Calibration

The Context
Device manufacturers use Inspection, Measuring, and Test Equipment (IM&TE) for a variety of process including design verification, design validation, and acceptance activities. The thread through all of these processes is an assurance that the IM&TE provides the correct results.

FDA's QSR outlines the methods in §820.72(a), while §820.72(b)(1) has some specifics about calibration traceability. IM&TE must be:

- Suitable for its intended purposes
- Capable of producing valid results
- Routinely calibrated, inspected, checked, and maintained
- Traceable to national or international standards

The Warning Letter
FDA sent a March 4, 2016 Warning Letter to DMP Ltd., a manufacturer of dental impression materials and composite resins located in Greece. The Warning Letter was the result of an FDA inspection.

The Issue Cited
The Warning Letter cited an inadequate procedure and inadequate records. For the procedure, the deficiencies related to missing information including:

> All inspection, measuring, and test equipment is suitable for its intended purposes and capable of producing valid results.
>
> Calibrations, inspections, checks, and maintenance activities include documentation of the equipment identification, calibration dates, the individuals performing each calibration, and the next calibration date.
>
> Calibration standards are traceable to national or international standards and that calibration records are displayed on or near the equipment or readily available to personnel using the equipment.

The records citation says that calibration records are available for the [redacted], but the calibration is not traceable to an appropriate national or international standard.

The Requirement
The Quality System Regulation requires, in §820.72(a) Control of Inspection, Measuring, and Test Equipment, "Each manufacturer shall ensure that all inspection, measuring, and test equipment, including mechanical, automated, or electronic inspection and test equipment, is suitable for its intended purposes and is capable of producing valid results. Each manufacturer shall establish and maintain procedures to ensure that equipment is routinely calibrated, inspected, checked, and maintained. The procedures shall include provisions for handling, preservation, and storage of equipment, so that its accuracy and fitness for use are maintained. These activities shall be documented."

In addition, §820.72(a)(1) Calibration Standards requires, “Calibration standards used for inspection, measuring, and test equipment shall be traceable to national or international standards. If national or international standards are not practical or available, the manufacturer shall use an independent reproducible standard. If no applicable standard exists, the manufacturer shall establish and maintain an in-house standard.”

Recommendations
Ensure that your IM&TE control program includes specific elements to help assure that you get correct results.

The IM&TE should be adequate for its intended use.
This means that you understand the measurement to make and the relationship between the precision and accuracy of the instrument and the target value and specifications of the value to measure.

The IM&TE should be capable of producing valid results.
The preamble to the QSR, in item #137, explains the intention. “[C]omments stated that [IM&TE] may be ‘suitable for its intended purpose’ and still not always ‘produce valid results’. FDA believes that the term ‘valid results’ is commonly understood and notes that it has been in the original CGMP regulation under Sec. 820.61 for 18 years. The requirement is for the equipment to work properly, thereby providing ‘valid results’.”

Routinely calibrate, inspect, check, and maintain the IM&TE.
Determine and document the calibration and maintenance schedule for each piece of IM&TE. A common approach uses an Excel spreadsheet with date arithmetic to determine the date of the next activity. Note that calibration and maintenance could be on different schedules. For a piece of electronic IM&TE may be stable and require 12-month calibration. However, it may also depend on airflow for cooling and requires air filter maintenance on a 6-maonth schedule.

Calibration standards used for IM&TE are traceable to national or international standards.
The conventional approach uses an external calibration laboratory to perform the calibration. The lab provides a calibration certificate with each piece of IM&TE. The certificate should have a statement of traceability as well as the identity of the standards used. For the US, the national lab is the National Institute of Standards and Technology, NIST.