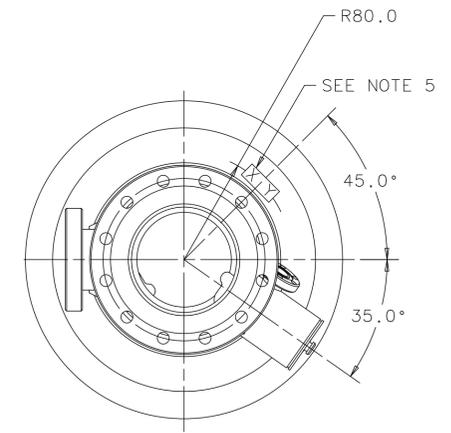
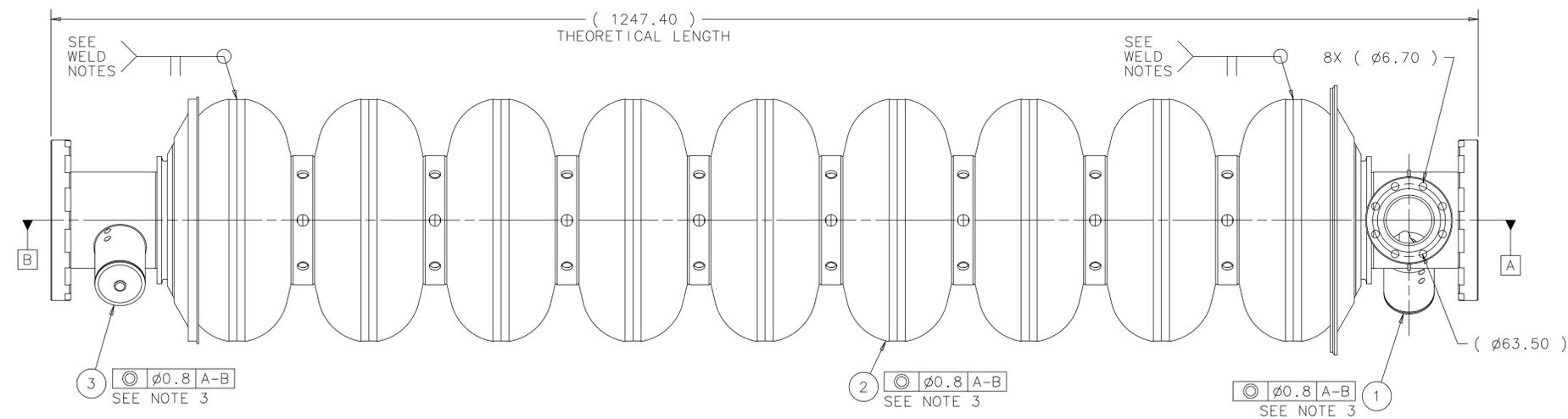
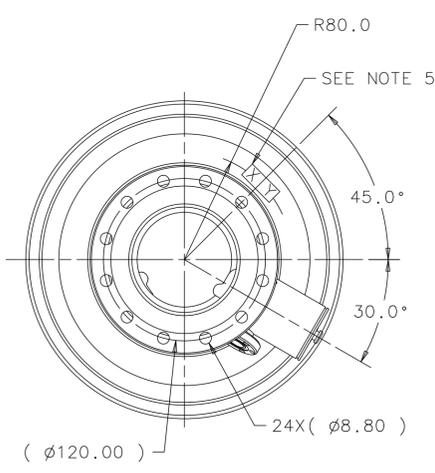
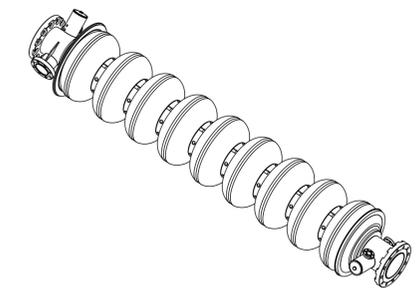
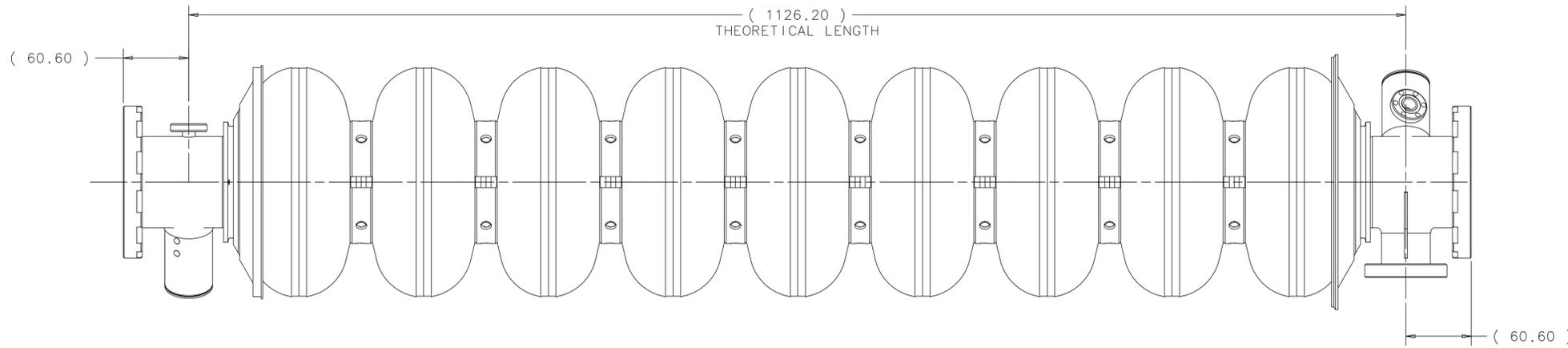


REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	CHANGED PARENT ASSEMBLY UPDATED DRAWING TO REFLECT CHANGE	E. PIRTLE	19-DEC-2008
		M. FOLEY	06-JAN-2008



NOTES

- THIS DEVICE IS EASILY DEFORMED. A FIXTURE IS REQUIRED FOR ALL HANDLING.
- ENSURE THAT THE CLOCKING OF THE SUB-ASSEMBLIES ARE HELD TO ±0.5°
- ITEMS 1, 2, AND 3 ARE TO BE CONCENTRIC WITHIN ø0.4MM ALONG DATUMS A AND B
- DEFINITION OF FORM AND TOLERANCES CONCERNING WELD JOINT PREPARATION AT THE IRIS AND THE EQUATOR TO BE COORDINATED BETWEEN MANUFACTURERS AND FNAL
- PUNCH 4MM HIGH, 0.2MM DEEP LETTERS  
X=FIRM CODE Y=MANUFACTURING NUMBER

WELDING NOTES:

- ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2x10<sup>-10</sup> ATM-CC/SEC FOR HELIUM.
- ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
- ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
- ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

PARTS OF THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. PARTS OF THIS DRAWING HAVE BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

ITEM	PART NO.	DESCRIPTION OR SIZE	QTY.
3	MD-440003	FNAL END HALF CELL ASSEMBLY (LONG VERSION)	1
2	MD-439173	DESY DUMBBELL WELDMENT ASSEMBLY (SHORT VERSION)	1
1	MD-439180	DESY END HALF CELL ASSEMBLY (SHORT VERSION)	1

PARTS LIST

UNLESS OTHERWISE SPECIFIED	ORIGINATOR	M. FOLEY	17-OCT-2005
.X	.XX	ANGLE	DRAWN
± 1.0	± 0.20	± 0.5°	CHECKED
			APPROVED

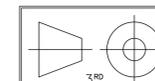
1. BREAK ALL SHARP EDGES 0.40 MAX.	USED ON
2. DO NOT SCALE DRAWING.	
3. DIMENSIONS BASED UPON ASME Y14.5M-1994	
4. MAX. ALL MACH. SURFACES	
5. DRAWING UNITS: METRIC	

SEE PARTS LIST

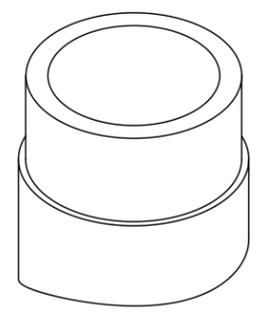
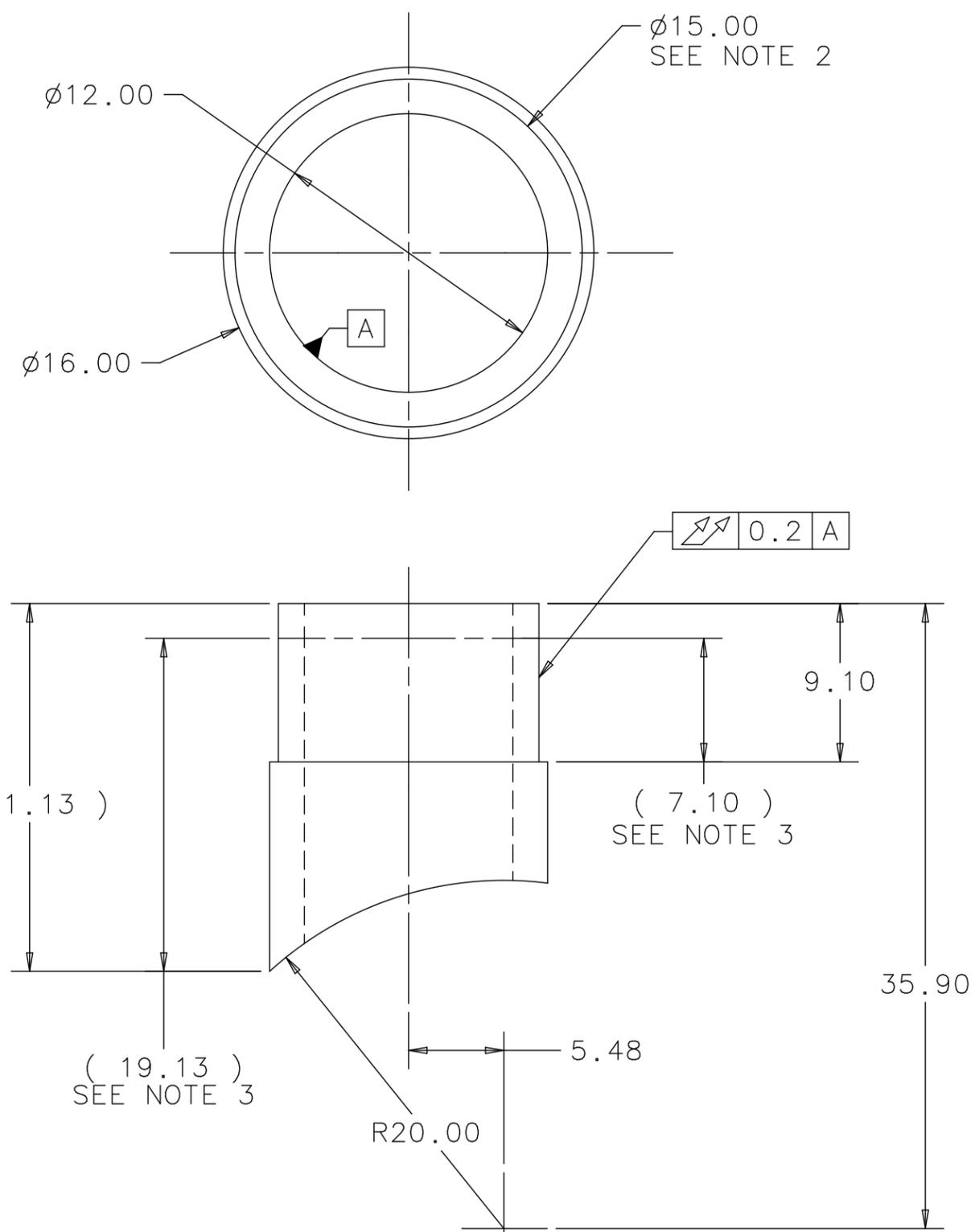
**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

FNAL 1.3GHZ TESLA  
RF CAVITY  
ASSEMBLY

SCALE	DRAWING NUMBER	SHEET	REV
1:2	4904.010-MD-440004	1 OF 1	A
CREATED WITH : Ideas12NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



NOTES:

- 1) SURFACE IS TO BE FREE OF DAMAGE
- 2) DIMENSION COORESponds WITH PART NUMBER MD-439157. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
- 3) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439174 AND MD-439175

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
±	--	± 0.02	CHECKED	D.MITCHELL	16-SEP-2005
			APPROVED	M.FOLEY	20-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX.			USED ON		
2. DO NOT SCALE DRAWING.			MD-439174		
3. DIMENSIONS BASED UPON ASME Y14.5M-1994			MD-439175		
4. MAX. ALL MACH. SURFACES			MATERIAL		
5. DRAWING UNITS: METRIC, mm			RRR 300 NIOBIUM		

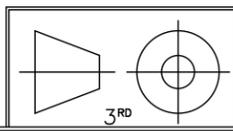
**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
HOM SPOOL PIECE

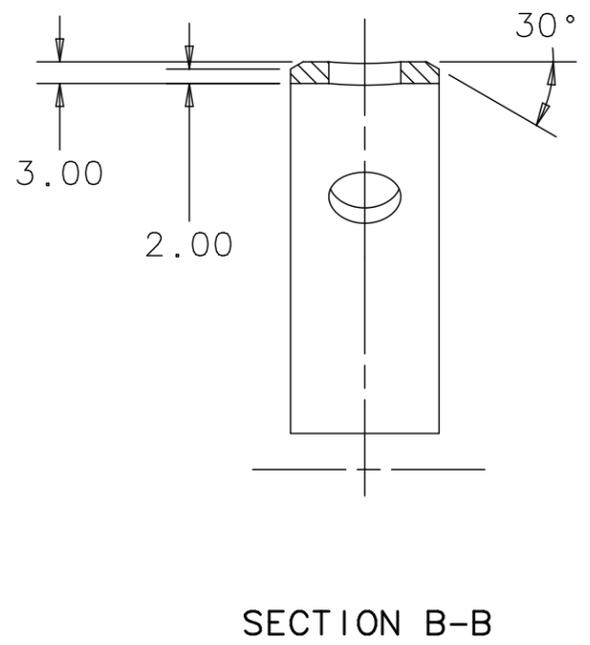
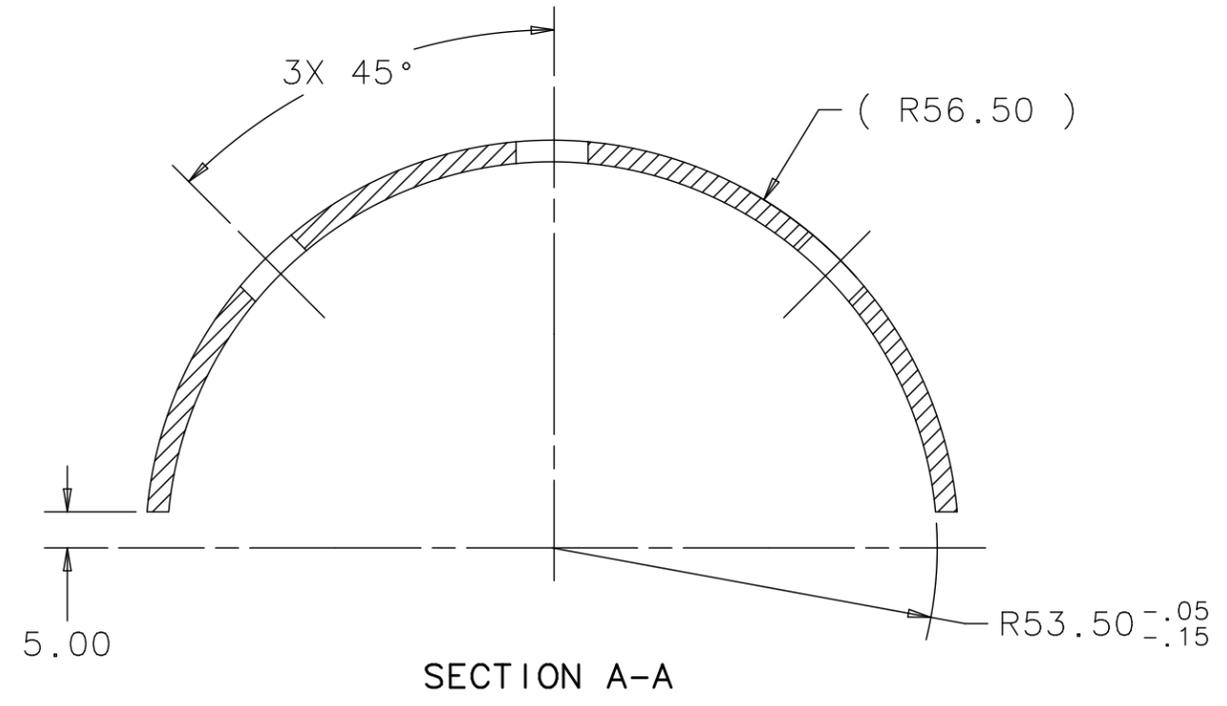
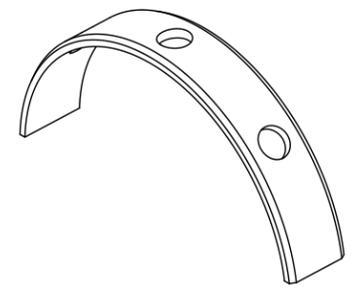
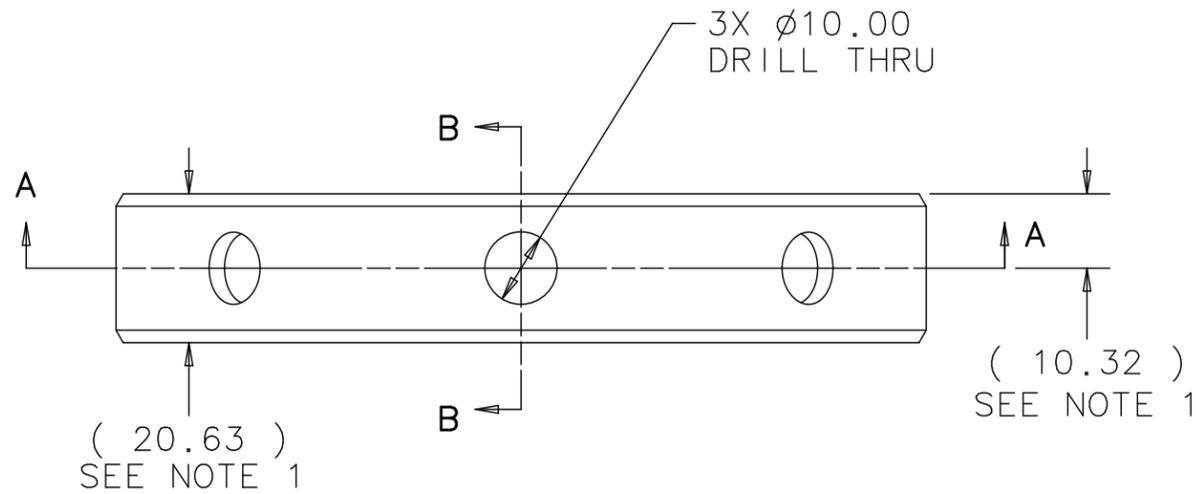
SCALE	DRAWING NUMBER	SHEET	REV
3:1	4904.010-MB-439150	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	CHANGED MATERIAL FROM RRR 30 TO RRR 300	E.PIRTLE	27-OCT-2006
		M.FOLEY	27-OCT-2006



NOTE:

1) DIMENSIONS TO BE DETERMINED BY THE MANUFACTURER TO ALLOW FOR FUTURE EB-WELDING CONTRACTION.

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
$\pm$ - -	$\pm$ 0.08	$\pm$ 1°	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N8 5. DRAWING UNITS: U.S. INCH			APPROVED	M.FOLEY	16-SEP-2005
			USED ON		
MATERIAL			RRR 300 NIOBIUM		

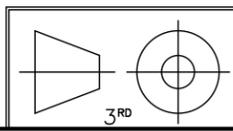
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UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
HALF SUPPORT RING

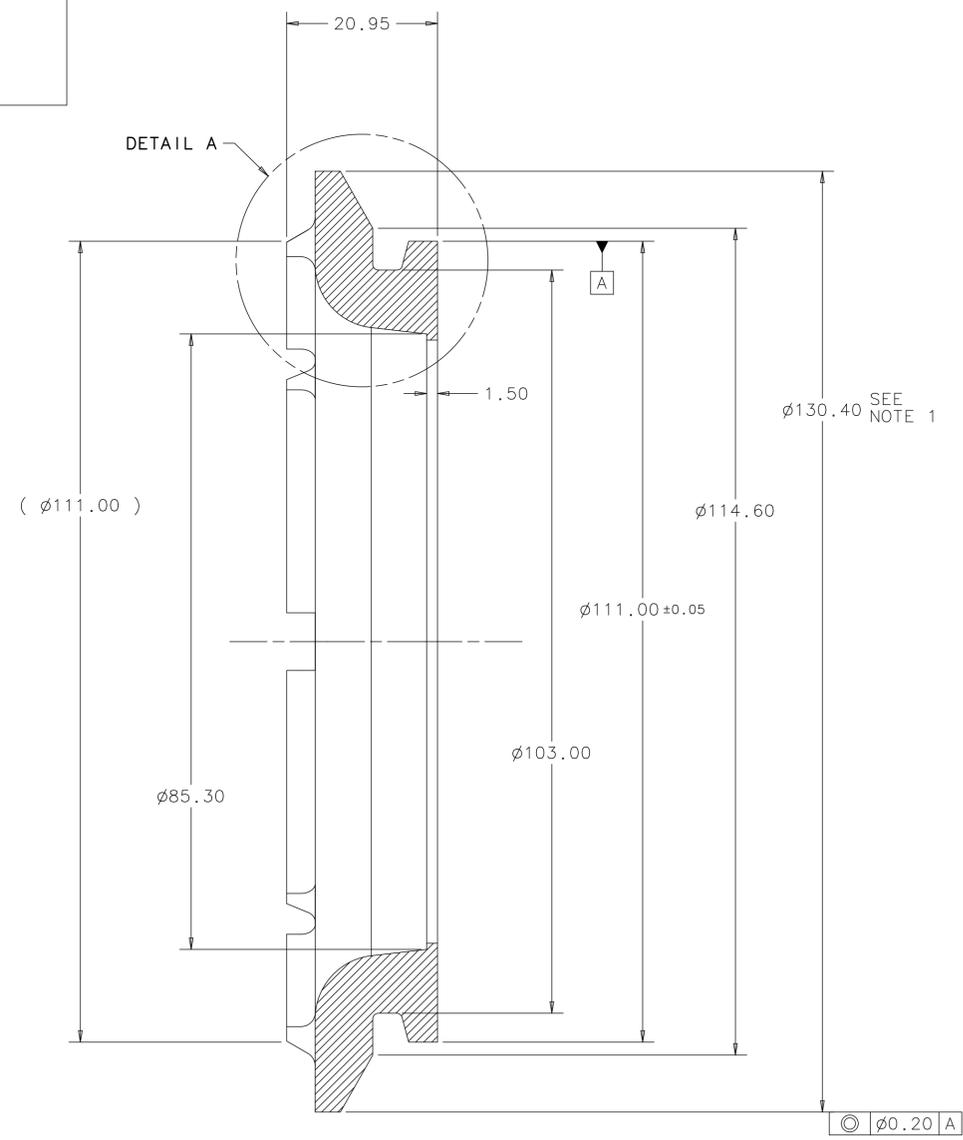
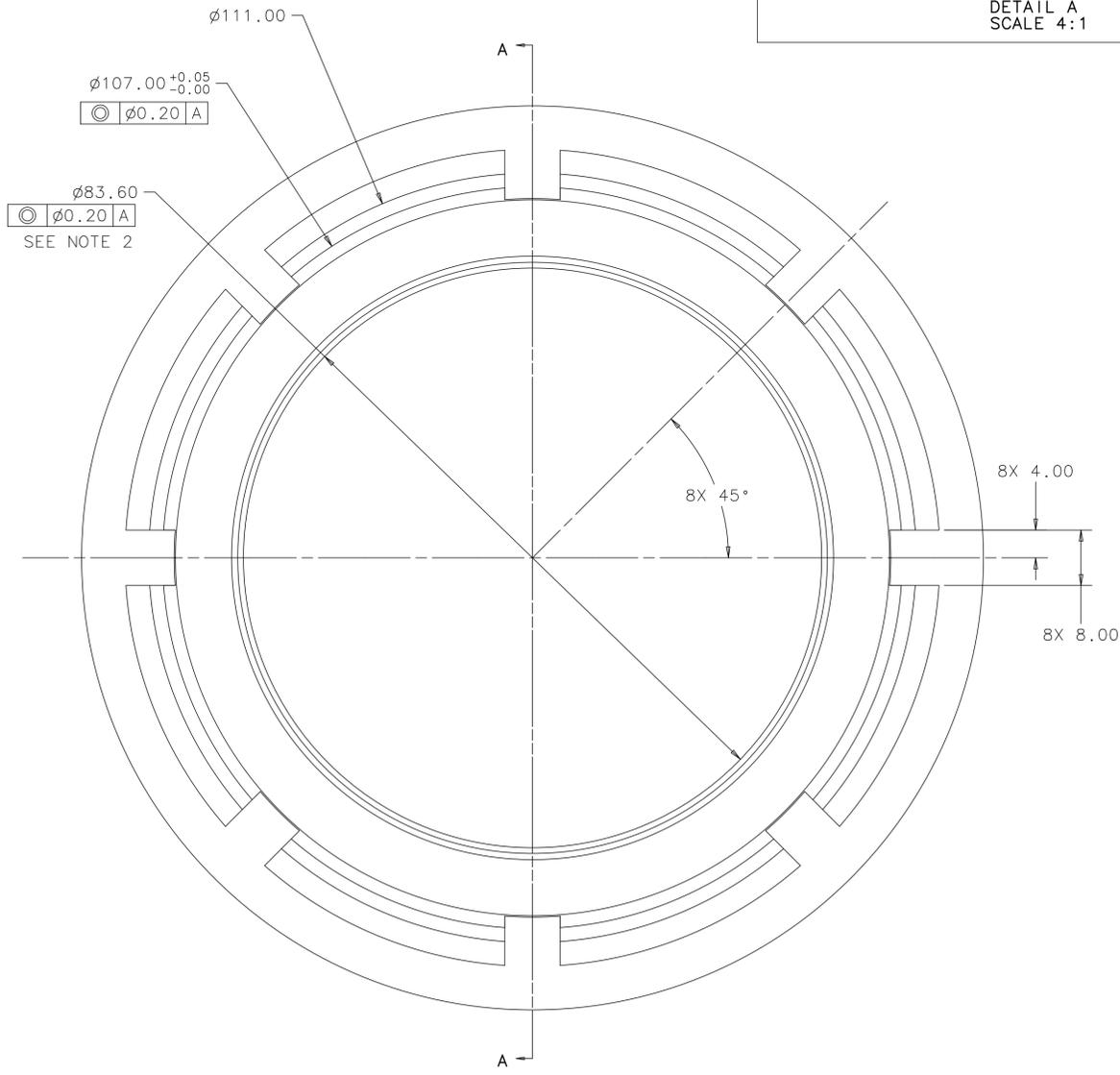
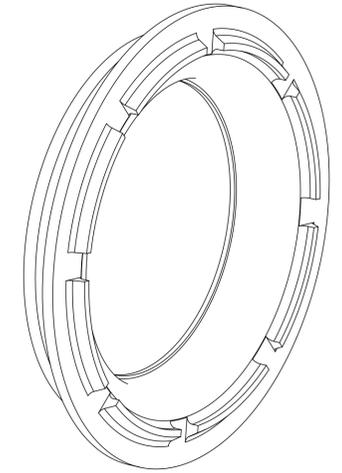
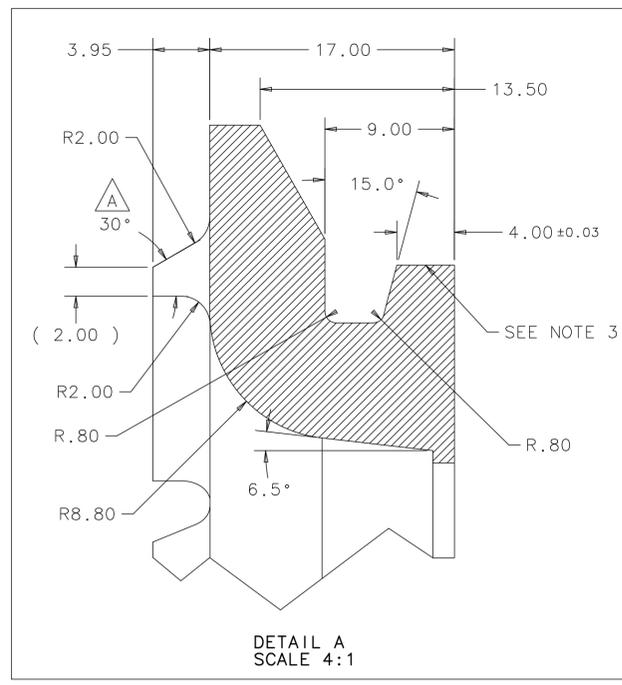
SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MB-439151	1 OF 1	A
CREATED WITH : Ideas12NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	ADDED MISSING DIMENSION	E. PIRTLE	04-APR-2006
		M. FOLEY	06-APR-2006
B	CHANGED MATERIAL FROM RRR 30 TO RRR 300	E. PIRTLE	26-OCT-2006
		M. FOLEY	26-OCT-2006



- NOTE:
- 1) DIMENSION COORESPONDS WITH PART NUMBER MD-439168 (SHORT VERSION) OR PART NUMBER MD-439167 (LONG VERSION). TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
  - 2) DIMENSION COORESPONDS WITH PART NUMBER MB-439164. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
  - 3) SURFACE CONTOUR TO BE MACHINED AFTER WELDING STEPS IN DRAWING NUMBER MD-439178

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY
.X	.XX	ANGLE	DRAWN	E. PIRTLE
±	-- ±	± 0.10 ± 1°	CHECKED	D. MITCHELL
1. BREAK ALL SHARP EDGES 0.40 MAX.			APPROVED	M. FOLEY
2. DO NOT SCALE DRAWING.			USED ON	
3. DIMENSIONS BASED UPON ASME Y14.5M-1994			MD-439178	
4. MAX. ALL MACH. SURFACES			MATERIAL	
5. DRAWING UNITS: U.S. INCH			RRR 300 NIOBIUM	

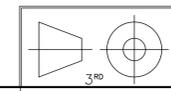
**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

**DESY 1.3GHZ TESLA RF CAVITY END DISK FLANGE**

SCALE	DRAWING NUMBER	SHEET	REV
2:1	4904.010-MD-439152	1 OF 1	B

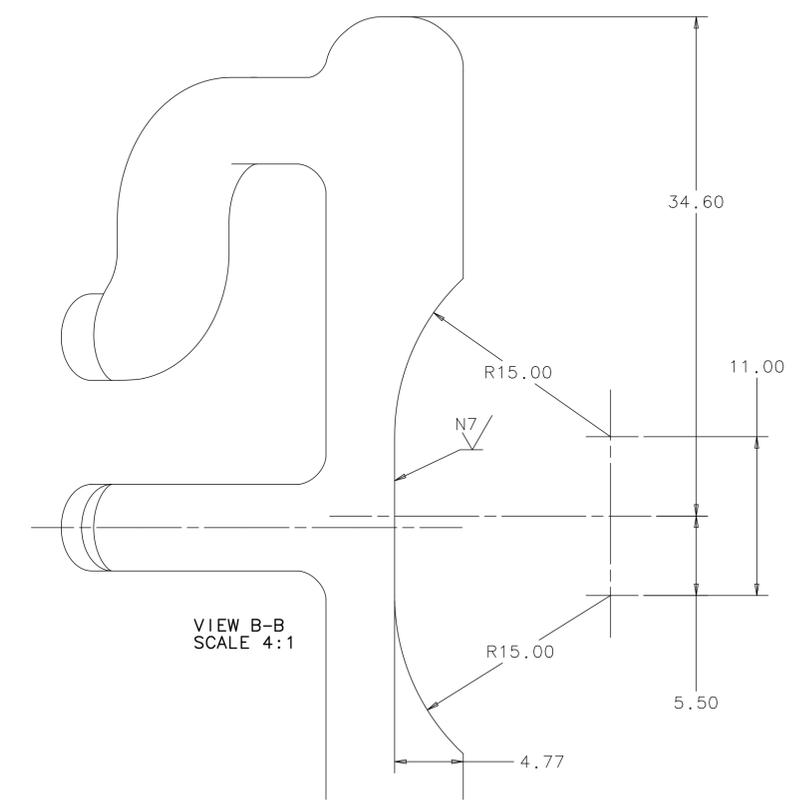
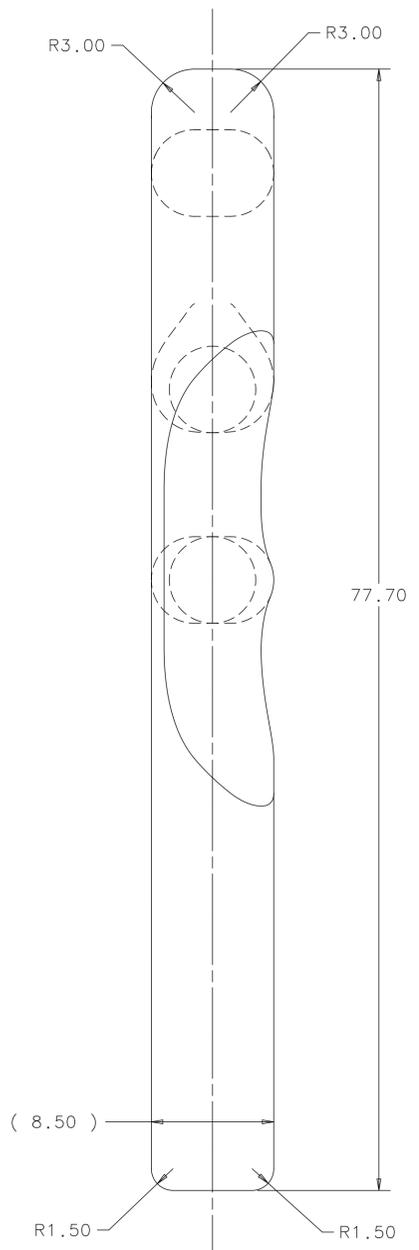
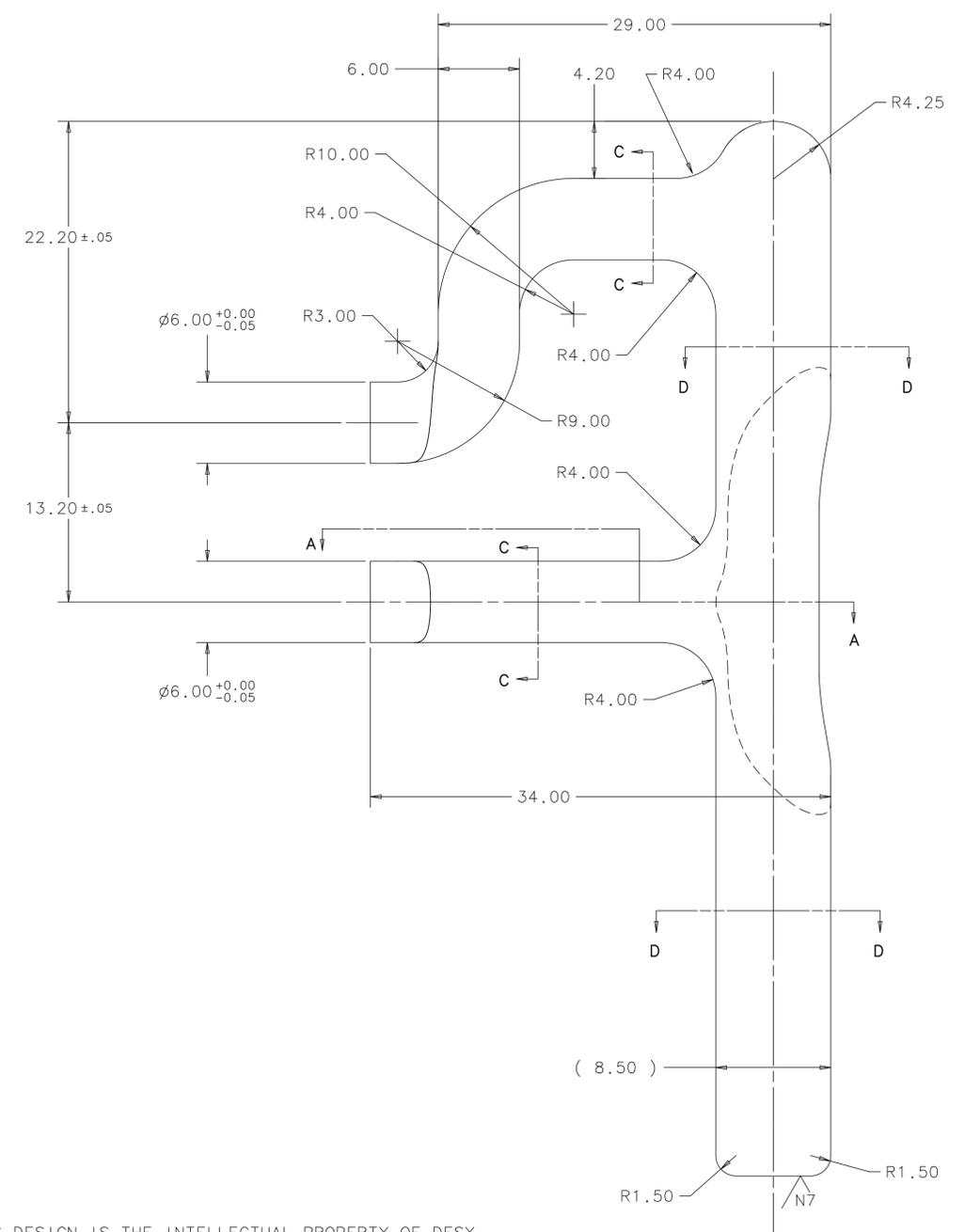
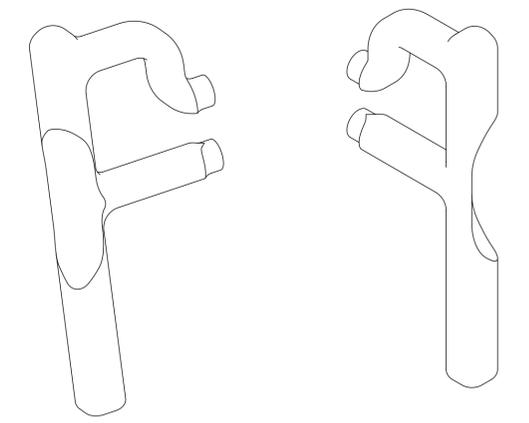
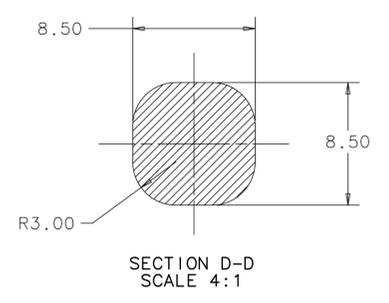
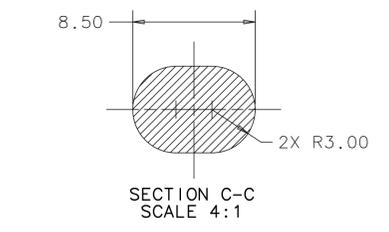
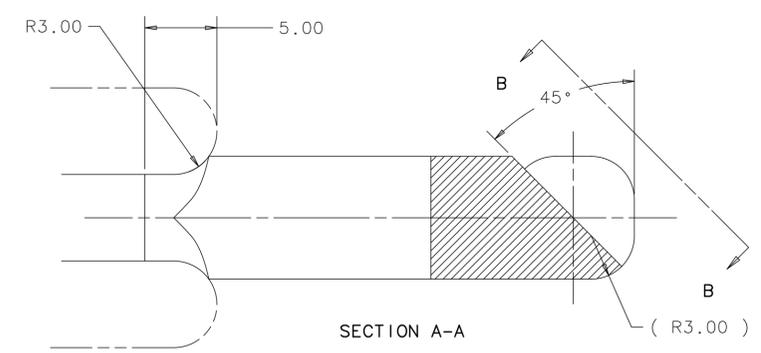
CREATED WITH : Ideas12NXSeries GROUP: ACCELERATOR MECH. SUPPT.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT



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REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



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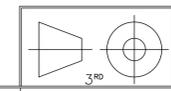
FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY
.X	.XX	ANGLE	DRAWN	E.PIRTLE
±	--	± 0.10	CHECKED	D.MITCHELL
1. BREAK ALL SHARP EDGES 0.40 MAX.			APPROVED	M.FOLEY
2. DO NOT SCALE DRAWING.			USED ON	
3. DIMENSIONS BASED UPON ASME Y14.5M-1994			MD-439174	
4. MAX. ALL MACH. SURFACES			MATERIAL	
5. DRAWING UNITS: METRIC, mm			RRR 300 NIOBIUM	

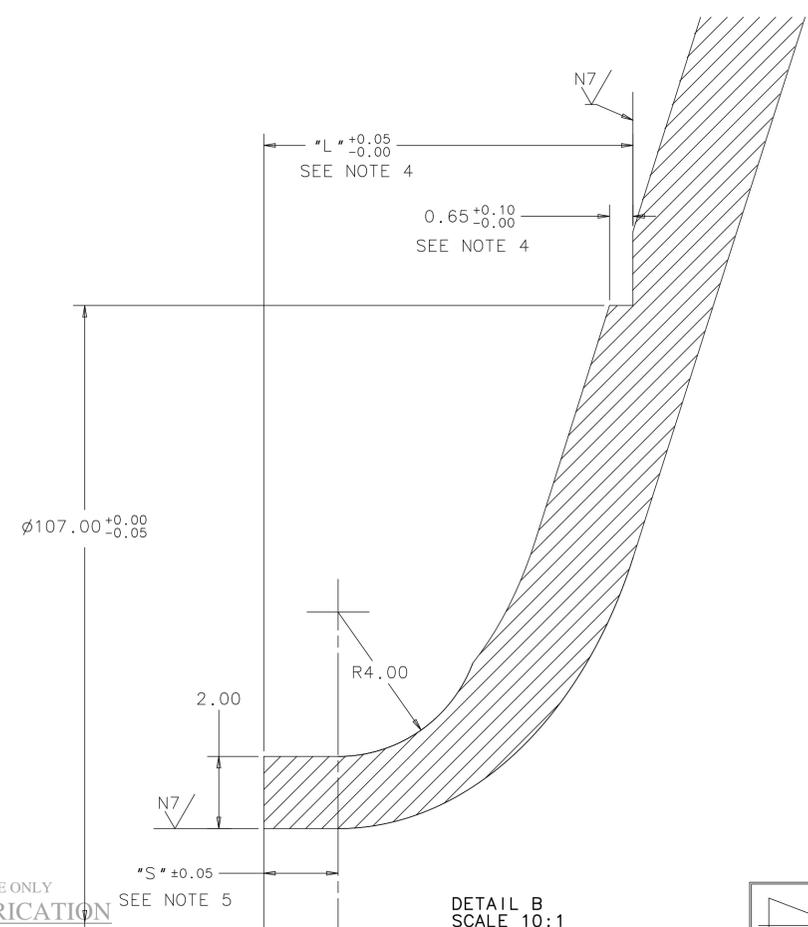
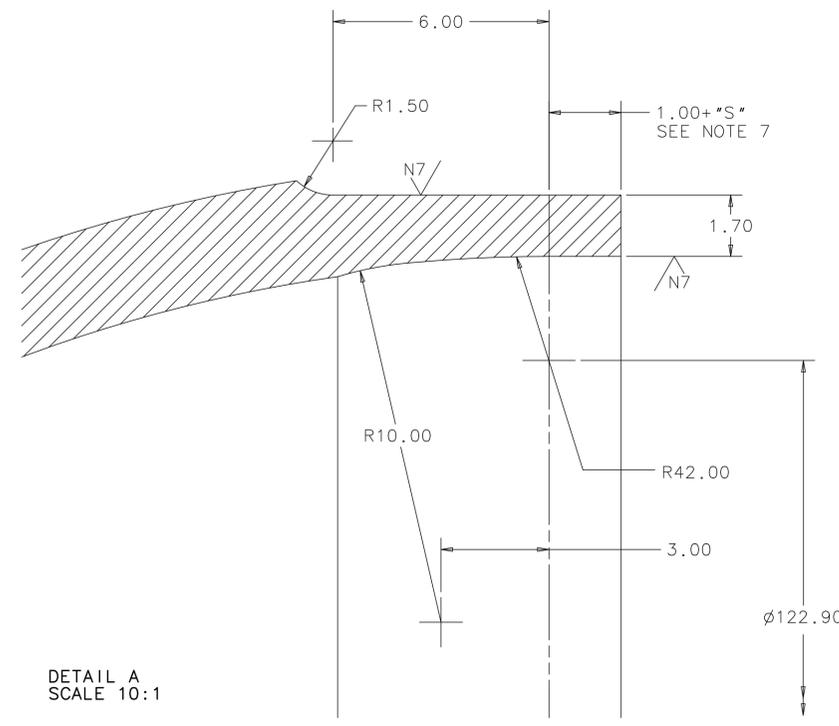
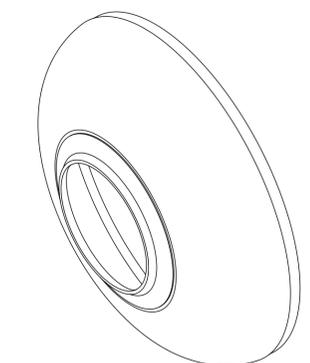
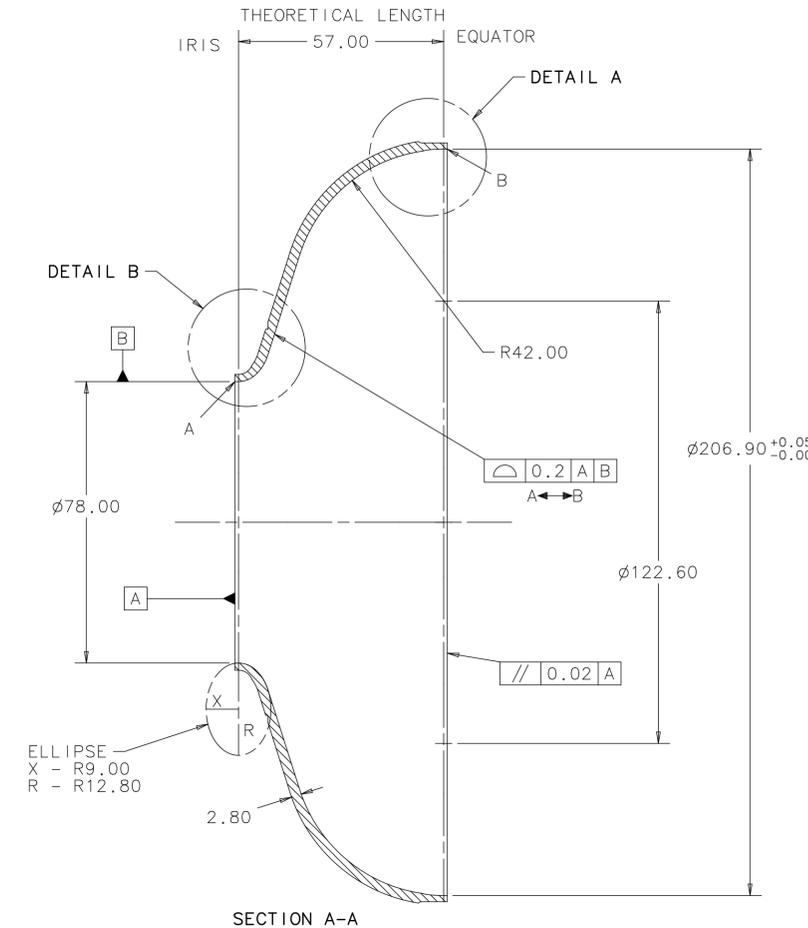
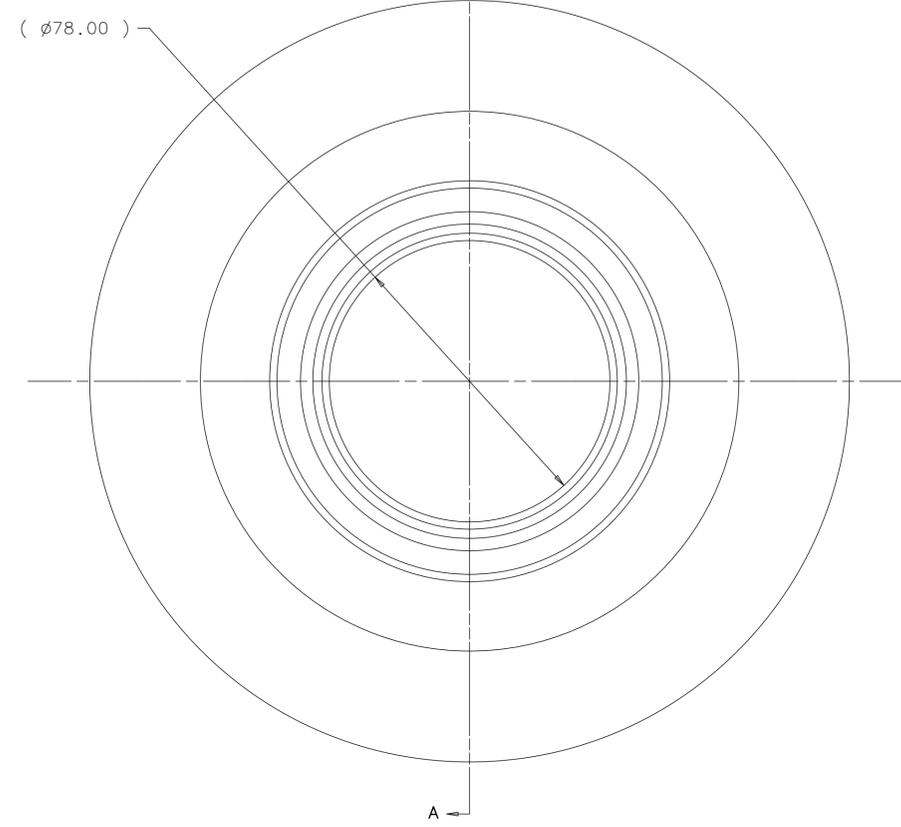
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UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
LONG END HOM FORMTEIL

SCALE	DRAWING NUMBER	SHEET	REV
4:1	4904.010-MD-439154	1 OF 1	



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



- NOTES:
- 1) THE INTERNAL SURFACE MAY SHOW NO DAMAGE CAUSED BY FORMING
  - 2) DIAMETER, FORM, AND POSITION TOLERANCES MEASURED IN HALF CELL'S STRAINED CONDITION
  - 3) DO NOT BREAK EDGES ON END CELL
  - 4) DIMENSION "L" DETERMINED BY THE MANUFACTURER SO THAT DIMENSION 0.65 IS KEPT
  - 5) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS
  - 6) DUE TO THE MANUFACTURING PROCESS THE WALL THICKNESS BETWEEN IRIS AND EQUATOR IS NOT CONSTANT
  - 7) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.

UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESIGN	
.X	.XX	ANGLE	
±	- -	± 0.05	± 1°
1. BREAK ALL SHARP EDGES 0.40 MAX.	APPROVED	M.FOLEY	16-SEP-2005
2. DO NOT SCALE DRAWING.	USED ON		
3. DIMENSIONS BASED UPON ASME Y14.5M-1994	MD-439178		
4. MAX. ALL MACH. SURFACES	MATERIAL		
5. DRAWING UNITS: METRIC, mm	RRR 300 NIOBIUM		

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UNITED STATES DEPARTMENT OF ENERGY

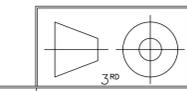
DESY 1.3GHZ TESLA  
RF CAVITY  
LONG END HALF CELL

SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MD-439155	1 OF 1	

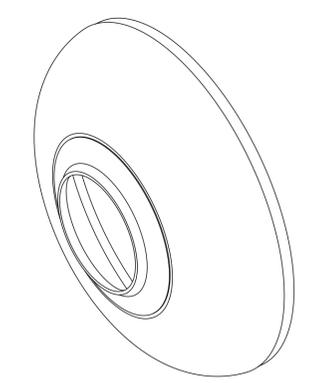
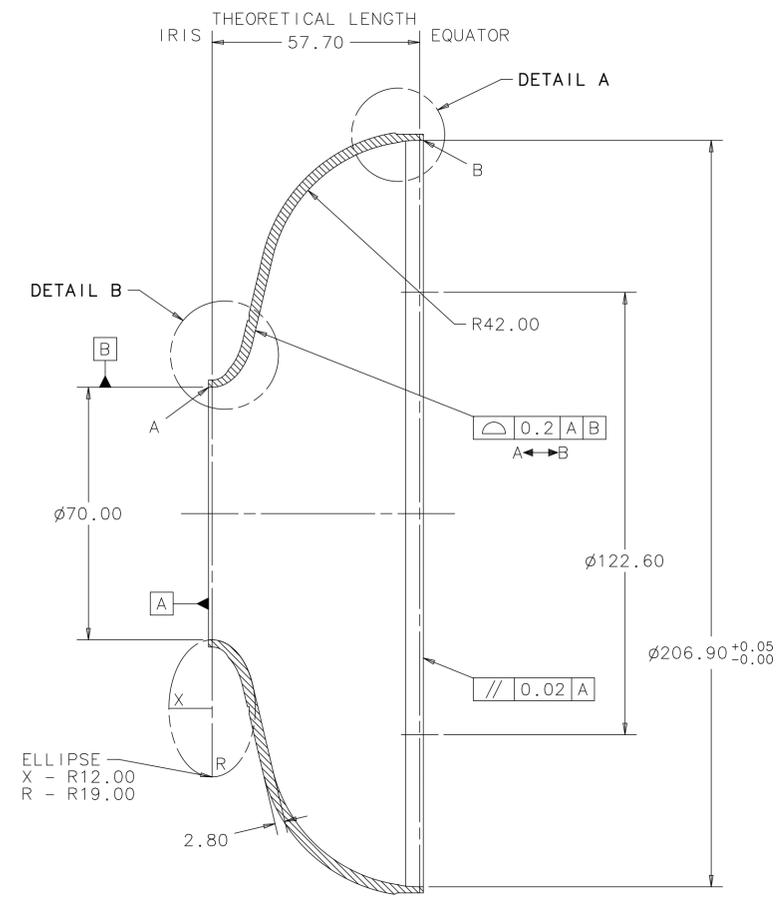
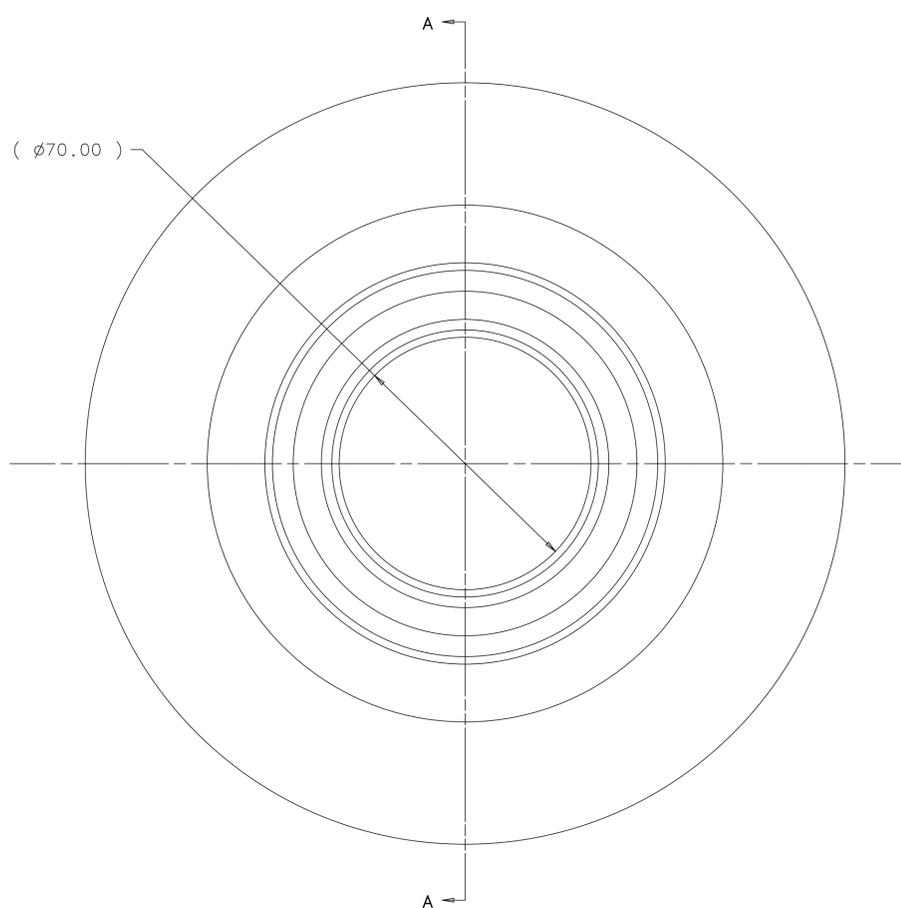
CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT.

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

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**NOT FOR FABRICATION**  
MAY NOT BE CURRENT

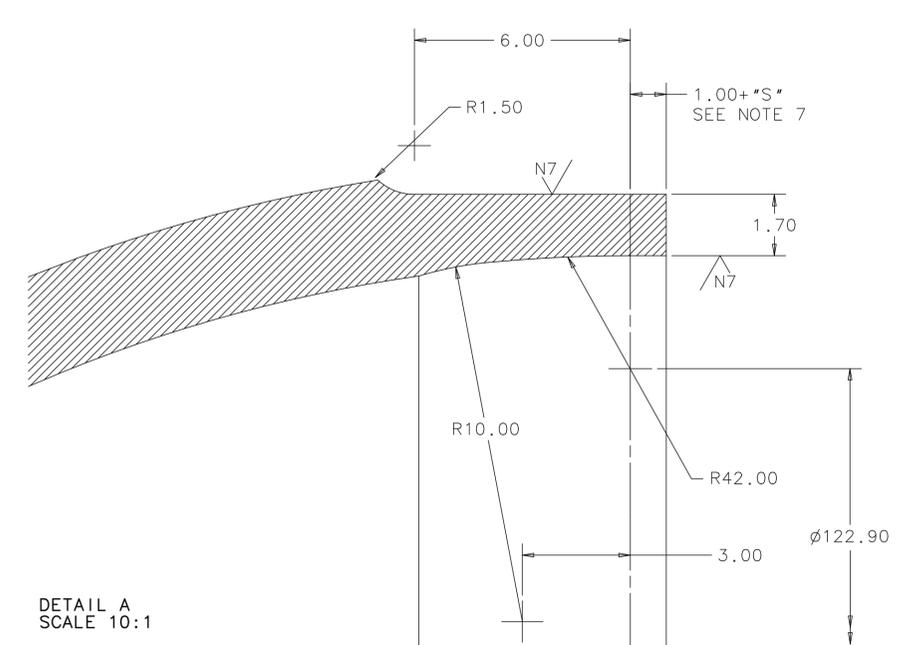


REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE

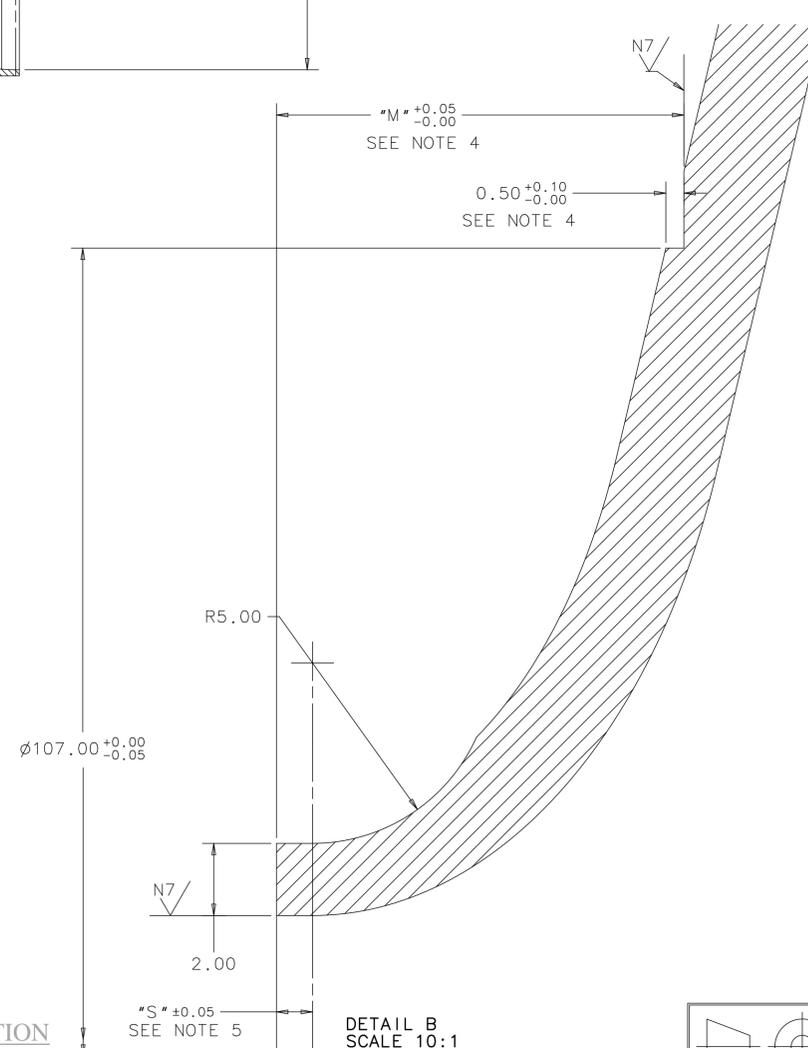


ELLIPSE  
X - R12.00  
R - R19.00

SECTION A-A



DETAIL A  
SCALE 10:1



DETAIL B  
SCALE 10:1

- NOTES:
- 1) THE INTERNAL SURFACE MAY SHOW NO DAMAGE CAUSED BY FORMING
  - 2) DIAMETER, FORM, AND POSITION TOLERANCES MEASURED IN HALF CELL'S STRAINED CONDITION
  - 3) DO NOT BREAK EDGES ON END CELL
  - 4) DIMENSION "M" DETERMINED BY THE MANUFACTURER SO THAT DIMENSION 0.50 IS KEPT
  - 5) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS
  - 6) DUE TO THE MANUFACTURING PROCESS THE WALL THICKNESS BETWEEN IRIS AND EQUATOR IS NOT CONSTANT
  - 7) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.

UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESIGN	DATE
.X	.XX	ANGLE	
± -- ± 0.05 ± 1°	DRAWN	E.PIRTLE	18-APR-2005
	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX.	APPROVED	M.FOLEY	16-SEP-2005
2. DO NOT SCALE DRAWING.	USED ON	MC-439172	
3. DIMENSIONS BASED UPON ASME Y14.5M-1994	MATERIAL	RRR 300 NIOBIUM	
4. MAX. ALL MACH. SURFACES			
5. DRAWING UNITS: METRIC, mm			

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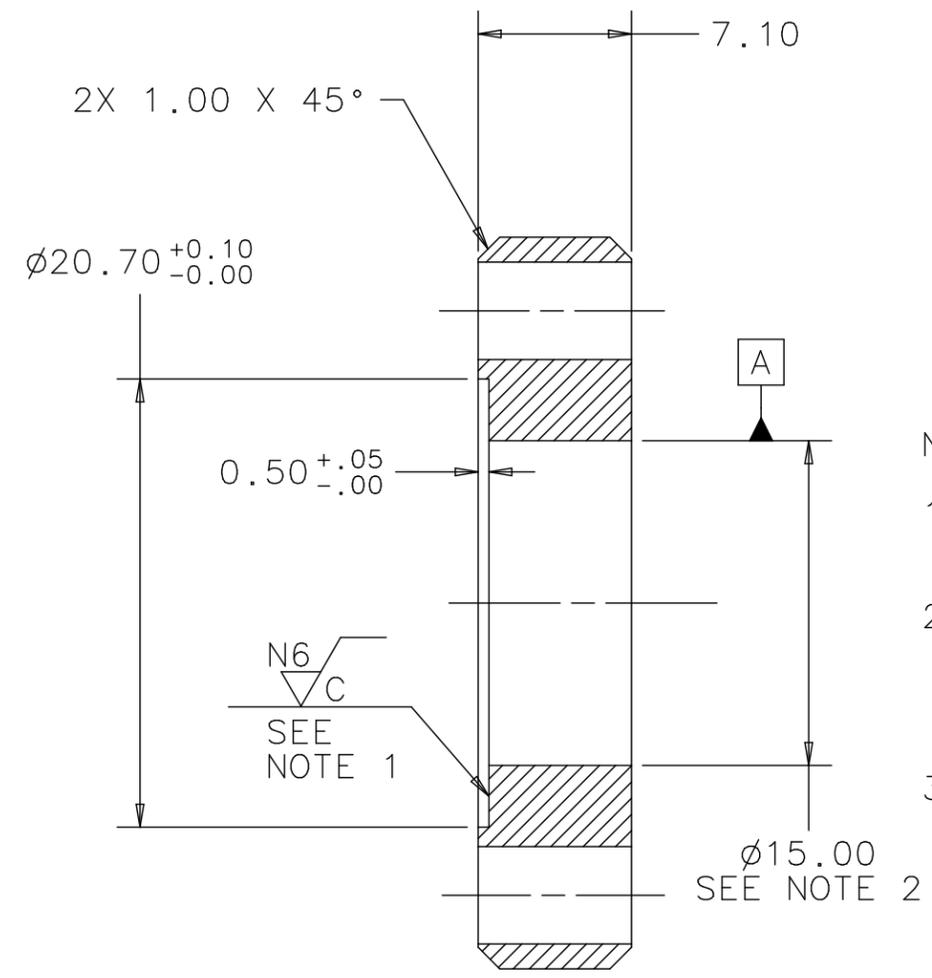
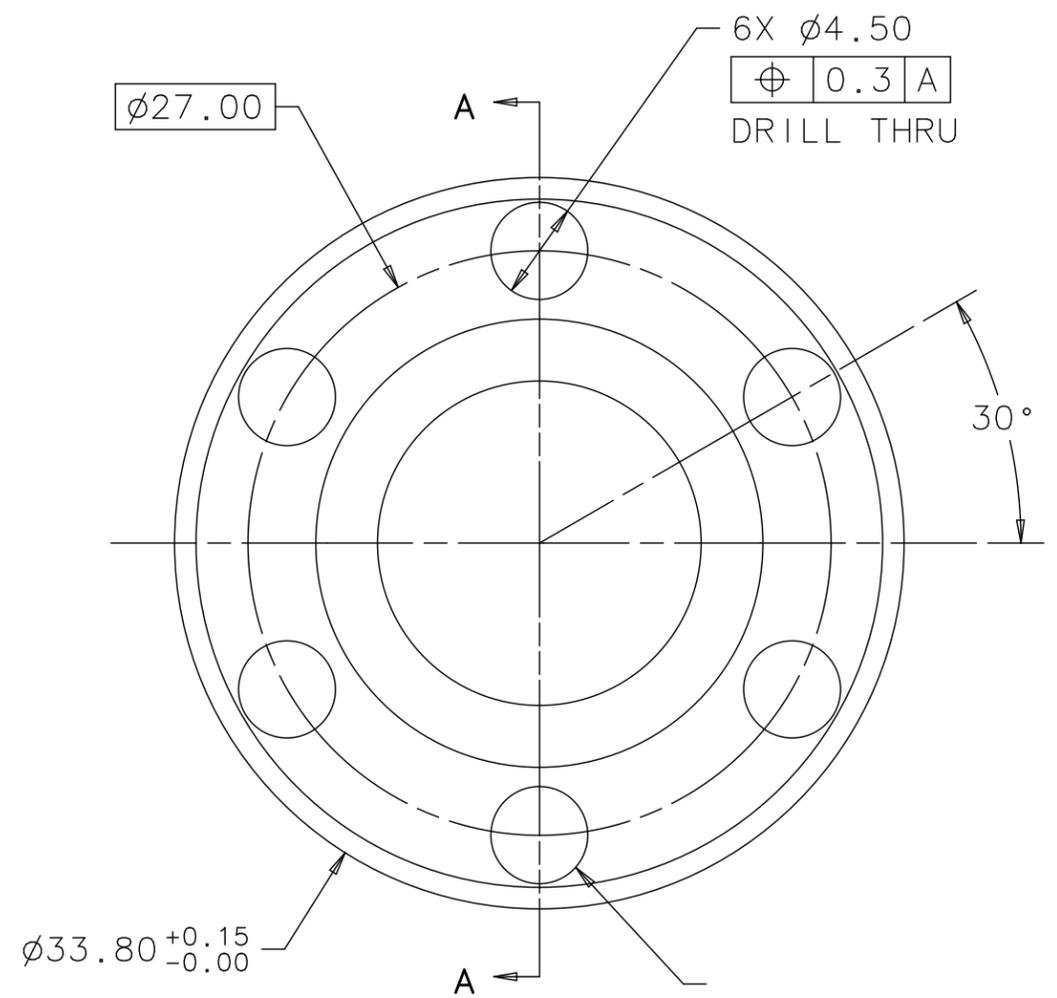
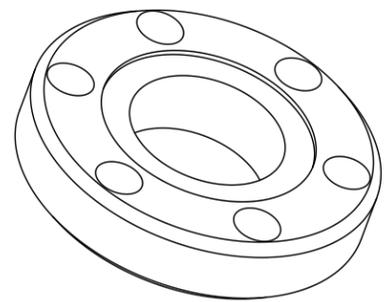
DESY 1.3GHZ TESLA  
RF CAVITY  
MID HALF CELL

SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MD-439156	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

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FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



SECTION A-A

NOTE:

- 1) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING
- 2) DIMENSION COORESPONDS WITH PART NUMBER MB-439150. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
- 3) USE PRIMARY MILLIMETER DIMENSIONS TO MAKE PART. [INCHES] SHOWN FOR REFERENCE

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
±	--	± 0.20	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX.			APPROVED	M.FOLEY	16-SEP-2005
2. DO NOT SCALE DRAWING.			USED ON		
3. DIMENSIONS BASED UPON ASME Y14.5M-1994			MD-439179		
4. MAX. ALL MACH. SURFACES			MATERIAL		
5. DRAWING UNITS: METRIC			NIOBIUM-TITANIUM 55%		

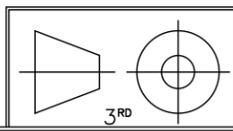
**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
NW 12 FLANGE

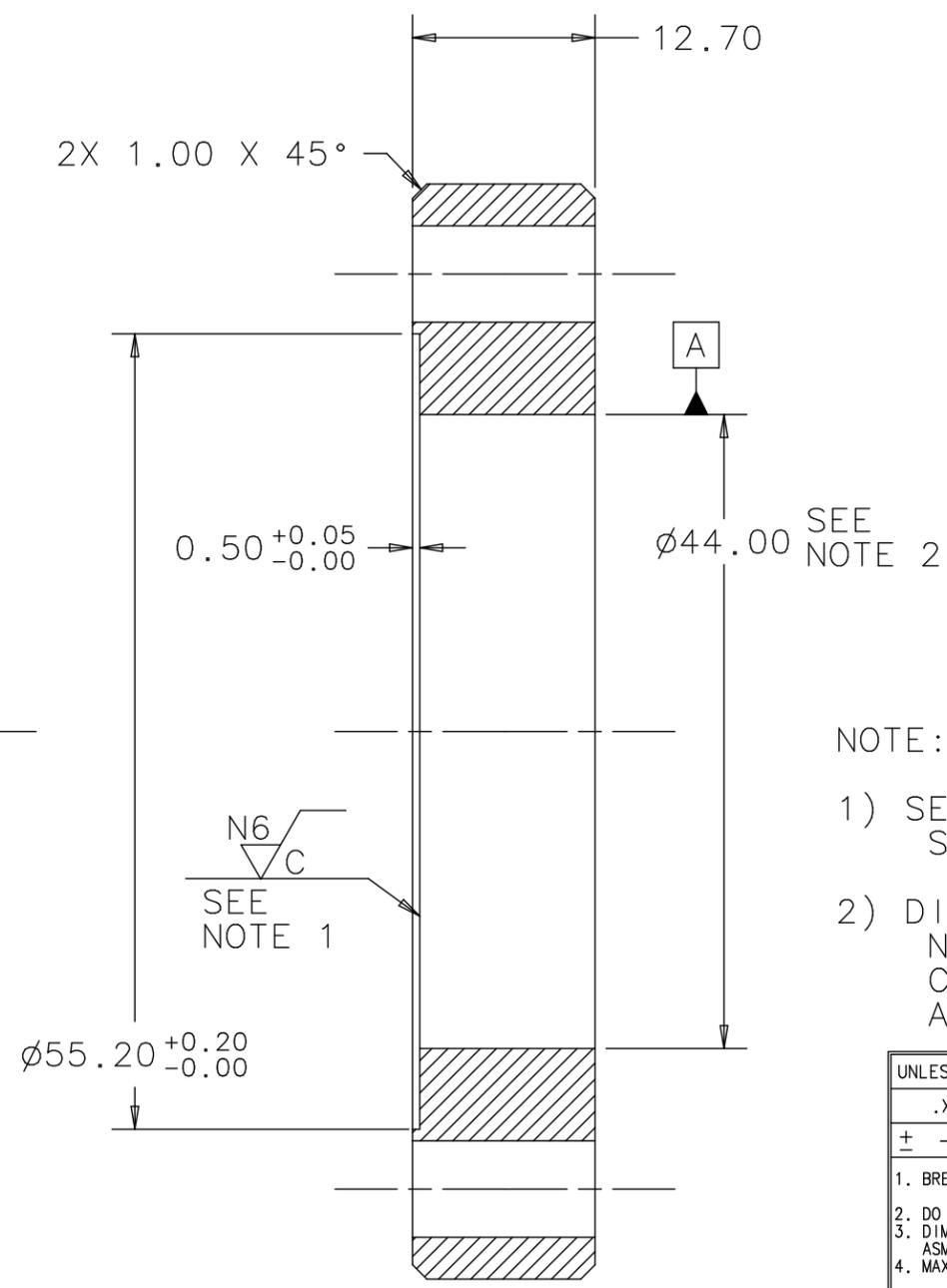
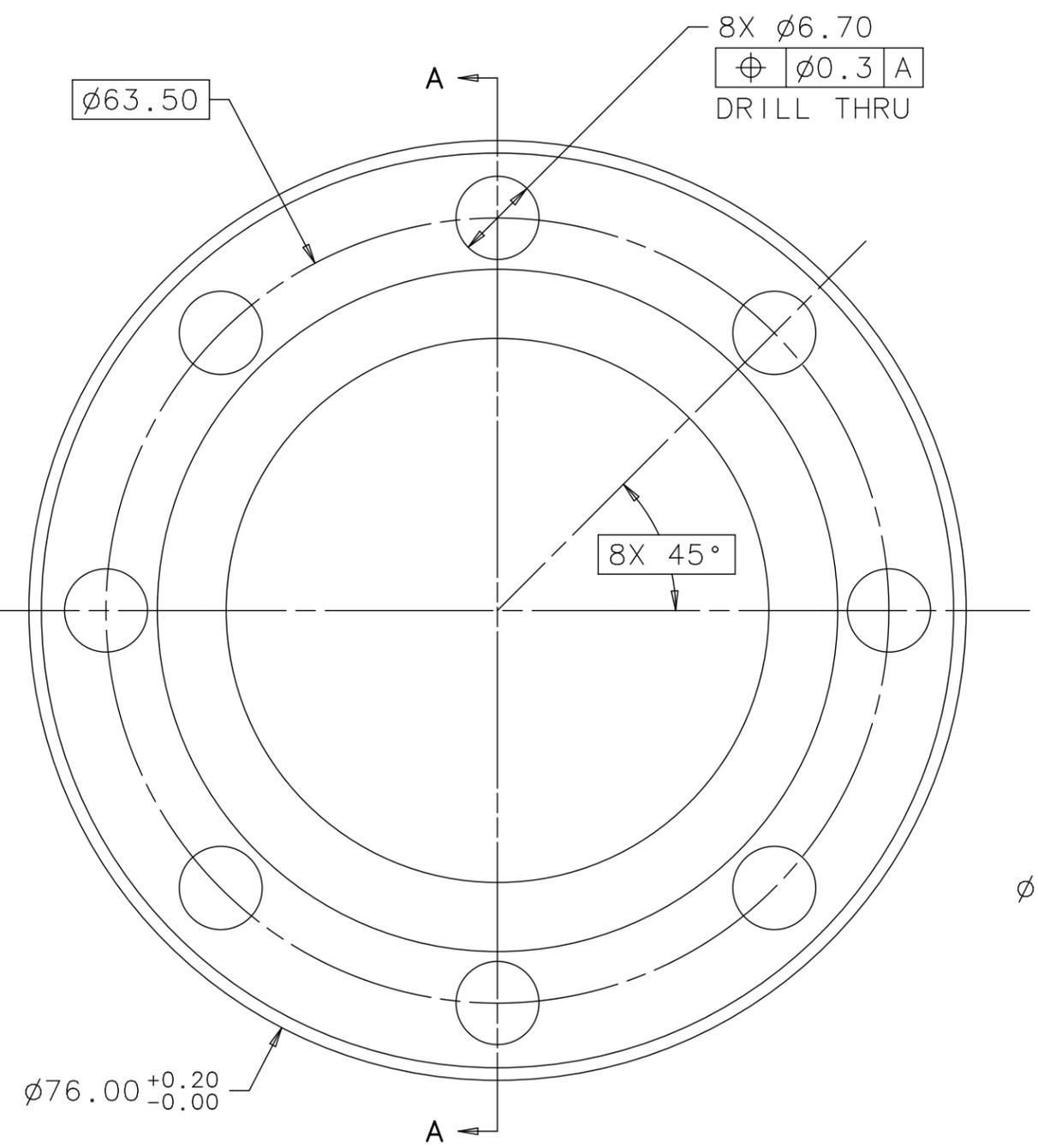
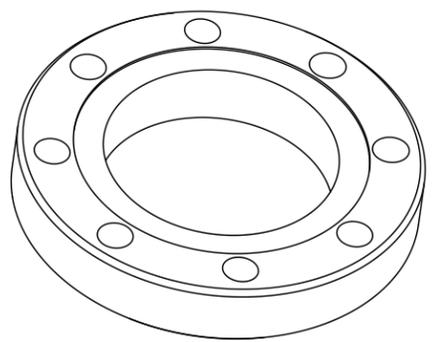
SCALE	DRAWING NUMBER	SHEET	REV
3:1	4904.010-MB-439157	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



- NOTE:
- 1) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING
  - 2) DIMENSION COORESponds WITH PART NUMBER MB-439171. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
±	--	± 0.20	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES 5. DRAWING UNITS: METRIC, mm			APPROVED	M.FOLEY	16-SEP-2005
			USED ON		
			MATERIAL		
			NIOBIUM-TITANIUM 55%		

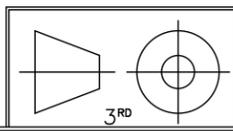
**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
 RF CAVITY  
 NW 40 FLANGE

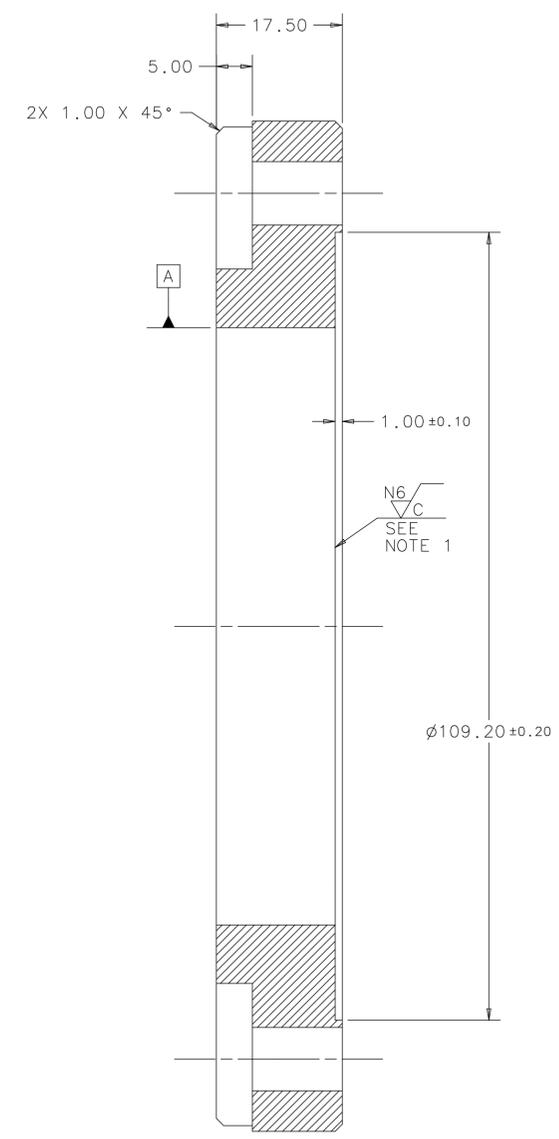
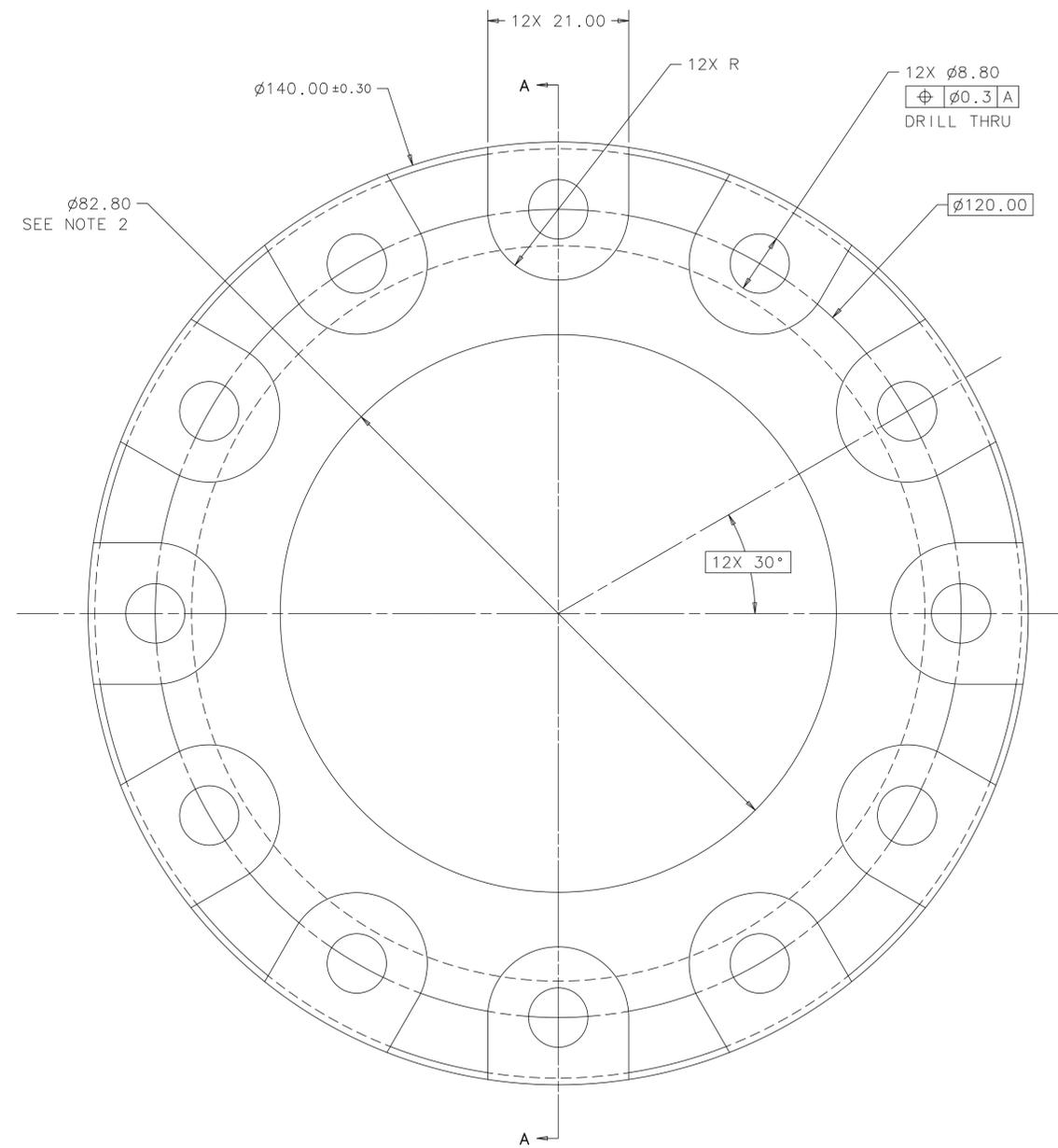
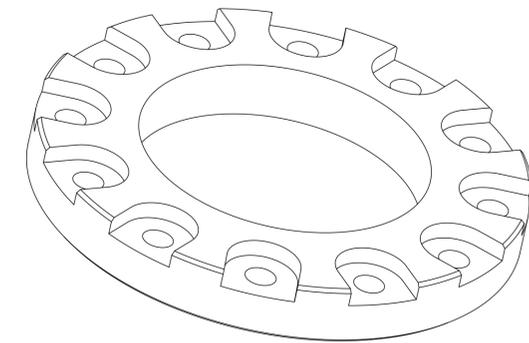
SCALE	DRAWING NUMBER	SHEET	REV
2:1	4904.010-MB-439158	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
 MAY NOT BE CURRENT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



SECTION A-A

- NOTE:
- 1) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING
  - 2) DIMENSION COORESPONDS WITH PART NUMBER MD-439153 AND MD-439161. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS

UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESY	
.X	DRAWN	E.PIRTLE	18-APR-2005
± -- ± 0.30 ± 1°	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX.	APPROVED	M.FOLEY	20-SEP-2005
2. DO NOT SCALE DRAWING.	USED ON		
3. DIMENSIONS BASED UPON ASME Y14.5M-1994	MD-439179		
4. MAX. ALL MACH. SURFACES	MD-439180		
5. DRAWING UNITS: METRIC, mm	MATERIAL		
	NIOBIUM-TITANIUM 55%		

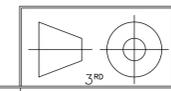
**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
 RF CAVITY  
 NW 78 END TUBE FLANGE

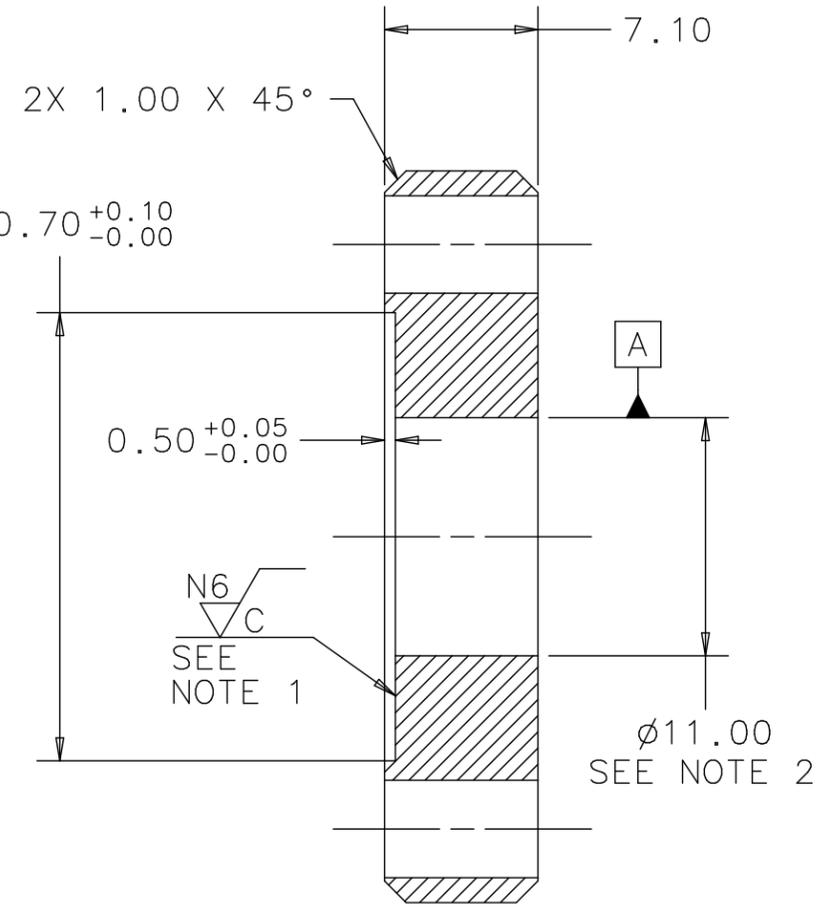
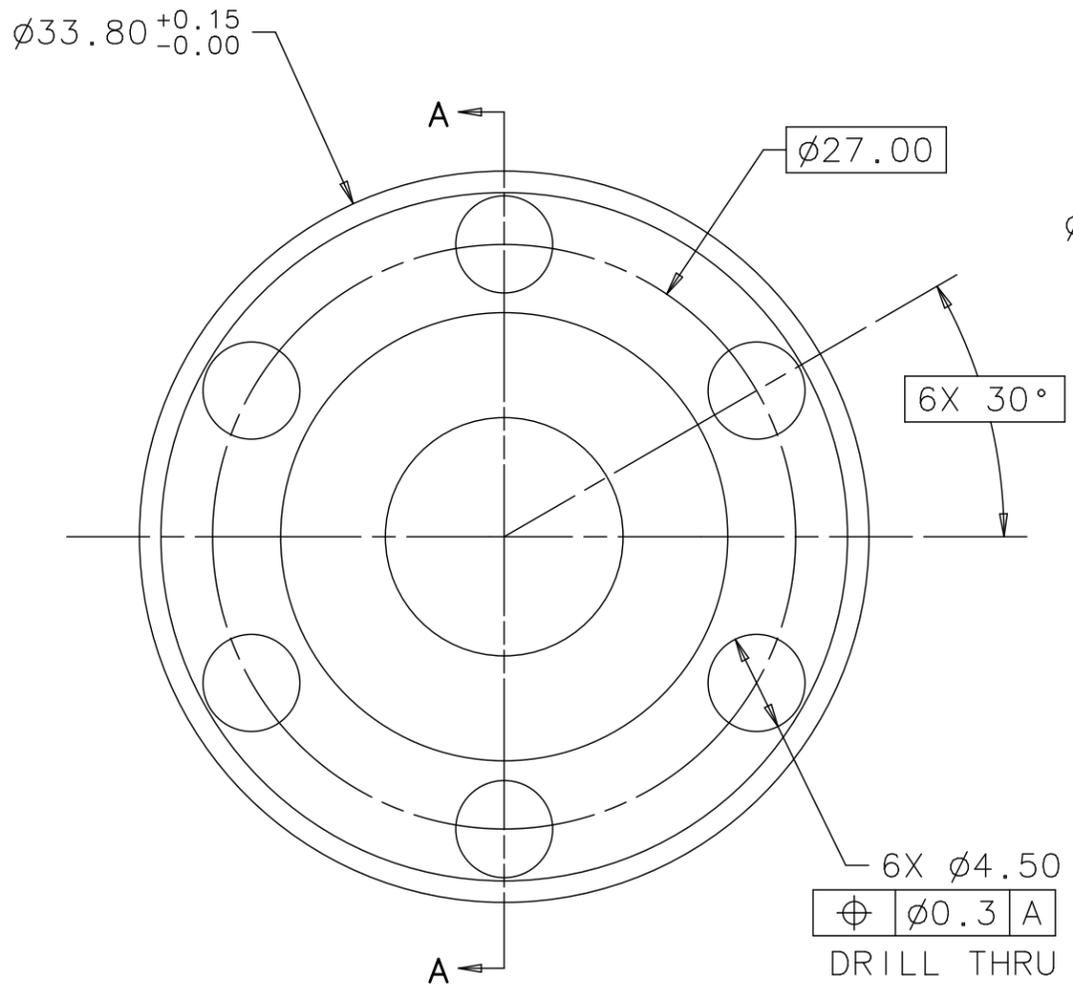
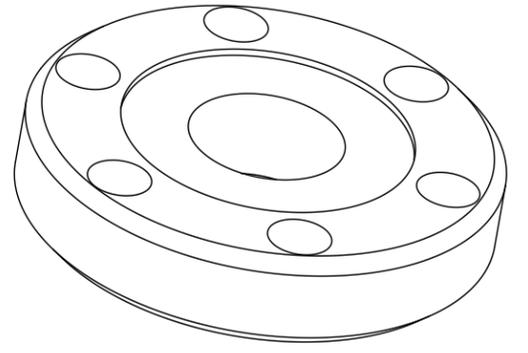
SCALE	DRAWING NUMBER	SHEET	REV
2:1	4904.010-MD-439159	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
 MAY NOT BE CURRENT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



SECTION A-A

NOTE :

- 1) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING
- 2) DIMENSION COORESPONDS WITH PART NUMBER MB-439170. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS

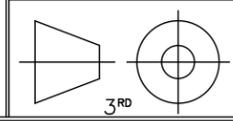
UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
±	--	± 0.20	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX.			APPROVED	M.FOLEY	16-SEP-2005
2. DO NOT SCALE DRAWING.			USED ON		
3. DIMENSIONS BASED UPON ASME Y14.5M-1994			MD-439179		
4. MAX. ALL MACH. SURFACES N7			MATERIAL		
5. DRAWING UNITS: METRIC, mm			NIOBIUM-TITANIUM 55%		

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

DESY 1.3GHZ TESLA  
RF CAVITY  
NW 8 FLANGE

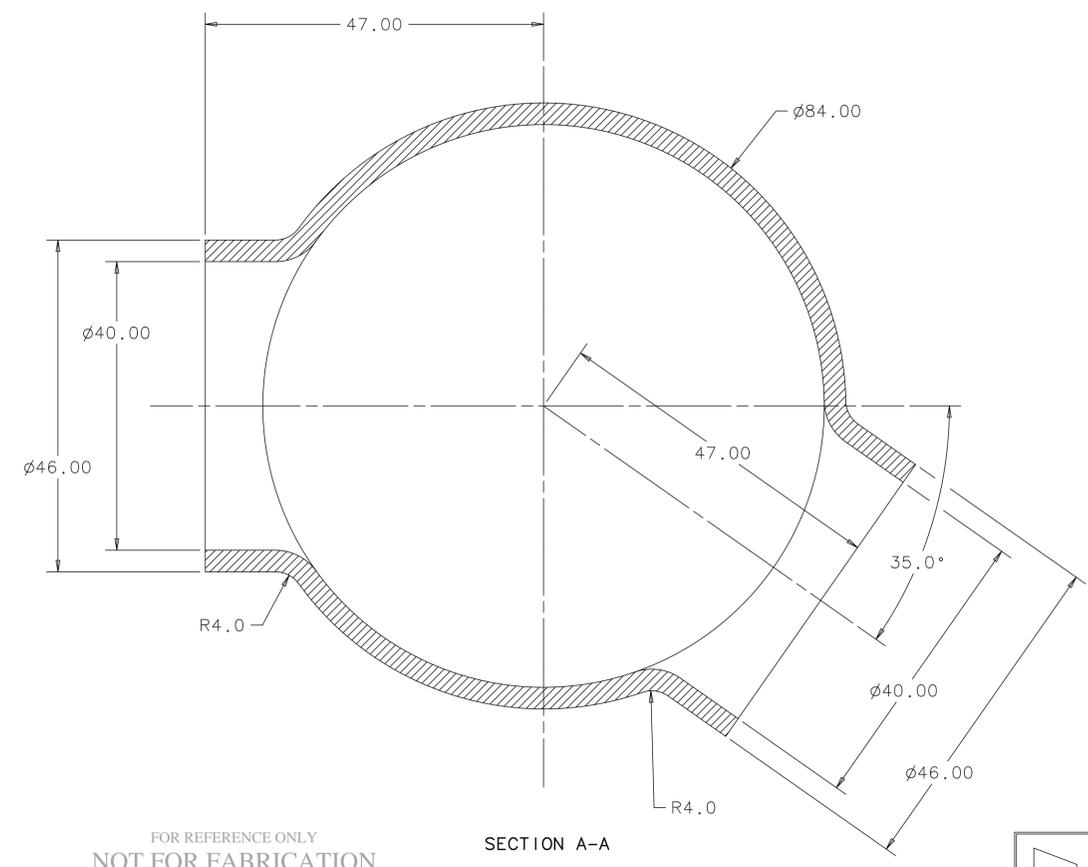
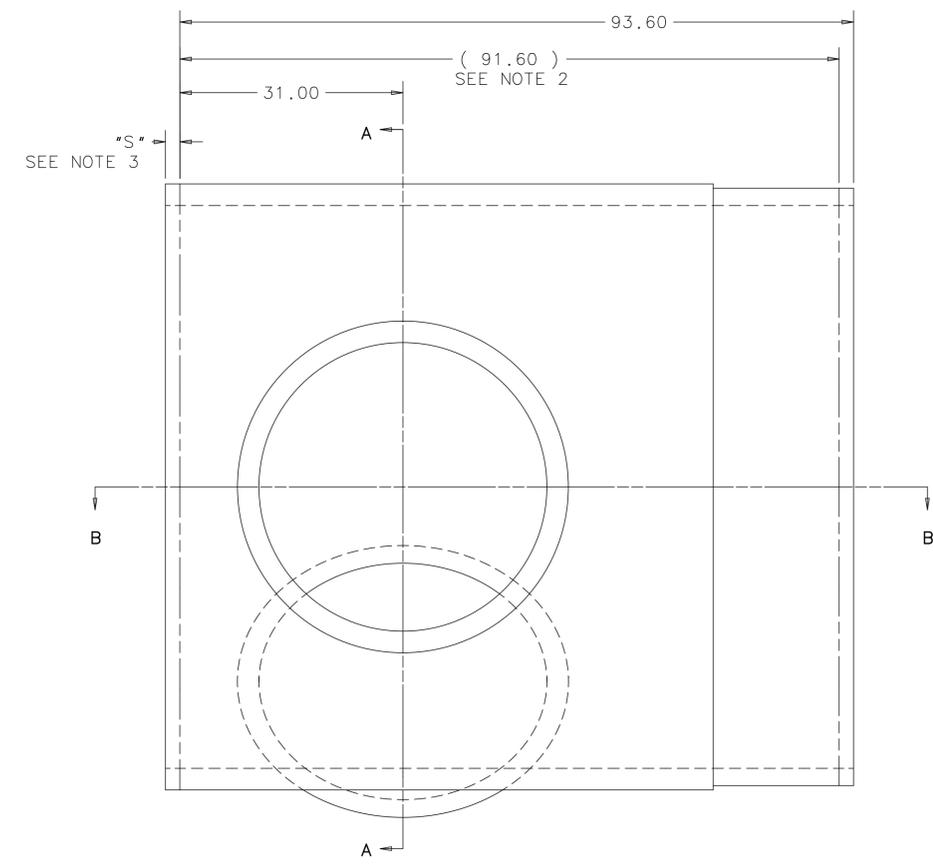
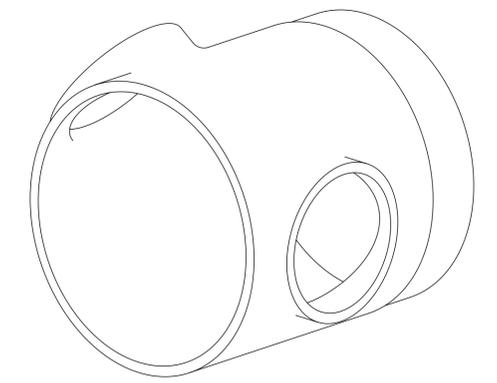
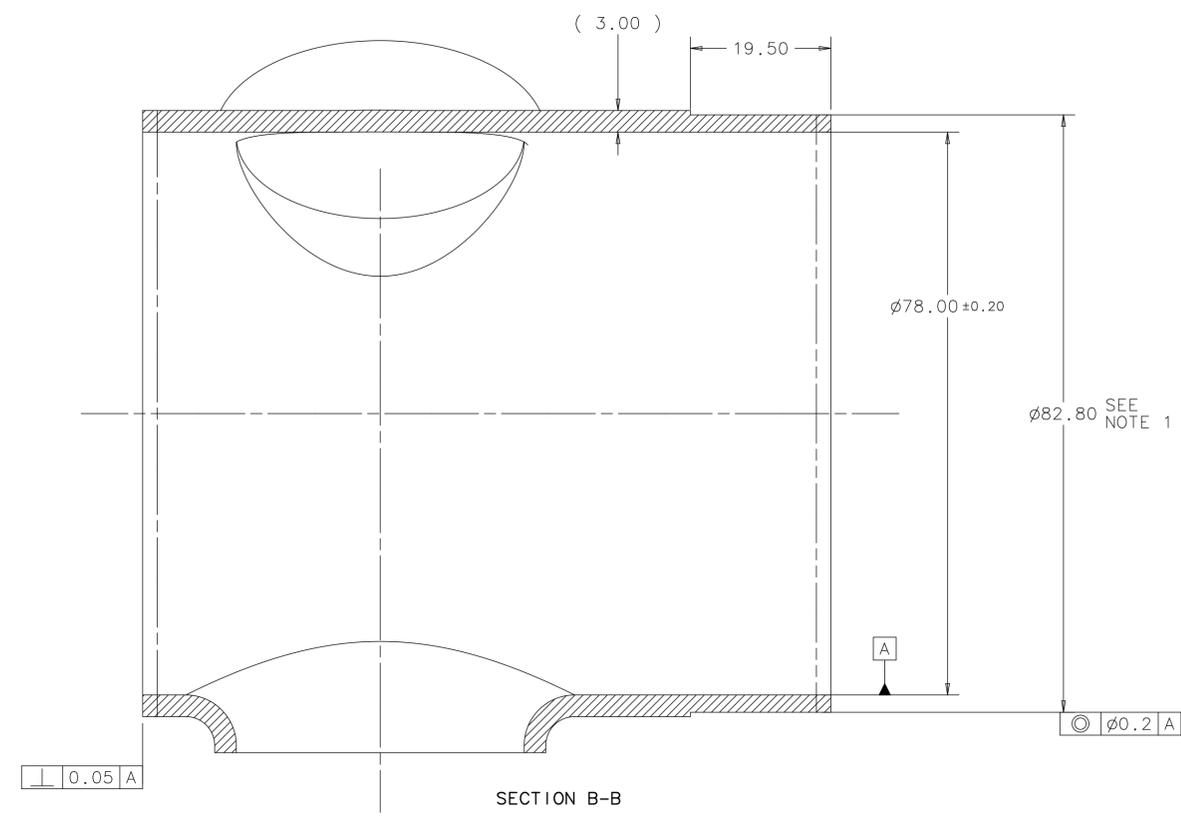
THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

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**NOT FOR FABRICATION**  
MAY NOT BE CURRENT



SCALE	DRAWING NUMBER	SHEET	REV
3:1	4904.010-MB-439160	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



- NOTES:
- 1) DIMENSION COORESPONDS WITH PART NUMBER MD-439159. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
  - 2) FINAL LENGTH AFTER MACHINING OPERATION DETAILED IN FUTURE STEP
  - 3) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS

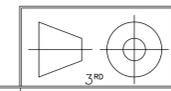
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESIGN	DATE
.X	.XX	ANGLE	DRAWN
$\pm 0.2$	$\pm 0.10$	$\pm 0.5^\circ$	CHECKED
			APPROVED
			USED ON
			MATERIAL


**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY  
 DESY 1.3GHZ TESLA  
 RF CAVITY  
 SHORT END TUBE

SCALE	DRAWING NUMBER	SHEET	REV
2:1	4904.010-MD-439161	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

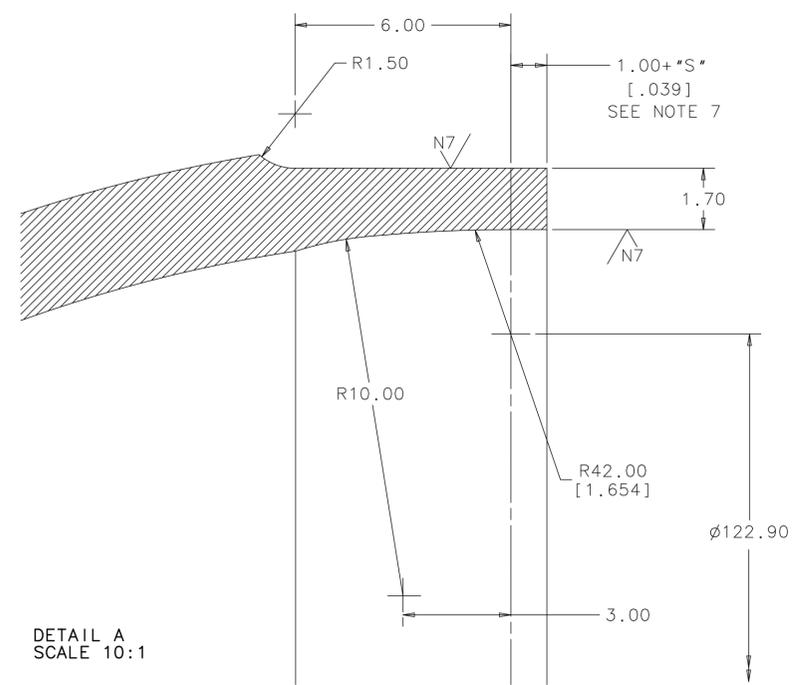
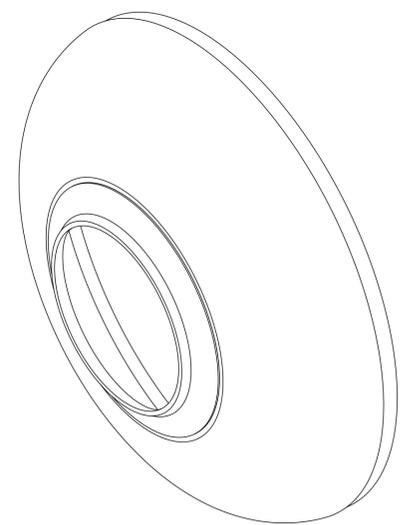
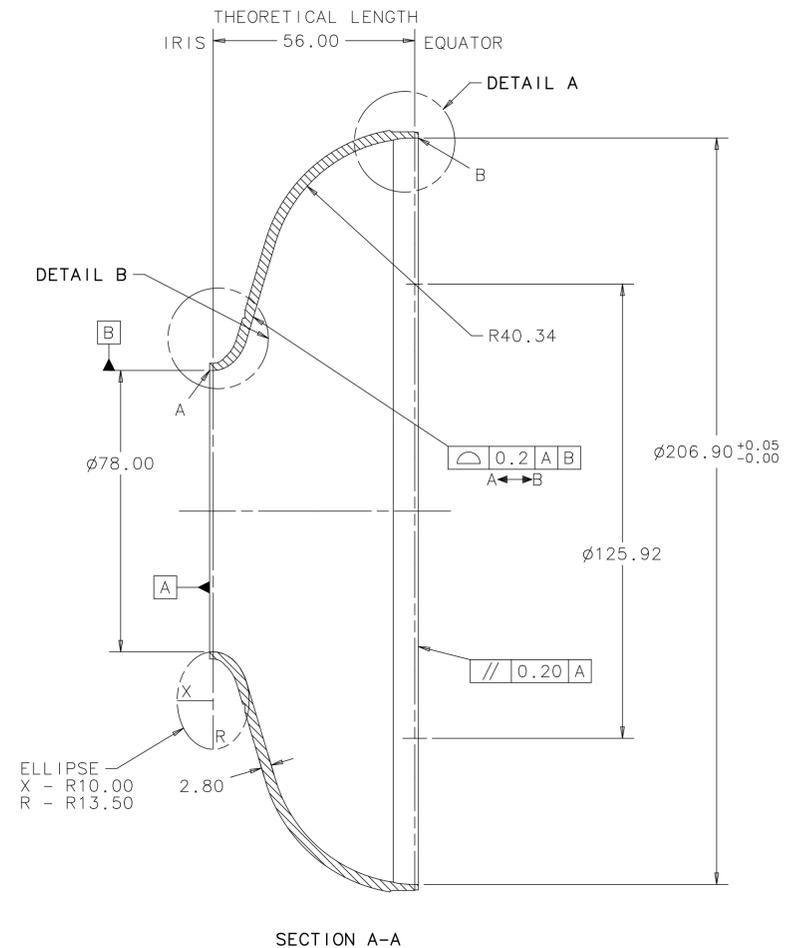
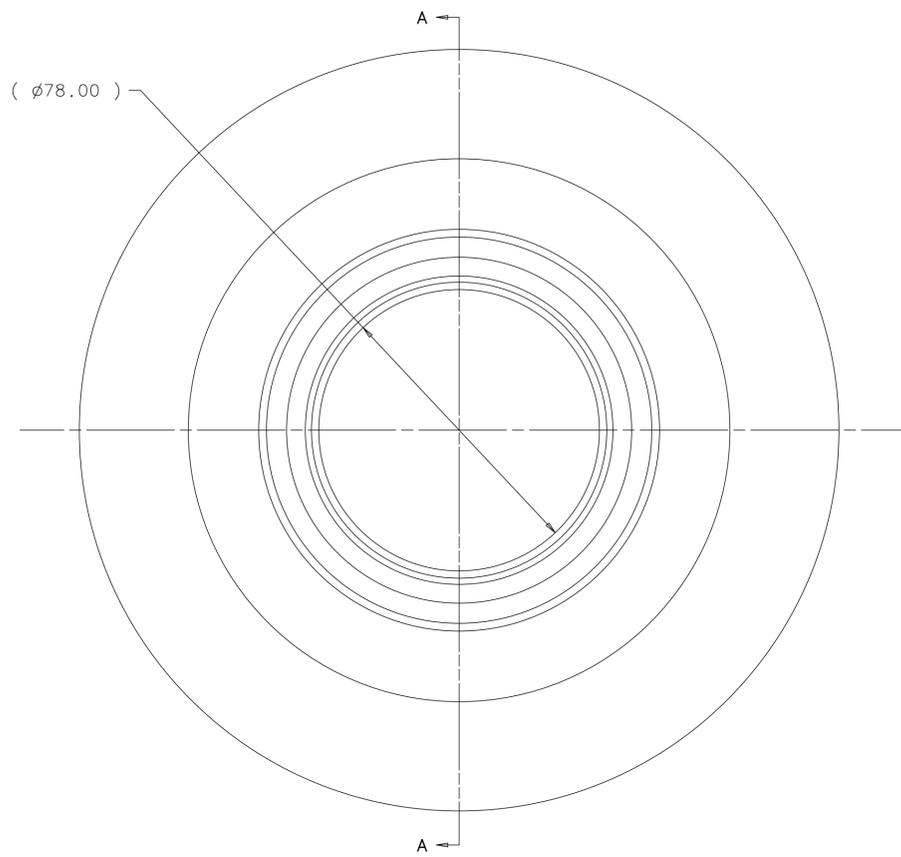
THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
 MAY NOT BE CURRENT

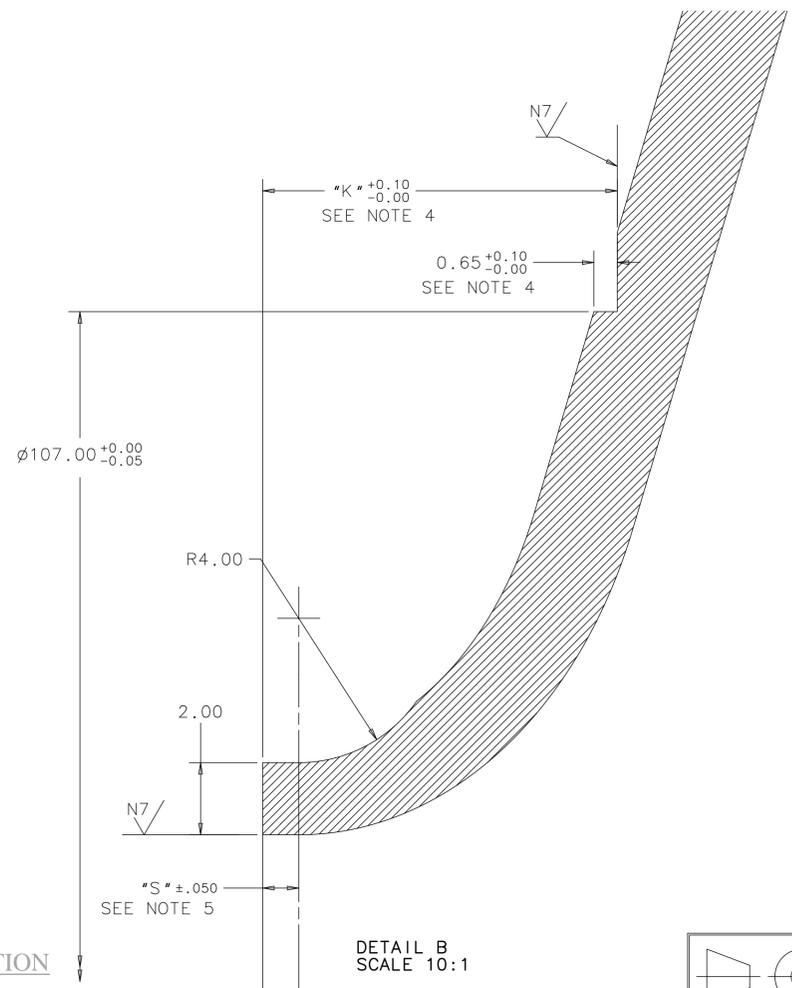




REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



DETAIL A  
SCALE 10:1



DETAIL B  
SCALE 10:1

- NOTES:
- 1) THE INTERNAL SURFACE MUST SHOW NO DAMAGE CAUSED BY FORMING.
  - 2) DIAMETER, FORM, AND POSITION TOLERANCES MEASURED IN THE HALF CELL'S STRAINED CONDITION
  - 3) DO NOT BREAK EDGES ON END CELL
  - 4) DIMENSION "K" DETERMINED BY THE MANUFACTURER SO THAT DIMENSION 0.65 IS KEPT
  - 5) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS
  - 6) DUE TO THE MANUFACTURING PROCESS THE WALL THICKNESS BETWEEN THE IRIS AND EQUATOR IS NOT CONSTANT
  - 7) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.

UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESIGN	DATE
.X	.XX	ANGLE	
±	- -	± 0.05	± 1°
1. BREAK ALL SHARP EDGES 0.40 MAX.		APPROVED	M.FOLEY 16-SEP-2005
2. DO NOT SCALE DRAWING.		USED ON	
3. DIMENSIONS BASED UPON ASME Y14.5M-1994		MD-439178	
4. MAX. ALL MACH. SURFACES		MATERIAL	
5. DRAWING UNITS: METRIC, mm		RRR 300 NIOBIUM	

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UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
SHORT END HALF CELL

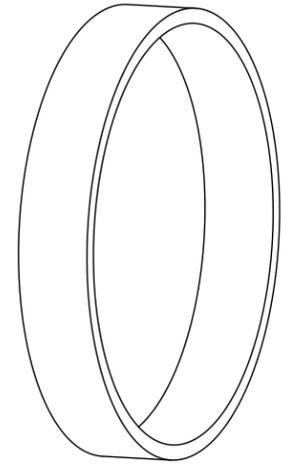
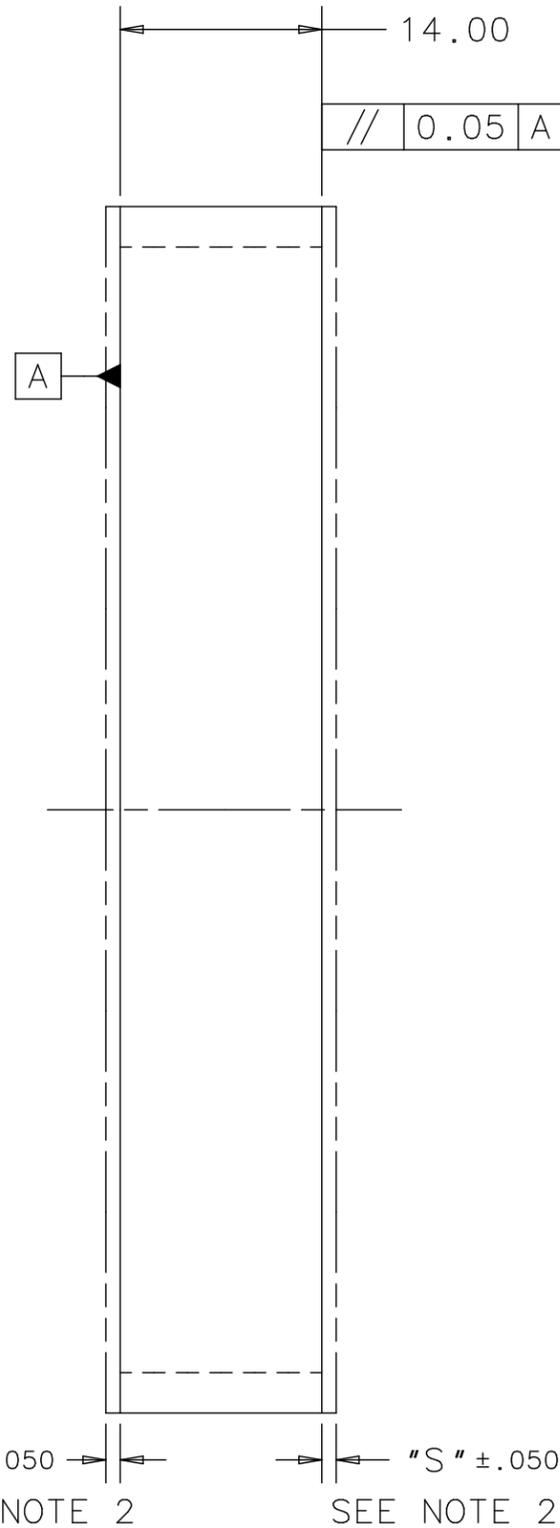
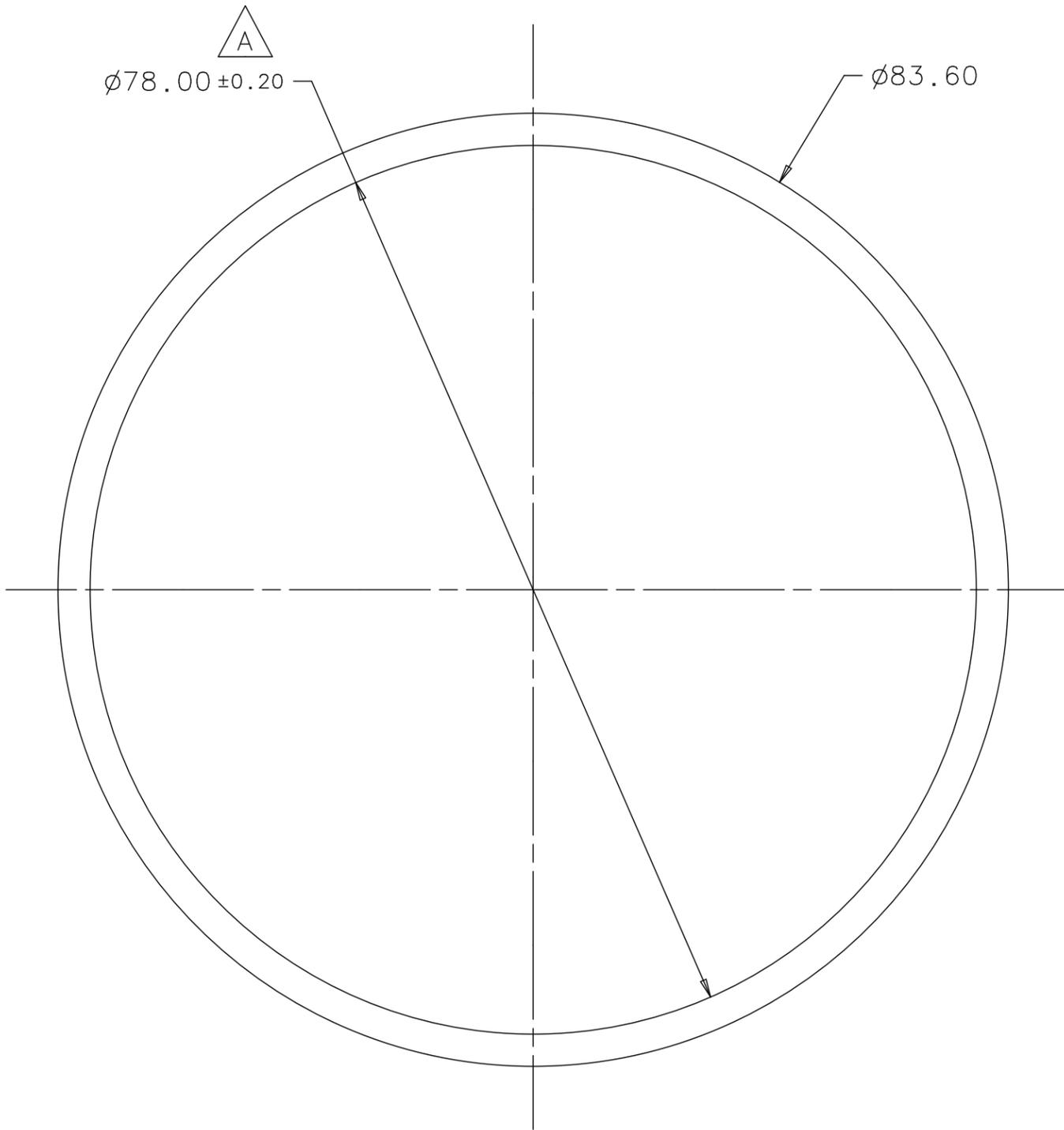
SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MD-439163	1 OF 1	

CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT.

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

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MAY NOT BE CURRENT

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	CHANGED TOLERANCE FROM 0.02 TO 0.2	E.PIRTLE	26-OCT-2006
		M.FOLEY	26-OCT-2006



NOTE :

- 1) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING
- 2) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY E-BEAM WELDERS

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
±	--	± 0.20	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N8 5. DRAWING UNITS: U.S. INCH			APPROVED	M.FOLEY	16-SEP-2005
			USED ON		MD-439178
			MATERIAL		
			RRR 300 NIOBIUM		



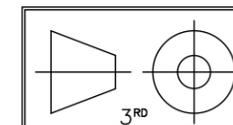
FERMI NATIONAL ACCELERATOR LABORATORY  
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
END TUBE SPOOL PIECE

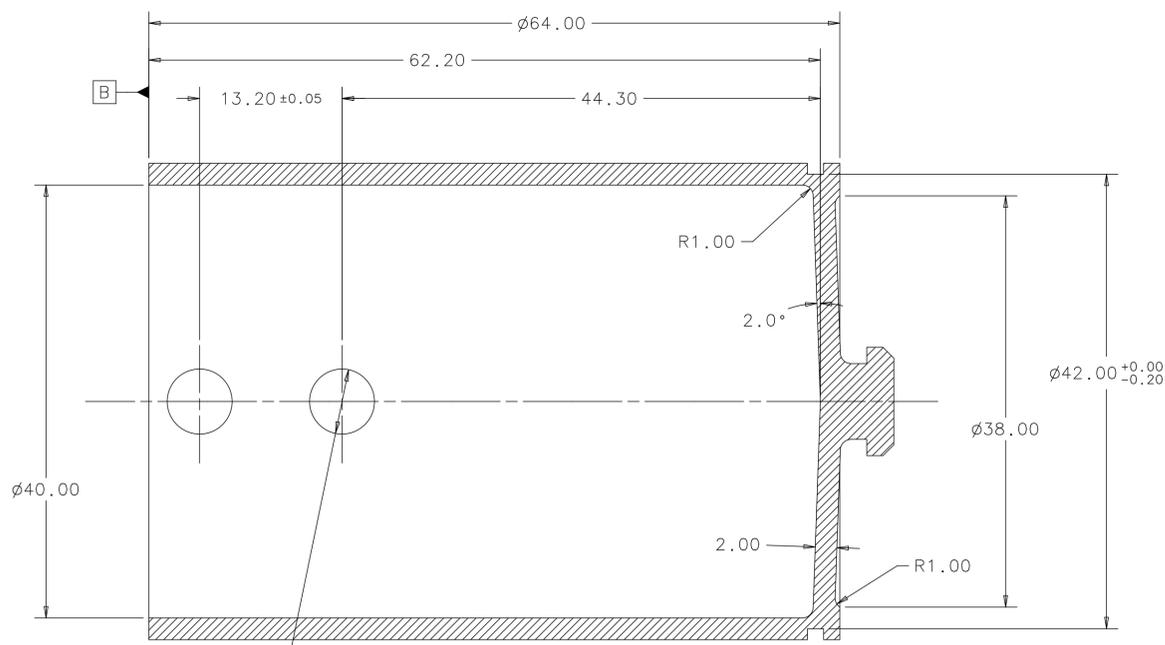
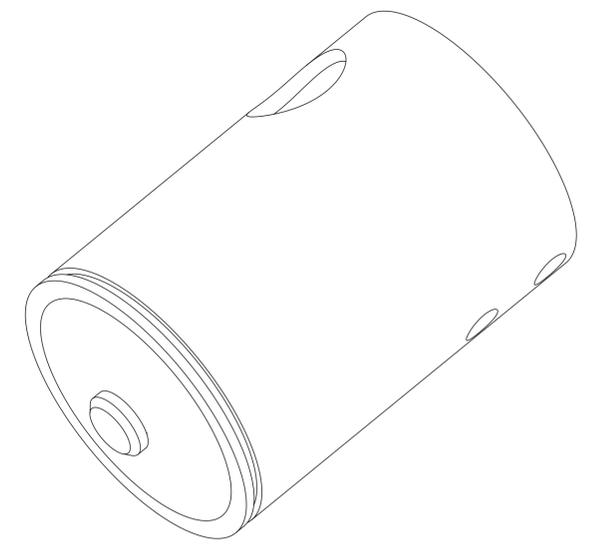
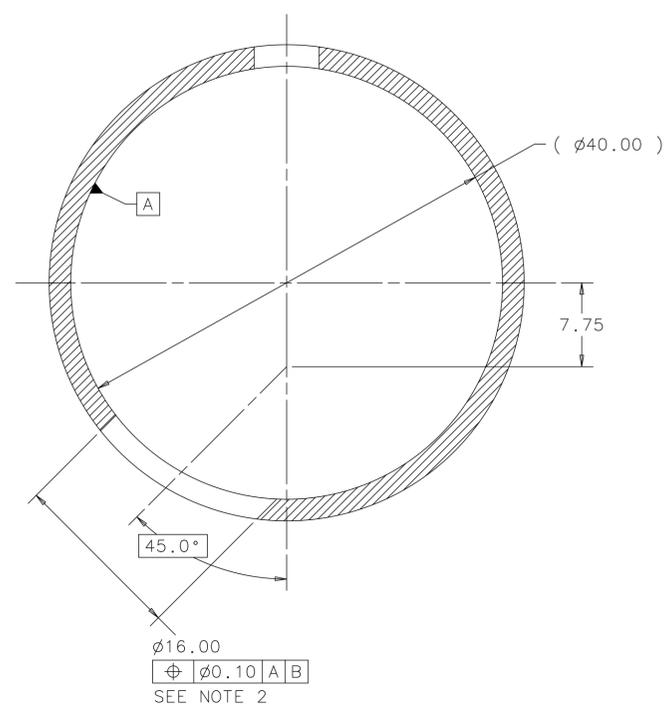
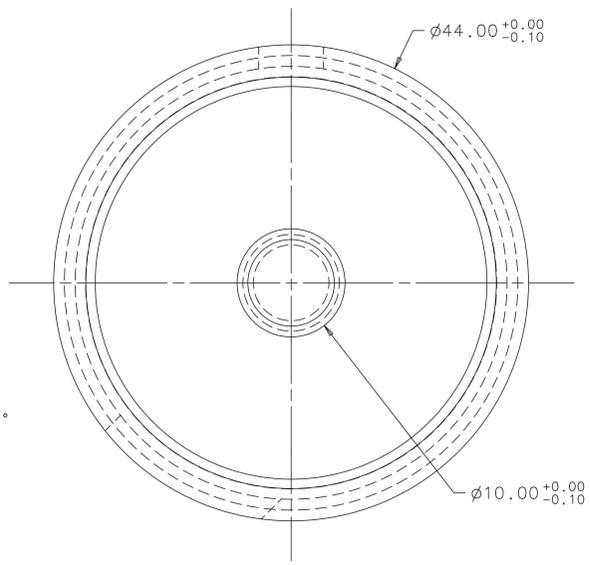
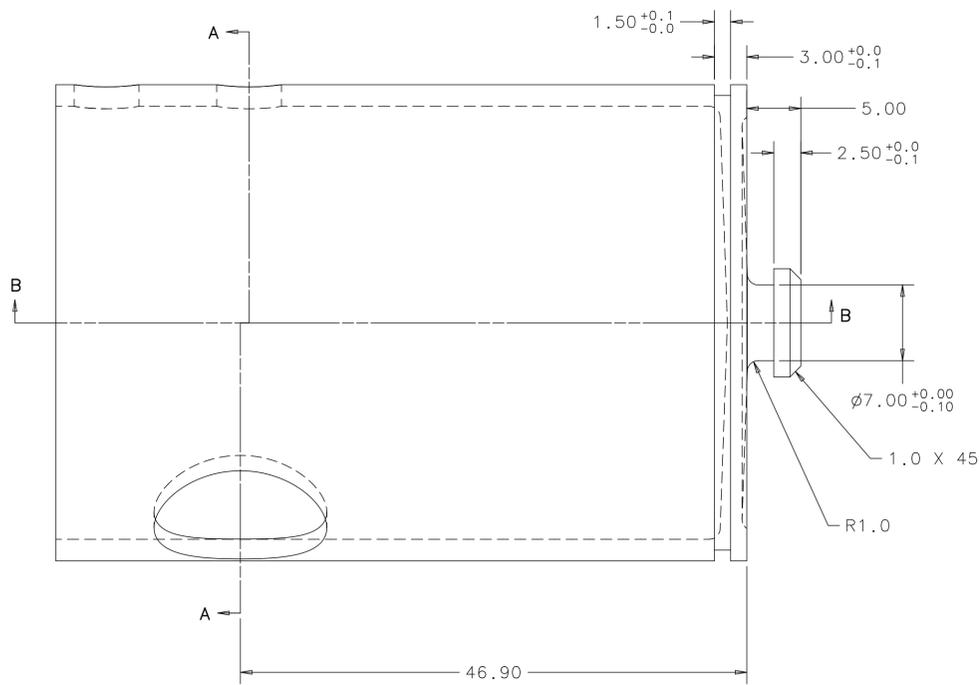
SCALE	DRAWING NUMBER	SHEET	REV
2:1	4904.010-MB-439164	1 OF 1	A
CREATED WITH : Ideas12NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

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**NOT FOR FABRICATION**  
MAY NOT BE CURRENT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



SECTION B-B  
 $2 \times \text{⌀} 6.00^{+0.05}_{-0.00}$   
 $\text{⌀} \text{⌀} 0.08 \text{ A B}$   
 SEE NOTE 1

- NOTES:
- 1) DIMENSION COORESPONDS WITH PART NUMBER MD-439154. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
  - 2) DIMENSION COORESPONDS WITH PART NUMBER MB-439157. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS

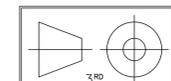
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESIGN	DATE
.X	DRAWN	E.PIRTLE	18-APR-2005
± 0.2	CHECKED	D.MITCHELL	16-SEP-2005
± 0.10	APPROVED	M.FOLEY	20-SEP-2005
± 0.5°	USED ON	MD-439174	
1. BREAK ALL SHARP EDGES 0.40 MAX.	MATERIAL	RRR 300 NIOBIUM	
2. DO NOT SCALE DRAWING.			
3. DIMENSIONS BASED UPON ASME Y14.5M-1994			
4. MAX. ALL MACH. SURFACES			
5. DRAWING UNITS: METRIC, mm			

**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY  
 DESY 1.3GHZ TESLA  
 RF CAVITY  
 LONG END HOM FORMTEIL HOUSING

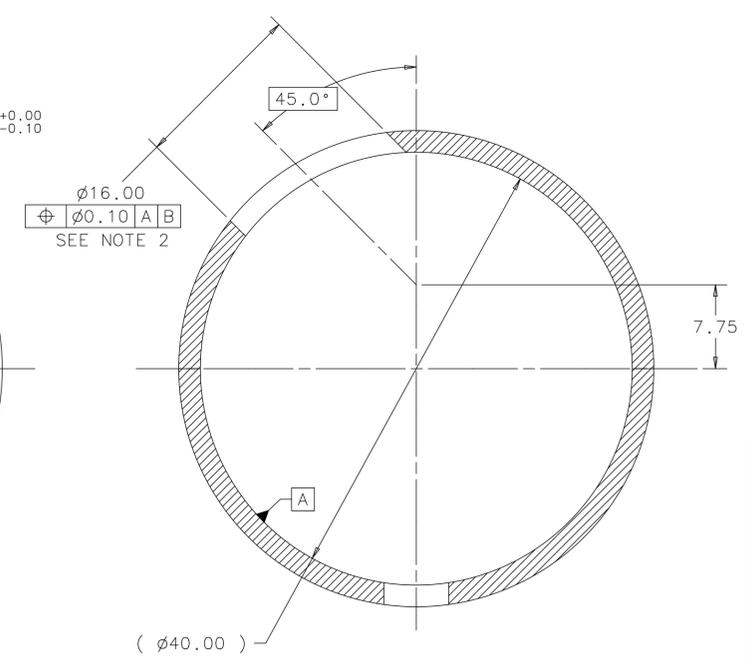
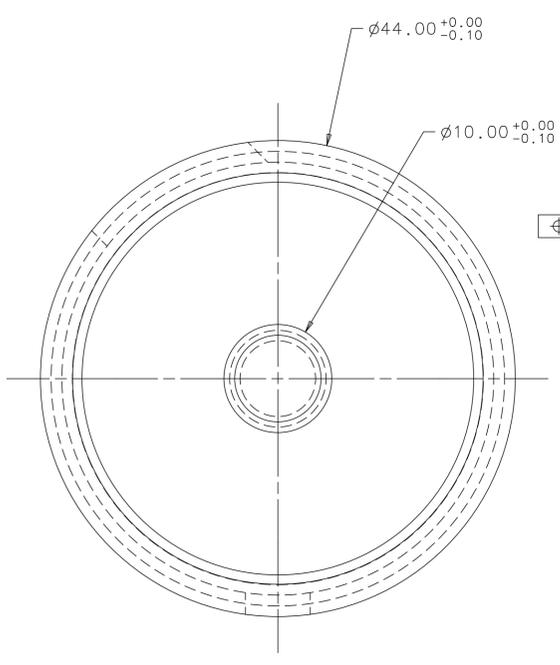
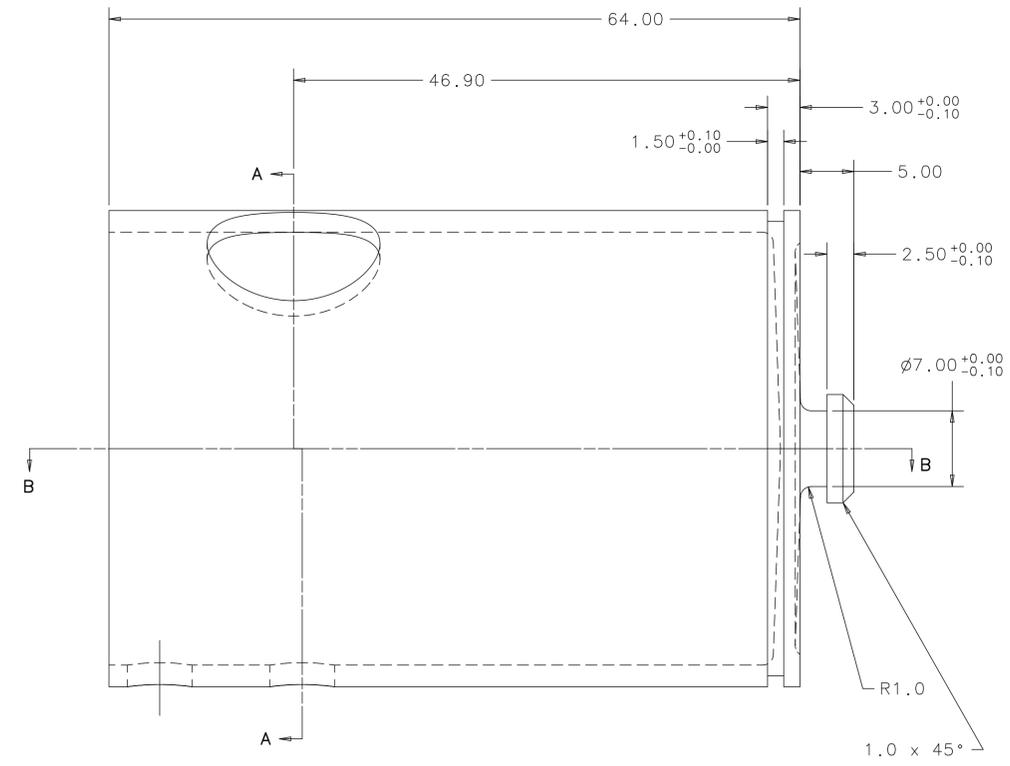
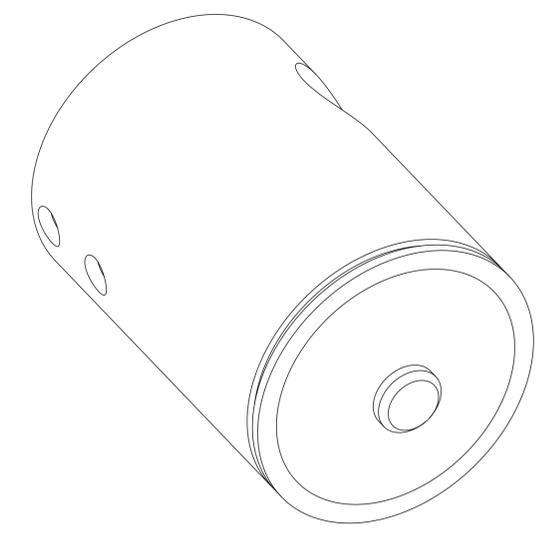
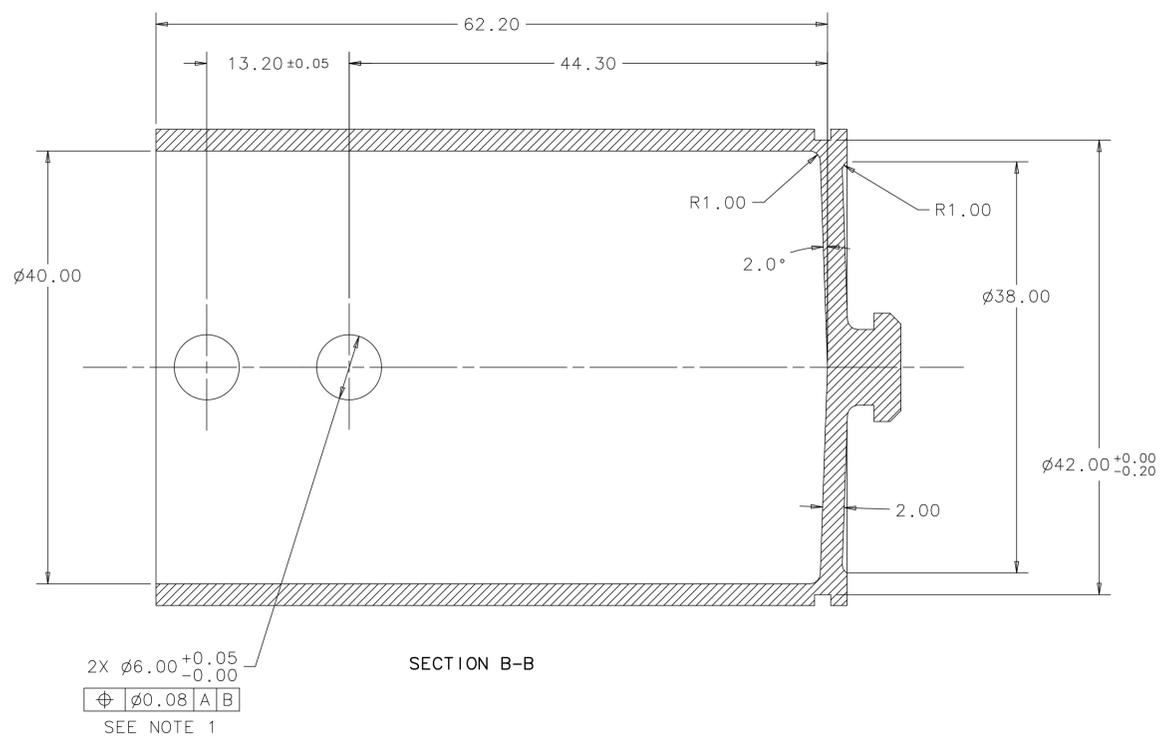
SCALE	DRAWING NUMBER	SHEET	REV
3:1	4904.010-MD-439165	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

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**NOT FOR FABRICATION**  
 MAY NOT BE CURRENT



REV	DESCRIPTION	1	2
		DATE	DATE



- NOTES:
- 1) DIMENSION COORESPONDS WITH PART NUMBER MD-439162. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
  - 2) DIMENSION COORESPONDS WITH PART NUMBER MD-439175. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
± 0.2	± 0.10	± 0.5°	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX.			APPROVED	M.FOLEY	20-SEP-2005
2. DO NOT SCALE DRAWING.			USED ON		
3. DIMENSIONS BASED UPON ASME Y14.5M-1994			MD-439175		
4. MAX. ALL MACH. SURFACES			MATERIAL		
5. DRAWING UNITS: METRIC, mm			RRR 300 NIOBIUM		

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

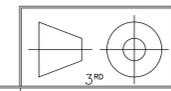
DESY 1.3GHZ TESLA  
RF CAVITY  
SHORT END HOM FORMTEIL HOUSING

SCALE	DRAWING NUMBER	SHEET	REV
3:1	4904.010-MD-439166	1 OF 1	

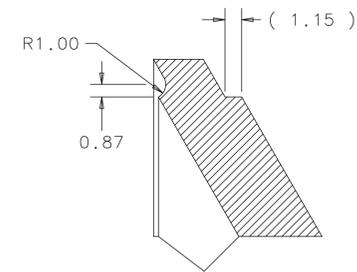
CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT.

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

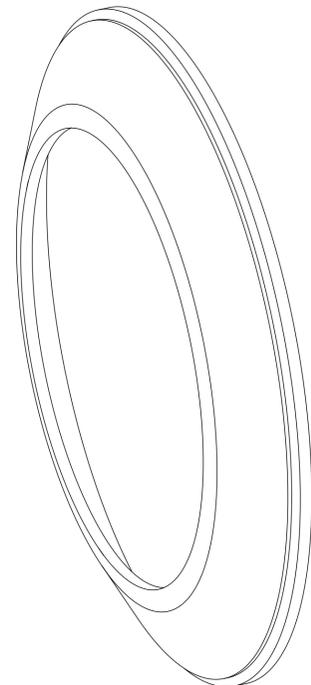
FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT



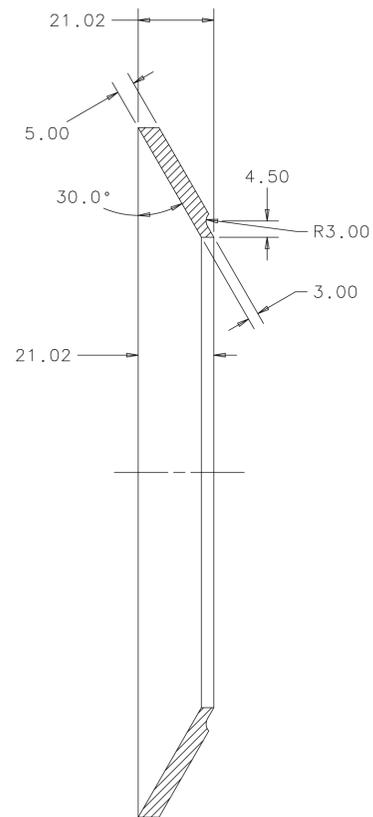
REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



DETAIL A  
SCALE 4:1

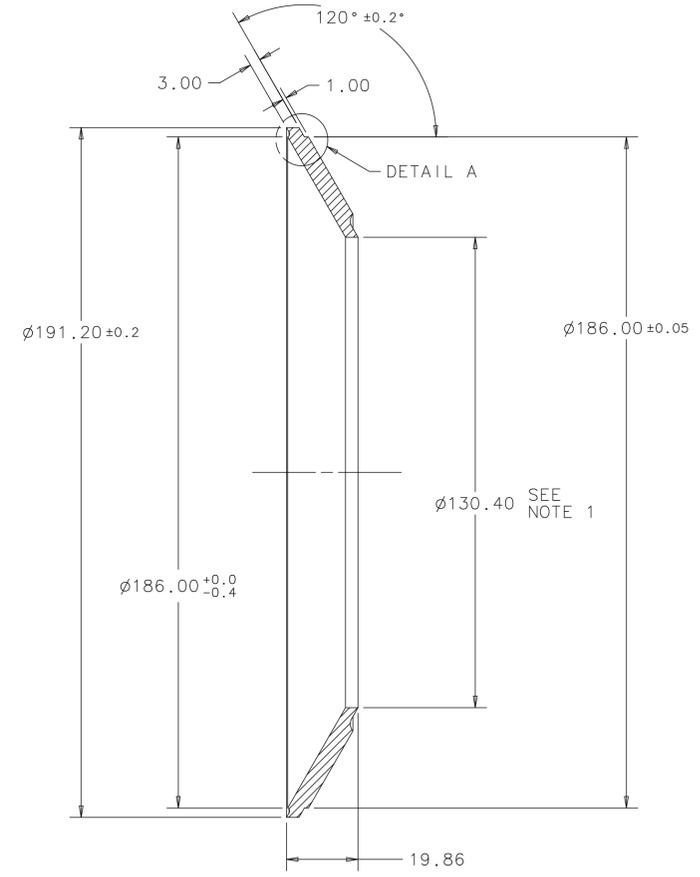


CONTOUR BEFORE THE MACHINING  
OPERATION IN DRAWING NUMBER MD-439178

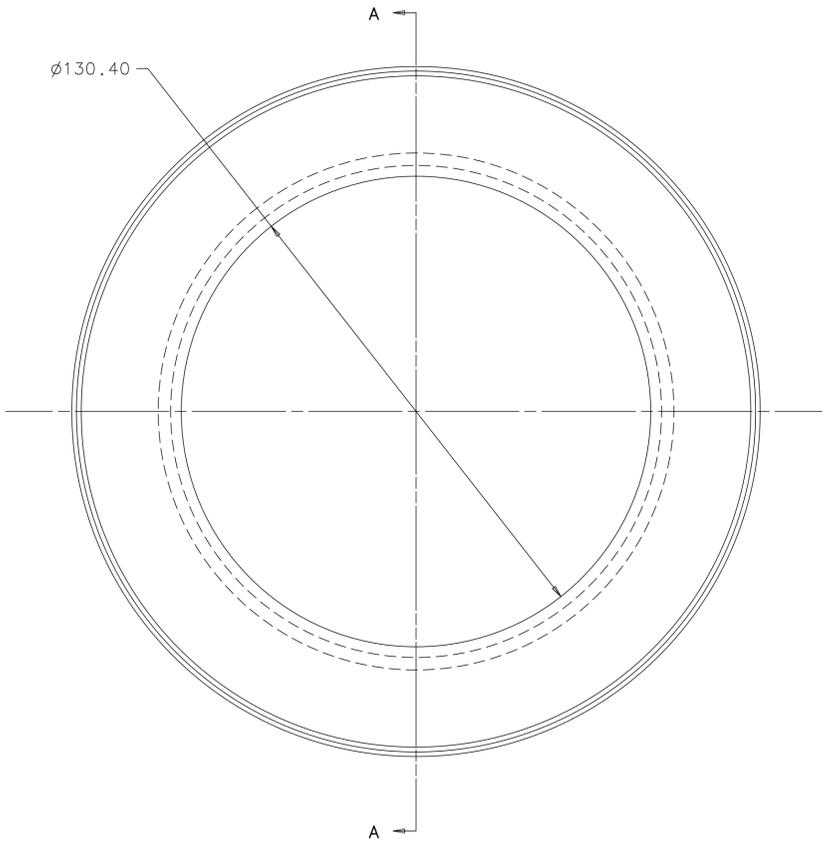


SECTION A-A

CONTOUR AFTER THE MACHINING  
OPERATION IN DRAWING NUMBER MD-439178



SECTION A-A



NOTE:  
1) DIMENSION COORESponds WITH PART NUMBER MD-439152.  
TOLERANCE IS TO BE COORDINATED BETWEEN  
MANUFACTURERS AND EB-WELDERS

UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESIGN	DATE
.X	.XX	ANGLE	DRAWN
±	--	± 0.10	± 0.5°
1. BREAK ALL SHARP EDGES 0.40 MAX.	CHECKED	D. MITCHELL	16-SEP-2005
2. DO NOT SCALE DRAWING.	APPROVED	M. FOLEY	16-SEP-2005
3. DIMENSIONS BASED UPON ASME Y14.5M-1994	USED ON	MD-439178	
4. MAX. ALL MACH. SURFACES N7	MATERIAL	NIOBIUM-TITANIUM 55%	
5. DRAWING UNITS: METRIC, mm			

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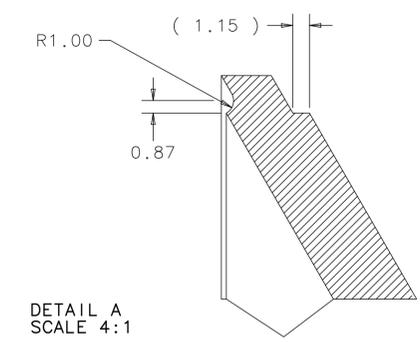
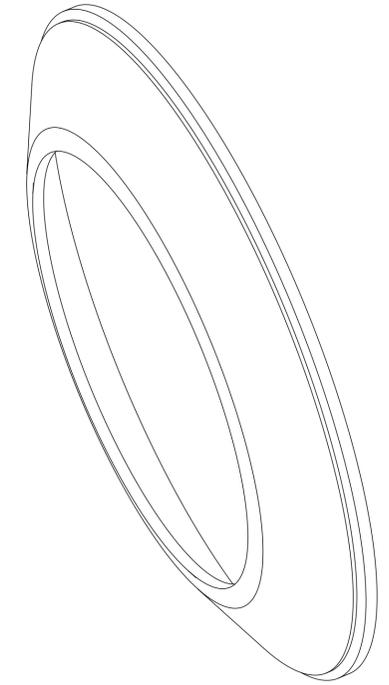
DESY 1.3GHZ TESLA  
RF CAVITY  
LONG ENDCAP DISK

SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MD-439167	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

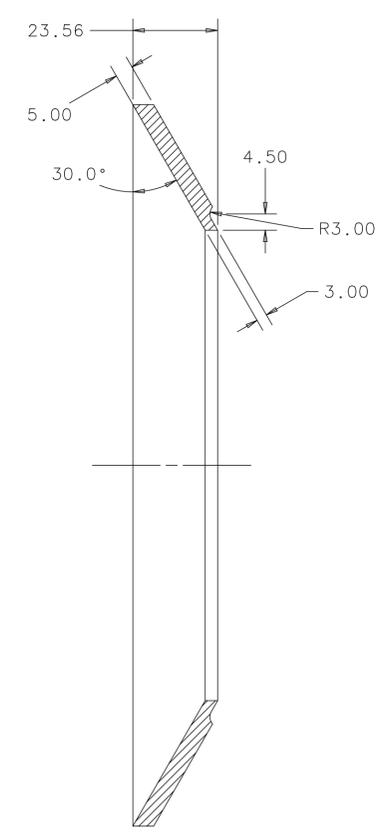
THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY  
ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS  
BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION  
PURPOSES WITHIN THE USA AND IS TO BE USED  
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF  
FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT

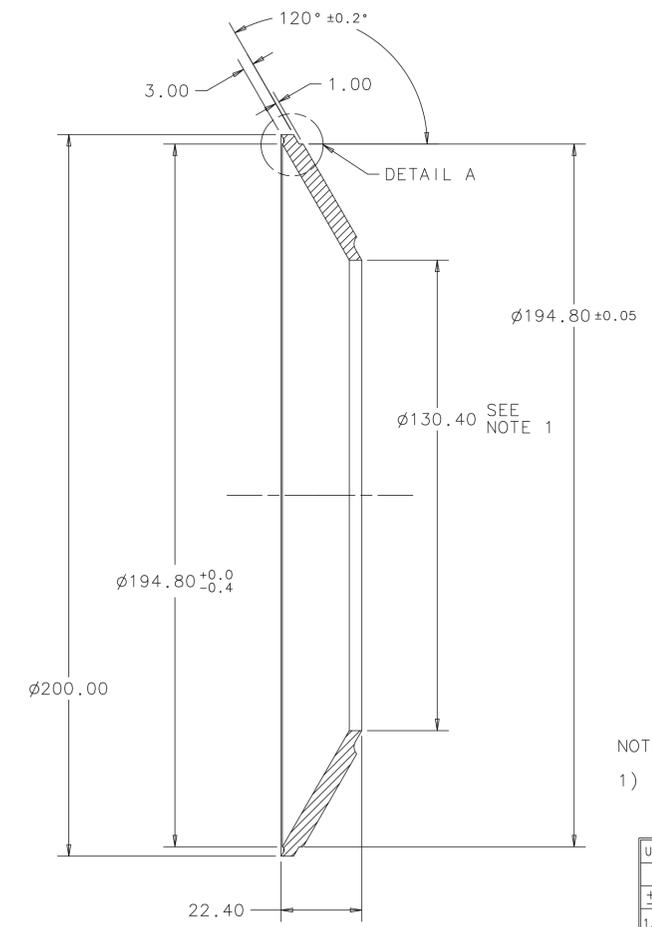
REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



CONTOUR BEFORE THE MACHINING  
OPERATION IN DRAWING NUMBER MD-439178



CONTOUR AFTER THE MACHINING  
OPERATION IN DRAWING NUMBER MD-439178



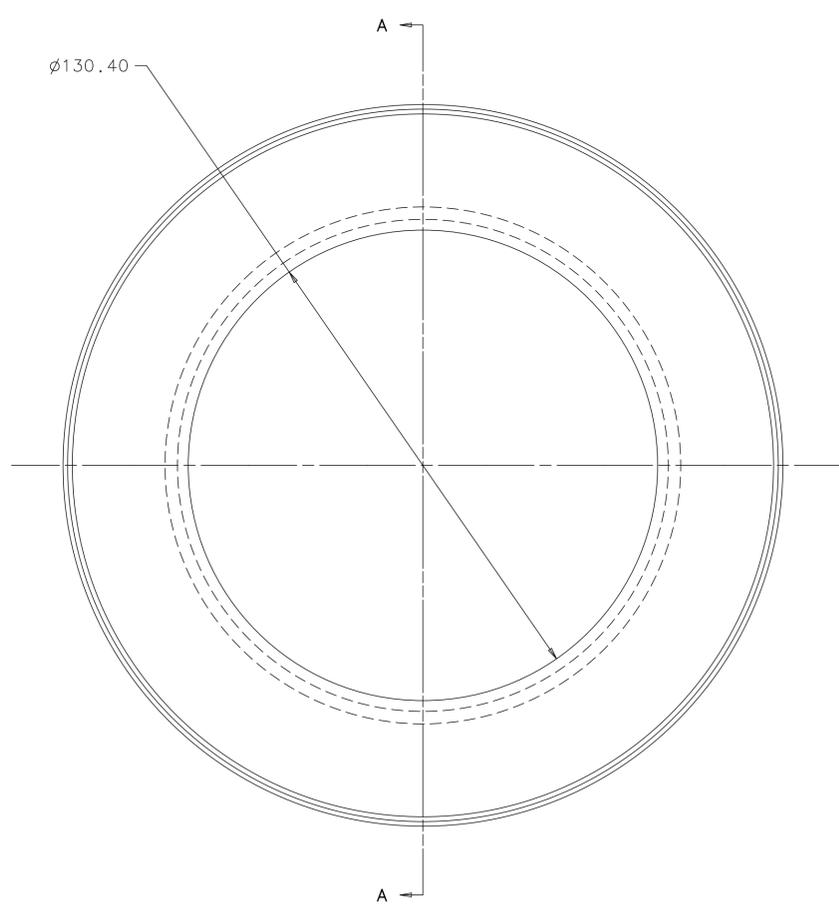
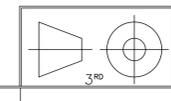
NOTE:  
1) DIMENSION COORESponds WITH PART NUMBER MD-439152.  
TOLERANCE IS TO BE COORDINATED BETWEEN  
MANUFACTURERS AND EB-WELDERS

UNLESS OTHERWISE SPECIFIED		ORIGINATOR	DESY
.X	.XX	DRAWN	E.PIRTLE
±	-- ±	CHECKED	D.MITCHELL
		APPROVED	M.FOLEY
1. BREAK ALL SHARP EDGES 0.40 MAX.		USED ON	
2. DO NOT SCALE DRAWING.		MD-439178	
3. DIMENSIONS BASED UPON ASME Y14.5M-1994		MATERIAL	
4. MAX. ALL MACH. SURFACES N7		NIOBIUM-TITANIUM 55%	
5. DRAWING UNITS: METRIC, mm			

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DESY 1.3GHZ TESLA  
RF CAVITY  
SHORT ENDCAP DISK

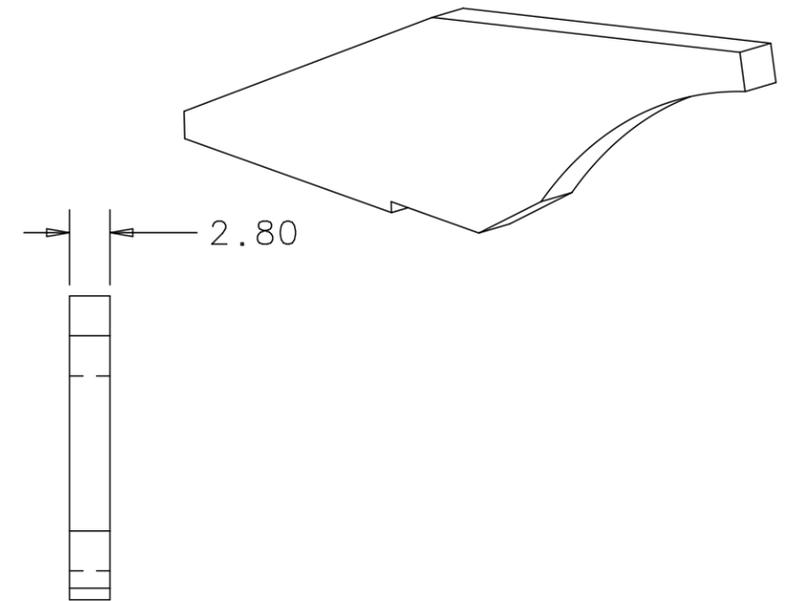
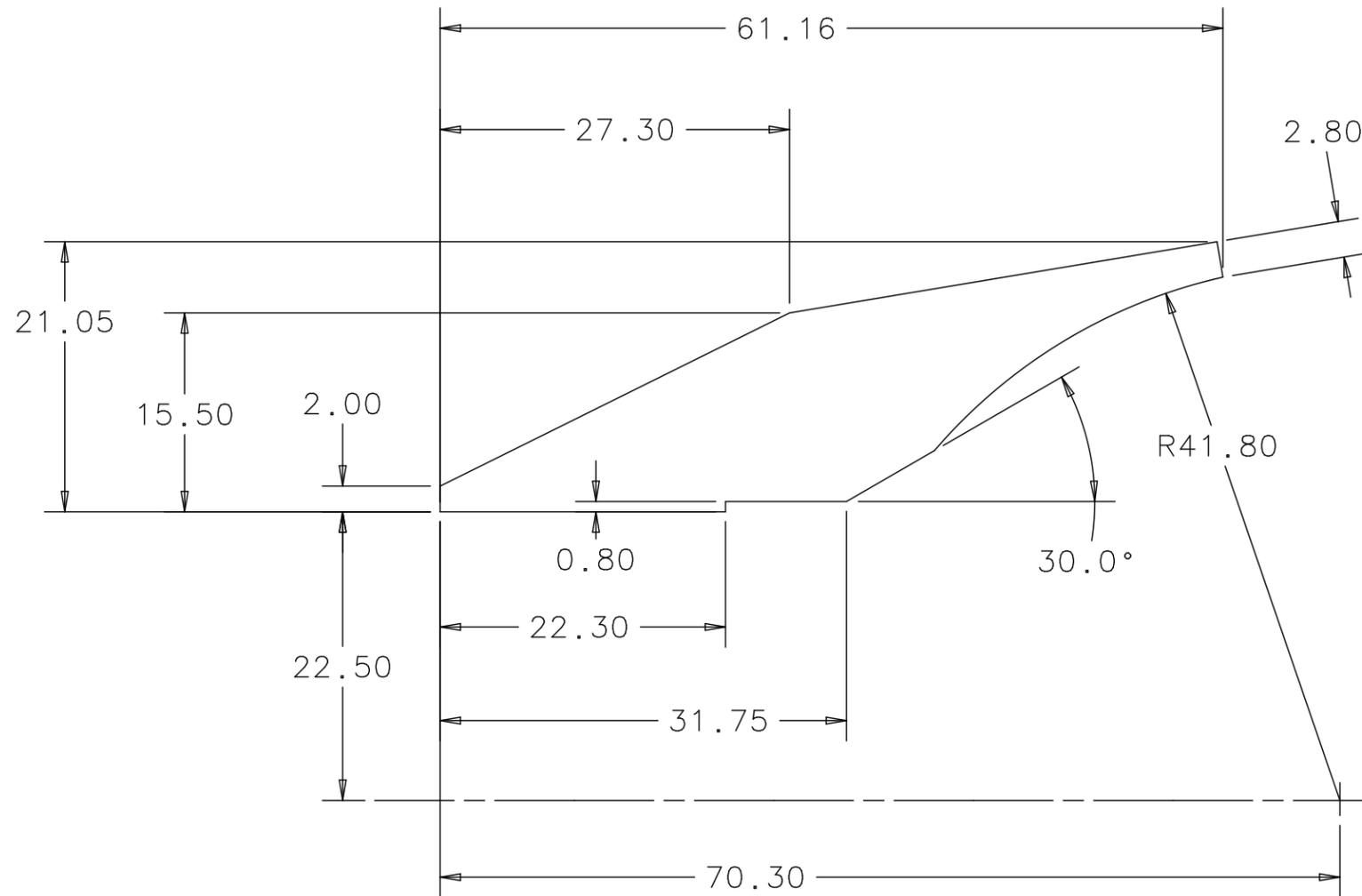
SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MD-439168	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	



THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY  
ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS  
BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION  
PURPOSES WITHIN THE USA AND IS TO BE USED  
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF  
FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	CHANGED MATERIAL FROM RRR 40 TO RRR 300	E.PIRTLE	26-OCT-2006
		M.FOLEY	26-OCT-2006

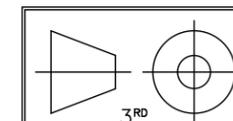


UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
±	- -	± 0.20	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N8 5. DRAWING UNITS: U.S. INCH			APPROVED	M.FOLEY	16-SEP-2005
			USED ON		MD-439177
			MATERIAL		RRR 300 NIOBIUM



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UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
SHORT END TUBE RIB

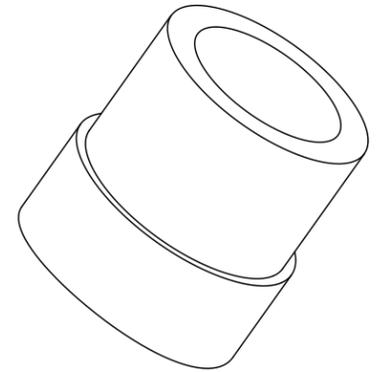
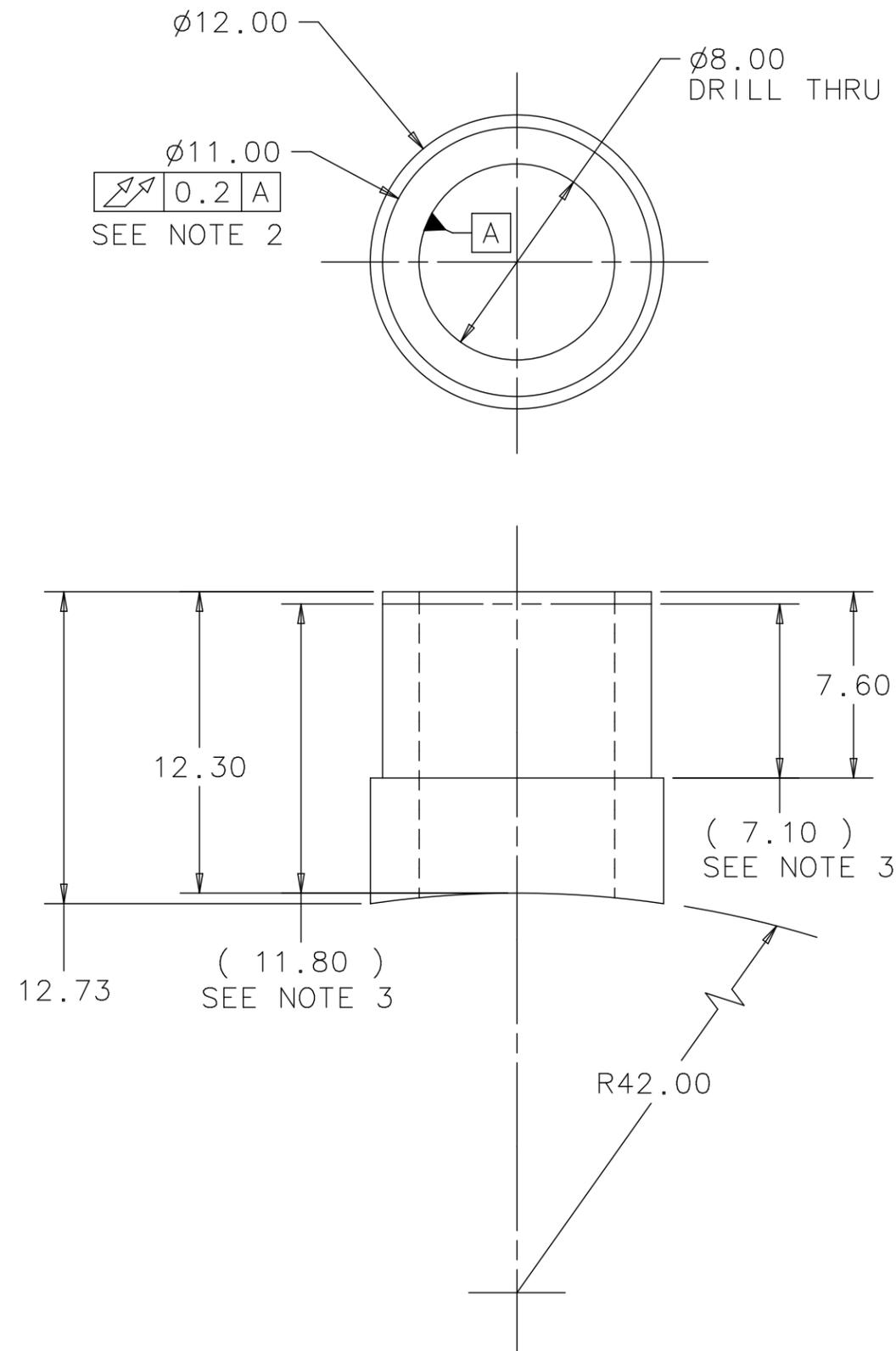


SCALE	DRAWING NUMBER	SHEET	REV
2:1	4904.010-MB-439169	1 OF 1	A
CREATED WITH : Ideas12NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	CHANGED MATERIAL FROM RRR 30 TO RRR 300	E.PIRTLE	26-OCT-2006
		M.FOLEY	26-OCT-2006



NOTE :

- 1) SURFACE FREE OF DAMAGE
- 2) DIMENSION COORESponds WITH PART NUMBER MB-439160. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
- 3) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439179

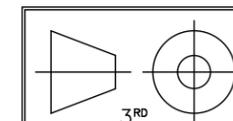
UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
±	- -	± 0.20	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N8 5. DRAWING UNITS: U.S. INCH			APPROVED	M.FOLEY	20-SEP-2005
			USED ON		
			MATERIAL		
			RRR 300 NIOBIUM		



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UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
LONG END ANTENNA SPOOL PIECE

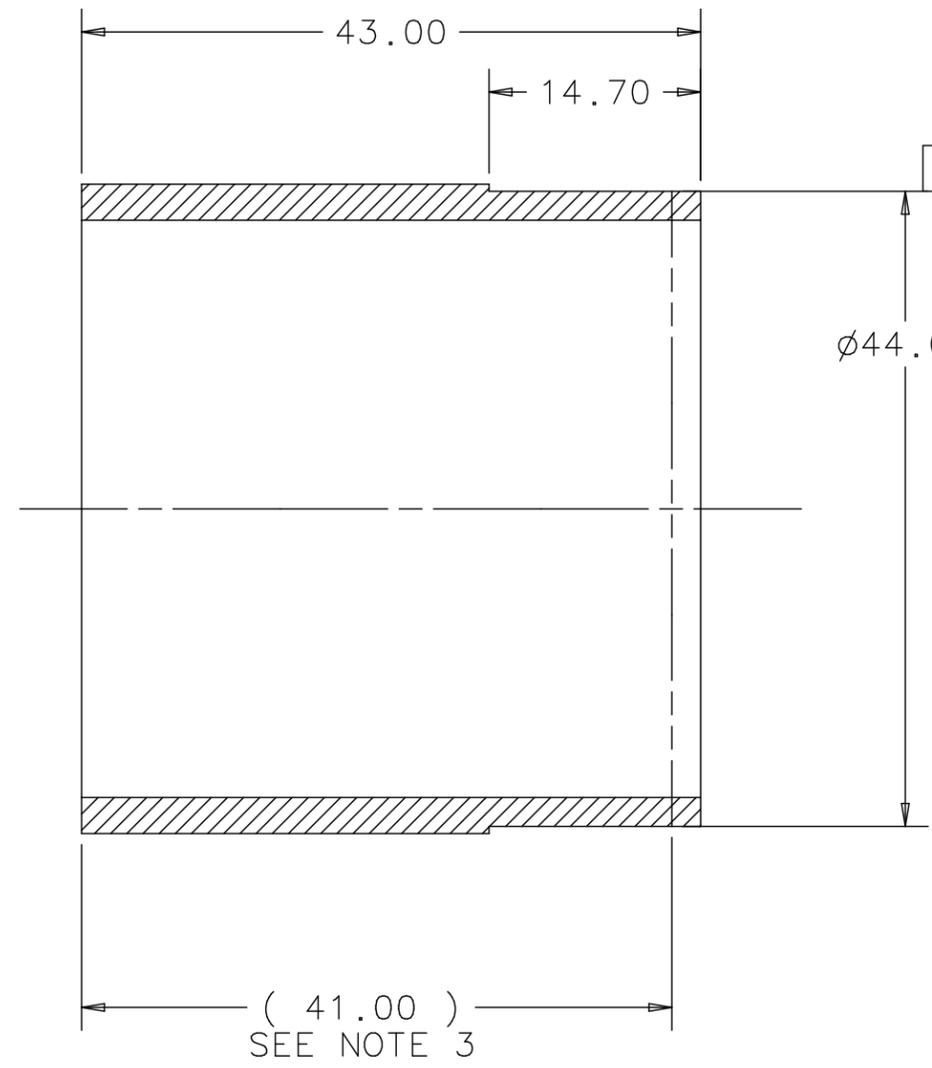
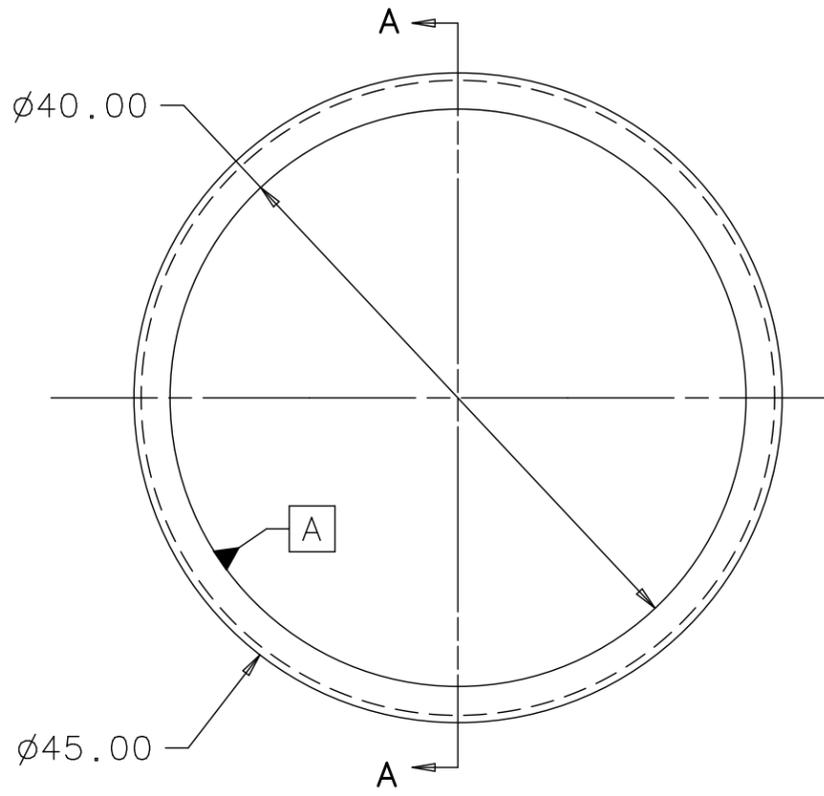
SCALE	DRAWING NUMBER	SHEET	REV
4:1	4904.010-MB-439170	1 OF 1	A
CREATED WITH : Ideas12NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	



THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT

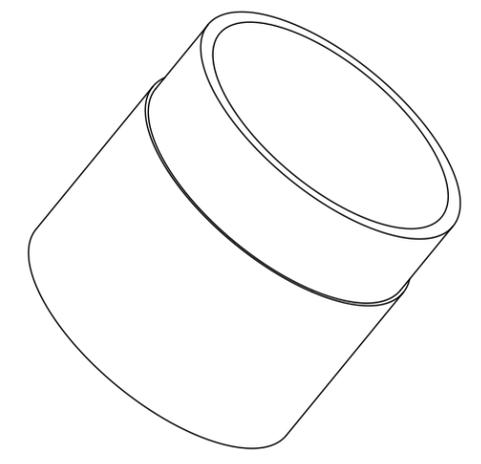
REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



0.1 A

Ø44.00 SEE NOTE 2

( 41.00 )  
SEE NOTE 3



NOTES:

- 1) SURFACE FREE OF DAMAGE
- 2) DIMENSION COORESponds WITH PART NUMBER MB-439158. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
- 3) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439180

SECTION A-A

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DESY	
.X	.XX	ANGLE	DRAWN	E.PIRTLE	18-APR-2005
± --	± 0.20	± 1°	CHECKED	D.MITCHELL	16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N8 5. DRAWING UNITS: METRIC, mm			APPROVED	M.FOLEY	20-SEP-2005
			USED ON		MD-439177
			MATERIAL	RRR 300 NIOBIUM	

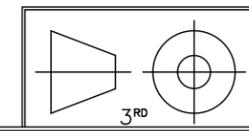


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DESY 1.3GHZ TESLA  
RF CAVITY  
COUPLER SPOOL PIECE

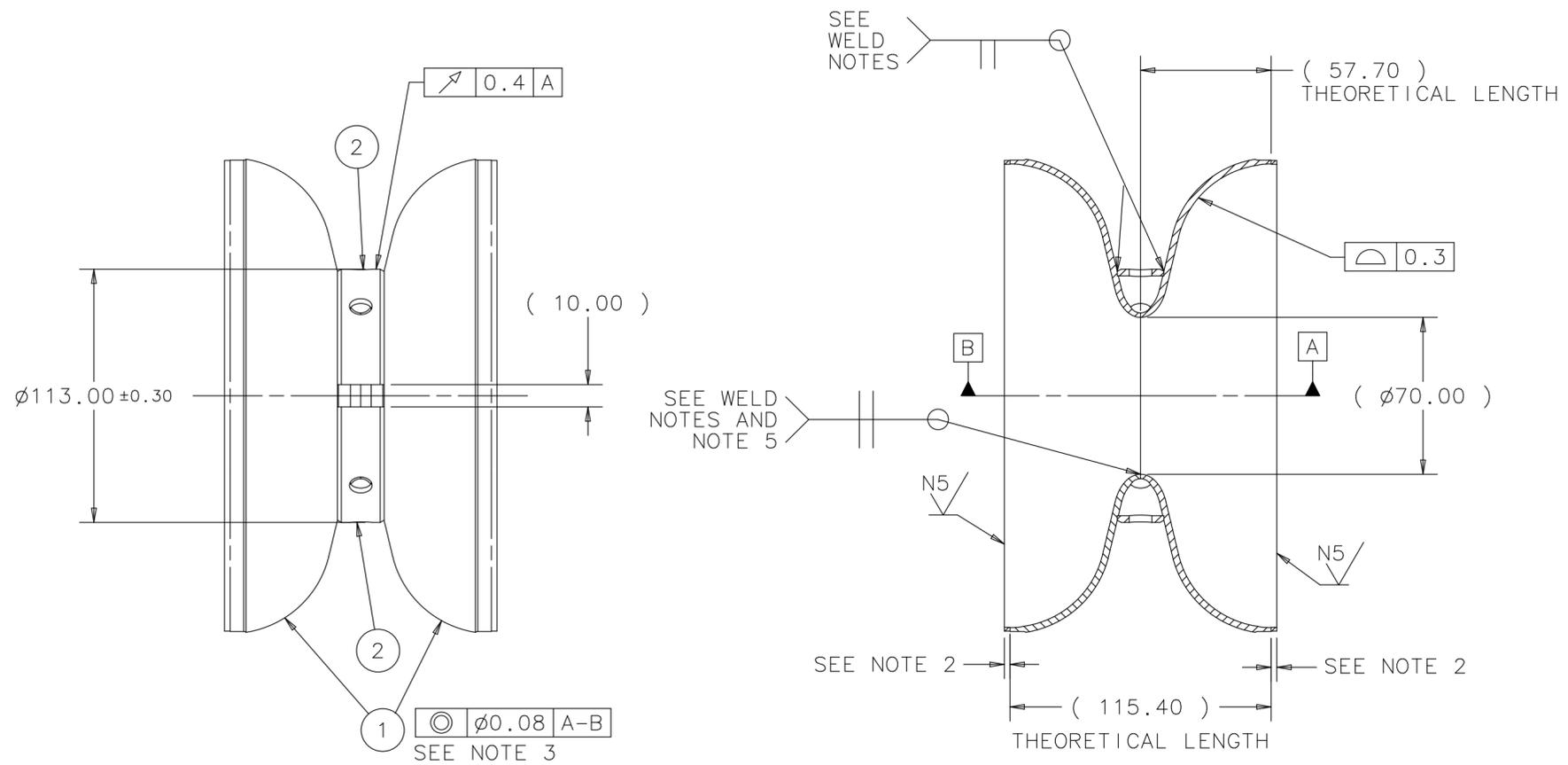
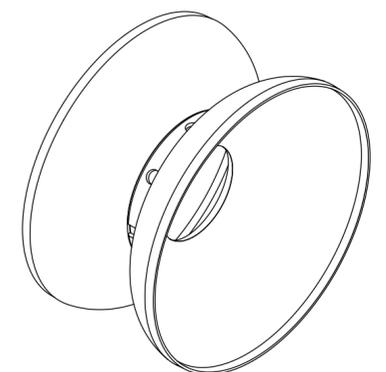
THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
MAY NOT BE CURRENT



SCALE	DRAWING NUMBER	SHEET	REV
2:1	4904.010-MB-439171	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF  $2 \times 10^{-10}$  ATM-CC/SEC FOR HELIUM.
  - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
  - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
  - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- 1) RF SURFACES IS TO BE FREE OF DAMAGE
  - 2) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.
  - 3) ALL PARTS ARE TO BE CONCENTRIC WITHIN  $\phi 0.08$ mm ALONG DATUM A AND B
  - 4) DO NOT BREAK EDGES ON END CELL
  - 5) DUAL PASS WELD -- WELD BOTH SIDES TO ENSURE OVERLAP

ITEM	PART NO.	DESCRIPTION OR SIZE	QTY.
2	MB-439151	HALF CELL SUPPORT RING HALF	2
1	MD-439156	NORMAL HALF CELL	2

PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	DESY
.X	.XX	ANGLE	
±	--	± 0.10	± 1°
1. BREAK ALL SHARP EDGES 0.40 MAX.		DRAWN	E.PIRTLE 18-APR-2005
2. DO NOT SCALE DRAWING.		CHECKED	D.MITCHELL 16-SEP-2005
3. DIMENSIONS BASED UPON ASME Y14.5M-1994		APPROVED	M.FOLEY 20-SEP-2005
4. MAX. ALL MACH. SURFACES		USED ON MD-439173	
5. DRAWING UNITS: METRIC, mm		MATERIAL SEE PARTS LIST	

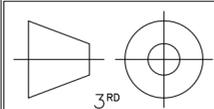
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UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
DUMBELL

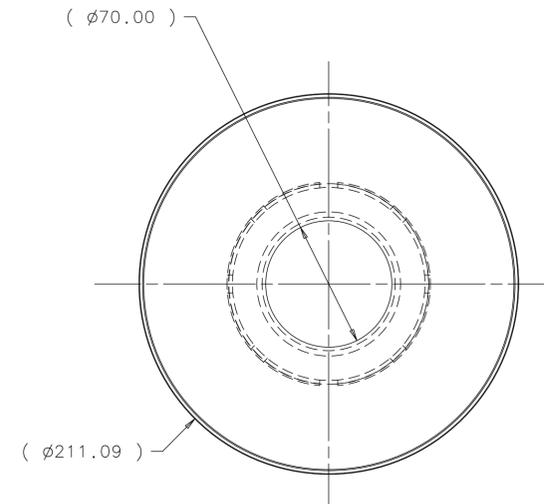
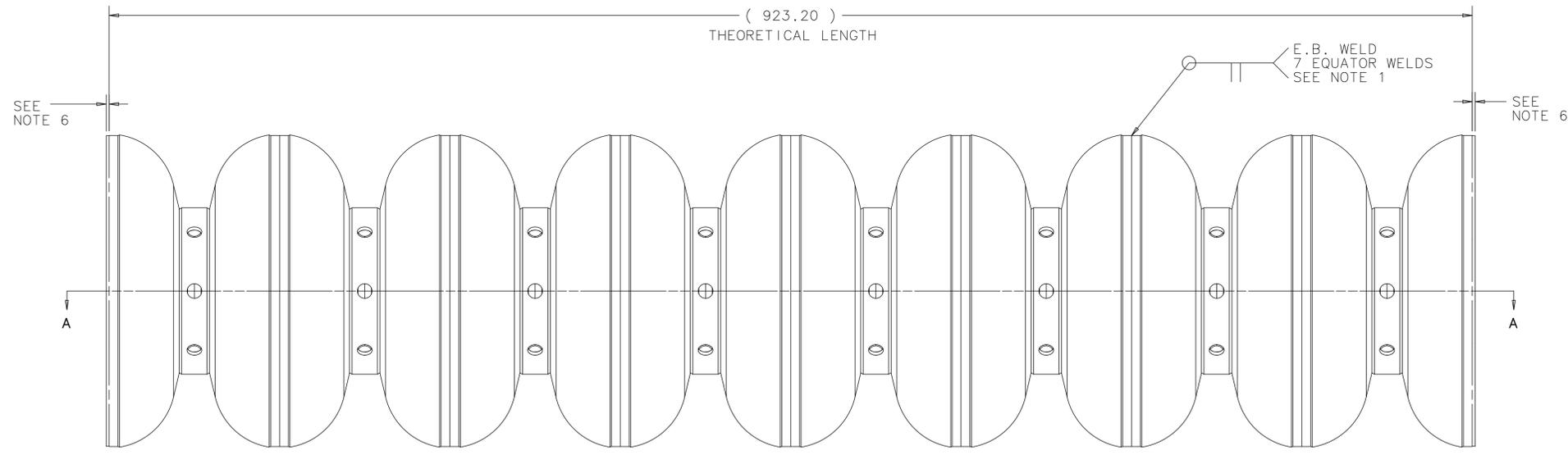
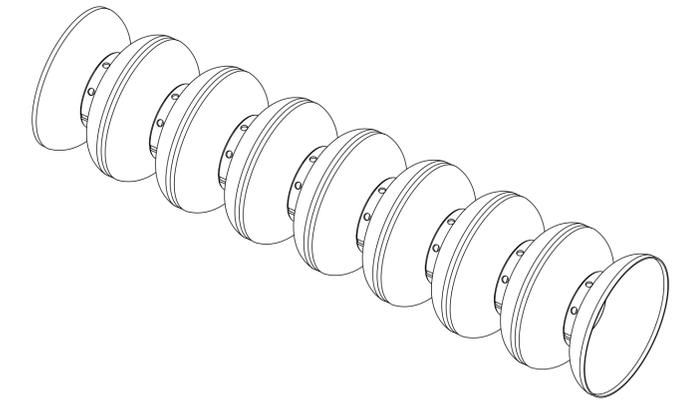
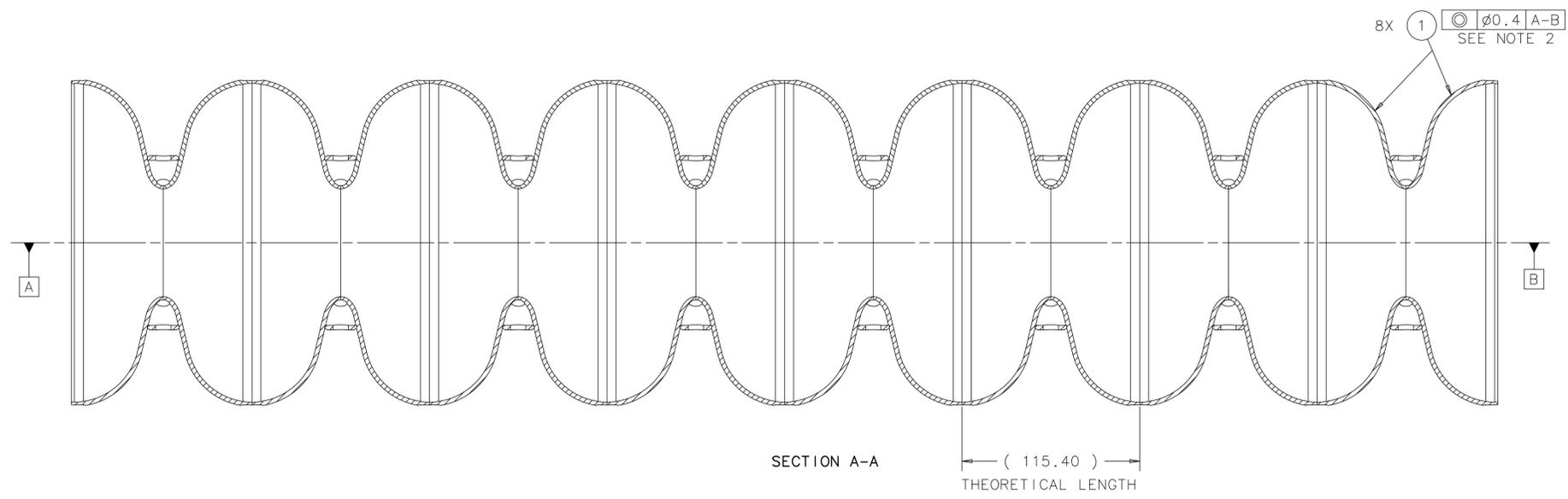
SCALE	DRAWING NUMBER	SHEET	REV
1:2	4904.010-MC-439172	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

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**NOT FOR FABRICATION**  
MAY NOT BE CURRENT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



NOTES:

- 1) ENSURE THAT THE CLOCKING OF THE SUPPORT RINGS ON THE DUMBBELL WELDMENTS ARE HELD TO  $\pm 5^\circ$
- 2) ALL PARTS ARE TO BE CONCENTRIC WITHIN  $\pm 0.4\text{mm}$  ALONG DATUM A AND B
- 3) DEFINITION OF FORM AND TOLERANCES CONCERNING WELD JOINT PREPARATION AT THE IRIS AND THE EQUATOR TO BE COORDINATED BETWEEN MANUFACTURERS AND FNAL
- 4) INDIVIDUAL PART DIMENSIONS ARE FINAL LENGTH AFTER ACID ETCHING AND TUNING
- 5) THIS DEVICE IS EASILY DEFORMED. A FIXTURE IS REQUIRED FOR ALL HANDLING.
- 6) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.
- 7) DO NOT BREAK SHARP EDGES ON END CELL

WELDING NOTES:

- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF  $2 \times 10^{-10}$  ATM-CC/SEC FOR HELIUM.
- 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
- 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
- 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

NOT FOR FABRICATION  
MAY NOT BE CURRENT

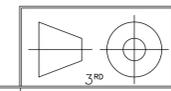
1	MC-439172	BARBELL WELDMENT AND SUPPORT RINGS ASSY	8
ITEM	PART NO.	DESCRIPTION OR SIZE	QTY.

PARTS LIST			
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESY	
.XX mm	.XXX in	ANGLE	DRAWN
$\pm 0.05$	$\pm .002$	$\pm 1^\circ$	CHECKED
			APPROVED
			USED ON
			MATERIAL
			SEE PARTS LIST

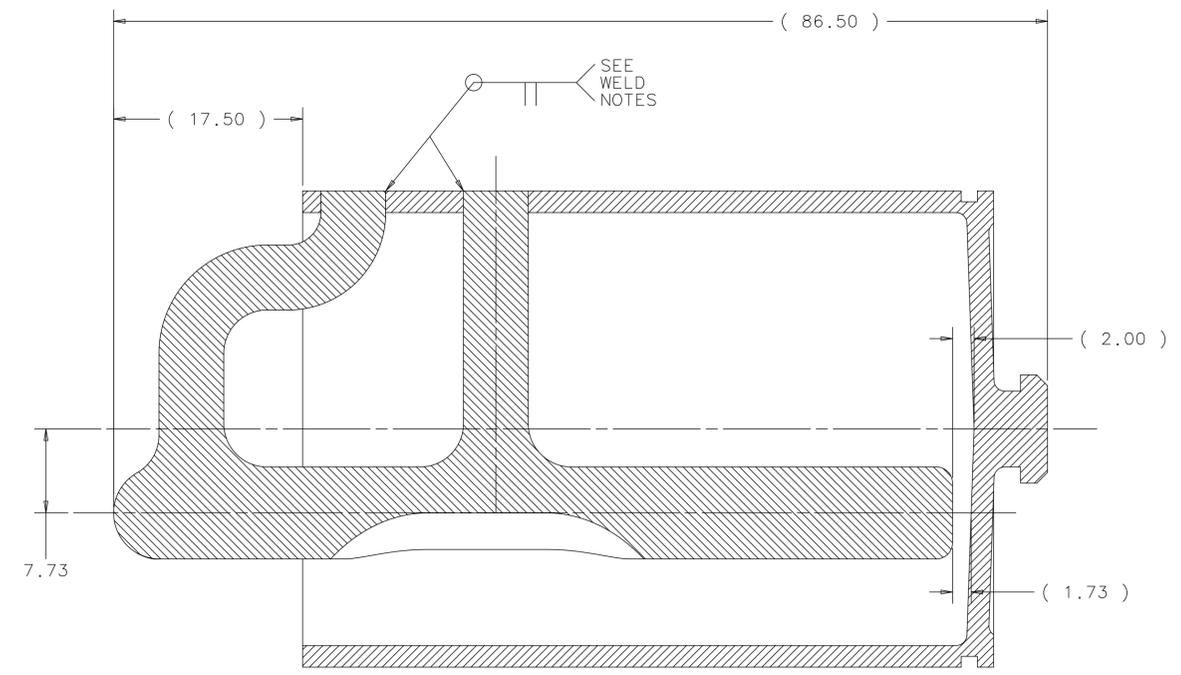
**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
RF CAVITY  
DUMBBELL WELDMENT

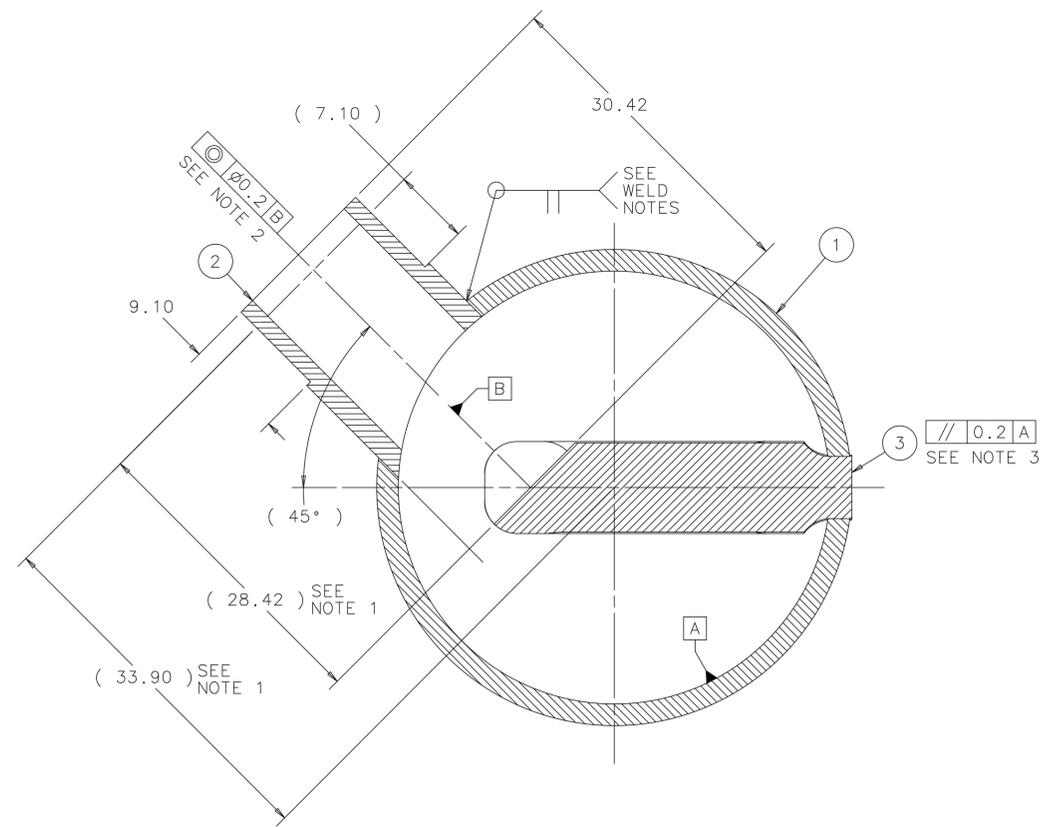
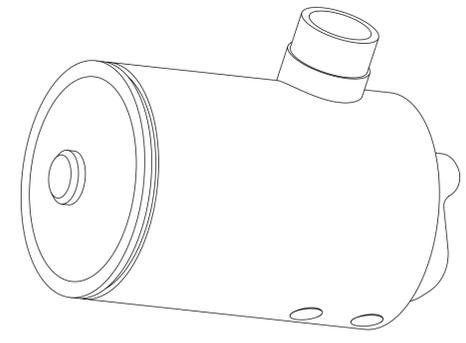
SCALE	DRAWING NUMBER	SHEET	REV
1:2	4904.010-MD-439173	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	



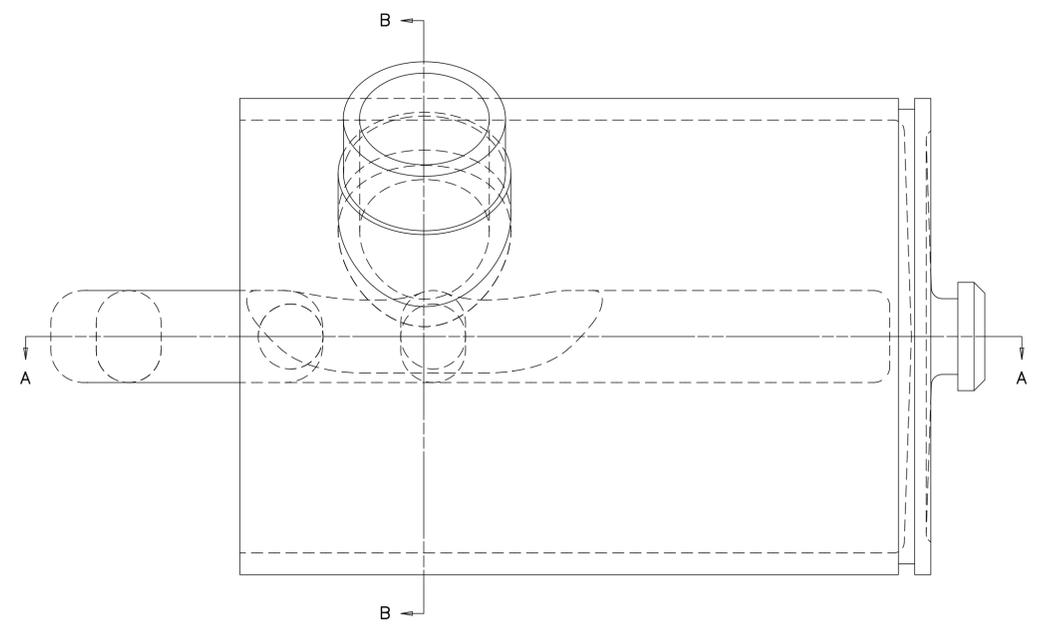
REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



SECTION A-A



SECTION B-B



- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF  $2 \times 10^{-10}$  ATM-CC/SEC FOR HELIUM.
  - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
  - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
  - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.
  - 5) WELD PREP TO MATCH WALL THICKNESS AT DISCRETION OF MANUFACTURER

- NOTES:
- 1) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439179
  - 2) ITEM #2 MUST BE CONCENTRIC TO ITEM #1 TO WITHIN  $\phi 0.2$
  - 3) ITEM #3 MUST BE CONCENTRIC TO ITEM #1 TO WITHIN  $\phi 0.2$

ITEM	PART NO.	DESCRIPTION OR SIZE	QTY.
3	MD-439154	LONG VERSION FORMTEIL	1
2	MB-439150	HOM SPOOL PIECE	1
1	MD-439165	HOM LONG VERSION FORMTEIL HOUSING	1

PARTS LIST			
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESY	
.X	.XX	DRAWN	E.PIRTLER
±	± 0.10	CHECKED	D.MITCHELL
		APPROVED	M.FOLEY
1. BREAK ALL SHARP EDGES 0.4mm/0.015in MAX.		USED ON MD-439176	
2. DO NOT SCALE DRAWING.		MATERIAL SEE PARTS LIST	
3. DIMENSIONS BASED UPON ASME Y14.5M-1994			
4. MAX. ALL MACH. SURFACES			
5. DRAWING UNITS: METRIC			

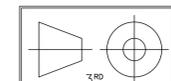
**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
 RF CAVITY  
 LONG END HOM ASSEMBLY

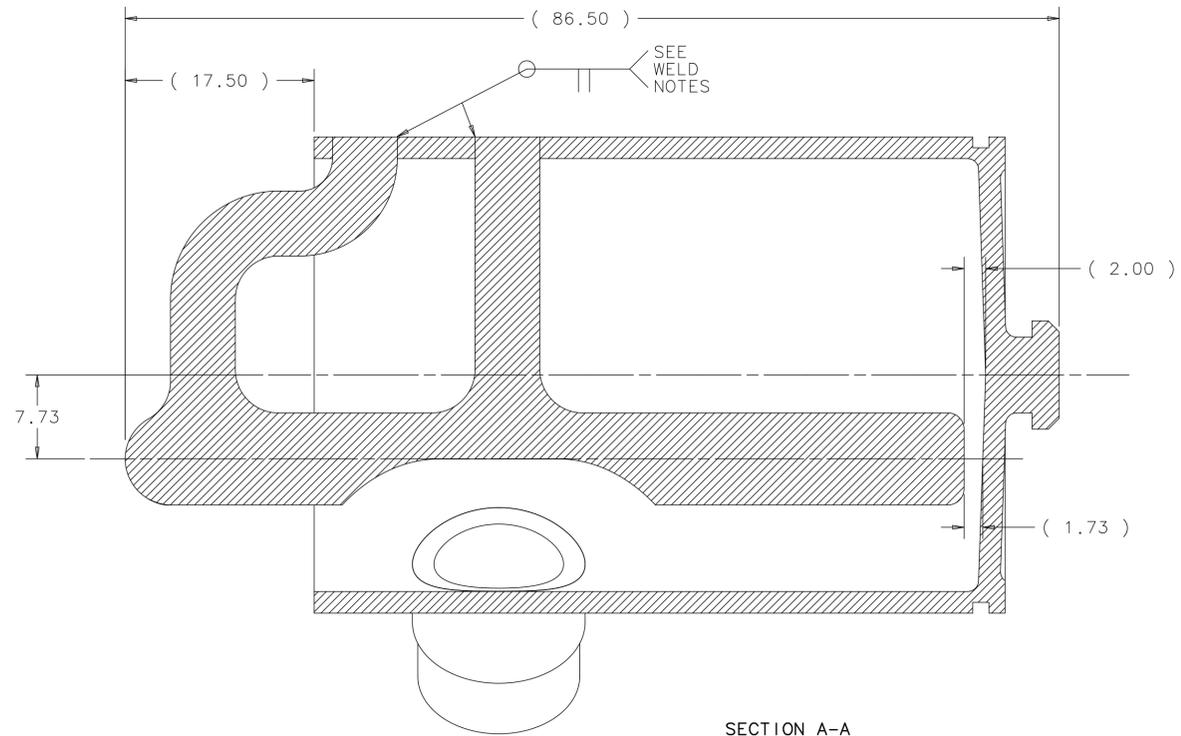
SCALE	DRAWING NUMBER	SHEET	REV
3:1	4904.010-MD-439174	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

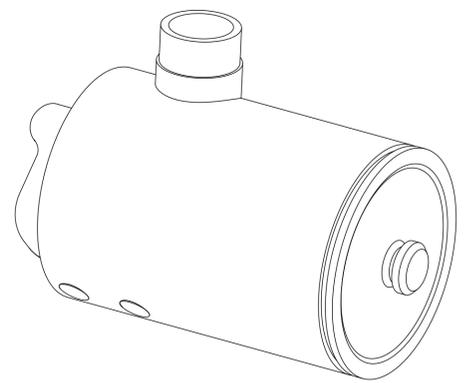
FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
 MAY NOT BE CURRENT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE

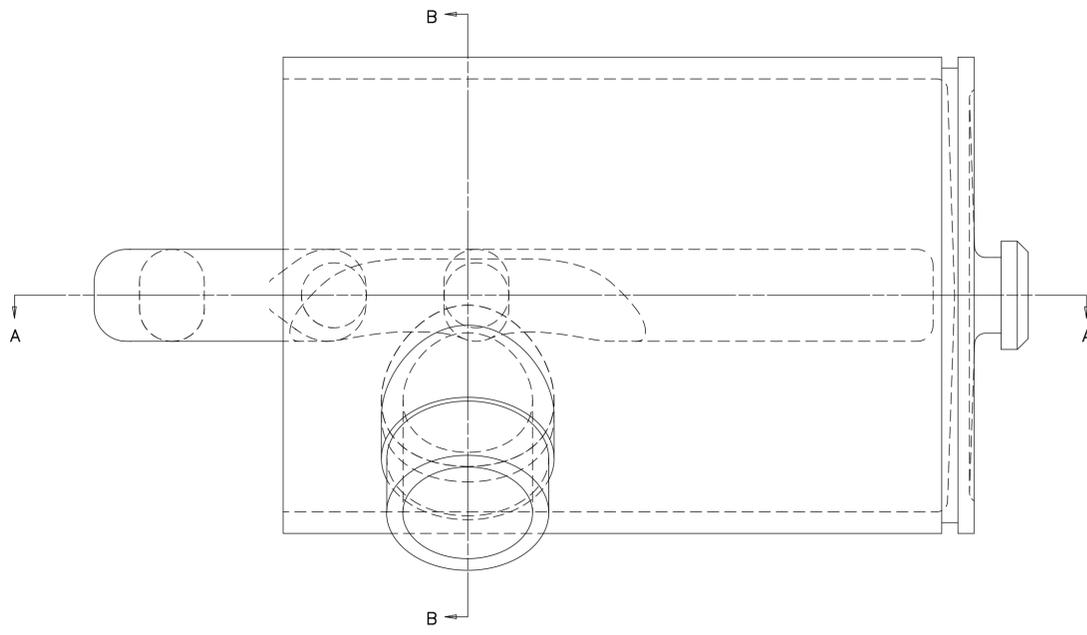


SECTION A-A

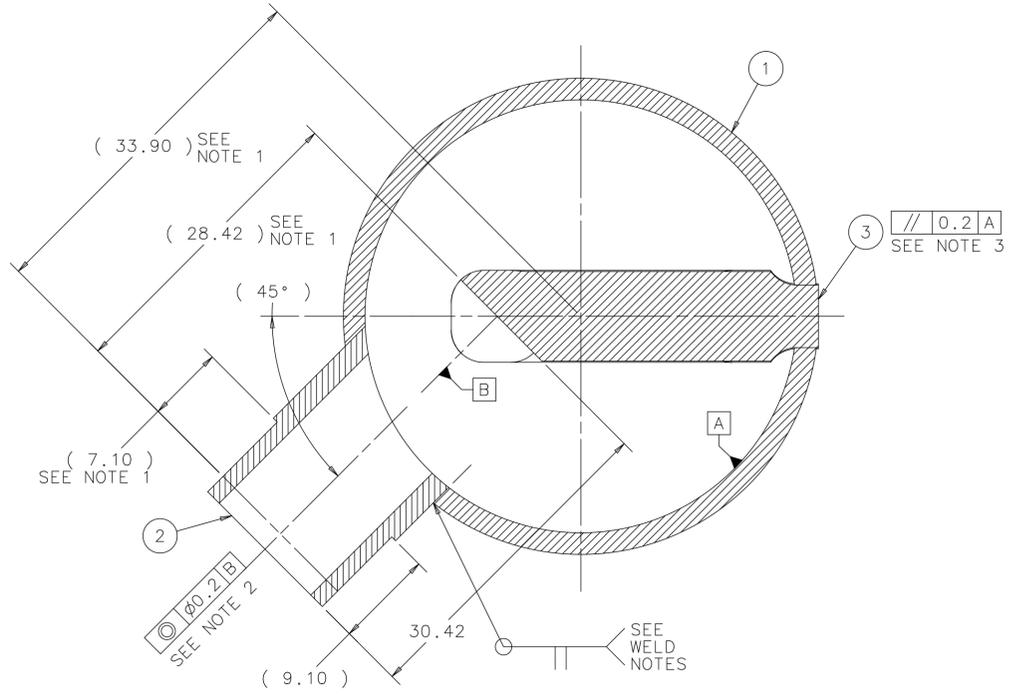


- WELDING NOTES:
- ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF  $2 \times 10^{-10}$  ATM-CC/SEC FOR HELIUM.
  - ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
  - ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
  - ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.
  - WELD PREP TO MATCH WALL THICKNESS AT DISCRETION OF MANUFACTURER

- NOTES:
- FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439180
  - ITEM #2 MUST BE CONCENTRIC TO ITEM #1 TO WITHIN  $\phi 0.2$
  - ITEM #3 MUST BE CONCENTRIC TO ITEM #1 TO WITHIN 0.2



SECTION B-B



FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
 MAY NOT BE CURRENT

ITEM	PART NO.	DESCRIPTION OR SIZE	QTY.
3	MD-439162	SHORT VERSION FORMTEIL	1
2	MB-439150	HOM SPOOL PIECE	1
1	MD-439166	SHORT VERSION HOM FORMTEIL HOUSING	1

PARTS LIST			
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESY	
.X	.XX	ANGLE	E.P.IRTLE 18-APR-2005
± --	± 0.10	± 1°	CHECKED D.MITCHELL 16-SEP-2005
1. BREAK ALL SHARP EDGES 0.40 MAX.	APPROVED	M.FOLEY	20-SEP-2005
2. DO NOT SCALE DRAWING.	USED ON MD-439177		
3. DIMENSIONS BASED UPON ASME Y14.5M-1994	MATERIAL SEE PARTS LIST		
4. MAX. ALL MACH. SURFACES	N6		
5. DRAWING UNITS: METRIC, mm			

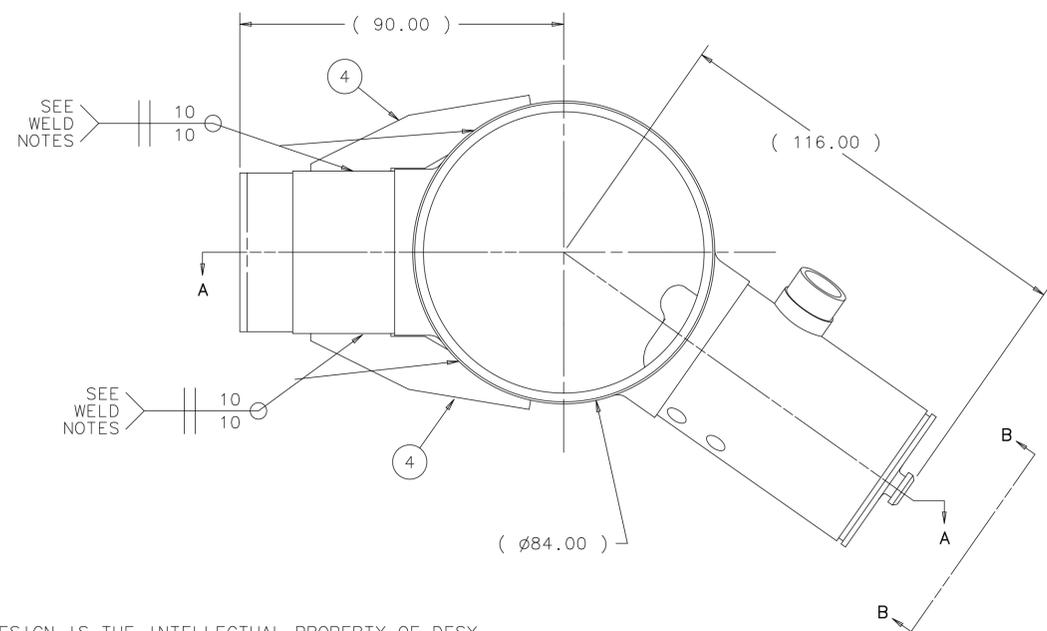
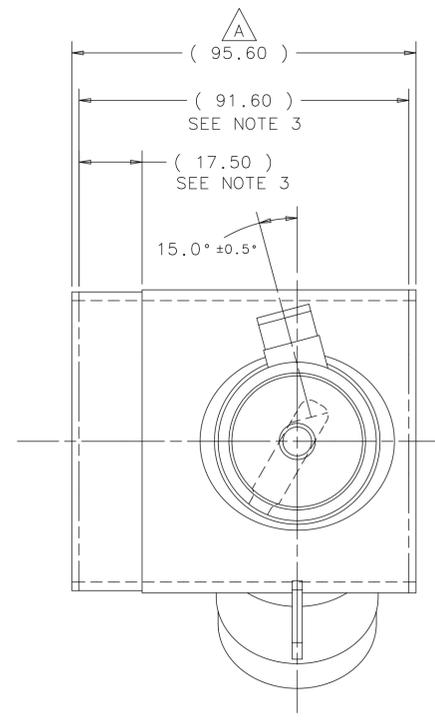
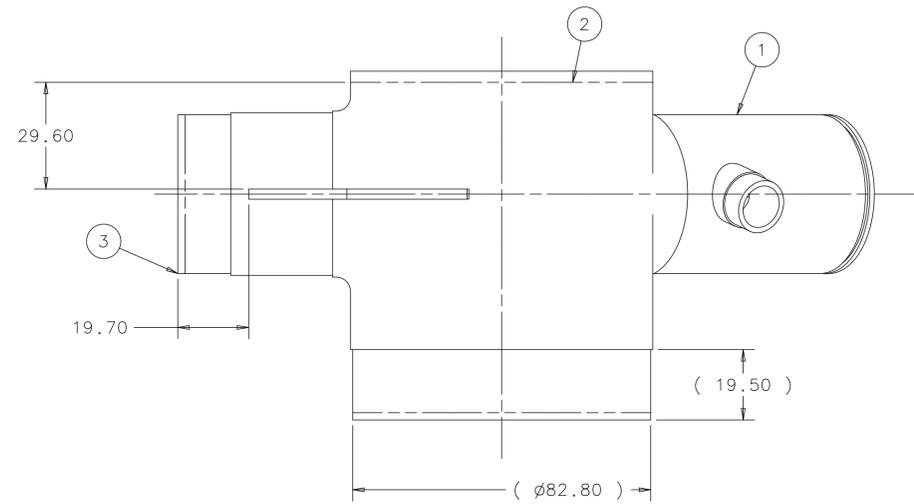
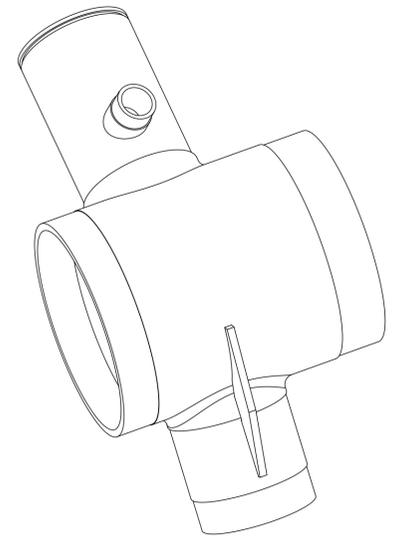
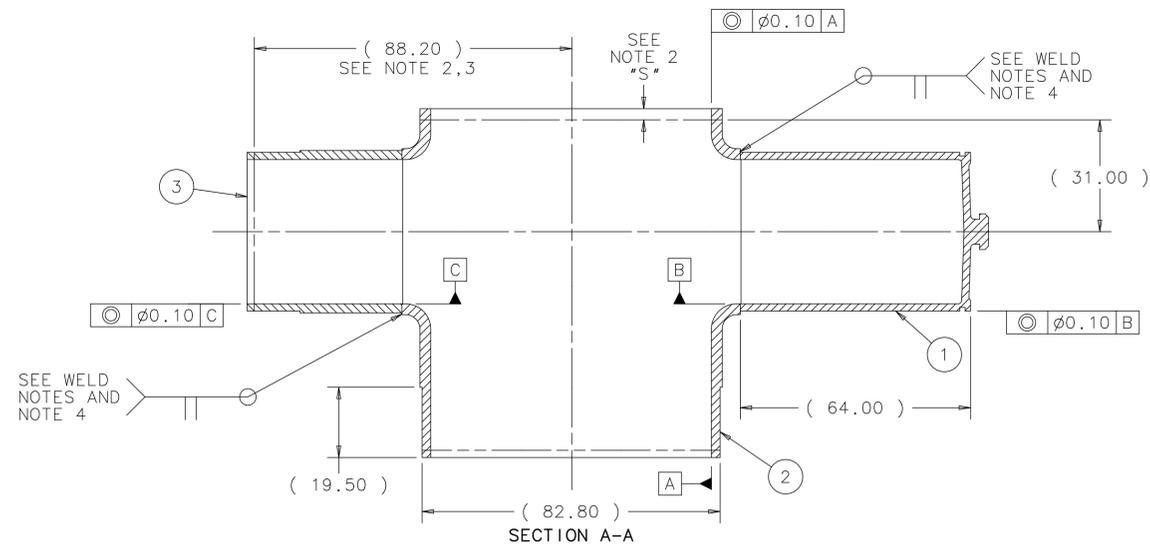
**FERMI NATIONAL ACCELERATOR LABORATORY**  
 UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA  
 RF CAVITY  
 SHORT END HOM ASSEMBLY

SCALE	DRAWING NUMBER	SHEET	REV
3:1	4904.010-MD-439175	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	CHANGED LENGTH	E. PIRTLE	13-APR-2006
		M. FOLEY	17-APR-2006



- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF  $2 \times 10^{-10}$  ATM-CC/SEC FOR HELIUM.
  - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
  - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES.
  - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- 1) DEFINITION OF FORM AND TOLERANCES CONCERNING WELD JOINT PREPARATION AT THE IRIS AND THE EQUATOR TO BE COORDINATED BETWEEN MANUFACTURERS AND FNAL
  - 2) SUPPLEMENT FOR WELD SHRINKAGE REFERRED TO IN PIECE PART DRAWINGS
  - 3) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439180
  - 4) WELD PREP JOINTS TO MATCH WALL THICKNESS AT DISCRETION OF MANUFACTURER

ITEM	PART NO.	DESCRIPTION OR SIZE	QTY.
4	MB-439169	COUPLER RIB	2
3	MB-439171	COUPLER SPOOL PIECE	1
2	MD-439161	SHORT VERSION END TUBE	1
1	MD-439175	SHORT VERSION HOM ASSEMBLY	1

PARTS LIST			
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESY	
.X	.XX	DRAWN	E. PIRTLE 18-APR-2005
±	- -	CHECKED	D. MITCHELL 20-SEP-2005
		APPROVED	M. FOLEY 16-SEP-2005
USED ON		MD-439180	
MATERIAL		SEE PARTS LIST	
5. DRAWING UNITS: METRIC, mm			

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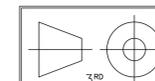
DESY 1.3GHZ TESLA  
 RF CAVITY  
 SHORT END TUBE WELDMENT

SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MD-439177	1 OF 1	A

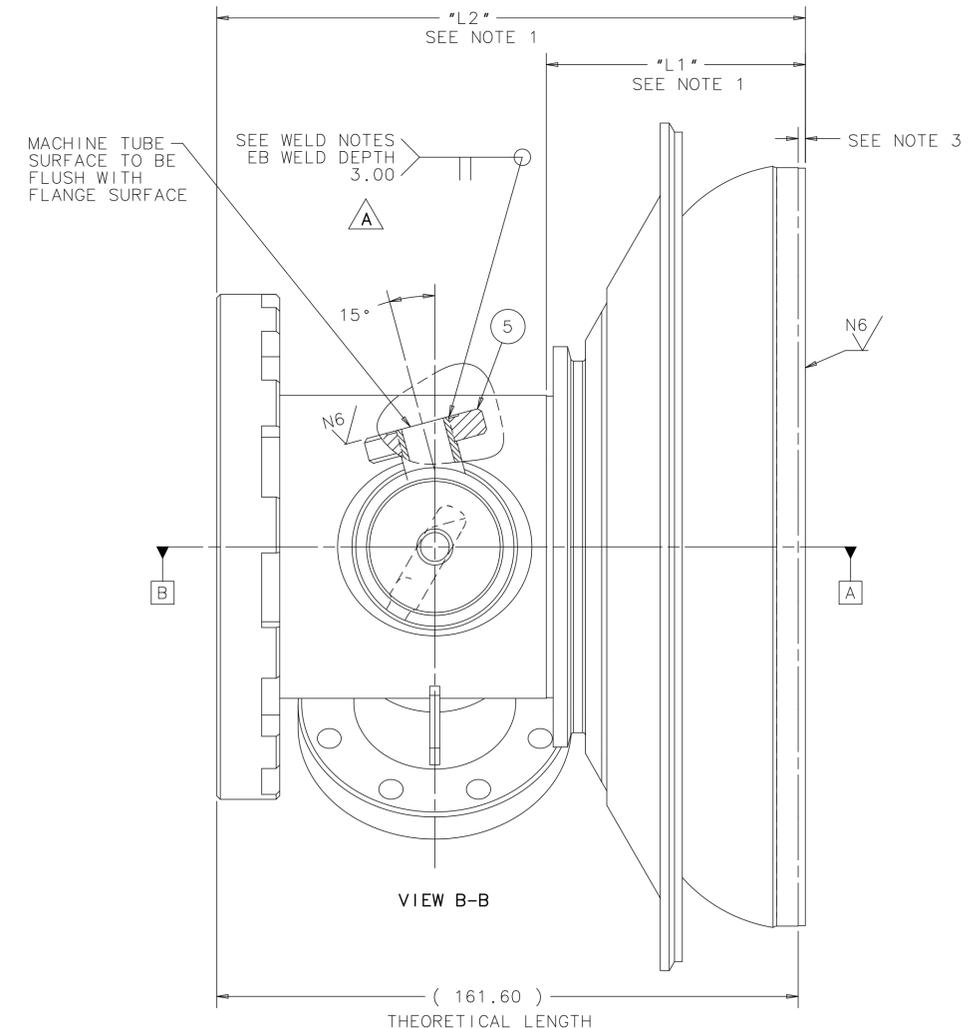
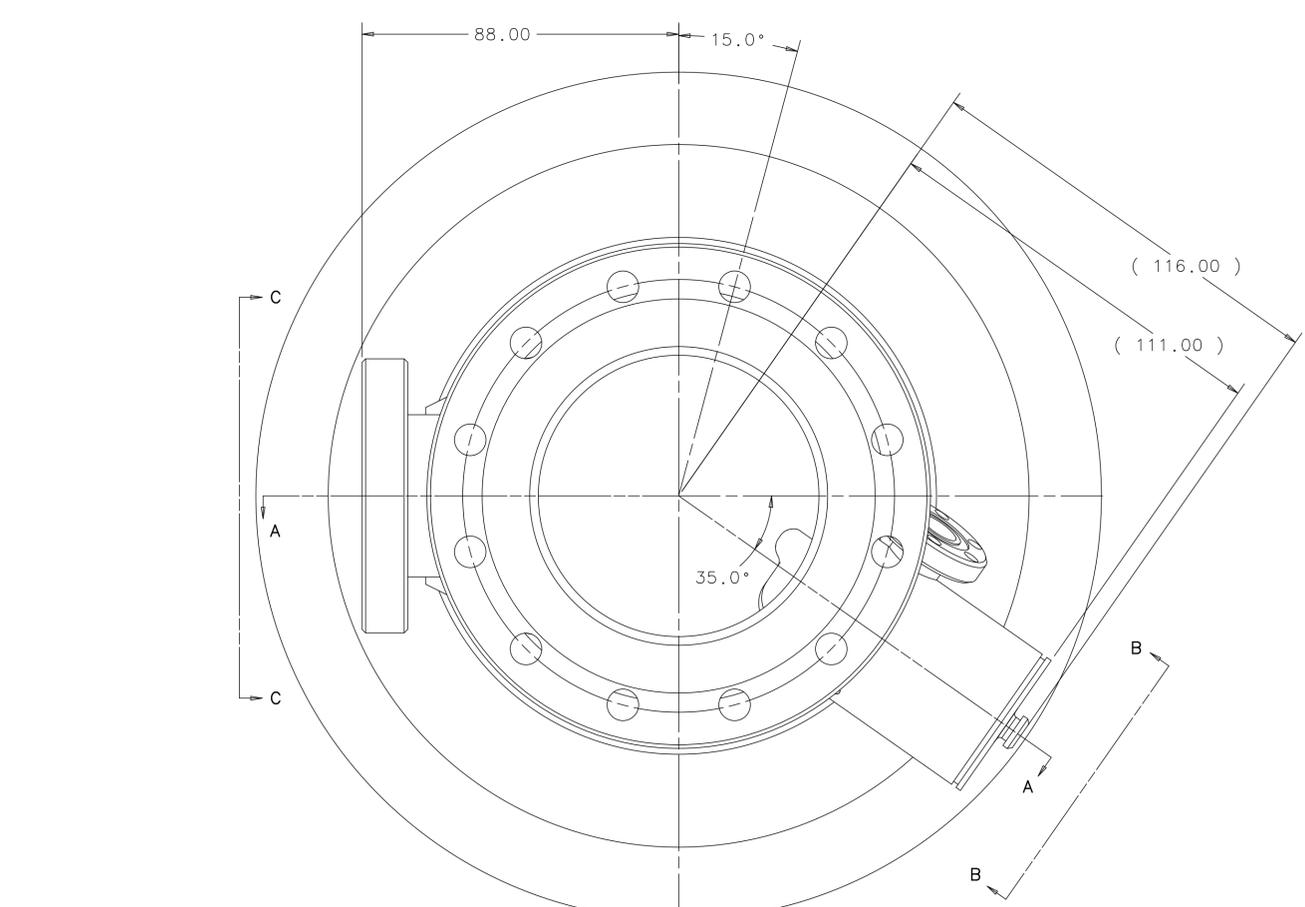
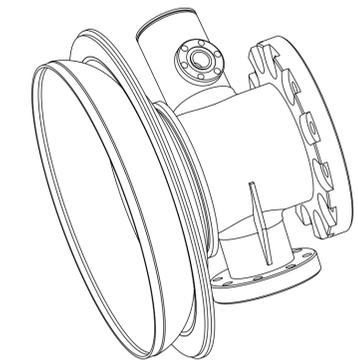
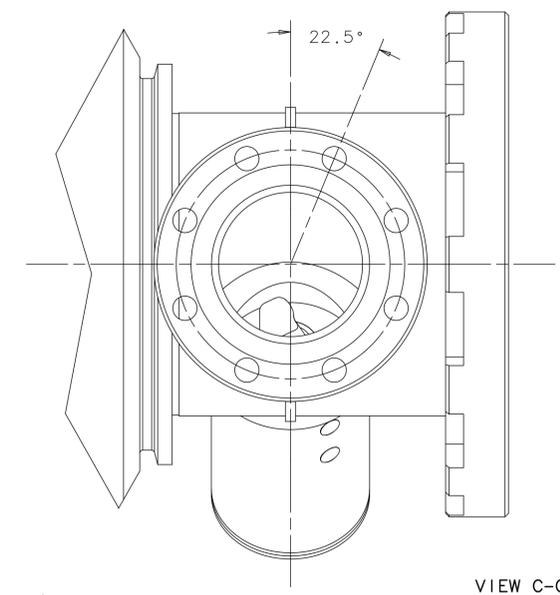
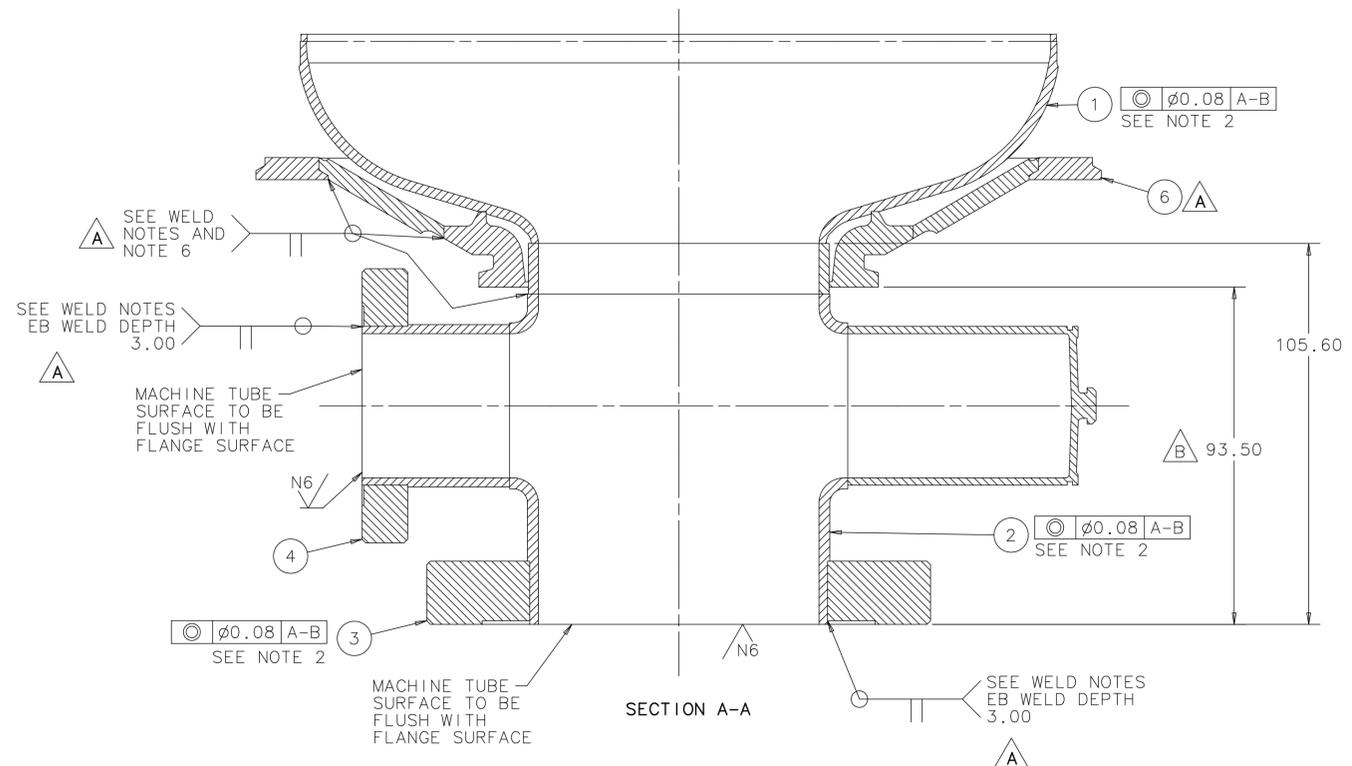
CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT.

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

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**NOT FOR FABRICATION**  
 MAY NOT BE CURRENT



REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	ADDED EB WELD DEPTH NOTE	E.PIRTLE	31-JAN-2006
B	CHANGED LENGTH	M.FOLEY	31-JAN-2006
		M.FOLEY	05-APR-2006
C	ADDED DRAWING IN USED ON IN TITLE BLOCK	M.FOLEY	06-APR-2006
		E.PIRTLE	26-APR-2006
D	ADDED PART 6	M.FOLEY	26-APR-2006
		E.PIRTLE	19-DEC-2008
		M.FOLEY	06-JAN-2008



- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF  $2 \times 10^{-10}$  ATM-CC/SEC FOR HELIUM.
  - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
  - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
  - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- 1) DIMENSIONS L1 AND L2 ARE DEPENDENT ON A FREQUENCY MEASUREMENT. HALF CELL EQUATOR IS TO BE FINISHED TO FNAL SPECIFICATIONS RELATED TO SAID MEASUREMENT ALLOWING ADDITIONAL MATERIAL FOR WELD SHRINKAGE \*S\*.
  - 2) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING. SURFACE MUST BE FREE OF DAMAGES.
  - 3) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.
  - 4) ALL PARTS ARE TO BE CONCENTRIC WITHIN  $\phi 0.08$ mm ALONG DATUM A AND B
  - 5) DO NOT BREAK EDGES ON END CELL
  - 6) DUAL PASS WELD -- ENSURE OVERLAP

ITEM	PART NO.	DESCRIPTION OR SIZE	QTY.
6	MB-459457	TRANSITION RING MC END	1
5	MB-439157	NW12 HOM FLANGE	1
4	MB-439158	NW40 COUPLER FLANGE	1
3	MD-439159	NW78 BEAM FLANGE	1
2	MD-439177	END TUBE WELDMENT (SHORT VERSION)	1
1	MD-439178	END DISK WELDMENT (SHORT VERSION)	1

PARTS LIST			
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DESY	
.X	.XX	DRAWN	E.PIRTLE 18-APR-2005
$\pm$	$\pm$	CHECKED	D.MITCHELL 16-SEP-2005
		APPROVED	M.FOLEY 20-SEP-2005
USED ON		MD-439181 MD-440004	
MATERIAL		SEE PARTS LIST	

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UNITED STATES DEPARTMENT OF ENERGY

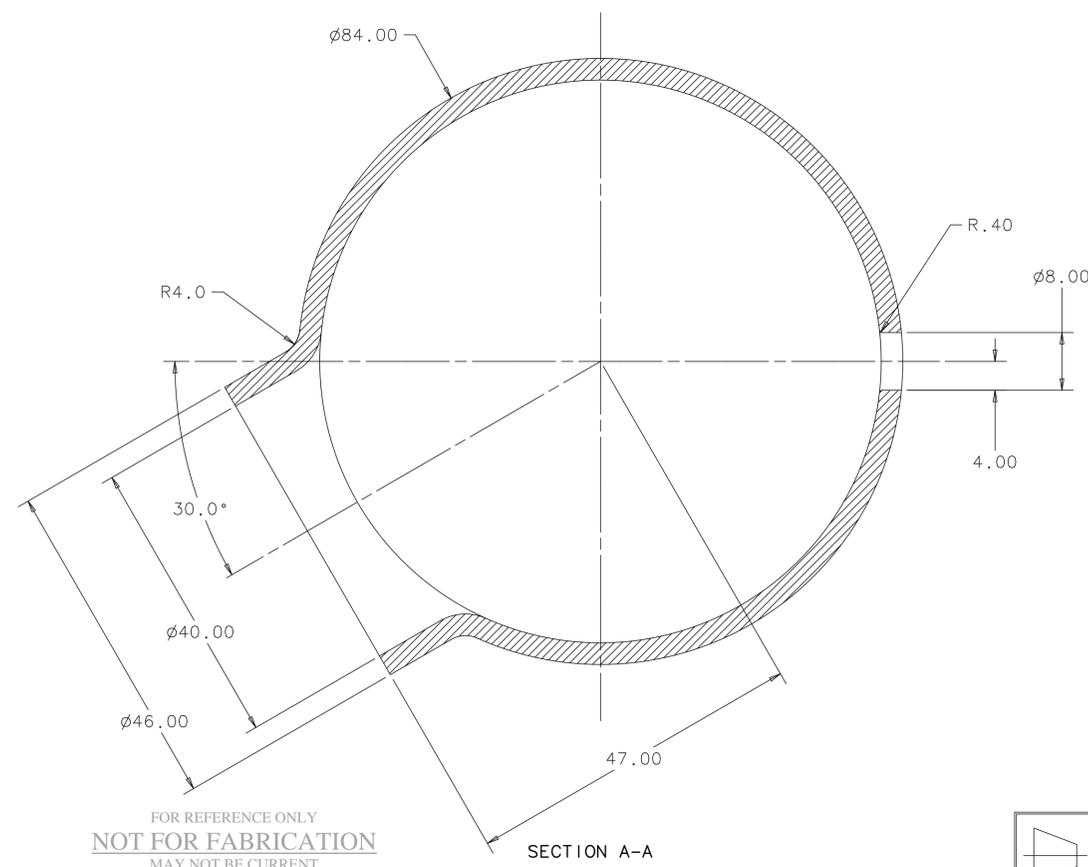
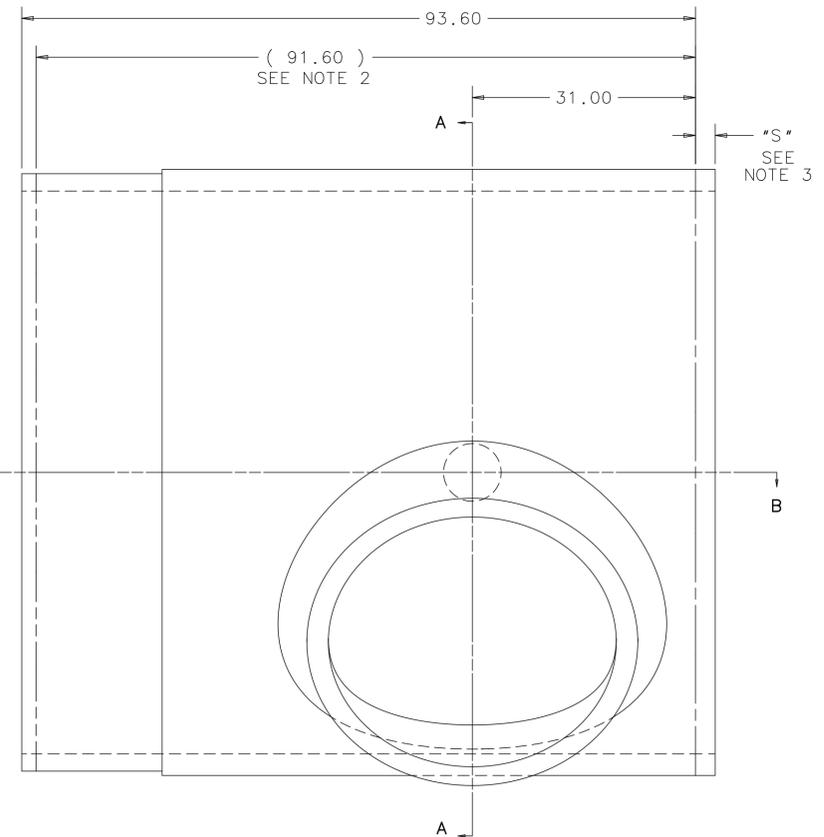
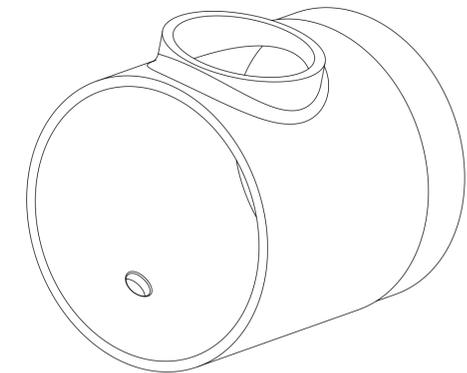
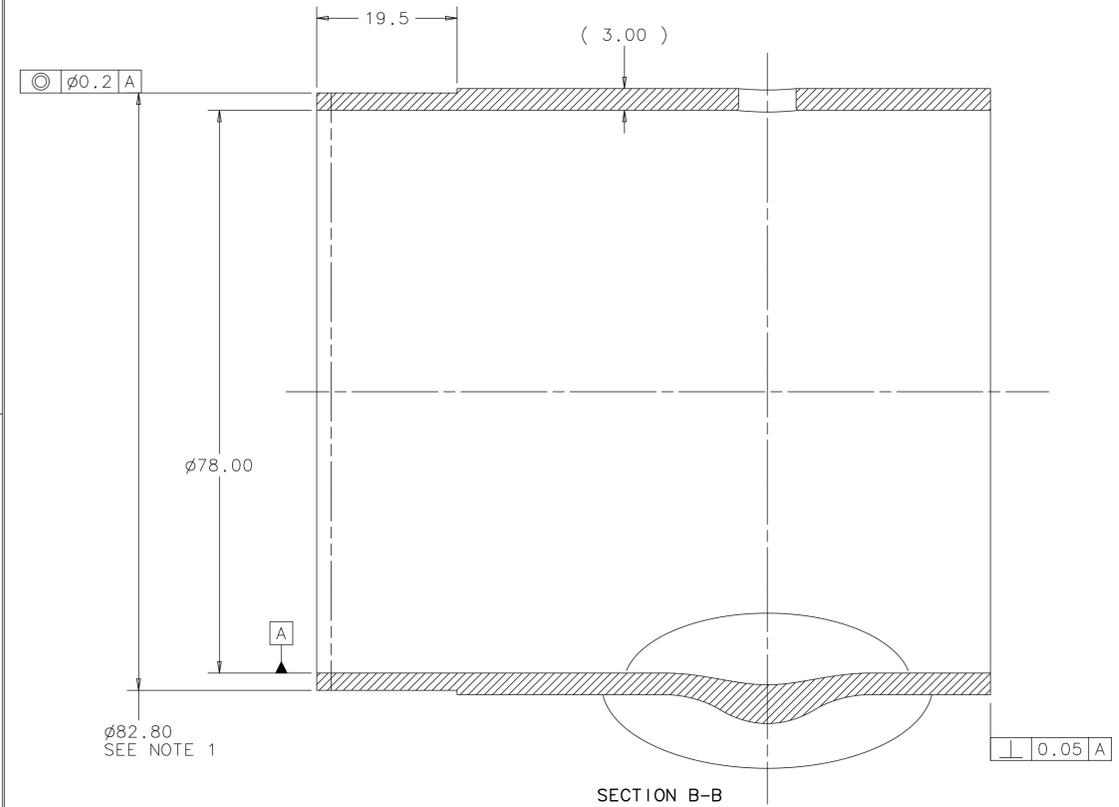
DESY 1.3GHZ TESLA  
RF CAVITY  
SHORT END HALF CELL ASSEMBLY

SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MD-439180	1 OF 1	D

CREATED WITH : Ideas12NXSeries GROUP: ACCELERATOR MECH. SUPPT.

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REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



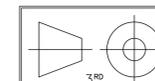
- NOTES:
- 1) DIMENSION COORESponds WITH PART NUMBER MD-439159. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
  - 2) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-440003
  - 3) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS

UNLESS OTHERWISE SPECIFIED	ORIGINATOR	M.FOLEY	17-OCT-2005
.X	.XX	ANGLE	DRAWN
$\pm 0.2$	$\pm .010$	$\pm 0.5^\circ$	CHECKED
1. BREAK ALL SHARP EDGES 0.40 MAX.		APPROVED	
2. DO NOT SCALE DRAWING.		M.FOLEY	
3. DIMENSIONS BASED UPON ASME Y14.5M-1994		M.FOLEY	
4. MAX. ALL MACH. SURFACES N7		25-OCT-2005	
5. DRAWING UNITS: METRIC, mm		USED ON	
		MD-440002	
		MATERIAL	
		RRR 300 NIOBIUM	

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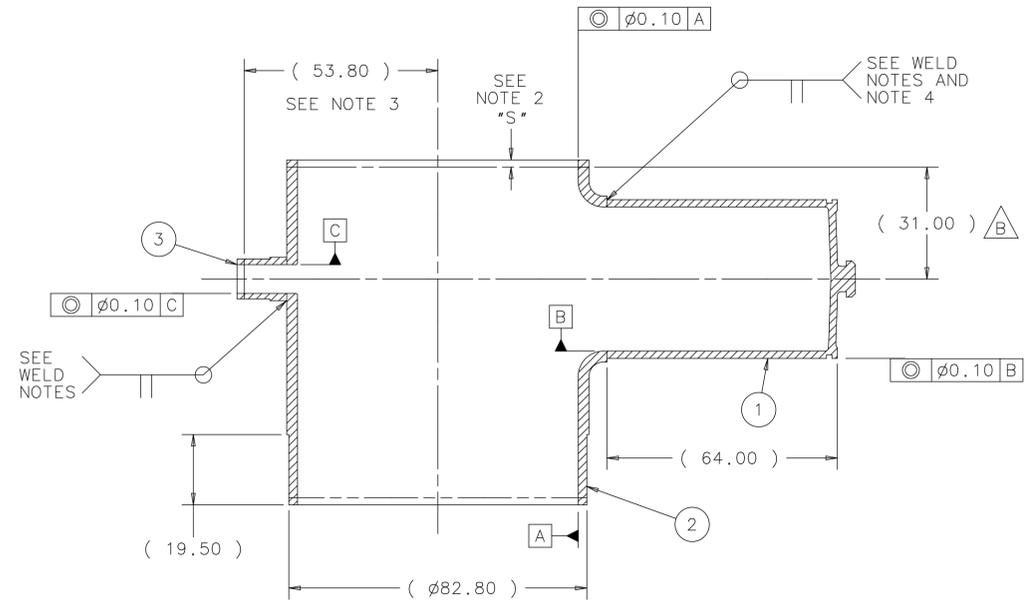
FNAL 1.3GHZ TESLA  
RF CAVITY  
LONG END TUBE

SCALE	DRAWING NUMBER	SHEET	REV
2:1	4904.010-MD-440001	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

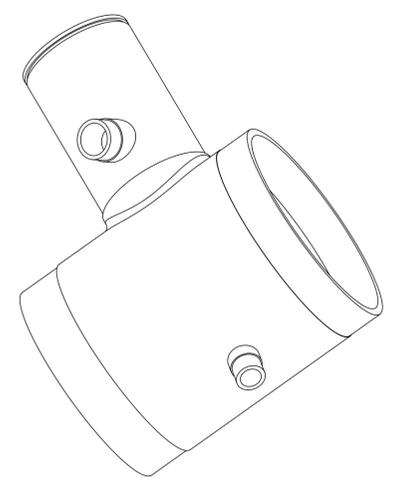


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**NOT FOR FABRICATION**  
MAY NOT BE CURRENT

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	ADDED REFERENCE DIMENSION	E.PIRTLE	28-APR-2006
		M.FOLEY	28-APR-2006
A	CHANGED REFERENCE DIMENSION 30.80 TO 31.00	E.PIRTLE	17-MAY-2006
		M.FOLEY	18-MAY-2006

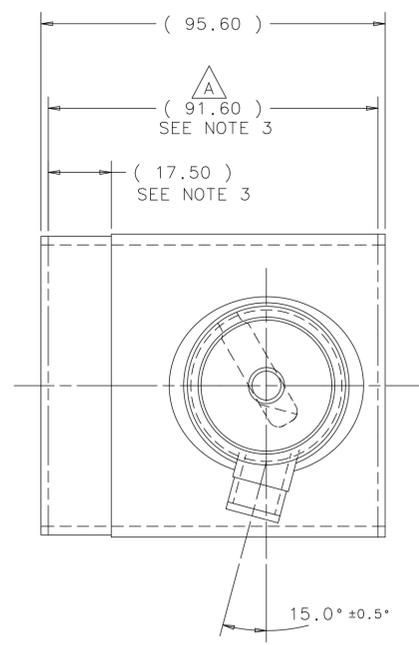
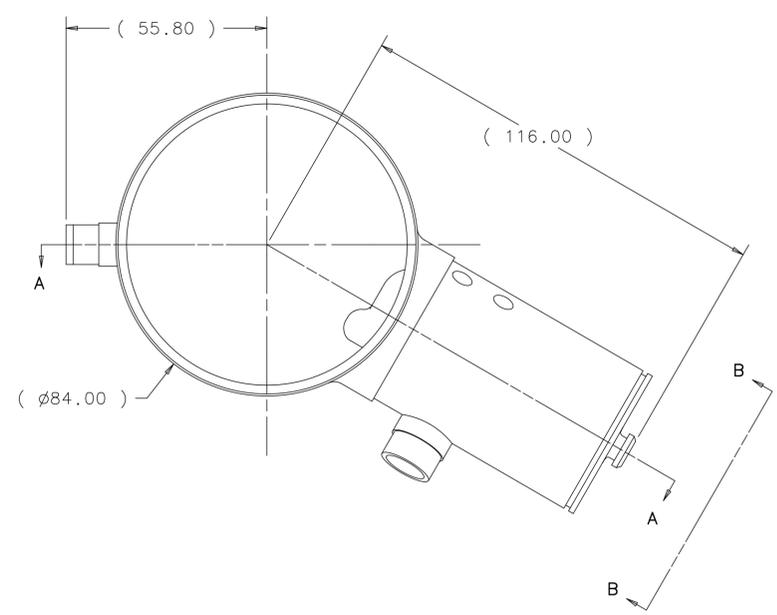


SECTION A-A



- WELDING NOTES:
- ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF  $2 \times 10^{-10}$  ATM-CC/SEC FOR HELIUM.
  - ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
  - ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
  - ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- DEFINITION OF FORM AND TOLERANCES CONCERNING WELD JOINT PREPARATION AT THE IRIS AND THE EQUATOR TO BE COORDINATED BETWEEN MANUFACTURERS AND FNAL
  - SUPPLEMENT FOR WELD SHRINKAGE REFERRED TO IN PIECE PART DRAWINGS
  - FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-440003
  - WELD PREP JOINTS TO MATCH WALL THICKNESS AT DISCRETION OF MANUFACTURER



VIEW B-B

ITEM	PART NO.	DESCRIPTION OR SIZE	QTY.
3	MB-439170	DESY ANTENNA SPOOL PIECE	1
2	MD-440001	FNAL LONG VERSION END TUBE	1
1	MD-439174	DESY LONG VERSION HOM ASSEMBLY	1

PARTS LIST			
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	M.FOLEY	17-OCT-2005
.X	.XX	ANGLE	DRAWN
±	- -	± 0.20 ± 1°	CHECKED
1. BREAK ALL SHARP EDGES 0.40 MAX.		APPROVED	M.FOLEY
2. DO NOT SCALE DRAWING.		USED ON	
3. DIMENSIONS BASED UPON ASME Y14.5M-1994		MD-440003	
4. MAX. ALL MACH. SURFACES		MATERIAL	
5. DRAWING UNITS: METRIC, mm		SEE PARTS LIST	

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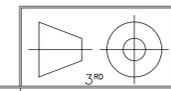
FNAL 1.3GHZ TESLA  
 RF CAVITY  
 LONG END TUBE WELDMENT

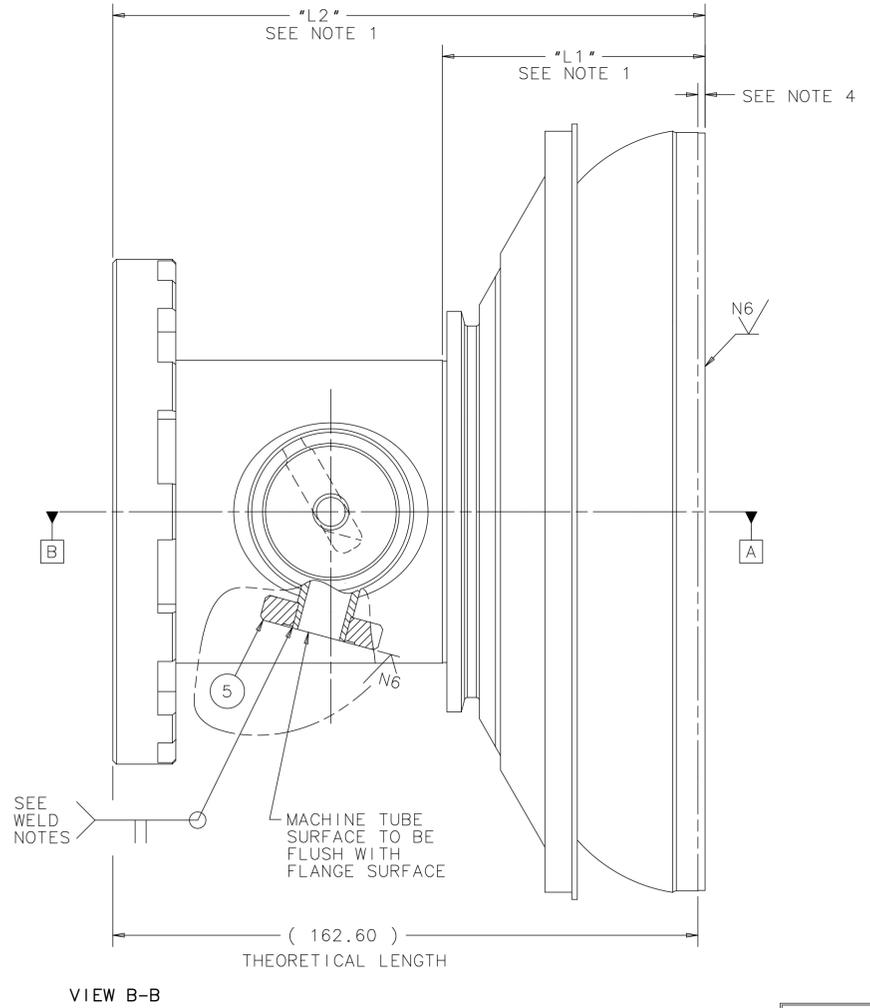
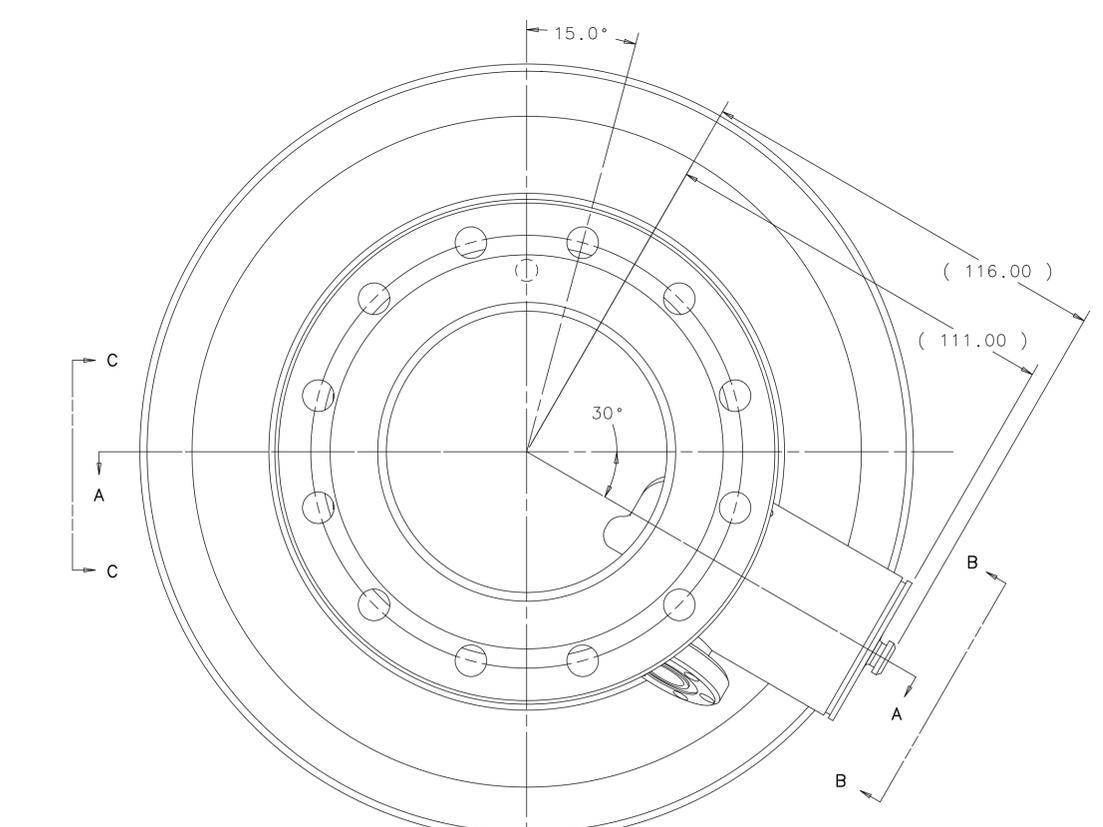
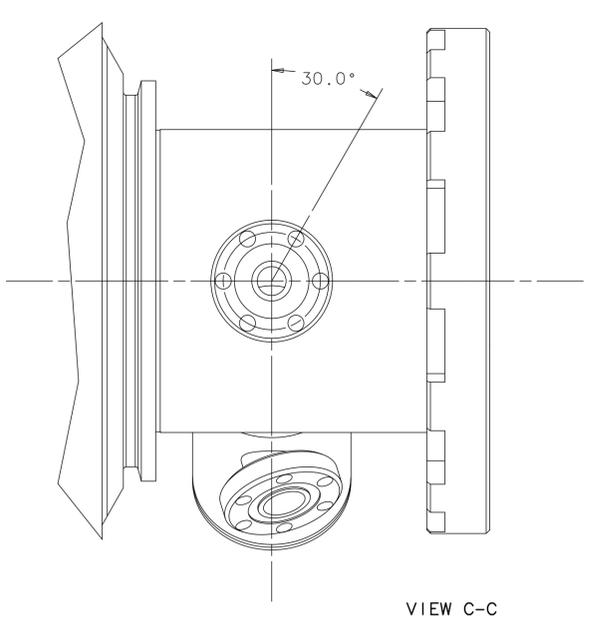
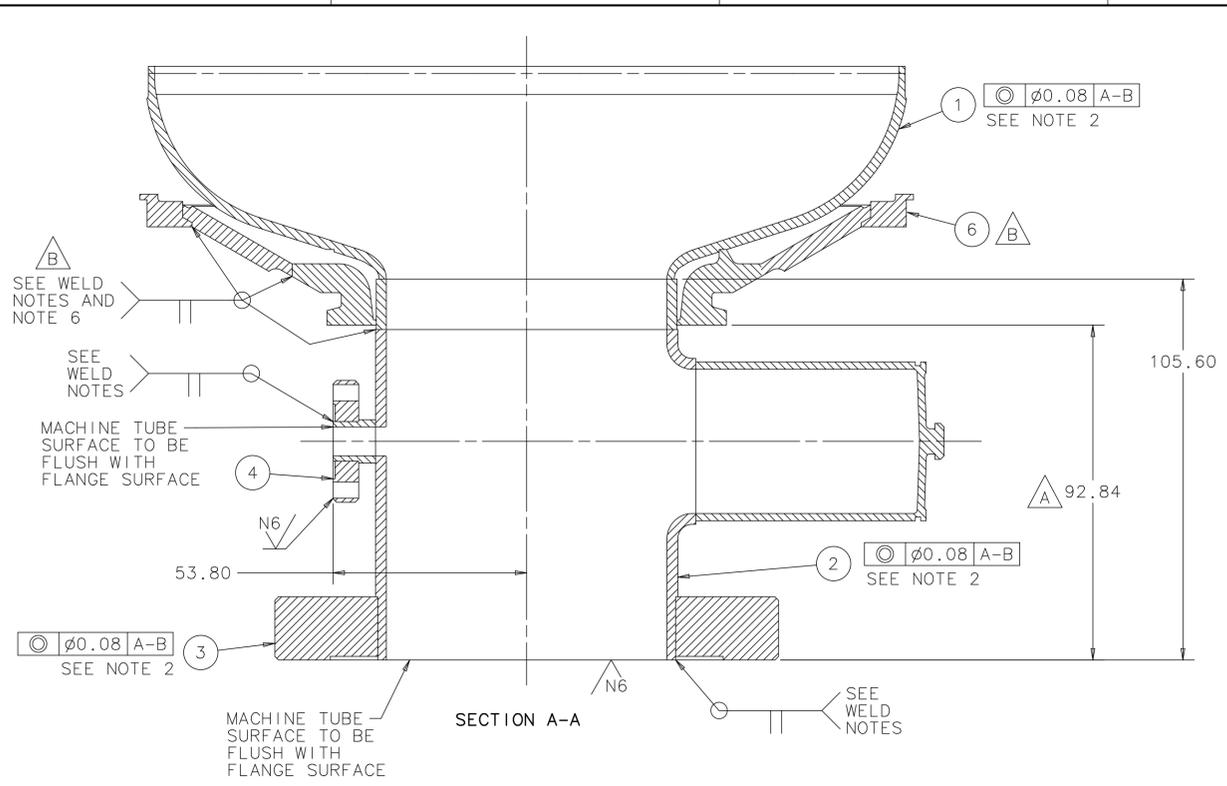
SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MD-440002	1 OF 1	B

CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT.

PARTS OF THIS DESIGN ARE THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. PARTS OF THIS DRAWING HAVE BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

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REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	CHANGED LENGTH	E.PIRTLE	28-APR-2006
		M.FOLEY	28-APR-2006
B	ADDED PART 6	E.PIRTLE	19-DEC-2008
		M.FOLEY	06-JAN-2008

- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF  $2 \times 10^{-10}$  ATM-CC/SEC FOR HELIUM.
  - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
  - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
  - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- 1) DIMENSIONS L1 AND L2 ARE DEPENDENT ON A FREQUENCY MEASUREMENT. HALF CELL EQUATOR IS TO BE FINISHED TO FINAL SPECIFICATIONS RELATED TO SAID MEASUREMENT ALLOWING ADDITIONAL MATERIAL FOR WELD SHRINKAGE "S".
  - 2) ITEMS 1, 2, AND 3 ARE TO BE CONCENTRIC WITHIN  $\phi 0.08$ MM ALONG DATUM A AND B
  - 3) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING. SURFACE MUST BE FREE OF DAMAGES.
  - 4) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.
  - 5) DO NOT BREAK EDGES ON END CELL
  - 6) DUAL PASS WELD -- ENSURE OVERLAP

ITEM	PART NO.	DESCRIPTION OR SIZE	QTY.
6	MB-459459	TRANSITION RING FIELD PROBE END	1
5	MB-439157	DESY NW12 HOM FLANGE	1
4	MB-439160	DESY NW8 ANTENNA FLANGE	1
3	MD-439159	DESY NW78 BEAM FLANGE	1
2	MD-440002	FNAL END TUBE WELDMENT (LONG VERSION)	1
1	MD-439178	DESY END DISK FLANGE WELDMENT (LONG VERSION)	1

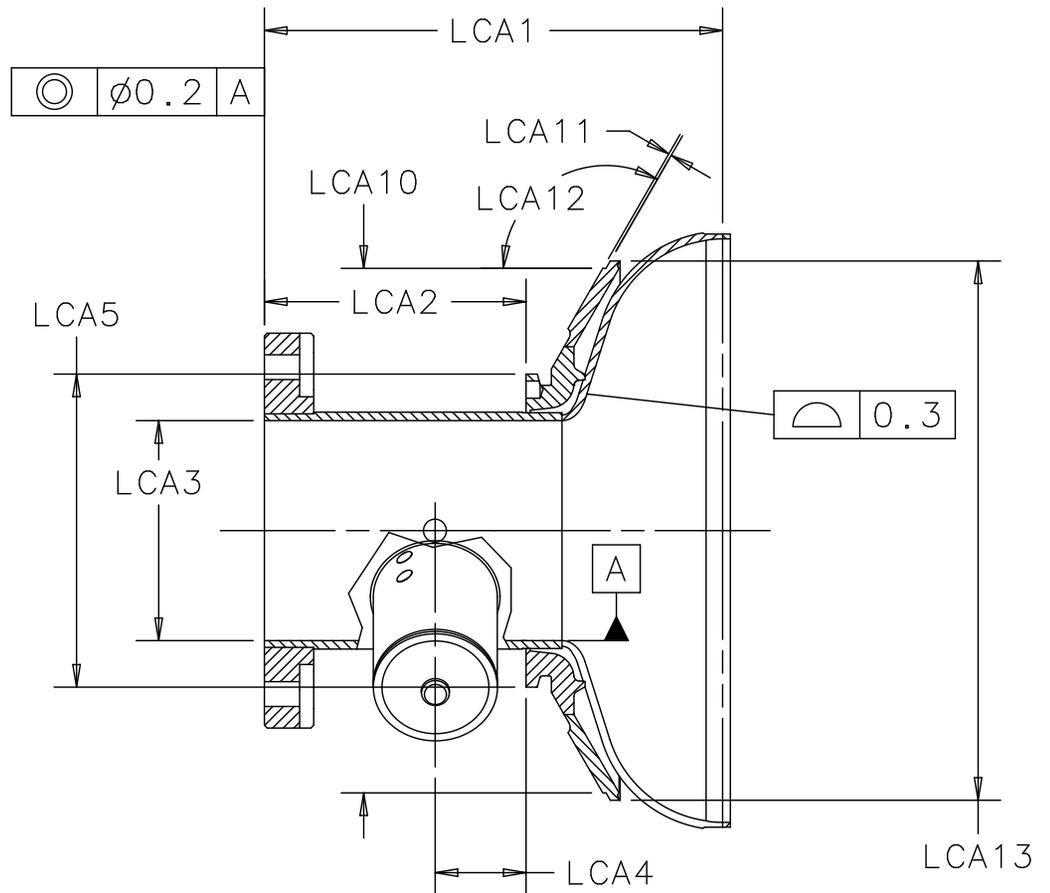
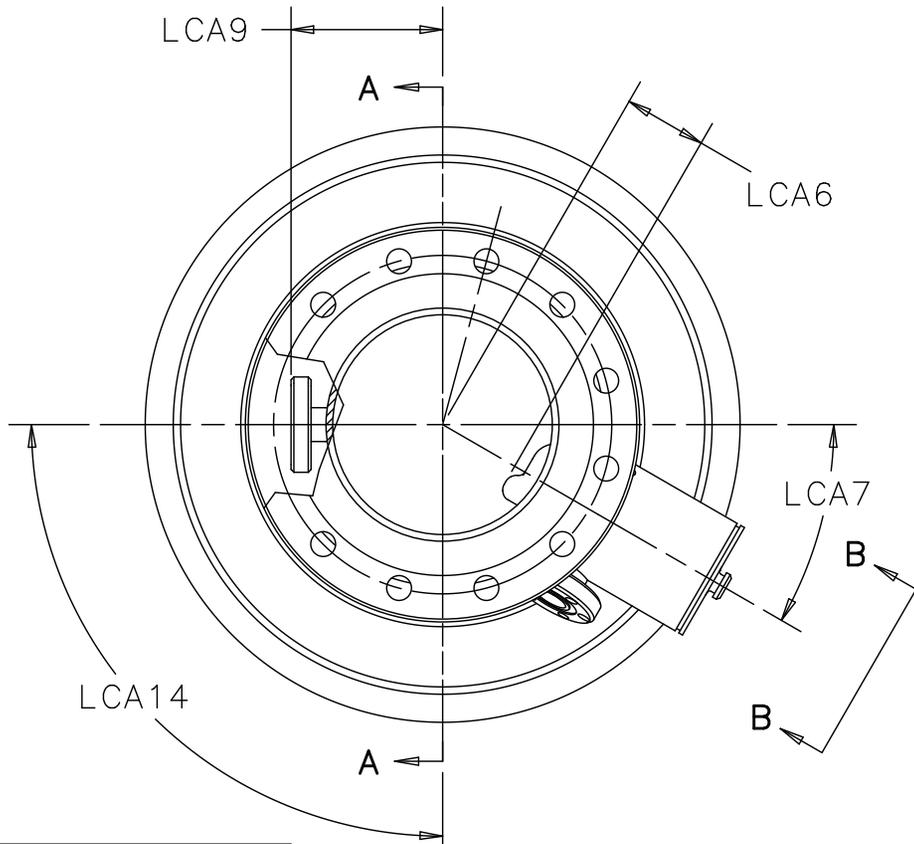
PARTS LIST			
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	M.FOLEY	17-OCT-2005
.X	.XX	ANGLE	DRAWN
±	-	± 0.20	± 0.5°
CHECKED	M.FOLEY	25-OCT-2005	
APPROVED	M.FOLEY	25-OCT-2005	
USED ON	MD-440004		
MATERIAL	SEE PARTS LIST		
5. DRAWING UNITS: METRIC			

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

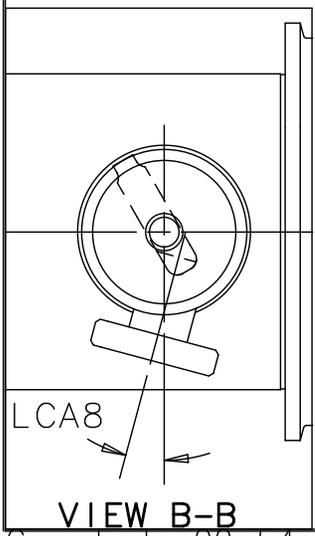
**FNAL 1.3GHZ TESLA**  
**RF CAVITY**  
**LONG END HALF CELL ASSEMBLY**

SCALE	DRAWING NUMBER	SHEET	REV
1:1	4904.010-MD-440003	1 OF 1	B
CREATED WITH : Ideas12NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

PARTS OF THIS DESIGN ARE THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. PARTS OF THIS DRAWING HAVE BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.



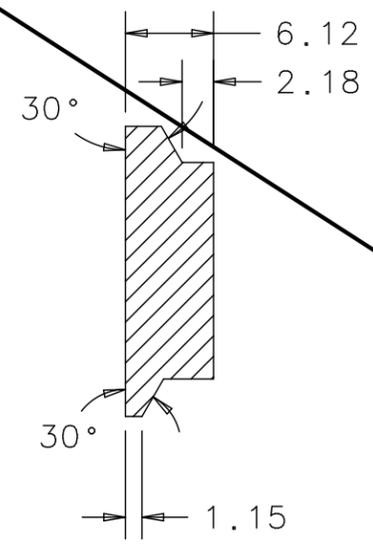
SECTION A-A



FOR REFERENCE ONLY  
**NOT FOR FABRICATION**  
 MAY NOT BE CURRENT

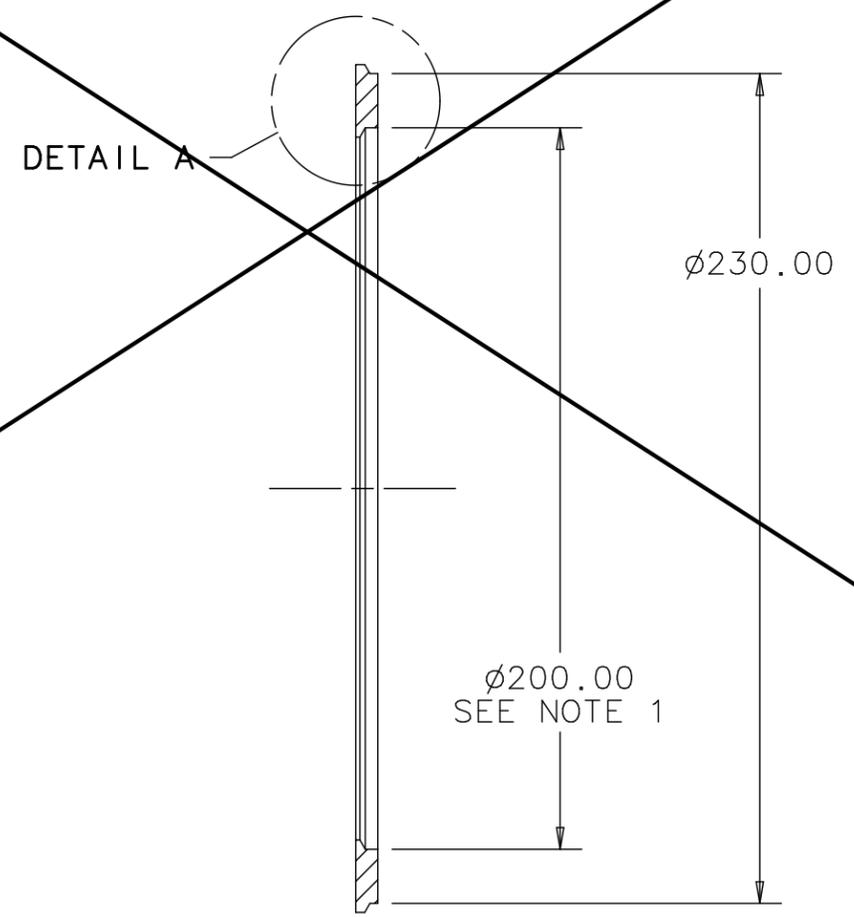
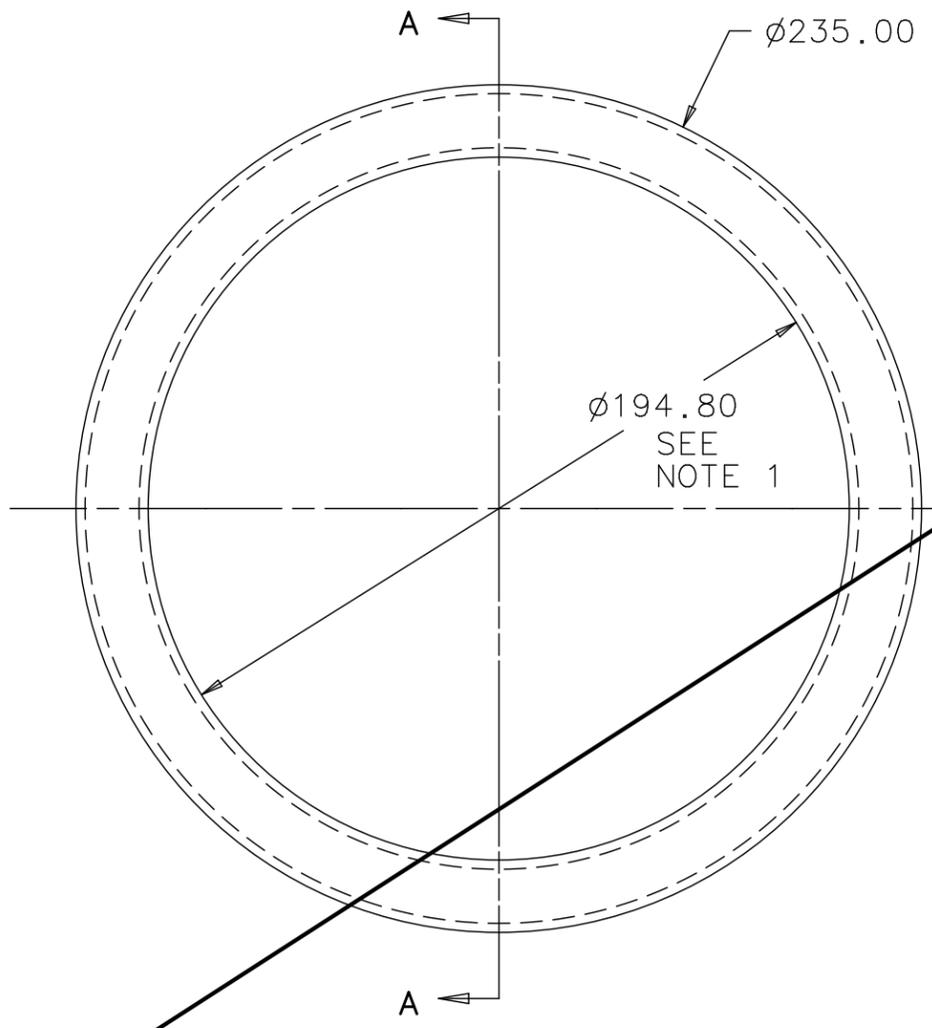
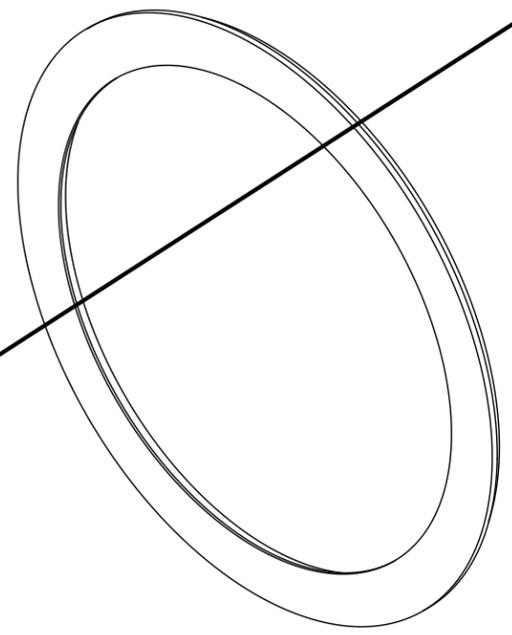
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	M.FOLEY	24-OCT-2005
	DRAWN	E.PIRTLE	24-OCT-2005
±	CHECKED	M.FOLEY	25-OCT-2005
	APPROVED	M.FOLEY	25-OCT-2005
1. BREAK ALL SHARP EDGES 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON 4. MAX. ALL MACH. SURFACES 5. DRAWING UNITS:		USED ON MATERIAL	
<b>FERMI NATIONAL ACCELERATOR LABORATORY</b> UNITED STATES DEPARTMENT OF ENERGY			
QUALITY CONTROL DRAWING FNAL 1.3GHZ TESLA RF CAVITY LONG END HALF CELL ASSEMBLY			
SCALE	DRAWING NUMBER	SHEET	REV
3:8	4904.010-MA-440050	1 OF 1	
CREATED WITH : Ideas11NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



DETAIL A  
SCALE 2:1

REPLACE WITH ILC DWG  
#D0000000813185



SECTION A-A

NOTES:

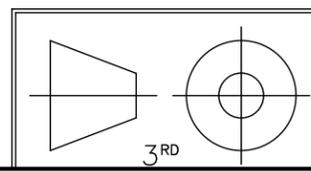
- 1) MACHINE ID TO WATCH OD OF SHORT END CAP DISK (MD-439168)

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	M. FOLEY	19-DEC-2008
.X	.XX	ANGLES	DRAWN	E. PIRTLE	19-DEC-2008
±	--	± 0.20	CHECKED	M. FOLEY	06-JAN-2009
1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7 5. DRAWING UNITS: METRIC			APPROVED	M. FOLEY	06-JAN-2009
			USED ON		MD-439180
MATERIAL			TITANIUM GRADE 2		

 FERMILAB NATIONAL ACCELERATOR LABORATORY  
UNITED STATES DEPARTMENT OF ENERGY

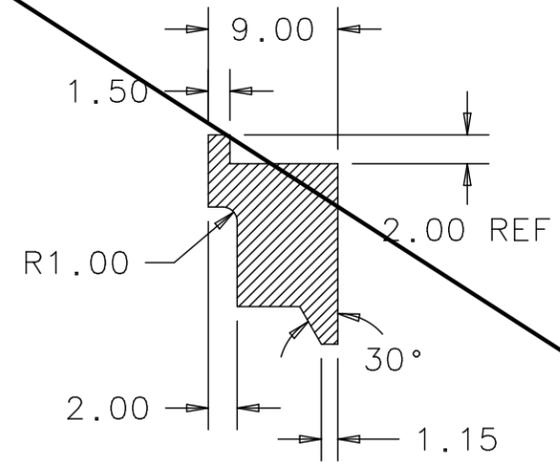
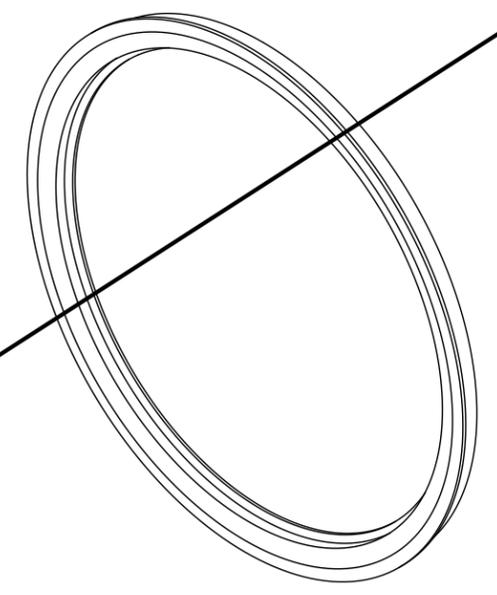
FNAL 1.3GHZ TESLA  
SHORT END  
TRANSITION RING MC END

SCALE	DRAWING NUMBER	SHEET	REV
1:2	4904.010-MB-459457	1 OF 1	
CREATED WITH : Ideas12NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

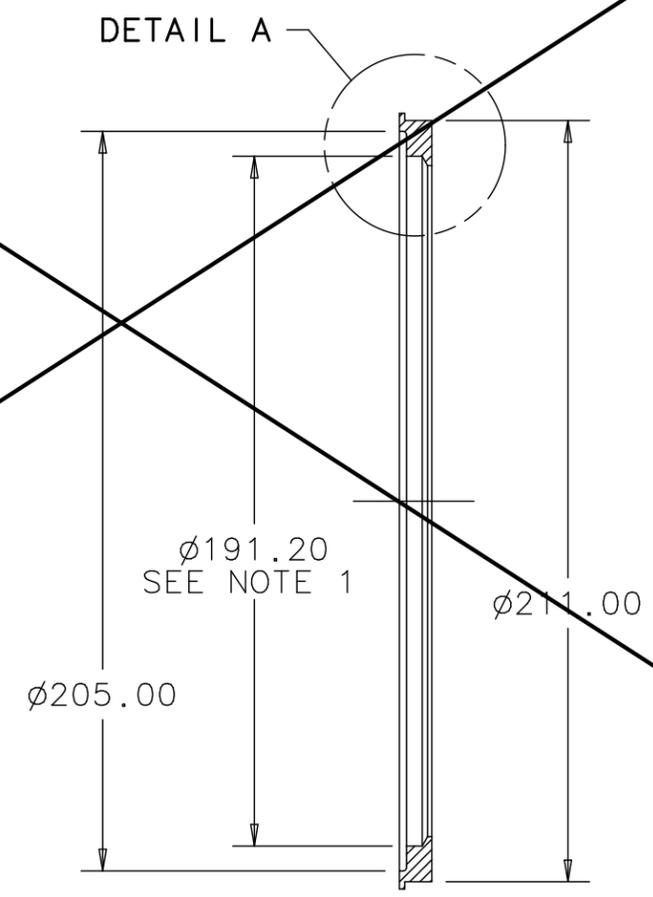
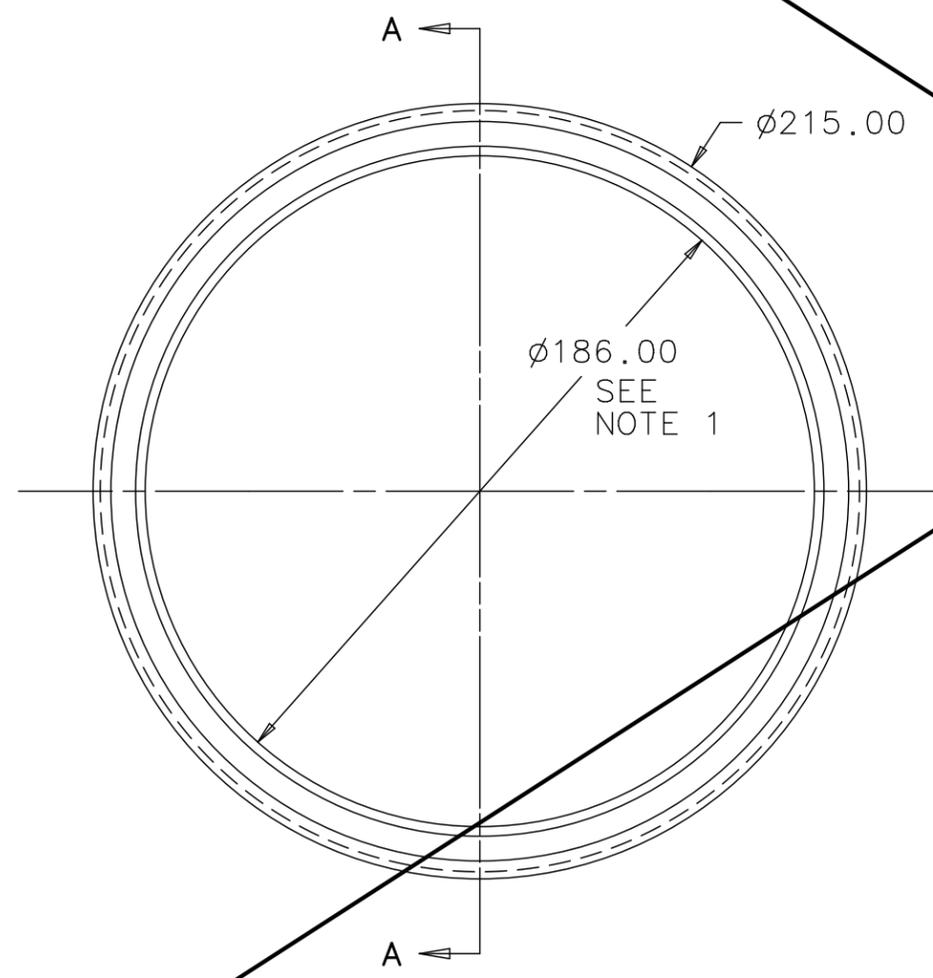


REV	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE

REPLACE WITH ILC DWG  
#D0000000813195



DETAIL A  
SCALE 2:1



SECTION A-A

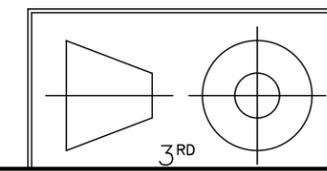
NOTES:

- 1) MACHINE ID TO MATCH OD OF LONG END CAP DISK (MD-439167)

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	M. FOLEY	17-OCT-2005
.X	.XX	ANGLES	DRAWN	E. PIRTLE	19-DEC-2008
±	--	± 0.20	CHECKED	M. FOLEY	06-JAN-2009
1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7 5. DRAWING UNITS: METRIC			APPROVED	M. FOLEY	06-JAN-2009
			USED ON		MD-440003
			MATERIAL	TITANIUM GRADE 2	

 FERMILAB NATIONAL ACCELERATOR LABORATORY  
UNITED STATES DEPARTMENT OF ENERGY

FNAL 1.3GHZ TESLA  
LONG END  
TRANSITION RING FIELD PROBE END

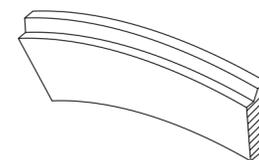
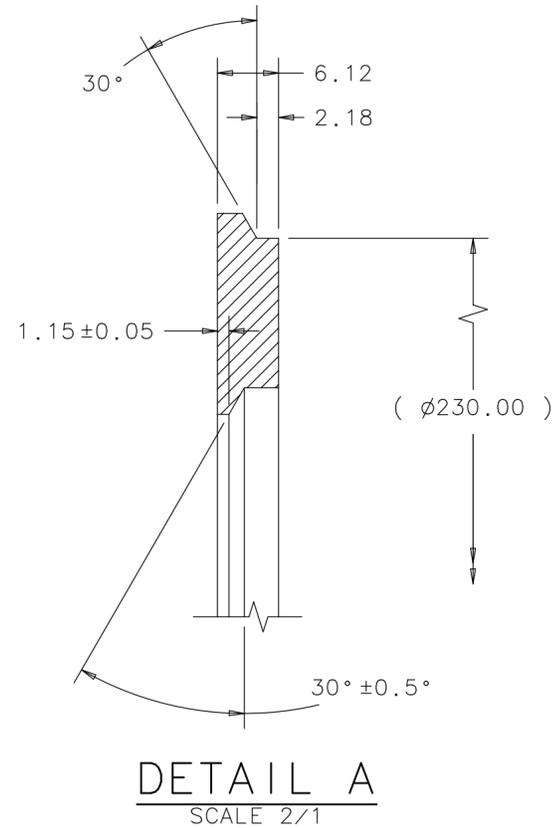
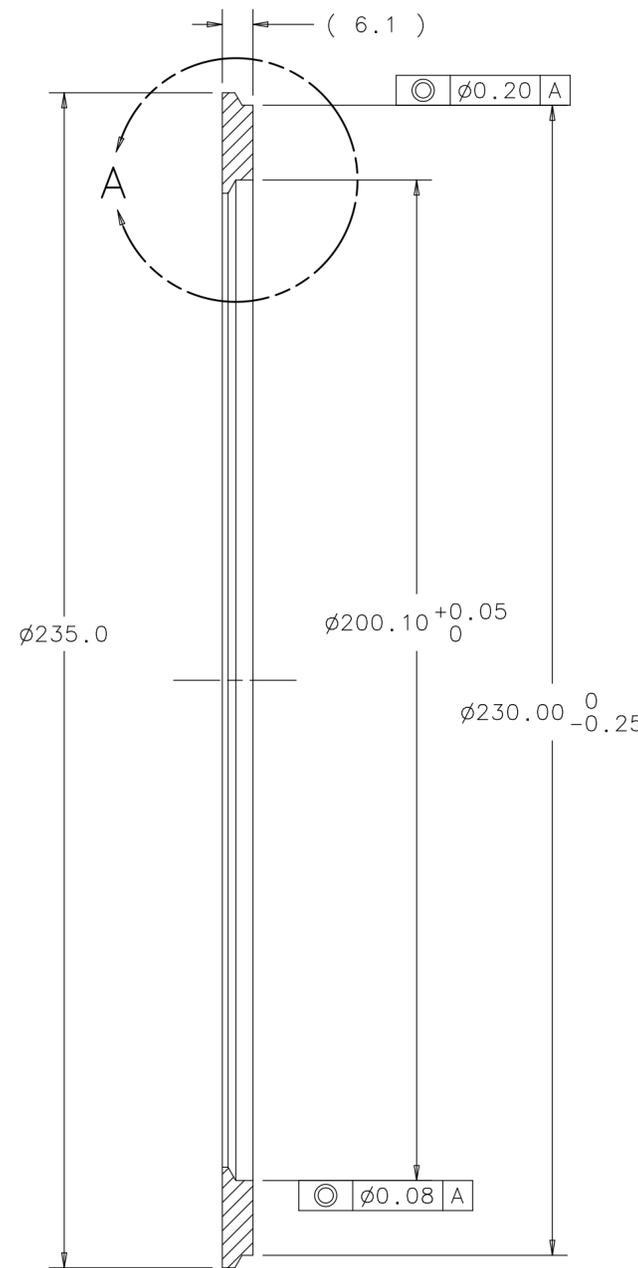
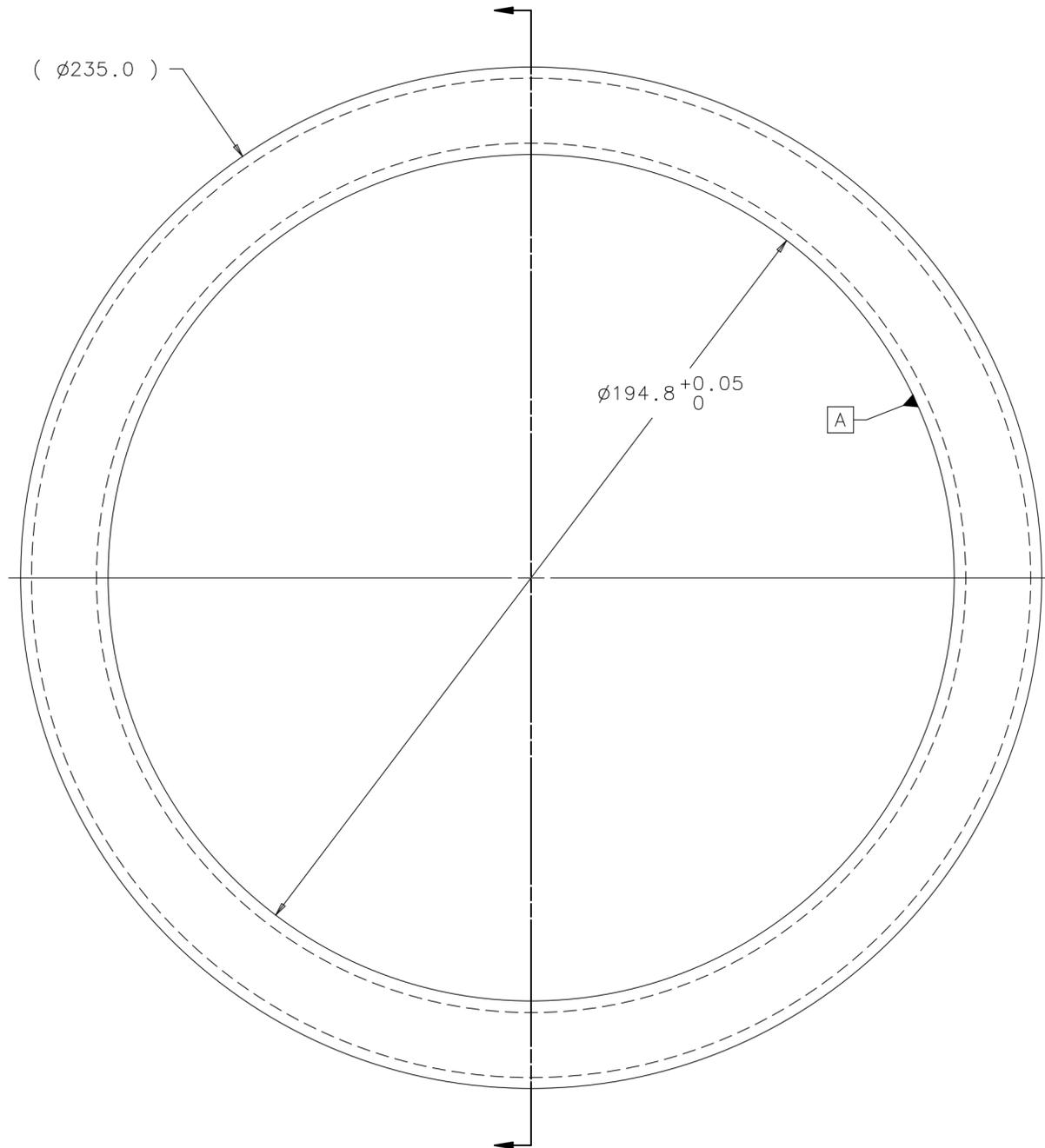


SCALE	DRAWING NUMBER	SHEET	REV
1:2	4904.010-MB-459459	1 OF 1	
CREATED WITH : Ideas12NXSeries		GROUP: ACCELERATOR MECH. SUPPT.	

NOTES (UNLESS OTHERWISE SPECIFIED):

- DO NOT BREAK SHARP EDGES.
- PARTS MUST BE FREE OF DIRT, GREASE, OIL AND CHIPS.

REVISION HISTORY				
CAD MAINTAINED. CHANGES SHALL BE INCORPORATED BY THE DESIGN ACTIVITY.				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



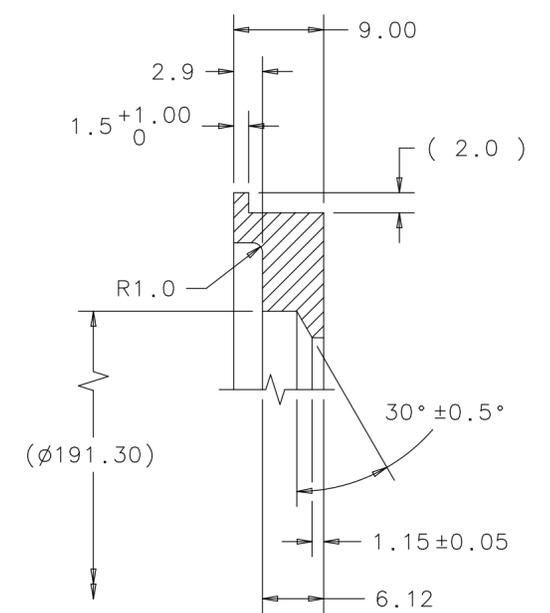
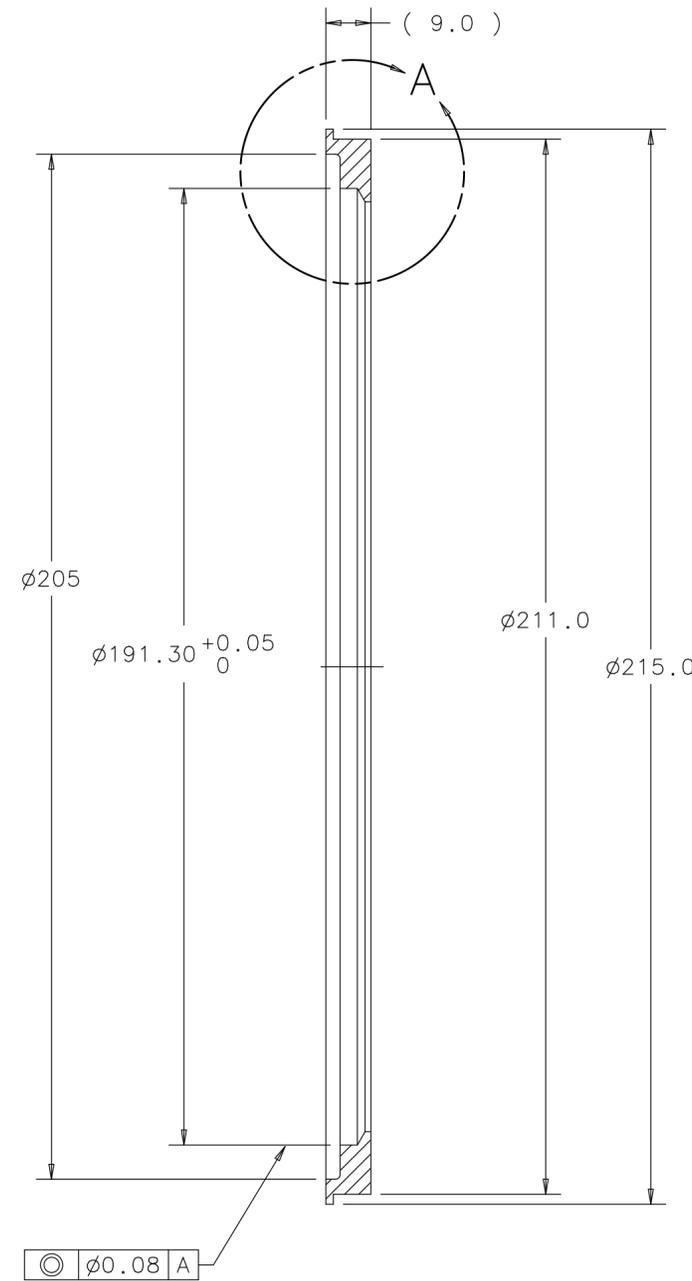
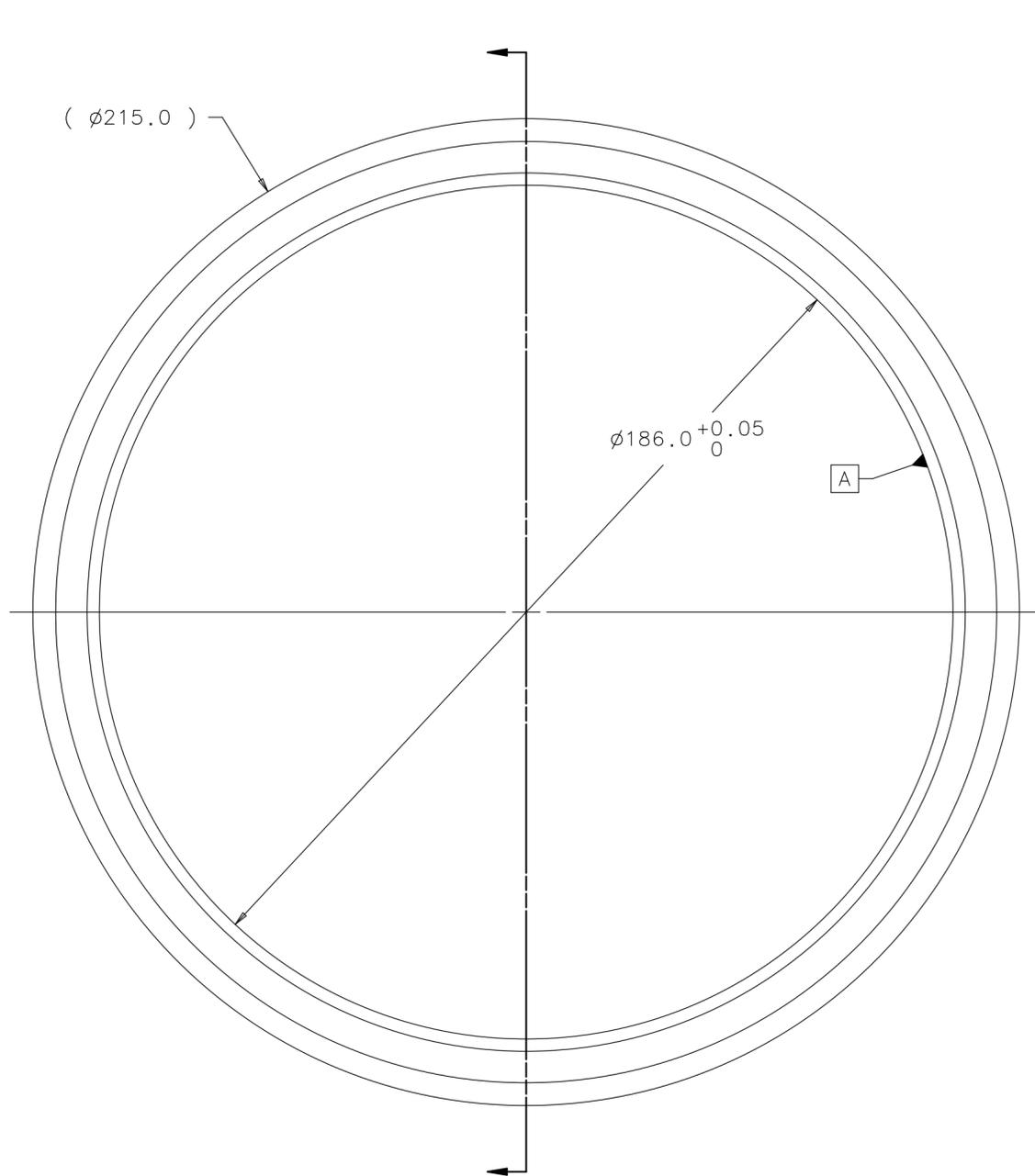
-	-
NEXT ASSY	USED ON
APPLICATION	

FINISH N/A	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS INTERPRET DIM PER ASME Y14.5M-1994 BREAK ALL SHARP EDGES .75 MAX. ALL MACH. SURFACES 3.2 MAX.	DRAWN BY L ROSINE	DATE 13NOV07	<b>FERMI NATIONAL ACCELERATOR LABORATORY</b> UNITED STATES DEPARTMENT OF ENERGY P.O. BOX 500, BATAVIA, IL 60510-0500				
		CHECKED BY	DATE					
MATERIAL TITANIUM GRADE2	TOLERANCES X $\pm$ 2 .X $\pm$ 0.8 .XX $\pm$ 0.13 ANGLE $\pm$ 1°	THIRD ANGLE PROJECTION 	ENGINEERED BY	DATE				
		DATABASE DESY EDMS	TEAM/GROUP T4CM DESIGN	TITLE ILC TYPE IV CRYOMODULE HELIUM VESSEL CAVITY_TRANS_RING_MC_END				
APPLICATION		CAD I-DEAS	SOLID MODEL NO. D00000000827582	<table border="1"> <tr> <td>SIZE A2</td> <td>CAGE CODE OU5R6</td> <td>DWG NO. D00000000813185</td> <td>REV A</td> </tr> </table>	SIZE A2	CAGE CODE OU5R6	DWG NO. D00000000813185	REV A
SIZE A2	CAGE CODE OU5R6	DWG NO. D00000000813185	REV A					
		SCALE & AS NOTED		NOT SCALE DWG SHEET 1 OF 1				

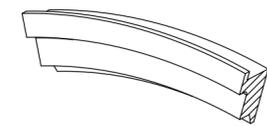
NOTES (UNLESS OTHERWISE SPECIFIED):

- DO NOT BREAK SHARP EDGES.
- PARTS MUST BE FREE OF DIRT, GREASE, OIL AND CHIPS.

REVISION HISTORY				
CAD MAINTAINED. CHANGES SHALL BE INCORPORATED BY THE DESIGN ACTIVITY.				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		



DETAIL A  
SCALE = 2:1



⊙ ø0.08 A

APPL	DATE	BY
NEXT ASSY	-	-
USED ON	-	-
APPLICATION		

FINISH N/A	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS INTERPRET DIM PER ASME Y14.5M-1994 BREAK ALL SHARP EDGES .75 MAX. ALL MACH. SURFACES 3.2 MAX.		DRAWN BY L ROSINE	DATE 13NOV07	<b>FERMI NATIONAL ACCELERATOR LABORATORY</b> UNITED STATES DEPARTMENT OF ENERGY P.O. BOX 500, BATAVIA, IL 60510-0500				
	MATERIAL TITANIUM GRADE 2	TOLERANCES X ± 2 .X ± 0.8 .XX ± 0.13 ANGLE ± 1°	THIRD ANGLE PROJECTION 	CHECKED BY		DATE	TITLE ILC TYPE IV CRYOMODULE HELIUM VESSEL CAVITY_TRANS_RING_FLD_PROBE_END		
				ENGINEERED BY	DATE	<table border="1"> <tr> <td>SIZE A2</td> <td>CAGE CODE OU5R6</td> <td>DWG NO. D00000000813195</td> <td>REV A</td> </tr> </table>	SIZE A2	CAGE CODE OU5R6	DWG NO. D00000000813195
SIZE A2	CAGE CODE OU5R6	DWG NO. D00000000813195	REV A						
			DATABASE DESY EDMS	TEAM/GROUP T4CM DESIGN	SCALE 1:1	DO NOT SCALE DWG	SHEET 1 OF 1		
			CAD I-DEAS	SOLID MODEL NO. D00000000827572					