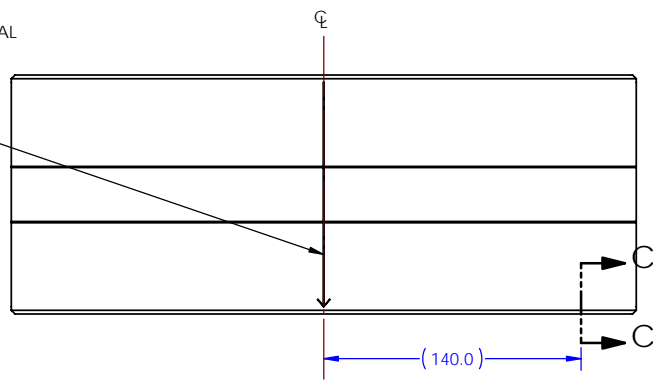


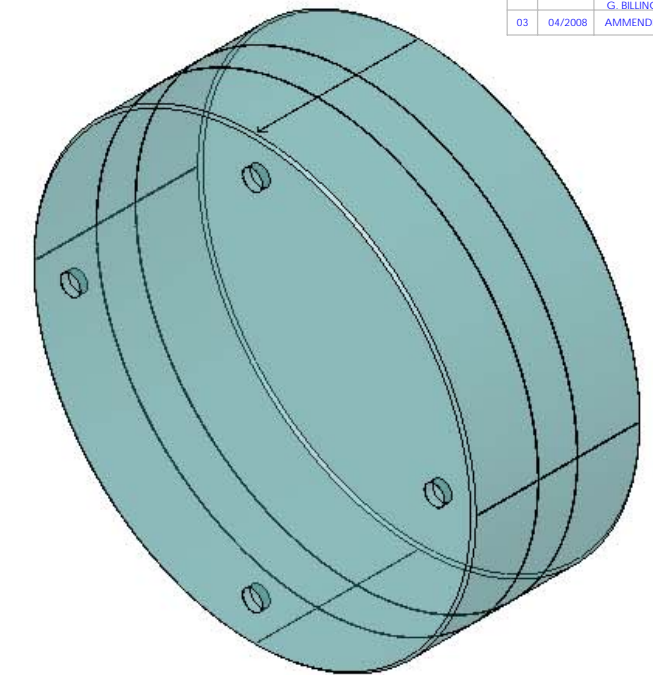
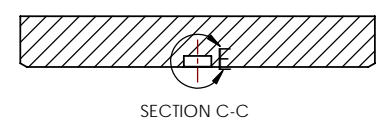
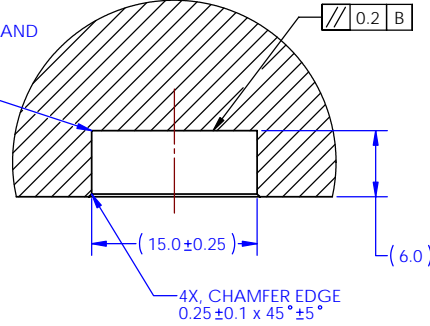
REV	DATE	DCN #	DRAWING TREE #
00	01/2008	INITIAL RELEASE	
01	03/2008	ALTERATIONS BASED ON REVIEW BY G. BILLINGSLEY AND I. WELMUT	
02	04/2008	ADDITION OF CLEAR APERTURE TO SURFACES 'S1' AND 'S2' FOLLOWING DISCUSSIONS BETWEEN K. STRAIN AND G. BILLINGSLEY	
03	04/2008	AMMENDMENT TO MANUFACTURING NOTE 4. (K. STRAIN)	

ETCH, GRIND OR SANDBLAST LEGIBLE REFERENCE GROOVE (GROOVE WIDTH 0.25mm ± 0.05mm) ALONG ϕ , PARALLEL TO THE CYLINDRICAL AXIS (DEFINED BY DATUM FEATURE -A-) WITH ARROW POINTING TO SURFACE 'S1' WITHIN ±0.1mm

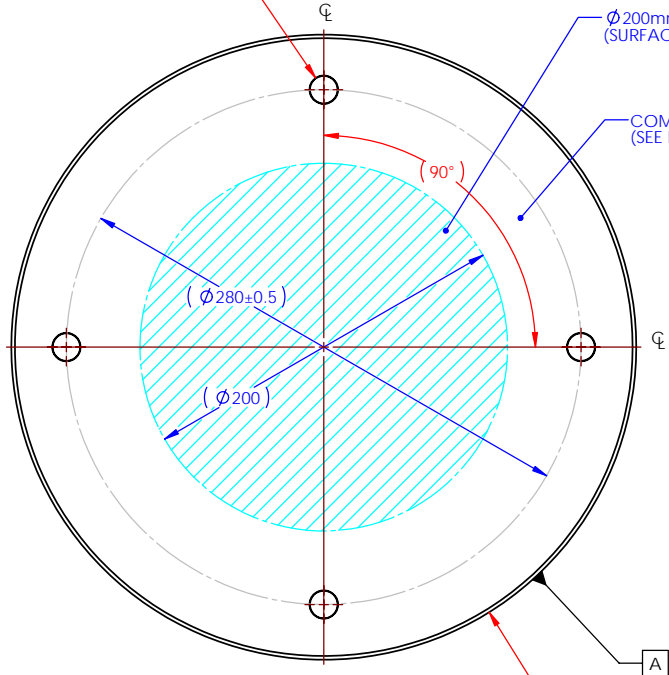


RADIUS AROUND BOTTOM OF RECESS R1 MAX. GROUND FINISH ACCEPTABLE FOR BASE AND SIDES OF RECESS.

DETAIL E SCALE 3 : 1

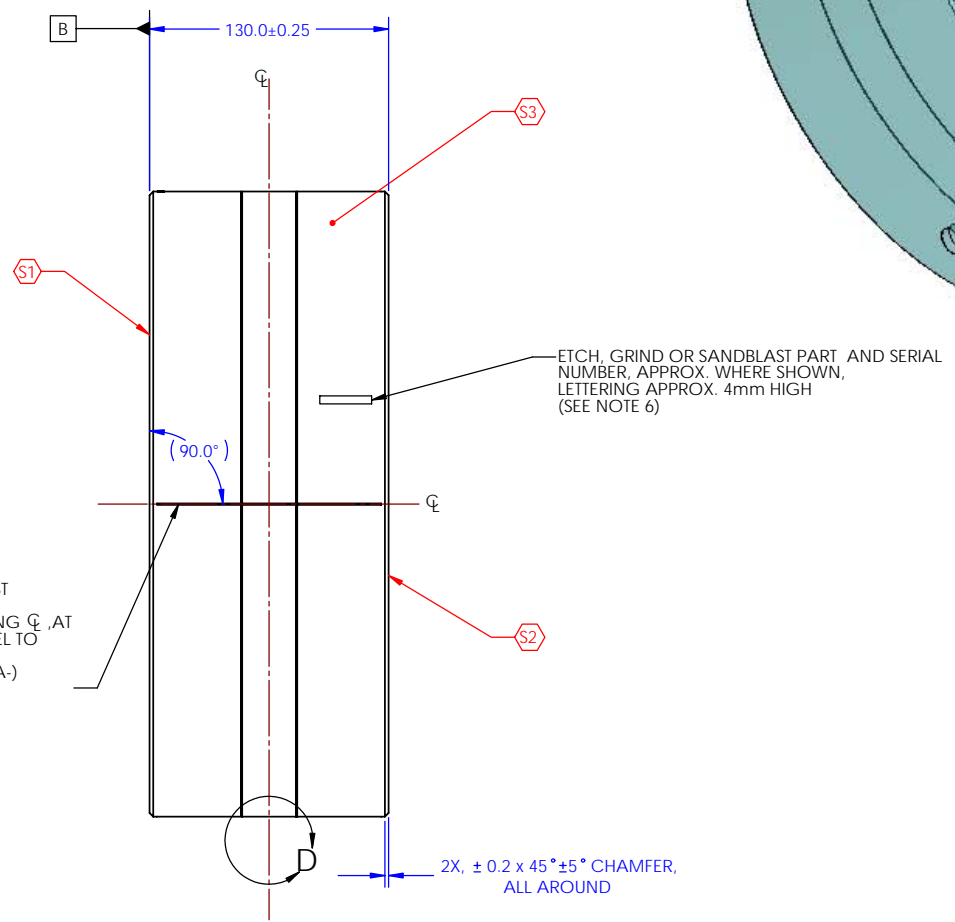


4X, $\phi 15.0 \pm 0.25 \nabla 6.0$ EQUALLY SPACED ON A 280 ± 0.5 BOLT CIRCLE. EDGE CHIPPING TO BE MINIMISED.



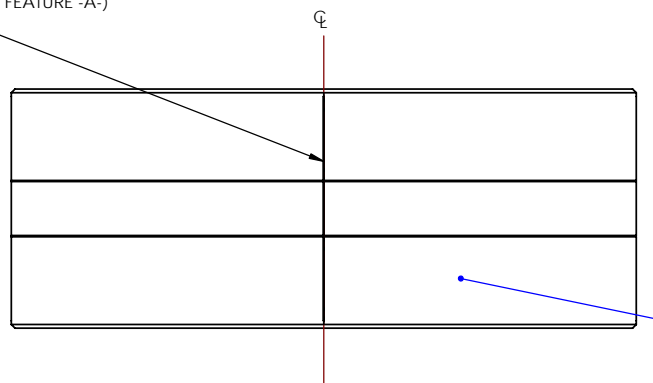
$\phi 200$ mm CLEAR APERTURE (SURFACE 'S1' AND SURFACE 'S2')

COMMERCIAL POLISH SURFACE 'S1' (SEE NOTE 4)

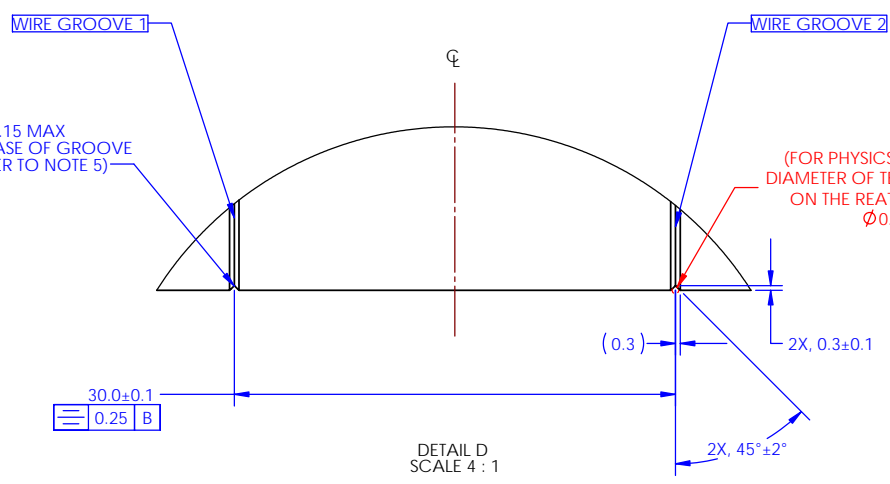


2X, ETCH, GRIND OR SANDBLAST LEGIBLE REFERENCE GROOVE (WIDTH 0.25mm ± 0.05mm) ALONG ϕ , AT 0° AND 180° POSITION PARALLEL TO THE CYLINDRICAL AXIS (DEFINED BY DATUM FEATURE -A-) WITHIN ±0.1mm

ETCH, GRIND OR SANDBLAST LEGIBLE REFERENCE GROOVE (GROOVE WIDTH 0.25mm ± 0.05mm) ALONG ϕ , PARALLEL TO THE CYLINDRICAL AXIS (DEFINED BY DATUM FEATURE -A-) WITHIN ±0.1mm



INSPECTION POLISH (SEE NOTE 3)



(FOR PHYSICS REFERENCE: DIAMETER OF TEST MASS WIRES ON THE REACTION CHAIN, $\phi 0.46$)

- MANUFACTURING NOTES:
- DO NOT SCALE FROM DRAWING.
 - THIS DRAWING IS ACCOMPANIED BY LIGO COMPONENT SPECIFICATION 'E080089'. [REFER TO E080089 FOR MATERIAL AND INSPECTION NOTES.]
 - INSPECTION POLISH ALL FACES, EDGES AND CHAMFERS. SURFACES SHALL APPEAR TRANSPARENT WITH NO GREY, SCUFFS OR SCRATCHES VISIBLE TO THE NAKED EYE WHEN VIEWED IN NORMAL ROOM LIGHT AGAINST A BLACK BACKGROUND.
 - SURFACE QUALITY ON SURFACE 'S1' AND WITHIN THE CLEAR APERTURE ON SURFACE 'S2' TO BE 80/50 SCRATCH/DIG (AS PER MIL-PRF-13830B)
 - WIRE GROOVES 1 and 2, SHOWN IN DETAIL 'D' ARE REQUIRED TO LOCATE TWO STEEL WIRE LOOPS ($\phi 0.46$ mm). GROOVES MUST EXTEND AROUND THE FULL CIRCUMFERENCE OF THE MASS IN THE POSITIONS SHOWN. THE SEPARATION OF THE GROOVES FROM THE CENTRE OF MASS (ϕ), AND EACH OTHER IS CRITICAL. GROOVES SHOULD BE APPROXIMATELY 'V'-SHAPED WITH A MAX. RADIUS OF 0.15mm AT THE BASE OF EACH GROOVE.
 - ETCH, GRIND OR SANDBLAST PART AND SERIAL NUMBER, APPROX. WHERE SHOWN, USE LETTERING APPROX. 4mm HIGH.
- THE SERIAL NUMBER SHOULD BE OF THE FORMAT: D080116-YY-Z WHERE 'YY' IS INCREMENTAL FOR EACH SUBSTRATE, STARTING AT '01', AND 'Z' IS THE CURRENT REVISION LETTER OF THIS SPECIFICATION. EXAMPLES: D080116-01-A, D080116-02-A, ...D080116-09-A, AND SO ON.

NOTES (UNLESS OTHERWISE SPECIFIED)		PARTS LIST	
DIMENSIONS ARE IN MILLIMETERS (mm)		LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 400 GROUP	
TOLERANCES:		SYSTEM	ADVANCED LIGO
x ± 0.1		SUB-SYSTEM	SUS
xx ± 0.05		AS PER LIGO-E080089	ETM QUAD
MATERIAL:		FINISH	SEE NOTES
ANGULAR ± 0.1°		DRAWN	NAME
		CHECKED	DATE
		APPROVED	SCALE
			PROJECTION
			SHEET 1 OF 1