

## 1.0 Scope & Purpose

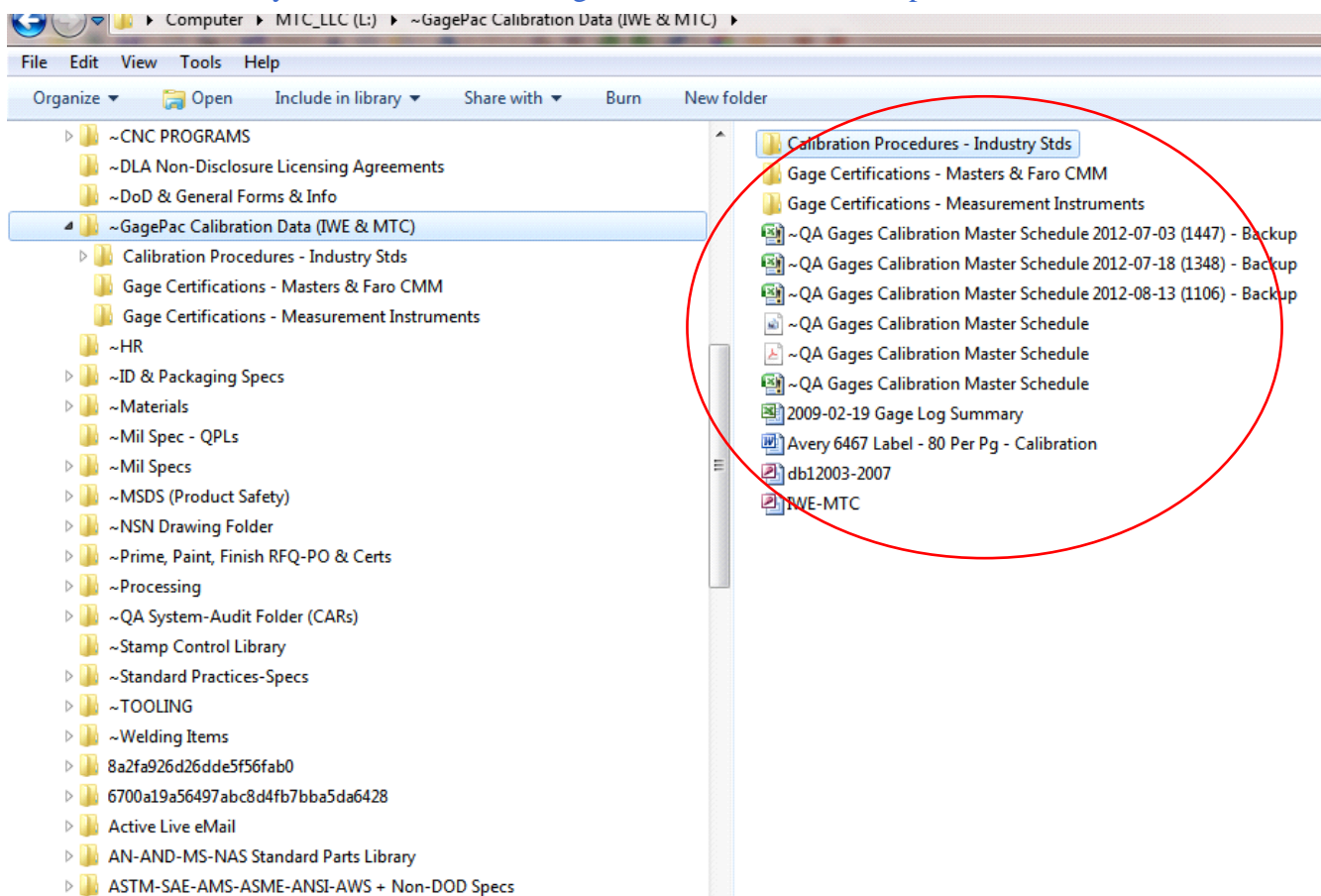
This Work Instruction (WI) briefly defines the basics of using the Calibration Master Schedule Log and is intended to standardize the data entry format and minimum information required to be documented.

Briefly define the programs functionality, purpose, intent and capabilities – what it does and does not do.

## 2.0 General Overview

As shown below, the GagePac Calibration Data Folder on line has 5 basic elements.

- Calibration Master Schedule Log
- Gage Certifications – Masters Folder
- Gage Certifications - Measurement Instruments Folder
- Plus a set of backup records saved for calibration records beyond 3 prior calibration cycles.
- And, an Avery 6467 Label - 80 Per Pg – Calibration Label Template



### 3.0 Process and Documentation

The QA/Engineering Manager or designee creates the Calibration Master Schedule Log.

The QA/Engineering Department Representative or designee maintains the Calibration Master Schedule Log.

All employees are required to check each instrument used as a media of product acceptance prior to use.

If an instrument is found to be within 30-days of calibration due date, it is recommended that said instrument be submitted to the QA/Engineering Manager or designee for re-calibration.

If an instrument is found not to be past the scheduled calibration due date, said instrument is be submitted to the QA/Engineering Manager or designee for appropriate corrective action and issuance of a QDR, if required per QAM, Section 4.5. Actions may require customer notification to segregate suspected discrepant material.

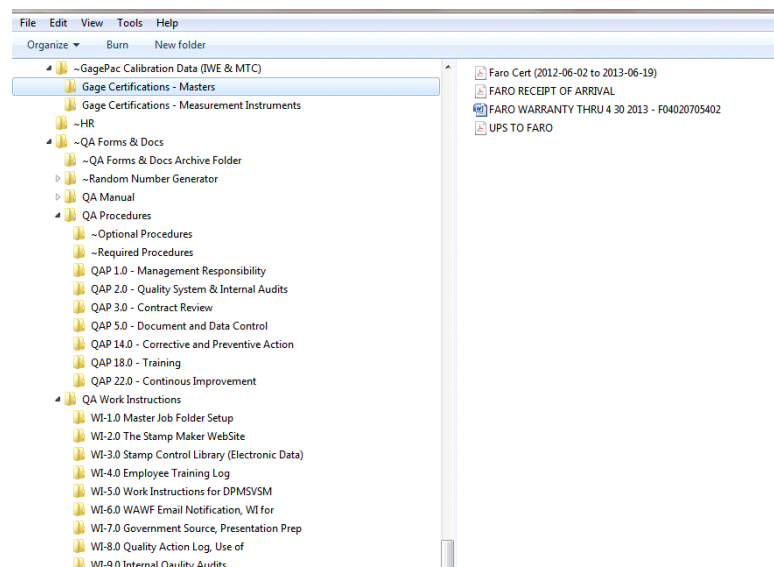
The QA/Engineering Manager or designee shall at a minimum, perform a monthly Calibration Master Schedule check and notify the appropriate instrument custodian of a required gage re-call and re-calibration.

#### 3.1 Gage Certifications – Masters Folder

As shown below, this folder is some-what self explanatory.

All gages in this folder are to be use for calibration purposes only and are not to use as a media of product acceptance.

All calibrations of instruments in this area must be calibrated by an accredited calibration lab as defined in QAM, Section 4.6 and 4.7.



The QA/Engineering Manager or designee shall scan all new master gage certificates of calibration into the master gage folder and record the initial gage data in the Calibration Master Schedule Log prior to official release for use as shown starting with section 3.5 and on of this WI.

### 3.2 Gage Certifications - Measurement Instruments Folder

As shown below, this folder is some-what self explanatory.

All gages in this folder are to be used for as a media of product acceptance.

All calibrations of instruments in this area can be calibrated in-house by the QA/Engineering Department Representative or designee or, may be sent out to an accredited calibration lab as defined in QAM, Section 4.6 and 4.7.

The QA/Engineering Manager or designee shall scan all new inspection instrument certificates of calibration into the measurement gage folder and record the initial gage data in the Calibration Master Schedule Log prior to official release for use as shown starting with section 3.5 and on of this WI.

The screenshot displays a file explorer window with the following folder structure on the left:

- ~CNC PROGRAMS
- ~DLA Non-Disclosure Licensing Agreements
- ~DoD & General Forms & Info
- ~GagePac Calibration Data (IWE & MTC)
- Gage Certifications - Masters
- Gage Certifications - Measurement Instruments**
- ~HR
- ~QA Forms & Docs
- ~QA Forms & Docs Archive Folder
- ~Random Number Generator
- QA Manual
- QA Procedures
- ~Optional Procedures
- ~Required Procedures
- QAP 1.0 - Management Responsibility
- QAP 2.0 - Quality System & Internal Audits
- QAP 3.0 - Contract Review
- QAP 5.0 - Document and Data Control
- QAP 14.0 - Corrective and Preventive Action
- QAP 18.0 - Training
- QAP 22.0 - Continuous Improvement
- QA Work Instructions
- WI-1.0 Master Job Folder Setup
- WI-2.0 The Stamp Maker WebSite
- WI-3.0 Stamp Control Library (Electronic Data)
- WI-4.0 Employee Training Log
- WI-5.0 Work Instructions for DPMSVSM
- WI-6.0 WAWF Email Notification, WI for
- WI-7.0 Government Source, Presentation Prep
- WI-8.0 Quality Action Log, Use of
- WI-9.0 Internal Quality Audits
- ~QA System-Audit Folder (CARs)
- ~RFP-IDPO-NECO Quotes
- ~Stamp Control Library
- ~TOOLING
- CATIA
- COMMERCIAL CUSTOMERS
- CONVERSION FILES

The right pane shows a list of files, with 'TC070 - .375-24 UNJ TDGA' highlighted by a red arrow. Below the file list is a sample 'Calibration Certificate' from SPI. The certificate details are as follows:

Part Number		Tool	
12-355-4		OUTSIDE MICROMETER	
Serial Number	Range	Resolution	
110959867	6 - 7"	0.0001"	
Standard Name			
ASME B89			
Visual Inspection			
<input checked="" type="checkbox"/>			
Function Inspection			
<input checked="" type="checkbox"/>			
Humidity			
50 % ± 15%			
Temperature			
20 °C ± 0.5°C			
Uncertainty			
1.5 µm ± 107.4µm			
Outside Measurements			
Measurement	Nominal Value	Tolerance +/-	Deviation +/-
1	0.0000	0.0002"	0.0000
2	0.1400	0.0002"	0.0000
3	0.4000	0.0002"	0.0000
4	0.6600	0.0002"	0.0000
5	0.8000	0.0002"	0.0000
6	7.0000	0.0002"	0.0000
Inspection Serial Number			
530-40			
NIST Number			
07-54907-A			
PTB Number			
4939 P18 05			
Inspector Name			
Tian Yip			
Date of Inspection			
2012-1-16			
Date of Purchase			
Attach Invoice for proof of purchase date			

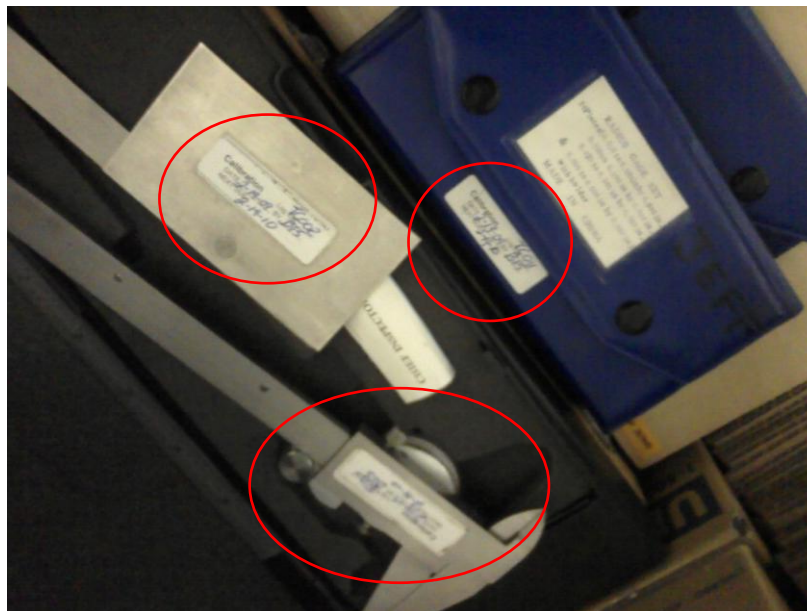
### 3.3 Avery 6467 Label - 80 Per Pg – Calibration Label Template

After many years of trial and error, this label format appears to be the most universal for day-to-day use.

As noted in sections 3.1 and 3.2, the labels make the calibration task and re-certification uniform and easy to see an instrument's calibration status.

As shown below, the calibration label can be on the physical instrument or, in cases where an instrument case is used, the case can be used for the label.

Additionally, if calibrated by an out-side source or lab, the calibrating facility may use their format with the key element being traceability to the Master Schedule Log ID sequence log.



All calibration labels must have the following information visible on the label:

- Trace ID/serial number as cataloged in the Calibration Master Log/Record – preferably the log ID number as recorded in the log. This keeps the gage records sequential and easily tracked.
- Actual date of calibration
- Next calibration due date
- Initials of person that performed the actual calibration task
- And initials of the Calibrated By person.

#### **NOTE:**

**IT IS REQUIRED THAT THE CALIBRATION STATUS BE CHECKED AT EVERY USE.**

### 3.4 Master Calibration Log Backup, Use of

As the calibration program only maintains 3 calibration cycles per gage, the backup copies can be used for additional gage calibration history.

Backups are automatically generated when new calibration data is added to the master calibration schedule log.

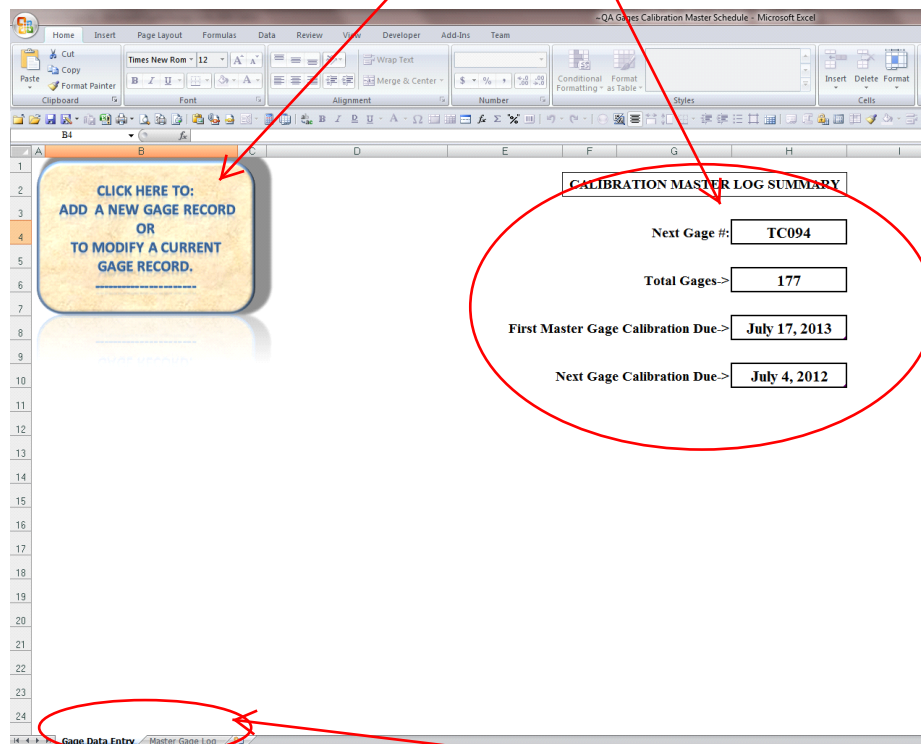
A maximum of 5 backups can be automatically maintained. Older backup are normally stored in an archive folder.

### 3.5 Master Calibration Log, Use of

The Master Calibration Schedule Log is the critical element of the documentation process and maintaining compliance to the companies established QMS procedures for calibration control.

As shown below, when opening the log, you will notice several features of the program.

- Total number of gage records
- Next gage ID number to be used
- When the first Master Gage is due calibration.
- Next gage calibration due date.
- And, an activate gage calibration procedure button.



Once the Excel file is opened, you will see the above screen display with 2 tabs.



The first tab is the current overview of records status as noted above.

The second tab is the actual calibration log data as shown below.

Gage Number	Gage Type	Gage Description	Gage Size General	Status	Error Gage Size (Min)	Error Gage Size (Max)	Gage Units Of Measure	Location	Owner	Accuracy	Comments	Master Gage Used	Calibration Due Date	Last Calibration Date	Calibrated on (Date)	Calibrated By	Calibration Cycle (Days)	Manufacturer	Model Number	Serial Number
M0083	Block		3.000	Active	0.00000	0.00000	Inches	Inspection		0.00001			23-Apr-2014	24-Apr-2009	24-Apr-2009	NBS Lab	1825			
M0084	Block		4	Active	0.00000	0.00000	Inches	Inspection		0.00001			23-Apr-2014	24-Apr-2009	24-Apr-2009	NBS Lab	1825			
BH001	Caliper	Digital Calipers	0" - 8"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Mitutoyo		
BH008	Finger Indicator	Test Indicator	0.03	Active	0.00000	0.00000	Inches	Shop Floor	Employee	0.00050		M0001	9-Aug-2012	7-Jul-2010	5-Jul-2011	TONY CASILAS	401	Fowler		
TC001	Caliper	8" Calipers	8"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00100			25-Jul-2012	7-Jul-2010	20-Jun-2011	TONY CASILAS	401	Spe	57-615-907	TC001
TC002	Protractor (gn)	Protractor	180 Deg	Active	0.00000	0.00000	Degrees	Employee	Employee	0.00000			21-Mar-2013	7-Jul-2010	14-Feb-2012	TONY CASILAS	401	General	#17	
TC003	Calipers (gn)	Digital Caliper	0" - 6"	Active	0.00050	0.00050	Inches	Employee	Employee	0.00010		M0001	28-Aug-2012	12-Aug-2010	29-Aug-2011	TONY CASILAS	365		Electronic	
TC004	Micrometer	OD Mic	0" - 1"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Phase II		
TC005	Protractor	Protractor	180 Deg	Active	0.00000	0.00000	Degrees	Employee	Employee	0.00000			26-Mar-2013	7-Jul-2010	19-Feb-2012	TONY CASILAS	401	Shears	303-801	4-71002
TC006	Protractor	Dial Protractor	180 Deg	Active	0.00000	0.00000	Degrees	Employee	Employee	0.25000			27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Shears	303-8201	4-80112
TC007	Finger Indicator	Indicator	0.05	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Mitutoyo	513-104	8C931
TC008	Micrometer	Disk Mic	1" - 2"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010		M0001	6-Jul-2015	7-Jul-2010	7-Jul-2010	TONY CASILAS	1825	Nsk		24207
TC009	Micrometer	OD Mic	0 - 25.4	Active	0.00000	0.00000	Millimeter	Employee	Employee	0.01000		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Stanett	230M	
TC010	Caliper	Digital Caliper	0" - 6"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00050		M0001	23-Mar-2013	16-Feb-2012	16-Feb-2012	TONY CASILAS	401			
TC011	Set	Radius Gage Set	010" - 500"	Active	0.00000	0.00000	Inches	Employee	Employee	0.01000			6-Jul-2015	7-Jul-2010	7-Jul-2010	TONY CASILAS	1825			
TC012	Set	Radius Gage Set	1/64" - 1/2"	Active	0.00000	0.00000	Inches	Employee	Employee	0.01560			6-Jul-2015	7-Jul-2010	7-Jul-2010	TONY CASILAS	1825			
TC013	Set	Radius Gage Set	9/16" - 1"	Active	-0.50000	0.50000	Inches	Inspection	Company	0.05250			18-Feb-2016	19-Feb-2011	19-Feb-2011	TONY CASILAS	1825	Unk		
TC014	Finger Indicator	Test Indicator	0.03	Active	0.00000	0.00000	Inches	Employee	Employee	0.00050		M0001	19-Feb-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	365	Phase II		
TC015	Micrometer	ID Mic	2" - 12"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00100		M0001	19-Feb-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	365	Stanett		
TC016	Block	Master Sin Angles	40938	Active	0.00000	0.00000	Degrees	Employee	Employee	0.00010			15-Jun-2013	16-Jun-2008	16-Jun-2008	TONY CASILAS	1825	Phase II		
TC017	Depth Mic	Depth Mic	0 - 8"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010	0 to 1" Rod missing, use for 1" to 8"	M0001	18-Feb-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	365	Mitutoyo		
TC018	Micrometer	ID Mic	8" - 20"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00100		M0001	19-Feb-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	365	Stanett		
TC019	Micrometer	OD Mic	0" - 1"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Unk		
TC020	Micrometer	OD Mic	2" - 3"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Unk		
TC021	Micrometer	OD Mic	3" - 4"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Unk		
TC022	Micrometer	OD Mic	4" - 5"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Phase II		
TC023	Micrometer	OD Mic	5" - 6"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00010		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Unk		
TC024	Set	Sin Angles	30 - 90	Active	0.00000	0.00000	Degrees	Employee	Employee	0.00010			18-Feb-2016	19-Feb-2011	19-Feb-2011	TONY CASILAS	1825	Phase II		
TC025	Micrometer	Internal hole mics	280 - 400	Active	0.27500	0.50000	Inches	Employee	Employee	0.00010			27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Mitutoyo		
TC026	Height Gage	Digital Height Gage	0 - 24"	Active	0.00000	0.00000	Inches	Inspection	Employee	0.00050		M0001	3-Jul-2013	3-Jul-2012	3-Jul-2012	TONY CASILAS	365	Mitutoyo		
TC027	Caliper	Dial Calipers	0 - 12"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00100		M0001	13-Feb-2013	7-Jul-2010	14-Feb-2012	TONY CASILAS	365	Unk		
TC028	Caliper	Dial Calipers	0 - 12"	Active	0.00000	0.00000	Inches	Employee	Employee	0.00100		M0001	27-Mar-2013	20-Feb-2012	20-Feb-2012	TONY CASILAS	401	Unk		

A full report can be published from this sheet as a hard copy or PDF.

### 3.6 Calibration Process/Data Entry Popup, Form Overview

A single click on the calibration button will bring up a data entry form to use to add new gages, modify already entered gages or calibration performance.

There are 3 tabs on the data input form.

- Use the first tab to enter a new gage or to recall a gage record after calibration
- Use the second tab to enter calibration data and calibration procedures
- The third tab is to adjust gage R&R data boundaries – i.e. % of use and cycle adjustments. This element is used in the R&R calculations to adjust calibration cycle schedules.

CLICK HERE TO:  
ADD A NEW GAGE RECORD  
OR  
TO MODIFY A CURRENT  
GAGE RECORD.

**CALIBRATION MASTER LOG SUMMARY**

Next Gage #: **TC094**

Total Gages-> **177**

Calibration Due-> **July 17, 2013**

Calibration Due-> **July 4, 2012**

**Gage Calibration Master Log**

Gage Number: TC089 Find Gage Record to Edit/Update Cancel

**Gage Log Data | Gage Calibration Data | Gage R & R Data**

Gage Type: Od Mic (omic) Description: O.D. Mic

Gage Mfr: S P I Gage Model: Gage SN: 110956867

Purchased Date: 5/11/2012 Purchased Price: 200

Gage Size: 6-7" Gage Units: Inches

Gage Accuracy: .0001" Error Size Min: 0 Error Size Max: 0

Gage Location: Inspection Gage Owner: Company:

Comments: New Gage placed in service for inspection. **Calibration Due Date: 6/16/2013**

Add New Gage **Gage Status: Active** Record Created By: Debra Arenstein Gage Record Entered: 5/11/2012

Update Gage **Date of Last Calibration: 5/11/2012**

The Gage Log Data tab is the start-point for all other gage data functions.

The following page shows the fundamentals of establishing a newly purchased or added gage to the QMS as noted in QAM, Section 4.6 and 4.7

A couple of key notes to remember when entering a new gage:

- Initial gage data can only be entered once in the life of the gage and only the programmer has access to modify a gage record.
- Once the initial gage calibration results are entered off the first-time gage calibration and it is recorded, it cannot be modified as this data is used for all future calibration cycle adjustments and in calculating schedule adjustments. Again, only the programmer can modify a record in the database.

- Once a gage ID sequence number has been given to a gage, it cannot be changed as that sequence number is now permanently assigned to that specific gage and/or gage serial number.
- Once a calibration procedure has been established, it is recommended that the procedure NOT be modified as once modified; the data will not match the initial data and voids the gage R&R calculations. i.e. The cycle adjustments will default back to the original cycle schedule.
- Once data has been entered, the transaction cannot be reversed. So check your entries before you click the Add or Update button.
- And lastly, even if a gage is serialized, it is recommended to stay with the sequential numbering system. There is a place in the data record for recording the gage serial number for traceability.

### 3.7 Calibration Process/Data Entry Popup, Gage Log Data Tab

As shown below, the initial gage setup is fairly simple and the majority of the data and/or gage information will be recorded on the gage manufactures original certificate of calibration.

**Gage Calibration Master Log**

Gage Number: TC089 Find Gage Record to Edit/Update Cancel

**Gage Log Data** | **Gage Calibration Data** | **Gage R & R Data**

Gage Type: Od Mic (omic) Description: O.D. Mic

Gage Mfr: S P I Gage Model: 12-355-4 Gage SN: 110956867

Purchased Date: 5/11/2012 Purchased Price: 200

Gage Size: 6-7" Gage Units: Inches

Gage Accuracy: .0001" Error Size Min: 0 Error Size Max: 0

Gage Location: Inspection Gage Owner: Company

Comments: New Gage placed in service for inspection. **Calibration Due Date: 5/11/2013**

Add New Gage Update Gage

**Gage Status:** Active **Record Created By:** Debra Arenstein **Gage Record Entered:** 5/11/2012

**Date of Last Calibration:** 5/11/2012

**Calibration Certificate** **SPI**

TC089

Part Number: 12-355-4 Tool: OUTSIDE MICROMETER  
Serial Number: 110956867 Range: 6 - 7"  
Standard Name: ASME B89 Resolution: 0.0001"

Visual Inspection: ☒  
Function Inspection: ☒

Humidity: 50 % H-15%  
Temperature: 20 °C +/- 0.5°C  
Uncertainty: 1.5 µm + 10<sup>-6</sup> L

**Outside Measurements**

Measurement	Nominal Value	Tolerance +/-	Deviation +/-	Disposition*
1	6.00000	0.0002"	0.00000	<input checked="" type="checkbox"/>
2	6.14000	0.0002"	0.00000	<input checked="" type="checkbox"/>
3	6.40000	0.0002"	0.00000	<input checked="" type="checkbox"/>
4	6.60000	0.0002"	0.00000	<input checked="" type="checkbox"/>
5	6.80000	0.0002"	0.00000	<input checked="" type="checkbox"/>
6	7.00000	0.0002"	0.00000	<input checked="" type="checkbox"/>

Inspection Serial Number: 530-40 NIST Number: 07-04907-A PTB Number: 4939 PTB 05

Gauge Block Set: 530-40

Inspector Name: Tian Yip  
Date of Inspection: 2012-1-16  
Date of Purchase:   
Attach Invoice for proof of purchase date

\* Check mark indicates within tolerance

There are several drop-down menus to help simplify the process.

- Gage Type
- Gage Units
- Gage Owner
- Gage Location
- Gage Status
- Record Created by



This helps standardized the database information for future review, sorting and report summarization.

The initially entered information recorded on this tab should not change, with one exception.

When the gage record is retrieved, this tab will automatically populate with the gage record and once the initial record has been recorded, upon record recall the information in the dark-green block will change to the new scheduled calibration due date.

### 3.8 Calibration Process/Data Entry Popup, Gage Calibration Data Tab

Shown below is a recalled record of the initial gage setup recalled based on the recorded data from the gage manufactures original certificate of calibration when it was initially recorded.

**Gage Calibration Master Log**

Gage Number: TC089 Find Gage Record to Edit/Update Cancel

**Gage Log Data | Gage Calibration Data | Gage R & R Data**

Calibration Date: 5/11/2012 Calibrated By: LAB

Master Gage No.: M0001 Calibration Cycle: 365

**New Calibration Entries**

Reading 1: Reading 2: Reading 3: Reading 4:

**Prior Calibration**

**Initial Entries**

6  
6.4  
6.7  
7

**Calibration Procedure**

4 point check: 6.0000; 6.4000; 6.6000; 7.0000

**Gage Status** Active **Record Created By** Debra Arenstein **Gage Record Entered** 5/11/2012

**Date of Last Calibration:** 5/11/2012

**Calibration Certificate**

Part Number: 12-355-4 Serial Number: 110056857 Standard Name: ASME B89 Tool: OUTSIDE MICROMETER Range: 6 - 7" Resolution: 0.0001"

Visual Inspection: ☒ Function Inspection: ☒

Humidity: 50 % ± 15% Temperature: 20 °C ± 0.5 °C Uncertainty: 1.5 µm ± 10% - 6 µm

**Outside Measurements**

Measurement	Nominal Value	Tolerance +/-	Deviation +/-	Disposition*
1	6.00000	0.0002"	0.00000	<input checked="" type="checkbox"/>
2	6.14800	0.0002"	0.00000	<input checked="" type="checkbox"/>
3	6.40000	0.0002"	0.00000	<input checked="" type="checkbox"/>
4	6.60000	0.0002"	0.00000	<input checked="" type="checkbox"/>
5	6.80000	0.0002"	0.00000	<input checked="" type="checkbox"/>
6	7.00000	0.0002"	0.00000	<input checked="" type="checkbox"/>

Inspection Serial Number: 07-04807-A NIST Number: 4829 P1B 05

Gauge Block Set: 550-40

Inspector Name: Tian Yip Date of Inspection: 2012-1-16

Date of Purchase: Attach invoice for proof of purchase date

\* Check mark indicates within tolerance

Some elements to notice on this form.

In the Initial Entries column is the first-time calibration data generally recorded off the manufacturers Certificate of Calibration.

You'll notice that the information is in phantom (No-Editable). This is a permanent record of the gages condition when placed in service.

Once the gage has cycled through one calibration, the second column, Prior Calibration, will auto-populate with the last recorded calibration record data.

All new and subsequent calibrations are to be entered in the New Calibration Entries column.

There are drop-down menus that can be changed. The Calibrated By and the Gage Status.

Also note the Master Gage Number. This gives traceability to the standard used for the calibration procedure.

### 3.9 Calibration Process/Data Entry Popup, Gage R & R Data Tab

The Gage R&R Data Tab shown below starts with a standard use setting of 75% and a calibration cycle set at 365 days.

The gage R&R that is performed by this program is not a true gage R&R but is a simplified form using a zero deviation base. The logic looks over two calibration cycles and based on the initial gage calibration data, will plus 10% if no deviation is found or minus 25% if an adjustment is required or deviation is recorded.

It is recommended that the settings on this tab not be adjusted except by QA/Engineering or a trained designee.

Gage Calibration Master Log

Gage Number: TC089 Find Gage Record to Edit/Update Cancel

Gage Log Data | Gage Calibration Data | **Gage R & R Data**

RR Cycle Days: 365

R & R Std Used: 0.1 < Enter Decimal % of Annual Usage.

R & R Adjustment:

Add New Gage Update Gage

**Gage Status** Active **Record Created By** Debra Arenstein **Gage Record Entered** 5/11/2012

**Date of Last Calibration:** 5/11/2012

Calibration Certificate

TC089

Part Number: 12-355-4 Tool: OUTSIDE MICROMETER

Serial Number: 110956867 Range: 6 - 7"

Standard Name: ASME B89 Resolution: 0.0001"

Visual Inspection: ☒ Function Inspection: ☒

Humidity: 50 % +/- 15% Temperature: 20 °C +/- 0.5 °C Uncertainty: 1.5 µm +107 -6%

Measurement	Nominal Value	Tolerance +/-	Deviation +/-	Disposition*
1	0.00000	0.0002"	0.00000	<input checked="" type="checkbox"/>
2	0.14000	0.0002"	0.00000	<input checked="" type="checkbox"/>
3	0.40000	0.0002"	0.00000	<input checked="" type="checkbox"/>
4	0.60000	0.0002"	0.00000	<input checked="" type="checkbox"/>
5	0.80000	0.0002"	0.00000	<input checked="" type="checkbox"/>
6	1.00000	0.0002"	0.00000	<input checked="" type="checkbox"/>

Inspection Serial Number: 530-40 NIST Number: 07-54907-A PTB Number: 4639 PTB 06

Gauge Block Set: 530-40

Inspector Name: Tim Yip Date of Inspection: 2012-1-16 Date of Purchase: Attach invoice for proof of purchase date

\* Check mark indicates within tolerance

## 4.0 Data Entry Process

The following process defines standards to be used with the Master Calibration Schedule Log. Following this procedure will establish an auditable trail for traceability to the standards used for the calibration system.

### 4.1 Calibration Process/Data Entry Popup, Gage Log Data Tab, New Gage Record

When starting a new Gage record, you must first collect all the data available for the gage being added to the calibration system.

Calibration is a 3-part process.

- Visual inspection of the gage and all of the working parts. i.e. Does the gage show signs of proper care or signs of misuse.
- Does the gage have history? i.e. Is there evidence of a prior calibration or a C of C.
- What gage data is available for review? i.e. Gage Manufacturers C of C, etc.

Once it has been determined that the gage is a candidate for active service, we can start the Gage Calibration Program.

Start with 3.5, then go to 3.6 and next 3.7 to get to the following screen:

The screenshot shows the 'Gage Calibration Master Log' window. At the top, there's a 'Gage Number' input field (circled in red) and a 'Find Gage Record to Edit/Update' button. Below this is a tabbed interface with 'Gage Log Data', 'Gage Calibration Data', and 'Gage R & R Data'. The 'Gage Log Data' tab is active, showing fields for Gage Type, Description, Gage Mfr, Gage Model, Gage SN, Purchased Date (mm/dd/yyyy), Purchased Price, Gage Size, Gage Units, Gage Accuracy, Error Size Min, Error Size Max, Gage Location, and Gage Owner. A 'Comments' field contains the text 'New Gage placed in service for inspection.' To the right of the comments is a 'Calibration Due Date' field (mm/dd/yyyy). At the bottom left, the 'Add New Gage' button is circled in red. To its right are fields for 'Gage Status', 'Record Created By', and 'Gage Record Entered' (mm/dd/yyyy). At the bottom center, there's a 'Date of Last Calibration' field (mm/dd/year).

Notice, on the prior print screen, the Add New Gage button shows active. This button is only active on a new gage entry and will phantom after its initial use.

Enter all the appropriate data as shown below.

**Gage Calibration Master Log**

Gage Number: TC089 Find Gage Record to Edit/Update Cancel

**Gage Log Data | Gage Calibration Data | Gage R & R Data**

Gage Type: Od Mic (omic) Description: O.D. Mic

Gage Mfr: SPI Gage Model: 12-355-4 Gage SN: 110956867

Purchased Date: 5/11/2012 Purchased Price: 200

Gage Size: 6-7" Gage Units: Inches

Gage Accuracy: .0001" Error Size Min: 0 Error Size Max: 0

Gage Location: Inspection Gage Owner: Company

Comments: New Gage placed in service for inspection.

**Calibration Due Date**: 5/11/2013

Add New Gage Update Gage

**Gage Status**: Active **Record Created By**: Debra Arenstein **Gage Record Entered**: 5/11/2012

**Date of Last Calibration**: 5/11/2012

**Calibration Certificate**

Part Number: 12-355-4 Tool: OUTSIDE MICROMETER

Serial Number: 110956867 Range: 6 - 7"

Standard Name: ASME B89 Resolution: 0.0001"

Visual Inspection: ☒ Function Inspection: ☒

Humidity: 50 % ± 15% Temperature: 20 °C ± 0.5 °C Uncertainty: 1.5 µm ± 10<sup>-6</sup> in

**Outside Measurements**

Measurement	Nominal Value	Tolerance +/-	Deviation +/-	Disposition*
1	6.0000	0.0002"	0.00000	<input checked="" type="checkbox"/>
2	6.14000	0.0002"	0.00000	<input checked="" type="checkbox"/>
3	6.40000	0.0002"	0.00000	<input checked="" type="checkbox"/>
4	6.60000	0.0002"	0.00000	<input checked="" type="checkbox"/>
5	6.80000	0.0002"	0.00000	<input checked="" type="checkbox"/>
6	7.00000	0.0002"	0.00000	<input checked="" type="checkbox"/>

Inspection Serial Number: 530-40 NIST Number: 07-54807-A PTB Number: 4939 PTB 05

Gage Book Set: 530-40

Inspector Name: Tian Yip Date of Inspection: 2012-1-16 Date of Purchase: Attach Invoice for proof of purchase date

\* Check mark indicates within tolerance

After all the data has been added, move to the Gage Calibration Data Tab.

If the gage is new, the Calibrated By would be Lab and If used but new in the system, select the calibrated by and enter the appropriate master gage that you will be using to calibrate this gage.

**Gage Calibration Master Log**

Gage Number: TC089 Find Gage Record to Edit/Update Cancel

**Gage Log Data | Gage Calibration Data | Gage R & R Data**

Calibration Date: 5/11/2012 Calibrated By: LAB

Master Gage No.: M0001 Calibration Cycle: 365

**New Calibration Entries**

Reading	Prior Calibration	Initial Entries
Reading 1		6
Reading 2		6.4
Reading 3		6.7
Reading 4		7

**Calibration Procedure**

4 point check: 6.0000; 6.4000; 6.6000; 7.0000

Add New Gage Update Gage

**Gage Status**: Active **Record Created By**: Debra Arenstein **Gage Record Entered**: 5/11/2012

**Date of Last Calibration**: 5/11/2012

**Calibration Certificate**

Part Number: 12-355-4 Tool: OUTSIDE MICROMETER

Serial Number: 110956867 Range: 6 - 7"

Standard Name: ASME B89 Resolution: 0.0001"

Visual Inspection: ☒ Function Inspection: ☒

Humidity: 50 % ± 15% Temperature: 20 °C ± 0.5 °C Uncertainty: 1.5 µm ± 10<sup>-6</sup> in

**Outside Measurements**

Measurement	Nominal Value	Tolerance +/-	Deviation +/-	Disposition*
1	6.0000	0.0002"	0.00000	<input checked="" type="checkbox"/>
2	6.14000	0.0002"	0.00000	<input checked="" type="checkbox"/>
3	6.40000	0.0002"	0.00000	<input checked="" type="checkbox"/>
4	6.60000	0.0002"	0.00000	<input checked="" type="checkbox"/>
5	6.80000	0.0002"	0.00000	<input checked="" type="checkbox"/>
6	7.00000	0.0002"	0.00000	<input checked="" type="checkbox"/>

Inspection Serial Number: 530-40 NIST Number: 07-54807-A PTB Number: 4939 PTB 05

Gage Book Set: 530-40

Inspector Name: Tian Yip Date of Inspection: 2012-1-16 Date of Purchase: Attach Invoice for proof of purchase date

\* Check mark indicates within tolerance

As this is a new gage to the system, you need to first define a Calibration Procedure. If it is not on the manufacturers C of C, you can establish a procedure using a prior similar gage or build your own, providing the best distribution of the full range of the gage, as shown in the prior example.

Next, use the New Calibration Entries column to enter actual data either as recorded by a lab or you check and record. Reference Section 4.2 of this WI for details.

The last item is to check the R&R Tab record. If the manufacturer has a recommended cycle, use the drop-down menu to select the appropriate cycle schedule. The default would be 365 days.

The screenshot shows the 'Gage Calibration Master Log' software window. It has a 'Gage Number' field with 'TC089' and a 'Find Gage Record to Edit/Update' button. Below are tabs for 'Gage Log Data', 'Gage Calibration Data', and 'Gage R & R Data'. The 'Gage R & R Data' tab is active, showing fields for 'RR Cycle Days' (365), 'R & R Std Used' (0.1), and 'R & R Adjustment'. A note says '<-Enter Decimal % of Annual Usage.' At the bottom, there are buttons for 'Add New Gage' and 'Update Gage', and fields for 'Gage Status' (Active), 'Record Created By' (Debra Arenstein), 'Gage Record Entered' (5/11/2012), and 'Date of Last Calibration' (5/11/2012).

To the right is a 'Calibration Certificate' for SPI. It includes fields for Part Number (12-355-4), Serial Number (110956867), Standard Name (ASME B89), Tool (OUTSIDE MICROMETER), Range (6 - 7"), and Resolution (0.0001"). It also has checkboxes for Visual Inspection and Function Inspection, both checked. Environmental conditions like Humidity (50% +/- 10%), Temperature (20 °C +/- 0.5 °C), and Uncertainty (1.5 µm +/- 10% 4x) are listed. A table of 'Outside Measurements' shows six measurements with nominal values, tolerances, deviations, and dispositions. Inspection and PTB numbers are also provided.

If the default usage is not 75%, you can change it to what you feel will best represent the actual estimated gage usage by using the drop-down menu and selecting the appropriate usage percentage.

Do a final review of all the entered data and if acceptable, press the Add New Gage button to record the transaction.

Once the data has been recorded, the form will clear and the Add New button will go phantom and you can click the cancel button to exit the data entry form or re-enter the gage sequence number and click the Find Gage Record button to pull up the record you just entered.

With the re-called data record, you can create a calibration label and place it on the gage or case as shown in section 3.3 of this WI.



## 4.2 Calibration Process/Data Entry Popup, Gage Log Data Tab, Calibration

When starting a calibration procedure, complete a visual inspection for elements that may be reason to pull the gage from service and if acceptable, enter the gage number and click the find gage button.

Next, select the Gage Calibration Data Tab and using the specified Master Gage and following the Calibration Procedure as noted, record actual as shown above.

If the gage requires adjustment to be within specification, note any adjustments in the comments section on the Gage Log Data tab.

Once all the data has been documented, make sure you identify the Calibrated By, using the drop-down menu.

The final item is the click the Update Gage button and you're almost complete.

The final item is to replace the old calibration label with the updated information and attach the new label to the gage or case as shown in section 3.3 of this WI.

## 5.0 Reference Documents

- QAM
- WIs 1.0 thru 9.0
- ~QA (Job-WO) (NSN) Data Entry Workbook
  - Form QA 001
  - Form QA 002