

# Project #108 A&B

## Hammer Handle Shank (thread preparation)

(7/28/14 wrr)

### Project Description:

The hammer handle shank is the one of three machined parts needed to complete the hammer assembly. In this project you will be completing all features of the hammer handle shank excluding the threaded ends; those will be completed later in the class. This project uses two prints and process sheets (A &B).

**Project #108A:** The first blue print is a process print that is used as a preparation step for the overall length and knurling process. Correct completion of the first part to print is needed to manufacture the second stage of the part without complicated calculations.

**Project #108B:** The second print represents the completed part. Lengths, finishes, grooves, and diameters are all critical on this part.

## Project #108A

**Project Objectives:** After you have completed this project, you should be able to:

1. Face and center drill on the lathe.
2. Turn precision diameters between centers.
3. Describe the knurling process and identify knurl specifications from the Machinery's Handbook.
4. Form a medium knurl on a diameter, using a manual lathe.

### References/ Study Material:

Precision Machining Technology textbook:

Section 5, Unit 2, pg. 374-378, (working between centers, lathe centers, center and tailstock alignment)

Section 5, Unit 3, pg. 414-416, (center drilling, spot drilling, and drilling)

Section 5, Unit 3, pg. 422-424, (Knurling)

Machinery's Handbook: None

Machine Tool Study Guide: None

Online Tasks: **MS-25**, Straight Turning Between Centers, 36 minutes

**MS-27**, Knurling, 18 minutes

**MS-33**, Drilling on a Lathe, 16 minutes

**Materials Needed:** Stock size 3/4" diameter or larger x 5.625"

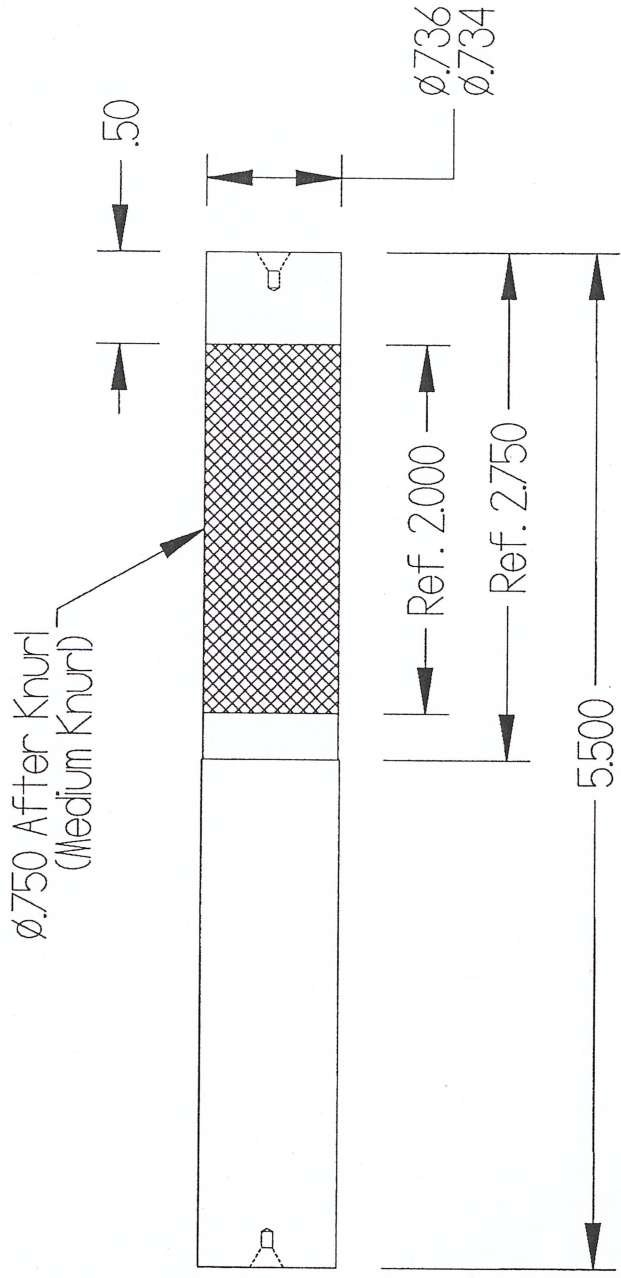
**Additional Tooling:** Knurling tool

### Knurling Information

Knurling is used to make a gripping surface. The process of knurling increases the diameter of the workpiece by cutting and forming the workpiece. The knurl sizes are specified as a "Diametral Pitch." The diametral pitches are 64, 96, 128, and 160. The equivalent descriptive terms are coarse, medium, fine, and extra-fine knurls. Specifications for knurl tooth depth, is found in the Machinery's Handbook under Knurls and Knurling - Diametral pitch knurls.

### Process Sheet #108A Hammer Handle Shank

Operation No.	Machine	Description	Tools	Speeds/ Feeds
10	Horizontal Bandsaw	Stock size 3/4" diameter or larger x 5.625" long	Multi pitch blade	180 SFPM
20	Lathe	Face ends (to size 5.50) and center drill both. <b>Note: Use a 5C- Collet</b>	5C- Collet Drill chuck	Face @ 418 rpm & <u>Drill @</u> 940
30	Lathe	Align centers using straight bar and universal indicator, must be aligned within .001".	universal indicator	
40	Lathe	Place between centers and turn .736"/.734" x 2.75" <b>Note: make a small depth cut (.005) over the full 2.75" length. Measure the diameter at each end and compare size, adjust tailstock if needed.</b>	Lathe centers Face plate Lathe dog	314 or 418 rpm
50	Instructor	Contact instructor for inspection of machined diameter straightness (.736"/.734") over 2.75"	Initials and Date: _____	
60	Lathe	Knurl part to print spec's	Knurling tool	Back gear 60 rpm
70	Instructor	Contact instructor for knurl inspection	Initials and Date: _____	
90	<b>Start the second half of this project see page 108-5</b>			



NOTES: Unless otherwise specified  
 TOLERANCES: Fractional: +/- 1/64  
 Decimal: XX +/- .015  
 Decimal: XXX +/- .010  
 Decimal: XXXX +/- .005  
 Angular +/- 30'  
 FAO 125

Title: Hammer Handle Shank Op#1		
MAT'L	Steel	SCALE: FULL
DWG.NO:		REV: 8/16/11

CVTC

**No documented inspection needed at this point**



## Project #108B

**Project Objectives:** After you have completed this project, you should be able to:

1. Layout and turn a precision groove and lengths on the lathe using indicators.
2. Turn precision diameters between centers.
3. Describe the proper sharpening requirements and use of a parting tool.
4. Use a cutoff tool on the lathe with the appropriate speeds, feeds, and setups.

### **References/ Study Material:**

Precision Machining Technology textbook:

Section 5, Unit 3, pg. 419-422, (form cutting, grooving, and cutoff/parting)

Machinery's Handbook: None

Machine Tool Study Guide:

Online Tasks: **MS-29**, Cutoff Tool, 18 minutes

**Materials Needed:** Hammer Handle Shank with process 108A complete.

**Additional Tooling:** Parting tool, cutting oil, and oil drip pan to salvage oil.

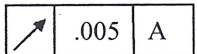
## Process Sheet #108B Hammer Handle Shank

Operation No.	Machine	Description	Tools	Speed Feeds
5		Hammer Handle Shank with 108A complete		
10	Lathe	Place part between centers (knurled end toward tail stock), layout the groove locations, cut .404" groove to size. <b>Note: use 0-1 travel indicator to help locate grooves</b>	Hermaphrodite caliper, Cutoff tool, 0-1blade mic, and 0-1travel indicator, live center.	90 rpm
20	Lathe	Rough turn, finish turn and chamfer left end of part	0-1" micrometer Dead center	270 rpm 628 rpm
30	Lathe	Flip part end for end, move lathe dog to other end and place part back between centers		
35	Lathe	Layout/scribe a line for the 3.50 length	Hermaphrodite caliper	
40	Contact instructor for the deep cut (rough turning) demo		Initials and Date: _____	
50	Lathe	Rough turn the .4967 - .4926 on right end leave .030" to .040" for finish turning	0-1" micrometer Dead center	90 rpm
60	Lathe	Finish turn the .4967 - .4926 and chamfer both diameters	0-1" micrometer Dead center	628 rpm
70	Lathe	Deburr part	File	
80	Bench	Inspect part and record measurements on inspection sheet <b>Note: tolerances that are +/- .005 or less need to be recorded to the 4<sup>th</sup> decimal place</b>	Inspection Tools	
90	Bench	Engrave your name/initials and number on your part	Electric engrave	



## Hammer Handle Shank

Operator \_\_\_\_\_ Clock No. \_\_\_\_\_  
 Date handed in: \_\_\_\_\_ Inspector \_\_\_\_\_  
 Grade \_\_\_\_\_

Dimension	Checks	O K	O S	U S	Rwk Rpr	Comment	Function Y/N
5.50 +/- .015							
3.50 +/- .015							
1.00 +/- .015							
.750 dia +/- .010							
Medium Knurl							
.404 dia +/- .010							
.125 +/- .010							
R.031 +/- .010							
All .06 X 45 degrees							
(left end)							
Max. .4967						4 <sup>th</sup> decimal	
Min. .4926							
(right end)							
Max. .4967						4 <sup>th</sup> decimal	
Min. .4926							
 .005 A							
FAO 125							
Deburr							