



Handling Out-of-Tolerance Equipment

Your test and measurement equipment comes back as being found out-of-tolerance (OOT). What do you do next? This is not well defined in the standards; they only tell you to “take the necessary corrective action.”ⁱ ISO 9001:2008, 7.6 states “In addition, the organization shall assess and record the validity of the previous measuring results when the equipment is found not to conform to requirements. The organization shall take appropriate action on the equipment and any product affected.”ⁱⁱ You now need a procedure to adequately evaluate these results for impact on your product or operations.

Many companies have procedures for recalling suspect product; this is not a pleasant procedure and should not be the first step taken when a piece of inspection, measurement and test equipment (IMTE) has been found out-of-tolerance. Use the list below to see if the suspect IMTE could have contributed to bad product before launching more drastic actions. You can eliminate or mitigate the concern by answering these questions:

- ❖ Was the condition the result of a catastrophic failure of the IMTE (blown power supply or fuse, broken needle, over-ranged, inoperable, etc.) and was immediately removed from service for a calibration or repair?
- ❖ In what areas and on which products was the IMTE used?
- ❖ What measurements were made with this equipment? Your inspection plans are a good place to start. Was the IMTE used in determining product quality or other important criteria?
- ❖ What parameters or ranges were determined to be OOT on the IMTE?
- ❖ Was the OOT condition used on the measurements? Much of today's equipment has multiple ranges and functions, many of which are never used in daily operations.
- ❖ If it was, what was the OOT condition relative to the accuracy needed? Many people use IMTE that is many times more accurate than they need (i.e. a micrometer is out by 0.001 inch; the most critical measurement made is to ± 0.010 inch).
- ❖ Are suspect parameters measuring something that is checked later by either poke-yoke methods (i.e. did the parts fit together) or by final inspection?
- ❖ Is there data within your system (periodic equipment checks, SPC, etc.) that would indicate when the problem may have occurred which would reduce the time needed to investigate?

Avoiding OOT Equipment

There are various methods to reduce the occurrence of OOT equipment or the magnitude of the impact on your organization. These include:

- ❖ Reducing the calibration interval or cycle to avoid excess drift of the equipment.ⁱⁱⁱ
- ❖ Sensitizing all users to check dropped or suspect equipment.
- ❖ Using periodic checks between calibrations to monitor proper operation of the equipment (i.e. micrometer w/ a gage block, meter w/ a resistor, thermometer w/ an ice bath, etc.).
- ❖ Replacing equipment with newer, more stable or simpler equipment less susceptible to damage.
- ❖ Replacing portable equipment with benchtop versions (dial indicator rather than a micrometer) so that equipment handling can be reduced as a cause of OOT equipment.
- ❖ Obtaining better training on the use of instruments if operator errors are causing equipment malfunctions.
- ❖ Changes to the storage, workspace, flooring or other work areas to reduce the likelihood of equipment damage.
- ❖ Using stands, racks, cases and other protective features to protect the equipment.

ⁱ ISO 10012:2003, Measurement management systems -- Requirements for measurement processes and measuring equipment

ⁱⁱ ISO 9001:2008, Quality management systems - Requirements

ⁱⁱⁱ NCSLI RP-1: Establishment and Adjustment of Calibration Intervals at www.ncsli.org