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## Calibration

### 1.0 Purpose

This instruction defines the process for performing calibration of Inspection, Measuring and Test Equipment (IMTE) and Measuring Standards. This procedure is to serve as a supplement to [QA-SOP-05](#) for clarification and definition.

### 2.0 Scope

This instruction includes the methods, accuracies and interval levels for the calibration of IMTE and Measuring Standards.

### 3.0 Applicable Documents

- ISO 10012, Quality Assurance Requirements for Measuring Equipment ;
- [QA-SOP-05](#), Calibration;
- [QA-WI-015](#), Instructions for Checking Out and Returning Gages;
- [MTM-NQM-CVR](#), ASME Nuclear Quality Assurance Manual;
- [MTM-QAM-01](#), Major Tool & Machine, Inc., Quality Assurance Manual.

### 4.0 Definitions

- **CMM** – Coordinate Measuring Machine

### 5.0 Instructions

#### 5.1 Calibration Frequency/Method List - Definition of Columns

##### 5.1.1 Gage Description

The Gage Description will serve as the name for a given gage or measuring standard.

##### 5.1.2 Initial Frequency

Initial Frequency for a given gage or measuring standard shall be derived from industry standards, manufacturer suggestion or applicable specifications or standards. Note that this is INITIAL Frequency and may be adjusted per the prescribed directives outlined in [QA-SOP-05](#).

##### 5.1.3 Adjusted Frequency

The adjusted frequency for a given gage or measuring standard may be applied if stability is maintained for two consecutive internals without adjustments and upon review of the Nonconformance system there are no nonconformances related to that specific gage.

##### 5.1.4 Accuracy

The Accuracy for a given gage or measuring standard shall be derived from the stipulations listed in [QA-SOP-05](#). The collective uncertainty of the Measuring Standard shall not exceed the accuracy limit for the instrument. Accuracies are listed in inches unless otherwise specified.

##### 5.1.5 Method

The method shall serve as a description of the standard or technique utilized to calibrate the instrument. This may be listed as a direct reference to a given standard, as being accomplished by an outside source, or as a measuring standard to be utilized. In any event, the calibration shall be accomplished by IMTE calibration personnel who possess the knowledge, skill and training to satisfactorily accomplish the task via the method listed.

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### 5.1.6 Traceable Standard

The Traceable Standard shall be the measuring standard utilized as a comparison to standards traceable/certified to the National Institute of Standards and Technology. The traceable standard may be listed as the certification of calibration/accuracy received from an outside source.

## Calibration Frequency/Method List

Gage Description	Initial Frequency	Adjusted Frequency	Method	Traceable Standard
<b>Micrometers</b>				
Outside Diameter	6 months	1 year	OD Micrometer	Master Gage Blocks
Blade mics	6 months	1 year	OD Micrometer	Master Gage Blocks
Intra mics	6 months	1 year	Master Ring Gage	Set Ring
Bench mic	6 months	2 years	OD Micrometer	Certification
Supermics	6 months	2 years	OD Micrometer	Certification
Multi mics	6 months	1 year	OD Micrometer	Master Gage Blocks
Flange mics	6 months	1 year	OD Micrometer	Master Gage Blocks
Uni mics	6 months	1 year	OD Micrometer	Master Gage Blocks
Ball mics	6 months	1 year	OD Micrometer	Master Gage Blocks
Anvil mics	6 months	1 year	OD Micrometer	Master Gage Blocks
Point mics	6 months	1 year	OD Micrometer	Master Gage Blocks
Inner Diameter	6 months	1 year	ID Micrometer	Webber Mic Master
Depth mics	6 months	1 year	Depth Micrometer	Master Gage Blocks
Thread mics	6 months	1 year	OD Micrometer	Certification
<b>Dial/Vernier Calipers</b>				
Height Gage	6 months	1 year	Height Gage	Webber Mic Master
Caliper	6 months	1 year	Caliper	Master Gage Blocks
Pi Tape	1 year		Pi-Tape	Certification
<b>Indicators</b>				
Travel	6 months	1 year	Travel Indicator	Cadillac Gage Secondary Master
Test	6 months	1 year	Test Indicator	Webber Mic Master
Depth Gage	6 months	1 year	Depth Micrometer	Master Gage Blocks
Indi-cal	6 months	1 year	OD Micrometer	Master Gage Blocks
Stick-gage	6 months	1 year	OD Micrometer	Indicator Used
<b>Dial Bore Gages</b>				
Dial Bore	6 months	1 year	Dial Bore and Small Holew	Webber Mic Master
<b>Heightmasters</b>				
Cadillac Gage	6 months	1 year	Height Gage	Webber Mic Master
Webber	18 months		Outside Service	Certification
<b>Master Length Gage</b>				
Master Length Gage	1 year		CMM	Certification

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Gage Description	Initial Frequency	Adjusted Frequency	Method	Traceable Standard
<b>Hole Gage/Wires</b>				
Thread Gage	1 year		Thread Plug Gage	Thread Wire Cert.
Master Set Plug	1 year	2 years	Thread Plug Gage	Certification
Thread Wires	18 months	2 years	OD Micrometer	Certification
Thread Ring Gage	1 year	3 years	Thread Ring Gage	Master Set Plug
Plug Gage	1 year		Pin and Plug	Master Gage Blocks
Gage Pins	1 year		Pin and Plug	Master Gage Blocks
Insp. Gage Pins	1 year	2 years	Pin and Plug	Master Gage Blocks
<b>Protractors</b>				
Bevel Protractor	6 months	1 year	Sine Bar	Certification
<b>Torque Masters</b>				
Torque Wrench	6 months	1 year	Outside Service	Certification
Torque Screw-Driver	6 months	1 year	Outside Service	Torque Master
Torque Master	6 months	1 year	Outside Service	Certification
<b>Environmental Gages</b>				
Thermometer	1 year		Outside Service	Certification
Barometer	1 year		Outside Service	Certification
Hydrometer	1 year		Outside Service	Certification
Pyrometer	1 year		Outside Service	Certification
Oven Control	1 year		Outside Service	Certification
Oven Recorder	1 year		Outside Service	Certification
Analogic Gage	1 year		Outside Service	Certification
<b>Surface Roughness</b>				
Profilometer	6 months	1 year	Profilometer	Certification
Comparator	6 months	1 year	Outside Service	Certification
<b>Coating Thickness</b>				
Coating Thickness	6 months	1 year	OD Micrometer	Certification
<b>Precision Levels</b>				
Precision Level	3 years		Surface Plate	Certification
<b>Squares</b>				
Master Square	1 year		CMM	Certification
Master Scale	1 year		Gage Block Stack Up	Master Gage Blocks
Scale	1 year	2 years	Gage Block Stack Up	Master Gage Blocks
Tape Measure	1 year		Master Scale	Master Gage Blocks
<b>Sine Gages</b>				
Sine Bar	3 years		Outside Service	Master Gage Blocks
Sine Plate	3 years		Outside Service	Master Gage Blocks
<b>Support Equipment</b>				
Blocks	3 years		CMM	Certification
Straight Edge	3 years		CMM	Certification
Parallel	3 years		CMM	Certification
<b>Angle Plates</b>				
Angle Plate	3 years		CMM	Certification

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Gage Description	Initial Frequency	Adjusted Frequency	Method	Traceable Standard
<b>“V” Blocks</b>				
“V” Blocks	3 years		CMM or Surface Plate	Certification
<b>Gage Blocks</b>				
Master Gage Blocks	18 months	2 years	Outside Service	Certification
Inspection Gage Blocks	18 months	2 years	Outside Service	Certification
Mfg. Gage Blocks	18 months	2 years	Bench Mic	Certification
<b>Surface Plates</b>				
Surface Plate	3 years		Outside Service	Certification
<b>Sheffield Gages</b>				
Sheffield Gage	3 years		Outside Service	Certification
<b>Pressure Gages</b>				
Pressure Gages	1 year		Outside Service	Certification
<b>Weight Scales</b>				
Weight Scale	1 year		Outside Service	Certification
<b>Thickness Gages</b>				
Ultrasonic	Calibrate each use	1 year	Step Wedge	Certification
<b>Torque Masters</b>				
Torque Master	1 year		Outside Service	Certification
<b>Light Meters</b>				
Visible Light	1 year		Outside Service	Certification
Black Light	1 year		Outside Service	Certification
Radiometer	1 year		Outside Service	Certification
<b>Electrical Meters</b>				
Ohm Meter	1 year		Outside Service	Certification
<b>Mechanical Tester</b>				
Hardness	1 year		Outside Service	Certification
Pull (Tensile)	1 year		Outside Service	Certification
Hard Test Stds.	25 years		Outside Service	Certification
<b>Welding Machines</b>				
Welding Machine	6 months		Outside Service	Certification
Weld Fillet Gage	2 years		Master Fillet Gage	Master Fillet Gage
<b>CMM's</b>				
DEA	1 year		Outside Service	Certification
<b>Lasers</b>				
Laser	1 year		Outside Service	Certification
<b>Master Ring Gages</b>				
Master Ring Gage	1 year	3 years	Outside Service	Certification
<b>Ballbars</b>				
Ballbars	1 year		Outside Service	Certification
<b>Hydrostatic Test</b>				
Master and Working Pressure Gages	6 months (reference QA-WI-014)		Outside Service	Certification

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## 5.2 NDE/NDT Gages

The following table lists the frequency levels of gages dedicated to NDE/NDT only. NDE/NDT gages shall be identified by a unique serial number, followed by: - NDT. NDE/NDT gages are handled the same as other gages, except for the NDT designation, following the serial number.

Gage Description	Initial Frequency	Adjusted Frequency	Method	Traceable Standard
<b>General</b>				
Visible Light	Each Use		Outside Service	Certification
Black Light	Each Use		Outside Service	Certification
Radiometer	6 months		Outside Service	Certification
Light Meter Stand	3 years		Master Gage Blocks	Certification
Comparators	1 year		Master Gage Blocks	Certification
Timer, Lab	1 year		Outside Service	Certification
Handheld Timer	1 year		Outside Service	Certification
<b>Magnetic Particle</b>				
Gaussmeter	6 months & Each Use		Gaussmeter Checker	6 months certification
Gaussmeter Checker	6 months		Outside Service	Certification
Dead Weight 10 & 30 lb Yokes	3 years		Scales	Certification
Magnetic Generator	6 months		Dead Weight	ASTME 1444
Ammeter, Timer Control & Quick Break	6 months		Outside Service	Certification
<b>Penetrant</b>				
Temperature gage H2 O	6 months		Outside Service	Calibration
Pressure gage H2 O	6 months		Outside Service	Certification
Pressure Gage, Air	6 months		Outside Service	Certification
<b>Ultrasound</b>				
UT Thickness Meter	Each Use & 1 year Factory cal.		Step Wedge	Certification
Step Wedge	1 year Each Use	2 years	Bench Mic	Certification
Hardness Checker	& 1 year Factory cal.		Outside Service	Certification
<b>Radiation Detectors</b>				
Survey Meter	6 months		Outside Service	Certification
Area Monitor w/ Flashing Light	1 year		Outside Service	Certification

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### 5.3 Frequency Levels

The following table lists the frequency level options in an order from the strictest (tightest) to the least restrictive:

<b><u>Frequency Level</u></b>	<b><u>Time Frame</u></b>
Level 1	Prior to each use
Level 2	3 months
Level 3	6 months
Level 4	12 months (1 year)
Level 5	18 months
Level 6	24 months (2 years)
Level 7	36 months (3 years)