

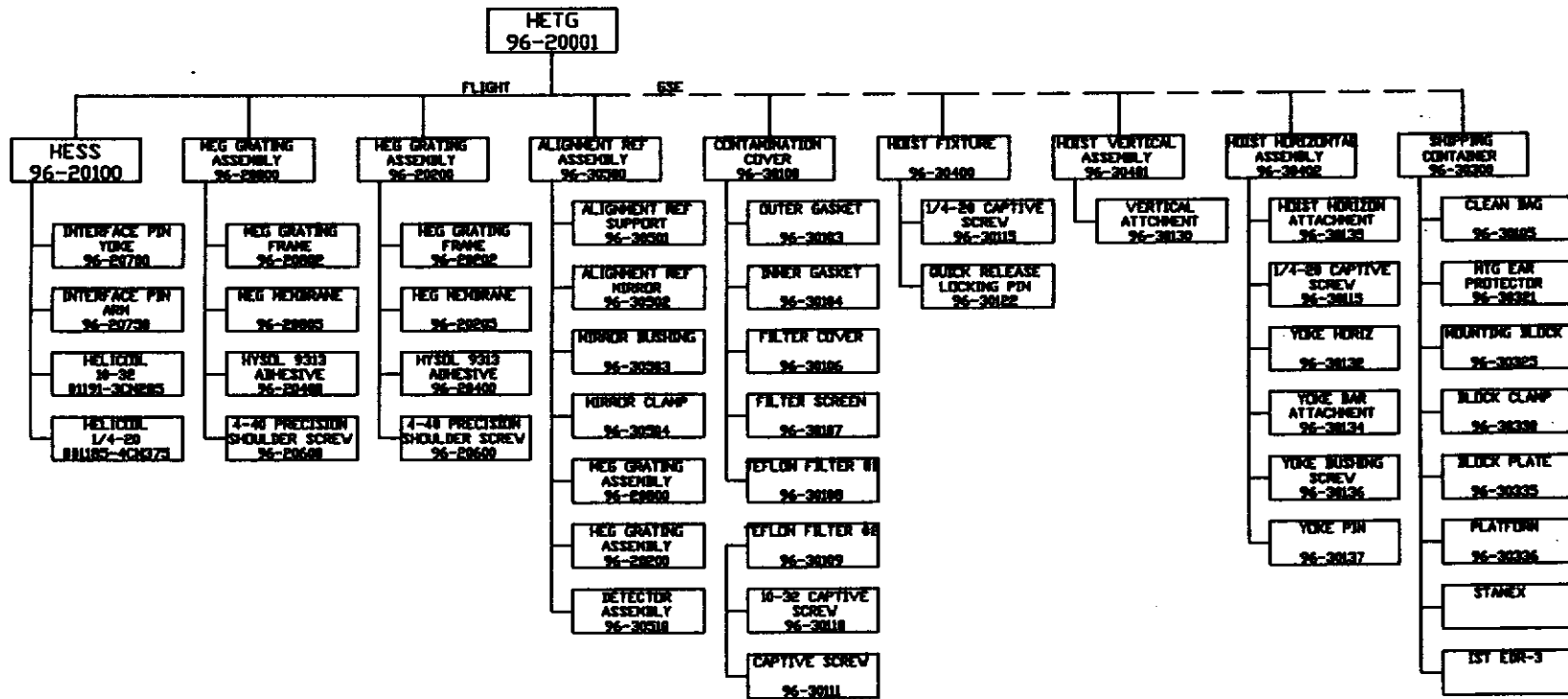
**Drawings and Schematics  
(DRs SSE04, SSE05, SSE06)**

**There is no SSE06 for the HETG because there are no electrical parts.**

DWG TREE LIST

Drawing Number	Drawing Title	REV	QTY
96-20000	HETG Engineering DWG Tree	C	1
96-20001	HETG Assembly	A	1
96-20100	HETG Support Structure	B	1
96-20700	Interface Yoke Pin	B	3
96-20750	Interface Pin	B	3
96-20800	MEG Grating Assembly	A	192
96-20802	MEG Grating Frame	C	192
96-20600	4-40 Precision Shoulder Screw	D	192
96-20602	Stainless Steel Washer	A	192
96-20200	HEG Grating Assembly	A	144
96-20202	HEG Grating Frame	C	144
96-20600	4-40 Precision Shoulder Screw	D	144
96-20602	Stainless Steel Washer	A	144
96-30500	Alignment Ret Assembly	A	1
96-30501	Alignment Ret Support	D	1
96-30502	Alignment Ret Mirror	B	1
96-30503	Mirror Bushing	A	1
96-30505	Mirror Assembly	A	1
96-30100	Contamination Cover	D	2
96-30103	Outer Gasket	A	24
96-30104	Inner Gasket	A	24
96-30111	Captive Screw	A	18
96-30112	10-32 Captive Screw	A	6
96-30106	Filter Cover	A	6
96-30107	Filter Screen	A	6
96-30108	Teflon Filter #1	A	6
96-30109	Teflon Filter #2	A	6
96-30400	Hoist Fixture	B	1
96-30115	1/4-20 captive screw	A	3
96-30122	Quick Release Locking Pin	A	3
96-30401	Vertical Assembly	A	1
96-30130	Vertical Attachment	B	1
96-30402	Horizontal Assembly	A	1
96-30135	Hoist Horizontal Attachment	A	1
96-30132	Yoke-Horizontal	A	1
96-30134	Yoke Bar	A	3
96-30136	Yoke Bushing	A	3
96-30137	Yoke Pin	A	1
96-30122	Quick Release Locking Pin	A	6
96-30300	Shipping Container	1	1
96-30321	MTG Ear Protector	A	3
96-30325	Mounting Block	A	3
96-30330	Block Clamp	A	3
96-30335	Block Plate	A	3
96-30336	Platform	A	1
	STANEX CONTAINER		1
	IST EDR-3		1

REVISIONS		
LTR	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE: ANGLES ± 1° 3 PLACE DECIMALS ± .015 2 PLACE DECIMALS ± .01		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH	
MATERIAL		DRAWN C. PAK	5/96	HETG ENGINEERING DRAWING TREE	
NEXT ASSY USED <input type="checkbox"/> APPLICATION		CHECKED		SIZE B	CODE IDENT NO 80230
		APPROVED		DRAWING NO 96-20000	REV. C
		RELEASED		SCALE	1 OF 1

REVISIONS

LTR	DATE	APPROVED

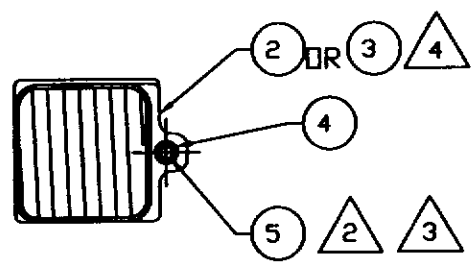
NOTES:

1. ALIGN GRATING ASSEMBLIES PER 96-01007.

2. TORQUE SCREWS TO 64 IN-OZ.

3. SPOT BOND PER 96-01002.

4. APPLY HYSOL 9313 PER 96-01002

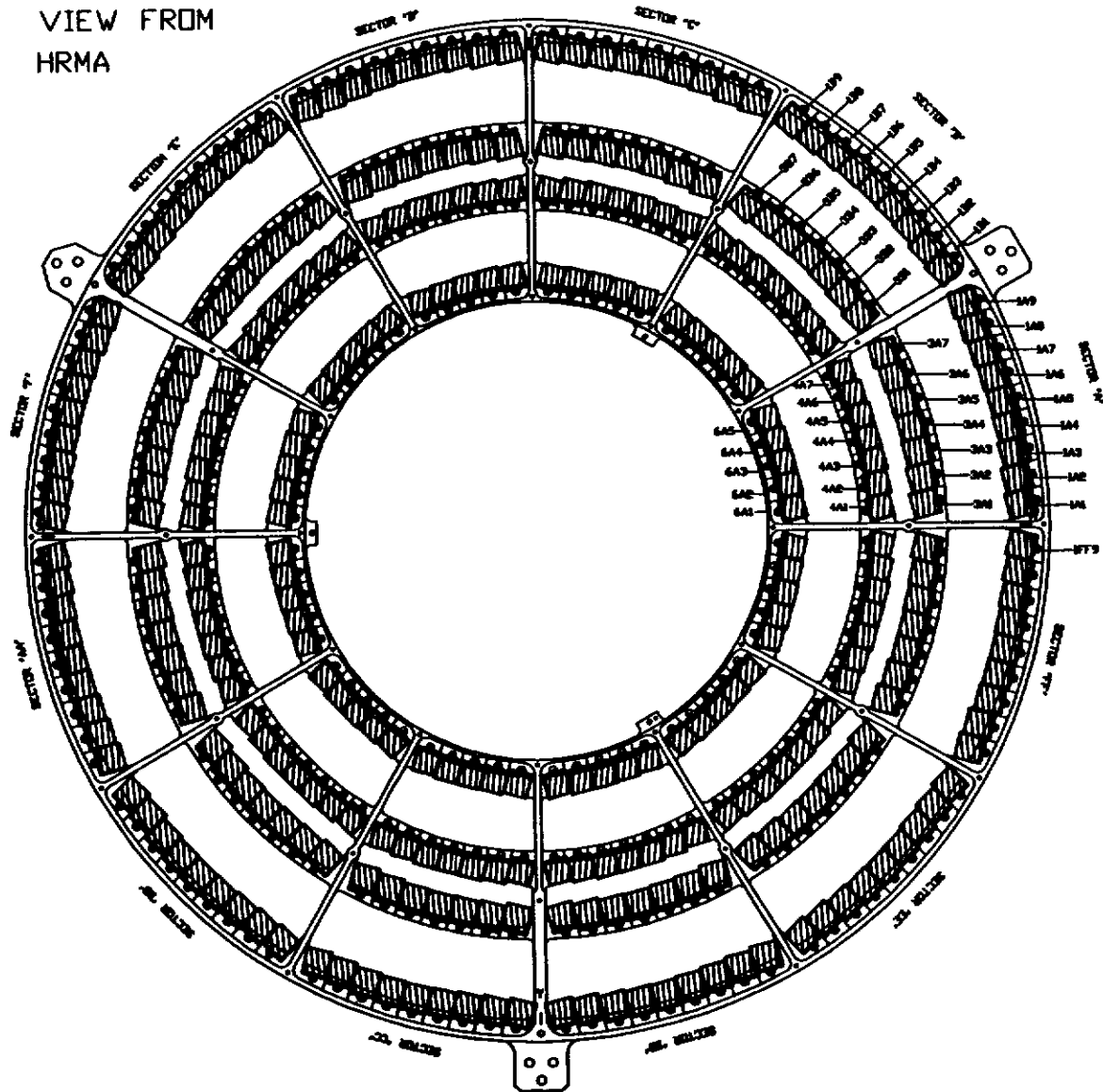


336 X

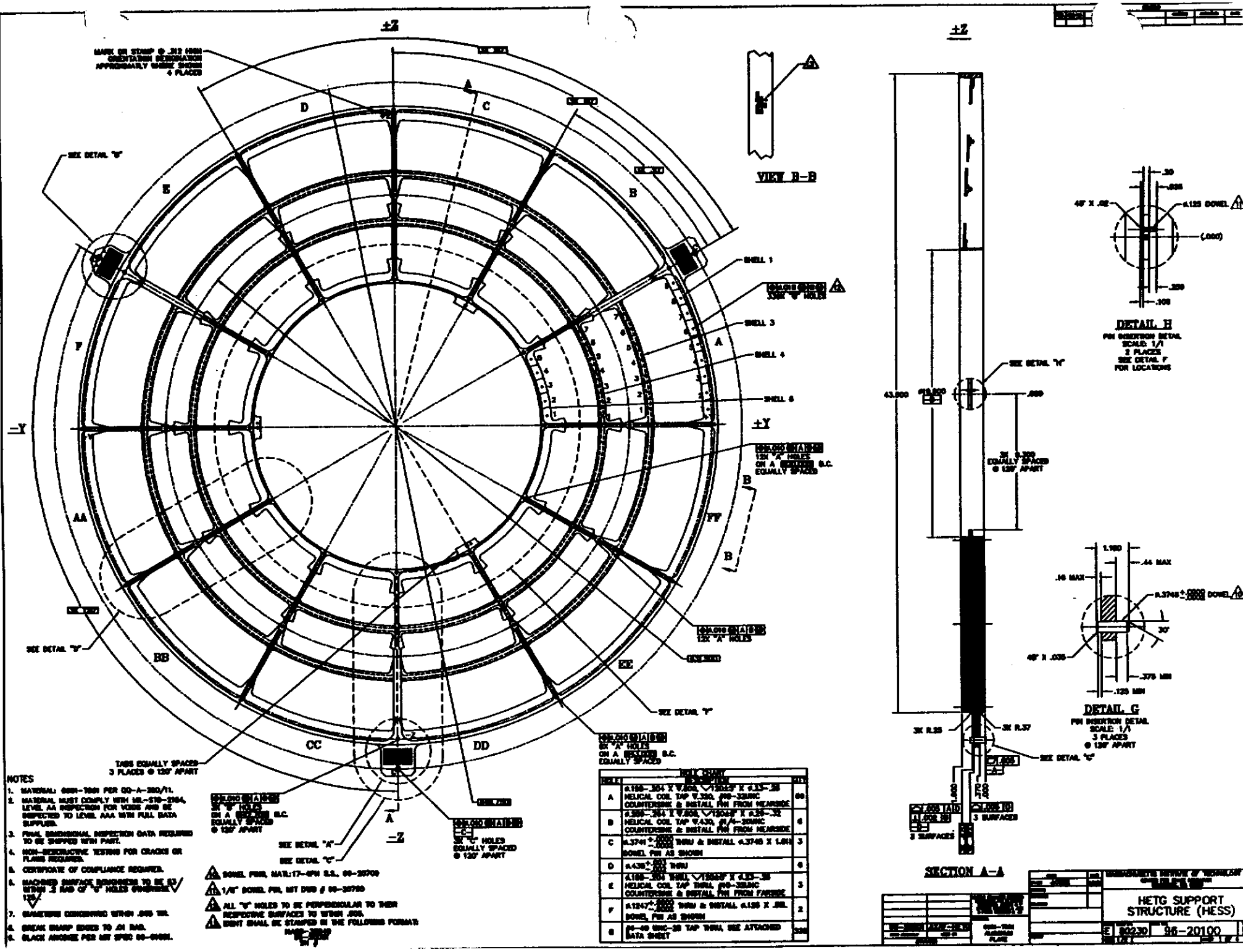
NO	DESCRIPTION	DWG NO	REV	QTY
1	HESS	96-20100	B	1
2	MEG ASSEMBLY	96-20800	A	192
3	HEG ASSEMBLY	96-20200	A	144
4	FLIGHT WASHER	96-20601	A	336
5	PREC. SHOULDER SCREW	96-20600	D	336

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES ±1° 3 PLACE DECIMALS ±.005 2 PLACE DECIMALS ±.01		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH	
MATERIAL		BRANN C. PAK	8/96	HETG ASSEMBLY	
SEE MASTER PARTS LIST		CHECKED			
HETG AXAF		APPROVED			
NEXT ASSY USED ON	APPLICATION	RELEASED		SIZE	CODE IDENT NO.
				B	80230
				DRAWING NO.	96-20001
				REV.	B
				SCALE	NONE
					SHEET 1 OF 2

VIEW FROM  
HRMA

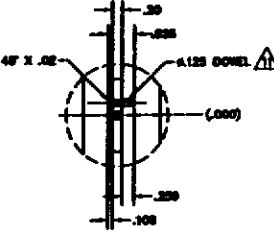


SIZE	CODE IDENT NO.	REV
B	80230 96-20001	B
SCALE	SHEET 2 OF 2	

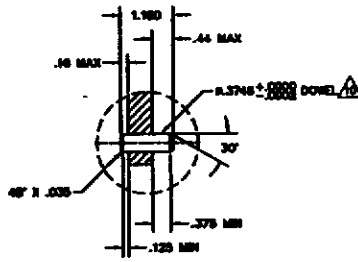
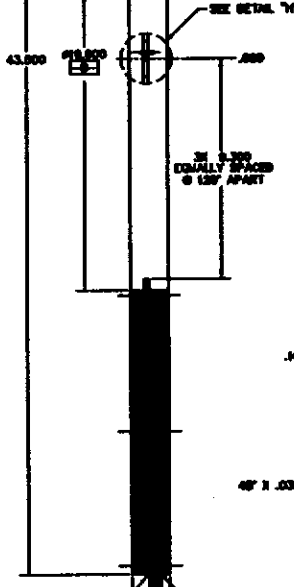


MARK ON STAMP @ .312 INCH  
ORIENTATION DESIGNATION  
APPROXIMATELY MARKED, SHOWN  
& PLACED

VIEW B-B



DETAIL B  
FOR INSERTION DETAIL  
SCALE: 1/1  
3 PLACES  
SEE DETAIL F  
FOR LOCATIONS



DETAIL C  
FOR INSERTION DETAIL  
SCALE: 1/1  
3 PLACES  
SEE DETAIL F  
FOR LOCATIONS

SECTION A-A

REVISIONS		UNCLASSIFIED	
NO.	DATE	BY	APP.
HETG SUPPORT STRUCTURE (HESS) 86-20100		UNCLASSIFIED CONTROL NO. 86-20100	

- NOTES
1. MATERIAL: 6061-T6 PER 100-A-280/71.
  2. MATERIAL MUST COMPLY WITH MIL-STD-2084, LEVEL AA INSPECTION FOR VENE AND BE INSPECTED TO LEVEL AAA WITH FULL DATA SUPPLIER.
  3. FINAL DIMENSIONAL INSPECTION DATA REQUIRED TO BE SHIPPED WITH PART.
  4. NON-DESTRUCTIVE TESTING FOR CRACKS OR FLAWS REQUIRED.
  5. CERTIFICATE OF COMPLIANCE REQUIRED.
  6. MACHINED SURFACE FINISHES TO BE AS/ WITHIN 2 RAD OF  $\sqrt{R}$  HOLES OTHERWISE  $\sqrt{10}$ .
  7. DIMENSIONS CONCERNING WITHIN .005 THU.
  8. BREAK SHARP EDGES TO .01 RAD.
  9. BLACK ANODIZE PER MIL SPEC 88-5008.

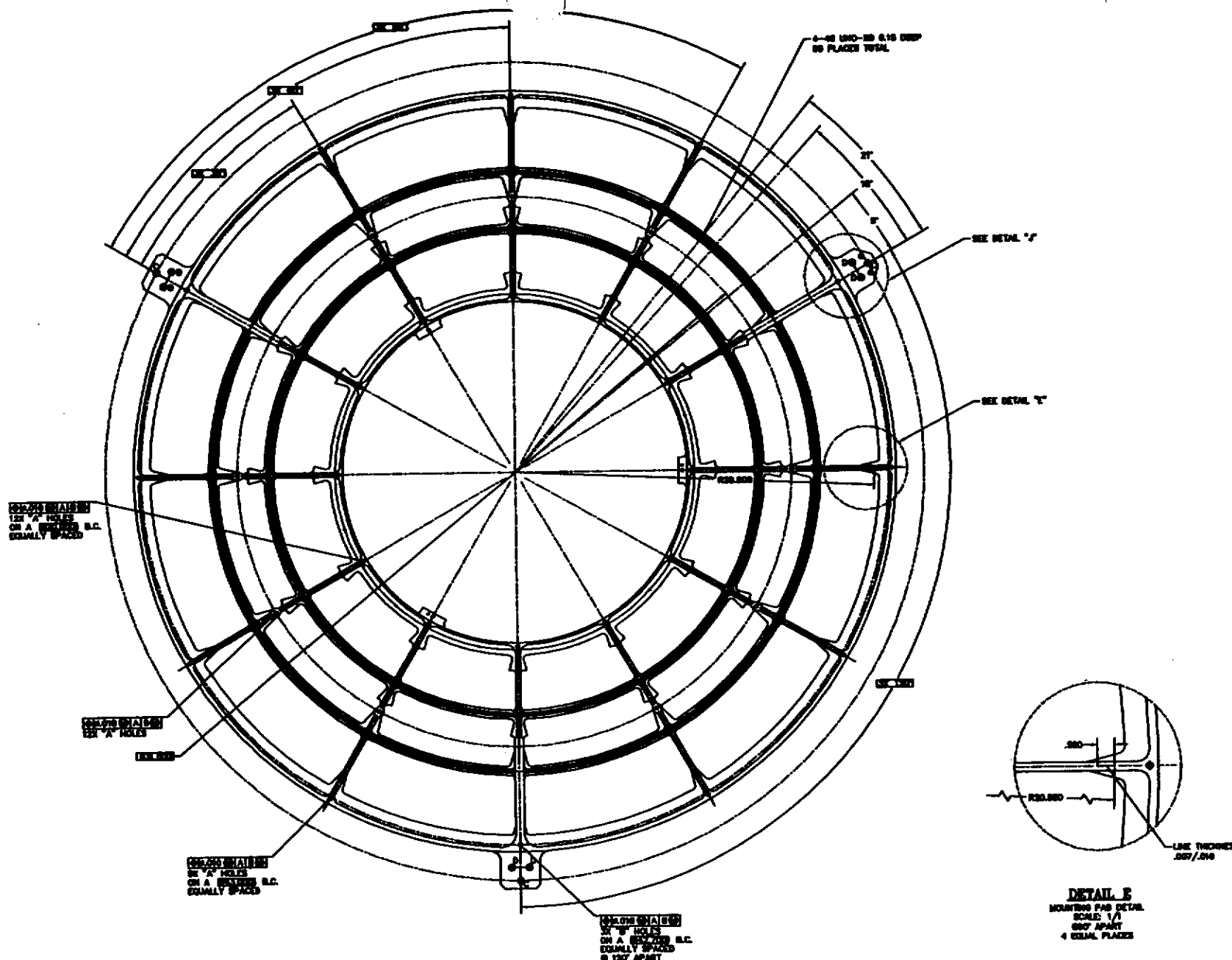
HOLES  
ON A BORE H.C.  
EQUALLY SPACED  
@ 120° APART

HOLES  
ON A BORE H.C.  
EQUALLY SPACED  
@ 120° APART

HOLES  
ON A BORE H.C.  
EQUALLY SPACED  
@ 120° APART

HOLES  
ON A BORE H.C.  
EQUALLY SPACED

ITEM	DESCRIPTION	QTY
A	6.180-304 X 1/8 DIA. X 1.125" H 6.35-38 MECHAN. COIL TAP V.330, #10-32UNC COUNTERSINK & INSTALL PIN FROM REAR SIDE	60
B	6.380-304 X 1/8 DIA. X 1.125" H 6.35-38 MECHAN. COIL TAP V.430, #14-32UNC COUNTERSINK & INSTALL PIN FROM REAR SIDE	6
C	6.374 X 1.125 THRU & INSTALL 6.3748 X 1.081 DOWEL PIN AS SHOWN	3
D	6.430-304 THRU	6
E	6.180-304 THRU X 1.125" H 6.35-38 MECHAN. COIL TAP THRU #10-32UNC COUNTERSINK & INSTALL PIN FROM REAR SIDE	3
F	6.124-304 THRU & INSTALL 6.126 X 1.081 DOWEL PIN AS SHOWN	2
G	61-60 HSS-38 TAP THRU SEE ATTACHED DATA SHEET	300



CONCENTRIC  
12" DIA HOLES  
ON A CENTER B.C.  
EQUALLY SPACED

CONCENTRIC  
12" DIA HOLES  
ON A CENTER B.C.

SEE DETAIL X

CONCENTRIC  
12" DIA HOLES  
ON A CENTER B.C.  
EQUALLY SPACED

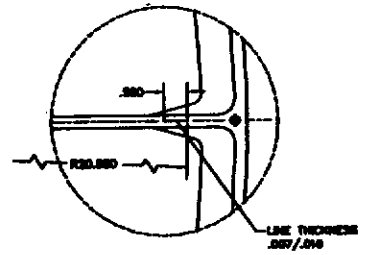
CONCENTRIC  
12" DIA HOLES  
ON A CENTER B.C.  
EQUALLY SPACED  
@ 120° APART

REAR VIEW

4-20 UNF-2B 0.15 DRIP  
80 PLACES TOTAL

SEE DETAIL Y

SEE DETAIL Y



DETAIL B  
MOUNTING PAD DETAIL  
SCALE: 1/1  
800° APART  
4 EQUAL PLACES

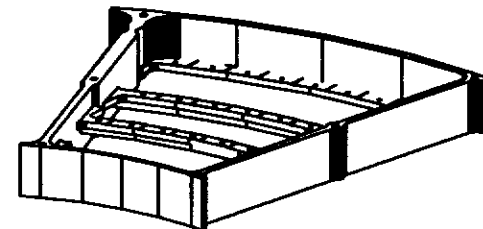
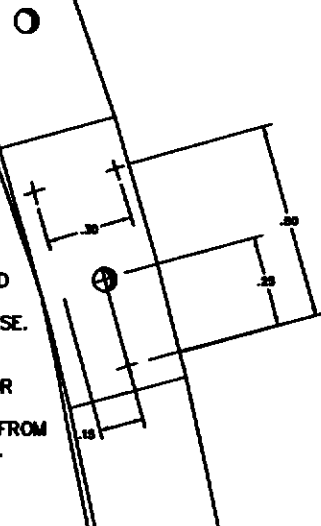
DESIGNER		CHECKED		DATE	
DRAWN		APPROVED		SCALE	
MATERIAL		FINISH		QUANTITY	
TOLERANCES		DIMENSIONS		WEIGHT	
STANDARD		SPECIFICATION		DRAWING NO.	
PROJECT		JOB NO.		SHEET NO.	
DRAWING TITLE		DRAWING NO.		SHEET NO.	
HETG SUPPORT STRUCTURE, (HESS)		E 80230		98-20100	



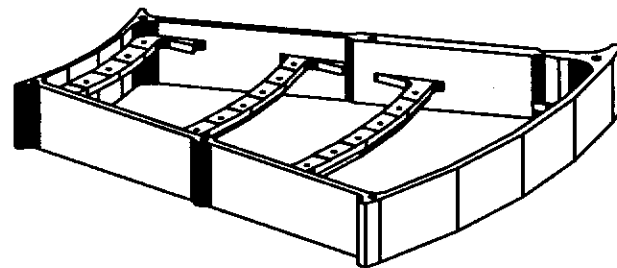
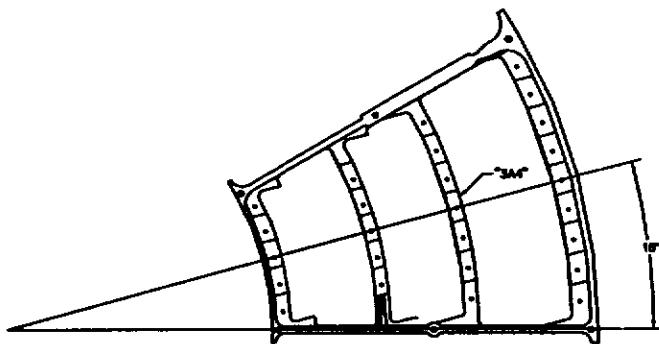


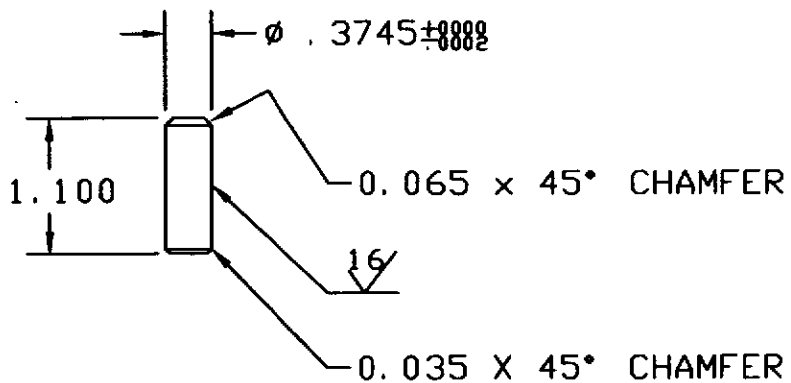
DIMENSIONS SHOWN ARE TO BE USED FOR INSPECTION PURPOSES IN CALCULATING X, Y & Z LOCATIONS OF SURFACE IN RELATION TO HOLES ON THAT SPECIFIC SURFACE.

THIS SURFACE IS DESIGNATED AS "3A4" AND DIMENSIONS ARE 15' ROTATED COUNTERCLOCKWISE. DIMENSION CHECK POINTS FOR THIS SECTION WILL BE AT ANGLES GREATER OR LESS THAN 15' DEPENDING UPON THEIR ORIENTATION FROM THE CENTER OF THE HESS.



SECTION "A" OF HESS





NOTES:

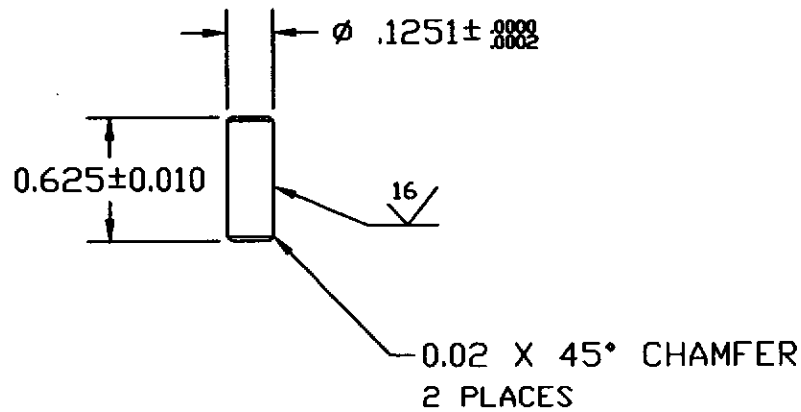
1. MIN ULTIMATE TENSILE STRENGTH = 180 KSI
2. MIN ULTIMATE SHEAR STRENGTH = 100 KSI
3. MIN SURFACE HARDNESS OF 36 RC.

REVISIONS		
LTR	DATE	APPROVED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE: ANGLES $\pm 1^\circ$ 3 PLACE DECIMALS $\pm .005$ 2 PLACE DECIMALS $\pm .01$		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH	
MATERIAL		DRAWN C. PAK	3/95	INTERFACE PIN	
17-4 PH		CHECKED			
AXAF		APPROVED			
96-20001 HETG		RELEASED		SIZE B	CONTRACT NO. 80230
NEXT ASSY USED ON APPLICATION				DRAWING NO. 96-20700	REV. B
				SCALE	SHEET 1 OF 1

REVISIONS

LTR	DATE	APPROVED

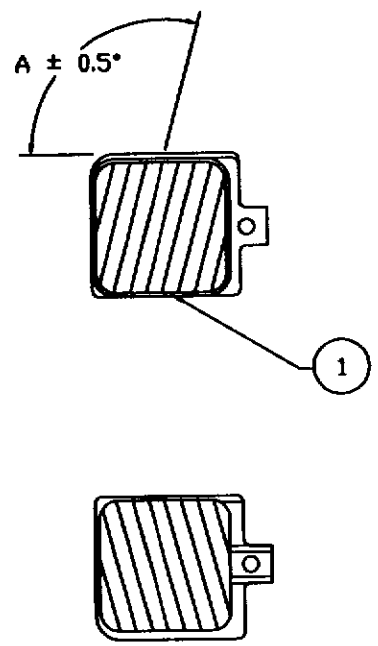


NOTES:

1. MIN ULTIMATE TENSILE STRENGTH = 180 KSI
2. MIN ULTIMATE SHEAR STRENGTH = 100 KSI
3. ALLIED DEVICE PART NO D5D625 OR EQUIV.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES ± 1° 3 PLACE DECIMALS ± .005 2 PLACE DECIMALS ± .01		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH					
MATERIAL		DRAWN	C. PAK	3/95	ARM INTERFACE PIN				
303 CRES		CHECKED							
96-20101 AXAF		APPROVED							
NEXT ASSY USED ON APPLICATION		RELEASED							
		SIZE	B	CODE IDENT NO.	80230	DRAWING NO.	96-20750	REV.	B
		WEIGHT		SCALE		SHEET 1 OF 1			

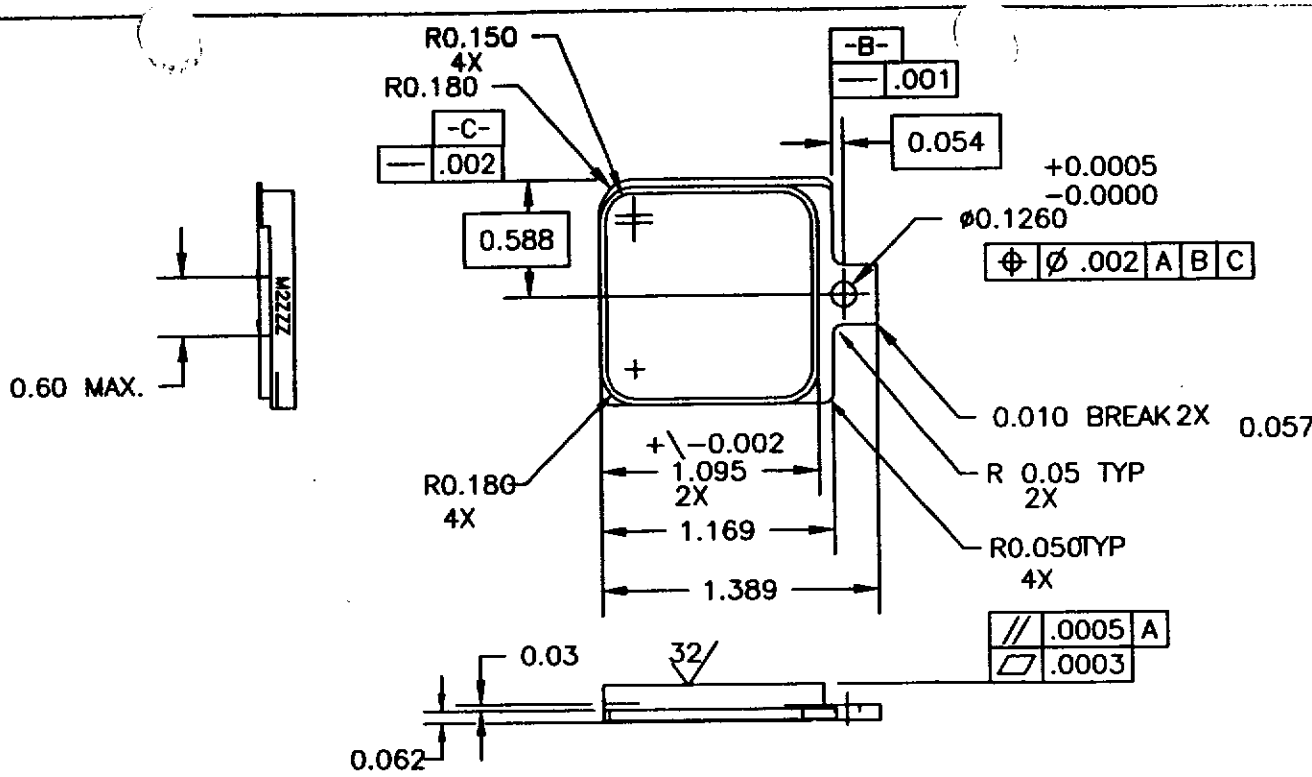
REVISIONS		
LTR	DATE	APPROVED



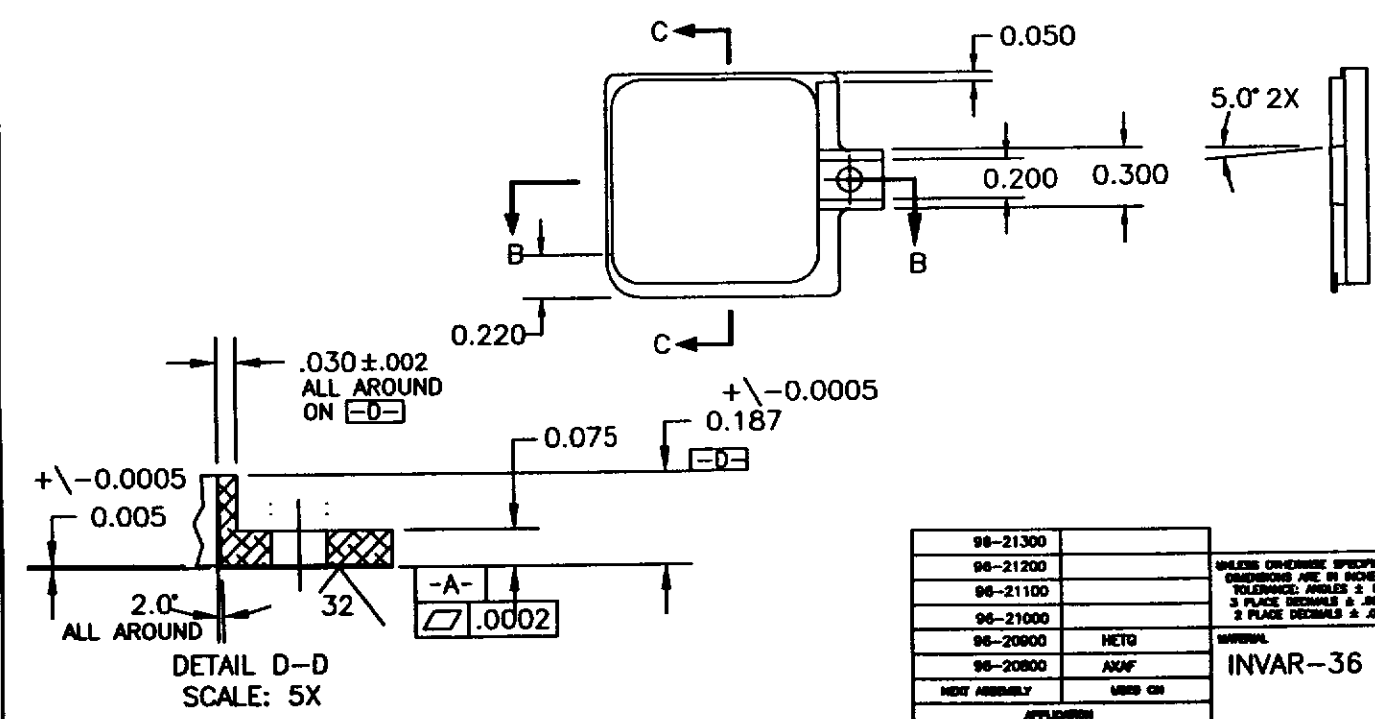
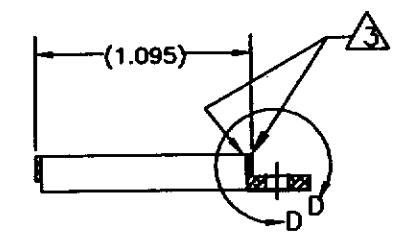
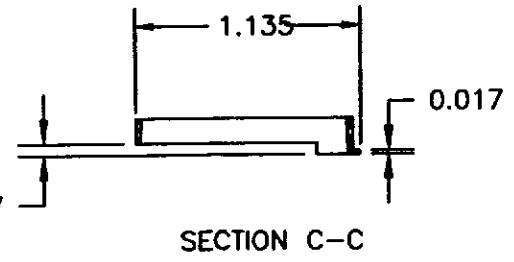
TYPE	'A'
A	100.0°
B	130.0°
C	160.0°
D	190.0°
E	220.0°
F	250.0°

NOTES:  
 1. BOND F/N'S 1 & 2 PER 96-01005.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE: ANGLES ± 1° 3 PLACE DECIMALS ± .005 2 PLACE DECIMALS ± .01		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH		
MATERIAL		DRAWN C. PAK	1/95	M. E. GRATING ASSEMBLY		
HETG		CHECKED		SIZE	CODE IDENT. NO.	DRAWING NO.
96-20001		APPROVED		B	80230	96-20800
NEXT ASSY USED ON		RELEASED		SCALE	NONE	SHEET 1 OF 1
APPLICATION		WEIGHT		REV.		A



REV.	REV. NO.	DESCRIPTION	REVISION	CHK.	APPROVED	DATE



- NOTES:
1. SURFACE ROUGHNESS 125 MAX.
  2. BREAK SHARP EDGES .005 RAD MAX
  3. DO NOT DEBURR TOP INSIDE OR OUTSIDE EDGES.
  4. ZZZ = 001 THRU 999 LABEL HEIGHT = 0.06 IN.

98-21300	
98-21200	
98-21100	
98-21000	
98-20800	HETG
98-20800	AXAF
NEXT ASSEMBLY	USED ON
APPROVED	

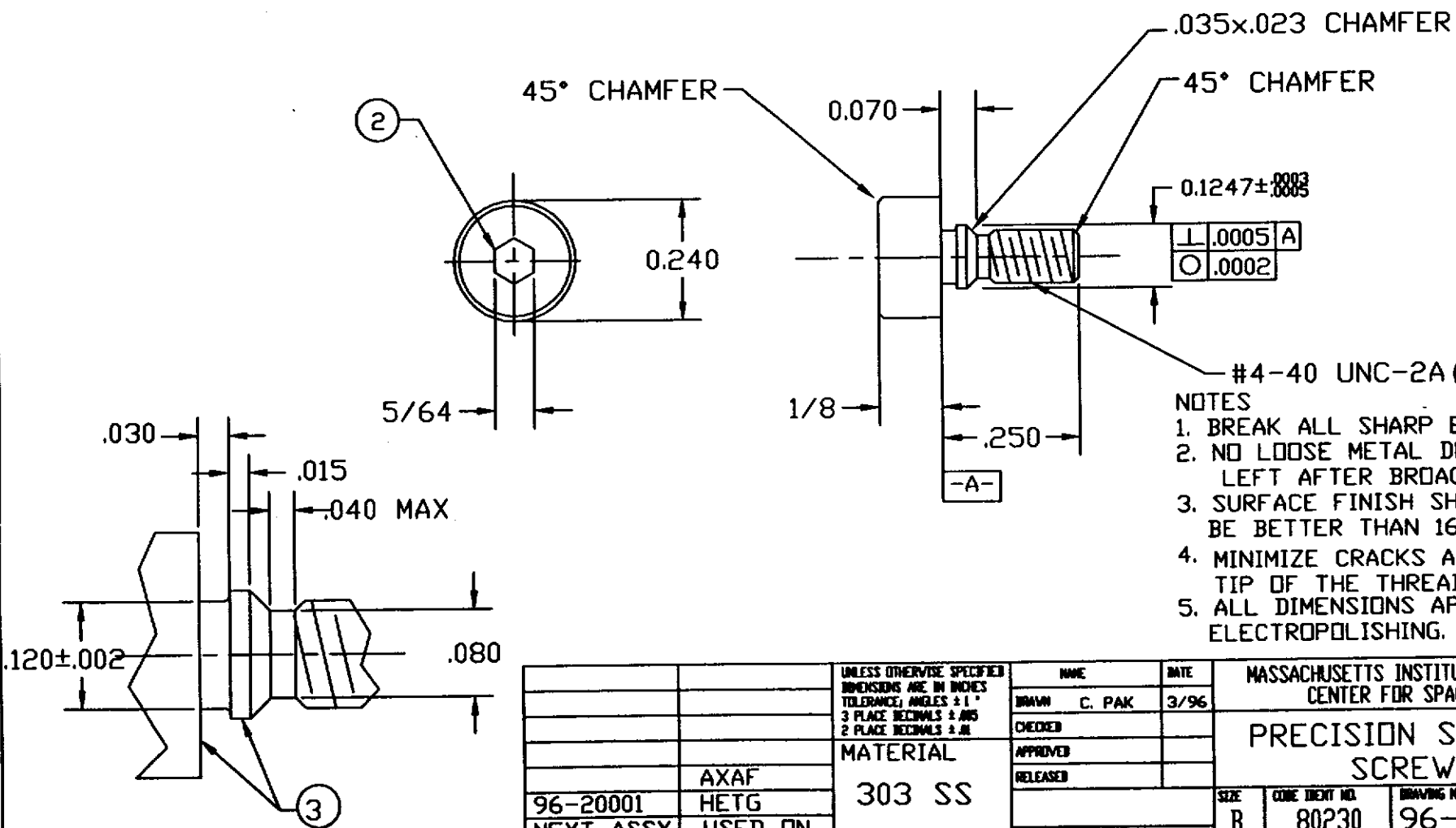
UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES  
TOLERANCES: ANGLES ± 1°  
3 PLACE DECIMALS ± .001  
2 PLACE DECIMALS ± .01

INVAR-36

NAME	DATE
DRAWN C. PAK	4/98
CHECKED	
APPROVED	
RELEASED	
VERIFY	

MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH CAMBRIDGE, MA 02139	
MEG - INVAR	
SCALE 2:1	SHEET 1 OF 1

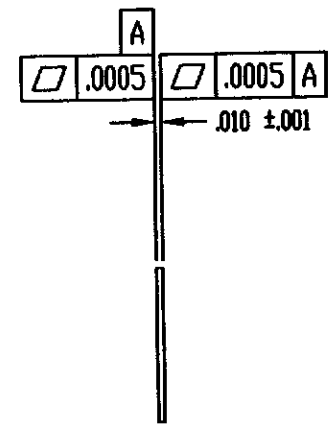
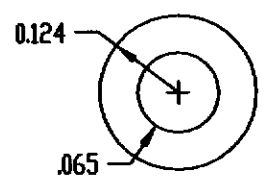
REVISIONS		
LTR	DATE	APPROVED



- NOTES
1. BREAK ALL SHARP EDGES
  2. NO LOOSE METAL DEBRIS LEFT AFTER BROACHING.
  3. SURFACE FINISH SHALL BE BETTER THAN 16
  4. MINIMIZE CRACKS AT THE TIP OF THE THREADS.
  5. ALL DIMENSIONS APPLY AFTER ELECTROPOLISHING.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE: ANGLES $\pm 1^\circ$ 3 PLACE DECIMALS $\pm .005$ 2 PLACE DECIMALS $\pm .01$		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH	
MATERIAL		DRAWN C. PAK	3/96	PRECISION SHOULDER SCREW	
303 SS		CHECKED		SIZE	CODE IDENT NO.
96-20001 AXAF HETG		APPROVED		B	80230
NEXT ASSY USED ON APPLICATION		RELEASED		DRAWING NO.	96-20600
		WEIGHT		REV.	D
				SCALE	SHEET 1 OF 1

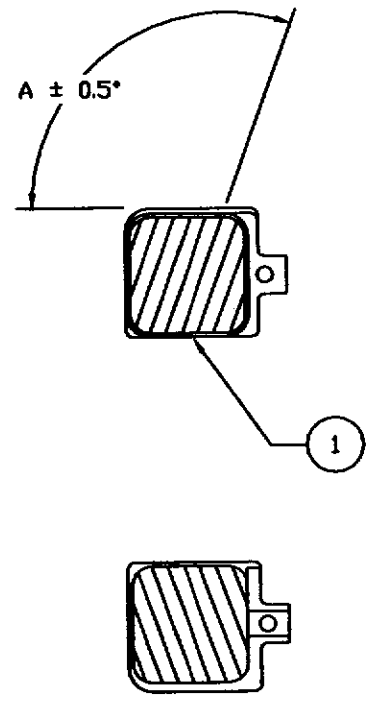
REVISIONS		
LTR	DATE	APPROVED



- NOTES  
 1. BREAK ALL SHARP EDGES  
 2. ALL DIMENSIONS AFTER ELECTROPOLISHING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE: ANGLES ± 1° 3 PLACE DECIMALS ± .005 2 PLACE DECIMALS ± .01		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH		
MATERIAL		DRAWN C. PAK	2/96	FLIGHT WASHER		
301 SS		CHECKED		SIZE	CONF. IDENT. NO.	DRAWING NO.
NEXT ASSY USED ON		APPROVED		B	80230	96-20601
APPLICATION		RELEASED		SCALE NONE		SHEET 1 OF 1
	AXAF					REV. A
	HETG					

REVISIONS		
LTR	DATE	APPROVED



TYPE	'A'
A	110.0°
B	140.0°
C	170.0°
D	200.0°
E	230.0°
F	260.0°

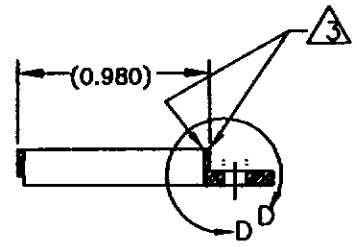
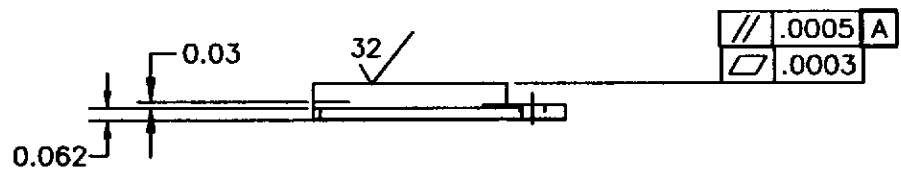
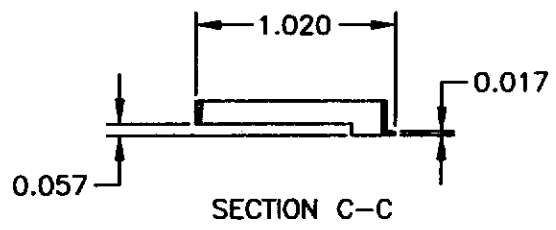
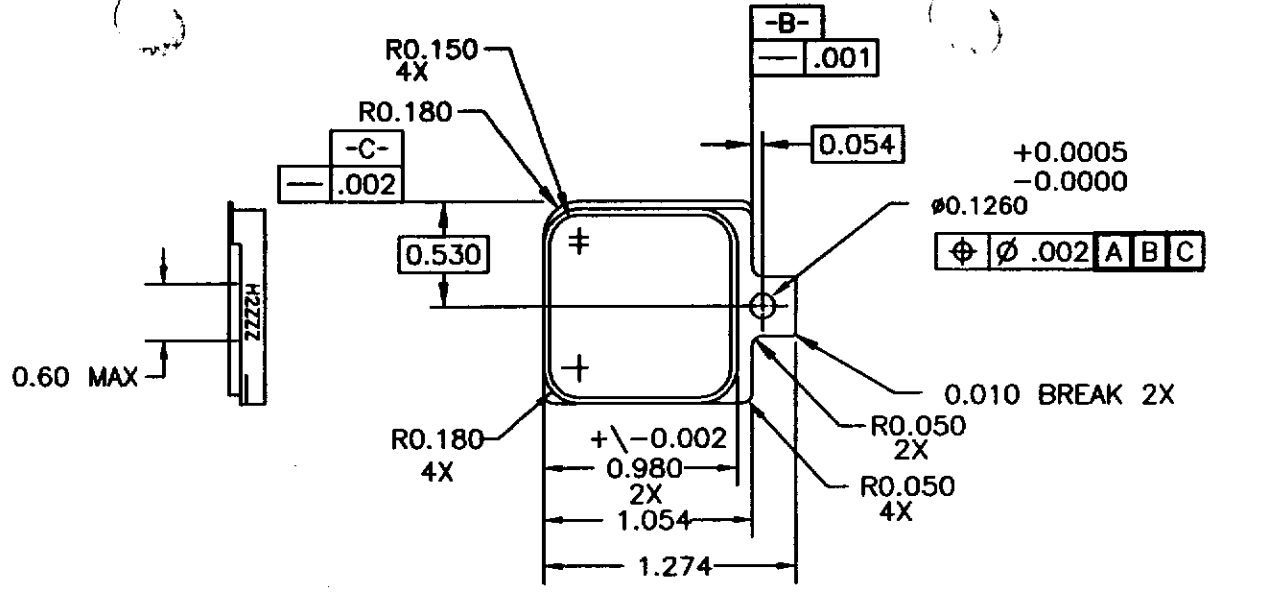
NOTES:

1. BOND F/N'S 1 & 2 PER 96-01005.

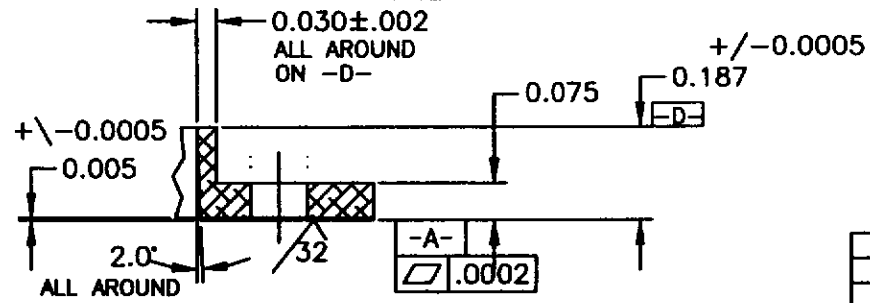
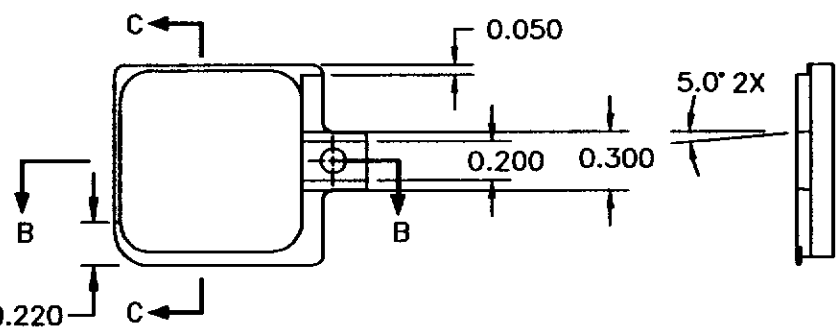
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE: ANGLES ± 1° 3 PLACE DECIMALS ± .015 2 PLACE DECIMALS ± .01		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH		
MATERIAL		DRAWN C. PAK	1/95	H. E. GRATING ASSEMBLY		
HETG		CHECKED		SIZE	CODE IDENT. NO.	DRAWING NO.
96-20001		APPROVED		B	80230	96-20200
NEXT ASSY USED ON		RELEASED		SCALE	NONE	SHEET 1 OF 1
APPLICATION		WEIGHT		REV.		A



REVISIONS				APPROVED	DATE
REV	ISS NO.	DESCRIPTION	CI		



SECTION B-B



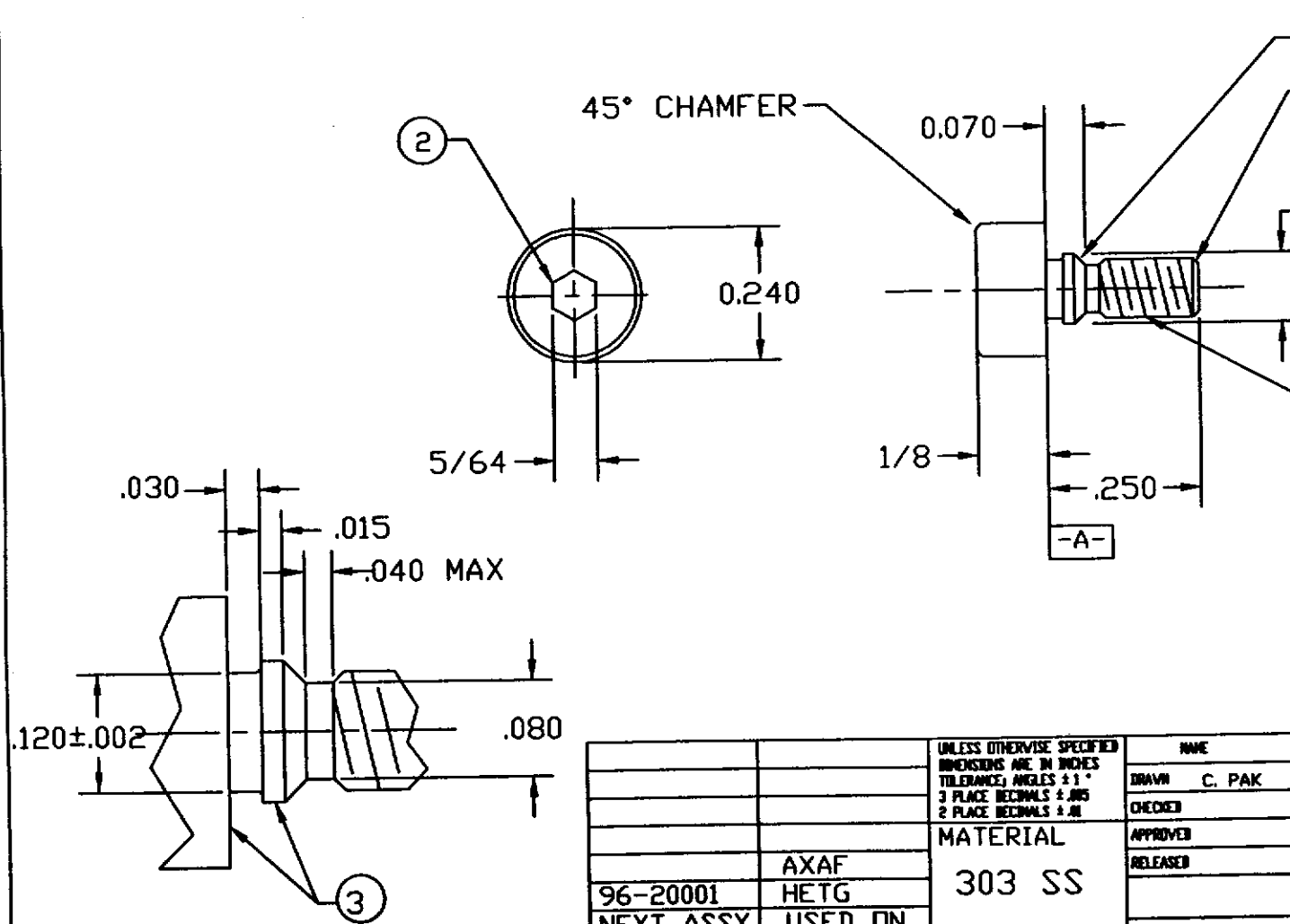
DETAIL D-D  
SCALE: 5X

NOTES:

1. SURFACE ROUGHNESS 125 MAX.
2. BREAK SHARP EDGES .005 RAD MAX.
3. DO NOT DEBURR TOP INSIDE OR OUTSIDE EDGES.
4. ZZZ=001 THRU 999  
LABEL HEIGHT - 0.06 IN.

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE: ANGLES ± 1° 3 PLACE DECIMALS & .001 2 PLACE DECIMALS & .01	NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH CAMBRIDGE, MA 02139
			DRAWN C. PAK	4/78	
		MATERIAL INVAR-36	CHECKED		HEG INVAR
			APPROVED		
		NEXT ASSEMBLY USED ON	RELEASED		C 80230 96-20202
			APPROVED		
APPROVED					SCALE 2:1
					SHEET 1 OF 1

REVISIONS		
LTR	DATE	APPROVED

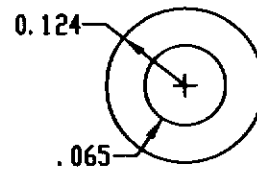
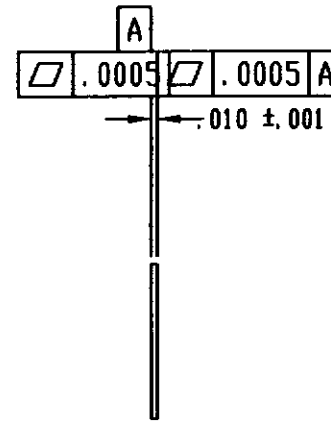


- NOTES
1. BREAK ALL SHARP EDGES
  2. NO LOOSE METAL DEBRIS LEFT AFTER BROACHING.
  3. SURFACE FINISH SHALL BE BETTER THAN 16
  4. MINIMIZE CRACKS AT THE TIP OF THE THREADS.
  5. ALL DIMENSIONS APPLY AFTER ELECTROPOLISHING.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES $\pm 1^\circ$ 3 PLACE DECIMALS $\pm .005$ 2 PLACE DECIMALS $\pm .01$		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH		
MATERIAL		DRAWN C. PAK	3/96	PRECISION SHOULDER SCREW		
303 SS		CHECKED		SIZE	CONE IDENT NO.	DRAWING NO.
96-20001 HETG		APPROVED		B	80230	96-20600
NEXT ASSY USED ON		RELEASED		SCALE		SHEET 1 OF 1
APPLICATION		WEIGHT				

REVISIONS

LTR	DATE	APPROVED



NOTES

1. BREAK ALL SHARP EDGES
2. ALL DIMENSIONS AFTER ELECTROPOLISHING

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES $\pm 1^\circ$ 3 PLACE DECIMALS $\pm .005$ 2 PLACE DECIMALS $\pm .01$	NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH			
			BROWN C. PAK	2/96	FLIGHT WASHER			
		MATERIAL	CHECKED					
		301 SS	APPROVED					
		AXAF	RELEASED		SIZE	CAGE IDENT. NO.	DRAWING NO.	REV.
		HETG			B	80230	96-20601	A
NEXT ASSY USED ON			WEIGHT		SCALE NONE			SHEET 1 OF 1
APPLICATION								