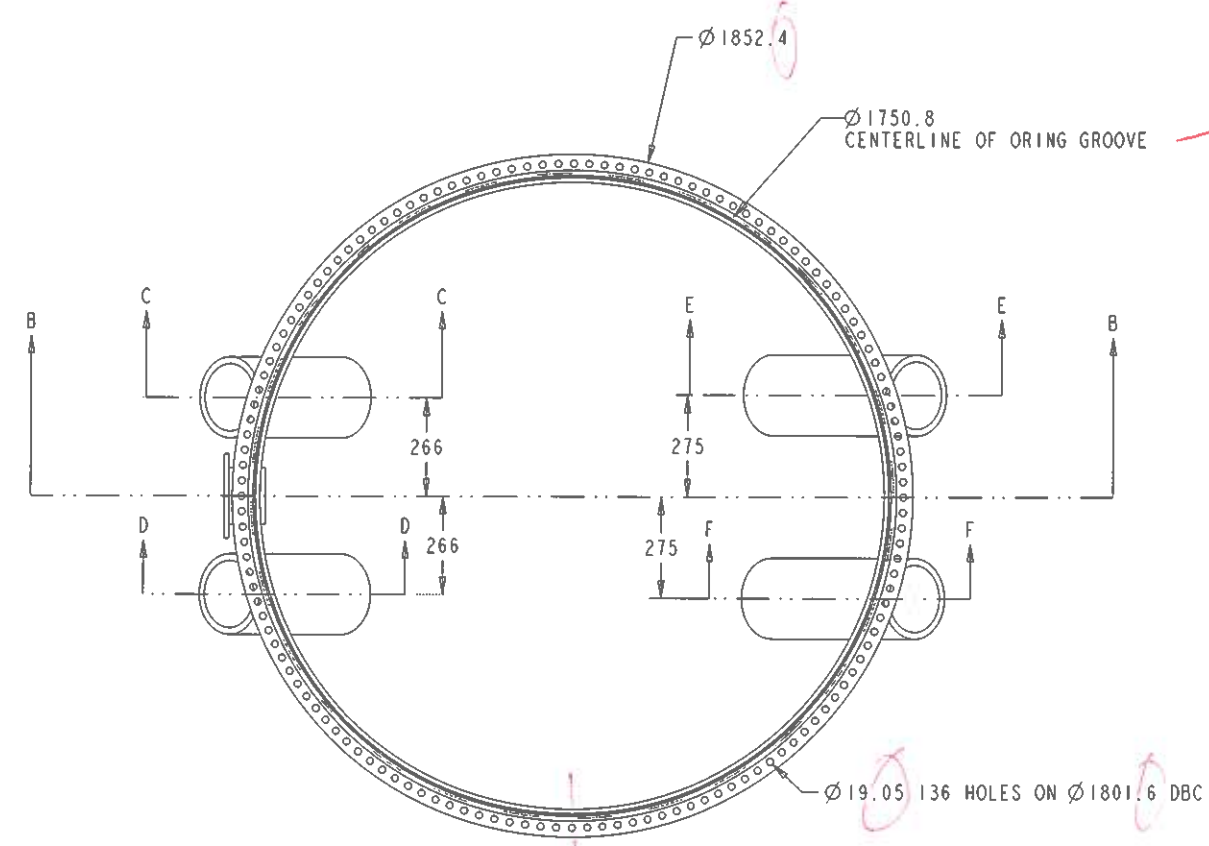
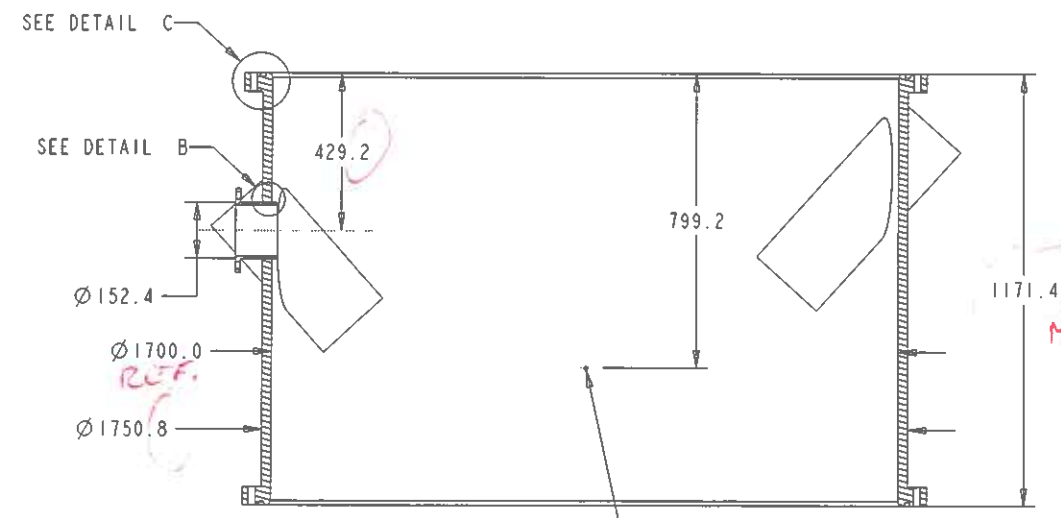


ITEM	DESCRIPTION	MATL	QUANTITY
<del>PARTS</del>			



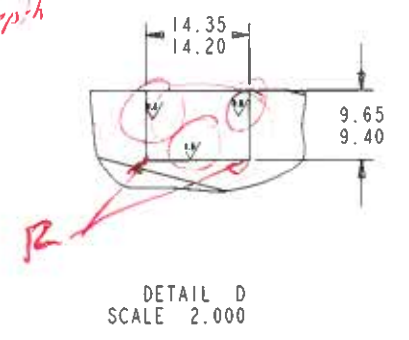
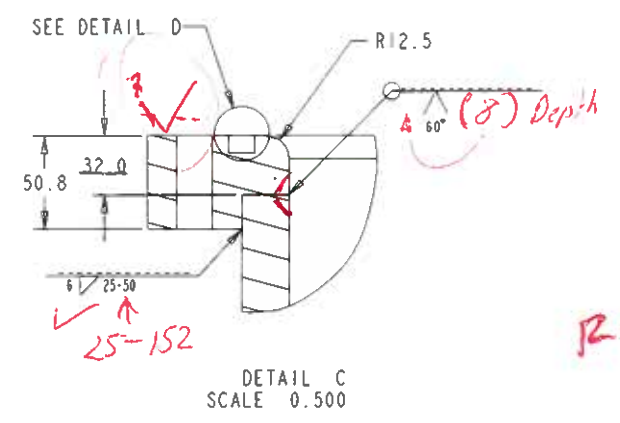
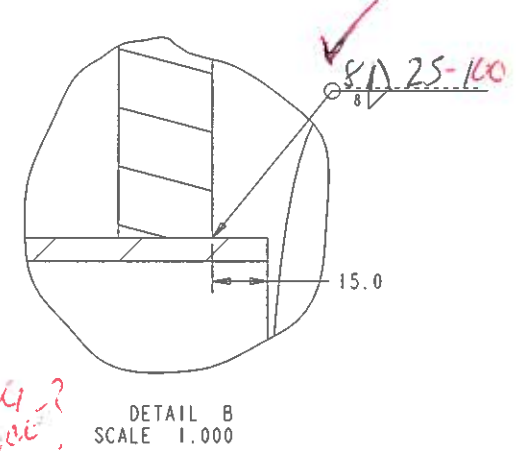
*MEASURE HOW?*

*WELD SEAM LOCATION*



SECTION B-B  
 $\phi 9.53 \pm 6.35$   
 ONLY 1 HOLE, DIRECTLY ACROSS FROM HORIZONTAL BUTT WELD AND 90 DEGREES FROM GAS PORT  
*(DO NOT BREAK THROUGH)*

*MINIMUM ALLOWANCE?*



ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS  $x \pm y$   $xx \pm .yy$   
 ANGULAR DIMENSIONS  $\pm$   
 SURFACE FINISH  $\sqrt{32}$

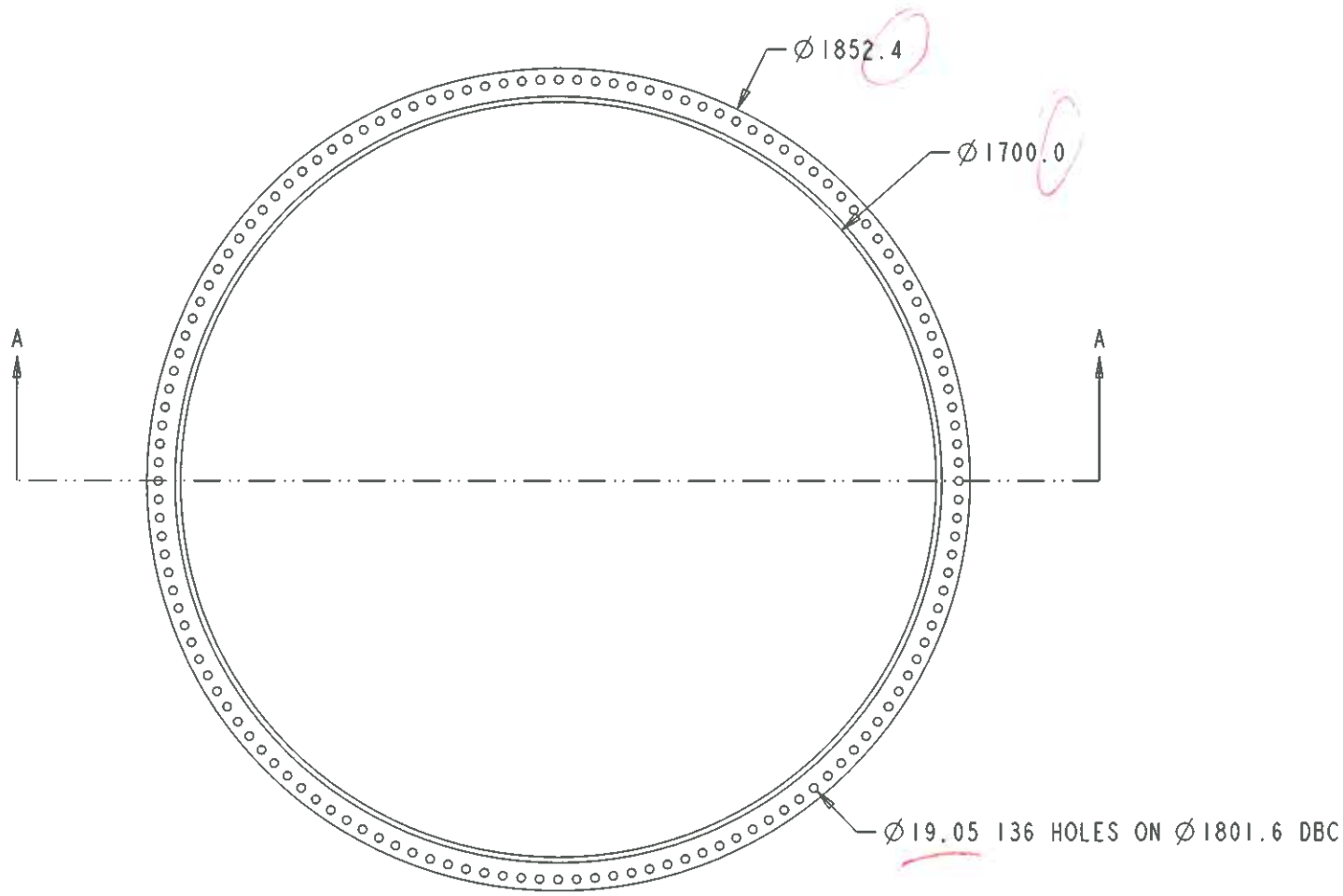
UNIVERSITY OF ALBERTA  
 EDMONTON ALBERTA CANADA  
 DESIGNED CHRIS NG TELEPHONE (780) 492 3095  
 DRAWN CHRIS NG FAX (780) 492 3408  
 CHECKED EMAIL: cjang@ualberta.ca

REF. DWG.	REV.	DATE	REVISION	BY	APPD.

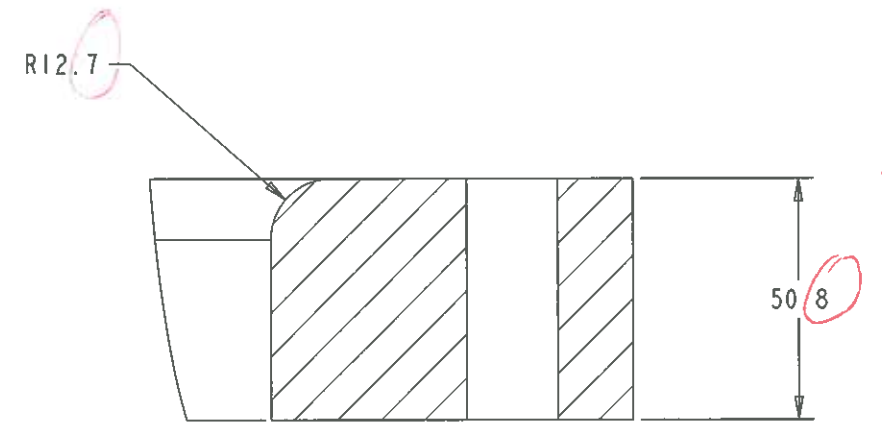
**CENTER OF PARTICLE PHYSICS**

**MAIN VESSEL**

SCALE 0.100	APPROVAL	DWG. NO.	REV.
DATE Jan 9, 2012	CHEF ENGR		

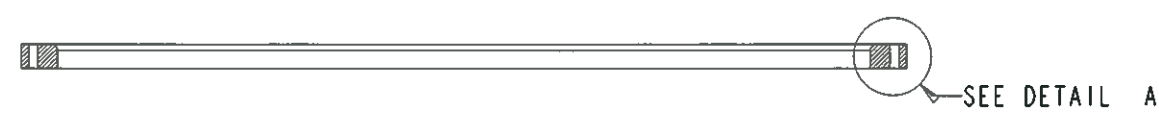


ITEM	DESCRIPTION	MATL	QUANTITY



DETAIL A  
SCALE 1.000

*MATERIAL  
6061*



SECTION A-A

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS  $X \pm 0.1$   $XX \pm 0.25$   
 ANGULAR DIMENSIONS  $\pm 1'$   
 SURFACE FINISH 32um

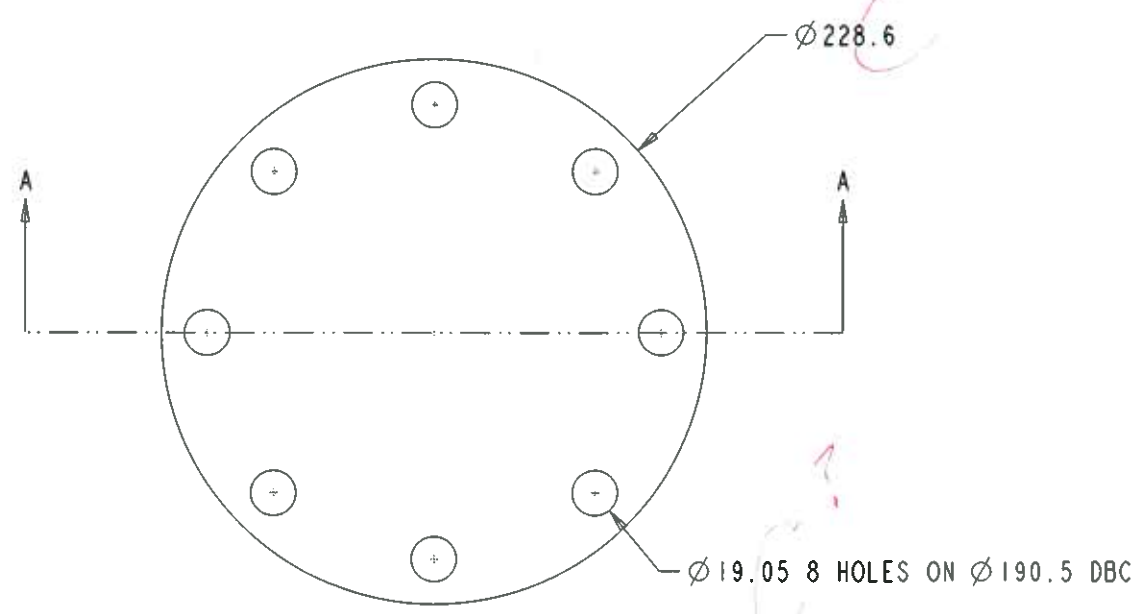
**UNIVERSITY OF ALBERTA**  
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 CHECKED E-MAIL: c.jng@ualberta.ca  
 APPROVED

REF. DWGS.	REV.	DATE	REVISION	BY

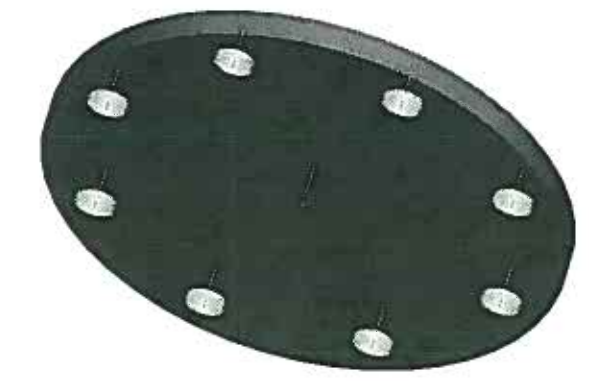
**CENTER OF PARTICLE PHYSICS**

WINDOW CLAMP

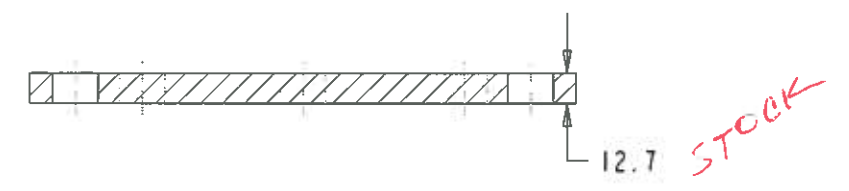
SCALE 0.100	APPROVAL	DWG NO	REV.
DATE JAN 9, 2012	CHIEF ENGR		



ITEM	DESCRIPTION	MATL	QUANTY



*MATERIAL?*



SECTION A-A

REF. DWGS	REV.	DATE	REVISION	BY
	A	DEC 7	ORIGINAL	
	B	DEC 22	ELIMINATED HOLE IN MIDDLE	

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS X ± .1 XX ± .05  
 ANGULAR DIMENSIONS ± 1°  
 SURFACE FINISH 32mm

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APPROVED

**CENTER OF PARTICLE PHYSICS**

GAS PORT PLATE

SCALE 0.500 APPROVAL DWG. NO. REV.  
 DATE DEC 22, 2011 CHIEF ENGR. B

e

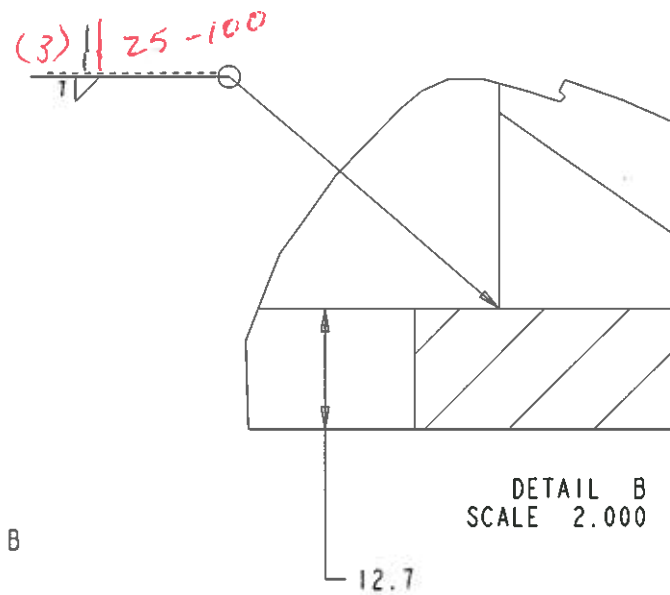
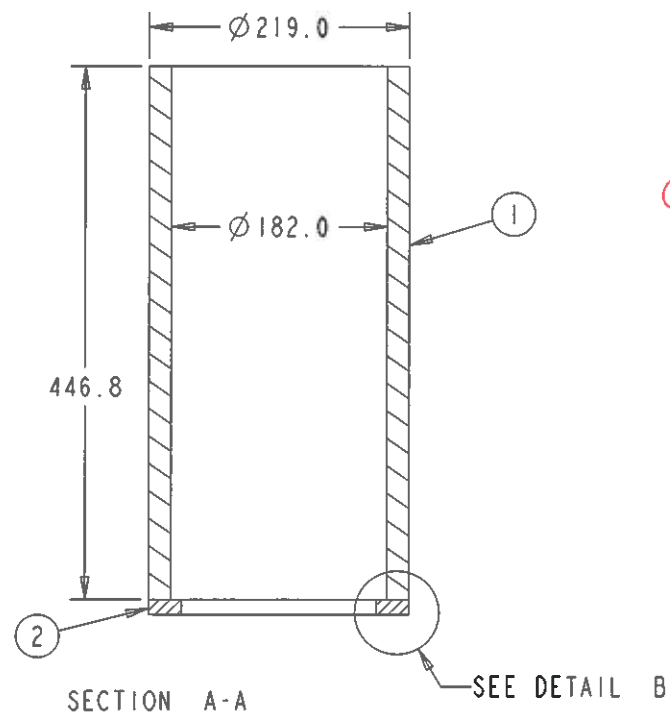
d

c

b

a

ITEM	DESCRIPTION	MATL	QUANTITY
1	Quartz Window Sleeve Pipe	ALUM	1
2	Quartz Window Sleeve Plate	ALUM	1

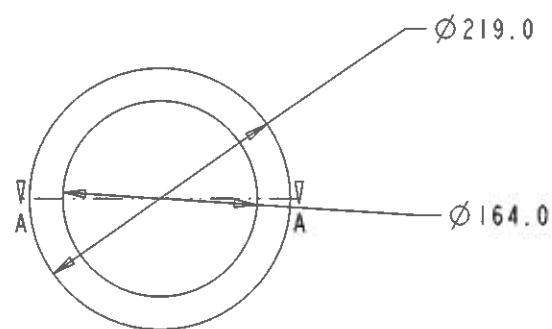


NOTES:

1. 1 WILL BE A 8" SCH 140 PIPE WITH ID BORED TO PROPER DIMENSION

2. 2 WILL BE MADE FROM AN ALUMINUM PLATE

*TYPE ?  
LOOK!*



ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS X ± .1 XX ± .05  
 ANGULAR DIMENSIONS ± 1'  
 SURFACE FINISH 32um

<b>UNIVERSITY OF ALBERTA</b> EDMONTON ALBERTA CANADA		TELEPHONE (780) 492 3095
DESIGNED CHRIS NG		FAX (780) 492 3408
DRAWN CHRIS NG		E-MAIL: cjang@ualberta.ca
CHECKED		
APPROVED		

REF. DWGS	REV.	DATE	REVISION	BY

**CENTER OF PARTICLE PHYSICS**

QUARTZ WINDOW SLEEVE WELDED BEFORE MACHINING

SCALE 0.250	APPROVAL	DWG. NO	REV.
DATE JAN 6. 2012	CHIEF ENGR		

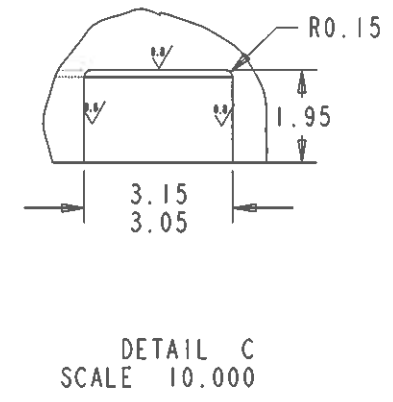
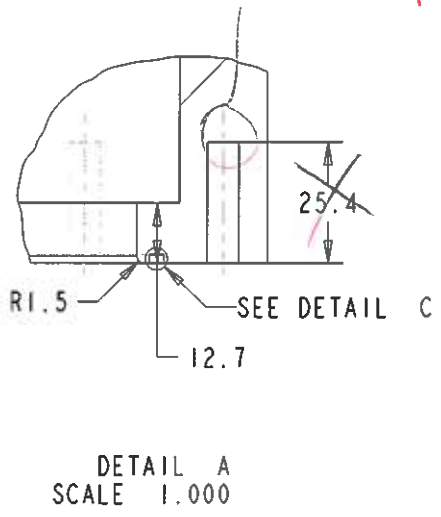
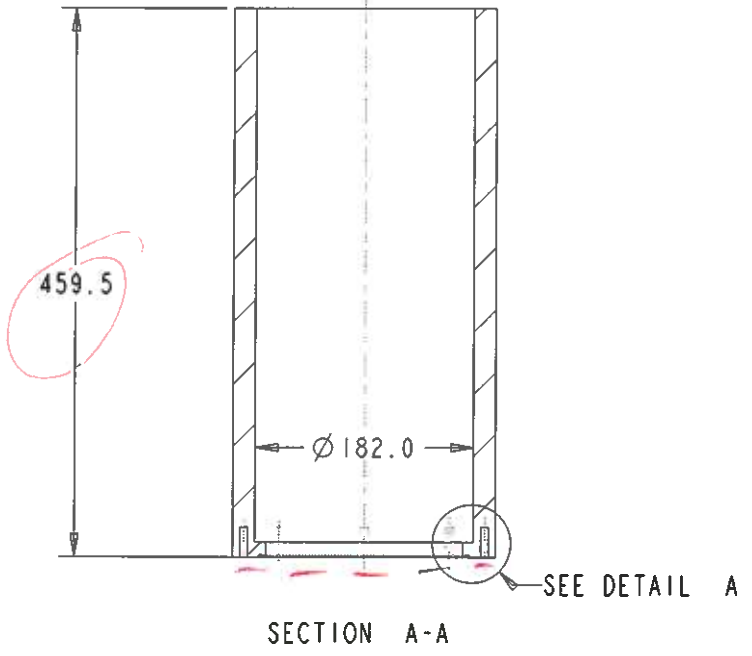
e

d

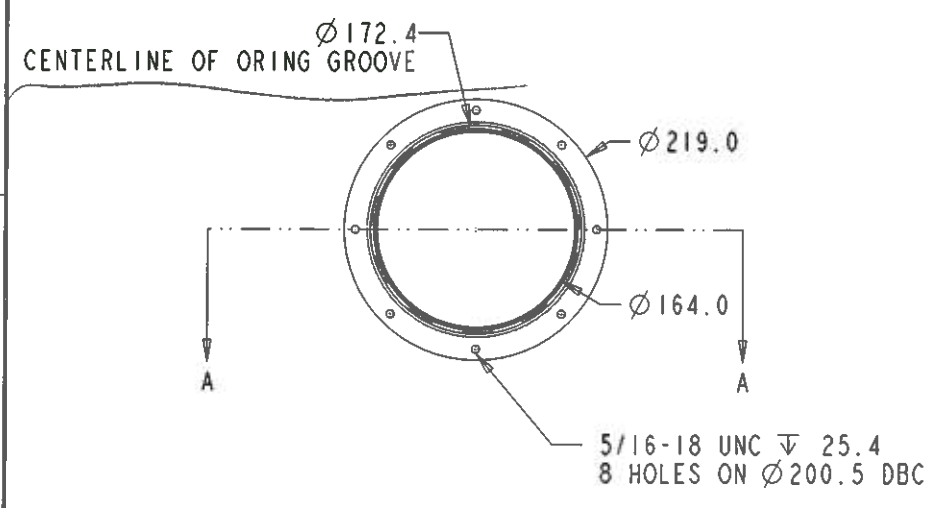
c

b

a



- NOTES:
- O-ring Groove for AS568-166 Standard O-ring
  - Sealing surface must be free of burrs and scratches



ITEM	DESCRIPTION	MATL	QUANTITY

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS X ± .1 XX ± .05  
 ANGULAR DIMENSIONS ± 1°  
 SURFACE FINISH 32um

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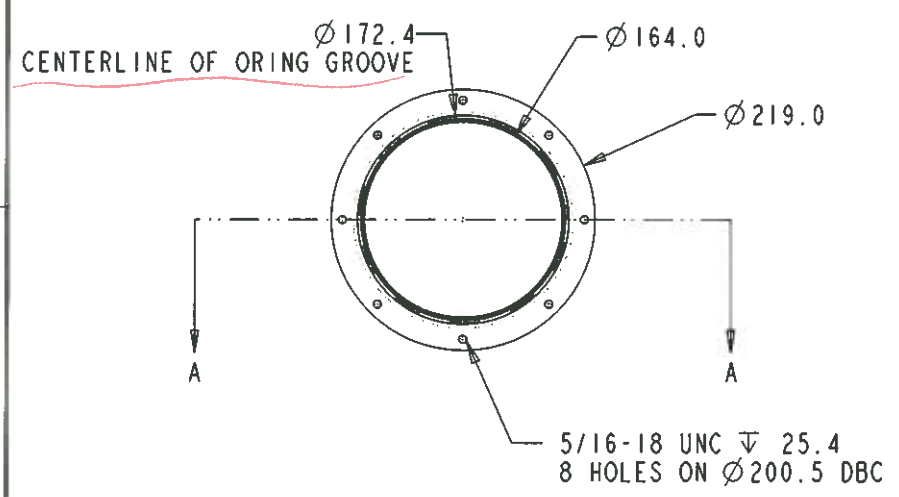
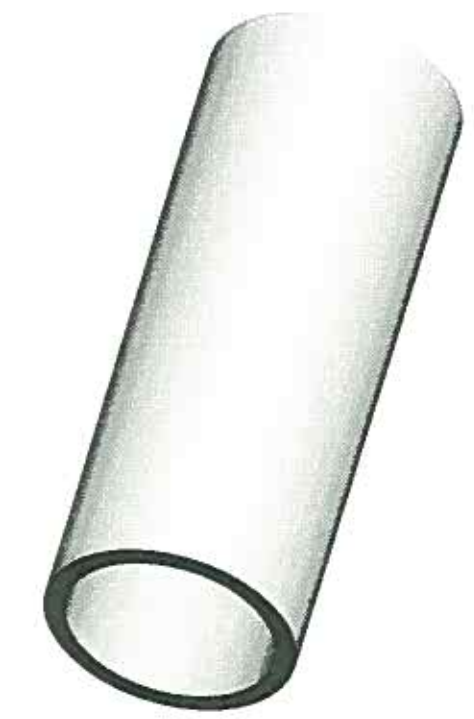
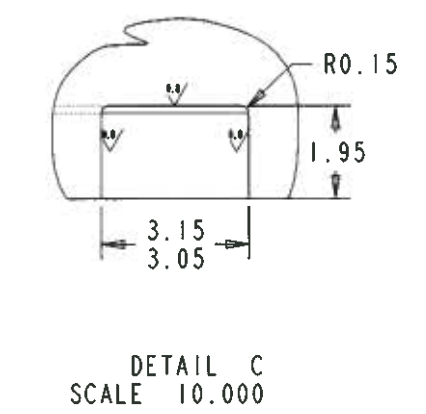
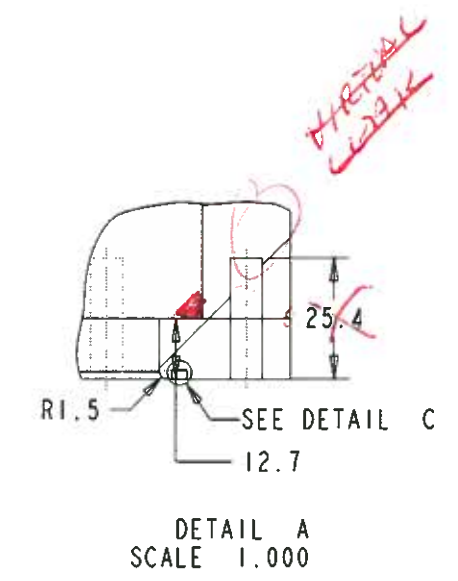
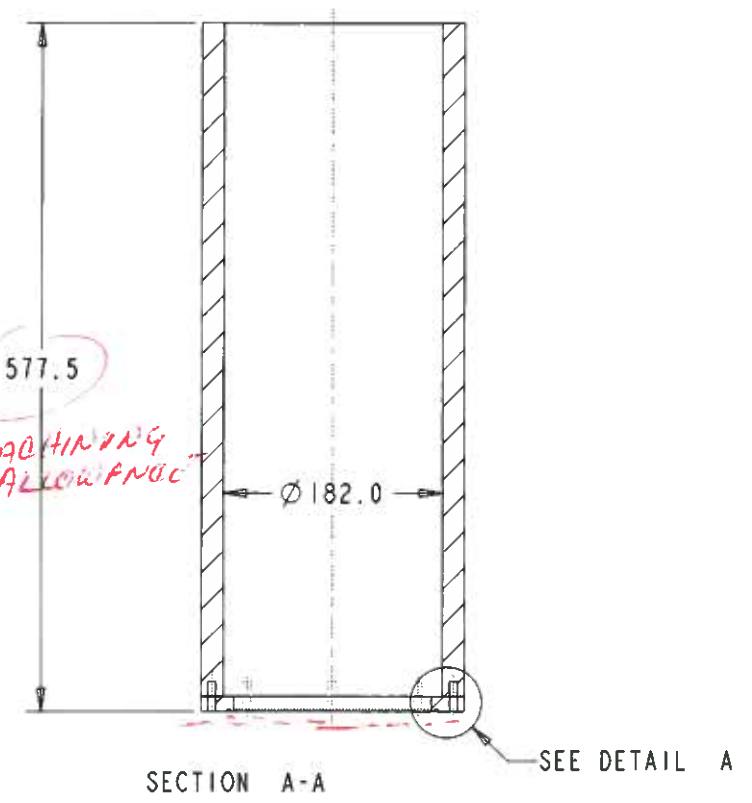
APPROVED

REF. DWGS.	REV.	DATE	REVISION	BY

**CENTER OF PARTICLE PHYSICS**

QUARTZ WINDOW SLEEVE

SCALE 0.250 APPROVAL DWG. NO. REV.  
 DATE Jan 9, 2012 CHIEF ENGR. B



- NOTES:
- O-ring Groove for AS568-166 Standard O-ring
  - Sealing surface must be free of burrs and scratches

ITEM	DESCRIPTION	MATL	QUANTITY

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS X ± .1 XX ± .05  
 ANGULAR DIMENSIONS ± 1'  
 SURFACE FINISH 32um

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REF. DWGS.	REV.	DATE	REVISION	BY

**CENTER OF PARTICLE PHYSICS**

QUARTZ WINDOW SLEEVE LONG

SCALE 0.250 APPROVAL DWG. NO. REV.  
 DATE JAN 9, 2012 CHIEF ENGR. 8

e

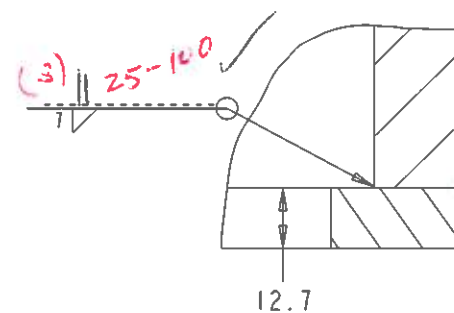
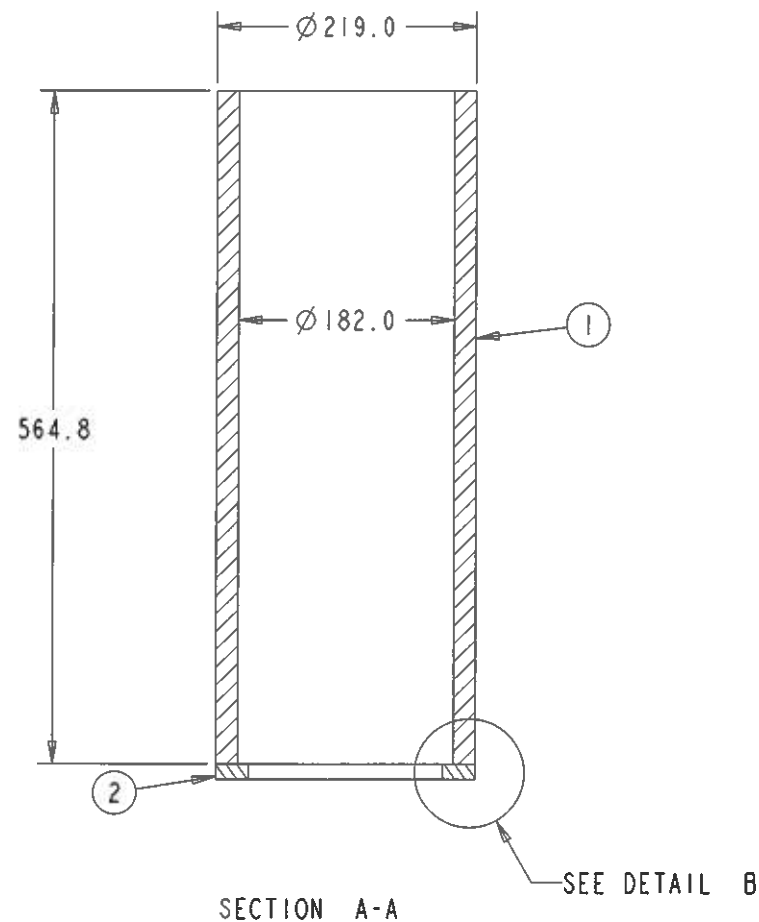
d

c

b

a

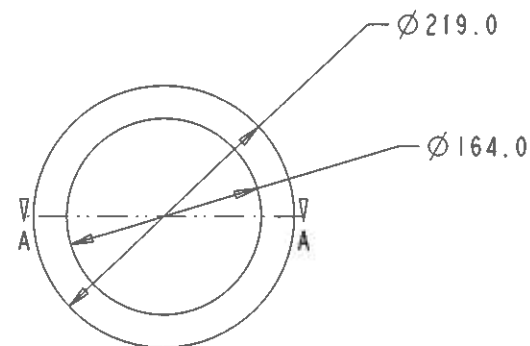
ITEM	DESCRIPTION	MATL	QUANTITY
1	Quartz Window Sleeve Pipe Long	ALUM	1
2	Quartz Window Sleeve Plate	ALUM	1



NOTES:

- 1. 1 WILL BE A 8" SCH 140 PIPE WITH ID BORED TO PROPER DIMENSION
- 2. 2 WILL BE MADE FROM AN ALUMINUM PLATE

*TYPE*  
*Level*



ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS X ± .1 XX ± .05  
 ANGULAR DIMENSIONS ± 1'  
 SURFACE FINISH 32um

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 EDMONTON ALBERTA CANADA

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APPROVED  
 DATE JAN 6, 2012

REF. DWGS.	REV.	DATE	REVISION	BY

CENTER OF PARTICLE PHYSICS

QUARTZ WINDOW SLEEVE LONG  
WELDED BEFORE MACHINING

SCALE 0.250 APPROVAL DWG. NO. REV.  
 DATE JAN 6, 2012 CHIEF ENGR

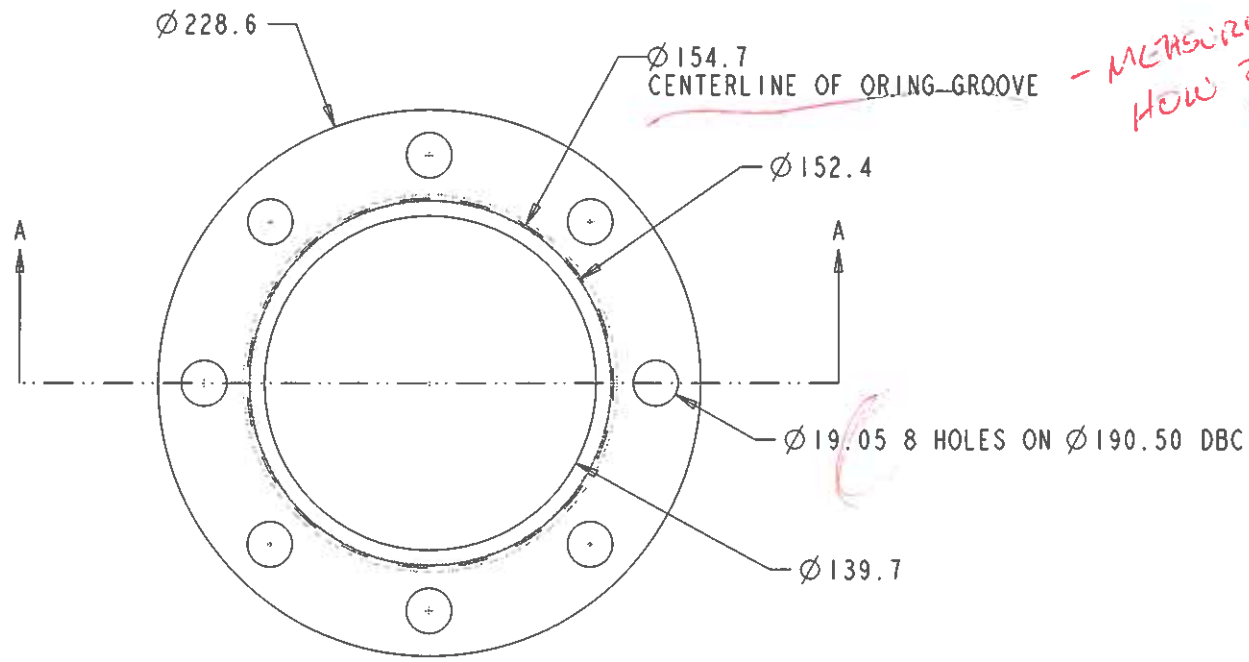
e

d

c

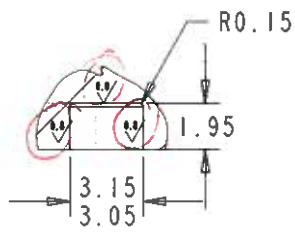
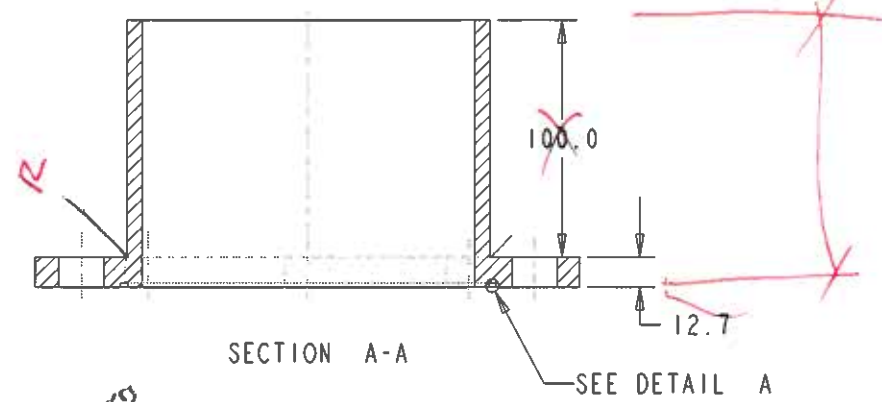
b

a



*- MEASURE HOW?*

*BUY THIS?*



DETAIL A  
SCALE 5.000

*MATERIAL? LOW!*

*suggestion  
break shape corners*

NOTES:

- O-ring Groove for AS568-163 Standard O-ring
- Sealing surface must be free of burrs and scratches

*- VITON*

ITEM	DESCRIPTION	MATL	QUANTITY

REF. DWGS.	REV.	DATE	REVISION	BY

ALL DIMENSIONS IN MM UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS X ± .1 XX ± .05  
 ANGULAR DIMENSIONS ± 1  
 SURFACE FINISH 32Ra

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 CHECKED E-MAIL: cjang@ualberta.ca

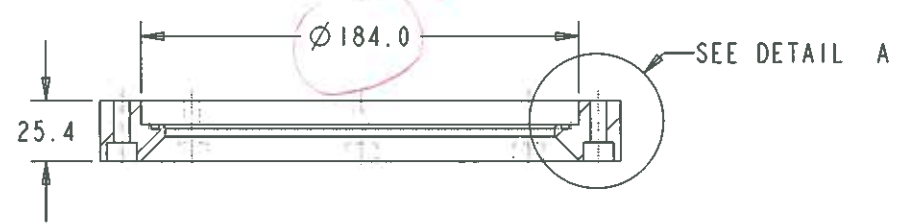
APPROVED

**CENTER OF PARTICLE PHYSICS**

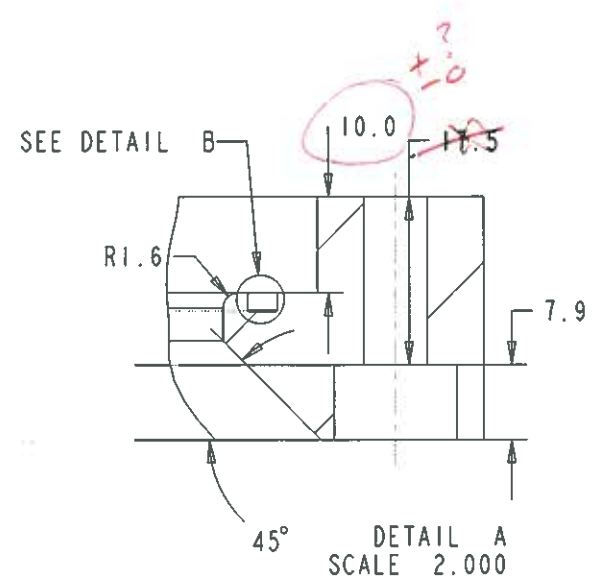
GAS PORT FLANGE

SCALE 0.500 APPROVAL DWG. NO. REV.  
 DATE JAN 9, 2012 CHIEF ENGR. B

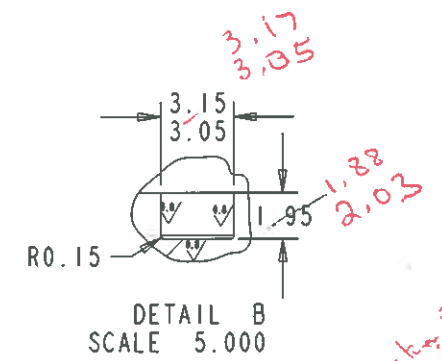
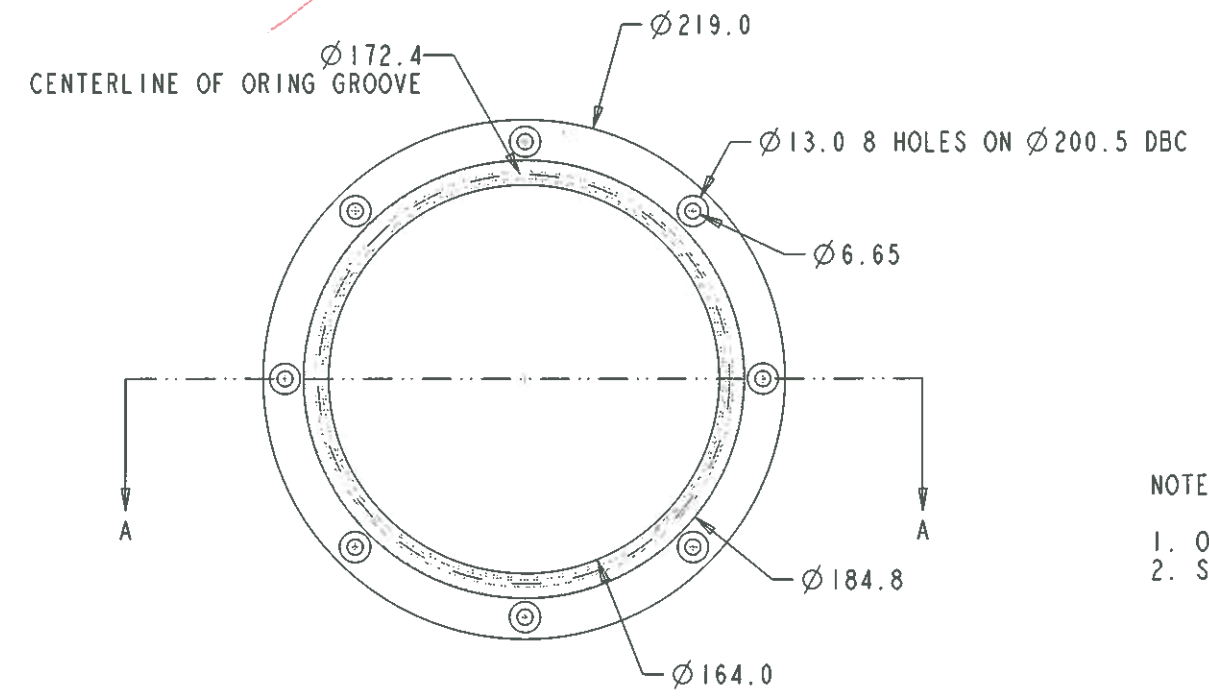




SECTION A-A



DETAIL A  
SCALE 2.000



DETAIL B  
SCALE 5.000

ITEM	DESCRIPTION	MATL	QUANTY



NOTES:

- O-ring Groove for AS568-166 Standard O-ring
- Sealing surface must be free of burrs and scratches

*Parker Book  
3/32 O-ring  
MATERIAL?  
VITON  
MATERIAL?  
COOL*

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
TOLERANCES UNLESS OTHERWISE SPECIFIED:  
FRACTIONAL DIMENSIONS  
DECIMAL DIMENSIONS X ± .1 XX ± .05  
ANGULAR DIMENSIONS ± 1'  
SURFACE FINISH 32

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REF. DWGS.	REV.	DATE	REVISION	BY

**CENTER OF PARTICLE PHYSICS**  
QUARTZ HOLDER  
SCALE 0.500 APPROVAL DWG. NO. REV.  
DATE JAN 9, 2011 CHIEF ENGR. B

e

d

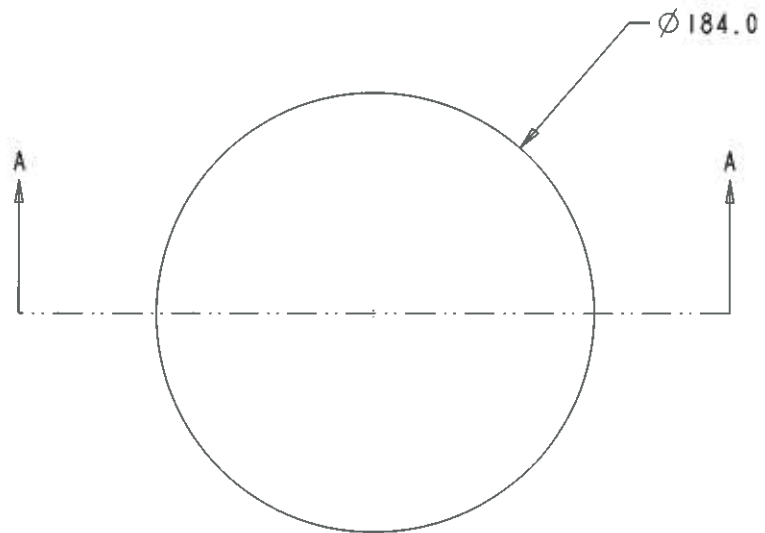
c

b

a

ITEM	DESCRIPTION	MATL	QUANTITY

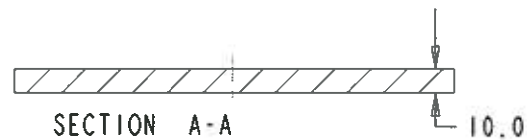
3



2



*MANUFACTURER  
TOLERANCE*



1

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS X ± .1 XX ± .05  
 ANGULAR DIMENSIONS ± .5°  
 SURFACE FINISH Ra 3.2

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REF. DWGS.	REV.	DATE	REVISION	BY

**CENTER OF PARTICLE PHYSICS**

QUARTZ WINDOW 1404

SCALE 0.500 APPROVAL DWG. NO. REV.  
 DATE DEC 15, 2011 CHIEF ENGR

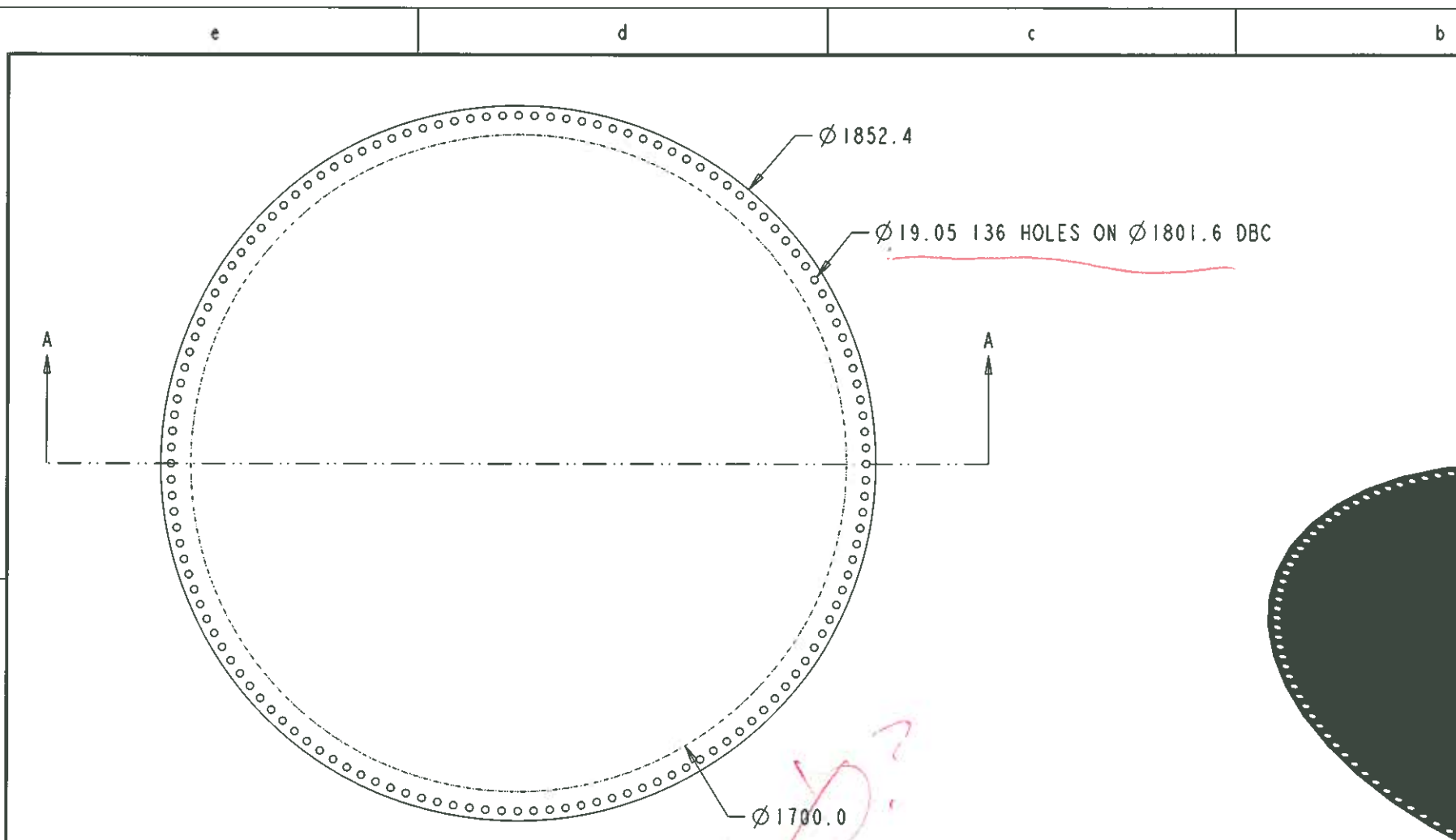
e

d

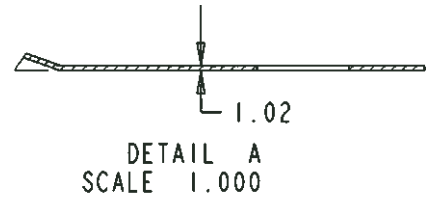
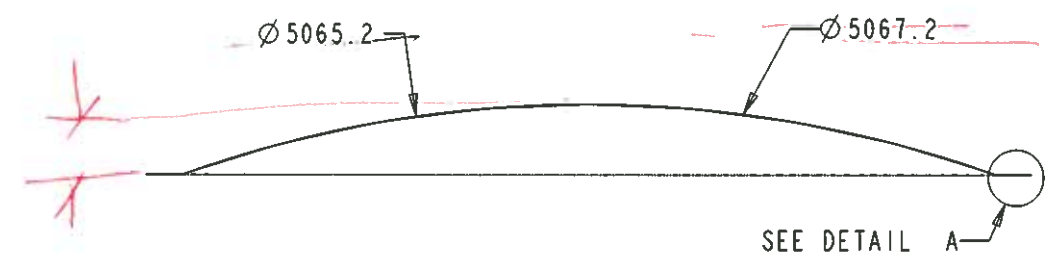
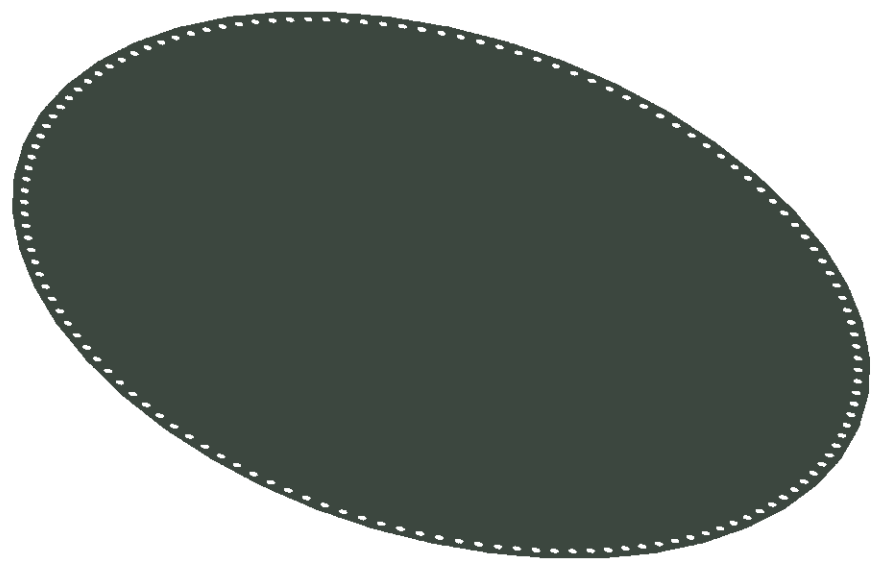
c

b

a



ITEM	DESCRIPTION	MATL	QUANTITY



Thickness in the curve is smaller due to the hydroforming deforming the aluminum

*HYDROFORMING FIXTURE?*

REV.	DATE	REVISION	BY
A	DEC 7	Original	
B	DEC 22	Title Block Correction	
C	DEC 22	Fixed Thickness	

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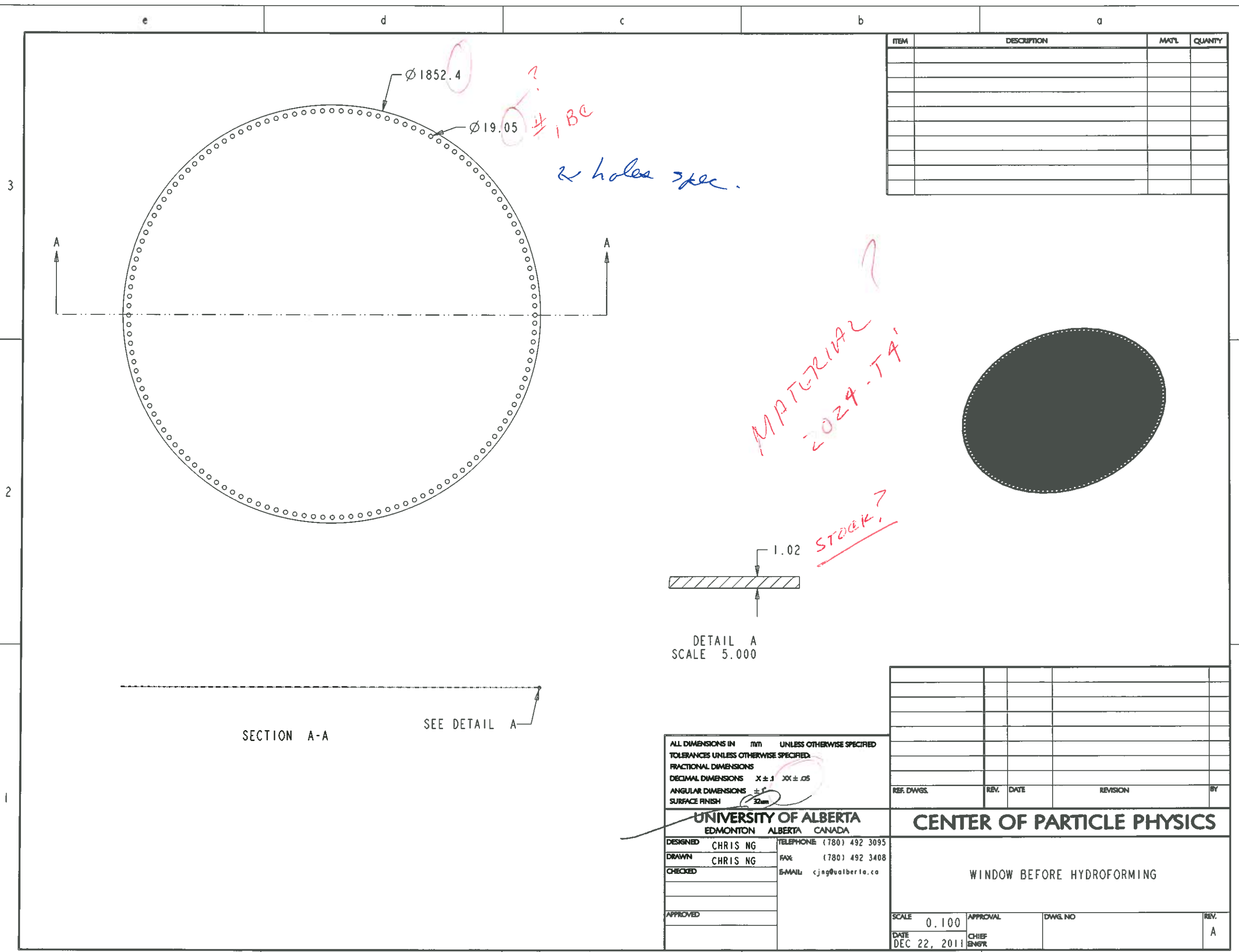
DESIGNED CHRIS NG TELEPHONE (780) 492 3095  
DRAWN CHRIS NG FAX (780) 492 3408  
CHECKED E-MAIL: c.jag@ualberta.ca

APPROVED

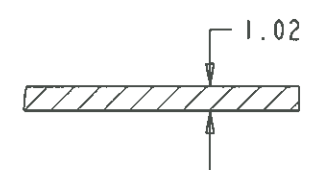
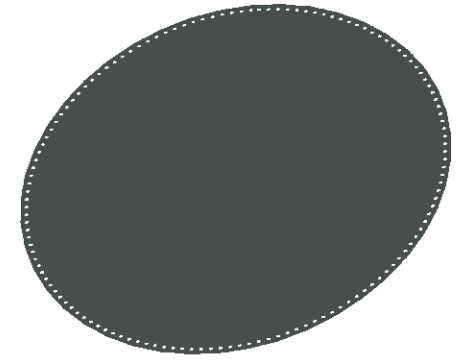
**CENTER OF PARTICLE PHYSICS**

WINDOW AFTER HYDROFORMING

SCALE 0.100 APPROVAL DWG NO. REV. C  
DATE DEC 22, 2011 CHIEF ENGR



ITEM	DESCRIPTION	MATL	QUANTITY



DETAIL A  
SCALE 5.000

SECTION A-A  
SEE DETAIL A

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS X ± .1 XX ± .05  
 ANGULAR DIMENSIONS ± .5°  
 SURFACE FINISH 32um

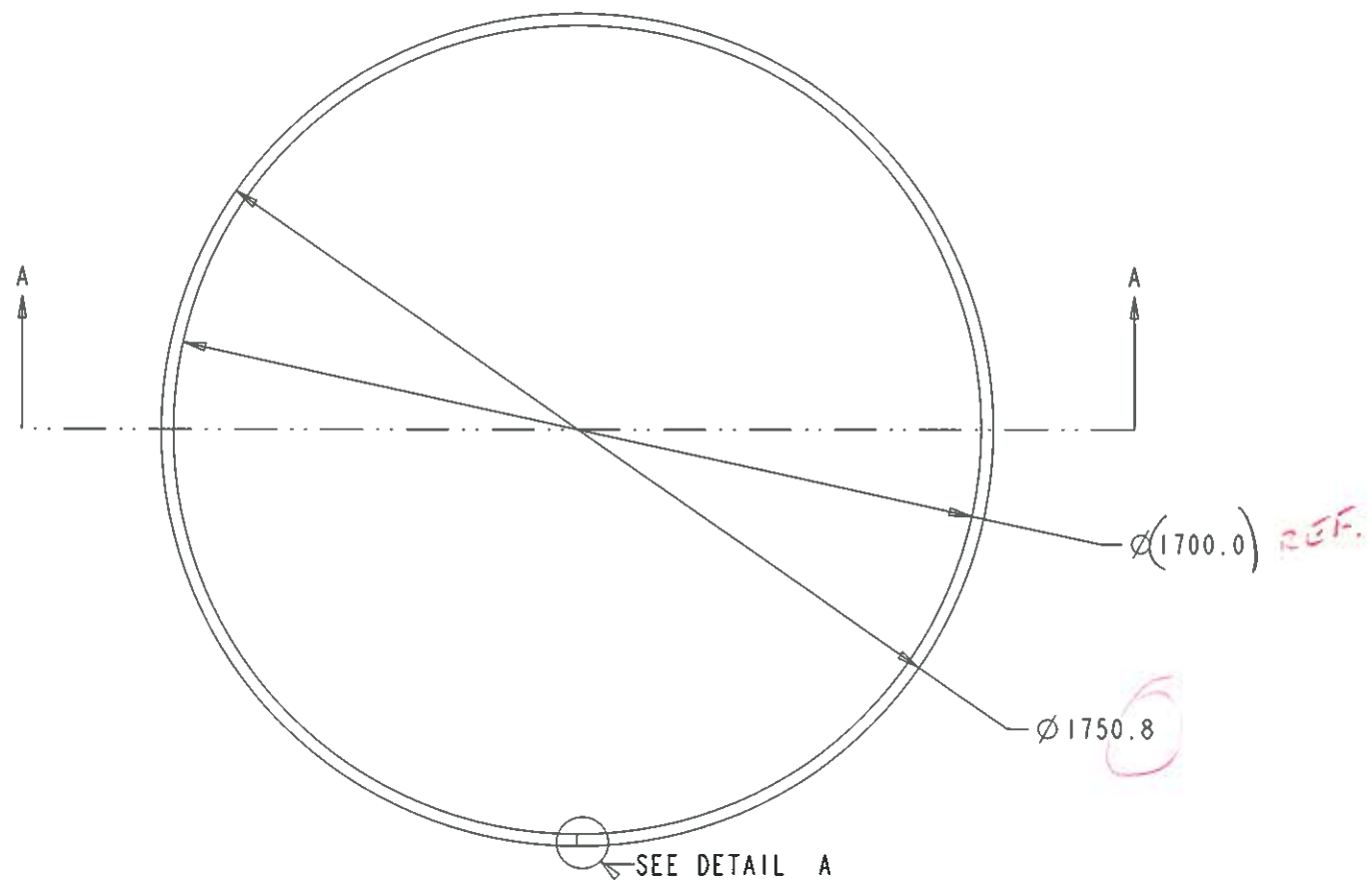
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 DRAWN CHRIS NG FAX (780) 492 3408  
 CHECKED E-MAIL: cjang@ualberta.ca  
 APPROVED

REF. DWGS.	REV.	DATE	REVISION	BY

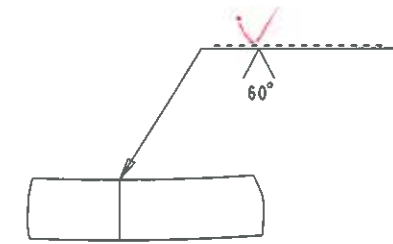
**CENTER OF PARTICLE PHYSICS**

WINDOW BEFORE HYDROFORMING

SCALE 0.100	APPROVAL	DWG. NO.	REV. A
DATE DEC 22, 2011	CHIEF ENGR.		



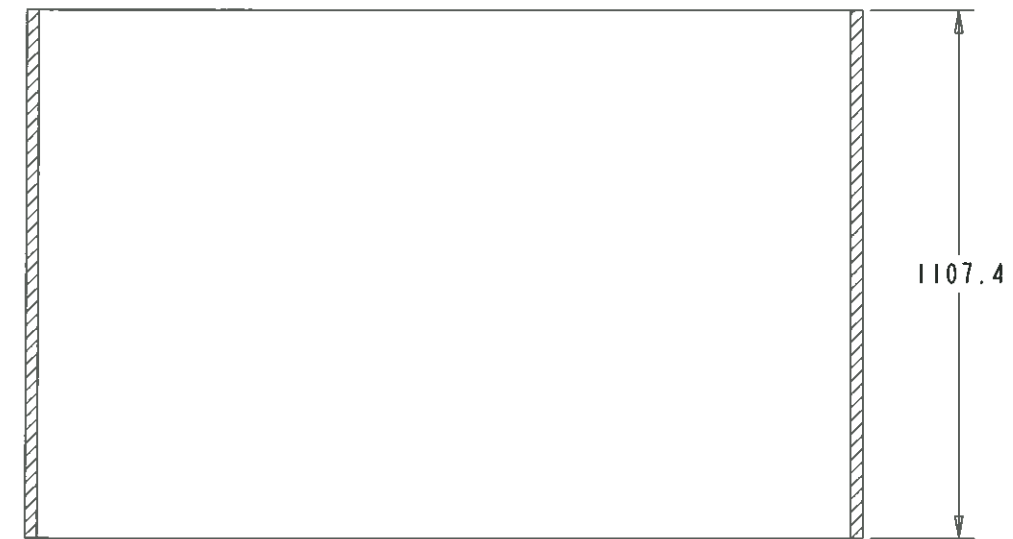
ITEM	DESCRIPTION	MAT'L	QUANTITY



DETAIL A  
SCALE 0.500

*6061  
TYPES?*

NOTES:  
MAKE VESSEL OUT OF ONE 1" SHEET OF ALUMINUM  
BEND INTO CYLINDRICAL SHAPE AND ~~SINGLE-V~~ BUTT WELD  
Double-V



SECTION A-A

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
TOLERANCES UNLESS OTHERWISE SPECIFIED:  
FRACTIONAL DIMENSIONS X ± .1 XX ± .05  
DECIMAL DIMENSIONS X ± .1 XX ± .05  
ANGULAR DIMENSIONS ± 1°  
SURFACE FINISH 32mm

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APPROVED

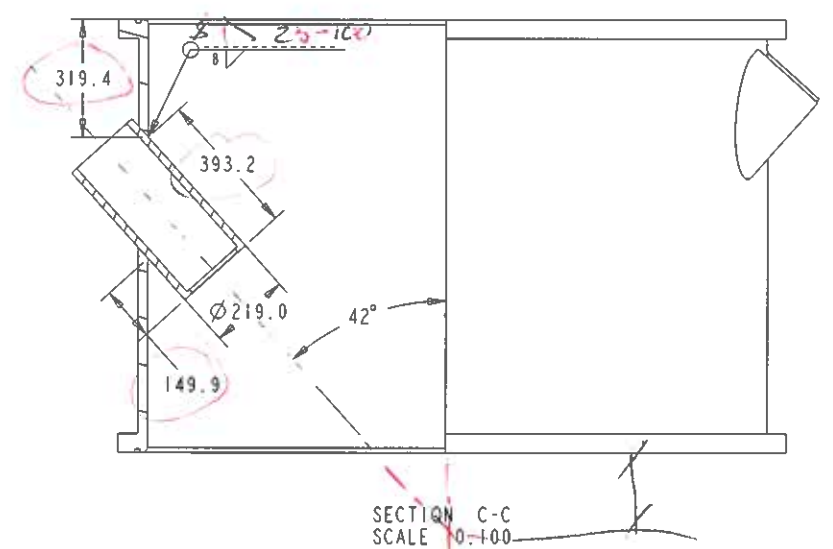
REF. DWGS.	REV.	DATE	REVISION	BY

**CENTER OF PARTICLE PHYSICS**

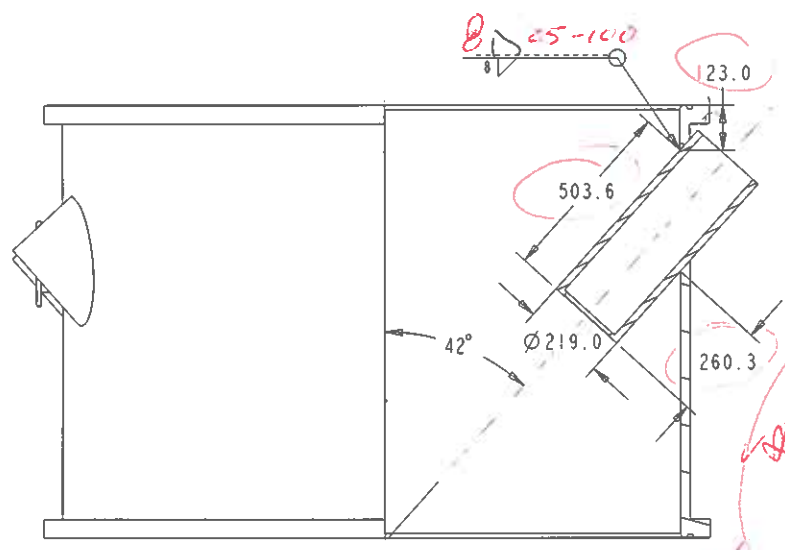
MAIN VESSEL WELD

SCALE 0.100	APPROVAL	DWG. NO.	REV.
DATE JAN 9, 2012	CHIEF ENGR		A

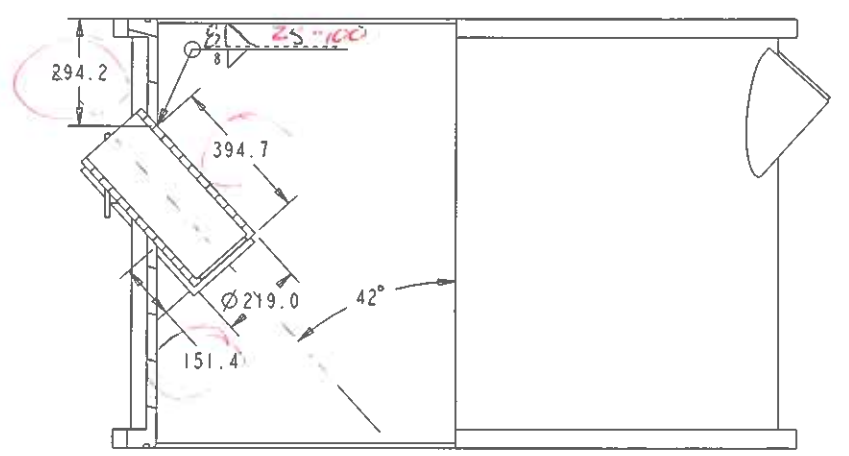
ITEM	DESCRIPTION	MATL	QUANTITY



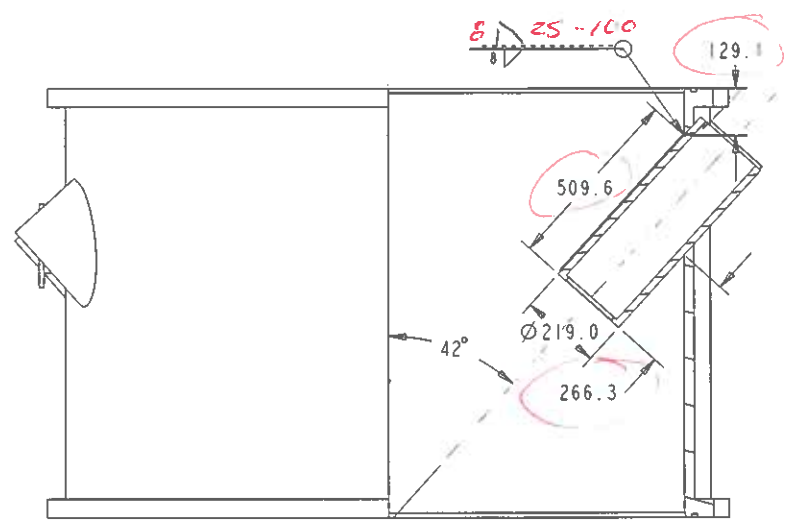
SECTION C-C  
SCALE 0.100



SECTION E-E  
SCALE 0.100



SECTION D-D  
SCALE 0.100



SECTION F-F  
SCALE 0.100

*clearance??*

*97 AWS D1.1 Zone 2??*

*Welds Qualified to AWS minimum*

*Welder Procedures Qualified in Accordance to AWS with Supporting PQR Procedure Qualification Records*

*Welds Inspected by AWS CWI minimum*

- NOTES:
1. CYLINDRICAL BODY SHALL BE MADE WITH CLEAN ROLLERS TO ELIMINATE ANY POSSIBILITY OF ANY INCLUSIONS BEING INTRODUCED INTO THE MATERIAL
  2. WELDS SHALL BE CAREFULLY INSPECTED BEFORE MACHINING
  3. ALL SEALING SURFACES MUST BE FREE OF NICKS/DENTS/SCRATCHES
  4. DEGREASE ALL PARTS PRIOR TO WELDING
  5. CYLINDRICAL BODY WELD SHOULD BE LOCATED APPROX 90 DEGREES FROM GAS PORT WELD
  6. SMALL BLIND HOLE SHALL BE LOCATED DIRECTLY ACROSS FROM CYLINDRICAL BODY WELD
  7. ALL INSIDE WELDS TO BE VACUUM TIGHT
  8. FINISHED VESSEL TO BE VACUUM TIGHT. LEAK RATE MUST NOT EXCEED  $2.0 \times 10^{-9}$  SCC PER SECOND OF HELIUM GAS
  9. FINISHED VESSEL TO BE DEGREASED & CLEANED FOLLOWED WITH ETHANOL OR METHANOL RINSE
  10. PROVIDE BLANK-OFF FLANGES TO MATCH EACH FLANGE *-TYPE?*
  11. SUPPLY BOLTS/WASHERS/NUTS FOR ALL FLANGES *CERTIFIED*
  12. SUPPLY O-RINGS FOR FLANGES *-SIZE TYPE?*
  13. LEAK TESTING SHALL TAKE PLACE AT VENDOR FACILITY *-*

*Required Documents??*

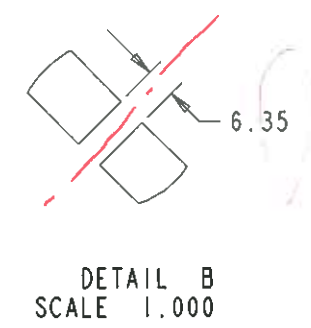
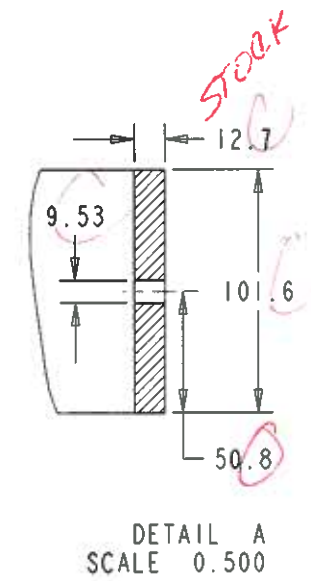
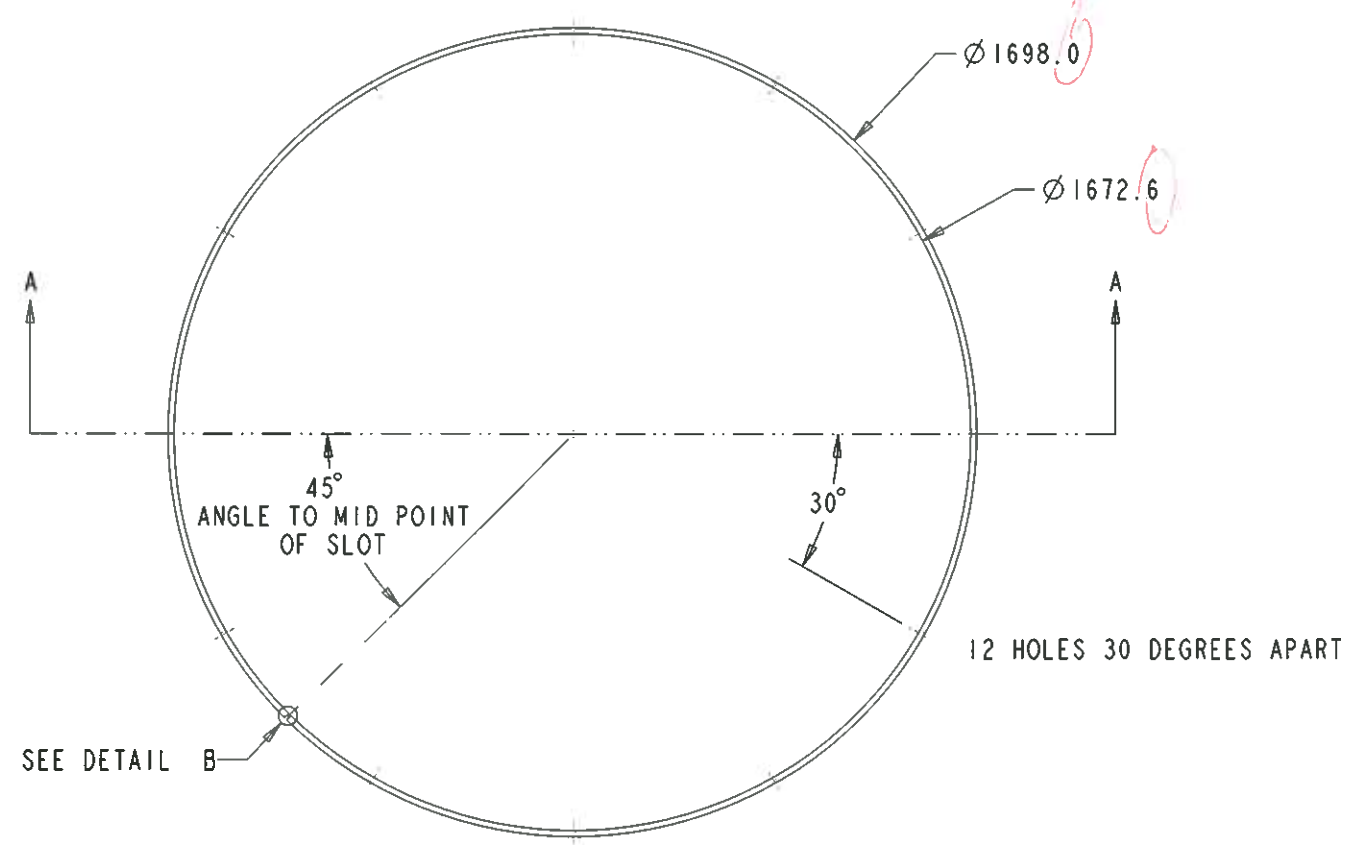
*CONSIDER ALTERNATIVE DIMENSIONING*

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS  $\pm 0.1$   $\pm 0.05$   
 ANGULAR DIMENSIONS  $\pm 1'$   
 SURFACE FINISH  $\sqrt{320}$

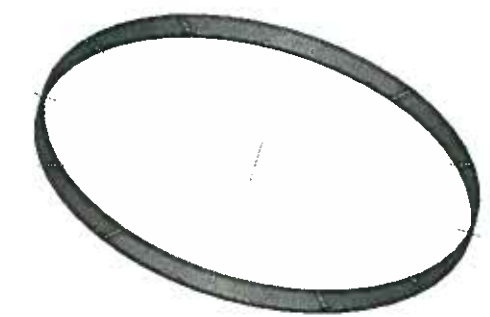
UNIVERSITY OF ALBERTA EDMONTON ALBERTA CANADA	
DESIGNED CHRIS NG	TELEPHONE (780) 492 3055
DRAWN CHRIS NG	FAX (780) 492 3408
CHECKED	EMAIL cng@ualberta.ca
APPROVED	

REF. DWGS.	REV.	DATE	REVISION	BY	APP'D

CENTER OF PARTICLE PHYSICS			
MAIN VESSEL QUARTZ WINDOW WELDS			
SCALE	APPROVAL	DWG. NO.	REV.
Jan 9, 2012	CHIEF ENGR		



ITEM	DESCRIPTION	MATL	QUANTITY



MATERIAL?  
WOOD

HOW DOES THIS WORK?

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS ± 0.10  
 DECIMAL DIMENSIONS X ± 0.10 ± 0.05  
 ANGULAR DIMENSIONS ± 1°  
 SURFACE FINISH 32 μm

**UNIVERSITY OF ALBERTA**  
 EDMONTON ALBERTA CANADA  
 DESIGNED CHRIS NG TELEPHONE (780) 492 3095  
 DRAWN CHRIS NG FAX (780) 492 3408  
 CHECKED E-MAIL: cjag@ualberta.ca  
 APPROVED

REF. DWGS.	REV.	DATE	REVISION	BY
	A	DEC 15	ORIGINAL	
	B	DEC 22	ADDED HOLES, SLOT	

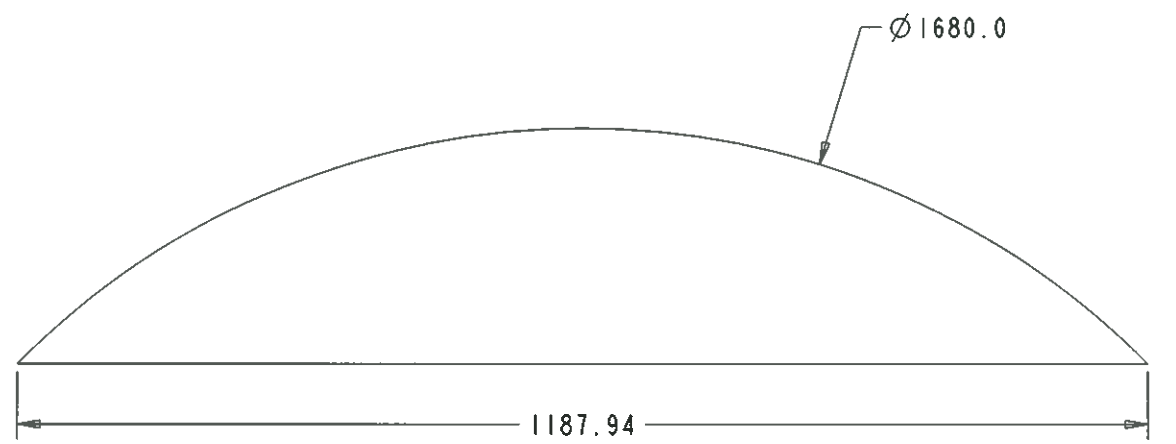
**CENTER OF PARTICLE PHYSICS**  
 SUPPORT RING  
 SCALE 0.100 APPROVAL DWG. NO. REV. B  
 DATE DEC 22, 2011 CHIEF ENGR.

e d c b a

ITEM	DESCRIPTION	MATL	QUANTITY

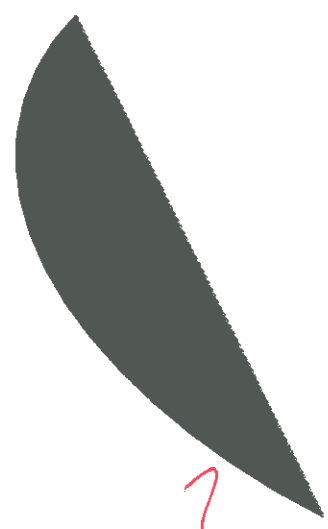
3

3



2

2



*STOCK?*

*MATERIAL? 6061?*

*HOW DOES THIS WORK?*

REF. DWGS.	REV.	DATE	REVISION	BY

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED  
 TOLERANCES UNLESS OTHERWISE SPECIFIED:  
 FRACTIONAL DIMENSIONS  
 DECIMAL DIMENSIONS X ± .1 XX ± .05  
 ANGULAR DIMENSIONS ± 1'  
 SURFACE FINISH 32um

**UNIVERSITY OF ALBERTA**  
 EDMONTON ALBERTA CANADA

DESIGNED CHRIS NG TELEPHONE (780) 492 3095  
 DRAWN CHRIS NG FAX (780) 492 3408  
 CHECKED E-MAIL: c.jag@ualberta.ca

APPROVED

**CENTER OF PARTICLE PHYSICS**

SUPPORT DISK

SCALE 0.200 APPROVAL DWG. NO. REV.  
 DATE DEC 7, 2011 CHIEF ENGR.

e d c b a