Activity 6.3a - Machining the TensileTesting Samples

Purpose

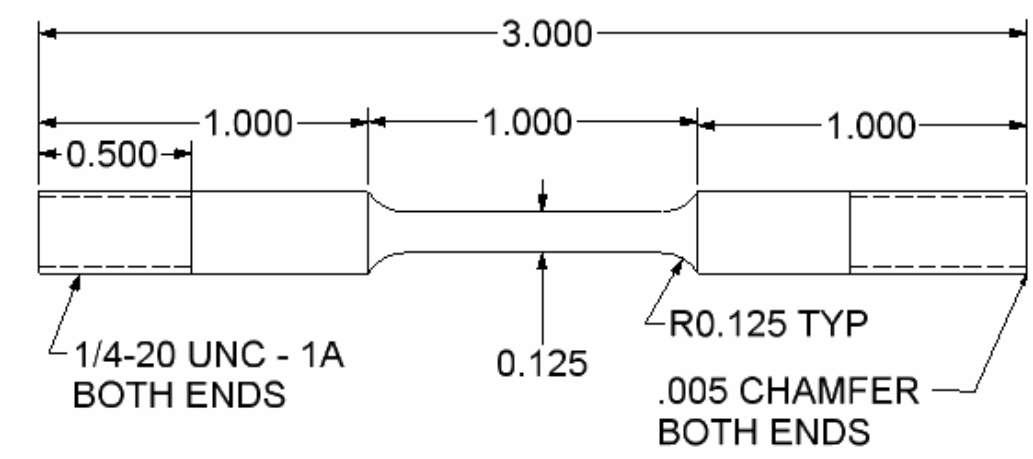
Engineers that design parts for any product must be sure that the parts made are reliable, safe and function in a predictable way. To achieve this objective a great deal of care must be taken in choosing the material from which the part is to be fabricated. In choosing this material the engineer must know all the properties and characteristics that the material exhibits. For this information to be known a great deal of testing of the material used must be performed. Material testing is a process by which properties of a material can be investigated and determined. This process is very important when designing products and parts that will perform in the desired way.

Materials

One 1/4" round diameter aluminum bar 3 inches long
One 1/4" round diameter brass bar 3 inches long.
Metal lathe and lathe tooling
Micrometer 1 inch
Die holder or wrench and die with 1/4" – 20 NC thread.
Hacksaw
Bench grinder

Procedure

1. Study the following drawing:



2. Using a bandsaw cut the length of the rod to 3-1/16”.

3. Remove burrs on ends of material with a file.

4. Place material in lathe collet and face one end, then chamfer.

5. Remove the stock from the lathe, measure and mark material at 3.000”.

6. Place material in lathe collet, turn to the mark you made, then chamfer (refer to drawing).

7. Center drill end to include tapered portion of center drill.

8. Put the lathe in the backgears setting and thread (1/4-20) both ends of the material (refer to drawing).

9. Mark material for appropriate gage section location (refer to drawing).

10. Place material in lathe between centers.

11. Turn material to correct tensile diameter in cuts no greater than .030” and ending cuts of no more than .005”. Be sure that the ends of the cuts are filleted.

12. Submit to instructor for grading.

Conclusion

1. What is the purpose of the fillets on the test sample?

2. How is the diameter of the center section determined?

3. How much thread must be held at each end of the test sample when testing?