



Zero Errors for Automated Manufacturing

METTLER TOLEDO



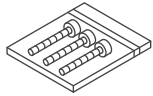
1 Easy to apply quality control method ...

2 ... for parts, kits and modules

3 ... if simplicity

4 ... high throughput

5 ... ISO9001 and TS16949 matter



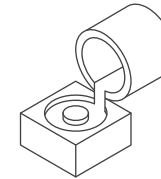
Repair / Mounting Kits

Check completeness of content in tool boxes, repair or mounting kits.



Modules and Devices

Control for the completeness of gears or entire machines, including oil level.



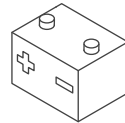
Metal-casted parts

Verify integrity and material density of light metal die-cast or sand-cast parts.



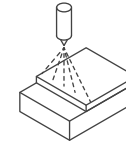
Plastic molded parts

Check the integrity and material density of parts, including presence of encased elements.



Car Batteries

Control for completeness to determine if all parts are included and if fluid level is right.



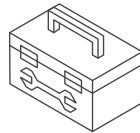
Surface Treatment

Non-destructive quality control for material abrasion- or coating processes.



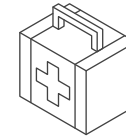
Material Characterization

Density determination and completeness control for sinter metal parts.



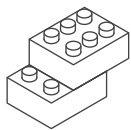
Tool Boxes

Check to determine if all tools are inside the closed and sealed box.



Medial Equipment

Completeness control for single use medical devices, operation or emergency kits.



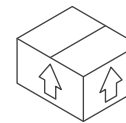
Toy Kits

Check toy kits to ensure that all parts, including instructions, are included.



Ball Bearing and Shafts

Reliable verification to ensure the amount components and lubricant is correct.



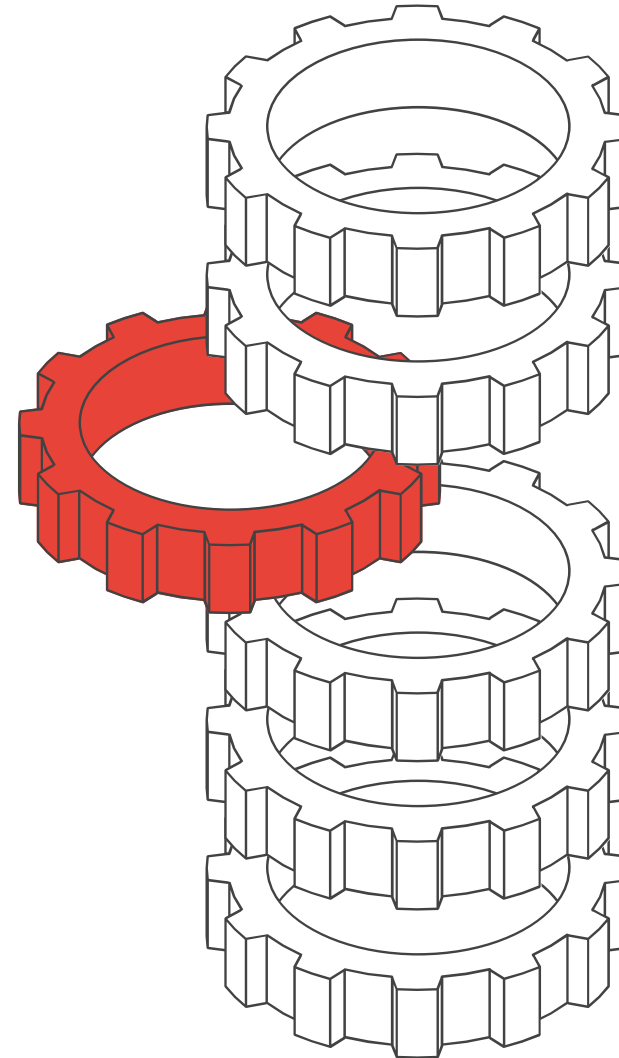
Shipments for e-Business

Completeness control before shipping of consumer goods in e-business.

The basis for zero-errors manufacturing is sustainable products, adequate processes and educated staff.

Nevertheless, in-production quality-control is still needed to eliminate defective products before they reach the next manufacturing step – or even worse, before they reach the customer.

Modern quality-control keeps pace with the manufacturing process in order to enable high throughput. In addition, it is flexible to allow fast format change-over for new products, and it is compliant with quality control standards such as ISO9001:2015 and ISO/TS16949. Finally, it is economical, because return-on-investment cycles become shorter.



Dedicated weighing devices offer a fast and simple in-process quality control method. They are suitable for detecting the smallest deviations of 1 ppm (one point in one million) in a fraction of a second.

The technology does not require part-specific software, nor does it depend on any particular light condition. It works perfectly, even in complete darkness, and reflecting surfaces do not matter. There is no need for holding the product in a defined position. Cavities inside the product can be reliably detected just by weighing.

Dedicated weigh modules are also mechanically and electrically easy to integrate into machines and their data-processing systems. As a result, weighing is an easy-to-apply yet also very reliable quality control method.



Weigh modules for easy integration into machines and instruments allow automated high-precision weighing.

Dynamic conveyor scales provide reliable quality control with highest throughput for mass production.



Static scales are ideal for manual quality control for small series of parts, kits or modules. METTLER TOLEDO colorWeight® provides comfort and enhances efficiency for the operator.

The colorWeight® display indicates at a glance if a weight is below, within or above the target weighing tolerance set by operator. The scale has a product memory to store data for a large number of products.

colorWeight® saves time and money with the smart colored display, making completeness, density or integrity checks simple, fast and less error-prone.

colorWeight®



Below Tolerance

The scale display is yellow because the weight is almost out of tolerance, but the product is still acceptable. This intermediate step is not mandatory.

Within Tolerance

The scale display is green because the weight is within the tolerance set by operator. The product quality is good.



Above Tolerance

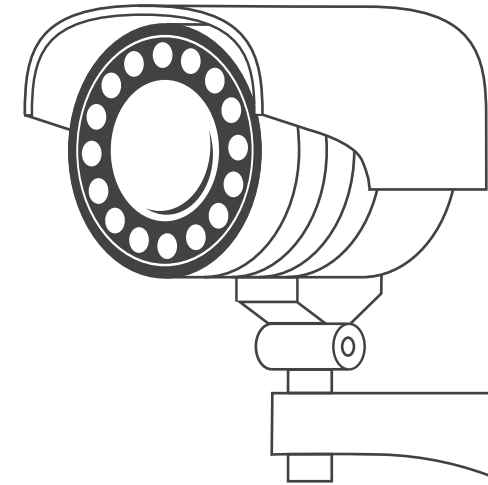
The scale display is red because the weight is outside the tolerance set by operator. The product is bad or needs correction.



Vision systems and similar non-contact solutions for quality control can be very precise and fast. However, successful application is often time-consuming and sometimes requires costly feasibility tests.

Poor light conditions and reflecting or transparent products can make visual quality control a challenge. Verification of a product inside a package is impossible unless X-ray technology is used.

Visual verification of complex three-dimensional products often requires more than one camera. Individual assembly kit parts that are piled on top of each other are difficult to identify with a vision system. Hidden cavities inside the product cannot be detected at all.

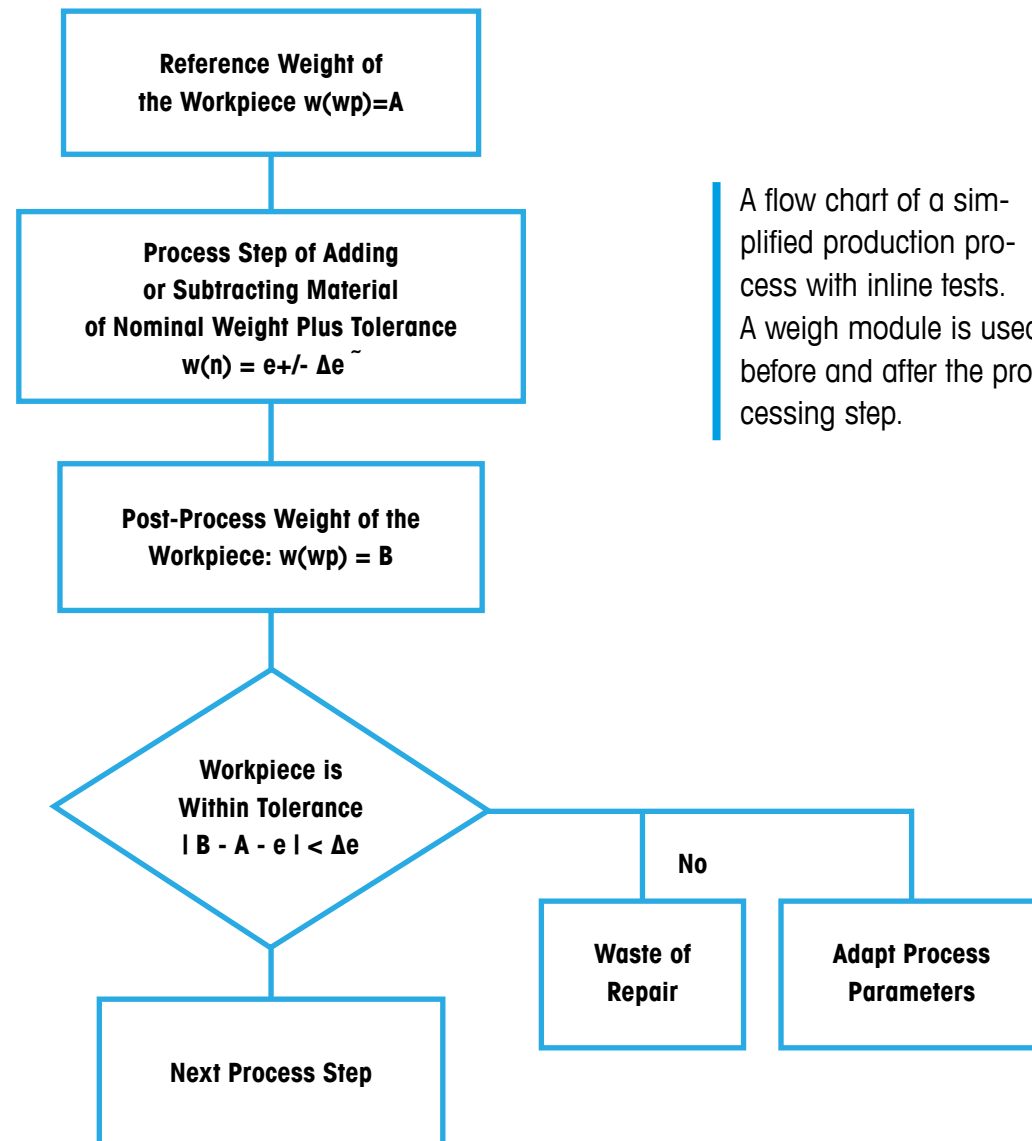


- | | |
|-------------------|---------------------|
| Poor Light? | Calibration? |
| Cavities Inside? | Traceability? |
| Inside Packaging? | Invisible Sections? |
| Piled Products? | Three Dimensions? |

Calibration and traceability including documentation can be a challenge for vision-based quality control methods. Because the kilogram is one of the seven SI (International System of Units) base units, weighing makes calibration, traceability and documentation easy when complying with ISO9001 or TS16949. Most modern weigh modules have even incorporated calibration weights to test their functionality and accuracy whenever necessary.



Weighing is an inexpensive and easy-to-apply method for in-process and end-of-line quality control. It allows high throughput to support error-free automated manufacturing. In a fraction of a second, a weigh module can detect violations of weight tolerance as small as 1ppm in an automated process. Lighting and positioning of the part does not matter, making this method suitable for complex shapes, hidden structures and material inconsistency as well as transparent or reflective materials. Modern weigh modules, designed for automation, are very compact and rugged. They can be easily integrated into machines and instruments. There is no need for expensive software or special product engineering.



Watch webinar about weight based quality control:

▶ www.mt.com/ind-wbqc-webinar

Watch videos about weight based quality control:

▶ www.mt.com/ind-wbqc-video

See weighing technology made for automation:

▶ www.mt.com/apw

See applications for in-process-quality-control:

▶ www.mt.com/ind-in-process-qc

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Subject to technical changes

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