STAR – SECTOR MOUNTING TOOL

Lawrence Berkeley Laboratory - University of California **Engineering Note**	Code SR0210	Serial M7631A	STAR Doc # CSN0300A	Page 1 of 10
Author Rusell Wells	Department Mechanical Engineering	Date 1/20/98	STAR WBS # 4.2.10	

Program
Solenoidal Tracker at RHIC

Sub program
Time Projection Chamber - Assembly and Test

Title
SMT Lifting Beam

MHG

Rev A: 1/15/98 Increased load test weight from 4000 to 4800 lbs. and increased rating to 2400 lbs. Made STAR Note 300 a Controlled STAR Note.

Person in Charge: Russell Wells Date 2/6/98
Russell Wells

Reviewed by: Date 2/4/98
Frederick Angliss

pc

Introduction

A spreader lifting beam is needed for hoisting the STAR TPC Sector Mounting Tool (SMT) into position. The SMT with outer sector weighs 1027 lbs. and is 82 inches in length. The spreader consists of a simple 6061-T651 aluminum bar with holes at either end to accept small, 4.75 ton, shackles and a series of 9 holes placed symmetrically around the bars mid-span sized to accept a large shackle. The large shackle allows a direct connection to the B77A room 105 crane hook.

Rev A: To accomondate sector removal with the TPC in the magnet a 940 counter weight and assorted hardware has been added bringing the total weight of the assembly to 2100 lb.

Calculations

Beam dimensions of height, h, thickness, b, and length, l, (between load points) are given below.

$$b := 1.0 \cdot in \qquad h := 6 \cdot in \qquad l := 81.76 \cdot in$$

The spreader will be designed for a lifting capacity, P, of 2000 lbs. The material selected is 6061-T6 aluminum. The load from the SMT will be transferred to the beam via the two end points at a span of 81.8 inches. The beam in turn transmits the load to the crane hook via one or more of the lifting points near mid-span. The nine centrally located holes provide a means of balancing the load (leveling the beam).

$$P := 2400 \cdot lbf \qquad E := 10 \cdot 10^6 \cdot \frac{lbf}{in^2} \qquad \rho := .1 \cdot \frac{lbf}{in^3}$$

The spreader can be treated as a simply supported beam with a central point load. The maximum stress in the beam is due to bending.

Area moment of inertia $I := \frac{b \cdot h^3}{12}$ $I = 18 \cdot in^4$

Bending moment $M := \frac{P \cdot l}{4}$ $M = 4.906 \cdot 10^4 \cdot in \cdot lbf$

Distance to the extreme fiber $c := \frac{h}{2}$

Bending stress $\sigma := \frac{M \cdot c}{I}$ $\sigma = 8.176 \cdot 10^3 \cdot \frac{lbf}{in^2}$ $\sigma = 5.637 \cdot 10^7 \cdot Pa$

Maximum deflection $\delta := \frac{P \cdot l^3}{48 \cdot E \cdot I}$ $\delta = 0.152 \cdot in$ $\delta = 3.856 \cdot 10^{-3} \cdot m$

Safety Factor , on ultimate strength of 6061-T6

$\sigma_{ult} := 42000 \cdot \frac{lbf}{in^2}$ $SF := \frac{\sigma_{ult}}{\sigma}$ $SF = 5.137$ OK, SF> 5

Shear tear out, where a is the distance from edge of hole to edge of plate, where dH is the hole diameter and the distance from center to edge is 2.5 and 1.5 inches for the large and small holes, respectively.

Large hole to edge $d_H := 1.44$ $a := 2.50 \cdot in - \frac{d_H}{2} \cdot in$

$\tau := \frac{P}{2 \cdot a \cdot b}$ $\tau = 674.157 \cdot \frac{lbf}{in^2}$

Small hole to edge $d_H := 0.94$ $a := 1.50 \cdot in - \frac{d_H}{2} \cdot in$

$\tau := \frac{P}{2 \cdot a \cdot b}$ $\tau = 1.165 \cdot 10^3 \cdot \frac{lbf}{in^2}$

Bearing failure, where d is the diameter of the lifting shackle pin.

Large shackle $d := 1.37 \cdot in$

$\sigma_b := \frac{P}{d \cdot b}$ $\sigma_b = 1.752 \cdot 10^3 \cdot \frac{lbf}{in^2}$

Small shackles $d := .88 \cdot in$

$\sigma_b := \frac{\frac{P}{2}}{d \cdot b}$ $\sigma_b = 1.752 \cdot 10^3 \cdot \frac{lbf}{in^2}$

Weight of spreader beam, $Wt := b \cdot h \cdot l \cdot \rho$ $Wt = 49.056 \cdot lbf$

Elastic Stability

An approximation of the elastic stability of the lifting beam can be made by application of the formula for a straight uniform beam of narrow rectangular section under a center load applied at a point a distance of "a" below (negative value) the centroid of the section. The ends of the beam are simply supported but restrained from twisting. In the case of the lifting beam the end load tends to hold the beam vertical and resist twisting to some degree. From Roark and Young 6th Ed. Table 34 No. 12.

Large hole to edge $d_H := 1.44$ $\quad a := \left(2.50 \cdot in - \frac{d_H}{2} \cdot in\right) - 3.0 \cdot in$

Poisson's ratio $\quad \nu := .34$

Shear Modulus $\quad G := \frac{E}{2 \cdot (1 + \nu)}$

Buckling Load:

$$P_b := \frac{2.82 \cdot b^3 \cdot h \cdot \sqrt{\left(1 - 0.63 \cdot \frac{b}{h}\right) \cdot E \cdot G}}{l^2} \cdot \left[1 - \frac{1.74 \cdot a}{l} \cdot \sqrt{\frac{E}{G \cdot \left(1 - .63 \cdot \frac{b}{h}\right)}}\right]$$

$P_b = 1.528 \cdot 10^4 \cdot lbf$

Nominal safety factor on buckling ;

$SF_b := \frac{P_b}{P}$

$SF_b = 6.369$ OK

Side loads

If the load is not directly beneath the crane hook a transverse, or side, load is imposed on the lifting beam. If the transverse load is great enough to substantially bend the beam out of plane twisting occurs and the beam can fail. To prevent bending due to an off vertical lift and/or play between the shackle and beam, aluminum channel has been bolted to either side of the main bar. The channels are sized to resist the side loads generated by up to a 15 degree misalignment. To allow for free movement of the top shackle, the flanges of the channel at the top of the beam have been milled down. The calculation of the area moment of inertia reflects this detail.

Approximate flange thickness (tapered) $t_f := .250 \cdot in$

Web thickness $t_w := .314 \cdot in$

Width of channel web $h_i := h - 2 \cdot t_f$

Height of channel flange, milled flange $b_f := 2 \cdot in$ $b_{fm} := .53 \cdot in$

Transverse thickness of assembly at web $b_w := b + t_w$

Transverse thickness at assem. at milled flange $b_{wm} := b + 2 \cdot b_{fm}$

Transverse thickness of assembly at flange $b_o := b + 2 \cdot b_f$

Area moment of inertia for bending in the transverse direction

$$I_{xeq} := \frac{h_i \cdot b_w^3}{12} + \frac{t_f \cdot b_o^3}{12} + \frac{t_f \cdot b_{wm}^3}{12}$$

$$I_{xeq} = 3.826 \cdot in^4$$

Assuming the load is within 15 degrees of vertical, the side load is:

Transverse load $P_x := P \cdot \sin\left(\frac{\pi}{12}\right)$ $P_x = 621.166 \cdot lbf$

Horizontal deflection $\delta_x := \frac{P_x \cdot l^3}{48 \cdot E \cdot I_{xeq}}$ $\delta_x = 0.185 \cdot in$

Bending Stress $\sigma_x := \frac{P_x \cdot \frac{l}{4} \cdot \frac{b_o}{2}}{I_{xeq}}$ $\sigma_x = 8.296 \cdot 10^3 \cdot \frac{lbf}{in^2}$

Safety Factor $SF := \frac{\sigma_{ult}}{\sigma_x}$ $SF = 5.063$ OK

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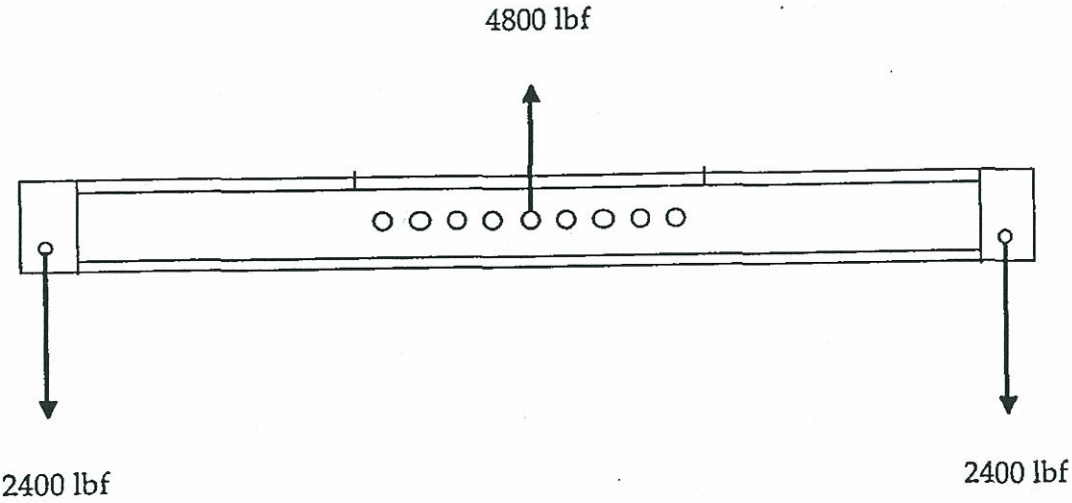
Proof Load Test.

The lifting (spreader) beam load test consists of anchoring the beam to a weight of at least 5000 lbs. via the lifting points at either end and applying a 4800 vertical force at the center lift point or attaching two weights of 2400 lb each to either end.



Remarks:

Test Performed by: Dwight O.P.S. Date: 1/21/98

Test Witnessed by: Jan Wu Date: 1-21-98

PE #_____

UP-GRADE OF SR-009-77A

Oakland * Santa Clara * Sacramento

Testing Engineers, Incorporated

NDT DEPARTMENT

2811 Adeline Street * Oakland, CA 94623 * 510-835-3142

LABORATORY NO. Y0636 DATE 06/25/97
CLIENT U.C. LAWRENCE BERKELEY LAB
ADDRESS No. 1 Cyclotron Road
Berkeley, CA 94720
JOB LOCATION NDT Lab - Oakland
CLIENT P.O. NO.
JOB NO.
ITEM DESC. STRONG BACK
PLAN OR DRAWING NO.
EXAMINATION: PARTIAL SEE BELOW 100%

LIQUID PENETRANT INSPECTION REPORT

NDE Standard ASTM E165

Acceptance Standard No Cracks

Procedure No. SPP-PT-400 (Rev. 3)

Stage of Fab.: In Process ☐ Final ☒

Type of Work: New ☒ Repair ☐

Heat Treatment: Before Inspection ☒ After Inspection ☐

Surface Condition: Machined

Material: Type Aluminum Temp. Ambient

Other NDT Required: Yes ☐ No ☒

Type:

PENETRANT Visible ☒ Fluorescent ☐
Solvent Removable ☒
Post-Emulsified ☐
Water Washable ☐

Mfgr. Magnaflux Corp NO. SKL-SP

Batch No. 92K08K Dwell Time 20 min

CLEANER
Mfgr. Magnaflux Corp. NO. SKC-NF

Batch No. 95M13K

EMULSIFIER
Mfgr. N/A NO.

Batch No. Dwell Time

DEVELOPER Dry ☐ Wet ☐ Non-Aqueous ☒

Mfgr. Magnaflux Corp. NO. SKD-S2

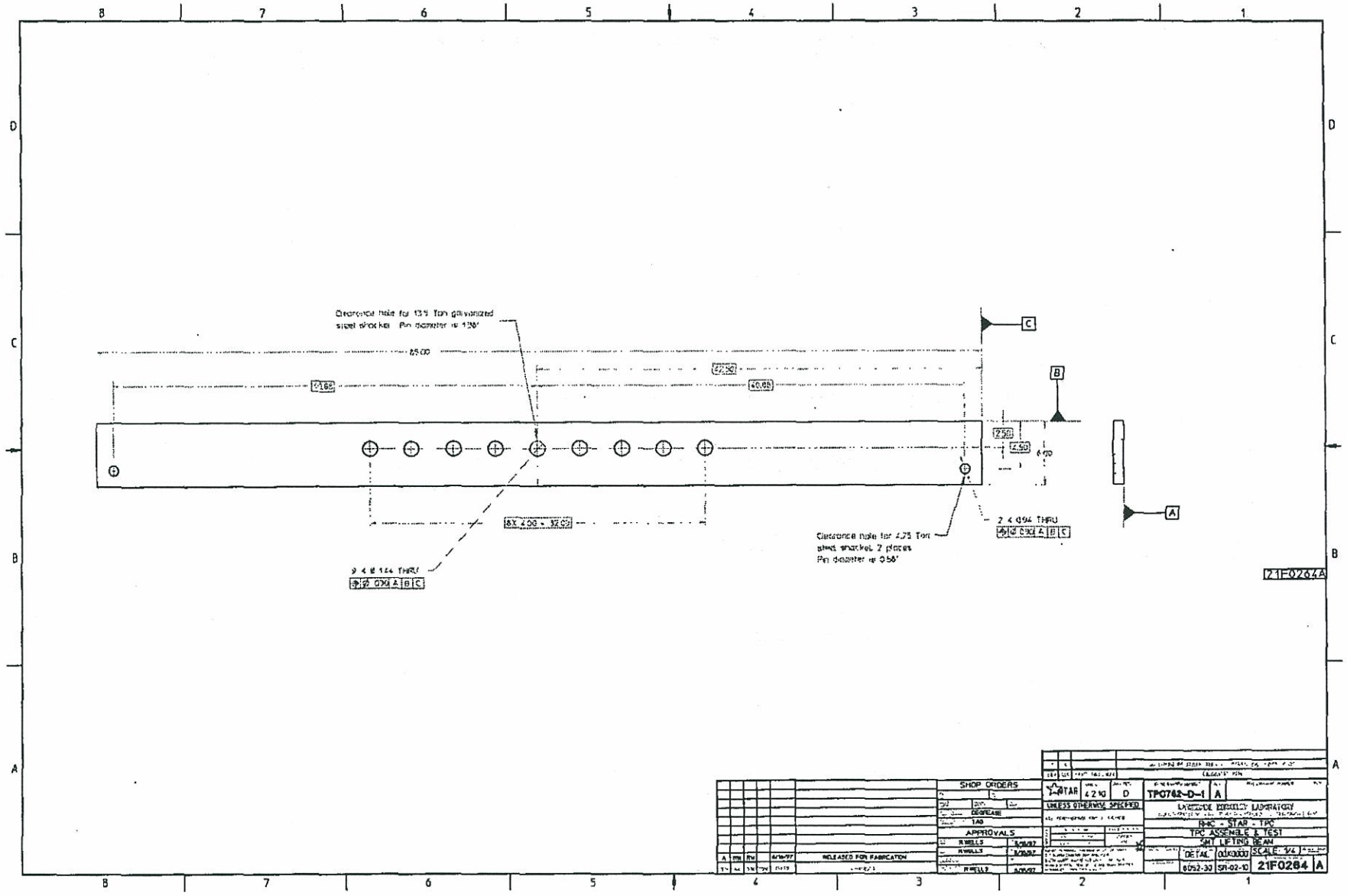
Batch No. 96C01K Dwell Time 10 min

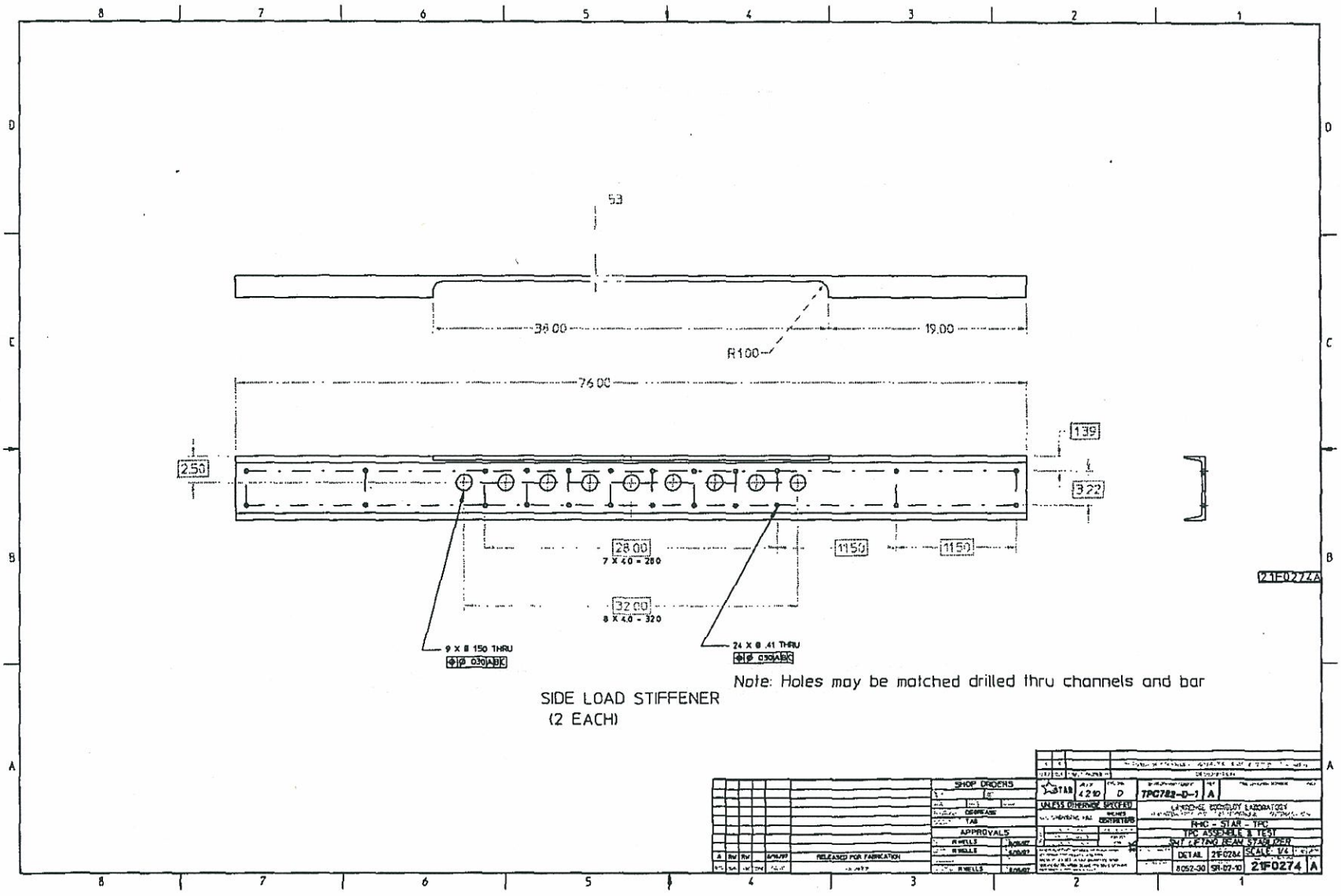
PC # or SN #	ACC	REJ	REMARKS
STRONG BACK Marked: 21F0284A (1 Total)	1	0	Performed liquid penetrant inspection on three (3) designated holes, specifically the 1" diameter holes at each end and the 1-1/2" diameter hole at the very center. The inspection was performed on the I.D. surface of these holes and on the plate material surrounding them. No rejectable indications were detected.

TEST WITNESSED BY:

Technician John W. Lowe Level: II
Asst. Tech. Level:
Certification Expiration Date: 5/06
Report Reviewed by:
Peter K. Palko, NDT Supervisor

WP/NDT/LIQUID/Y0636





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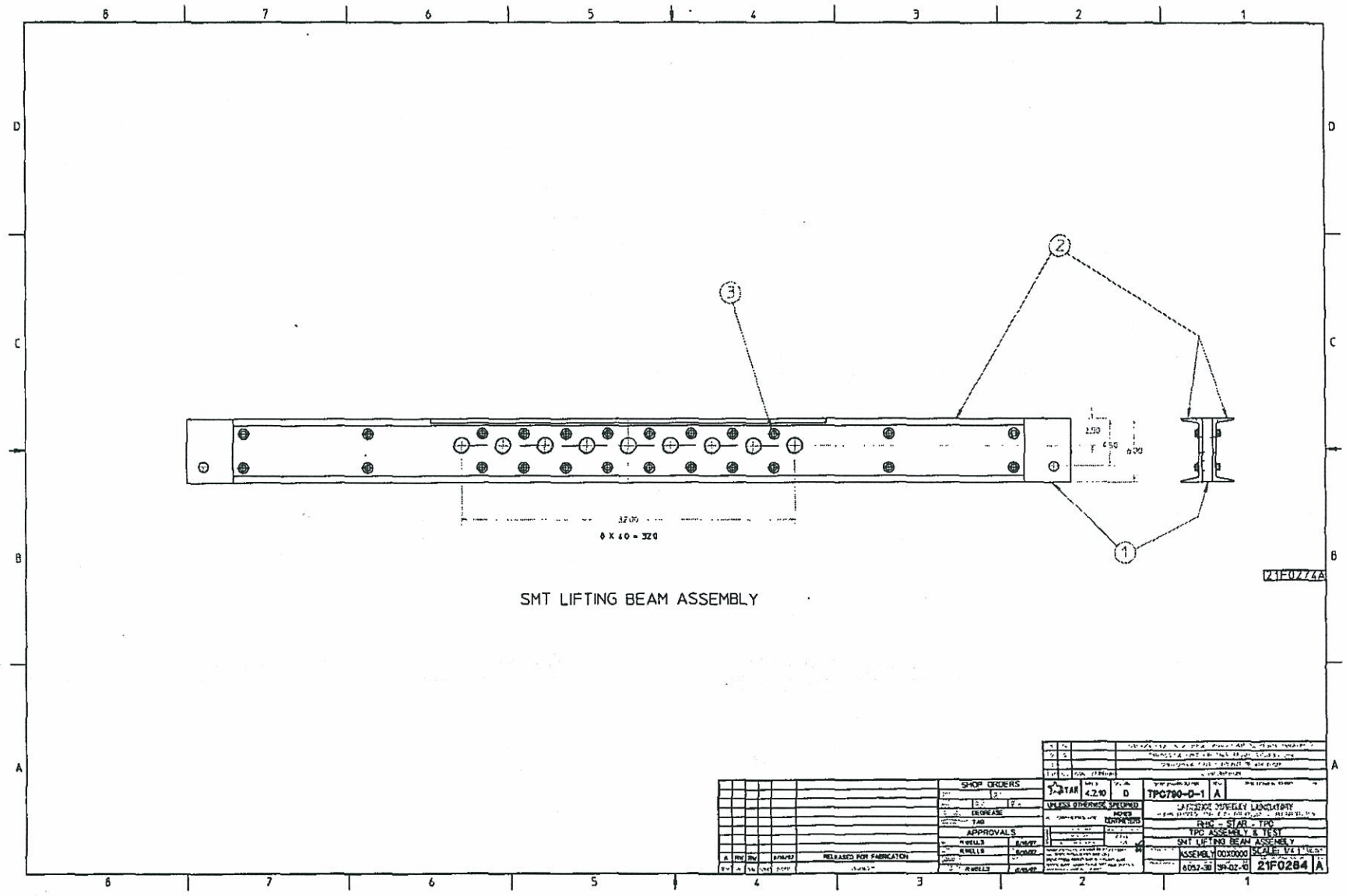
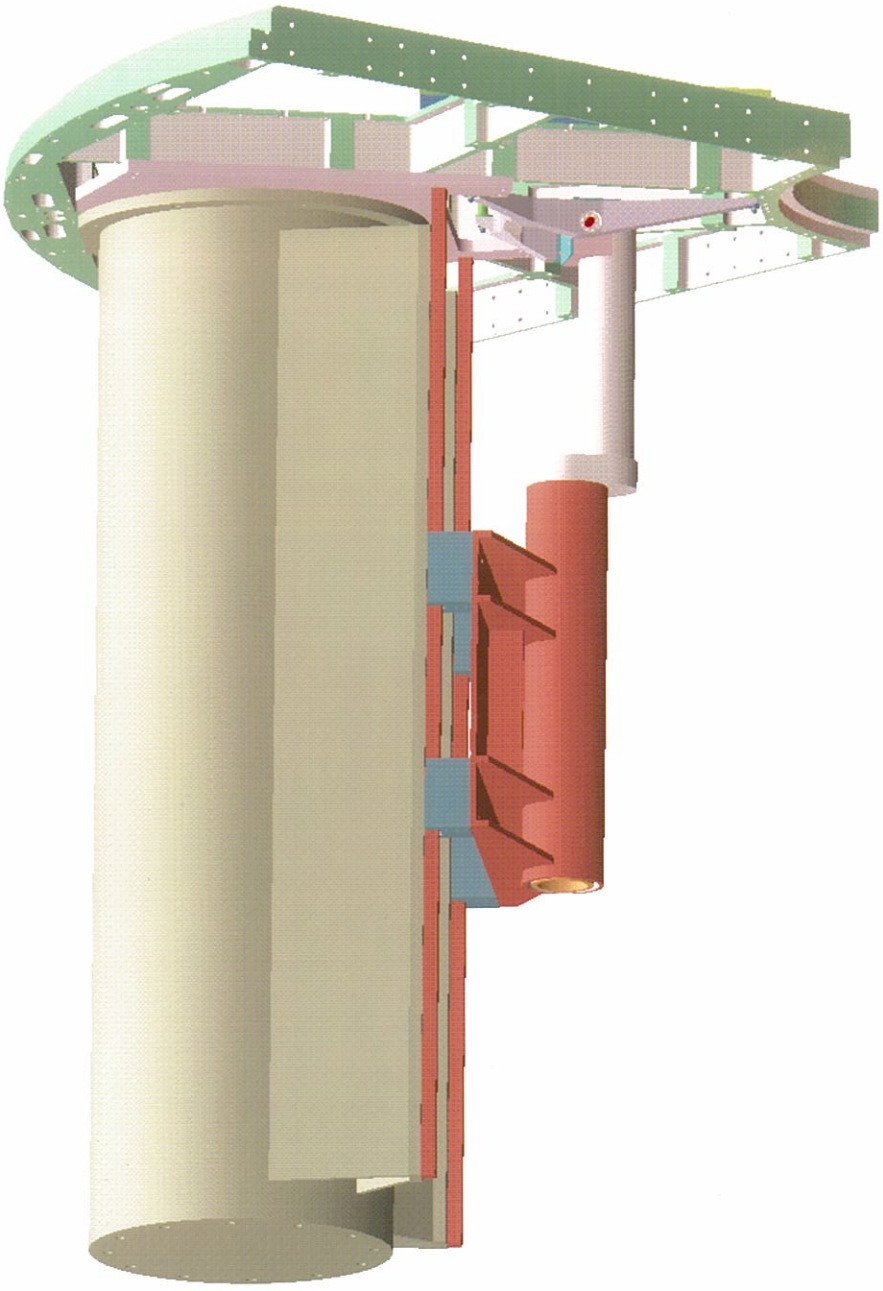
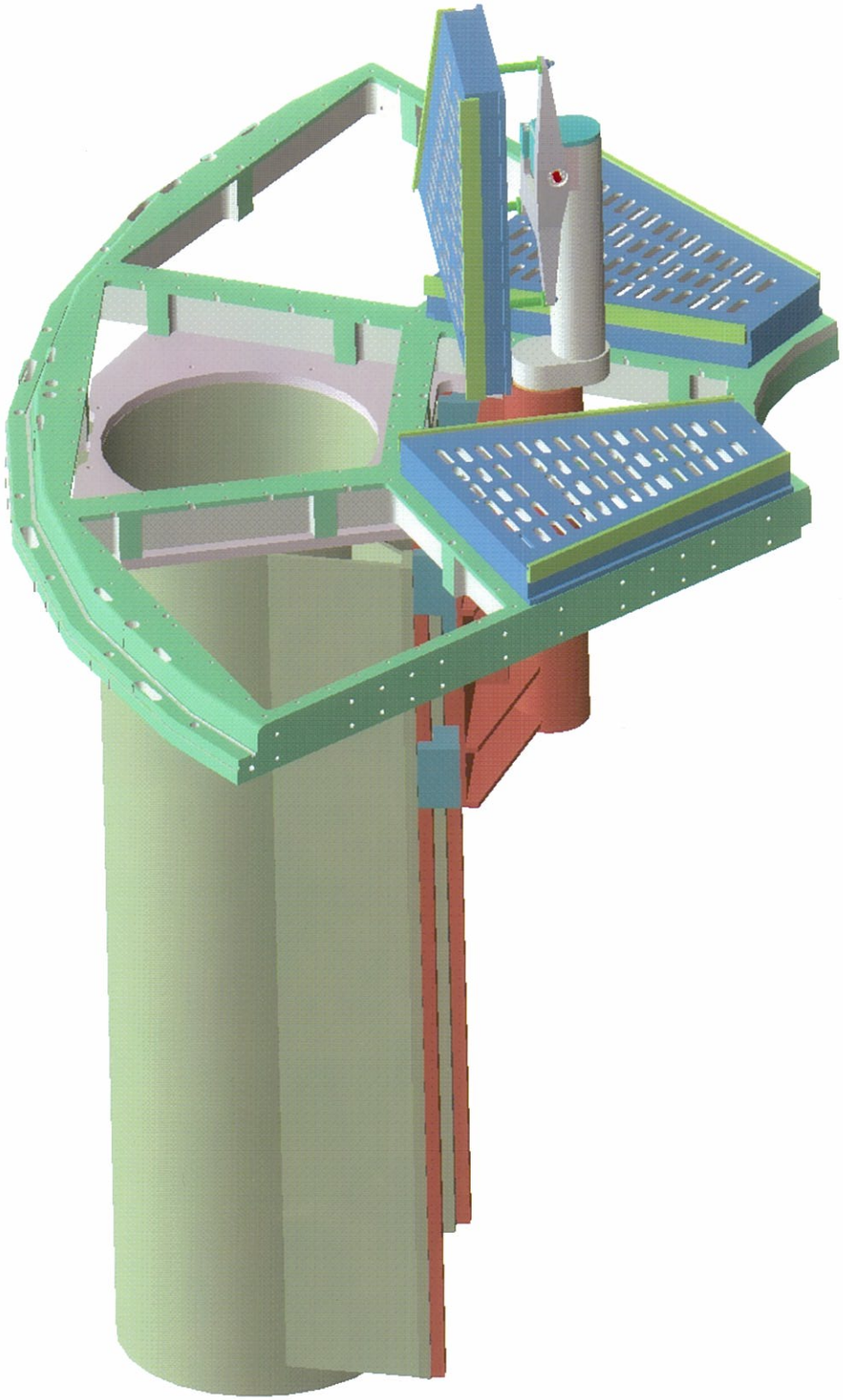
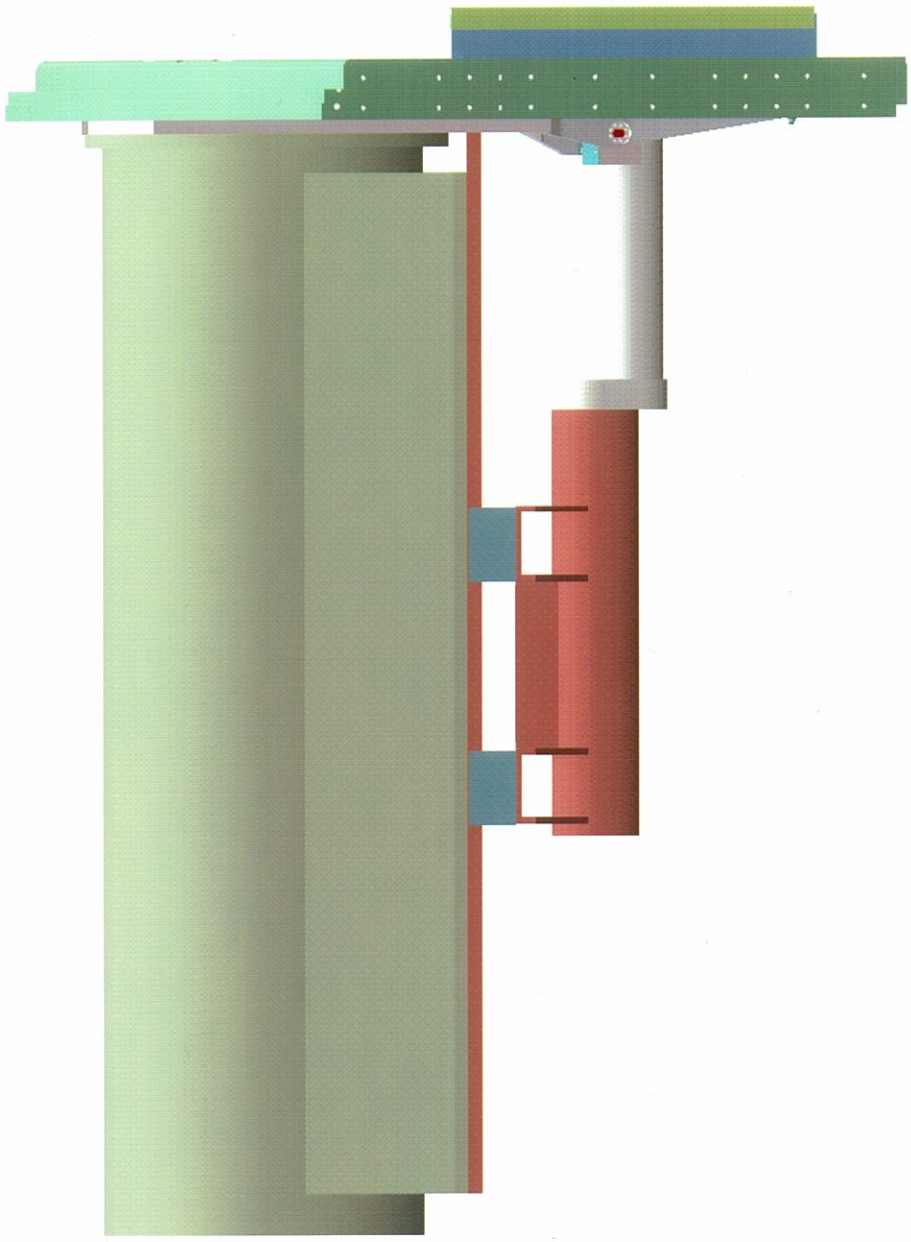
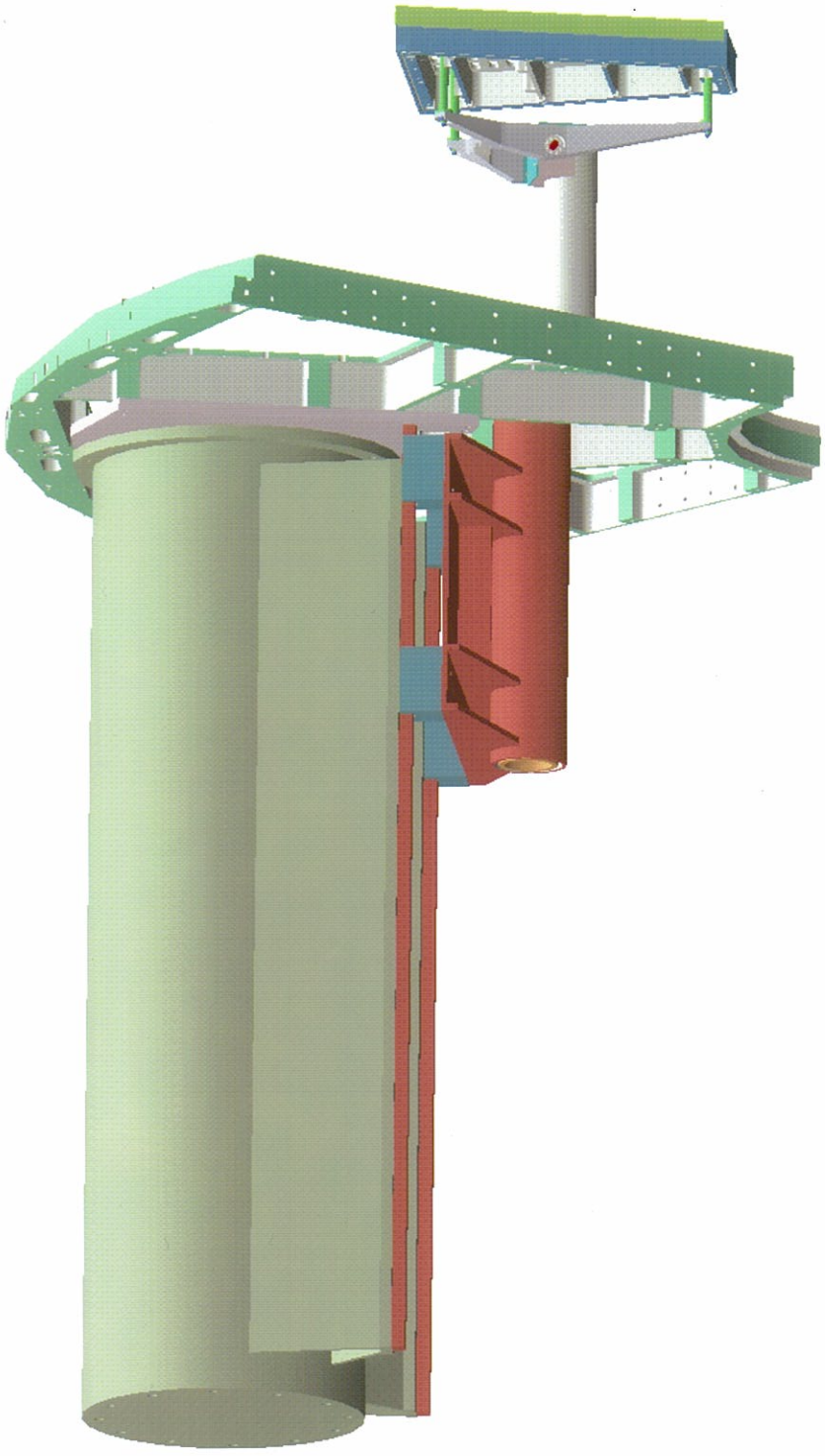
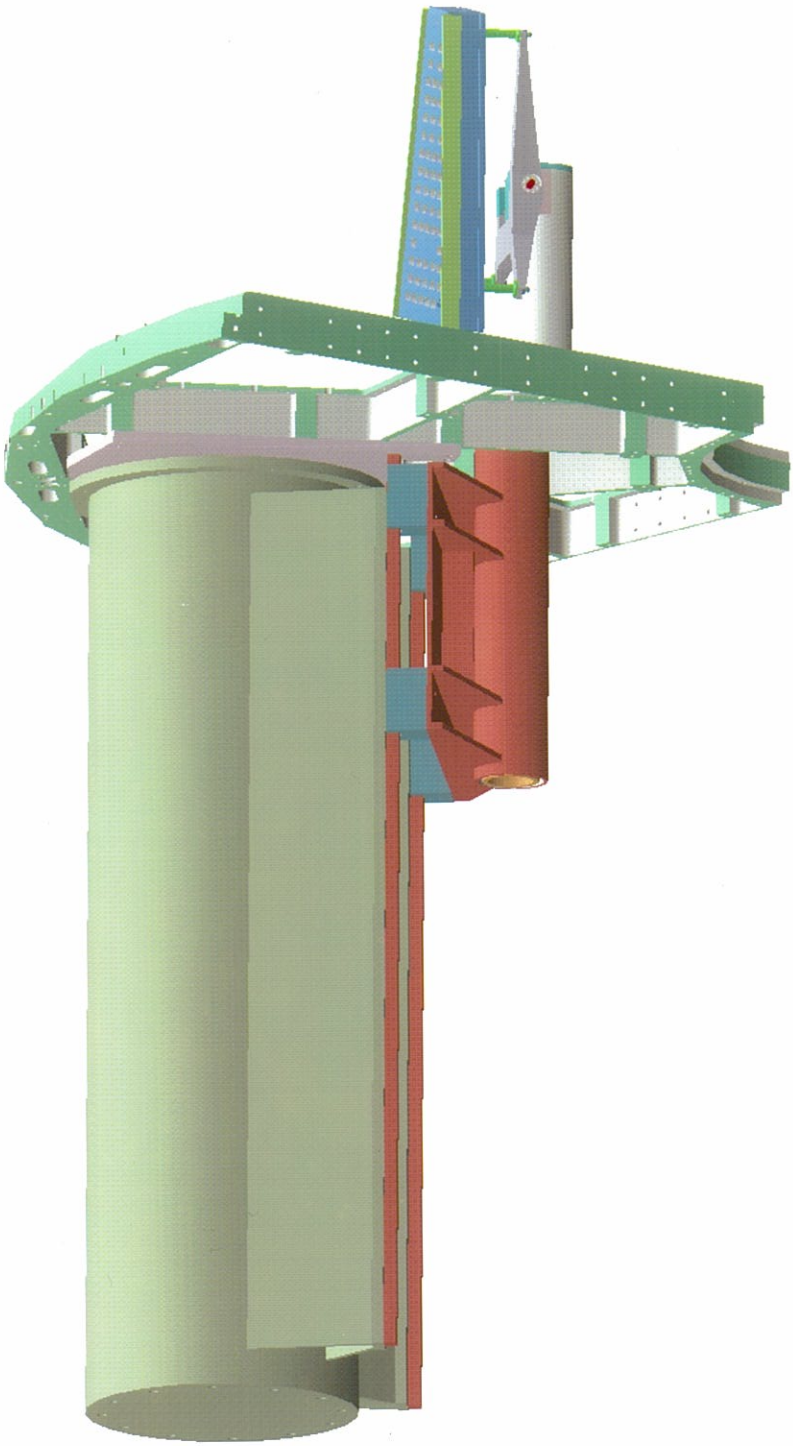


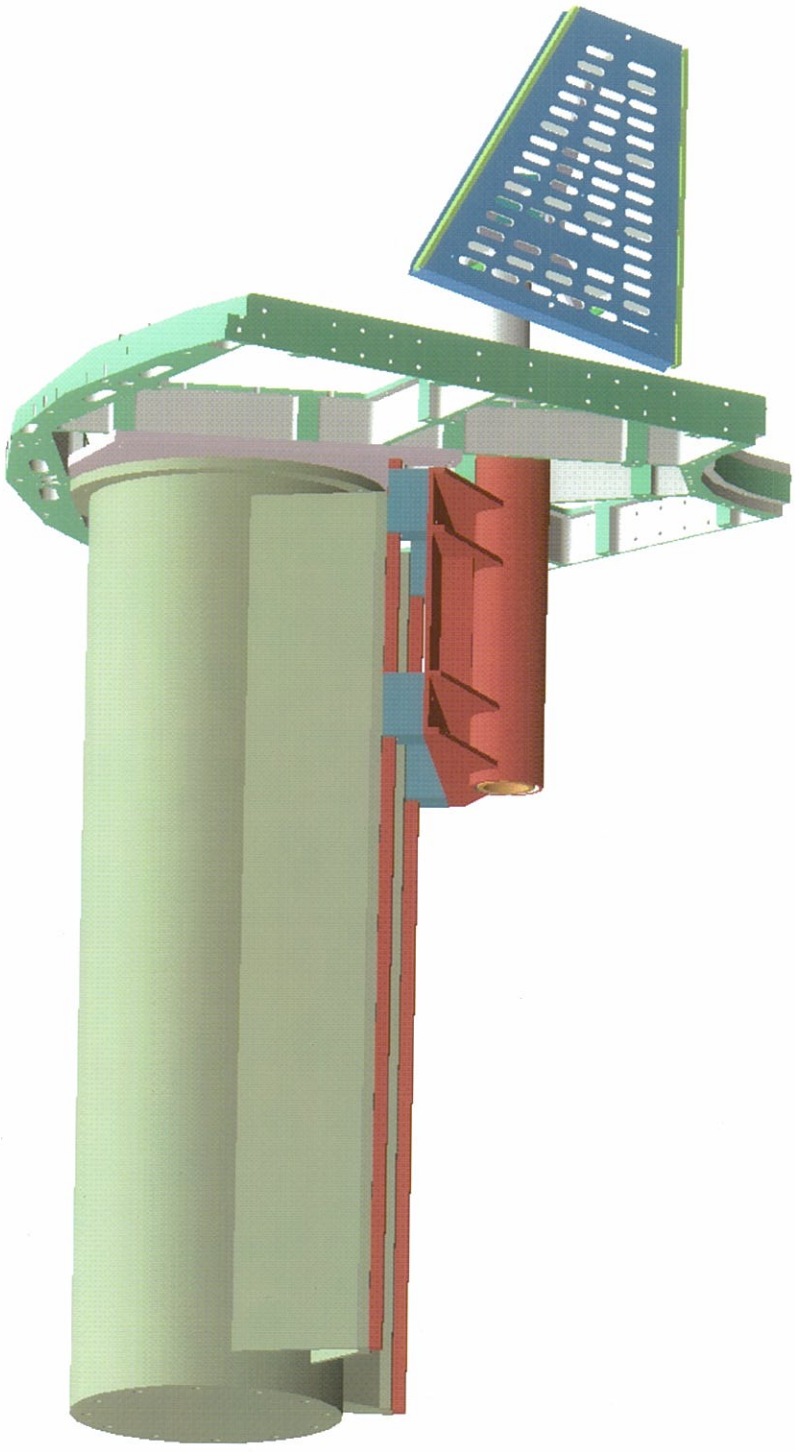


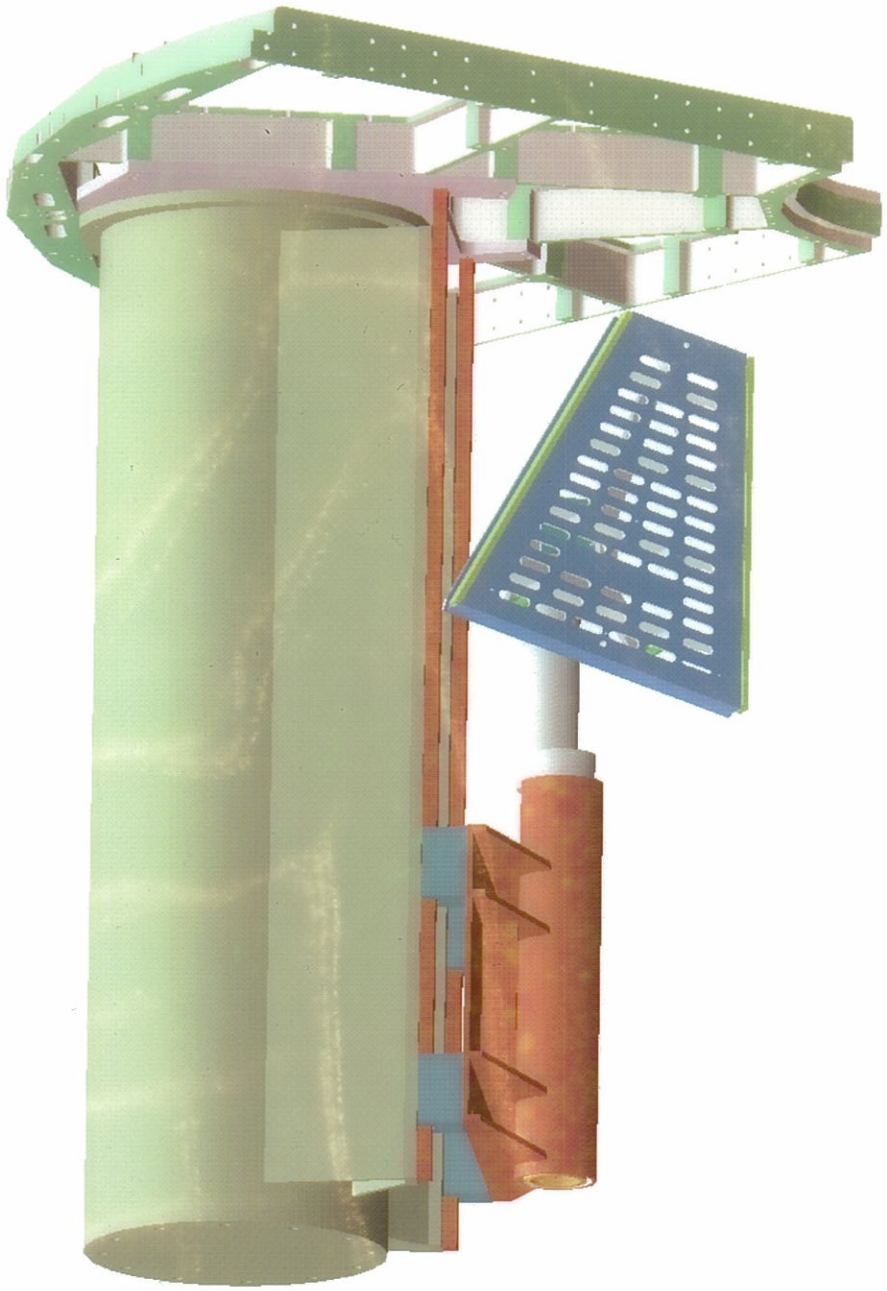












UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE IN INCHES	ACCT. NO.	SER. NO.		MICROFILMED	DETAIL	24A7606	24A7771	C
TOLERANCES: .X = ±.06; .XX = ±0.01; 0.XXX = ±.005	DATE ISS'D	DATE REQ'D	NO. REQ'D		DESIGN ACCOUNT	CATEGORY CODE	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:				8052-30	SR-02-10		
FINISH 125/.32	SURFACE TREATMENT	Degrease						
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD	Tag						
ALL SCREW THREADS PER ANSI Y14.6	DRWN BY	l. amerman	DATE 09/08/94					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY	R. LEWIS	DATE 08/07/95					
REFERENCE - ANSI Y14.5 & B46.1								

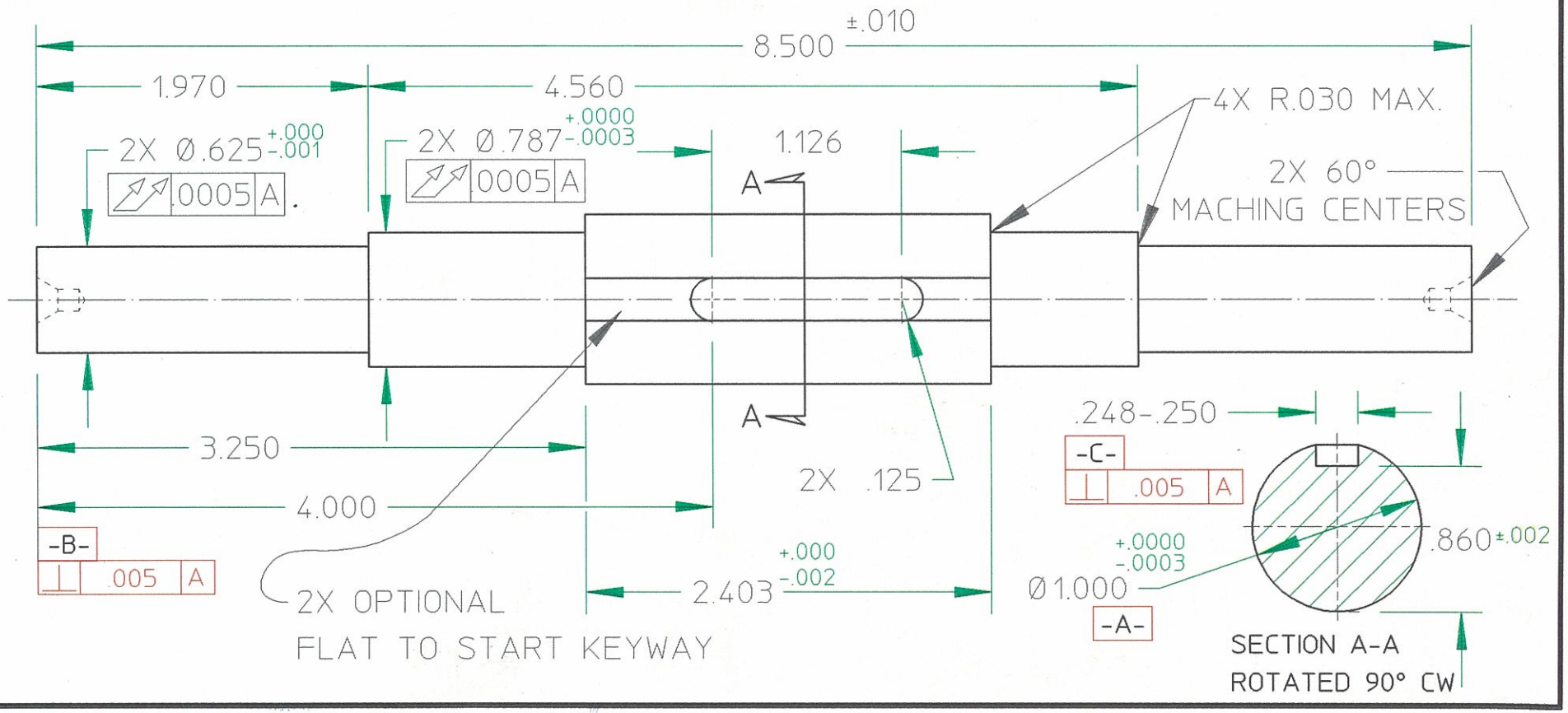
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - PLATEN SHAFT

MATERIAL: TYPE 01 DRILL ROD, HARDENED 60-65 ROCKWELL

REV.	DWN.	CHK.	DATE	CHANGES
A	LA	RL	9/94	RELEASE FOR FABRICATION
B	JO	GK	4/97	REVISED SHAFT DIA. & KEYWAY SIZE
C	JO	GK	1/98	CHGD BEARING FIT TOL., ADDED C'DRILL TO ENDS, CHGD MATL TO TYPE 01 DRILL ROD, HARDENED 60-65 ROCKWELL FROM 304 SST

WBS#	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC767-A-1	C		



STAR Drawing Number Summary Report

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TPC750-E-1	A	1	24A7606B	TPC Assemble & Test	Sector Mounting Tool Assembly
TPC751-B-1	B	1	24A7612B	TPC Assemble & Test	SMT - Worm Gear 1
TPC752-A-1	A	1	24A7621A	TPC Assemble & Test	SMT - Bearing Sleeve
TPC753-C-1	B	1	24A7633B	TPC Assemble & Test	SMT - Pillow Block
TPC754-D-1	A	1	24A8244A	TPC Assemble & Test	SMT - Components
TPC755-D-1	A	1	24A7654B	TPC Assemble & Test	SMT - Inner Tube
TPC756-B-1	A	1	24A7662A	TPC Assemble & Test	SMT - Bearing Retainer
TPC757-E-1	C	1	24A7676C	TPC Assemble & Test	SMT - Tube Mount
TPC758-A-1	A	1	24A7681A	TPC Assemble & Test	SMT - Gearbox Plug
TPC759-C-1	A	1	24A7693A	TPC Assemble & Test	SMT - Gearbox Face
TPC760-D-1	A	1	24A7704B	TPC Assemble & Test	SMT - Geartrain Housing Cover
TPC761-D-1	B	1	24A7714B	TPC Assemble & Test	SMT - Geartrain Housing
TPC762-E-1	B	1	24A7726B	TPC Assemble & Test	SMT - Gearbox
TPC763-A-1	A	1	24A7731A	TPC Assemble & Test	SMT - Bushing
TPC764-B-1	A	1	24A7742A	TPC Assemble & Test	SMT - Gearbox Cover
TPC765-A-1	A	1	24A7751A	TPC Assemble & Test	SMT - Spacer Bushing
TPC766-A-1	A	1	24A7761A	TPC Assemble & Test	SMT - Idler Shaft
TPC767-A-1	B	1	24A7771B C	TPC Assemble & Test	SMT - Platen Shaft
TPC768-B-1	C	1	24A7782C	TPC Assemble & Test	SMT - Shaft 1
TPC769-A-1	B	1	24A9861B	TPC Assemble & Test	SMT - Worm Gear 2
TPC770-C-1	B	1	24A7803B	TPC Assemble & Test	SMT - Offset Tube
TPC771-A-1	A	1	24A7791B	TPC Assemble & Test	SMT - Platen Shaft Right Spacer
TPC772-A-1	B	1	24A7821B	TPC Assemble & Test	SMT - Shaft 4
TPC773-A-1	B	1	24A7831B	TPC Assemble & Test	SMT - Shaft 2
TPC774-A-1	A	1	24A7971B	TPC Assemble & Test	SMT - Platen Shaft Left Spacer
TPC775-E-1	A	1	24A7856E	TPC Assemble & Test	SMT - Mounting Flange, Inner Sector
TPC776-E-1	A	1	24A7866B	TPC Assemble & Test	SMT - Rail Support
TPC777-D-1	A	1	24A7874A	TPC Assemble & Test	SMT - Vertical Support Extension
TPC778-D-1	A	1	24A7884A	TPC Assemble & Test	SMT - Vertical Support Anchor Spool
TPC779-D-1	A	1	24A7894A	TPC Assemble & Test	SMT - Vertical Support Base
TPC780-E-1	A	1	24A9846B	TPC Assemble & Test	SMT - Spider Double Leg, Outer Sector
TPC781-D-1	B	1	24A9854B	TPC Assemble & Test	SMT - Spider Single Leg, Outer Sector
TPC782-D-1	A	1	21F0274A	TPC Assemble & Test	SMT - Lifting Beam Stabilizer
TPC783-C-1	B	1	24A7983B	TPC Assemble & Test	SMT - Spider Standoff
TPC784-D-1	A	1	24A7944B	TPC Assemble & Test	SMT - Adjusting Leg
TPC785-D-1	A	1	24A7954A	TPC Assemble & Test	SMT - Rigid Base
TPC786-B-1	A	1	24A9872A	TPC Assemble & Test	SMT - Spider Flange
TPC787-D-1	B	1	24A9884B	TPC Assemble & Test	SMT - Spider Single Leg, Inner Sector
TPC788-E-1	A	1	24A9896A	TPC Assemble & Test	SMT - Spider Double Leg, Inner Sector
TPC789-A-1	A	1	24A8201B	TPC Assemble & Test	SMT - Gear Spacer
TPC790-D-1	A	1	21F0284A	TPC Assemble & Test	SMT - Lifting Beam Assembly
TPC791-E-1	A	1	24A9836C	TPC Assemble & Test	SMT - Outer Sector Plate
TPC792-D-1	A	1	21F0294A	TPC Assemble & Test	SMT - Outer Sector Set Plate
TPC793-D-1	A	1	21F0264A	TPC Assemble & Test	SMT - Inner Sector Set Plate
TPC794-C-1	A	1	24A7643A	TPC Assemble & Test	SMT - Tube Plug Adapter 2
TPC795-E-1	A	1	24A9046A	TPC Assemble & Test	SMT - Drawing Tree
TPC796-E-1	A	1	24A9376A	TPC Assemble & Test	TPC Cross Section
TPC797				TPC Assemble & Test	

STAR Drawing Number Summary Report

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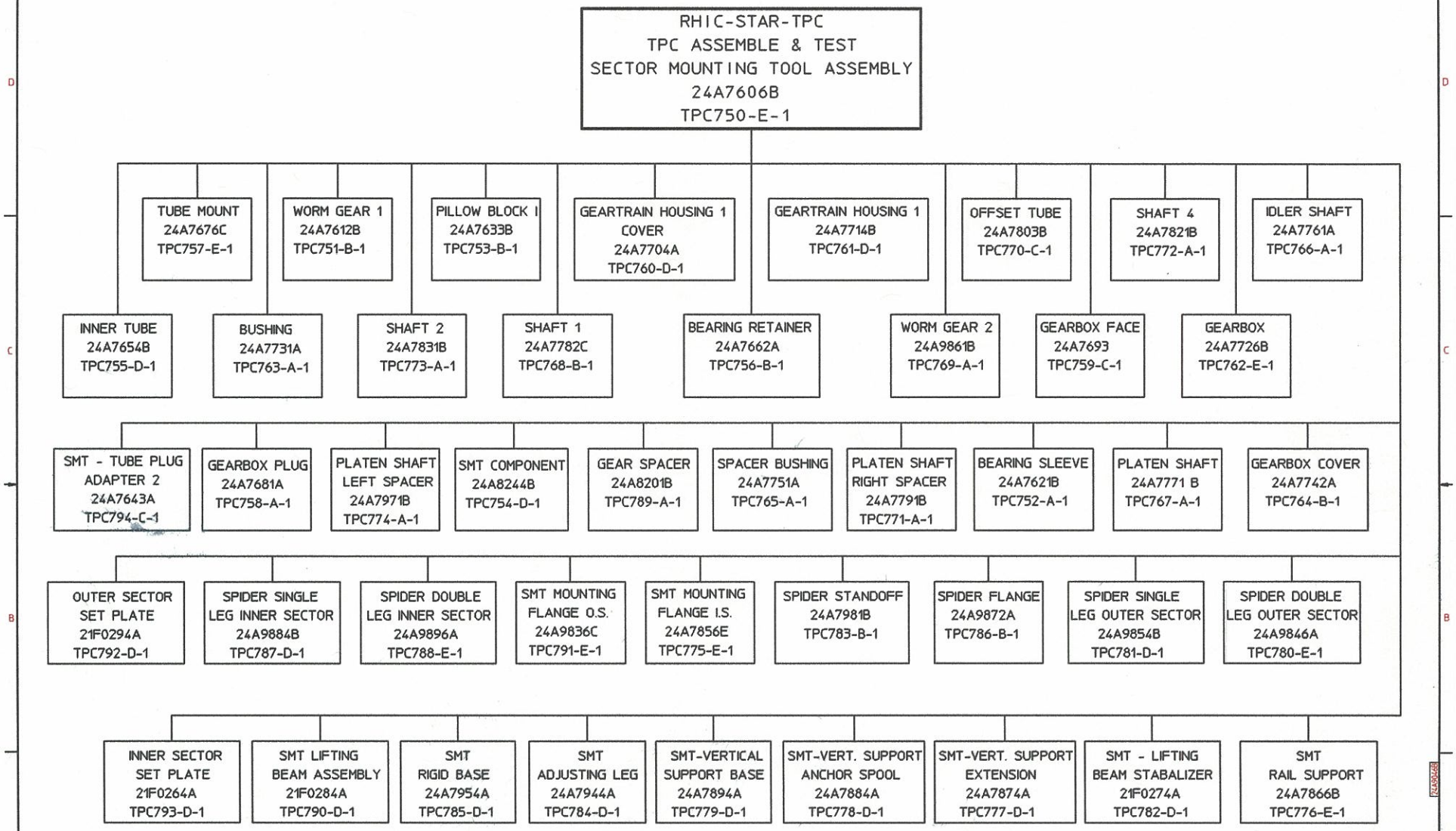
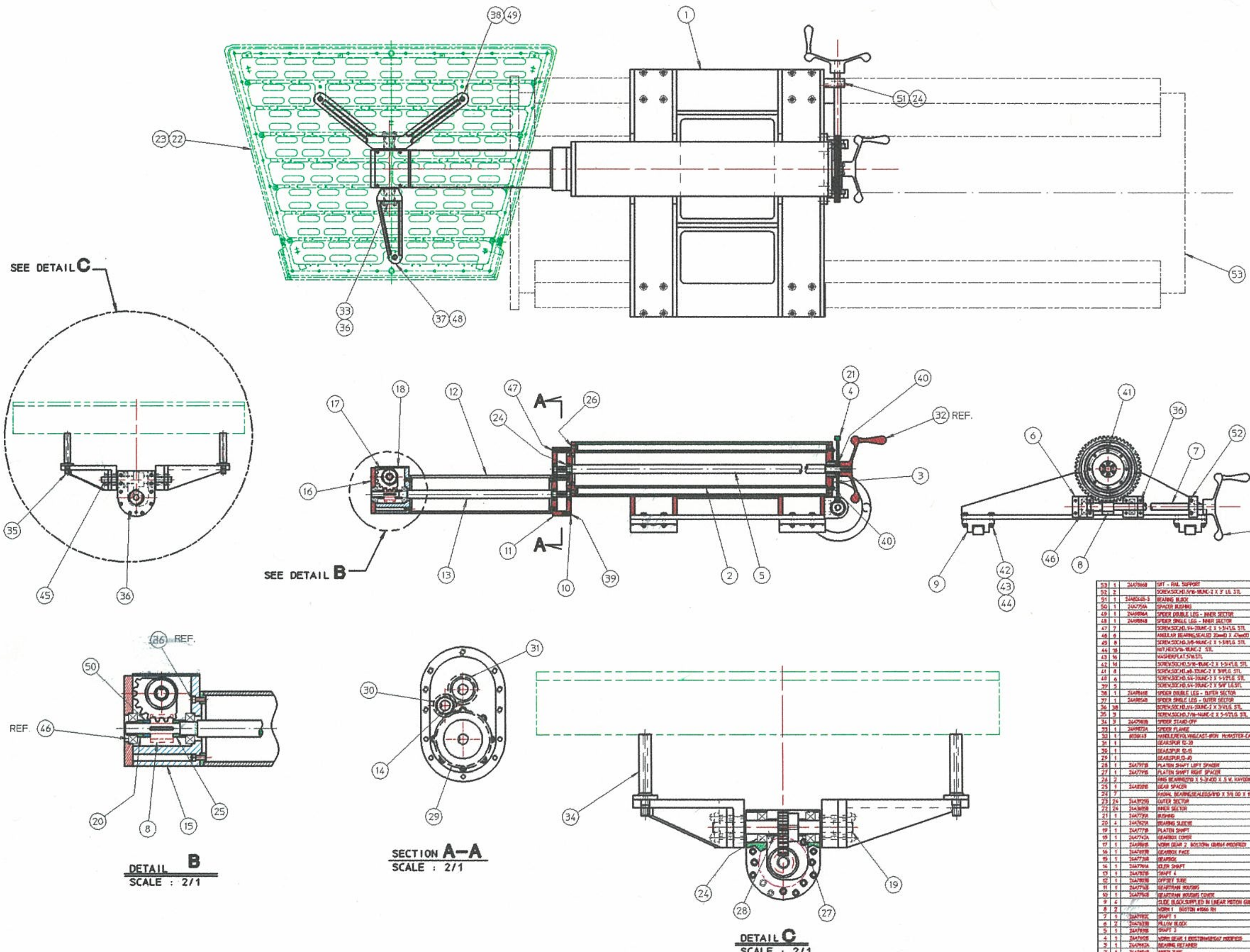
TPC798				TPC Assemble & Test	
TPC799				TPC Assemble & Test	

SECTOR


RHIC-STAR-TPC
TPC ASSEMBLE & TEST
SECTOR MOUNTING TOOL ASSEMBLY
24A7606B
TPC750-E-1
TUBE MOUNT 24A7676C TPC757-E-1
WORM GEAR 1 24A7612B TPC751-B-1
PILLOW BLOCK I 24A7633B TPC753-B-1
GEARTRAIN HOUSING 1 COVER 24A7704A TPC760-D-1
GEARTRAIN HOUSING 1 24A7714B TPC761-D-1
OFFSET TUBE 24A7803B TPC770-C-1
SHAFT 4 24A7821B TPC772-A-1
IDLER SHAFT 24A7761A TPC766-A-1
INNER TUBE 24A7654B TPC755-D-1
BUSHING 24A7731A TPC763-A-1
SHAFT 2 24A7831B TPC773-A-1
SHAFT 1 24A7782C TPC768-B-1
BEARING RETAINER 24A7662A TPC756-B-1
WORM GEAR 2 24A9861B TPC769-A-1
GEARBOX FACE 24A7693 TPC759-C-1
GEARBOX 24A7726B TPC762-E-1
SMT - TUBE PLUG ADAPTER 2 24A7643A TPC794-C-1
GEARBOX PLUG 24A7681A TPC758-A-1
PLATEN SHAFT LEFT SPACER 24A7971B TPC774-A-1
SMT COMPONENT 24A8244B TPC754-D-1
GEAR SPACER 24A8201B TPC789-A-1
SPACER BUSHING 24A7751A TPC765-A-1
PLATEN SHAFT RIGHT SPACER 24A7791B TPC771-A-1
BEARING SLEEVE 24A7621B TPC752-A-1
PLATEN SHAFT 24A7771 B TPC767-A-1
GEARBOX COVER 24A7742A TPC764-B-1
OUTER SECTOR SET PLATE 21F0294A TPC792-D-1
SPIDER SINGLE LEG INNER SECTOR 24A9884B TPC787-D-1
SPIDER DOUBLE LEG INNER SECTOR 24A9896A TPC788-E-1
SMT MOUNTING FLANGE O.S. 24A9836C TPC791-E-1
SMT MOUNTING FLANGE I.S. 24A7856E TPC775-E-1
SPIDER STANDOFF 24A7981B TPC783-B-1
SPIDER FLANGE 24A9872A TPC786-B-1
SPIDER SINGLE LEG OUTER SECTOR 24A9854B TPC781-D-1
SPIDER DOUBLE LEG OUTER SECTOR 24A9846A TPC780-E-1
INNER SECTOR SET PLATE 21F0264A TPC793-D-1
SMT LIFTING BEAM ASSEMBLY 21F0284A TPC790-D-1
SMT RIGID BASE 24A7954A TPC785-D-1
SMT ADJUSTING LEG 24A7944A TPC784-D-1
SMT-VERTICAL SUPPORT BASE 24A7894A TPC779-D-1
SMT-VERT. SUPPORT ANCHOR SPOOL 24A7884A TPC778-D-1
SMT-VERT. SUPPORT EXTENSION 24A7874A TPC777-D-1
SMT - LIFTING BEAM STABALIZER 21F0274A TPC782-D-1
SMT RAIL SUPPORT 24A7866B TPC776-E-1
SHOP ORDERS
APPROVALS
R.WELLS
LAWRENCE BERKELEY LABORATORY
RHIC-STAR-TPC
TPC ASSEMBLE & TEST
SECTOR MOUNTING TOOL DRAWING TREE
SCALE NONE
24A9046

DRAWINGS



ITEM	REQ	PART NUMBER	DESCRIPTION
53	1	24A7866B	SRT - RAIL SUPPORT
52	2		SCREW,SOC.HD.5/16-18UNC-2 X 3" LG. STL
51	1	24A8046B-3	BEARING BLOCK
50	1	24A7750A	SPACER BUSHING
49	1	24A9896A	SPIDER DOUBLE LEG - INNER SECTOR
48	1	24A9884B	SPIDER SINGLE LEG - INNER SECTOR
47	7		SCREW,SOC.HD.1/4-20UNC-2 X 1-3/4"LG. STL
46	6		ANGULAR BEARING,SEALED 20mmID X 47mmOD X 14mmW
45	8		SCREW,SOC.HD.3/8-16UNC-2 X 1-3/8"LG. STL
44	16		NUT,HEX,5/16-18UNC-2 STL
43	16		WASHER,FLAT,5/16,STL
42	16		SCREW,SOC.HD.5/16-18UNC-2 X 1-3/4"LG. STL
41	8		SCREW,SOC.HD.#8-32UNC-2 X 3/8"LG. STL
40	6		SCREW,SOC.HD.1/4-20UNC-2 X 1-1/2"LG. STL
39	5		SCREW,SOC.HD.1/4-20UNC-2 X 5/8" LG.STL
38	1	24A9846B	SPIDER DOUBLE LEG - OUTER SECTOR
37	1	24A9854B	SPIDER SINGLE LEG - OUTER SECTOR
36	38		SCREW,SOC.HD.1/4-20UNC-2 X 3/4"LG. STL
35	3		SCREW,SOC.HD.7/16-14UNC-2 X 5-1/2"LG. STL
34	3	24A7983B	SPIDER STAND-OFF
33	1	24A9872A	SPIDER FLANGE
32	1	6108K43	HANDLE,REVOLVING,CAST-IRON McMASTER-CARR
31	1		GEAR,SPUR 12-30
30	1		GEAR,SPUR 12-15
29	1		GEAR,SPUR,12-40
28	1	24A7971B	PLATEN SHAFT LEFT SPACER
27	1	24A7779B	PLATEN SHAFT RIGHT SPACER
26	2		RING BEARING,5"ID X 5-3/4"OD X .5 W. KAYDON
25	1	24A8201B	GEAR SPACER
24	7		RADIAL BEARING,SEALED,5/8"ID X 3/8 OD X 11/32 W
23	24	24A7729B	OUTER SECTOR
22	24	24A3695B	INNER SECTOR
21	1	24A7739A	BUSHING
20	4	24A7621A	BEARING SLEEVE
19	1	24A7771B	PLATEN SHAFT
18	1	24A7743A	GEARBOX COVER
17	1	24A7861B	WORM GEAR 2 BOSTON# GB4 MODIFIED
16	1	24A7973B	GEARBOX FACE
15	1	24A7726B	GEARBOX
14	1	24A7761A	IDLER SHAFT
13	1	24A7821B	SHAFT 4
12	1	24A7803B	OFFSET TUBE
11	1	24A7716B	GEARTRAIN HOUSING
10	1	24A7756B	GEARTRAIN HOUSING COVER
9	4		SLIDE BLOCK,SUPPLIED IN LINEAR MOTION GUIDE	#SR25HB2SS C0+260LP
8	2		WORM 1 BOSTON #1066 RH
7	1	24A7793C	SHAFT 1
6	2	24A7633B	PILLOW BLOCK
5	1	24A7819B	SHAFT 2
4	1	24A7912B	WORM GEAR 1 BOSTON#GB167 MODIFIED
3	1	24A7992A	BEARING RETAINER
2	1	24A7854B	INNER TUBE
1	1	24A7876C	TUBE MOUNT

STAR | WBS # 4.2.10 | DWG SIZE E | STAR DRAWING NUMBER TPC750–E–1 | REV. A | RHIC DRAWING NUMBER | REV.

UNLESS OTHERWISE SPECIFIED — ALL DIMENSIONS ARE INCHES.

.X/X = ±.06/.15; XX/X = ±0.02/0.05; .XXX/.XX = ±.004/.01 — ANGLES ±.5° — FINISH 125/32

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
TPC ASSEMBLY & TEST
SECTOR MOUNTING TOOL ASSEMBLY

DRAWING TYPE: ASSEMBLY | SHEET: 00X0000 | SCALE: 1/4 | WORK ORDER: 8052-30 | CATEGORY: 5R-02-10 | LBL DRAWING NUMBER: 24A7606 | B

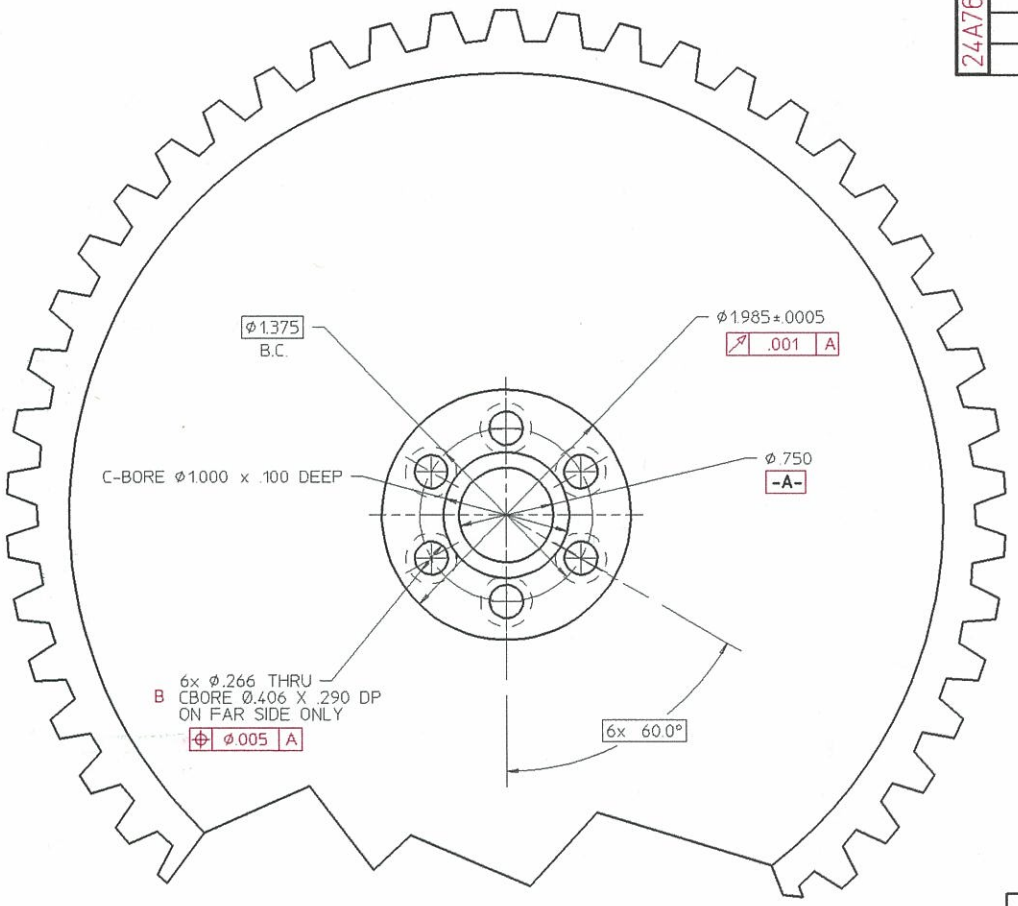
SHOP ORDERS
SURFACE TREATMENT: DEGREASE
IDENTIFICATION: TAG

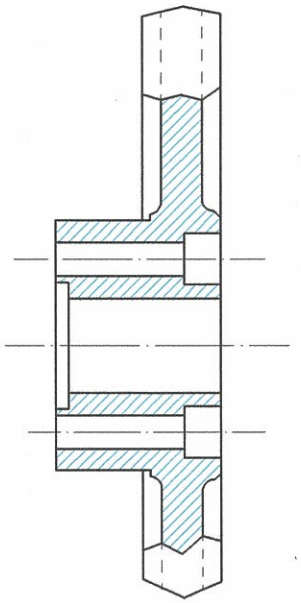
APPROVALS
DRAWN: A.RAWLINS/J.DRITZ
CHECKED: B.KOHELER
RESPONSIBLE ENGINEER: R.WELLS

REV.	DWN	CHK	ZONE	DATE	CHANGES
B	B	R		7/1/97	MAJOR REVISION
A	R	R		11/9/95	RELEASED FOR FABRICATION

24A7606B

24A7612A	ITEM	REQ	PART NUMBER	DESCRIPTION
				WORM GEAR #GB1067





WBS # 4.2.10	Production Approval / Cognizant Engineer: A. Wandesforde	STAR DRAWING NUMBER TPC751-B-1	REV. B	RHIC DRAWING NUMBER	REV.

REV.	DWN.	CHK.	DATE	CHANGES
B	JO	GK	3/97	ADDED CBORE Ø.406 X .290 DP
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 | ANGLES ±.5° | .XX/.X = ±0.02/0.05 | FINISH 125/.32 | 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS

ACCT. NO. | SER. NO.

DATE ISS'D | DATE REQ'D | NO. REQ'D

DELIVER TO

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

DRWN BY: L. amerman | DATE: 09/08/94

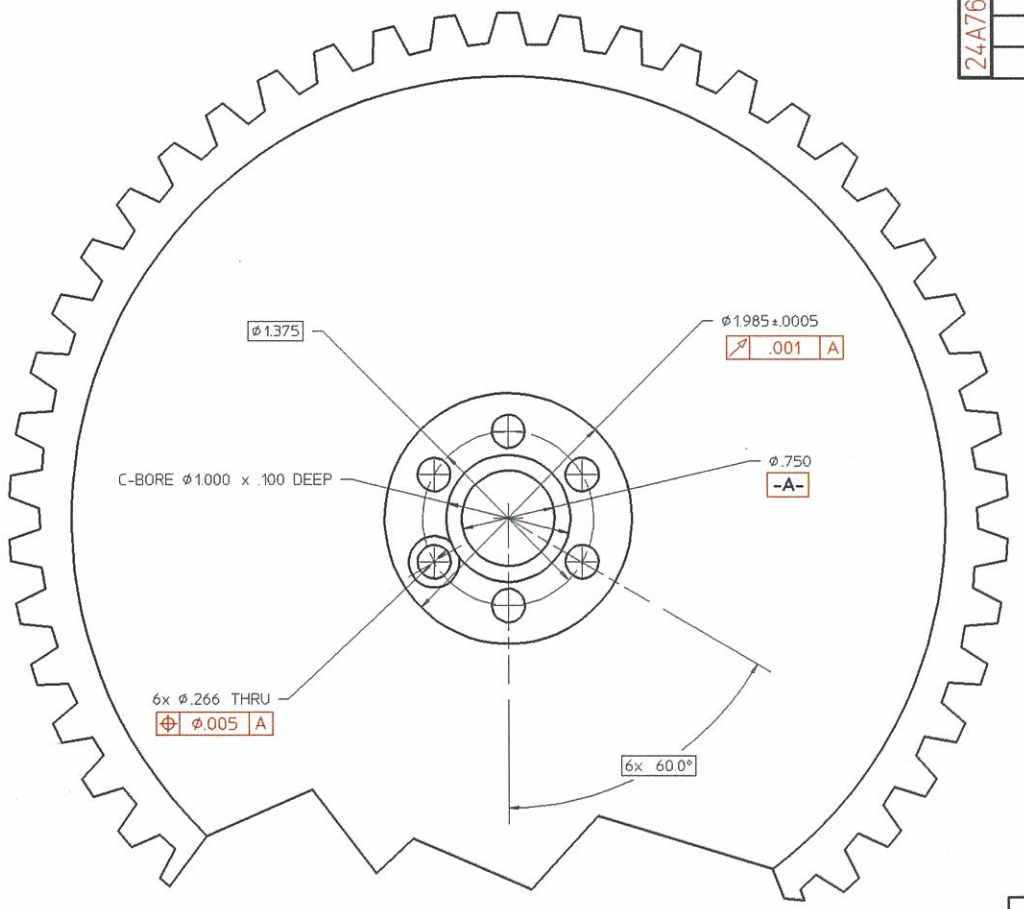
CHECK BY: R. LEWIS | DATE: 08/03/95

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - WORM GEAR 1

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	8052-30	SR-02-10	24A7612	B

24A7612A	ITEM	REQ	PART NUMBER	DESCRIPTION
				WORM GEAR #GB1067



WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC751-B-1	A	XXXXXXXXXX	-

REV.	DWN.	CHK.	DATE	CHANGES
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 | ANGLES ±5° | .XX/.X = ±0.02/0.05 | FINISH 125/.32 | 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1.

SHOP ORDERS

ACCT. NO. | SER. NO.

DATE ISS'D | DATE REQ'D | NO. REQ'D

DELIVER TO:

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

			DATE
DRWN BY	L. amerman		09/08/94
CHECK BY	R. LEWIS		08/03/95

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
SECTOR MOUNTING TOOL
Worm Gear 1

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	8052-30	SR-02-10	24A7612	A

old

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 | XX/.X = ±0.02/0.05 | 0.XXX/.XX=±.005/.01 | ANGLES ±.5° | FINISH 125/.32

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1.

REV.	DWN.	CHK.	DATE	CHANGES

SHOP ORDERS

ACCT. NO.	SER. NO.
DATE ISS'D	DATE REQ'D	NO. REQ'D
DELIVER TO:	
SURFACE TREATMENT ---	
IDENTIFICATION METHOD ---	
DRWN BY l. amerman	DATE 09/02/94
CHECK BY R. LEWIS	DATE 08/03/95

PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
	DETAIL	24A7606	24A7621	A
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	SCALE: FULL	DO NOT SCALE PRINTS
	8052-30	SR-02-10		

LAWRENCE BERKELEY LABORATORY

UNIVERSITY OF CALIFORNIA - BERKELEY

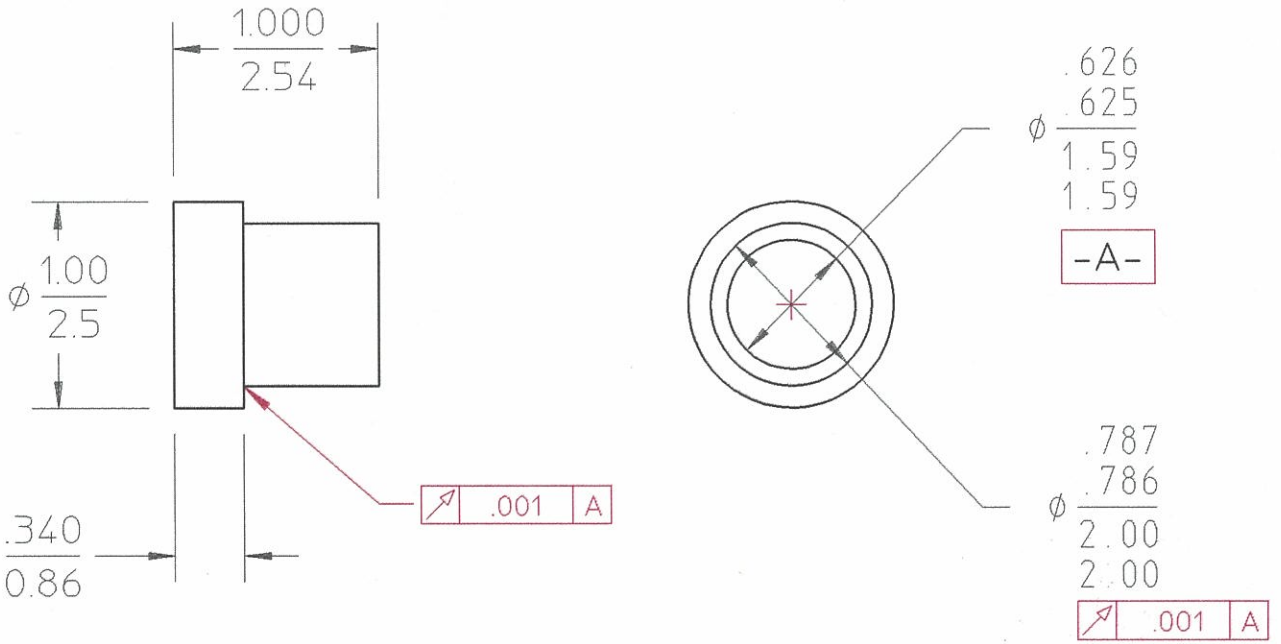
STAR/RHIC TPC

SECTOR MOUNTING TOOL

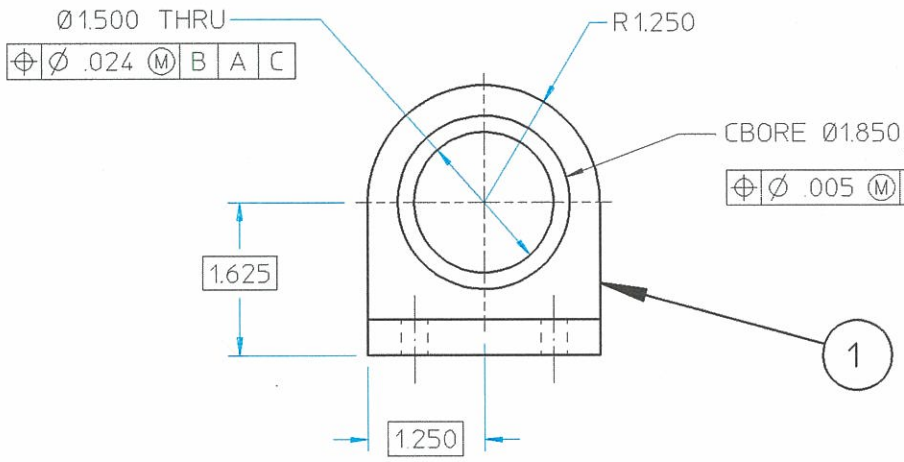
Bearing Sleeve

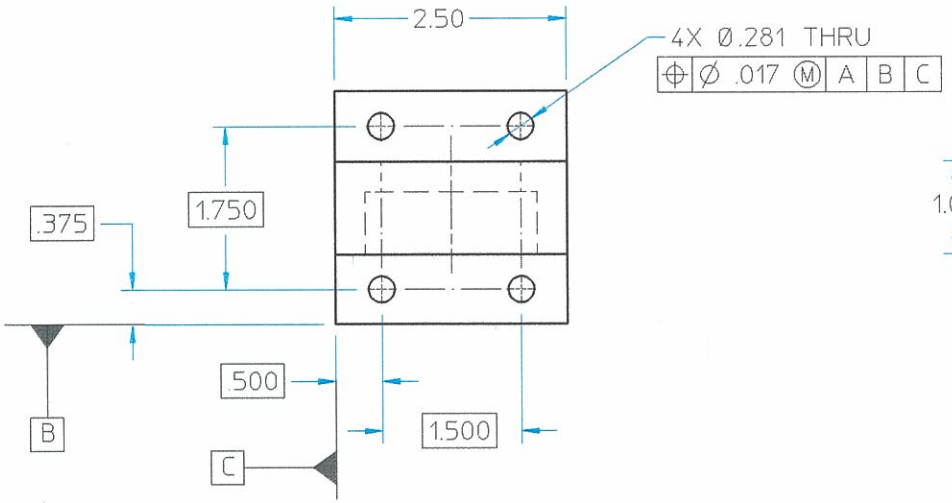
MATERIAL: BRASS

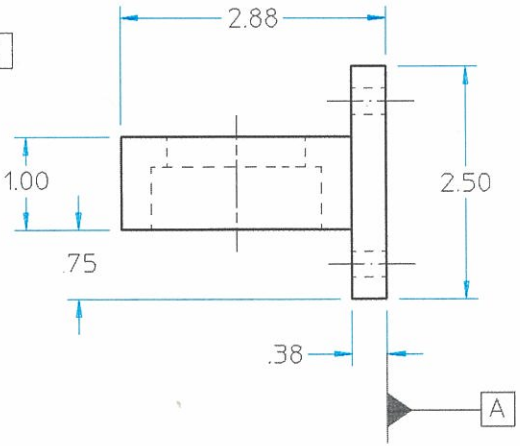
WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC752-A-1	A	-	



REQ	ITEM	PART NUMBER	DESCRIPTION
1	1		ALUMINUM 2024 OR 7075







24A7633B

REV.	DWN.	CHK.	DATE	CHANGES
B	JO	GK	8/15/97	MAJOR REVISION
A	LA	AW	8/3/95	RELEASED FOR FABRICTION

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
TOLERANCES: X/X = ±.06/.15 ANGLES ±.5° | .XX/X = ±0.02/0.05 FINISH | 0.XXX/.XX=±.005/.01 125/32
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK
REFERENCE - ANSI Y14.5 & B46.1

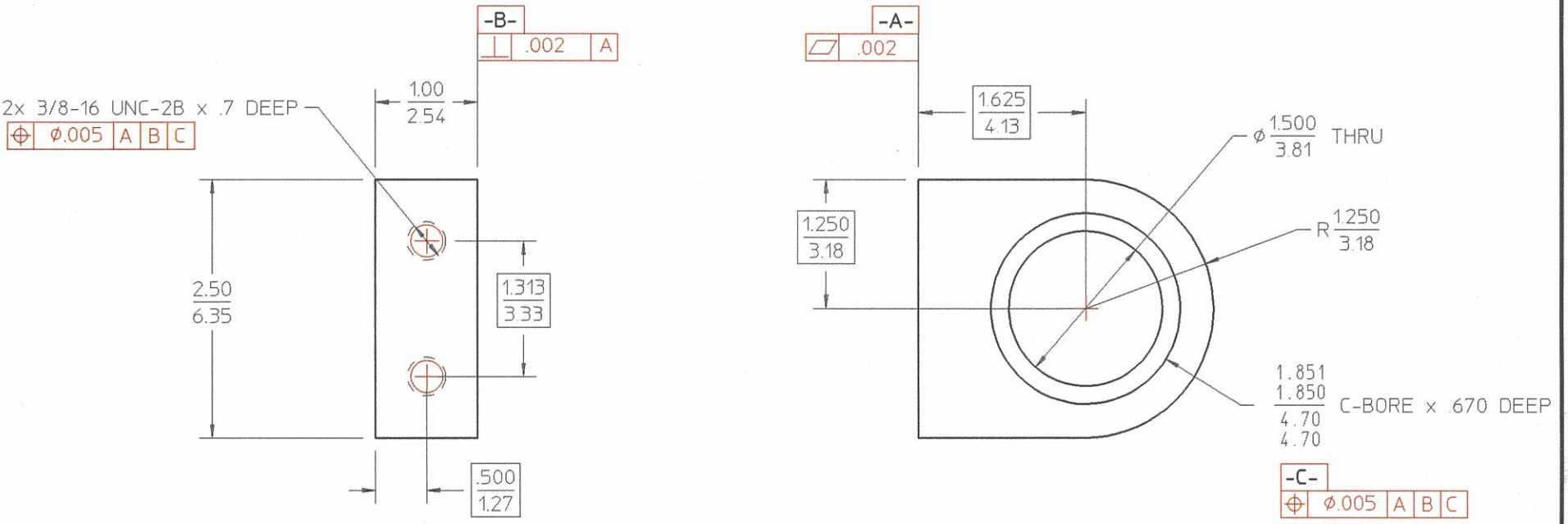
SHOP ORDERS
ALLT NO. | SER NO.
DATE ISSD | DATE REQD | NO REQD
DELIVER TO
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRAWN BY: L. AMERMANI/J. ORTIZ DATE 8/15/97
CHECK BY: R. LEWIS DATE 8/15/97

WBS # 4.2.10
Production Approval
Cognizant Engineer: A. Wandesforde
STAR DRAWING NUMBER: TPC753-C-1
REV: A
RHIC DRAWING NUMBER
REV.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - PILLOW BLOCK

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606	LBL DRAWING NUMBER	REV.
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	24A7633	B
	8052-30	SR-02-10		

24A7632A	ITEM	REQ	PART NUMBER	DESCRIPTION
				ALUMINUM 2024 or 7075



WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC753-B-1	A	XXXXXXXXXX	-

REV.	DWN.	CHK.	DATE	CHANGES
A				RELEASED FOR FABRICTION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 | ANGLES ±.5° | XX/.X = ±0.02/0.05 | FINISH 125/.32 | 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1.

SHOP ORDERS

ACCT. NO. | SER. NO.

DATE ISS'D | DATE REQ'D | NO. REQ'D

DELIVER TO

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

DRWN BY: I. amerman | DATE: 09/09/94

CHECK BY: R. LEWIS | DATE: 08/03/95

LAWRENCE BERKELEY LABORATORY

UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC

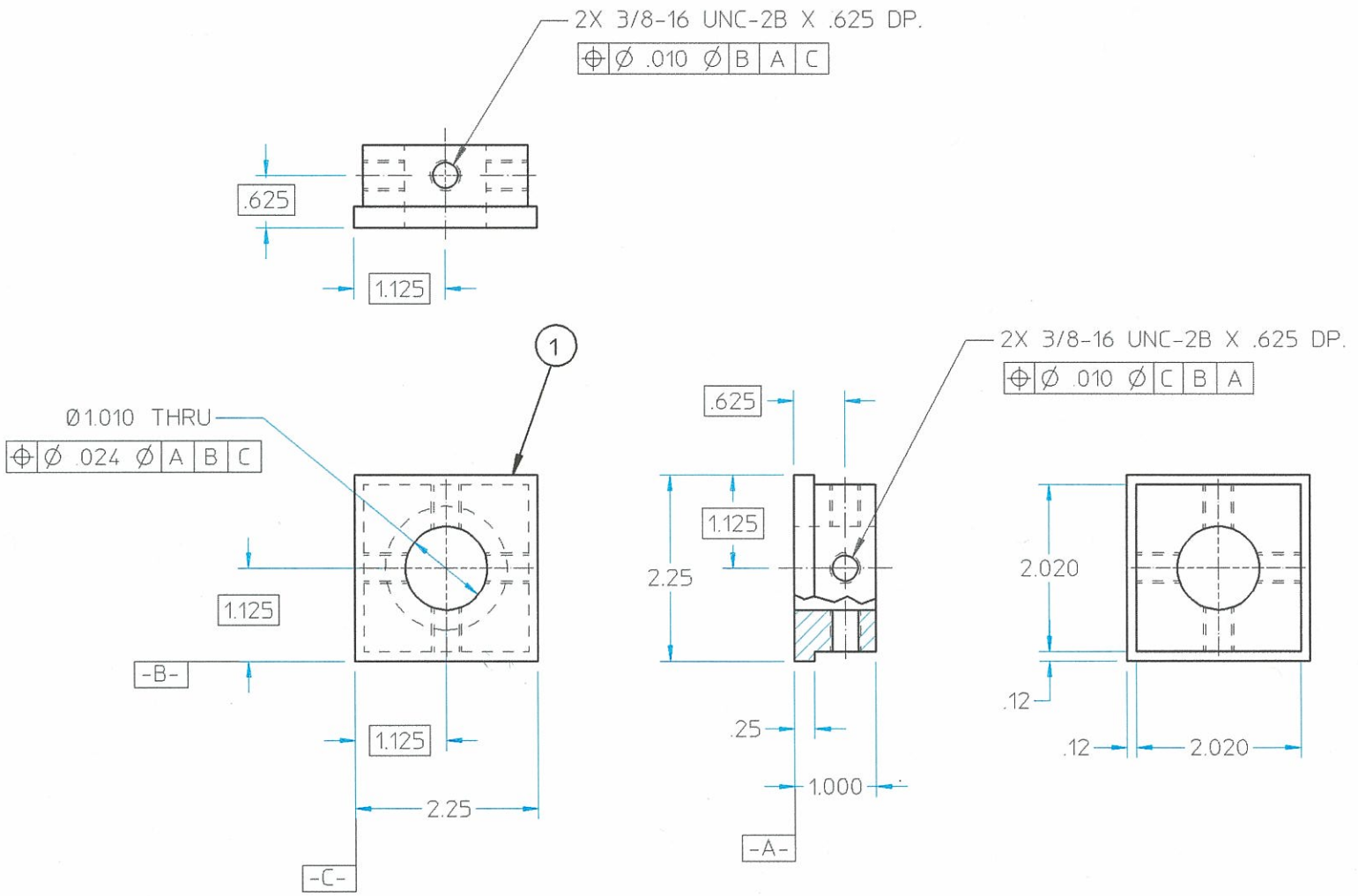
SECTOR MOUNTING TOOL

Bearing Block

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
MICROFILMED	DETAIL	24A7606	LBL DRAWING NUMBER: 24A7632	REV: A
	DESIGN ACCOUNT: 8052-30	CATEGORY CODE: SR-02-10		

old

ITEM	REQ	PART NUMBER	DESCRIPTION
1	3	24A7643A	STEEL PLATE, 1" HOT ROLLED A36



24A7643A

WBS # 4.2.10	Production Approval:	Cognizant Engineer: R.WELLS	STAR DRAWING NUMBER: TPC794-C-1	REV: A	RHIC DRAWING NUMBER	REV: -

REV.	DWN.	CHK.	DATE	CHANGES
A	JO	JO	4/97	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE IN INCHES

TOLERANCES: .X/.X = ±.06/.15 ANGLES ±.5° | XX/.X = ±0.02/0.05 FINISH | .0 XXX/.XX = ±.005/.01 125/.32

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS

ACCT. NO.: SER. NO.:

DATE ISS'D.: DATE REQ'D.: NO. REQ'D.:

DELIVER TO:

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

DRAWN BY: J.ORTIZ DATE: 4/18/97

CHECK BY: J.ORTIZ DATE: 4/18/97

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC

TPC ASSEMBLE & TEST

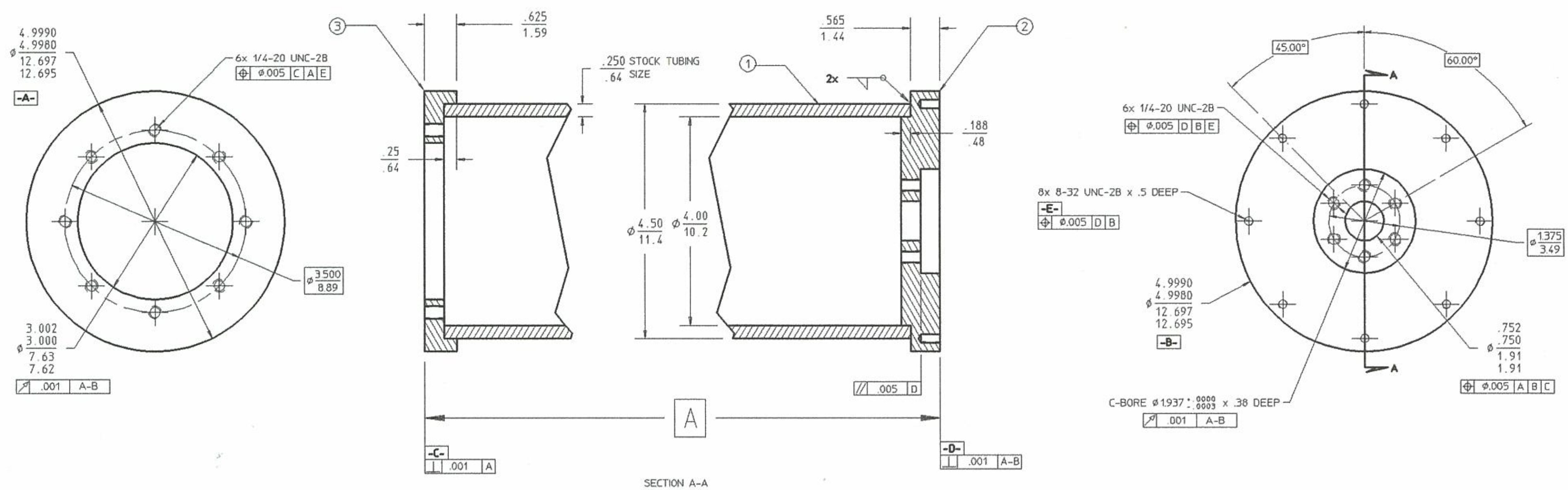
SMT - TUBE PLUG ADAPTER 2

PATENT CLEAR	DRAWING TYPE: DETAIL	SHOWN ON: 24A7944	SCALE: FULL	DO NOT SCALE PRINTS
MICROFILMED	DESIGN ACCOUNT: 8052-30	CATEGORY CODE: SR-02-10	LBL DRAWING NUMBER: 24A7643	REV: A

ITEM	REQ	PART NUMBER	DESCRIPTION
1	1		STEEL, TUBING, Ø4.5 O.D., .25 INCH WALL
2	1		STEEL, PLATE, .75 INCH
3	1		STEEL, PLATE, .625 INCH

NOTE:

PART	DIMENSION A
24A7654-1	42.000"/O.S.
24A7654-2	31.750"/IS



REV.	DWN	CHK.	ZONE	DATE	CHANGES
B	AR			8/95	C'BORE DIAMETER WAS 1.984
A	RL			8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
TOLERANCES: .X/.X = ±.06/.15; .XX/.X = ±.02/0.05; .XXX/.XX = ±.004/.01; ANGLES ±.5°; FINISH 125/32
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK
REFERENCE – ANSI Y14.5 & B46.1

SHOP ORDERS
SURFACE TREATMENT: Degrease
CERTIFICATION METHOD: Tag
DRWN BY: L. amerman — DATE 09/06/94
CHECK BY: A. RAWLINS — DATE 08/04/95

Production Approval 4.2.97 — Engineer: A. Wandesforde

STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
TPC755-D-1	A	XXXXXXXXXX	-

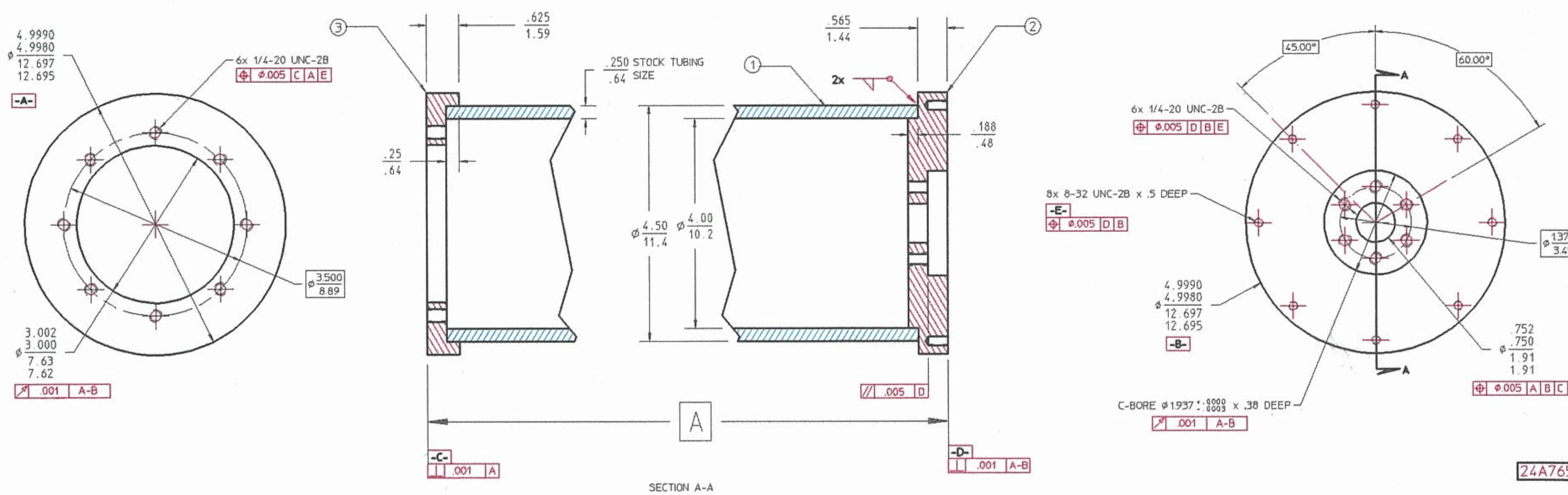
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA – BERKELEY
RHIC/STAR TPC
SECTOR MOUNTING TOOL
Inner Tube

DRAWING TYPE: DETAIL — SHOWN ON: 24A7606 — SCALE: FULL — DO NOT SCALE PRINTS
DESIGN ACCOUNT: 8052-30 — CATEGORY CODE: SR-02-10
LBL DRAWING NUMBER: 24A7654 — REV: B

ITEM	REQ	PART NUMBER	DESCRIPTION
1	1		STEEL, TUBING, Ø4.5 O.D., .25 INCH WALL
2	1		STEEL, PLATE, .75 INCH
3	1		STEEL, PLATE, .625 INCH

NOTE:

PART	DIMENSION A
24A7654-1	42.000"/O.S.
24A7654-2	31.750"/IS



REV.	DWN.	CHK.	ZONE	DATE	CHANGES
B	AR			8/95	C'BORE DIAMETER WAS 1.984
A	RL			8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
TOLERANCES: X/X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX = ±.004/.01; ANGLES ±.5°; FINISH 125/32
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK
REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRAWN BY: L. amerman — DATE 09/06/94
CHECK BY: A. RAWLINS — DATE 08/04/95

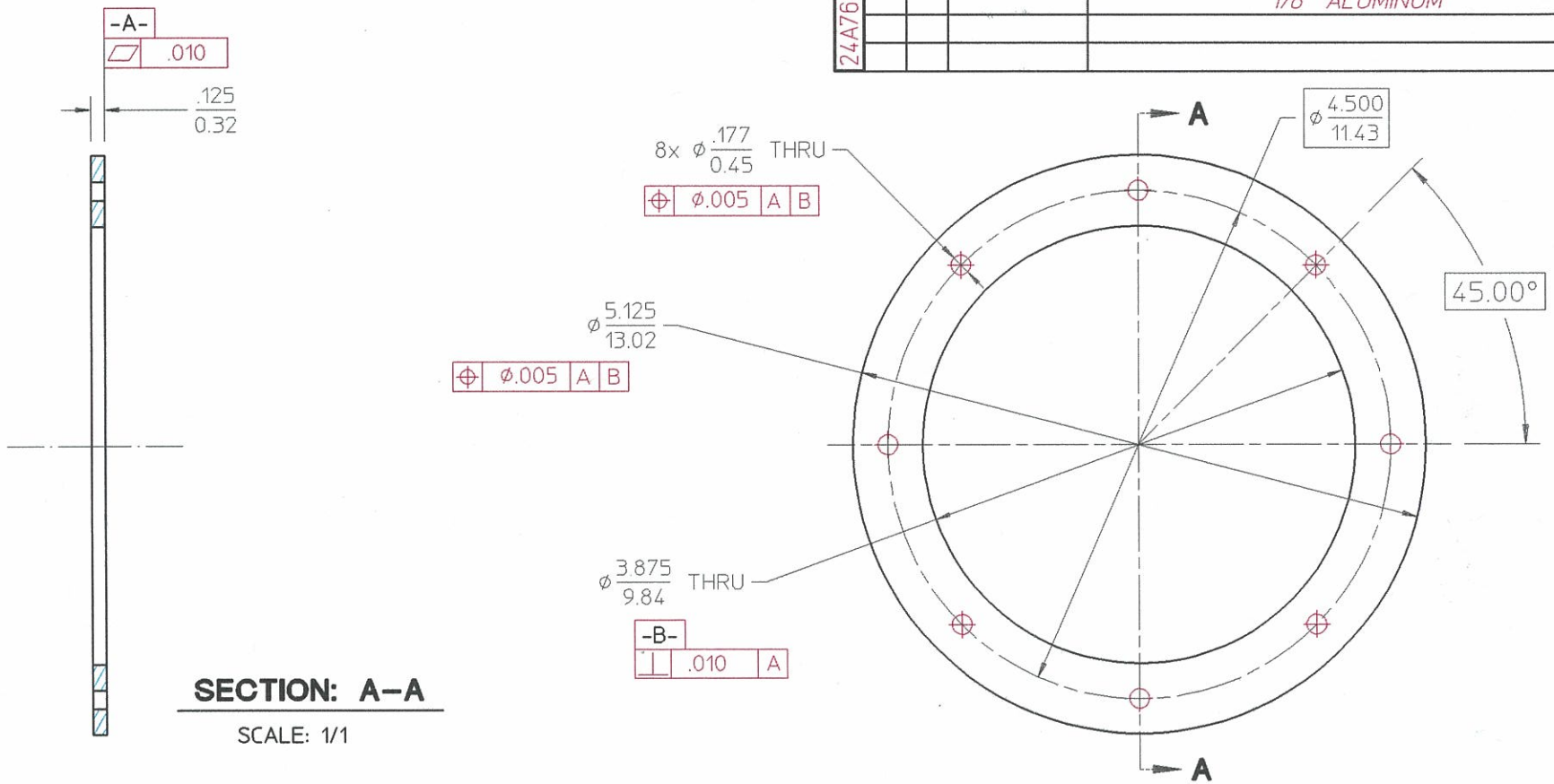
WBS # 4.2.10
Cognizant Engineer: A. Wandesforde
STAR DRAWING NUMBER: TPC755-D-1 — REV. A
RHIC DRAWING NUMBER — REV.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - INNER TUBE

DRAWING TYPE: DETAIL — SHOWN ON: 24A7606 — SCALE: FULL — DO NOT SCALE PRINTS
DESIGN ACCOUNT: 8052-30 — CATEGORY CODE: SR-02-10
LBL DRAWING NUMBER: 24A7654 — REV. B

24A7662A	ITEM	REQ	PART NUMBER	DESCRIPTION
				1/8" ALUMINUM



SECTION: A–A

SCALE: 1/1

WBS #	Production Approval	STAR DRAWING NUMBER	REV	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC756–B–1	A		

REV.	DWN.	CHK.	DATE	CHANGES
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 ANGLES ±.5° | .XX/.X = ±0.02/0.05 FINISH 125/.32 | 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS

ACCT. NO. | SER. NO.

DATE ISS'D | DATE REQ'D | NO. REQ'D

DELIVER TO

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

DRWN BY: L. amerman DATE: 09/08/94

CHECK BY: R. LEWIS DATE: 08/03/95

LAWRENCE BERKELEY LABORATORY

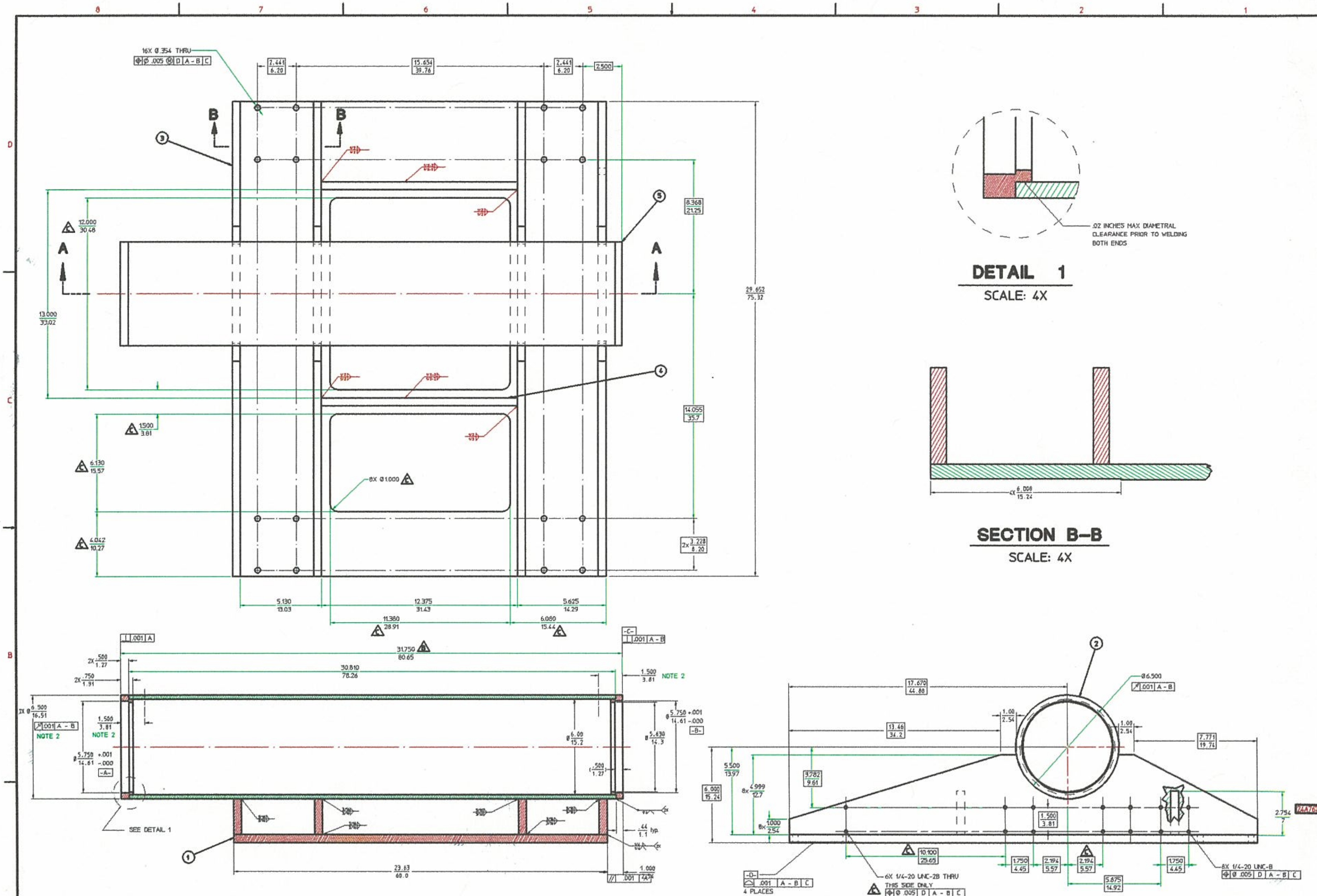
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC

TPC ASSEMBLY & TEST

SMT - BEARING RETAINER

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606	LBL DRAWING NUMBER	REV
MICROFILMED	DESIGN ACCOUNT: 8052-30	CATEGORY CODE: SR-02-10	24A7662	A



SECTION: A – A

NOTE:
1. C-BORE FEATURES APPLY TO BOTH ENDS.
2. RUNOUT TOLERANCE APPLIES OVER LENGTH SPECIFIED ONLY.

ITEM	REQ	PART NUMBER	DESCRIPTION
5	2	24A7676A-5	STEEL PLATE, A36, 1/2" THK.
4	2	24A7676A-4	STEEL PLATE, A36, 1/2" THK.
3	4	24A7676A-3	STEEL PLATE, A36, 1/2" THK.
2	1	24A7676A-2	STEEL TUBING, 6.50 O.D. X .25 WALL
1	1	24A7676A-1	STEEL PLATE, A36, 1/2" THK.

REV	DWN	CHK	ZONE	DATE	CHANGES
C	JO	GK		4/95	ADDED 6 1/4-20 UNC-2B HOLES & 2 CUTOUTS
B	RL	GK		8/95	DECREASED OVERALL LENGTH BY .06 INCHES TO 31.75
A	RL	GK		8/95	RELEASE FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
FINISH: Degrease
Tag
A.RAWLINS/J.ORTIZ
G.KOEHLER

STAR DRAWING NUMBER: TPC757-E-1 REV. A
4.2.10

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
TPC ASSEMBLY AND TEST
SMT - TUBE MOUNT

DETAIL 24A7606 8052-30 SR-02-10 SCALE: NTS
24A7678 C

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO.	SER. NO.		MICROFILMED	DETAIL	24A7606	24A7681	A
TOLERANCES: X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01 — ANGLES ±.5° — FINISH 125/.32	DATE ISS'D	DATE REQ'D	NO. REQ'D		DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	DELIVER TO:							
ALL SCREW THREADS ARE ISO METRIC CLASS 6	SURFACE TREATMENT: Degrease							
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	IDENTIFICATION METHOD: Tag							
REFERENCE – ANSI Y14.5 & B46.1.	DRWN BY: l. amerman		DATE: 09/08/94					
	CHECK BY		DATE					

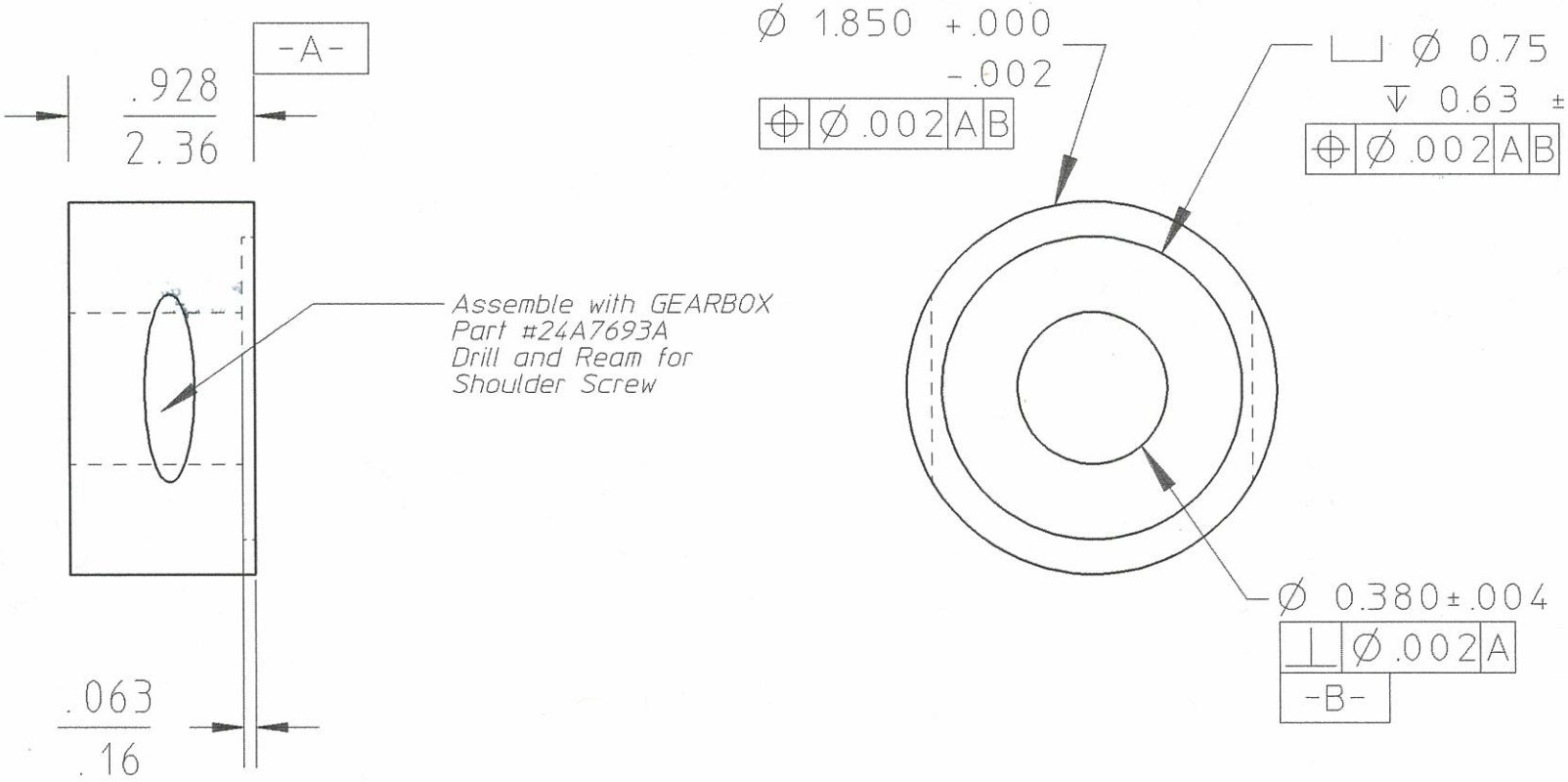
REV.	DWN.	CHK.	DATE	CHANGES

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA – BERKELEY

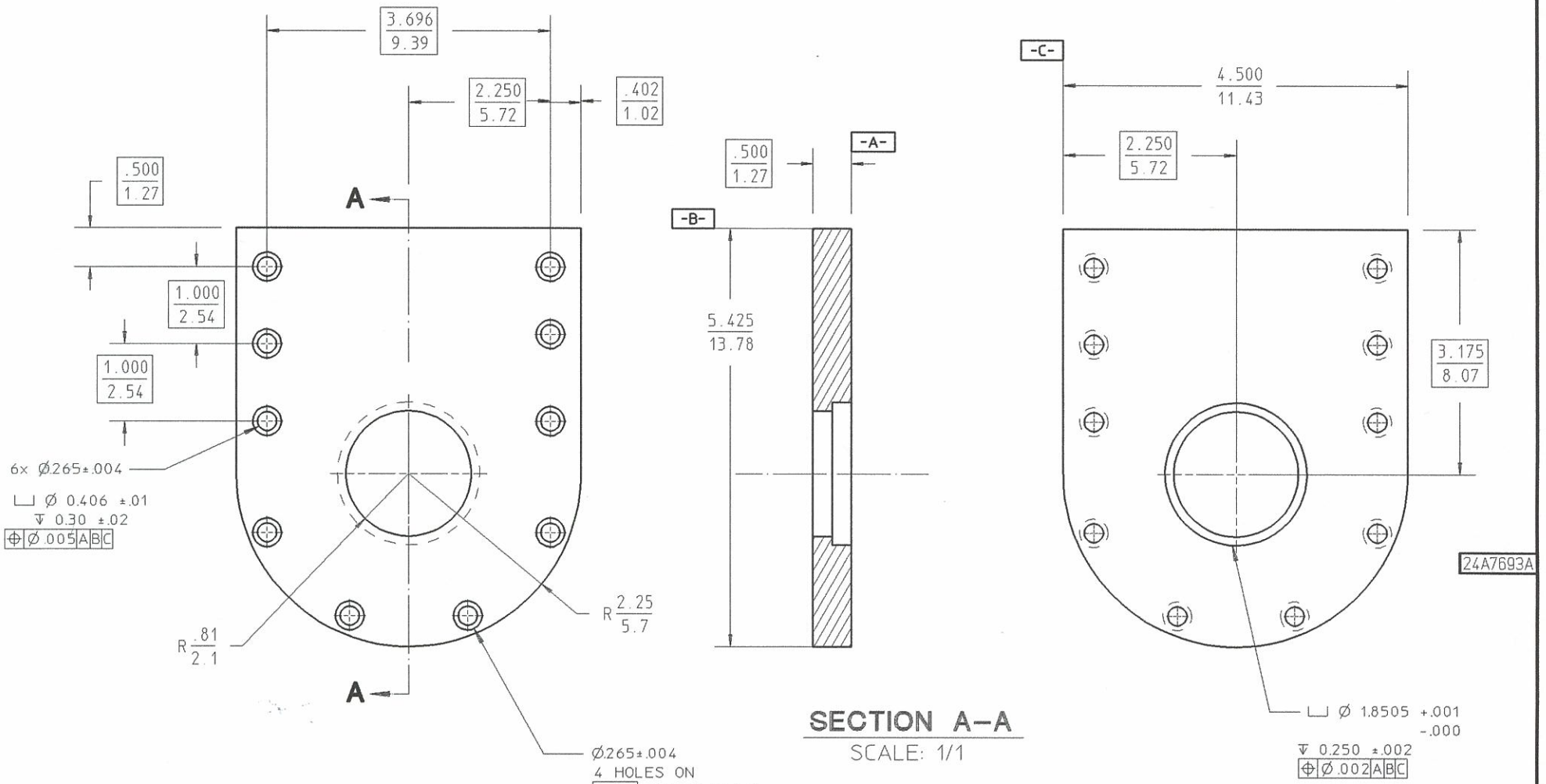
RHIC/STAR DETECTOR
TPC ASSEMBLY & TEST
SMT – GEARBOX PLUG

MATERIAL: ALUMINUM 2024 or 7075

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC758–A–1	A		



ITEM	REQ	PART NUMBER	DESCRIPTION
1	2	-	ALUMINUM 2024 or 7075



SECTION A–A
SCALE: 1/1

Note:
Assemble with GEARBOX
Part #24A7726B
with 10 1/4-20 x .5"
Socket Head Cap Screws

WBS #	Production Approval: / Cognizant Engineer:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	A. Wandesforde	TPC759-C-1	A		

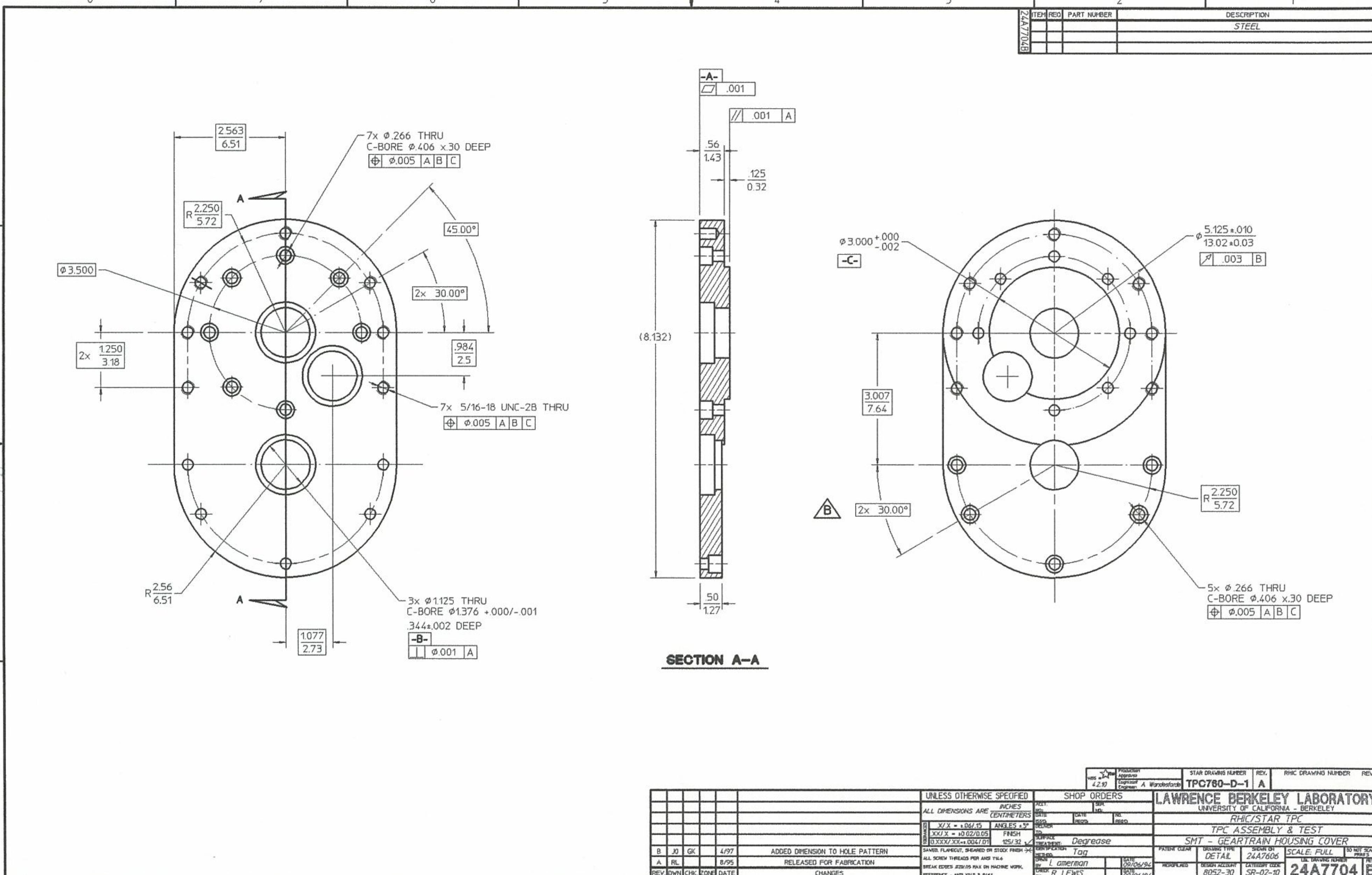
REV.	DWN.	CHK.	DATE	CHANGES
A	LA/JO	GK	9/2/94	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
TOLERANCES: .X/.X = ±.06/.15 ; .XX/.X = ±0.02/0.05 ; 0.XXX/.XX=±.005/.01 ; ANGLES ±.5° ; FINISH 125/.32
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS ARE ISO METRIC CLASS 6
BREAK EDGES .020/.05 MAX ON MACHINE WORK.
REFERENCE - ANSI Y14.5 & B46.1

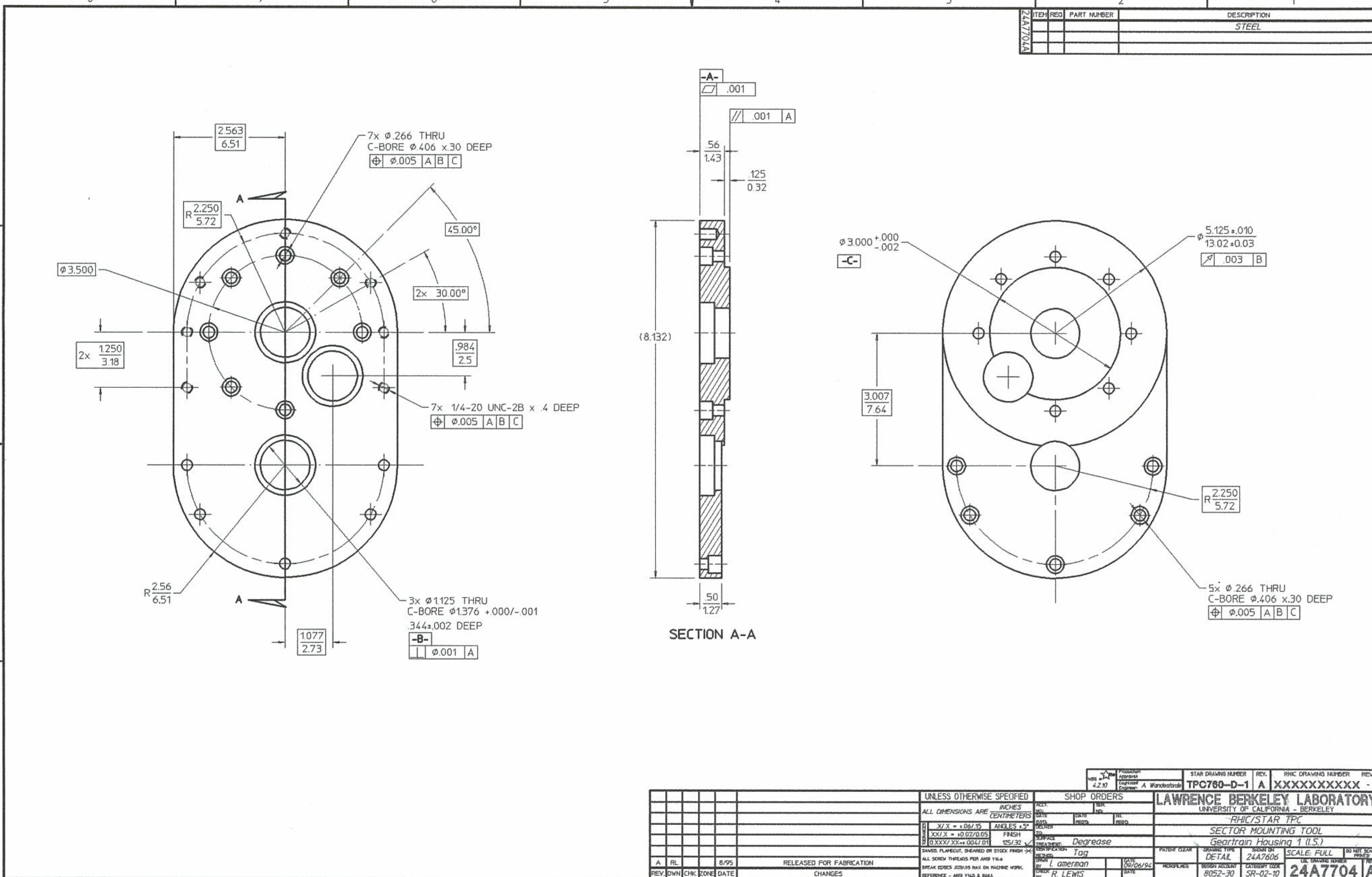
SHOP ORDERS
ACCT. NO.: SER. NO.:
DATE ISS'D: DATE REQ'D: NO. REQ'D:
DELIVER TO:
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRAWN BY: l. amerman/j. ortiz DATE: 09/02/94
CHECK BY: g. koehler DATE: 09/02/94

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
TPC ASSEMBLY & TEST
SMT - GEARBOX FACE

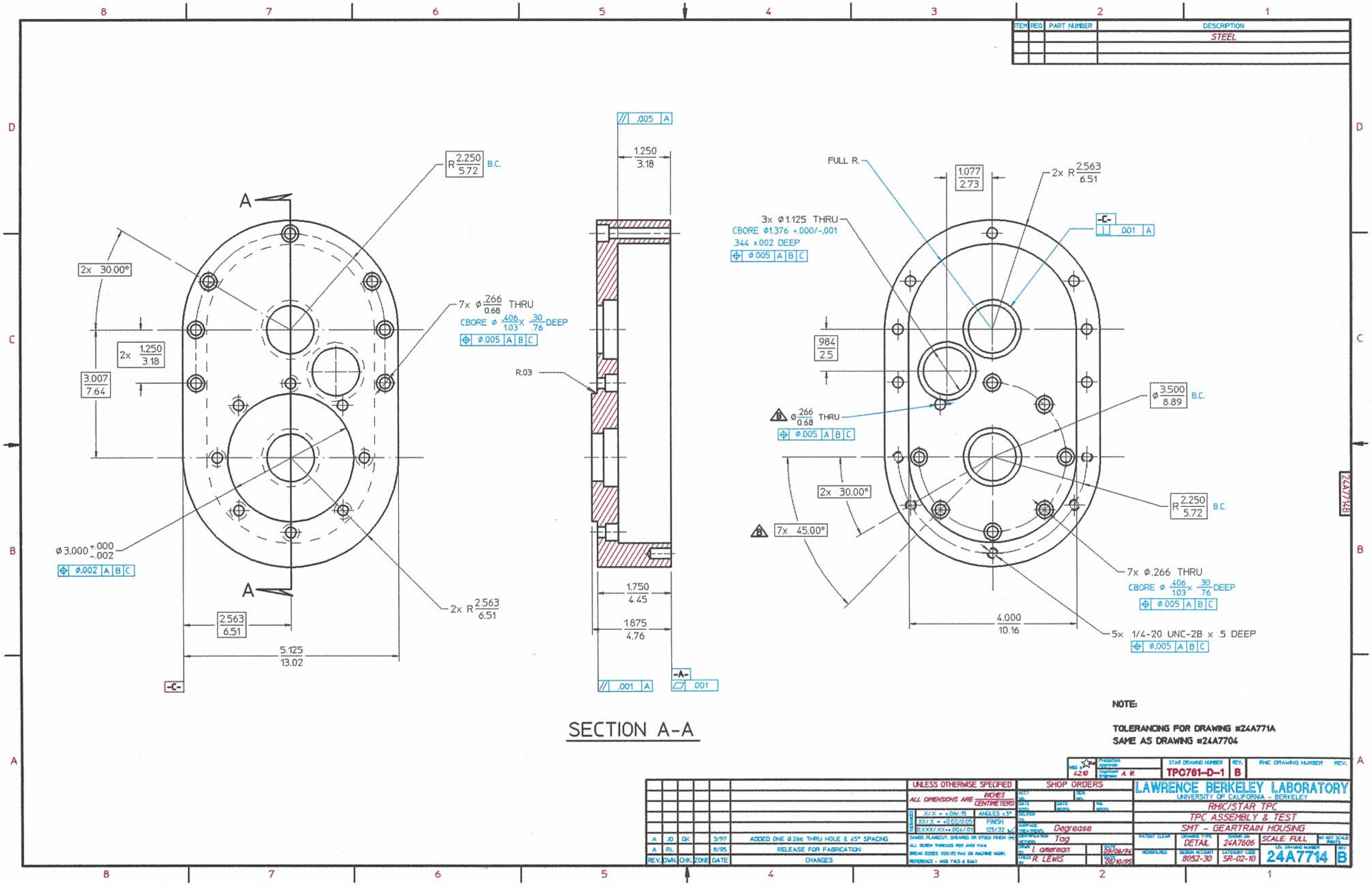
PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
MICROFILMED	DETAIL	24A7606	LBL DRAWING NUMBER	REV.
	DESIGN ACCOUNT: 8052-30	CATEGORY CODE: SR-02-10	24A7693	A



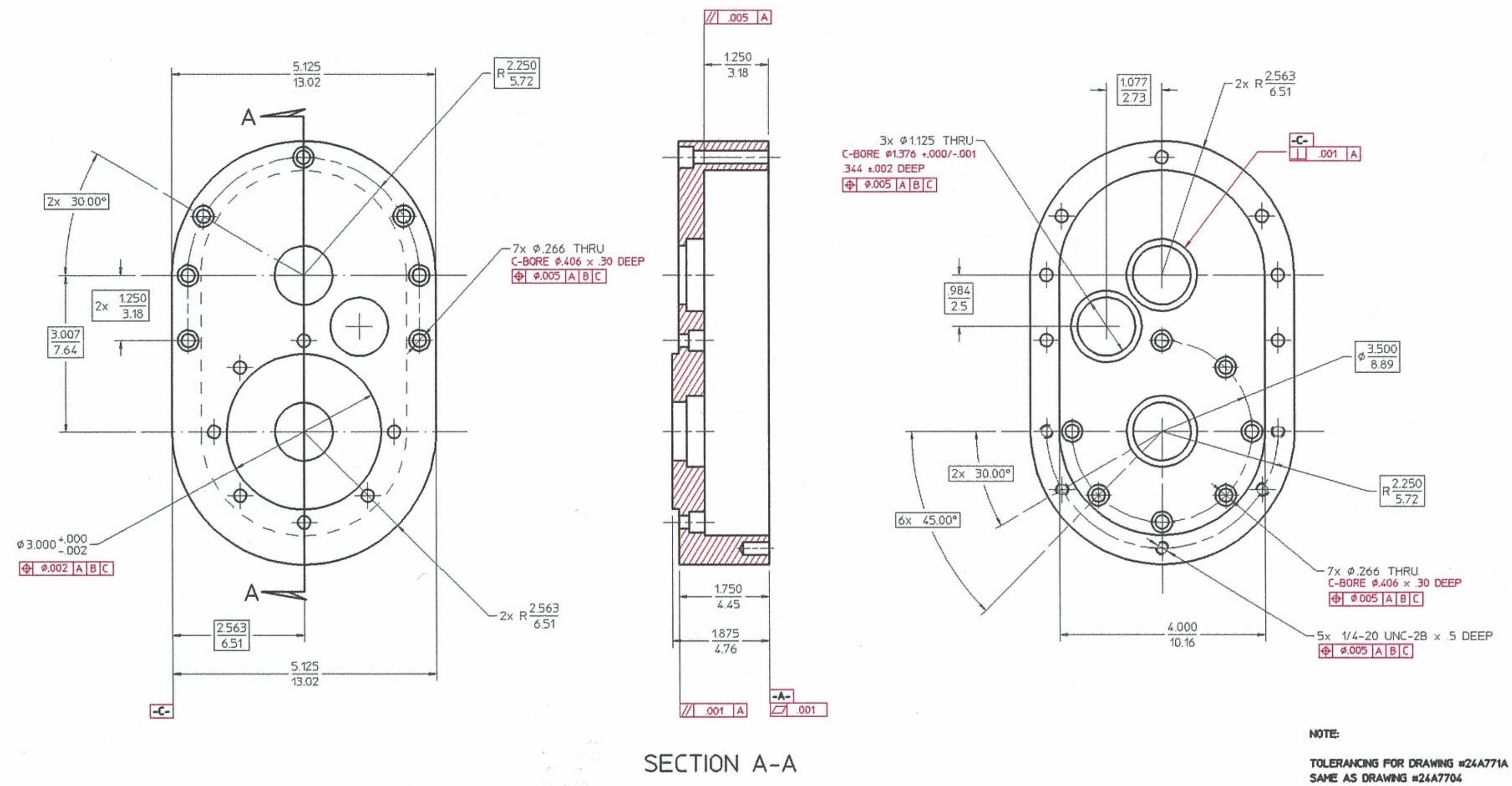
24A7704B
ITEM REQ PART NUMBER DESCRIPTION
STEEL
2.563 6.51
7x Ø.266 THRU
C-BORE Ø.406 x.30 DEEP
Ø.005 A B C
R 2.250 5.72
A
45.00°
Ø3.500
2x 30.00°
2x 1.250 3.18
.984 2.5
7x 5/16-18 UNC-2B THRU
Ø.005 A B C
R 2.56 6.51
3x Ø1.125 THRU
C-BORE Ø1.376 +.000/-.001
.344±.002 DEEP
-B-
Ø.001 A
1.077 2.73
-A-
.001
.001 A
.56 1.43
.125 0.32
(8.132)
.50 1.27
SECTION A-A
Ø3.000 +.000 -.002
-C-
Ø 5.125±.010 13.02±0.03
.003 B
3.007 7.64
B
2x 30.00°
R 2.250 5.72
5x Ø.266 THRU
C-BORE Ø.406 x.30 DEEP
Ø.005 A B C
STAR DRAWING NUMBER TPC760-D-1 REV. A
RHIC DRAWING NUMBER REV.
A Wandesforde
B J0 GK 4/97 ADDED DIMENSION TO HOLE PATTERN
A RL 8/95 RELEASED FOR FABRICATION
REV. DWN CHK ZONE DATE CHANGES
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES CENTIMETERS
X/X = ±.06/.15 ANGLES ±.5°
XX/X = ±0.02/0.05 FINISH
0.XXX/XX=±.004/.01 125/32
SHOP ORDERS
Degrease
Tag
L amerman 09/06/94
R. LEWIS 09/06/94
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - GEARTRAIN HOUSING COVER
DETAIL 24A7606 SCALE: FULL
8052-30 SR-02-10 24A7704 B



7x Ø.266 THRU
C-BORE Ø.406 x.30 DEEP
Ø.005 A B C
2.563 6.51
R 2.250 5.72
Ø3.500
45.00°
2x 30.00°
2x 1.250 3.18
.984 2.5
7x 1/4-20 UNC-2B x .4 DEEP
Ø.005 A B C
R 2.56 6.51
3x Ø1.125 THRU
C-BORE Ø1.376 +.000/-.001
.344±.002 DEEP
-B-
Ø.001 A
1.077 2.73
-A-
.001
.001 A
.56 1.43
.125 0.32
(8.132)
.50 1.27
SECTION A-A
Ø3.000 +.000 -.002
-C-
Ø 5.125±.010 13.02±0.03
.003 B
3.007 7.64
R 2.250 5.72
5x Ø.266 THRU
C-BORE Ø.406 x.30 DEEP
Ø.005 A B C
ITEM REQ PART NUMBER DESCRIPTION
STEEL
24A7704A
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES CENTIMETERS
X/X = ±.06/.15 ANGLES ±.5°
XX/X = ±0.02/0.05 FINISH
0.XXX/XX=±.004/.01 125/32
SHOP ORDERS
SURFACE TREATMENT: Degrease
CERTIFICATION METHOD: Tag
DRWN BY L. amerman 09/06/94
CHECK BY R. LEWIS
A RL 8/95 RELEASED FOR FABRICATION
REV. DWN CHK ZONE DATE CHANGES
STAR DRAWING NUMBER TPC760-D-1 REV. A
RHIC DRAWING NUMBER XXXXXXXXXX REV. -
Cognizant Engineer: A. Wandesforde
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR TPC
SECTOR MOUNTING TOOL
Geartrain Housing 1 (I.S.)
DRAWING TYPE DETAIL
SHOWN ON 24A7606
SCALE: FULL
DESIGN ACCOUNT 8052-30
CATEGORY CODE SR-02-10
LBL DRAWING NUMBER 24A7704 REV. A



SECTION A-A
NOTE:
TOLERANCING FOR DRAWING #24A771A
SAME AS DRAWING #24A7704
2x 30.00°
2x 1.250 3.18
3.007 7.64
R 2.250 5.72 B.C.
7x ⌀ .266 0.68 THRU
CBORE ⌀ .406 1.03 x .30 .76 DEEP
⌀ 3.000 +.000 -.002
2x R 2.563 6.51
2.563 6.51
5.125 13.02
1.250 3.18
R.03
1.750 4.45
1.875 4.76
FULL R.
1.077 2.73
3x ⌀1.125 THRU
CBORE ⌀1.376 +.000/-.001
.344 ±.002 DEEP
.984 2.5
⌀ .266 0.68 THRU
⌀ 3.500 8.89 B.C.
7x 45.00°
4.000 10.16
5x 1/4-20 UNC-2B x .5 DEEP
7x ⌀.266 THRU
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - GEARTRAIN HOUSING
STEEL
TPC761-D-1
DETAIL
SCALE FULL
24A7714
B
ADDED ONE ⌀.266 THRU HOLE & 45° SPACING
RELEASE FOR FABRICATION
UNLESS OTHERWISE SPECIFIED
SHOP ORDERS
Degrease
Tag
R. LEWIS
8052-30
SR-02-10
24A7606



ITEM	REQ	PART NUMBER	DESCRIPTION
			STEEL

NOTE:

TOLERANCING FOR DRAWING #24A771A
SAME AS DRAWING #24A7704

REV.	DWN	CHK.	ZONE	DATE	CHANGES
A	RL			8/95	RELEASE FOR FABRICATION

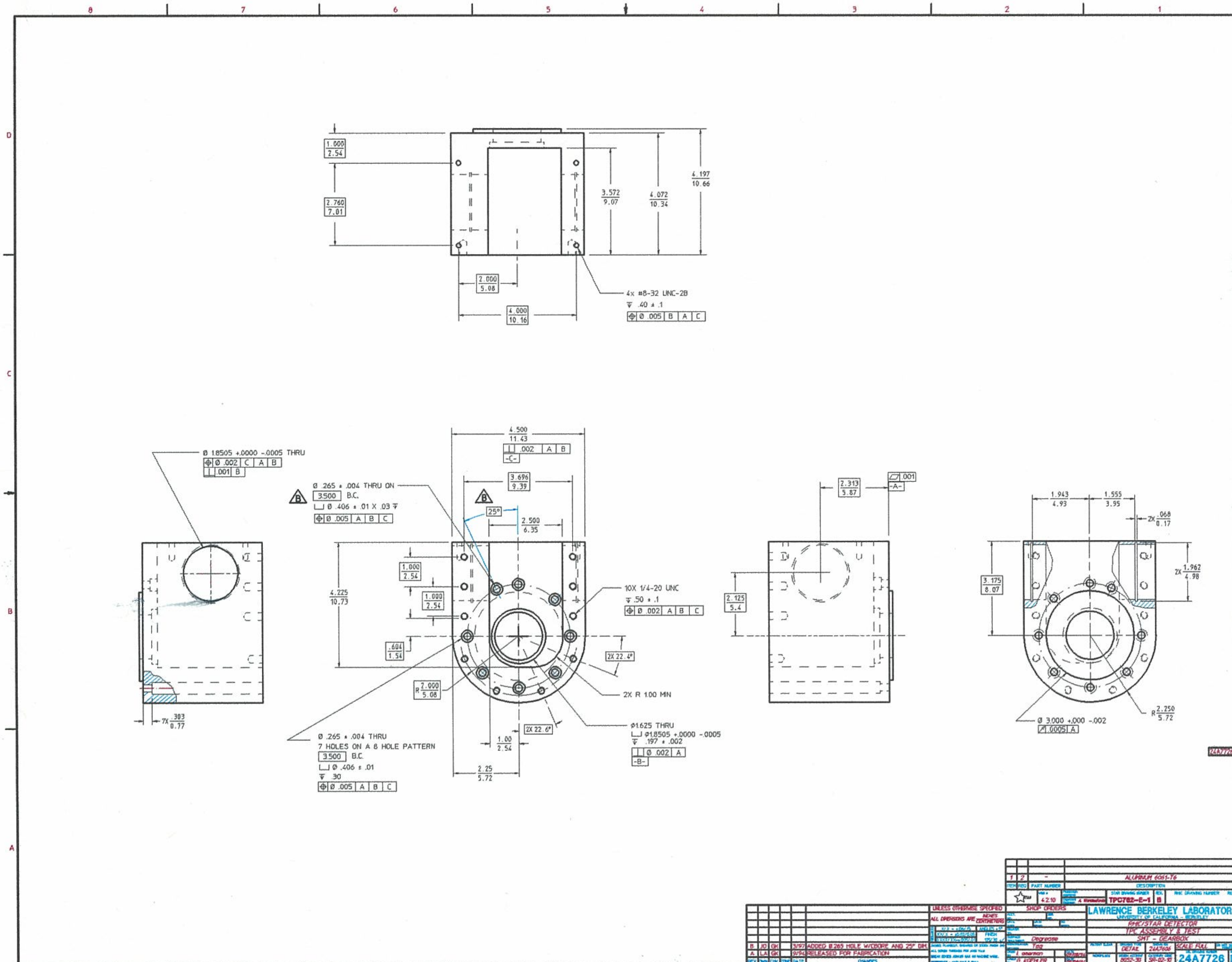
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
X/X = ±.06/.15 ANGLES ±.5°
XX/.X = ±0.02/0.05 FINISH
.XXX/.XX = ±.004/.01 125/32

SHOP ORDERS
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRAWN BY: I. amerman DATE 09/06/94
CHECKED BY: R. LEWIS DATE 09/10/95

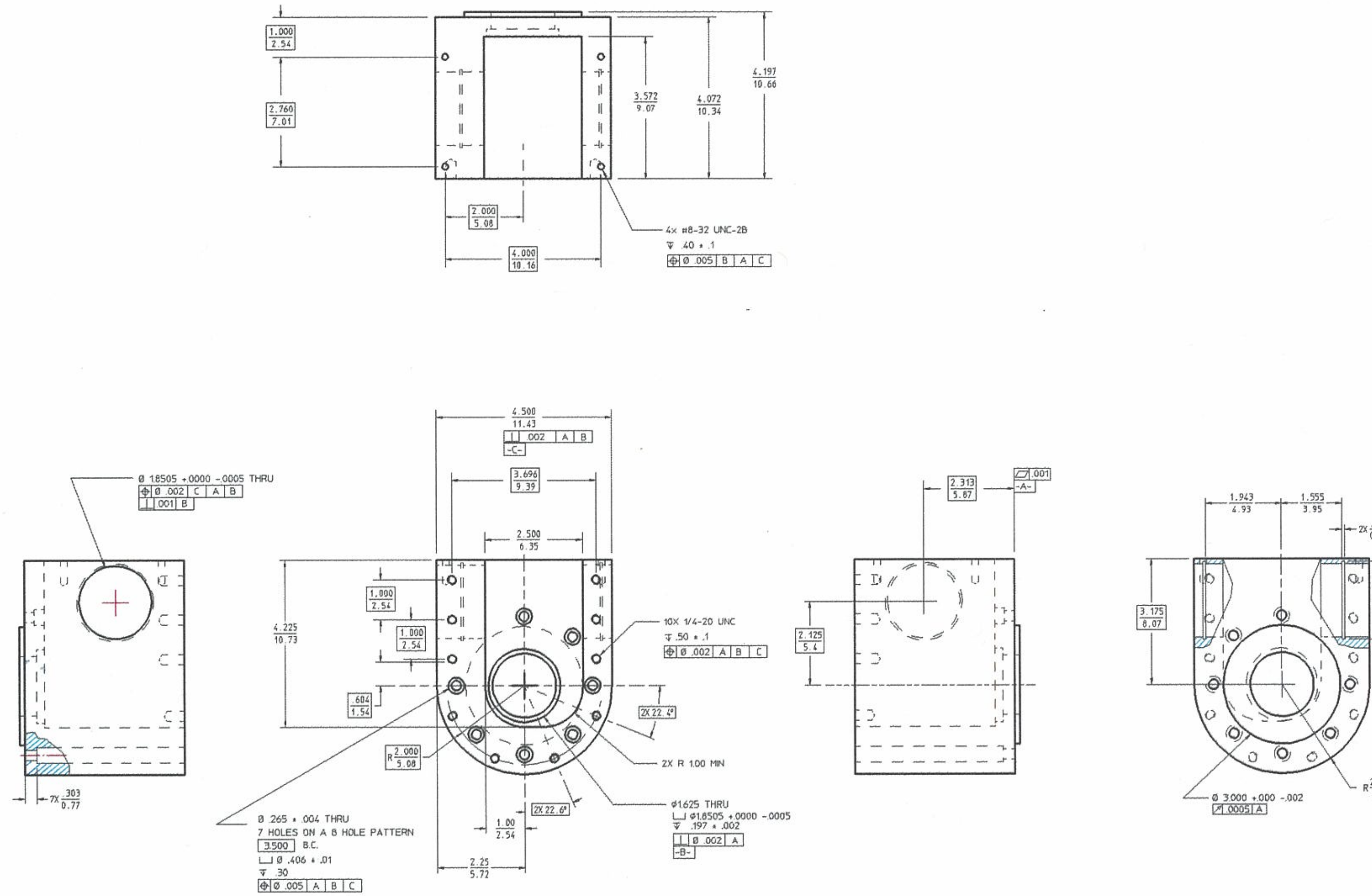
STAR DRAWING NUMBER: TPC761-D-1 REV. A
RHIC DRAWING NUMBER: XXXXXXXXXX REV. -

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR TPC
SECTOR MOUNTING TOOL
Geartrain Housing 2 (I.S.)

DRAWING TYPE: DETAIL
SHOWN ON: 24A7606
SCALE: FULL
DESIGN ACCOUNT: 8052-30
CATEGORY CODE: SR-02-10
LBL DRAWING NUMBER: 24A7714 REV. A



/jortiz/STAR/SECTOR_TOOL/24A7726B_MOD_GBOX.....31-Mar-97



ITEM	REQ	PART NUMBER	DESCRIPTION
1	2	-	ALUMINUM 6061-T6

STAR DRAWING NUMBER: TPC782-E-1 REV. A
RHIC DRAWING NUMBER: XXXXXXXXXX - REV.
4.2.10 A. Mandelbrot

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
X.X = ±.06/.15 ANGLES ±.5°
X.XX/X = ±.007/0.05 FINISH 125/32
0.XXX/.XX = ±.005/.01

SHOP ORDERS
Degrease
Tag
J. Gearhart

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
SECTOR MOUNTING TOOL
Gearbox

DETAIL | 24A7606 | SCALE: FULL
6052-30 | SR-02-10 | 24A7728 | A

RELEASED FOR FABRICATION
REV | DWN | CHK | ZONE | DATE | CHANGES

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS	PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO. / SER. NO.		DETAIL	24A7606	24A7731	A
TOLERANCES: .X/.X = ±.06/.15 · XX/.X = ±0.02/0.05 · 0.XXX/.XX=±.005/.01 · ANGLES ±.5° · FINISH 125/.32	DATE ISS'D / DATE REQ'D / NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	DELIVER TO:					
ALL SCREW THREADS PER ANSI Y14.6	SURFACE TREATMENT ---					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	IDENTIFICATION METHOD ---					
REFERENCE - ANSI Y14.5 & B46.1.	DRWN BY l. amerman — DATE 09/30/94					
	CHECK BY R. LEWIS — DATE 08/07/95					

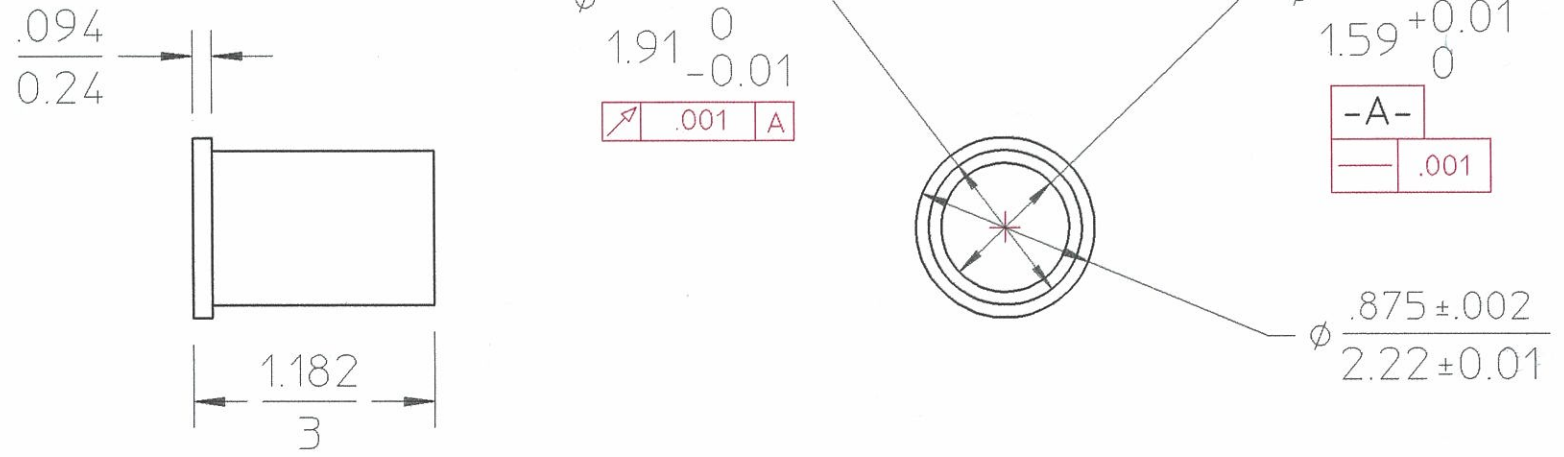
REV.	DWN.	CHK.	DATE	CHANGES

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

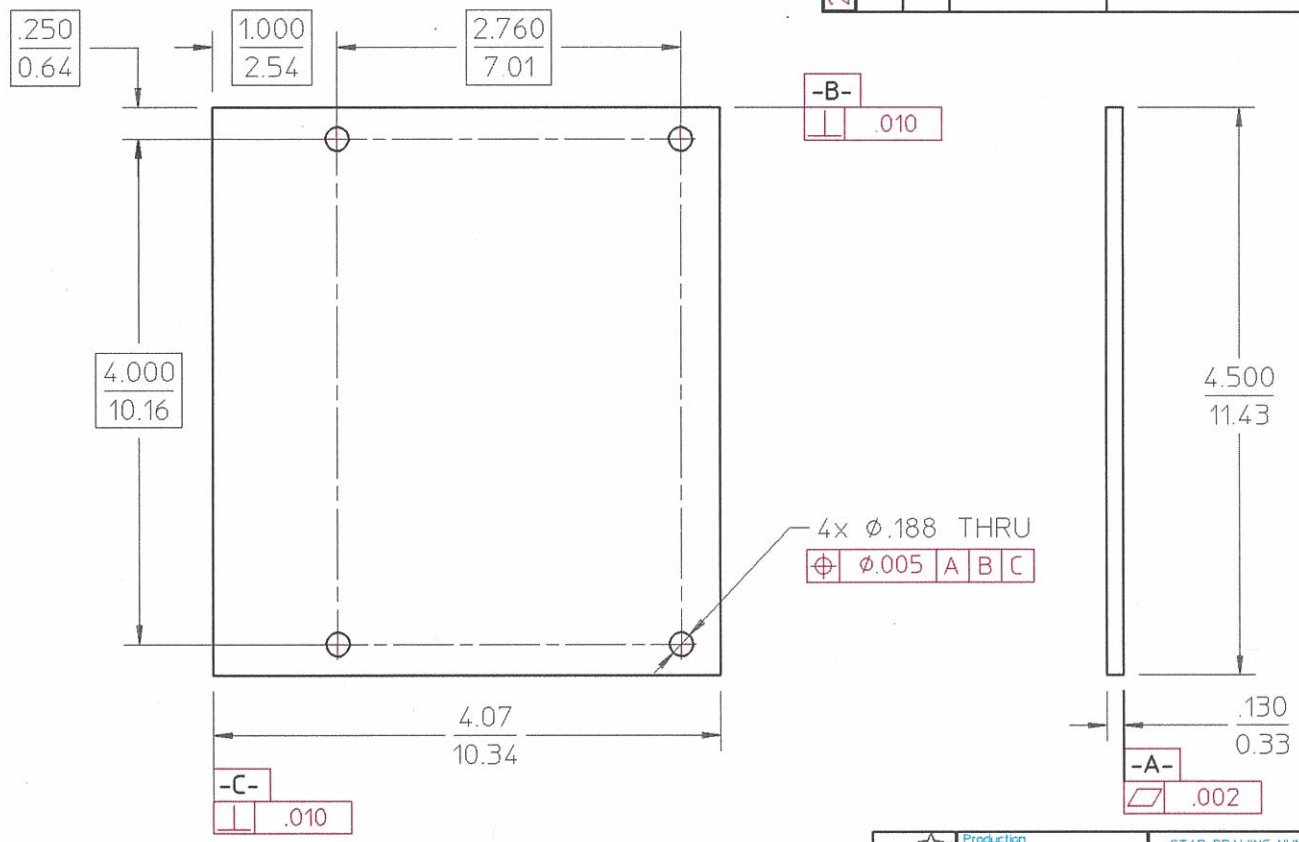
RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - BUSHING

MATERIAL: DELRIN

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC763-A-1	A		



24A7742A	ITEM	REQ	PART NUMBER	DESCRIPTION
	1	2	-	ALUMINUM 6061-T6



WBS # 4.2.10	Production Approval: / Cognizant Engineer: A. Wandesforde	STAR DRAWING NUMBER: TPC764-B-1	REV: A	RHIC DRAWING NUMBER	REV

REV.	DWN.	CHK.	DATE	CHANGES
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 | ANGLES ±.5° | .XX/.X = ±0.02/0.05 | FINISH 125/.32 | 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS ARE PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK;

REFERENCE - ANSI Y14.5 & B46.1.

SHOP ORDERS

ACCT. NO.	SER. NO.		
DATE ISS'D	DATE REQ'D	NO. REQ'D	
DELIVER TO			
SURFACE TREATMENT	---		
IDENTIFICATION METHOD	---		
DRWN BY: L. amerman		DATE: 09/02/94	
CHECK BY: R. LEWIS		DATE: 08/07/95	

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - GEARBOX COVER

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV
	8052-30	SR-02-10	24A7742	A

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES	ACCT. NO.	SER. NO.			DETAIL	24A7606	24A7751	A
TOLERANCES: .X = ±.06/.15; .XX = ±.02/.05; .XXX = ±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:							
FINISH 125	SURFACE TREATMENT: Degrease							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD: Tag							
ALL SCREW THREADS ARE PER ANSI Y14.6	DRWN BY: J.ORTIZ		DATE: 4/30/97					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY: G.KOEHLER		DATE: 4/30/97					
REFERENCE - ANSI Y14.5 & B46.1.								

REV.	DWN.	CHK.	DATE	CHANGES
A	JO	GK	4/97	RELEASE FOR FABRICATION

LAWRENCE BERKELEY LABORATORY

UNIVERSITY OF CALIFORNIA - BERKELEY

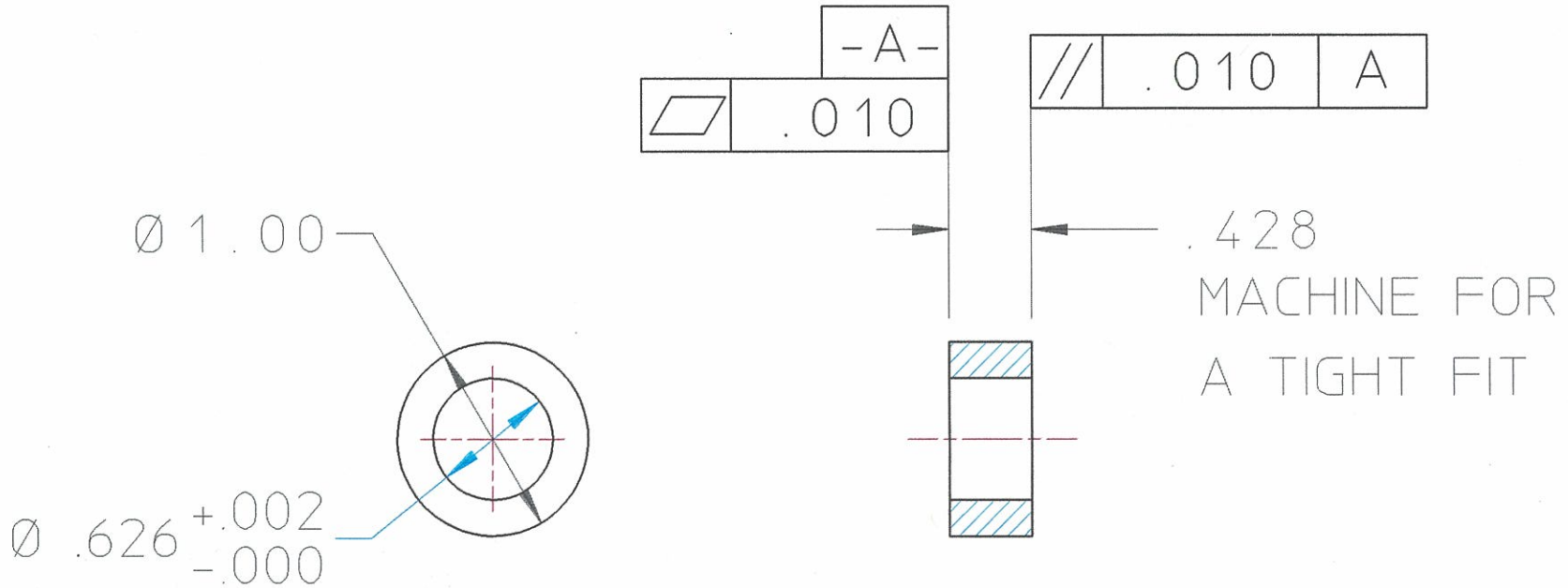
RHIC/STAR DETECTOR

TPC ASSEMBLY & TEST

SMT - SPACER BUSHING

MATERIAL: BRASS

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: R.WELLS	TPC765-A-1	A		-



UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO.	SER. NO.			DETAIL	24A7606	24A7761	A
TOLERANCES: X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:							
FINISH 125/.32	SURFACE TREATMENT: Degrease							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD: Tag							
ALL SCREW THREADS PER ANSI Y14.6	DRWN BY: I. amerman		DATE 09/06/94					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY: R. LEWIS		DATE 08/07/95					
REFERENCE - ANSI Y14.5 & B46.1.								

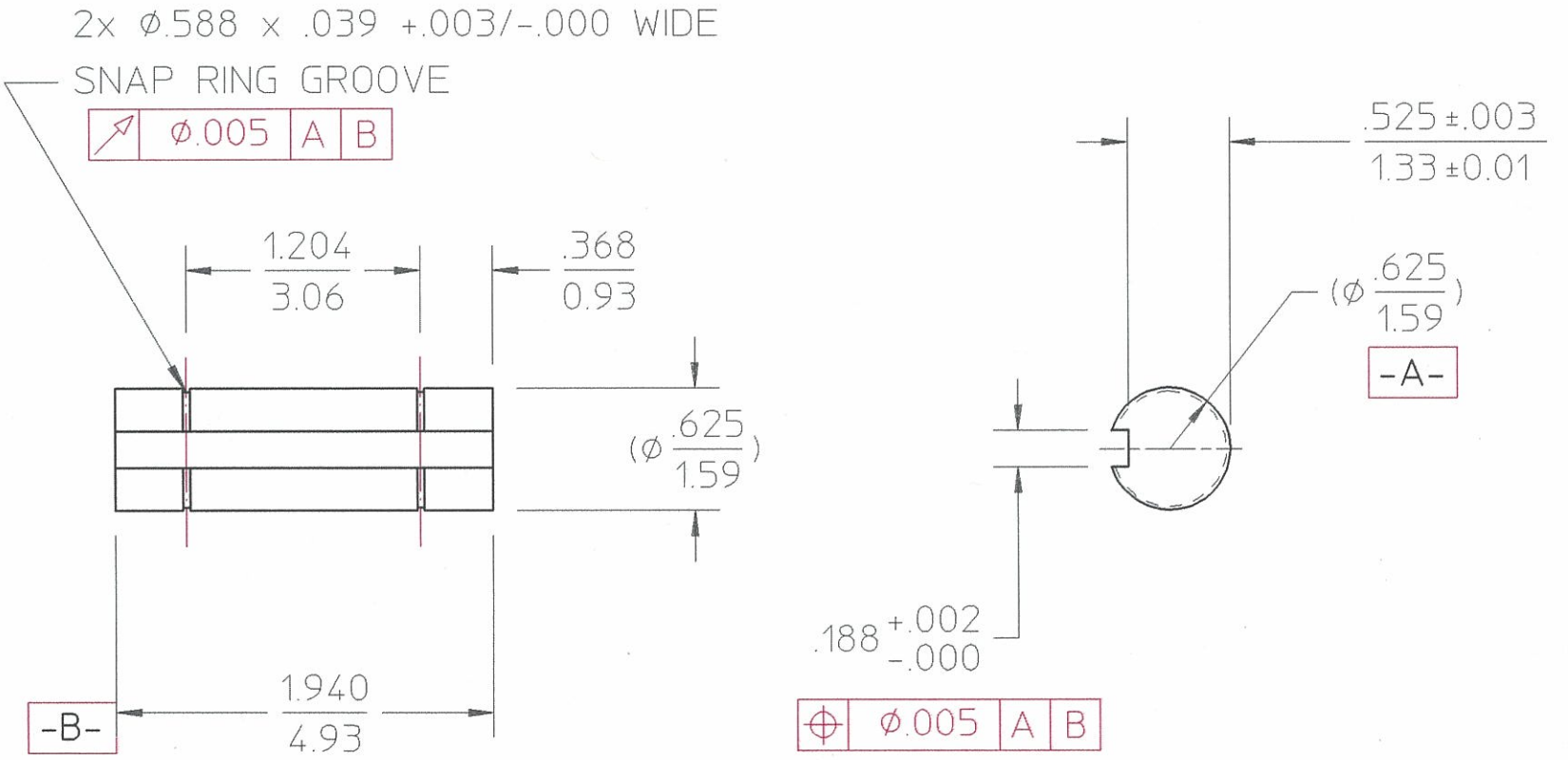
REV.	DWN.	CHK.	DATE	CHANGES

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - IDLER SHAFT

MATERIAL: 5/8" STEEL SHAFTING

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC766-A-1	A		



UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE IN INCHES	ACCT. NO.	SER. NO.		MICROFILMED	DETAIL	24A7606	24A7771	C
TOLERANCES: .X = ±.06 / .XX = ±0.01 / 0.XXX = ±.005 — ANGLES ±.5° — FINISH 125/.32	DATE ISS'D	DATE REQ'D	NO. REQ'D		DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	DELIVER TO:							
ALL SCREW THREADS PER ANSI Y14.6	SURFACE TREATMENT: Degrease							
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	IDENTIFICATION METHOD: Tag							
REFERENCE - ANSI Y14.5 & B46.1.	DRWN BY: I. amerman		DATE: 09/08/94					
	CHECK BY: R. LEWIS		DATE: 08/07/95					

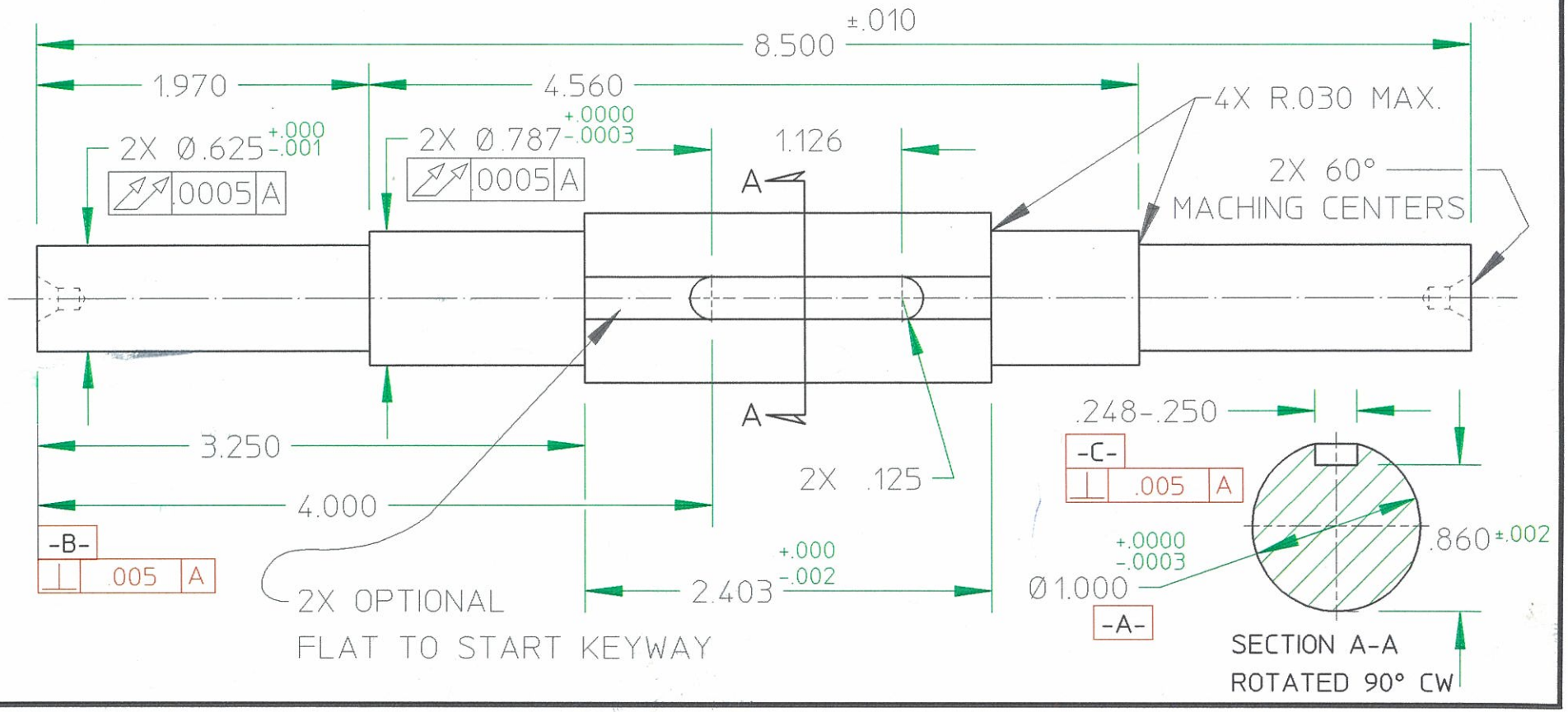
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - PLATEN SHAFT

MATERIAL: TYPE 01 DRILL ROD, HARDENED 60-65 ROCKWELL

REV.	DWN.	CHK.	DATE	CHANGES
A	LA	RL	9/94	RELEASE FOR FABRICATION
B	JO	GK	4/97	REVISED SHAFT DIA. & KEYWAY SIZE
C	JO	GK	1/98	CHGD BEARING FIT TOL., ADDED C'DRILL TO ENDS, CHGD MATL TO TYPE 01 DRILL ROD, HARDENED 60-65 ROCKWELL FROM 304 SST

WBS#	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC767-A-1	C		



UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO.	SER. NO.			DETAIL	24A7606	24A7771	B
TOLERANCES: X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:							
FINISH 125/.32	SURFACE TREATMENT: Degrease							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD: Tag							
ALL SCREW THREADS PER ANSI Y14.6	DRWN BY: I. amerman		DATE 09/08/94					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY: R. LEWIS		DATE 08/07/95					
REFERENCE - ANSI Y14.5 & B46.1								

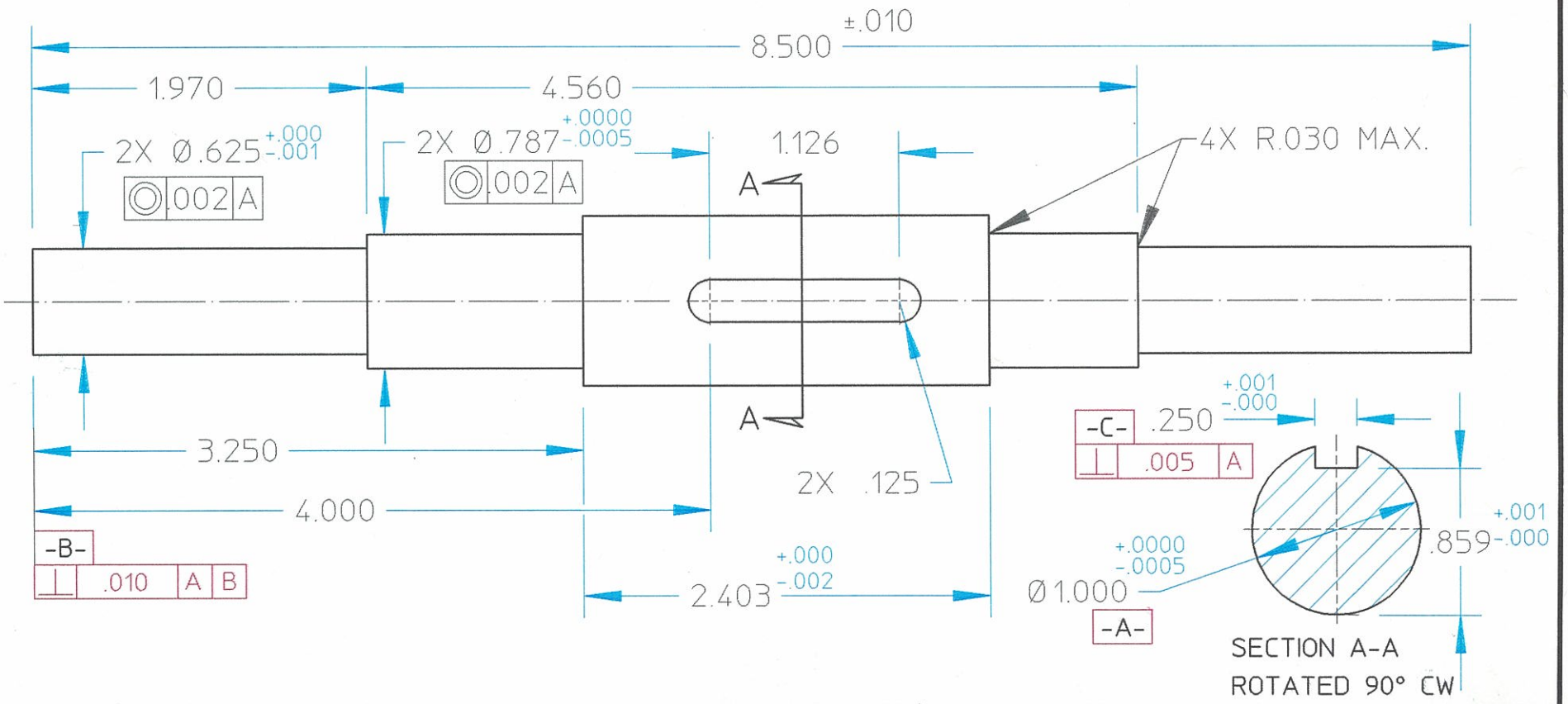
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - PLATEN SHAFT

MATERIAL: SST BAR, 304, ROUND, AS REQUIRED

REV.	DWN.	CHK.	DATE	CHANGES
A	LA	RL	9/94	RELEASE FOR FABRICATION
B	JO	GK	4/97	REVISED SHAFT DIA. & KEYWAY SIZE

WBS#	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC767-A-1	B		



UNLESS OTHERWISE SPECIFIED	SHOP ORDERS	PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO. / SER. NO.	MICROFILMED	DETAIL	24A7606	24A7711	A
TOLERANCES: .X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01	DATE ISS'D / DATE REQ'D / NO. REQ'D		DESIGN ACCOUNT: 8052-30	CATEGORY CODE: SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:					
FINISH 125/.32	SURFACE TREATMENT: Degrease					
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD: Tag					
ALL SCREW THREADS PER ANSI Y14.6	DRWN BY: I. amerman — DATE: 09/08/94					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY: R. LEWIS — DATE: 08/07/95					
REFERENCE - ANSI Y14.5 & B46.1.						

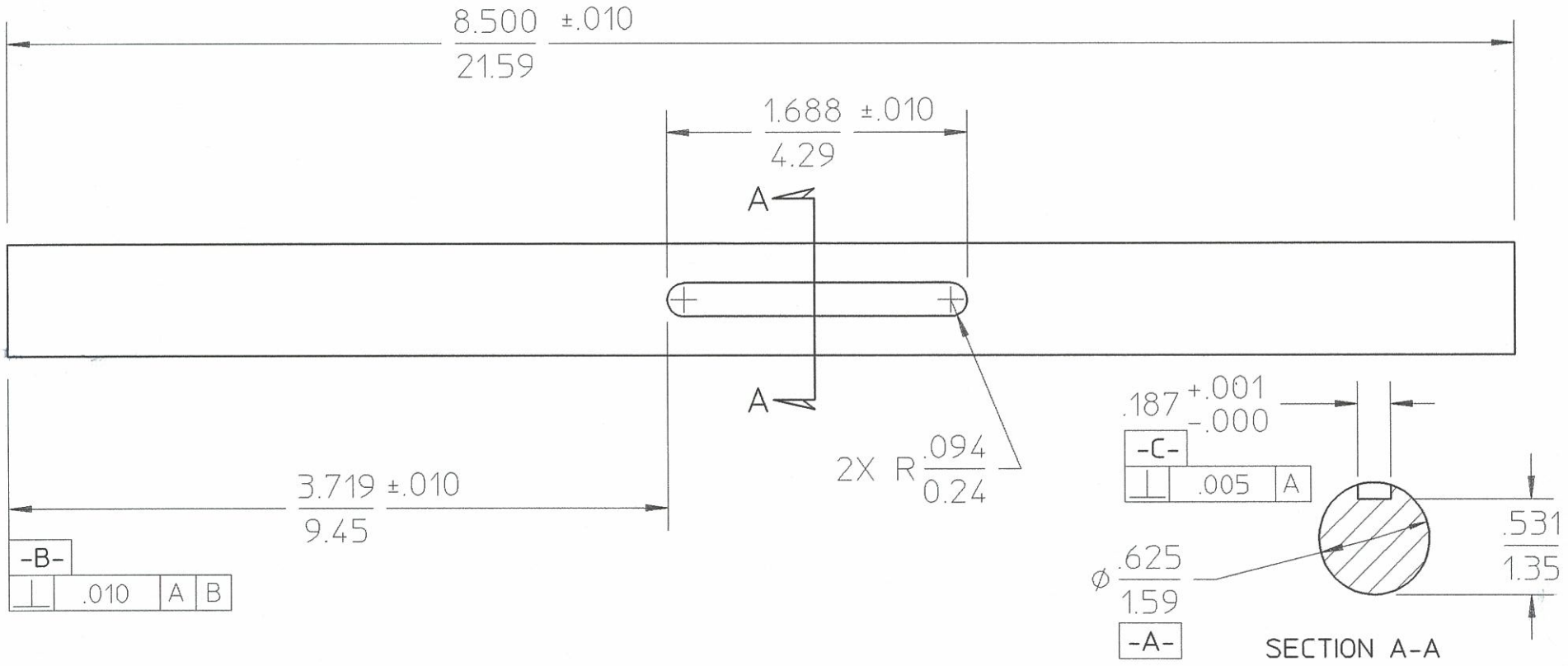
REV.	DWN.	CHK.	DATE	CHANGES

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

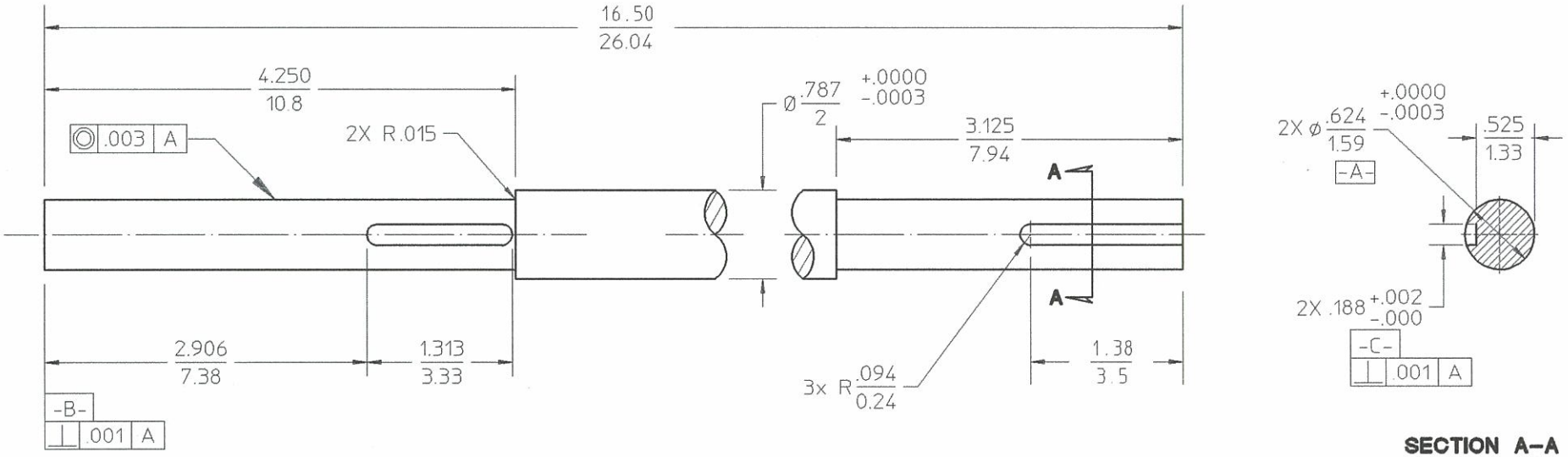
RHIC/STAR TPC
SECTOR MOUNTING TOOL
Platen Shaft

MATERIAL: 0.625" STEEL SHAFTING (supplied)

WBS#	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC767-A-1	A		



24A7782C	ITEM	REQ	PART NUMBER	DESCRIPTION
	1	1	24A7782C	01.00" STAINLSTEEL BAR, ROUND, 304



SECTION A-B

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC768-B-1	C		

REV.	DWN.	CHK.	DATE	CHANGES
C	JO	GK	4/97	MAJOR REVISION
B	RL		8/95	CHANGED 9.454 DIM. STARTING POINT
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: X/.X = ±.06/.15; ANGLES ±.5°; .XX/.X = ±0.02/0.05; FINISH 125/.32; 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1.

SHOP ORDERS

ACCT. NO. | SER. NO.

DATE ISS'D | DATE REQ'D | NO. REQ'D

DELIVER TO:

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

DRWN BY: I. amerman | DATE: 09/08/94

CHECK BY | DATE

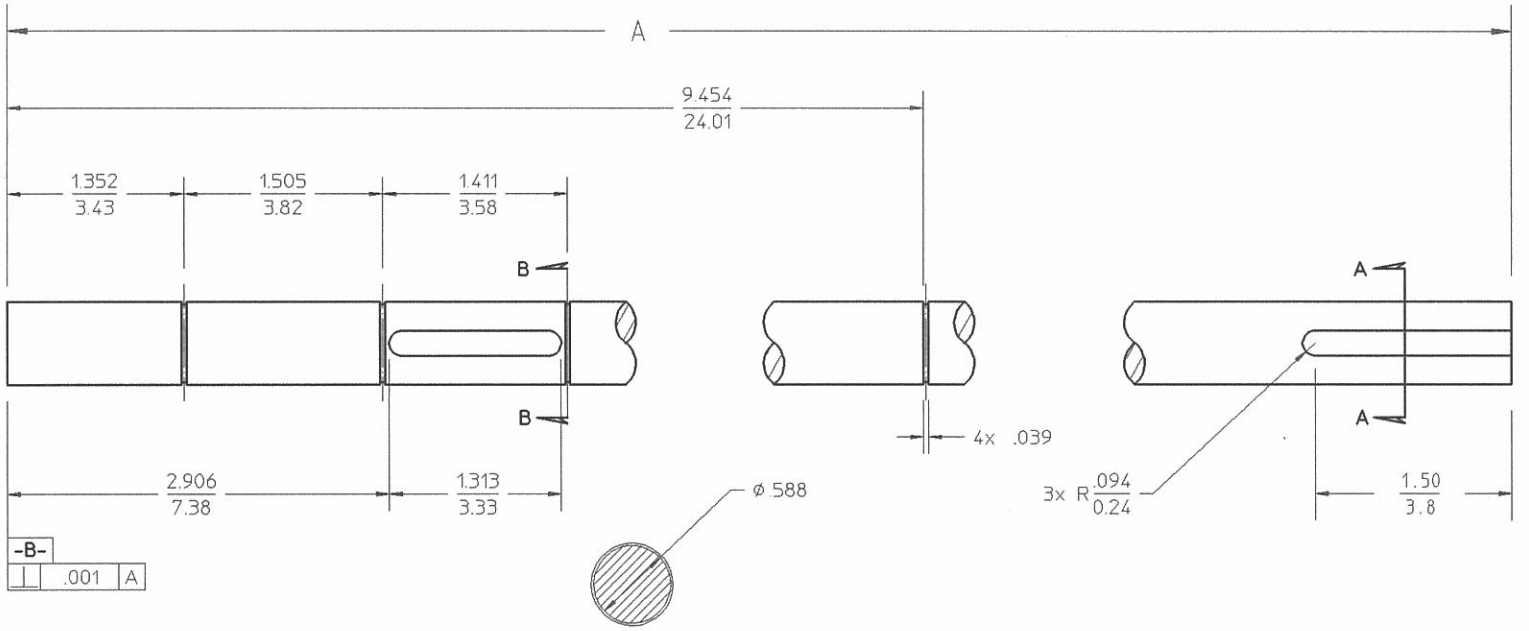
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC-STAR-TPC
TPC ASSEMBLY AND TEST
SECTOR MOUNTING TOOL - SHAFT 1

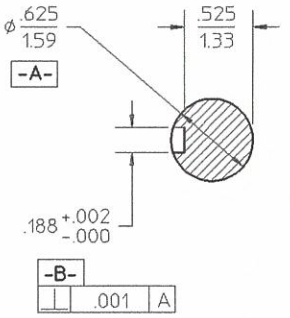
PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	8052-30	SR-02-10	24A7782	C

TAB. NO.	A DIM.
24A7782-01	18 INCHES
24A7782-02	19 INCHES

24A7782B	ITEM	REQ	PART NUMBER	DESCRIPTION
				0.625" STEEL SHAFTING (supplied)



SECTION B-B



SECTION A-A

WBS # 4.2.10	Production Approval: / Cognizant Engineer: A. Wandesforde	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
		TPC768-B-1	A	XXXXXXXXXX	-

REV.	DWN.	CHK.	DATE	CHANGES
B	RL		8/95	CHANGED 9.454 DIM. STARTING POINT
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: X/.X = ±.06/.15 | ANGLES ±.5° | .XX/.X = ±0.02/0.05 | FINISH 125/.32 | 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS

ACCT. NO.	SER. NO.		
DATE ISS'D	DATE REQ'D	NO. REQ'D	
DELIVER TO:			
SURFACE TREATMENT	Degrease		
IDENTIFICATION METHOD	Tag		
DRWN BY	I. amerman		DATE 09/08/94
CHECK BY			DATE

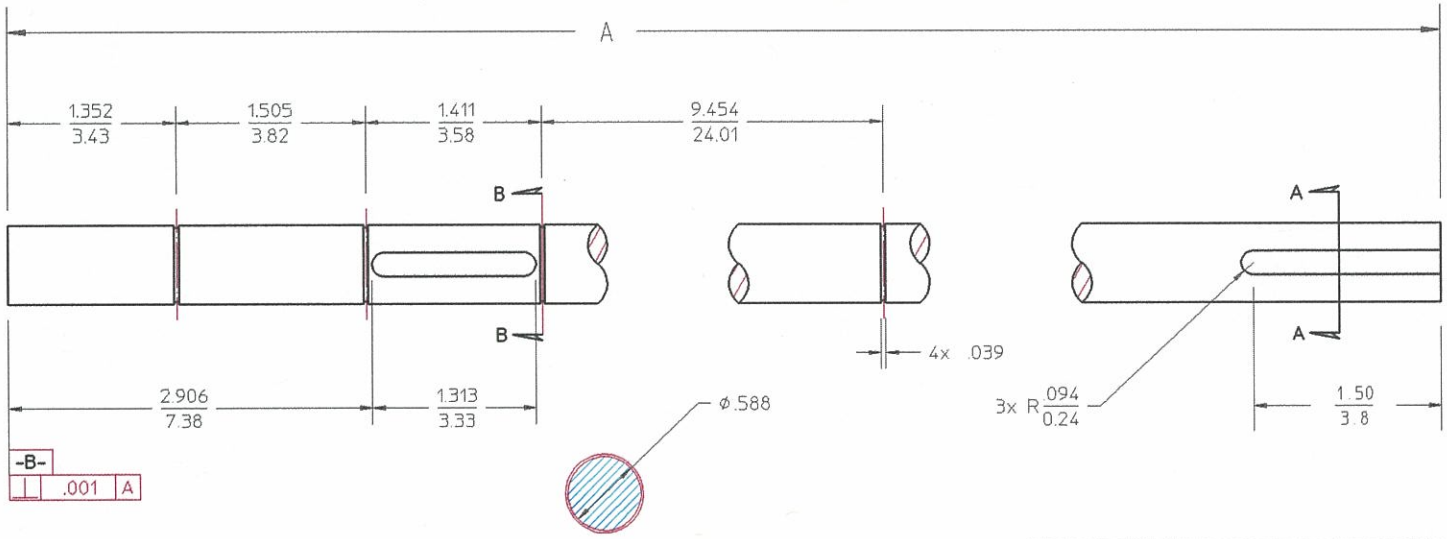
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
SECTOR MOUNTING TOOL
Shaft 1

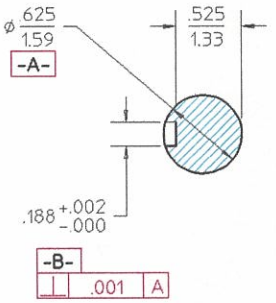
PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606	LBL DRAWING NUMBER	REV.
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	24A7782	B
	8052-30	SR-02-10		

TAB. NO.	A DIM.
24A7782-01	18 INCHES
24A7782-02	19 INCHES

24A7782A ITEM	REQ	PART NUMBER	DESCRIPTION
			0.625" STEEL SHAFTING (supplied)



SECTION B-B



SECTION A-A

WBS #	Production Approval:	STAR DRAWING NUMBER	REV	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC768-B-1	A	XXXXXXXXXX	-

REV.	DWN.	CHK.	DATE	CHANGES
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 ANGLES ±.5°; .XX/.X = ±0.02/0.05 FINISH 125/.32; 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS

ACCT. NO. SER. NO.

DATE ISS'D DATE REQ'D NO. REQ'D

DELIVER TO

SURFACE TREATMENT Degrease

IDENTIFICATION METHOD Tag

DRWN BY L. amerman DATE 09/08/94

CHECK BY DATE

LAWRENCE BERKELEY LABORATORY

UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC

SECTOR MOUNTING TOOL

Shaft 1

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV
	8052-30	SR-02-10	24A7782	A

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES	ACCT. NO.	SER. NO.			DETAIL	24A7606	24A7791	B
TOLERANCES: .X = ±.06/.15; .XX = ±.02/.05; .XXX. = ±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:							
FINISH 125	SURFACE TREATMENT: Degrease							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD: Tag							
ALL SCREW THREADS ARE PER ANSI Y14.6	DRWN BY: R.RAWLINS		DATE 11/30/95					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY: G.KOEHLER		DATE 11/30/95					
REFERENCE - ANSI Y14.5 & B46.1.								

LAWRENCE BERKELEY LABORATORY

UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR

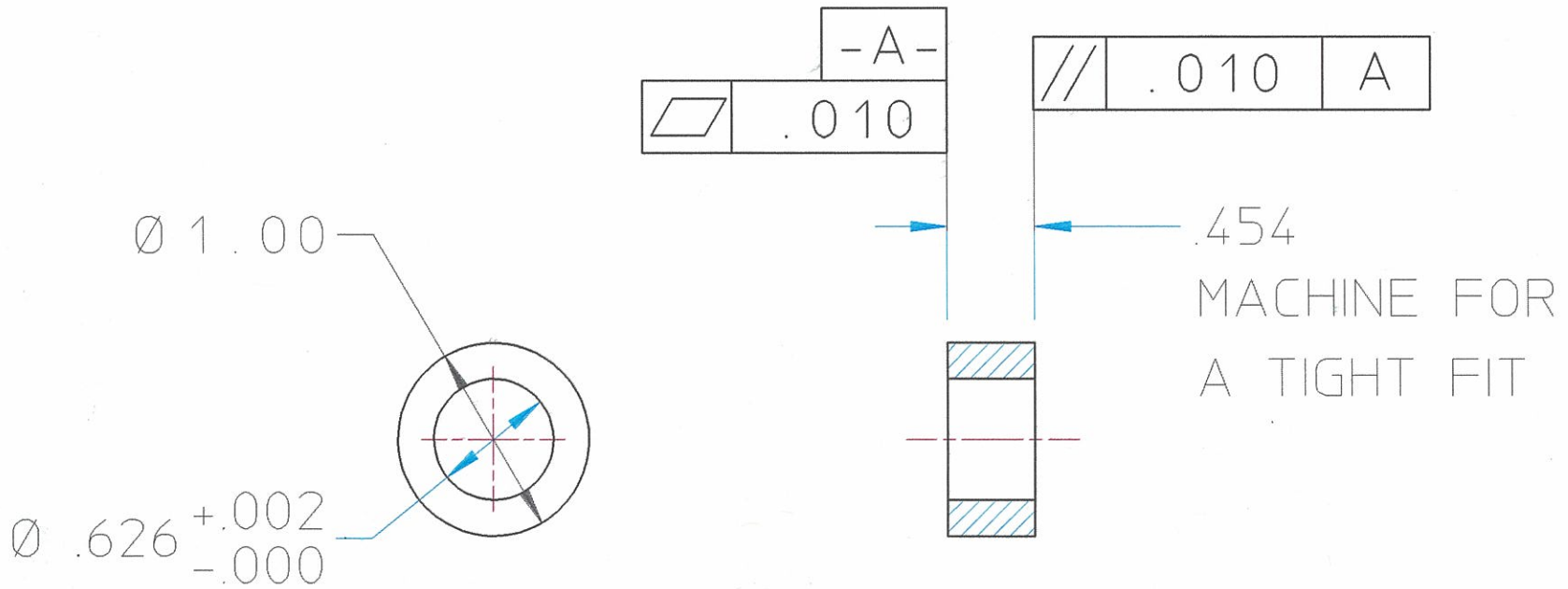
TPC ASSEMBLY & TEST

SMT - PLATEN SHAFT RIGHT SPACER

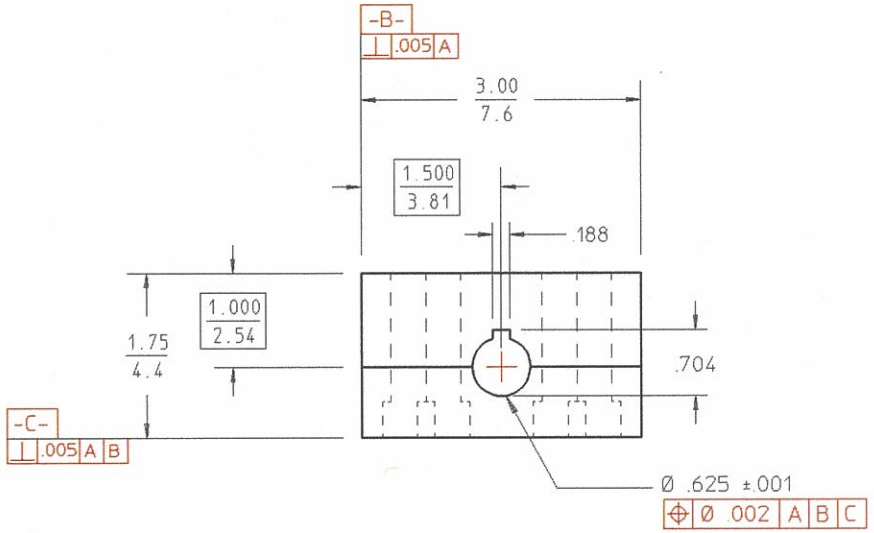
MATERIAL: BRASS

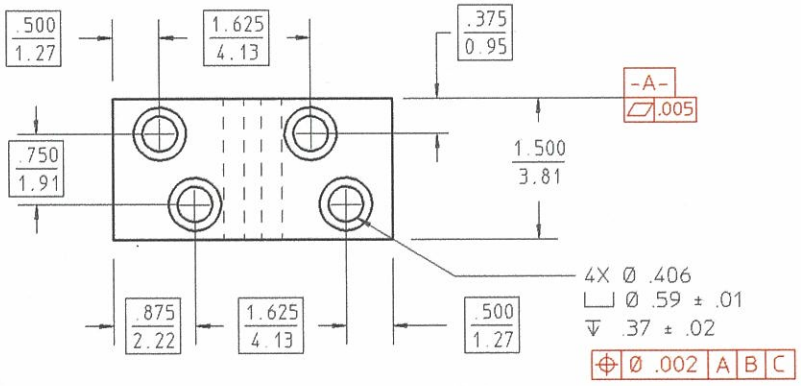
REV.	DWN.	CHK.	DATE	CHANGES
A	JO	GK	11/95	RELEASE FOR FABRICATION
B	JO	GK	4/97	MAJOR REVISION

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: R.WELLS	TPC771-A-1	A		



ITEM	REQ	PART NUMBER	DESCRIPTION
			ALUMINUM 6061 T6





24A7793A

NOTE:
MAKE IN TWO PARTS AND SEPERATE AT THIS LINE

WBS # 4.2.10	Production Approval: / Cognizant Engineer: A. Wandesforde	STAR DRAWING NUMBER: TPC769-C-1	REV.: A	RHIC DRAWING NUMBER: XXXXXXXXXX	REV.: -

REV.	DWN	CHK	DATE	CHANGES
A	SH		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
TOLERANCES: .X/.X = ±.06/.15; .XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01; ANGLES ±.5°; FINISH 125/.32
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK.
REFERENCE - ANSI Y14.5 & B46.1

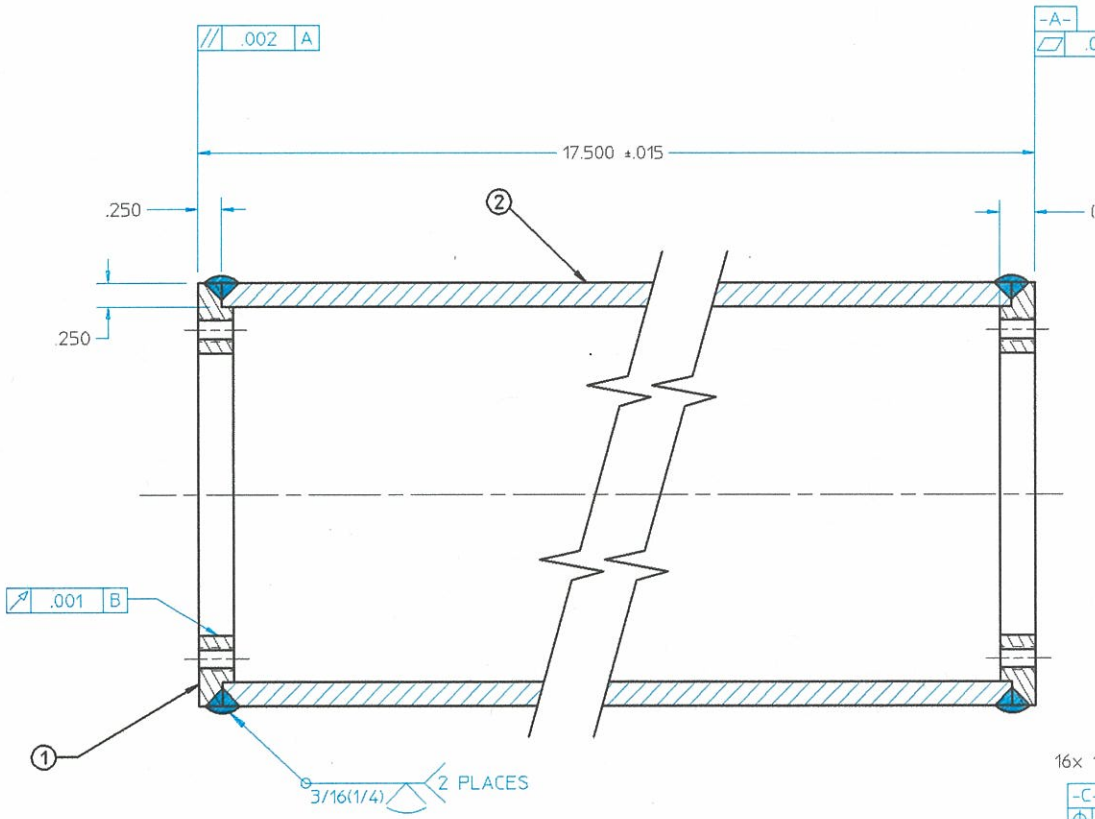
SHOP ORDERS
ACCT. NO.: SER. NO.:
DATE ISSD.: DATE REQ'D.: NO. REQ'D.:
DELIVER TO:
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRWN BY: L. amerman DATE: 09/06/94
CHECK BY: DATE:

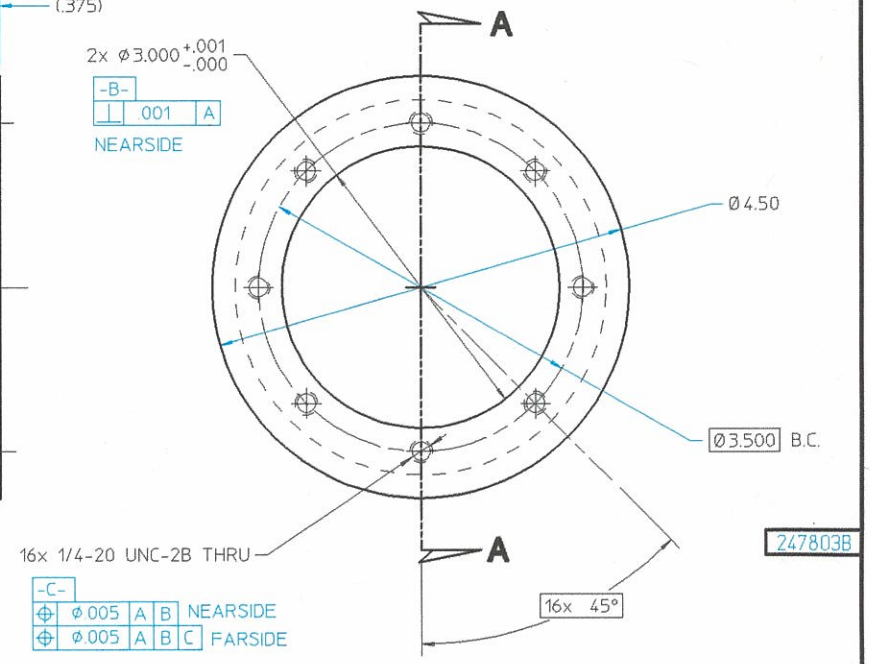
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR TPC
SECTOR MOUNTING TOOL
Platen Clamp

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	8052-30	SR-02-10	24A7793	A

NOT REQUIRED

ITEM	REQ	PART NUMBER	DESCRIPTION
1	2	24A7803B-1	STEEL PLATE, COLD ROLLED, AS REQ.
2	1	24A7803B-2	STEEL TUBE, 4.5 INCH O.D. x .250 WALL





247803B

SECTION A–A

REV.	DWN.	CHK.	DATE	CHANGES
B	JO	GK	3/97	CHANGED 9.000" DIM. TO 17.500 & THIRD LINE OF TITLE BLOCK
A	RL	GK	8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
TOLERANCES: .X/.X = ±.06/.15 ANGLES ±1° | XX/.X = ±0.02/0.05 FINISH | 0.XXX/.XX=±.005/.01 125/32
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK.
REFERENCE - ANSI Y14.5 & B46.1

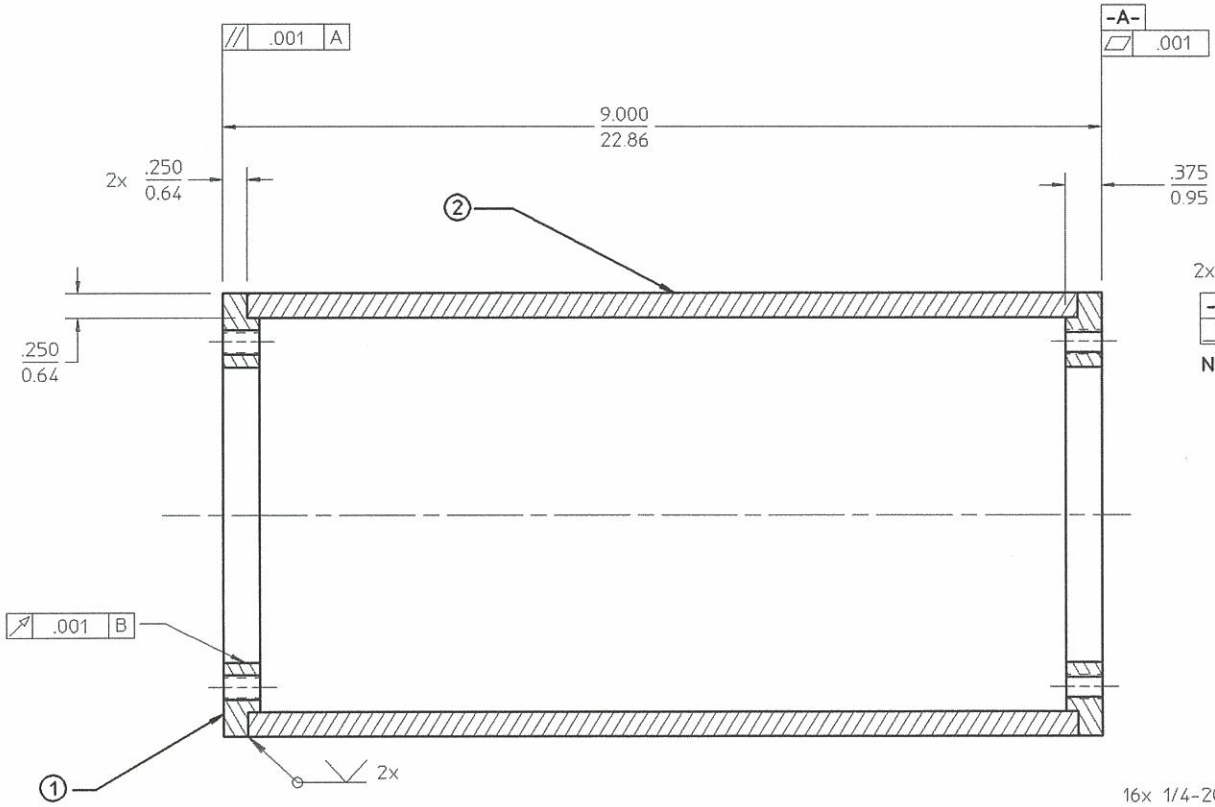
SHOP ORDERS
ACCT. NO. | SER. NO. | DATE ISSD. | DATE REQ'D. | NO. REQ'D.
DELIVER TO:
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRAWN BY: I. amerman DATE: 09/08/94
CHECK BY: G.KOEHLER DATE: 09/08/94

WBS # 4.2.10
Production Approval:
Cognizant Engineer: A. Wandesforde
STAR DRAWING NUMBER: TPC770-C-1
REV.: B
RHIC DRAWING NUMBER
REV.

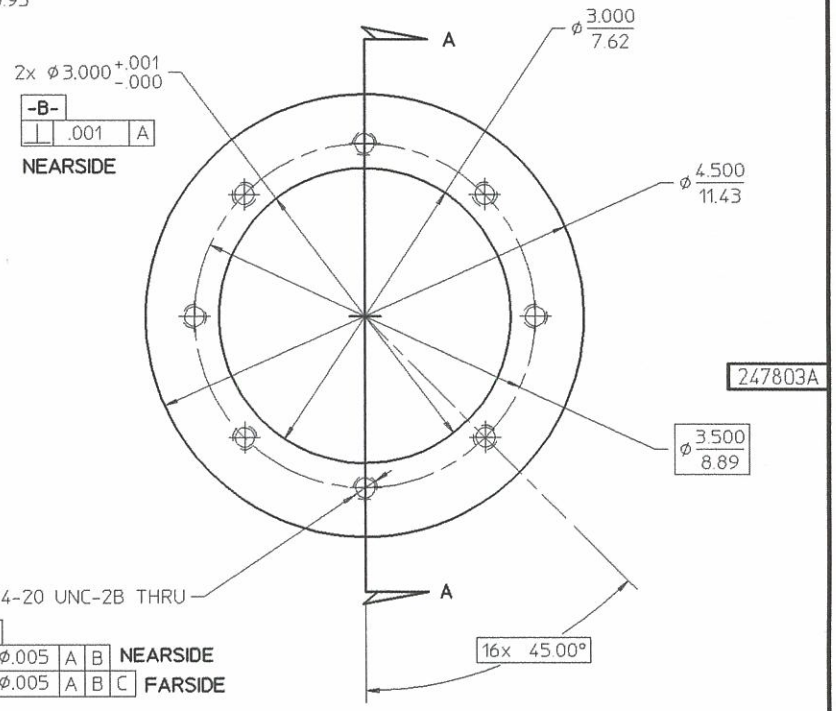
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - OFFSET TUBE

PATENT CLEAR | DRAWING TYPE: DETAIL | SHOWN ON: 24A7606 | SCALE: FULL | DO NOT SCALE PRINTS
MICROFILMED | DESIGN ACCOUNT: 8052-30 | CATEGORY CODE: SR-02-10 | LBL DRAWING NUMBER: 24A7803 | REV.: B

ITEM	REQ	PART NUMBER	DESCRIPTION
	2	1	STEEL PLATE, 3/8 INCH HOT ROLLED
	1	2	STEEL PIPE, 4.5 INCH O.D.



SECTION A-A



247803A

WBS # 4.2.10	Production Approval: Cognizant Engineer: A. Wandesforde	STAR DRAWING NUMBER TPC770-C-1	REV. A	RHIC DRAWING NUMBER XXXXXXXXXX	REV. -

REV.	DWN.	CHK.	DATE	CHANGES
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15; .XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01; ANGLES ±.5°; FINISH 125/.32

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS

ACCT. NO.: SER. NO.:

DATE ISS'D: DATE REQ'D: NO. REQ'D:

DELIVER TO:

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

DRAWN BY: L. amerman DATE: 09/08/94

CHECK BY: DATE:

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC

SECTOR MOUNTING TOOL

Short Tube (I.S.)

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	8052-30	SR-02-10	24A7803	A

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO.	SER. NO.		MICROFILMED	DETAIL	24A7606	24A7821	B
TOLERANCES: X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D		DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:							
FINISH 125/.32	SURFACE TREATMENT: Degrease							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD: Tag							
ALL SCREW THREADS PER ANSI Y14.6	DRWN BY: l. amerman		DATE 09/08/94					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY: A. Wandesforde		DATE 09/08/94					
REFERENCE - ANSI Y14.5 & B46.1								

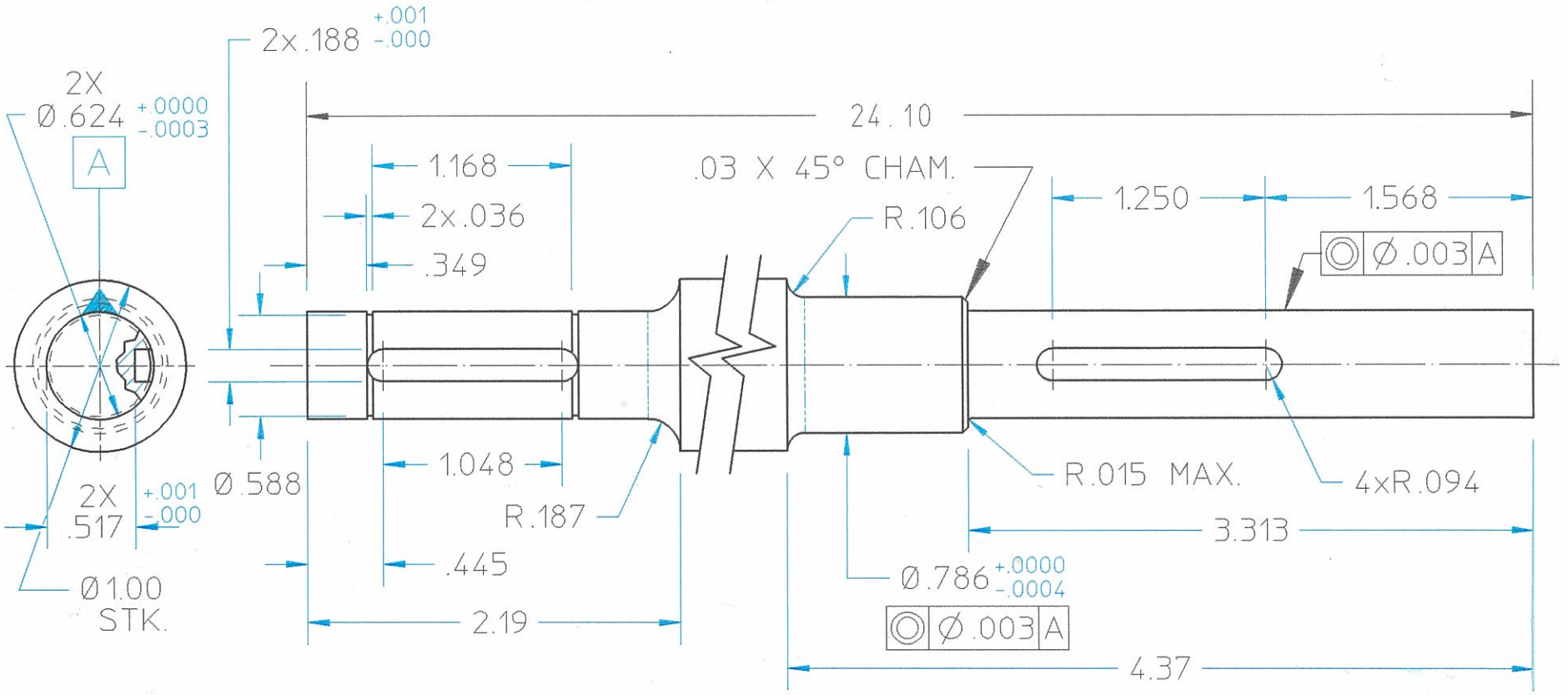
REV.	DWN.	CHK.	DATE	CHANGES
A	LA	AW	9/94	RELEASED FOR FABRICATION
B	JO	GK	3/97	MAJOR REVISION

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - SHAFT 4

MATERIAL: SST BAR, 304, ROUND, Ø1.000"

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC772-A-1	B	-	



UNLESS OTHERWISE SPECIFIED	SHOP ORDERS	PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO. / SER. NO.	MICROFILMED	DETAIL	24A7606	24A7821	A
TOLERANCES: .X/.X = ±.06/.15 ; XX/.X = ±0.02/0.05 ; 0.XXX/.XX=±.005/.01 ; ANGLES ±.5° ; FINISH 125/.32	DATE ISS'D / DATE REQ'D / NO. REQ'D		DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
SAWED, FLAMECUT, SHEARED OR STOCK FINISH ; ALL SCREW THREADS PER ANSI Y14.6 ; BREAK EDGES .020/.05 MAX ON MACHINE WORK. ; REFERENCE - ANSI Y14.5 & B46.1.	DELIVER TO: ; SURFACE TREATMENT: Degrease ; IDENTIFICATION METHOD: Tag ; DRWN BY: I. amerman 09/08/94 ; CHECK BY: DATE					

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
SECTOR MOUNTING TOOL
Shaft 4

MATERIAL: 0.625" STEEL SHAFTING (supplied)

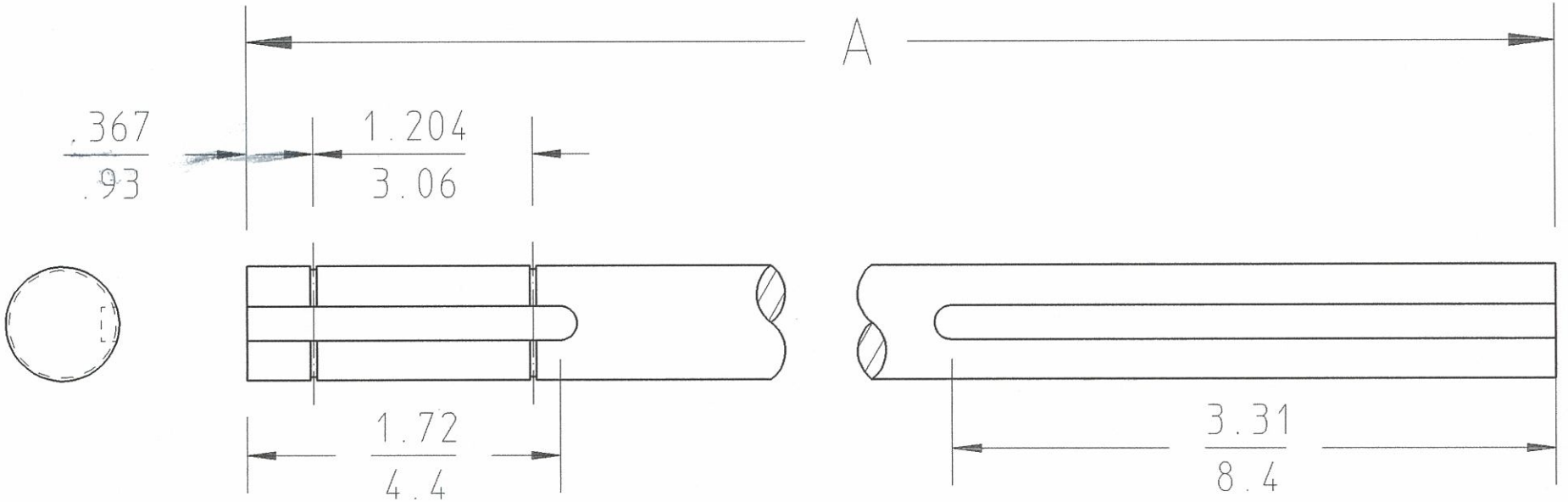
REV.	DWN.	CHK.	DATE	CHANGES

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC772-A-1	A	XXXXXXXXXX	-

NOTE:
2 Snap Ring Grooves:
0.036" Wide x 0.588" Dia.

2 Keyways:
0.188" x 0.1" Deep

PART	DIMENSION 'A'
24A7821-1	15.60"
24A7821-2	22.60



UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO.	SER. NO.			DETAIL	24A7606	24A7831	B
TOLERANCES: .X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:							
FINISH 125/.32	SURFACE TREATMENT Degrease							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD Tag							
ALL SCREW THREADS PER ANSI Y14.6	DRWN BY I. amerman		DATE 9/8/94					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY A. Wandesforde		DATE					
REFERENCE - ANSI Y14.5 & B46.1.								

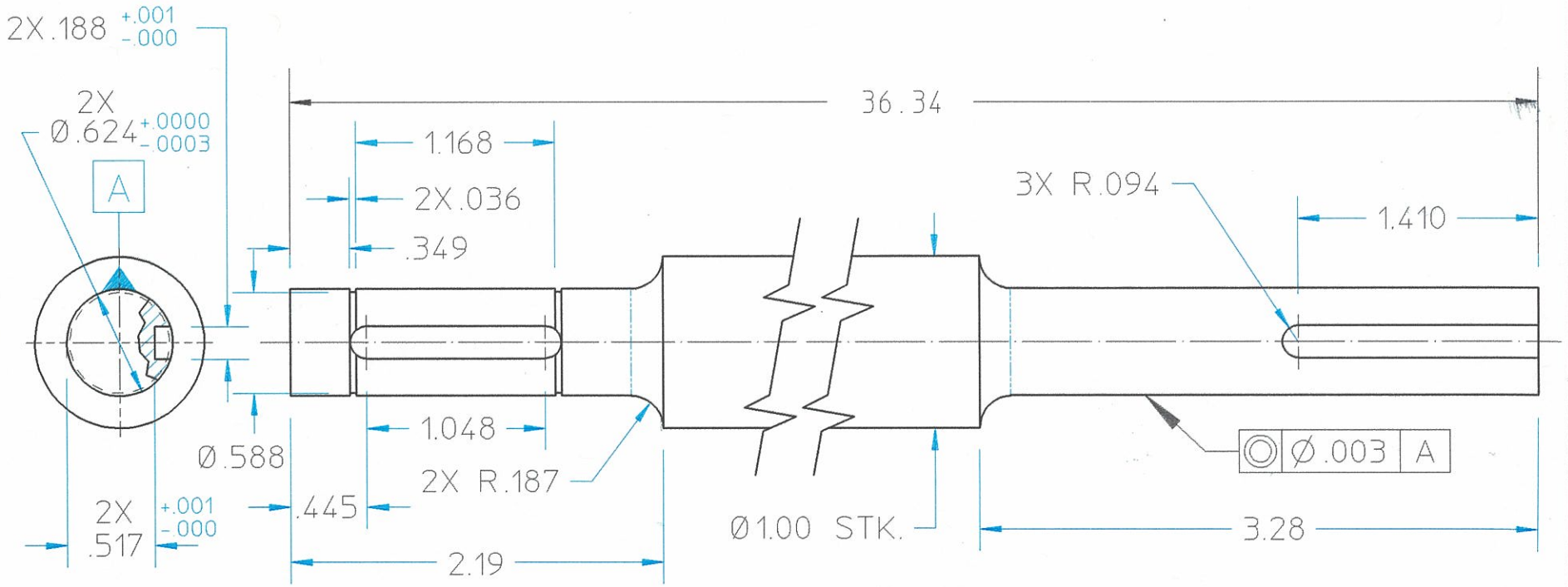
REV.	DWN.	CHK.	DATE	CHANGES
A	LA	AW	9/8/94	RELEASED FOR FABRICATION
B	JO	GK	3/24/97	MAJOR REVISION

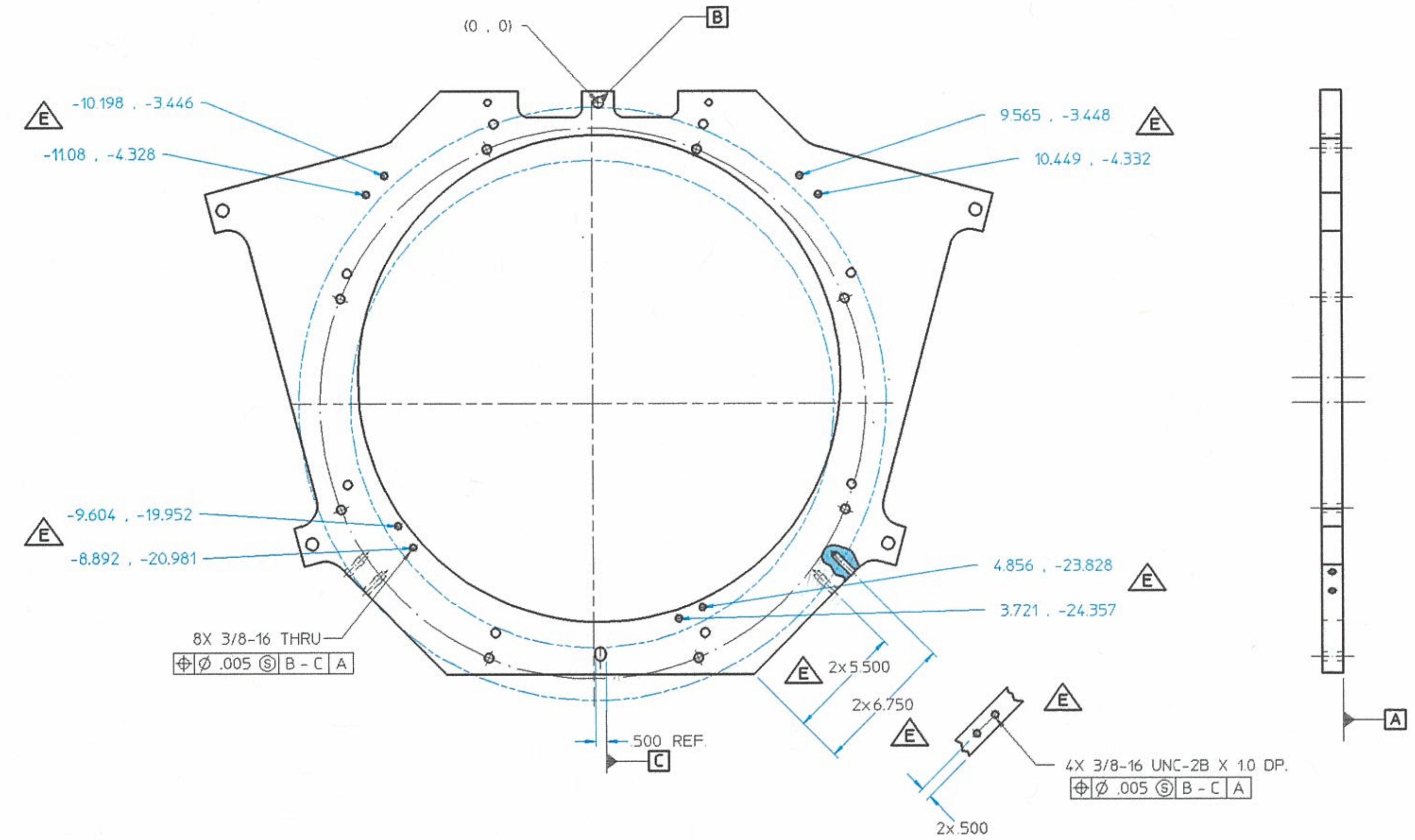
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
TPC ASSEMBLY & TEST
SMT - SHAFT 2

MATERIAL: SST BAR, 304, ROUND, Ø1.000

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer:	TPC773-A-1	B	-	

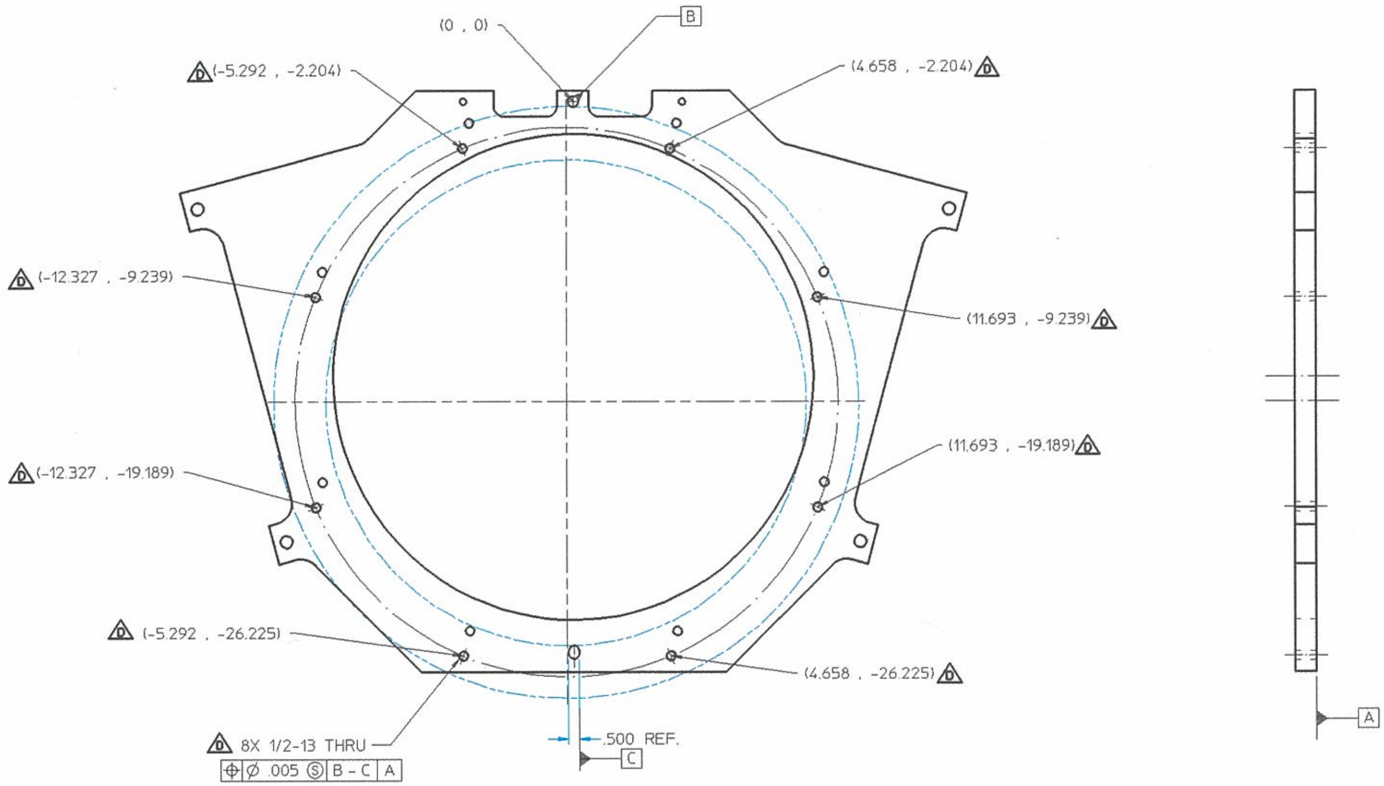




NOTES:
1. SEE REVISION C FOR COMPLETE PART DETAILS.
2. ESTIMATED WEIGHT = 55 LBS.

1	1		ALUM. WROUGHT TOOLING PLATE, 1"
WBS 4.2.10	DWG SIZE E	STAR DRAWING NUMBER TPC775-E-1	REV. A
UNLESS OTHERWISE SPECIFIED		LAWRENCE BERKELEY LABORATORY	
ALL DIMENSIONS ARE INCHES		RHIC/STAR-TPC	
		TPC ASSEMBLY & TEST	
		SMT-MOUNTING FLANGE-LS	
DETAIL	SCALE 1/2	24A7856	E

/jortiz/STAR/SECTOR_TOOL/24A7856D.SECTOR.MTG.FLANGE.2.....11-May-97



NOTES:
1. SEE REVISION C FOR COMPLETE PART DETAILS.
2. ESTIMATED WEIGHT = 55 LBS.

REV.	DWN.	CHK.	DATE	CHANGES
D			4/11/97	ADDED 8X 1/2-13 THD THRU HOLES
C				PROFILE CHANGE, ADD 2 3/8" TAPPED HOLES
B				MADE EXTENSIVE CONFIGURATION CHANGES
A				RELEASED FOR FABRICATION

SHOP ORDERS

APPROVALS
A.RAWLINS
G.KOEHLER
R.WELLS

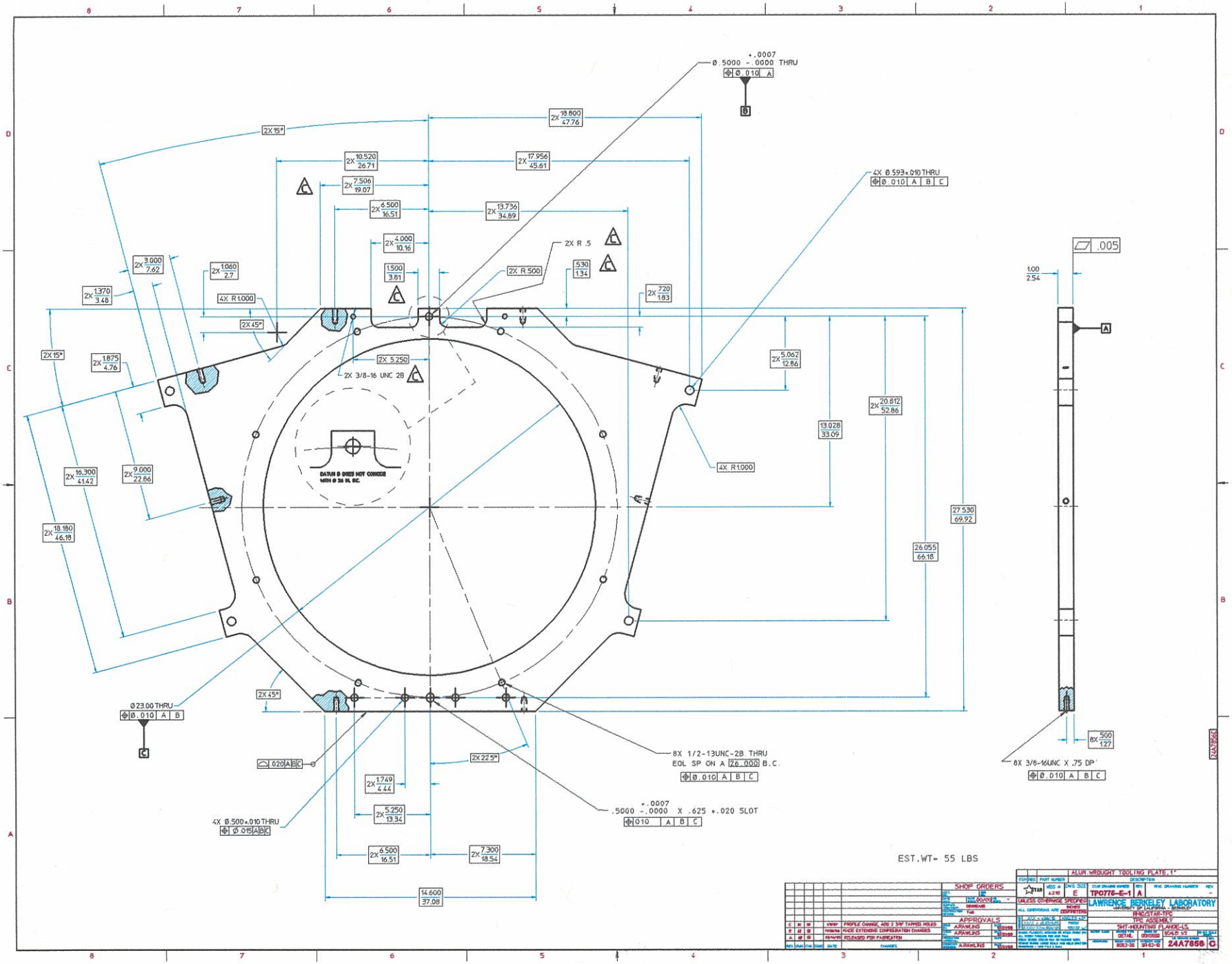
ALUM. WROUGHT TOOLING PLATE, 1"

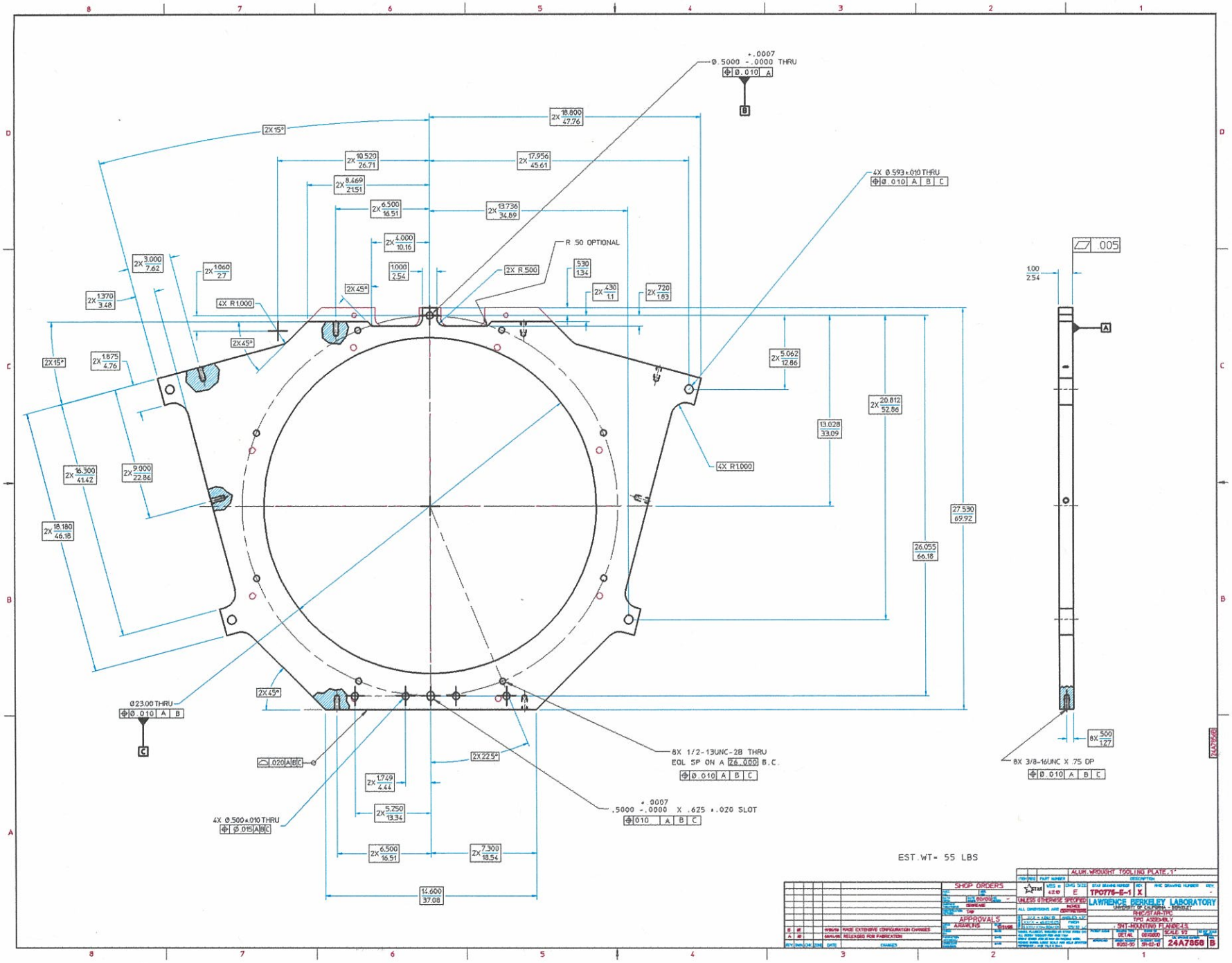
STAR DRAWING NUMBER: TPO776-E-1 REV. D
DWG SIZE: E
WBS = 4.2.10

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES

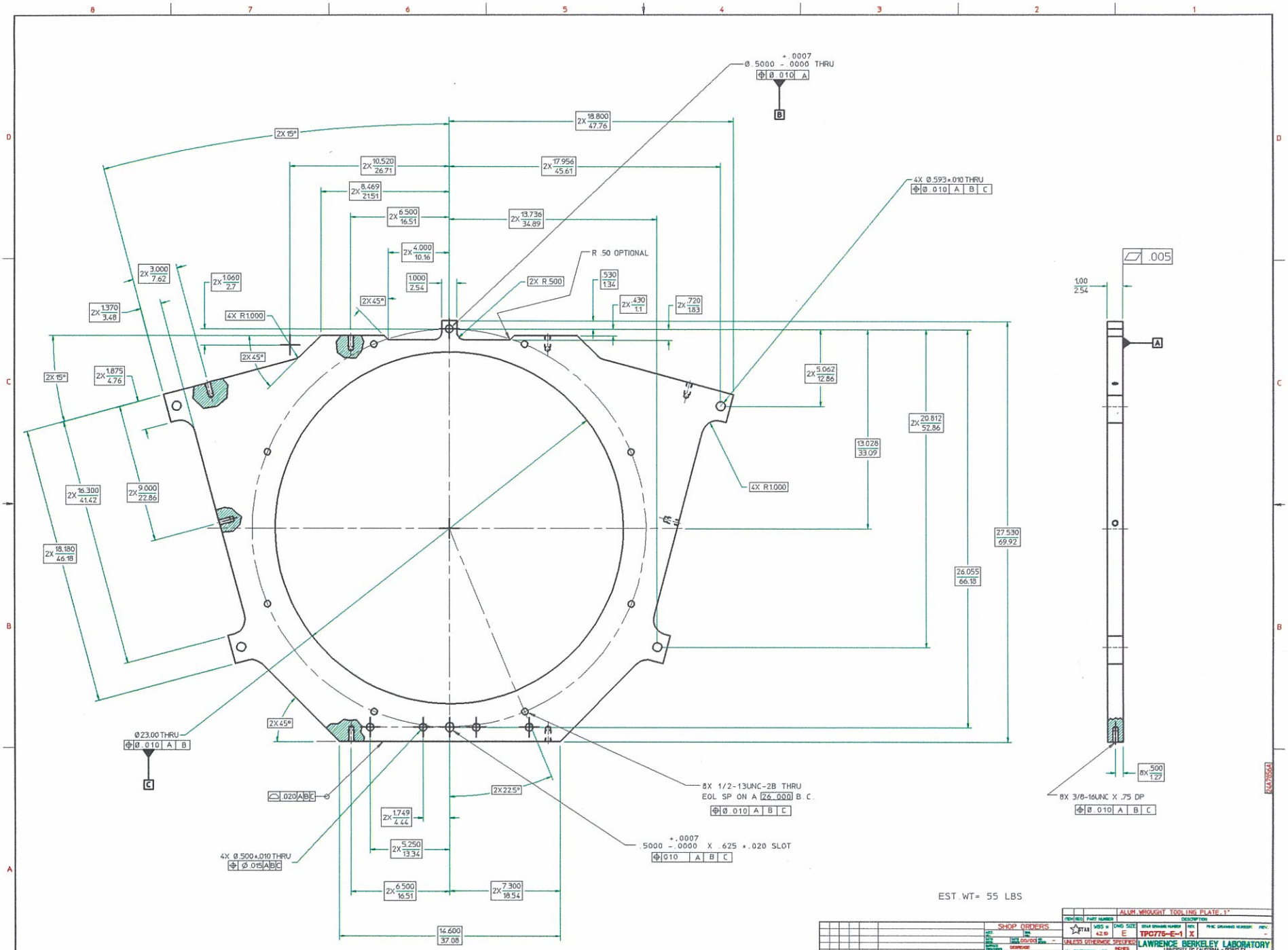
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR-TPC
TPC ASSEMBLY & TEST
SMT-MOUNTING FLANGE-I.S.
DETAIL
SCALE 1/2
24A7856 D

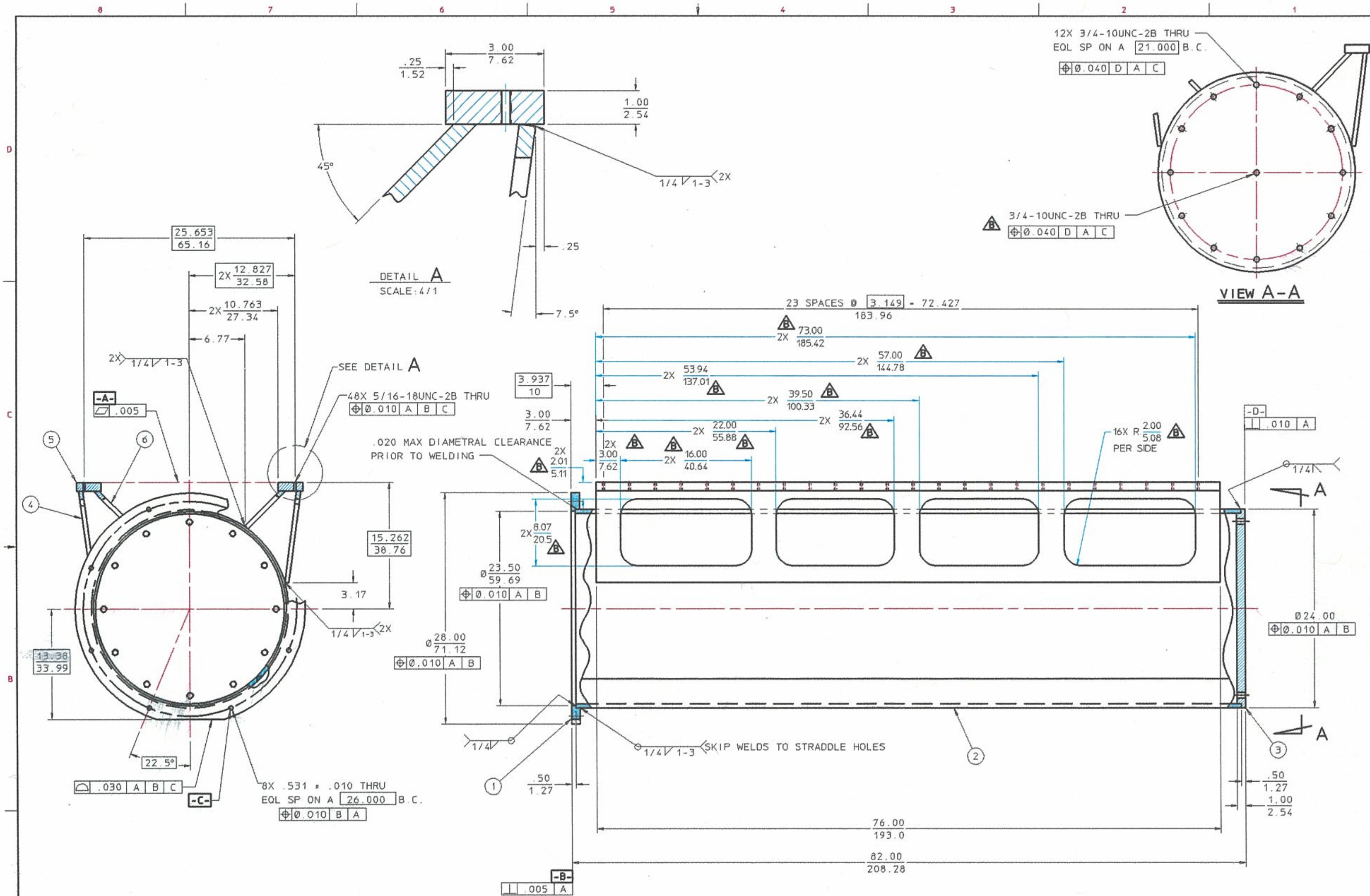
(/jortiz/STAR/SECTOR_TOOL/24A7856D.SECTOR.MTG.FLANGE....11-APR-97)


Ø.5000 +.0007 -.0000 THRU
Ø.010 A
2X 18.800 47.76
2X 15°
2X 10.520 26.71
2X 17.956 45.61
2X 7.506 19.07
2X 6.500 16.51
2X 13.736 34.89
2X 4.000 10.16
4X Ø.593±.010 THRU
Ø.010 A B C
2X R .5
2X R.500
1.500 3.81
.530 1.34
2X .720 1.83
2X 3.000 7.62
2X 1.060 2.7
2X 1.370 3.48
4X R1.000
2X 45°
2X 15°
2X 1.875 4.76
2X 5.250
2X 3/8-16 UNC 2B
2X 5.062 12.86
2X 20.812 52.86
13.028 33.09
4X R1.000
2X 16.300 41.42
2X 9.000 22.86
2X 18.180 46.18
27.530 69.92
26.055 66.18
2X 45°
Ø23.00 THRU
Ø.010 A B
.020 A B C
2X 22.5°
8X 1/2-13UNC-2B THRU
EOL SP ON A 26.000 B.C.
Ø.010 A B C
2X 1.749 4.44
2X 5.250 13.34
.5000 +.0007 -.0000 X .625 ±.020 SLOT
.010 A B C
4X Ø.500±.010 THRU
Ø.015 A B C
2X 6.500 16.51
2X 7.300 18.54
14.600 37.08
EST.WT= 55 LBS
.005
1.00 2.54
A
8X .500 12.7
8X 3/8-16UNC X .75 DP
Ø.010 A B C
SHOP ORDERS
APPROVALS
ALUM. WROUGHT TOOLING PLATE, 1"
LAWRENCE BERKELEY LABORATORY
TPC ASSEMBLY
SMT-MOUNTING FLANGE-LS
24A7856 C
/jortiz/STAR/SECTOR_TOOL/24A7856C.SMT.MTG.FLG.I.S.....11-Apr-97



/jortiz/STAR/SECTOR_TOOL/24A7856B_SMT.MOUNTING_FLANGE.MODS.....6-Nov-96


Ø.5000 +.0007 -.0000 THRU
Ø .010 A
B
2X 18.800 47.76
2X 15°
2X 10.520 26.71
2X 17.956 45.61
2X 8.469 21.51
2X 6.500 16.51
2X 13.736 34.89
2X 4.000 10.16
4X Ø.593±.010 THRU
Ø .010 A B C
R .50 OPTIONAL
2X R.500
.530 13.4
2X .430 11
2X .720 18.3
1.000 2.54
2X 3.000 7.62
2X 1.060 2.7
2X 1.370 3.48
2X 45°
4X R1.000
2X 15°
2X 1.875 4.76
2X 5.062 12.86
2X 20.812 52.86
13.028 33.09
4X R1.000
2X 16.300 41.42
2X 9.000 22.86
2X 18.180 46.18
27.530 69.92
26.055 66.18
.005
1.00 2.54
A
.500 12.7
8X 3/8-16UNC X .75 DP
Ø .010 A B C
Ø23.00 THRU
Ø .010 A B
C
2X 45°
.020 A B C
2X 22.5°
2X 1.749 4.44
2X 5.250 13.34
4X Ø.500±.010 THRU
Ø .015 A B C
8X 1/2-13UNC-2B THRU
EOL SP ON A 26.000 B.C.
Ø .010 A B C
+.0007
.5000 -.0000 X .625 ±.020 SLOT
010 A B C
2X 6.500 16.51
2X 7.300 18.54
14.600 37.08
EST. WT= 55 LBS
SHOP ORDERS
APPROVALS
A RAMUNS
RELEASED FOR FABRICATION
ALUM. WROUGHT TOOLING PLATE, 1"
DESCRIPTION
STAR
WBS # 4.2.9
DWG SIZE E
TPC775-E-1
REV. X
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES [MILLIMETERS]
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHESTAR-TPC
TPC ASSEMBLY
SMT-MOUNTING FLANGE-LS
SCALE 1/2
24A7856 A



EST.WT.= 564 LBS

NOTES:
1. ALL DIMENSIONS GIVEN IN METRIC ARE FOR REFERENCE AND TOLERANCE IS NOT SHOWN.

SHOP ORDERS

APPROVALS

A. RAWLINS
G. KOEHLER
R. WELLS

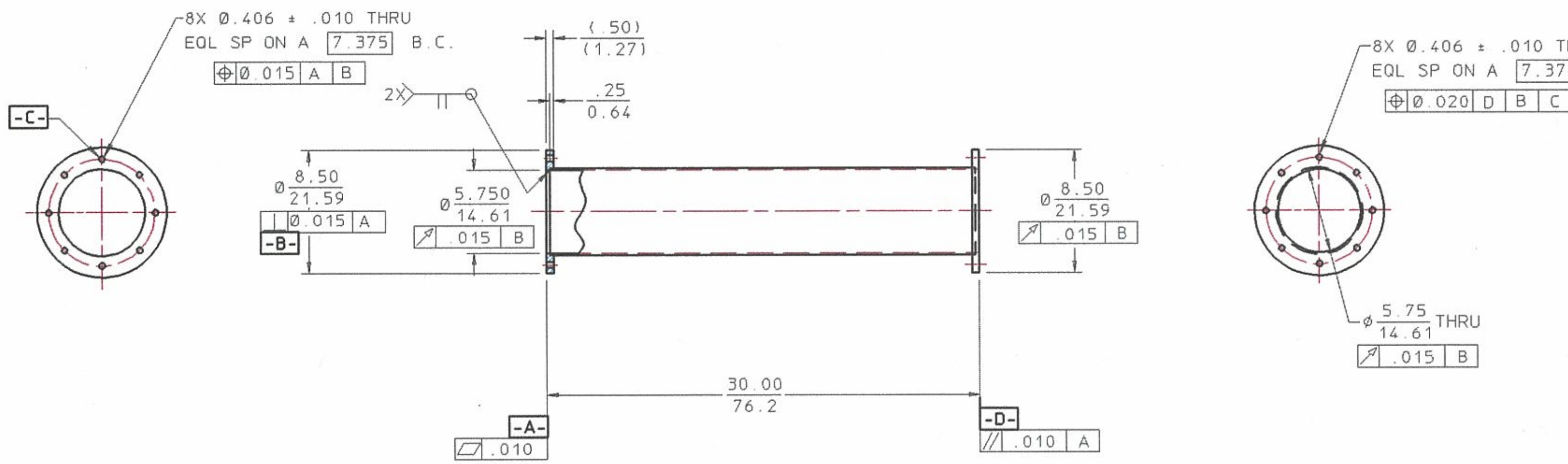
UNLESS OTHERWISE SPECIFIED

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
TPC ASSEMBLY & TEST
SMT-RAIL SUPPORT

TPC776-E-1 A

24A7666 B

ITEM	REQ	PART NUMBER	DESCRIPTION
1	1	-	TUBING,Ø 6"OD X .125 WALL, ALUM. 6061-T6
2	2		PLATE,1/2"THK, ALUM. 6061-T6



24A7874A

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
A	AR	GK		9/20/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
TOLERANCES: X/X = ±.06/.15; XX/X = ±0.02/0.05; 0.XXX/XX= ±.004/.01
ANGLES ±.5°
FINISH 125/32
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK
REFERENCE - ANSI Y14.5 & B46.1

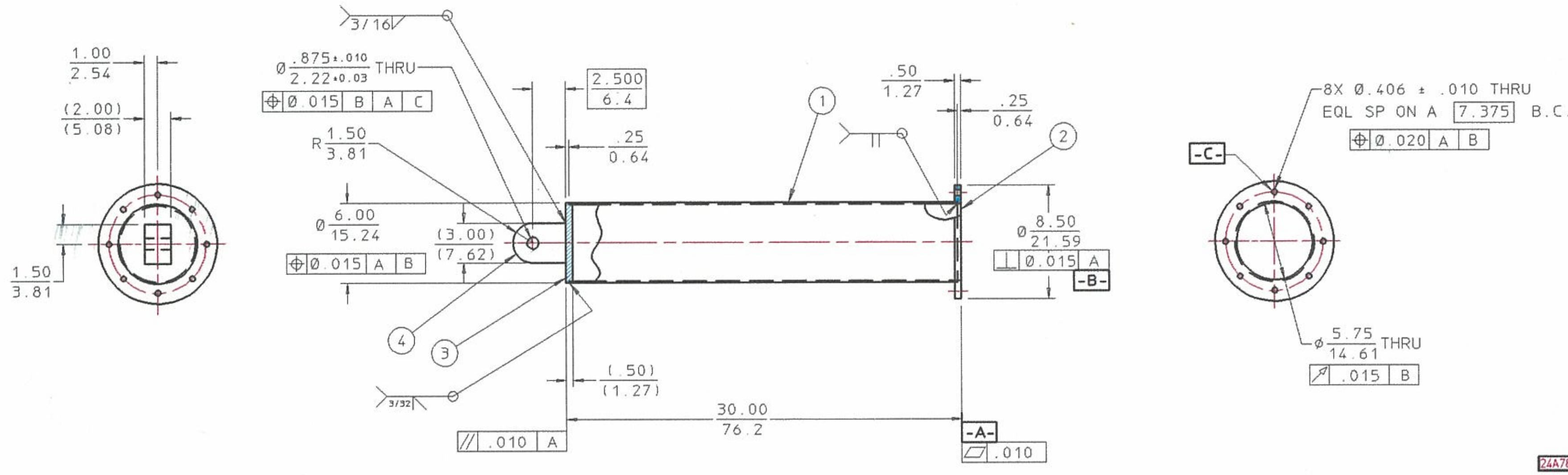
SHOP ORDERS
ACCT. NO. / SER. NO.
DATE ISSD. / DATE REQD. / NO. REQD.
DELIVER TO
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRAWN BY: A.RAWLINS — DATE 09/20/95
CHECK BY: G.KOEHLER — DATE 09/20/95

MSS # 4210
Physicist Approver
Cognizant Engineer: R. WELLS
STAR DRAWING NUMBER: TPO777-D-1 REV. A
RHIC DRAWING NUMBER REV.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
TPC ASSEMBLY & TEST
SMT-VERTICAL SUPPORT EXTENSION

PATENT CLEAR
DRAWING TYPE: DETAIL
SHOWN ON: 00X0000
SCALE 1/4
DO NOT SCALE PRINTS
MICROFILMED
DESIGN ACCOUNT: 8052-30
CATEGORY CODE: SR-02-10
LBL DRAWING NUMBER: 24A7874 REV. A

ITEM	REQ	PART NUMBER	DESCRIPTION
1	1	-	TUBING,Ø 6"OD X .125 WALL, ALUM. 6061-T6
2	1		PLATE,1/2"THK, ALUM. 6061-T6
3	1		PLATE,1/2"THK, ALUM. 6061-T6
4	1		BAR,3 X 2"THK, ALUM. 6061-T6



24A7884A

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
TOLERANCES: X/X = ±.06/.15; XX/X = ±0.02/0.05; 0.XXX/XX=±.004/.01
ANGLES ±.5°
FINISH 125/32
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK
REFERENCE - ANSI Y14.5 & B46.1

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
A	AR	GK		9/20/95	RELEASED FOR FABRICATION

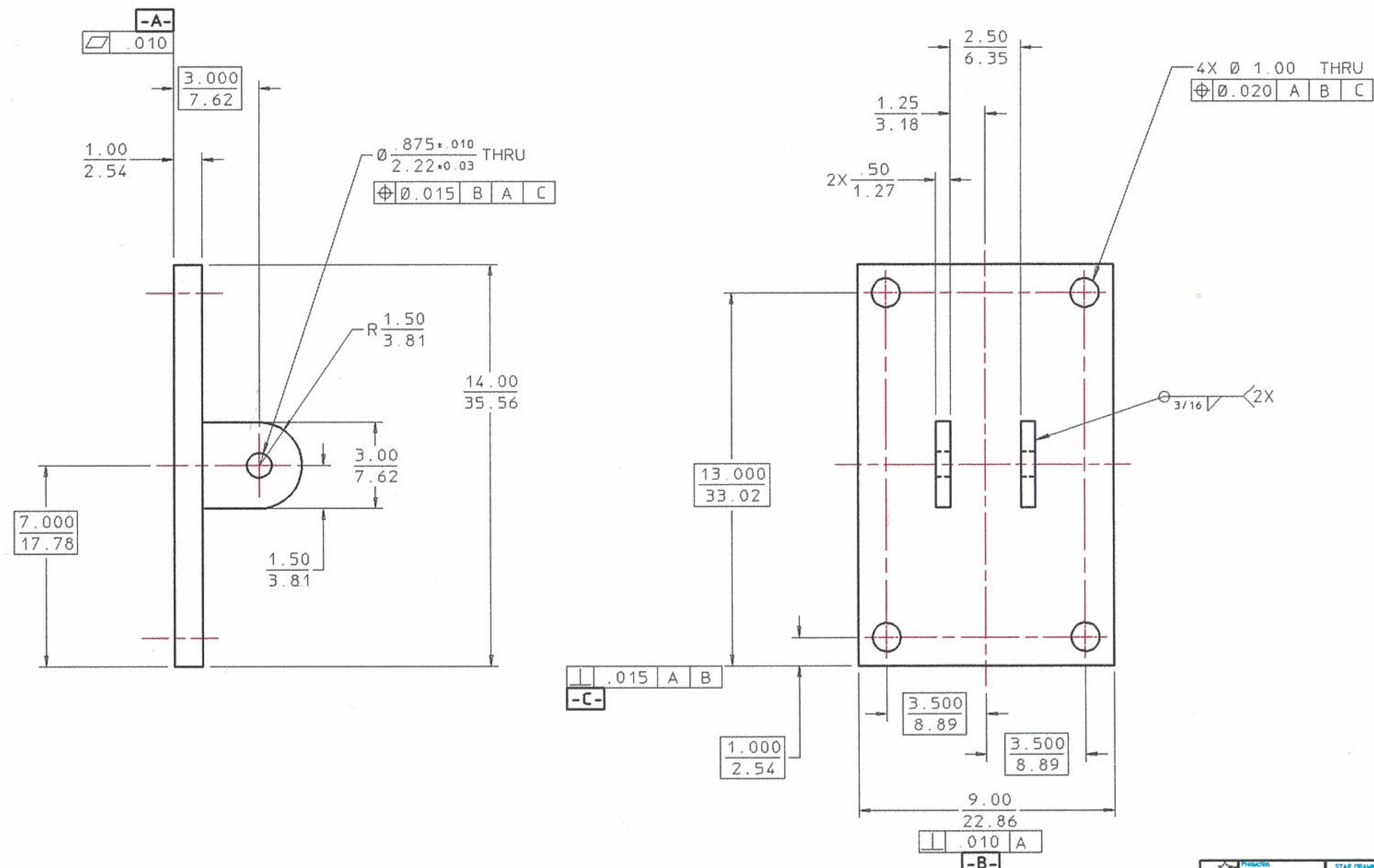
SHOP ORDERS
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRAWN BY: A.RAWLINS DATE 09/20/95
CHECK BY: G.KOEHLER DATE 09/20/95
WBS # 4.2.10
Cognizant Engineer: R.WELLS
STAR DRAWING NUMBER: TPC778-D-1 REV. A
RHIC DRAWING NUMBER REV. -

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
TPC ASSEMBLY & TEST
SMT-VERTICAL SUPPORT ANCHOR SPOOL

DRAWING TYPE: DETAIL
SHOWN ON: 00X0000
SCALE: 1/4
DO NOT SCALE PRINTS
DESIGN ACCOUNT: 8052-30
CATEGORY CODE: SR-02-10
LBL DRAWING NUMBER: 24A7884
REV. A

ITEM	REQ	PART NUMBER	DESCRIPTION
1	1	-	PLATE,1"THK. ALUM. 6061-T6
2	2	-	PLATE,1/2"THK. ALUM. 6061-T6



UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
.X/X = ±.06/.15 ANGLES ±.5°
.XX/X = ±.02/0.05 FINISH
.XXX/.XX = ±.004/.01 125/32

SHOP ORDERS
Degrease
Tag
A.RAWLINS 09/20/95
G.KOEHLER 09/20/95

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
A	AR	GK		9/20/95	RELEASED FOR FABRICATION

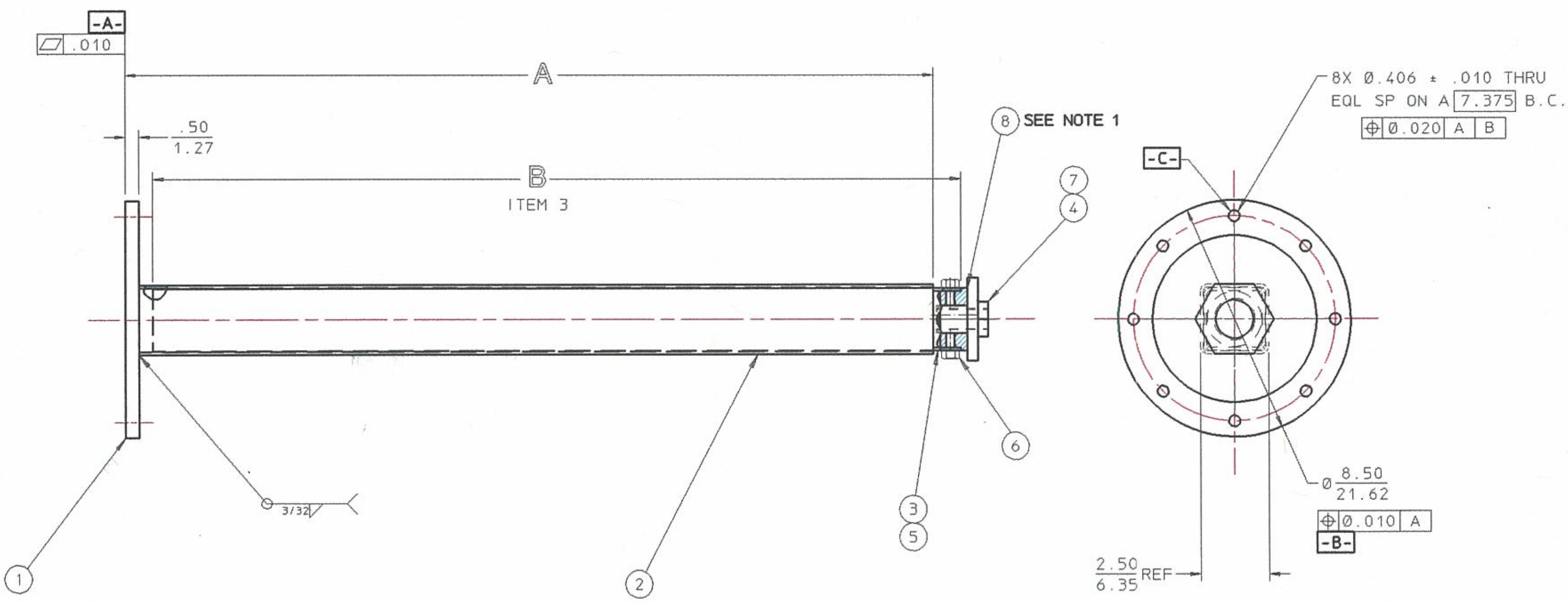
STAR DRAWING NUMBER: TPO779-D-1 REV. A
Engineer: R. WELLS
RHIC DRAWING NUMBER REV. -

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
TPC ASSEMBLY & TEST
SMT-VERTICAL SUPPORT BASE

DRAWING TYPE: DETAIL | SHOWN ON: 00X0000 | SCALE 1/4
DESIGN ACCOUNT: 8052-30 | CATEGORY CODE: SR-02-10 | LBL DRAWING NUMBER: 24A7894 | REV. A

TAB NO.	A	B
-01	29.50	29.50
-02	16.50	16.50



NOTES:

1. ITEMS 3 & 8 CAN BE INTERCHANGED FOR ITEM 5 AT USERS DISCRETION TO ACHIEVE ELEVATION REQUIRED.

ITEM	REQ	PART NUMBER	DESCRIPTION
8	3	24A7643B	TUBE PLUG ADAPTER 1
7	1		RETAINING RING, EXTERNAL, ROTOR CLIP NO. SH-100
6	4		3/8-16 X 3/8" LG, HEX. BOLT, STEEL
5	3	24A8244B-2	TUBE PLUG ADAPTER 2
4	3	24A8244B-1	THREADED SLEEVE
3	1	22F12GL	TUBING,SQ.,12 GA.,2-1/4" TELESPAR, UNISTRUT
2	1	24F12PL	TUBING,SQ.,12 GA.,2-1/2" TELESPAR, UNISTRUT
1	1	24A7944B-1	PLATE,1/2"THK,ASTM-A36 STL

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
B	JB	GK		4/18/97	REVISED ITEM XXXXXX & XX
A	AR	GK		09/28/95	RELEASED FOR FABRICATION

SHOP ORDERS
ACCT. NO. / SER. NO.
DATE ISSUED / DATE REQ'D 00/00 / NO. REQ'D -
SURFACE TREATMENT: DEGREASE
IDENTIFICATION METHOD: TAG

APPROVALS
DRAWN BY: A.RAWLINS — DATE 09/28/95
CHECK BY: G.KOEHLER — DATE 09/28/95
PRODUCTION APPROVAL: — DATE
COGNIZANT ENGINEER: R.WELLS — DATE 09/28/95

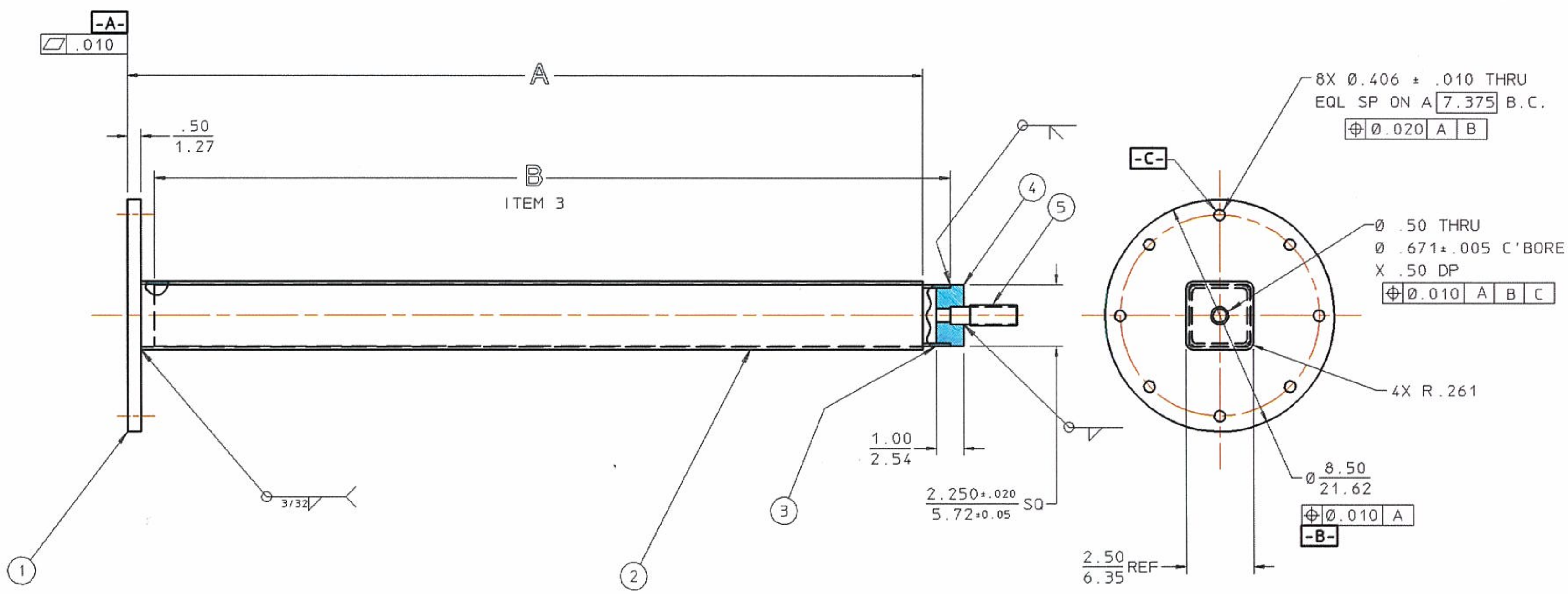
STAR — WBS # 4.2.10 — DWG SIZE D — STAR DRAWING NUMBER TPC784-D-1 — REV. A — RHIC DRAWING NUMBER — REV. -

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
TOLERANCES: X/X = ±.06/.15; XX/X = ±0.02/0.05; 0.XXX/.XX = ±.004/.01
ANGLES ±.5°
FINISH 125/32

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
TPC ASSEMBLY
SMT-ADJUSTING LEG

DRAWING TYPE: DETAIL — SHOWN ON: 00X0000 — SCALE: 1/2
DESIGN ACCOUNT: 8052-30 — CATEGORY CODE: SR-02-10
LBL DRAWING NUMBER: 24A7944 — REV. B

TAB NO.	A	B
-01	29.50	29.50
-02	16.50	16.50



ITEM	REQ	PART NUMBER	DESCRIPTION
5	1	24A8252	LEFT HAND STUD
4	1		BAR,SQ.2-1/2",ASTM-A36 STL
3	1	22F12GL	TUBING,SQ.12 GA.,2-1/4" TELESPAR, UNISTRUT
2	1	24F12PL	TUBING,SQ.12 GA.,2-1/2" TELESPAR, UNISTRUT
1	1		PLATE,1/2"THK,ASTM-A36 STL

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
A	XI	XI	XX	09/26/95	RELEASED FOR FABRICATION

SHOP ORDERS
ACCT. NO. | SER. NO.
DATE ISSUED | DATE REQ'D 00/00 | NO. REQ'D -
SURFACE TREATMENT: DEGREASE
IDENTIFICATION METHOD: TAG

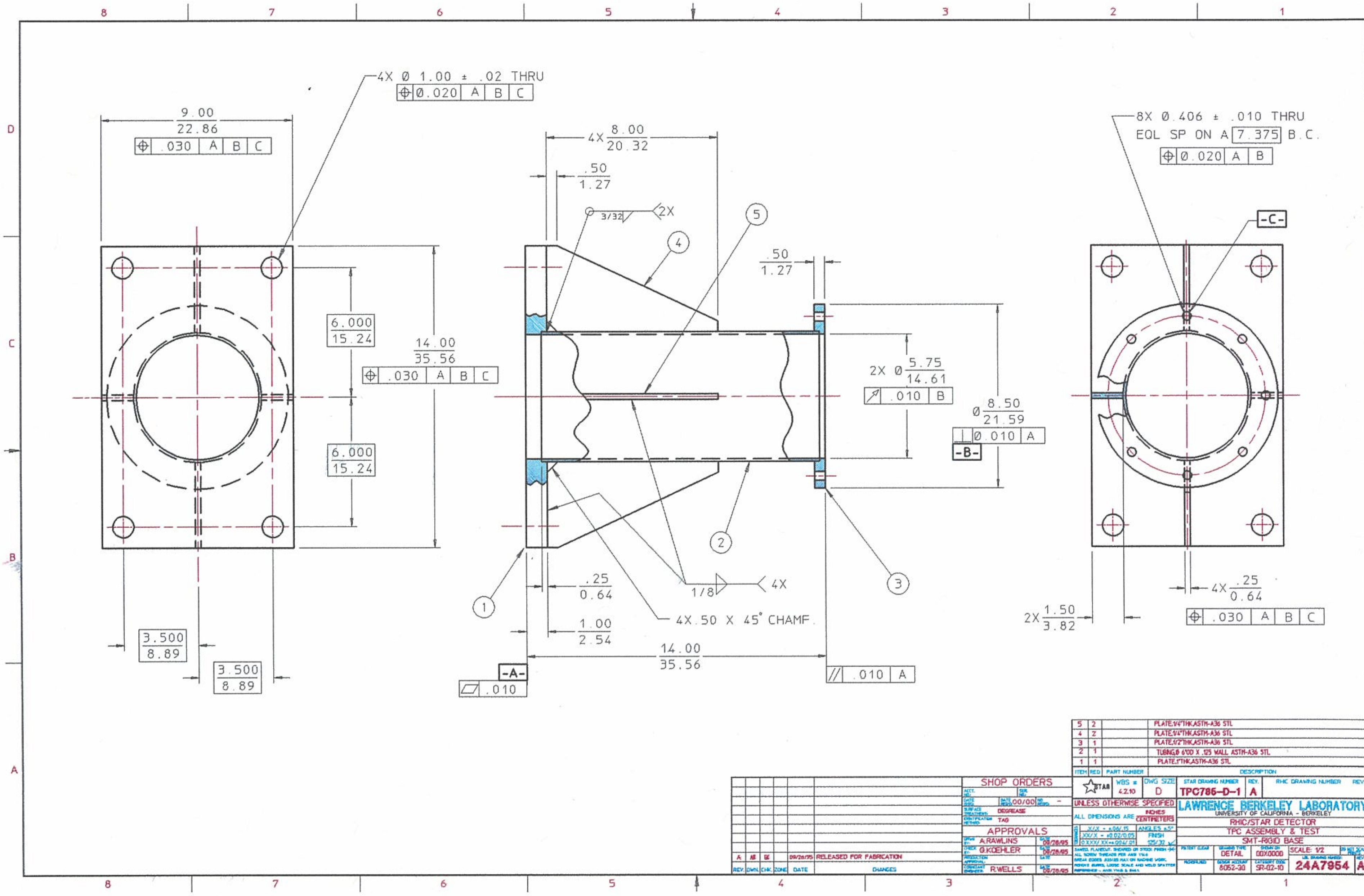
APPROVALS
DRWN BY: A.RAWLINS — DATE 09/28/95
CHECK BY: G.KOEHLER — DATE
PRODUCTION APPROVAL: — DATE
COGNIZANT ENGINEER: R.WELLS — DATE

STAR | WBS # 4.2.10 | DWG SIZE D
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
TOLERANCES: X/X = ±.06/.15; .XX/X = ±0.02/0.05; 0.XXX/.XX = ±.004/.01
ANGLES ±.5°
FINISH 125/32

STAR DRAWING NUMBER: TPC784-D-1 | REV. X (A) | RHIC DRAWING NUMBER: XXXXXXXXXX | REV. -

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
TPC ASSEMBLY
SMT-ADJUSTING LEG

DRAWING TYPE: DETAIL | SHOWN ON: 00X0000 | SCALE: 1/2
DESIGN ACCOUNT: 8052-30 | CATEGORY CODE: SR-02-10 | LBL DRAWING NUMBER: 24A7944 | REV. A


4X Ø 1.00 ± .02 THRU
Ø.020 A B C
9.00
22.86
.030 A B C
6.000
15.24
14.00
35.56
.030 A B C
3.500
8.89
4X 8.00
20.32
.50
1.27
3/32
2X
5
4
2
3
1
2X Ø 5.75
14.61
.010 B
Ø 8.50
21.59
Ø.010 A
-B-
.25
0.64
1.00
2.54
1/8
4X
4X.50 X 45° CHAMF.
-A-
.010
// .010 A
8X Ø.406 ± .010 THRU
EQL SP ON A 7.375 B.C.
Ø.020 A B
-C-
4X .25
0.64
2X 1.50
3.82
.030 A B C
PLATE,1/4"THK,ASTM-A36 STL
PLATE,1/4"THK,ASTM-A36 STL
PLATE,1/2"THK,ASTM-A36 STL
TUBING,Ø 6"OD X .125 WALL ASTM-A36 STL
PLATE,1"THK,ASTM-A36 STL
ITEM RED PART NUMBER DESCRIPTION
SHOP ORDERS
DEGREASE
TAG
APPROVALS
A.RAWLINS 09/28/95
G.KOEHLER 09/28/95
R.WELLS 09/28/95
A 09/26/95 RELEASED FOR FABRICATION
REV. DWN. CHK. ZONE DATE CHANGES
STAR WBS = 4.2.10
DWG SIZE D
STAR DRAWING NUMBER TPC786-D-1 REV. A
RHIC DRAWING NUMBER REV.
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES CENTIMETERS
X/X = ±.06/.15
XX/X = ±0.02/0.05
0.XXX/XX=±.004/.01
ANGLES ±.5°
FINISH 125/32
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
TPC ASSEMBLY & TEST
SMT-RIGID BASE
DETAIL
00X0000
SCALE: 1/2
8052-30
SR-02-10
24A7954 A

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES	ACCT. NO.	SER. NO.			DETAIL	24A7606	24A7971	B
TOLERANCES: .X = ±.06/.15	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
.XX = ±.02/.05	DELIVER TO:							
.XXX = ±.005/.01	SURFACE TREATMENT: Degrease							
ANGLES ±.5°	IDENTIFICATION METHOD: Tag							
FINISH 125	DRWN BY: R.RAWLINS		DATE 11/30/95					
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	CHECK BY: G.KOEHLER		DATE 11/30/95					
ALL SCREW THREADS ARE PER ANSI Y14.6								
BREAK EDGES .020/.05 MAX ON MACHINE WORK.								
REFERENCE - ANSI Y14.5 & B46.1.								

LAWRENCE BERKELEY LABORATORY

UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR

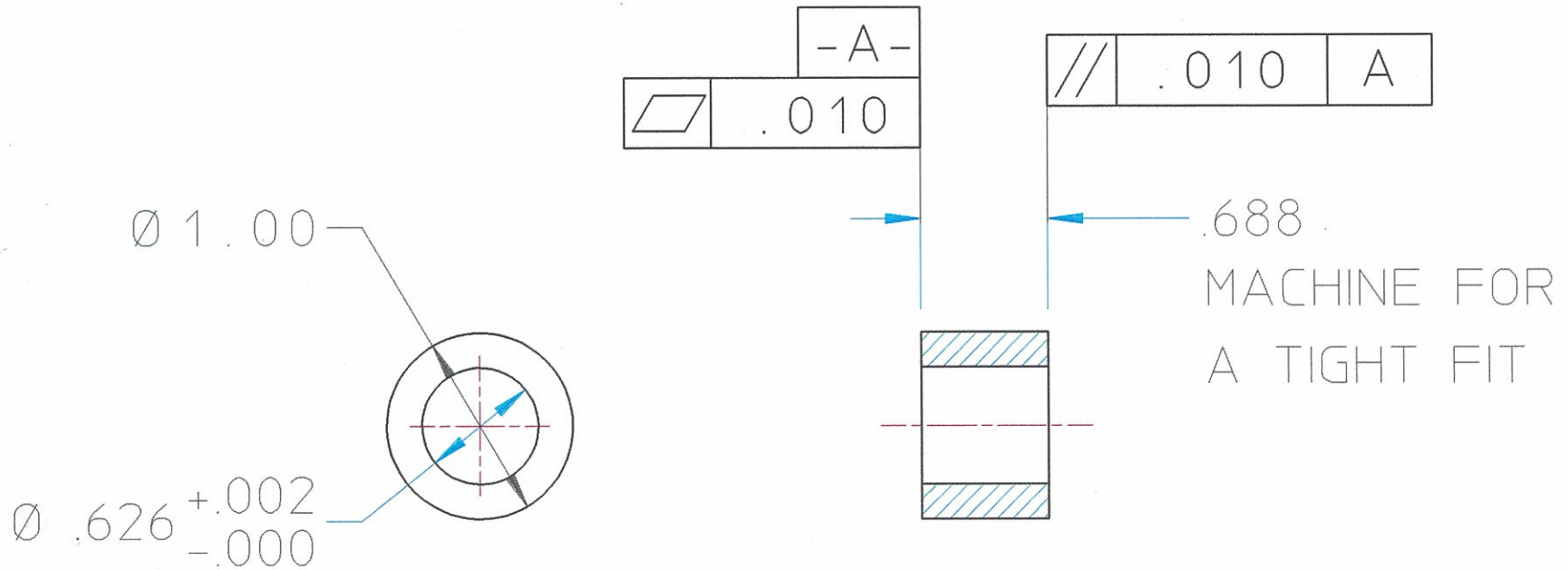
TPC ASSEMBLY & TEST

SMT - PLATEN SHAFT LEFT SPACER

MATERIAL: BRASS

REV.	DWN.	CHK.	DATE	CHANGES
A	JO	GK	11/95	RELEASE FOR FABRICATION
B	JO	GK	4/97	MAJOR REVISION

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: R.WELLS	TPC774-A-1	A		



REQ	ITEM	PART NUMBER	DESCRIPTION
			STAINLESS STEEL BAR, ROUND, Ø 1.50
			STAINLESS STEEL BAR, ROUND, Ø 1.50

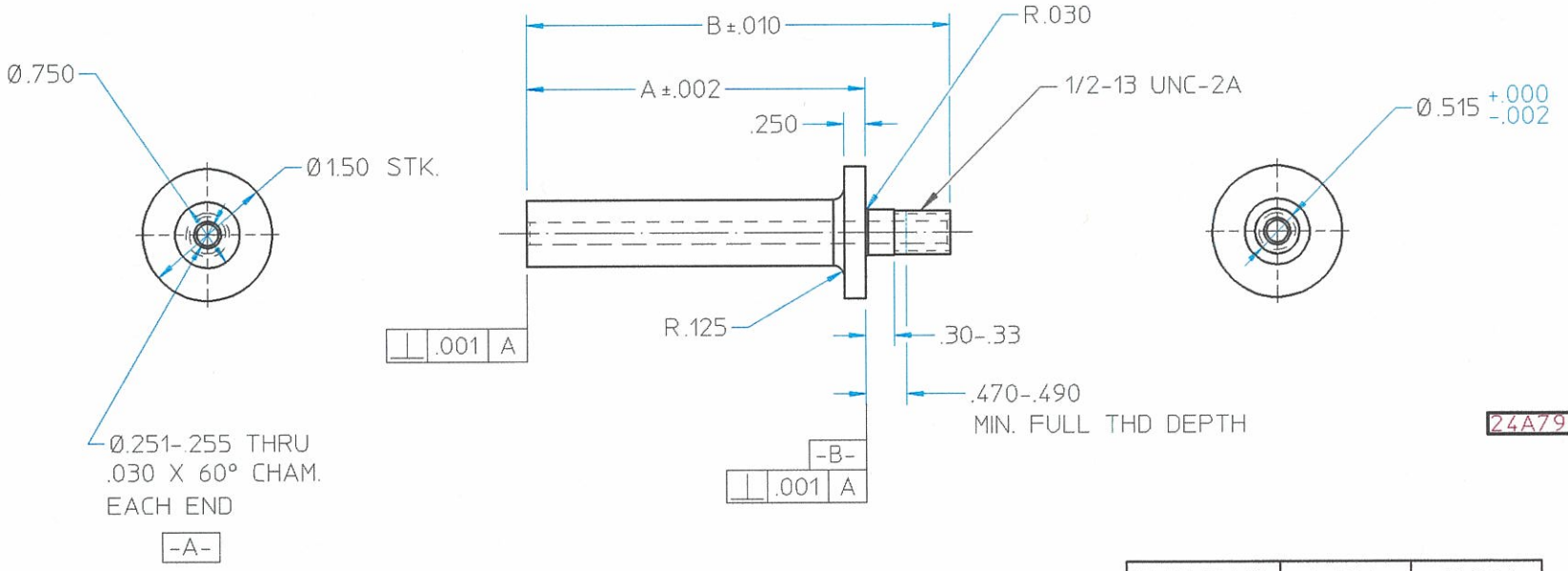


TABLE NO.	A DIM.	B DIM.
-1	3.900	4.875
-2	4.025	5.000

REV.	DWN.	CHK.	DATE	CHANGES
B	JO	GK	4/97	MAJOR REVISION
A	RL	GK	8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
TOLERANCES: X = ±.06, XX = ±0.01, 0.XXX = ±.005; ANGLES ±5°; FINISH 125
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK.
REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS
ACCT. NO.
SER. NO.
DATE ISSUED
DATE REQ'D
NO. REQ'D
DELIVER TO
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRWN BY: JORTIZ DATE 4/10/97
CHECK BY: G.KOEHLER DATE 4/10/97

WBS # 4.2.10
Production Approval:
Cognizant Engineer: G.KOEHLER
STAR DRAWING NUMBER: TPC783-B-1
REV.: B
RHIC DRAWING NUMBER
REV.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR TPC
TPC ASSEMBLY & TEST
SMT - SPIDER STANDOFF

PATENT CLEAR
MICROFILMED
DRAWING TYPE: DETAIL
SHOWN ON: 24A7606
SCALE: FULL
DO NOT SCALE PRINT
DESIGN ACCOUNT: 8052-30
CATEGORY CODE: SR-02-10
LBL DRAWING NUMBER: 24A7983
REV.: B

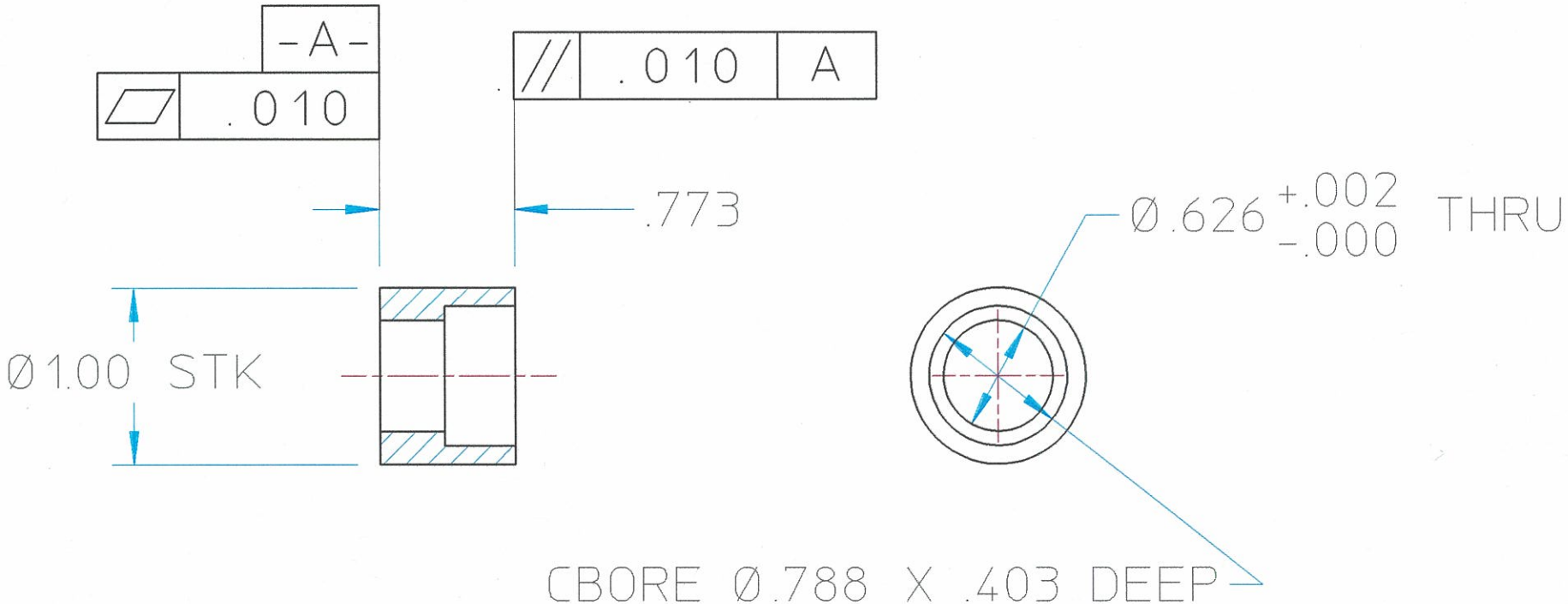
/jortiz/STAR/SECTOR_TOOL/24A7983B_SPIDER.STANDOFF.....4-Apr-97

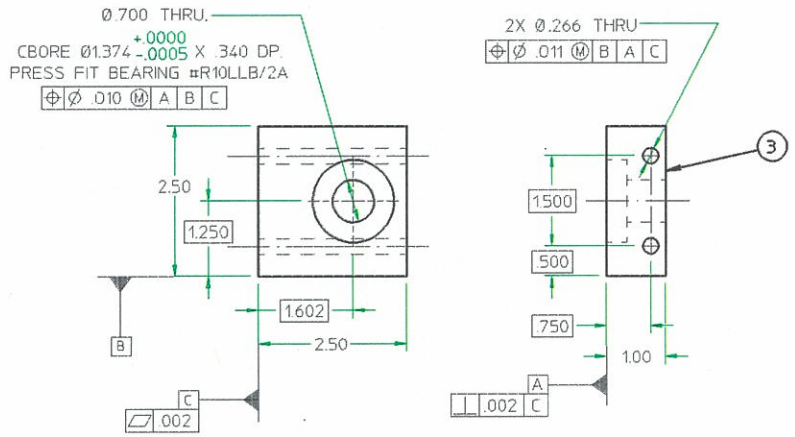
UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES	ACCT. NO.	SER. NO.			DETAIL	24A7606	24A8201	B
TOLERANCES: .X = ±1 / ANGLES ±.5° / .XX = ±.02 / FINISH / .XXX = ±.010 / 125	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	DELIVER TO:			LAWRENCE BERKELEY LABORATORY				
ALL SCREW THREADS ARE PER ANSI Y14.6	SURFACE TREATMENT: Degrease			UNIVERSITY OF CALIFORNIA - BERKELEY				
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	IDENTIFICATION METHOD: Tag			RHIC/STAR DETECTOR				
REFERENCE - ANSI Y14.5 & B46.1.	DRWN BY: A.RAWLINS		DATE 11/30/95	TPC ASSEMBLY & TEST				
	CHECK BY: G.KOEHLER		DATE 11/30/95	SMT - GEAR SPACER				

REV.	DWN.	CHK.	DATE	CHANGES
A	AR	GK	11/30/95	RELEASE FOR FABRICATION
B	JO	GK	4/21/97	MAJOR REVISION

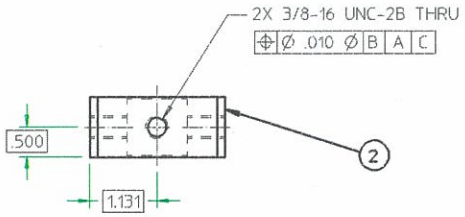
MATERIAL: BRASS

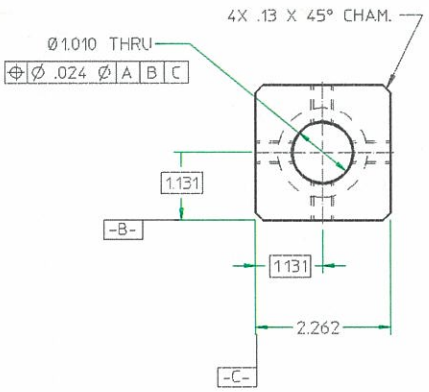
WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: R.WELLS	TPC789-A-1	A		

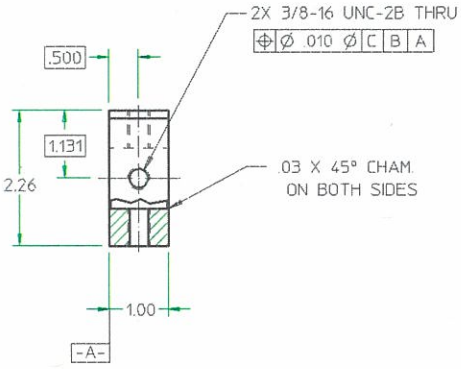




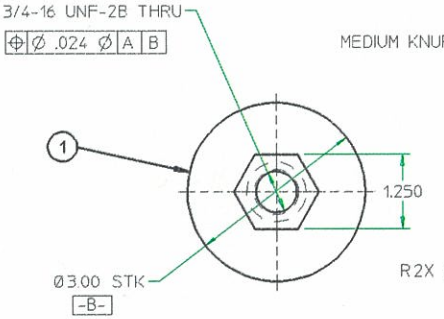
PILLOW BLOCK

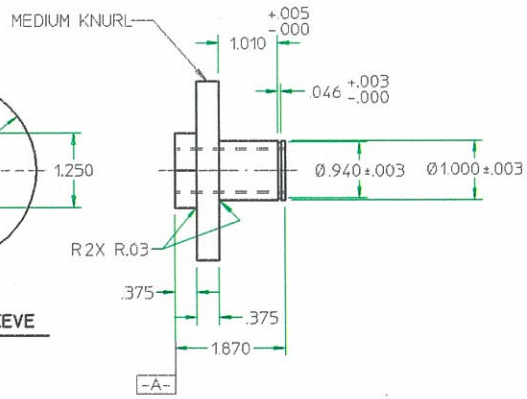






TUBE PLUG ADJUSTER





THREADED SLEEVE

24A8244A

ITEM	REQ	PART NUMBER	DESCRIPTION
3	1	24A8244B-3	ALUMINUM PLATE, T6061-T6, 1" THK.
2	3	24A8244B-2	ALUMINUM PLATE, T6061-T6, 1" THK.
1	3	24A8244B-1	SILICON BRONZE, CDA 647 OR 655 AS REQ.

STAR DRAWING NUMBER: TPC754-D-1 | REV: A | RHIC DRAWING NUMBER | REV.

STAR WBS # 4.2.10 | DWG SIZE: D

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE INCHES / CENTIMETERS | ANGLES ±5° | FINISH 125

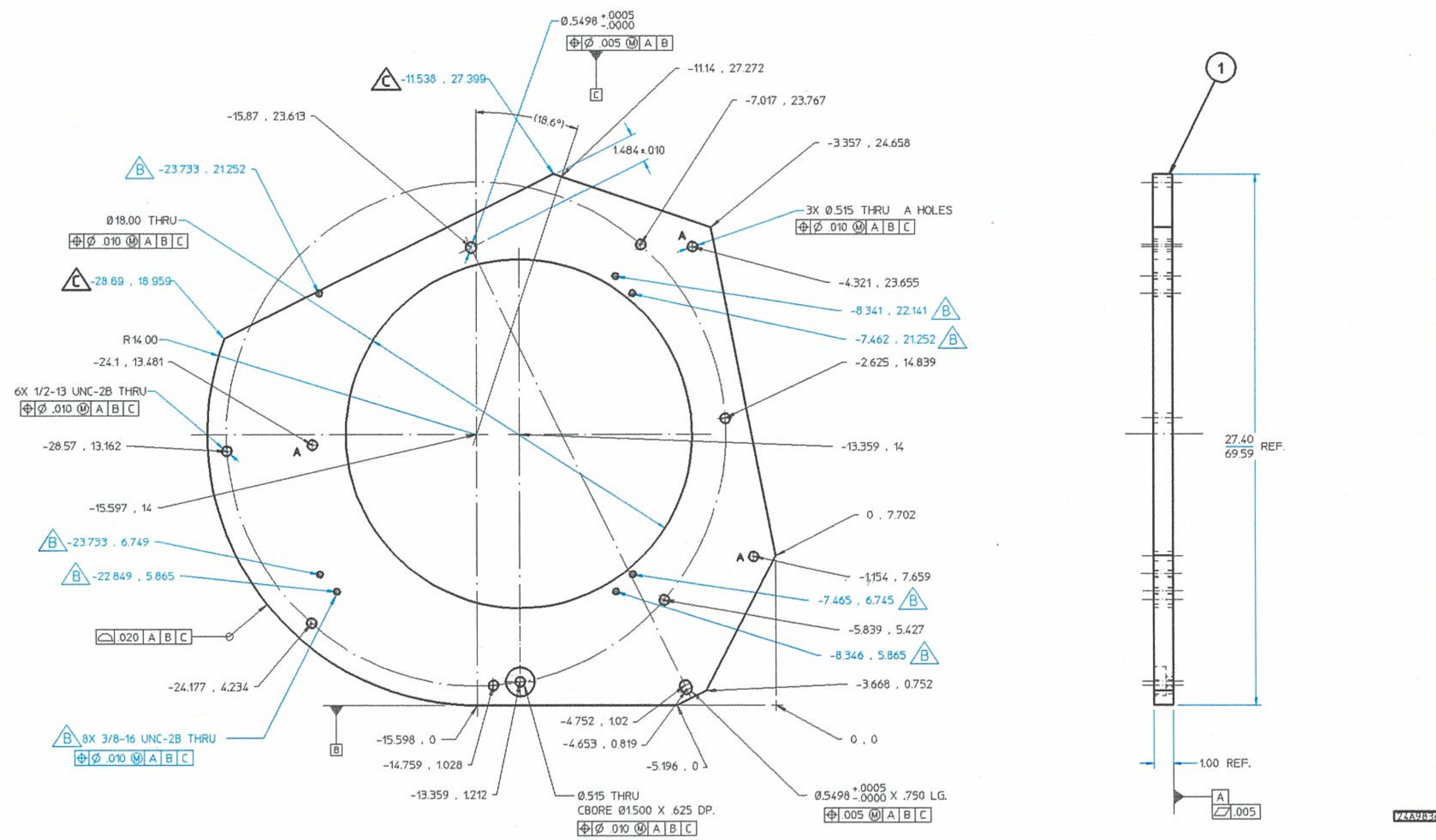
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLY & TEST
SMT - COMPONENTS

DETAIL 8052-30 | SHEET/SHEETS SR-02-10 | SCALE FULL | 24A8244 A

REV	DWN	CHK	ZONE	DATE	CHANGES
A	JO	GK		4/15/97	RELEASED FOR FABRICATION

SHOP ORDERS

APPROVALS
JORTIZ 4/15/97
G.KOEHLER 4/15/97
R.WELLS 4/15/97



NOTES:
1. ESTIMATED WEIGHT IS 415 LBS.
2. ALL X, Y HOLE COORDINATES ARE BASIC

REQD	ITEM	PART NO.	DESCRIPTION
1	1	24A9836A	ALUMINUM, WROUGHT TOOLING PLATE, 1" THK.

REV	DWG	CHK	ZONE	DATE	CHANGES
B	JO	GK		6/28/99	TRIMMED PLATE PROFILE
B	JO	GK		5/1/97	ADDED 3/8-16 UNC-2B THRU HOLES
A	JO	GK		3/28/97	RELEASE FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
TOLERANCES: .X ± .1; .XX ± .01; .XXX ± .005; FRAC. ± 1/64; ANGLES ± 1°; FINISH 125

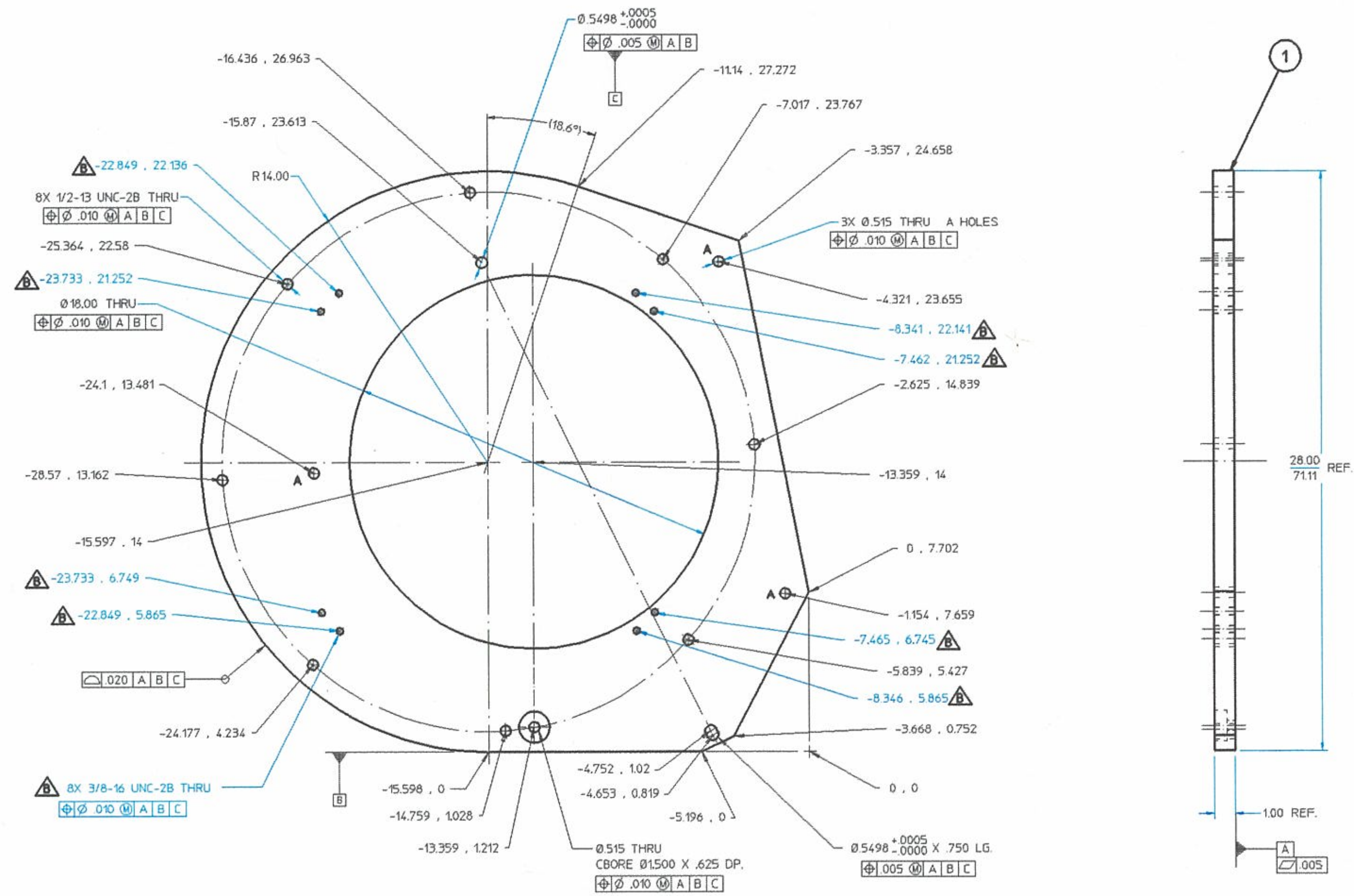
THREADS ARE CLASS 2. CHAMFER ENDS OF ALL SCREW THREADS 30°. CUT 1.5 PITCH THREAD RELIEF WITH ROUND ROOT TOOL ON MACHINE CUT THREADS. BREAK EDGES .016 MAX. ON MACHINED WORK. REMOVE BURRS WELD SPLATTER & LOOSE SCALE. REFERENCES: ANSI Y14.5 & Y14.1.

SHOP ORDERS
DEGREASE
TAG
J. ORTIZ 3/21/97
G. KOEHLER 3/21/97

STAR — WBS # 4.2.10 — DWG SIZE E — STAR DRAWING NUMBER TPC791-E-1 — REV. A — RHIC DRAWING NUMBER — REV.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLY & TEST
SMT - OUTER SECTOR PLATE
DWG. TYPE DETAILS — SCALE 1/2
8052-30 — SR-02-10 — DWG. NO. 24A9836 — REV. C

/jortiz/STAR/SECTOR_TOOL/24A9836C_OUTSECT_PLATE_DET.FIN.....7-Nov-97



NOTES:
1. ESTIMATED WEIGHT IS 41.5 LBS.
2. ALL X, Y HOLE COORDINATES ARE BASIC

REV	ZONE	DATE	CHANGES
B			ADDED 3/8-16 UNC-2B THRU HOLES
A			RELEASE FOR FABRICATION

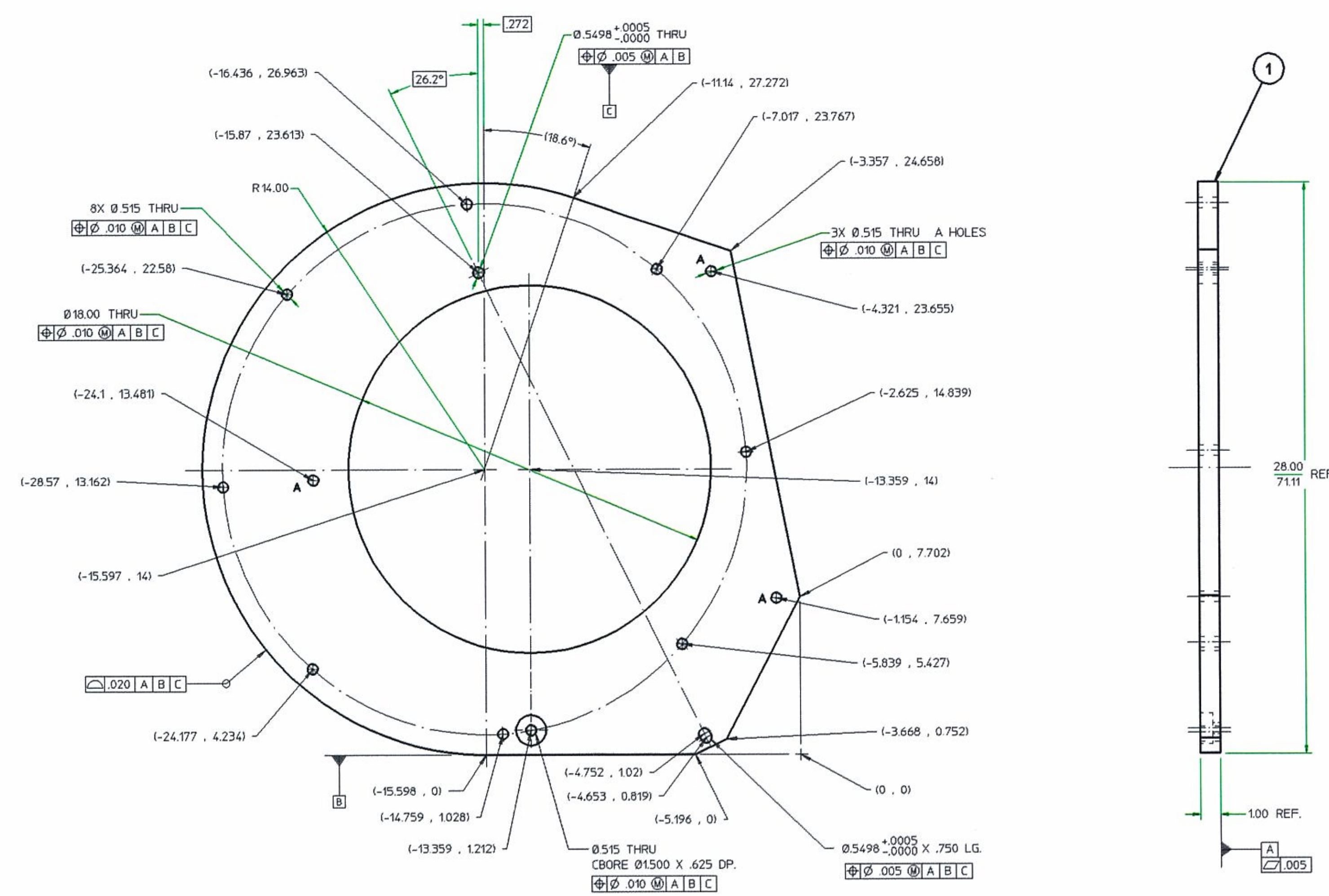
1	24A9836A	ALUMINUM, WROUGHT TOOLING PLATE, 1" THK.
QTY	PART NO.	DESCRIPTION

TP0791-E-1 A

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLY & TEST
SMT - OUTER SECTOR PLATE
DETAILS

DEGREASE
TAG
J. ORTIZ
G. KOEHLER
SCALE 1/2
8052-30 SR-02-10 24A9836 B

/jortiz/STAR/SECTOR_TOOL/24A9836B_OUTSECT_PLATE_DET.4.....7-Nov-97



NOTES:
1. ESTIMATED WEIGHT IS 41.5 LBS.
2. ALL X, Y HOLE COORDINATES ARE BASIC

REQ'D	ITEM	PART NO	DESCRIPTION
1	1	24A9836A	ALUMINUM, WROUGHT TOOLING PLATE, 1" THK.

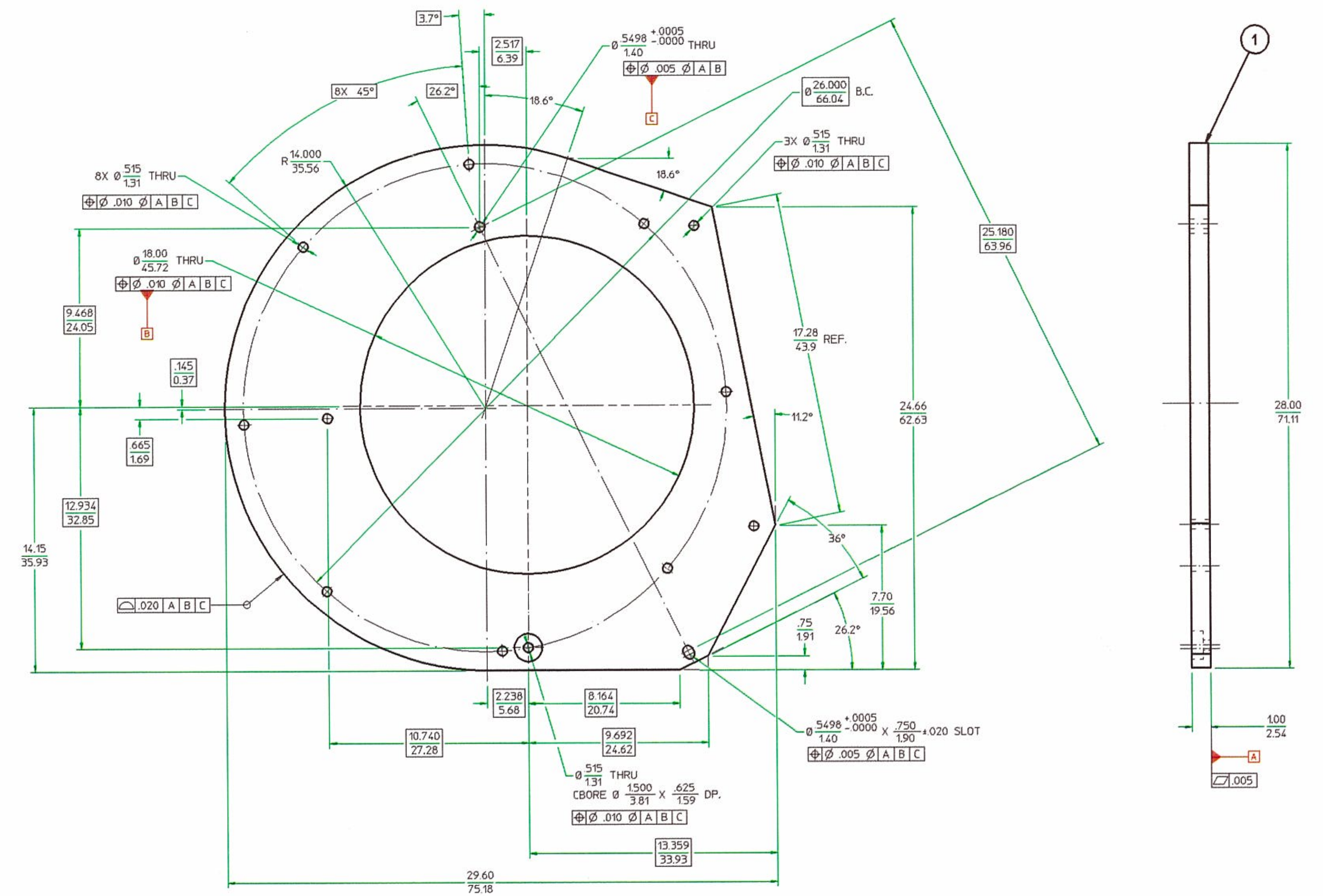
REV	DWG	CHK	ZONE	DATE	CHANGES
A	JO	GK			RELEASE FOR FABRICATION

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY

RHIC - STAR - TPC
SECTORS
OUTER SECTOR PLATE
DETAILS

DEGREASE
TAG
J. ORTIZ
G. KOEHLER

SCALE 1/2
8052-30 SR-02-10 24A9836 A



NOTES:
1. ESTIMATED WEIGHT IS 415 LBS.

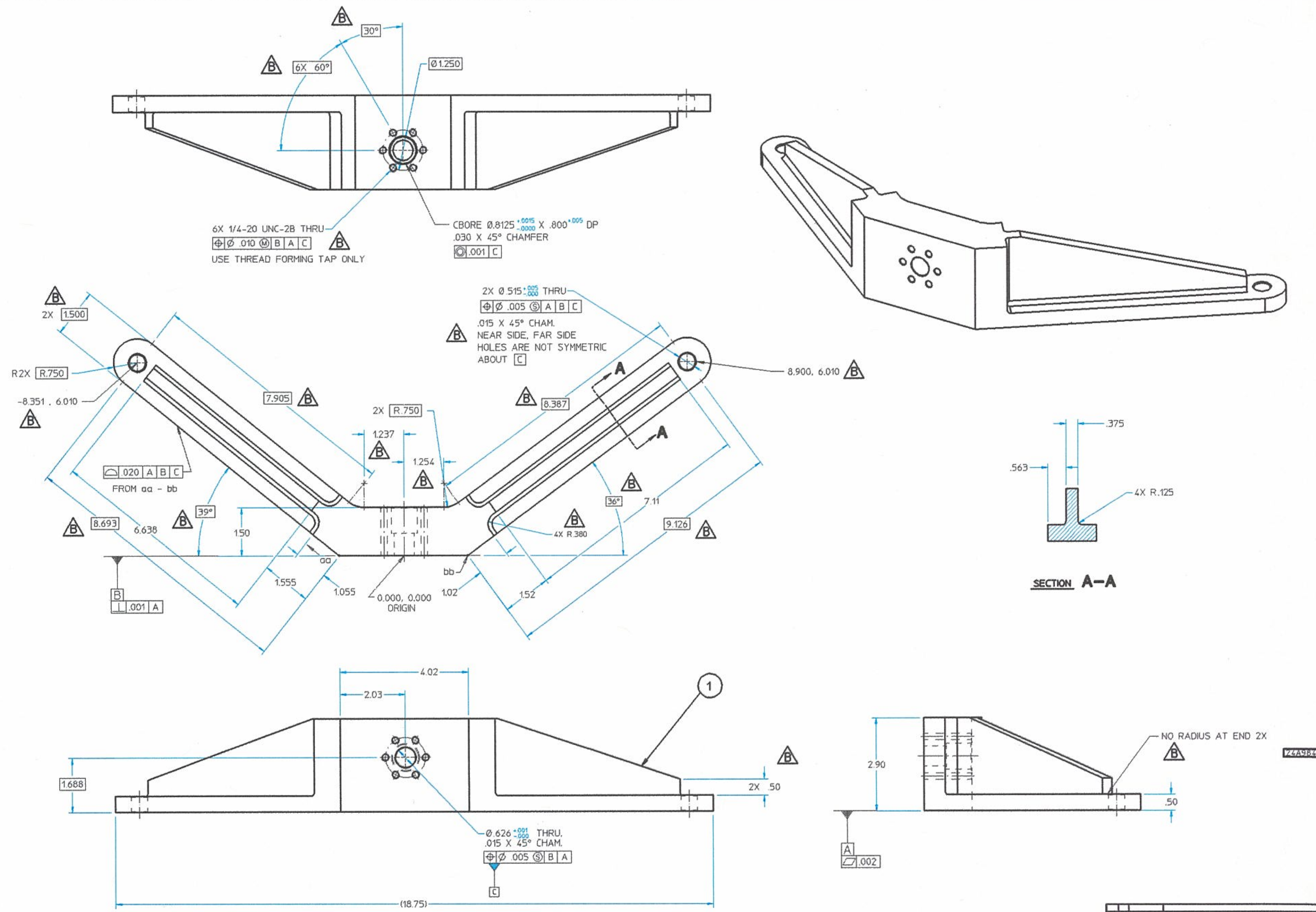
REQD	ITEM	PART NO.	DESCRIPTION
1	1	24A9836A	ALUMINUM, WROUGHT TOOLING PLATE, 1" THK.

REV	DWG	CHK	ZONE	DATE	CHANGES
A	JO	GK		3/21/97	RELEASE FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
TOLERANCES: .X ± .1 FRAC. ± 1/64; .XX ± .01 ANGLES ± 1°; .XXX ± .005 FINISH 125
THREADS ARE CLASS 2. CHAMFER ENDS OF ALL SCREW THREADS 30°. CUT 1.5 PITCH TIME RELIEF WITH ROUND ROOT FILL ON MACHINE CUT THREADS. BREAK EDGES .016 MAX. ON MACHINED WORK. REMOVE BURRS WELD SPLATTER & LOOSE SCALE. REFERENCES: ANSI Y14.5 & B46.1.

SHOP ORDERS
SURFACE TREATMENT: DEGREASE
TAG
DRAWN BY: J. ORTIZ 3/21/97
CHECKED BY: G. KOEHLER 3/21/97

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY
RHIC - STAR - TPC
SECTORS
OUTER SECTOR PLATE
DWG. TYPE: DETAILS
SCALE: 1/2
DESIGN ACCT. NO: 8052-30
CATEGORY CODE: SR-02-10
DWG. NO. 24A9836 REV. A



NOTES:
1. X, Y DIMENSIONS FOR Ø.515 HOLES ARE BASIC AND ARE TO BE USED FOR LOCATING THE HOLES.
2. TOOLING BALL HOLES TO AID FEATURE POSITIONING MAY BE USED SEE ENGINEERING GROUP.
3. LEG ANGLES ARE NOT SYMETRIC ABOUT ORIGIN.

REV	DWN	CHK	ZONE	DATE	CHANGES
B	JB	GK		5/15/97	MAJOR REVISION
A	JB	GK		4/7/97	RELEASED FOR FABRICATION

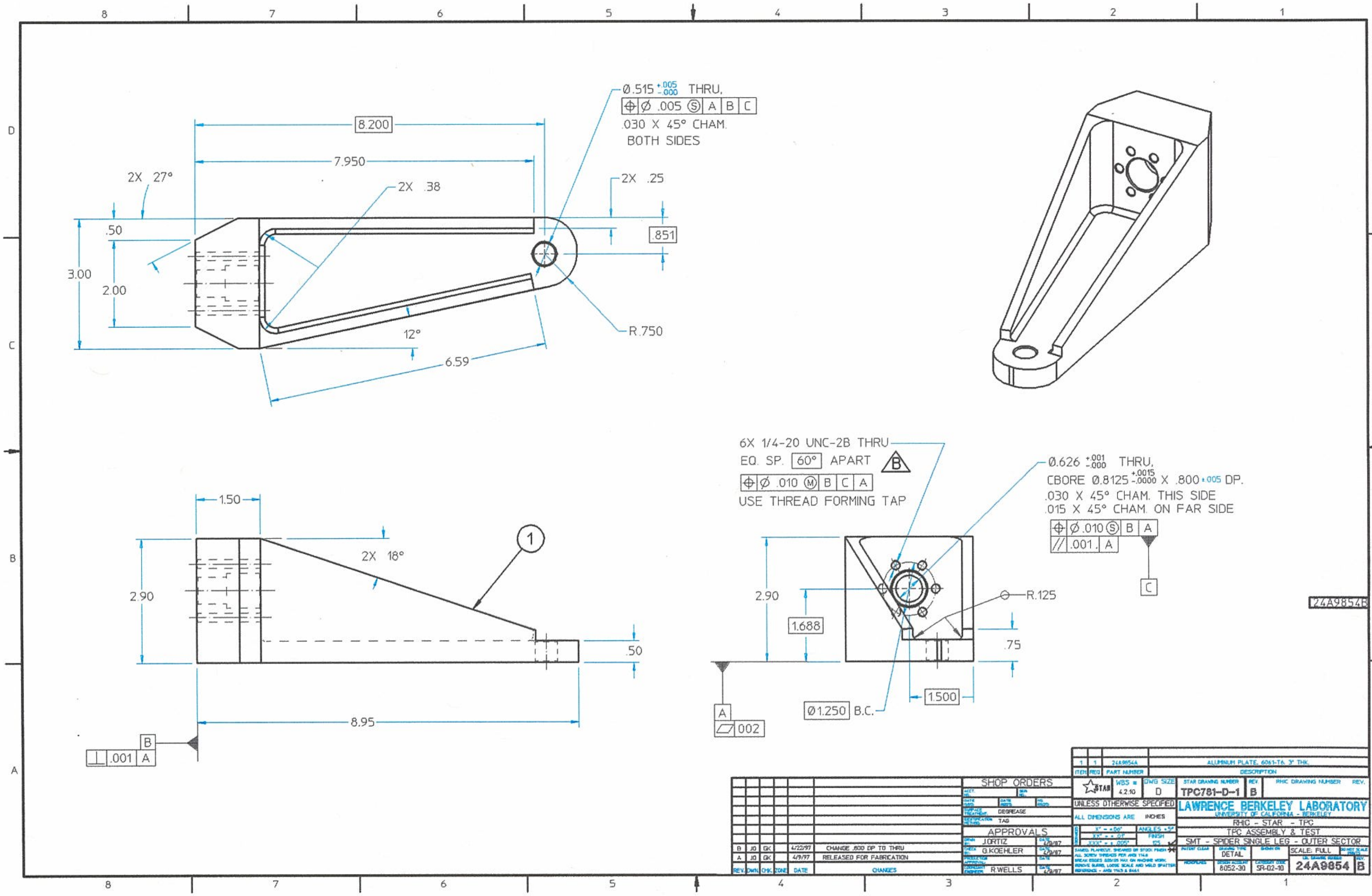
ITEM	REQ	PART NUMBER	DESCRIPTION
1	1	24A9846A	ALUMINUM PLATE, 6061-T6, 3" THK.

SHOP ORDERS
APPROVALS: J.ORTIZ 4/7/97; G.KOEHLER 4/7/97; R.WELLS 4/7/97

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE INCHES

STAR — WBS # 4.2.10 — DWG SIZE E — STAR DRAWING NUMBER TPO780-E-1 — REV. B

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLY & TEST
SMT - SPIDER DOUBLE LEG - OUTER SECTOR
DETAIL 24A7608 SCALE FULL
6082-30 5R-02-10 24A9846 B



24A9854B
Ø.515 +.005 -.000 THRU.
.005 Ⓢ A B C
.030 X 45° CHAM.
BOTH SIDES
8.200
7.950
2X 27°
2X .38
2X .25
.851
.50
3.00
2.00
R.750
12°
6.59
1.50
2X 18°
1
2.90
.50
8.95
.001 A
B
6X 1/4-20 UNC-2B THRU
EQ. SP. 60° APART
B
Ø .010 Ⓜ B C A
USE THREAD FORMING TAP
Ø.626 +.001 -.000 THRU.
CBORE Ø.8125 +.0015 -.0000 X .800 ±.005 DP.
.030 X 45° CHAM. THIS SIDE
.015 X 45° CHAM. ON FAR SIDE
Ø.010 Ⓢ B A
// .001 A
C
2.90
1.688
R.125
.75
1.500
Ø1.250 B.C.
A
002
1 1 24A9854A ALUMINUM PLATE, 6061-T6, 3" THK.
ITEM REQ PART NUMBER DESCRIPTION
SHOP ORDERS
SURFACE TREATMENT: DEGREASE
IDENTIFICATION METHOD: TAG
APPROVALS
DRWN BY: J.ORTIZ 4/9/97
CHECK BY: G.KOEHLER 4/9/97
COGNIZANT ENGINEER: R.WELLS 4/9/97
B JO GK 4/22/97 CHANGE .800 DP TO THRU
A JO GK 4/9/97 RELEASED FOR FABRICATION
REV. DWN. CHK. ZONE DATE CHANGES
STAR
WBS # 4.2.10
DWG SIZE D
STAR DRAWING NUMBER TPC781-D-1 REV. B
RHIC DRAWING NUMBER REV.
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLY & TEST
SMT - SPIDER SINGLE LEG - OUTER SECTOR
DRAWING TYPE DETAIL
SCALE: FULL
8052-30
SR-02-10
24A9854 B

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO.	SER. NO.		MICROFILMED	DETAIL	24A7606	24A9861	B
TOLERANCES: X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D		DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:							
FINISH 125/.32	SURFACE TREATMENT ---							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD ---							
ALL SCREW THREADS ARE ISO METRIC CLASS 6	DRWN BY A.RAWLINS		DATE 11/14/95					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY G.KOEHLER		DATE 11/14/95					
REFERENCE - ANSI Y14.5 & B46.1								

LAWRENCE BERKELEY LABORATORY

UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR

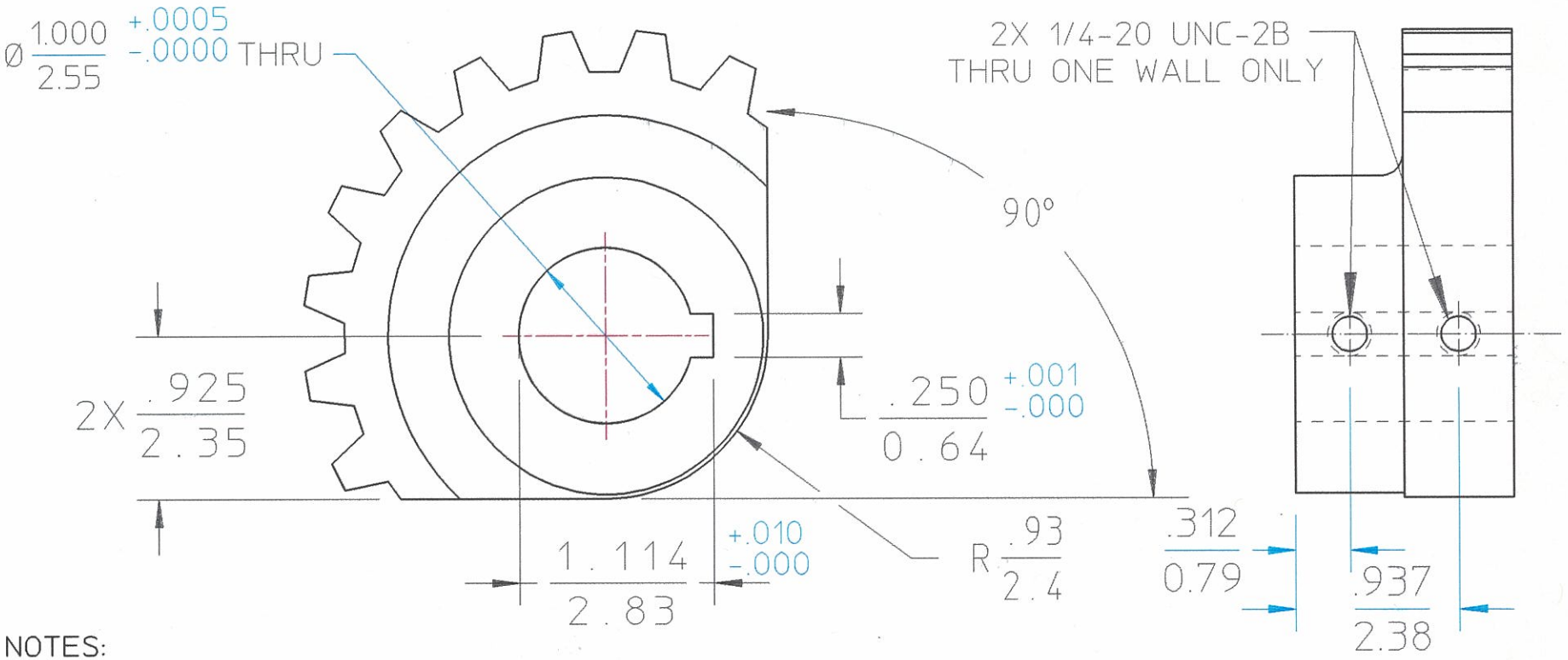
TPC ASSEMBLY & TEST

SMT - WORM GEAR 2

MATERIAL: WORM GEAR,BOSTON#GB1061

REV.	DWN.	CHK.	DATE	CHANGES
A	AR	GK	11/95	RELEASED FOR FABRICATION
B	JO	GK	3/97	ADDED 2X 1/4-20 HOLES, CHD. GEAR BORE & KEYWAY

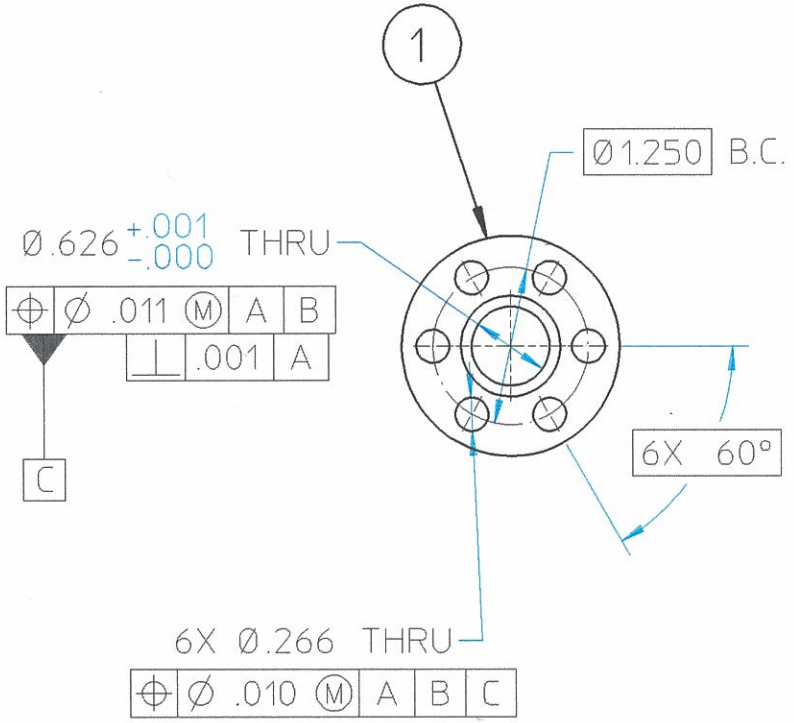
WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: R.WELLS	TPC769-A-1	B		

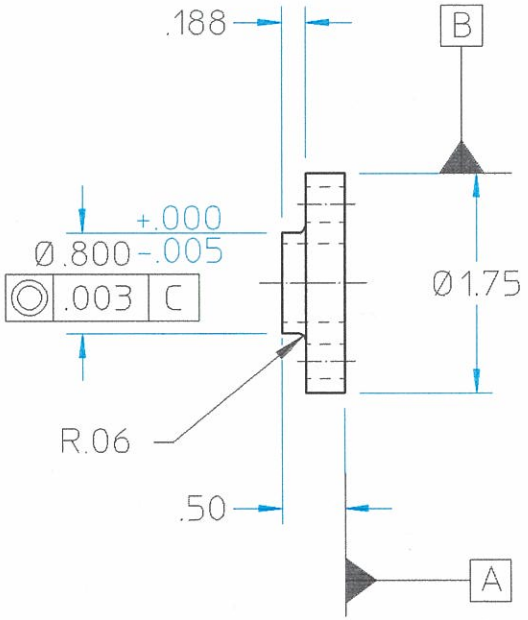


NOTES:

1. ALL DIMENSIONS GIVEN IN METRIC ARE FOR REFERENCE ONLY AND TOLERANCE IS NOT SHOWN.

24A9872A	ITEM	REQ	PART NUMBER	DESCRIPTION
	1	4	24A9872A	STEEL BAR, Ø2.00 STK.





WBS # 4.2.10	Production Approval:	Cognizant Engineer: R WELL	STAR DRAWING NUMBER TPC786-B-1	REV. A	RHIC DRAWING NUMBER	REV.

REV.	DWN.	CHK.	DATE	CHANGES
A	JO	GK	4/97	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES

TOLERANCES: .X = ; ANGLES ±.5°; .XX = ±0.01; FINISH 125/.32; .XXX = ±.005

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1.

SHOP ORDERS

ACCT. NO. ; SER. NO. ; DATE ISS'D ; DATE REQ'D ; NO. REQ'D ; DELIVER TO ; SURFACE TREATMENT Degrease ; IDENTIFICATION METHOD Tag

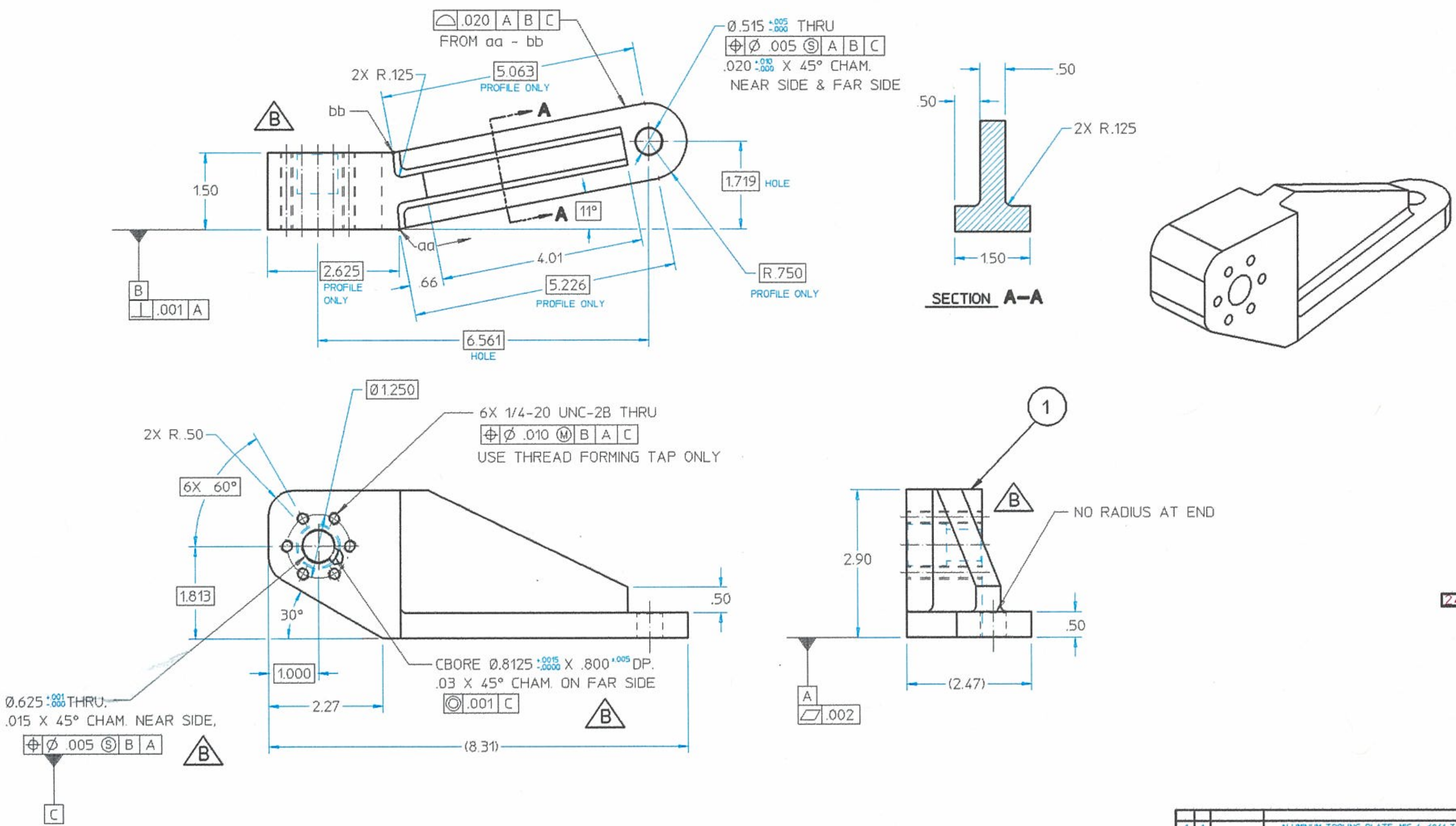
DRWN BY J.ORTIZ DATE 4/9/97

CHECK BY G.KOEHLER DATE 4/9/97

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC - STAR - TPC
TPC ASSEMBLY & TEST
SMT - SPIDER FLANGE

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	8052-30	SR-02-10	24A9872	A



24A9884B

ITEM	REQ	PART NUMBER	DESCRIPTION
1	1		ALUMINUM TOOLING PLATE, MIC-6, 6061-T6, 3.0"THK.

REV	DWN	CHK	ZONE	DATE	CHANGES
B	JO	GK		6/30/97	SWITCHED NEAR & FAR SIDE NOTES ADDED HIDDEN LINES
A	JO	GK		6/16/97	RELEASED FOR FABRICATION

SHOP ORDERS
SURFACE TREATMENT: DEGREASE
IDENTIFICATION METHOD: TAG

APPROVALS
DRAWN BY: JORTIZ DATE 6/16/97
CHECK BY: G. KOEHLER DATE 6/16/97
COGNIZANT ENGINEER: G. KOEHLER DATE 6/16/97

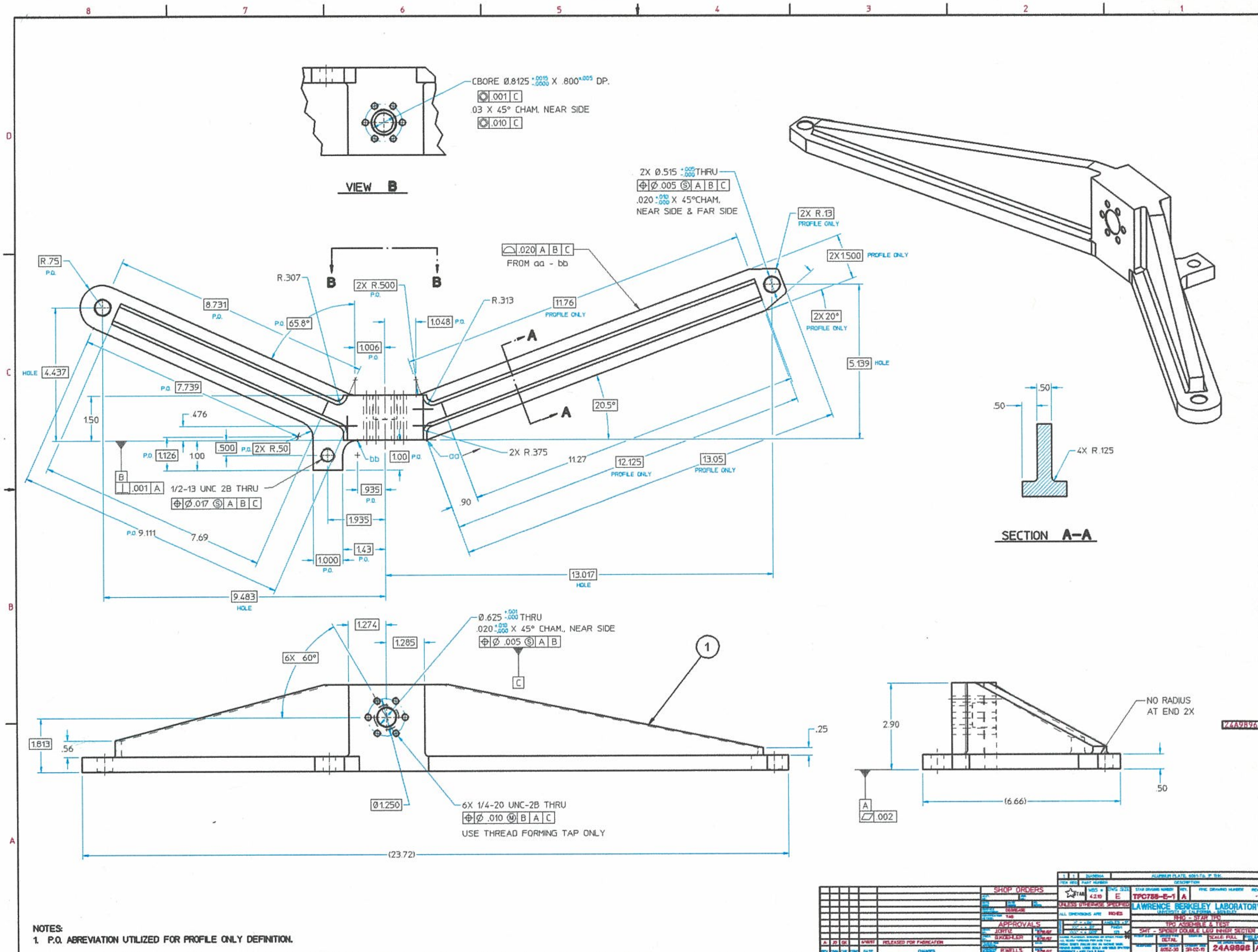
STAR WBS # 4.2.10 DWG SIZE D
STAR DRAWING NUMBER TPC787-D-1 REV. B

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
.X" = ±.060" .XX" = ±.015" .XXX" = ±.004"
ANGLES ±.5° FINISH 125

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLE & TEST
SMT IS SINGLE SPIDER LEG

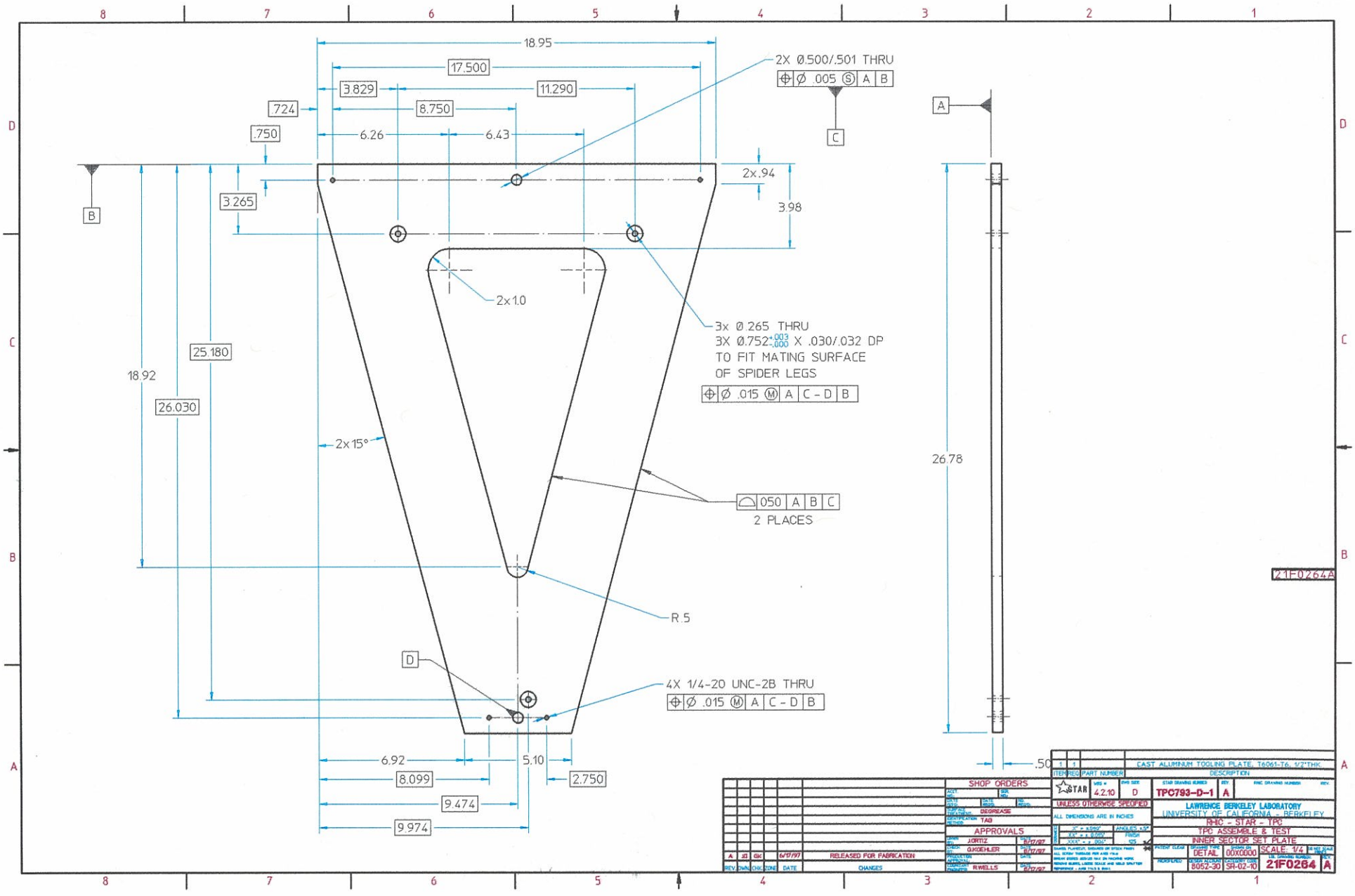
DRAWING TYPE: DETAIL
SHOWN ON: 00X0000
SCALE: 1/4
DESIGN ACCOUNT: 8052-30
CATEGORY CODE: SR-02-10
LBL DRAWING NUMBER: 24A9884 REV. B

/jortiz/STAR/SECTOR_TOOL/24A9884B_SPIDER_1_IS_DET_FIN.....30-Jun-97

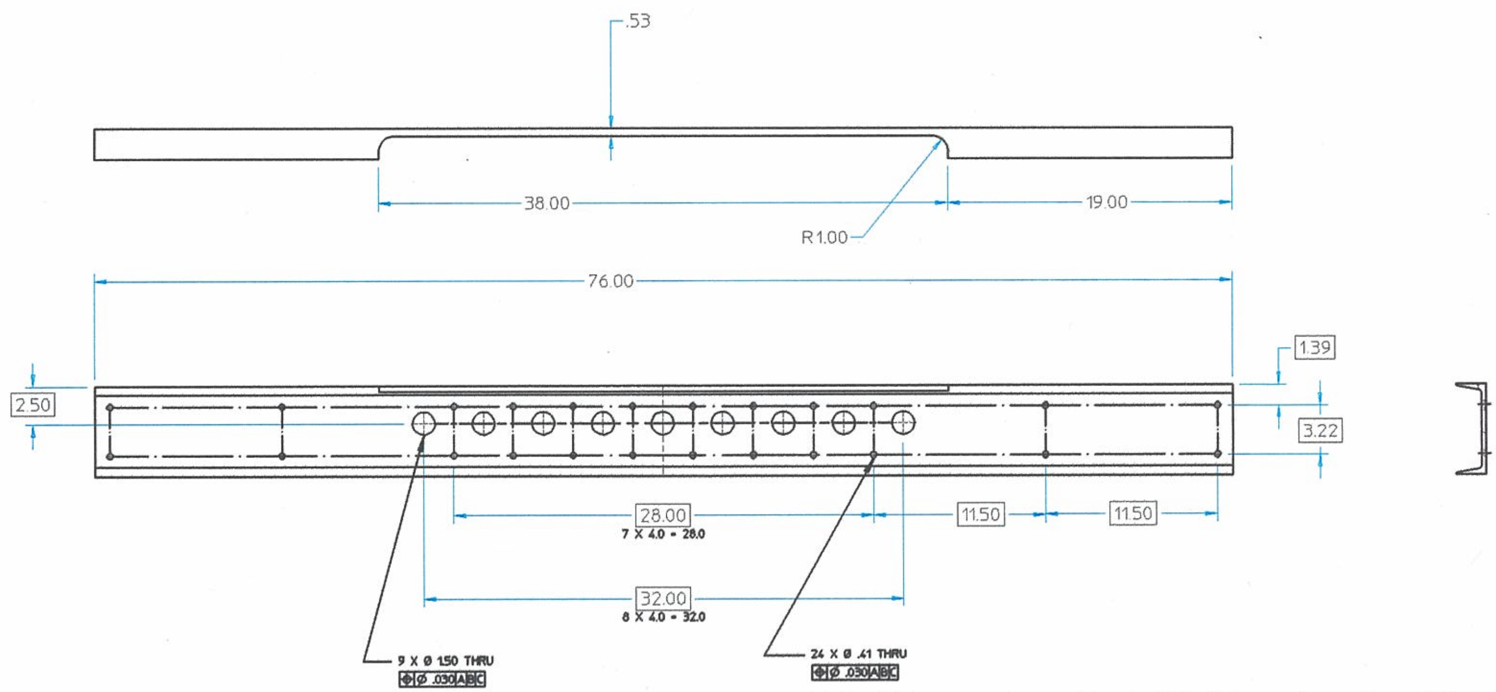


NOTES:
1. P.O. ABREVIATION UTILIZED FOR PROFILE ONLY DEFINITION.

/jortiz/STAR/SECTOR_TOOL/24A9896A_is.spider.5A.DET.....20-Jun-97



/jortiz/STAR/SECTOR_TOOL/21F0264A_INNER_SECTOR_SETPLATE.....17-Jun-97



Note: Holes may be matched drilled thru channels and bar

SIDE LOAD STIFFENER
(2 EACH)

21F0274A

ITEM	REQ	PART NUMBER	DESCRIPTION
1	1		ALUMINUM CHANNEL, 6061-T6, 6.0" X 2.03", .314 WEB

REV	DWN	CHK	ZONE	DATE	CHANGES
A	RW	RW		6/18/97	RELEASED FOR FABRICATION

SHOP ORDERS: DEGREASE, TAG

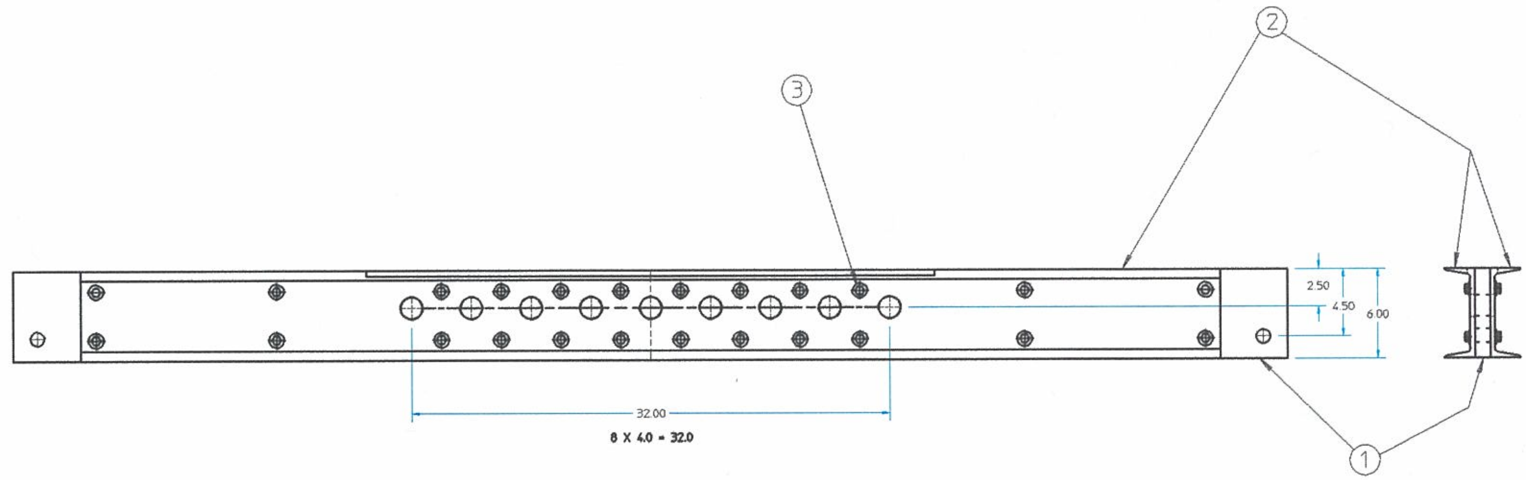
APPROVALS: RWELLS 6/18/97; RWELLS 6/20/97; RWELLS 6/20/97

STAR · WBS # 4.2.10 · DWG SIZE D · STAR DRAWING NUMBER TPC782-D-1 · REV. A

UNLESS OTHERWISE SPECIFIED · ALL DIMENSIONS ARE INCHES · X" = ±.060" · .XX" = ±.015" · .XXX" = ±.005" · ANGLES ±.5° · FINISH 125

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLE & TEST
SMT LIFTING BEAM STABILIZER

DRAWING TYPE: DETAIL · SHOWN ON: 21F0284 · SCALE: 1/4 · DESIGN ACCOUNT: 8052-30 · CATEGORY CODE: SR-02-10 · LBL DRAWING NUMBER: 21F0274 · REV. A



SMT LIFTING BEAM ASSEMBLY

ITEM	REQ	PART NUMBER	DESCRIPTION
3	24		3/8"-24 UNC X 2" HEX HEAD CAP SCREWS, GRADE 2
2	2		21F0274A SMT LIFTING BEAM STABILIZER
1	1		21F0264A SMT LIFTING BEAM BAR

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
A	RW	RW		6/16/97	RELEASED FOR FABRICATION

SHOP ORDERS

SURFACE TREATMENT: DEGREASE
IDENTIFICATION METHOD: TAG

APPROVALS

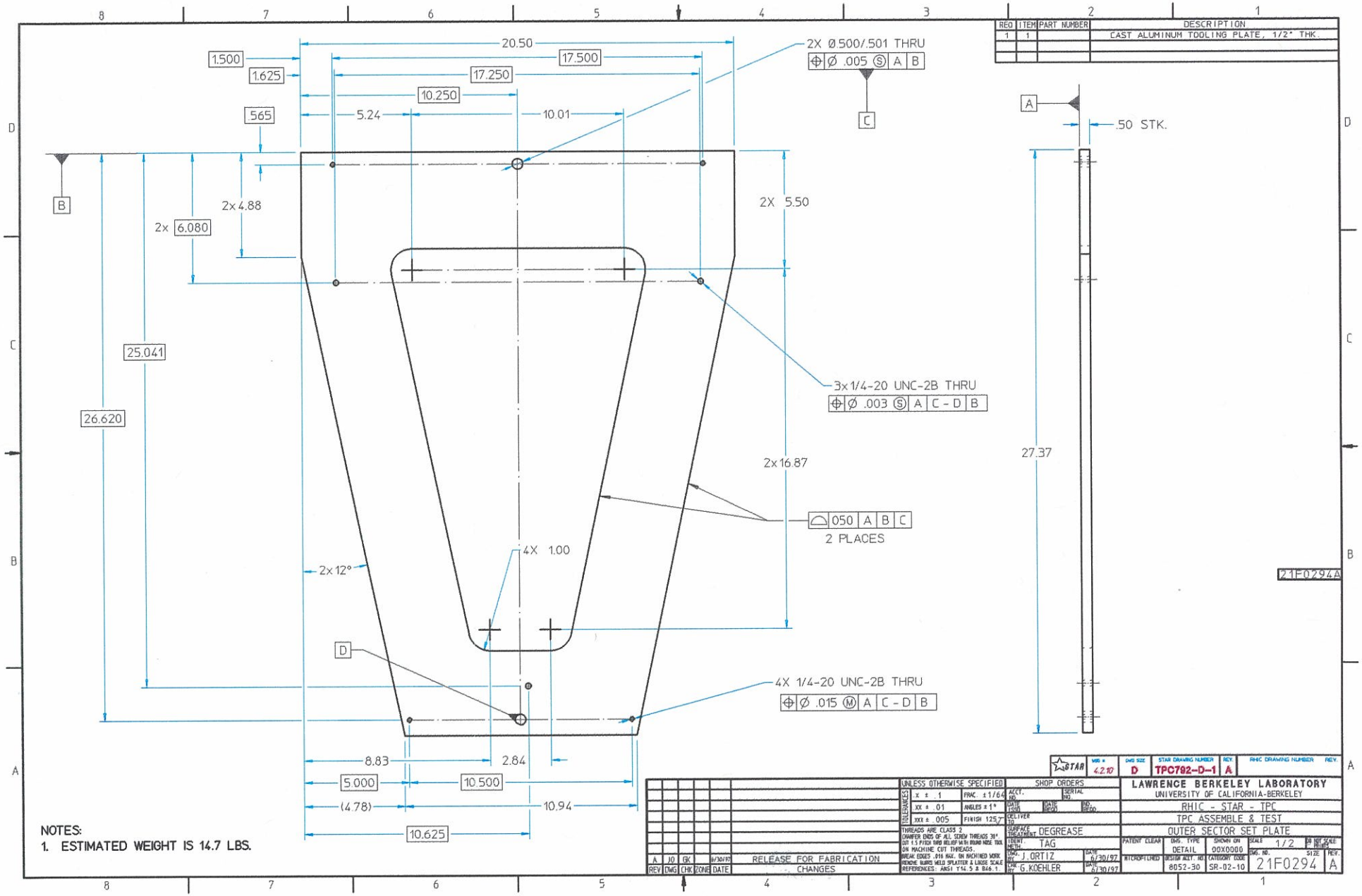
		DATE
DRWN BY:	R.WELLS	6/16/97
CHECK BY:	R.WELLS	6/16/97
PRODUCTION APPROVAL:		
COGNIZANT ENGINEER:	R.WELLS	6/16/97

STAR — WBS #: 4.2.10 — DWG SIZE: D — STAR DRAWING NUMBER: TPC790-D-1 — REV.: A — RHIC DRAWING NUMBER

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
TOLERANCES: .X" = ±.060", .XX" = ± 0.015", .XXX" = ± .004", ANGLES ±.5°, FINISH 125

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLY & TEST
SMT LIFTING BEAM ASSEMBLY

DRAWING TYPE: ASSEMBL'Y — DRAWN ON: 00X0000 — SCALE: 1/4
DESIGN ACCOUNT: 8052-30 — CATEGORY CODE: SR-02-10 — LBL DRAWING NUMBER: 21F0284 — REV.: A



REQ	ITEM	PART NUMBER	DESCRIPTION
1	1		CAST ALUMINUM TOOLING PLATE, 1/2" THK.

NOTES:
1. ESTIMATED WEIGHT IS 14.7 LBS.

REV	DWG	CHK	ZONE	DATE	
A	JO	GK		6/30/97	RELEASE FOR FABRICATION
					CHANGES

UNLESS OTHERWISE SPECIFIED
TOLERANCES: X ± .1 FRAC. ±1/64; XX ± .01 ANGLES ±1°; XXX ± .005 FINISH 125
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 39° (.01 / 1.5 PITCH DIA) RELIEF to fit ROUND SIZE TAP ON MACHINE CUT THREADS.
BREAK EDGES .016 MAX. ON MACHINED WORK.
REMOVE BURRS WELD SPLATTER & LARGE SCALE
REFERENCES: ANSI Y14.5 & B46.1.

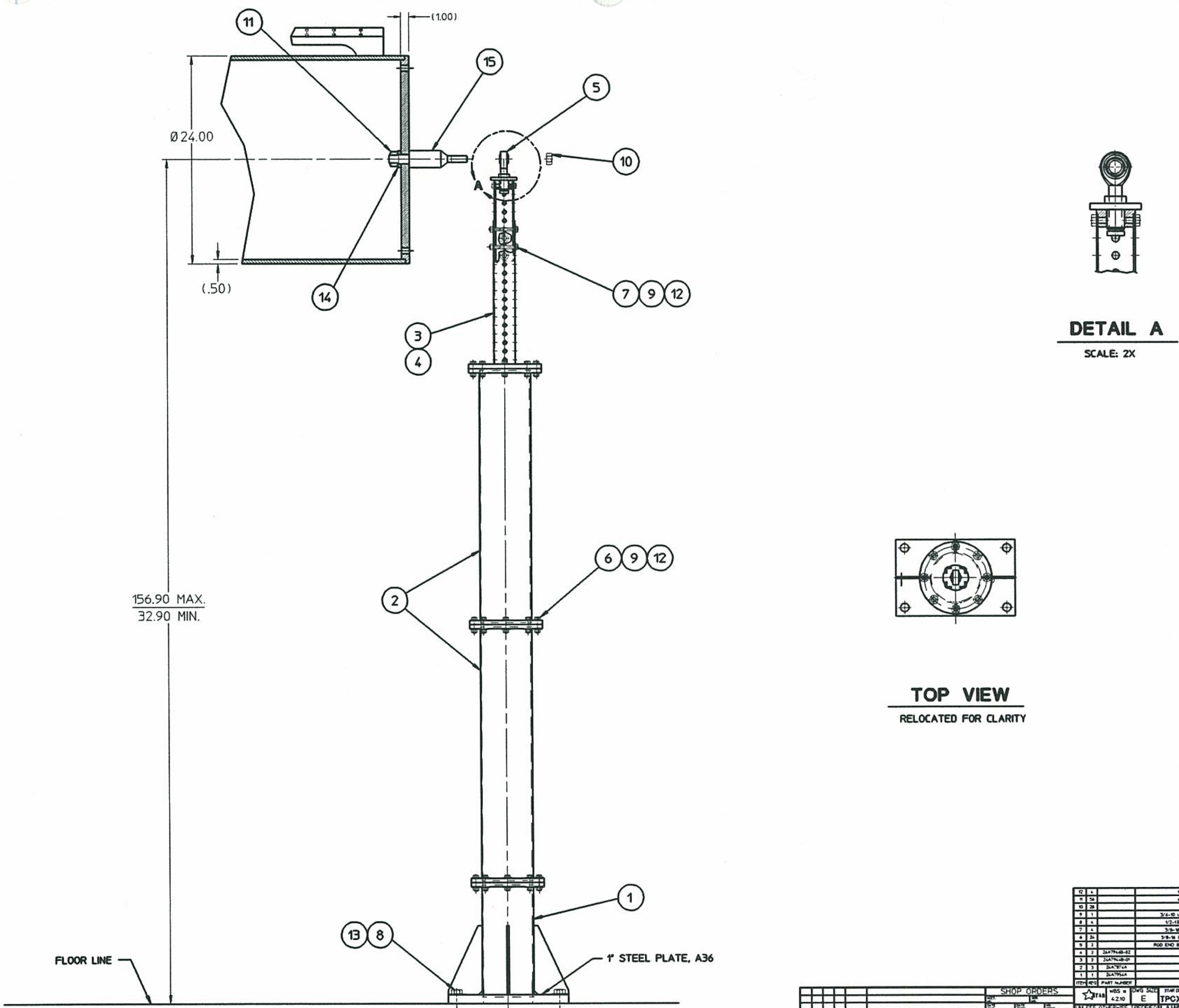
SHOP ORDERS
ACCT. NO.
SERIAL NO.
DATE LOCAL
DATE REPRO
NO. REPRO
DELIVER TO
SURFACE TREATMENT: DEGREASE
IDENT. METH: TAG
DWG. BY: J. ORTIZ 6/30/97
CHK. BY: G. KOEHLER 6/30/97

STAR WBS # 4.2.10
DWG SIZE: D
STAR DRAWING NUMBER: TPC792--D--1
REV: A
RHIC DRAWING NUMBER
REV.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLE & TEST
OUTER SECTOR SET PLATE

PATENT CLEAR	DWG. TYPE	SHOWN ON	SCALE	DO NOT SCALE DRAWING
NTCRPTLRED	DETAIL	00X0000	1/2	
	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	8052-30	SR-02-10	21F0294	A

/jortiz/STAR/SECTOR_TOOL/set_plate_OS_DETAIL.....30-Jun-97



ITEM	REQ	PART NUMBER	DESCRIPTION
12	4		WASHER, FLAT, STEEL FOR 1/2 SCREW
11	56		WASHER, FLAT, STEEL FOR 3/8 SCREW
10	28		3/8-16 NUT, HEX., STEEL
9	1		3/4-10 UNC-2A X 3 1/2"LG., HEX. HEAD SCREW, STEEL
8	4		1/2-13 UNC-2A X 3"LG., HEX. HEAD SCREW, STEEL
7	4		3/8-16 UNC-2A X 3"LG., HEX. HEAD SCREW, STEEL
6	24		3/8-16 UNC-2A X 1 1/2"LG. HEX. HEAD SCREW, STEEL
5	2		ROD END BEARING, AURORA #MM12-3R, 11,516# RADIAL LOAD
4	2	24A7964B-02	SMT - ADJUSTING LEG
3	2	24A7964B-01	SMT - ADJUSTING LEG
2	3	24A7874A	SMT - VERTICAL SUPPORT EXTENSION
1	1	24A7956A	SMT - RIGID BASE

REV	DWN	CHK	DATE	CHANGES
A	JD		4/10/96	RELEASED FOR FABRICATION

SHOP ORDERS
DEGREASE
TAG

APPROVALS
J.ORTIZ
R.WELLS
R.WELLS

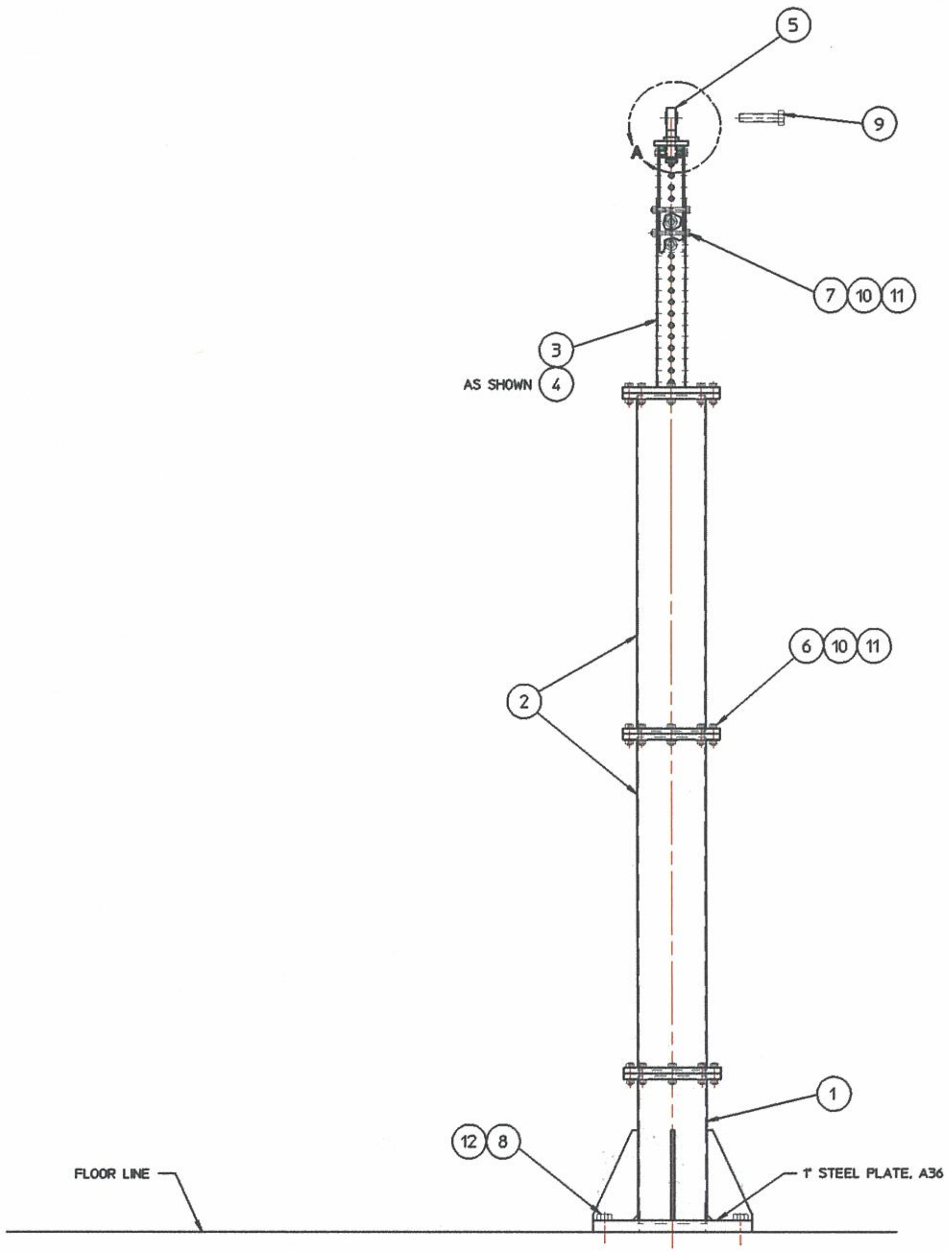
STAR | WBS # 4.2.10 | DWG SIZE E | STAR DRAWING NUMBER TPCXXX-E-1 | REV. A | RHIC DRAWING NUMBER | REV.

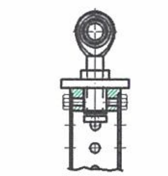
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES
ANGLES ±.5°

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLY & TEST
SMT VERTICAL SUPPORT ASSEMBLY

DETAIL | 8052-30 | SR-02-10 | SCALE: FULL | 21F0858 | A

NOTES:
1. ALL HARDWARE UTILIZED IS GRADE 2.





DETAIL A

SCALE: 2X

TOP VIEW

RELOCATED FOR CLARITY

21F0856A

NOTES:
1. ALL HARDWARE UTILIZED IS GRADE 2.

ITEM	REQ.	PART NUMBER	DESCRIPTION
12	4		WASHER, FLAT, STEEL, FOR 1/2 SCREW
11	56		WASHER, FLAT, STEEL, FOR 3/8 SCREW
10	28		3/8-16 NUT, HEX, STEEL
9	1		3/4-10 UNC-2A X 3 1/2"LG. HEX. HEAD SCREW, STEEL
8	4		1/2-13 UNC-2A X 3"LG. HEX. HEAD SCREW, STEEL
7	4		3/8-16 UNC-2A X 3"LG. HEX. HEAD SCREW, STEEL
6	24		3/8-16 UNC-2A X 1 1/2"LG. HEX. HEAD SCREW, STEEL
5	3		ROD END BEARING, AURORA [illegible], [illegible] RADIAL LOAD
4	2	24A7944B-02	SMT - ADJUSTING LEG
3	2	24A7944B-01	SMT - ADJUSTING LEG
2	3	24A7874A	SMT - VERTICAL SUPPORT EXTENSION
1	1	24A7954A	SMT - RIGID BASE

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
A	JB			4/18/96	RELEASED FOR FABRICATION

SHOP ORDERS

APPROVALS

J.ORTIZ

R.WELLS

R.WELLS

STAR WBS # 4.2.10 | DWG SIZE E | STAR DRAWING NUMBER TPC797-E-1 | REV. A | RHIC DRAWING NUMBER | REV.

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC - STAR - TPC
TPC ASSEMBLY & TEST
SMT VERTICAL SUPPORT ASSEMBLY

DETAIL | 6052-30 | SR-02-10 | SCALE: FULL

21F0858 A

21F0856A

ITEM	REQ	PART NUMBER	DESCRIPTION
12	4		WASHER, FLAT, STEEL FOR 1/2 SCREW
11	56		WASHER, FLAT, STEEL FOR 3/8 SCREW
10	28		3/8-16 NUT, HEX., STEEL
9	1		3/4-10 UNC-2A X 3 1/2"LG., HEX. HEAD SCREW, STEEL
8	4		1/2-13 UNC-2A X 3"LG., HEX. HEAD SCREW, STEEL
7	4		3/8-16 UNC-2A X 3"LG., HEX. HEAD SCREW, STEEL
6	24		3/8-16 UNC-2A X 1 1/2"LG., HEX. HEAD SCREW, STEEL
5	2		ROD END BEARING, AURORA #MM12-3R, 11,518# RADIAL LOAD
4	2	24A7944B-02	SMT - ADJUSTING LEG
3	2	24A7944B-01	SMT - ADJUSTING LEG
2	3	24A7874A	SMT - VERTICAL SUPPORT EXTENSION
1	1	24A7954A	SMT - RIGID BASE

A

SHOP ORDERS

ACCT. NO.:	SER. NO.:	
DATE ISS'D:	DATE REQ'D:	NO. REQ'D:
SURFACE TREATMENT: DEGREASE		
IDENTIFICATION METHOD: TAG		

APPROVALS

DRWN BY: J.ORTIZ	DATE 2/19/98
CHECK BY: R.WELLS	DATE 2/19/98
PRODUCTION APPROVAL:	DATE
COGNIZANT ENGINEER: R.WELLS	DATE 2/19/98

STAR | WBS # 4.2.10 | DWG SIZE E | STAR DRAWING NUMBER TPC797-E-1 | REV. A | RHIC DRAWING NUMBER | REV.

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X" = ± .1 | ANGLES ±.5° | .XX" = ± .01" | FINISH 125 | .XXX" = ± .005"

SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK.
REMOVE BURRS, LOOSE SCALE AND WELD SPATTER
REFERENCE - ANSI Y14.5 & B46.1.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

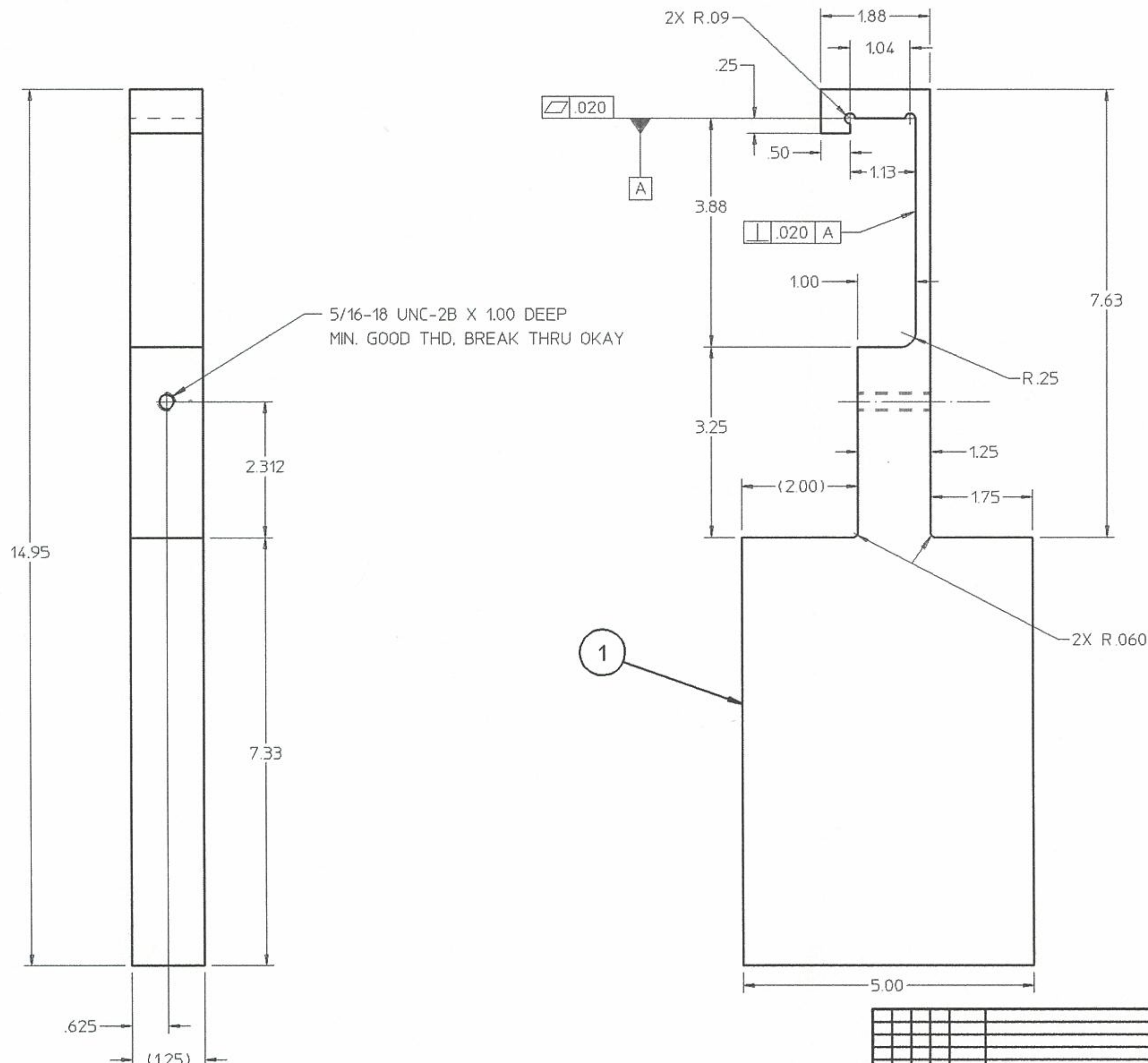
RHIC - STAR - TPC

TPC ASSEMBLY & TEST

SMT VERTICAL SUPPORT ASSEMBLY

PATENT CLEAR	DRAWING TYPE DETAIL	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	LBL DRAWING NUMBER: 21F0856	REV. A

2 1



NOTE:
1. ALL EDGES CAN BE BURNED AND MACHINE THREE LOCATIONS AS REQD.

ITEM	REQ	PART NUMBER	DESCRIPTION
1	4		STEEL PLATE, HOT ROLLED, A36, 1 1/4" THK

REV	DWN	CHK	ZONE	DATE	CHANGES
A	JO			3/24/98	RELEASED FOR FABRICATION

SHOP ORDERS
SURFACE TREATMENT: DEGREASE
IDENTIFICATION METHOD: TAG

APPROVALS
DRWN: J.ORTIZ 3/24/98
CHECK: R.WELLS 3/24/98
ENGINEER: R.WELLS 3/24/98

STAR WBS # 4.2.10 — DWG SIZE D
STAR DRAWING NUMBER: TPC798-D-1 — REV. A
RHIC DRAWING NUMBER — REV. -

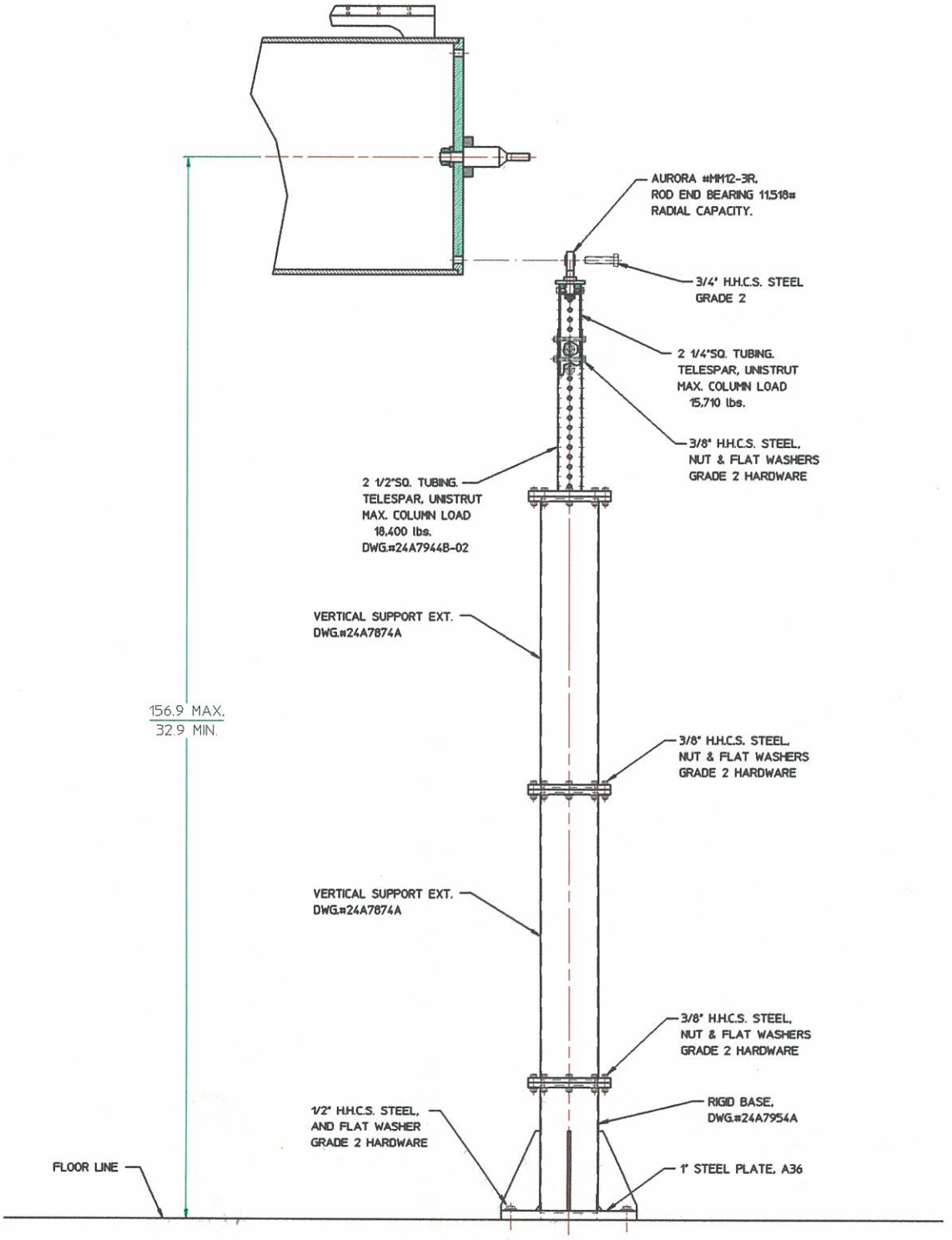
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES.
X" = ±.06 — ANGLES ±.5°
.XX" = ±.03 — FINISH 125
.XXX" = ±.005"

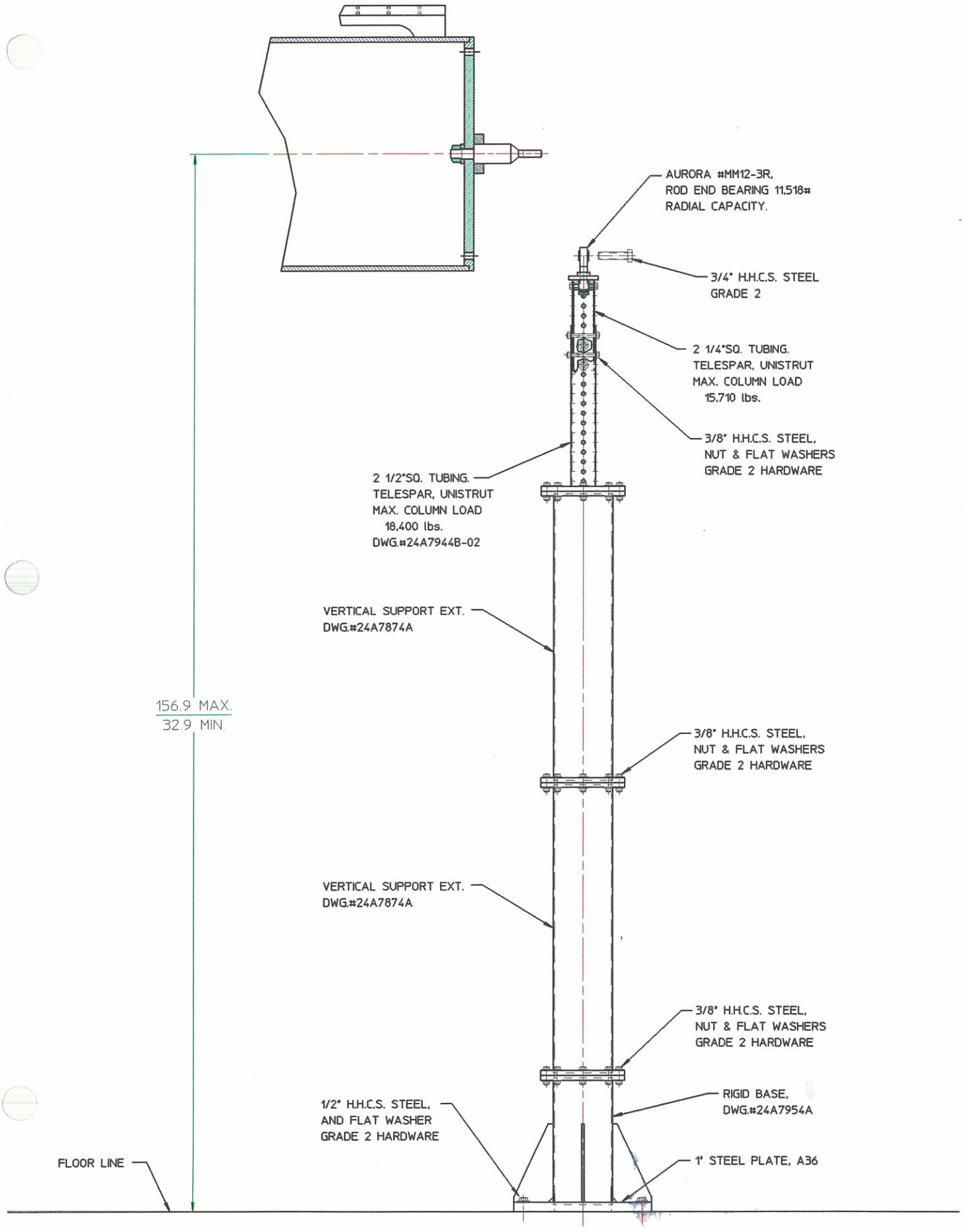
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLE & TEST
SMT - CLOCKING COUNTERWEIGHT

DETAIL — 00X0000 — SCALE: FULL
8052-30 — SR-02-10 — 21F0884 — A

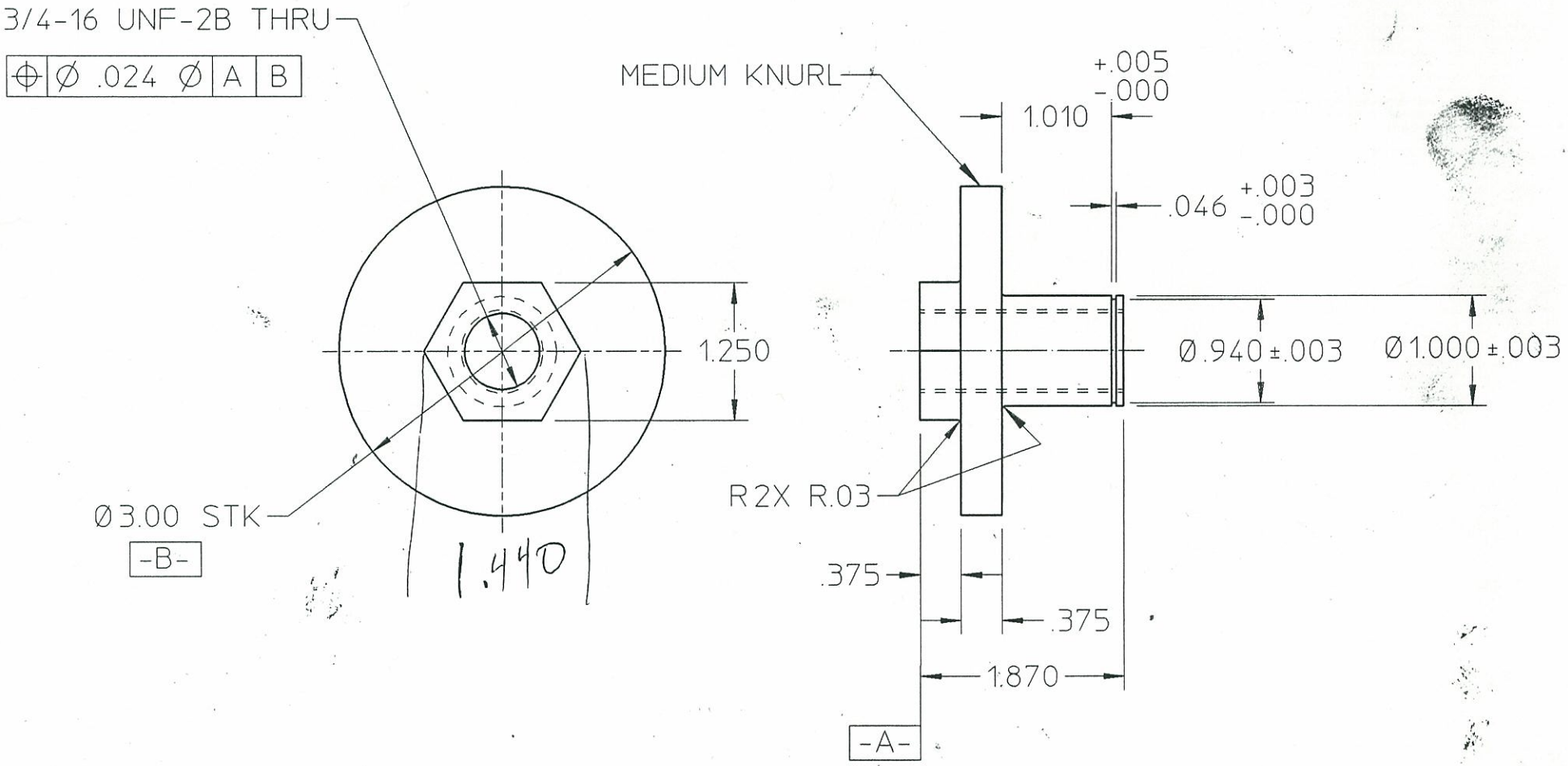
21F0884A

SKETCHES


AURORA #MM12-3R,
ROD END BEARING 11,518#
RADIAL CAPACITY.
3/4" H.H.C.S. STEEL
GRADE 2
2 1/4"SQ. TUBING.
TELESPAR, UNISTRUT
MAX. COLUMN LOAD
15,710 lbs.
3/8" H.H.C.S. STEEL,
NUT & FLAT WASHERS
GRADE 2 HARDWARE
2 1/2"SQ. TUBING.
TELESPAR, UNISTRUT
MAX. COLUMN LOAD
18,400 lbs.
DWG.#24A7944B-02
VERTICAL SUPPORT EXT.
DWG.#24A7874A
156.9 MAX.
32.9 MIN.
3/8" H.H.C.S. STEEL,
NUT & FLAT WASHERS
GRADE 2 HARDWARE
VERTICAL SUPPORT EXT.
DWG.#24A7874A
3/8" H.H.C.S. STEEL,
NUT & FLAT WASHERS
GRADE 2 HARDWARE
RIGID BASE,
DWG.#24A7954A
1/2" H.H.C.S. STEEL,
AND FLAT WASHER
GRADE 2 HARDWARE
1" STEEL PLATE, A36
FLOOR LINE


AURORA #MM12-3R,
ROD END BEARING 11,518#
RADIAL CAPACITY.
3/4" H.H.C.S. STEEL
GRADE 2
2 1/4"SQ. TUBING.
TELESPAR, UNISTRUT
MAX. COLUMN LOAD
15,710 lbs.
3/8" H.H.C.S. STEEL,
NUT & FLAT WASHERS
GRADE 2 HARDWARE
2 1/2"SQ. TUBING.
TELESPAR, UNISTRUT
MAX. COLUMN LOAD
18,400 lbs.
DWG.#24A7944B-02
VERTICAL SUPPORT EXT.
DWG.#24A7874A
156.9 MAX.
32.9 MIN.
3/8" H.H.C.S. STEEL,
NUT & FLAT WASHERS
GRADE 2 HARDWARE
VERTICAL SUPPORT EXT.
DWG.#24A7874A
3/8" H.H.C.S. STEEL,
NUT & FLAT WASHERS
GRADE 2 HARDWARE
RIGID BASE,
DWG.#24A7954A
1/2" H.H.C.S. STEEL,
AND FLAT WASHER
GRADE 2 HARDWARE
1" STEEL PLATE, A36
FLOOR LINE

JOHN ORT
X 7298 / 7036
8052-30



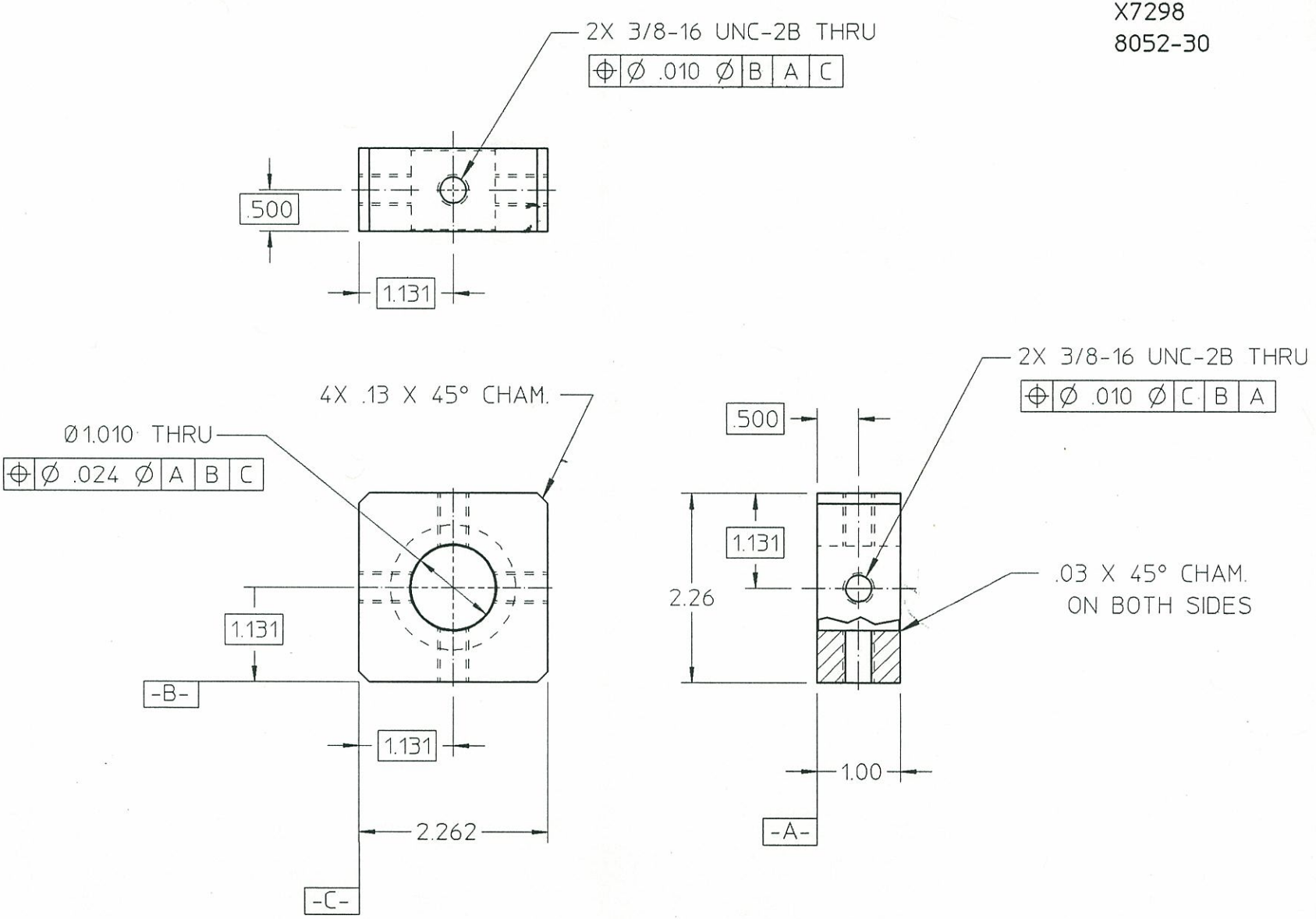
- BRASS -

THREADED SLEEVE, 2

3 REQD

MATL: SILICON BRONZE - USER FURNISHED

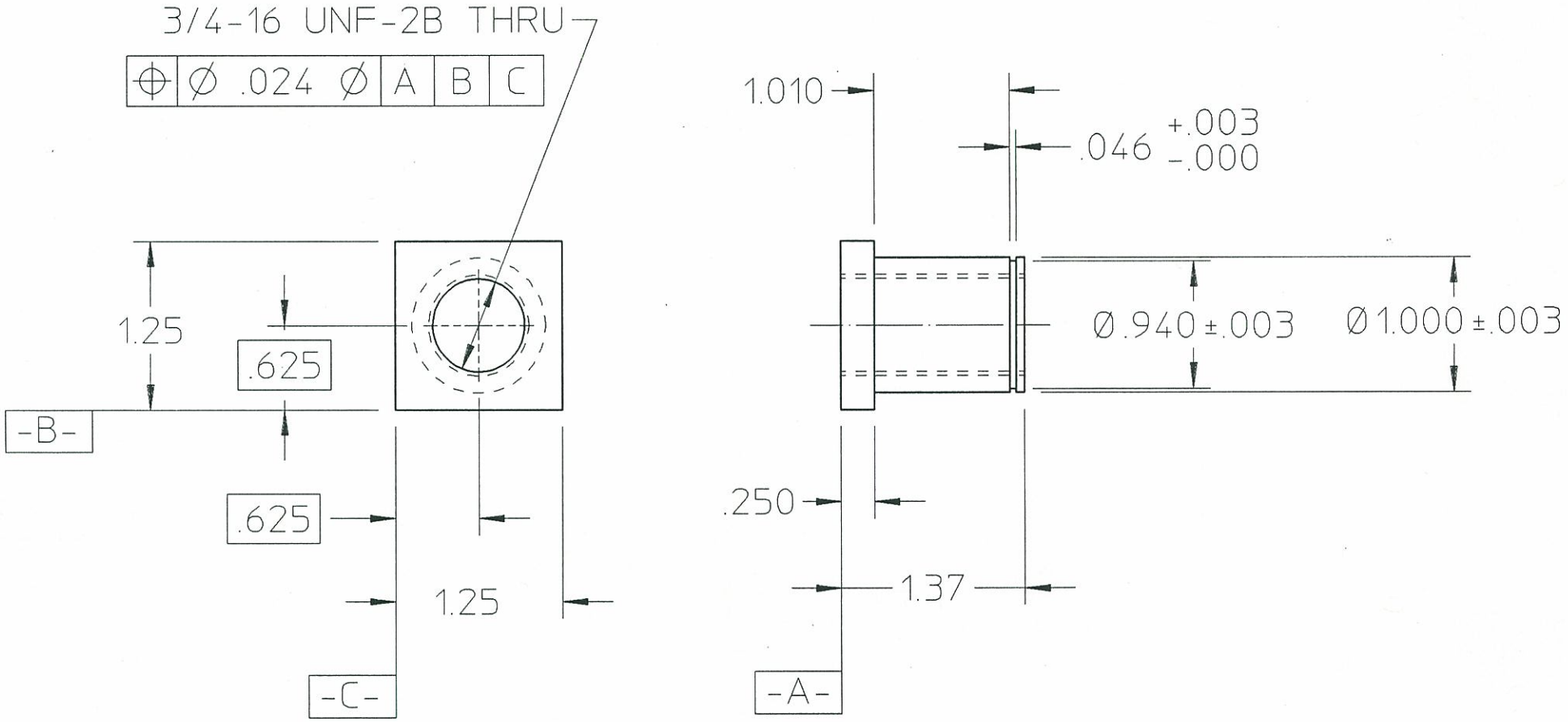
JOHN ORTIZ
X7298
8052-30



TUBE PLUG ADJUSTER

2 REQD

MATL: ALUMINUM BAR, 6061-T6 - USER FURNISHED

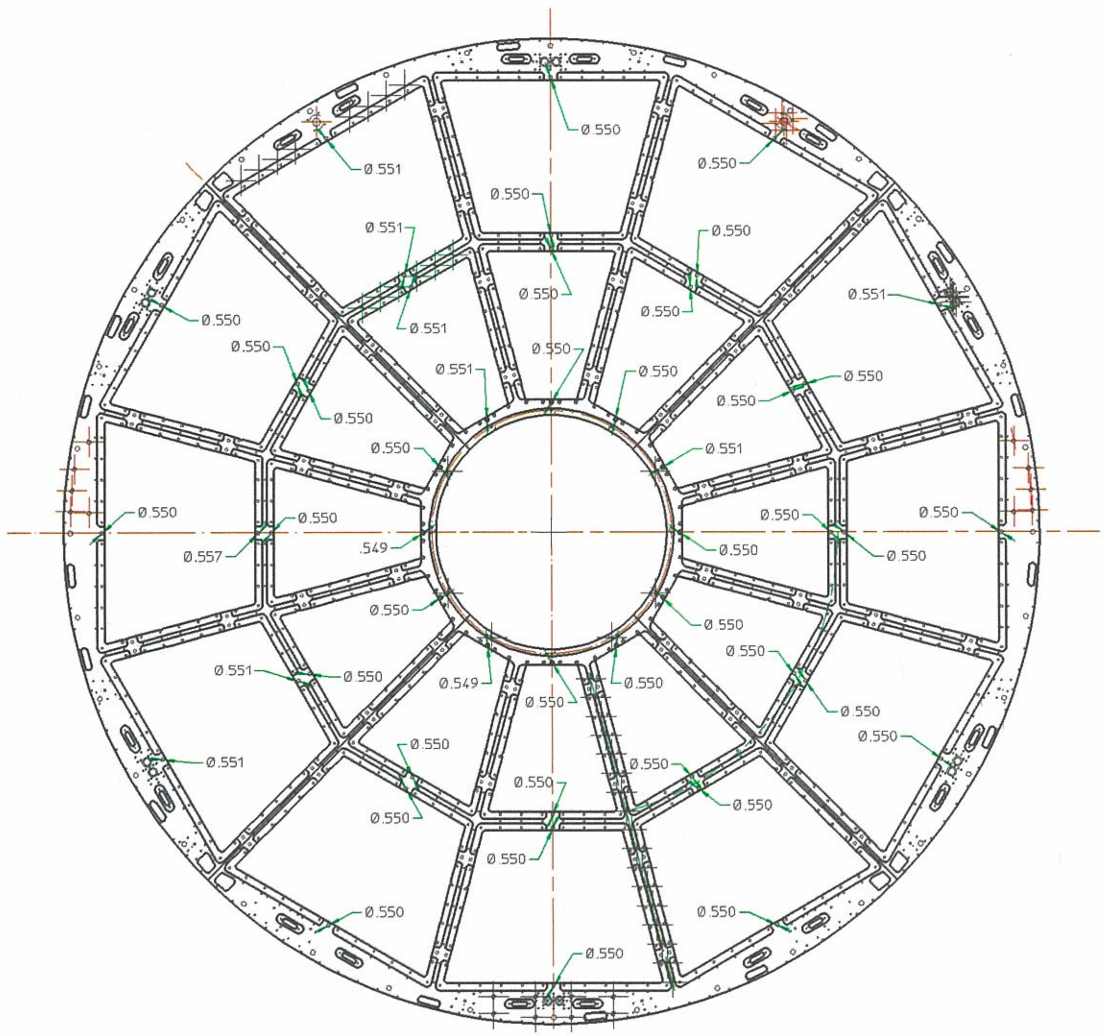


THREADED SLEEVE

2 REQD

MATL: SILICON BRONZE - USER FURNISHED

VOID?



EAST WHEEL – FRONT VIEW

REQ	ITEM	PART NUMBER	DESCRIPTION

REV	DWG	CHK	ZONE	DATE	CHANGES
A	JMO			5-97	

UNLESS OTHERWISE SPECIFIED
TOLERANCES: .X ± / FRAC. ± / .XX ± .015 / ANGLES ± / .XXX ± .005 / FINISH 125
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°, CUT 1.5 PITCH THRD RELIEF WITH ROUND NOSE TOOL ON MACHINE CUT THREADS.
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS WELD SPLATTER & LOOSE SCALE
REFERENCES: ANSI Y14.5 & B46.1

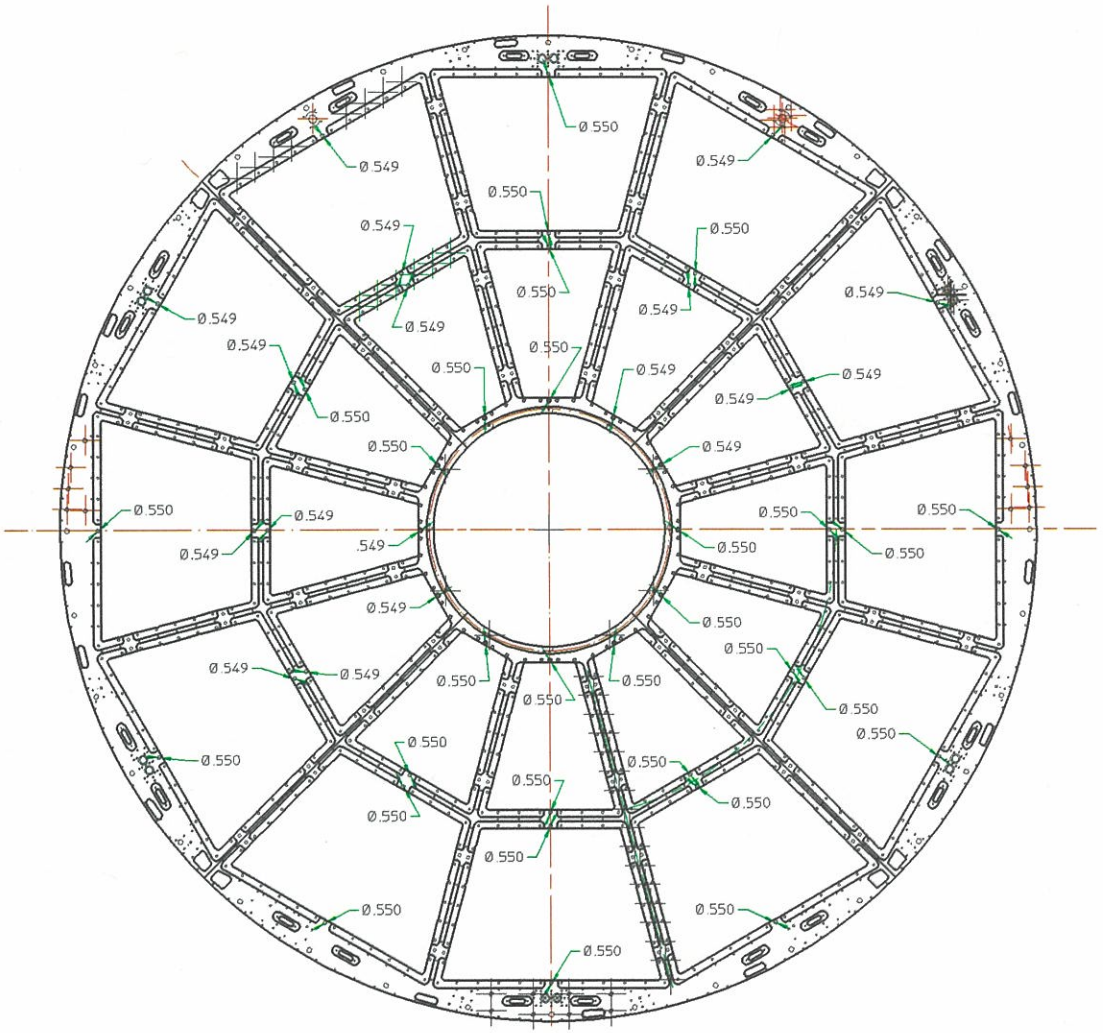
SHOP ORDERS — ACCT. NO. / SERIAL NO. / DATE ISSD / DATE REQD / NO. REQD / DELIVER TO
SURFACE TREATMENT: OIL FREE
IDENT. METH.
DWG. BY: J.ORTIZ — DATE 5-12-97
CHK. BY: G.KOEHLER — DATE 5-12-97

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY
RHIC-STAR-TPC
WHEEL - SN1
FRONT SIDE - SECTOR PIN HOLES

PATENT CLEAR	DWG. TYPE	SHOWN ON	SCALE	DO NOT SCALE PRINTS
	DETAIL	24AXXX4	1:10	
MICROFILMED	DESIGN ALT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
		SR-XX-XX	24AXXX4	A

24AXXX4A

REQ	ITEM	PART NUMBER	DESCRIPTION



WEST WHEEL – FRONT VIEW

24AXXX4B

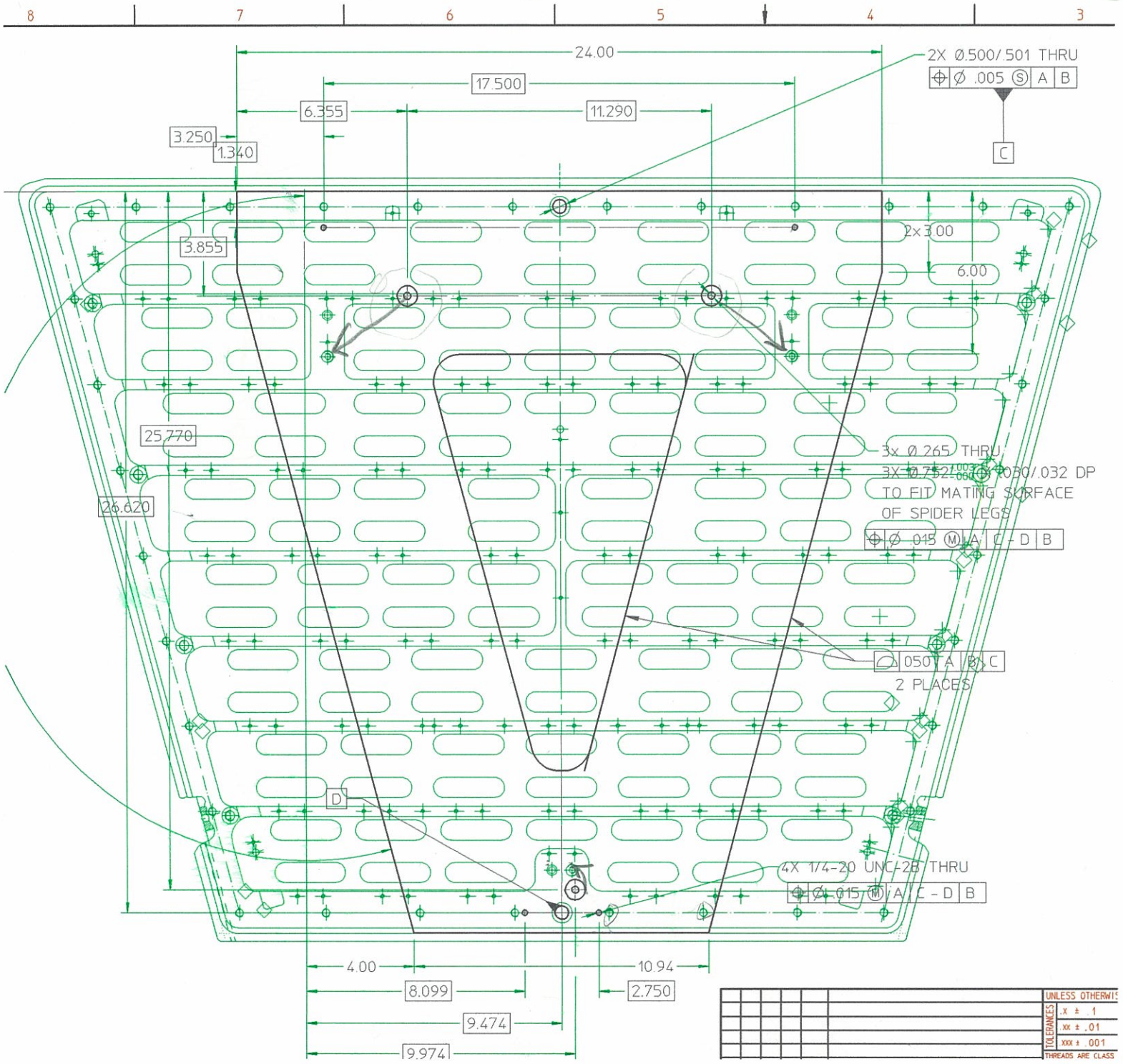
REV	DWG	CHK	ZONE	DATE	CHANGES
A	JMD			5-97	

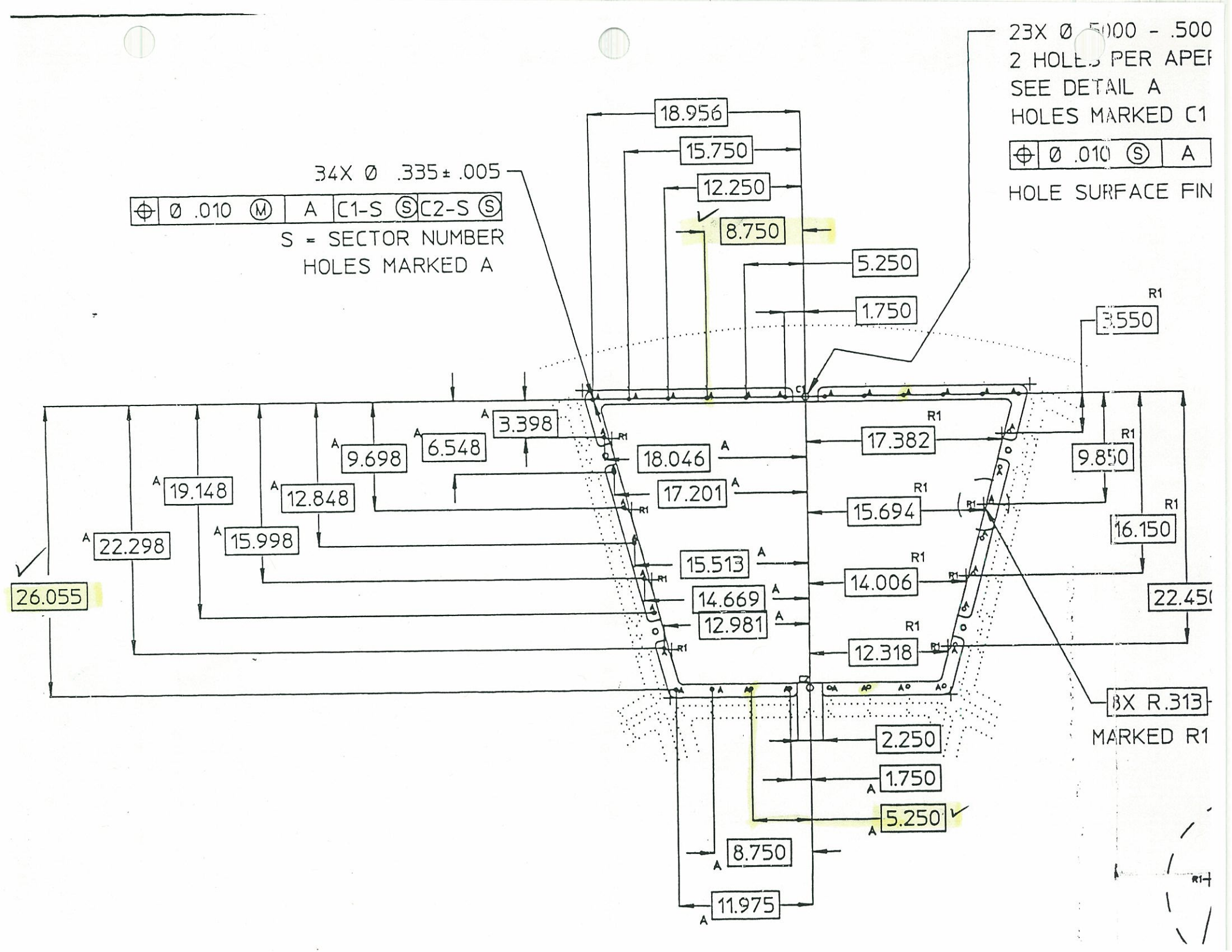
UNLESS OTHERWISE SPECIFIED
TOLERANCES: .X ± FRAC. ± | .XX ± .015 ANGLES ± | .XXX ± .005 FINISH 125
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°
CUT 1.5 PITCH RAD RELIEF WITH ROUND NOSE TOOL ON MACHINE CUT THREADS.
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS WELD SPLATTER & LOOSE SCALE
REFERENCES: ANSI Y14.5 & B46.1

SHOP ORDERS
ACCT. NO. | SERIAL NO.
DATE ISSD | DATE RECD | NO. RECD
DELIVER TO
SURFACE TREATMENT: OIL FREE
MATERIAL
DWG. BY: J. ORTIZ DATE: 5-12-97
APP'D BY: G. KOEHLER DATE: 5-12-97

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY
RHIC-STAR-TPC
WHEEL - SN2
FRONT SIDE - SECTOR PIN HOLES

PATENT CLEAR	DWG. TYPE	SHOWN ON	SCALE 1:10	DO NOT SCALE DRAWING
	DETAIL	24AXXX4		
INTERCHANGED	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
		5R-XX-XX	24AXXX4	A

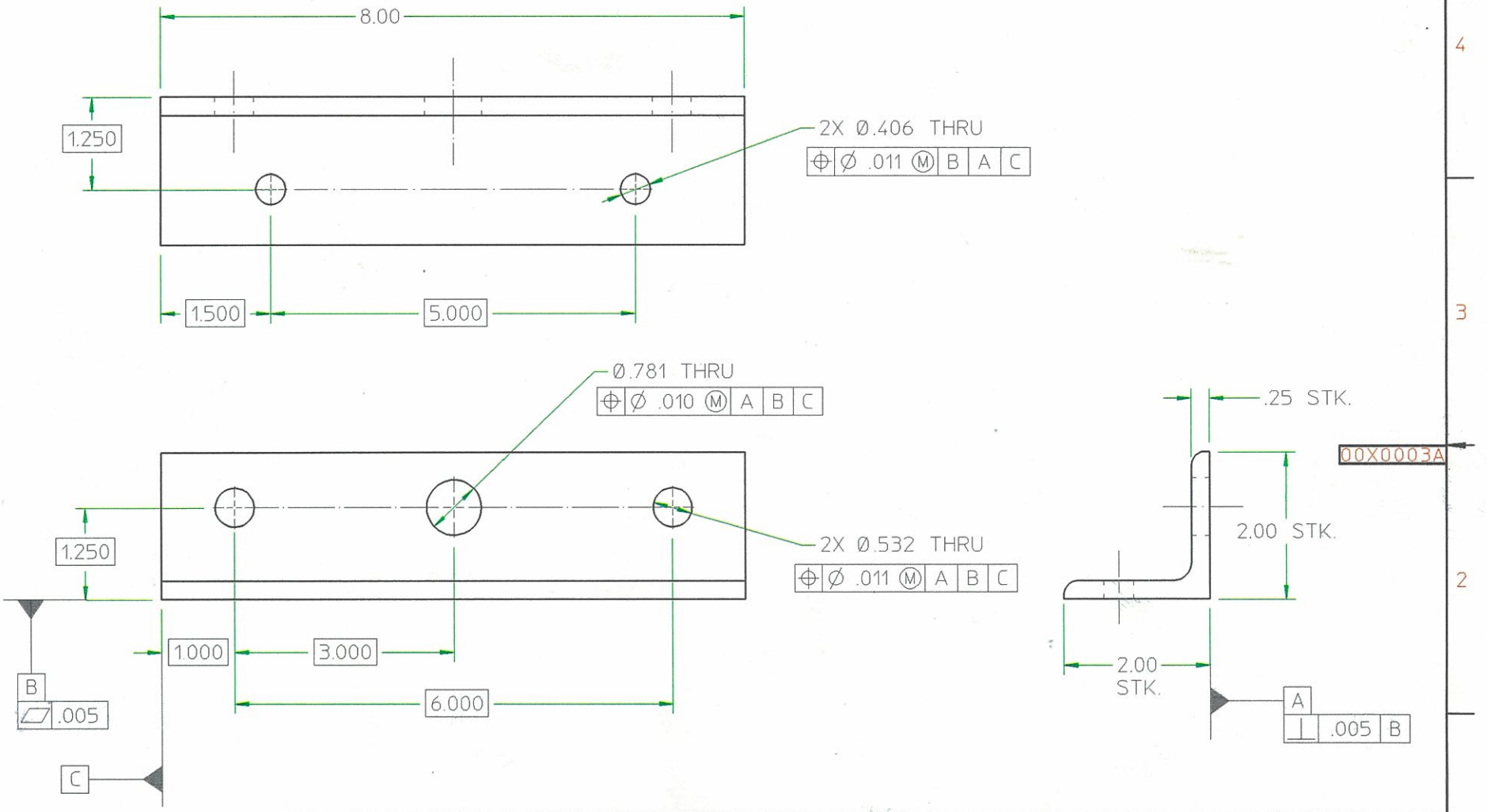

8
7
6
5
4
3
24.00
17.500
6.355
11.290
3.250
1.340
3.855
25.770
26.620
2X Ø.500/.501 THRU
Ø .005 S A B
C
2x 3.00
6.00
3x Ø.265 THRU
3X Ø.752/.760 Ø.080/.032 DP
TO FIT MATING SURFACE
OF SPIDER LEGS
Ø .015 M A C - D B
.050 T A B C
2 PLACES
D
4X 1/4-20 UNC-2B THRU
Ø .015 M A C - D B
4.00
8.099
9.474
9.974
10.94
2.750
UNLESS OTHERWI
.x ± .1
.xx ± .01
.xxx ± .001
TOLERANCES
THREADS ARE CLASS


23X Ø .5000 - .500
2 HOLES PER APER
SEE DETAIL A
HOLES MARKED C1
⌖ Ø .010 Ⓢ A
HOLE SURFACE FIN
34X Ø .335± .005
⌖ Ø .010 Ⓜ A C1-S Ⓢ C2-S Ⓢ
S = SECTOR NUMBER
HOLES MARKED A
18.956
15.750
12.250
8.750
5.250
1.750
3.550
3.398
9.698
6.548
18.046
17.201
15.513
14.669
12.981
17.382
15.694
14.006
12.318
9.850
16.150
22.450
19.148
12.848
22.298
15.998
26.055
2.250
1.750
5.250
8.750
11.975
8X R.313
MARKED R1
R1

8052-30 J.ORTIZ X7298

REQ	ITEM	PART NUMBER	DESCRIPTION
4	1		ALUMINUM ANGLE, 6061-T6, 2" X 2" X 1/4" THK.

4 PCS



REV	DWG	CHK	ZONE	DATE	CHANGES
A	JO	RW		7/7/97	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

TOLERANCES: .X ± .1 | FRAC. ±1/64 | .XX ± .01 | ANGLES ± .01° | .XXX ± .005 | FINISH 125

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°.
CUT 1.5 PITCH THRD RELIEF WITH ROUND NOSE TOOL ON MACHINE CUT THREADS.
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS WELD SPLATTER & LOOSE SCALE
REFERENCES: ANSI Y14.5 & B46.1.

SHOP ORDERS

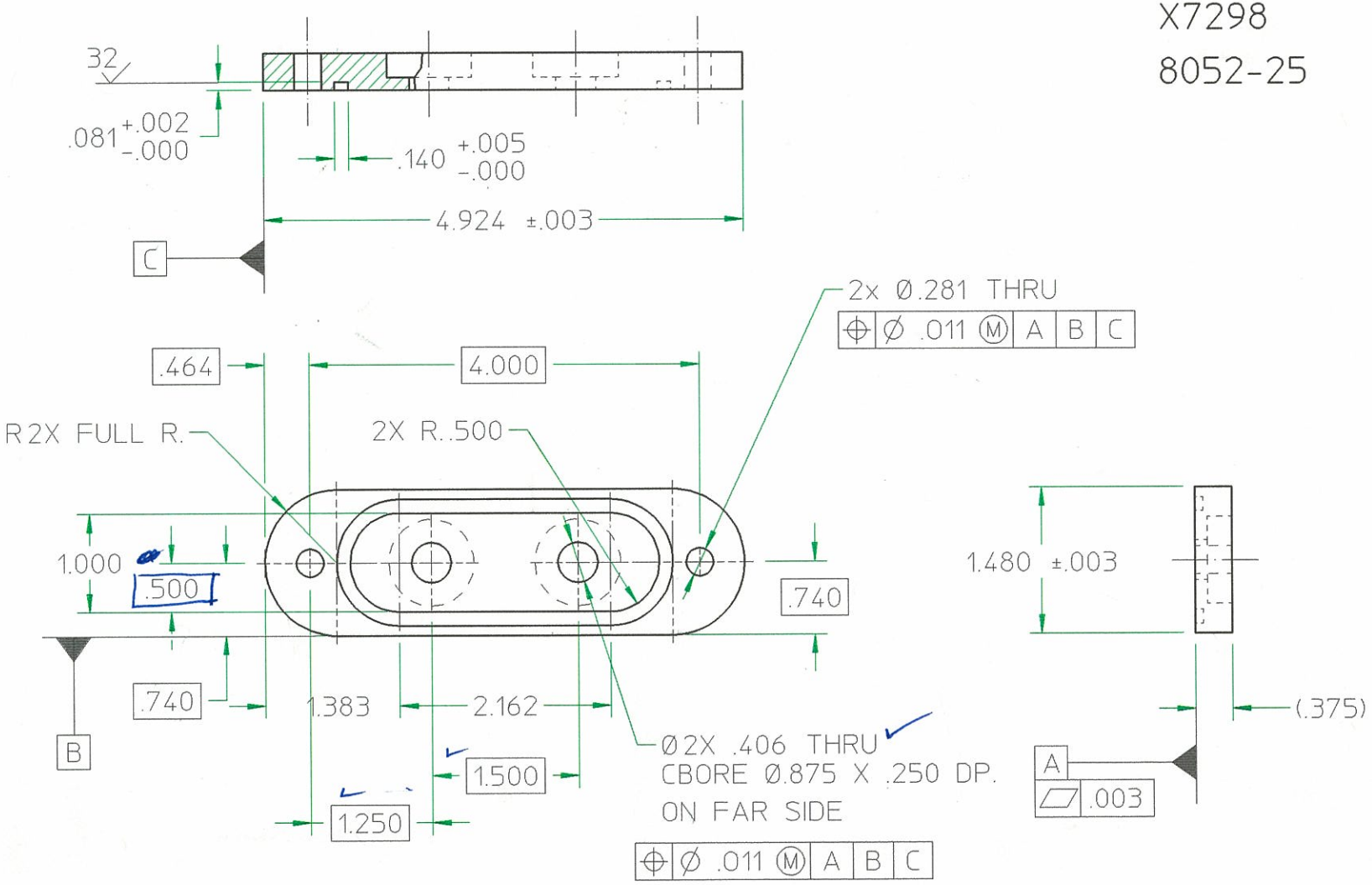
ACCT. NO. | SERIAL NO.
DATE ISSD | DATE REQD. | NO. REQD.
DELIVER TO
SURFACE TREATMENT: DEGREASE
IDENT. METH.: TAG
DWG. BY: J. ORTIZ — DATE: 7/7/97
CHK. BY: R. WELLS — DATE: 7/7/97

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY

RHIC - STAR - TPC
TPC ASSEMBLE & TEST
IFC SHEAVE ANGLE MOUNT

PATENT CLEAR	DWG. TYPE	SHOWN ON	SCALE	DO NOT SCALE PRINTS
	DETAIL	00X0000	FULL	
MICROFILMED	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	8052-30	SR-02-10	00X0003	A

JOHN ORTIZ
X7298
8052-25



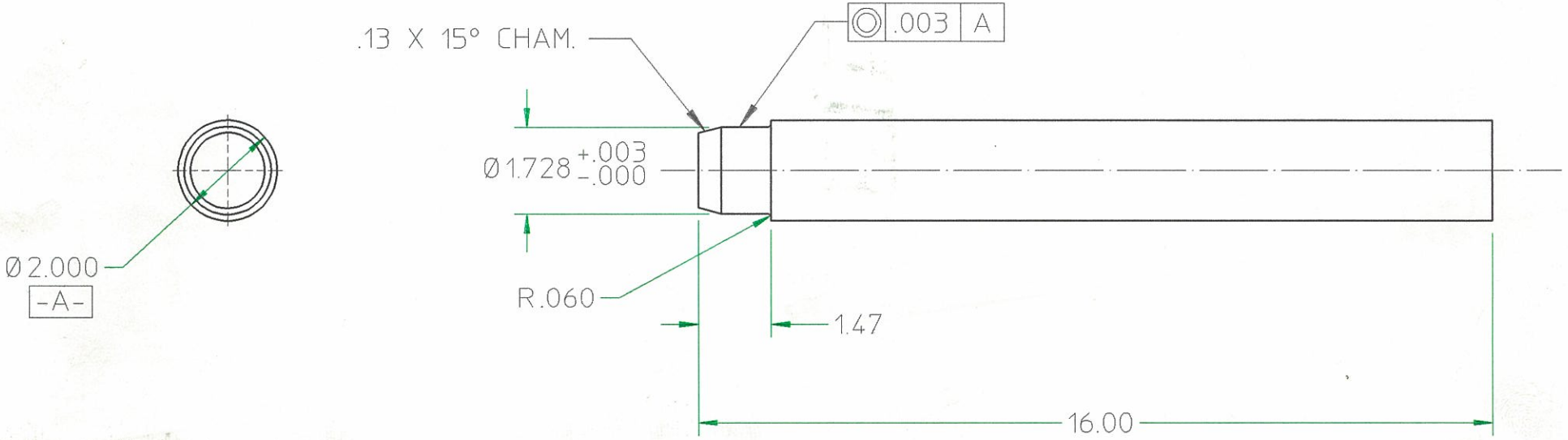
1 WINDOW BLANKS

2 REQD

MATL: ALUMINUM BAR, RECT., 6061-T6, 3/8" THK. X 1 1/2" WIDE

SCALE: 1/1

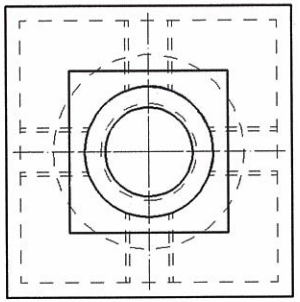
JOHN ORTIZ
X7298 / 7036
8052-30

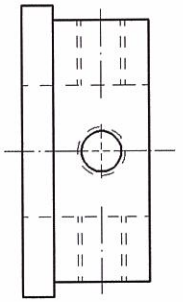


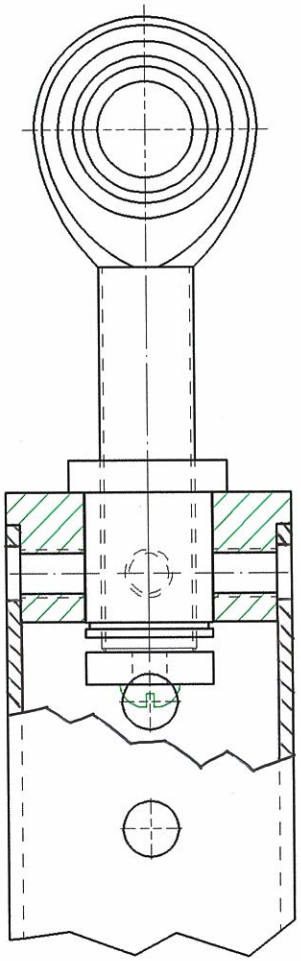
EXTENSION BASE PIN.1

1 REQD

MATL: STEEL BAR, Ø2.25

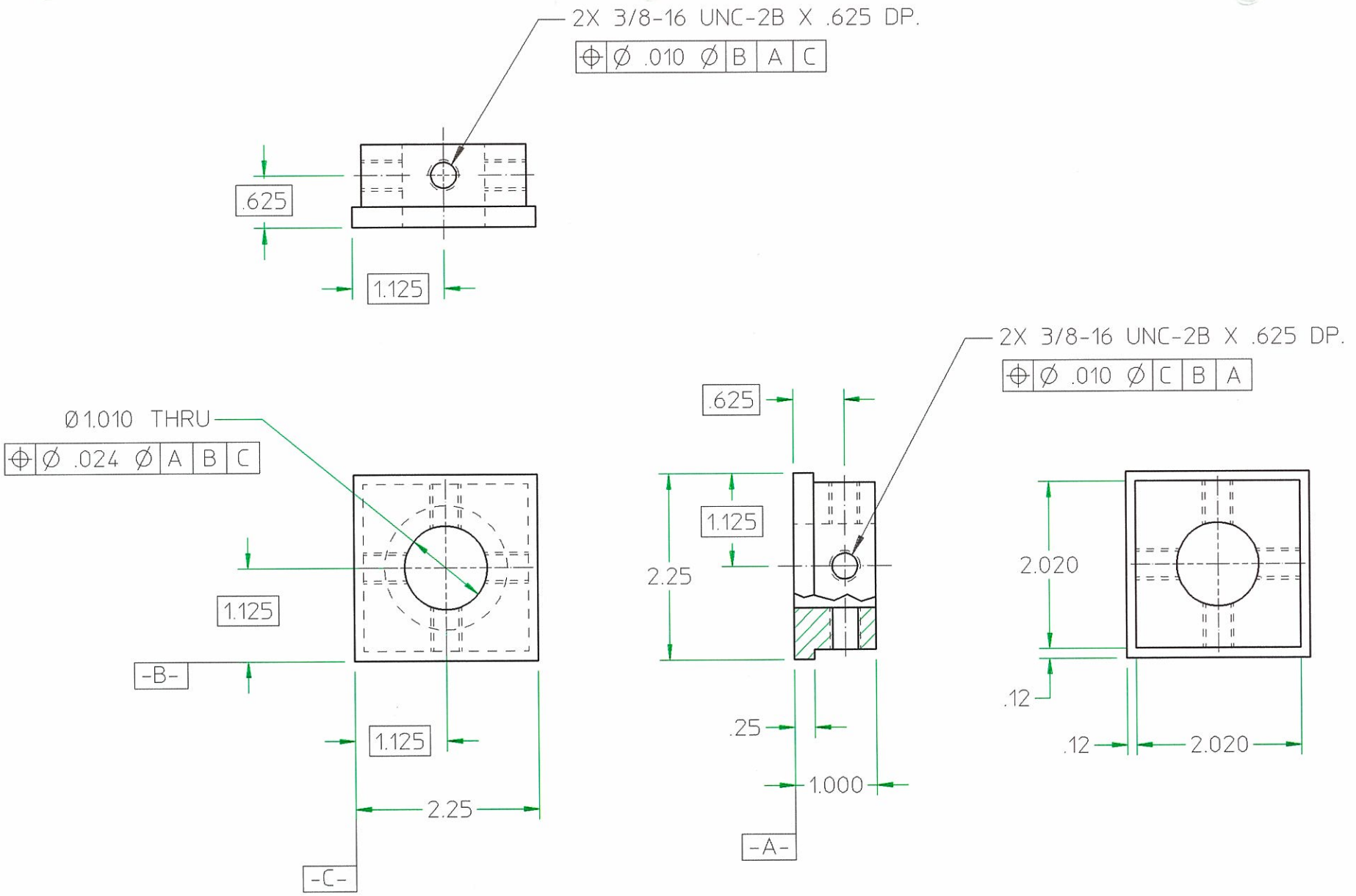






SLEEVE LAYOUT

JOHN ORTIZ
X7298
8052-30



TUBE PLUG

2 REQD

MATL: STEEL BAR

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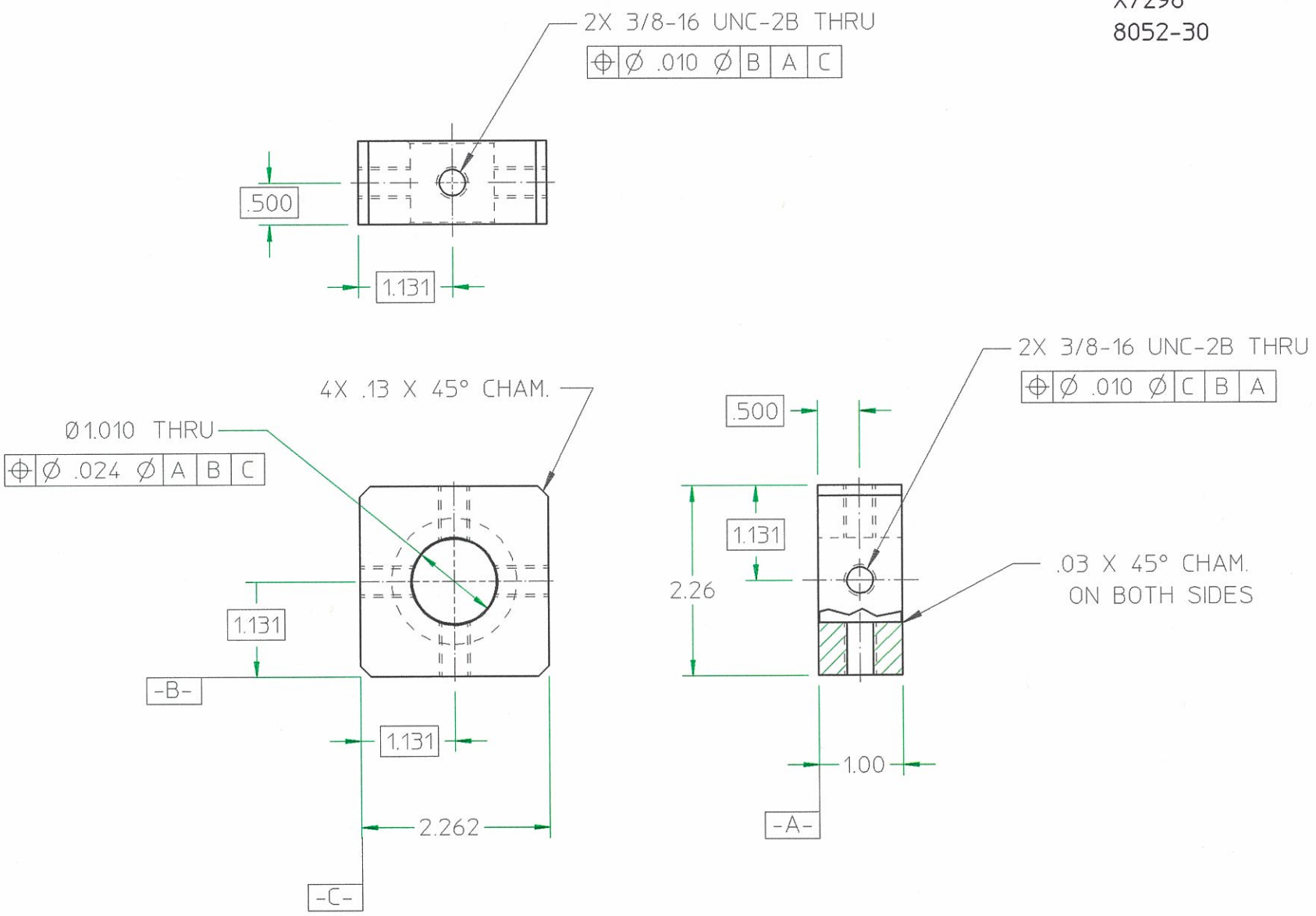
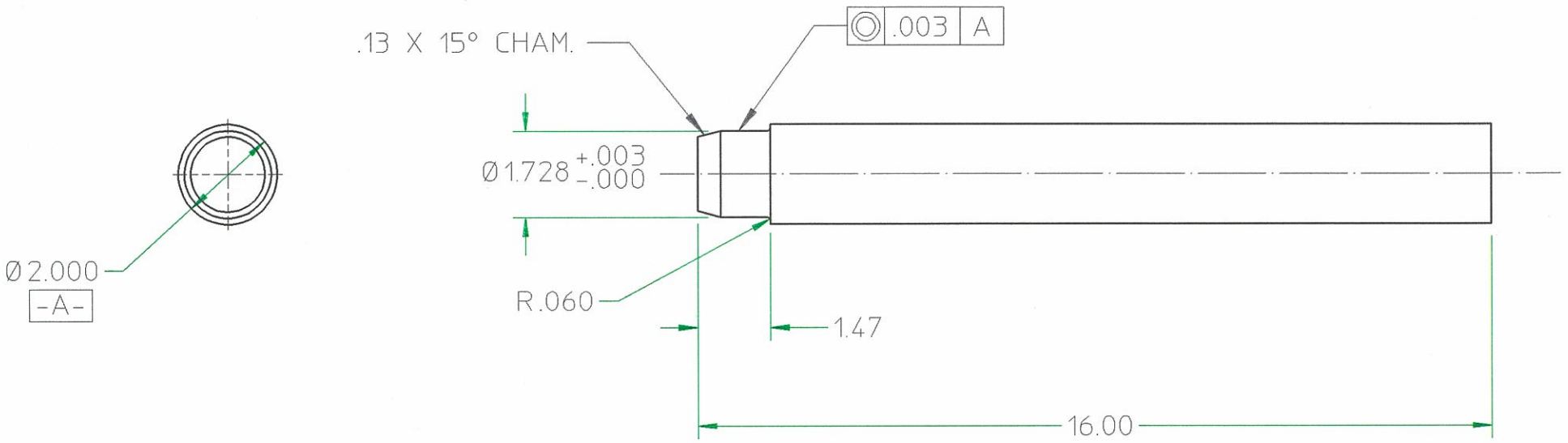


TUBE PLUG ADJUSTER

2 REQD

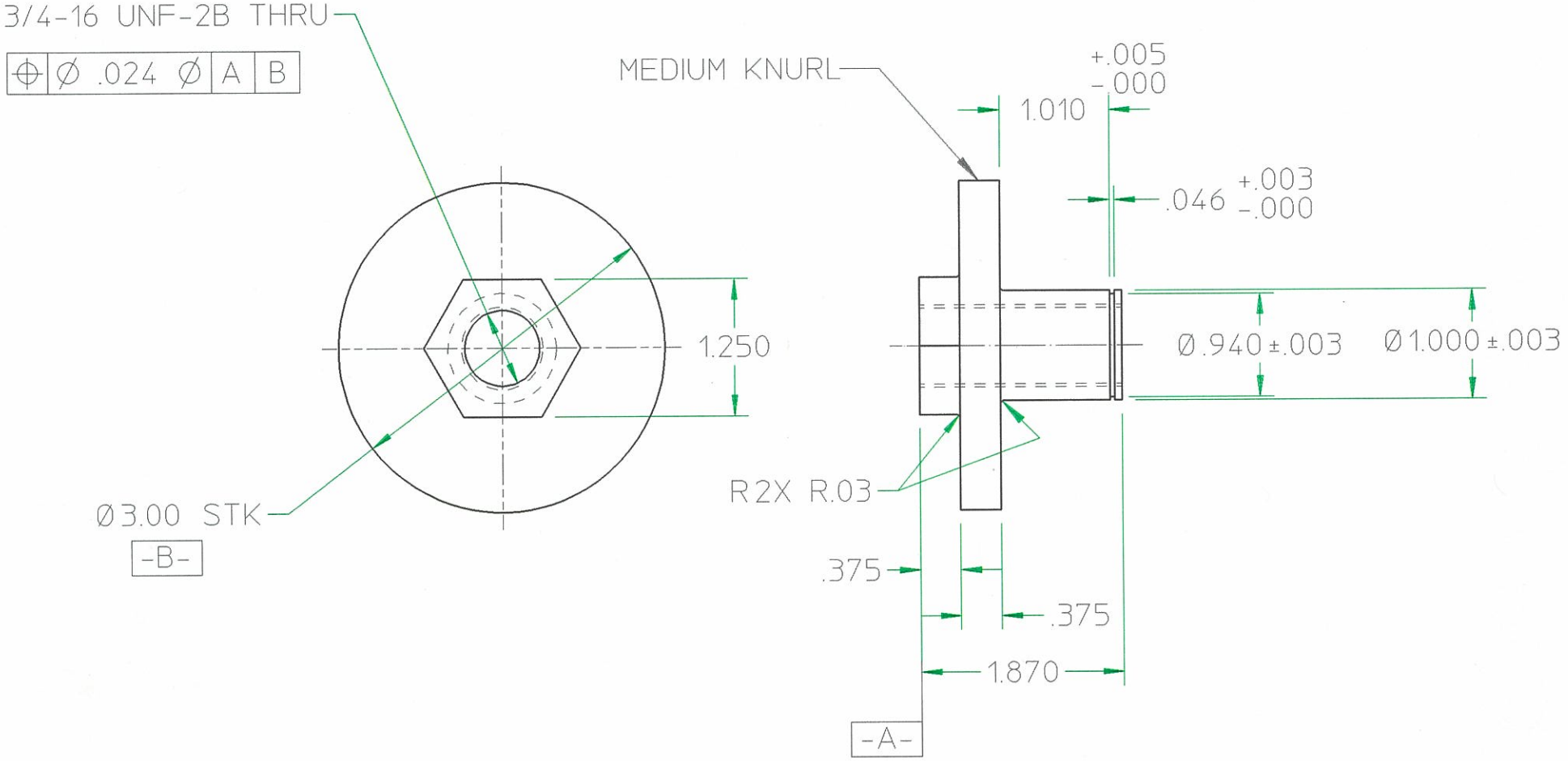
MATL: ALUMINUM BAR, 6061-T6 - USER FURNISHED



EXTENSION BASE PIN.1

1 REQD

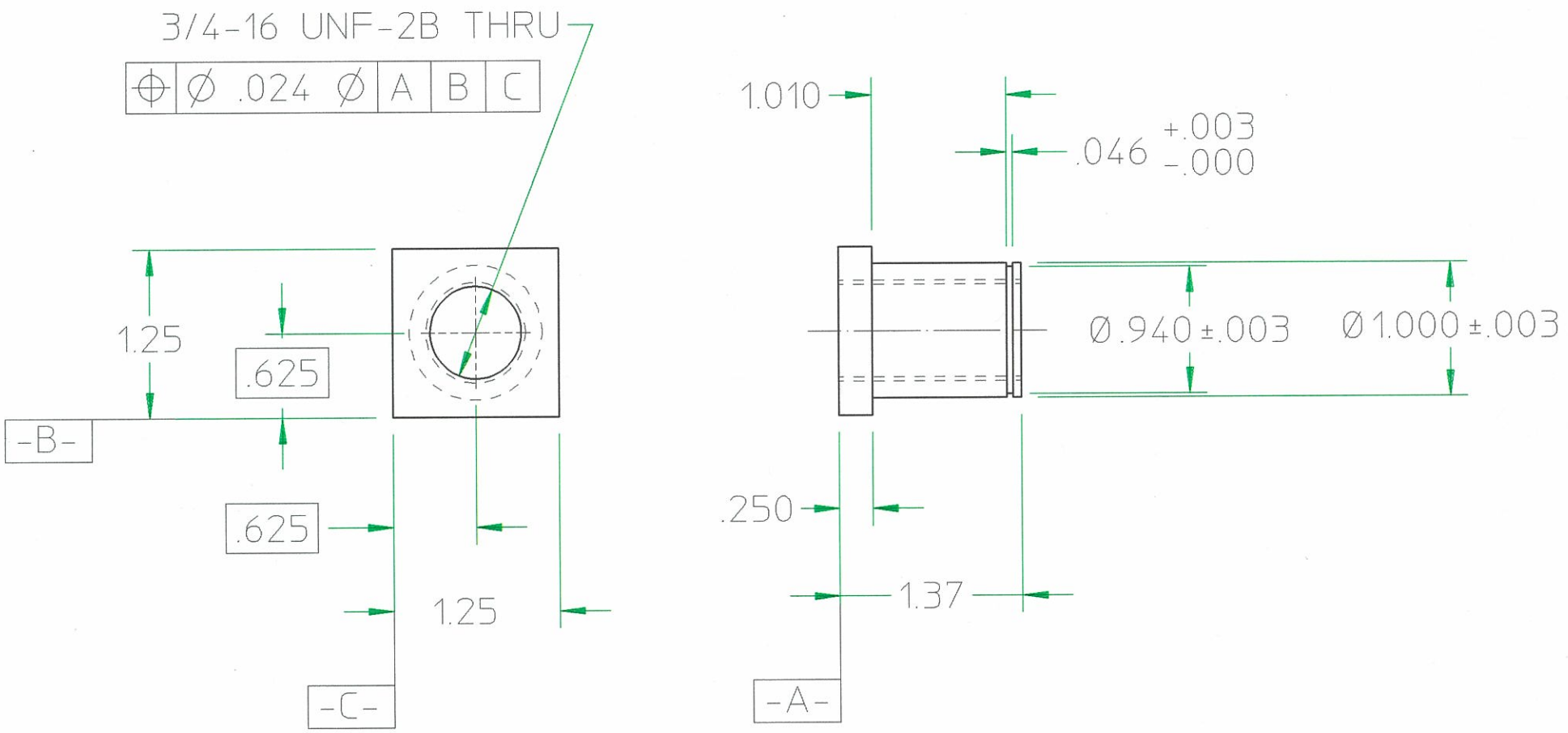
MATL: STEEL BAR, Ø2.25



THREADED SLEEVE

3 REQD

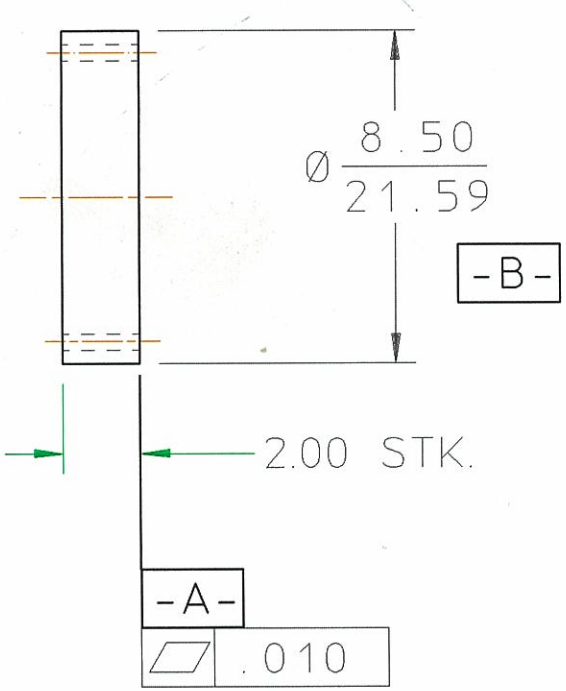
MATL: SILICON BRONZE - USER FURNISHED

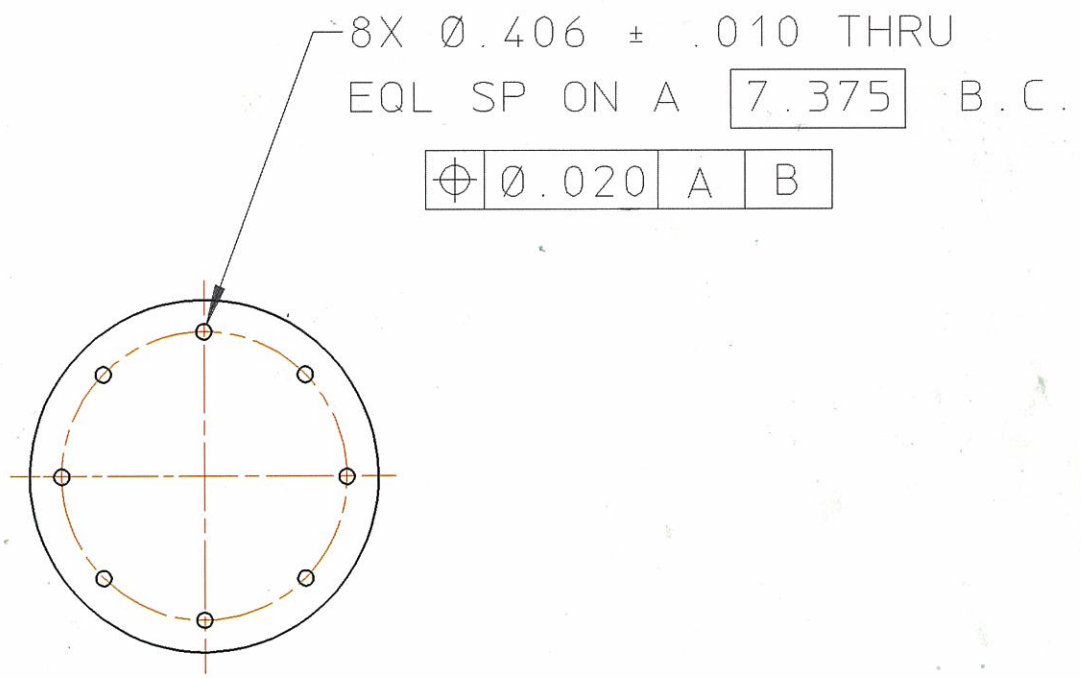


THREADED SLEEVE

2 REQD

MATL: SILICON BRONZE - USER FURNISHED

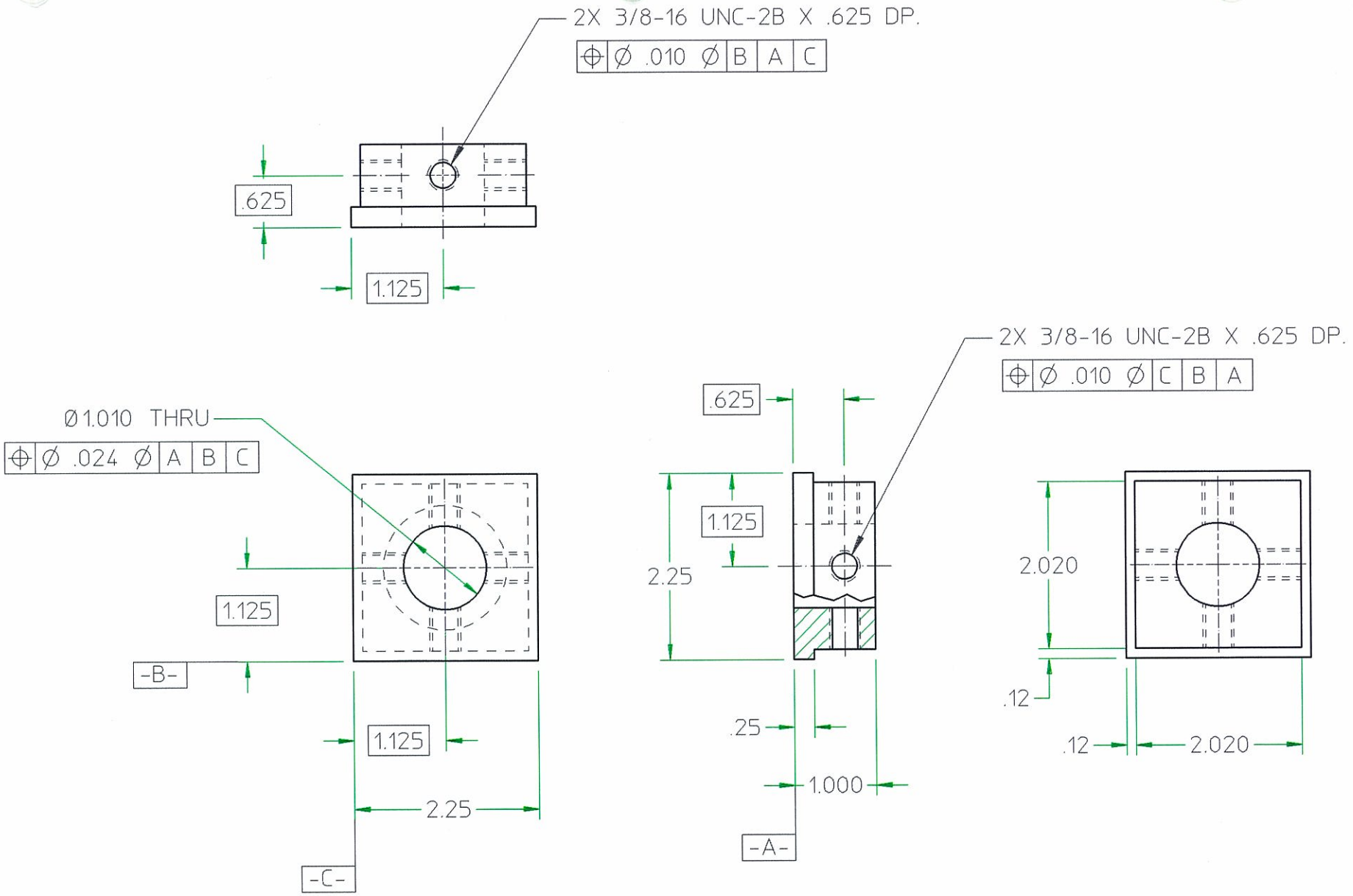




SPACER

1 REQD

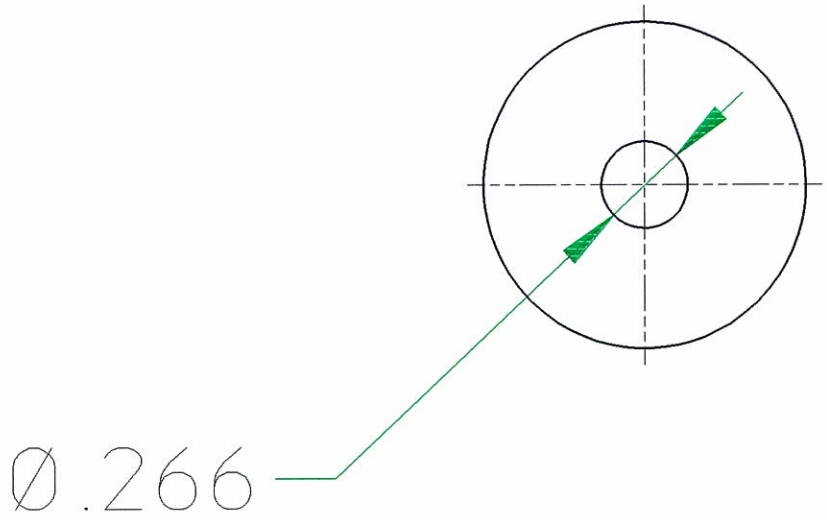
MATL: ALUMINUM PLATE, 6061-T6, 2" THK.

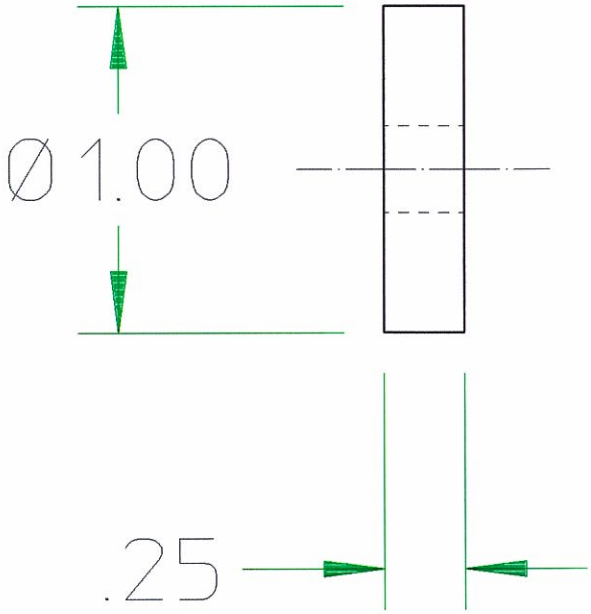


TUBE PLUG

2 REQD

MATL: STEEL BAR

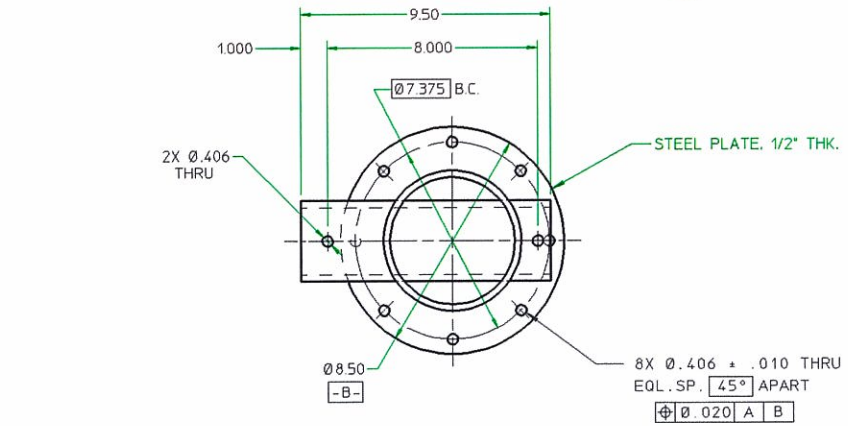


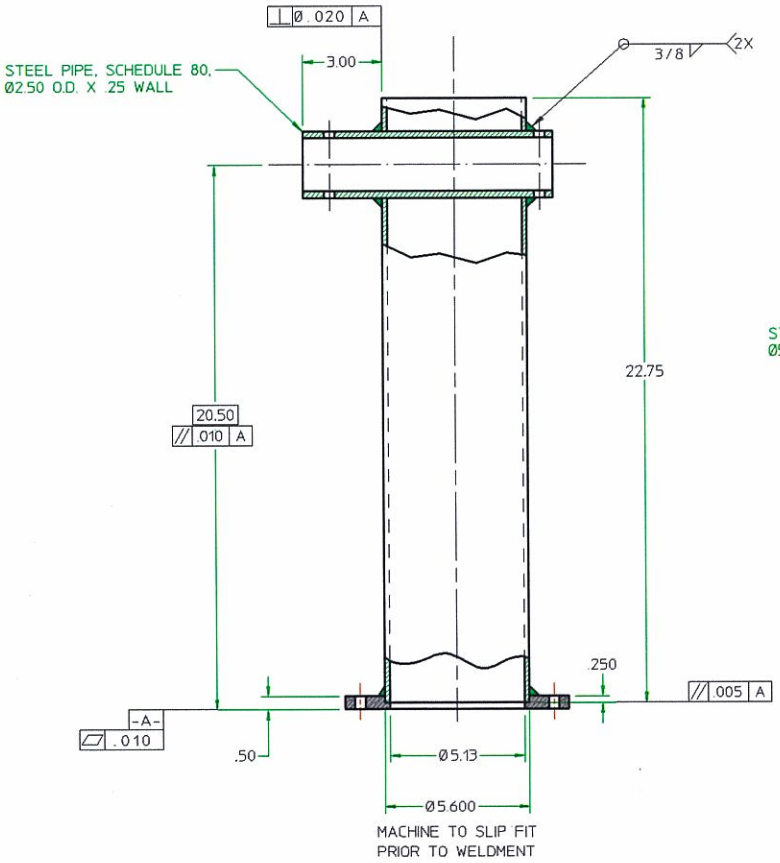


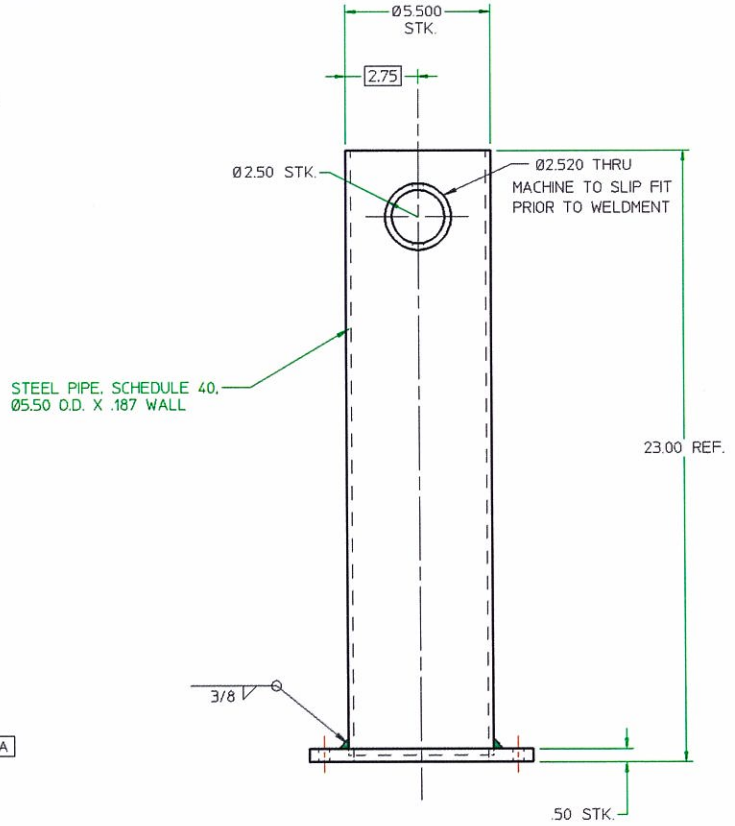
TUBE PLUG

2 REQD

MATL: STEEL BAR





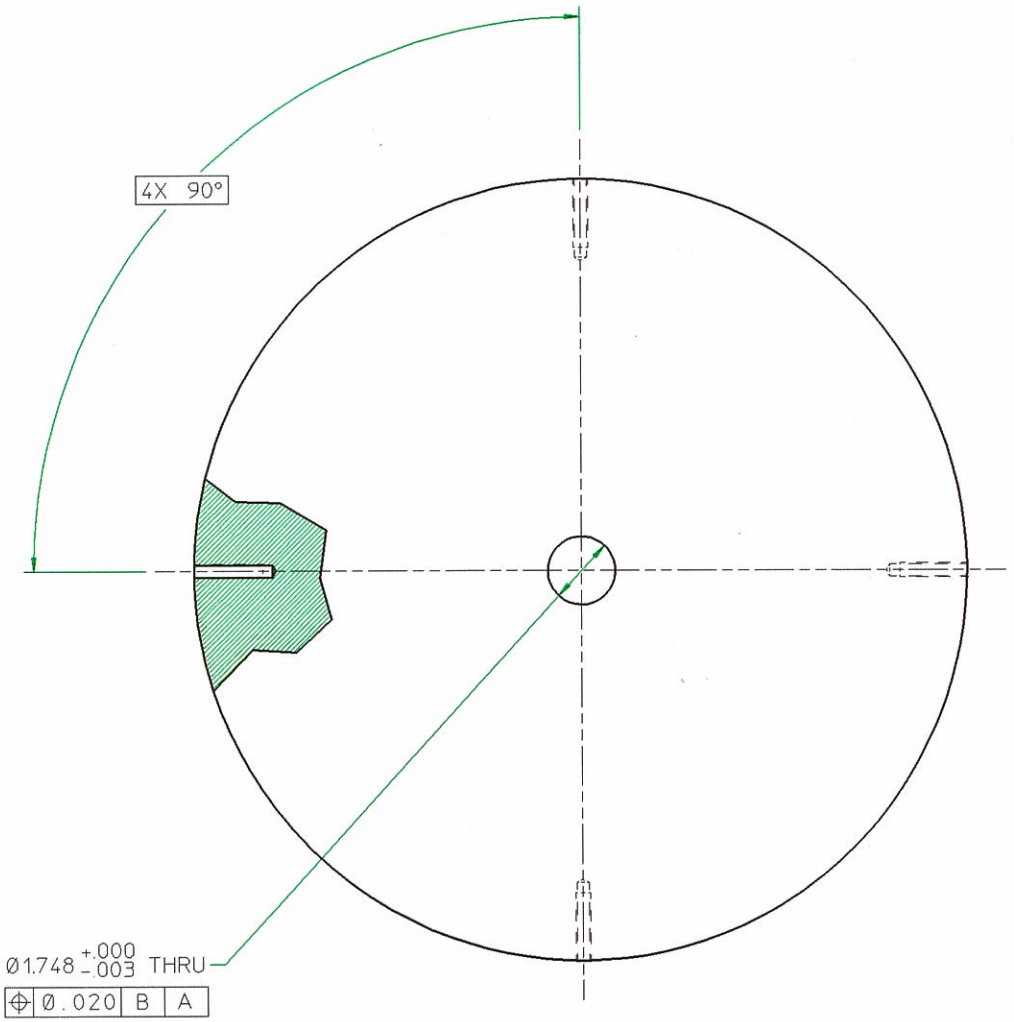


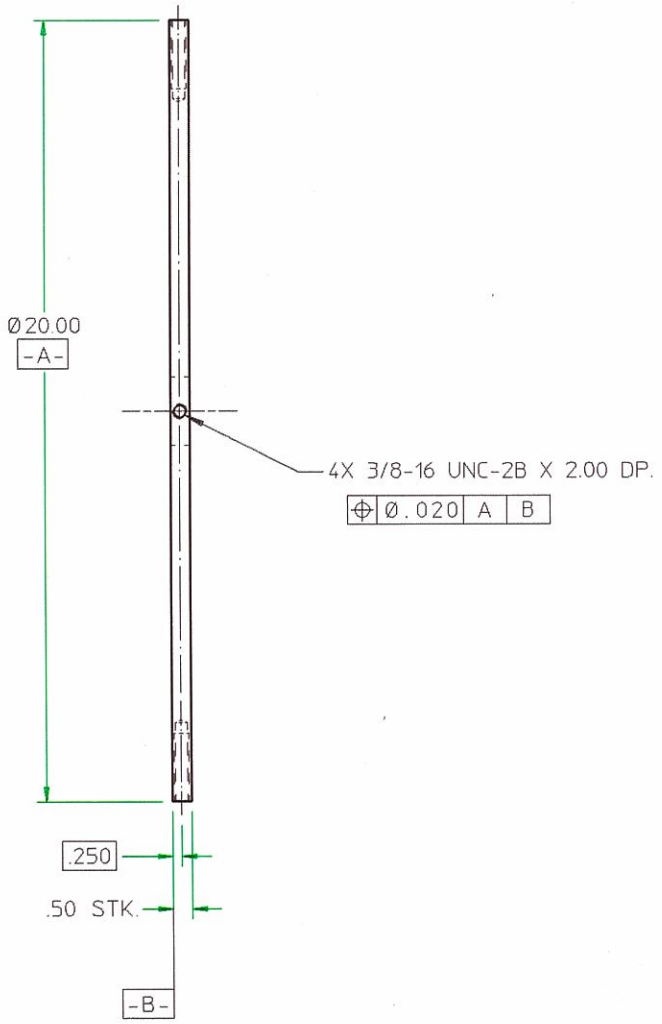
STANCHION EXTENSION WELDMENT

1 REQD

MATL: NOTED

SCALE: NONE

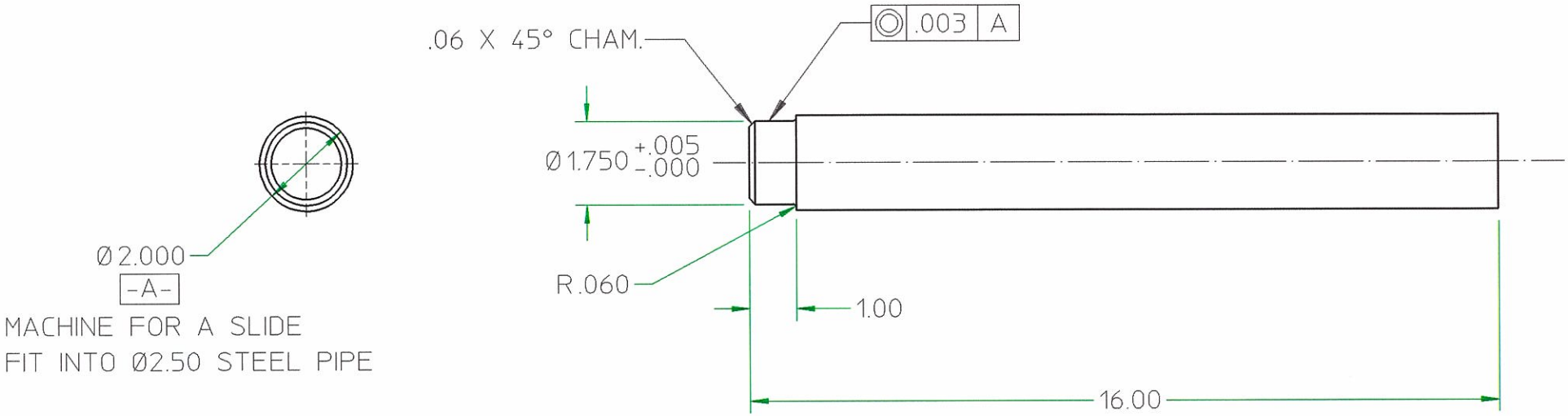




CENTERING PLATE

1 REQD

MATL: ALUMINUM PLATE, 6061-T6, .50 THK.

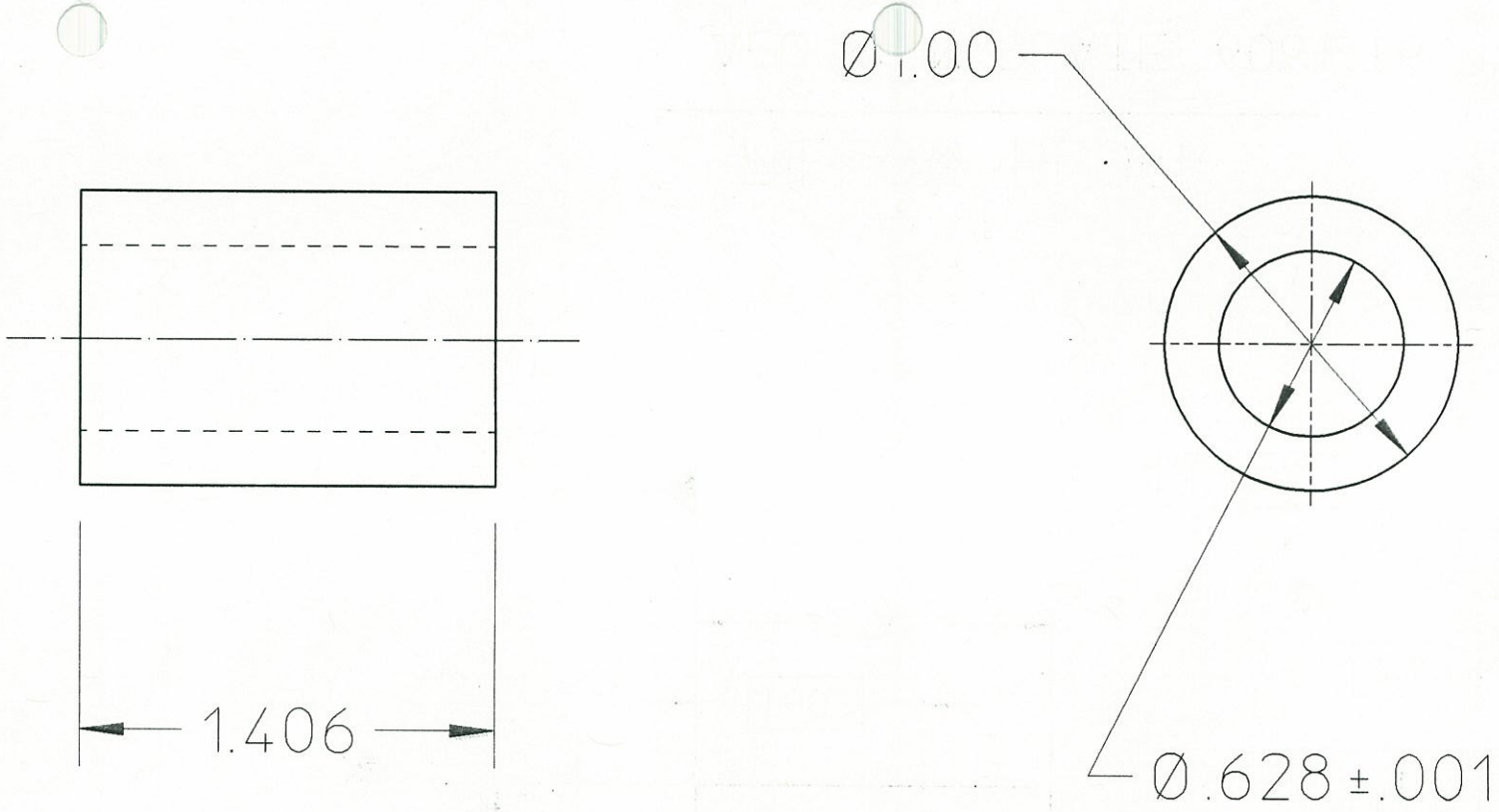


MACHINE FOR A SLIDE
FIT INTO Ø2.50 STEEL PIPE

EXTENSION BASE PIN

1 REQD

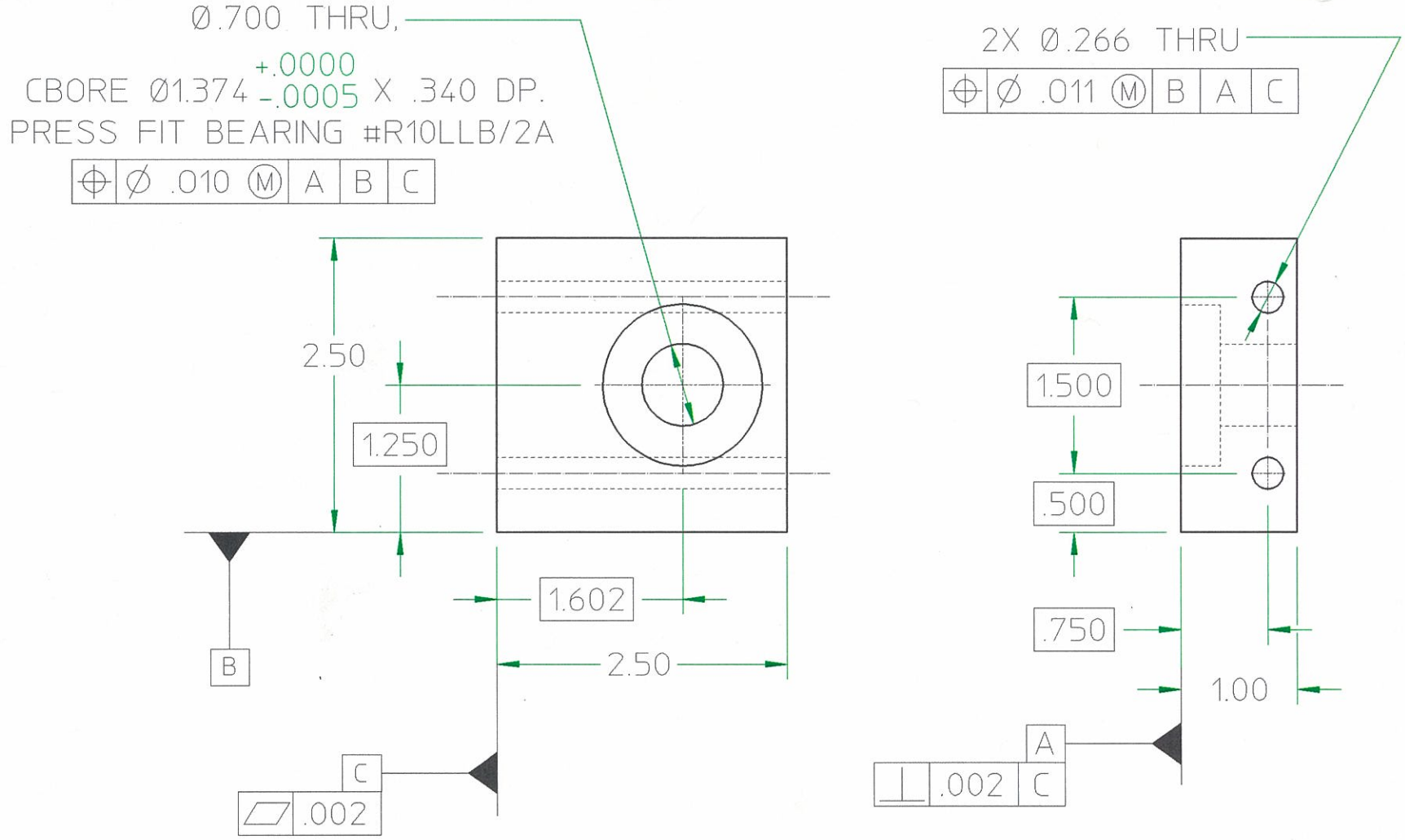
MATL: STEEL BAR, Ø2.25



SPACER BUSHING

BRASS BAR, ROUND, 1.00"DIA.

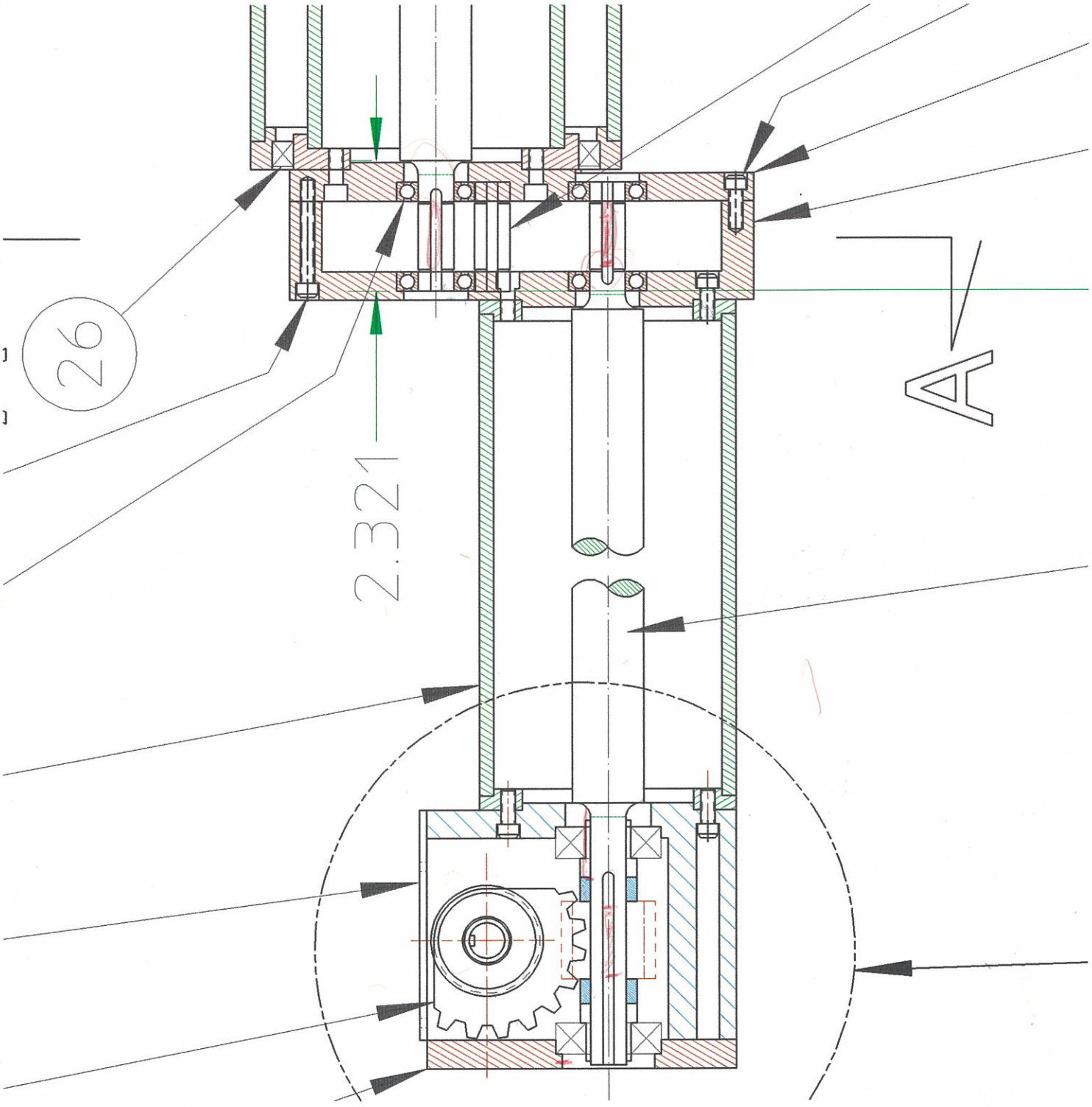
1 REQD

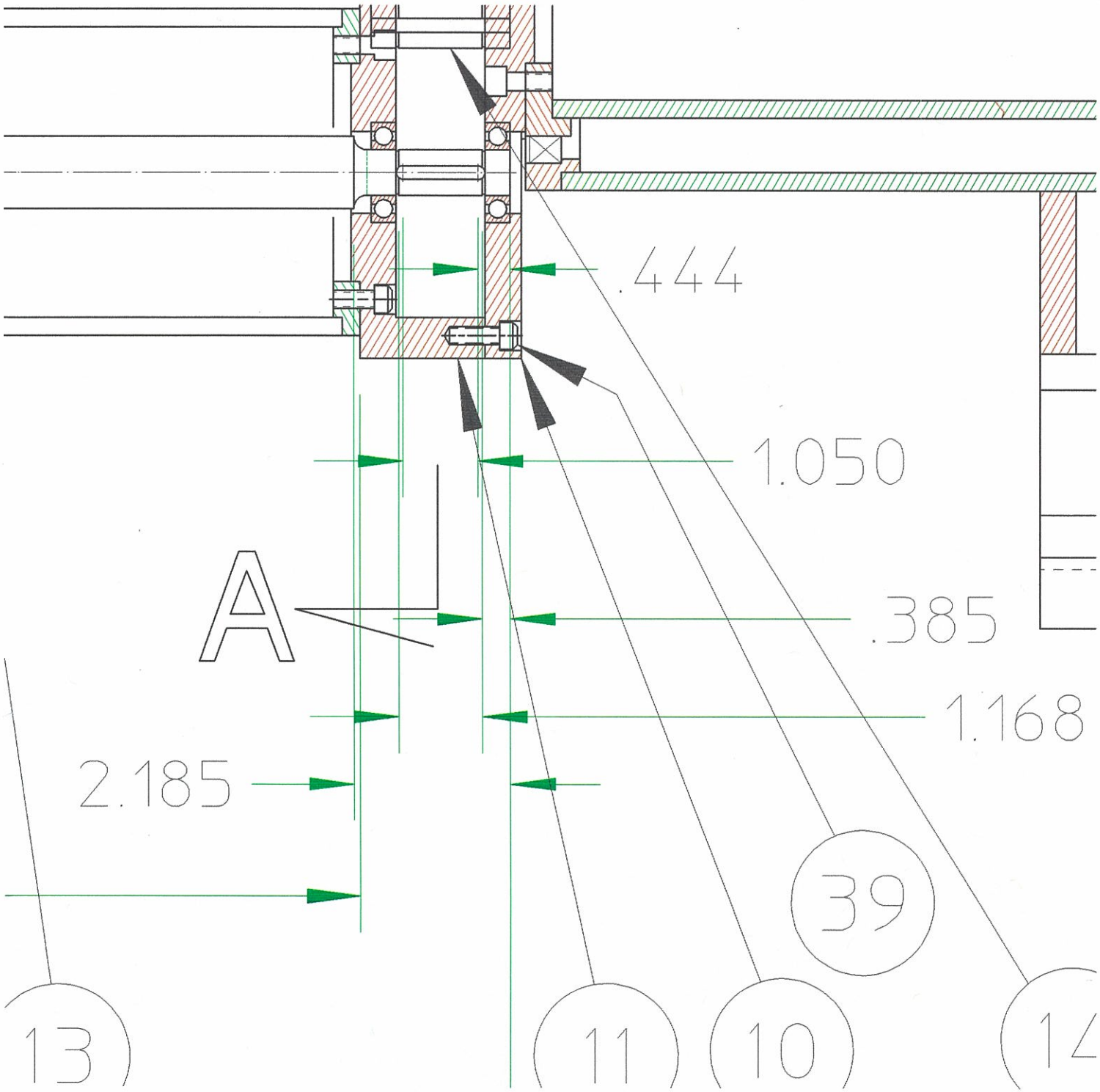


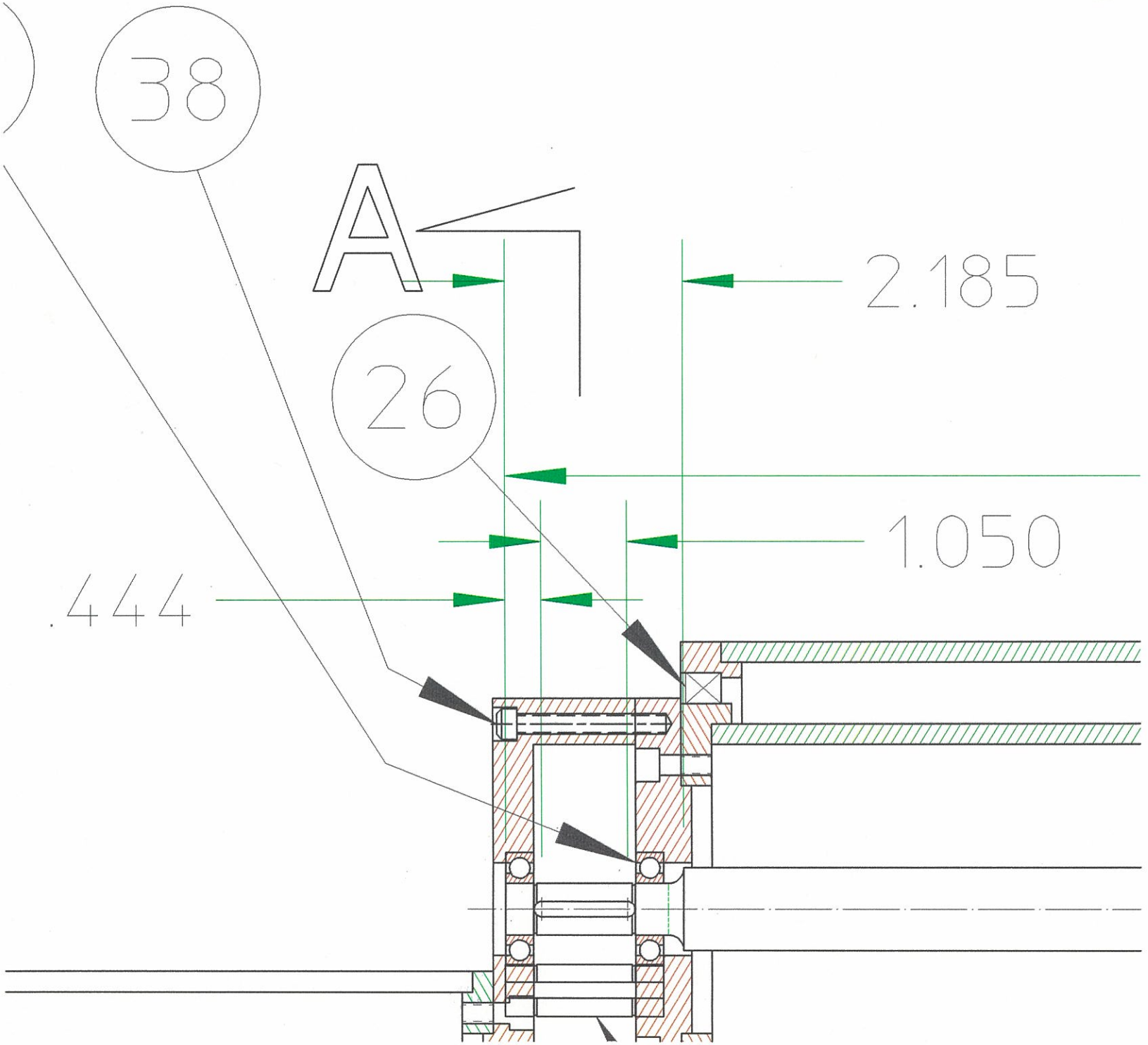
PILLOW BLOCK

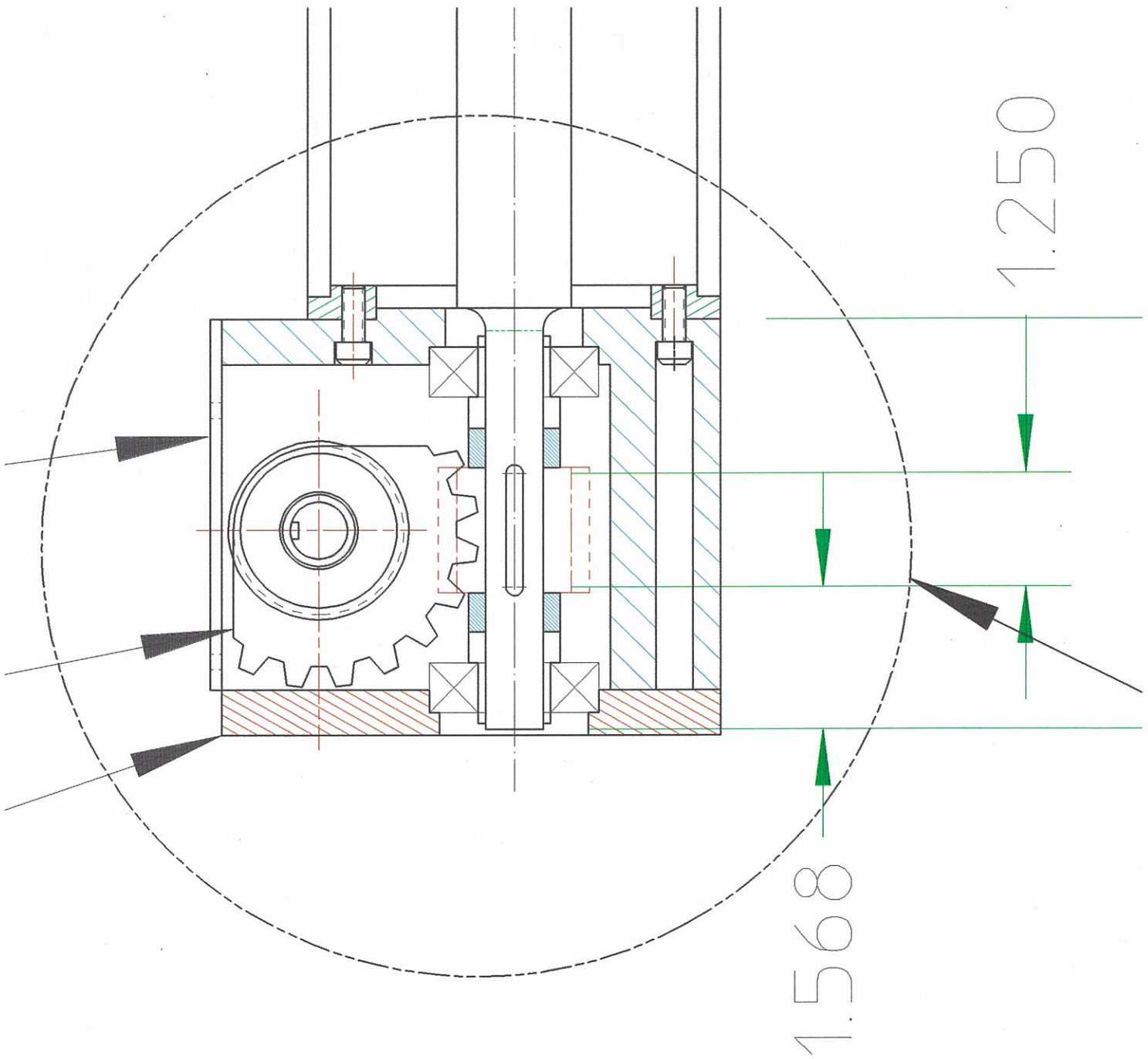
ALUMINUM PLATE, 6061-T6, 1" THK.

1 REQD

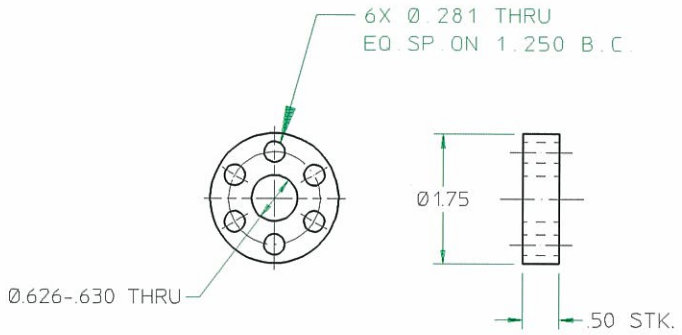

26
2.321
A


.444
1.050
A
.385
1.168
2.185
39
13
11
10
14


38
A
26
2.185
1.050
.444


1.250
1.568

JOHN ORTIZ
X7298
8052-24



2 SPACER
MATL: STEEL, COLD ROLLED, 1/2" THK.
1 REQD

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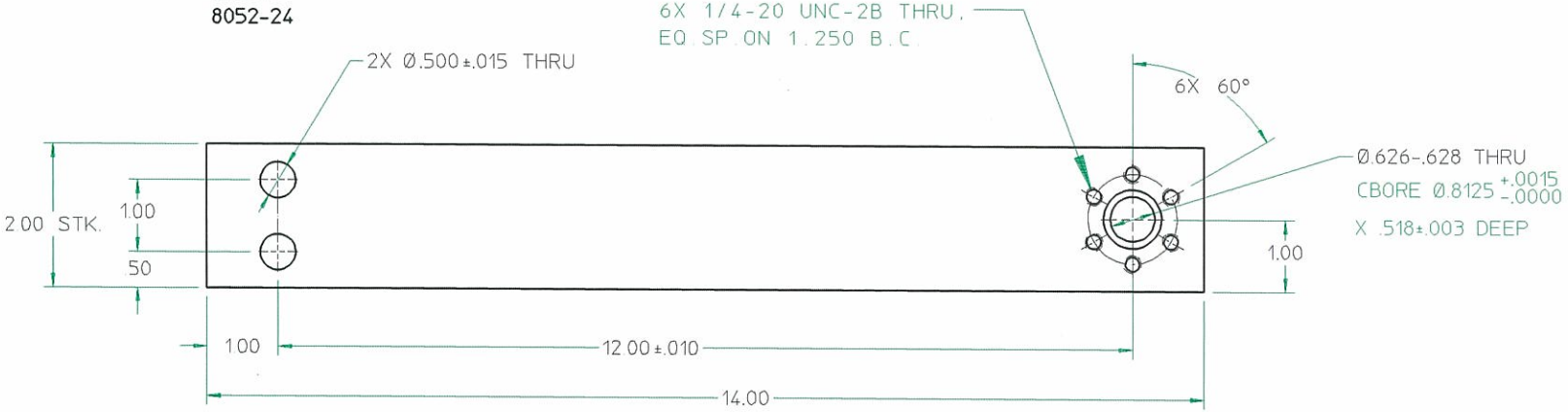
X7298
8052-24



1 TORQUE TEST BAR
MATL: ALUMINUM BAR, RECT., 1" X 2", 6061-T6
1 REQD

NOTE: SAW CUT ENDS OKAY

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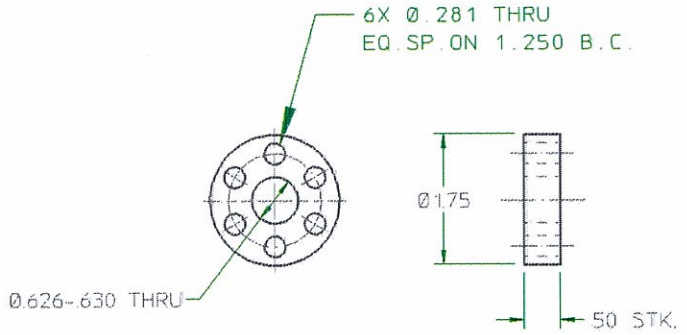
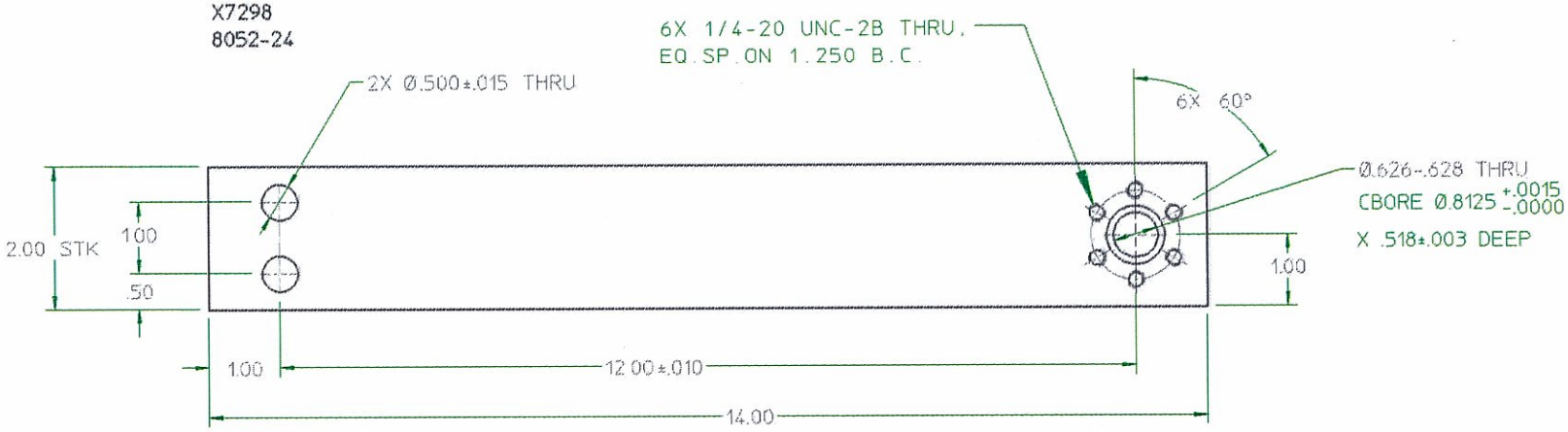
X7298
8052-24



(2) SPACER
MATL: STEEL, COLD ROLLED, 1/2" THK.
1 REQD

JOHN ORTIZ
X7298
8052-24

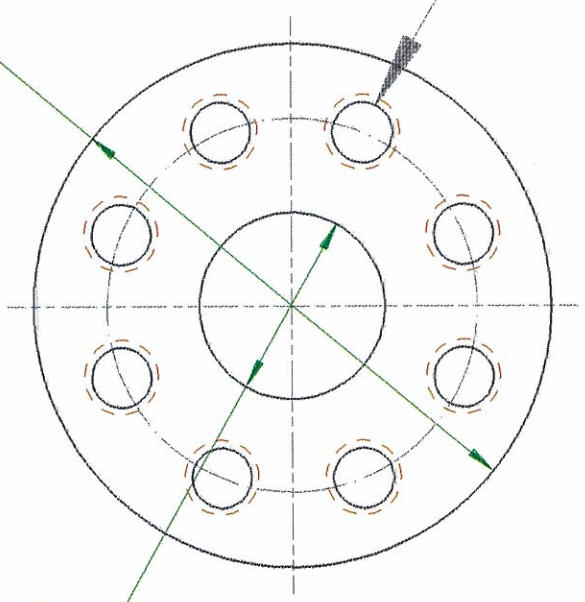


(1) TORQUE TEST BAR
MATL: ALUMINUM BAR, RECT., 1" X 2", 6061-T6
1 RE

NOTE: SAW CUT ENDS OKAY

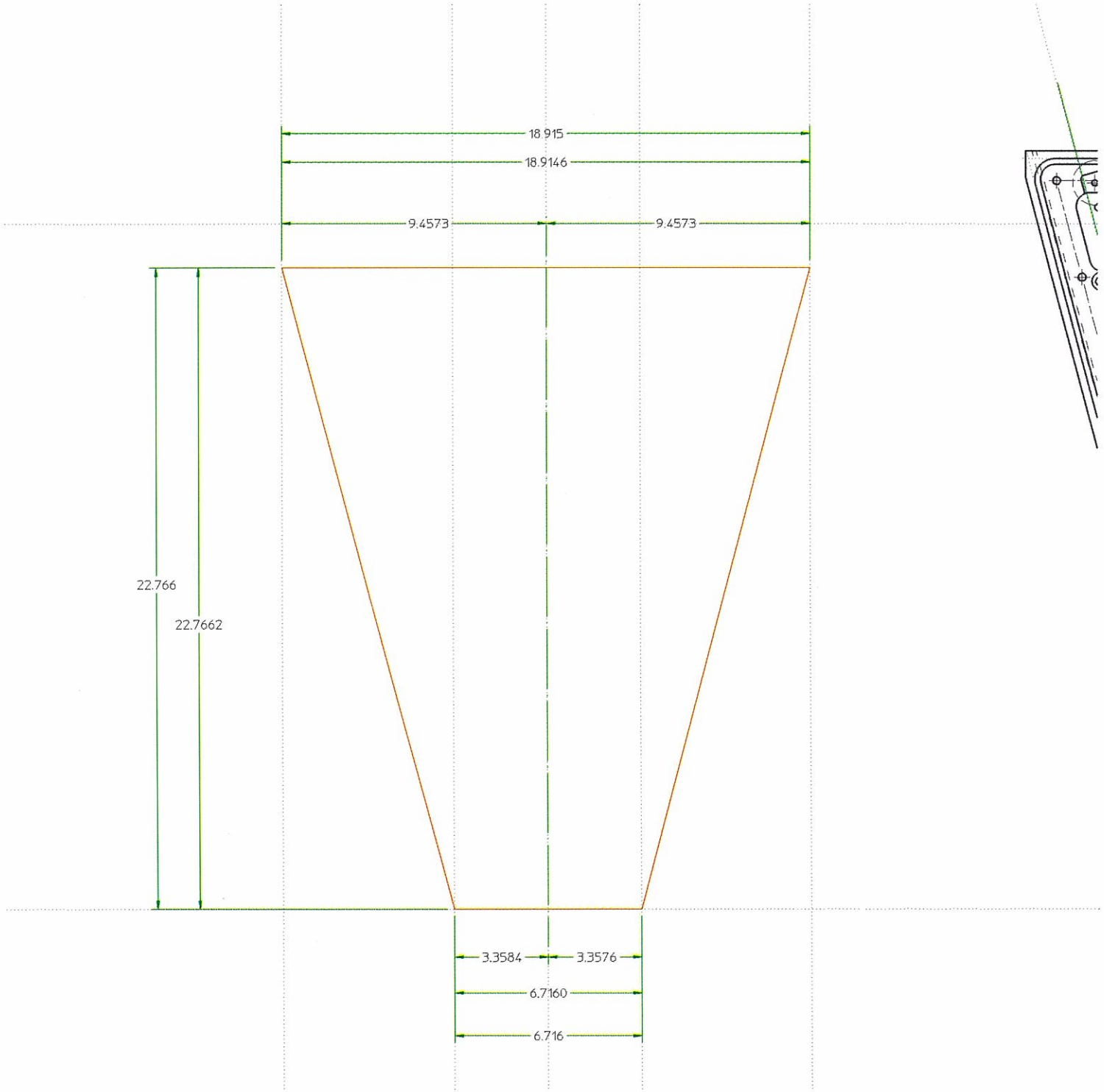
8X 1/4-20 UNC-2B THD THRU
EQ. SP. 40° APART ON 1.250 B.C.

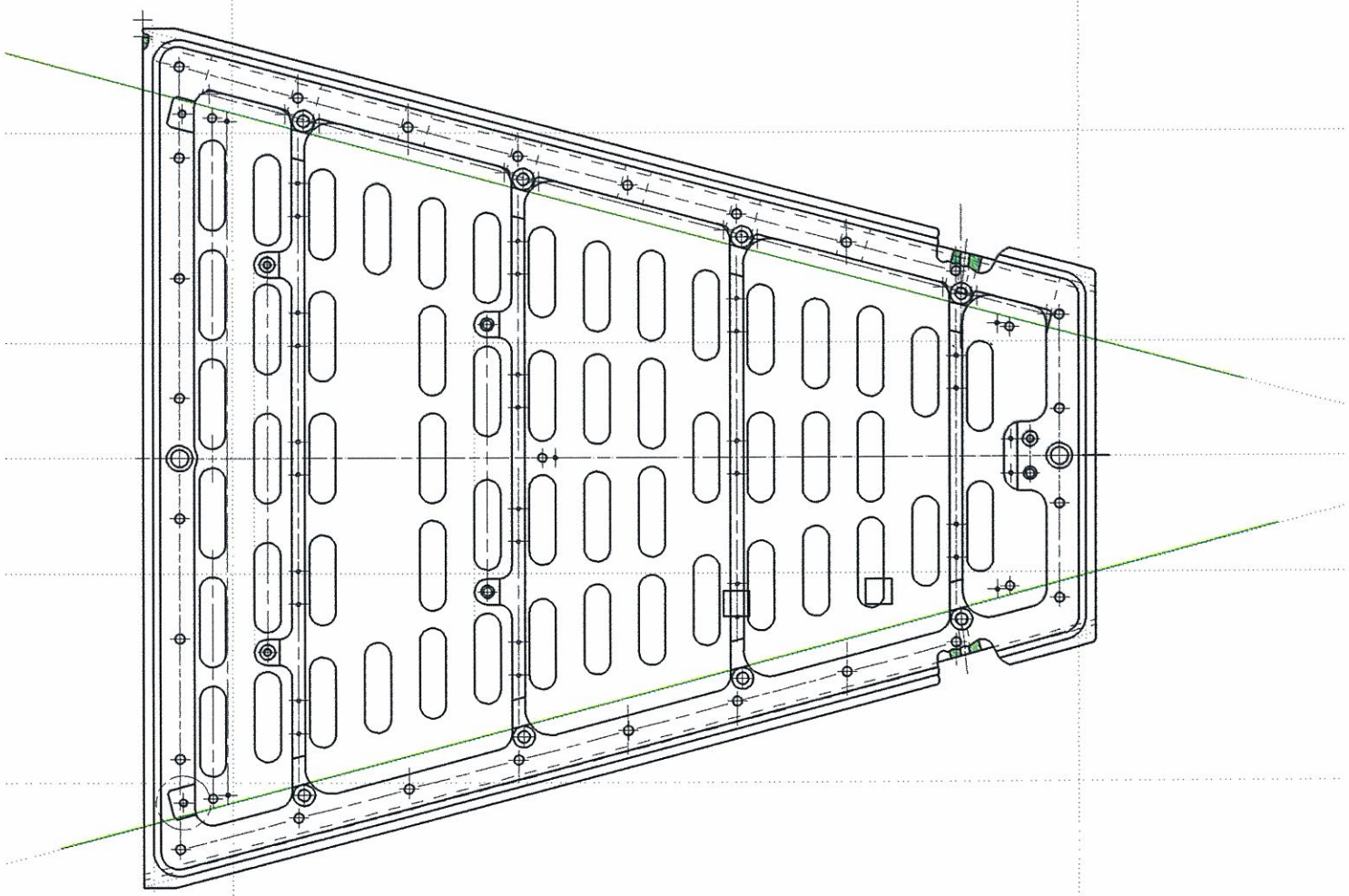
⌖	Ø.011 Ⓜ	A	B	C



+.002
-.000 THRU

⌭	Ø.011 Ⓜ	A	B	C


18.915
18.9146
9.4573
9.4573
22.766
22.7662
3.3584
3.3576
6.7160
6.716



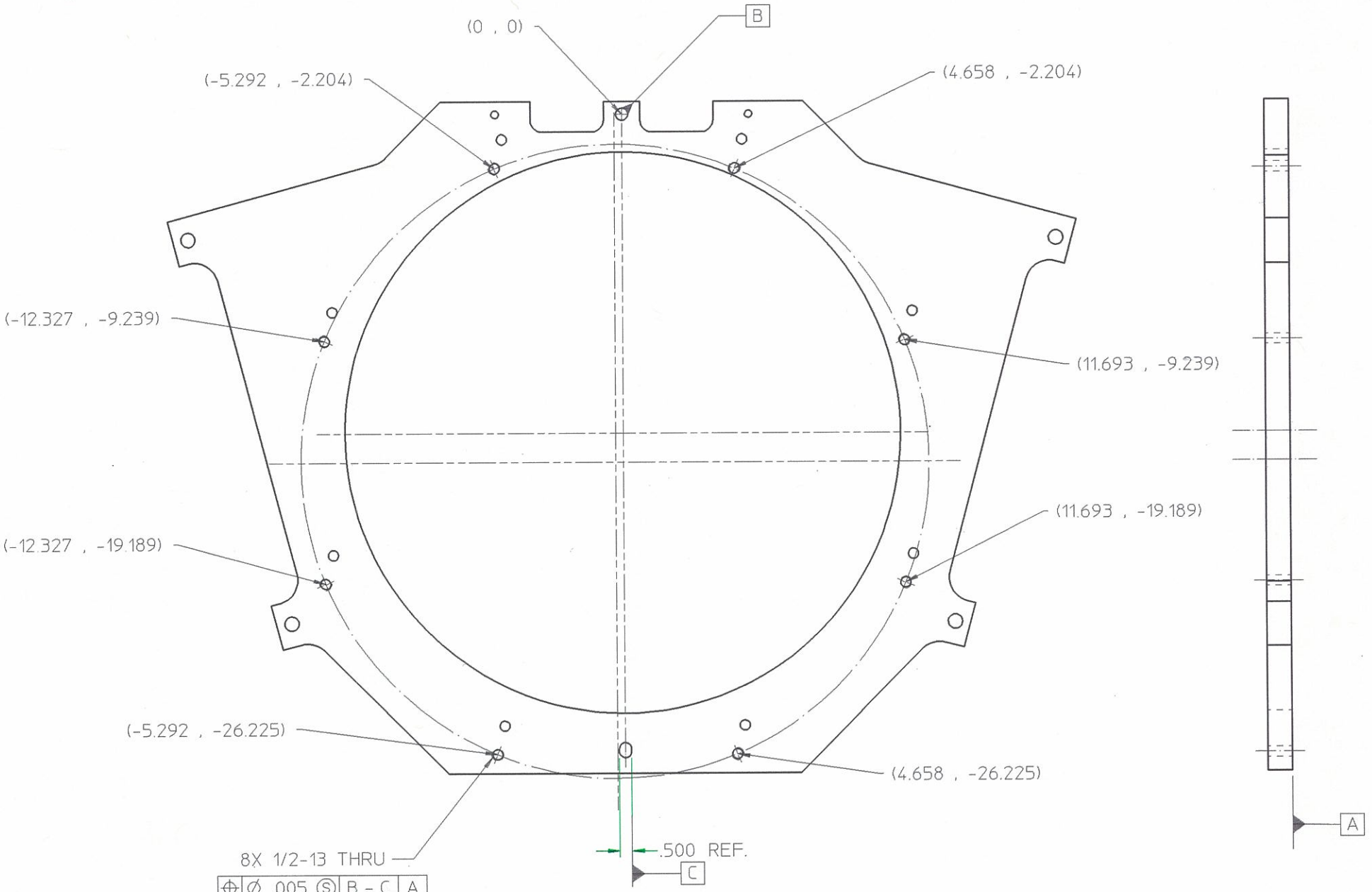
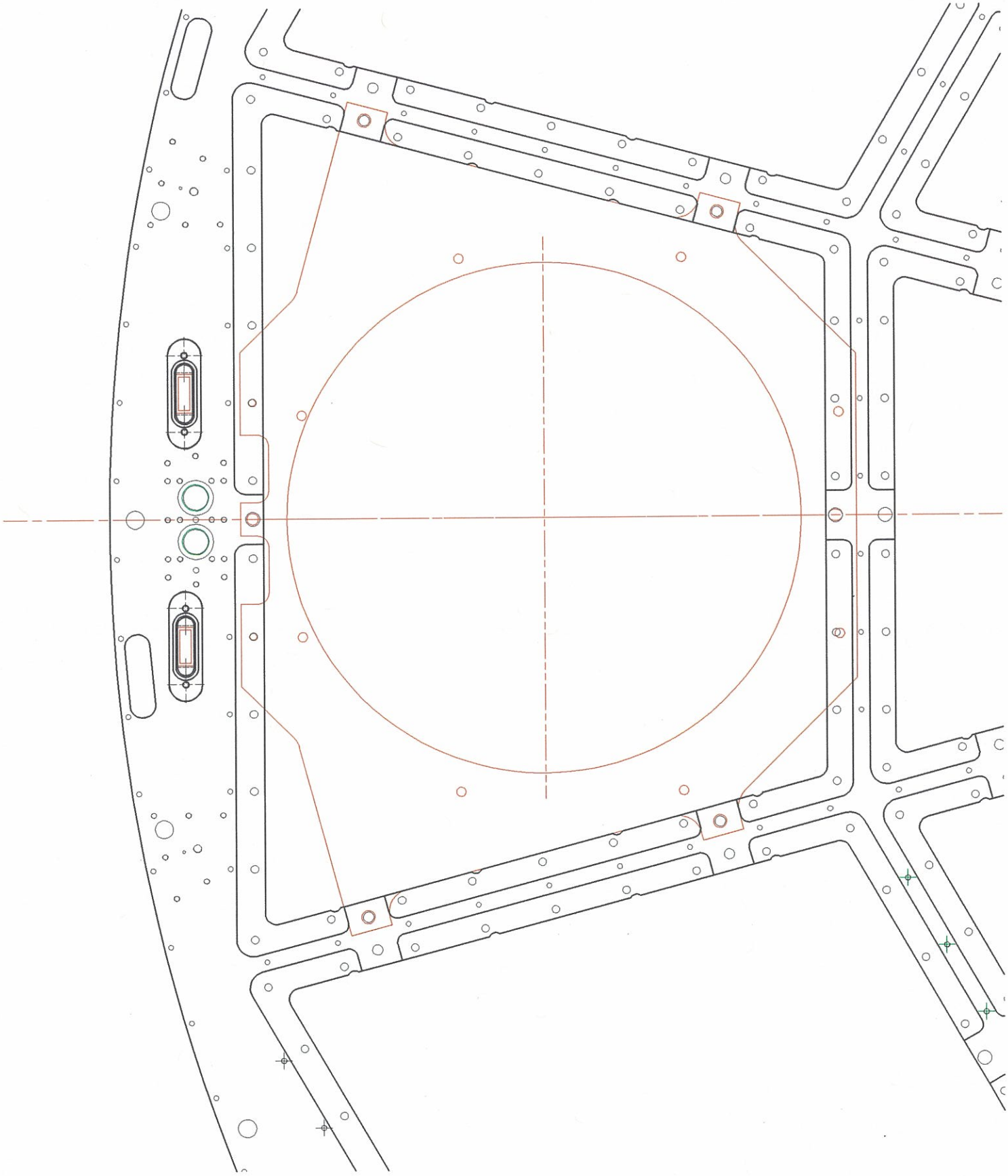


PLATE MODIFICATIONS



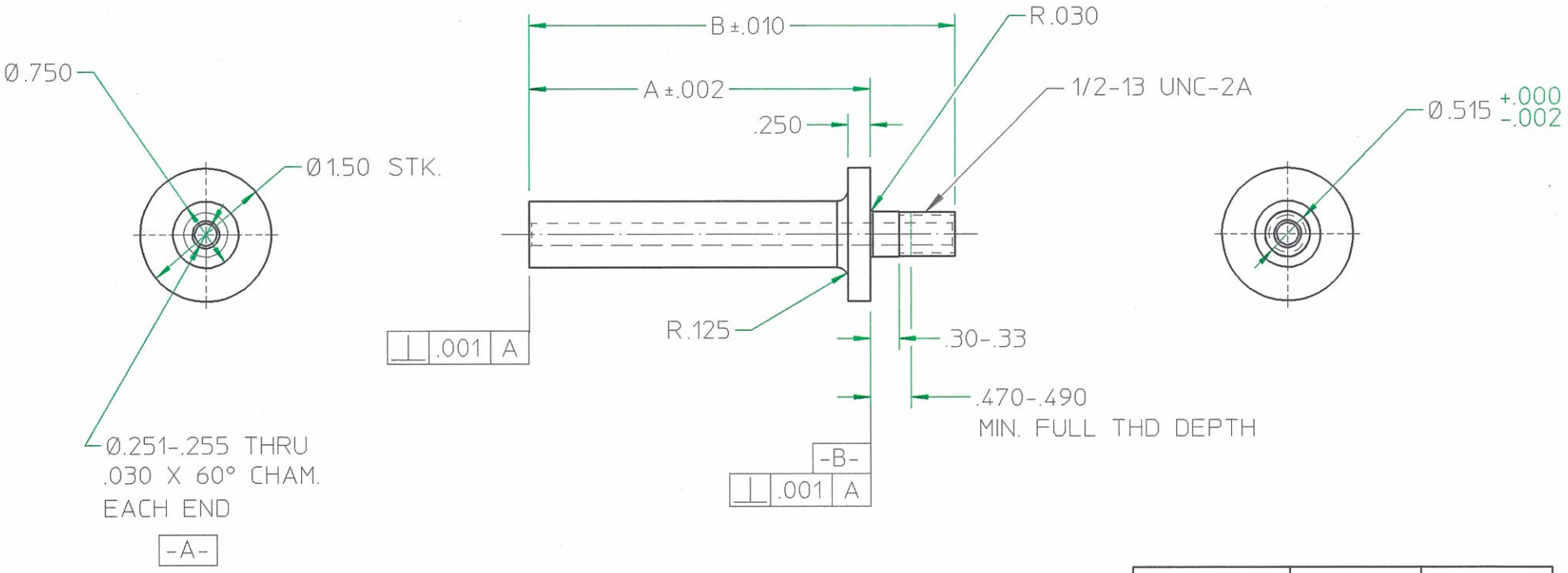
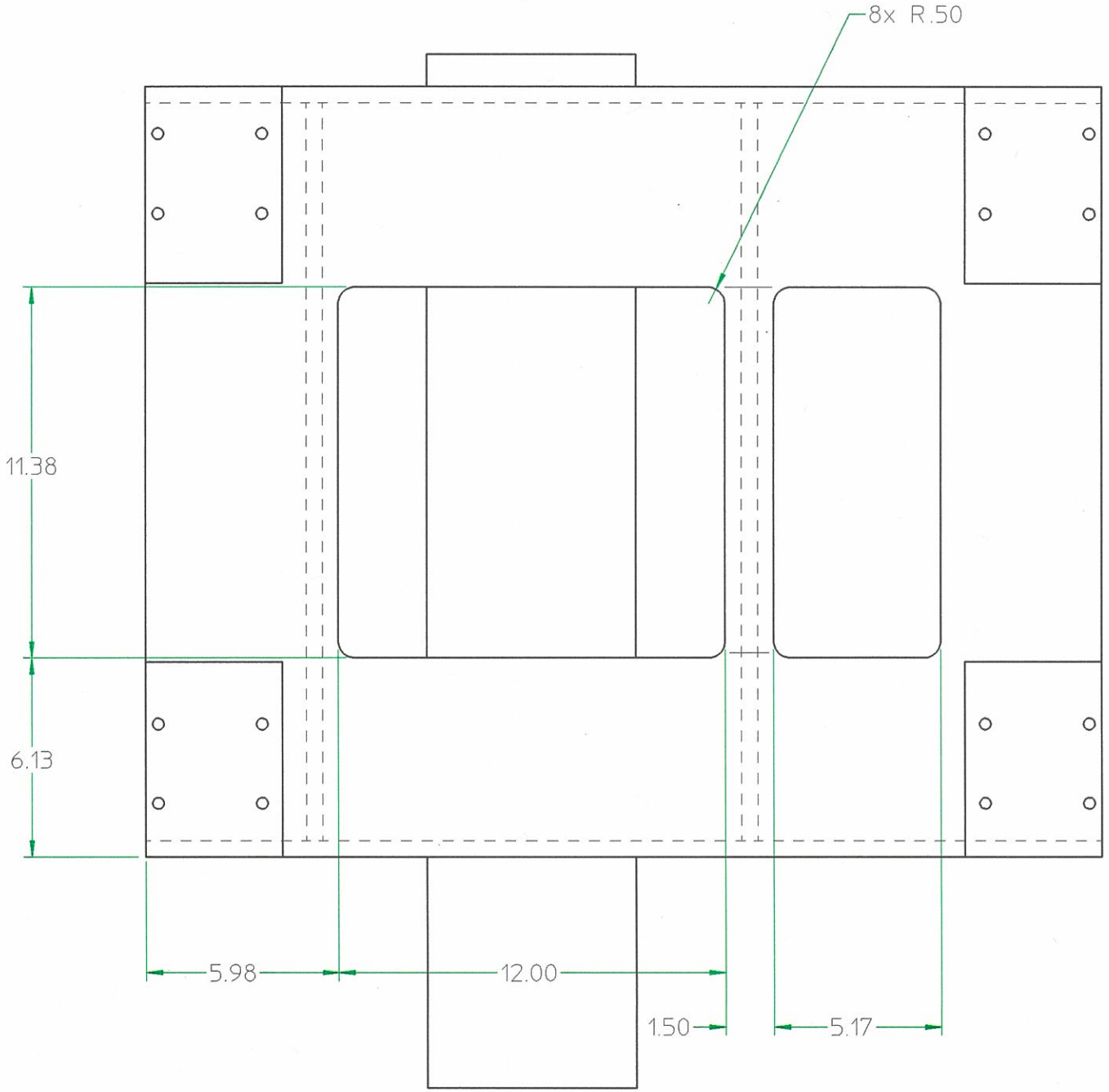


TABLE NO.	A DIM.	B DIM.
1	3.900	4.875
2	4.025	5.000

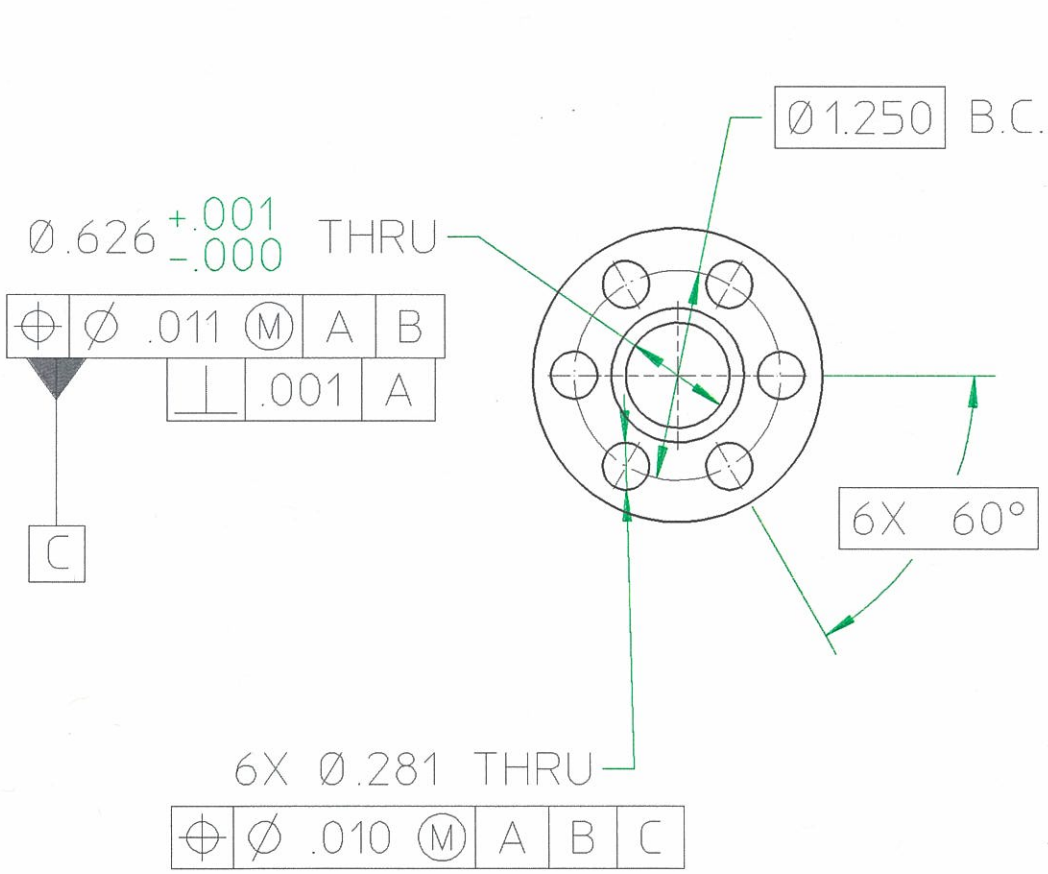
1 STANDOFF
3 REQD

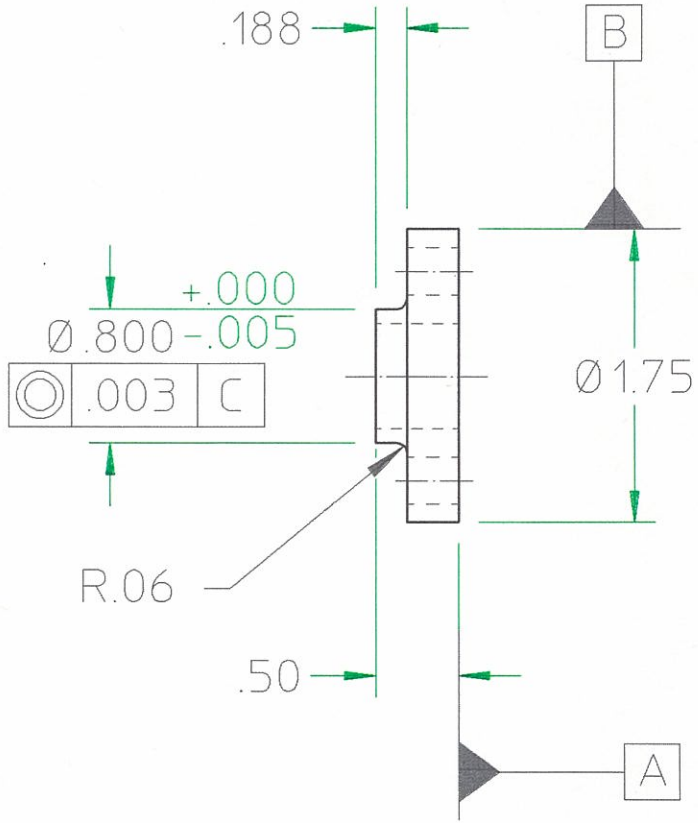
2 STANDOFF
3 REQD

MATL: STAINLESS STEEL BAR, ROUND, 1.50" DIA.
SCALE: 1/1



TROLLEY MOD.





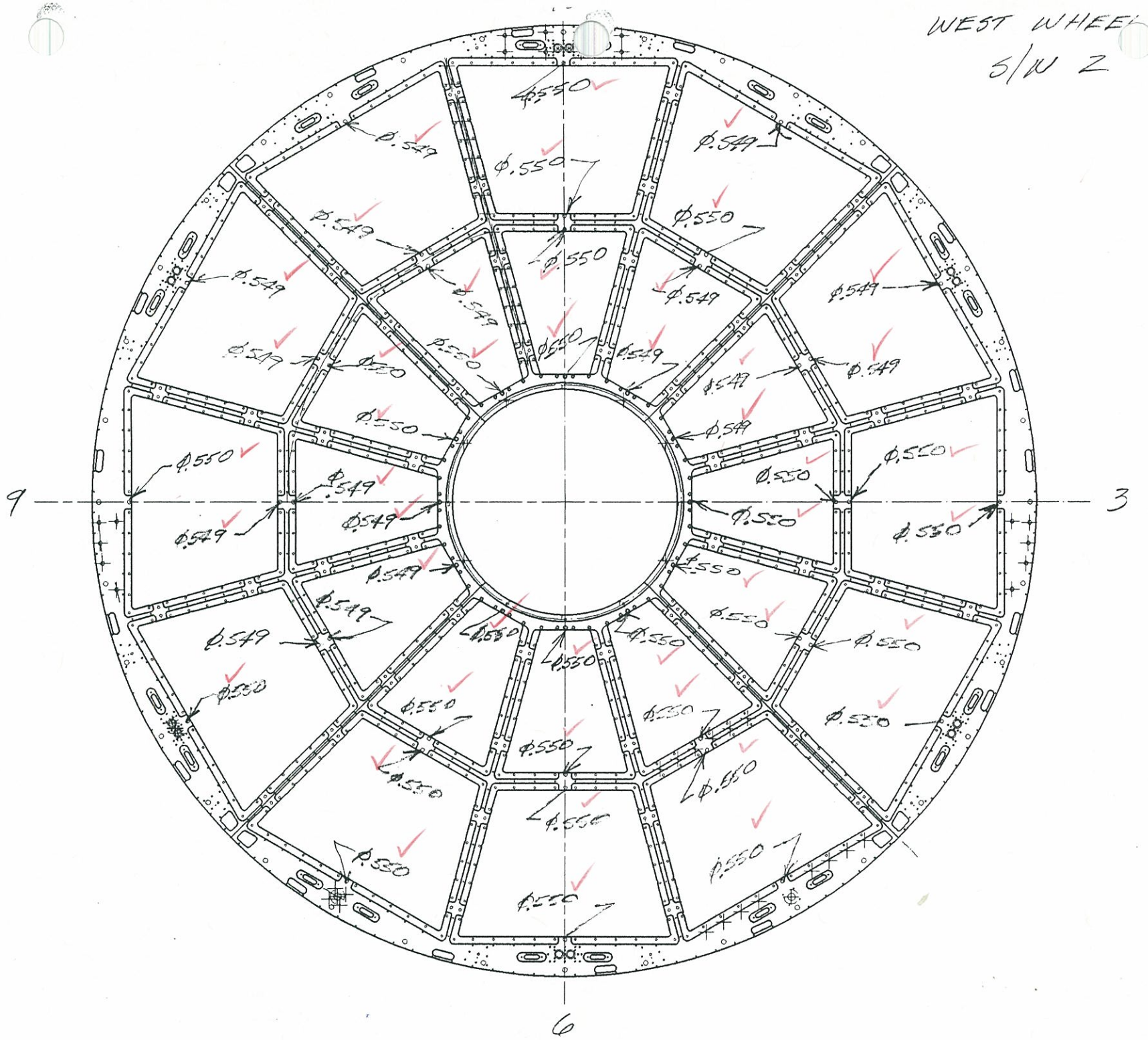
1 FLANGE

4 REQD

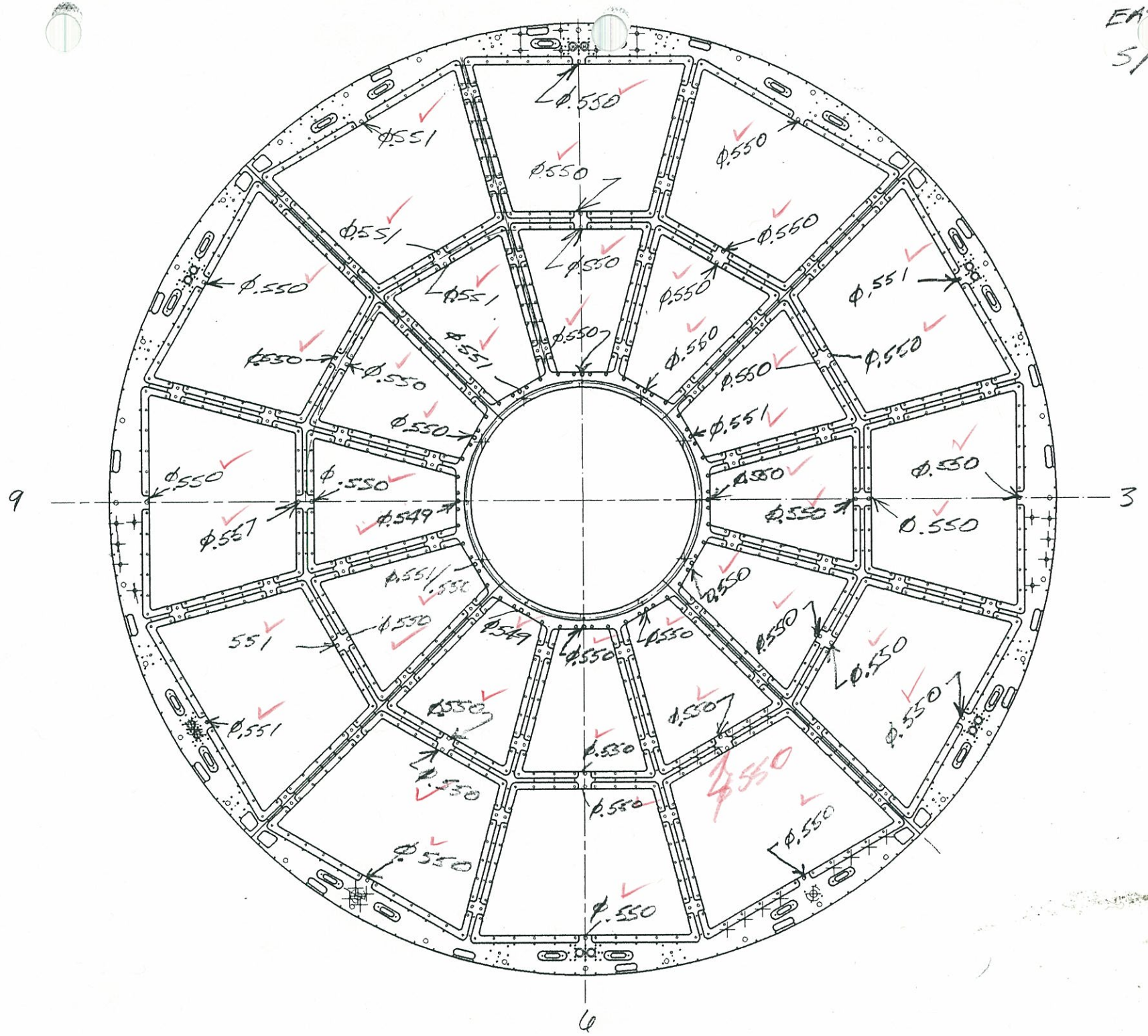
MATL: STEEL BAR, ROUND, 2" DIA.

SCALE: 1/1

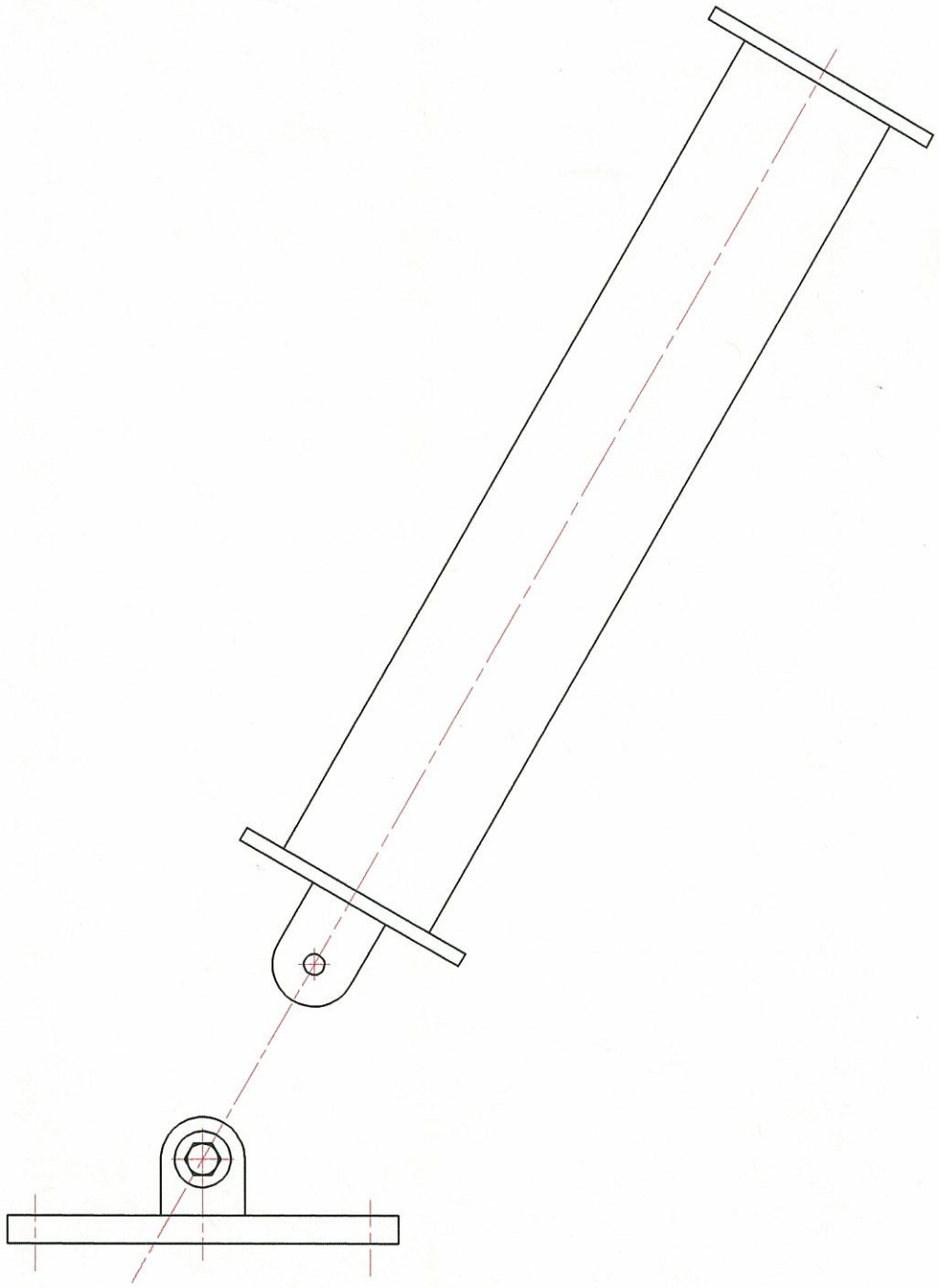
WEST WHEEL
S/N 2



EAST WHEEL
S/N 1



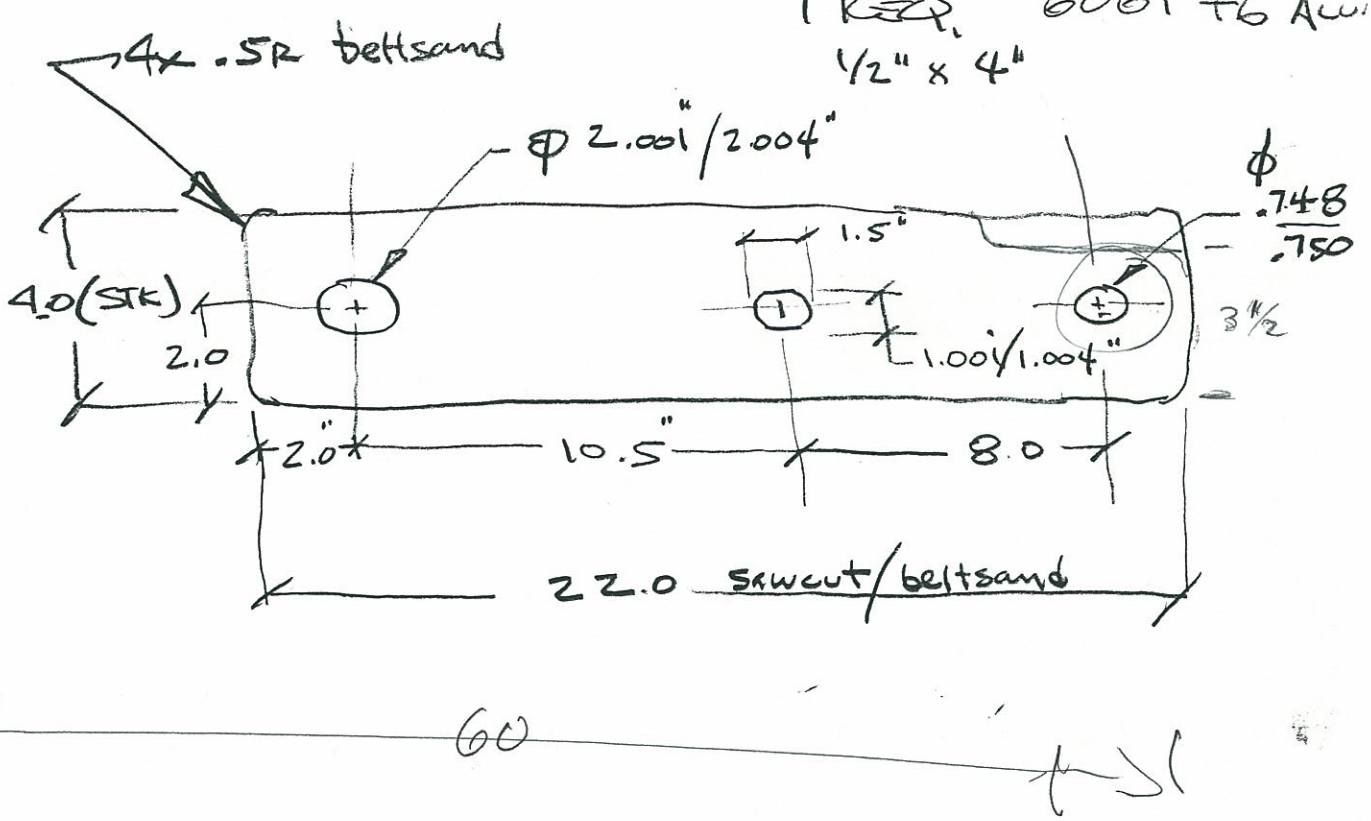
tootoo



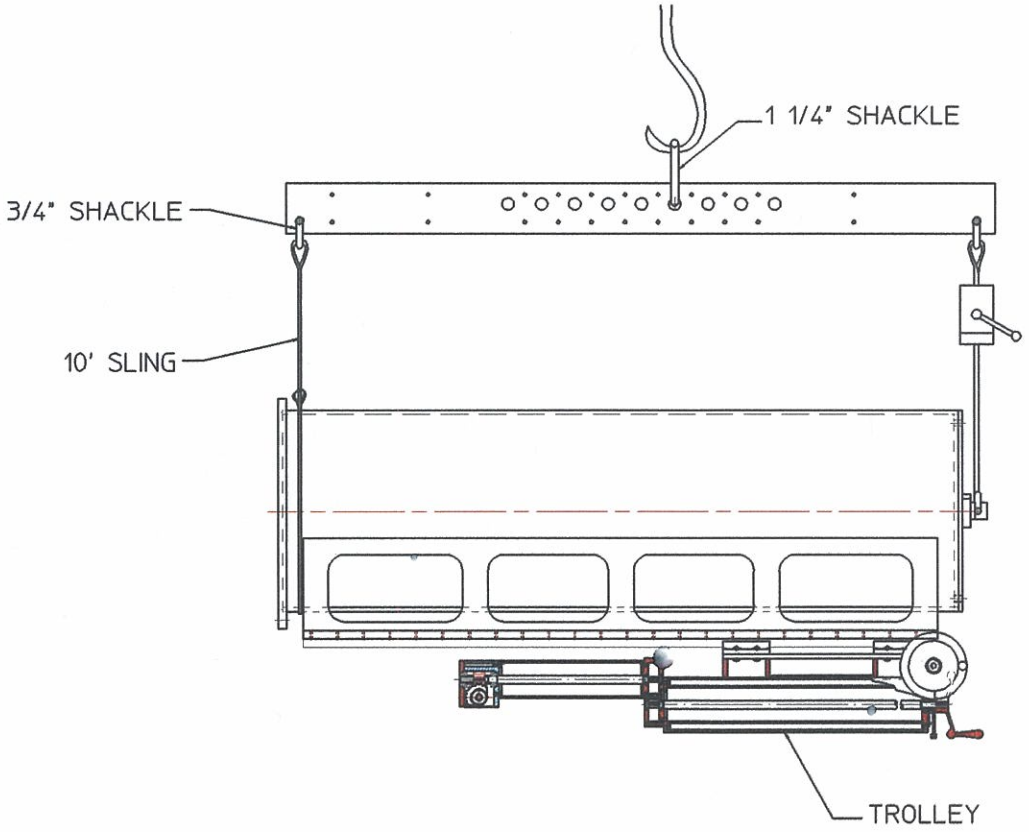
8052-30

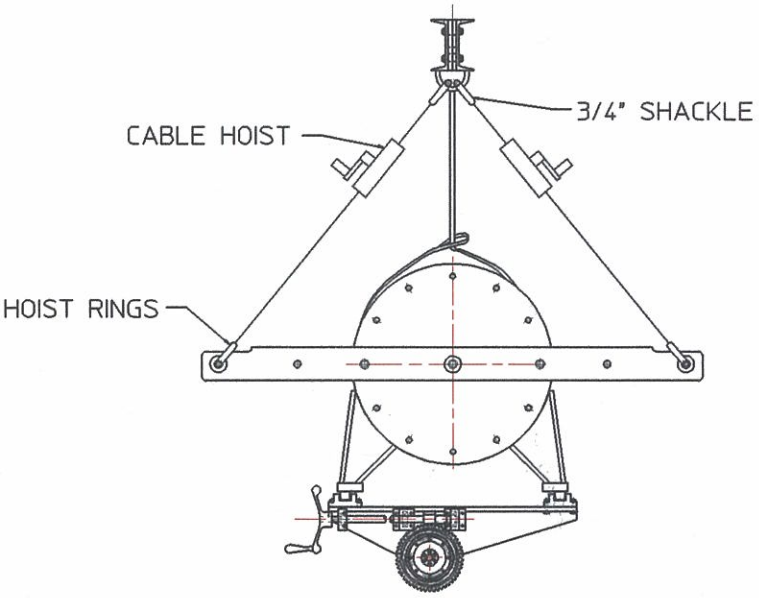
1 REQ. 6061 T6 Alu

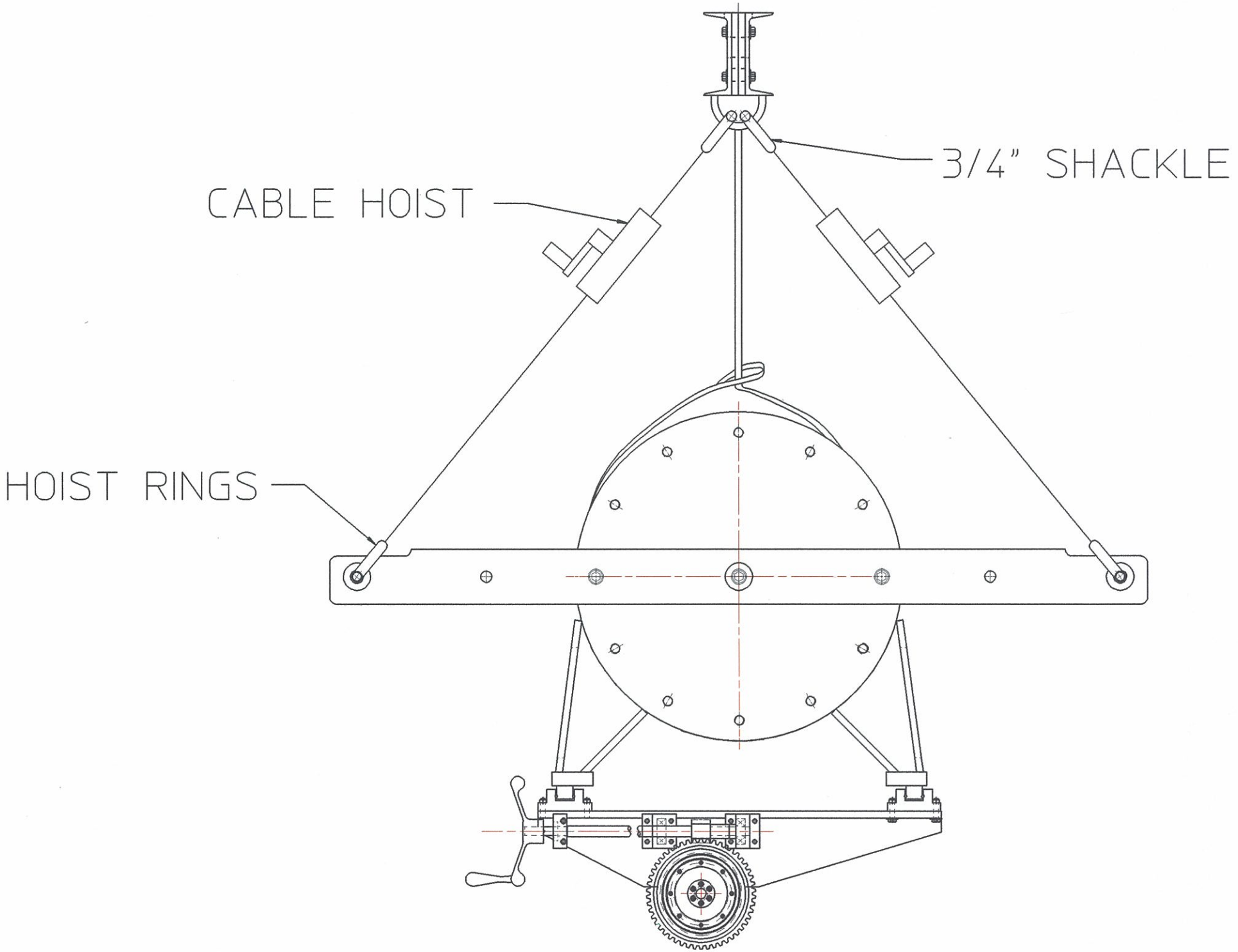
1/2" x 4"

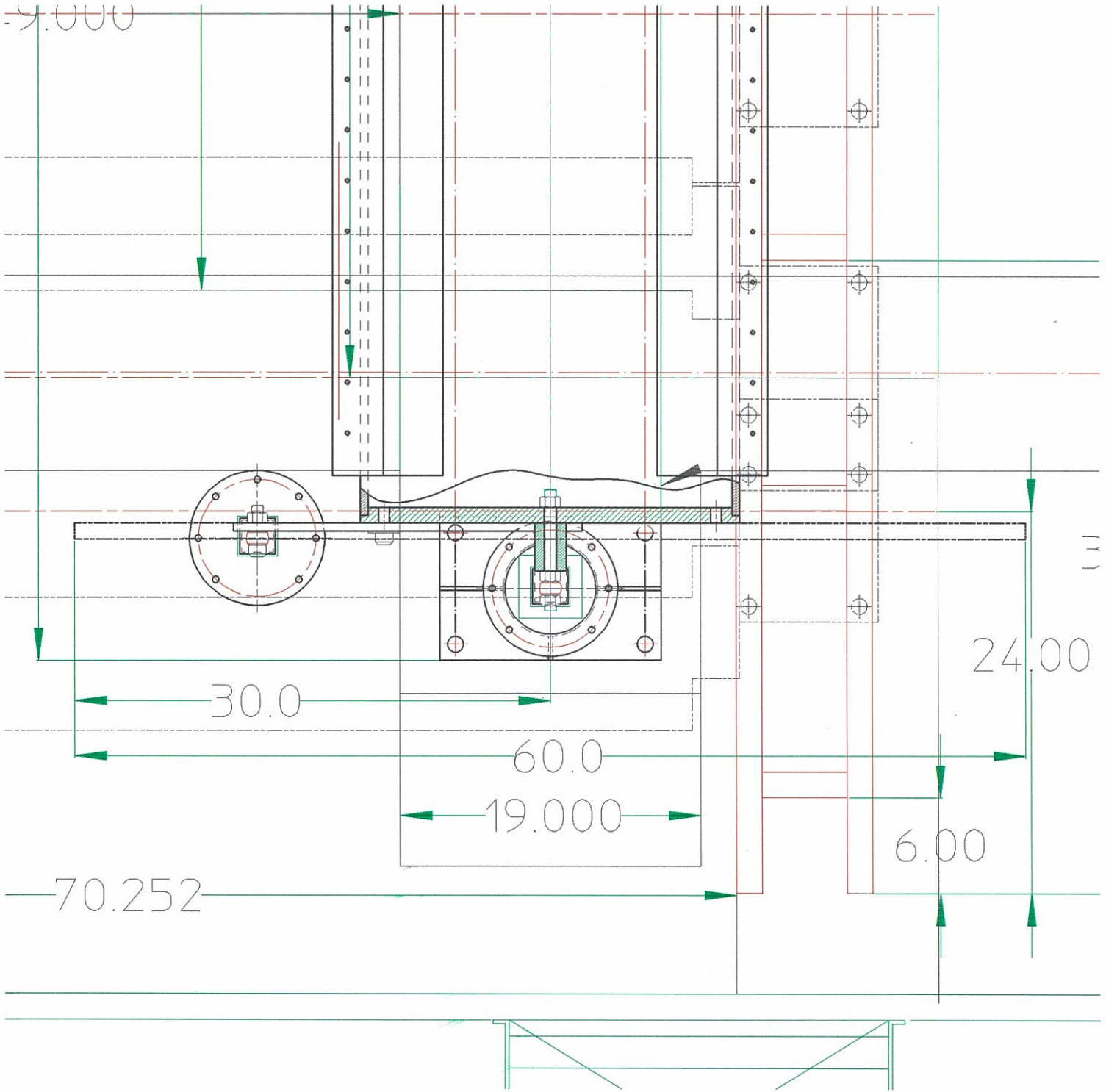


60


1 1/4" SHACKLE
3/4" SHACKLE
10' SLING
TROLLEY


CABLE HOIST
3/4" SHACKLE
HOIST RINGS


3/4" SHACKLE
CABLE HOIST
HOIST RINGS


9.000
24.00
30.0
60.0
19.000
6.00
70.252

PRS

130 UNIVERSITY OF CALIF
2700 7TH ST
BERKELEY CA 94710
GARY KOEHLER/M.S.70-311

(CALLER) LISA BRINKERHOFF

YOUR PURCHASE ORDER NUMBER
9611
ITEMS ORDERED 2

MCMASTER-CARR SUPPLY COMPANY
9630 NORWALK BLVD
SANTA FE SPRINGS CA 90670-2932
IF THERE ARE ANY QUESTIONS ABOUT THIS SHIPMENT CONTACT OUR SALES DEPARTMENT
(562)692-5911

MCM NUMBER 4587593-01

WAREHOUSE LOCATION	MCMASTER CARR PART NUMBER	FILL QUANTITY	ITEM DESCRIPTION	YOUR LINE	YOU ORDERED	WE SHIPPED
2- 77-15 62-06	90473 A250	1 PK	GRADE 2 ZINC-PLATED STEEL HEX NUT 1"-12 SCREW SZ,FINE THREAD,1-1/2" WD,55/64" HT PKG= 5 EA/PK 1	2	1 PK	1
2-105	92196 A851	4 EA	18-8 STAINLESS STEEL SOCKET HEAD CAP SCREW 3/4"-10 COARSE THREAD,4" LENGTH PKG= 10 EA/PK 2	1	4 EA	4

McMASTER-CARR
supply company
SANTA FE SPRINGS, CALIFORNIA 90670 USA
TEL (310)695-2449
FAX (310)695-2323
E-MAIL: la.sales@mcmaster.com

MAIL PAYMENT TO:
P.O. BOX 7690
CHICAGO IL 60680-7690

REFER TO
THIS NUMBER.

INVOICE

NO. 458759301
DATE: DEC-01-97

BILL TO:
UNIVERSITY OF CALIF
LAWRENCE BERKELEY NATIONAL LABORATORY
U S DEPT OF ENERGY
1 CYCLOTRON RD
BERKELEY, CA 94720

SHIPPED TO:
UNIVERSITY OF CALIF
LAWRENCE BERKELEY NATIONAL LABORATORY
FOR U S DEPT OF ENERGY-PROCARD
2700 7TH ST
BERKELEY, CA 94710

GARY KOEHLER/M.S.70-311

YOUR PURCHASE ORDER NUMBER: 9611
LISA BRINKERHOFF
DATE SHIPPED: 12/1/97 VIA: UPS FOB: DEST
TIME SHIPPED: 12:05 P.M.
NO. OF PACKAGES 1 SHIP WT(LBS) 5
YOUR ACCOUNT NUMBER: 1323167-00
MCMASTER-CARR REFERENCE: 4587593-01
TERMS:CREDIT CARD

ITEM	MC MASTER-CARR PART NUMBER AND DESCRIPTION	ORDER	BALANCE	SHIPPED	UNIT PRICE	EXTENSION
1	92196A851 18-8 STAINLESS STEEL SOCKET HEAD CAP SCREW 3/4"-10 COARSE THREAD, 4" LENGTH	4 EA		4 EA	12.89 EA	51.56
2	90473A250 GRADE 2 ZINC-PLATED STEEL HEX NUT 1"-12 SCREW SZ, FINE THREAD, 1-1/2" WD, 55/64" HT	1 PK		1 PK	8.69 PK	8.69

SUBTOTAL: 60.25
CREDIT CARD PAYMENT: 60.25
TOTAL: $.00

THANK YOU FOR PLACING YOUR ORDER WITH MCMASTER-CARR.
THIS ORDER WAS CHARGED TO YOUR CREDIT CARD: LISA B./M.S.46-125

FEDERAL I.D. # 36-1458720 1205 A

56

UNIVERSITY OF CALIF
2700 7TH ST
BERKELEY CA 94710
GARY COHLER/70311 BLD

(CALLER) JOHN MOREAU

YOUR PURCHASE ORDER NUMBER
10017

ITEMS ORDERED 1

MCMASTER-CARR SUPPLY COMPANY
9630 NORWALK BLVD
SANTA FE SPRINGS CA 90670-2932

IF THERE ARE ANY QUESTIONS ABOUT THIS SHIPMENT CONTACT OUR SALES DEPARTMENT
(562)692-5911

MCM NUMBER
4826627-01

WAREHOUSE LOCATION	MCMASTER CARR PART NUMBER	FILL QUANTITY	ITEM DESCRIPTION	YOUR LINE	YOU ORDERED	WE SHIPPED
8- 17-19 04	3001 T61	2 EA	DROP FORGED GALV STEEL JAW & JAW TURNBUCKLE 3/4"-10 THREAD,6" TAKE-UP,16-3/4"APPROX CLSD LG 8 RPA	1	2 EA	2

PRINT NUMBERS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
REQUEST FOR PROCUREMENT

SERIAL NUMBER

REQUESTER GARY KOEHLER DATE REQUESTED 12/10/97

DELIVER TO ↑ DATE NEEDED 1 week

BLDG 70 ROOM 311 (MS 70A-3307) PHONE NUMBER 7931

ACCOUNT NO. 8052-30 AUTHORIZED SIGNATURE G. Koehler

QUANTITY	DESCRIPTION	APPROX PRICE
2 each	McMaster # 3001T61 JAW END TURNBUCKLES	$75-

VENDOR McMaster-Carr

ADDRESS

CITY STATE

PHONE NUMBER

CONTACT

REMARKS

REQUISITION NUMBER

SHIP CODE

TOTAL COST

P.O. NO.

TERMS

PICK UP DATE

TIME AFTER

CLOSED DURING LUNCH YES ☐ NO ☐

VEHICLE

XBG 662
(REV.2/92)

F2/9

PRINT NUMBERS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
REQUEST FOR PROCUREMENT

SERIAL NUMBER

REQUESTER GARY KOEHLER DATE REQUESTED 12/9/97

DELIVER TO ↑ DATE NEEDED 1 week

BLDG 70 ROOM 311 (MS 70A-3307) PHONE NUMBER 7931

ACCOUNT NO. 8052-30 AUTHORIZED SIGNATURE G. Koehler

QUANTITY	DESCRIPTION	APPROX PRICE
2'-3'	3/4" ϕ steel bearing shafting, tolerance +.000" -.001"	

VENDOR

ADDRESS

CITY STATE

PHONE NUMBER

CONTACT

REMARKS

REQUISITION NUMBER

SHIP CODE

TOTAL COST

P.O. NO.

TERMS

PICK UP DATE

TIME AFTER

CLOSED DURING LUNCH YES ☐ NO ☐

VEHICLE

XBG 662
(REV. 2/92)

PRINT NUMBERS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
REQUEST FOR PROCUREMENT

SERIAL NUMBER

REQUESTER GARY KOEHLER ↑ DATE REQUESTED 12/8/97

DELIVER TO ↑ DATE NEEDED 1 week

BLDG 70 ROOM 311 (MS 70A-3307) PHONE NUMBER 7931

ACCOUNT NO. 8052-30 AUTHORIZED SIGNATURE G. Koehler

QUANTITY	DESCRIPTION	APPROX PRICE
	BOSTON GEAR PRODUCTS @	
4 EACH	#30686 CONNECTING LINK	
1 EACH	# 30044 10' CHAIN PACKAGE	
2 EACH	SPRING CLIP ↑ CONNECTING LINK FOR #35 CHAIN	
2 EACH	# 68258 Sprocket	
2 EACH	# 64682 PILLOW BLOCK	
4 EACH	# 64684 " "	
1 EACH	# 12856 WORM	
1 EACH	# 13780 WORM GEAR	

VENDOR _____ SHIP CODE _____

ADDRESS _____ TOTAL COST _____

CITY _____ STATE _____ P.O. NO. _____

PHONE NUMBER _____ TERMS _____

CONTACT _____ PICK UP DATE _____

REMARKS TIME AFTER _____

CLOSED DURING LUNCH YES ☐ NO ☐

REQUISITION NUMBER _____ VEHICLE _____

XBG 662
(REV. 2/92)

LISA 5521

LISA

PRINT NUMBERS

UNIVERSITY OF CALIFOR[illegible]
LAWRENCE BERKELEY LA
REQUEST FOR PROCUREME

SERIAL NUMBER

DAVE DAYTON

REQUESTER JOHN ORTIZ DAT

DELIVER TO SEE BELOW " DAT

BLDG 70 ROOM 3307 PHO

ACCOUNT NO. 8052-30 AUTHORIZED SIGNATURE

MORE PARTS COMING YOUR WAY DUE 4/6/98 @ BNL

QUANTITY	DESCRIPTION	
4	- TAPPED END STRAP CL REID NO. CTE-8 1/2" x 1" x 3 1/4" Lg.	
4	- SETUP STUDS, 5/16-18 THD x 3" Lg. REID NO. SUS-1	1.23 EA.
4	- FLANGE NUTS, 5/16-18 THD, STEEL, REID NO. FNC-2	1.57 EA.

SHIP DIRECT TO: WIRTH / DAYTON
BLDG. 1006
BROOKHAVEN NATIONAL LAB
UPTON, NY 11973

VENDOR REID TOOL SUPPLY

ADDRESS

CITY STATE

PHONE NUMBER 800-253-0421

CONTACT

REMARKS FOLLOW-ON ORDER (1st SET OF PARTS LOST)
P.N. FROM 95-96 CATALOG

REQUISITION NUMBER

SHIP CODE

TOTAL COST

P.O. NO.

TERMS

PICK UP DATE

TIME AFTER

CLOSED DURING LUNCH YES ☐ NO ☐

VEHICLE

XBG 662
(REV. 2/92)

FAXED 4/1/98 2:00pm

Reid Tool Supply Company
2265 Black Creek Road ● Muskegon, Michigan 49444 ● (616) 777-3951

U.P.S.

140614600

P.O. #: 13576

Shipper No. 1406146-00
Page 1

Bill To

UNIVERSITY OF CALIFORNIA
L B L ACCOUNTING DEPT 208584
PO BOX 528
BERKELEY CA 94701-0528

Ship To

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
1 CYCLOTRON RD
BERKELEY CA 94720

Attn: JOHN ORITZ BUILD 70

JOHN MOREAU PURCHG AGT Phone (510) 486-1777

CUSTOMER NO	YOUR P.O. NO	SCHED DTE	SHIP VIA	DATE	SHIPPER NO
0056801-001	13576	**03/24/98**	**U.P.S.**	03/24/98	**1406146-00**

LINE	ORDER QTY	LOCATION	ITEM NUMBER	ITEM DESCRIPTION	SHIP QTY	BACK ORDERED
2	4	**R-23-D -2**	SUS-1	SET-UP STUD 5/16 X 3 7318.15	4	0
1	4	**T-18-H -1**	CTE-8	3.25X1 TAPPED END CLAMP 8466.20 MADE IN CHINA	4	0
3	4	**T-30-G -2**	FNC-2	FLANGE NUT 5/16-18 7318.16	4	0
			SEND INVOICE TO : JOHN MOREAU FAX # 1-510-486-6668			

ALL ITEMS MANUFACTURED IN THE U.S.A. UNLESS OTHERWISE NOTED.
THANK YOU VERY MUCH FOR YOUR ORDER

Total Number of Items: 3 Estimated Weight: 1 lb 12.80 oz 0.816 kg

Opr: LAA Branch: 01 SLSM: 000
RSL
Picker: Packer:

Packing List

Checker:

Lawrence Berkeley Laboratory - STAR Project 1 Cyclotron Road Berkeley, CA 94720 MS 70A-3307

FAX

Date: 4/1/98

Number of pages including cover sheet: 2

To: John Moreau

Phone: 5523

Fax phone: 6668

CC:

From: JOHN ORTIZ

Phone: (510) 486- 7298

Fax phone: (510) 486-7105

E-mail @lbl.gov

REMARKS: ☒ Urgent ☐ For your review ☐ Reply ASAP ☐ Please comment

THIS PKG WAS EMPTY WHEN IT WAS PICKED UP FROM THE CAGE IN BLDG 70A. THIS IS A COPY OF THE INVOICE & WE NEED TO REORDER AND FED X IT OVER NIGHT.

THANKS,

John Ortiz

PRINT NUMBERS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
REQUEST FOR PROCUREMENT

SERIAL NUMBER

REQUESTER JOHN ORTIZ DATE REQUESTED 3/24/98

DELIVER TO " " DATE NEEDED 4/1/98

BLDG 70 ROOM 3307 PHONE NUMBER X7298

ACCOUNT NO. 8052-30 AUTHORIZED SIGNATURE Russell Wilk

QUANTITY	DESCRIPTION	APPROX PRICE
4	- TAPPED END STRAP CLAMP REID NO. CTE-8 1/2" x 1" x 3 1/4" Lg.	7.95 ea.
4	- SETUP STUDS, 5/16-18 THD x 3" Lg. REID NO. SUS-1	1.23 ea.
4	- FLANGE NUTS, 5/16-18 THD, STEEL, REID NO. FNC-2	1.57 ea.

VENDOR REID TOOL SUPPLY

ADDRESS

CITY STATE

PHONE NUMBER 800-253-0421

CONTACT

REMARKS

P.N. FROM 95-96 CATALOG

REQUISITION NUMBER

SHIP CODE

TOTAL COST

P.O. NO.

TERMS

PICK UP DATE

TIME AFTER

CLOSED DURING LUNCH YES ☐ NO ☐

VEHICLE

XBG 662
(REV. 2/92)

Lawrence Berkeley Laboratory - STAR Project 1 Cyclotron Road Berkeley, CA 94720 MS 70A-3307

FAX

Date: 3/24/98

Number of pages including cover sheet: 2

To:
JOHN, JOHN OR LISA

Phone:

Fax phone:

CC:

From:
JOHN ORTIZ

Phone: (510) 486- 7298

Fax phone: (510) 486-7105

E-mail @lbl.gov

REMARKS: ☒ Urgent ☐ For your review ☐ Reply ASAP ☐ Please comment

Please let me know if there is a problem in acquiring these items.

Thanks,

John Ortiz

PRINT NUMBERS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
REQUEST FOR PROCUREMENT

SERIAL NUMBER

REQUESTER Gary Koehler DATE REQUESTED 1/29/98

DELIVER TO John Wirth DATE NEEDED 3 days

BLDG 77 ROOM _____ PHONE NUMBER 5901

ACCOUNT NO. 8052-30 AUTHORIZED SIGNATURE _____

QUANTITY	DESCRIPTION	APPROX PRICE
1 ea	WORM GEAR CABLE PULLER HOIST #33615T15 McMASTER CARR	$75 each

VENDOR _____

ADDRESS _____

CITY _____ STATE _____

PHONE NUMBER _____

CONTACT _____

REMARKS SHIP FASTEST WAY UPS

REQUISITION NUMBER _____

SHIP CODE _____

TOTAL COST _____

P.O. NO. _____

TERMS _____

PICK UP DATE _____

TIME AFTER _____

CLOSED DURING LUNCH YES ☐ NO ☐

VEHICLE _____

XBG 662
(REV. 2/92)

113 UNIVERSITY OF CALIF
[redacted] 7TH ST
[redacted]KELEY CA 94710
JOHN ORTIZ, BLDG 70-307
(CALLER) JOHN

YOUR PURCHASE ORDER NUMBER
4090
ITEMS ORDERED 2

MCMASTER-CARR SUPPLY COMPANY
9630 NORWALK BLVD
SANTA FE SPRINGS CA 90670-2932
IF THERE ARE ANY QUESTIONS ABOUT THIS SHIPMENT CONTACT OUR SALES DEPARTMENT
(562)692-5911

MCM NUMBER 6214356-01

WAREHOUSE LOCATION	MCMASTER CARR PART NUMBER	FILL QUANTITY	ITEM DESCRIPTION	YOUR LINE	YOU ORDERED	WE SHIPPED
2- 78-12 **44-78**	91259 **A132**	1 EA	ALLOY STEEL STANDARD SHOULDER SCREW 1" DIA X 1-1/2" LONG,3/4"-10 THREAD PKG= 10 EA/PK 1	1	1 EA	1
2- 80-02 **09-14**	91259 **A845**	1 EA	ALLOY STEEL STANDARD SHOULDER SCREW 3/4" DIA X 2-1/2" LONG,5/8"-11 THREAD PKG= 10 EA/PK PKG= 10	2	1 EA	1

McMASTER-CARR
supply company
SANTA FE SPRINGS, CALIFORNIA 90670 USA
TEL (310)695-2449
FAX (310)695-2323

MAIL PAYMENT TO:
P.O. BOX 7690
CHICAGO IL 60680-7690

REFER TO
THIS NUMBER.

INVOICE

NO. 621435601
DATE: MAY-01-97

BILL TO:
UNIVERSITY OF CALIF
LAWRENCE BERKELEY NATIONAL LABORATORY
1 CYCLOTRON RD
BERKELEY, CA 94720-0001

SHIPPED TO:
UNIVERSITY OF CALIF
LAWRENCE BERKELEY NATIONAL LABORATORY
FOR U S DEPT OF ENERGY-PROCARD
2700 7TH ST
BERKELEY, CA 94710

JOHN ORTIZ, BLDG 70-307

YOUR PURCHASE ORDER NUMBER: 4090
JOHN
DATE SHIPPED: 5/1/97 VIA: UPS FOB: DEST
TIME SHIPPED: 5:26 P.M.
NO. OF PACKAGES 1 SHIP WT(LBS) 3
YOUR ACCOUNT NUMBER: 1323167-00
MCMASTER-CARR REFERENCE : 6214356-01
TERMS:CREDIT CARD

ITEM	MC MASTER-CARR PART NUMBER AND DESCRIPTION	ORDER	BALANCE	SHIPPED	UNIT PRICE	EXTENSION
1	91259A132 ALLOY STEEL STANDARD SHOULDER SCREW 1" DIA X 1-1/2" LONG, 3/4"-10 THREAD	1 EA		1 EA	15.26 EA	15.26
2	91259A845 ALLOY STEEL STANDARD SHOULDER SCREW 3/4" DIA X 2-1/2" LONG, 5/8"-11 THREAD	1 EA		1 EA	7.15 EA	7.15

SUBTOTAL:	22.41
CREDIT CARD PAYMENT:	22.41
TOTAL:	$.00

THANK YOU FOR PLACING YOUR ORDER WITH MCMASTER-CARR.
THIS ORDER WAS CHARGED TO YOUR CREDIT CARD: JOHN MOREAU M/S 46-125

FEDERAL I.D. # 36-1458720

PRINT NUMBERS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
REQUEST FOR PROCUREMENT

SERIAL NUMBER

REQUESTER John Ortiz DATE REQUESTED 4/30/96

DELIVER TO John Ortiz DATE NEEDED 5/ /97

BLDG 70 ROOM 307 PHONE NUMBER X7298

ACCOUNT NO. 8052-30 AUTHORIZED SIGNATURE Gary Koch

ITEM	QUANTITY	DESCRIPTION	APPROX PRICE
1	1	Shoulder bolt, steel 1" DIA. x 1 1/2 lg x 3/4-10 UNC-2A THD	
2	1	Shoulder bolt, steel 3/4" DIA x 2 1/2 lg. x 5/8-11 UNC-2A THD	

VENDOR

ADDRESS

CITY STATE

PHONE NUMBER

CONTACT

REMARKS

REQUISITION NUMBER

SHIP CODE

TOTAL COST

P.O. NO.

TERMS

PICK UP DATE

TIME AFTER

CLOSED DURING LUNCH YES ☐ NO ☐

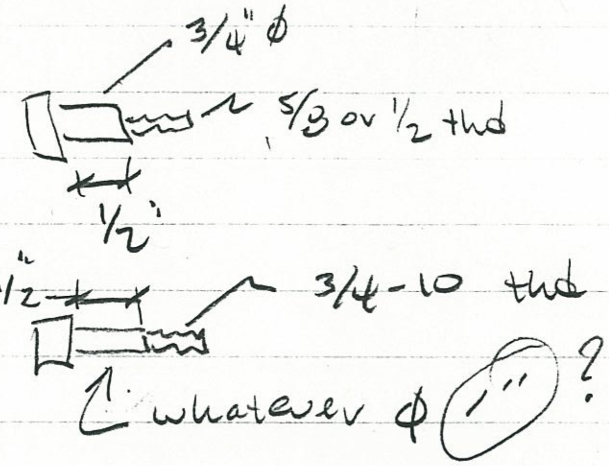
VEHICLE

XBG 662
(REV. 2/92)

2 - 3/4" shoulder bolts
Steel.

2. ~~1.5~~

1. ~~2.5~~



PRINT NUMBERS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB

SERIAL NUMBER

REQUEST FOR PROCUREMENT

REQUESTER John Ortiz DATE REQUESTED 4/4/97

DELIVER TO Doug Martin DATE NEEDED 4/10/97

BLDG 70 ROOM PHONE NUMBER X7298

ACCOUNT NO. 8052-30 AUTHORIZED SIGNATURE Gary Koll

QUANTITY	DESCRIPTION	APPROX PRICE
2	GAUGE PINS	ϕ.549
2	" "	ϕ.5495
2	" "	ϕ.550
2	" "	ϕ.551
1	" "	ϕ.557

VENDOR

ADDRESS

CITY STATE

PHONE NUMBER

CONTACT

REMARKS

REQUISITION NUMBER

SHIP CODE

TOTAL COST

P.O. NO.

TERMS

PICK UP DATE

TIME AFTER

CLOSED DURING LUNCH YES ☐ NO ☐

VEHICLE

XBG 662
(REV. 2/92)

PRINT NUMBERS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
REQUEST FOR PROCUREMENT

SERIAL NUMBER

REQUESTER Gary Koehler DATE REQUESTED 3-21-97

DELIVER TO Doug @ Bldg 77 DATE NEEDED 1 week

BLDG 70 ROOM 311 PHONE NUMBER 7931

ACCOUNT NO. 8052-30 AUTHORIZED SIGNATURE G Koehler

QUANTITY	DESCRIPTION	APPROX PRICE
18"	Steel tubing, 4½" O.D. x .25" wall, EW 1026 DOM	162 + 25 to cut = $187 —

VENDOR

ADDRESS

CITY STATE

PHONE NUMBER 475-5700

CONTACT Sandy @ tubesales

REMARKS

UPS → Bldg 77.

REQUISITION NUMBER

SHIP CODE

TOTAL COST

P.O. NO.

TERMS

PICK UP DATE

TIME AFTER

CLOSED DURING LUNCH YES ☐ NO ☐

VEHICLE

XBG 662
(REV.2/92)

J & M FASTENERS

181-B MAYHEW WAY
WALNUT CREEK, CALIFORNIA 94596

(510) 932-4484

"DEPENDABLE SOURCE FOR FASTENERS"

No. Quote

Date 2-18-97

ACCT NO

CUSTOMER'S NO

ORDERED BY Gary

UCLBL

PHONE NO 486-7931

FAX 486-7105

CHARGE TO

ADDRESS

SHIP TO

SHIP VIA | WILL CALL | FOB | TERMS | ☐ TAXABLE ☐ RESALE

B/O #	STOCK	QTY ORD		PRICE	SHIPPED	B/O	COMMENTS
			Allen Nut-Alloy	R or C			
	15	12	3/8"-16	159.74			
	20	12	5/8"-11	438.25			

CODE

REC'D BY

99

02-18-1997 02:17PM FROM J&M FASTENERS TO 4867105 P.02

DATE: 13-MAR-97

LBL PACKING LIST
****

Requisition Number

PO Number 6449303

Total PO Amount 140.00

Deliver To	ORTIZ, JOHN M
Location	070 0311

Account Number 8052-22

Job Order Number

Receipt Number 69399

Received By RJMCKEEV On 13-MAR-97

Vendor Name	Buyer Name	Phone
Bokers Inc	BRINKERHOFF, LISA A	510-486-5521

Line	Item Description	Ordered	Received	Open
1	Aluminum washer, 2024 .580 O	100	110.00	-10.00
Receiver Notes	vendor overshipped 10ea; overage accepted and sent on to u r			

BOKER'S, INC.

STAMPING & WASHER SPECIALISTS

3104 Snelling Avenue • Minneapolis, Minnesota 55406

Phone: 612/729-9365 • Fax: 612/729-8910

Toll Free 1-800/927-4377

Boker's, Inc., as a metal stamping job shop, produces customer parts to specific customer specifications. These parts, to our knowledge, fall within the "end user function" definition under applicable federal and state regulations, and are classified as non-hazardous "articles" within the meaning of those regulations. Should you require material safety data sheets regarding your Boker's, Inc. parts, please contact Barry Tedlund at (612) 729-9365

Robert Fisher

Plant Manager

JOB ORDERS

JOB ORDER ☒ PROCUREMENT ☐ MAKE/BUY NO. _____ PAGE 1 OF 1

ISSUED TO: C&M Shops ☐ Elec. Shops ☐ Elec. Eng. ☐ Env. Hlth/Safety ☐
PR. Mech. Shops ☒ Mech. Tech. ☐ Mech. Eng. ☐ Inst. Sci./Eng. ☐

Date 4/17/97 | Account No. 8052-30 | Serial No. 036243

Ordered By: JOAN ORTIZ 7298 Ext.

Refer Questions To: ← Ext.

Job Requested By: (Client) R. WELLS Ext.

Design Check By: (Engineer Responsible) G. KOEHLER Ext.

Production Check By: [signature] Date 4-17-97

Authorized By: C. Koehler Date 4/17/97

Residual Risks Accepted By:

Job Description: RHIC-STAR-TPC

SECTOR MOUNTING TOOL

SPIDER SINGLE LEG-OUTER SECTOR

DELIVER TO:	NAME	Bldg.	Rm.	Ext.	DUE DATE
PARTS	John Wirth	77A			~~4/25/97~~
ASSEMBLY					GK/cw 5/9/97

REFERENCE DISTRIBUTION SEND COPIES TO:	Bldg.	Rm.	PRINTS J.O.	PRINTS DWGS.
WELLS	70	314	✓	
KOEHLER	↓	311	✓	✓
ORTIZ	↓	307	✓	✓
WIRTH	77A		✓	✓

WORK DISTRIBUTION

CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.	CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.
MECH. ENG.				MECH. SHOP OFF.	40	2	2
MECH. TECH. OFF.				ASS'Y SHOP			
SHOP 25				MACH. SHOP			
SHOP 71				PAINT SHOP			
SHOP				SHEET METAL			
SHOP				WELDING SHOP			
ELECT. ENG.				C&M OFFICE			
COORDINATING				CARPENTERS			
DRAFTING				ELECTRICIANS			
ELECT. FAB.				LABORERS			
ELECT. INSTALL				MAINT. TECHS			
ELECT. MAINT.				PAINTERS			
ELECT. Q.A.				PLUMBERS			
OPER. CHECK							
TECH. SUPP.				TOTAL HRS 40 AT HR.			
ELEC-MECH. 80				LABOR $ 2,000 00			
				MATERIAL $ -0-			
SAFETY SHOPS				TOTAL $ 2,000 00			

SAFETY/ENVIRONMENTAL ANALYSIS BY: DATE:
PRELIM. _____ FINAL _____

FABRICATION:
☒ LBL SHOPS
☐ OUTSIDE SHOPS
Attach completed MAKE/BUY form when Mech. Shops labor exceeds $~~1000~~

SPACE RESERVED FOR DEPARTMENTS RECEIVING COPIES

MECH ENGR DEPT APR 18 1997 RECEIVED

PRINT DIVISION MECH ENGR DEPT LBL. BERKELEY APR 18 3 07 PM '97

ITEM NO.	SHOP USE	DRAWING OR PART NUMBER	QUANTITY	NAME – DESCRIPTION – INSTRUCTIONS
1.		24A9846A	1	SPIDER DOUBLE LEG-OUTER SECTOR
2.		24A9854A	1	SPIDER SINGLE LEG - OUTER SECTOR
NOTE:				
	SEE DOUG			MORTON FOR MATERIAL

RL-527 7600-54597 (Rev. 10/80)

ESTIMATE TOTALS

serial#	print#	supv	helper	INSP	CMM	NC	NCP	SHOP	E	P&E	SM	W ELD	NCW	CER	ASSY	CONT	UHVC	PAINT
036243	24A9846A	0		2		20	3	1	5							6	.5	
036243	24A9854A	0		1.5		14	1.5	2									.5	
		0		3.5		34	4.5	3	5							6	1	

Total Hours

57

Total Cost (incl Helper & Cont)

$2,921.82

JOB ORDER ☑ PROCUREMENT ☐ MAKE/BUY NO. _____ PAGE 1 OF 1

ISSUED TO: C&M Shops ☐ Elec. Shops ☐ Elec. Eng. ☐ Env. Hlth/Safety ☐
PR. Mech. Shops ☒ Mech. Tech. ☐ Mech. Eng. ☐ Inst. Sci./Eng. ☐

Date 6/19/97 | Account No. 8052-30 | Serial No. 036366

Ordered By: John Ortiz Ext. 7298 | Refer Questions To: ← Ext.

Job Requested By: (Client) GARY KOEHLER Ext.

Design Check By: (Engineer Responsible) GARY KOEHLER Ext.

Production Check By: 6-20-97 Date | Authorized By: Gary Koehler 6/18/97 Date

Job Description: RHIC-STAR-TPC | Residual Risks Accepted By:

TPC ASSEMBLE & TEST

SMT- SPIDER DOUBLE LEG IS

DELIVER TO:	NAME	Bldg.	Rm.	Ext.	DUE DATE
PARTS	JON WIRTH	77A			6/25/97
ASSEMBLY					

REFERENCE DISTRIBUTION SEND COPIES TO:	Bldg.	Rm.	PRINTS J.O.	PRINTS DWGS.
RUSS WELLS	70		✓	
GARY KOEHLER	↓		✓	✓
JOHN ORTIZ			✓	✓
JON WIRTH	77A		✓	✓
DOUG MORTON	77		✓	

WORK DISTRIBUTION

CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.	CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.
MECH. ENG.				MECH. SHOP OFF.	32	2	2
MECH. TECH. OFF.				ASS'Y SHOP			
SHOP 25				MACH. SHOP			
SHOP 71				PAINT SHOP			
SHOP				SHEET METAL			
SHOP				WELDING SHOP			
ELECT. ENG.				C&M OFFICE			
COORDINATING				CARPENTERS			
DRAFTING				ELECTRICIANS			
ELECT. FAB.				LABORERS			
ELECT. INSTALL				MAINT. TECHS			
ELECT. MAINT.				PAINTERS			
ELECT. Q.A.				PLUMBERS			
OPER. CHECK							
TECH. SUPP.				TOTAL HRS 32 AT 50 HR.			
ELEC-MECH. 80				LABOR $ 1,600.00			
				MATERIAL $ -01			
SAFETY SHOPS				TOTAL $ 1,600.00			

SAFETY/ENVIRONMENTAL ANALYSIS
BY: DATE:
_____ PRELIM. _____
_____ FINAL _____

FABRICATION:
☒ LBL SHOPS
☐ OUTSIDE SHOPS
Attach completed MAKE/BUY form when Mech. Shops labor exceeds $1000

SPACE RESERVED FOR DEPARTMENTS RECEIVING COPIES

PRINT DIVISION
MECH ENGR DEPT
LBL.
BERKELEY
JUN 20 10 33 AM '97

ITEM NO.	SHOP USE	DRAWING OR PART NUMBER	QUANTITY	NAME — DESCRIPTION — INSTRUCTIONS
1		24A9896A	1	SMT - SPIDER DOUBLE LEG
				INNER SECTOR
	NOTE:			
		SEE DOUG		MORTON FOR MATERIAL

JOB ORDER

ESTIMATE TOTALS

serial#	print#	supv	helper	INSP	CMM	NC	NCP	SHOP	E	P&E	SM	W ELD	NCW	CER	ASSY	CONT	UHVC	PAINT
036366	24A9896A	0		1.75		28	3		2								.5	
		0		1.75		28	3		2								.5	

Total Hours

35.25

Total Cost (incl Helper & Cont)

$1,806.92

JOB ORDER ☒ PROCUREMENT ☐ MAKE/BUY NO. _____ PAGE 1 OF 1

ISSUED TO: C&M Shops ☐ Elec. Shops ☐ Elec. Eng. ☐ Env. Hlth/Safety ☐
PR. Mech. Shops ☒ Mech. Tech. ☐ Mech. Eng. ☐ Inst. Sci./Eng. ☐

Date 6/18/97 | Account No. 8052-30 | Serial No. 036360

Ordered By: John Ortiz Ext. 7298 | Refer Questions To: ← Ext.

Job Requested By: (Client) GARY KOEHLER Ext.

Design Check By: (Engineer Responsible) GARY KOEHLER Ext.

Production Check By: [signature] Date 6/18/97 | Authorized By: [signature] Date 6/18/97

Job Description: RHIC - STAR - TPC | Residual Risks Accepted By:

TPC ASSEMBLE & TEST

SMT - IS SINGLE SPIDER LEG

DELIVER TO:	NAME	Bldg.	Rm.	Ext.	DUE DATE
PARTS	JOHN WIRTH	77A			6/25/97
ASSEMBLY					

REFERENCE DISTRIBUTION SEND COPIES TO:	Bldg.	Rm.	PRINTS J.O.	PRINTS DWGS.
RUSS WELLS	70		✓	
GARY KOEHLER	70		✓	✓
JOHN ORTIZ	70		✓	✓
JOHN WIRTH	77A		✓	✓
DOUG MORTON	77		✓	

WORK DISTRIBUTION

CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.	CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.
MECH. ENG.				MECH. SHOP OFF.	16	2	2
MECH. TECH. OFF.				ASS'Y SHOP			
SHOP 25				MACH. SHOP			
SHOP 71				PAINT SHOP			
SHOP				SHEET METAL			
SHOP				WELDING SHOP			
ELECT. ENG.				C&M OFFICE			
COORDINATING				CARPENTERS			
DRAFTING				ELECTRICIANS			
ELECT. FAB.				LABORERS			
ELECT. INSTALL				MAINT. TECHS			
ELECT. MAINT.				PAINTERS			
ELECT. Q.A.				PLUMBERS			
OPER. CHECK							
TECH. SUPP.				TOTAL HRS 16 AT 50 HR.			
ELEC-MECH. 80				LABOR $ 800 00			
				MATERIAL $ —			
SAFETY SHOPS				TOTAL $ 800 00			

SAFETY/ENVIRONMENTAL ANALYSIS
BY: DATE:
_____ PRELIM. _____
_____ FINAL _____

FABRICATION:
☒ LBL SHOPS
☐ OUTSIDE SHOPS
Attach completed MAKE/BUY form when Mech. Shops labor exceeds $1000

SPACE RESERVED FOR DEPARTMENTS RECEIVING COPIES

PRINT DIVISION
MECH. ENGR DEPT
LBL. BERKELEY
JUN 18 11 29 AM '97

ITEM NO.	SHOP USE	DRAWING OR PART NUMBER	QUANTITY	NAME – DESCRIPTION – INSTRUCTIONS
1		24A9884A	1	SMT - IS SINGLE SPIDER LEG
*	NOTE:			
		SEE DOUG MORTON FOR MATERIAL.		

JOBORDER

RL-527 7600-54597 (Rev. 10/80)

ESTIMATE TOTALS

serial#	print#	supv	helper	INSP	CMM	NC	NCP	SHOP	E	P&E	SM	W ELD	NCW	CER	ASSY	CONT	UHVC	PAINT
036360	24A9884A	0		1		14	2		2								.5	
		0		1		14	2		2								.5	

Total Hours

19.5

Total Cost (incl Helper & Cont)

$999.57

JOB ORDER ☒ PROCUREMENT ☐ MAKE/BUY NO. _____ PAGE 1 OF 1

ISSUED TO: C&M Shops ☐ Elec. Shops ☐ Elec. Eng. ☐ Env. Hlth/Safety ☐
PR. Mech. Shops ☐ Mech. Tech. ☐ Mech. Eng. ☐ Inst. Sci./Eng. ☐

Date: 5/28/97 | Account No.: 8052-24 | Serial No.: 036287

Ordered By: John Ortiz Ext. 7298 | Refer Questions To: ← Ext.

Job Requested By: (Client) Russ Wells Ext.

Design Check By: (Engineer Responsible) Russ Wells Ext.

Production Check By: Lisa Dinkelacker Date 5/26/97 | Authorized By: Russell Wells Date 5/28/97

Job Description: RHIC-STAR-TPC | Residual Risks Accepted By:

SECTORS
OUTER SECTOR COOLING

DELIVER TO:	NAME	Bldg.	Rm.	Ext.	DUE DATE
PARTS	JOHN WIRTH	77A			6/6/97
ASSEMBLY					

REFERENCE DISTRIBUTION — SEND COPIES TO:	Bldg.	Rm.	PRINTS J.O.	PRINTS DWGS.
Russ Wells	70		✓	
John Ortiz	70		✓	✓
John Wirth	77A		✓	✓
Gary Koehler	70		✓	✓
Doug Morton	77A		✓	

WORK DISTRIBUTION

CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.	CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.
MECH. ENG.				MECH. SHOP OFF.	62	Z	Z
MECH. TECH. OFF.				ASS'Y SHOP			
SHOP 25				MACH. SHOP			
SHOP 71				PAINT SHOP			
SHOP				SHEET METAL			
SHOP				WELDING SHOP			
ELECT. ENG.				C&M OFFICE			
COORDINATING				CARPENTERS			
DRAFTING				ELECTRICIANS			
ELECT. FAB.				LABORERS			
ELECT. INSTALL				MAINT. TECHS			
ELECT. MAINT.	-			PAINTERS			
ELECT. Q.A.				PLUMBERS			
OPER. CHECK							
TECH. SUPP.				TOTAL HRS 60 AT 50 HR.			
ELEC-MECH. 80				LABOR $ 3,000 **			
				MATERIAL $ 1,260 **			
SAFETY SHOPS				TOTAL $ 4,260 **			

SAFETY/ENVIRONMENTAL ANALYSIS BY: _____ DATE: _____ PRELIM. _____ FINAL _____

FABRICATION: ☒ LBL SHOPS ☐ OUTSIDE SHOPS
Attach completed MAKE/BUY form when Mech. Shops labor exceeds $1000

SPACE RESERVED FOR DEPARTMENTS RECEIVING COPIES

PRINT DIVISION
MECH ENGR DEPT
LBL. BERKELEY
MAY 29 3 35 PM '97

ITEM NO.	SHOP USE	DRAWING OR PART NUMBER	QUANTITY	NAME — DESCRIPTION — INSTRUCTIONS
1		24A4266C	2	OUTER SECTOR COOLING MANIFOLD
				BONDING FIXTURE
*		NOTE:		
		SEE DOUG MORTON FOR MATERIAL		

ESTIMATE TOTALS

serial#	print#	supv	helper	INSP	CMM	NC	NCP	SHOP	E	P&E	SM	W ELD	NCW	CER	ASSY	CONT	UHVC	PAINT
036287	24A4266C	0		2.25		60	6		2								1	
		0		2.25		60	6		2								1	

Total Hours

71.25

Total Cost (incl Helper & Cont)

$3,652.28

JOB ORDER ☒ PROCUREMENT ☐ MAKE/BUY NO. _____ PAGE 1 OF 1

ISSUED TO: C&M Shops ☐ Elec. Shops ☐ Elec. Eng. ☐ Env. Hlth/Safety ☐
PR. Mech. Shops ☒ Mech. Tech. ☐ Mech. Eng. ☐ Inst. Sci./Eng. ☐

Date 3/18/97 | Account No. 8052-22 | Serial No. 036121

Ordered By: John Ortiz Ext. 7298 | Refer Questions To: ← Ext.

Job Requested By: (Client) RUSS WELLS Ext.

Design Check By: (Engineer Responsible) RUSS WELLS Ext.

Production Check By: [signature] Date 3/18/97 | Authorized By: Russell Wells Date 3/18/97

Job Description: RHIC-STAR-TPC | Residual Risks Accepted By:

INNER FIELD CAGE - END RINGS

COMPLIANT & FIXED RING

DELIVER TO:	NAME	Bldg.	Rm.	Ext.	DUE DATE
PARTS	BRADLEY	77A			4/30/97
ASSEMBLY					

REFERENCE DISTRIBUTION	Bldg.	Rm.	PRINTS J.O.	PRINTS DWGS.
SEND COPIES TO:				
WELLS	70		✓	
ORTIZ	↓		✓	✓
ANDERSSEN			✓	✓
FRITZ			✓	✓
BRADLEY	77A		✓	✓

WORK DISTRIBUTION

CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.	CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.
MECH. ENG.				MECH. SHOP OFF.	60	2	2
MECH. TECH. OFF.				ASS'Y SHOP			
SHOP 25				MACH. SHOP			
SHOP 71				PAINT SHOP			
SHOP				SHEET METAL			
SHOP				WELDING SHOP			
ELECT. ENG.				C&M OFFICE			
COORDINATING				CARPENTERS			
DRAFTING				ELECTRICIANS			
ELECT. FAB.				LABORERS			
ELECT. INSTALL				MAINT. TECHS			
ELECT. MAINT.				PAINTERS			
ELECT. Q.A.				PLUMBERS			
OPER. CHECK							
TECH. SUPP.				TOTAL HRS 60 AT HR.			
ELEC-MECH. 80				LABOR $ 3,000 00			
				MATERIAL $ -0-			
SAFETY SHOPS				TOTAL $ 3,000 00			

SAFETY/ENVIRONMENTAL
ANALYSIS
BY: DATE:
PRELIM.
FINAL

FABRICATION:
☐ LBL SHOPS
☐ OUTSIDE SHOPS
Attach completed MAKE/BUY form when Mech. Shops labor exceeds $1000

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MECH. SHOPS MAR 19 1997

PRINT MECH ENGR LBL. ENGR DIVISION DEPT. BERKELEY MAR 19 8 21 AM '97

ITEM NO.	SHOP USE	DRAWING OR PART NUMBER	QUANTITY	NAME – DESCRIPTION – INSTRUCTIONS
1		24A9336A	1	COMPLIANT MOUNTING RING
2		24A9826A	1	PRELIMINARY MACHING -
				FIXED MOUNTING RING
NOTE:		SEE DOUG MORTON FOR MATERIAL		
		ON HAND		IN BLDG 77.

RL-527 7600-54597 (Rev. 10/80)

ESTIMATE TOTALS

serial#	print#	supv	helper	INSP	CMM	NC	NCP	SHOP	E	P&E	SM	W ELD	NCW	CER	ASSY	CONT	UHVC	PAINT
036121	24A9336A	0		4		20	3	13	4							4	.75	
036121	24A9826A	0		4		20	3	13								4	.75	
		0		8		40	6	26	4							8	1.5	

Total Hours

93.5

Total Cost (incl Helper & Cont)

$4,792.81

JOB ORDER ☒ PROCUREMENT ☐ MAKE/BU NO. _____ PAGE 1 OF 1

ISSUED TO: C&M Shops ☐ Elec. Shops ☐ Elec. Eng. ☐ Env. Hlth/Safety ☐
PR. Mech. Shops ☒ Mech. Tech. ☐ Mech. Eng. ☐ Inst. Sci./Eng. ☐

Date 3/24/97 | Account No. 8052-30 | Serial No. 036209

Ordered By: JOHN ORTIZ Ext.

Refer Questions To: ← X 7298 Ext.

Job Requested By: (Client) GARY KOEHLER Ext.

Design Check By: (Engineer Responsible) GARY KOEHLER Ext.

Production Check By: JR Mehren Date 3-28-97

Authorized By: Gary Koehler Date 3/29

Residual Risks Accepted By:

Job Description:
RHIC-STAR-TPC

SECTOR MOUNTING TOOLS

OUTER SECTOR PLATE & LONG TUBE

DELIVER TO:	NAME	Bldg.	Rm.	Ext.	DUE DATE
PARTS	BRADLEY	77A			4/11/97
ASSEMBLY	ITEM 2	ONLY			

REFERENCE DISTRIBUTION SEND COPIES TO:	Bldg.	Rm.	PRINTS J.O.	PRINTS DWGS.
WELLS	70		✓	
KOEHLER	↓		✓	✓
ORTIZ	↓		✓	✓
BRADLEY	77A		✓	✓

WORK DISTRIBUTION

CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.	CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.
MECH. ENG.				MECH. SHOP OFF.	1	2	2
MECH. TECH. OFF.				ASS'Y SHOP			
SHOP 25				MACH. SHOP	27		
SHOP 71				PAINT SHOP			
SHOP				SHEET METAL			
SHOP				WELDING SHOP	2		
ELECT. ENG.				C&M OFFICE			
COORDINATING				CARPENTERS			
DRAFTING				ELECTRICIANS			
ELECT. FAB.				LABORERS			
ELECT. INSTALL				MAINT. TECHS			
ELECT. MAINT.				PAINTERS			
ELECT. Q.A.				PLUMBERS			
OPER. CHECK							
TECH. SUPP.				TOTAL HRS 30 AT 50 HR.			
ELEC-MECH. 80				LABOR $ 1,500.00			
				MATERIAL $ 400.00			
SAFETY SHOPS				TOTAL $ 1,900.00			

SAFETY/ENVIRONMENTAL ANALYSIS
BY: DATE:
_____ PRELIM. _____
_____ FINAL _____

FABRICATION:
☐ LBL SHOPS
☐ OUTSIDE SHOPS
Attach completed MAKE/BUY form when Mech. Shops labor exceeds $1000

SPACE RESERVED FOR DEPARTMENTS RECEIVING COPIES

ITEM NO.	SHOP USE	DRAWING OR PART NUMBER	QUANTITY	NAME – DESCRIPTION – INSTRUCTIONS
1		24A7803B	1	LONG TUBE (17.500")
2		24A9836A	1	OUTER SECTOR PLATE
				NOTE:
				NOTIFY JOHN ORTIZ WHEN ITEM 1 IS COMPLETED
				FOR PICK UP.

JOB ORDER

ESTIMATE TOTALS

serial#	print#	supv	helper	INSP	CMM	NC	NCP	SHOP	E	P&E	SM	W ELD	NCW	CER	ASSY	CONT	UHVC	PAINT
036209	24A7803B	0		.5		2.5		4	2			2						
036209	24A9836A	0		1		6	1.5										.5	
		0		1.5		8.5	1.5	4	2			2					.5	

Total Hours

20

Total Cost (incl Helper & Cont)

$1,025.20

DATE June 3, 1996

TO: John Ortiz

FROM: TOM WEST
BUILDING 77, ROOM 123B
PLANNING & ESTIMATING OFFICE

The attached report summarizes the estimate for your Job Order Number 035109. This report documents the initial cost estimate including Engineering Division support burden. The Laboratory accounting system will add the appropriate overhead rates. The numbers across the top of the report denotes Building 77's Departments.

Please call if you have any questions regarding the attached.
The **CONTACT PERSON** for this job is Jack Smith. **EXT. 5901**

MECHANICAL SHOPS

SHOP 1.....	INSPECTION.....	JEROME CUMMINGS
SHOP 2.....	NC MACHINING.....	JACK SMITH
SHOP 2A..	NC PROGRAMING.....	JACK SMITH
SHOP 3.....	CONVENTIONAL MACHINING.....	JACK SMITH
SHOP 4.....	PLANNING & ESTIMATING OFFICE.....	TOM WEST
SHOP 6.....	SHEET METAL.....	JEFF CAIN
SHOP 7.....	WELDING	JEFF CAIN
SHOP 7A..	NC WELD (BURN TABLE).....	JEFF CAIN
SHOP 8.....	CERAMICS.....	ANDREW MEI
SHOP 9.....	GLASS.....	TOM ORR
SHOP 10...	ASSEMBLY.....	JIM ONEILL
SHOP 12...	PLATING.....	AL HARCOURT
SHOP 13...	TOOL GRINDING.....	GARY GERUE
SHOP 20...	PAINT (SAND BLAST).....	GARY GERUE

JOB ORDER ☒ PROCUREMENT ☐ MAKE/BUY NO. _____ PAGE 1 OF 1

ISSUED TO: C&M Shops ☐ Elec. Shops ☐ Elec. Eng. ☐ Env. Hlth/Safety ☐
PR. Mech. Shops ☒ Mech. Tech. ☐ Mech. Eng. ☐ Inst. Sci./Eng. ☐

Date 5/23/96 | Account No. 8052-24 | Serial No. 035109

Ordered By: JOHN M. ORTIZ Ext. 7298
Refer Questions To: ← Ext.
Job Requested By: (Client) JON WIRTH Ext.
Design Check By: (Engineer Responsible) G. KOEHLER Ext. 7931
Production Check By: Date 5/24/96
Authorized By: G. Koehler Date 5/23
Residual Risks Accepted By:
Job Description: RHIC-STAR-TPC
CENTRAL MEMBRANE
INNER SECTOR COOLING MANIFOLD BONDING FIXTURE

DELIVER TO:	NAME	Bldg.	Rm.	Ext.	DUE DATE
PARTS	JON WIRTH	77			~~5/24/96~~
ASSEMBLY				7W	6/19/96

REFERENCE DISTRIBUTION — SEND COPIES TO:	Bldg.	Rm.	PRINTS J.O.	PRINTS DWGS.
WELLS	70		✓	
KOEHLER	70		✓	✓
ORTIZ	70		✓	✓
WIRTH	77		✓	✓
MORTON	77		✓	✓

WORK DISTRIBUTION

CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.	CRAFT	EST. HRS.	PRINTS J.O.	PRINTS DWGS.
MECH. ENG.				MECH. SHOP OFF.	40	2	2
MECH. TECH. OFF.				ASS'Y SHOP			
SHOP 25				MACH. SHOP			
SHOP 71				PAINT SHOP			
SHOP				SHEET METAL			
SHOP				WELDING SHOP			
ELECT. ENG.				C&M OFFICE			
COORDINATING				CARPENTERS			
DRAFTING				ELECTRICIANS			
ELECT. FAB.				LABORERS			
ELECT. INSTALL				MAINT. TECHS			
ELECT. MAINT.				PAINTERS			
ELECT. Q.A.				PLUMBERS			
OPER. CHECK							
TECH. SUPP.				TOTAL HRS 40 AT HR.			
ELEC-MECH. 80				LABOR $ 2000.00			
				MATERIAL $ 100 ea			
SAFETY SHOPS				TOTAL $ 2100.00			

SAFETY/ENVIRONMENTAL
ANALYSIS BY: DATE:
_____ PRELIM. _____
_____ FINAL _____

FABRICATION:
☒ LBL SHOPS
☐ OUTSIDE SHOPS
Attach completed MAKE/BUY form when Mech. Shops labor exceeds $1000

SPACE RESERVED FOR DEPARTMENTS RECEIVING COPIES

PRINT DIVISION MECH ENGR DEPT LBL. BERKELEY MAY 24 11 10 AM 96

ITEM NO.	SHOP USE	DRAWING OR PART NUMBER	QUANTITY	NAME – DESCRIPTION – INSTRUCTIONS
1		24A4806A	1	INNER SECTOR COOLING MANIFOLD BONDING BASE
5		24A9166A-1	2	INNER SECTOR COOLING MANIFOLD FIX. PLATE
6		24A9166A-2	2	INNER SECTOR COOLING MANIFOLD FIX. PLATE
* 2		24A4806A	20	STEEL PIN, Ø.102 (#37) X 1.00 LG.
* 3		24A4806A	2	STEEL PIN, Ø.089 (#43) X 1.00 LG.
* 4		24A4806A	8	STEEL PIN, Ø.152 (#24) X 1.00 LG.
*	NOTE: MATERIAL			FOR ITEMS 2, 3 AND 4 TO BE
		FURNISHED BY DOUG MORTON IN BLDG. 77		
				X5901

ESTIMATE TOTALS

serial#	print#	supv	helper	INSP	CMM	NC	NCP	SHOP	E	P&E	SM	W ELD	NCW	CER	ASSY	CONT	UHVC	PAINT
035109	24A4806A	0		4		24	2	2	2									
035109	24A9166A	0		.75		5	1										.5	
		0		4.75		29	3	2	2								.5	

NC hrs	NC Cost	UHVC Hrs	UHVC Cost	Non NC & Dept 4 hrs	Non NC & Dept 4 Cost	Total Cost (incl Helper & Cont)
32	$1,603.20	.5	$25.05	8.75	$438.38	$2,066.63

NOTES

24 A 760 6 A SR|02|10 ASSY 7/1/97

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SECTOR MOUNTING TOOL ASSY

21 80

SHOWN ON: | OTHER CATEGORY CODES

SR|02|10

A. RAWLINS/J.ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

---

24 A 761 2 A SR|02|10 DETAIL 9/8/94

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-WORM GEAR 1"

21 80

SHOWN ON: | OTHER CATEGORY CODES

24A7606 | SR|02|10

A. RAWLINS/J.ORT.
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

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24 A 762 1 A SR|02|10 DETAIL 9/2/94

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-BEARING SLEEVE

21 80

SHOWN ON: | OTHER CATEGORY CODES

24A7606A | SR|02|10

I. AMERMAN
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A 763 B A SR|02|10 DETAIL 8/15/97
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-BEARING BLOCK
21 80

SHOWN ON: 24A7606A
OTHER CATEGORY CODES: SR|02|10

I. AMERMAN/J. ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

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24 A 764 3 A SR|02|10 DET. 4/18/97
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

TITLE: RHIC-STAR-TPC TPC ASSEMBLE & TEST
21

SMT-TUBE PLUG ADAPTOR 2
80

SHOWN ON: 24A7944
OTHER CATEGORY CODES: SR|02|10

John Ortiz
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

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24 A 765 4 A SR|02|10 DET. 9/8/94
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-INNER TUBE
21 80

SHOWN ON: 24A7606A
OTHER CATEGORY CODES: SR|02|10

L. AMERMAN
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

24 A 766 2 A SR 02 10 DET 9/8/94

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE SMT-BEARING RETAINER

21 80

SHOWN ON: 24A7606A

OTHER CATEGORY CODES: SR 02 10

L. AMERMAN/J. ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

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24 A 768 1 A SR 02 10 DET 9/8/94

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE SMT-GEARBOX PLUG

21 80

SHOWN ON: 24A7606

OTHER CATEGORY CODES: SR 02 10

L. AMERMAN
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

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24 A 769 3 A SR 02 10 DET. 9/2/94

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE SMT-GEARBOX FACE

21 80

SHOWN ON: 24A7606

OTHER CATEGORY CODES: SR 02 10

L. AMERMAN/J. ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A 770 4 B SR10210 DETAIL 9/6/94
DRAWING NUMBER 2-7 SIZE 8 REV. 9 CATEGORY 10-15 TYPE 16 DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-GEARTRAIN HOUSING 1 IS
21 80

SHOWN ON: 24A7606

OTHER CATEGORY CODES: SR10210

L. AMERAN / J. ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A 771 4 A SR10210 DETAIL 9/6/94
DRAWING NUMBER 2-7 SIZE 8 REV. 9 CATEGORY 10-15 TYPE 16 DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-GEARTRAIN HOUSING 2 IS
21 80

SHOWN ON:

OTHER CATEGORY CODES: SR10210

L. AMERMAN / J. ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A 772 6 A SR10210 DETAIL 9/8/94
DRAWING NUMBER 2-7 SIZE 8 REV. 9 CATEGORY 10-15 TYPE 16 DATE 17-20

RHIC - STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-GEARBOX
21 80

SHOWN ON:

OTHER CATEGORY CODES: SR10210

L. AMERMAN / J. ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

24 A 773 1 A SR|02|10 DETAIL 9/30/94

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-BUSHING

21 80

SHOWN ON:	OTHER CATEGORY CODES
24A7606	SR|02|10

L. AMERMAN
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

24 A 774 2 A SR|02|10 DET. 8/2/94

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-GEARBOX COVER

21 80

SHOWN ON:	OTHER CATEGORY CODES
24A7606	SR|02|10

L. AMERMAN
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

24 A 775 1 A SR|02|10 DETAIL 4/30/97

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

TITLE: RHIC-STAR-TPC TPC ASSEMBLE & TEST

21

SMT- SPACER BUSHING

80

SHOWN ON:	OTHER CATEGORY CODES
24A7606	SR|02|10

John Ortega
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A 776 | 1 | A | SR10210 | DETAIL | 9/6/94
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT- IDLER SHAFT
21 80

SHOWN ON: 24A7606
OTHER CATEGORY CODES: SR10210

L. AMERMAN
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A 777 | 1 | A | SR10210 | DETAIL | 9/8/94
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-PLATEN SHAFT
21 80

SHOWN ON: 24A7606
OTHER CATEGORY CODES: SR10210

L. AMERMAN/J. ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A 778 | 2 | A | SR10210 | Detail | 9/8/94
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT - SHAFT 1
21 80

SHOWN ON: 24A7606
OTHER CATEGORY CODES: SR 10210

L. AMERMAN/J. ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

24 A 779 3 A SR|02|10 Detail 11/30/95

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

TITLE: RHIC-STAR-TPC TPC ASSEMBLE & TEST
21
SMT-PLATEN SHAFT RIGHT SPACER
80

SHOWN ON: 24A7606 | OTHER CATEGORY CODES: SR|02|10

J. ORTIZ / A. RAWLINS
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

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24 A 780 3 A SR|02|10 Detail

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

TITLE: RHIC-STAR-TPC TPC ASSEMBLE & TEST
21
SMT-OFFSET TUBE
80

SHOWN ON: 24A7606 | OTHER CATEGORY CODES: SR|02|10

John Ortiz
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

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24 A 782 1 A SR|02|10 DETAIL 8-30-95

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

RHIC-STAR-TPC TPC ASSEMBLE & TEST
SMT-SHAFT 4
TITLE: ~~MOUNTING FLANGE IS~~
21
80

SHOWN ON: 24A7606 | OTHER CATEGORY CODES: SR|02|10

A-RAWLINS/J.ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A | 783 | 1 | A | SR0210 | DETAIL | 8-30-95
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST
SMT- SHAFT 2

TITLE: MOUNTING FLANGES
21

80

SHOWN ON: 24A7606

OTHER CATEGORY CODES: SR0210

A. RAWLINS/V.ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A | 785 | 6 | A | SR0210 | DETAIL | 8-30-95
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: MOUNTING FLG. I.S.
21

80

SHOWN ON:

OTHER CATEGORY CODES: SR0210

A. RAWLINS/V.ORT.
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A | 786 | 6 | A | SR0210 | DETAIL | 9-1-95
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT- RAIL SUPPORT
21

80

SHOWN ON:

OTHER CATEGORY CODES:

A. RAWLINS/V.ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A | 787 | 4 | A | SR,02,10 | DETAIL | 9-20-95
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE SMT-VERTICAL SUPPORT EXTENSION
21

80

SHOWN ON: | OTHER CATEGORY CODES

A. RAWLINS
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A | 788 | 4 | A | SR,02,10 | DETAIL | 9-21-95
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE SMT-VERTICAL SUPPORT ANCHOR
21

80

SHOWN ON: | OTHER CATEGORY CODES

A. RAWLINS
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A | 789 | 4 | A | SR,02,10 | DETAIL | 9-25-95
DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE SMT-VERTICAL SUPPORT BASE
21

80

SHOWN ON: | OTHER CATEGORY CODES

A. RAWLINS
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A	794	4	A	SR10210	DETAIL	9-26-95
DRAWING NUMBER 2-7		SIZE 8	REV. 9	CATEGORY 10-15	TYPE 16	DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-ADJUSTING LEG

21 80

SHOWN ON: | OTHER CATEGORY CODES

SR10210

A. RAWLINS / V. ORTIZ
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A	795	2	A	SR10210	DETAIL	9-27-95
DRAWING NUMBER 2-7		SIZE 8	REV. 9	CATEGORY 10-15	TYPE 16	DATE 17-20

TITLE: RHIC-STAR-TPC TPC ASSEMBLE & TEST

21

SMT- RIGID BASE

80

SHOWN ON: | OTHER CATEGORY CODES

A. RAWLINS
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A	797	1	A	SR10210	DETAIL	9-29-95
DRAWING NUMBER 2-7		SIZE 8	REV. 9	CATEGORY 10-15	TYPE 16	DATE 17-20

TITLE: RHIC-STAR-TPC TPC ASSEMBLE & TEST

21

SMT-PLATEN SHAFT LEFT SPACER

80

SHOWN ON: | OTHER CATEGORY CODES

24A7606 | SR10210

John Dietz
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

24 A 983 6 A SR|02|10 DET 3/21/97

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

TITLE: RHIC-STAR-TPC SECTORS
21
SMT- OUTER SECTOR PLATE
80

SHOWN ON: | OTHER CATEGORY CODES

DESIGNER: John Ortiz

DRAFTSMAN:

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992-687-784

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24 A 986 1 A SR|02|10 DET 11/14/95

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

TITLE: RHIC-STAR-TPC TPC ASSEMBLE & TEST
21
SMT- WORM GEAR 2
80

SHOWN ON: | OTHER CATEGORY CODES

DESIGNER: J. ORTIZ / A. RAWLINS

DRAFTSMAN:

RL-3612-1 (REV. 7/92)

RHIC-STAR-TPC SECTOR ASSEMBLY TOOL
WORM GEAR 2

☆ U.S. GPO:1992-687-784

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24 A 987 2 A SR|02|10 DET. 4/9/97

DRAWING NUMBER 2-7 | SIZE 8 | REV. 9 | CATEGORY 10-15 | TYPE 16 | DATE 17-20

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

TITLE: RHIC-STAR-TPC TPC ASSEMBLE & TEST
21
SMT - SPIDER FLANGE
80

SHOWN ON: | OTHER CATEGORY CODES

24A7606 | SR|02|10

DESIGNER: John Ortiz

DRAFTSMAN:

RL-3612-1 (REV. 7/92)

SPIDER FLANGE

☆ U.S. GPO:1992-687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A 767	6	A	SR|02|10	DETAIL 7/1/97
DRAWING NUMBER 2-7	SIZE 8	REV. 9	CATEGORY 10-15	TYPE 16 DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT TUBE MOUNT IS

21 80

SHOWN ON: ZAA7606

OTHER CATEGORY CODES: SR|02|10

John Ortiz / A. Rawlings
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

DRAWING RECORD
MECHANICAL ENGINEERING
BERKELEY

24 A 798	3	A	SR|02|10	DET. 4/10/97
DRAWING NUMBER 2-7	SIZE 8	REV. 9	CATEGORY 10-15	TYPE 16 DATE 17-20

RHIC-STAR-TPC TPC ASSEMBLE & TEST

TITLE: SMT-SPIDER STANDOFF

21 80

SHOWN ON:

OTHER CATEGORY CODES

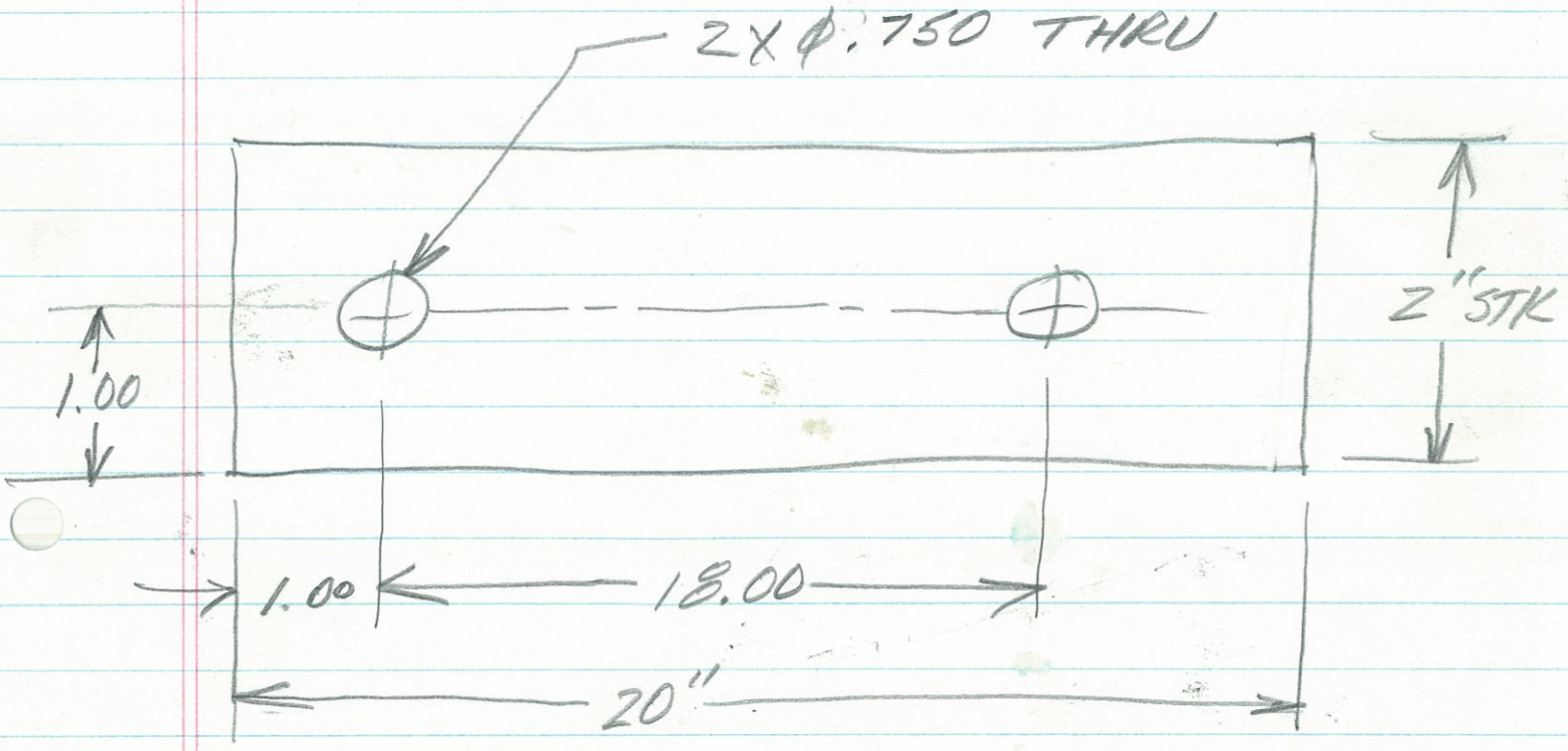
John Ortiz
DESIGNER

DRAFTSMAN

RL-3612-1 (REV. 7/92)

☆ U.S. GPO:1992–687-784

JOHN O.
8052-30
X7298
X7036

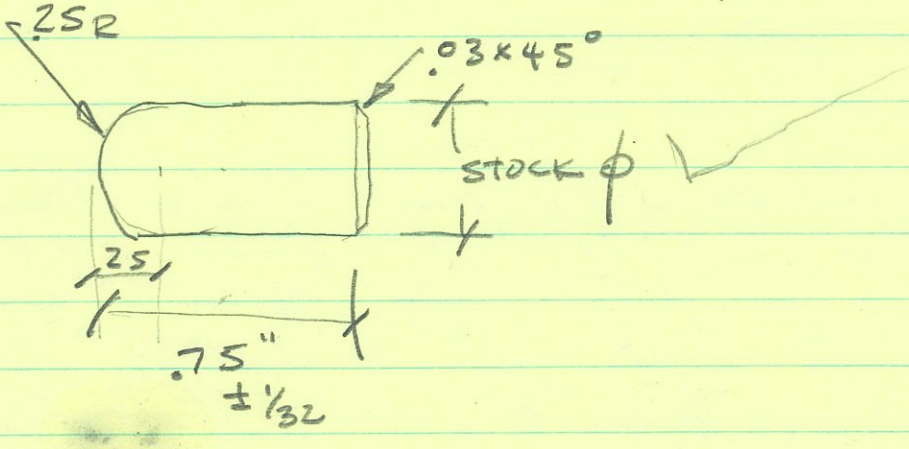


RAIL SPACER PLATE
8 REQD
MATL: ALUMINUM BAR, RECT.
1 X 2

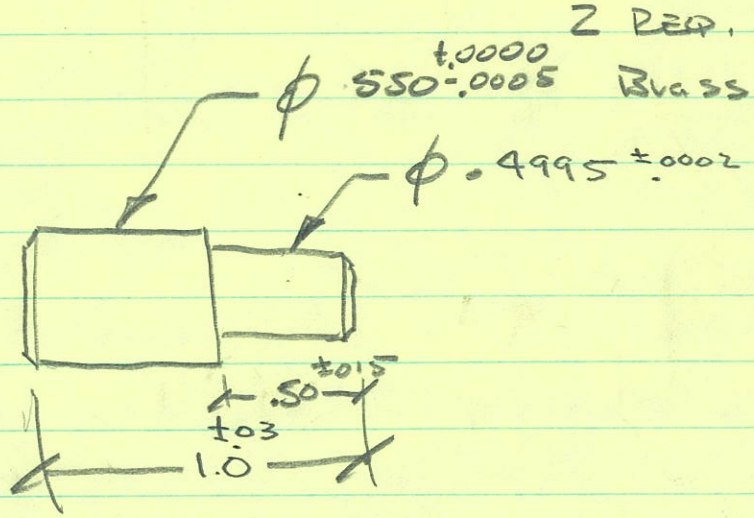
8052-30

2 ~~#~~ Req.

Modify silicon bronze pins



2 Req.



X6274
DIG CENTER

LAWRENCE BERKELEY LABORATORY
FACILITIES DEPARTMENT
Work Request Center
QM @ Facility Ext 6274 FAX 6272

Acknowledgement of Your Work Request

June 6, 1997

Dear John M Ortiz

This is to acknowledge that we have received and reviewed your request of June 6, 1997 for the following work:

Building : 77A
Room : ASS'M'BLY BAY AREA ACCT: 8052-30

NEED (10) TEN HOLES DRILLED IN CONCRETE FLOOR IN ORDER TO SEISMICALLY SECURE EQUIPMENT IN ASSEMBLY BAY AREA. PLEASE CALL JOHN X6001 AND HAVE HIM PAGED. HE'D LIKE TO KNOW HOW SOON IT CAN BE DONE.

BOB BAIRD , Day Shift Maintenance X 7941
will respond to you before 5:00 p.m. Monday, June 9, 1997

If you are not contacted by 5:00 p.m., please call us at X6274.

We will take appropriate action to insure that your request receives attention. We can serve you more quickly if you mention your Work Request Center Tracking Number, WRC# **028704**

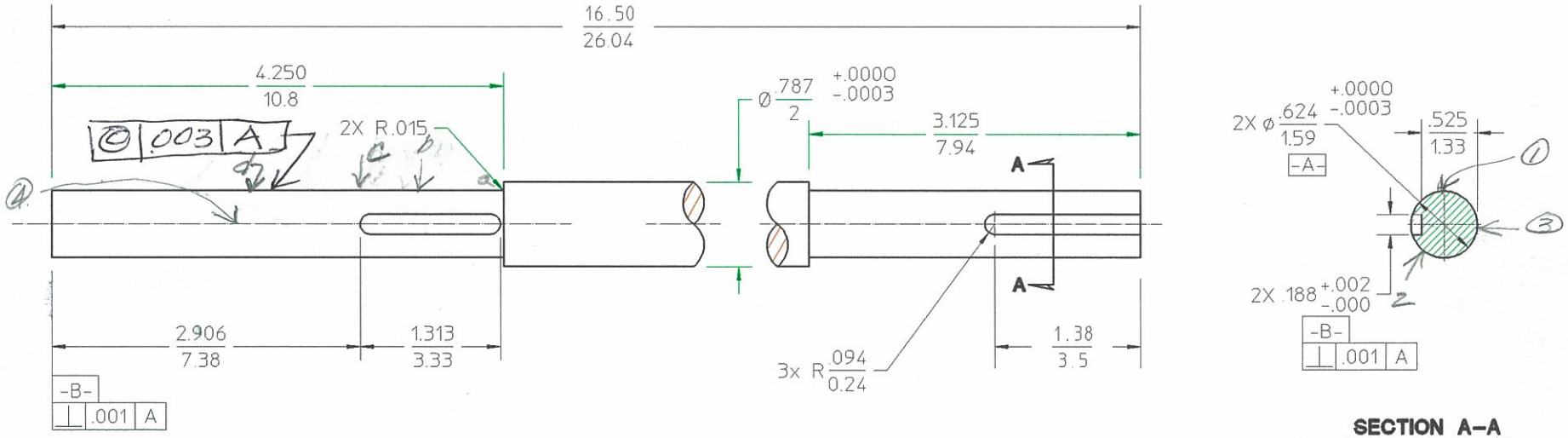
This will enable us to directly access your request while you are on the telephone with us.

We are committed to serving you. Please let us know if we can be of further assistance.

Readings

	A	B	C	D	E
①	.000	.0005	.001	.0015	.0012
②	.0002	.000	-.0007	-.0005	
③	-.0007	.000	.0002	.0005	
④			.0005	.0005	

24A7782C	ITEM	REQ	PART NUMBER	DESCRIPTION
	1	1	24A7782C	01.00" STAINLSTEEL BAR, ROUND, 304



SECTION A-A

B

WBS # 4.2.10	Production Approval: / Cognizant Engineer: A. Wandesforde	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
		TPC768-C-1	C	XXXXXXXXXX	-

REV.	DWN.	CHK.	DATE	CHANGES
C	JO	GK	4/97	MAJOR REVISION
B	RL		8/95	CHANGED 9.454 DIM. STARTING POINT
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X' = ±.06/.15 | ANGLES ±.5°; .XX/.X = ±0.02/0.05 | FINISH 125/.32; 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS

ACCT. NO. | SER. NO.

DATE ISS'D | DATE REQ'D | NO. REQ'D

DELIVER TO

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

DRWN BY: L. amerman | DATE: 09/08/94

CHECK BY | DATE

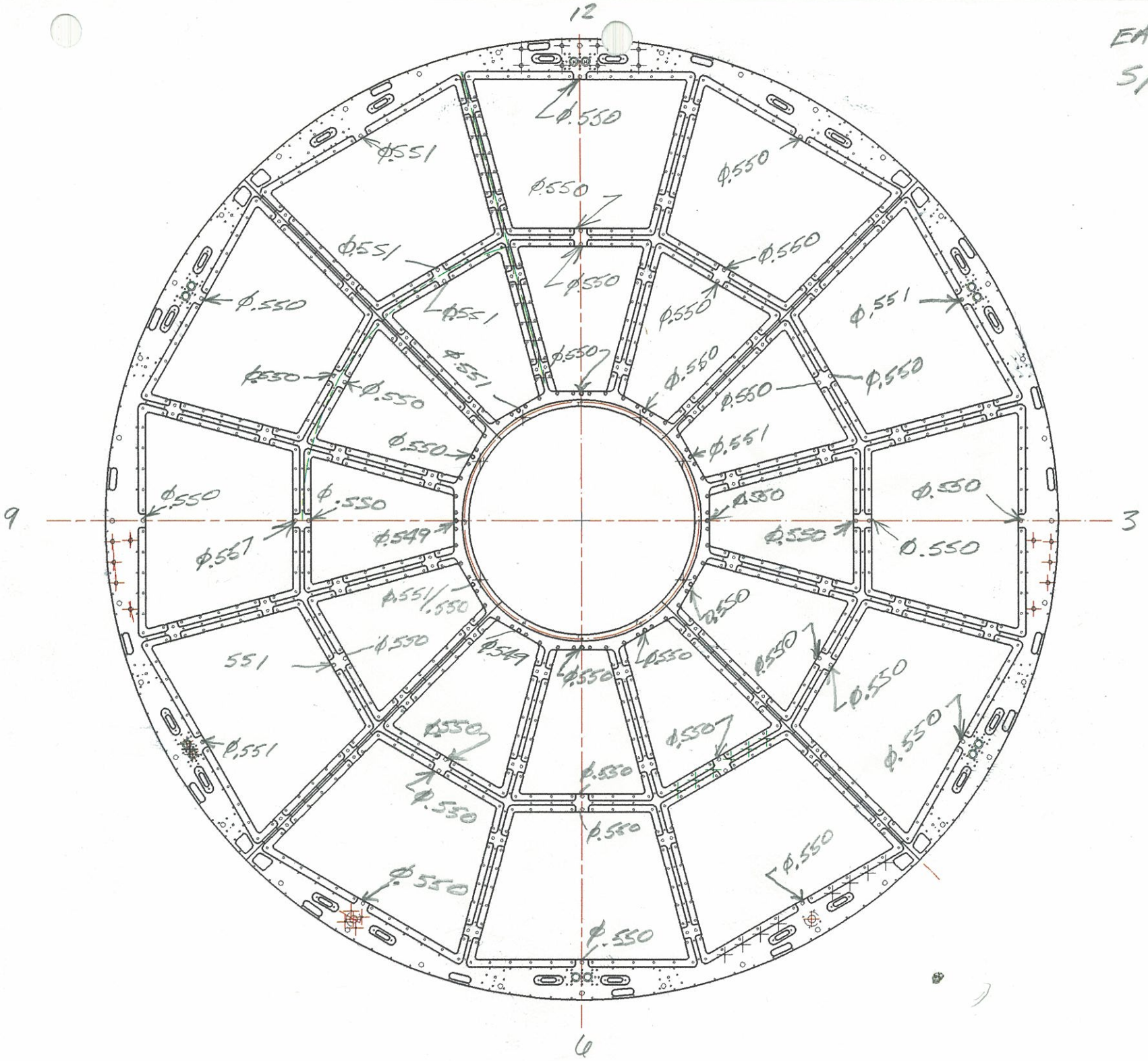
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC-STAR-TPC
TPC ASSEMBLY AND TEST
SECTOR MOUNTING TOOL - SHAFT 1

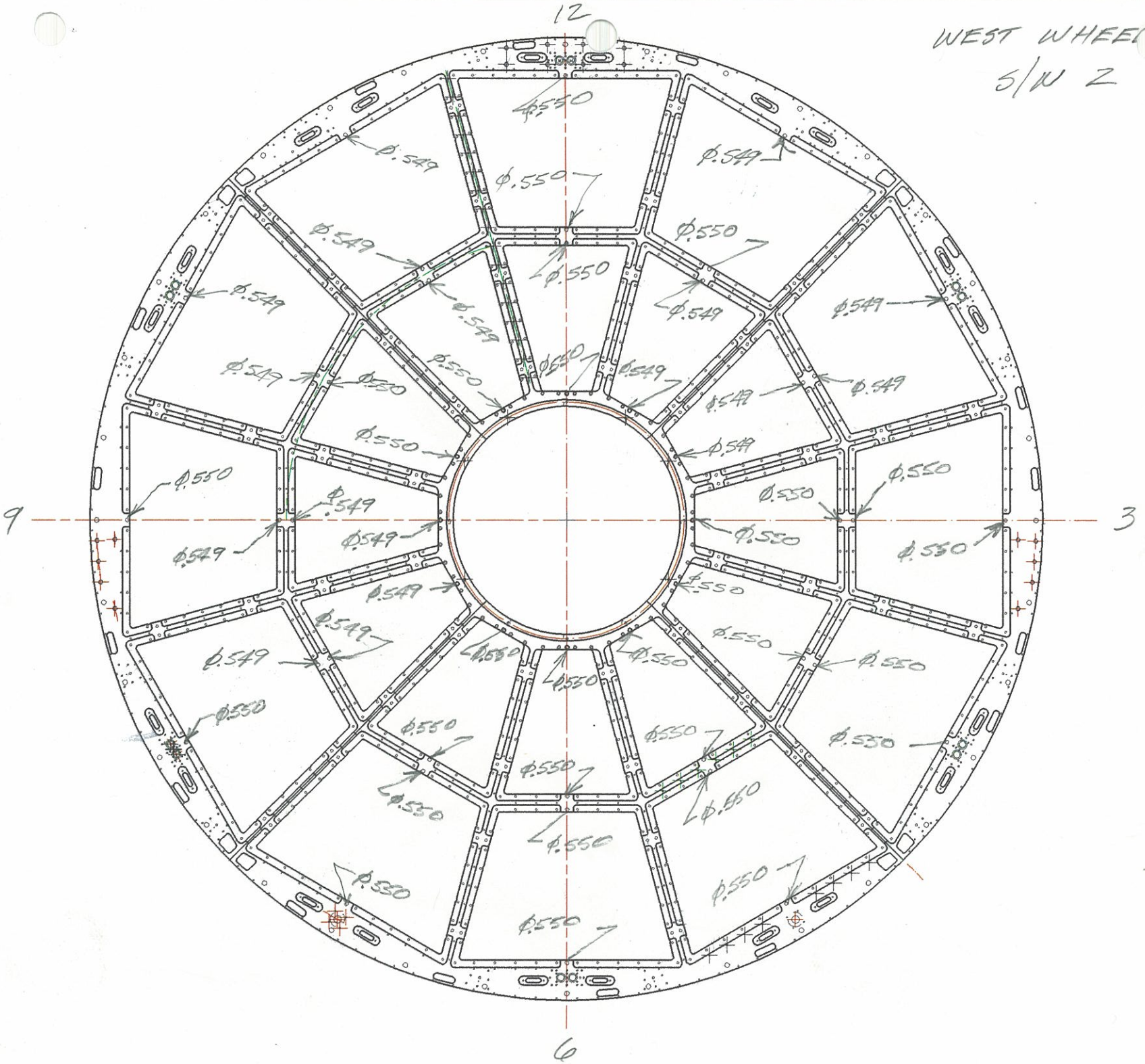
PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	8052-30	SR-02-10	24A7782	C

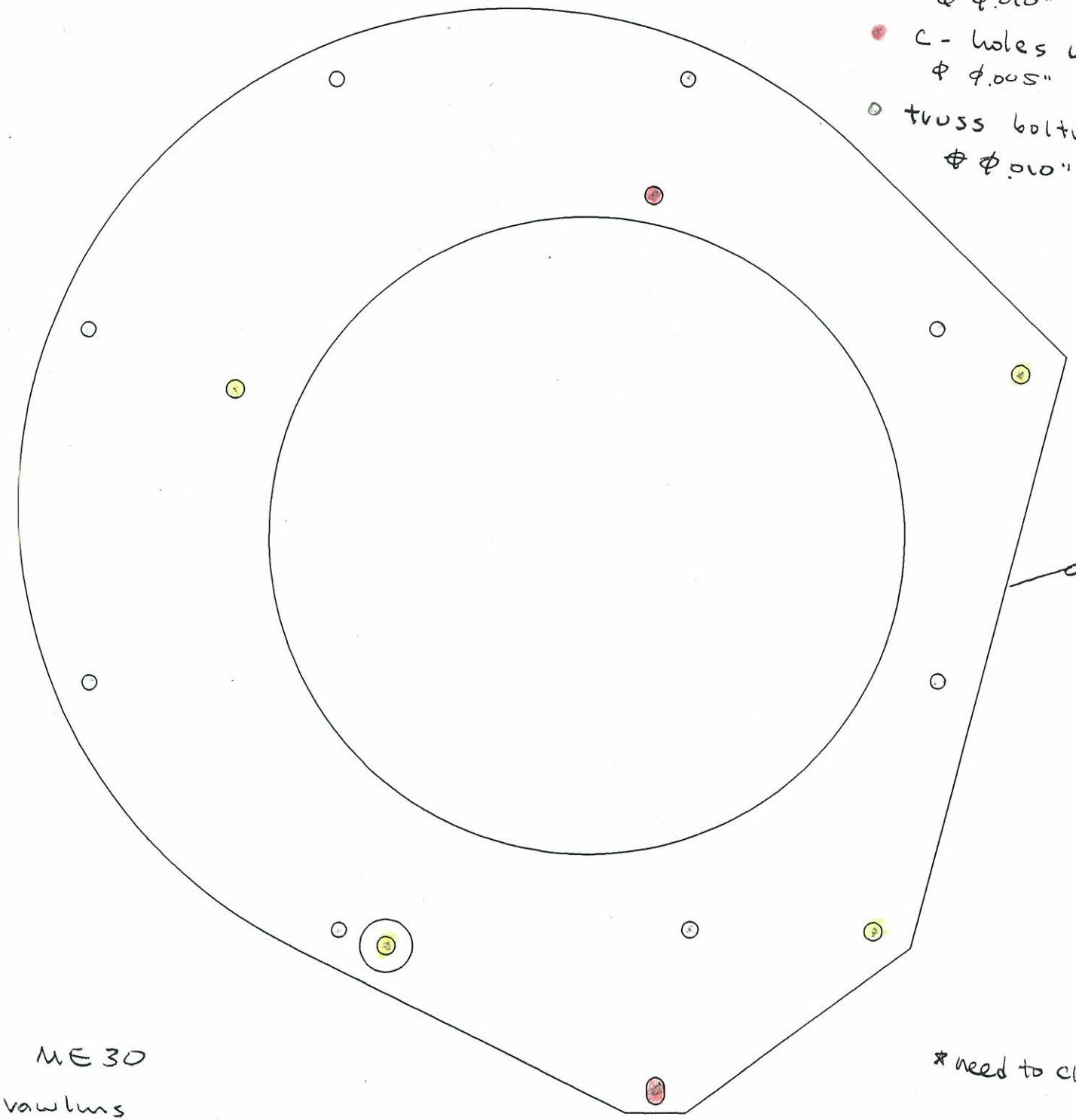
Now

EAST WHEEL
S/N 1



WEST WHEEL
S/N 2



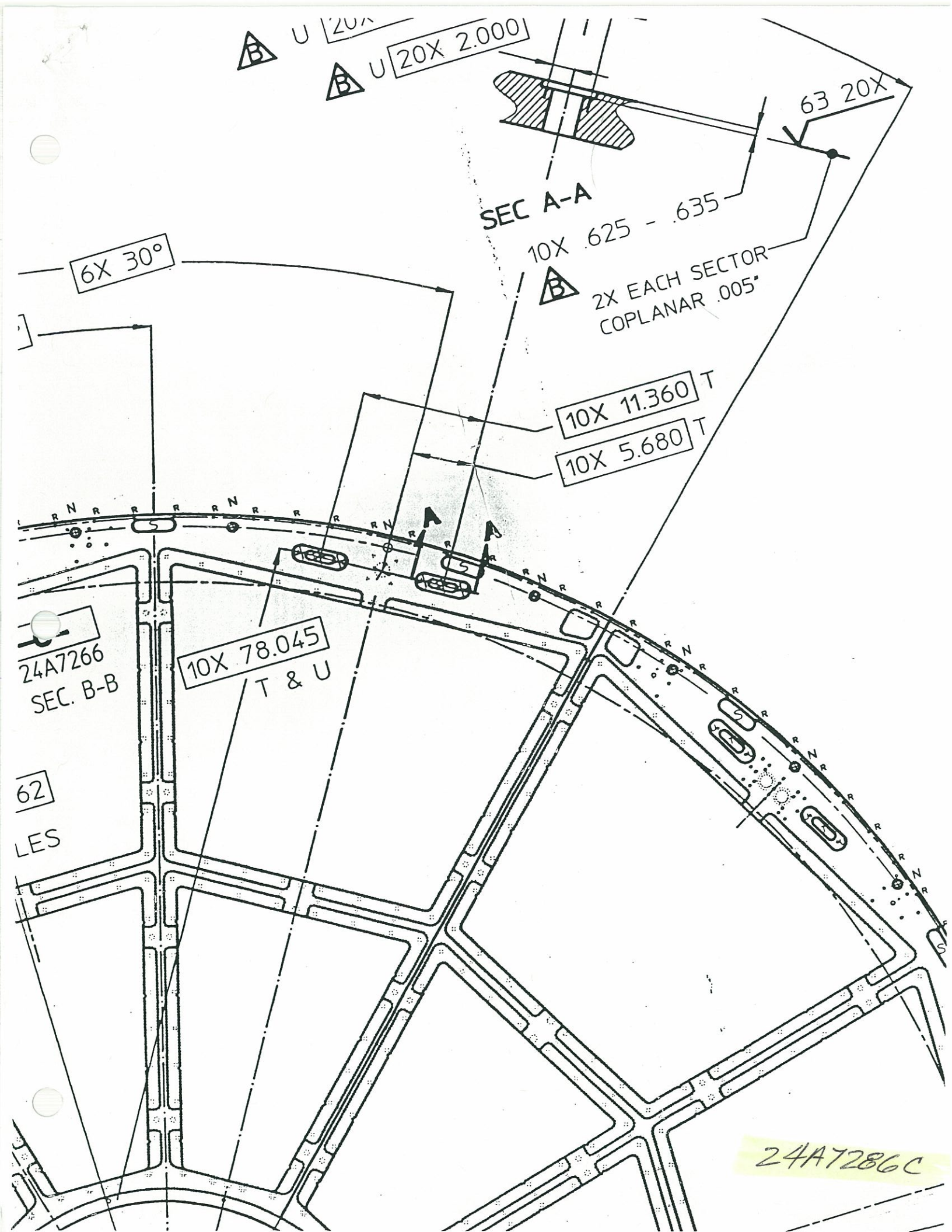


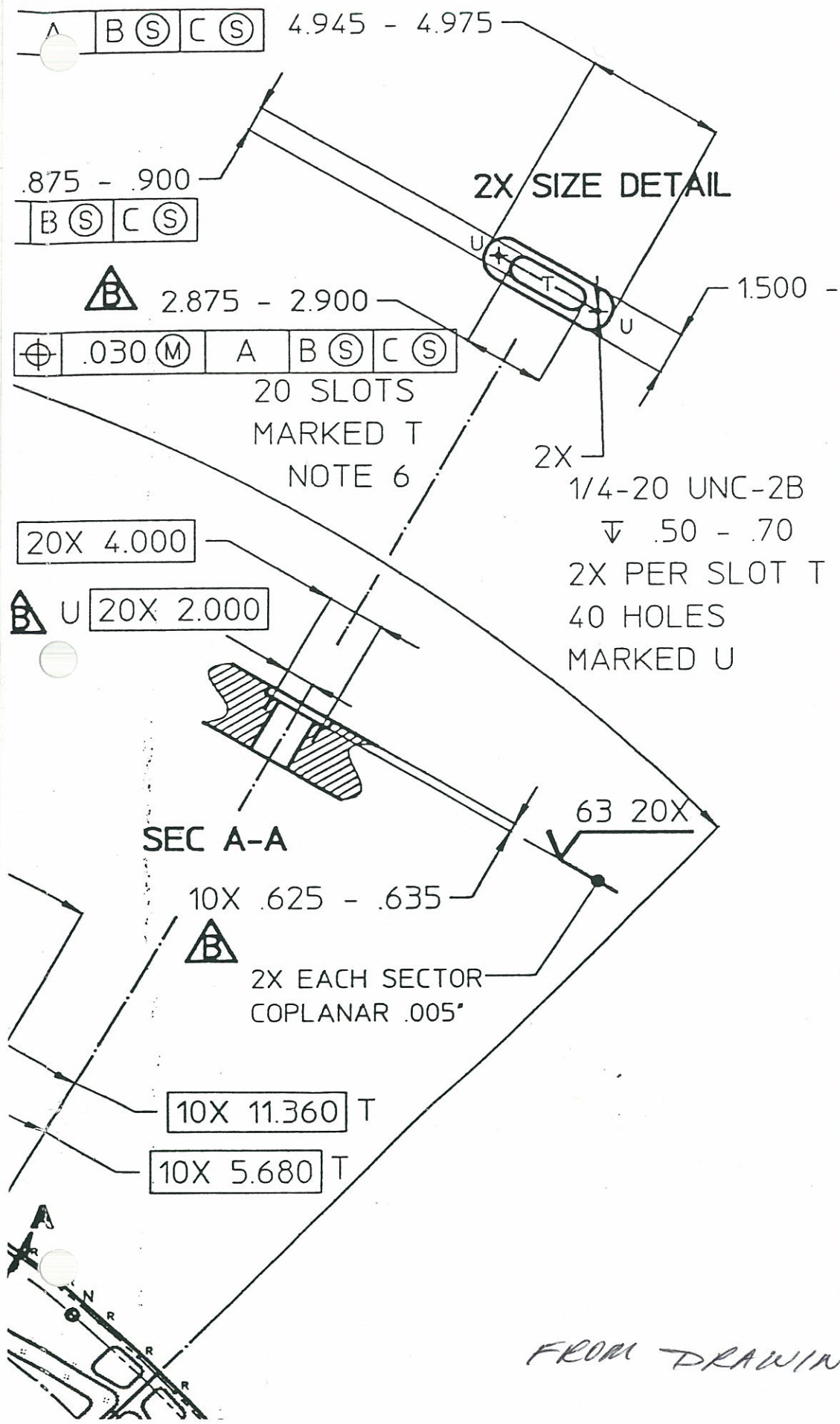
Kochler/STAR

'outsect. plate' ME30

consistent with vawlins

* need to check size.


U 20X
B
U 20X 2.000
B
63 20X
SEC A-A
10X .625 - .635
2X EACH SECTOR
COPLANAR .005"
B
6X 30°
10X 11.360 T
10X 5.680 T
A
A
10X 78.045
T & U
24A7266
SEC. B-B
62
LES
24A7286C



FEATURE SIZE AI

1 HOLE/LOC.

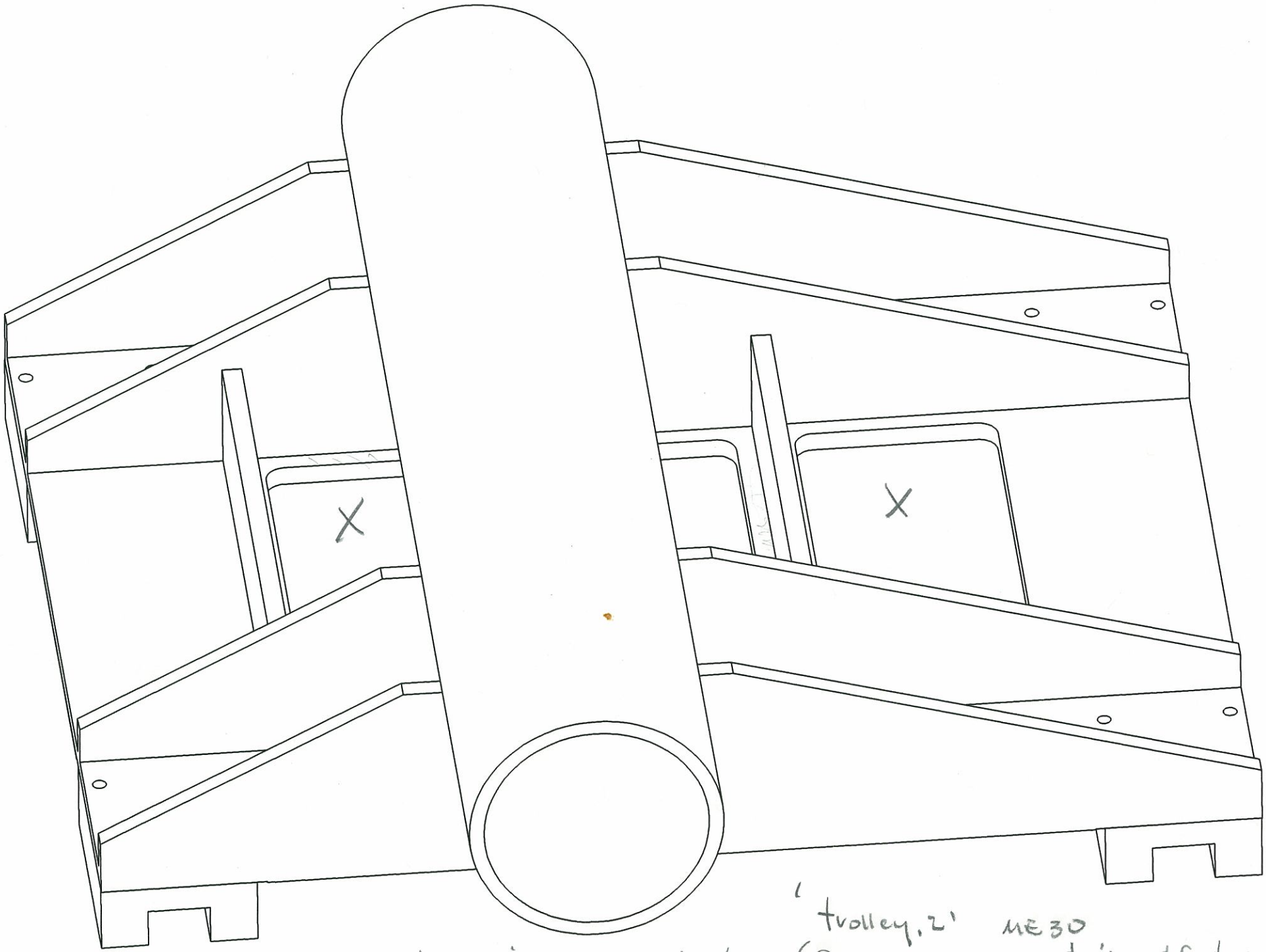
2 HOLES/LOC.

30 HOLES/LOC.

2 HOLES/LOC.

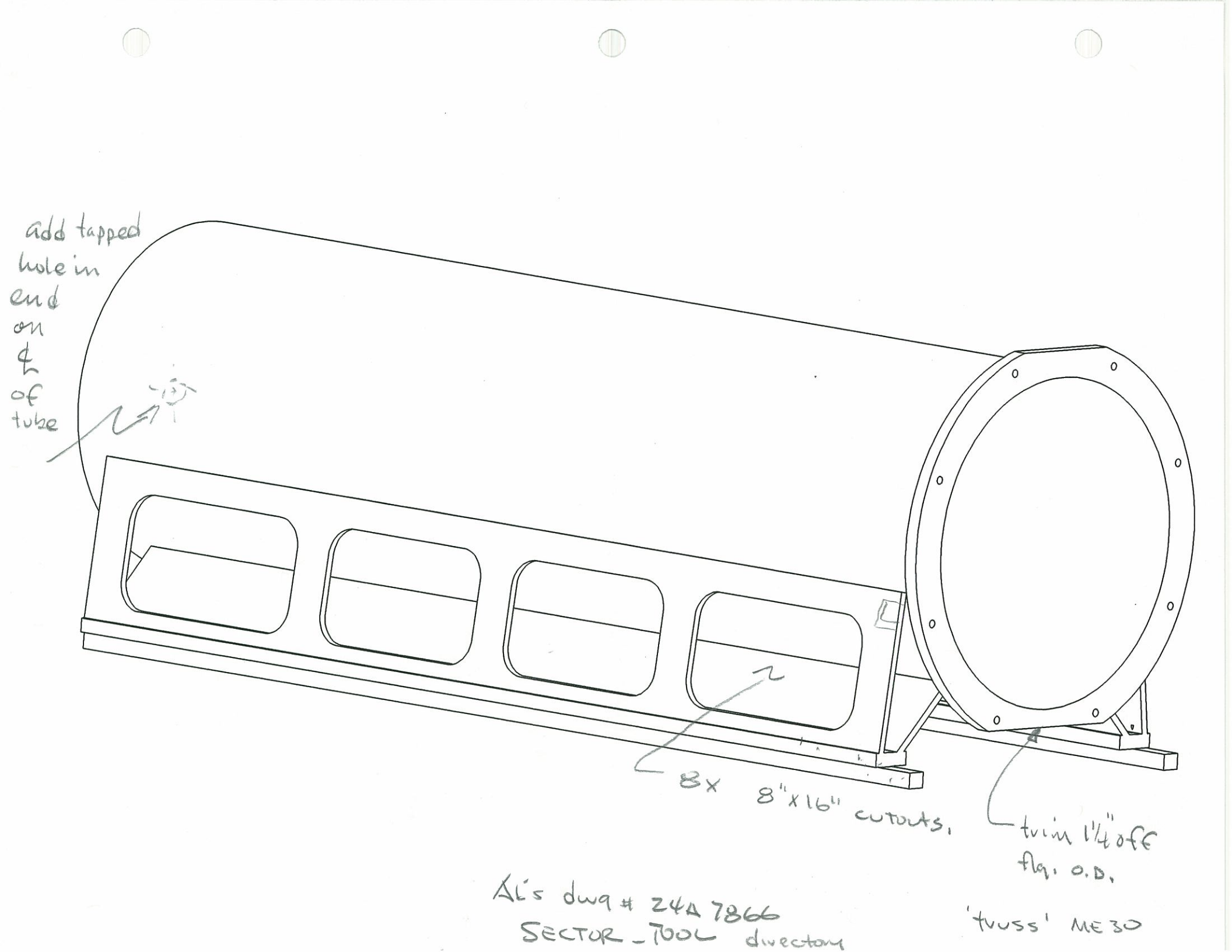
6

FROM DRAWING NO. 24A7286C



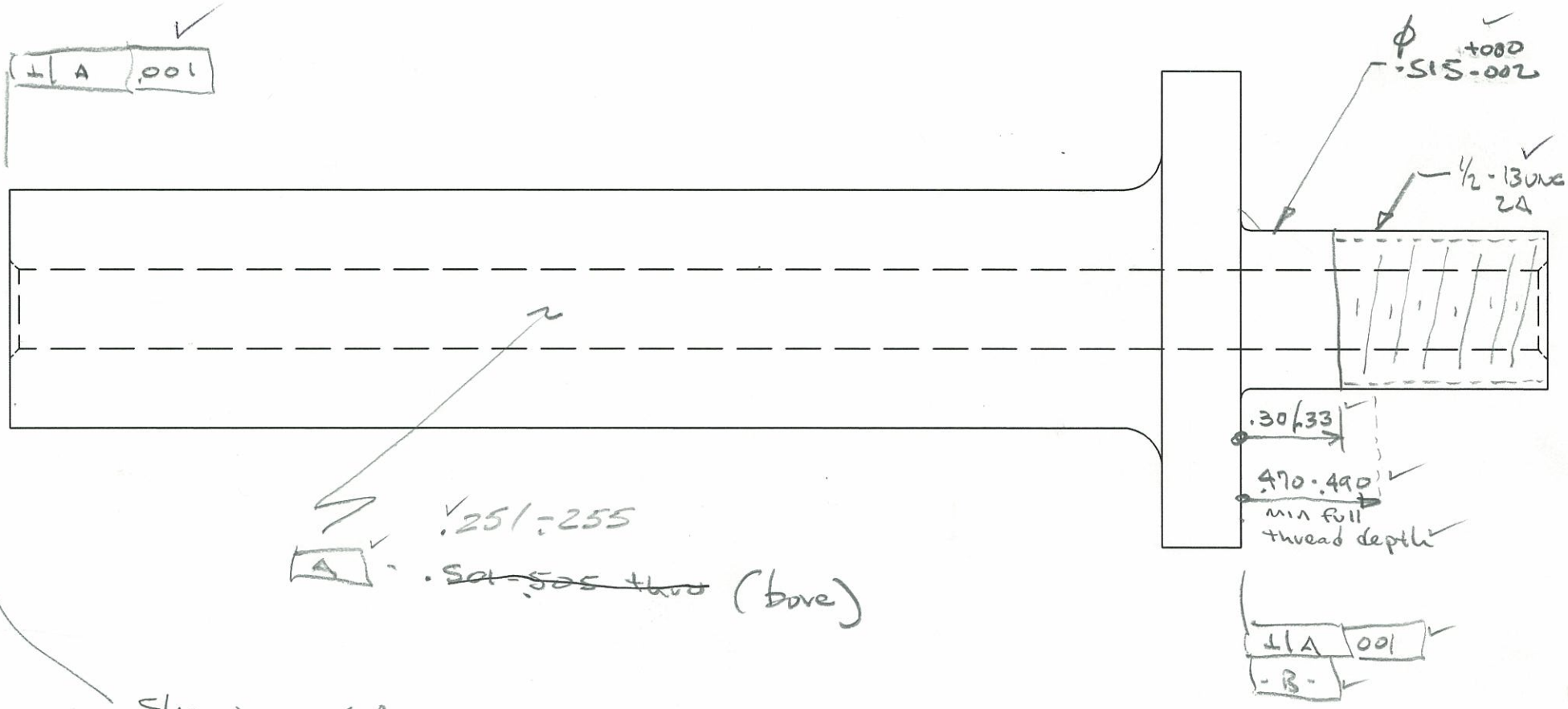
trolley, 2' ME30

dimension 2 lightening holes (for walking rat) don't modify dwg



AL's dwg # 24A 7866
SECTOR_TOOL directory

'truss' ME30

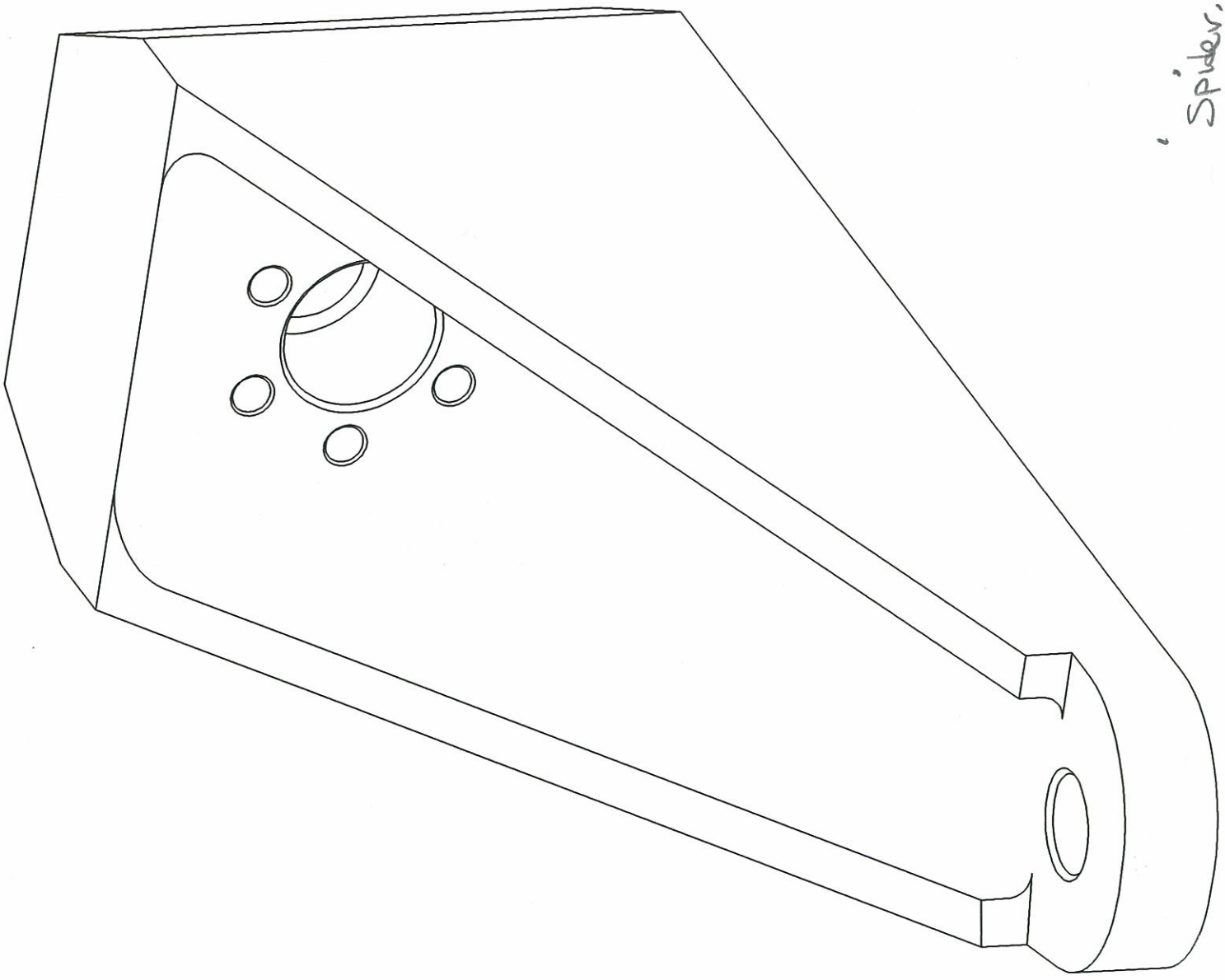


Show as 60° chamfer 2x for center drill

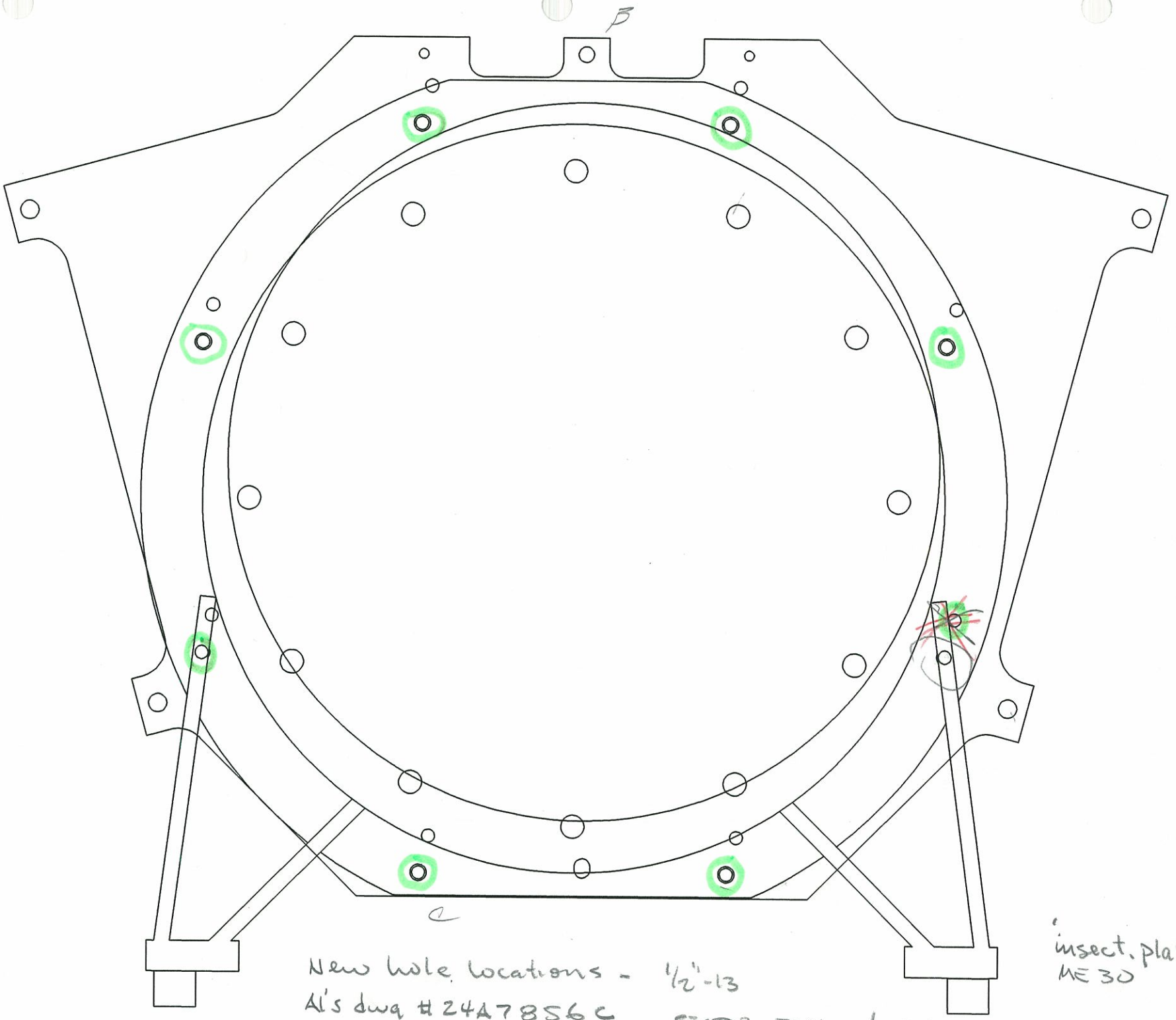
Koehler

File: 'standoff' ME30 body.

matl: .303/304 s.s.



'Spider.1a'



New hole locations - 1/2"-13
Al's dwg # 24A7856C

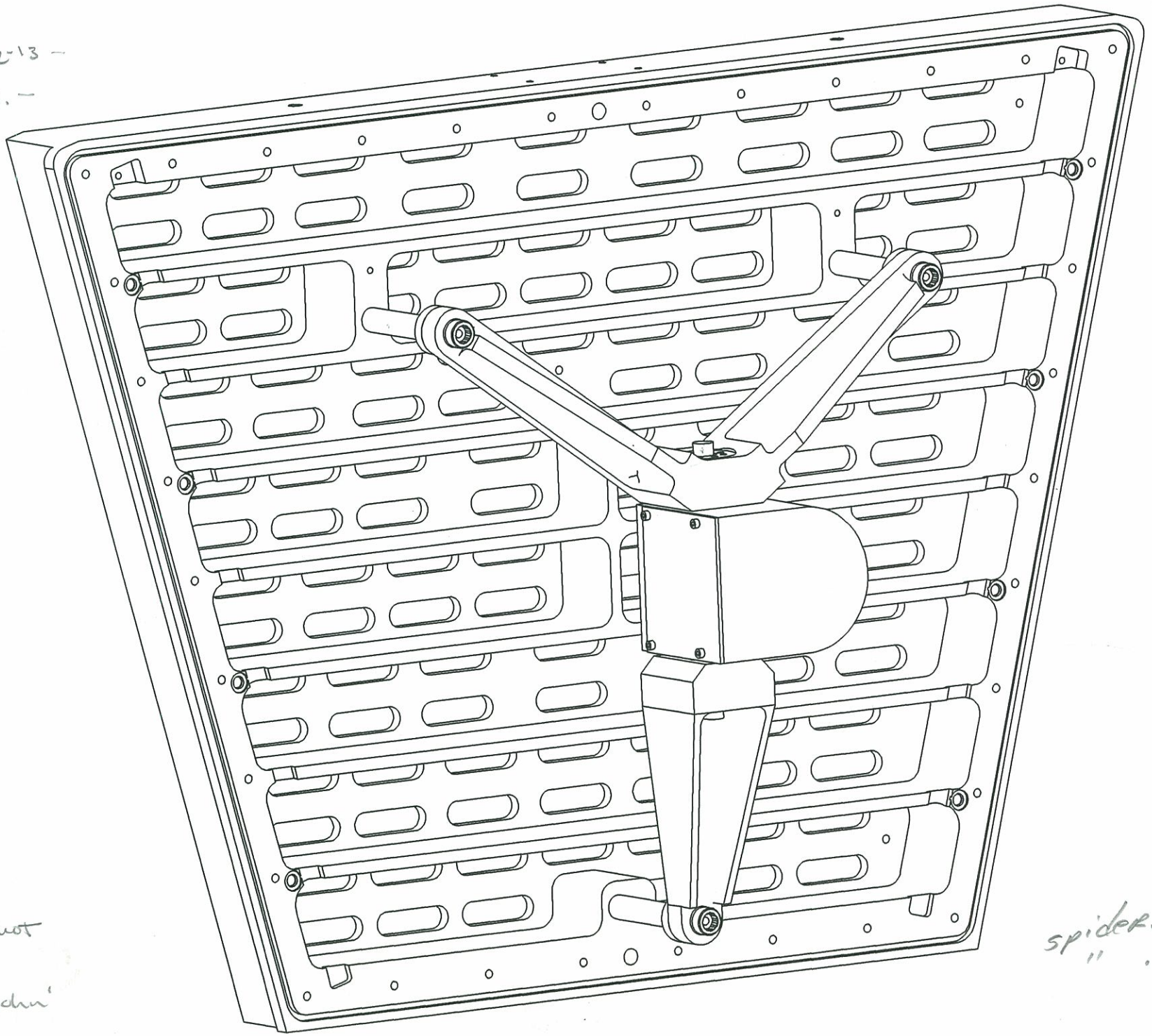
SECTOR_TOOL direction

'insect. plate'
ME 30

Part's

- standoff
- allen nut - 1/2-13 -
- 1/4-20 x 5 1/4" lg. -
- compression flange
- compression sleeve
- Spider - 1
- Spider - 2

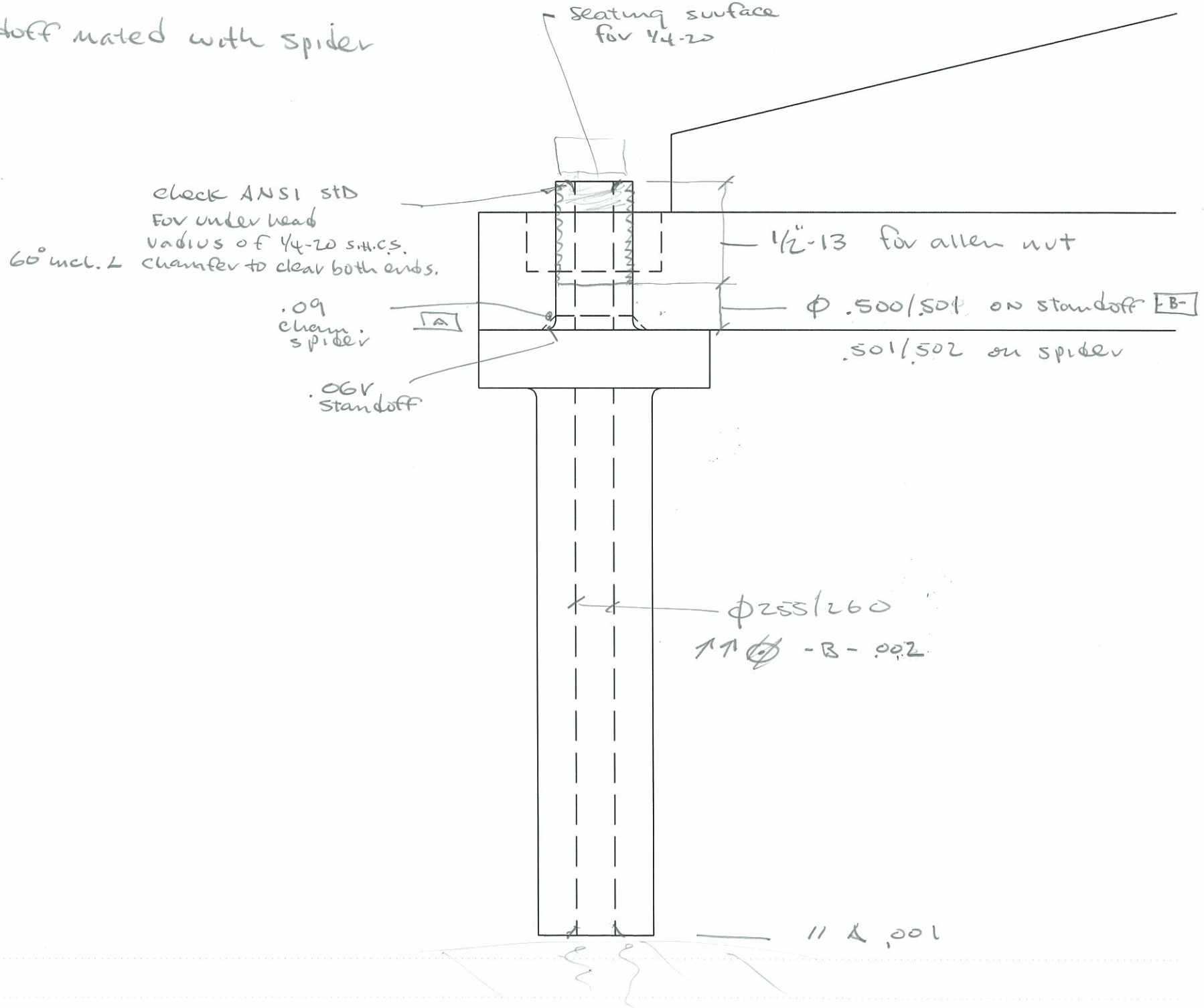
J&M fasteners p.h.



ME30 Snapshot
Koehler
'spider.assy.john'

spider. 1
" . 2

Standoff mated with spider



0-50 lbs
fish scale

Baseline
1 1/2 lbs

Screw torque	Fish sale, in # (ft-lb)
20 in lb	
30	
40	
50	
60	
70	
80	

Tensile stress area = .0318 in²

1- in lb gives 629 #/in²

S.H.C.S. = 160,000 psi ultimate

1/4 of 160 KSI = 40 KSI

$\frac{40{,}000}{630}$: 63 in-lb.

Baseline

1 1/2

Torque in lbs	in lbs (ft. lbs)
20 in lbs	9
30 in lbs	16
40	18.5 21
50	22
60	27
70	27
80	27

Return-Path: <Rich_Meyer@macmail.lbl.gov>
Date: 19 Jun 1997 11:11:07 -0700
Subject: FWD>RE>FWD>STAR TPC NUMBER
To: "John Ortiz" <jmortiz@lbl.gov>
X-Mailer: Mail*Link SMTP/QM 3.0.0

Mail*Link(r) SMTP FWD>RE>FWD>STAR TPC NUMBER

John,

Did you receive this?

Rich

Date: 6/19/97 10:59 AM
From: John Ortiz
> John,
>
> Your STAR Drawing Number is TPC788-E-1. However, I noted that the
> institution drawing number ended in a "6"; doesn't that mean the drawing
size
> should be "F"?
>
> Talk to you later,
>
> Rich
>
> ---
> Date: 6/18/97 10:39 AM
> To: Rich Meyer
> From: JOHN.ORTIZ@rsgi01.rhic.bnl.gov
> This is a request for a STAR drawing number
>

> NAME: JOHN ORTIZ
> E-MAIL ADDRESS: JMOrtiz@lbl.gov
> TELEPHONE NUMBER: 7298
>

> Drawing size: E
> Number of pages: 1
> Revision: A
> Revision Date: 6/19/97
> Title line 1: RHIC - STAR -TPC
> Title line 2: TPC ASSEMBLE & TEST
> Title line 3: SMT - IS DOUBLE SPIDER LEG
> Institution (ANL, UT Austin, etc.): LBNL
> Institution drawing number: 24A9896
> Drawn by (draftperson/designer): JOHN ORTIZ
> Cognizant engineer: GARY KOEHLER
> Production approval (cognizant engineer/physicist): RUSS WELLS
> Category code or WBS to level 3 (See STAR Note 19): 4.2.10
>

>

>
> This email generated from star_drawing_form.html by MIT's cgiemail.
>
>
>
>
>
>
>
GOOD MORNING RICH,

THE ENGINEERING STANDARD FOR A SIZE-6 DRAWING IS E-SIZE.

THANKS AGAIN FOR YOUR ASSISTANCE!

ADIOS!
\
JOHN

From: John.Ortiz@rsgi01.rhic.bnl.gov (4/8/97)
To: rich_meyer@lbl.gov
CC:
BCC:
Priority: Normal
Date sent: 4/8/97 2:23 PM

Mail*Link® SMTP

STAR drawing number request

This is a request for a STAR drawing number

NAME: John Ortiz
E-MAIL ADDRESS: JMOrtiz@lbl.gov
TELEPHONE NUMBER: 7298

TPC780-E-1

Drawing size: E
Number of pages: 1
Revision: A
Revision Date: 4/7/97
Title line 1: RHIC - STAR - TPC
Title line 2: SECTOR MOUNTING TOOL
Title line 3: SPIDER DOUBLE LEG
Institution (ANL, UT Austin, etc.): LBNL
Institution drawing number: 24A9846
Drawn by (draftperson/designer): J.ORTIZ
Cognizant engineer: G. KOEHLER
Production approval (cognizant engineer/physicist): R. WELLS
Category code or WBS to level 3 (See STAR Note 19): SR-02-10

This email generated from star_drawing_form.html by MIT's cgiemail.

Return-Path: <Rich_Meyer@macmail.lbl.gov>
Date: 21 Apr 1997 08:44:15 -0700
Subject: FWD>Star Drawing #
To: "Rich_Meyer@macmail3.lbl.gov" <Rich#u#Meyer#a#macmail3#d#lbl#d#gov@macmail.l
X-Mailer: Mail*Link SMTP/QM 3.0.0

Mail*Link(r) SMTP FWD>Star Drawing #

OFFICE MEMO Subject: RE>STAR drawing number request Time: 2:50 PM Date: 4/18/97

Your STAR Drawing # is TPC780-E-1.

Have a good one,

Rich

Date: 4/8/97 2:23 PM
To: Rich Meyer
From: John.Ortiz@rsgi01.rhic.bnl.gov
This is a request for a STAR drawing number

NAME: John Ortiz
E-MAIL ADDRESS: JMOrtiz@lbl.gov
TELEPHONE NUMBER: 7298

Drawing size: E
Number of pages: 1
Revision: A
Revision Date: 4/7/97
Title line 1: RHIC - STAR - TPC
Title line 2: SECTOR MOUNTING TOOL
Title line 3: SPIDER DOUBLE LEG
Institution (ANL, UT Austin, etc.): LBNL
Institution drawing number: 24A9846
Drawn by (draftperson/designer): J.ORTIZ
Cognizant engineer: G. KOEHLER
Production approval (cognizant engineer/physicist): R. WELLS
Category code or WBS to level 3 (See STAR Note 19): SR-02-10

This email generated from star_drawing_form.html by MIT's cgiemail.

Return-Path: <Rich_Meyer@macmail.lbl.gov>
Date: 21 Apr 1997 08:44:15 -0700
Subject: FWD>Star Drawing #
To: "Rich_Meyer@macmail3.lbl.gov" <Rich#u#Meyer#a#macmail3#d#lbl#d#gov@macmail.l
X-Mailer: Mail*Link SMTP/QM 3.0.0

Mail*Link(r) SMTP FWD>Star Drawing #

OFFICE MEMO Subject: RE>STAR drawing number request Time: 2:50 PM Date: 4/18/97

Your STAR Drawing # is TPC780-E-1.

Have a good one,

Rich

Date: 4/8/97 2:23 PM
To: Rich Meyer
From: John.Ortiz@rsgi01.rhic.bnl.gov
This is a request for a STAR drawing number

NAME: John Ortiz
E-MAIL ADDRESS: JMOrtiz@lbl.gov
TELEPHONE NUMBER: 7298

Drawing size: E
Number of pages: 1
Revision: A
Revision Date: 4/7/97
Title line 1: RHIC - STAR - TPC
Title line 2: SECTOR MOUNTING TOOL
Title line 3: SPIDER DOUBLE LEG
Institution (ANL, UT Austin, etc.): LBNL
Institution drawing number: 24A9846
Drawn by (draftperson/designer): J.ORTIZ
Cognizant engineer: G. KOEHLER
Production approval (cognizant engineer/physicist): R. WELLS
Category code or WBS to level 3 (See STAR Note 19): SR-02-10

This email generated from star_drawing_form.html by MIT's cgiemail.

Return-Path: <www-eng@luthien.lbl.gov>
Date: Thu, 10 Apr 1997 12:08:31 -0700
To: jortiz@me71.lbl.gov
Cc: ANCogan@lbl.gov, C_Corradi@lbl.gov, RMForment@lbl.gov, RCHamilton@lbl.gov,
        CELawrence@lbl.gov, NELewis@lbl.gov, A_Whichard@lbl.gov
Subject: TROUBLE REPORT 1060 - COMPLETED

John Ortiz,

This is an automated reply to inform you that your
trouble report, number 1060, has been closed/completed.
For more information, you can look at the description
of the solution for trouble report 1060.
This report was closed/completed by Chuck Lawrence - CELawrence@lbl.gov.

From: John.Ortiz@rsgi01.rhic.bnl.gov (4/8/97)
To: rich_meyer@lbl.gov
CC:
BCC:
Priority: Normal
Date sent: 4/8/97 2:30 PM

Mail*Link® SMTP

STAR drawing number request

This is a request for a STAR drawing number

NAME: John Ortiz
E-MAIL ADDRESS: JMOrtiz@lbl.gov
TELEPHONE NUMBER: 7298

Drawing size: ~~E~~ D
Number of pages: 1
Revision: A
Revision Date: 4/8/97
Title line 1: RHIC - STAR - TPC
Title line 2: SECTOR MOUNTING TOOL
Title line 3: SINGLE SPIDER LEG, ~~FLANGE & STANDOFF~~
Institution (ANL, UT Austin, etc.): LBNL
Institution drawing number: 24A9856
Drawn by (draftperson/designer): J. ORTIZ
Cognizant engineer: G. KOEHLER
Production approval (cognizant engineer/physicist): R. WELLS
Category code or WBS to level 3 (See STAR Note 19): SR-02-10

This email generated from star_drawing_form.html by MIT's cgiemail.

Return-Path: <Rich_Meyer@macmail.lbl.gov>
Date: 18 Jun 1997 10:39:46 -0700
Subject: Re: STAR drawing number requ
To: "JM Ortiz" <JMOrtiz@lbl.gov>
X-Mailer: Mail*Link SMTP/QM 3.0.0

	Subject:	Time: 10:37 AM
OFFICE MEMO	RE>STAR drawing number request	Date: 6/18/97

Your drawing number is TPC-787-D-1

Date: 6/18/97 10:32 AM
To: Rich Meyer
From: JOHN.ORTIZ@rsgi01.rhic.bnl.gov
This is a request for a STAR drawing number

NAME: JOHN ORTIZ
E-MAIL ADDRESS: JMOrtiz@lbl.gov
TELEPHONE NUMBER: 7298

Drawing size: D
Number of pages: 1
Revision: A
Revision Date: 6/16/97
Title line 1: RHIC - STAR - TPC
Title line 2: TPC ASSEMBLE & TEST
Title line 3: SMT - IS SINGLE SPIDER LEG
Institution (ANL, UT Austin, etc.): LBNL
Institution drawing number: 24A9884
Drawn by (draftperson/designer): JOHN ORTIZ
Cognizant engineer: GARY KOEHLER
Production approval (cognizant engineer/physicist): RUSS WELLS
Category code or WBS to level 3 (See STAR Note 19): 4.2.10

This email generated from star_drawing_form.html by MIT's cgiemail.

Return-Path: <Rich_Meyer@macmail.lbl.gov>
Date: 7 Jul 1997 16:08:55 -0700
Subject: FWD>STAR drawing number req
To: "John Ortiz" <jmortiz@lbl.gov>
X-Mailer: Mail*Link SMTP/QM 3.0.0

Mail*Link(r) SMTP FWD>STAR drawing number request

The STAR Drawing Number for this drawing is TPC759-D-1.

Rich.

Date: 7/7/97 9:39 AM
From: jortriz@rsgi01.rhic.bnl.gov
This is a request for a STAR drawing number

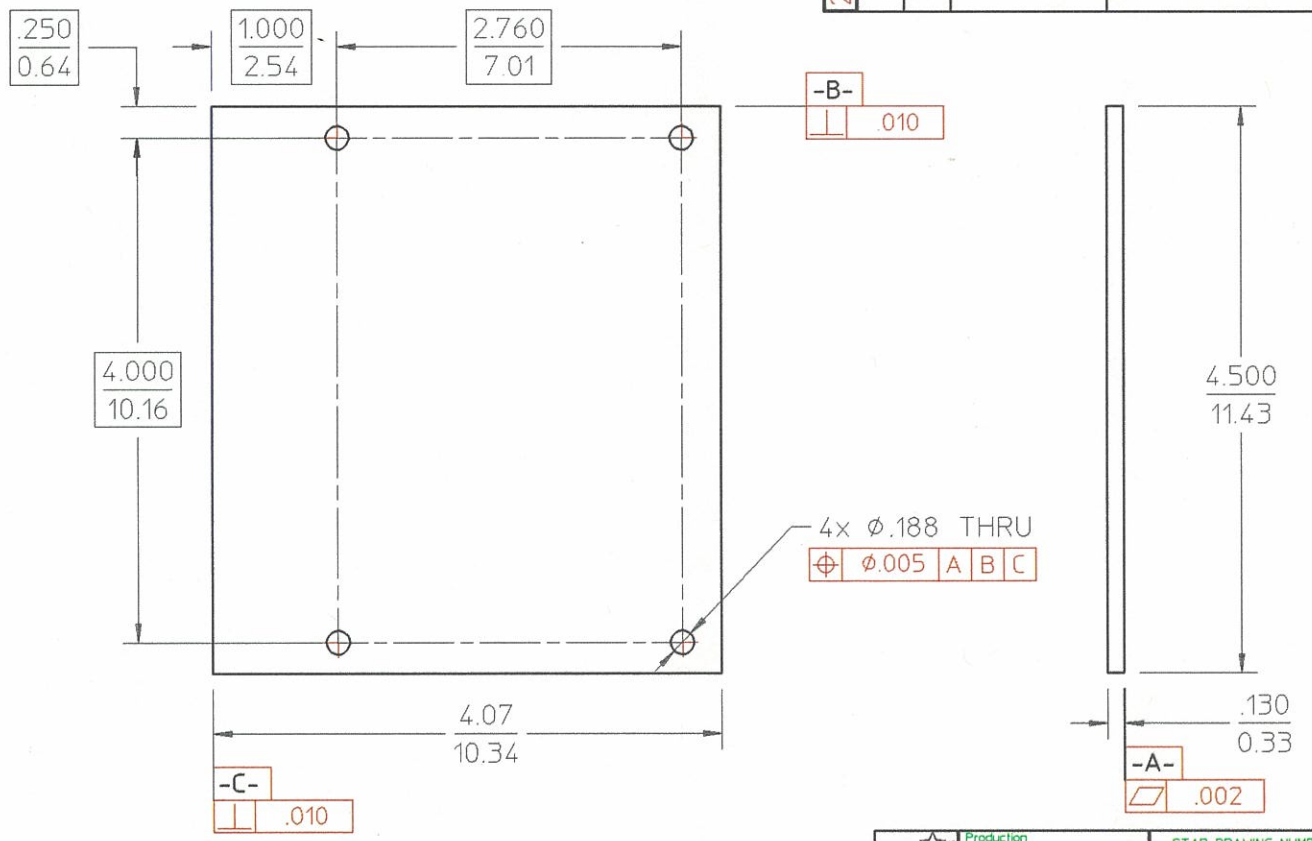
NAME: jortriz
E-MAIL ADDRESS: JMOrtiz.lbl.gov
TELEPHONE NUMBER: 7298

Drawing size: D
Number of pages: 1
Revision: A
Revision Date: 6/30/97
Title line 1: RHIC - STAR - TPC
Title line 2: TPC ASSEMBLE & TEST
Title line 3: OUTER SECTOR SET PLATE
Institution (ANL, UT Austin, etc.): LBNL
Institution drawing number: 21F0294
Drawn by (draftperson/designer): JOHN M. ORTIZ
Cognizant engineer: G, KOEHLER
Production approval (cognizant engineer/physicist): G. KOEHLER
Category code or WBS to level 3 (See STAR Note 19): 4.2.10

This email generated from star_drawing_form.html by MIT's cgiemail.

CASCADE
CASCADE
CASCADE

24A7742A	ITEM	REQ	PART NUMBER	DESCRIPTION
	1	2	-	ALUMINUM 6061-T6



WBS # 4.2.10	Production Approval: / Cognizant Engineer: A. Wandesforde	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
		TPC763-B-1	A	XXXXXXXXXX	-

REV.	DWN.	CHK.	DATE	CHANGES
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 | ANGLES ±.5° | XX/.X = ±0.02/0.05 | FINISH 125/.32 | 0.XXX/.XX=±.005/.01

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS ARE PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1.

SHOP ORDERS

ACCT. NO. | SER. NO.

DATE ISS'D | DATE REQ'D | NO. REQ'D

DELIVER TO:

SURFACE TREATMENT ---

IDENTIFICATION METHOD ---

DRWN BY I. amerman | DATE 09/02/94

CHECK BY R. LEWIS | DATE 08/07/95

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR TPC
SECTOR MOUNTING TOOL
Gearbox Cover

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	8052-30	SR-02-10	24A7742	A

old

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO.	SER. NO.		MICROFILMED	DETAIL	24A7606	24A7831	A
TOLERANCES: .X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D		DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:							
FINISH 125/.32	SURFACE TREATMENT: Degrease							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD: Tag							
ALL SCREW THREADS PER ANSI Y14.6	DRWN BY: I. amerman		DATE: 00/00/00					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY		DATE					
REFERENCE - ANSI Y14.5 & B46.1.								

REV.	DWN.	CHK.	DATE	CHANGES

LAWRENCE BERKELEY LABORATORY

UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
SECTOR MOUNTING TOOL
Shaft 2

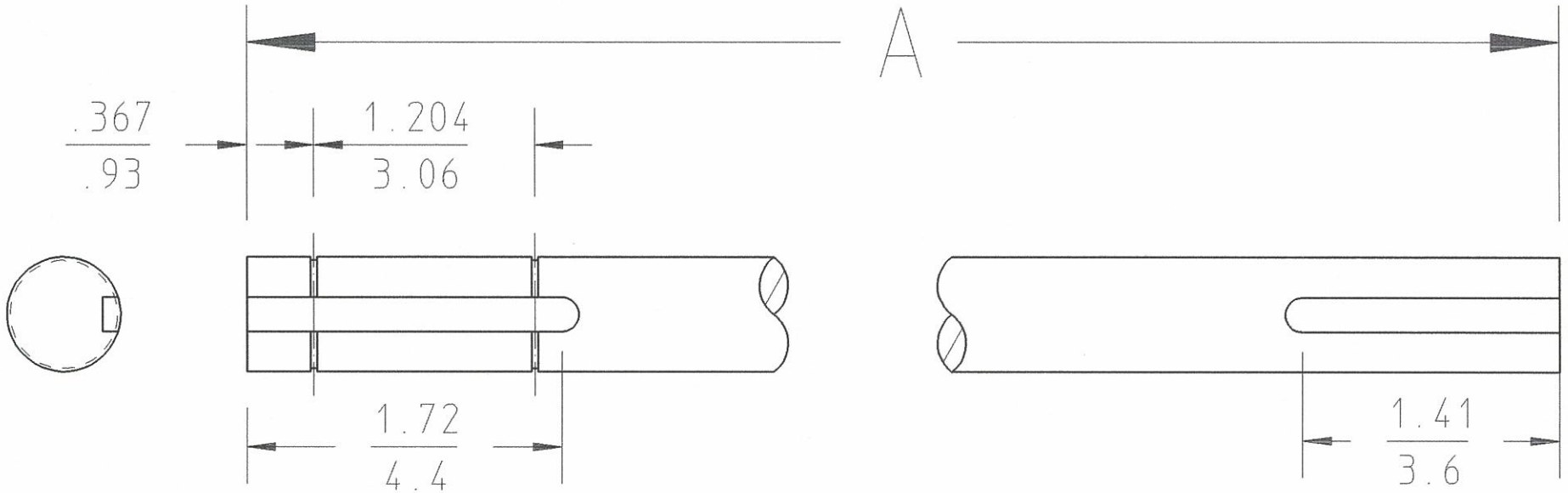
MATERIAL: 0.625" STEEL SHAFTING (supplied)

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: A. Wandesforde	TPC773-A-1	A	XXXXXXXXXX	-

NOTE:
2 Snap Ring Grooves:
0.036" Wide x 0.588" Dia.

2 Keyways:
0.188" x 0.1" Deep

PART	DIMENSION 'A'
24A7831-1	47.0"
24A7831-2	36.75"



24A7606

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES	ACCT. NO.	SER. NO.			DETAIL	~~00X0000~~	24A7981	—
TOLERANCES: .X = ±.1 / .XX = ±.02 / .XXX = ±.010 — ANGLES ±.5° — FINISH 125 ✓	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
SAWED, FLAMECUT, SHEARED OR STOCK FINISH ✕	DELIVER TO:							
ALL SCREW THREADS ARE PER ANSI Y14.6	SURFACE TREATMENT: Degrease							
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	IDENTIFICATION METHOD: Tag							
REFERENCE - ANSI Y14.5 & B46.1.	DRWN BY: ~~A.RAWLINS~~ ORIG — DATE: 11/30/95							
	CHECK BY		DATE					

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
SECTOR MOUNTING TOOL
PLATEN STANDOFF

MATERIAL: ALUMINUM

REV.	DWN.	CHK.	DATE	CHANGES
A	~~AR~~ GK	~~4/97~~	11/95	release for fabrication
B	JO	GK	4/98	major revision

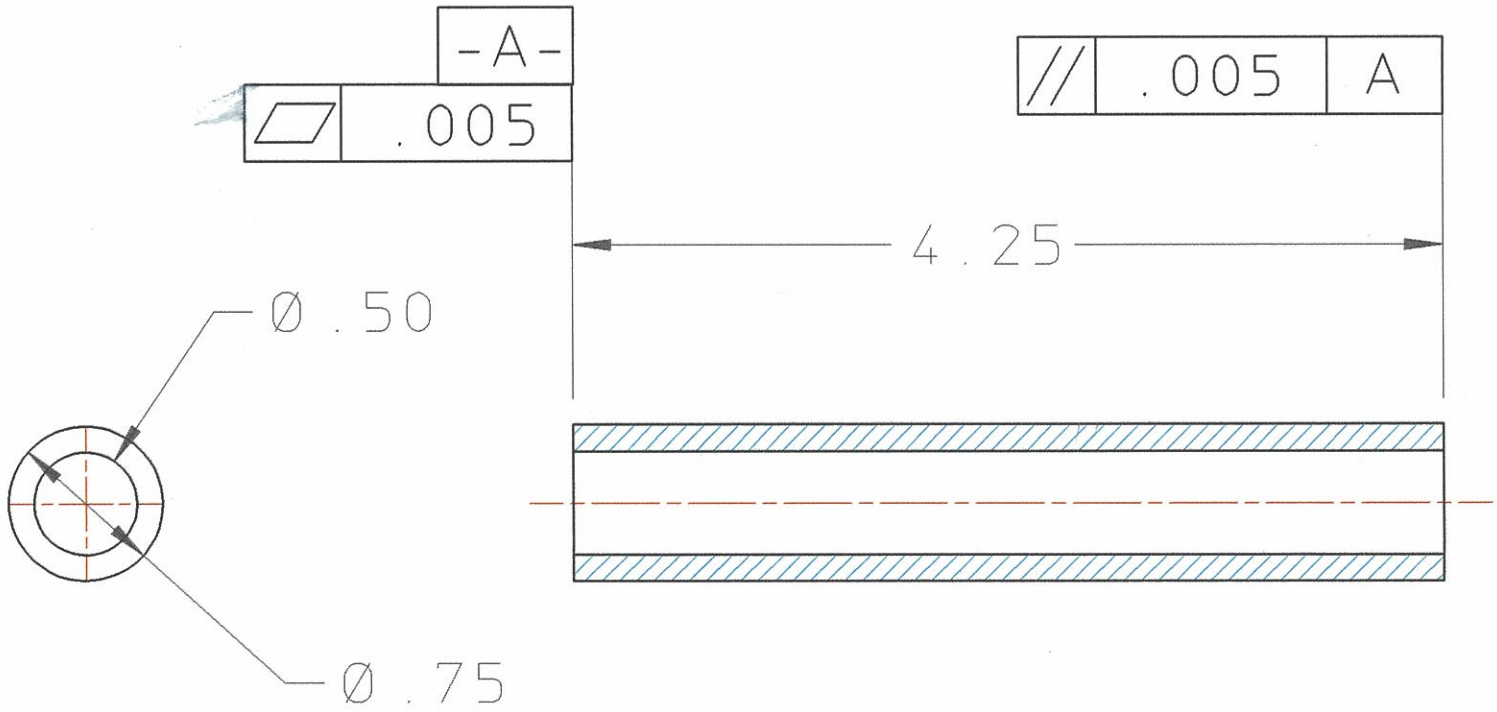
WBS # 4.2.10

Production Approval:

Cognizant Engineer: R.WELLS

STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
TPCXXX-A-1	A	XXXXXXXXXXX	-

776



major revision

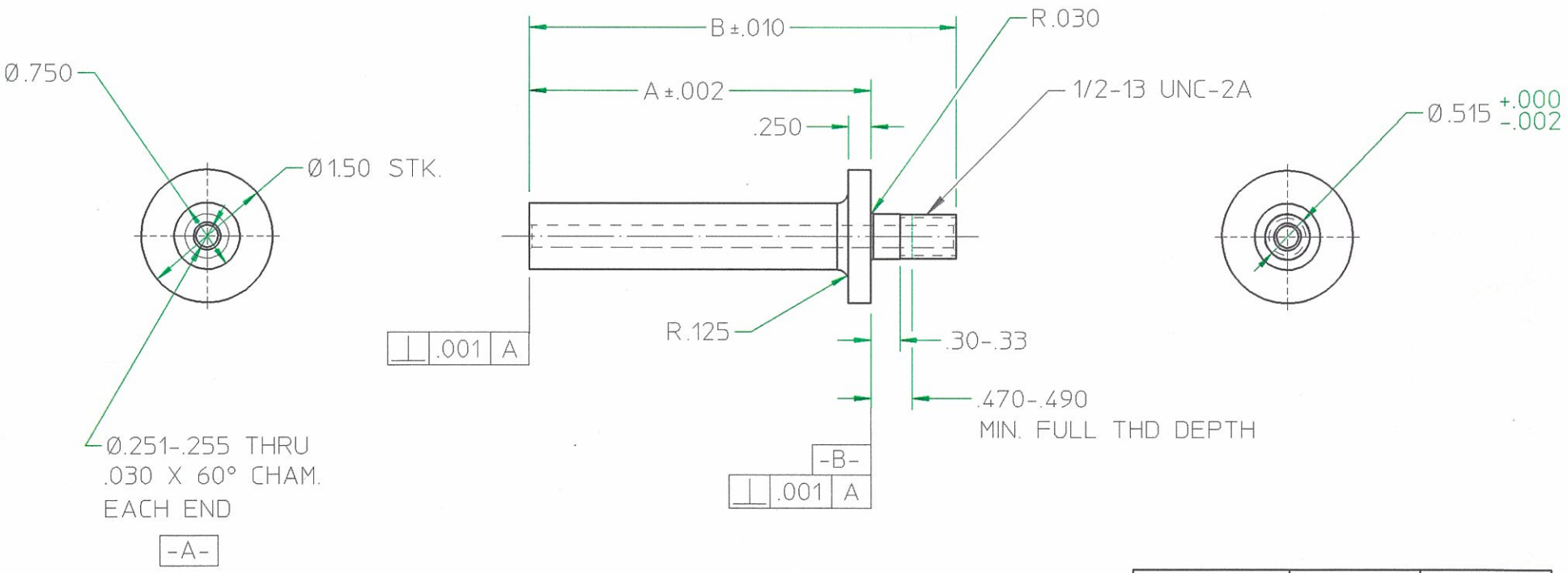


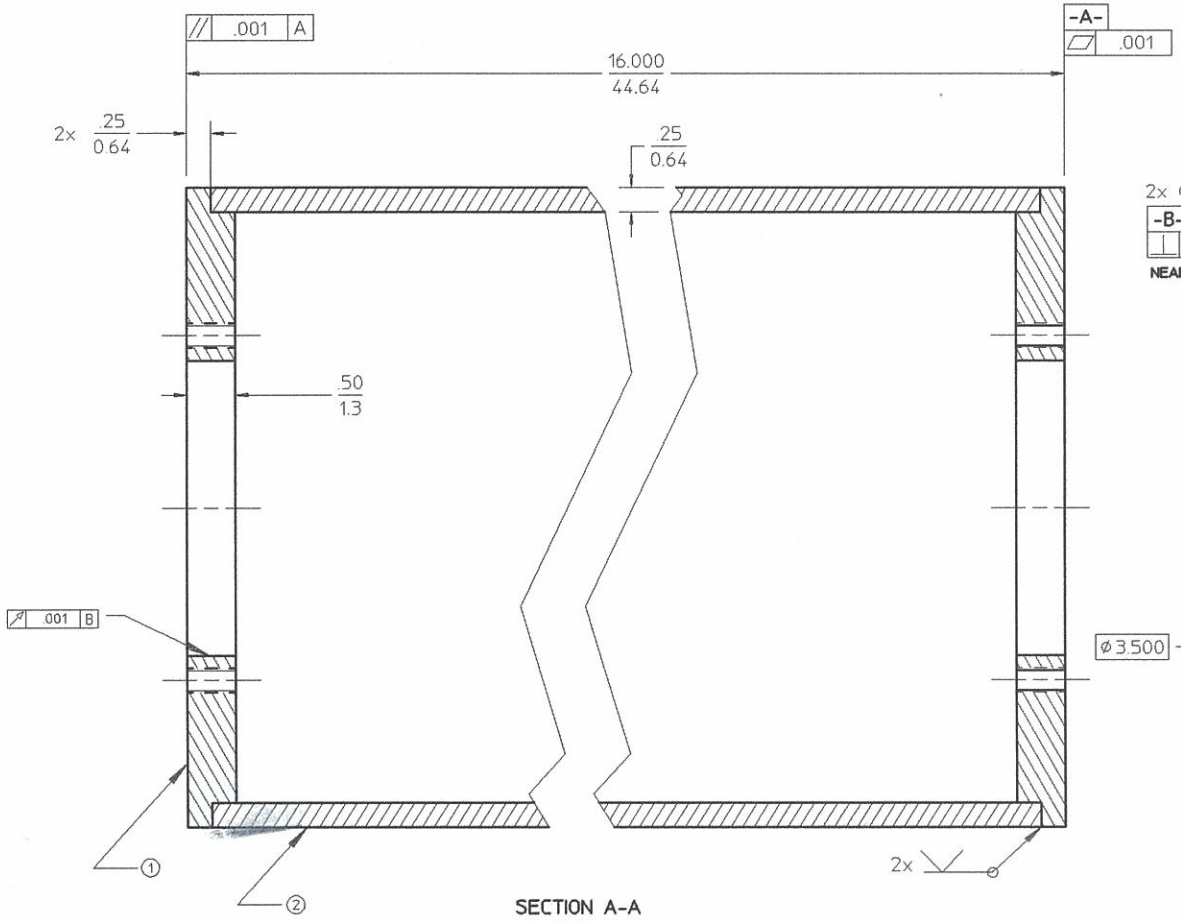
TABLE NO.	A DIM.	B DIM.
1	3.900	4.875
2	4.025	5.000

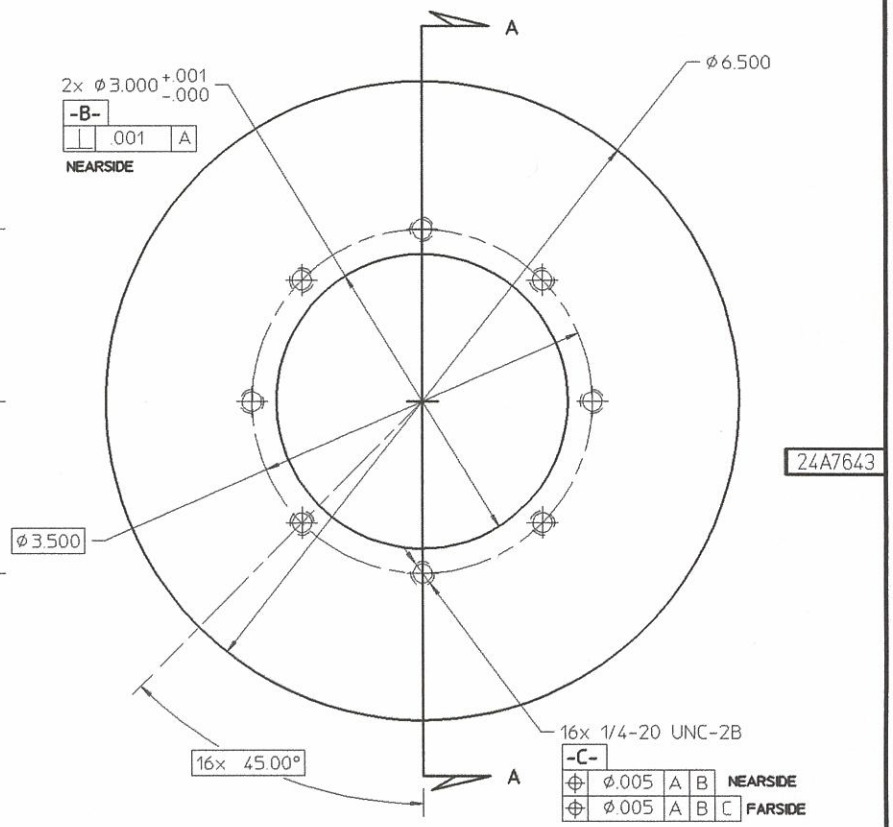
(1) STANDOFF
3 REQD

(2) STANDOFF
3 REQD

MATL: STAINLESS STEEL BAR, ROUND, 1.50" DIA.
SCALE: 1/1

ITEM	REQ	PART NUMBER	DESCRIPTION
	2	1	STEEL PLATE, 1/2" HOT ROLLED A36, LBL #9531-10632
	1	2	STEEL PIPE,6.625 O.D., LBL #4710-13920





24A7643

WBS # 4.2.10	Production Approval:	Cognizant Engineer: A. Wandesforde	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
			TPC754-C-1	A	XXXXXXXXXX	-

REV.	DWN.	CHK.	DATE	CHANGES
A	RL		8/95	RELEASED FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15; .XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01; ANGLES ±.5°; FINISH 125/32

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1.

SHOP ORDERS

ACCT. NO.: SER. NO.:

DATE ISS'D: DATE REQ'D: NO. REQ'D:

DELIVER TO:

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

DRWN BY: L. amerman DATE: 09/08/94

CHECK BY: R. LEWIS DATE: 08/03/95

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

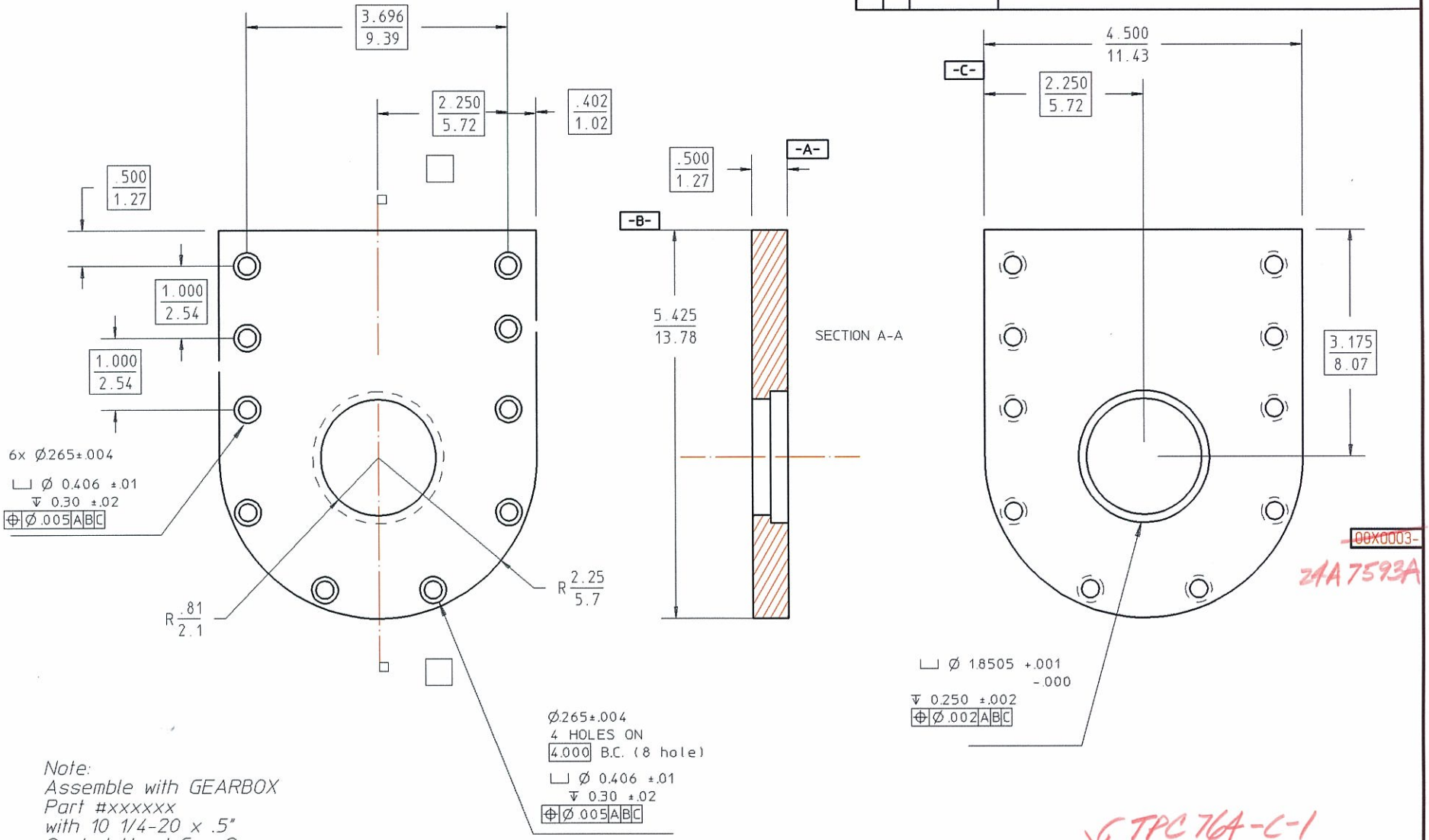
RHIC/STAR TPC

SECTOR MOUNTING TOOL

Short Tube (O.S.)

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	24A7606		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	8052-30	SR-02-10	24A7643	A

ITEM	REQ	PART NUMBER	DESCRIPTION
1	2	-	ALUMINUM 2024 or 7075



Note:
Assemble with GEARBOX
Part #xxxxxx
with 10 1/4-20 x .5"
Socket Head Cap Screws

~~00X0003-~~
24A7593A

TPC76A-C-1

WBS # 0.000	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
	Cognizant Engineer: A. Wandesforde	~~SIMXXX-C-1~~	A	XXXXXXXXXX	-

REV.	DWN.	CHK.	DATE	CHANGES

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
TOLERANCES: .X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01; ANGLES ±.5°; FINISH 125/32
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS ARE ISO METRIC CLASS 6
BREAK EDGES .020/.05 MAX ON MACHINE WORK.
REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS
ACCT. NO.
SER. NO.
DATE ISSD.
DATE REQ'D:
NO. REQ'D:
DELIVER TO:
SURFACE TREATMENT: Degrease
IDENTIFICATION METHOD: Tag
DRWN BY: L. amerman
DATE: 09/02/94
CHECK BY
DATE

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
SECTOR INSERTION TOOL
Gearbox Face

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: FULL	DO NOT SCALE PRINTS
	DETAIL	00X0000		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER	REV.
	0000-00	00-00-00	~~00X0003~~	~~-~~

24A7593 A

WORM_GEAR_2

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT NO.	SER. NO.			DETAIL	24A7606	24A7612	—
TOLERANCES: X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO							
FINISH 125/.32	SURFACE TREATMENT ---							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD ---							
ALL SCREW THREADS ARE ISO METRIC CLASS 6	DRWN BY A.RAWLINS		DATE 11/14/95					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY		DATE					
REFERENCE - ANSI Y14.5 & B46.1.								

REV.	DWN.	CHK.	DATE	CHANGES

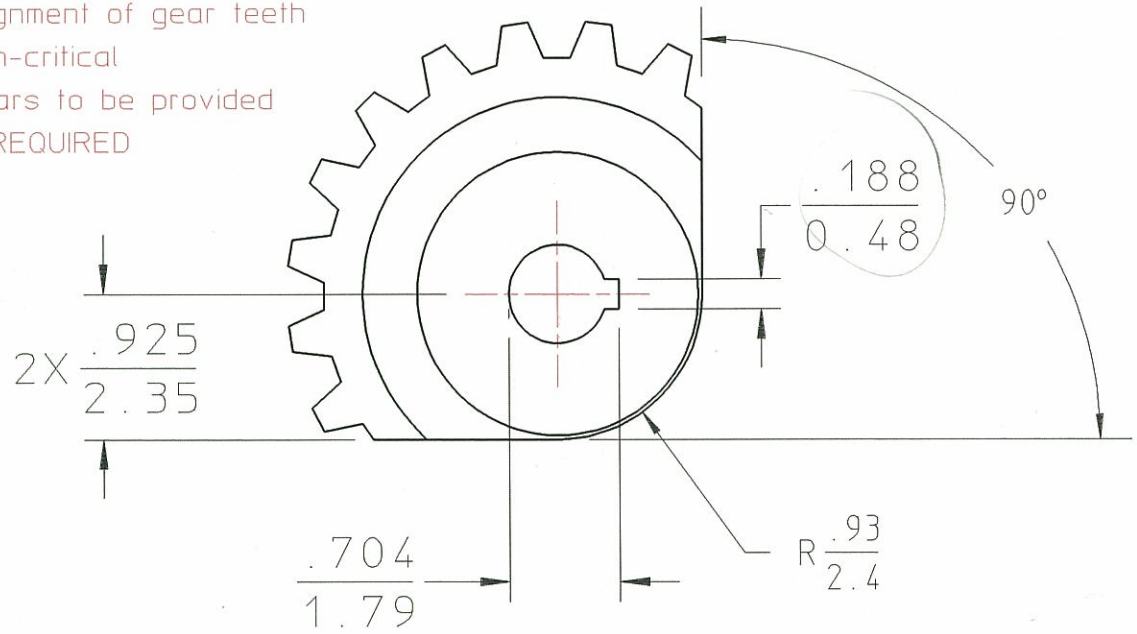
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
TPC-ASSEMBLY
SMT-Worm Gear 2

MATERIAL: WORM GEAR,BOSTON#GB1061

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: R.WELLS	TPCXXX-A-1	A	XXXXXXXXXX	-

NOTE:
Alignment of gear teeth
non-critical
Gears to be provided
2 REQUIRED



24A9861 dwg number

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS			PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO.	SER. NO.			DETAIL	24A7606	24A7612	B
TOLERANCES: X/.X = ±.06/.15; XX/.X = ±0.02/0.05; 0.XXX/.XX=±.005/.01	DATE ISS'D	DATE REQ'D	NO. REQ'D	MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10	SCALE: FULL	DO NOT SCALE PRINTS
ANGLES ±.5°	DELIVER TO:							
FINISH 125/.32	SURFACE TREATMENT ---							
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	IDENTIFICATION METHOD ---							
ALL SCREW THREADS ARE ISO METRIC CLASS 6	DRWN BY A.RAWLINS		DATE 11/14/95					
BREAK EDGES .020/.05 MAX ON MACHINE WORK.	CHECK BY G.KOEHLER		DATE 11/14/95					
REFERENCE - ANSI Y14.5 & B46.1								

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

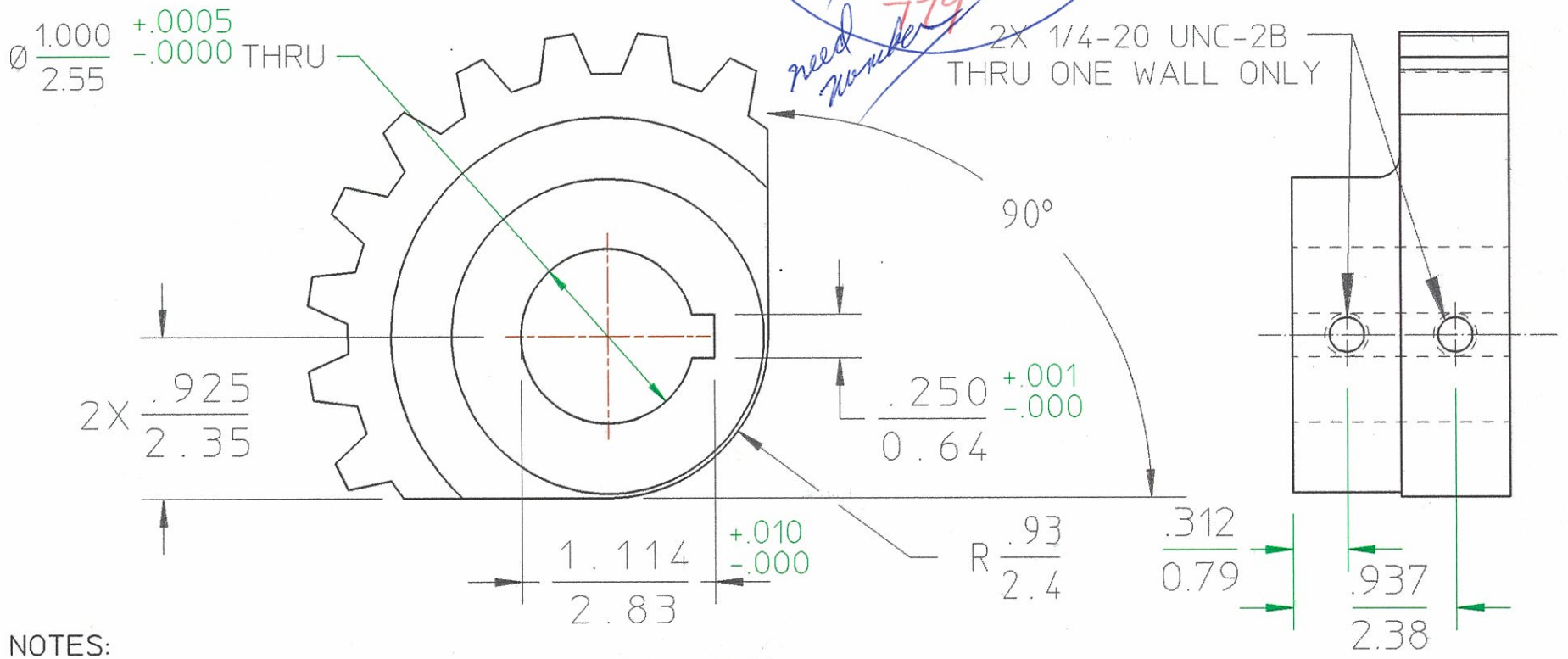
RHIC/STAR DETECTOR
TPC-ASSEMBLY
SMT-Worm Gear 2

MATERIAL: WORM GEAR,BOSTON#GB1061

REV.	DWN.	CHK.	DATE	CHANGES
A	AR	GK	11/95	RELEASED FOR FABRICATION
B	JO	GK	3/97	ADDED 2X 1/4-20 HOLES, CHD. GEAR BORE & KEYWAY

WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
4.2.10	Cognizant Engineer: R.WELLS	TPCXXX-A-1	B	XXXXXXXXXXX	-

need number 779



NOTES:

1. ALL DIMENSIONS GIVEN IN METRIC ARE FOR REFERENCE ONLY AND TOLERANCE IS NOT SHOWN.

FINAL

UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE INCHES

TOLERANCES: .X = ±.1 | ANGLES ±.5° | .XX = ±.02 | FINISH | .XXX = ±.010 | 125

SAWED, FLAMECUT, SHEARED OR STOCK FINISH

ALL SCREW THREADS ARE PER ANSI Y14.6

BREAK EDGES .020/.05 MAX ON MACHINE WORK.

REFERENCE - ANSI Y14.5 & B46.1

SHOP ORDERS

ACCT. NO. | SER. NO.

DATE ISS'D | DATE REQ'D | NO. REQ'D

DELIVER TO:

SURFACE TREATMENT: Degrease

IDENTIFICATION METHOD: Tag

DRWN BY: A.RAWLINS | DATE: 11/30/95

CHECK BY | DATE

REV.	DWN.	CHK.	DATE	CHANGES

PATENT CLEAR | MICROFILMED

DRAWING TYPE: DETAIL | SHOWN ON: 00X0000

DESIGN ACCOUNT: 8052-30 | CATEGORY CODE: SR-02-10

LBL DRAWING NUMBER: 24A8201 | REV.: —

SCALE: FULL | DO NOT SCALE PRINTS

LAWRENCE BERKELEY LABORATORY

UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
SECTOR MOUNTING TOOL
GEAR SPACER

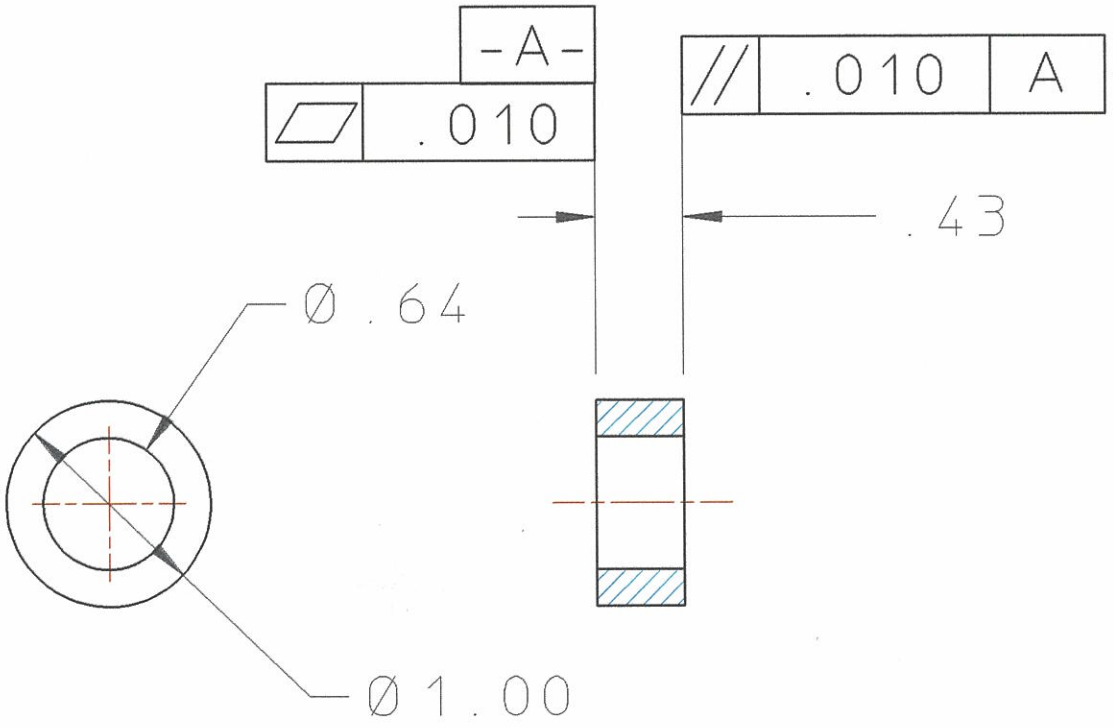
MATERIAL: BRASS

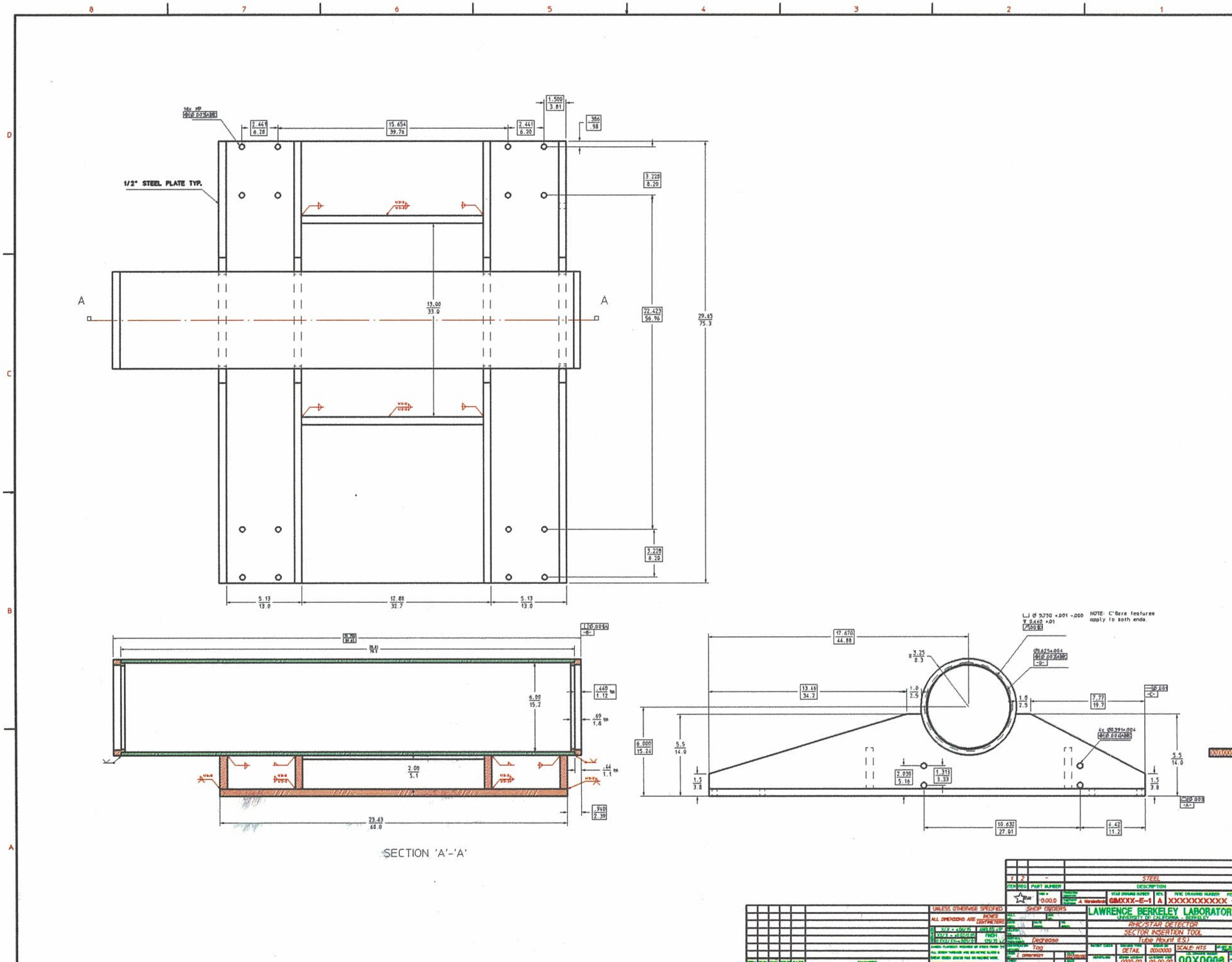
WBS # 4.2.10

Production Approval:

Cognizant Engineer: R.WELLS

STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
TPCXXX-A-1	A	XXXXXXXXXXX	-




1/2" STEEL PLATE TYP.
SECTION 'A'-'A'
NOTE: C'Bore features apply to both ends.
STEEL
ITEM
REQ
PART NUMBER
DESCRIPTION
GIMXXX-E-1
XXXXXXXXXXX
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
SHOP ORDERS
Degrease
Tag
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
SECTOR INSERTION TOOL
Tube Mount (IS)
DETAIL
SCALE: NTS
00X0008
CHANGES
old

24A 768

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS							
ALL DIMENSIONS ARE INCHES / CENTIMETERS	ACCT. NO.		SER. NO.					
TOLERANCES: .X/.X = ±.06/.15	DATE ISS'D		DATE REQ'D		NO. REQ'D			
XX/.X = ±0.02/0.05	DELIVER TO:							
0.XXX/.XX=±.005/.01	SURFACE TREATMENT	Degrease						
ANGLES ±.5°	IDENTIFICATION METHOD	Tag						
FINISH 125/.32	DRWN BY	I. amerman		DATE	09/08/94			
SAWED, FLAMECUT, SHEARED OR STOCK FINISH	CHECK BY			DATE				
ALL SCREW THREADS ARE ISO METRIC CLASS 6								
BREAK EDGES .020/.05 MAX ON MACHINE WORK.								
REFERENCE - ANSI Y14.5 & B46.1								

REV.	DWN.	CHK.	DATE	CHANGES

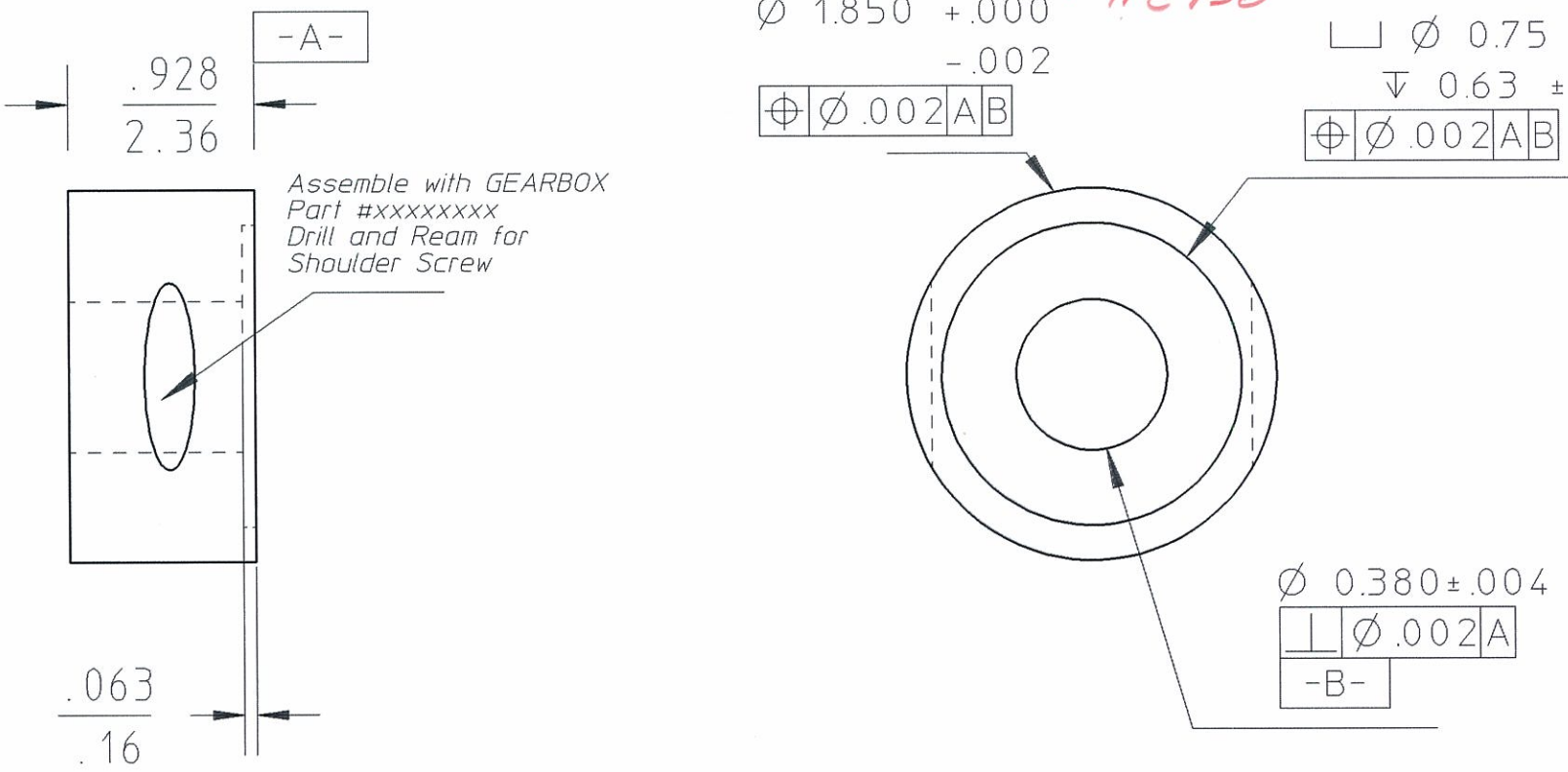
PATENT CLEAR	DRAWING TYPE	SHOWN ON	LBL DRAWING NUMBER	REV.
	DETAIL	00X0000	00X0001	-
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	SCALE: FULL	DO NOT SCALE PRINTS
	0000-00	00-00-00		

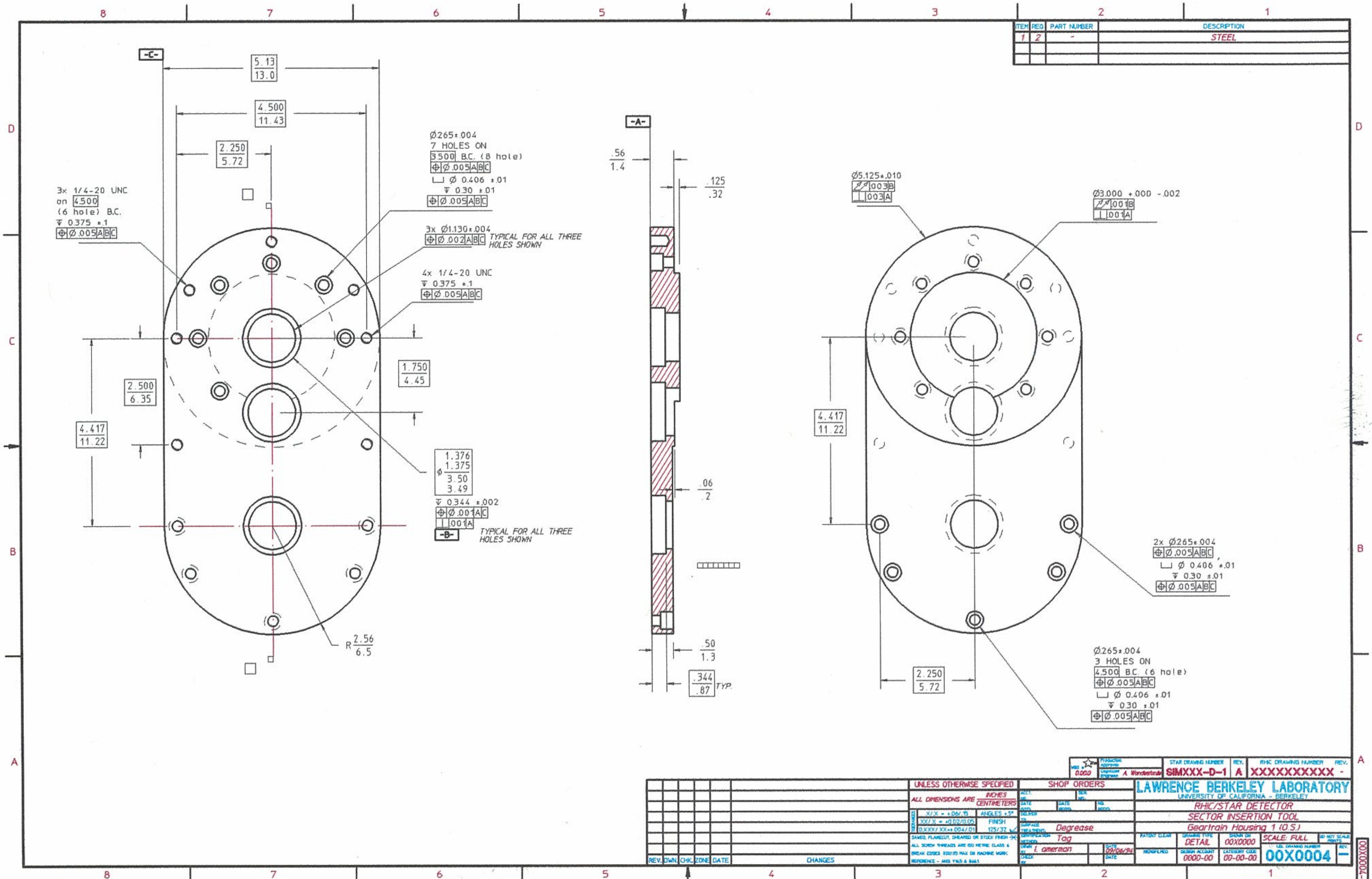
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
SECTOR INSERTION TOOL
Gearbox Plug

MATERIAL: ALUMINUM 2024 or 7075

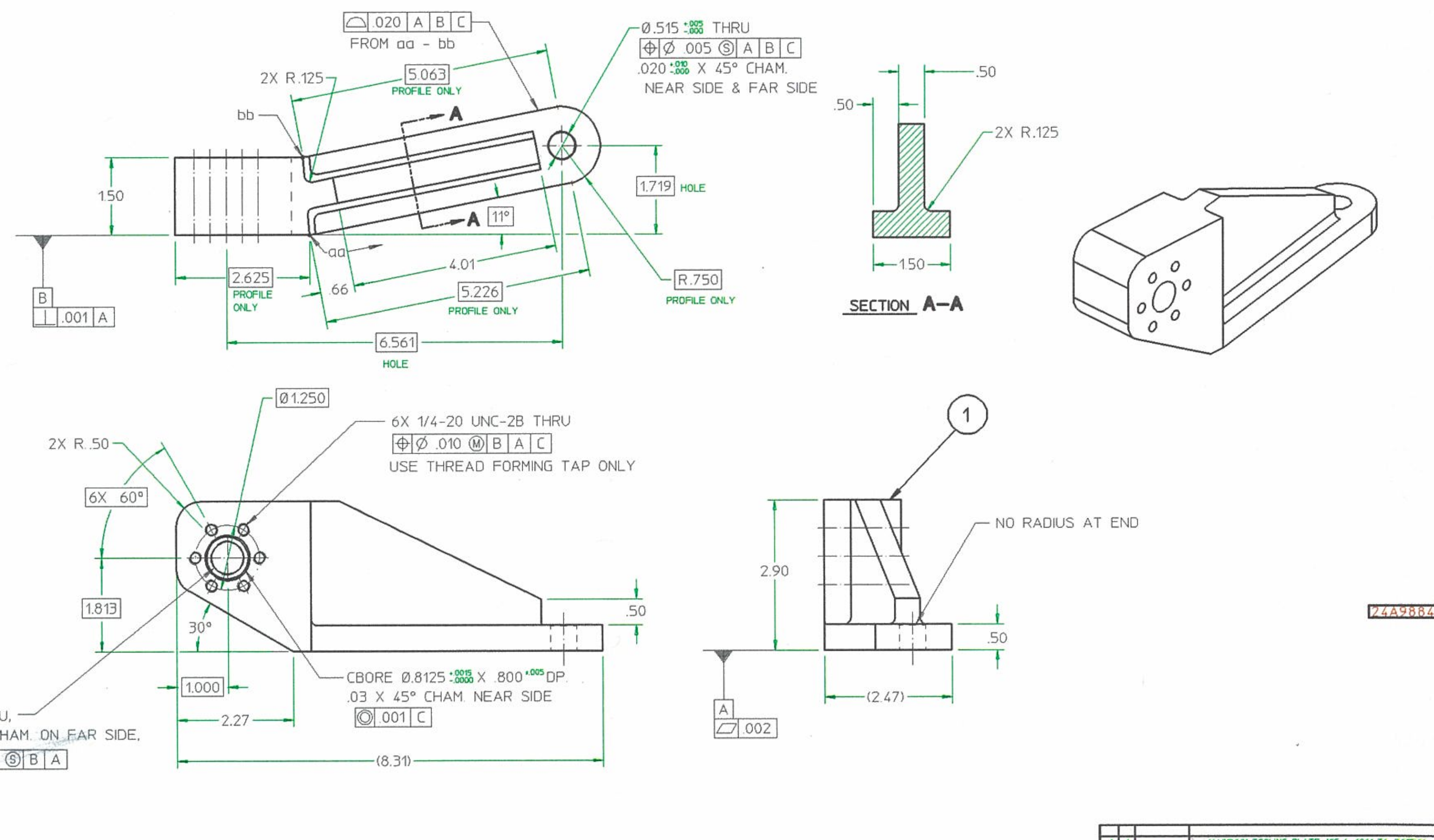
WBS #	Production Approval:	STAR DRAWING NUMBER	REV.	RHIC DRAWING NUMBER	REV.
0.00.0	Cognizant Engineer: A. Wandesforde	~~SIMXXX-A-1~~ TPC 758	A	XXXXXXXXXXX	-





LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
SECTOR INSERTION TOOL
Geartrain Housing 1 (0.5)
STAR DRAWING NUMBER SIMXXX-D-1 REV. A
RHIC DRAWING NUMBER XXXXXXXXXX REV. -
DETAIL
00X0000
SCALE: FULL
0000-00
00-00-00
00X0004
A. Wandenbruk
Degrease
Tag
L. Amerman
09/06/94
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES CENTIMETERS
X/X = ±.06/.15
XX/X = ±.02/0.05
0.XXX/XX=±.004/.01
ANGLES ±.5°
FINISH 125/32
SHOP ORDERS
CHANGES
REV. DWN. CHK. ZONE DATE
ITEM REQ PART NUMBER DESCRIPTION
1 2 - STEEL
-A-
-B-
-C-
5.13 / 13.0
4.500 / 11.43
2.250 / 5.72
2.500 / 6.35
4.417 / 11.22
1.750 / 4.45
Ø265±.004
7 HOLES ON
3.500 B.C. (8 hole)
Ø .005 A B C
Ø 0.406 ±.01
0.30 ±.01
3x Ø1.130±.004
Ø .002 A B C
TYPICAL FOR ALL THREE HOLES SHOWN
4x 1/4-20 UNC
0.375 ±.1
Ø .005 A B C
3x 1/4-20 UNC
on 4.500
(6 hole) B.C.
0.375 ±.1
Ø.005 A B C
Ø 1.376 / 1.375 / 3.50 / 3.49
0.344 ±.002
Ø .001 A C
.001 A
R 2.56 / 6.5
.56 / 1.4
.125 / .32
.06 / .2
.50 / 1.3
.344 / .87 TYP.
Ø5.125±.010
.003 B
.003 A
Ø3.000 +.000 -.002
.001 B
.001 A
2x Ø265±.004
Ø .005 A B C
Ø 0.406 ±.01
0.30 ±.01
Ø265±.004
3 HOLES ON
4.500 B.C. (6 hole)
Ø .005 A B C
Ø 0.406 ±.01
0.30 ±.01
00X0004-

24AT704A



NOTES:

1. MAJORITY OF HIDDEN LINES REMOVED FOR CLARITY.

ITEM	REQ	PART NUMBER	DESCRIPTION
1	1		ALUMINUM TOOLING PLATE, MIC-6, 6061-T6, 3.0"THK.

SHOP ORDERS — SURFACE TREATMENT: DEGREASE; IDENTIFICATION METHOD: TAG

APPROVALS — DRWN: J.ORTIZ 6/16/97; CHECK: G. KOEHLER 6/16/97; ENGINEER: G. KOEHLER 6/16/97

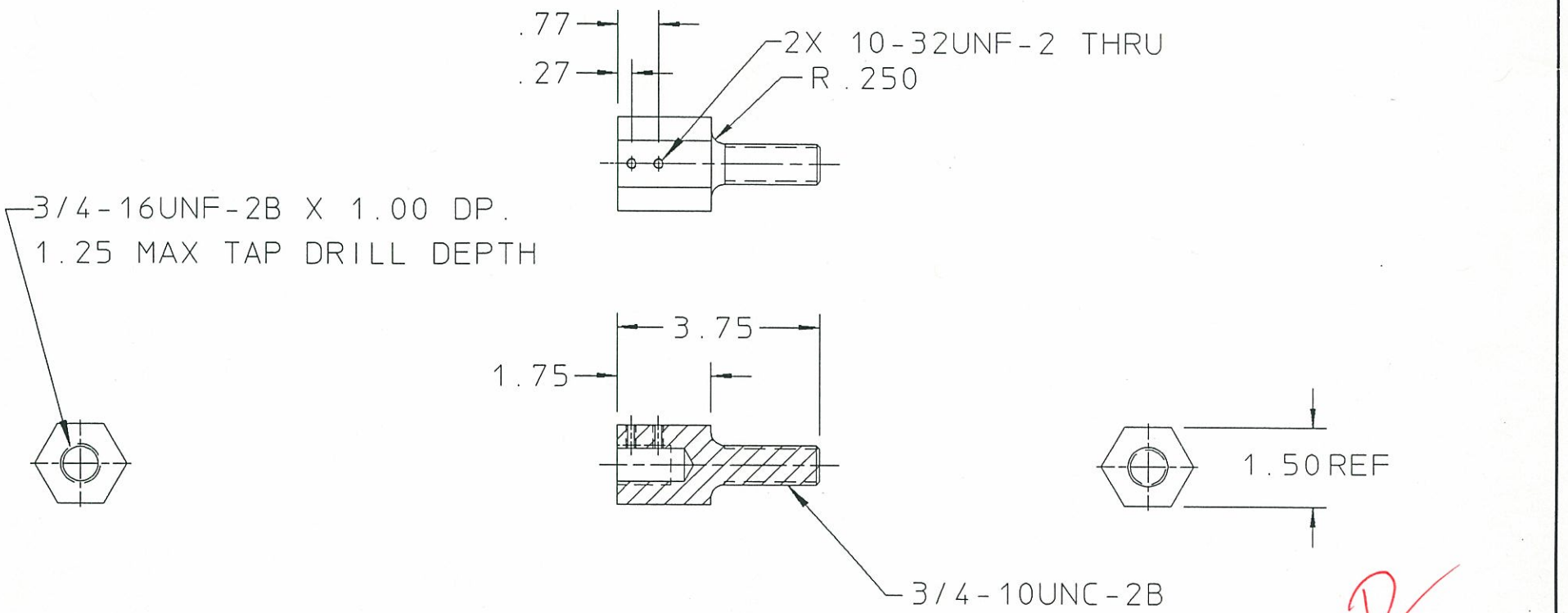
REV	DWN	CHK	ZONE	DATE	CHANGES
A	JO	GK		6/16/97	RELEASED FOR FABRICATION

STAR WBS #: 4.2.10 — DWG SIZE: D — STAR DRAWING NUMBER: TPC787-D-1 — REV: A — RHIC DRAWING NUMBER: -

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
TOLERANCES: X" = ±.060", .XX" = ±0.015", .XXX" = ±.004"; ANGLES ±.5°; FINISH 125

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
TPC ASSEMBLE & TEST
SMT IS SINGLE SPIDER LEG

DRAWING TYPE: DETAIL — SHOWN ON: 00X0000 — SCALE: 1/4
DESIGN ACCOUNT: 8052-30 — CATEGORY CODE: SR-02-10 — LBL DRAWING NUMBER: 24A9884 — REV: A



VOID

ITEM	REQ	PART NUMBER	DESCRIPTION
			BAR,1-1/2" HEX STOCK ,ALUM.6061-T651

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
A	XX	XX	XX	09/27/95	RELEASED FOR FABRICATION

SHOP ORDERS

ACCT. NO.: | SER. NO.:
DATE ISS'D: | DATE REQ'D: 00/00 | NO. REQ'D: -
SURFACE TREATMENT: DEGREASE
IDENTIFICATION METHOD: TAG

APPROVALS

DRWN BY:	A.RAWLINS	DATE 09/27/95
CHECK BY:	G.KOEHLER	DATE
PRODUCTION APPROVAL:		DATE
COGNIZANT ENGINEER:	R.WELLS	DATE

STAR | WBS # 4.2.10 | DWG SIZE B | STAR DRAWING NUMBER TPC786-B-1 | REV. X | RHIC DRAWING NUMBER XXXXXXXXXX | REV. -

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE .INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 | .XX/.X = ±0.02/0.05 | 0.XXX/.XX=±.004/.01 | ANGLES ±.5° | FINISH 125/.32

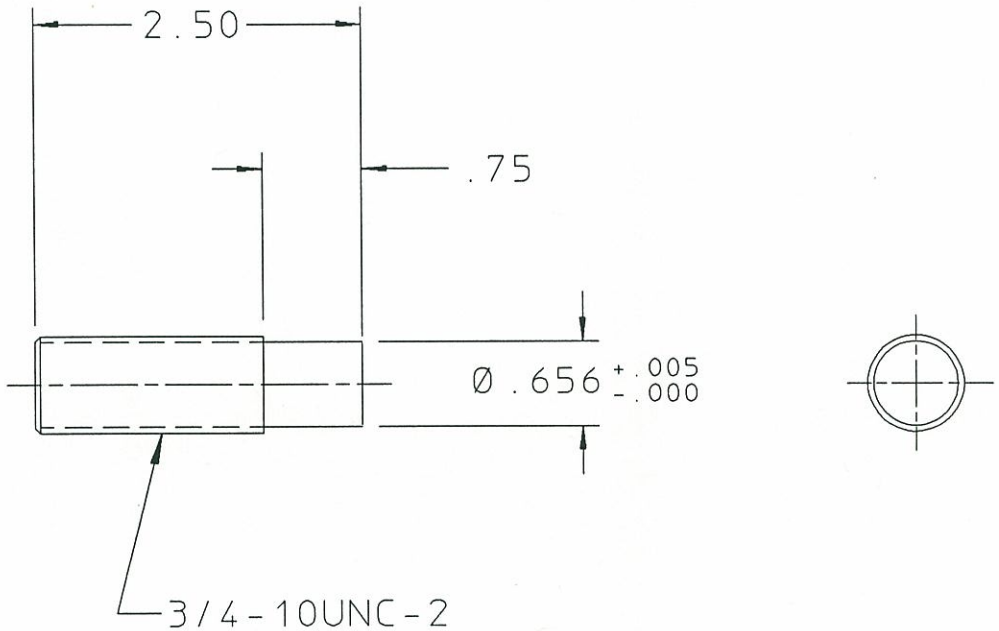
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK.
REMOVE BURRS, LOOSE SCALE AND WELD SPATTER
REFERENCE - ANSI Y14.5 & B46.1

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

RHIC/STAR DETECTOR
TPC ASSEMBLY
SMT-TURNBUCKLE ADAPTER

PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: 1/2	DO NOT SCALE PRINTS
	DETAIL	00X0000		
MICROFILMED	DESIGN ACCOUNT	CATEGORY CODE	LBL DRAWING NUMBER:	REV.
	8052-30	SR-02-10	24A8242	A

Void reassign



ITEM	REQ	PART NUMBER	ROD,THREADED,LEFT HAND, 3/4-10UNC-2 DESCRIPTION

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
A	XX	XX	XX	10/19/95	RELEASED FOR FABRICATION

SHOP ORDERS

ACCT. NO.:		SER. NO.:	
DATE ISS'D:		DATE REQ'D: 00/00	NO. REQ'D: -
SURFACE TREATMENT:	DEGREASE		
IDENTIFICATION METHOD:	TAG		

APPROVALS

DRWN BY:	A.RAWLINS	DATE 09/27/95
CHECK BY:	G.KOEHLER	DATE
PRODUCTION APPROVAL:		DATE
COGNIZANT ENGINEER:	R.WELLS	DATE

STAR | WBS # 4.2.10 | DWG SIZE B | STAR DRAWING NUMBER TPC815-B-1 | REV. X | RHIC DRAWING NUMBER XXXXXXXXXXX | REV. -

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS

TOLERANCES: .X/.X = ±.06/.15 | ANGLES ±.5° | .XX/.X = ±0.02/0.05 | FINISH 125/.32 | 0.XXX/.XX=±.004/.01

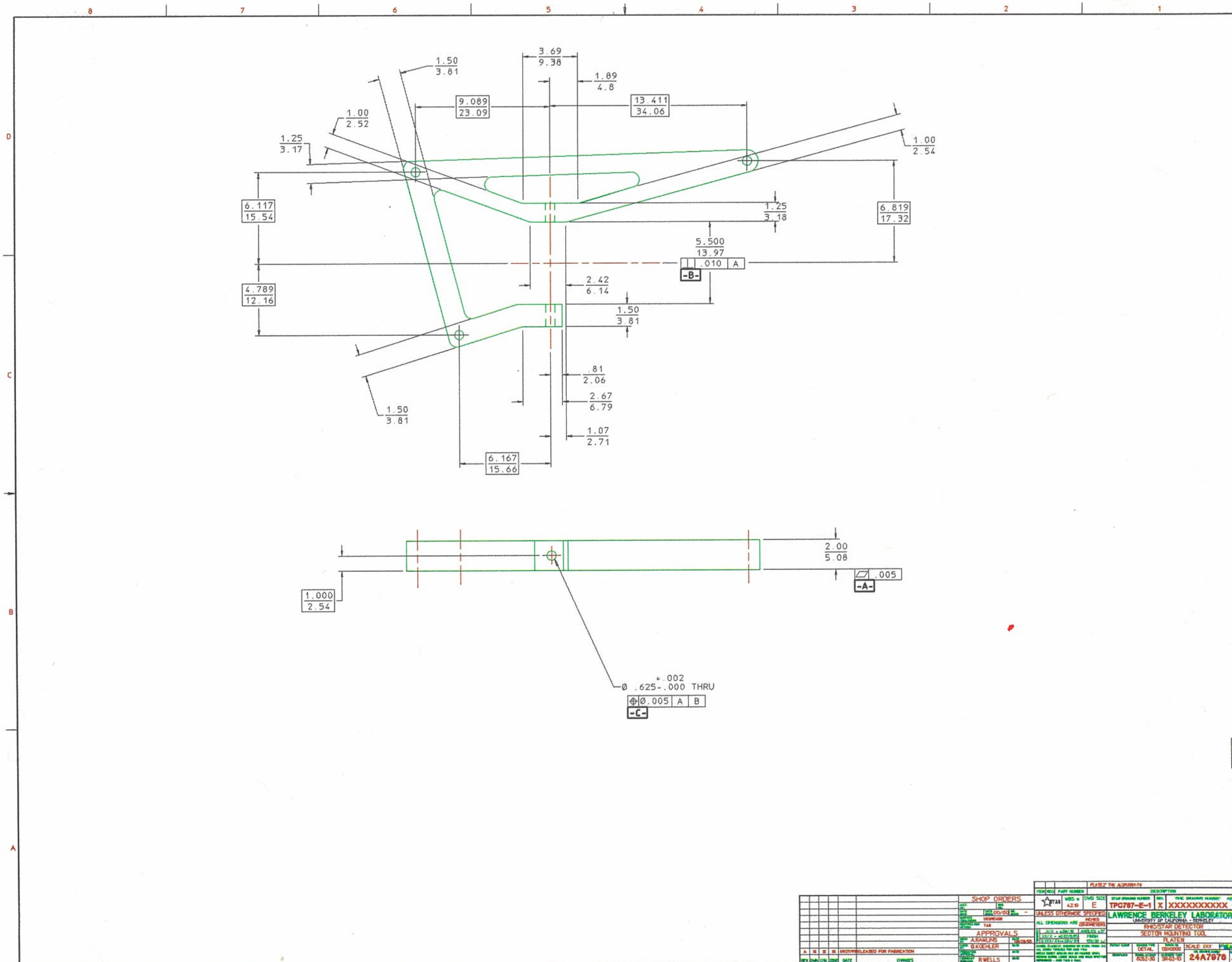
SAWED, FLAMECUT, SHEARED OR STOCK FINISH
ALL SCREW THREADS PER ANSI Y14.6
BREAK EDGES .020/.05 MAX ON MACHINE WORK.
REMOVE BURRS, LOOSE SCALE AND WELD SPATTER
REFERENCE - ANSI Y14.5 & B46.1

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY

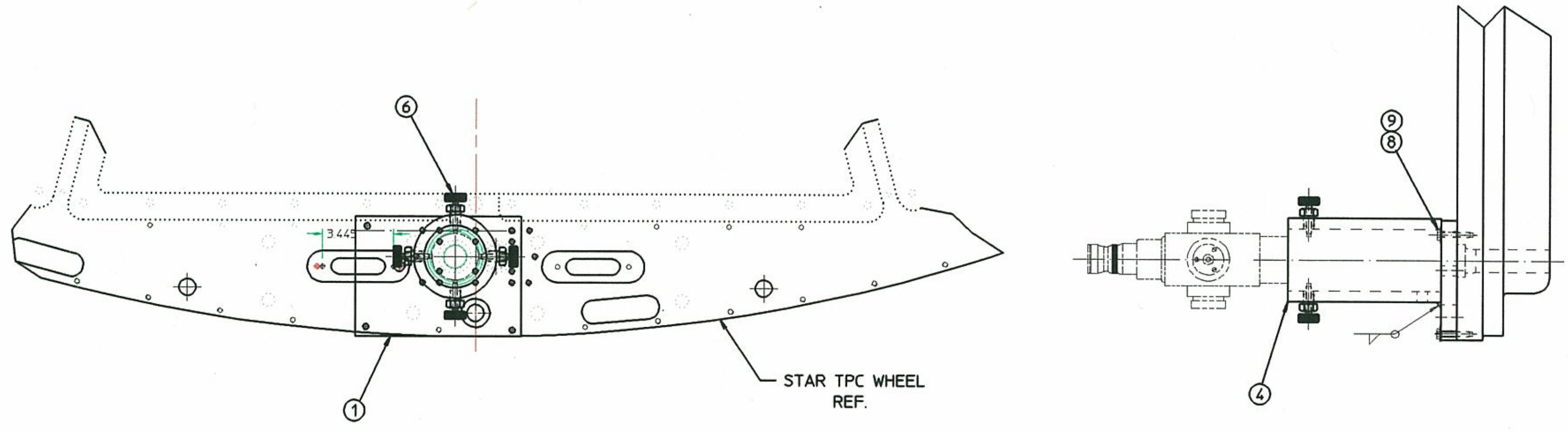
RHIC/STAR DETECTOR
TPC-ASSEMBLY
SMT-LEFT HAND STUD

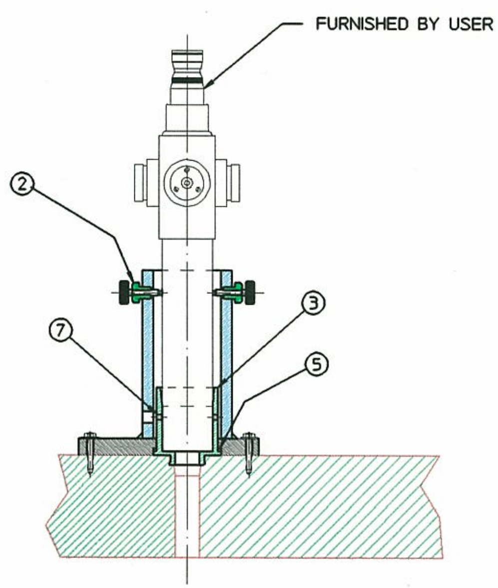
PATENT CLEAR	DRAWING TYPE	SHOWN ON	SCALE: 1/2	DO NOT SCALE PRINTS
	DETAIL	00X0000	LBL DRAWING NUMBER: 24A8252	REV. A
MICROFILMED	DESIGN ACCOUNT 8052-30	CATEGORY CODE SR-02-10		

Viral reassign


3.69
9.38
1.89
4.8
1.50
3.81
9.089
23.09
13.411
34.06
1.00
2.52
1.00
2.54
1.25
3.17
6.117
15.54
1.25
3.18
6.819
17.32
5.500
13.97
.010 A
-B-
2.42
6.14
4.789
12.16
1.50
3.81
.81
2.06
2.67
6.79
1.50
3.81
1.07
2.71
6.167
15.66
2.00
5.08
.005
-A-
1.000
2.54
+.002
Ø .625-.000 THRU
Ø.005 A B
-C-
SHOP ORDERS
APPROVALS
A.RAWLINS
G.KOEHLER
R.WELLS
RELEASED FOR FABRICATION
CHANGES
ITEM
REQ
PART NUMBER
DESCRIPTION
STAR
WBS #
4.2.10
DWG SIZE
E
TPC787-E-1
X
XXXXXXXXXXX -
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE
INCHES
CENTIMETERS
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC/STAR DETECTOR
SECTOR MOUNTING TOOL
PLATEN
DETAIL
SCALE: XXX
8052-30
SR-02-10
24A7878
A

VOID





21F0216A

REQD	ITEM	PART NO.	DESCRIPTION
4	9		WASHER, FLAT, STEEL, FOR 1/4 SCREW
4	8		HEX. HEAD SCREW, 1/4-20 X 1 1/4" LG., STEEL
4	7		SET SCREWS, STEEL, 1/4-20 X 1/4" LG.
4	6		SWIVEL PAD CLAMPS WITH DELRIN PADS, 1/4-20 X 1 1/2" LG., DELRIN CAT NO. CM-1
1	5		O-RING, NEOPRENE, Ø2.734 ID X .139 WALL PARKER NO. 2-232
1	4	21F0234A-2	MOUNTING TUBE
1	3	21F0234A-1	SLEEVE
4	2	21F0224A-2	ADJUSTING BOLT
1	1	21F0224A-1	MOUNTING PLATE

REV	DWG	CHK	CONF	DATE	CHANGES
A	JO	RW		8/13/98	RELEASE FOR FABRICATION

UNLESS OTHERWISE SPECIFIED

TOLERANCES: .X ± .1; .XX ± .01; .XXX ± .005; FRAC. ±1/64; ANGLES ± 1°; FINISH 125

THREADS ARE CLASS 2. CHAMFER ENDS OF ALL SCREW THREADS 30°. CUT 1.5 PITCH THREAD RELIEF WITH RADIUS AND TOOL ON MACHINE CUT THREADS. BREAK EDGES .016 MAX. ON MACHINED WORK. REMOVE BURRS WELD SPLATTER & LOOSE SCALE. REFERENCES: ANSI Y14.5 & Y46.1.

SHOP ORDERS

SURFACE TREATMENT: DEGREASE

IDENT. MARK: TAG

DRAWN BY: J. ORTIZ — DATE 3/13/97

CHECKED BY: R. WELLS — DATE 00-00-00

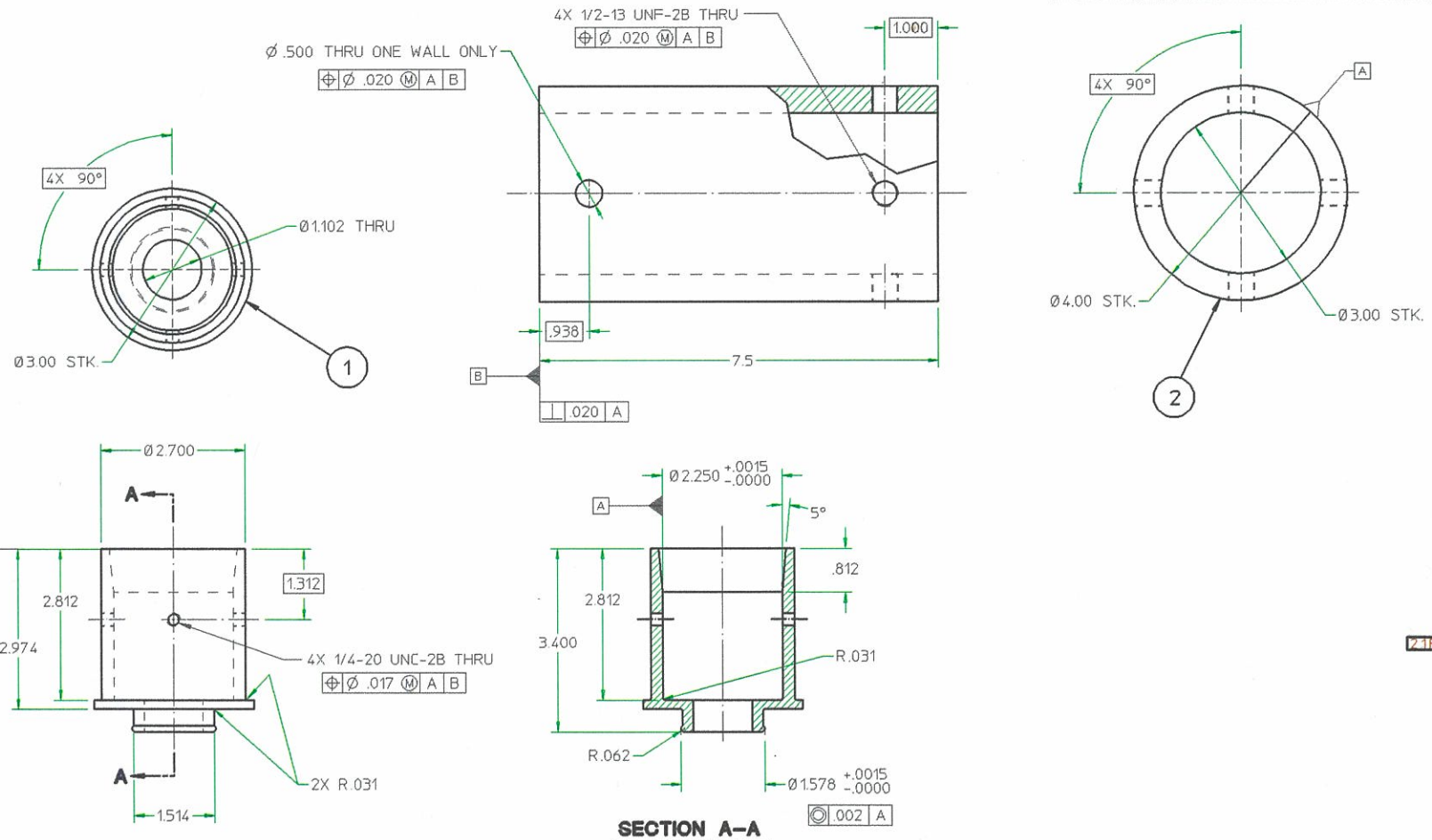
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY

RHIC - STAR - TPC
LASER SYSTEM
ASSEMBLY - WELDMENT

DWG. TYPE: ASSEMBLY — SHOWN ON: 00X0000 — SCALE: 1/2

DESIGN ALLOC. NO: 8052-26 — CATEGORY CODE: SR-02-06 — DWG. NO: 21F0216 — REV: A

REQ	ITEM	PART NUMBER	DESCRIPTION
1	1	21F0234A-1	ALUMINUM BAR, ROUND, 6061-T6, 3" DIA.
4	2	21F0234A-2	ALUMINUM PIPE, 6061-T6, 4.0" O.D. X .50 WALL



SECTION A-A

21F0234A

REV	DWG	CHK	ZONE	DATE	CHANGES
A	JO	RW		3/10/97	RELEASE FOR FABRICATION

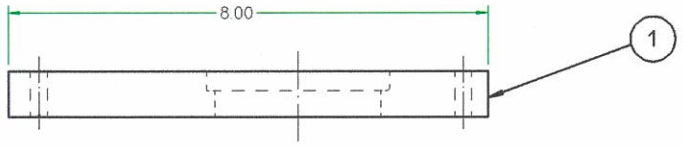
UNLESS OTHERWISE SPECIFIED
TOLERANCES: .X ± .1 FRAC. ±1/64; .XX ± .01 ANGLES ± 1°; .XXX ± .005 FINISH 125
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30° OFF 1.5 PITCH DIA
RELIEF WITH ROUND NOSE TOOL ON MACHINE CUT THREADS.
BREAK EDGES .015 MAX. ON MACHINED WORK.
REMOVE BURRS, WELD SPATTER & LOOSE SCALE
REFERENCES: ANSI Y14.5 & B46.1.

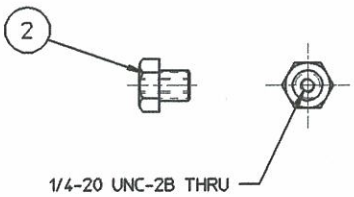
SHOP ORDERS
ACCT. NO.
MATERIAL SPEC.
DATE ISSUED
DATE NEEDED
DELIVER TO
SURFACE TREATMENT: DEGREASE
IDENT. METH.: TAG
DWG. BY: J. ORTIZ DATE: 3/10/97
CHK'R: R. WELLS DATE: 3/10/97

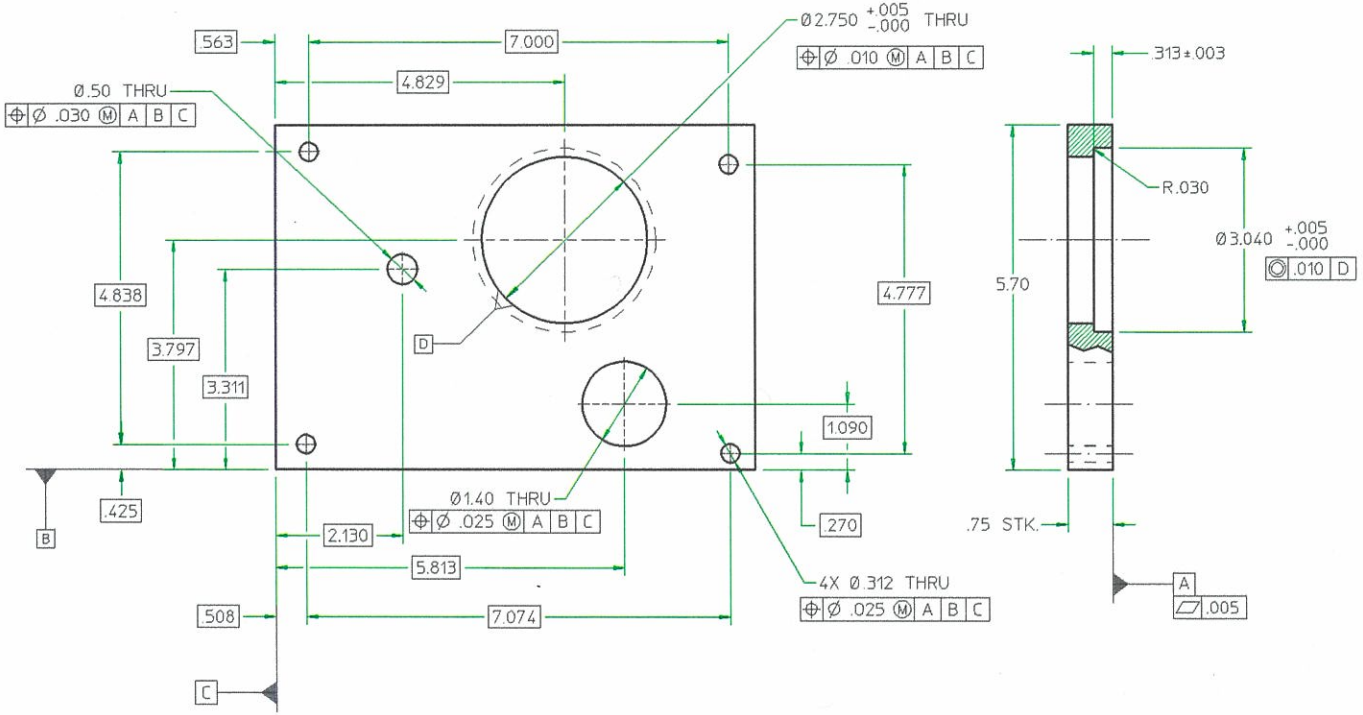
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY
RHIC - STAR - TPC
LASER SYSTEM
MOUNTING TUBE & SLEEVE

PATENT CLEAR	DWG. TYPE	SHOWN ON	SCALE	DO NOT SCALE DRAWING
	DETAILS	21F0216	FULL	
MICROFILMED	VENDOR REF. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	8052-26	SR-02-06	21F0234	A

REQ	ITEM	PART NUMBER	DESCRIPTION
1	1	21F0224A-1	ALUMINUM PLATE, 6061-T6, 3/4" STK.
4	2	21F0224A-2	BRASS BOLT, HEX., 1/2-13 UNC-2A







21F0224

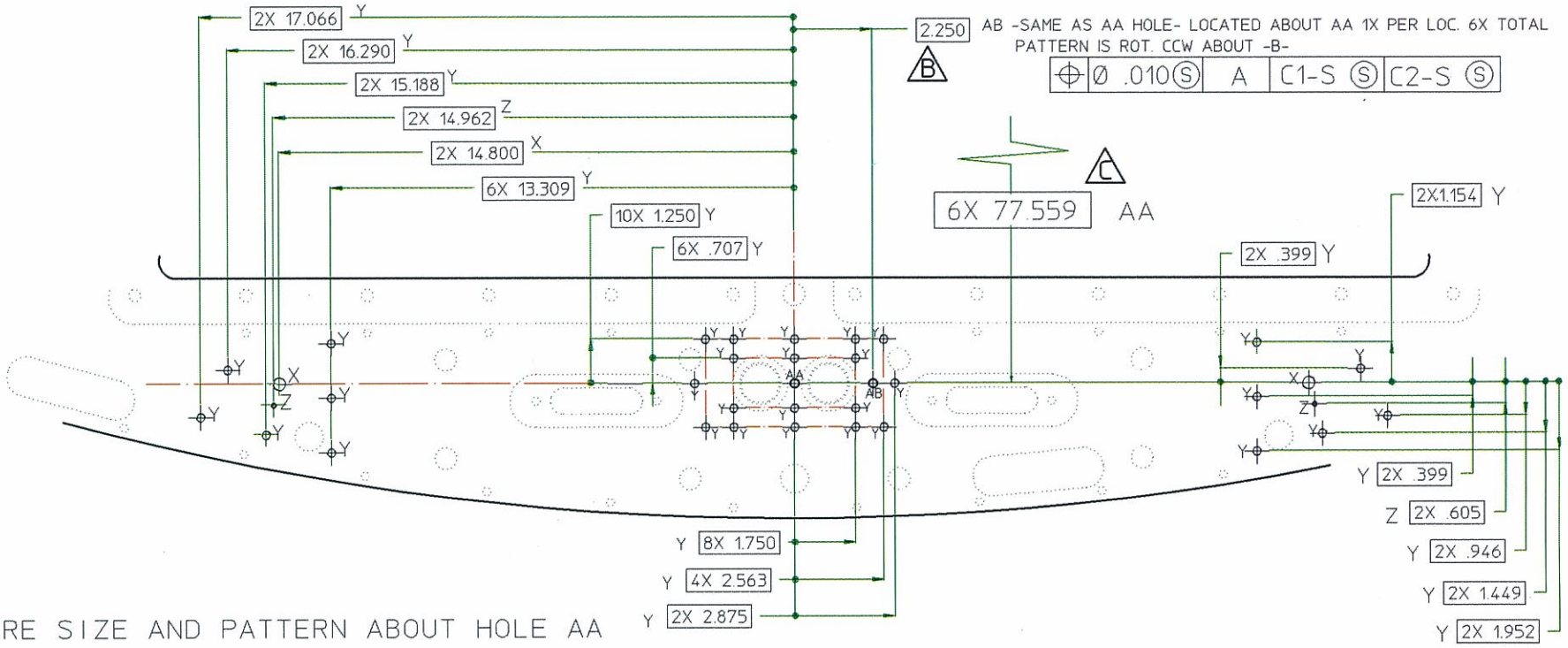
REV	DWG	CHK	ZONE	DATE	CHANGES
A	JO	RM		3/10/97	RELEASE FOR FABRICATION

UNLESS OTHERWISE SPECIFIED
TOLERANCES: X ± .1 FRAC. ± 1/64; XX ± .01 ANGLES ± 1°; XXX ± .005 FINISH 125
THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 39°.
.031 1.5 PITCH SRG RELIEF WITH ROUND NOSE TOOL
DM MACHINE CUT THREADS.
BREAK EDGES .015 MAX. ON MACHINED WORK
REMOVE BURRS WELD SPLATTER & LOOSE SCALE
REFERENCES: ANSI Y14.5 & B46.1.

SHOP ORDERS
ACCT. NO.
SERIAL NO.
DATE ISSUED
DATE REQD.
MD REQD.
DELIVER TO
SURFACE TREATMENT: DEGREASE
IDENT. METH.: TAG
DWG. BY: J. ORTIZ DATE 3/10/97
ENG: R. WELLS DATE 3/10/97

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY
RHIC - STAR - TPC
LASER SYSTEM
MOUNTING PLATE & MOD. BOLT

PATENT CLEAR	DWG. TYPE	SHOWN ON	SCALE	DO NOT SCALE DRAWING
	DETAILS	21F0216	FULL	
W/CHG/FILED	DESIGN ACCT. NO.	CATEGORY CODE	DWG. NO.	SIZE / REV.
	8052-26	SR-02-06	21F0224	A

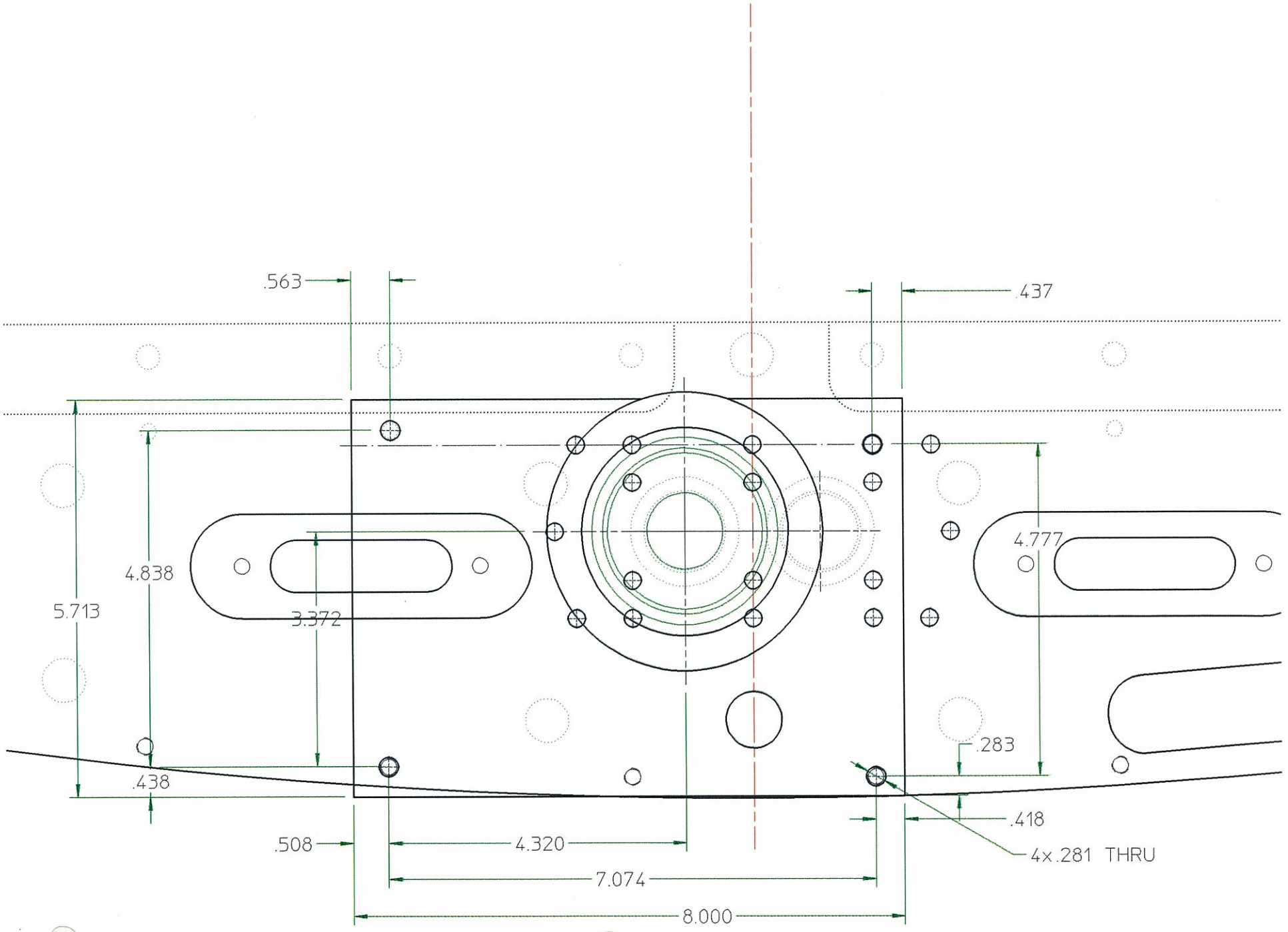


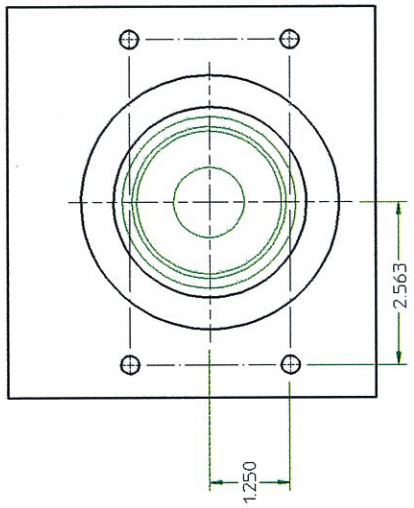
FEATURE SIZE AND PATTERN ABOUT HOLE AA

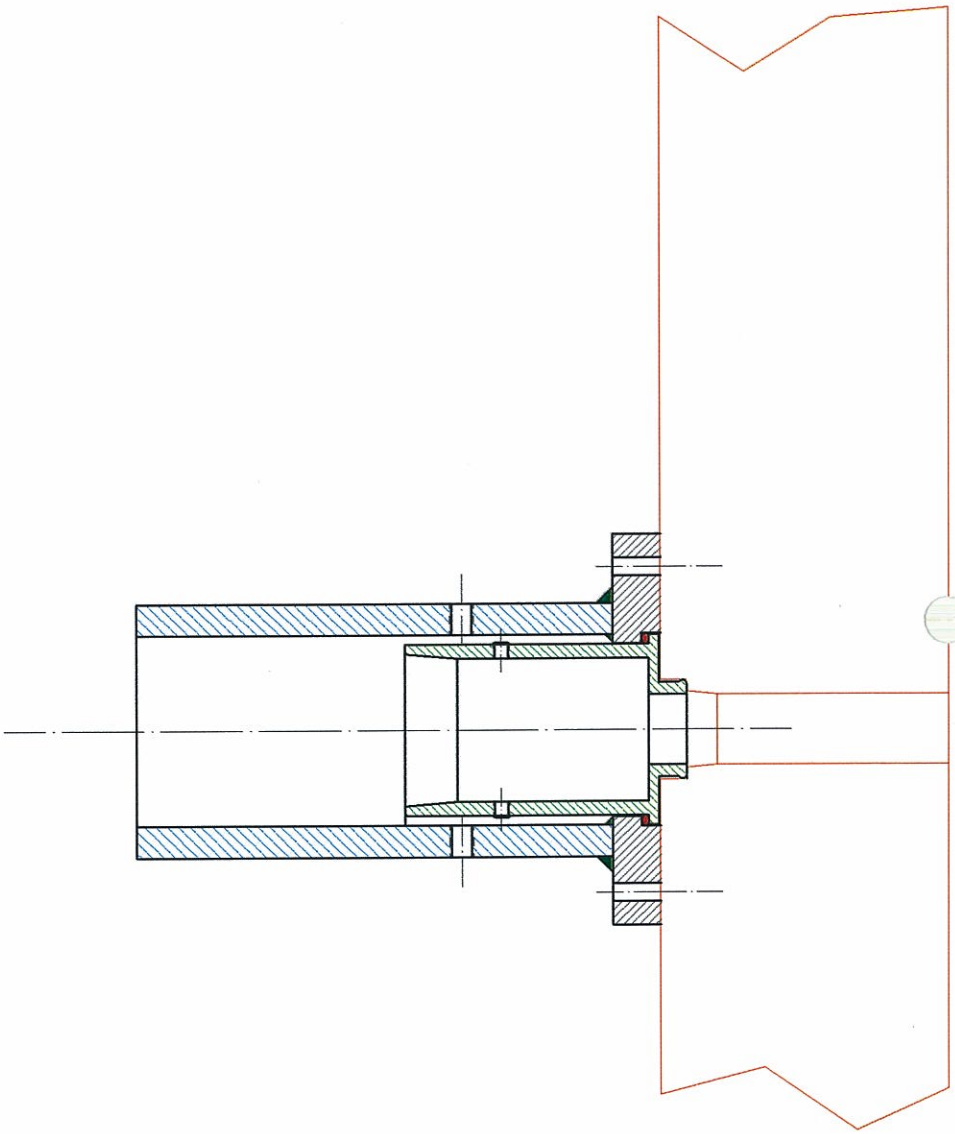
1 HOLE/LOC.	AA =	Ø .250 - .251 ↧ .500 - .750	⌖ Ø .010 Ⓢ A C1-S Ⓢ C2-S Ⓢ	S = SECTOR NUMBER
2 HOLES/LOC.	X =	3/8-16 UNC 2B ↧ .500 - .750	⌖ Ø .010 Ⓢ A C1-S Ⓢ C2-S Ⓢ	S = SECTOR NUMBER
30 HOLES/LOC.	Y =	1/4-20 UNC 2B ↧ .500 - .750	⌖ Ø .020 Ⓢ A C1-S Ⓢ C2-S Ⓢ	S = SECTOR NUMBER B
2 HOLES/LOC.	Z =	Ø .125 - .126 ↧ .250 - .375	⌖ Ø .010 Ⓢ A C1-S Ⓢ C2-S Ⓢ	S = SECTOR NUMBER

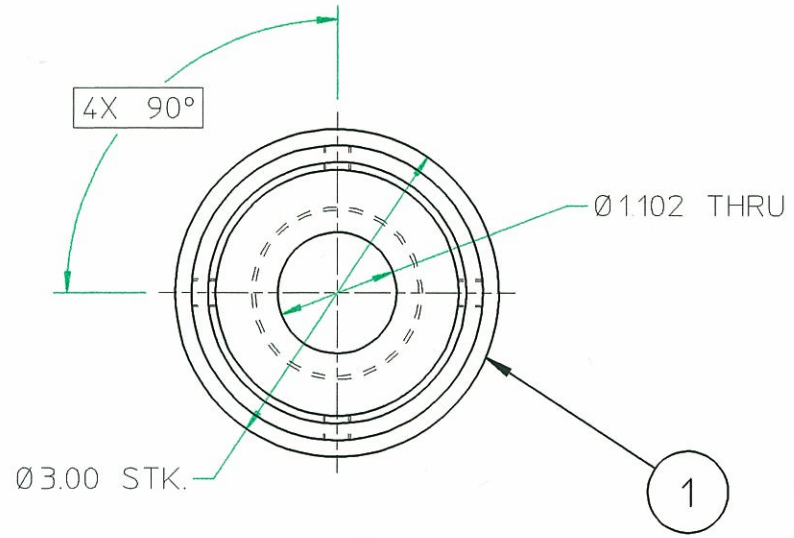
6X HOLE PATTERN DETAIL LOCATED ABOUT AA

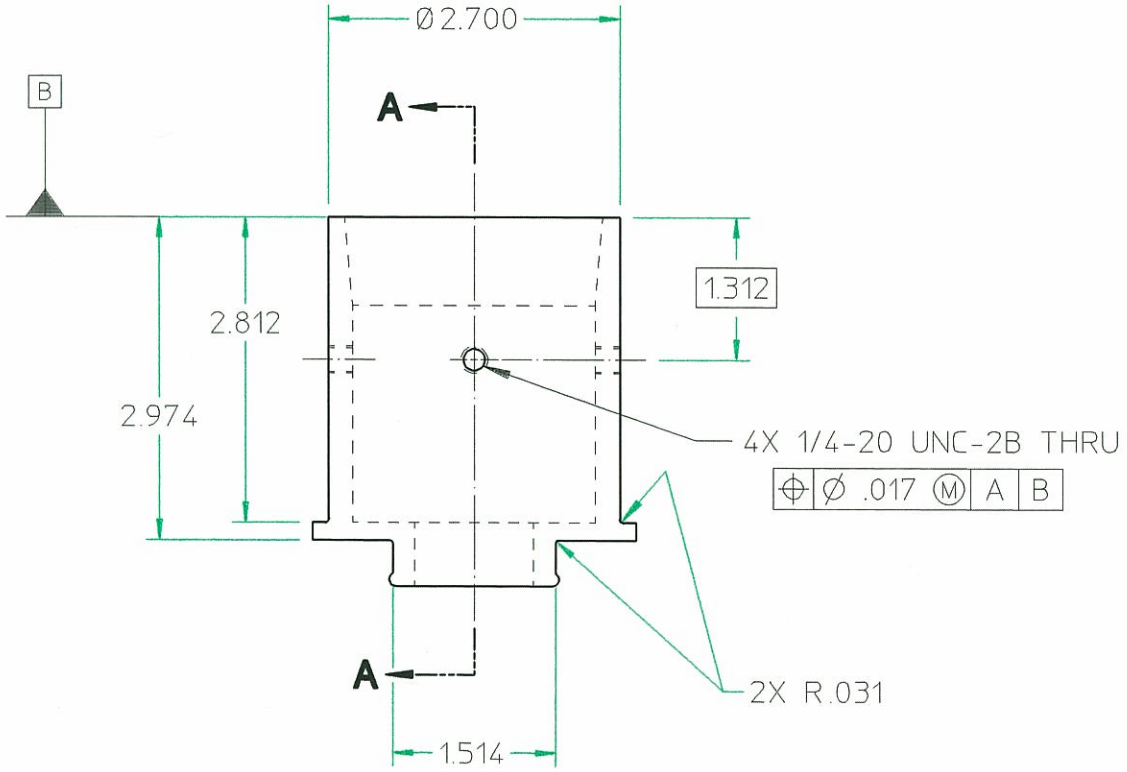
HOLES AA, X, Y, Z

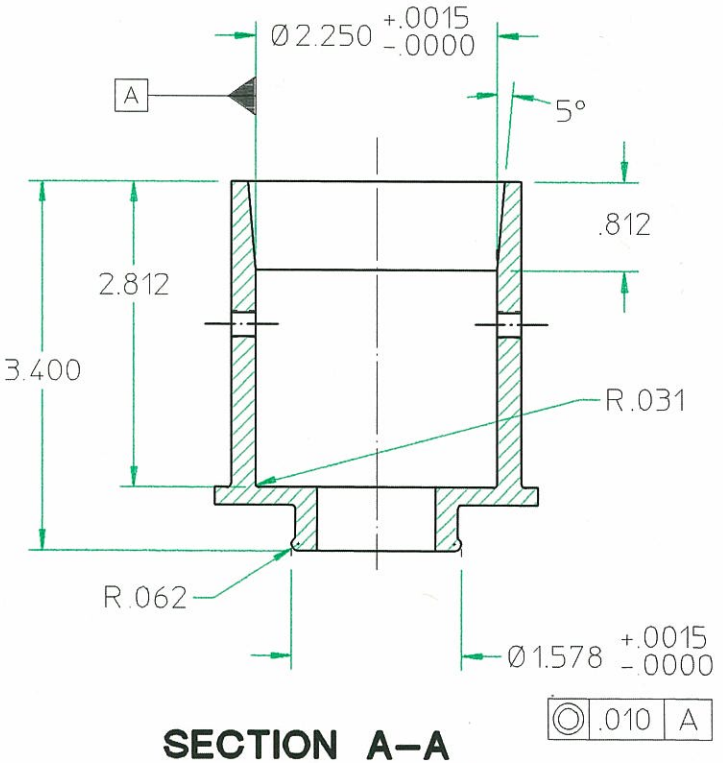

.563
.437
4.838
5.713
3.372
4.777
.283
.438
.418
.508
4.320
7.074
8.000
4x .281 THRU


2.563
1.250

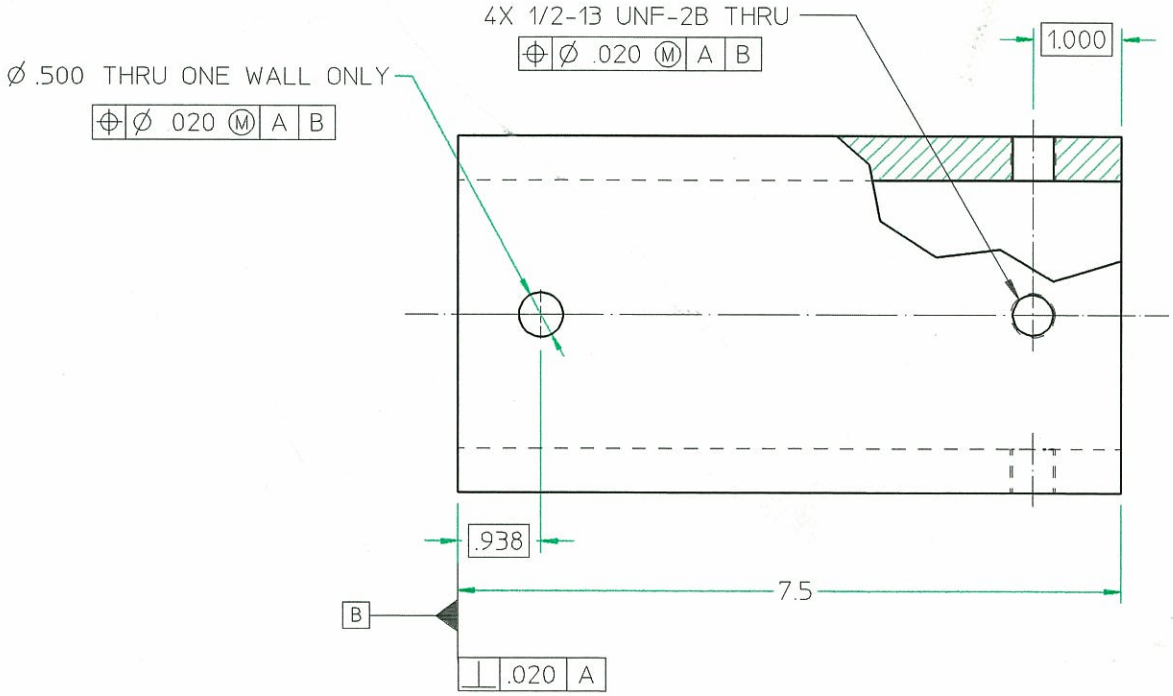


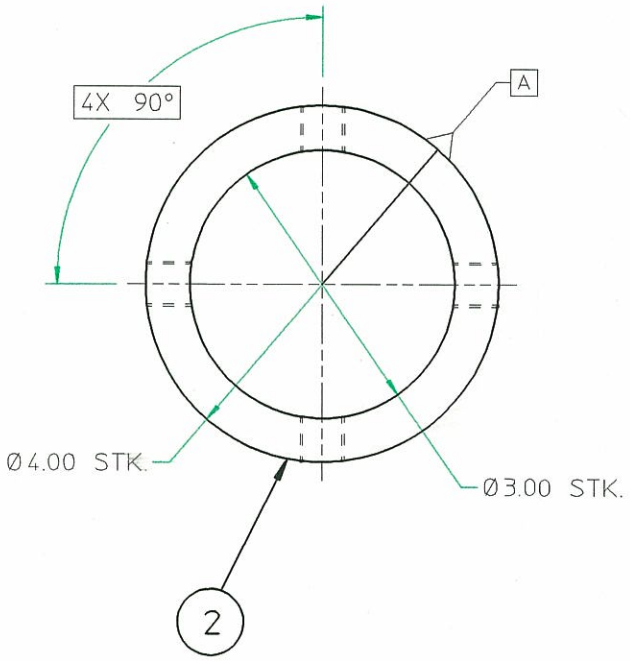

4X 90°
Ø1.102 THRU
Ø3.00 STK.
1

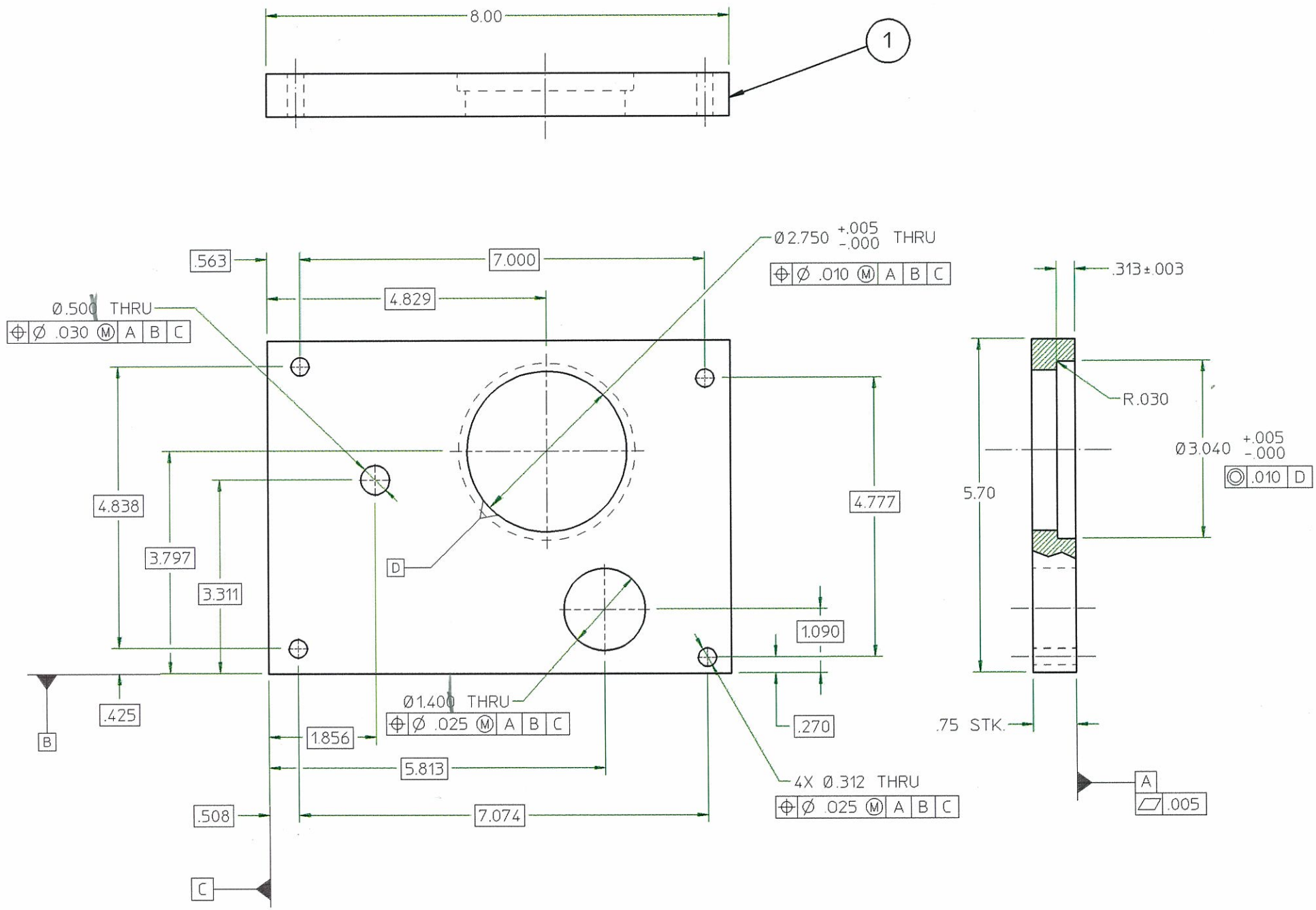

Ø2.700
B
A
1.312
2.812
2.974
4X 1/4-20 UNC-2B THRU
Ø .017 M A B
A
2X R.031
1.514

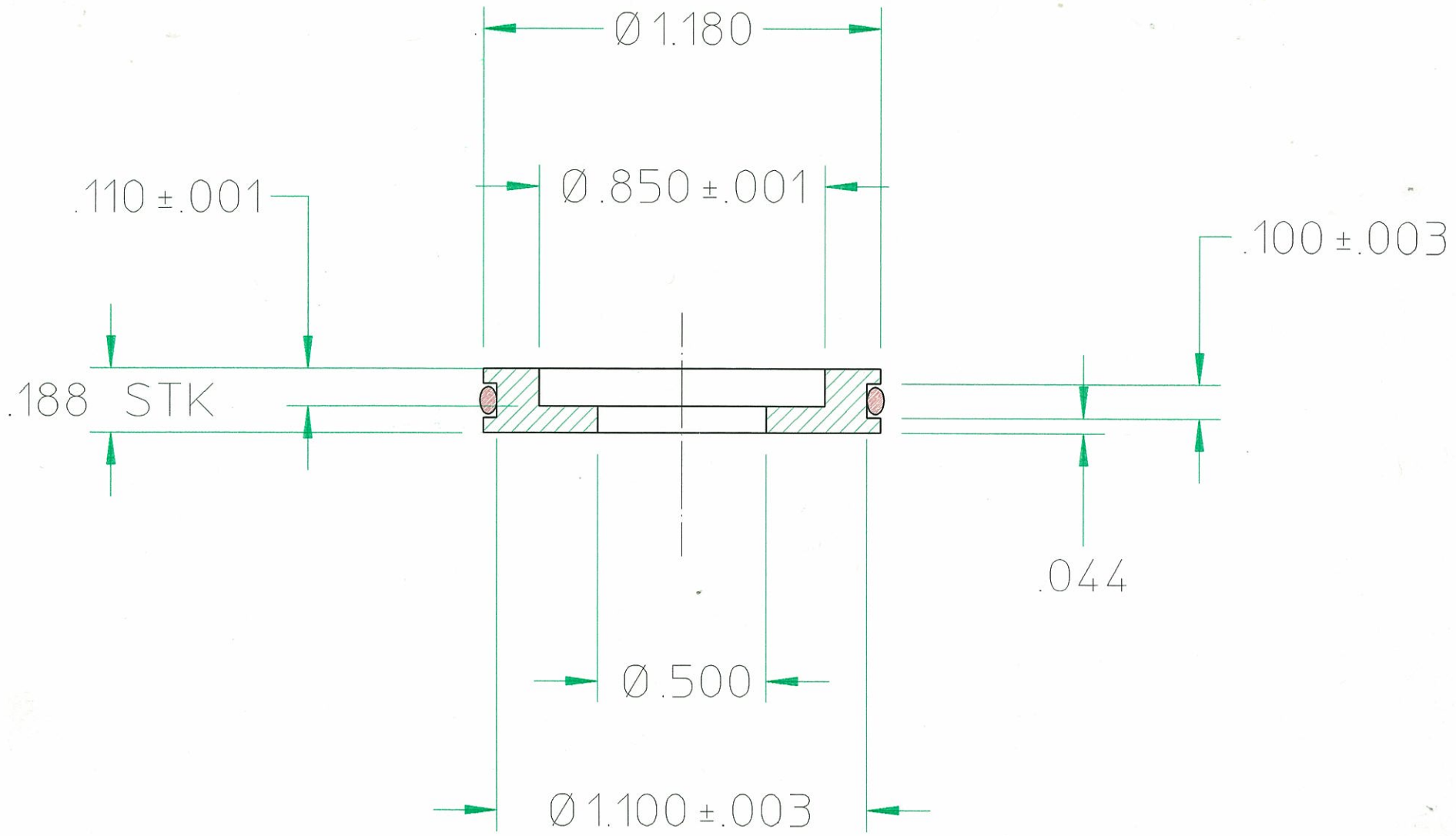

Ø2.250 +.0015 -.0000
A
5°
.812
2.812
3.400
R.031
R.062
Ø1.578 +.0015 -.0000
.010 A

SECTION A–A


4X 1/2-13 UNF-2B THRU
⌖ Ø .020 Ⓜ A B
Ø .500 THRU ONE WALL ONLY
⌖ Ø 020 Ⓜ A B
1.000
.938
7.5
B
⊥ .020 A

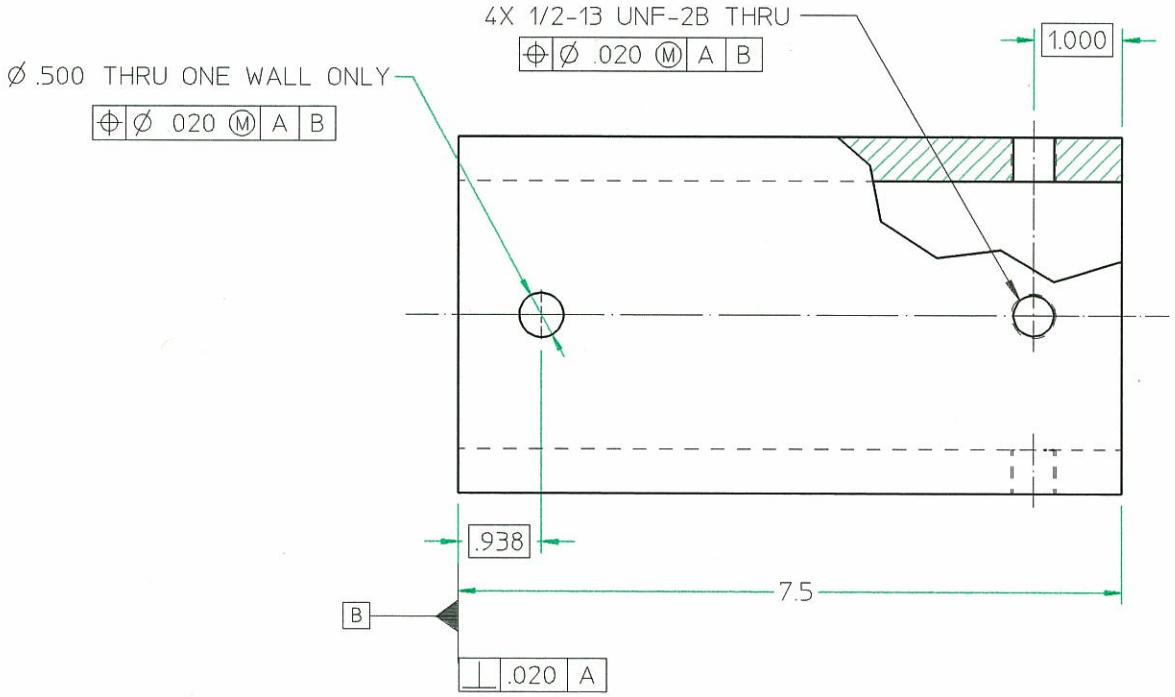

4X 90°
A
Ø4.00 STK.
Ø3.00 STK.
2

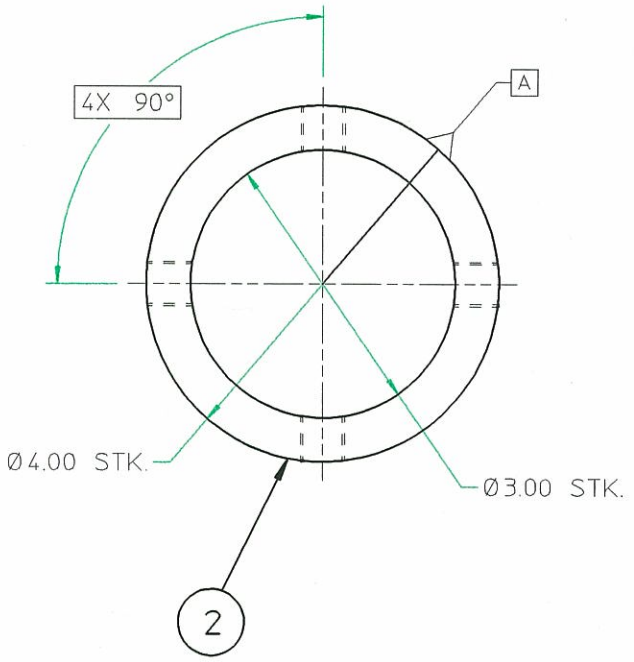

8.00
1
.563
7.000
4.829
Ø.500 THRU
Ø .030 M A B C
Ø2.750 +.005 -.000 THRU
Ø .010 M A B C
4.838
3.797
3.311
4.777
D
1.090
.425
B
Ø1.400 THRU
Ø .025 M A B C
1.856
5.813
.270
4X Ø.312 THRU
Ø .025 M A B C
.508
7.074
C
.313±.003
R.030
Ø3.040 +.005 -.000
.010 D
5.70
.75 STK.
A
.005



1 REQD

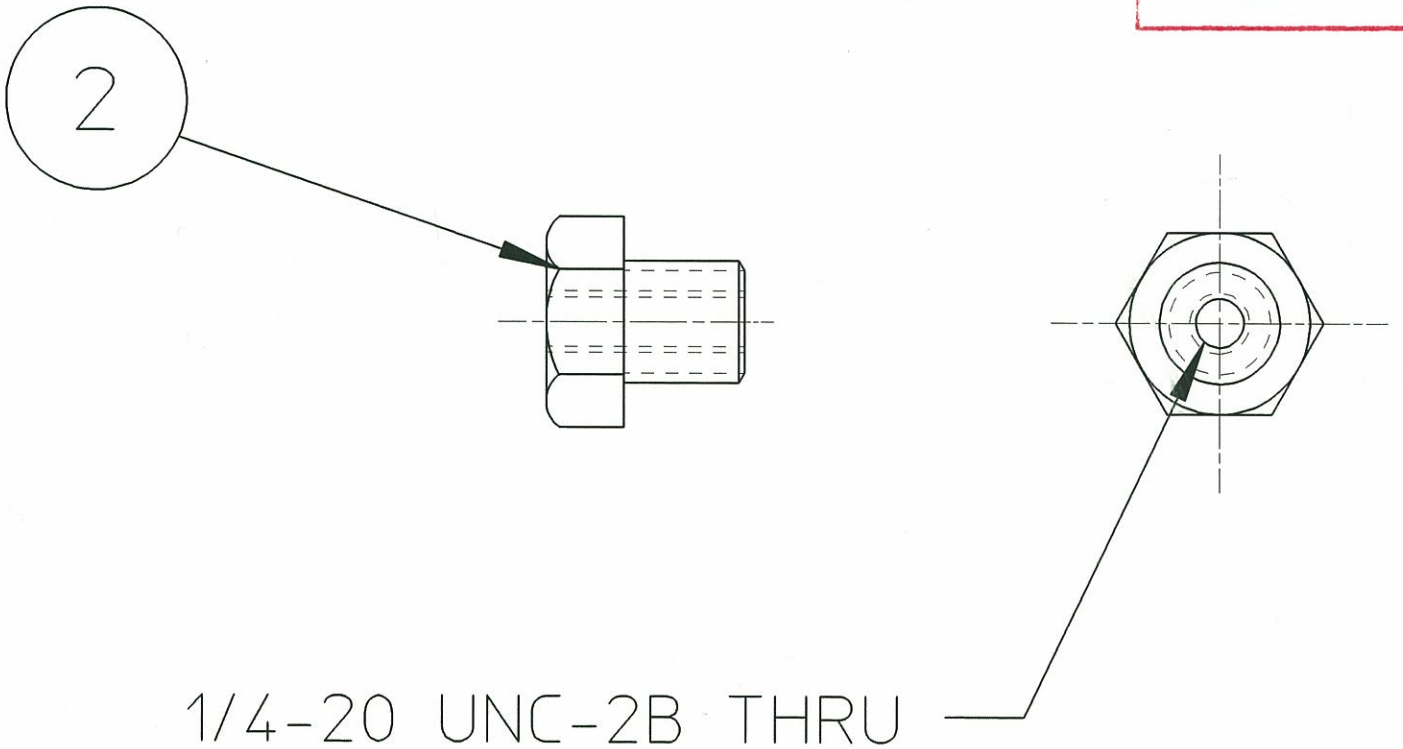
MATL: BRASS BAR


4X 1/2-13 UNF-2B THRU
⌖ Ø .020 Ⓜ A B
Ø .500 THRU ONE WALL ONLY
⌖ Ø 020 Ⓜ A B
1.000
.938
7.5
B
⊥ .020 A


4X 90°
A
Ø4.00 STK.
Ø3.00 STK.
2

4	2	21F0224A-2	BRASS BOLT, HEX., 1/2-13 UNC-2A

JOB No. 8052-26	SERIAL No.
DATE ISSUED 3/12	DATE REQ'D
MAKE 4	DELIVER TO
MAT LOCATION	SKETCH No.



PRINT NUMBERS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
REQUEST FOR PROCUREMENT

SERIAL NUMBER

REQUESTER John Ortiz DATE REQUESTED 3/7/97

DELIVER TO John Ortiz DATE NEEDED 3/14/97

BLDG 70 ROOM 307 PHONE NUMBER X7298

ACCOUNT NO. 8052-26 AUTHORIZED SIGNATURE Russell Wells

QUANTITY	DESCRIPTION	APPROX PRICE
5	SWIVEL PAD CLAMPS WITH DELRIN PADS 1/4-20 THD X 1 1/2" LONG. DELRIN CAT. NO. CM-1	$6.80 ea.

VENDOR Reid Tool Supply Co.

ADDRESS 2265 Black Creek Rd.

CITY Muskegon STATE MI

PHONE NUMBER 1-800-253-0421 49444-2684

CONTACT

REMARKS

REQUISITION NUMBER

SHIP CODE

TOTAL COST

P.O. NO.

TERMS

PICK UP DATE

TIME AFTER

CLOSED DURING LUNCH YES ☐ NO ☐

VEHICLE

XBG 662
(REV.2/92)

Reid Tool Supply Company
2265 Black Creek Road ● Muskegon, Michigan 49444 ● (616) 777-3951

U.P.S.

119568400

P.O. #: MASTERCARD (LI

Shipper No. 1195684-00
Page 1

Bill To

L B N L PROCARD 5260352
1 CYCLOTRON RD

BERKELEY CA 94720

Ship To

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY LAB
2700 7TH ST
BERKELEY CA 94710

Attn: JOHN ORTIZ M/S 70A-

CUSTOMER NO	YOUR P.O. NO	SCHED DTE	SHIP VIA	DATE	SHIPPER NO
0257019	MASTERCARD (LISA B)46-125	**03/07/97**	**U.P.S.**	03/07/97	**1195684-00**

LINE	ORDER QTY	LOCATION	ITEM NUMBER	ITEM DESCRIPTION	SHIP QTY	BACK ORDERED
1	5	**- T-29-B**	CM-1	1/4-20 X 1-1/2 DELRIN TIP SWIVEL PAD CLMP 8466.20	5	0

ALL ITEMS MANUFACTURED IN THE U.S.A. UNLESS OTHERWISE NOTED.
THANK YOU VERY MUCH FOR YOUR ORDER

Total Number of Items: 1 Estimated Weight: 0 lb 9.00 oz 0.255 kg

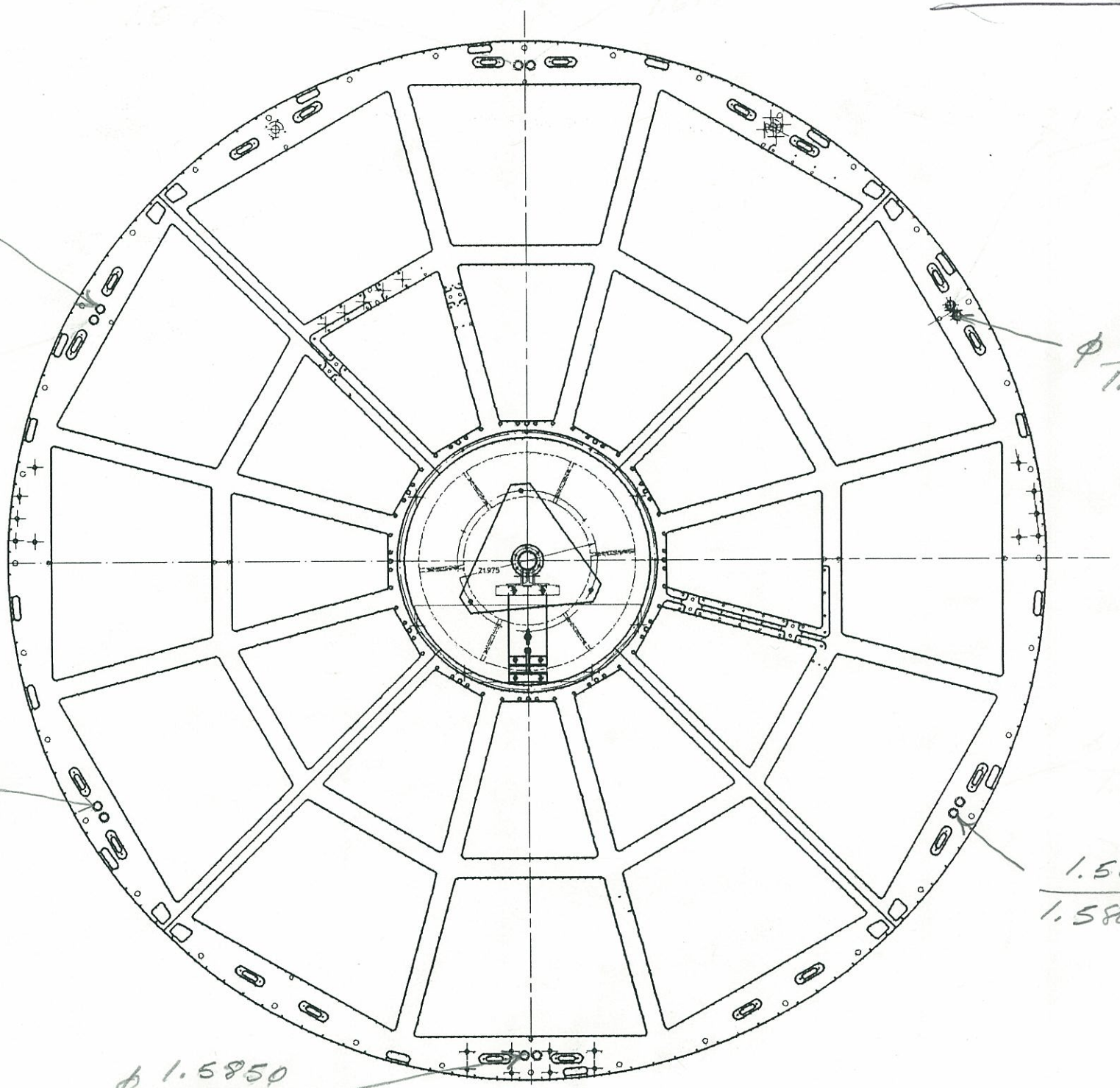
Opr: JCB Branch: 01 SLSM: 000
RSL
Picker: Packer:

Packing List

Checker:

TOP

WEST WHEEL



ϕ 1.5854
1.5849

ϕ 1.5826
1.5810

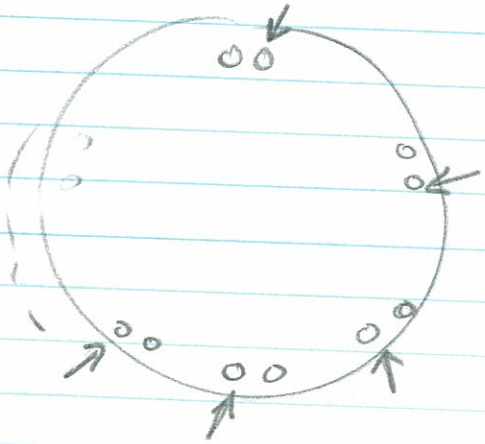
ϕ 1.5851
1.5846

1.5820
1.5806

ϕ 1.5850
1.5846

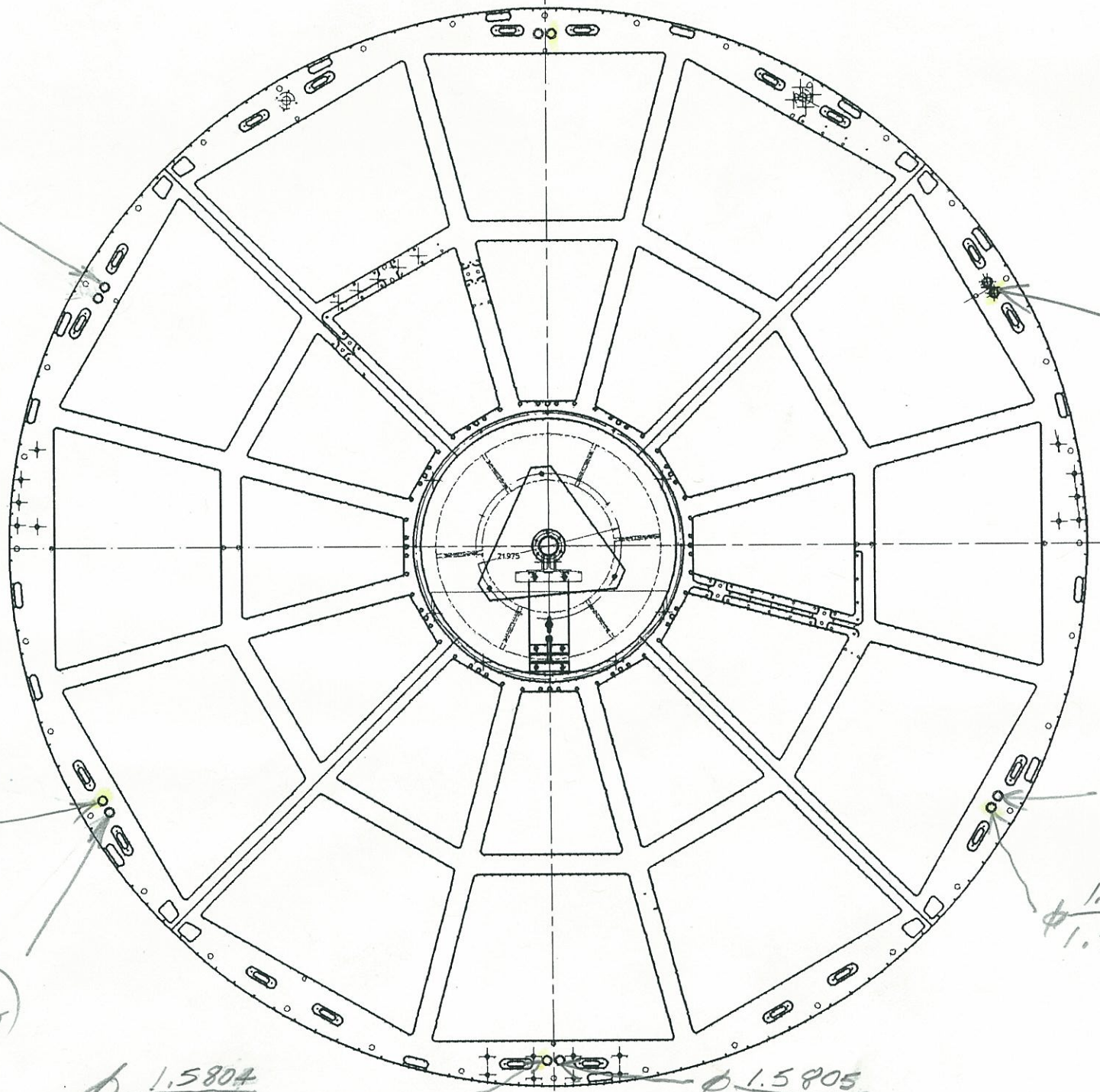
USE CLOCK-WISE

MOST LASER HOLE



TOP

EAST WHEEL



ϕ 1.5870 / 1.5867

ϕ 1.5806 / 1.5794

ϕ 1.5806 / 1.5797

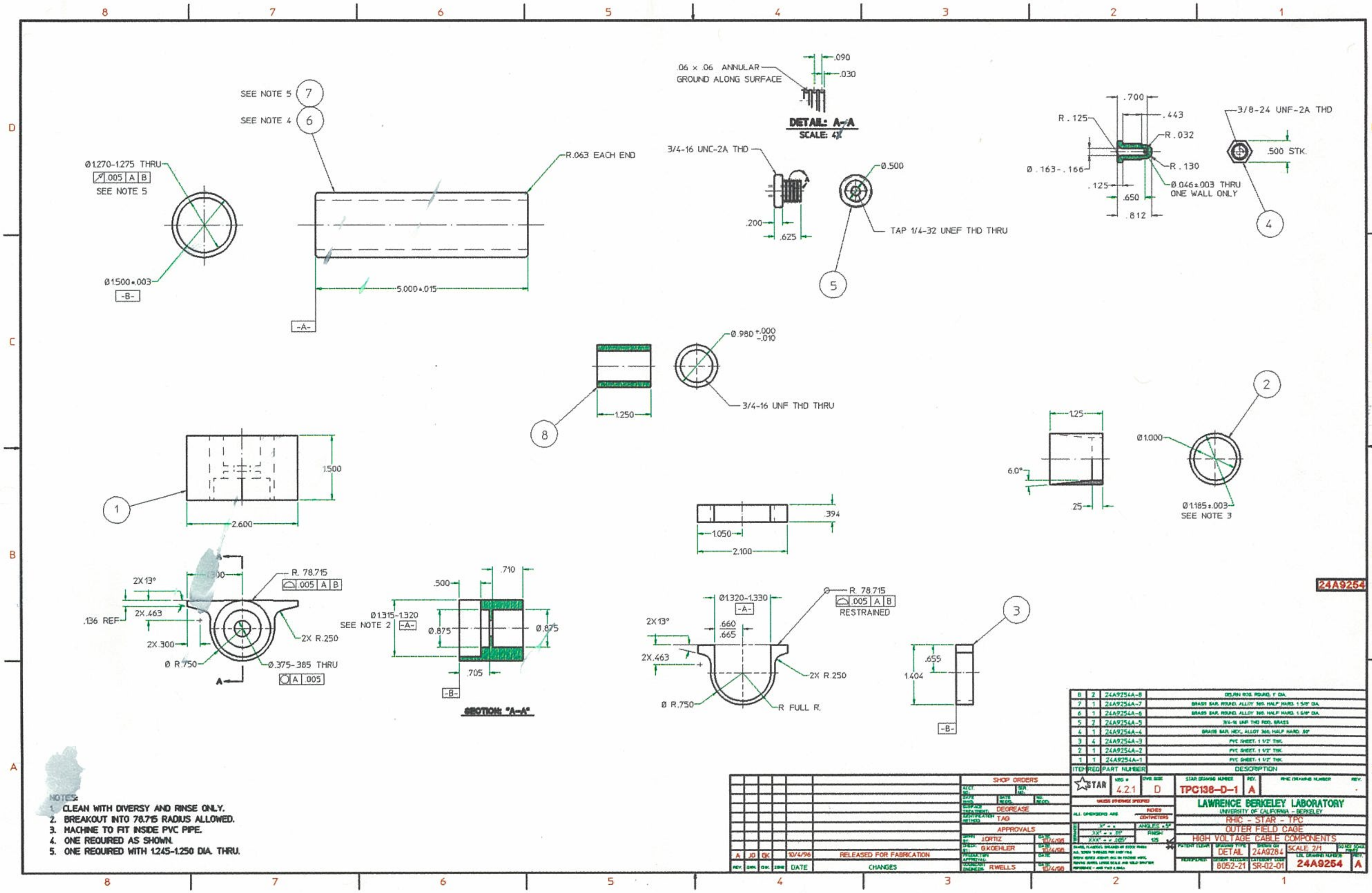
ϕ 1.5802 / 1.5799

ϕ 1.5804 / 1.5798

ϕ (1.5802 / 1.5799)

ϕ 1.5804 / 1.5800

ϕ 1.5805 / 1.5796



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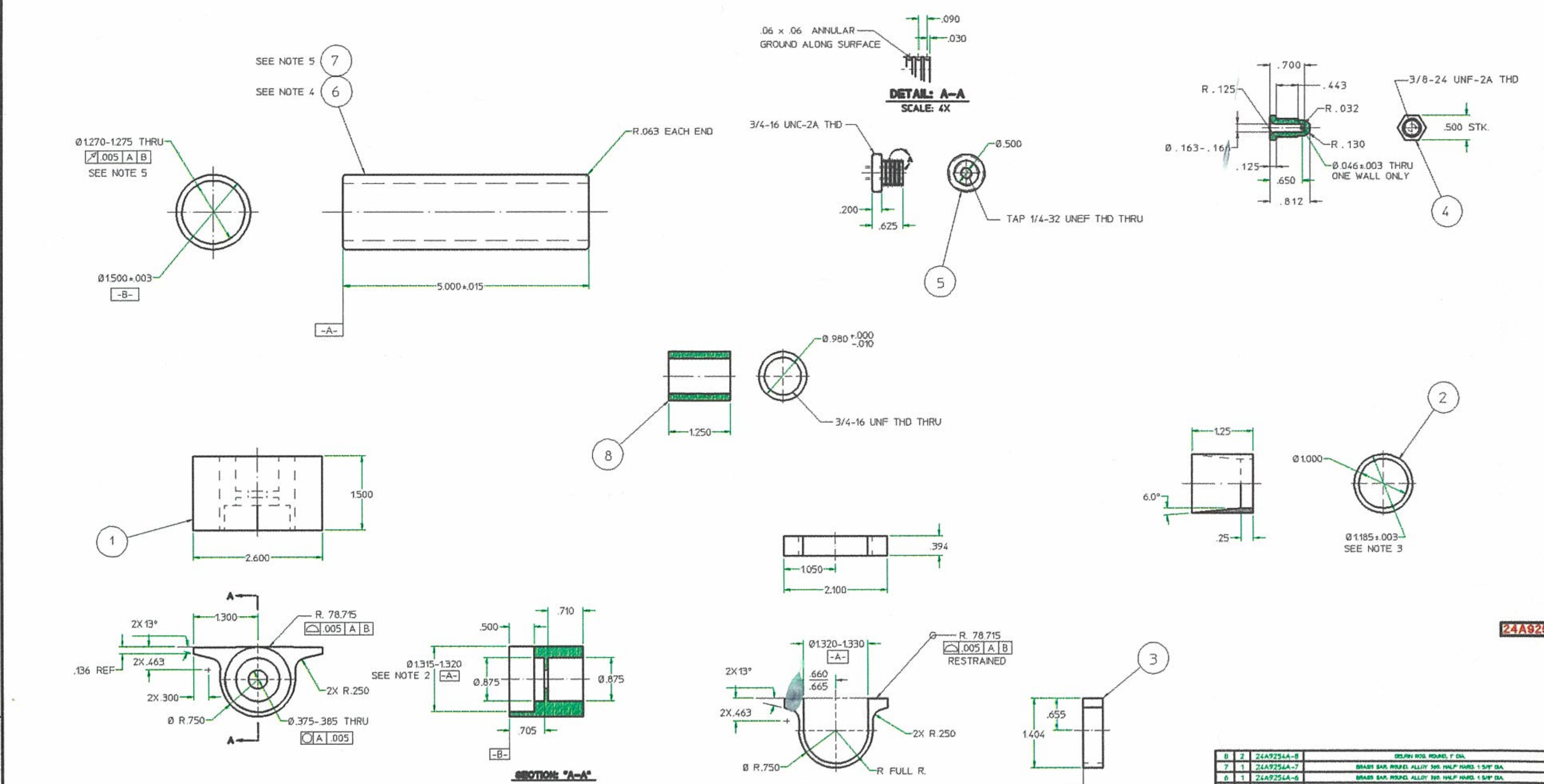

ITEM	REQ	PART NUMBER	DESCRIPTION
8	2	24A9254A-8	DELRIN ROD, ROUND, 1" DIA.
7	1	24A9254A-7	BRASS BAR, ROUND, ALLOY 360, HALF HARD, 1 5/8" DIA.
6	1	24A9254A-6	BRASS BAR, ROUND, ALLOY 360, HALF HARD, 1 5/8" DIA.
5	2	24A9254A-5	3/4-16 UNF THD ROD, BRASS
4	1	24A9254A-4	BRASS BAR, HEX, ALLOY 360, HALF HARD, .50"
3	4	24A9254A-3	PVC SHEET, 1 1/2" THK.
2	1	24A9254A-2	PVC SHEET, 1 1/2" THK.
1	1	24A9254A-1	PVC SHEET, 1 1/2" THK.

NOTES:
1. CLEAN WITH DIVERSY AND RINSE ONLY.
2. BREAKOUT INTO 78.715 RADIUS ALLOWED.
3. MACHINE TO FIT INSIDE PVC PIPE.
4. ONE REQUIRED AS SHOWN.
5. ONE REQUIRED WITH 1.245-1.250 DIA. THRU.

REV.	DWN.	CHK.	ZONE	DATE	CHANGES
A	JO	DK		10/4/96	RELEASED FOR FABRICATION

SHOP ORDERS
DEGREASE
TAG
APPROVALS
JORTIZ 10/4/96
G.KOEHLER 10/4/96
R.WELLS 10/4/96

STAR | WBS # 4.2.1 | DWG SIZE D | STAR DRAWING NUMBER TPC138-D-1 | REV. A | RHIC DRAWING NUMBER -

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE INCHES / CENTIMETERS
ANGLES ±.5°
FINISH 125

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA - BERKELEY
RHIC - STAR - TPC
OUTER FIELD CAGE
HIGH VOLTAGE CABLE COMPONENTS

DRAWING TYPE: DETAIL | 24A9284 | SCALE 2/1
DESIGN ACCOUNT: 8052-21 | CATEGORY CODE: SR-02-01 | LBL DRAWING NUMBER: 24A9254 | REV. A

/star_a/jortiz/high_voltage_cable/24A9254A_HIGH_VOLTAGE_FEEDTHRU_DETAILS.1....4-OCT-96