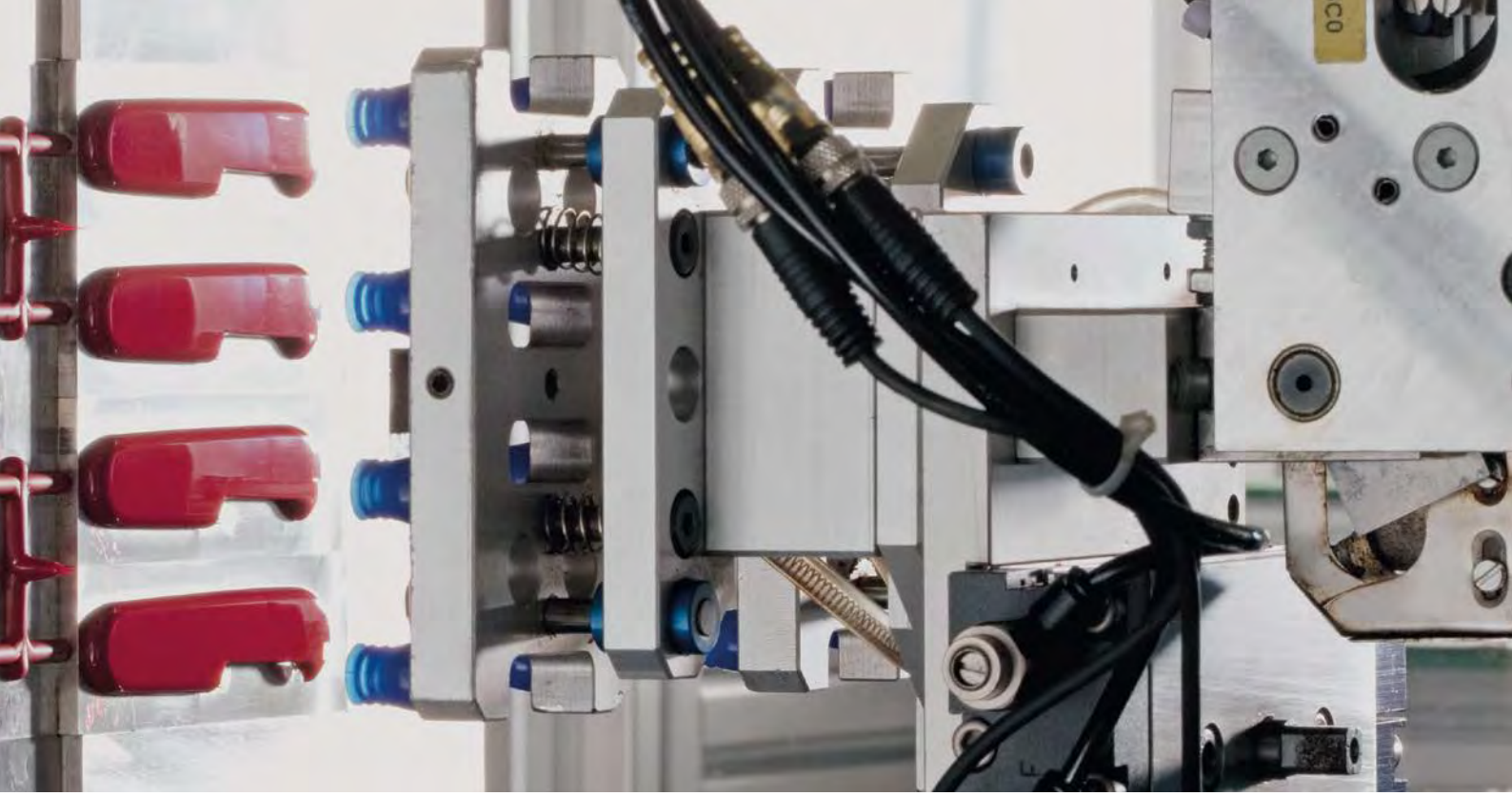
Process automation and fast user guidance in manual processes are essential to increase production efficiency and consistency. Verify your plastics production with weighing platforms and counting scales.

Counting workstations
When manufacturing on a contract basis, any extra piece that is produced adds up to additional costs. Often, inaccurate counts of molding or extrusion machines cause problems. Production managers need to know when to start or stop production. Miscounting high-tech plastic parts can be costly. Check production quantities with counting scales. Verify output quickly and securely. Take your parts to a counting station for weighing, data gathering and correct labeling.

Mobile solutions
Battery-powered scales can be placed on trolleys or other devices to make operator movement more efficient. It helps to reduce walking time significantly when production is spread out or the counting equipment is not used at the same place every day. Data transfer is done wirelessly or via USB stick.

Counting station on shop floor, barcode scanner to start an operation and to load article data and package counts and a printer to supply labels for identification and transportation.


ICS counting on trolley.



Semi-Automated counting solutions

This solution features the benefits of an automated production with the low cost of a manual installation. Simply place the scale next to your injection molding machine/stamping press or connect a conveyor belt. Install one or more weighing platforms at the end of this process and place boxes or bins on top. The weighing platform(s) have to be connected to a counting terminal. Determine the total weight or piece count of a correctly filled box of a certain product and save it in the scale's database. Use it to fill shipping boxes with products until the preset total weight is reached. The scale then indicates when the operator can remove the package, attach a label and ship.

Scale terminal controls alarm light and material flow.

Tips and Tricks

Piece-Weight Variation

Piece-weight deviation is one of the most frequent sources of counting errors. Piece weights can differ due to the use of different machines, tool wear, raw material inconsistencies or changing environmental conditions. If parts have a high deviation of more than 1 percent, the counting error can be cut in half by increasing the number of reference (sample) parts for example from 10 to 30 pieces. ICS scales offer the Average Piece Weight optimization function that lets you take bigger reference with as little counting as possible. That greatly reduces human errors in reference taking and makes weighing parts much more accurate due to increasing sample numbers.

www.mt.com/counting-brochure

At-line Quality Checks

Process reliability is indispensable for high-quality products and to ensure customer satisfaction. Damaged or incomplete products are discovered through manual over/under checkweighing or integrated high-precision weighing modules in production machines.

Checking completeness of shipping boxes and kits
If you want to make sure that your packages are packed with enough product, scales offer a practical and fail-safe method to check completeness. This especially counts when producing kits with small quantities of light-weight items. You can do this right in production in a dedicated packaging area or with a mobile solution. You can either check prefilled packages or fill packages assisted by a scale (for more details see Packaging chapter). Operators can either manually make sure a package contains the right amount, or they can use the colorWeight® backlight display, which clearly shows if a package is filled correctly.

Quality control of parts and assemblies by checkweighing
Single parts or pieces and complete assemblies consisting of different parts and components can also be checked for quality by weighing. The gravimetrical method is faster, reliable and less costly than common tactile or optical systems. Missing or redundant parts can be detected. That makes this step an important key point in quality checks, which leads to fewer recalls or customer complaints. This secures your reputation and brand integrity.

Semi-Automated Quality Checks
Assemblies, final products and plastic cables can also be verified semi-automatically. Placed on a conveyor belt, the pieces pass a weighing station, and depending on preset tolerances, the work piece is either sorted out or is placed in a shipping container or


Check kits fail-safe.


Verify completeness of assemblies.


Way raw material for production.

box. An example procedure begins by scanning the article barcode to download target weight and tolerances and starting the conveyor belt. It is very simple and easy to use and does not require any operator activity during checkweighing processes, as the products are sorted automatically.

In-Line solutions

In-line solutions offer quality checks for high throughput rates. In a split second, a weighing platform weigh module can detect violations of weight tolerance in an automated process. This high measurement speed enables 100 percent inspection at without any losses in time. Furthermore, lighting and positioning of the part doesn't matter; this method is suitable for complex shapes, packages and kits, hidden structures, material inconsistency as well as transparent or reflective materials.

Tips and Tricks

Control Production Devices with Scale Terminals

You can control the material flow with a scale terminal. Connect a conveyor belt or pusher via the terminal's digital I/O interface. Digital I/O is an optional scale interface that generates signals (outputs, 12V DC) to control external light alarms or pushers. In total, there are four output signals, which can be used to send digital information from the scale to a PLC. Stop or redirect production when the preset filling target is reached or checkweighing is in or out of the predefined tolerance. To notify operators, attach a light or sound an alarm to the terminal.

www.mt.com/ind-in-process-counting


Start operation with scan.


Belt feeds package onto scale.


In-line checks with weighing platform.

Packaging

Make sure you pack the correct amount of parts and ensure correct packaging and labeling. Counting scales ensure correct packaging and labeling. Create labels from simple printouts to automotive industry compliant labels and complete customized versions.

Packaging of bulk plastic parts
No matter if you package right after production at the molding or extrusion machines or in a dedicated packaging area. Scales are especially suitable to assist in packaging of plastic parts of all sizes and dimensions. Piece-counting is a smart solution for accurate filling of packages with bulk material. Simply define the weight of the piece to be filled and start filling until the preset target number is reached. The scale automatically counts the number of pieces currently boxed and the colorWeight® backlight display indicates if the target package weight is reached. You can fill thousands of small parts accurately in little time with this fast, easy-to-use and error-free solution. This can be done manually or with an automated processs with less operator involvement.


Fill and label packages scale assisted.


Checkweigh pre-filled packages for completeness.

Packaging with quality checks: Totalizing

In another variant, you can check if product packages or kits are intact while packaging. This two-in-one solution secures product integrity and accurate packaging at the same time. This is suitable for both product packages of assemblies, kits or loose parts. Position a scale under the shipping box. Preset the weight of the product packages and tolerances. Place packages in the shipping box and the scale will start checkweighing or checkcounting. The colorWeight® indicator will indicate if a product package is within predefined parameters and no parts are missing. If so, the scale will automatically zero and the operator can continue filling.

Tips and Tricks

Select the Right scale

Using the right weighing equipment for your processes is important for product quality. Using the wrong weighing equipment can lead to poor quality, wrong counts, product defects and rework. This results in significant monetary loss over time. Scales have to fit your application, tolerances and work environment. A free GWP® Recommendation will tell you which balance or scale will give you the best results based on METTLER TOLEDO's unparalleled accuracy and your specific parts. A METTLER TOLEDO Recommendation combines actual device production data and science to accurately match your needs to the right balance or scale.

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Totalizing function allows checks product completeness and package filling at the same time.

Logistics & Shipping

Prior to shipping, orders must be complete, on time and properly documented for tracking and tracing. METTLER TOLEDO weighing and labeling solutions make sure you pay the right transportation fees, meet freight regulations such as SOLAS, and fulfill your customers' requirements.

Printing options for labeling and packaging
Make your packages and products traceable. Document every weighing operation and create labels or printouts right away, eliminating error-prone handwritten notes. With scales, use predefined printing templates or define your own user-specific ones in different formats, such as labels, strips, forms, pictures and barcodes. Incorporate different components as needed, including article numbers, date, time or a customer logo. A broad range of METTLER TOLEDO standard printers and third-party printers can be used.

Customized printouts and labels
For printing barcodes, company logos or a specific customized layout, you can use METTLER TOLEDO DatabICS software. You can customize printout templates to meet your requirements and to comply with industrial standards or local regulations. Include barcodes, such as Code 128, EAN-13, UPC or others, as well as pictures or company logos in standard image formats.

Automotive industry labels
Suppliers to the automotive industry may have to fulfill label standards from Automotive Industry Action Group (AIAG), Organization for Data exchange by Tele Transmission (ODETTE) in Europe or other standards. The METTLER TOLEDO Print Design service supports many standard label formats.

Transport cargo and define shipping weight
Material handling in the shipping department is often under time pressure. Time-critical cargo is shipped around the globe. Weighing becomes increasingly important in this process, either to determine freight costs for outgoing goods or to comply with safety regulations such as SOLAS in sea freight.

METTLER TOLEDO offers and extensive portfolio for warehouse solutions. Verify heavy consignments or complete palettes on floor scales or palette truck scales. Transport cargo to the loading dock and gather weighing data at the same time with forklift scales. For small shipments, use the BBA231 basic bench scale.

Attach a printer to a scale terminal and print on the spot.

Floor and pallet scales for verifying bulk quantities.

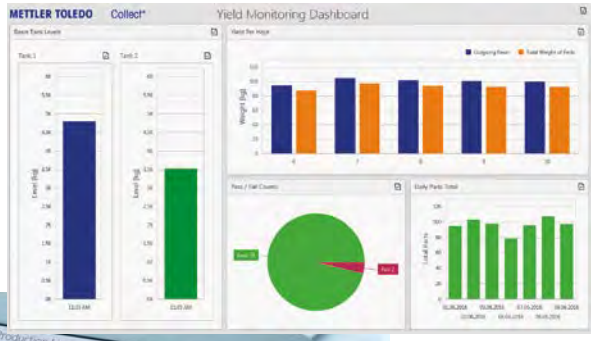
Process Supervision and
Yield Analysis with Weighing Data

Weighing data is produced with every weighing operation. Weight, date, time, operator etc. is stored in the scales memory and can be retrieved via WLEN, Ethernet or USB. Scale-management software such as DatabICS helps to manage the articles on the scale and facilitates simple data retrieval and storage.

Weighing data can be used to analyze production processes, to comply with audits and secure evidence in terms of customer complaints.

Make valuable use of your production data. Machines on the shop floor constantly provide data and you can use it to gain a competitive advantage. CollectPlus™ is data-collection software that captures production weight and process data from every scale on your shop floor. Watch variations in your weighing or counting processes in real-time. Monitor operator performance, count the ratio of correct and out-of-specification packages and even predict production output.

Take immediate action if operator efficiency drops and monitor the results right away. Put the information you need into an easy-to-understand template and follow your plastics parts production from resin bins or tanks to the final product.



An easy-to-understand yield analysis for SME companies. Follow production from incoming goods to packaging.

Get better insights into your production with an easy- to-follow layout and 30-second refresh rate.

Global Services

Optimize Operational Efficiency

Our service offering includes an extensive range of services to help you preserve the value of your investment. The primary aim of our Service Network is to meet the needs of global customers worldwide, giving the same high level of service quality regardless of location.

Comprehensive service agreements

A comprehensive service agreement is tailored to your operational requirements. It includes preventative maintenance, parts, labor, travel and guaranteed response time for repairs. This is your most cost-effective assurance against downtime, low-quality results and unbudgeted expense.

Customer-specific requirements

METTLER TOLEDO is familiar with local needs and specific customer requirements. This includes needs for local spare parts stock, special service reports, technical training, failure analysis, product upgrades and interaction with system integrators.

Repair services

METTLER TOLEDO is your single source for maintenance and repair of dimensioning, weighing and scanning equipment. In case of breakdown, we will provide services and parts in a cost-effective manner to get you up and running as quickly as possible.

▸ **www.mt.com/service**

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