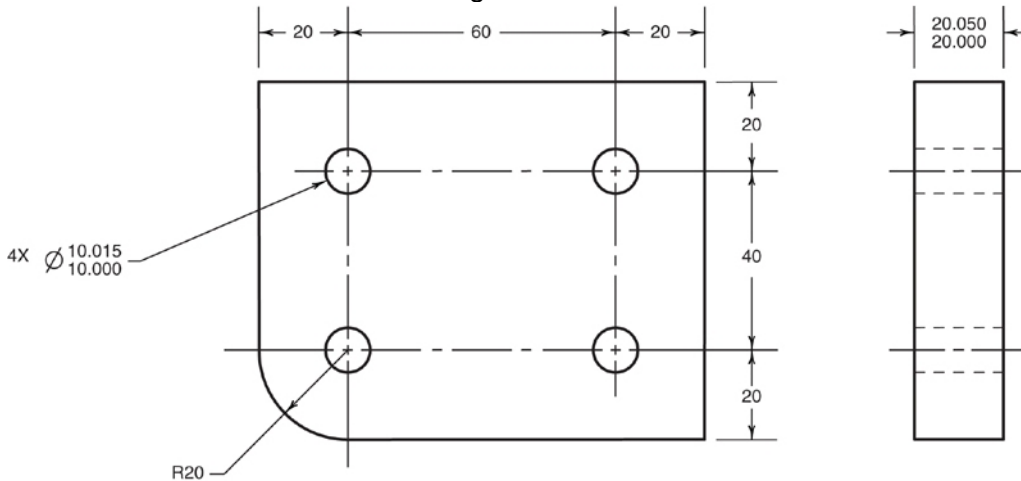


Engineering 210 – Lab # 19
Geometric Dimensioning and Tolerancing

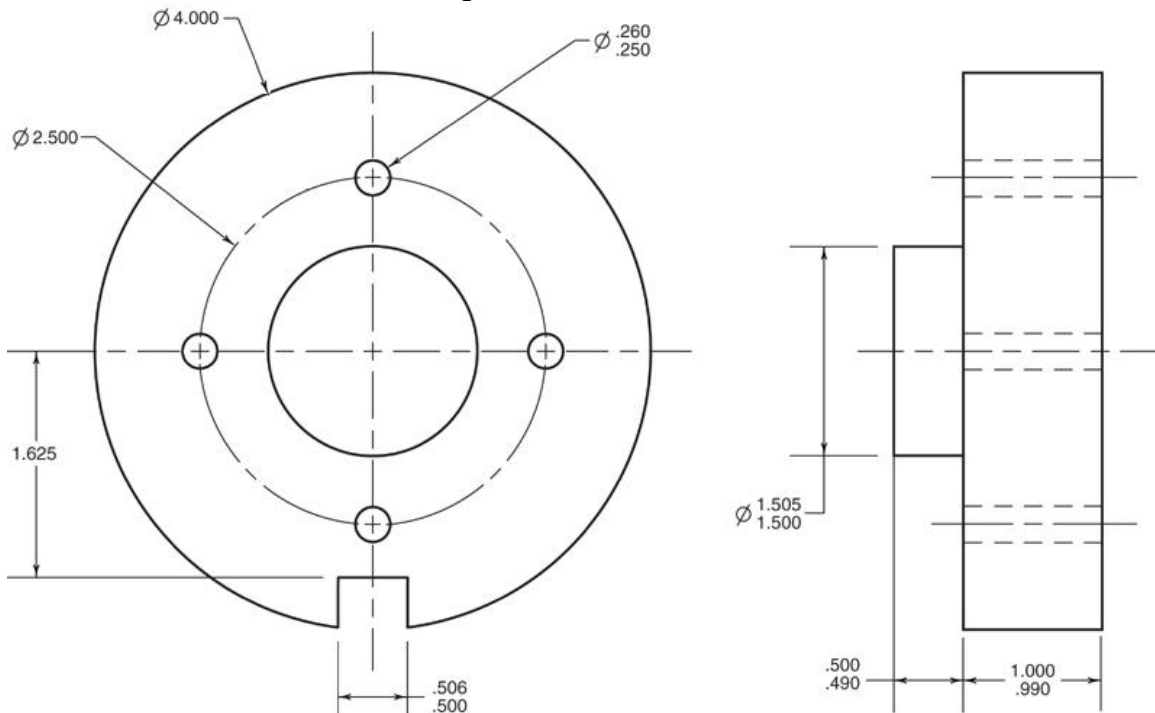
Part 1: Create an AutoCAD drawing of the two views shown.



Add the geometric dimensioning information per the following information:

1. Make the left-hand face in the right side view flat within 0.01. Identify this surface as datum feature A.
2. Make the top surface in the front view perpendicular within 0.01 relative to datum feature A. Identify this surface as datum feature B.
3. Make the right-hand surface in the front view perpendicular within 0.01 relative to primary datum feature A and secondary datum feature B. Identify this surface as datum feature C.
4. Make all dimensions basic except for the existing limit dimensions.
5. Position the four holes within a 0.007 cylindrical tolerance zone at maximum material condition relative to primary datum feature A, secondary datum feature B, and tertiary datum feature C.
6. In the front view, identify the top left corner as point X. Identify the bottom right corner as point Y. On the bottom surface in the front view, add a profile of a surface tolerance of 0.02 relative to primary datum feature A, secondary datum feature B, and tertiary datum feature C. Indicate that this tolerance applies between points X and Y

Part 2. Create an AutoCAD drawing of the two views shown.



Add the geometric dimensioning information per the following information:

1. Where the small cylinder intersects the large cylinder in the right side view, make the face on the larger cylinder datum feature D. Control this surface with a flatness tolerance of *.005*.
2. In the right side view, make the axis of the small cylinder datum feature E. The axis must be perpendicular within a *.002* cylindrical tolerance zone at maximum material condition relative to datum feature D.
3. In the front view, make the *.500 - .506* slot datum feature F. Position this slot within a *.003* tolerance zone at maximum material condition relative to primary datum feature D and secondary datum feature E at maximum material condition.
4. Make the 2.500 and 4.000 diameters basic dimensions.
5. Position the four small holes within a *.005* cylindrical tolerance zone at maximum material condition relative to primary datum feature D, secondary datum feature E at maximum material condition, and tertiary datum feature F at maximum material condition.
6. Apply a profile of a surface tolerance of *.050* to the outside surface in the front view relative to primary datum feature D and secondary datum feature F at maximum material condition.

Part 3: Exercises.

Given the following descriptions of geometric tolerances, starting with a blank drawing file, use ACAD to create a feature control frame for each.

1. The surface must be flat within a five thousandths of an inch tolerance zone
2. The surface must be parallel within a five thousandths of an inch tolerance zone relative to datum feature A.
3. The axis must be perpendicular within a five hundredths of a millimeter cylindrical tolerance zone at maximum material condition relative to datum feature B.
4. The surface must be straight within a one tenth of a millimeter tolerance zone.
5. The surface must be round within a twenty-five thousandths of an inch tolerance zone.
6. The total surface profile must be within a four hundredths of a millimeter tolerance zone equally disposed about the true profile of the feature relative to primary datum feature A, secondary datum feature B, and tertiary datum feature C.
7. The total runout of the surface must be within a fifteen thousandths of an inch tolerance zone relative to primary datum feature M and secondary datum feature N.
8. The axis must be concentric within a one tenth of a millimeter cylindrical tolerance zone relative to datum axis A.
9. The axes of the holes must be positioned within a twenty-five hundredths of a millimeter cylindrical tolerance zone at maximum material condition relative to primary datum feature D, secondary datum feature E, and tertiary datum feature F.
10. The axis must be positioned within a ten thousandths of an inch cylindrical tolerance zone at maximum material condition relative to primary datum feature A, secondary datum feature B, and tertiary datum feature C and perpendicular within a five thousandths of an inch cylindrical tolerance zone at maximum material condition relative to primary datum feature A.