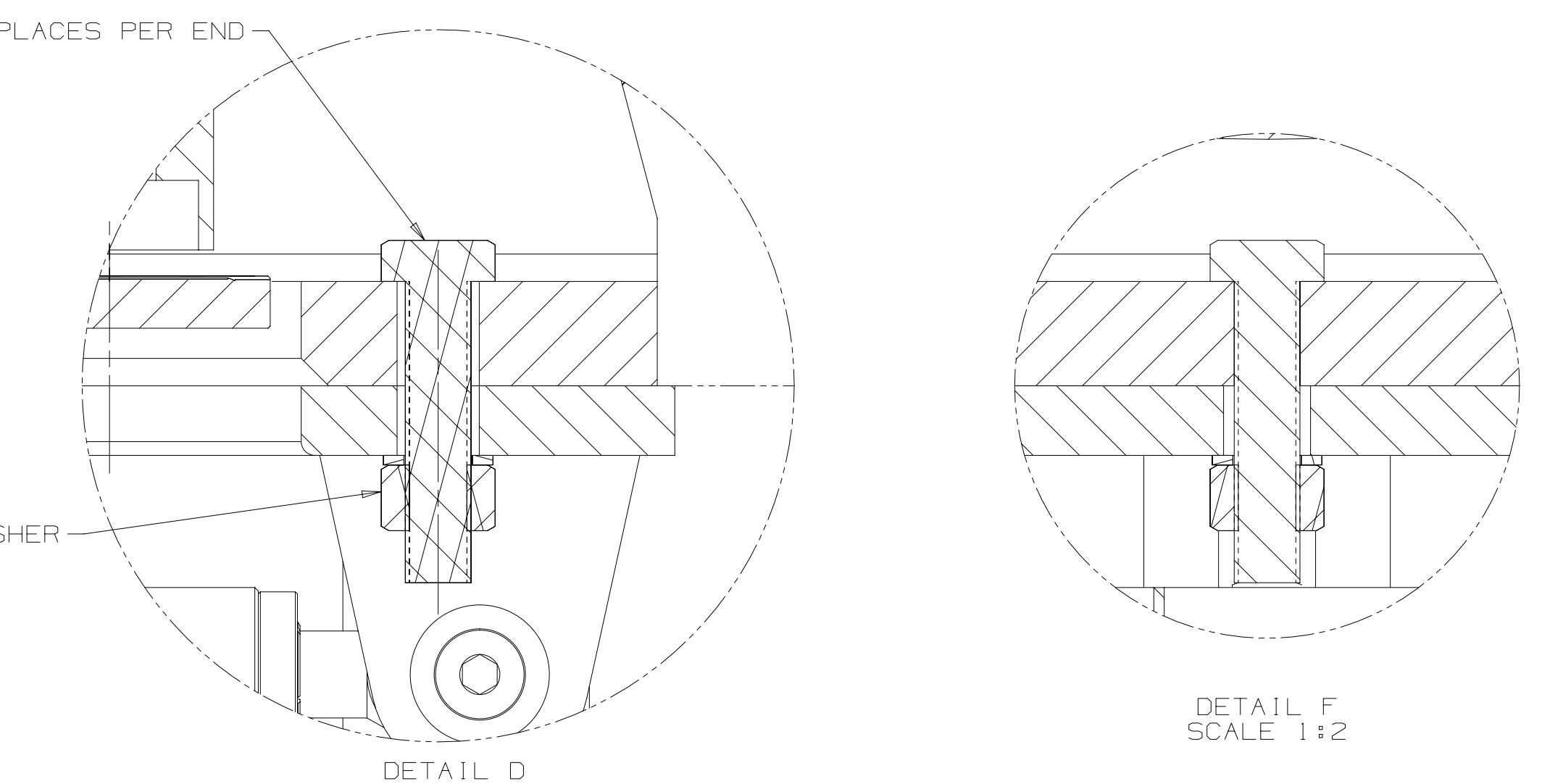
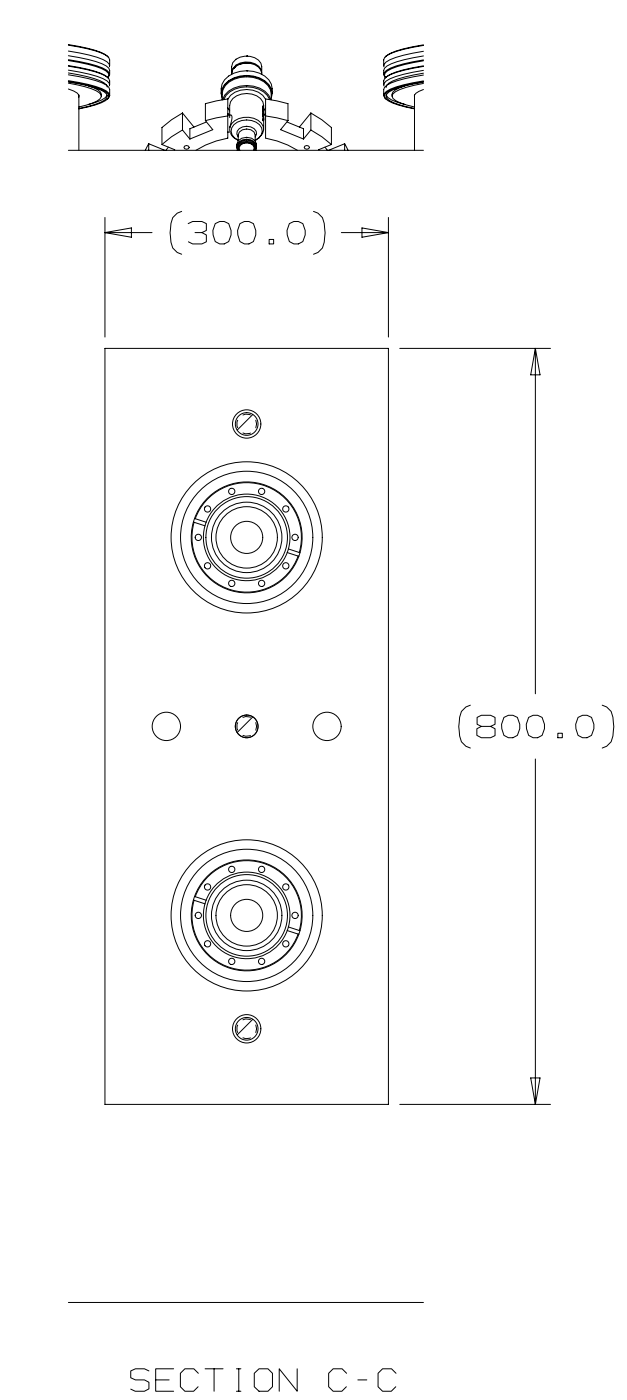
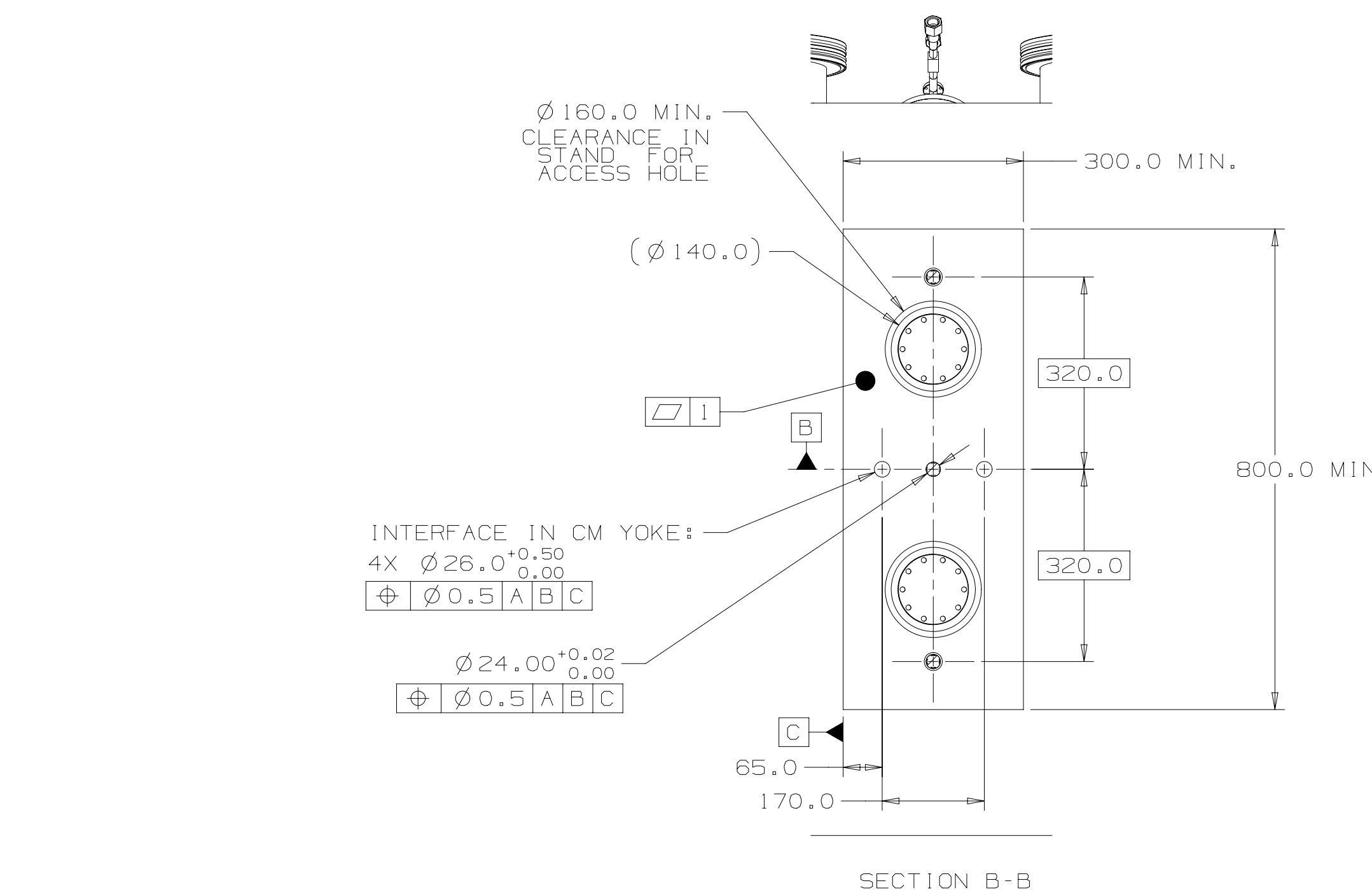
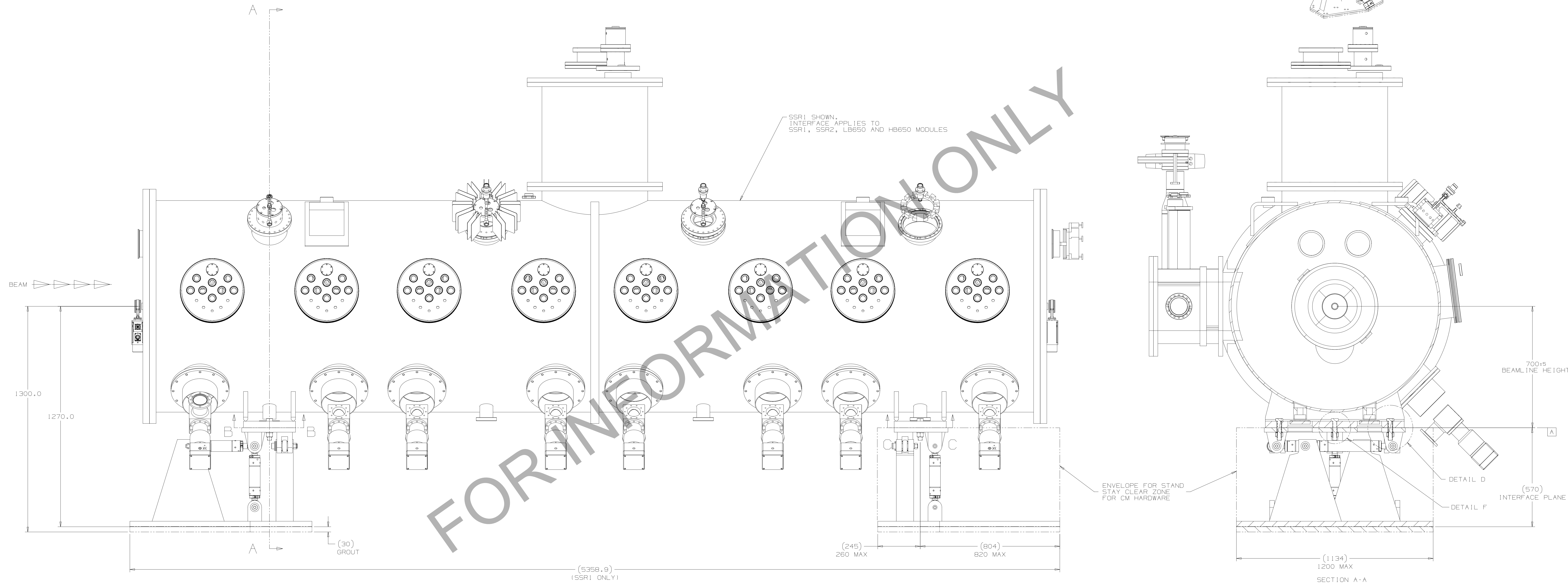


REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES
-	F10107984--RCD	15-Aug-2018	DRWN: S.OPLT APPROV:

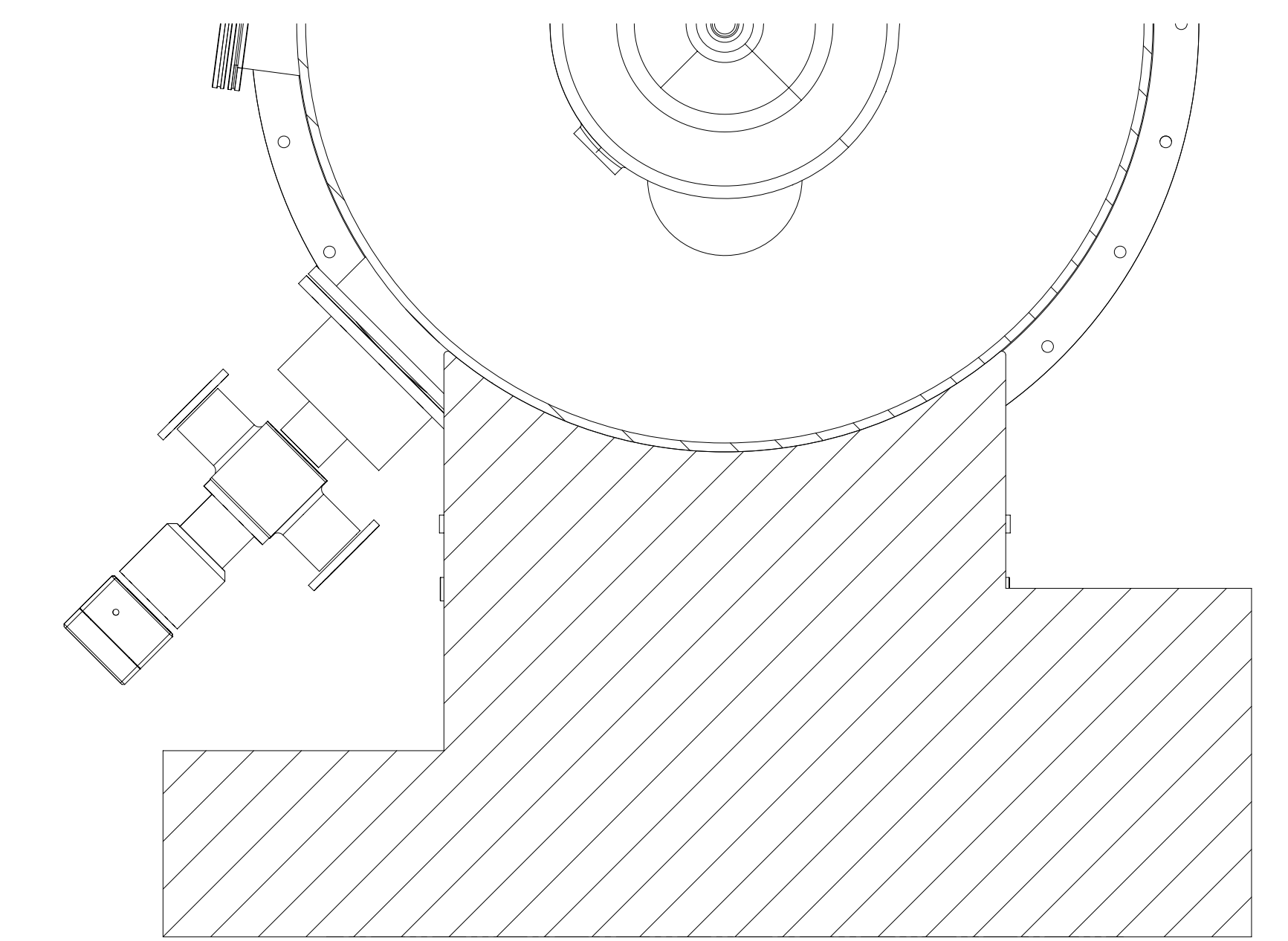
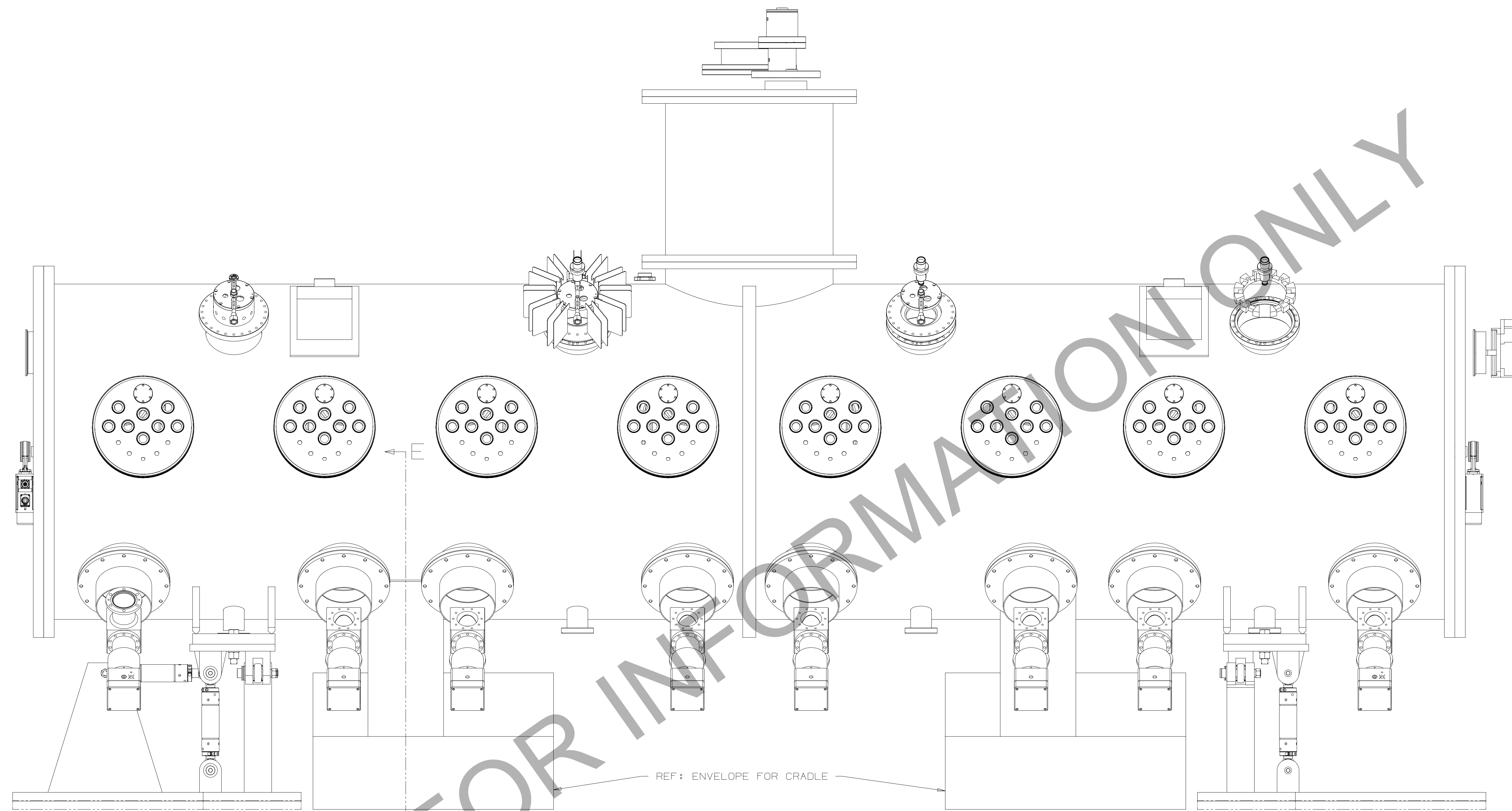


1. THIS IS AN INTERFACE CONTROL DRAWING FOR THE MECHANICAL INTERFACE BETWEEN CRYOMODULES AND THE OPTIMIZED CRYOMODULE RESTRAINT ASSEMBLY (ORCA), I.E. THE CRYOMODULE STAND. THIS DRAWING IS APPLICABLE TO SSR1, SSR2, LB650 AND HB650 CRYOMODULES.
2. DETAILED GEOMETRY OF THE CRYOMODULE AND THE ORCA ARE SHOWN FOR CONTEXT AND REFERENCE ONLY, AND MAY CHANGE AS DESIGNS EVOLVE. THIS DRAWING CONSTRAINS GEOMETRY ONLY AT THE INTERFACE PLANE.

UNLESS OTHERWISE SPECIFIED				DRWN	S.OPLT	DATE	15-Aug-2018	 FERMILAB NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY
±X	±X.X	±X.XX	±X.XX	CHECKED		DATE		
Z	0.3	0.12	N/A	1"	APPROVED	DATE		
BREAK ALL SHARP EDGES 0.5 MAX. DO NOT SCALE DRAWING DIMENSIONS BASED ON ASME Y14.5M-2009 MAX. ALL MACH SURFACES 3.2 DRAWING UNITS: MM								ORCA STAND INTERFACE SCALE: 1:1B SIZE: A0 DRAWING NUMBER: F10107984 SHEET: 1 of 2 REV: -
				MATERIAL			GROUP: Accelerator Mechanical Support	

Draft 2018-Nov-01

REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES
-	F10107984--RCD	15-Aug-2018	DRAWN: S.OPLT APPROVED:



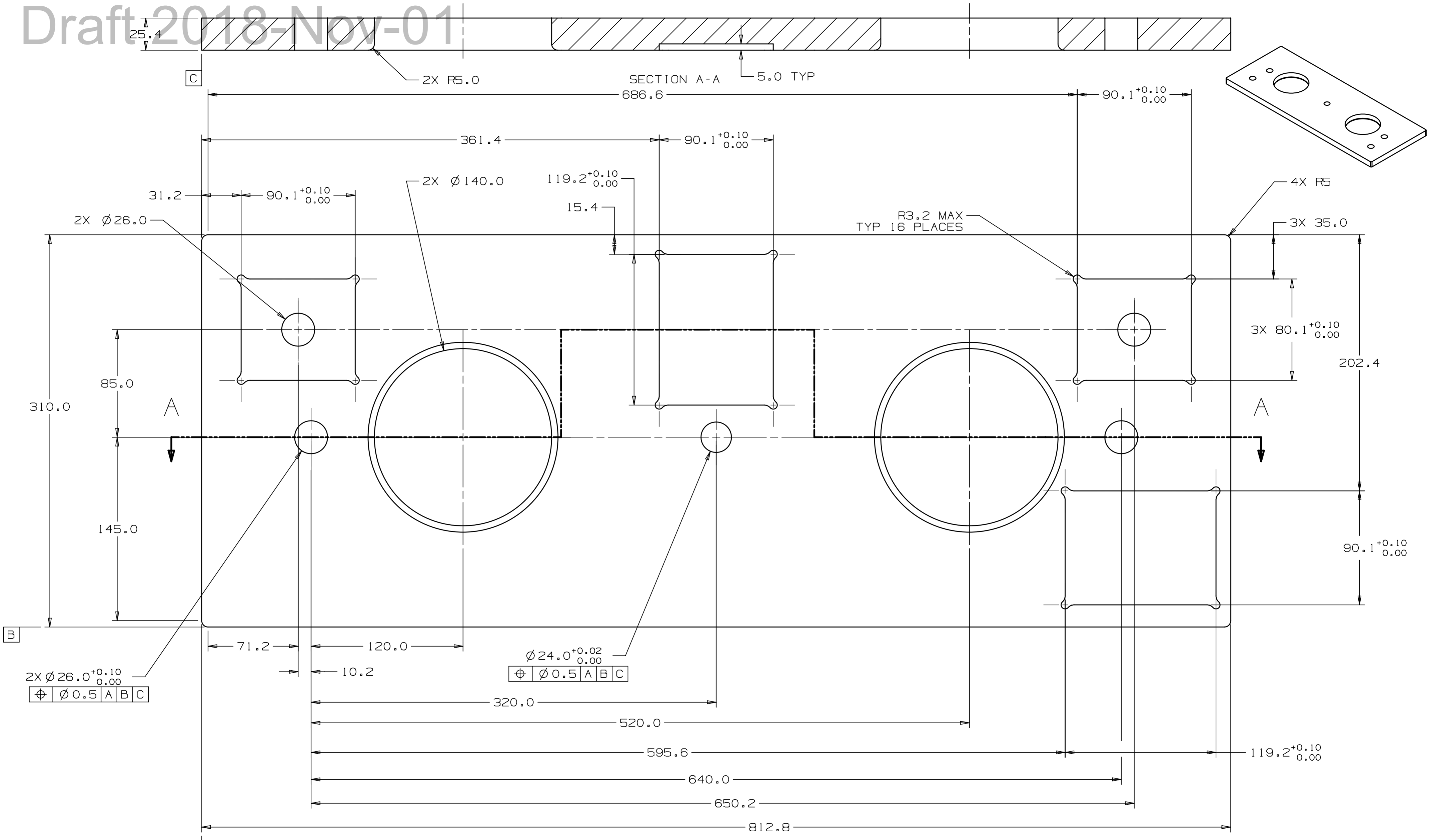
SECTION E-E

FOR INFORMATION ONLY

UNLESS OTHERWISE SPECIFIED				DRAWN	S.OPLT	DATE	15-Aug-2018	
±X	±X.X	±X.XX	±X/X	CHECKED		DATE		
Z	0.3	0.12	N/A	APPROVED		DATE		
BREAK ALL SHARP EDGES 0.5 MAX. DO NOT SCALE DRAWING DIMENSIONS BASED ON ASME Y14.5M-2009 MAX. ALL MACH SURFACES 3.2 DRAWING UNITS: MM				USED ON				
MATERIAL				GROUP1 Accelerator Mechanical Support				
CASE CODE: 06596				SCALE: 1:1				
FERMIL NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY				ORCA STAND INTERFACE				
SCALE	SIZE	DRAWING NUMBER	SHEET	REV				
1:1	A0	F10107984	2 of 2	-				

REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES
-	F10104360---RCD	30-May-2018	DRAWN: S.OPLT APPROVED:

Draft 2018-Nov-01



- NOTES:
- MATERIAL CERTIFICATION DOCUMENTATION REQUIRED
  - REMOVE ALL BURRS AND BREAK SHARP EDGES 0.5-1MM

UNLESS OTHERWISE SPECIFIED				
±X	±X.X	±X.XX	±X/X	±X*
2	0.3	0.12	N/A	1*

BREAK ALL SHARP EDGES 0.5 MAX.  
 DO NOT SCALE DRAWING  
 DIMENSIONS BASED ON ASME Y14.5-2009  
 MAX. ALL MACH SURFACES 3.2/  
 DRAWING UNITS: MM

DRAWN	S.OPLT	DATE	30-May-2018
CHECKED		DATE	
APPROVED		DATE	
USED ON	F10104367		
MATERIAL	1018 STEEL, UNS G10180		
GROUP: Accelerator Mechanical Support	CAGE CODE: OUSR6		

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 UNITED STATES DEPARTMENT OF ENERGY

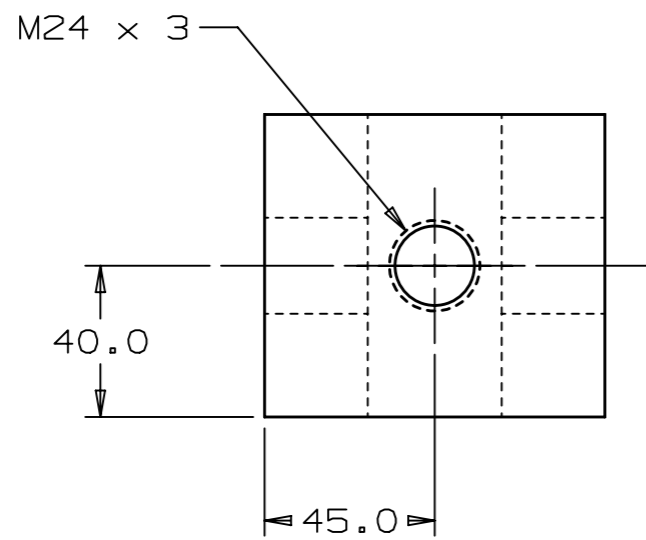
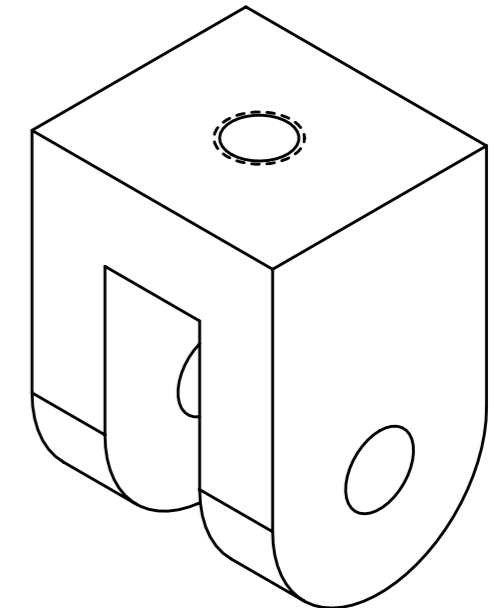
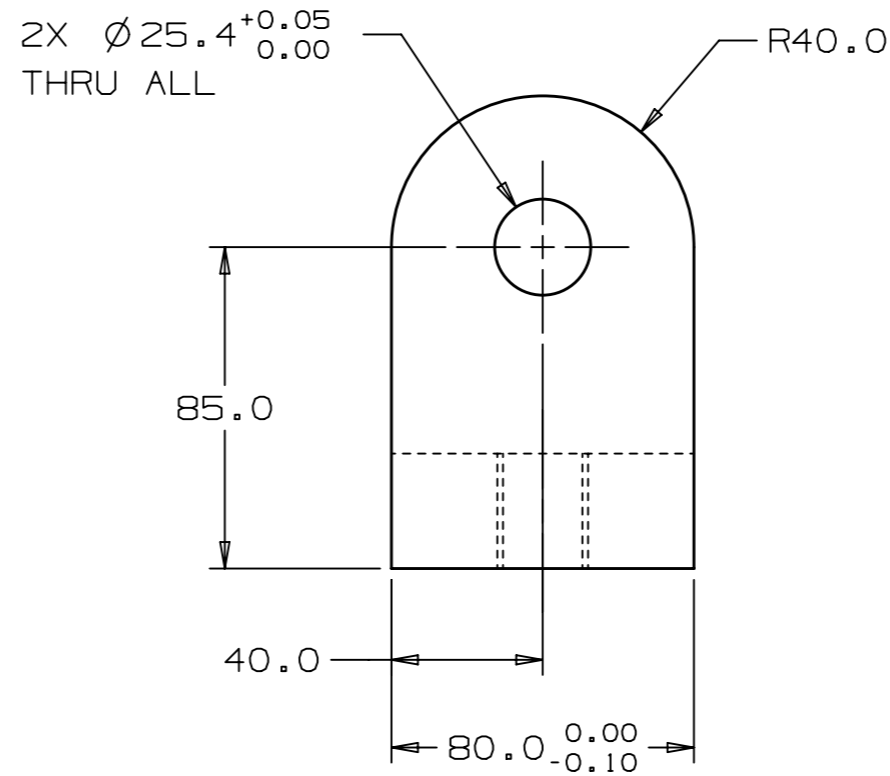
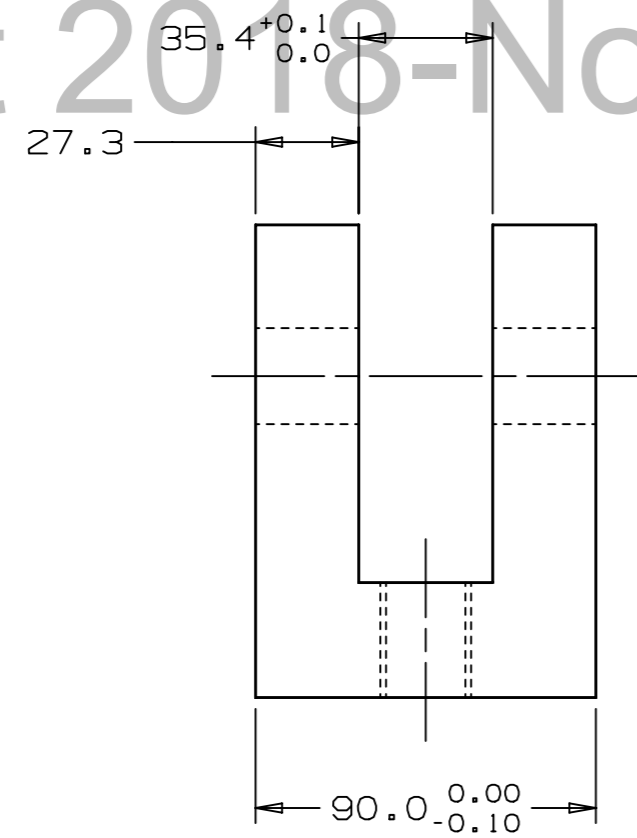
TURNBUCKLE TAB PLATE

SCALE 1:1	SIZE A2	DRAWING NUMBER F10104360	SHEET 1 OF 1	REV -
-----------	---------	--------------------------	--------------	-------

DESCRIPTION: TURNBUCKLE TAB  
PROJECT: PIP-11\_FrontEndMEBT  
CATEGORY: TAB

REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES	
-	F10104366---RCD	30-May-2018	DRAWN	S.OPLT
			APPROVED	

# Draft 2018-Nov-01



NOTES:

1. MATERIAL CERTIFICATION DOCUMENTATION REQUIRED
2. REMOVE ALL BURRS AND BREAK SHARP EDGES 0.5-1MM

TEMPLATE VERSION: 2018\_08\_24

UNLESS OTHERWISE SPECIFIED				
±X	±X.X	±X.XX	±X/X	±X°
2	0.3	0.12	N/A	1°

BREAK ALL SHARP EDGES, MAX: 0.5  
DO NOT SCALE DRAWING  
DIMENSIONS BASED ON: ASME Y14.5-2009  
MAX MACHINE ALL SURFACES: 3.2√  
DRAWING UNITS: MM

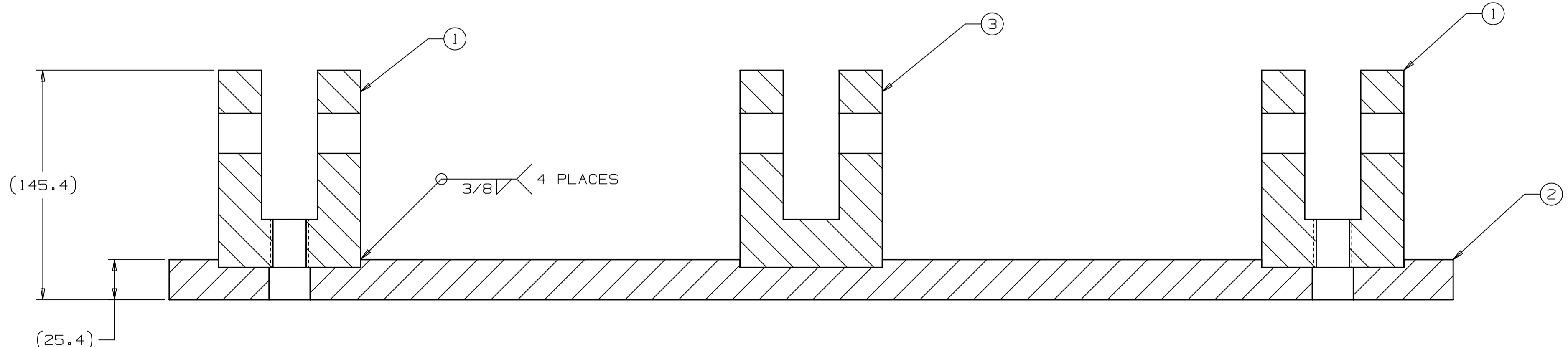
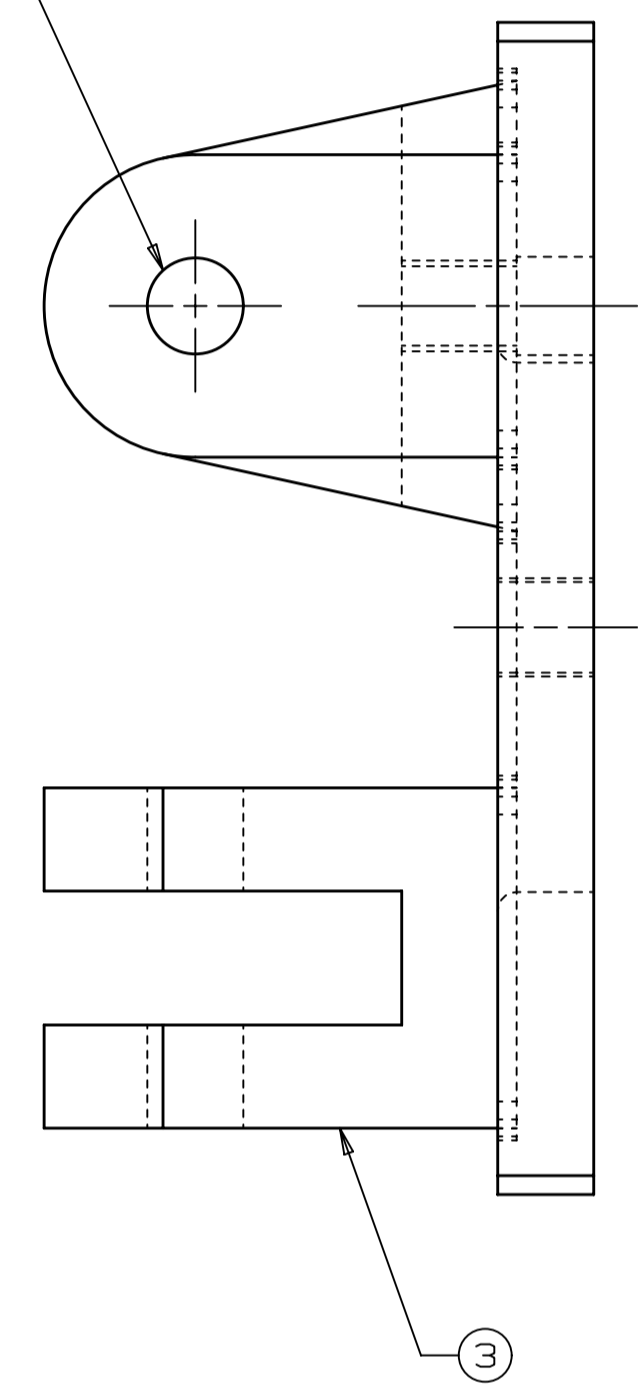
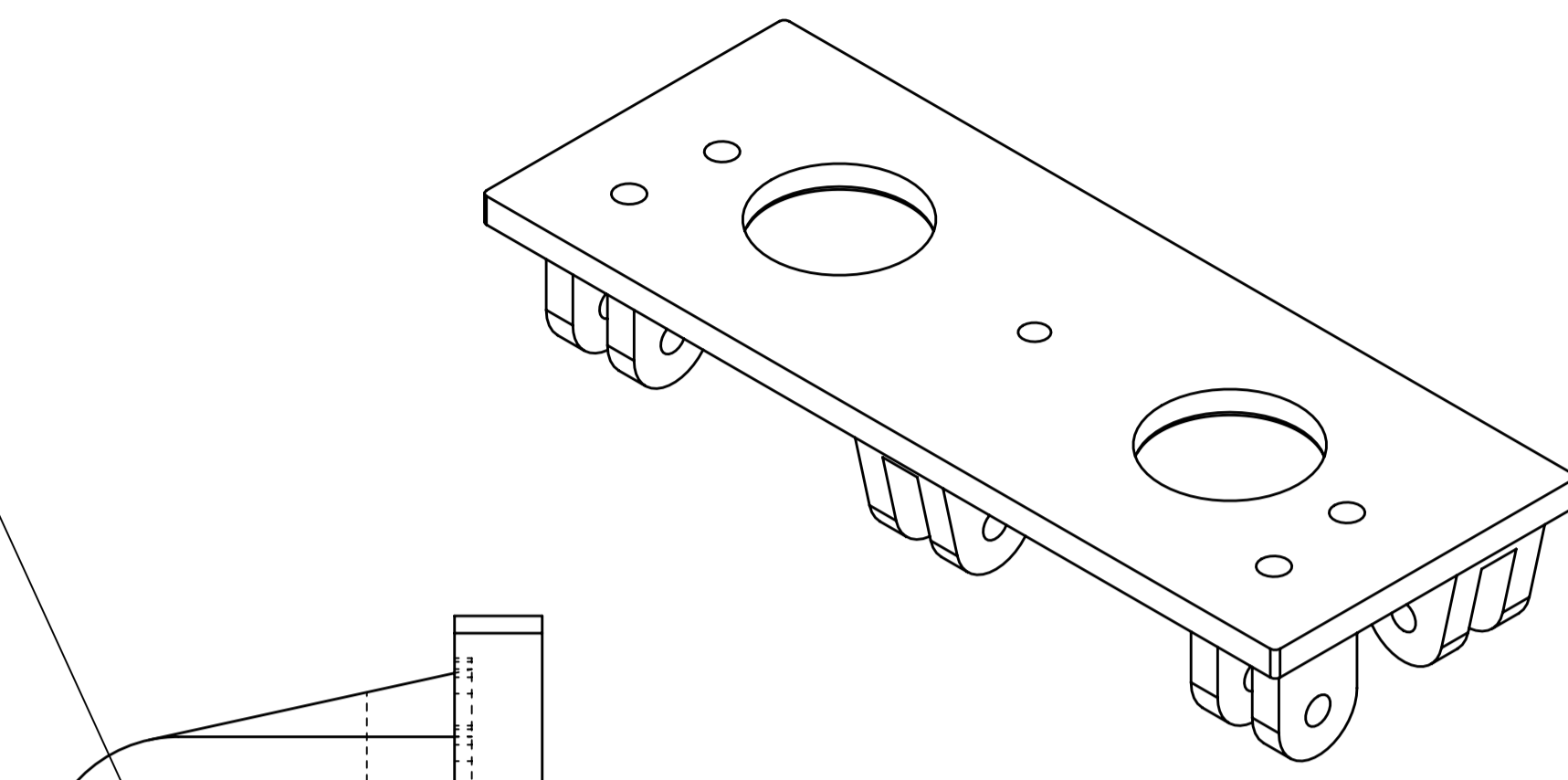
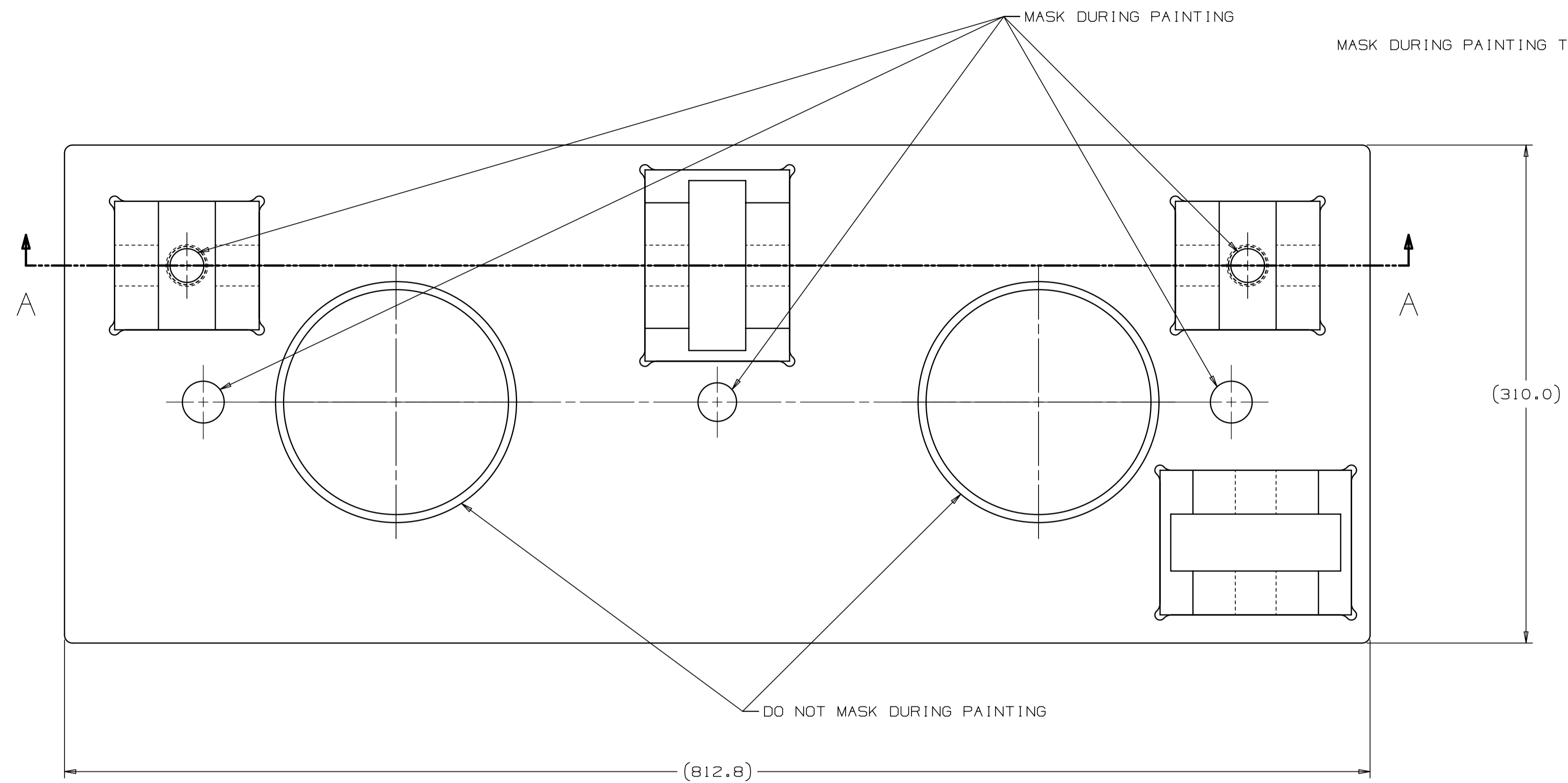
THIRD ANGLE PROJECTION

DRAWN	S.OPLT	DATE	30-May-2018
CHECKED		DATE	
APPROVED		DATE	
USED ON	F10104367 F10104370		
MATERIAL	1018 STEEL, UNS G10180		
GROUP:	Accelerator Mechanical Support	CAGE CODE:	OU5R6

<b>FERMI NATIONAL ACCELERATOR LABORATORY</b> UNITED STATES DEPARTMENT OF ENERGY				
				NAME TURNBUCKLE TAB
SCALE 1:1	SIZE A3	DRAWING NUMBER F10104366	SHEET 1 of 1	REV -

REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES
-	F10104367---RCD	30-May-2018	DRAWN: S.OPLT APPROVED:

# Draft 2018-Nov-01



ITEM	DB PART NO	DB PART NAME	QTY
3	F10109844	TURNBUCKLE TAB EXPANDED	2
2	F10104360	TURNBUCKLE TAB PLATE	1
1	F10104366	TURNBUCKLE TAB	2

- WELD FILLER MATERIAL SHALL BE E7018. USE OF ALTERNATE FILLERS REQUIRES PERMISSION FROM FERMILAB ENGINEERING. MATERIAL CERTIFICATION DOCUMENTATION FOR WELD FILLER MATERIAL REQUIRED.
- WELDING SHALL BE PER AWS D1.1 (STRUCTURAL STEEL). WPS AND WPQR DOCUMENTATION REQUIRED.
- FINISHING:
  - CLEAN ALL SURFACES TO REMOVE RUST, SCALE, DEBRIS, DUST, OILS, CUTTING FLUIDS, ETC.
  - MASK ALL HOLES, EXCEPT FOR LARGE DIA. 140 HOLES INDICATED
  - EXCEPT FOR AREAS MASKED, PAINT ALL SURFACES WITH A GLOSS BLACK ENAMEL SPRAY-APPLIED PAINT

UNLESS OTHERWISE SPECIFIED				
±X	±X.X	±X.XX	±X/X	±X*
2	0.3	0.12	N/A	1*

BREAK ALL SHARP EDGES 0.5 MAX.  
 DO NOT SCALE DRAWING  
 DIMENSIONS BASED ON ASME Y14.5-2009  
 MAX. ALL MACH SURFACES 3.2  
 DRAWING UNITS: MM

DRAWN	S.OPLT	DATE	30-May-2018
CHECKED		DATE	
APPROVED		DATE	
USED ON	F10104381		
MATERIAL	SEE PARTS LIST		
GROUP: Accelerator Mechanical Support		CAGE CODE: QJ596	

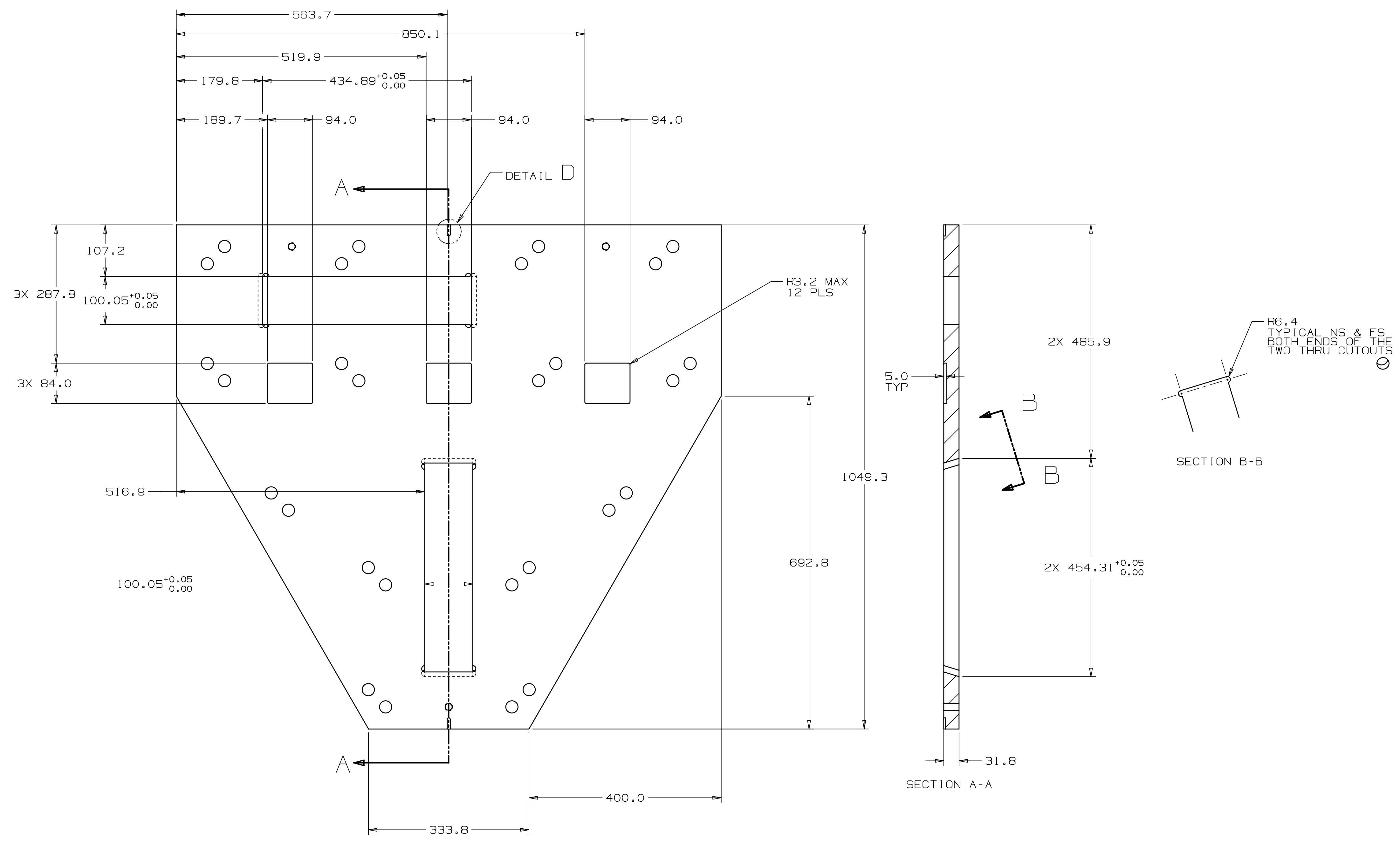
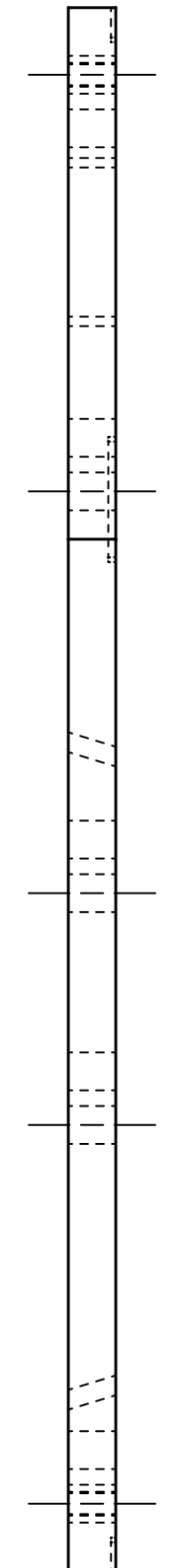
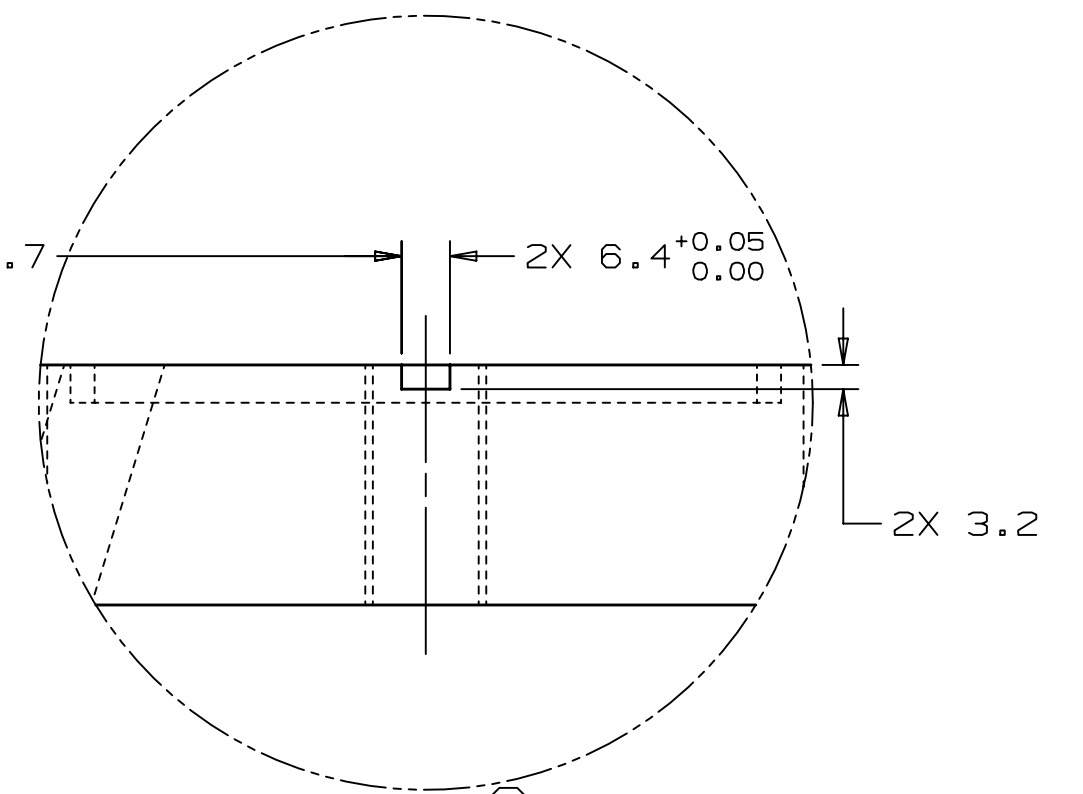
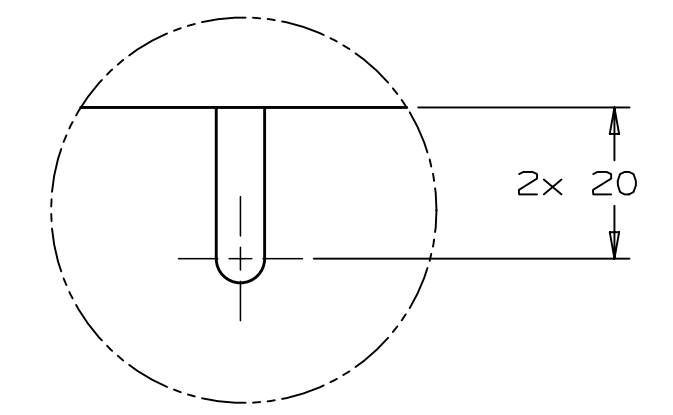
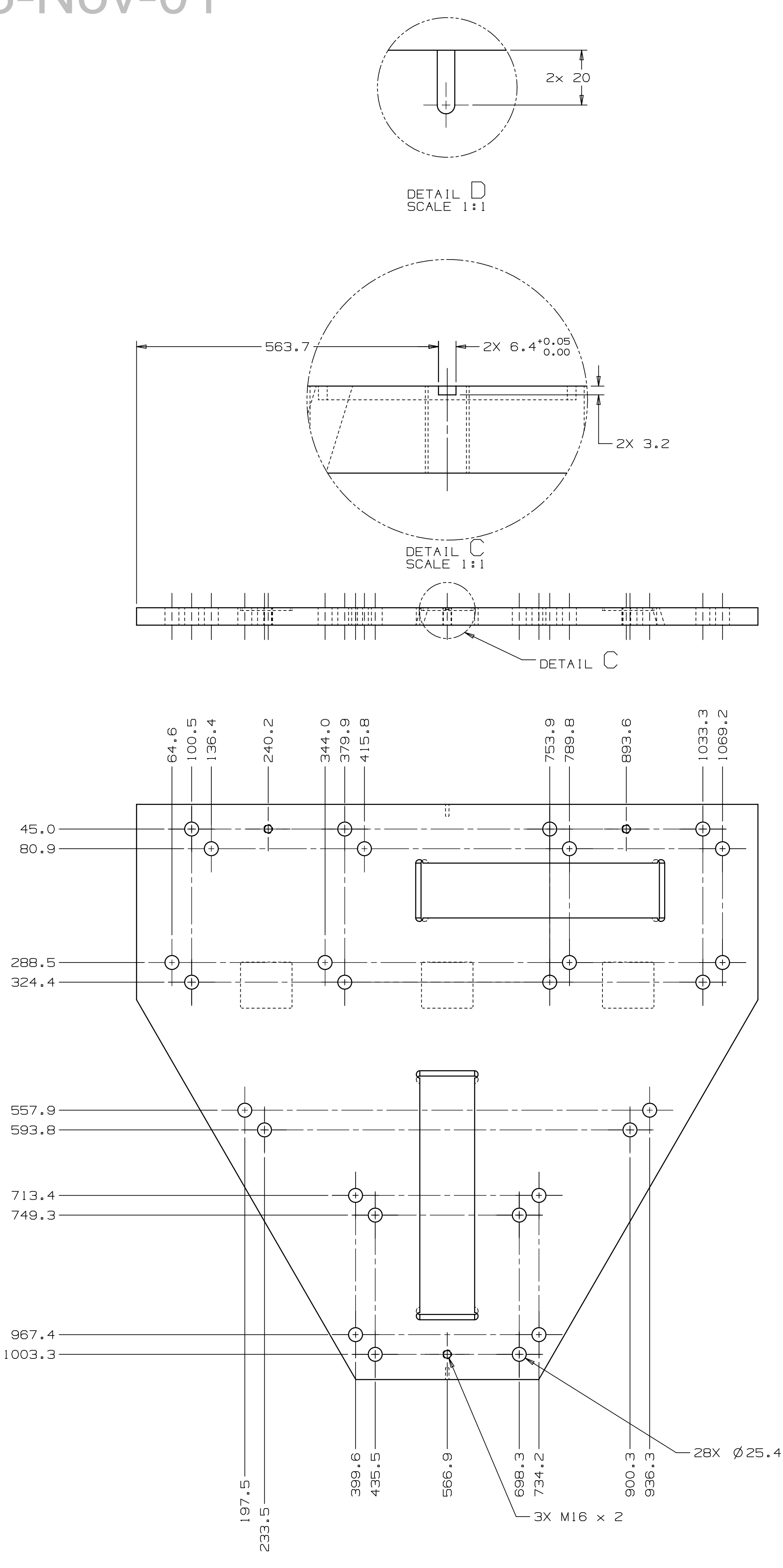
**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY

TURNBUCKLE TAB PLATE WELDMENT

SCALE	SIZE	DRAWING NUMBER	SHEET	REV
1:1	A1	F10104367	1 OF 1	-

Draft 2018-Nov-01

REV	REVISION	CONTROL DOCUMENT	DATES	SIGNATURES
-	F10104369	-RCD	30-May-2018	DRWN: S.OPLT APPROVED:

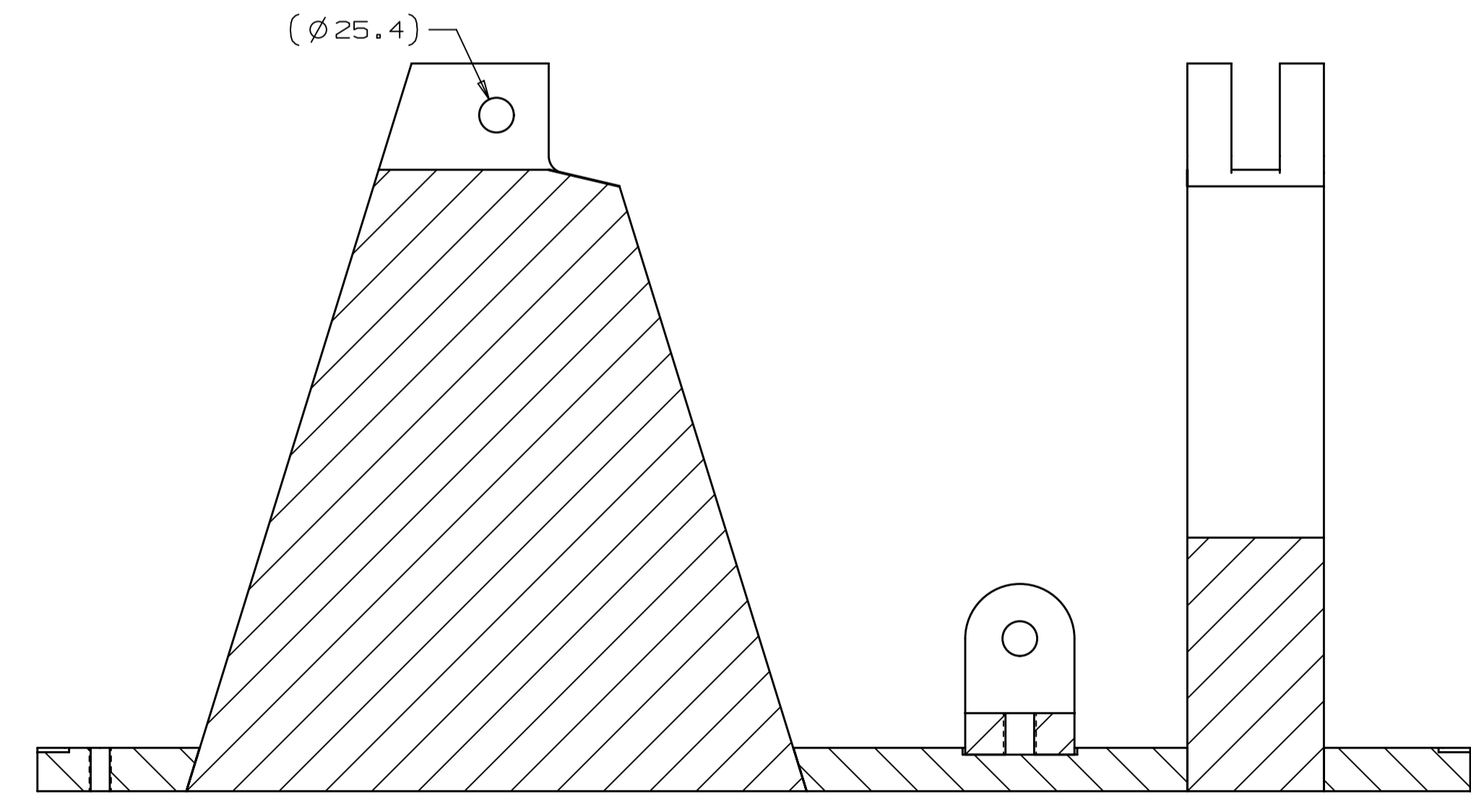
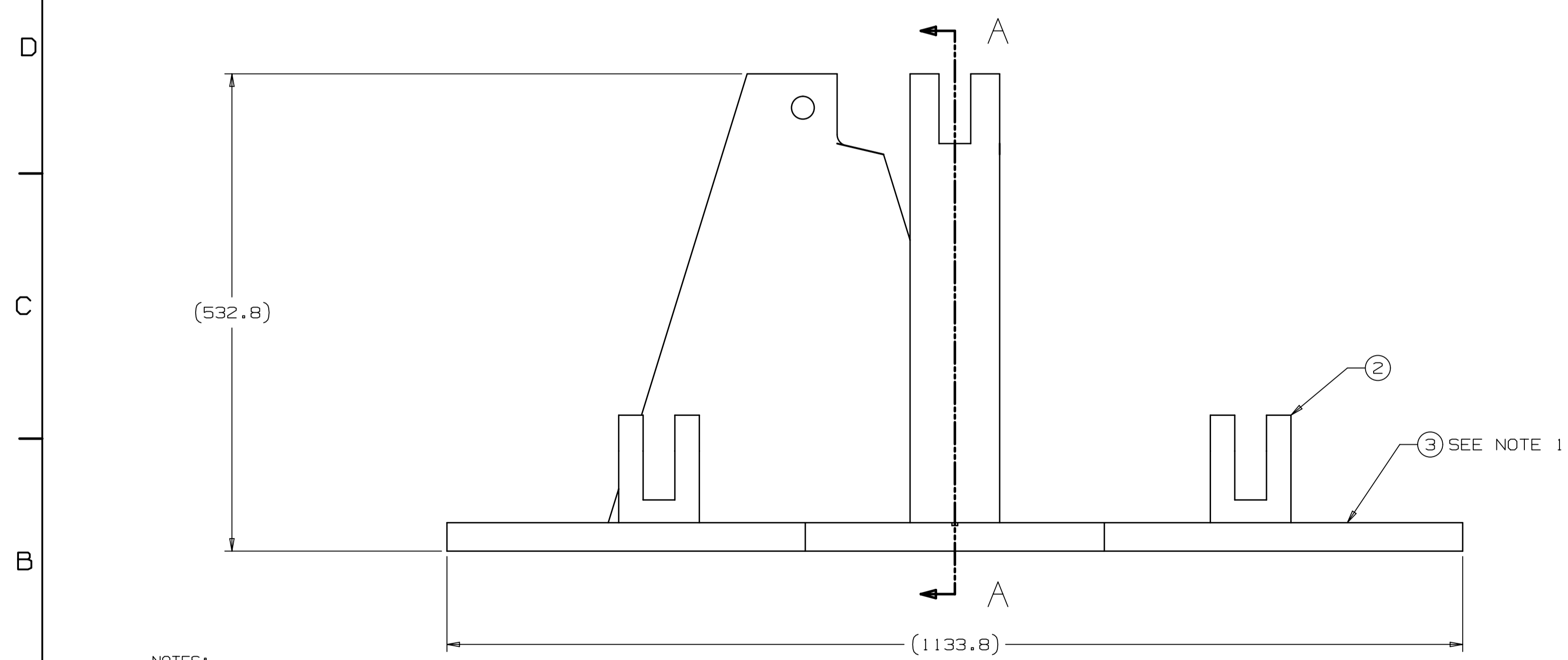
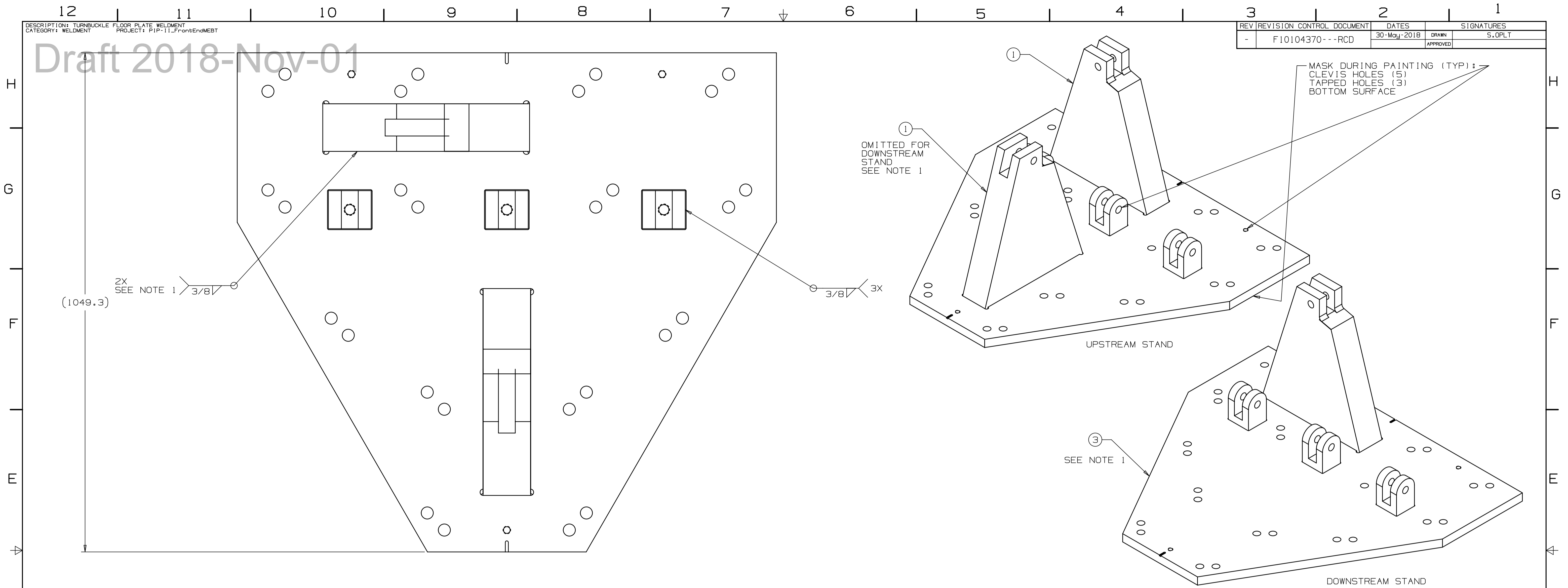


- NOTES:
1. MATERIAL CERTIFICATION DOCUMENTATION REQUIRED
  2. REMOVE ALL BURRS AND BREAK SHARP EDGES 0.5-1MM

UNLESS OTHERWISE SPECIFIED				DRWN	S.OPLT	DATE	30-May-2018	FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY						
±X	±X.X	±X.XX	±X/X	CHECKED		DATE		TURNBUCKLE FLOOR PLATE						
Z	0.3	0.12	N/A	APPROVED		DATE		SCALE	SIZE	DRAWING NUMBER	SHEET	REV		
BREAK ALL SHARP EDGES 0.5 MAX. DO NOT SCALE DRAWING DIMENSIONS BASED ON ASME Y14.5-2009 MAX. ALL MACH SURFACES 3.2 DRAWING UNITS: MM				USED ON F10104370				MATERIAL 1018 STEEL, UNS G10180		1:1	A0	F10104369	1 of 1	-
				GROUP1 Accelerator Mechanical Support				CASE CODE# 06586						

REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES
-	F10104370---RCD	30-May-2018	S.OPLT
			APPROVED

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- NOTES:
- DRAWING DEPICTS THE UPSTREAM STAND. FOR THE DOWNSTREAM STAND, USE BASEPLATE (3) F10110493 AND OMIT ITEM (1) AS NOTED
  - WELD FILLER MATERIAL SHALL BE E7018. USE OF ALTERNATE FILLERS REQUIRES PERMISSION FROM FERMILAB ENGINEERING. MATERIAL CERTIFICATION DOCUMENTATION FOR WELD FILLER MATERIAL REQUIRED
  - WELDING SHALL BE PER AWS D1.1 (STRUCTURAL STEEL). WPS AND WPQR DOCUMENTATION REQUIRED.
  - FINISHING:  
 -CLEAN ALL SURFACES TO REMOVE RUST, SCALE, DEBRIS, DUST, OILS, CUTTING FLUIDS, ETC.  
 -MASK INDICATED SURFACES AND HOLES  
 -EXCEPT FOR AREAS MASKED OR INDICATED (NO PAINT), PAINT ALL SURFACES WITH A GLOSS BLACK ENAMEL SPRAY-APPLIED PAINT
  - APPLY A CORROSION PROTECTION FILM TO BOTTOM SURFACE, MCMASTER CARR 4433T24 OR EQUIVALENT

ITEM	DB PART NO	DB PART NAME	QTY
3	F10104369	TURNBUCKLE FLOOR PLATE--*SEE NOTE 1	1
2	F10104366	TURNBUCKLE TAB	3
1	F10105262	TURNBUCKLE STAND HORIZONTAL SUPPORT PLATE	2

UNLESS OTHERWISE SPECIFIED				
±X	±X.X	±X.XX	±X/X	±X*
2	0.3	0.12	N/A	1*
BREAK ALL SHARP EDGES 0.5 MAX. DO NOT SCALE DRAWING DIMENSIONS BASED ON ASME Y14.5-2009 MAX. ALL MACH SURFACES 3.2 DRAWING UNITS: MM				
DRAWN		S.OPLT	DATE	30-May-2018
CHECKED			DATE	
APPROVED			DATE	
USED ON F10104381				
MATERIAL SEE PARTS LIST				
GROUP: Accelerator Mechanical Support			CAGE CODE: QJ596	

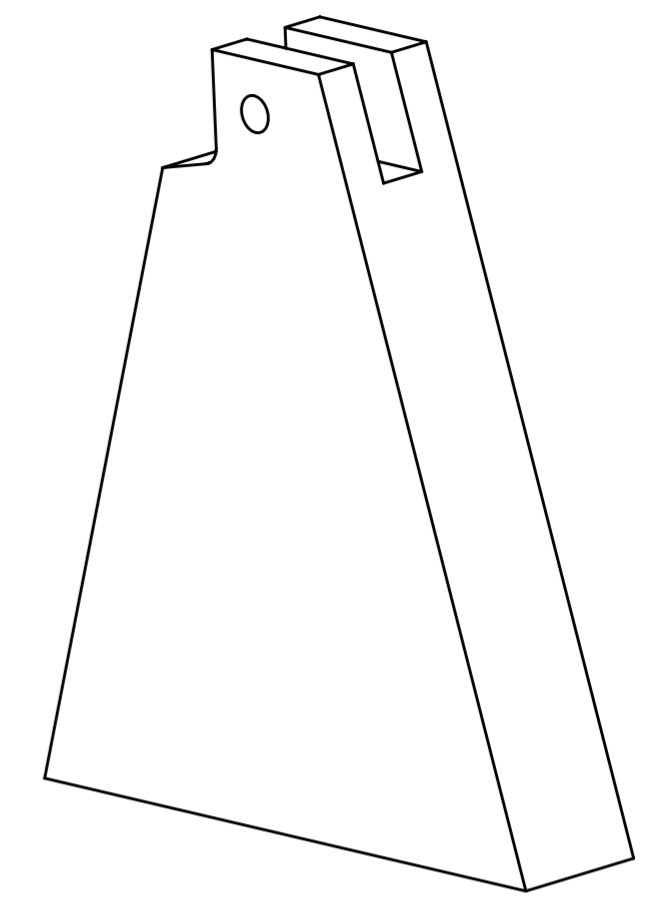
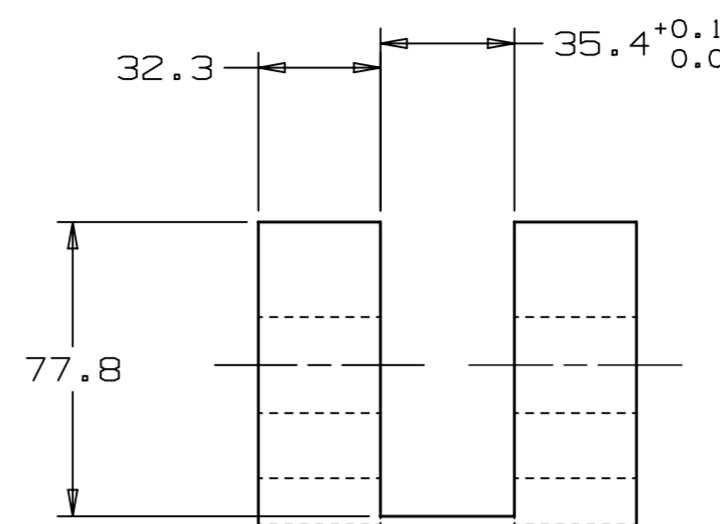
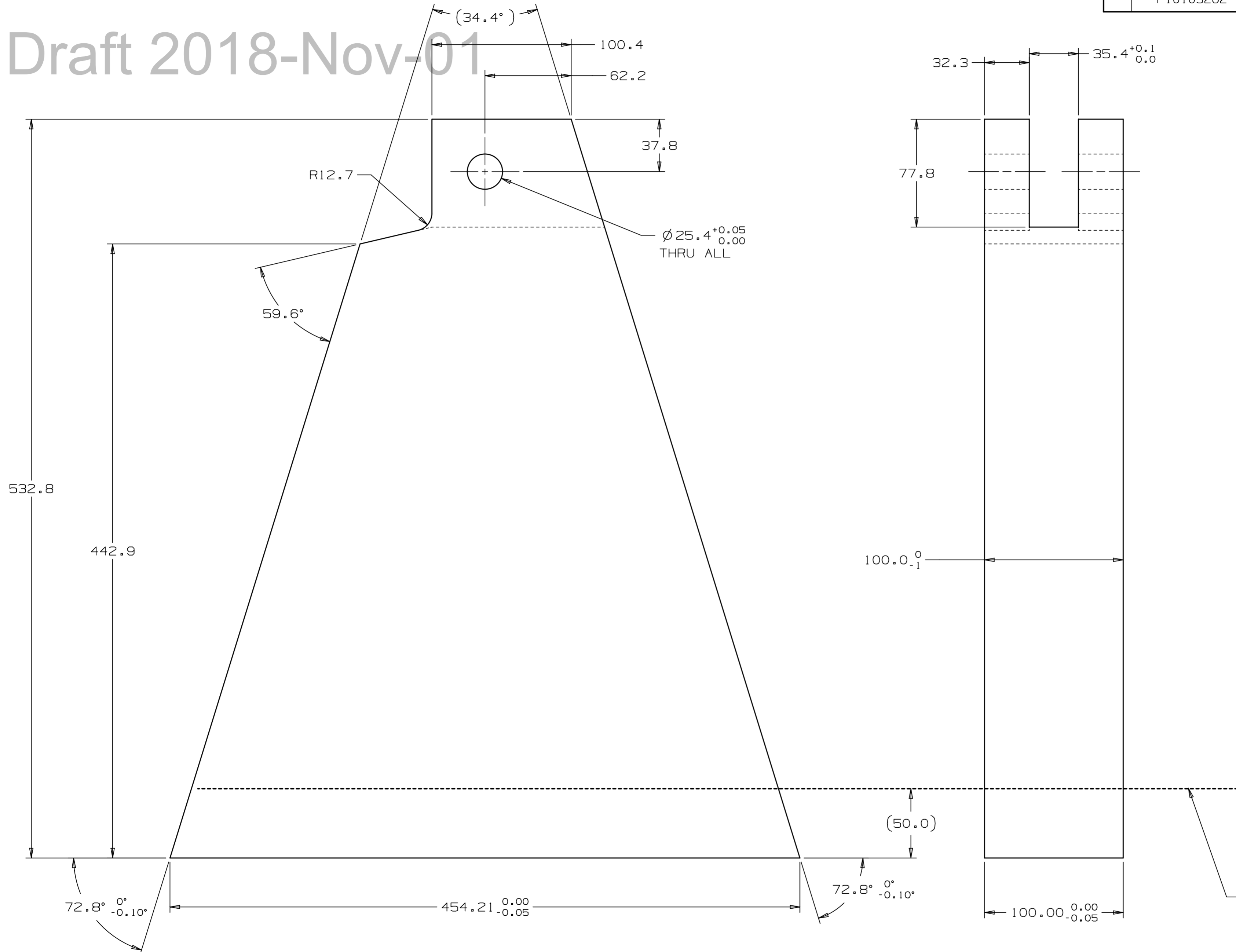
FERMI NATIONAL ACCELERATOR LABORATORY  
 UNITED STATES DEPARTMENT OF ENERGY

TURNBUCKLE FLOOR PLATE WELDMENT

SCALE 1:1	SIZE A1	DRAWING NUMBER F10104370	SHEET 1 OF 1	REV -
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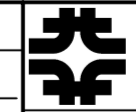
REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES
-	F10105262---RCD	10-Jul-2018	DRAWN: S.OPLT APPROVED:

Draft 2018-Nov-01



TOLERANCES SHOWN BELOW THIS LINE APPLY ONLY BELOW THE LINE

- NOTES:
- MATERIAL CERTIFICATION DOCUMENTATION REQUIRED
  - REMOVE ALL BURRS AND BREAK SHARP EDGES 0.5-1MM

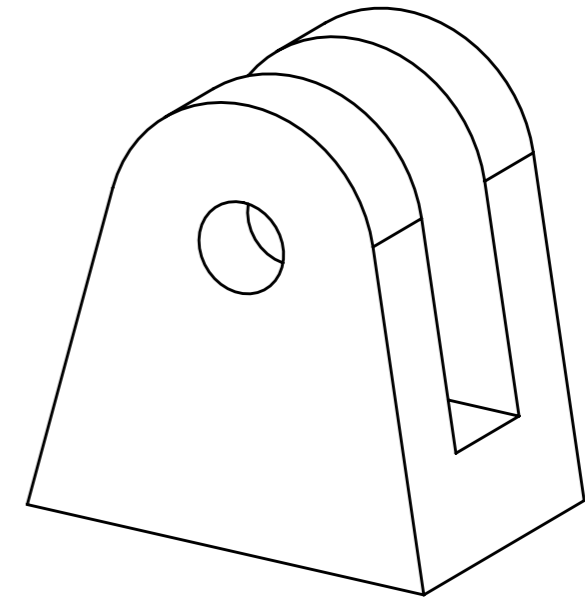
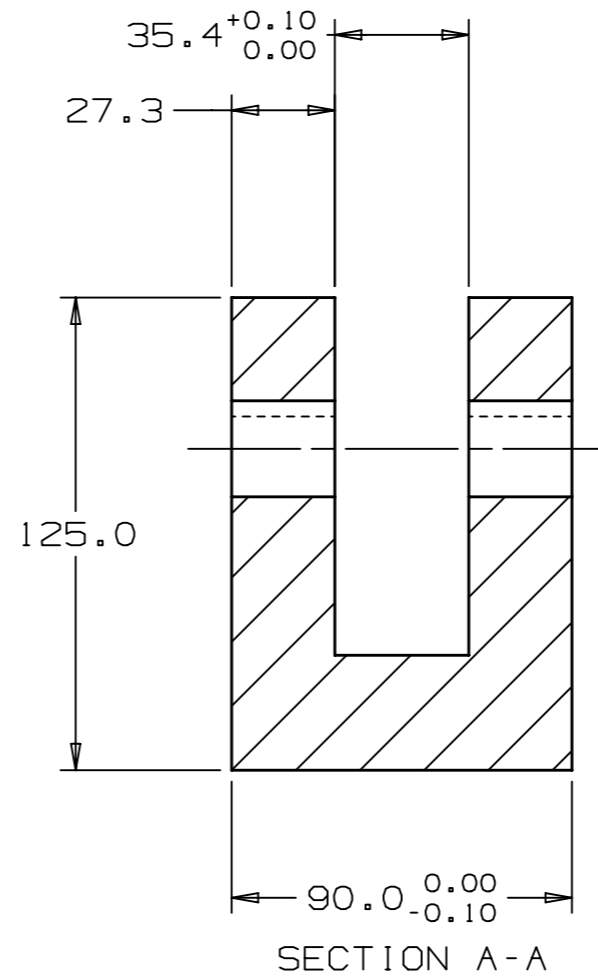
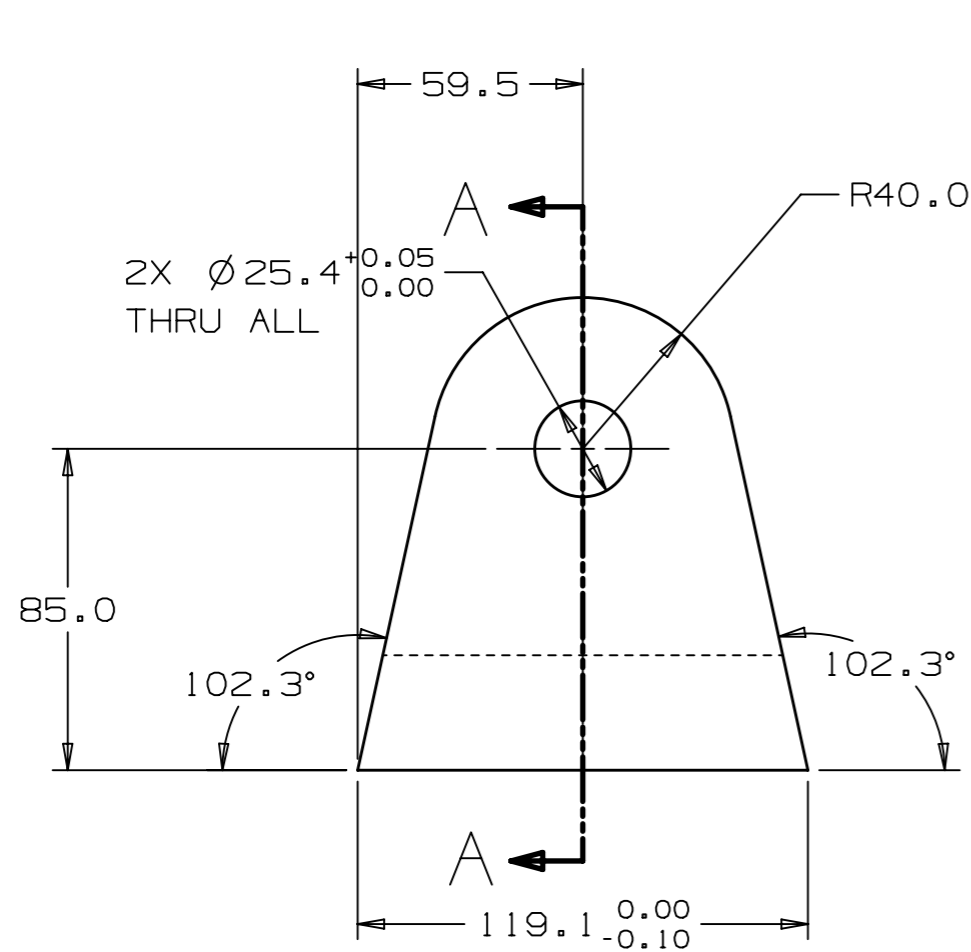
UNLESS OTHERWISE SPECIFIED					DRAWN	S.OPLT	DATE	10-Jul-2018	 <b>FERMI NATIONAL ACCELERATOR LABORATORY</b> UNITED STATES DEPARTMENT OF ENERGY
±X	±X.X	±X.XX	±X/X	±X°	CHECKED		DATE		
2	0.3	0.12	N/A	1°	APPROVED		DATE		
BREAK ALL SHARP EDGES 0.5 MAX. DO NOT SCALE DRAWING DIMENSIONS BASED ON ASME Y14.5-2009 MAX. ALL MACH SURFACES 3.2 DRAWING UNITS: MM					USED ON F10104370			NAME	
					MATERIAL STEEL, ASTM A36			TURNBUCKLE STAND HORIZONTAL SUPPORT PLATE	
					GROUP: Accelerator Mechanical Support			SCALE 1:1 SIZE A2 DRAWING NUMBER F10105262	
								SHEET 1 OF 1 REV -	



DESCRIPTION: TURNBUCKLE TAB EXPANDED  
 CATEGORY: TAB PROJECT:

REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES	
-	F10109844---RCD	30-May-2018	DRAWN	S.OPLT
			APPROVED	

# Draft 2018-Nov-01



NOTES:

1. MATERIAL CERTIFICATION DOCUMENTATION REQUIRED
2. REMOVE ALL BURRS AND BREAK SHARP EDGES 0.5-1MM

UNLESS OTHERWISE SPECIFIED				
±X	±X.X	±X.XX	±X/X	±X°
2	0.3	0.12	N/A	1°

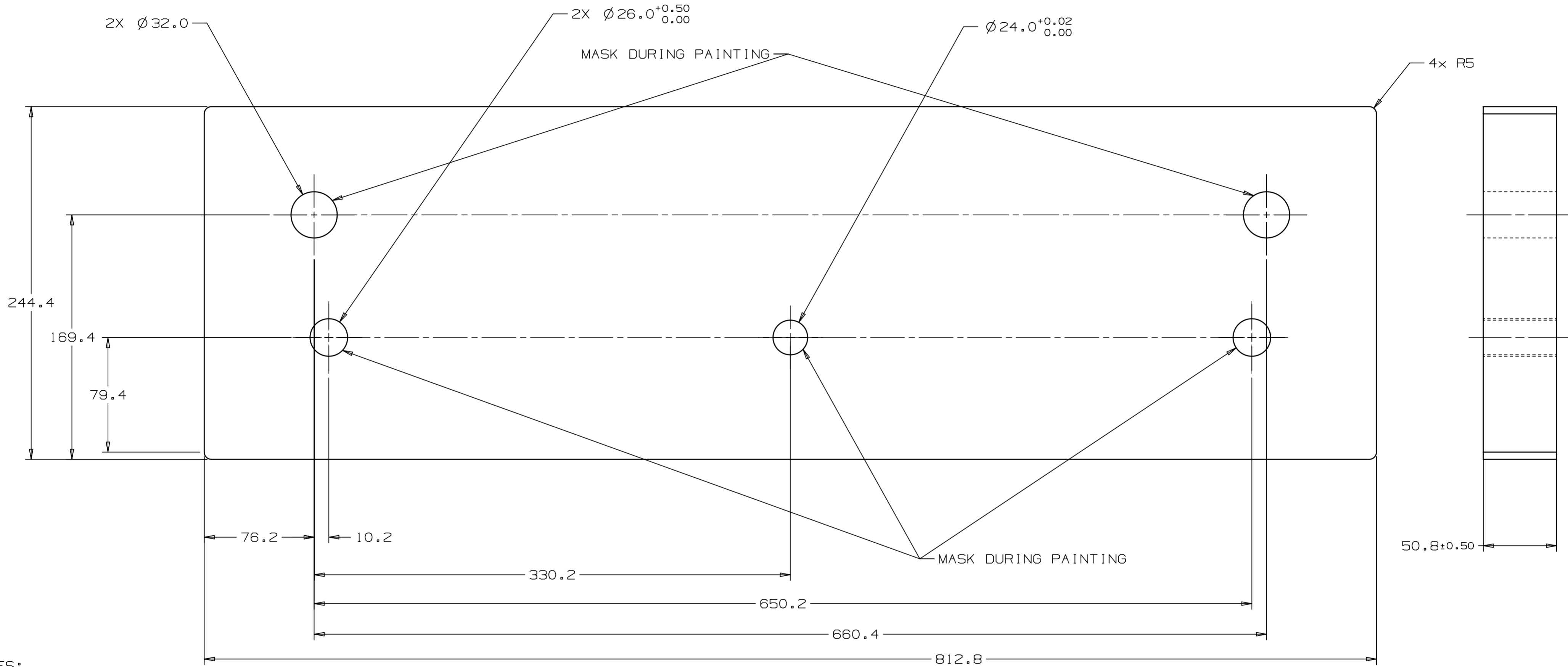
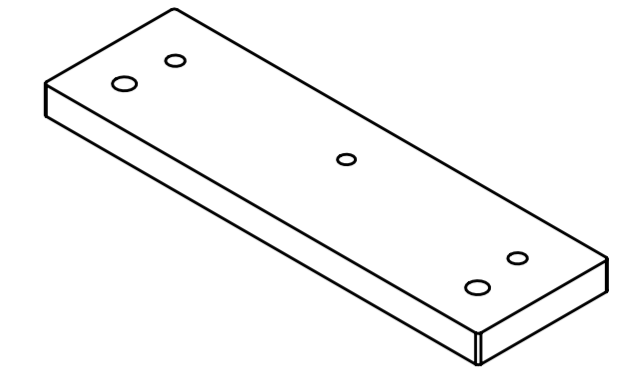
BREAK ALL SHARP EDGES 0.5 MAX.  
 DO NOT SCALE DRAWING  
 DIMENSIONS BASED ON ASME Y14.5-2009  
 MAX. ALL MACH SURFACES 3.2  
 DRAWING UNITS: MM

DRAWN	S.OPLT	DATE	30-May-2018
CHECKED		DATE	
APPROVED		DATE	
USED ON	F10104367		
MATERIAL	1018 STEEL, UNS G10180		
GROUP: Accelerator Mechanical Support	CAGE CODE: 0U5R6		

<b>FERMI NATIONAL ACCELERATOR LABORATORY</b> UNITED STATES DEPARTMENT OF ENERGY			
NAME			
TURNBUCKLE TAB EXPANDED			
SCALE	SIZE	DRAWING NUMBER	SHEET
1:1	A3	F10109844	1 OF 1
			REV
			-

REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES	
-	F10110324---RCD	30-May-2018	DRAWN	S.OPLT
			APPROVED	

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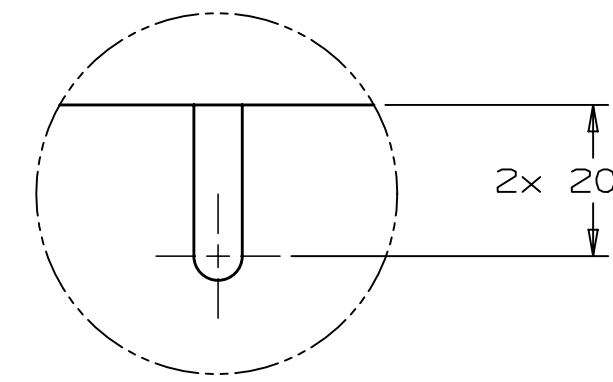
NOTES:

1. MATERIAL CERTIFICATION DOCUMENTATION REQUIRED
2. REMOVE ALL BURRS AND BREAK SHARP EDGES 0.5-1MM
3. FINISHING:
  - CLEAN ALL SURFACES TO REMOVE RUST, SCALE, DEBRIS, DUST, OILS, CUTTING FLUIDS, ETC.
  - MASK ALL HOLES
  - EXCEPT FOR AREAS MASKED, PAINT ALL SURFACES WITH A GLOSS BLACK ENAMEL SPRAY-APPLIED

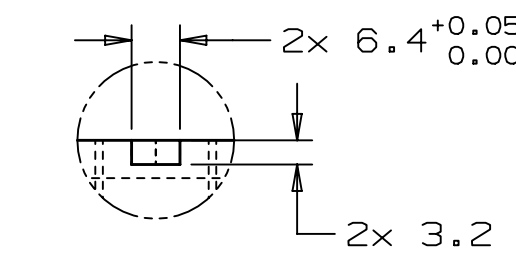
UNLESS OTHERWISE SPECIFIED					DRAWN	S.OPLT	DATE	30-May-2018	 <b>FERMI NATIONAL ACCELERATOR LABORATORY</b> UNITED STATES DEPARTMENT OF ENERGY
±X	±X.X	±X.XX	±X/X	±X*	CHECKED		DATE		
2	0.3	0.12	N/A	1*	APPROVED		DATE		
BREAK ALL SHARP EDGES 0.5 MAX. DO NOT SCALE DRAWING DIMENSIONS BASED ON ASME Y14.5-2009 MAX. ALL MACH SURFACES 3.2 DRAWING UNITS: MM					USED ON F10104381		NAME HWR MOUNTING PLATE		
					MATERIAL 1018 STEEL, UNS G10180		SCALE 1:1		
					GROUP: Accelerator Mechanical Support		CAGE CODE: 0U5R6		SHEET 1 OF 1
							SIZE A2		DRAWING NUMBER F10110324
									REV -

Draft 2018-Nov-01

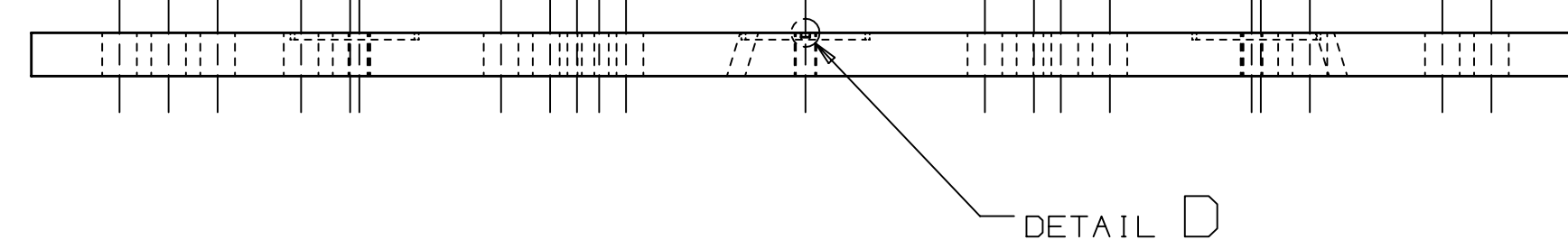
REV	REVISION	CONTROL DOCUMENT	DATES	DRAWN	SIGNATURES
-	F10110493	-RCD	30-May-2018	APPROVED	S.OPLT



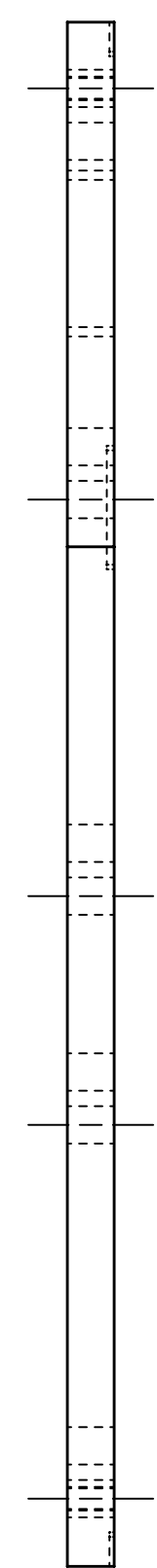
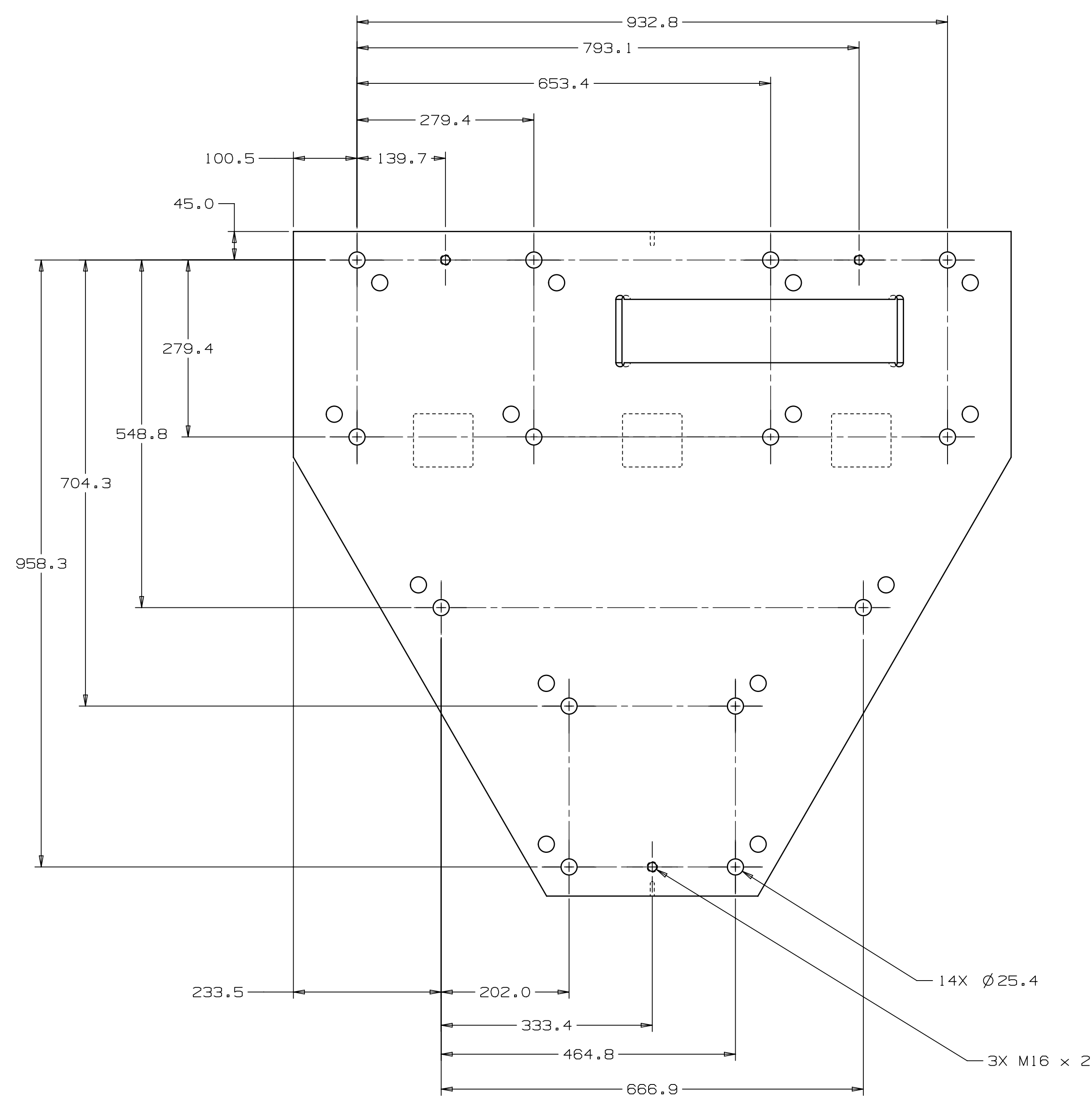
DETAIL E  
SCALE 1:1



DETAIL D  
SCALE 1:1



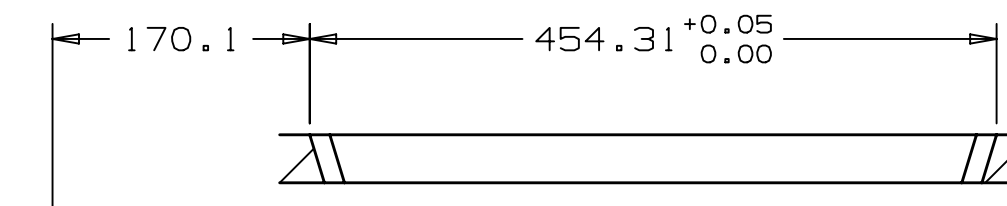
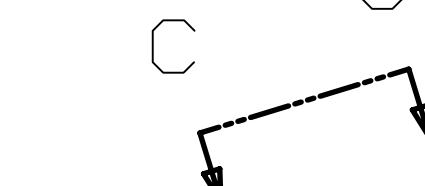
DETAIL D



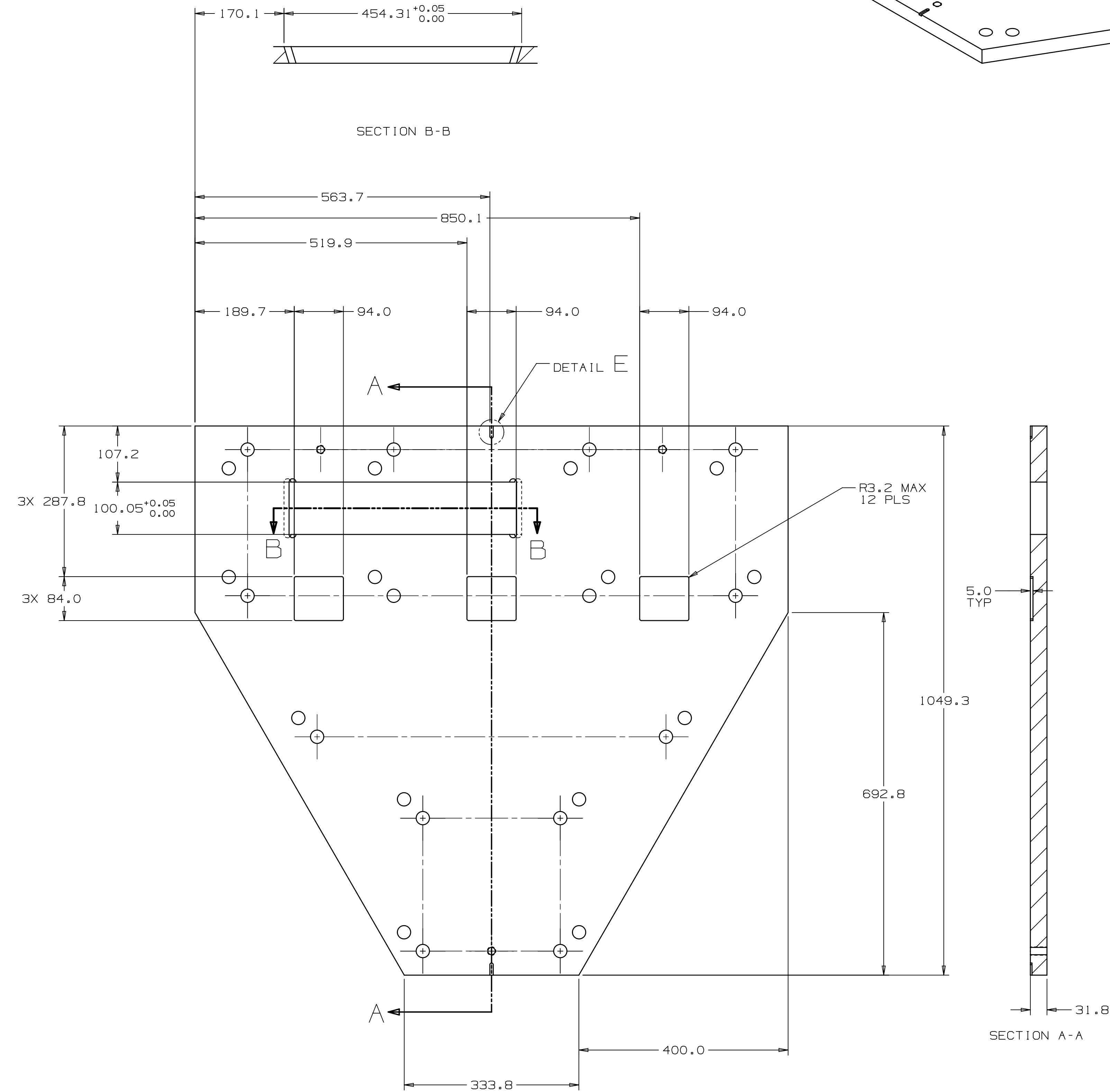
- NOTES:
1. MATERIAL CERTIFICATION DOCUMENTATION REQUIRED
  2. REMOVE ALL BURRS AND BREAK SHARP EDGES 0.5-1MM

R6.4  
TYPICAL NS & FS  
BOTH ENDS OF THE  
THRU CUTOUT

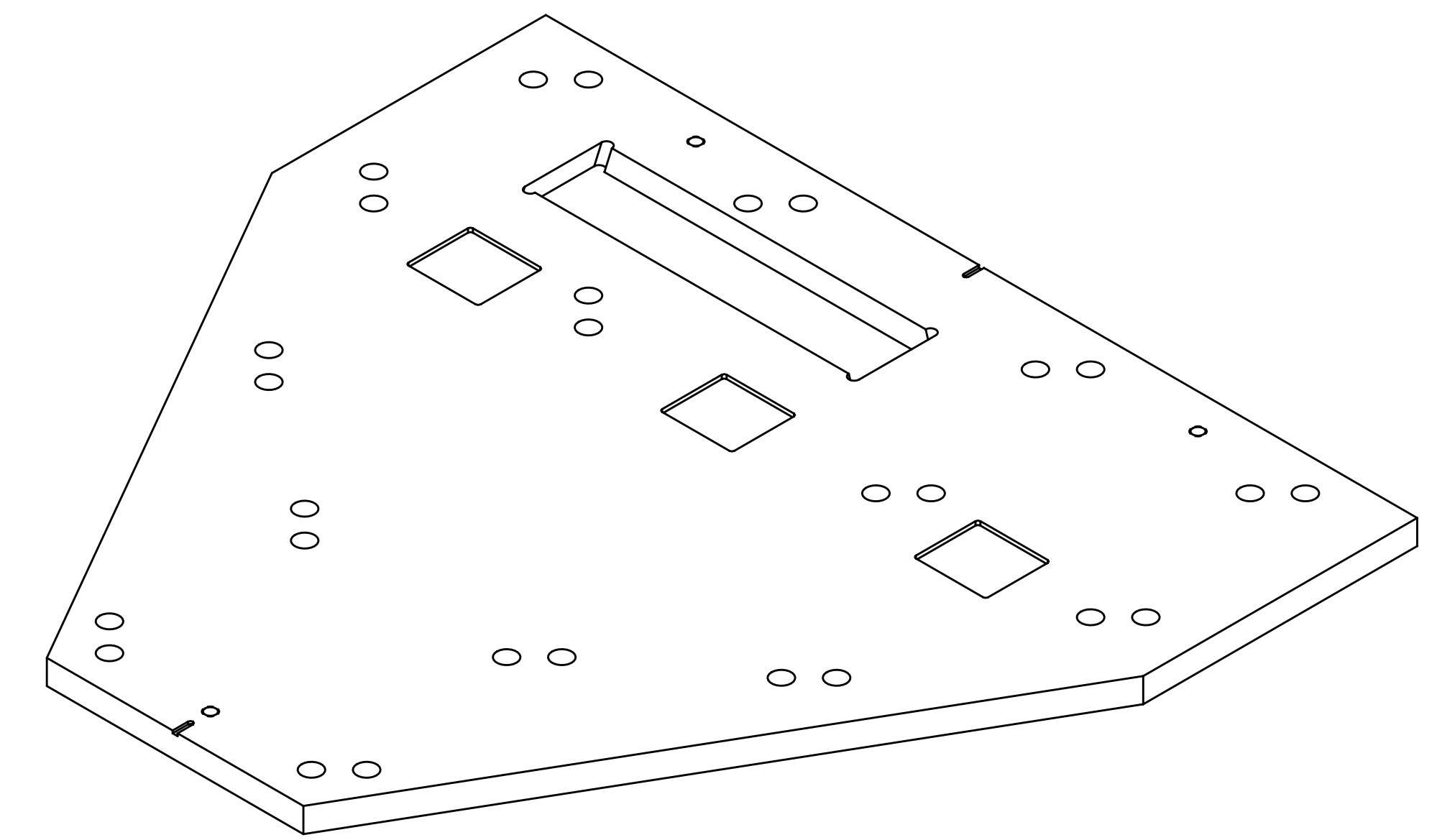
SECTION C-C



SECTION B-B



SECTION A-A



UNLESS OTHERWISE SPECIFIED					DRWN	S.OPLT	DATE	30-May-2018	 <b>FERMILAB</b> FERMILAB NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY
±X	±X.X	±X.XX	±X/X	±X"	CHECKED		DATE		
Z	0.3	0.12	N/A	1"	APPROVED		DATE		
BREAK ALL SHARP EDGES 0.5 MAX. DO NOT SCALE DRAWING DIMENSIONS BASED ON ASME Y14.5-2009 MAX. ALL MACH SURFACES 3.2 DRAWING UNITS: MM					USED ON F10104370		NAME TURNBUCKLE FLOOR PLATE DOWNSTREAM		
					MATERIAL 1018 STEEL, UNS G10180		SCALE 1:1		
GROUP1 Accelerator Mechanical Support					CASE CODE: 06SRB		SIZE A0		
					DRAWING NUMBER F10110493		SHEET 1 of 1		
							REV -		