Ameritube LLC 1000 N. Hwy 77, Hillsboro TX 76645	Revision Level: A	Procedure No. SOP 803
	Revision Date: 10/1/2015	Page No. 1 of 6
Micrometer, Measurement, & Inspection Training	This Document expires one day after printing Last Printed: October 29, 2015	

Date	*Description Of Change*	*Signature*	*Rev. Level*
10/1/15	*New*	*Joseph Ravitsky*	*A*

Procedure Approval: **Company Title:** President **Date:** 6/20/2012

1. Scope and Objectives

1.1. This procedure defines the activities required for establishing and maintaining the training process for the QMS and additionally identified training requirements

1.2. The objective of the training procedure shall be to ensure that all Ameritube LLC personnel receive adequate training that enables them to use the QMS or other training objective effectively.

1.3. The result of the training process shall be informed Ameritube LLC personnel capable of selecting and following appropriate procedures that allow them to improve product quality and improve the overall effectiveness of the QMS.

2. Applicability

2.1. This procedure applies internally to:

2.1.1. all Ameritube LLC personnel

2.2. This procedure applies externally to:

2.2.1. suppliers providing special processes to Ameritube LLC

3. Related Documents

3.1. QM-001, Quality Manual, Section 6.2.2, Competence, Awareness and Training

3.2. SOP 800 General Training, SOP 801 Traveler Training, SOP 802 Tag Training, SOP 803 Micrometer & Measurement Training

3.3. All appropriate Ameritube LLC documentation

3.4. All appropriate Ameritube LLC Work Instructions

3.5. All appropriate machine and software supplier documentation

3.6. Training Documentation Form

3.7. Annual Review form

3.8. Certificates of Completion

4. Calibration

1. All tools must be calibrated with stickers or other identification of calibration date.
2. Calibration procedures are defined in QMS-010.
3. Ameritube operators must only use calibrated measuring tools for training or inspection.

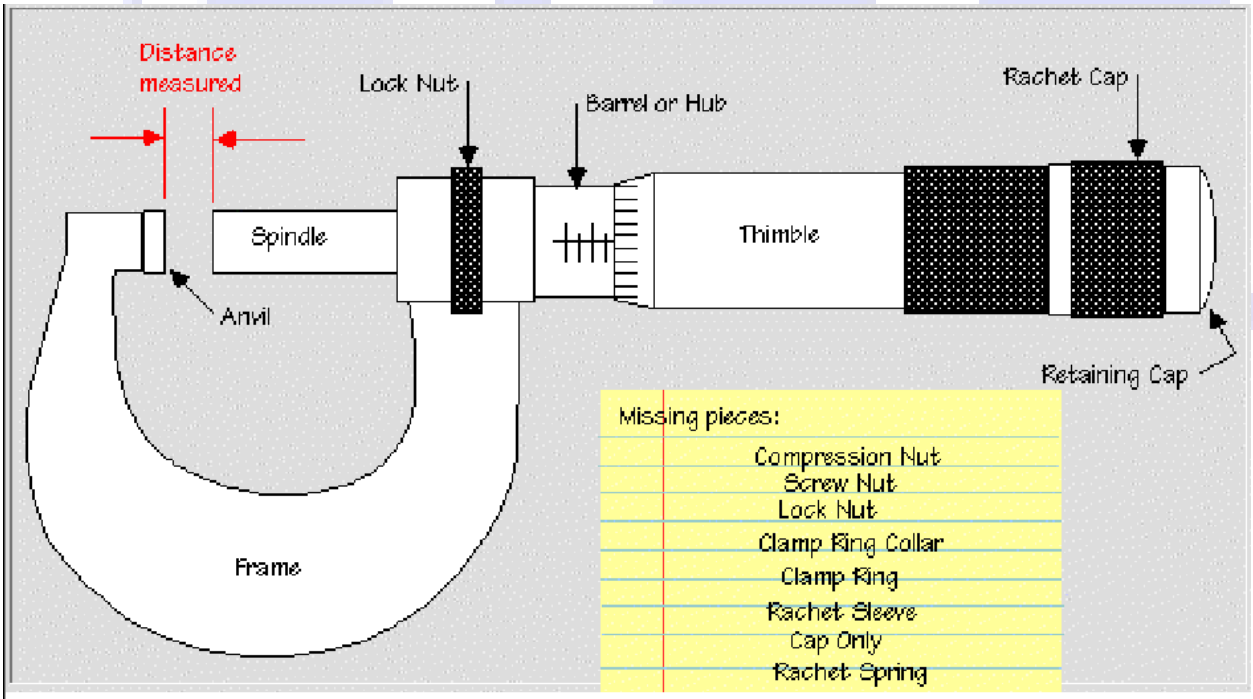
5. Procedure

Prior Mandatory General Training

1. New employees are trained on SOP 800, SOP 801, SOP 802 and SOP 803 prior to any further training.
2. Ameritube operators must understand that it is their responsibility to bring any issues or problems to management attention. Mixed grade bundles, mixed wall thicknesses, tubes separated from their tags, and other mistakes that may result from carelessness in the plant must be caught by the operator. This issue must be made clear to every operator.

MicrometerTraining:

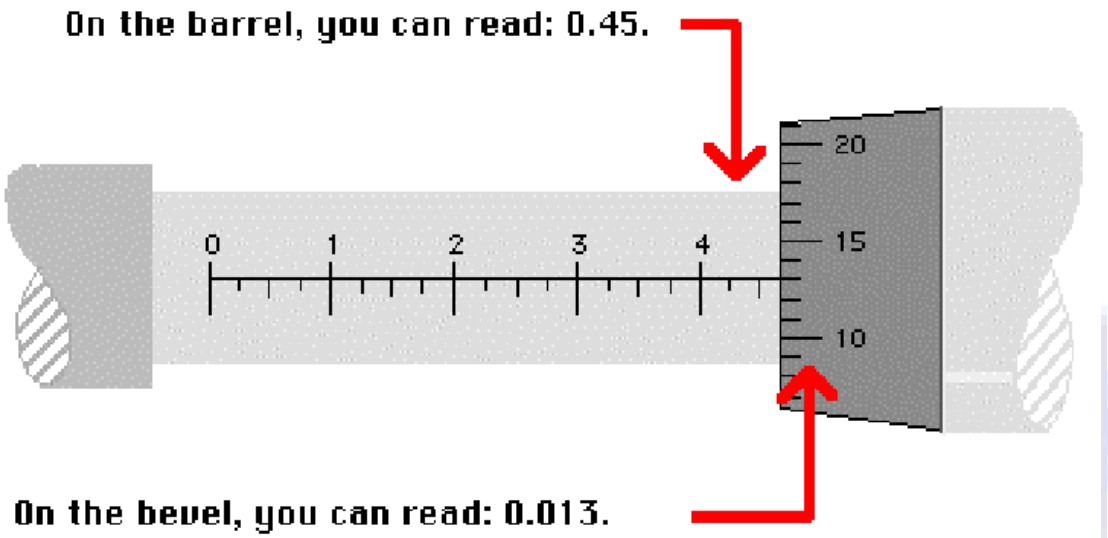
1. Operator must understand the general components of the micrometer.



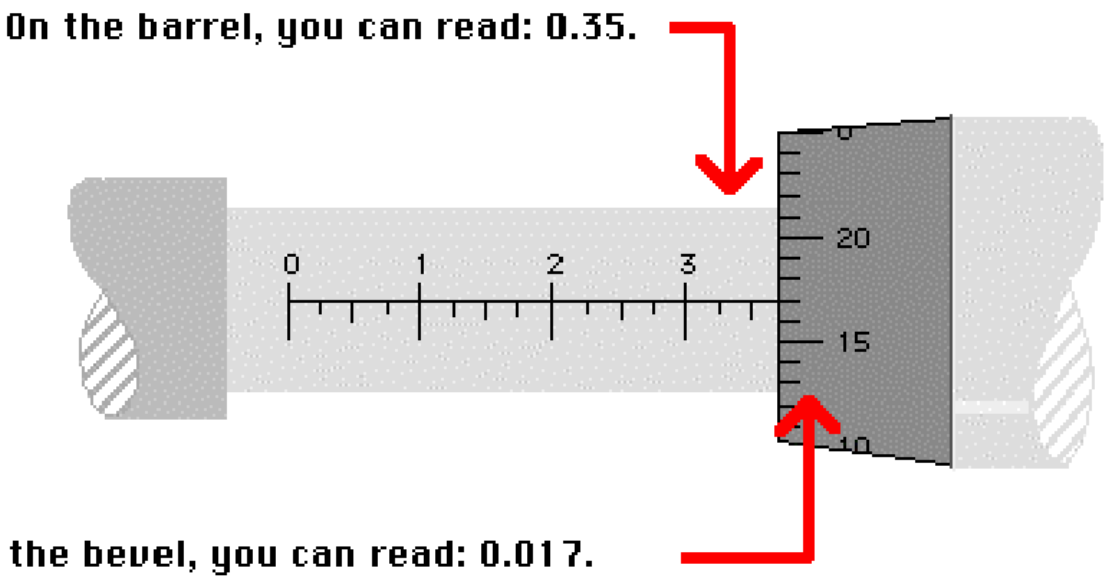
Note: To measure the **wall thickness** of a tube, the anvil should be rounded in order to fit snugly against the inside wall of the tube.
For **outer diameter** measure, the anvil will be flat just like the one in this drawing.

2. Operator must be trained on the proper use of both the wall and outside diameter micrometer
3. Operator must be trained with the following two examples of how to read the micrometer properly:

Reading a Micrometer



Total is 0.45 + 0.013 = .463



Total is 0.35 + 0.017 = 0.367

4. The operator must demonstrate through a series of samples that he can properly read the micrometer.

Length Measurement

1. Operator must have familiarity with reading a tape measure for the purposes of measuring length of the tube.

2. Operator must be able to ensure the tape measure is in good working order, readable and not damaged.

3. Operator must demonstrate his ability to use tape measure by measuring several samples.

Vision Testing

1. Ameritube operators understand that vision testing is necessary and a vision test or eye exam will be administered by authorized Ameritube personnel or based on customer request by a person authorized to perform a vision test according to ASNT-TC-1A.

2. The Jaeger 2 vision test will be used.

Inprocess Inspection

1. In process inspection must be done during the drawing and pilgering operations as well as periodic measurements during the production process.

2. During drawing and pilgering processes or other processes that change the outside diameter and wall thickness of the tubing measurements must be taken after every five tubes have been processed. 100% inspection may be requested by management while the process is being approved or if production requires more careful analysis.

3. Length of tubes is measured by putting one end of the tube at the 1' mark and measuring the length, then subtracting 1'. This is done to minimize problems with alignment of the measuring tape.

4. In process inspection results for outside diameter, wall thickness, and length must be recorded on work order forms, and turned into the quality office at the end of the day.

5. Tubes deemed non-compliant must be recorded on the job traveler during production, recorded on the work order as non-compliant and a NCR form must be generated and attached to the tubing in question.

<u>Final Dimensional Inspection</u>

1. As part of final inspection of the tubing, dimensional inspection is performed.

2. 10% of the tubing in each lot must be inspected in three points on the tube, 3 points on outside diameter and 3 points on wall thickness.

3. 100% dimensional inspection is done by setting up micrometers to be locked out as go/no-go measurements.

4. Length inspection is done by measuring the length of the first tube cut, starting the measurement at the one foot mark and measuring the resulting length and subtracting one. Subsequent tubes are placed next to the first tube to see that the length is maintained.

5. Final inspection results are placed on the final inspection report, which is turned into the quality office and used to generate the material test report (MTR)

6. Non-compliant material is segregated and a Non Compliant Material Report is made identifying the tube and specific non-conformance.