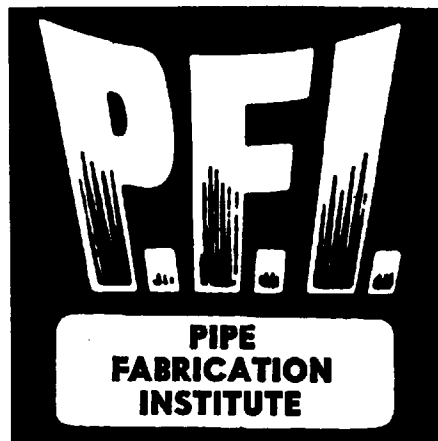


Tool Calibration

Prepared by
Pipe Fabrication Institute Engineering Committee



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TOOL CALIBRATION

1. Scope

- 1.1 To verify conformance to the established requirements in the fabrication of piping subassemblies, it is necessary to assure that all tools, gauges, and instruments shall be in good working order, operated per manufacturers' recommended procedures, and be calibrated as required.
- 1.2 It is the intent of this standard to provide guidance for establishing the minimum requirements for calibration, accuracy and documentation of equipment used in the inspection and fabrication activities.

2. Definitions

- 2.1 Calibration—A comparison of a device with a higher ranking reference device traceable to factory standards (when such standards exist) and the adjustment of the device being calibrated to meet permissible tolerances.
- 2.2 Device—A tool, gauge or other equipment used to determine whether prescribed characteristics have been obtained.
- 2.3 Reference Device—A device of higher accuracy used only for calibration of working devices.

3. Devices Subject to Calibration

- 3.1 Calibrated Devices
 - 3.1.1 Reference devices.
 - 3.1.2 Inspection, examination or testing devices used for final acceptance of a fabrication.
 - 3.1.3 Process control devices, such as temperature controlling, recording or indicating devices, electrical meters, etc.
- 3.2 Non-Calibrated Devices
 - 3.2.1. Non-precision measuring devices, such as measuring tapes, fillet weld gauges, squares, levels, etc., need not be calibrated. However, it is recommended that an initial check be made prior to issuance for use to detect possible manufacturing errors or defects.
 - 3.2.2 Meters subject to adverse operating conditions (such as meters on welding machines) need not be calibrated, provided other means are established for control of the process.

4. Calibration Frequency

- 4.1 Table 1 provides guidance as to the frequency of calibration of selected devices.
- 4.2 The calibration frequency of devices not specifically listed in Table 1 shall be determined by the fabricator based on the past performance and adjustments required during calibration.
- 4.3 The intervals given in Table 1 reflect suggested frequencies and should be adjusted to meet particular needs when necessary.
- 4.4 Devices which require calibration prior to each use shall be so identified.

5. Calibration Tolerances

- 5.1 Calibration tolerances should be determined based on the manufacturer's published accuracy for the device. Typical tolerances are shown in Table 1.

6. Control of Calibration

- 6.1 For work where full traceability of operation is required, a record shall be maintained for each device. As a minimum, the following information shall be recorded:
 - 6.1.1 Name of the device.
 - 6.1.2 Identification or serial number.
 - 6.1.3 Traceability to national standards, when such standards exist.
 - 6.1.4 Date of last calibration.
 - 6.1.5 Environmental conditions during calibration, when relevant.
 - 6.1.6 Amount of deviation corrected, if any.
 - 6.1.7 Date of next scheduled calibration.
 - 6.1.8 Identification of the individual or vendor performing the calibration.
- 6.2 Devices or their container shall be permanently identified, provided such identification does not interfere with the proper operation of the device.

Table 1

DIMENSIONAL	NDE	PRESSURE	ELECTRICAL	TEMPERATURE	LOAD	PRIMARY STD.	DESCRIPTION	SUGGESTED CALIBRATION FREQUENCIES	SUGGESTED TOLERANCE
							Gage Blocks Test Bars/Rods Proving Ring Mercury Thermometer Laboratory Hardness Testing Equipment	5 Years 5 Years 5 Years 1 Year 1 Year	Factory Stds. Factory Stds. Factory Stds. + 2 degrees F. Factory Stds.
							Load-Set Machines Dynamometers Tensile Test Machines Snubber Test Ring Impact Testing Equipment	3 Months 3 Months 1 Year 6 Months 1 Year	$\pm 2\%$ $\pm 2\%$ $\pm 1\%$ $\pm 2\%$ $\pm 1\%$
							Thermocouple Temperature Recording Instrument Optical Pyrometer Contact Pyrometer	3 Months 6 Months 6 Months 6 Months	Greater of $\pm 2\%$ or 25° $\pm 1\%$ of Chart $\pm 1\%$ of Meter $\pm 1\%$ of Meter
							Tong Tester Volt-Ohm-Amp Meter Potentiometer	6 Months 6 Months 18 Months	$\pm 1\%$ of Meter $\pm 2\%$ of Meter $\pm 2\%$ of Meter
							Welding Gas Proportioners Pressure Gauge/Recorders Dead Weight Tester	3 Years 6 Months 1 Year	$\pm 2\%$ Factory Stds. $\pm 1\%$
							Mag-Particle Equipment - Yoke Mag-Particle Equipment - Prod/Coil Ultrasonic Equipment* Portable Hardness Testing Equipment* Portable Chemistry Analyzers* Densitometer*	6 Months 6 Months Each Use (Note 1) (Note 1) Each Use	(Sec. ASME V) $\pm 2\%$ of Meter
							Outside Micrometers Inside Micrometers Ultrasonic Thickness Gauge* Paint Thickness Gauge - Magnetic Paint Thickness Gauge - Electronic	3 Months 3 Months Each Use 3 Months 3 Months	$\pm .002''$ $\pm .001''$ $\pm 8\%$ $\pm 8\%$

Note 1. These devices shall be verified against two
(2) known standards prior to use.

*This equipment does not require a calibration sticker.

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