Project #107

Hammer Head

(08/16/13 wrr)

Project Description:

The hammer head is 1 of 3 hammer components to be made in your first semester. The hammer head is a precision turned part with three diameters that must maintain the same centerline (run out) within .005". The student is required to set up a three-jaw and a four-jaw chuck to turn the three precision diameters, note: two diameters have a .004" tolerance range.
The second portion of the hammer head project requires the student to set up a milling machine to drill, counter bore, and tap a hole that is perpendicular to the part centerline, this will be completed in the 420-322 course work and after all the hammer components are completed.

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

1. Understand how to achieve the geometric tolerance of run out,  by turning multiple diameters on same centerline using 3 & 4 jaw chucks.
2. Turn two shoulders (flat surfaces) parallel to each other to a tolerance of .005".
3. Indicate a part within .001" when held in a four-jaw chuck.
4. Achieve a 63 surface finish or better using a lathe and HSS toolbit.

References/ Study Material:

Precision Machining Technology textbook: None

Machine Tool Study Guide:

Online Tasks: **MS-35**, Four-Jaw Chuck, 12 minutes

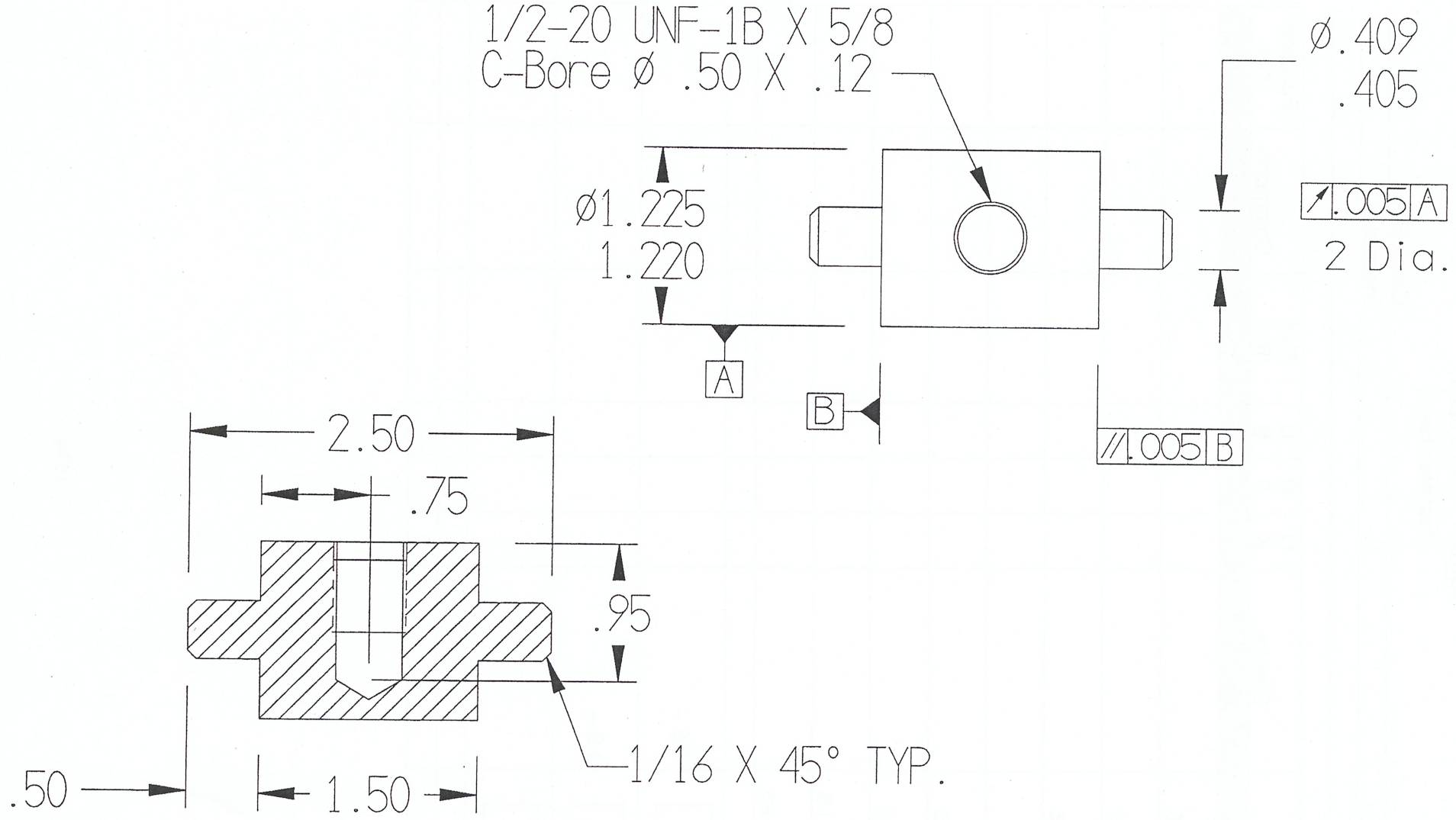
Materials Needed: Stock size: 1.25" diameter or larger x 5 1/2".

Note: 3" extra length for work holding

Additional Tooling: 4-jaw chuck

Process Sheet #107
Hammer Head

Operation No.	Machine	Description	Tools	Speed Feeds
10	Horizontal Bandsaw	Stock size: 1.25" diameter or larger x 5 1/2" long **Note:** 3" extra length for work holding	Multi pitch blade	180 SFPM
20	Lathe	Mount 3-jaw chuck on lathe		
30	Instructor	Contact instructor to review the process/concept of rough and finish machining	Initials and Date: _____	
40	Lathe	Mount stock in 3-jaw chuck with 2.50" of material in front of the jaws. Face end and rough turn 1/2" shoulder and .409"/.405" dia., leaving .020" for finishing.	3-jaw chuck 0-1" micrometer 1-2" micrometer dial caliper	270 rpm and 628 rpm
50	Lathe	Finish turn the 1/2" shoulder, .409 - .405 dia. Finish turn 1.225"-1.220" dia., then chamfer.	0-1" micrometer 1-2" micrometer dial caliper	270 rpm and 628 rpm
60	Horizontal Bandsaw	Cut stock to 2 5/8" long	Multi pitch blade	180 SFPM
70	Lathe	Face off saw cut end until smooth	3-jaw chuck	
80	Lathe	Attach **Independent** 4-jaw chuck to lathe.	Universal indicator	
90	Instructor	Contact instructor for the 4-jaw chuck demo, only after watching **MS-35 (4-Jaw Chuck)**	Initials and Date: _____	
100	Lathe	Face end to length, rough turn 1/2" shoulder and .409"/.405" dia. leaving .020"	0-1" micrometer dial caliper	270 rpm and 628 rpm
110	Lathe	Re-indicate your part before you finish turn the shoulder and diameter.	Universal indicator	
120	Lathe	Finish turn 1/2" shoulder, .409"/.405" dia. and chamfer.	0-1" micrometer dial caliper	628 rpm
130	Lathe	Deburr part	File	
140	Bench	Engrave your name/initials and number on your part	Electric engrave	



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

Title: Hammer Head	
MAT'L MILD STEEL	SCALE: FULL
DWG. NO:	REV: 8/16/11

CVTC

Hammer Head

Operator _____ Clock No. _____
Date handed in: _____ Inspector _____
Grade _____

Dimension	Checks	O K	O S	U S	Rwk Rpr	Comments	Function Y/N
Part #1							
2 1/2 +/- .015							
1 1/2 +/- .015							
1/2 +/- .015							
1.225 – 1.220 dia							
.409 - .405 dia. LS							
.409 - .405 dia. RS							
1/16 X 45 degrees LS							
1/16 X 45 degrees RS							
↗ | .005 | A	RS –						
↗ | .005 | A	LS –						
// | .005 | B							
FAO 125							
Deburr							