

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

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

DWG TREE LIST

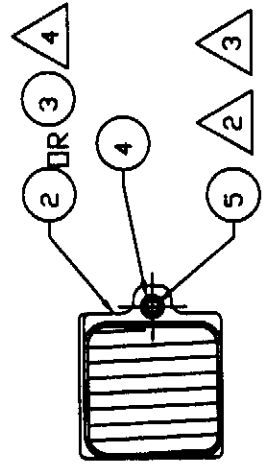
Drawing Number	Drawing Title	REV	QTY
96-20000	HETG Engineering DWG Tree	C	1
96-20001	HETG Assembly	A	1
96-20100	HETG Support Structure	B	1
96-20700	Interface Yoke Pin	B	3
96-20750	Interface Pin	B	3
96-20800	MEG Grating Assembly	A	192
96-20802	MEG Grating Frame	C	192
96-20600	4-40 Precision Shoulder Screw	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 Ref Assembly	A	1
96-30501	Alignment Ref Support	D	1
96-30502	Alignment Ref 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

NOTES:

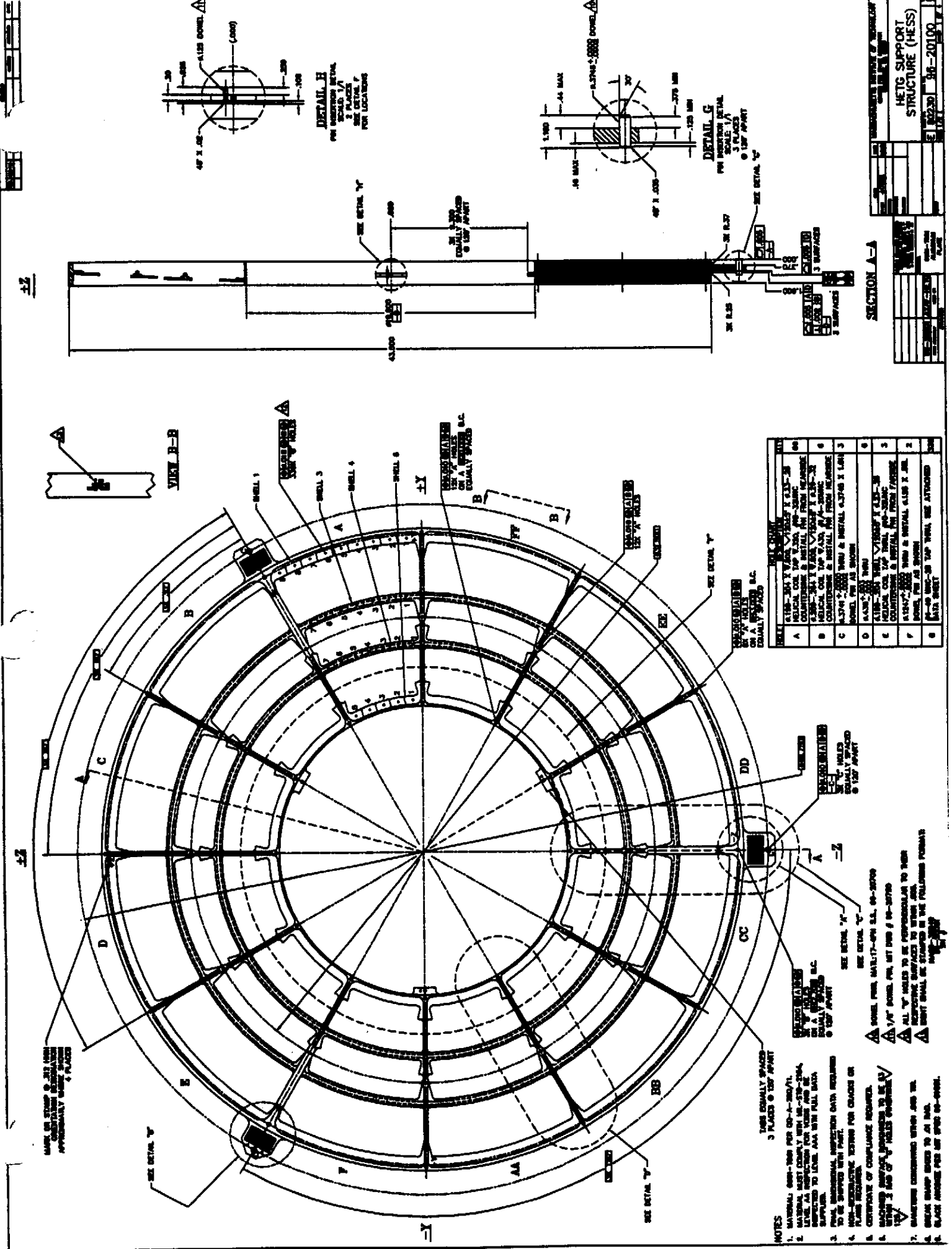
1. ALIGN GRATING ASSEMBLIES PER 96-01007.
2. TORQUE SCREWS TO 64 IN-DZ.
3. SPOT BOND PER 96-01002.
4. APPLY HYSOL 9313 PER 96-01002



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 31°		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH
3 PLACE DECIMALS 4. DIMS	2 PLACE DECIMALS 4. 01	BRANN C. PAK	8/96	HETG ASSEMBLY
MATERIAL		CHECKED		
SEE MASTER PARTS LIST		APPROVED		
NEXT ASSY USED ON APPLICATION		RELEASED		SIZE B
		WEIGHT		CORE IDENT NO. 80230
				DRAWING NO. 96-20001
				SCALE NONE
				REV. B
				SHEET 1 OF 2



WELD BE STRONG & ALL WELD APPROXIMATELY EQUAL SPACES

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

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SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

SEE DETAIL 'Y'

- NOTES
1. MATERIALS SHOWN PER SP-1-200/71.
 2. LABEL ALL INSTRUMENTS FOR WELDING AND BE SUBJECT TO LEVEL AAA WITH FULL DATA SUPPLIER.
 3. FINAL DIMENSIONAL INSPECTION DATA REQUIRED TO BE SHIPPED WITH PART.
 4. NON-REWORKING TESTING FOR CHECKS ON PLATE REQUIRED.
 5. CERTIFICATE OF COMPLIANCE REQUIRED.
 6. WELDING AND/OR OPERATIONS TO BE IN VIEW 2 AND 3 HELDS INDICATED.
 7. DIMENSIONS CONCERNING WIDTH AND TH. CRACKS SHOWN SHALL BE AS SHOWN.
 8. CRACKS SHOWN SHALL BE AS SHOWN.
 9. CRACKS SHOWN PER DET 06-0000.

ITEM	DESCRIPTION
A	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
B	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
C	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
D	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
E	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
F	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
G	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE

ITEM	DESCRIPTION
1	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
2	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
3	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
4	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
5	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
6	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
7	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
8	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE
9	HELICAL COIL TAP W/AN. P/AN. P/AN. COMPRESSOR & INSTALL PER FROM INCREASE

HETG SUPPORT STRUCTURE (HESS)

REV	DATE	DESCRIPTION
1	02/20/80	ISSUE FOR FABRICATION
2	03/20/80	ISSUE FOR FABRICATION

SECTION A-A

SCALE: 1/2" = 1'-0"

3 PLACES @ 120° APART

3 PLACES @ 120° APART

3 PLACES @ 120° APART

3 PLACES @ 120° APART

3 PLACES @ 120° APART

3 PLACES @ 120° APART

3 PLACES @ 120° APART

3 PLACES @ 120° APART

3 PLACES @ 120° APART

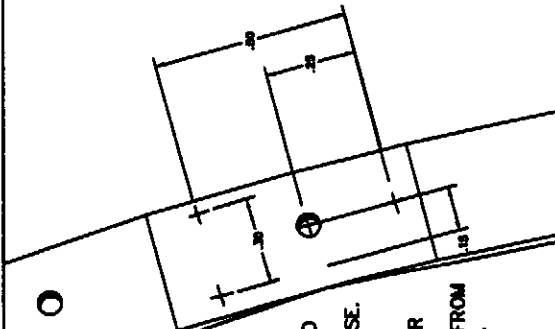
3 PLACES @ 120° APART

3 PLACES @ 120° APART

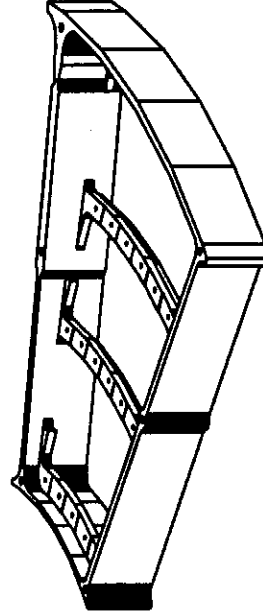
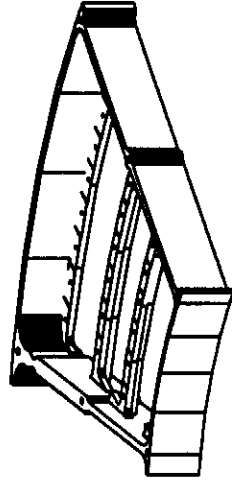
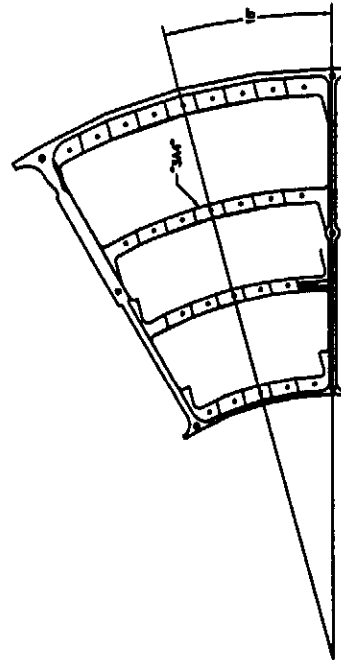
3 PLACES @ 120° APART

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.

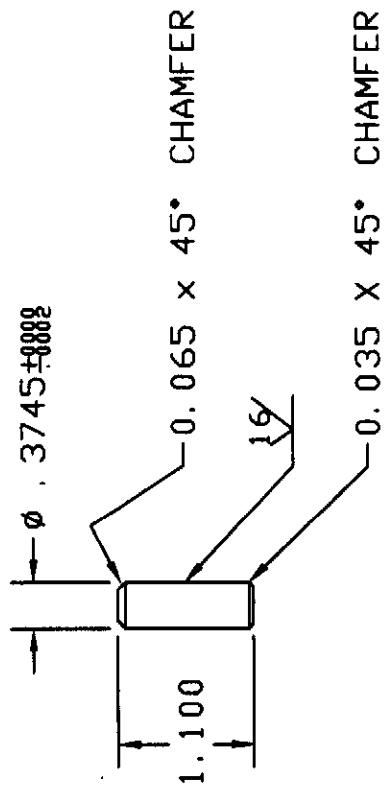
THIS SURFACE IS DESIGNATED AS "3A4" AND DIMENSIONS ARE 15" ROTATED COUNTERCLOCKWISE. DIMENSION CHECK POINTS FOR THIS SECTION WILL BE AT ANGLES GREATER OR LESS THAN 15° DEPENDING UPON THEIR ORIENTATION FROM THE CENTER OF THE HESS.



SECTION "A" OF HESS



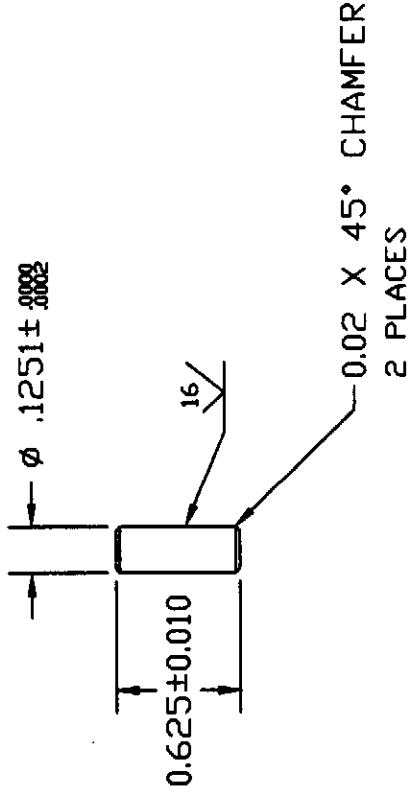
REVISIONS		
LTR.	DATE	APPROVED



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

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ANGLES & ° 3 PLACE DECIMALS & .005 2 PLACE DECIMALS & .01		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH
		BRN	3/90	
		C. PAK		
		CHECKED		
		APPROVED		
		RELEASED		
		WEIGHT		
	MATERIAL	INTERFACE PIN		
	17-4 PH	SIZE	80230	896-20700 B REV.
96-20001	AXAF	SCALE		
NEXT ASSY USED ON	HETG			
APPLICATION	USED ON			
				SHEET 1 OF 1

REVISIONS		
LTR	DATE	APPROVED

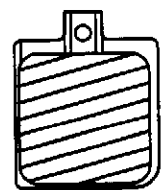
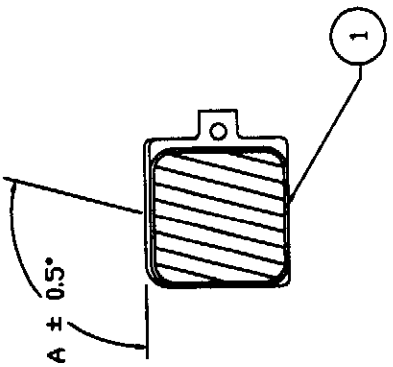


NOTES:
 1. MIN ULTIMATE TENSILE STRENGTH = 180 KSI
 2. MIN ULTIMATE SHEAR STRENGTH = 100 KSI
 3. ALLIED DEVICE PART NO D5D625 OR EQUIV.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES ± 1° 3 PLACE DECIMALS ± .002 2 PLACE DECIMALS ± .01		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH	
		DRAWN C. PAK	3/95		
		CHECKED			
		APPROVED			
		RELEASED			
		WEIGHT			
		MATERIAL		ARM INTERFACE PIN	
		303 CRES			
	AXAF				
	96-20101	HETG			
	NEXT ASSY USED ON				
	APPLICATION				
				SIZE	REV.
				B	B
				80230	96-20750
				SCALE	SHEET 1 OF 1

REVISIONS

LTR	DATE	APPROVED

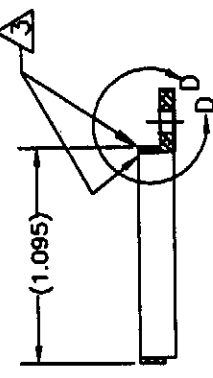
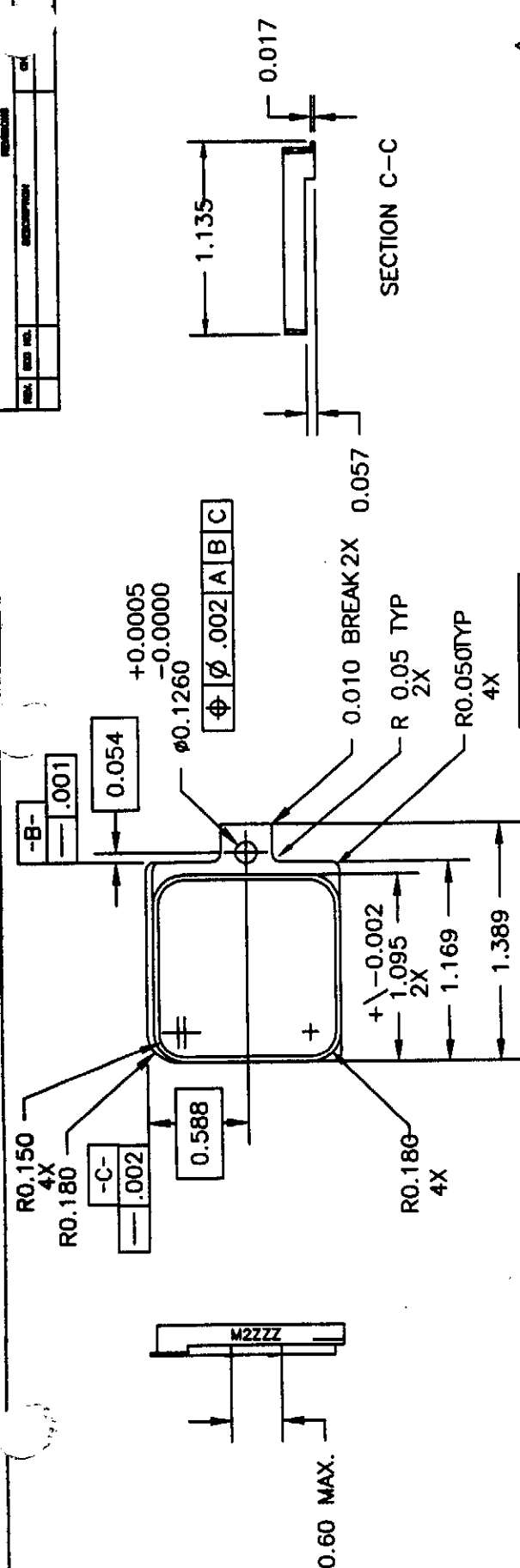


TYPE	'A'
A	100.0°
B	130.0°
C	160.0°
D	190.0°
E	220.0°
F	250.0°

NOTES:

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

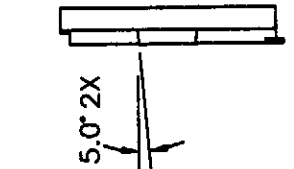
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES $\pm 1^\circ$ 3 PLACE DECIMALS $\pm .005$ 2 PLACE DECIMALS $\pm .01$		DATE	1/95
DRAWN C. PAK		NAME	
CHECKED		APPROVED	
RELEASED		SCALE	NONE
MATERIAL		WEIGHT	
96-20001		HE TG	
NEXT ASSY USED ON		AXAF	
APPLICATION			
MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH		CRK. BOST. NO.	80230
M. E. GRATING ASSEMBLY		DRAWING NO.	96-20800
SIZE	B	REV.	A
SHEET 1 OF 1			



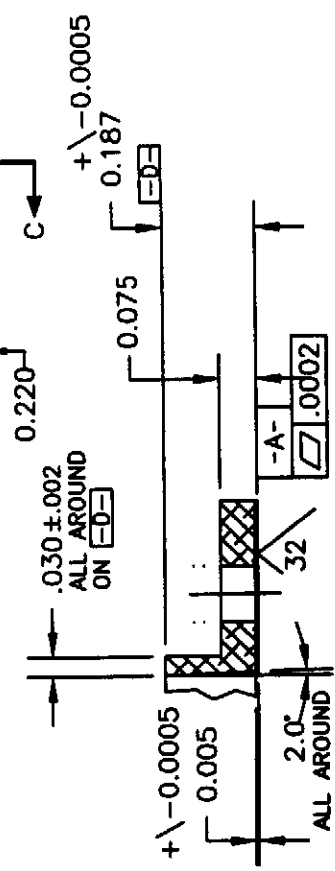
SECTION B-B

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.



SECTION C-C



DETAIL D-D
SCALE: 5X

98-21300	98-21200	98-21100	98-21000	98-20800	98-20600	98-20400	98-20200	98-20000
MATERIAL								
INVAR-36								
FINISH								
NET WT								
AVAF								
MATERIAL CHG								

DATE	1/78
NAME	
DRAWN C. POK	
CHECKED	
APPROVED	
RELEASED	
ISSUED	

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CENTER FOR SPACE RESEARCH
CAMBRIDGE, MA 02139

MEG - INVAR

PROJECT NO. C 80230
PART NO. 96-20802
SHEET 1 OF 1

REVISIONS	
LTB	DATE

.035x.023 CHAMFER

45° CHAMFER

0.1247 ± .0003

L .0005 A
O .0002

#4-40 UNC-2A (4)

NOTES

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

45° CHAMFER

0.070

0.240

1/8

.250

-A-

(2)

5/64

.015

.040 MAX

.080

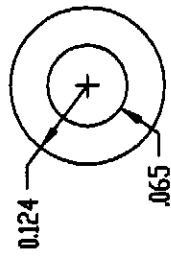
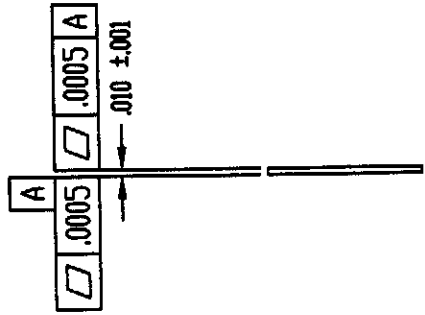
.120 ± .002

(3)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ANGLES ± 1°		DATE	NAME	INSTITUTION
3	PLACE DECIMALS & ANG	3/96 <td>C. PAK <td>MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH</td> </td>	C. PAK <td>MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH</td>	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH
2	PLACE DECIMALS & IN		CHECKED	
			APPROVED	
			RELEASED	
MATERIAL				
303 SS				
96-20001	AXAF			
NEXT ASSY USED ON	HETG			
APPLICATION	USED ON			
		SIZE	QTY REQD	DRAWING NO.
		B	80230	96-20600
		SCALE		REV.
				D
				SHEET 1 OF 1

PRECISION SHOULDER SCREW

REVISIONS		
LTR	DATE	APPROVED

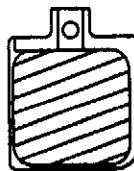
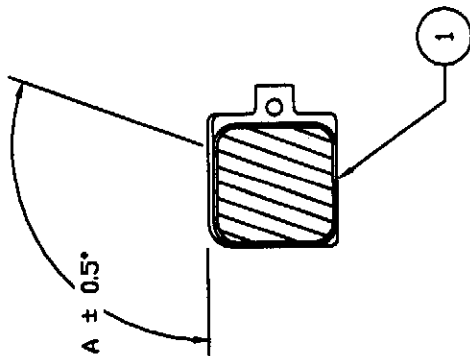


- NOTES
 1. BREAK ALL SHARP EDGES
 2. ALL DIMENSIONS AFTER ELECTROPOLISHING

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

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 TOLERANCES: ANGLES ± 1° 3 PLACE DECIMALS ± .003 2 PLACE DECIMALS ± .01	DATE	1/95
	NAME	C. PAK
	DRAWN BY	C. PAK
MATERIAL	CHECKED	
	APPROVED	
	RELEASED	
96-20001	HETG	
NEXT ASSY USED ON	AXAF	
APPLICATION		
SCALE	NONE	
WEIGHT		
SIZE	B	
CONC. DRAW. NO.	80230	
DRAWING NO.	96-20200	
REV.	A	
SHEET NO.	1	

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CENTER FOR SPACE RESEARCH

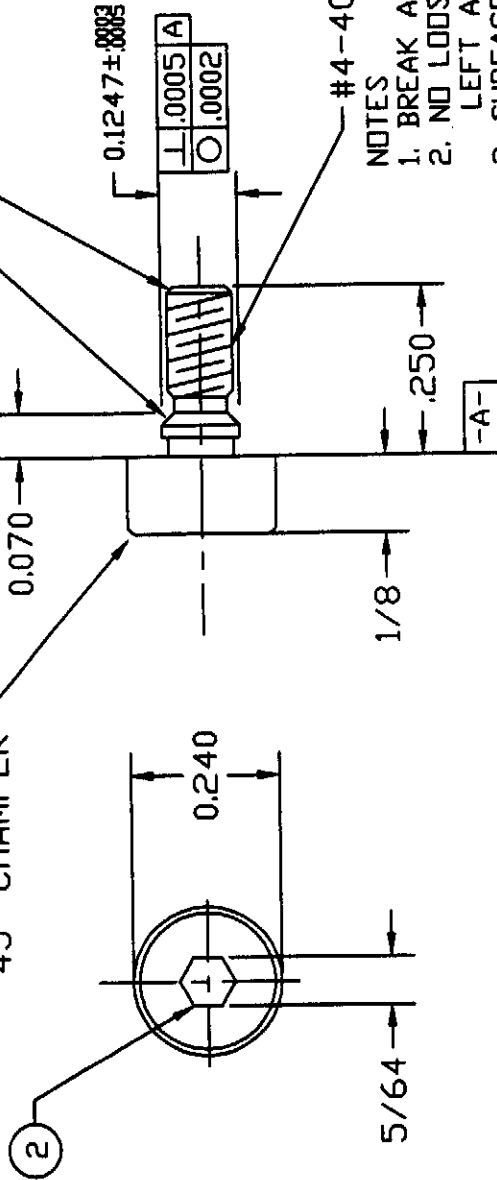
H. E. GRATING ASSEMBLY

REVISIONS	
DATE	APPROVED

45° CHAMFER

45° CHAMFER

45° CHAMFER



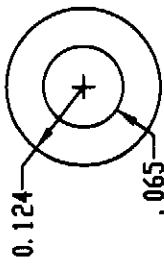
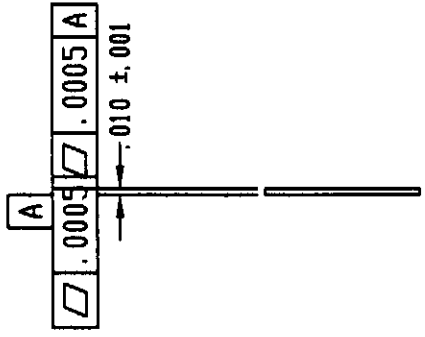
#4-40 UNC-2A (4)

NOTES

1. BREAK ALL SHARP EDGES
2. NO LOOSE METAL DEBRIS LEFT AFTER BRODACHING.
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 ARE AS FOLLOWS: 3 PLACE DECIMALS ± .005 2 PLACE DECIMALS ± .01		NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH	
96-20001	AXAF	DRAWN C. PAK	3/96	PRECISION SHOULDER SCREW	
NEXT ASSY USED ON APPLICATION	HETG	CHECKED		SIZE	REV. D
		APPROVED		B	
		RELEASED		80230	96-20600
				SCALE	SHEET 1 OF 1

REVISIONS	
LTR	DATE



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

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