



Agenzia Nazionale per le Nuove Tecnologie,  
l'Energia e lo Sviluppo Economico Sostenibile



*Ministero dello Sviluppo Economico*

## RICERCA DI SISTEMA ELETTRICO

Disegni costruttivi della Bobina di JT-60SA completi di tutti i particolari quali: doppi pancake della bobina, ingresso di elio di refrigerazione, giunti elettrici intermedi e terminazione riempitivi necessari all'avvolgimento della bobina

*A. Cucchiaro, P. Rossi, G.M. Polli, L. Reccia, G. Brolatti*

DISEGNI COSTRUTTIVI DELLA BOBINA DI JT-60SA COMPLETI DI TUTTI I PARTICOLARI QUALI:  
DOPPI PANCAKE DELLA BOBINA, INGRESSO DI ELIO DI REFRIGERAZIONE, GIUNTI ELETTRICI  
INTERMEDI E TERMINAZIONE RIEMPITIVI NECESSARI ALL'AVVOLGIMENTO DELLA BOBINA

A. Cucchiaro, P. Rossi, G.M. Polli, L. Reccia, G. Brolatti (ENEA)

Novembre 2011


Report Ricerca di Sistema Elettrico

Accordo di Programma Ministero dello Sviluppo Economico – ENEA

Area: Governo, gestione e sviluppo del sistema elettrico nazionale

Progetto: Fusione nucleare: Attività di fisica e tecnologia della fusione complementari ad ITER,  
denominate "Broader Approach"

Responsabile Progetto: Aldo Pizzuto, ENEA

	<b>Disegni costruttivi della bobina di JT-60SA completi di tutti i particolari quali: doppi pancake della bobina, ingresso di elio di refrigerazione, giunti elettrici intermedi e terminazione riempitivi necessari all'avvolgimento della bobina.</b>	RT-JT60SA-001	Rev. 0
		Pag 1 di 47	

DISEGNI COSTRUTTIVI DELLA BOBINA DI JT-60SA COMPLETI DI TUTTI I PARTICOLARI QUALI: DOPPI PANCAKE DELLA BOBINA, INGRESSO DI ELIO DI REFRIGERAZIONE, GIUNTI ELETTRICI INTERMEDI E TERMINAZIONE RIEMPITIVI NECESSARI ALL'AVVOLGIMENTO DELLA BOBINA

Rev. 0 31/10/2011

		Giorgio Brolatti		
		Luigi Reccia		
0	31/10/2011	Gian Mario Polli		Antonio Cucchiaro
		Paolo Rossi		
rev.	Date	Author	Reviewer	Approver

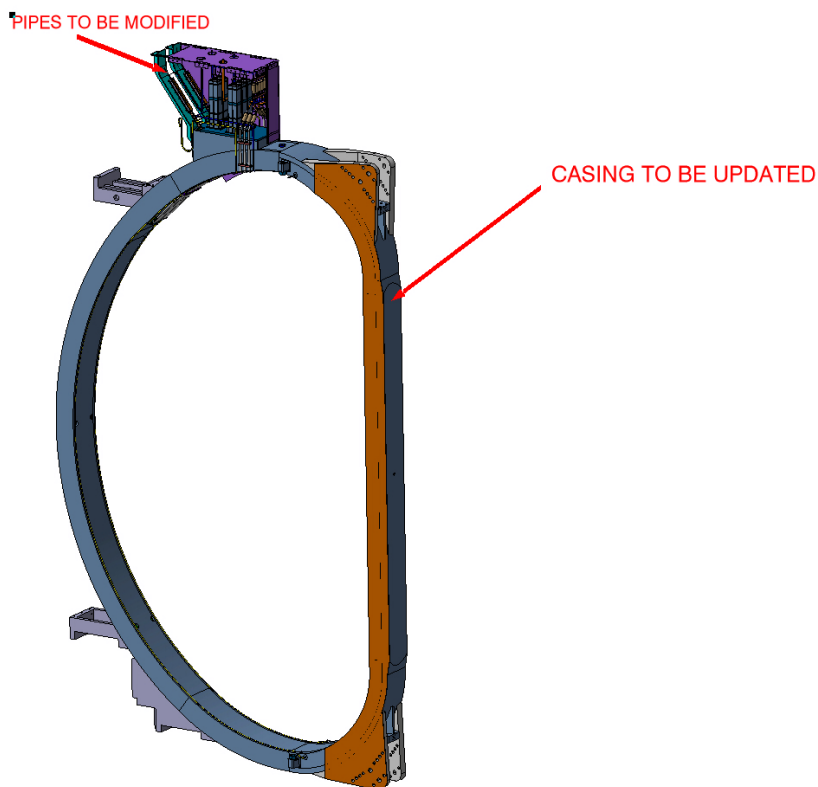
The principal product : 010202-203000\_01.CATProduct

### TWIN BOX MONOBLOCK version

In this package the following drawing number has been added: 010202-503111 sheet 3 (W.P. tolerance).

drawing number 010202-503108 sheet1 has to be updated according to new helium inlet design already included in the 3D model.

This version must be updated on the components shown:



---

#### VARIATIONS BETWEEN ENEA-CEA:

##### COIL:

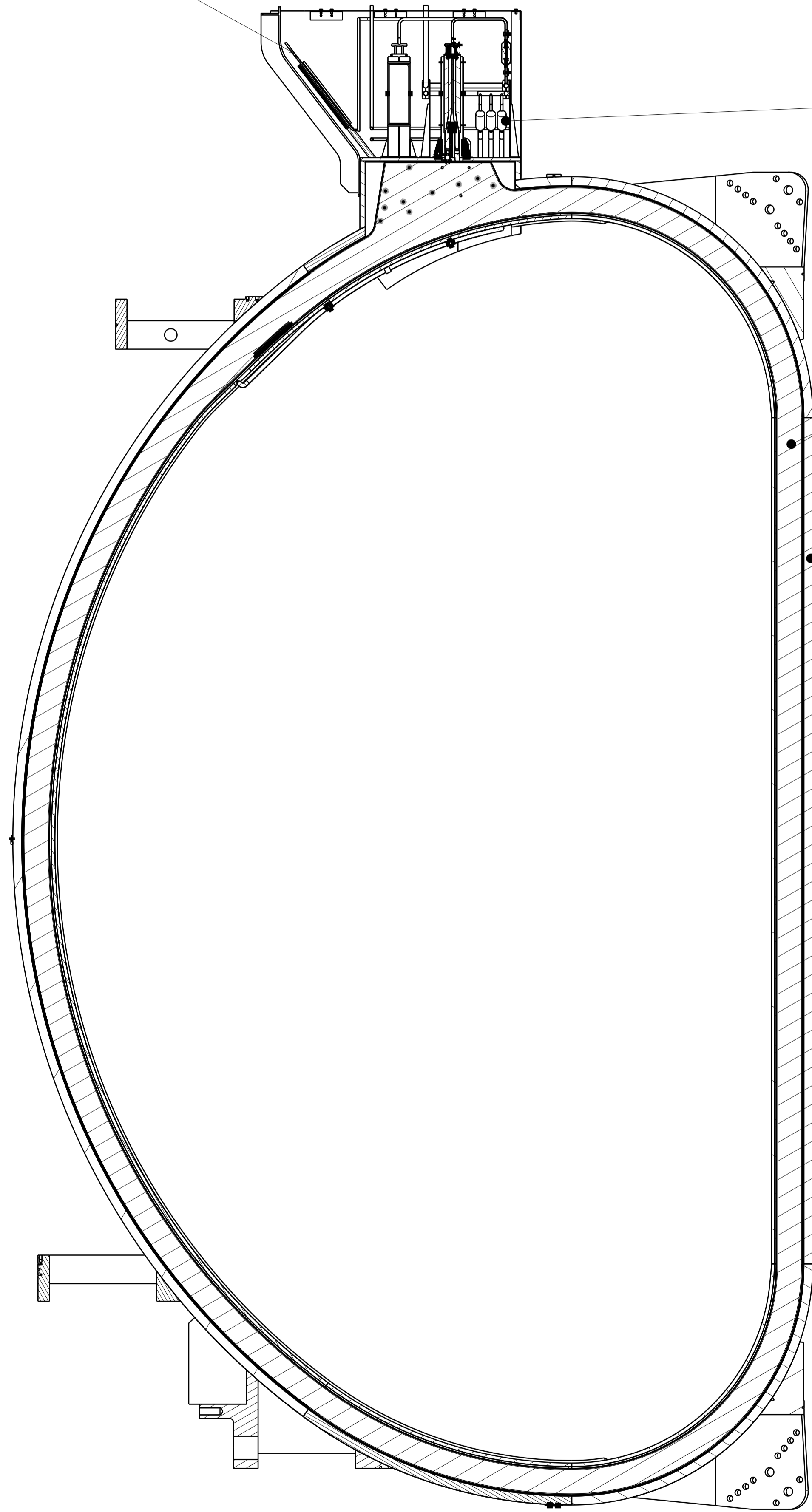
Insulation tapes between double pancakes.

##### CASING:

010202-503200 sheet 1: changed yellow zones

---

PIPES TO BE MODIFIED



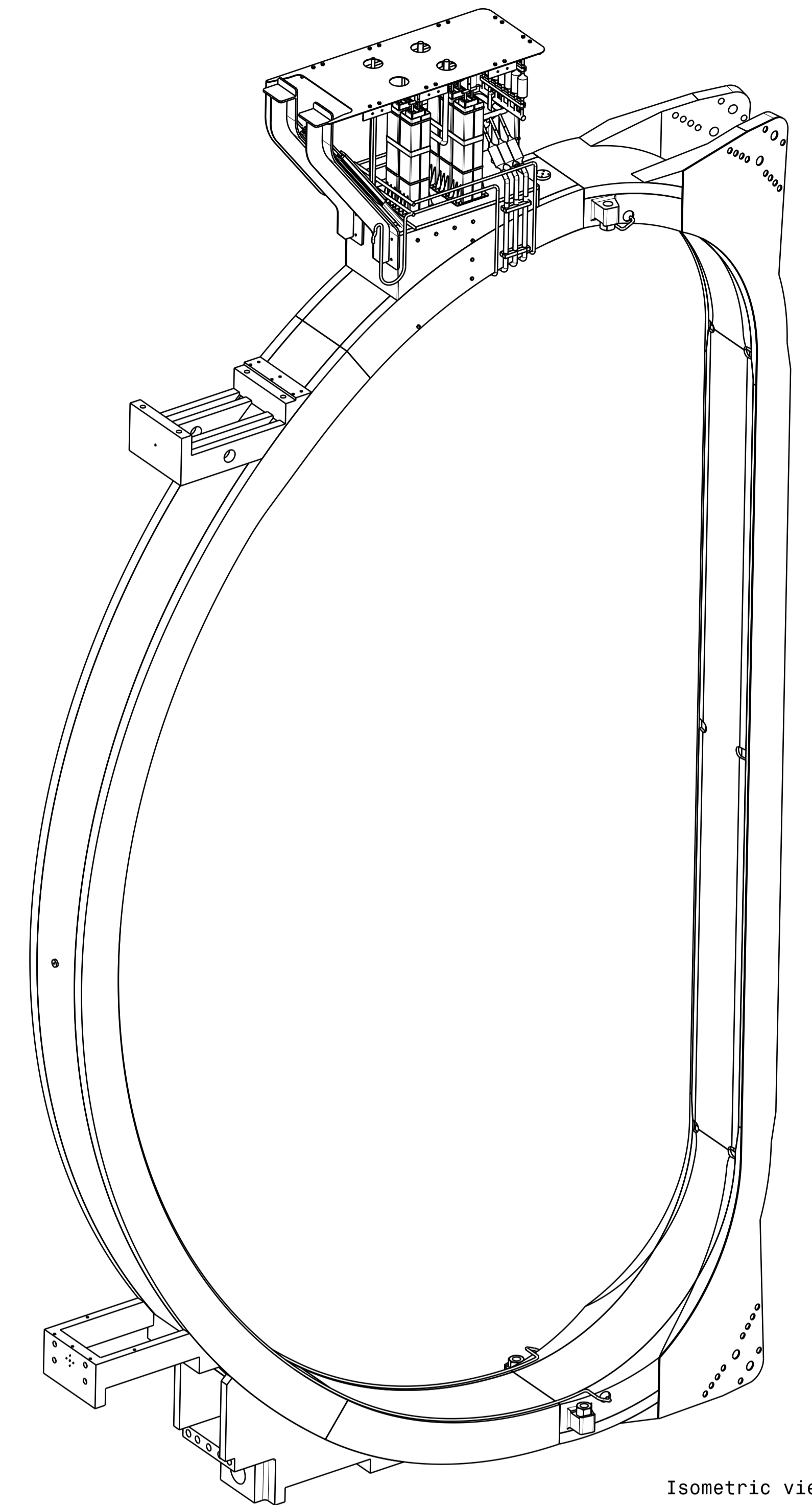
vertical cross section

3

1

2


CASING TO BE UPDATED



Isometric view

CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the SA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>		Ref to 3D CatProduct:010202-203000	
REV DATE <b>03/10/2011</b>		REVIEWED BY		CUSTOMER: <b>Fusion-for-Energy</b>	
FIRST ISSUE DATE <b>20-01-2011</b>		CHECKED BY		DRAWING TITLE <b>LAYOUT ENEA</b>	
SHEET SIZE <b>A1</b>		CONTROLLED BY <b>A. CUCCHIARO</b>		CODE ENEA ID: <b>DD-JT60-NCO</b>	
FIRST ANGLE PROJECTION		DRAWN BY <b>G. BROLATTI</b>		DRAWING NUMBER <b>503000</b>	
WBS <b>3 LEVELS</b>		<b>010202</b>		SHEET <b>01</b>	
				REVISION MATURITY <b>01</b>	

ITEM No	DRAWING No	DESCRIPTION	NO OFF	NO ORDERED	MATERIAL	SUPPLIER	DATE ORDERED	DATE DELIVERED	REMARKS
1	from:010202-503100 to:010202-503112	Winding pack with ground insulation							COIL
2	from:010202-503200 to:010202-503204	MACHINING DETAIL INNER-OUTER LEG							CASING
3	from:010202-503300 to:010202-503303	WINDING PACK & CASING ARRANGEMENT							WITH HELIUM COOLING
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									



**ENEA Fusion**  
Italy-Frascati Research Centre

00	01				ISSUE
200111	031011				DATE
					MATURITY
TITLE:-					DRN GBROL
					CHKD ACUCCH
					APPO ACUCCH

CONFIDENTIAL UNLESS AUTHORISED  
The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.

CONTRACTOR

ITEM LIST FOR

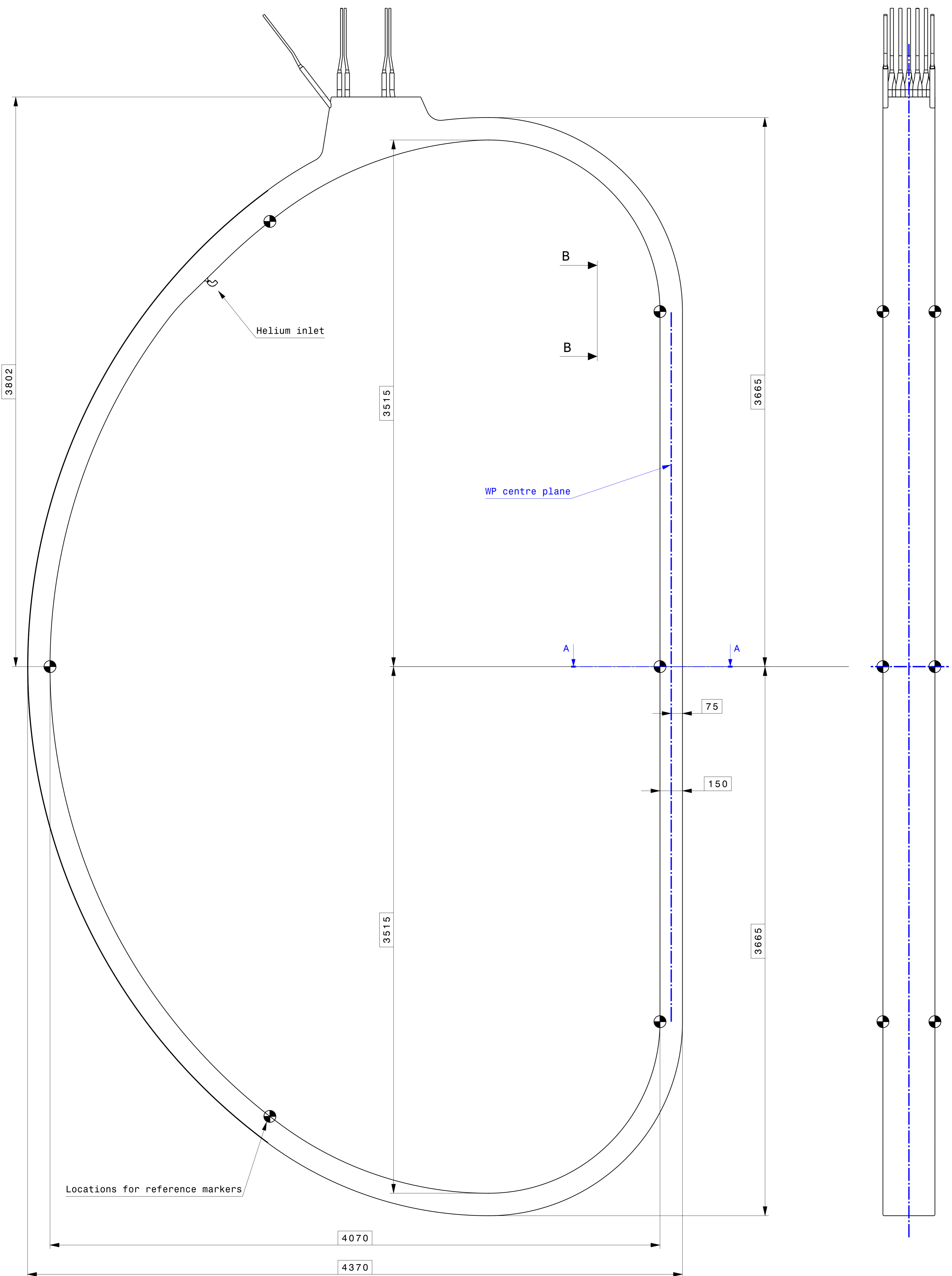
	010202	503000
SHEET NO.	1	OF 1 SHEETS

PLANNING NOTES

Item list

JT60-SA TF MODULE COIL

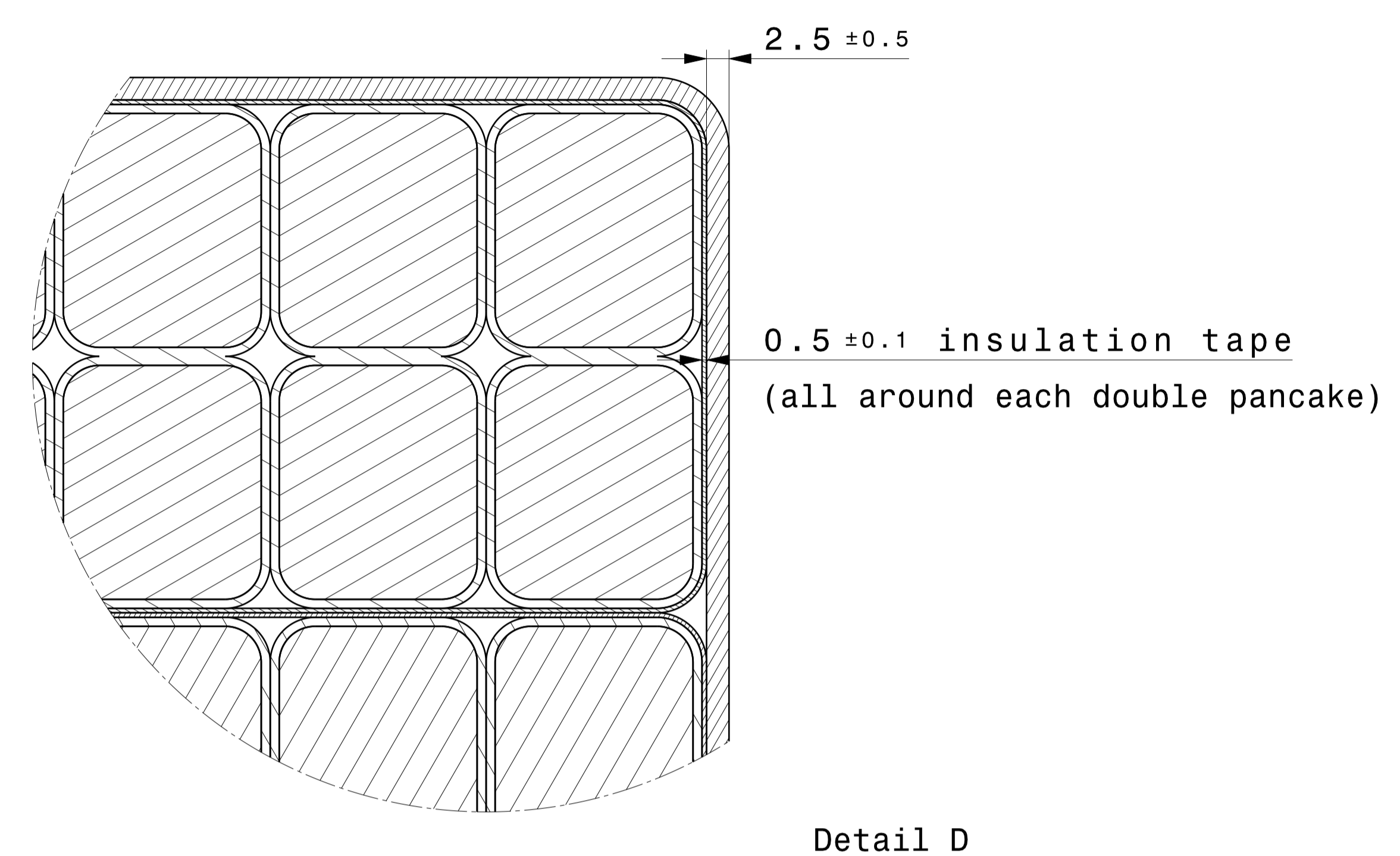
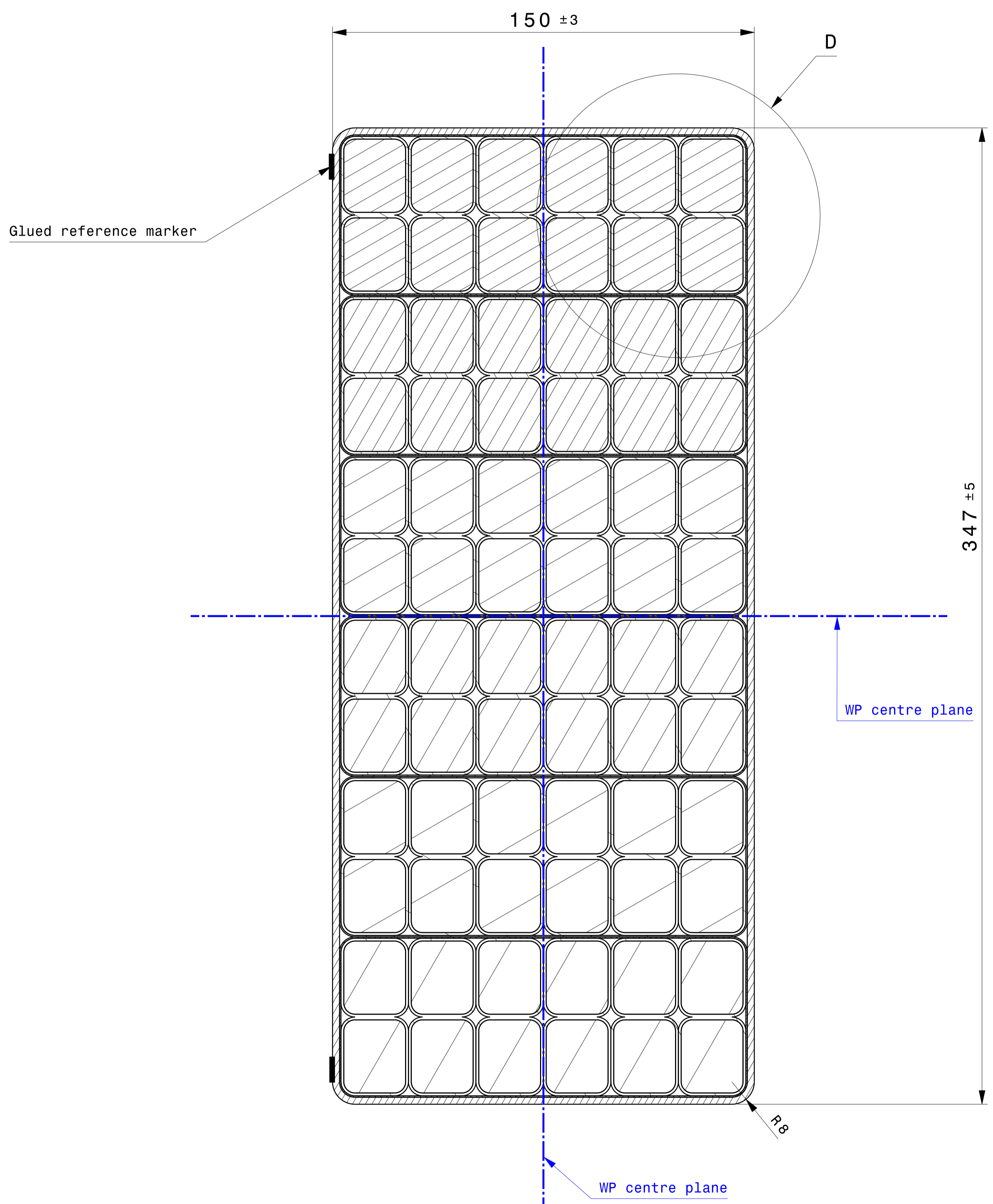
C.A.D. DRAWN NOT TO BE MODIFIED BY HAND



Note: Dimensions for reference only.  
 For final winding pack envelope refer  
 to drawing 010202-503111


CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IIA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY <b>A. CUCCHIARO</b>	Ref to 3D CatProduct: 010202-203100_01
REV DATE <b>03-10-2011</b>	SCALE	CHECKED BY	CUSTOMER: <b>Fusion-for-Energy</b>
FIRST ISSUE DATE <b>20-01-2011</b>	DRAWN BY <b>G. BROLATTI</b>	CONTROLLED BY <b>A. CUCCHIARO</b>	DRAWING TITLE <b>JT60-SA: TF MAGNET</b> Toroidal Field Coil Winding pack with ground insulation
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION	WBS LEVELS <b>3 LEVELS</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>
Drawing Number <b>503100</b>		SHEET <b>01</b>	REVISION MATURITY <b>01</b>

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



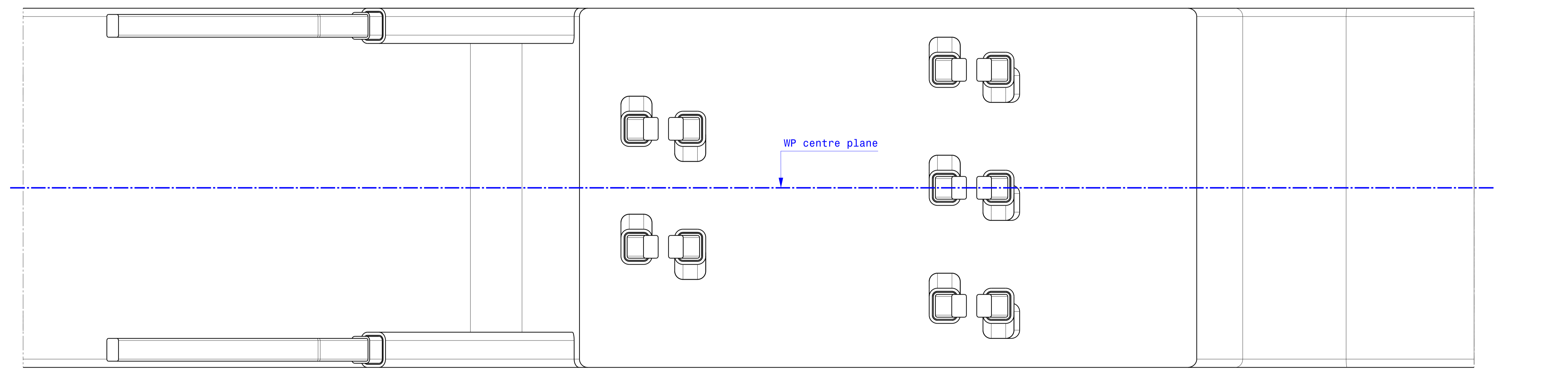
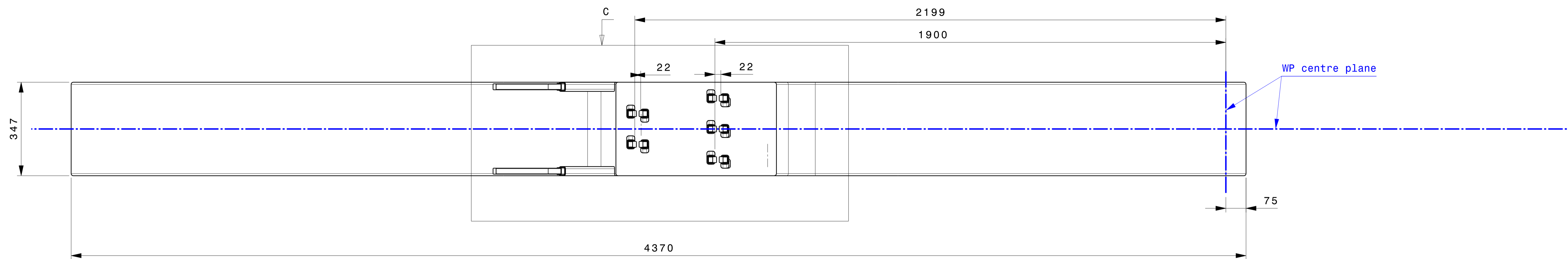
Detail D

Section A-A

CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>	Ref to 3D CatProduct: 010202-203100_01	
REV DATE <b>03-10-2011</b>	FIRST ISSUE DATE <b>20-01-2011</b>	REVIEWED BY	 <b>Fusion</b> Italy-Frascati Research Centre	CUSTOMER: Fusion-for-Energy
SCALE	DRAWN BY <b>G. BROLATTI</b>	CHECKED BY	DRAWING TITLE <b>JT60-SA: TF MAGNET</b> Toroidal Field Coil Section A-A	
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION	WBS 3 LEVELS	CODE ENEA ID: <b>DD-JT60TF-NCO</b>	SHEET <b>02</b> <small>/03</small>
			Drawing Number <b>503100</b>	REVISION <b>01</b>
				MATURITY



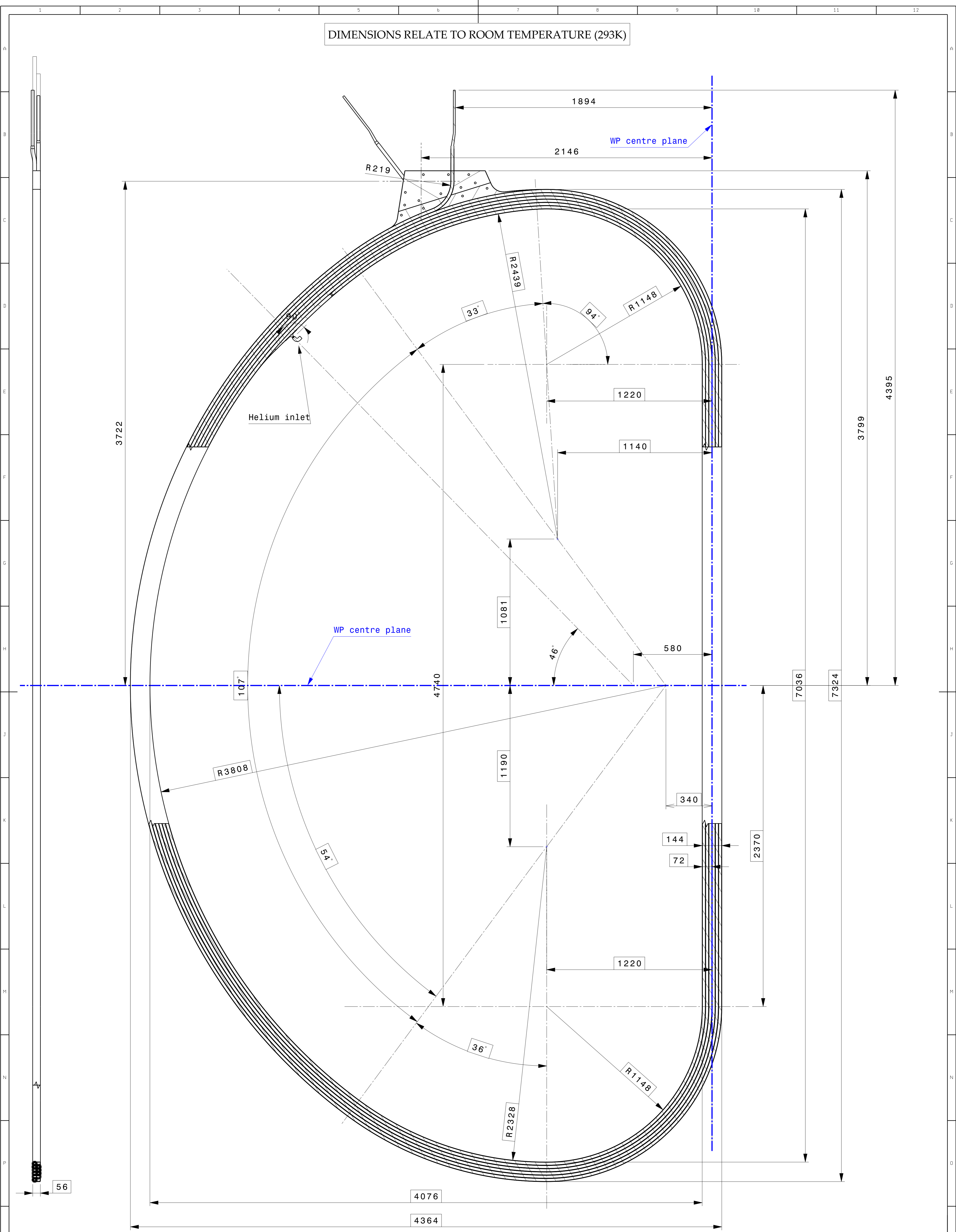
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



Note:  
 - Dimensions for reference only.  
 - Actual geometry depends on chosen joint configuration.

CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>	Ref to 3D CatProduct: 010202-203100_01	
REV DATE <b>03-10-2011</b>	CONTROLLED BY <b>A. CUCCHIARO</b>	CHECKED BY	CUSTOMER: <b>Fusion-for-Energy</b>	
FIRST ISSUE DATE <b>20-01-2011</b>	SCALE	DRAWN BY <b>G. BROLATTI</b>	DRAWING TITLE <b>JT60-SA: TF MAGNET</b> <i>Toroidal Field Coil</i> <i>WP double pancake ends. View from top</i>	
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION	WBS LEVELS <b>3</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>	Drawing Number <b>503100</b>
			SHEET <b>03</b>	REVISION <b>01</b>
			MATURITY	

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



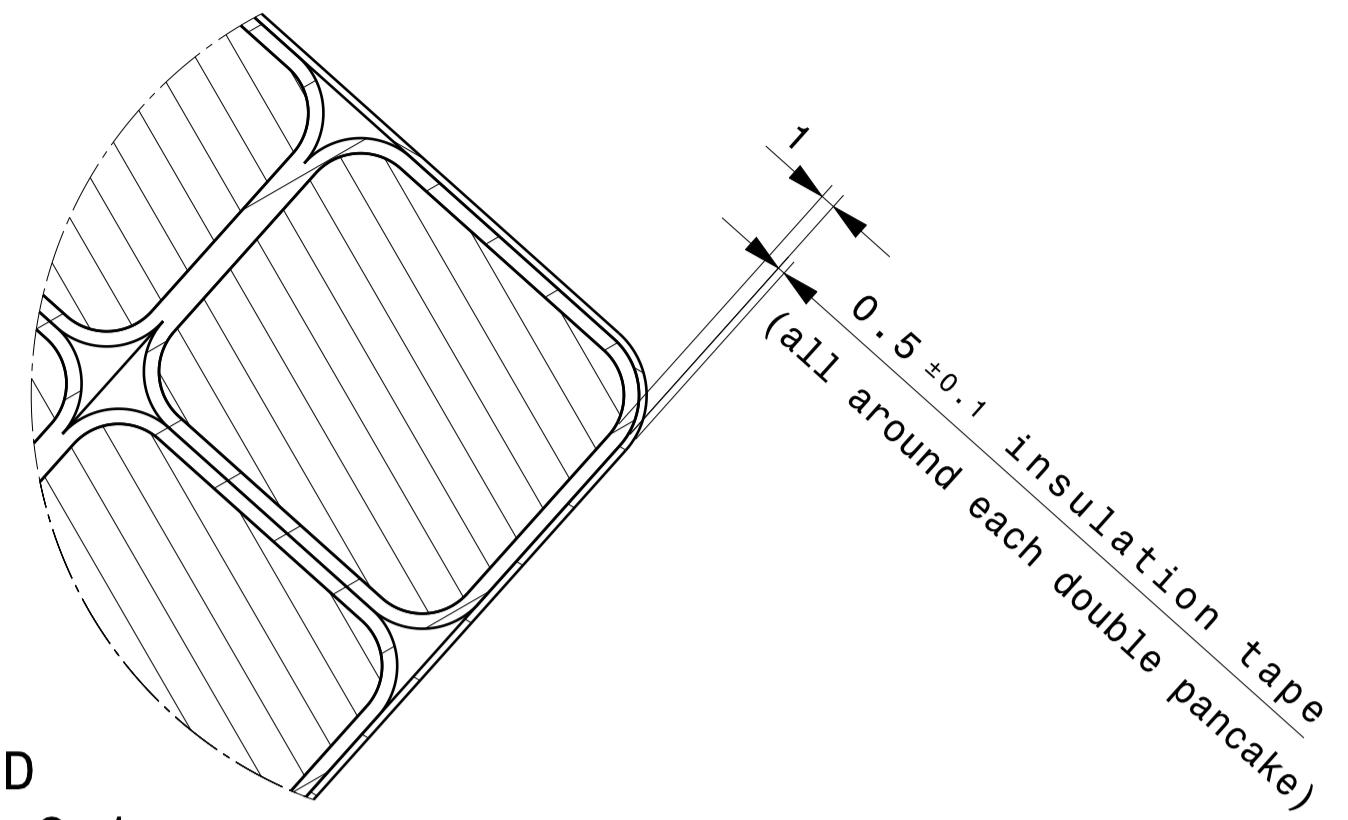
Note:  
 Dimensions for reference only.  
 For final winding pack envelope refer  
 to drawing 010202-503111. Dimensions  
 are related to double pancake without  
 0.5mm insulation tape.

DMS:		Ref to 3D CatProduct:010202-203101_01	
<small>CONFIDENTIAL UNLESS AUTHORISED</small> The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY <b>A. CUCCHIARO</b>	CUSTOMER: <b>Fusion-for-Energy</b>
REV DATE <b>03-10-2011</b>	FIRST ISSUE DATE <b>20-01-2011</b>	CHECKED BY _____	DRAWING TITLE <b>JT60-SA: TF MAGNET</b> Toroidal Field Coil Double pancake 01. Front view
SCALE _____	CONTROLLED BY <b>A. CUCCHIARO</b>	DRAWN BY <b>G. BROLATTI</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION 	WBS <b>3 LEVELS</b>	SHEET <b>01</b>
Drawing Number <b>010202</b>	Drawing Number <b>503101</b>	SHEET <b>01</b>	REVISION <b>01</b>
MATURITY _____	_____	_____	_____

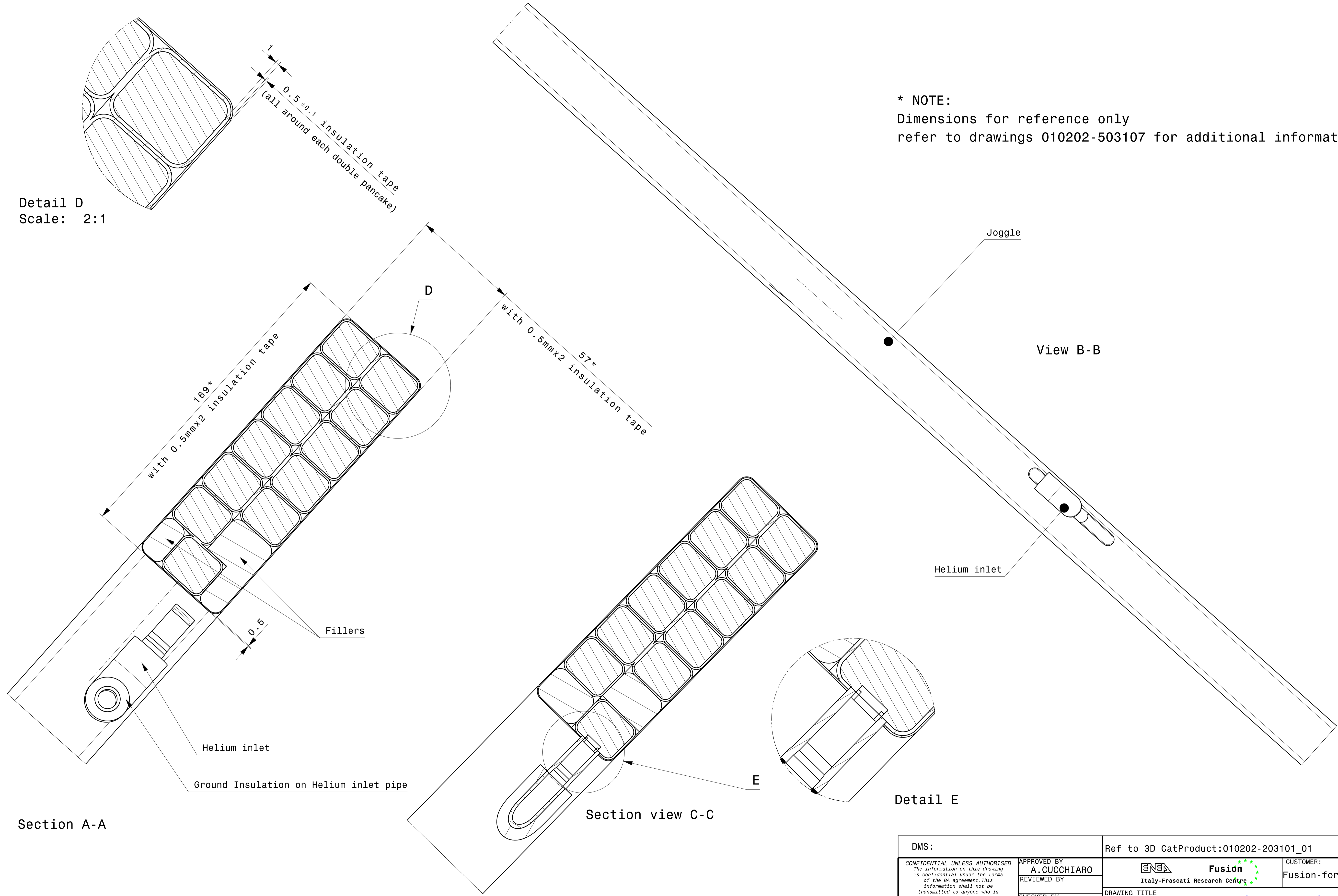


DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

\* NOTE:  
Dimensions for reference only  
refer to drawings 010202-503107 for additional information



Detail D  
Scale: 2:1



Section A-A

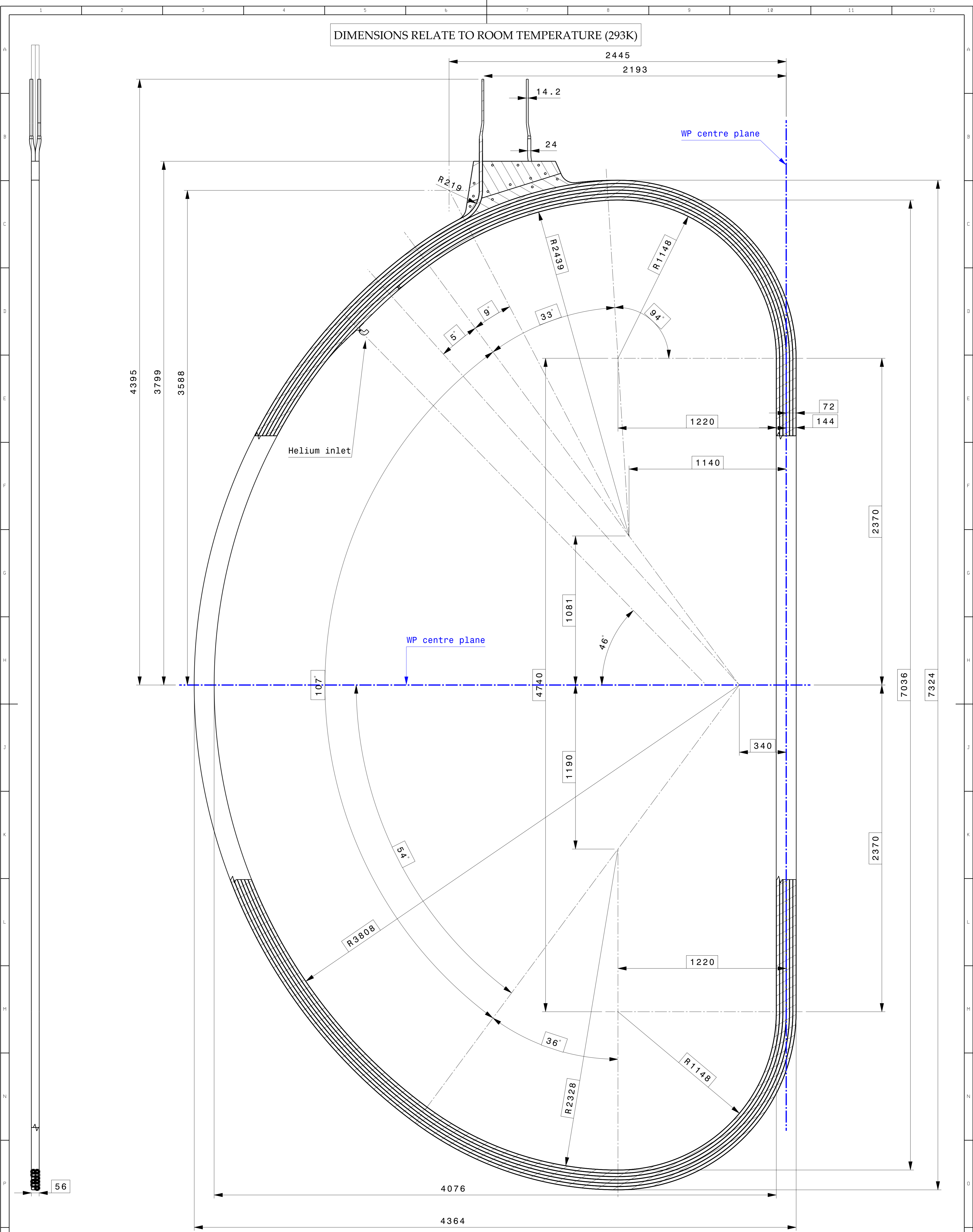
Section view C-C

View B-B

Detail E

DMS:		Ref to 3D CatProduct:010202-203101_01	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>	CUSTOMER: <b>Fusion-for-Energy</b>
		REVIEWED BY	DRAWING TITLE <b>JT60-SA: TF MAGNET</b> <i>Toroidal Field Coil</i> <i>Double pancake 01. Sections</i>
		CHECKED BY	
REV DATE <b>03-10-2011</b>	SCALE	CONTROLLED BY <b>A. CUCCHIARO</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>
FIRST ISSUE DATE <b>20-01-2011</b>		DRAWN BY <b>G. BROLATTI</b>	
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION	WBS LEVELS <b>3</b>	Drawing Number <b>010202 503101</b>
			SHEET REVISION MATURITY <b>03 01</b>

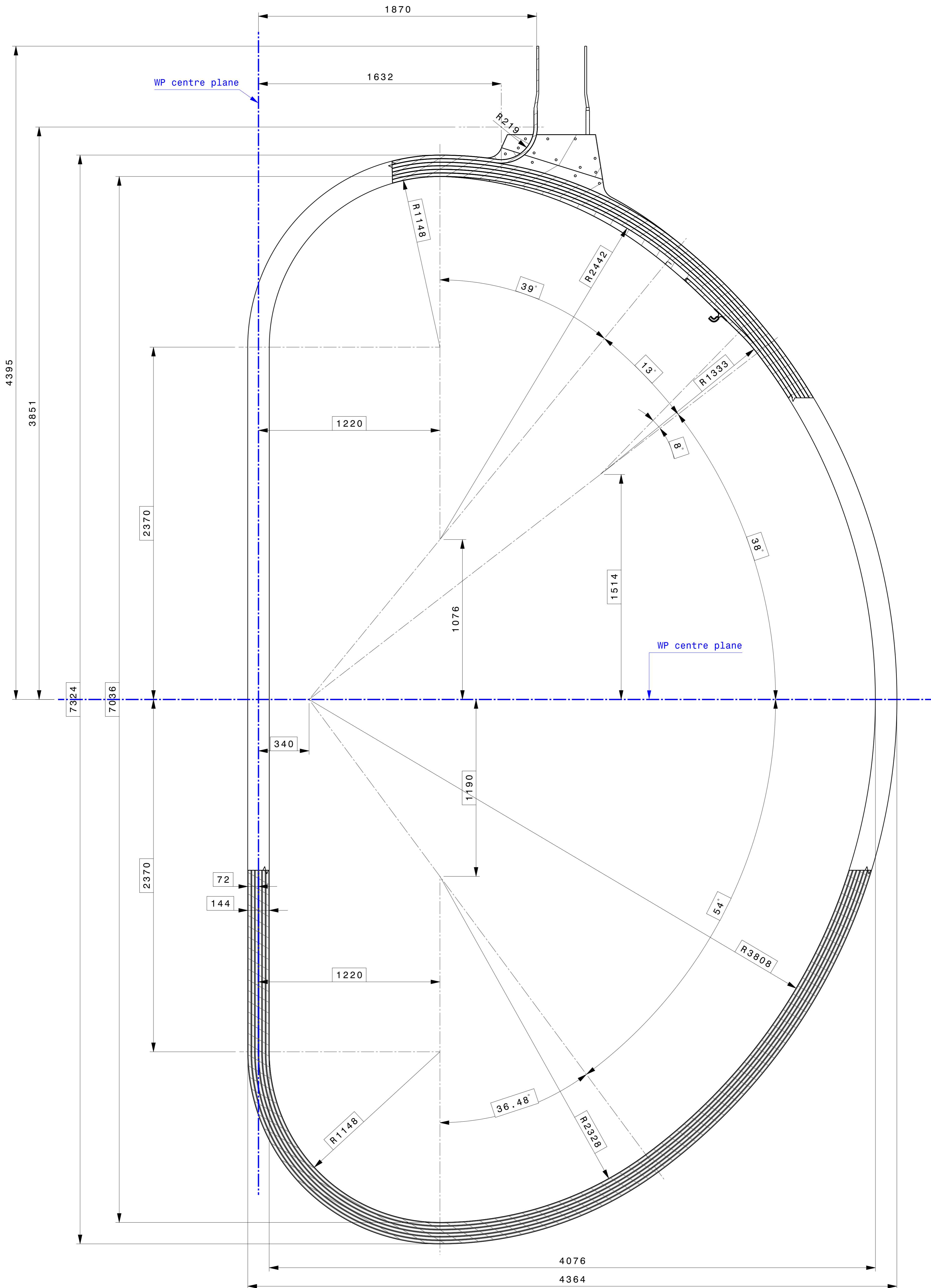
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



Note:  
 Dimensions for reference only.  
 For final winding pack envelope refer  
 to drawing 010202-503111. Dimensions  
 are related to double pancake without  
 0.5mm insulation tape.

DMS:		Ref to 3D CatProduct: 010202-203102_01	
<small>CONFIDENTIAL UNLESS AUTHORISED</small> The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY <b>A. CUCCHIARO</b>	CUSTOMER: <b>Fusion-for-Energy</b>
REV DATE <b>03-10-2011</b>		CHECKED BY _____	DRAWING TITLE <b>JT60-SA: TF MAGNET</b> <b>Toroidal Field Coil</b> <b>Double pancake 02. Front view</b>
FIRST ISSUE DATE <b>20-01-2011</b>	SCALE _____	CONTROLLED BY <b>A. CUCCHIARO</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION 	WBS <b>3 LEVELS</b>	SHEET <b>01</b>
Drawing Number <b>010202</b>		Drawing Number <b>503102</b>	REVISION <b>01</b>
		Drawing Number <b>010202</b>	MATURITY <b>01</b>

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

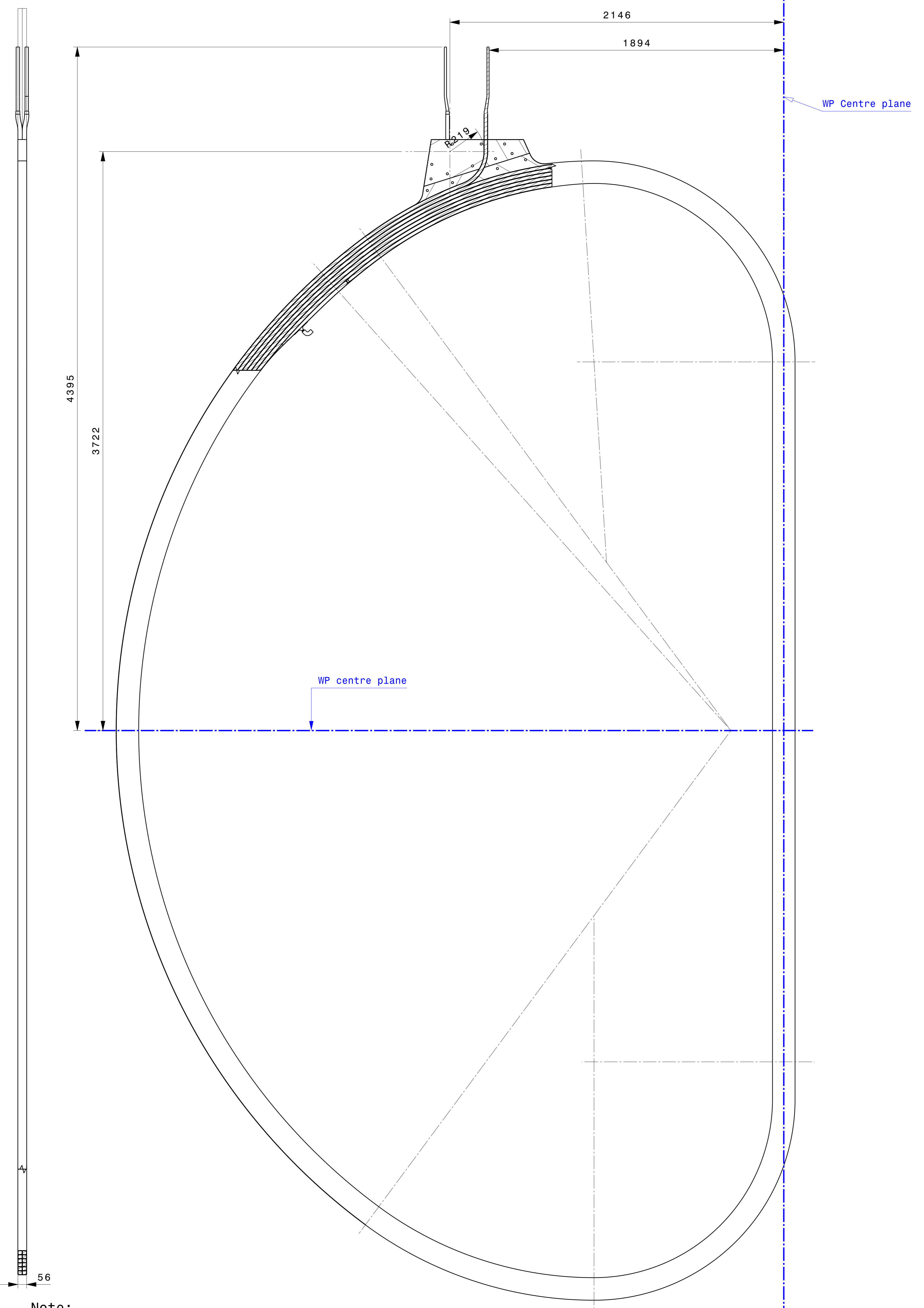


Note:

Dimensions for reference only.  
 For final winding pack envelope refer to drawing 010202-503111. Dimensions are related to double pancake without 0.5mm insulation tape.

DMS:		Ref to 3D CatProduct: 010202-203102_01	
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011		REVIEWED BY	DRAWING TITLE JT60-SA: TF MAGNET
FIRST ISSUE DATE 20-01-2011		CHECKED BY	CODE ENEA ID: DD-JT60TF-NCO
SHEET SIZE A1		CONTROLLED BY A. CUCCHIARO	Toroidal Field Coil
FIRST ANGLE PROJECTION		DRAWN BY G. BROLATTI	Double pancake 02. Rear view
WBS 3 LEVELS		010202	Drawing Number 503102
			SHEET REVISION MATURITY 02 /02 01

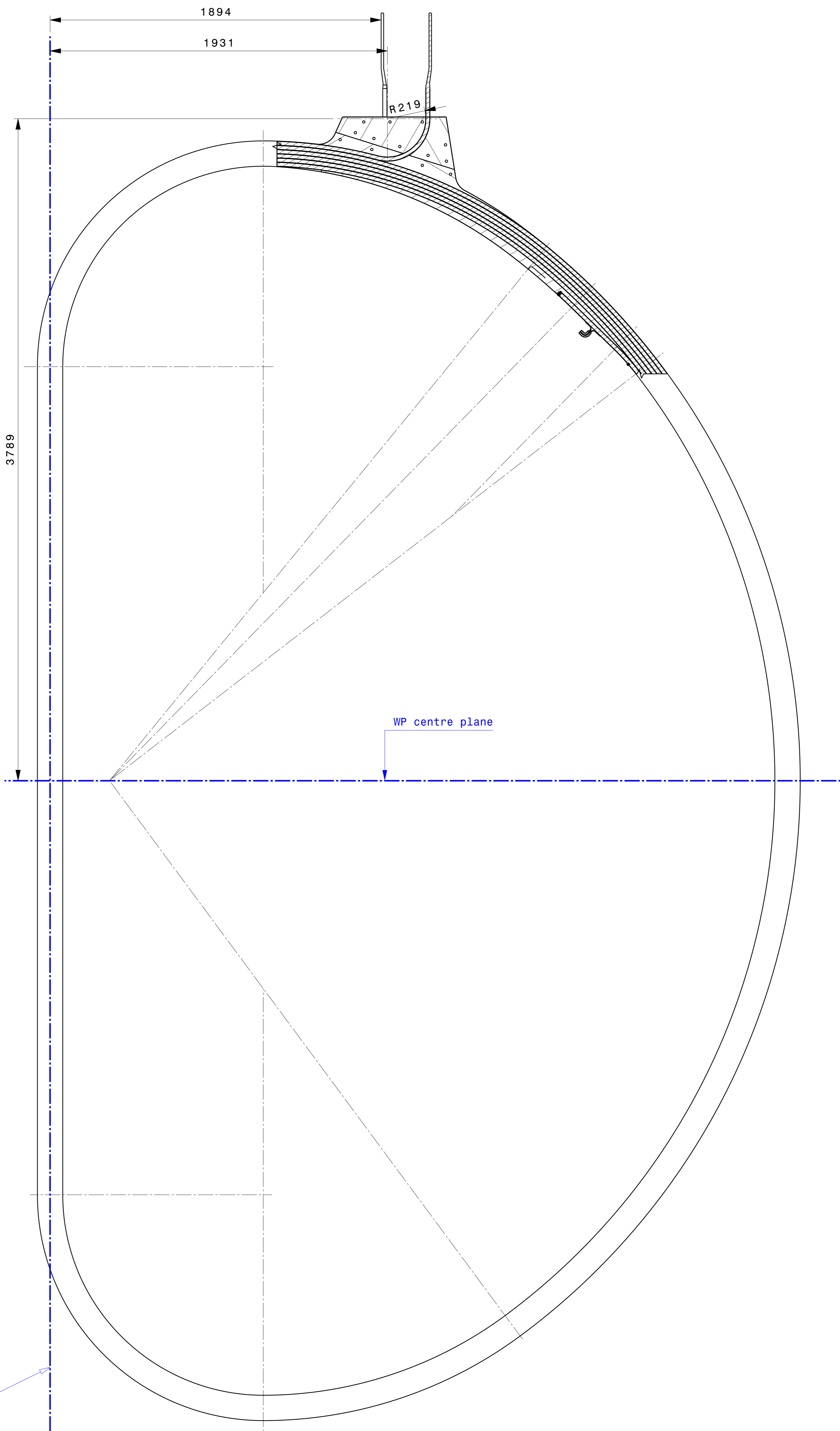
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



Note:  
 Double pancake "03"  
 Winding & helium inlet similar to Double pancake "01"  
 Conductor termination & filler layout only.  
 Dimensions for reference only.  
 For final winding pack envelope refer to drawing 010202-503111. Dimensions are related to double pancake without 0.5mm insulation tape.

DMS:		Ref to 3D CatProduct: 010202-203103_01			
CONFIDENTIAL UNLESS AUTHORIZED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorized to receive it.		APPROVED BY A. CUCCHIARO	ENEA Fusión Italy-Frascati Research Centre		CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011	FIRST ISSUE DATE 20-01-2011	SCALE	CONTROLLED BY A. CUCCHIARO	DRAWING TITLE JT60-SA: TF MAGNET Toroidal Field Coil	
DRAWN BY G. BROLATTI		CODE ENEA ID: DD-JT60TF-NC0	Double pancake 03. Front view		
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS 3 LEVELS	010202	Drawing Number 503103	SHEET REVISION MATURITY 01 /02 01

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



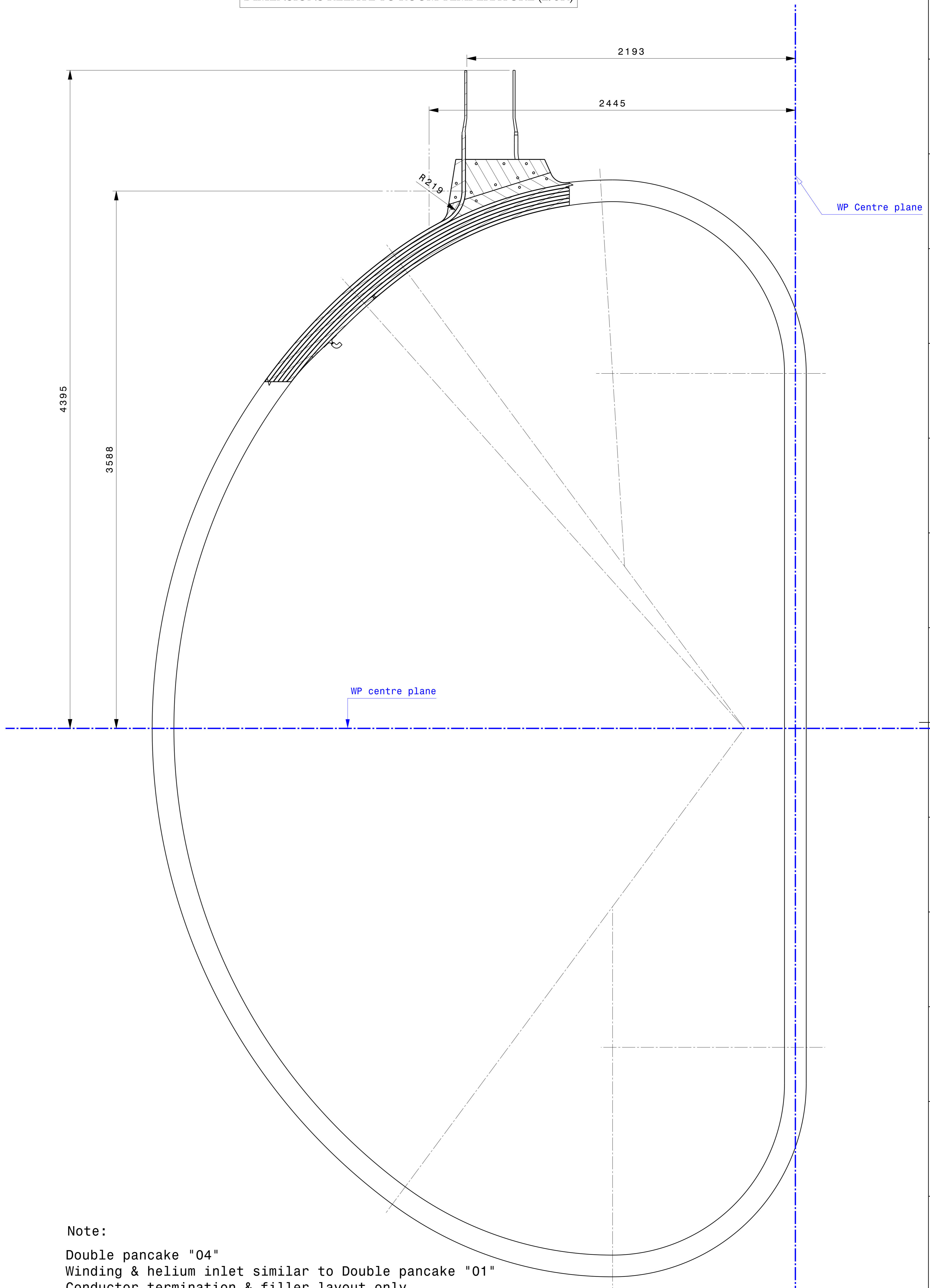
Note:

Double pancake "03"  
 Winding & helium inlet similar to Double pancake "01"  
 Conductor termination & filler layout only.  
 Dimensions for reference only.  
 For final winding pack envelope refer  
 to drawing 010202-503111. Dimensions  
 are related to double pancake without  
 0.5mm insulation tape.

DMS:		Ref to 3D CatProduct: 010202-203103_01			
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY A. CUCCHIARO	ENEA Fusión Italy-Frascati Research Centre		CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011	FIRST ISSUE DATE 20-01-2011	SCALE	CONTROLLED BY A. CUCCHIARO	DRAWING TITLE JT60-SA: TF MAGNET Toroidal Field Coil Double pancake 03. Rear view	
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS 3 LEVELS	CODE ENEA ID: DD-JT60TF-NCO	Drawing Number 503103	SHEET REVISION MATURITY 02 01 /02




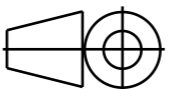
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



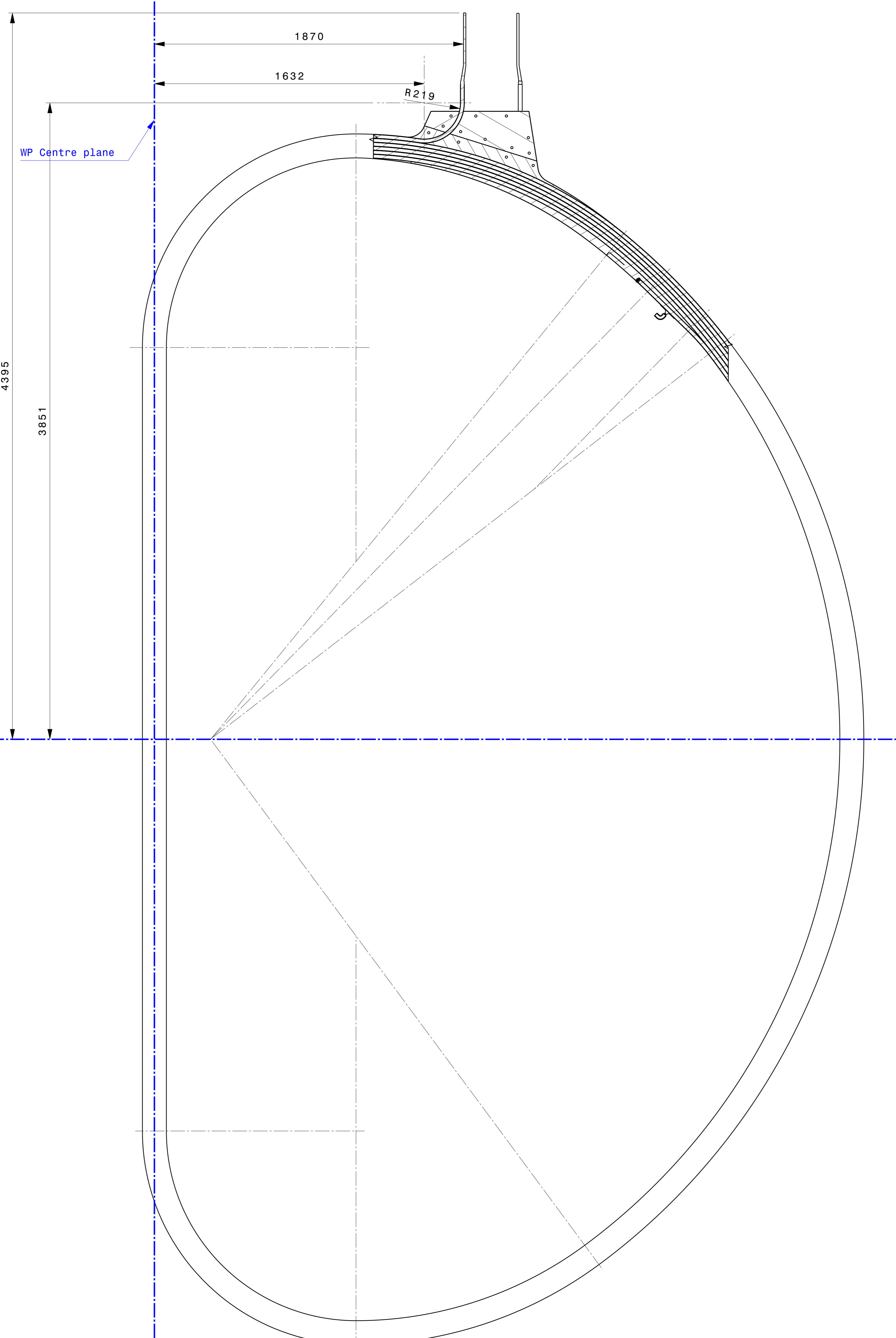
**Note:**

Double pancake "04"  
 Winding & helium inlet similar to Double pancake "01"  
 Conductor termination & filler layout only.

Dimensions for reference only.  
 For final winding pack envelope refer  
 to drawing 010202-503111. Dimensions  
 are related to double pancake without  
 0.5mm insulation tape.

DMS:		Ref to 3D CatProduct: 010202-203104_01			
<small>CONFIDENTIAL UNLESS AUTHORISED</small> The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.	APPROVED BY <b>A. CUCCHIARO</b>	 <b>Fusión</b> Italy-Frascati Research Centre	CUSTOMER: Fusion-for-Energy		
	REVIEWED BY		DRAWING TITLE <b>JT60-SA: TF MAGNET</b> Toroidal Field Coil		
REV DATE <b>03-10-2011</b>	CONTROLLED BY <b>A. CUCCHIARO</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>			
FIRST ISSUE DATE <b>20-01-2011</b>	SCALE	DRAWN BY <b>G. BROLATTI</b>		Double pancake 04. Front view SHEET REVISION MATURITY <b>01 01</b>	
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION 	WBS 3 LEVELS	<b>010202</b>	Drawing Number <b>503104</b>	<b>01 01</b>


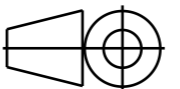
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



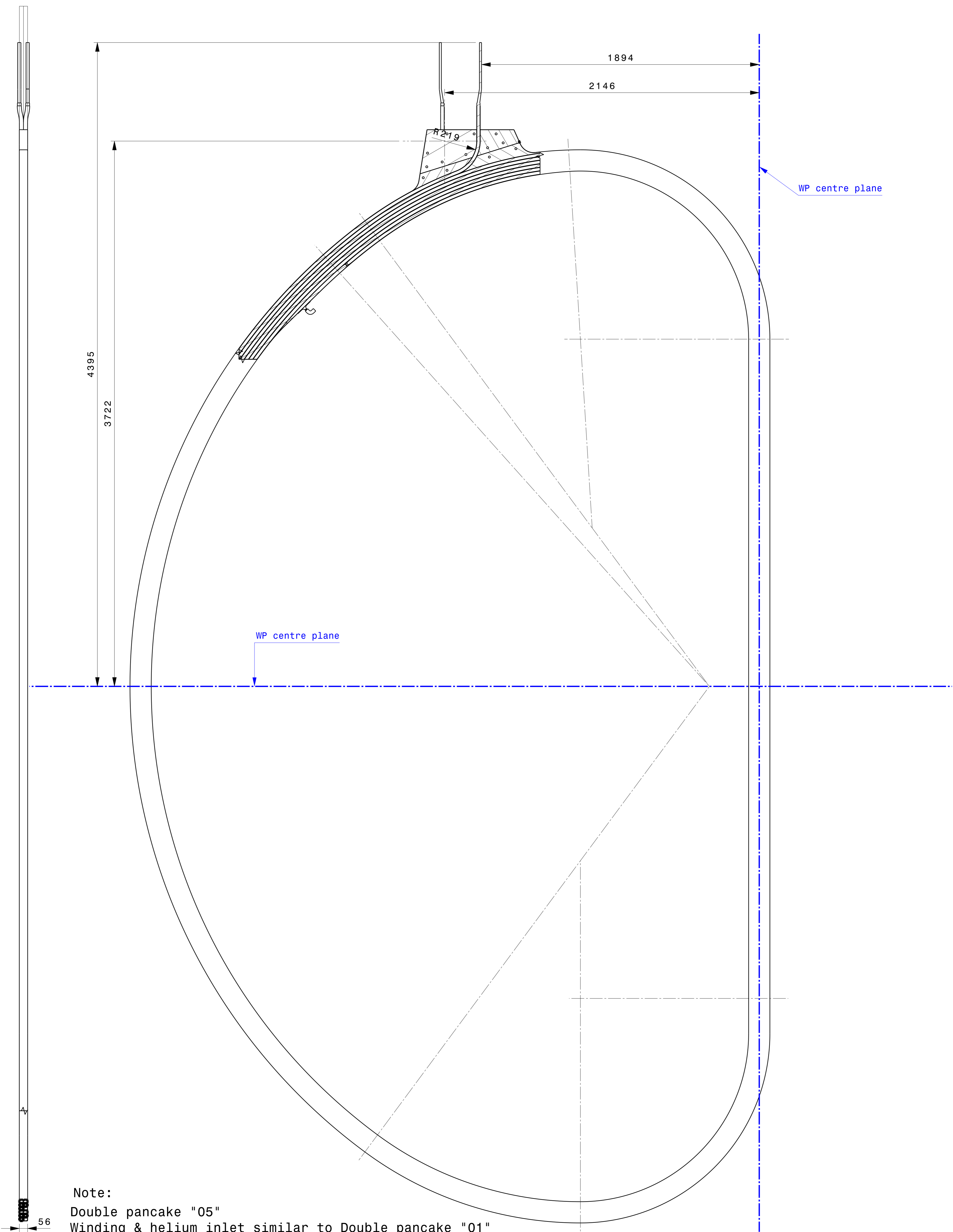
Note:

Double pancake "04"  
Winding & helium inlet similar to Double pancake "01"  
Conductor termination & filler layout only.

Dimensions for reference only.  
For final winding pack envelope refer  
to drawing 010202-503111. Dimensions  
are related to double pancake without  
0.5mm insulation tape.

DMS:		Ref to 3D CatProduct: 010202-203104_01			
<small>CONFIDENTIAL UNLESS AUTHORISED</small> <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>	APPROVED BY A. CUCCHIARO	 <b>Fusión</b> <small>Italy-Frascati Research Centre</small>	CUSTOMER: Fusion-for-Energy		
	REVIEWED BY		DRAWING TITLE <b>JT60-SA: TF MAGNET</b> Toroidal Field Coil		
REV DATE 03-10-2011	CONTROLLED BY A. CUCCHIARO	CODE ENEA ID: DD-JT60TF-NC0 <b>Double pancake 04. Rear view</b>			
FIRST ISSUE DATE 20-01-2011	SCALE	DRAWN BY G. BROLATTI			
SHEET SIZE A1	FIRST ANGLE PROJECTION 	WBS 3 LEVELS	010202	Drawing Number 503104	SHEET REVISION MATURITY 02 / 01

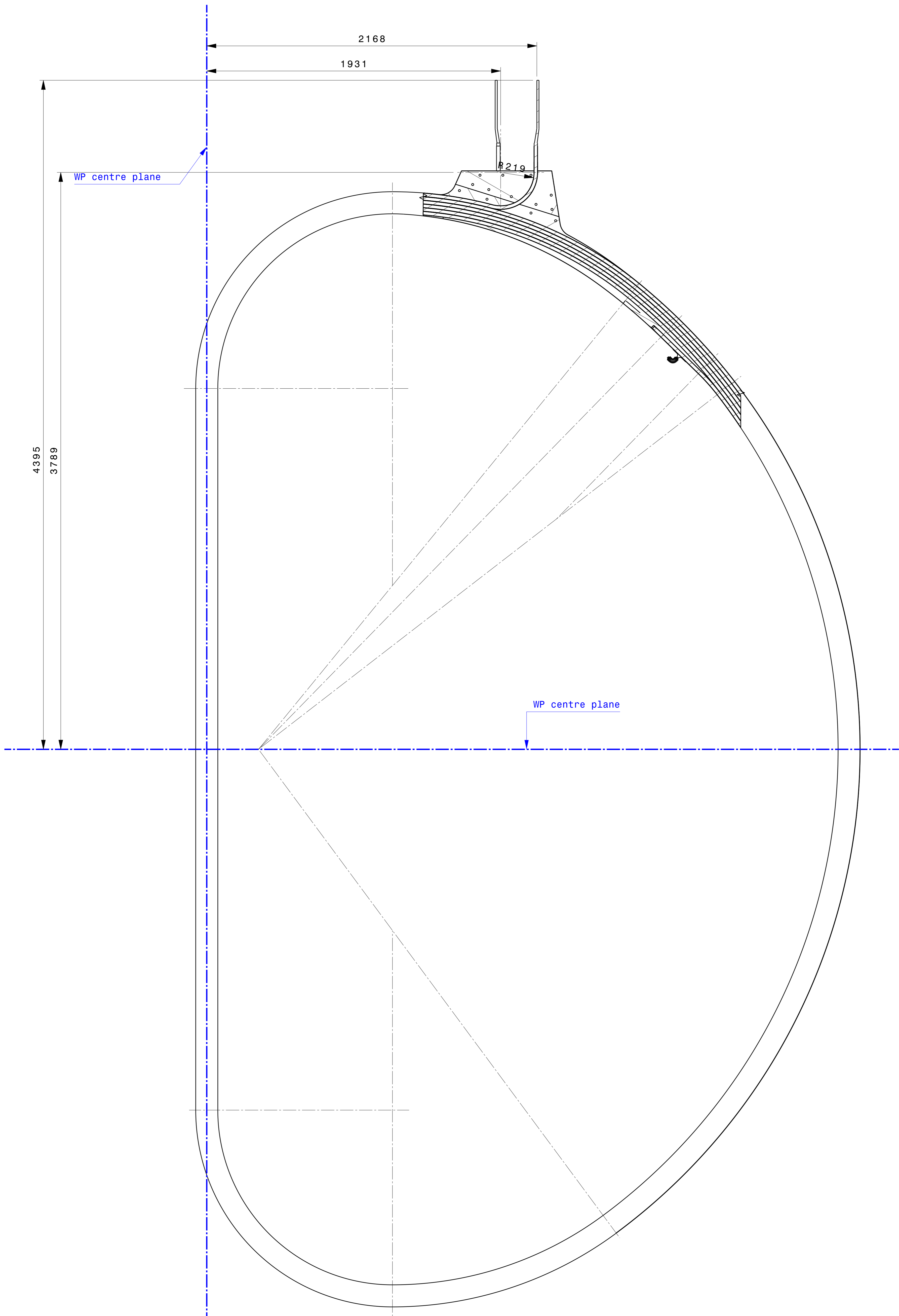
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



Note:  
 Double pancake "05"  
 Winding & helium inlet similar to Double pancake "01"  
 Conductor termination & filler layout only.  
 Dimensions for reference only.  
 For final winding pack envelope refer  
 to drawing 010202-503111. Dimensions  
 are related to double pancake without  
 0.5mm insulation tape.

DMS:		Ref to 3D CatProduct: 010202-203105_01			
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY A. CUCCHIARO	ENEA Fusión Italy-Frascati Research Centre		CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011	FIRST ISSUE DATE 20-01-2011	SCALE	CONTROLLED BY A. CUCCHIARO	DRAWING TITLE JT60-SA: TF MAGNET Toroidal Field Coil	
DRAWN BY G. BROLATTI		CODE ENEA ID: DD-JT60TF-NCO	Double pancake 05. Front view		
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS 3 LEVELS	010202	Drawing Number 503105	SHEET 01
		REVISION 02	MATURITY 01		

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

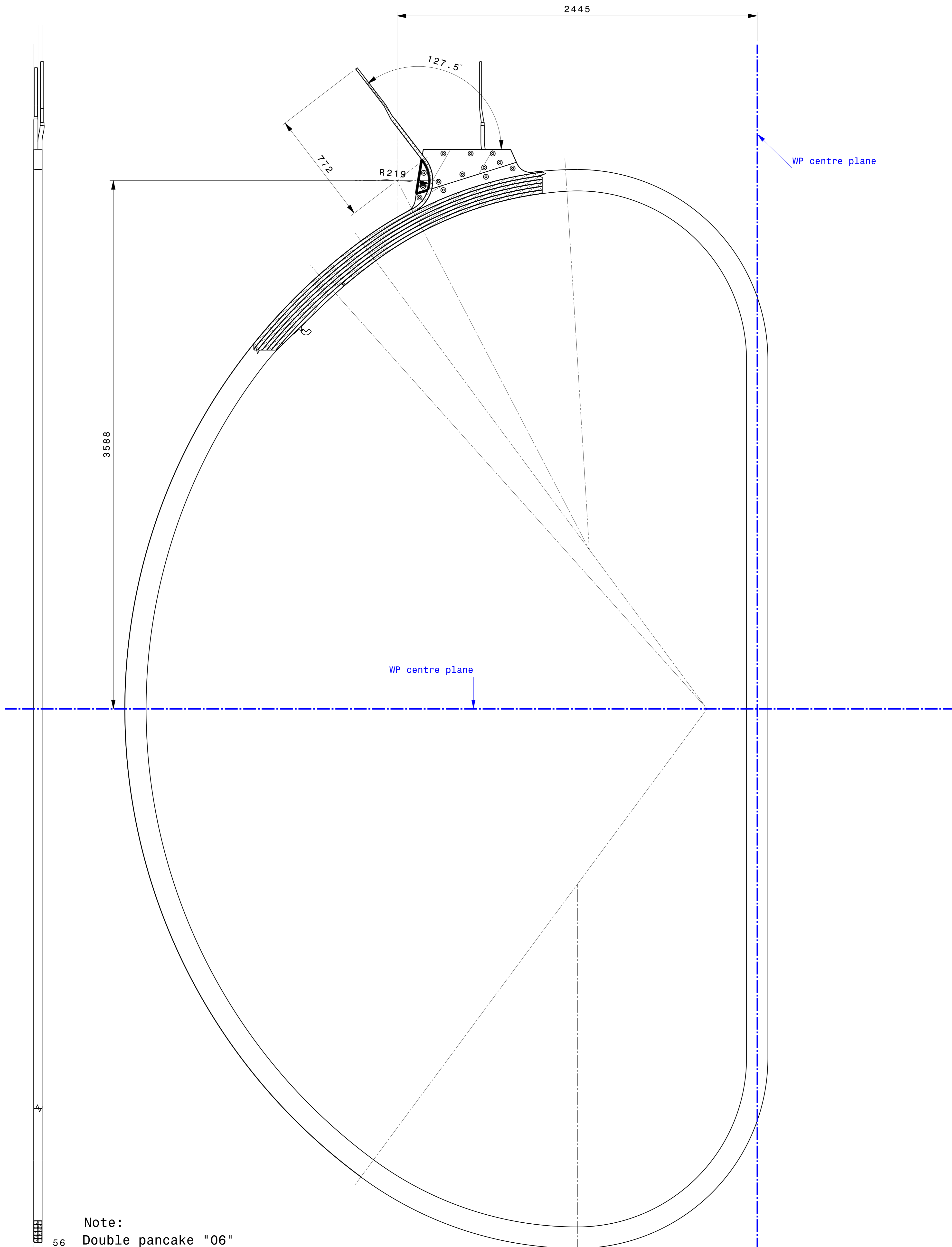


Note:

Double pancake "05"  
 Winding & helium inlet similar to Double pancake "01"  
 Conductor termination & filler layout only.  
 Dimensions for reference only.  
 For final winding pack envelope refer  
 to drawing 010202-503111. Dimensions  
 are related to double pancake without  
 0.5mm insulation tape.

DMS:		Ref to 3D CatProduct: 010202-203105_01	
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011		REVIEWED BY	DRAWING TITLE <b>JT60-SA: TF MAGNET</b> Toroidal Field Coil Double pancake 05. Rear view
FIRST ISSUE DATE 20-01-2011		CHECKED BY	
SCALE		CONTROLLED BY A. CUCCHIARO	CODE ENEA ID: DD-JT60TF-NCO
DRAWN BY G. BROLATTI		WBS 3 LEVELS	Drawing Number 503105
SHEET SIZE A1	FIRST ANGLE PROJECTION		SHEET 702
			REVISION 02
			MATURITY 01

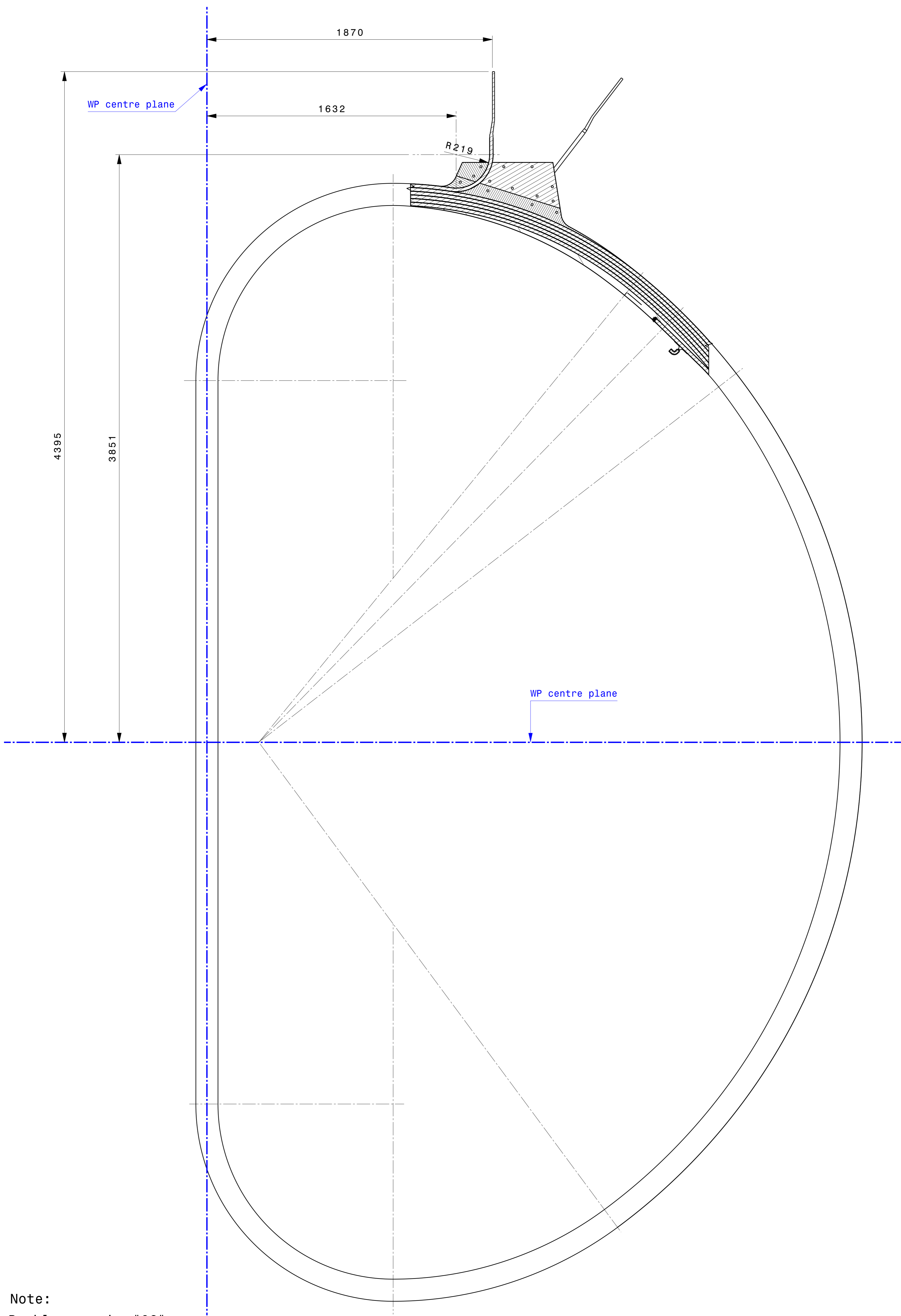
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



Note:  
 Double pancake "06"  
 Winding & helium inlet similar to Double pancake "01"  
 Conductor termination & filler layout only.  
 Dimensions for reference only.  
 For final winding pack envelope refer  
 to drawing 010202-503111. Dimensions  
 are related to double pancake without  
 0.5mm insulation tape.

DMS:		Ref to 3D CatProduct:010202-203106_01			
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY A. CUCCHIARO	ENEA <b>Fusión</b> Italy-Frascati Research Centre		CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011	FIRST ISSUE DATE 20-01-2011	SCALE	CONTROLLED BY A. CUCCHIARO	DRAWING TITLE <b>JT60-SA: TF MAGNET</b> Toroidal Field Coil	
DRAWN BY G. BROLATTI		CODE ENEA ID: DD-JT60TF-NCO	Double pancake 06. Front view		
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS 3 LEVELS	010202	Drawing Number 503106	SHEET 01
				REVISION /02	MATURITY 01


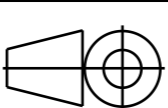
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



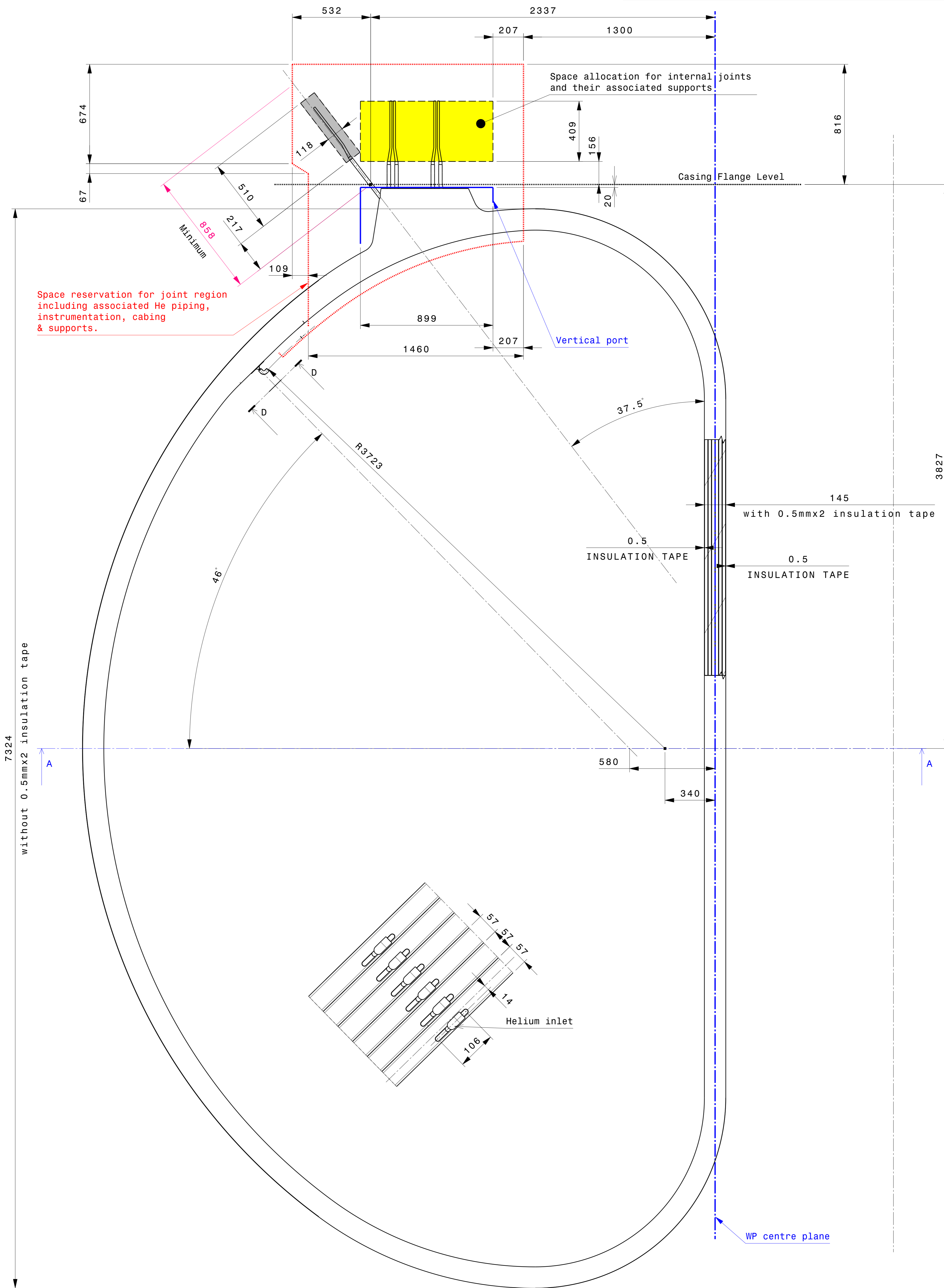
Note:

Double pancake "06"  
Winding & helium inlet similar to Double pancake "01"  
Conductor termination & filler layout only.

Dimensions for reference only.  
For final winding pack envelope refer  
to drawing 010202-503111. Dimensions  
are related to double pancake without  
0.5mm insulation tape.

DMS:		Ref to 3D CatProduct:010202-203106_01		
<small>CONFIDENTIAL UNLESS AUTHORISED</small> <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>	APPROVED BY A. CUCCHIARO	 <b>Fusión</b> <small>Italy-Frascati Research Centre</small>	CUSTOMER: Fusion-for-Energy	
	REVIEWED BY		DRAWING TITLE <b>JT60-SA: TF MAGNET</b> Toroidal Field Coil	
REV DATE 03-10-2011	CONTROLLED BY A. CUCCHIARO	CODE ENEA ID: DD-JT60TF-NCO		
FIRST ISSUE DATE 20-01-2011	SCALE	DRAWN BY G. BROLATTI	DRAWING TITLE <b>Double pancake 06. Rear view</b>	
SHEET SIZE A1	FIRST ANGLE PROJECTION 	WBS 3 LEVELS	010202	Drawing Number 503106
				SHEET 02
				REVISION 01
				MATURITY

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



Space reservation for joint region including associated He piping, instrumentation, cabling & supports.

Space allocation for internal joints and their associated supports.

Casing Flange Level

Vertical port

145 with 0.5mmx2 insulation tape

0.5 INSULATION TAPE

0.5 INSULATION TAPE

without 0.5mmx2 insulation tape

Helium inlet

WP centre plane

Note: Dimensions for reference only.

DMS:		Ref to 3D CatProduct: 010202-203107_01			
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY A.CUCCHIARO	ENEA Fusion Italy-Frascati Research Centre		CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011	FIRST ISSUE DATE 20-01-2011	SCALE	CONTROLLED BY A.CUCCHIARO	DRAWING TITLE JT60-SA: TF MAGNET Toroidal Field Coil 2D Layout	
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS 3 LEVELS	CODE ENEA ID: DD-JT60TF-NCO	Drawing Number 503107	SHEET REVISION MATURITY 01 /02 01

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

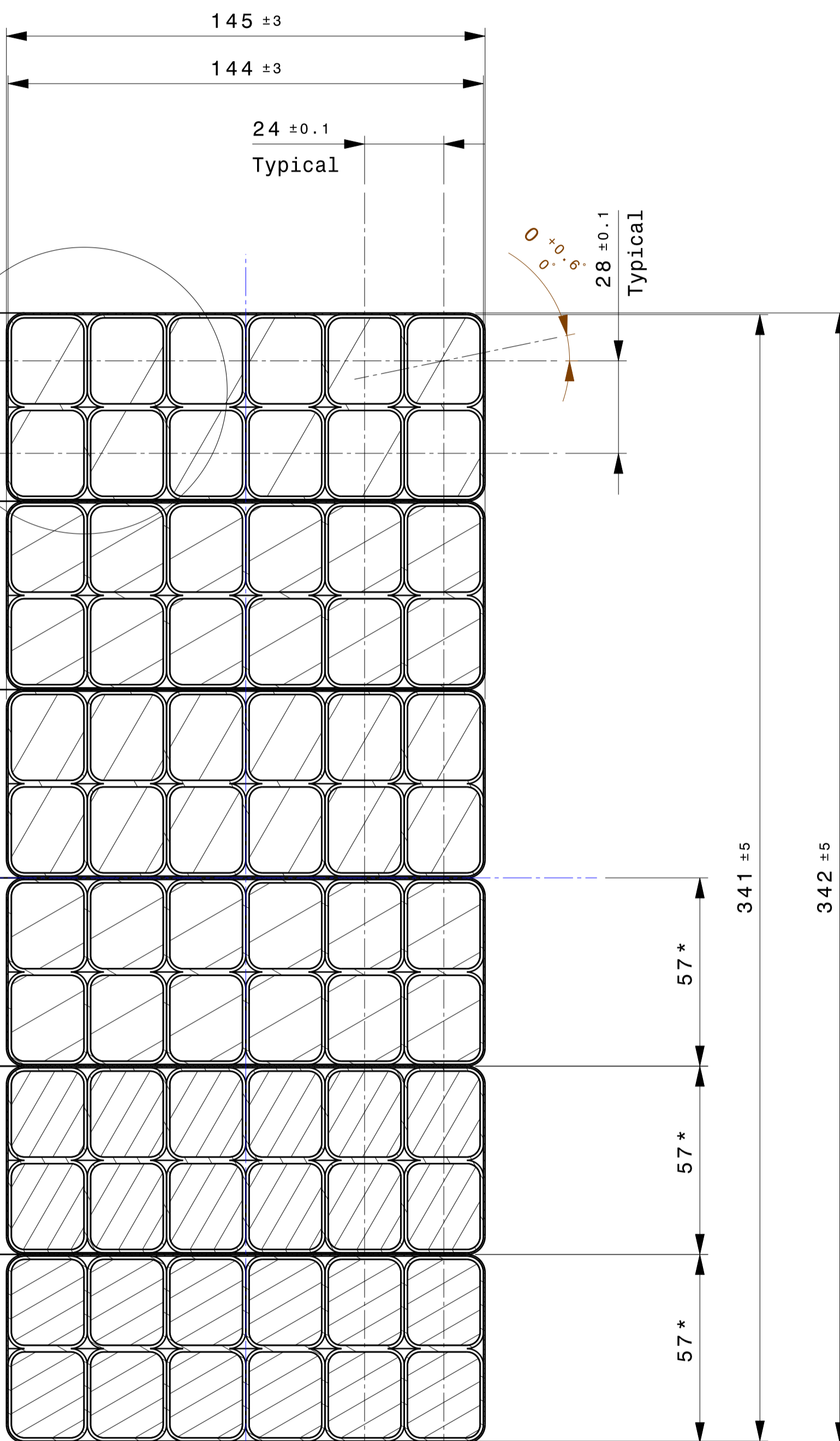
0.5 ±0.1 insulation tape  
(all around each double pancake)

Detail E

E

WP centre plane

WP centre plane



DP06

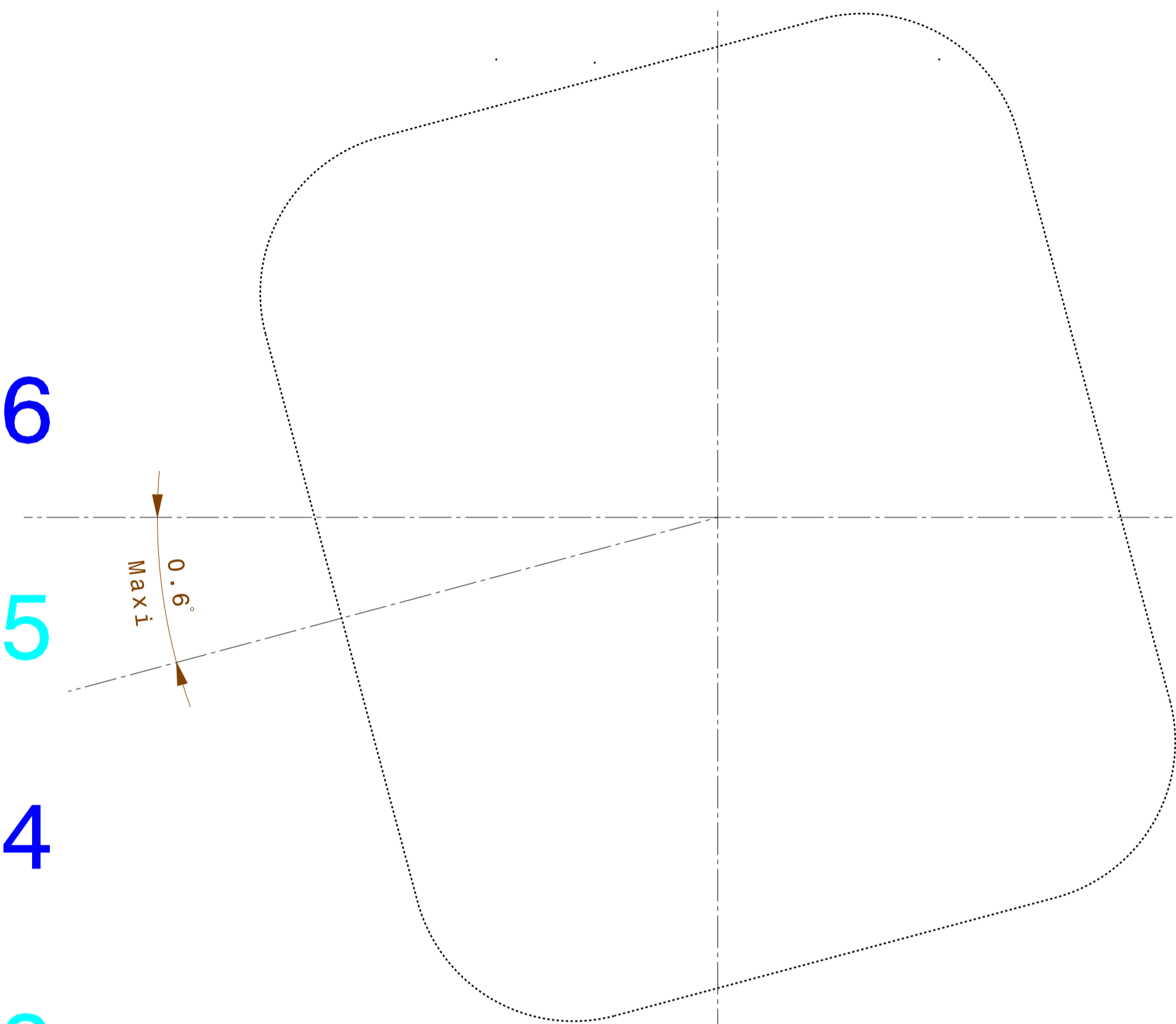
DP05

DP04

DP03

DP02

DP01

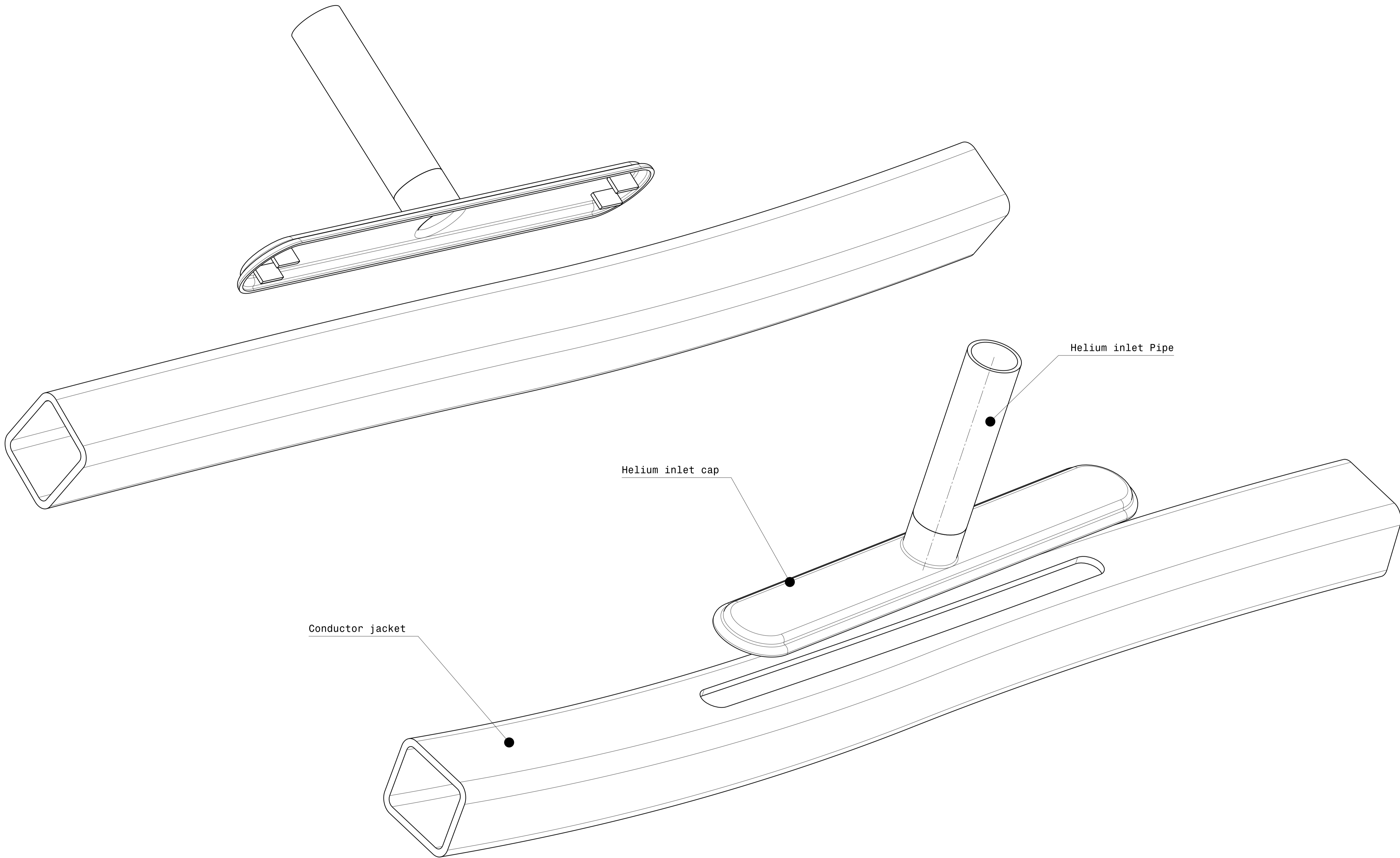


Note:  
\* with 0.5mmx2 insulation tape

DMS:		Ref to 3D CatProduct: 010202-203107_01			
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>		CUSTOMER: <b>Fusion-for-Energy</b>	
REV DATE <b>03-10-2011</b>		REVIEWED BY		DRAWING TITLE <b>JT60-SA: TF MAGNET Toroidal Field Coil Section A-A</b>	
FIRST ISSUE DATE <b>20-01-2011</b>		CHECKED BY		CODE ENEA ID: <b>DD-JT60TF-NCO</b>	
SCALE		CONTROLLED BY <b>A. CUCCHIARO</b>		SHEET <b>02</b>	
SHEET SIZE <b>A1</b>		DRAWN BY <b>G. BROLATTI</b>		REVISION <b>01</b>	
FIRST ANGLE PROJECTION		WBS LEVELS <b>010202</b>		MATERIALITY	
Drawing Number <b>503107</b>		SHEET <b>02</b>		REVISION <b>01</b>	






DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



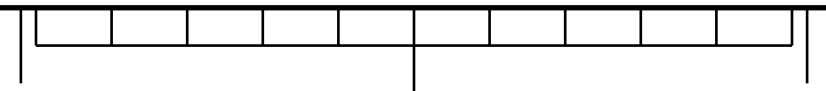
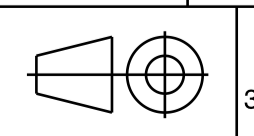
Conductor jacket

Helium inlet cap

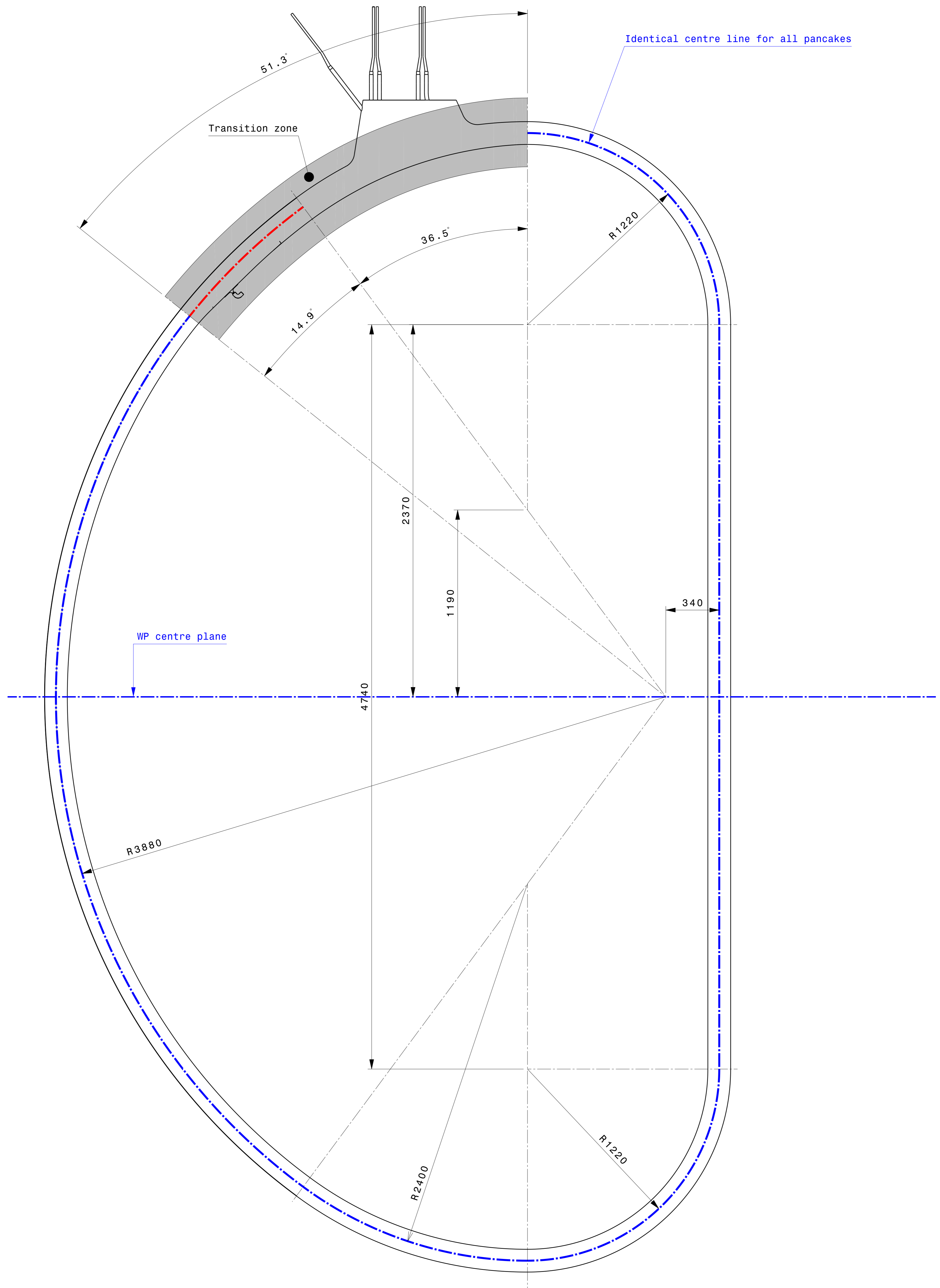
Helium inlet Pipe

DMS:		Ref to 3D CatProduct:						
<small>CONFIDENTIAL UNLESS AUTHORISED</small> <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY	  		DRAWING TITLE			
		REVIEWED BY						
		REV DATE <b>20-01-2011</b>	CHECKED BY ...	CONTROLLED BY ...	<b>JT60-SA: TF MAGNET</b> Toroidal Field Coil Draft for possible helium inlet			
SHEET SIZE A-1	SCALE ...	DRAWN BY G. BROLATTI	WBS 3 LEVELS	010202	DRAWING NUMBER 503108	SHEET 01	REVISION 00	MATURITY A


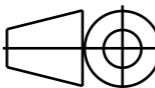
FIRST ANGLE PROJECTION



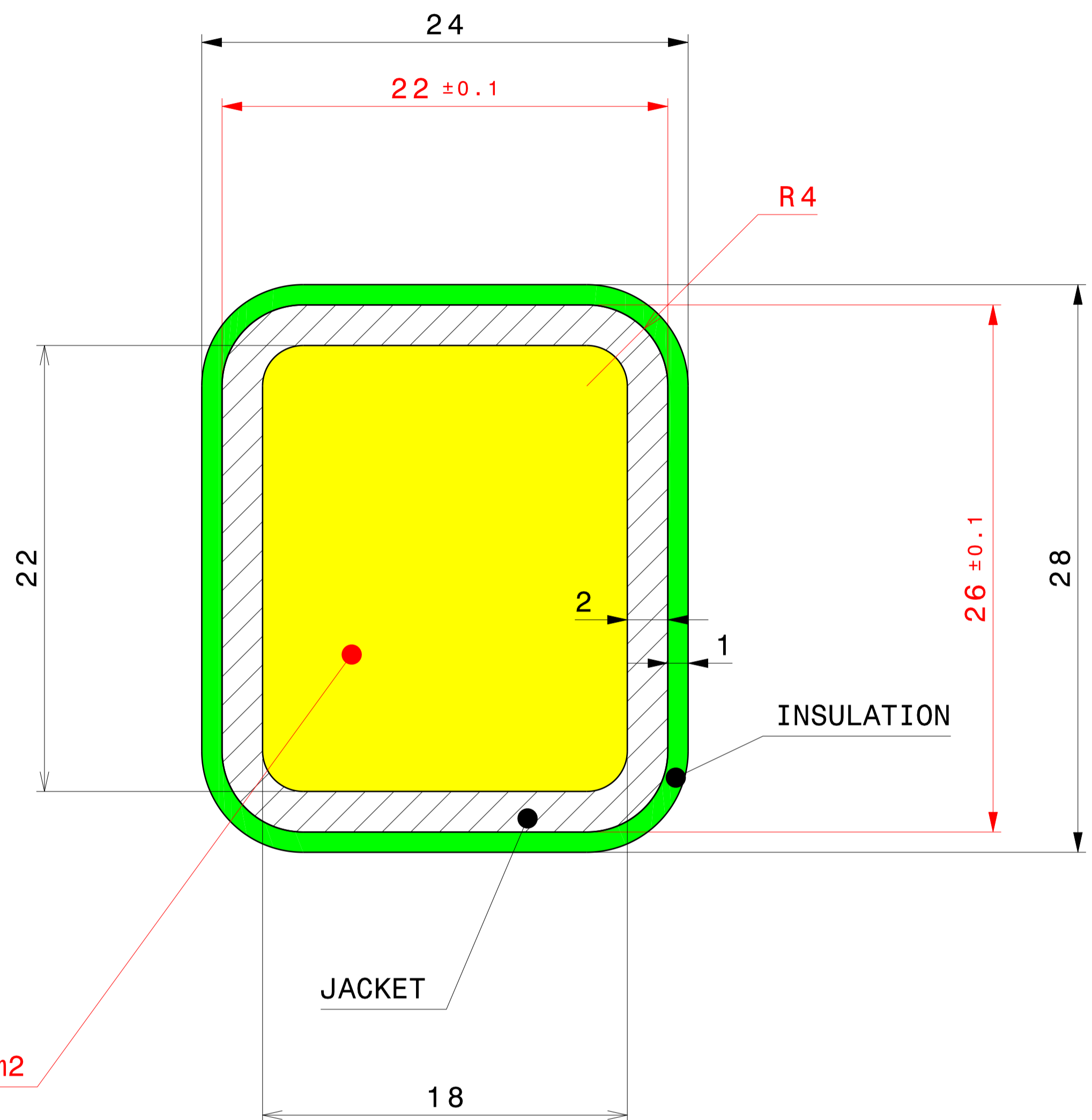
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)




Note: Dimensions for reference only.

DMS:		Ref to 3D CatProduct: 010202-203109_01		
<small>CONFIDENTIAL UNLESS AUTHORISED</small> <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>	 <b>Fusión</b> <small>Italy-Frascati Research Centre</small>	CUSTOMER: <b>Fusion-for-Energy</b>
REV DATE <b>03-10-2011</b>	FIRST ISSUE DATE <b>20-01-2011</b>	CHECKED BY CONTROLLED BY <b>A. CUCCHIARO</b>	DRAWING TITLE <b>JT60-SA: TF MAGNET</b> <b>Toroidal Field Coil</b> <b>Winding pack centre line</b>	
SCALE DRAWN BY <b>G. BROLATTI</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>	SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION 	WBS <b>3 LEVELS</b>
SHEET NUMBER <b>010202</b>	DRAWING NUMBER <b>503109</b>	SHEET <b>01</b>	REVISION <b>01</b>	MATURITY <b>01</b>

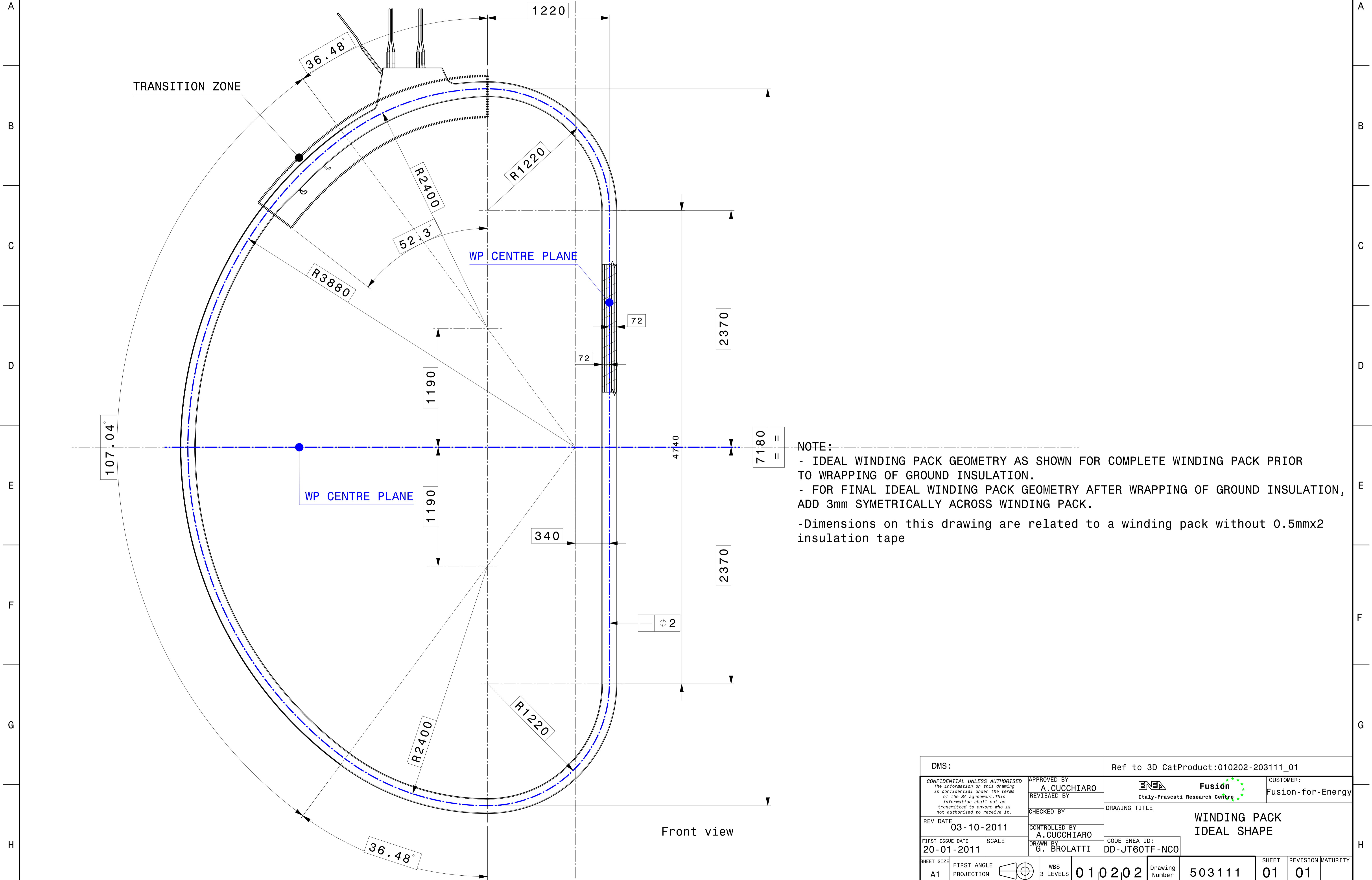
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



AREA for cable: 383.4mm<sup>2</sup>

DMS:				Ref to 3D CatProduct:							
<small>CONFIDENTIAL UNLESS AUTHORISED</small> <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>				APPROVED BY A. CUCCHIARO		 <b>Fusion</b> <small>Italy-Frascati Research Centre</small>		CUSTOMER: Fusion-for-Energy			
				REVIEWED BY				DRAWING TITLE <b>JT60-SA: TF MAGNET</b> <i>Toroidal Field Coil</i>			
REV DATE				CHECKED BY		CODE ENEA ID: <i>Insulated conductor cross section</i>					
FIRST ISSUE DATE 20-01-2011		SCALE		CONTROLLED BY A. CUCCHIARO		DD-JT60TF-NCO					
DRAWN BY G. BROLATTI		SHEET SIZE A1		FIRST ANGLE PROJECTION		WBS LEVELS 3 LEVELS		Drawing Number 010202		SHEET REVISION MATURITY 503110 01 00	

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

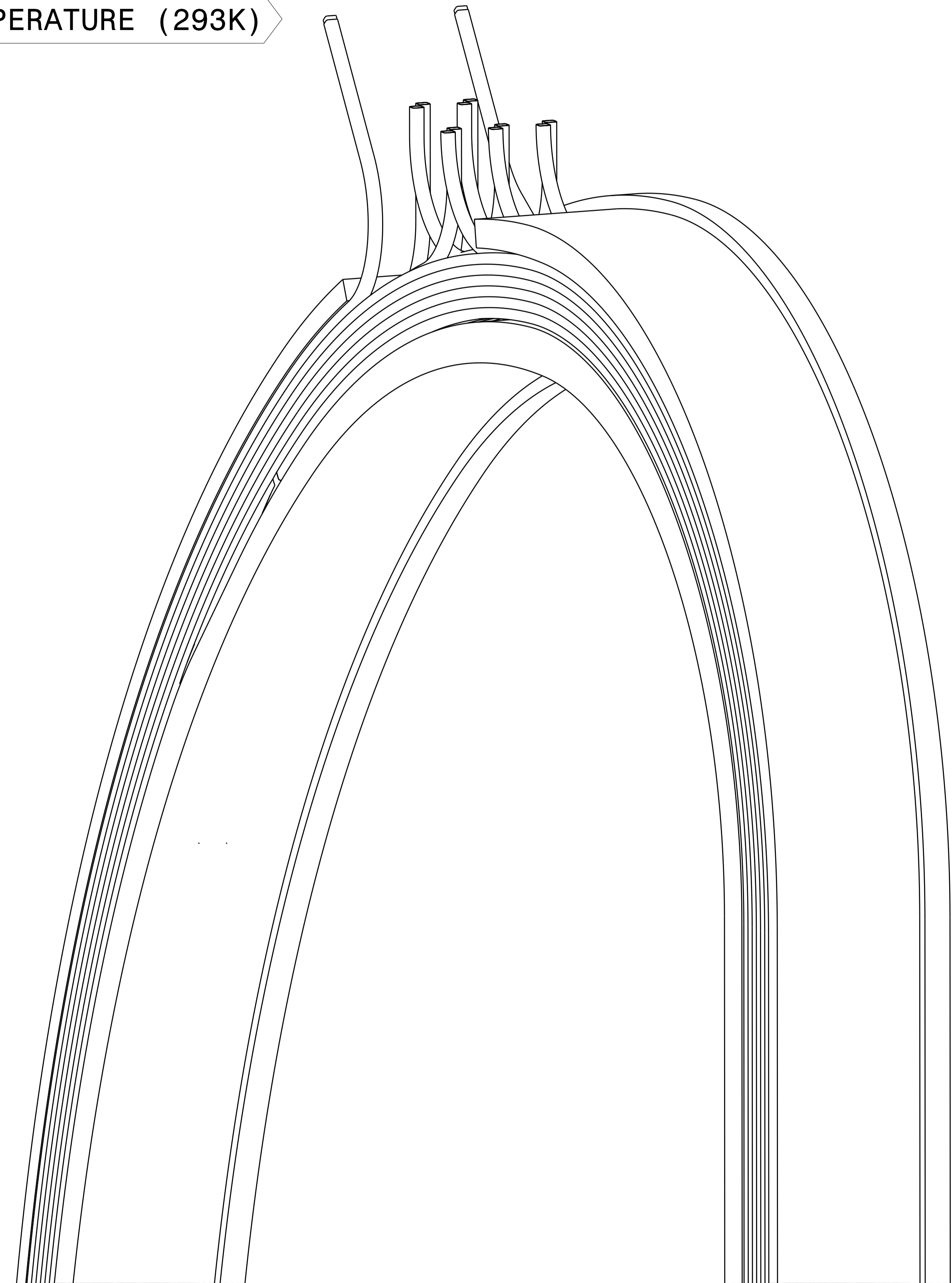
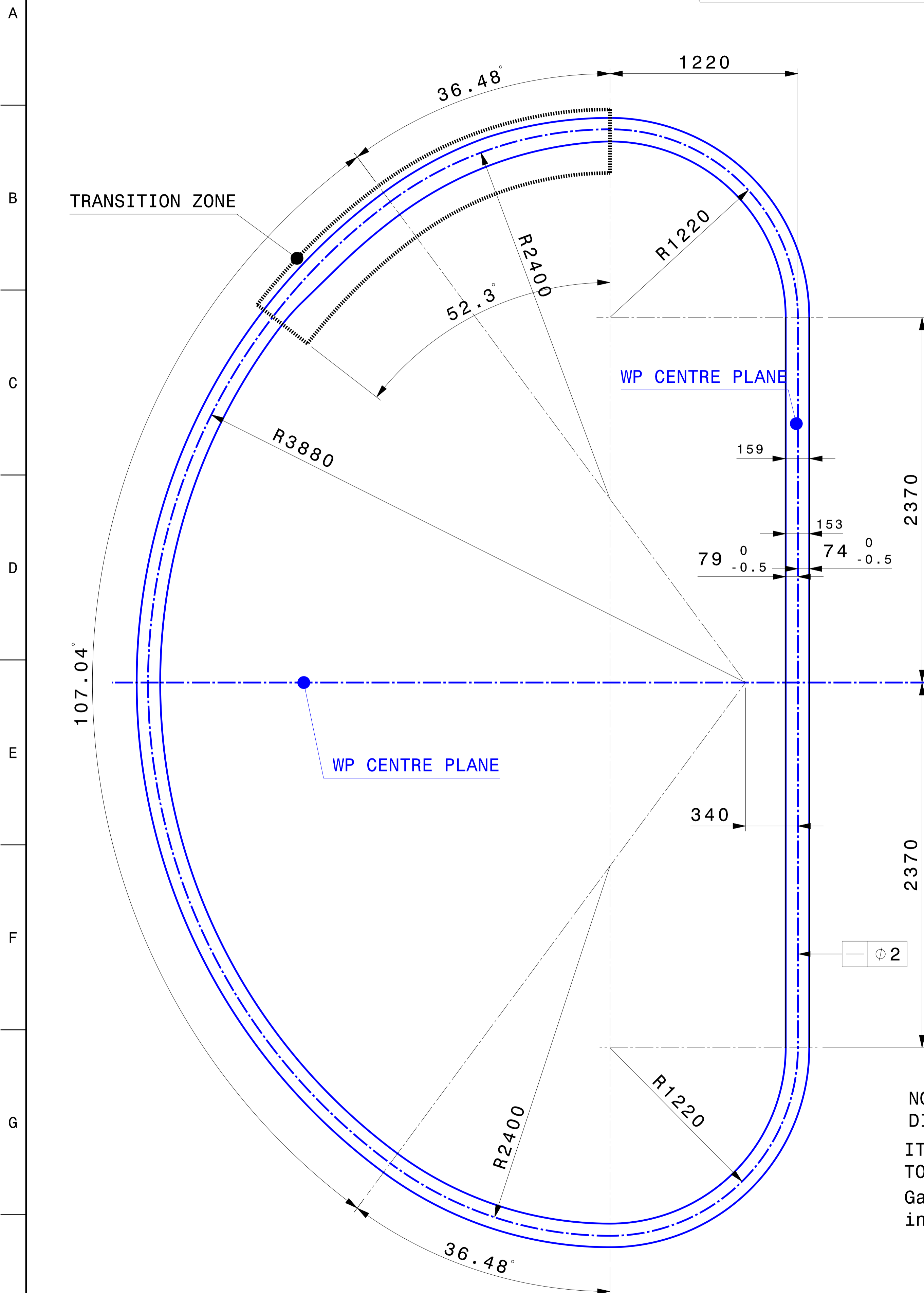


NOTE:  
 - IDEAL WINDING PACK GEOMETRY AS SHOWN FOR COMPLETE WINDING PACK PRIOR TO WRAPPING OF GROUND INSULATION.  
 - FOR FINAL IDEAL WINDING PACK GEOMETRY AFTER WRAPPING OF GROUND INSULATION, ADD 3mm SYMETRICALLY ACROSS WINDING PACK.  
 -Dimensions on this drawing are related to a winding pack without 0.5mmx2 insulation tape

Front view

DMS:		Ref to 3D CatProduct:010202-203111_01	
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011		REVIEWED BY	DRAWING TITLE WINDING PACK IDEAL SHAPE
FIRST ISSUE DATE 20-01-2011		CONTROLLED BY A. CUCCHIARO	CODE ENEA ID: DD-JT60TF-NCO
SHEET SIZE A1		DRAWN BY G. BROLATTI	Drawing Number 503111
FIRST ANGLE PROJECTION	WBS LEVELS 3	010202	SHEET REVISION MATURITY 01 01

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

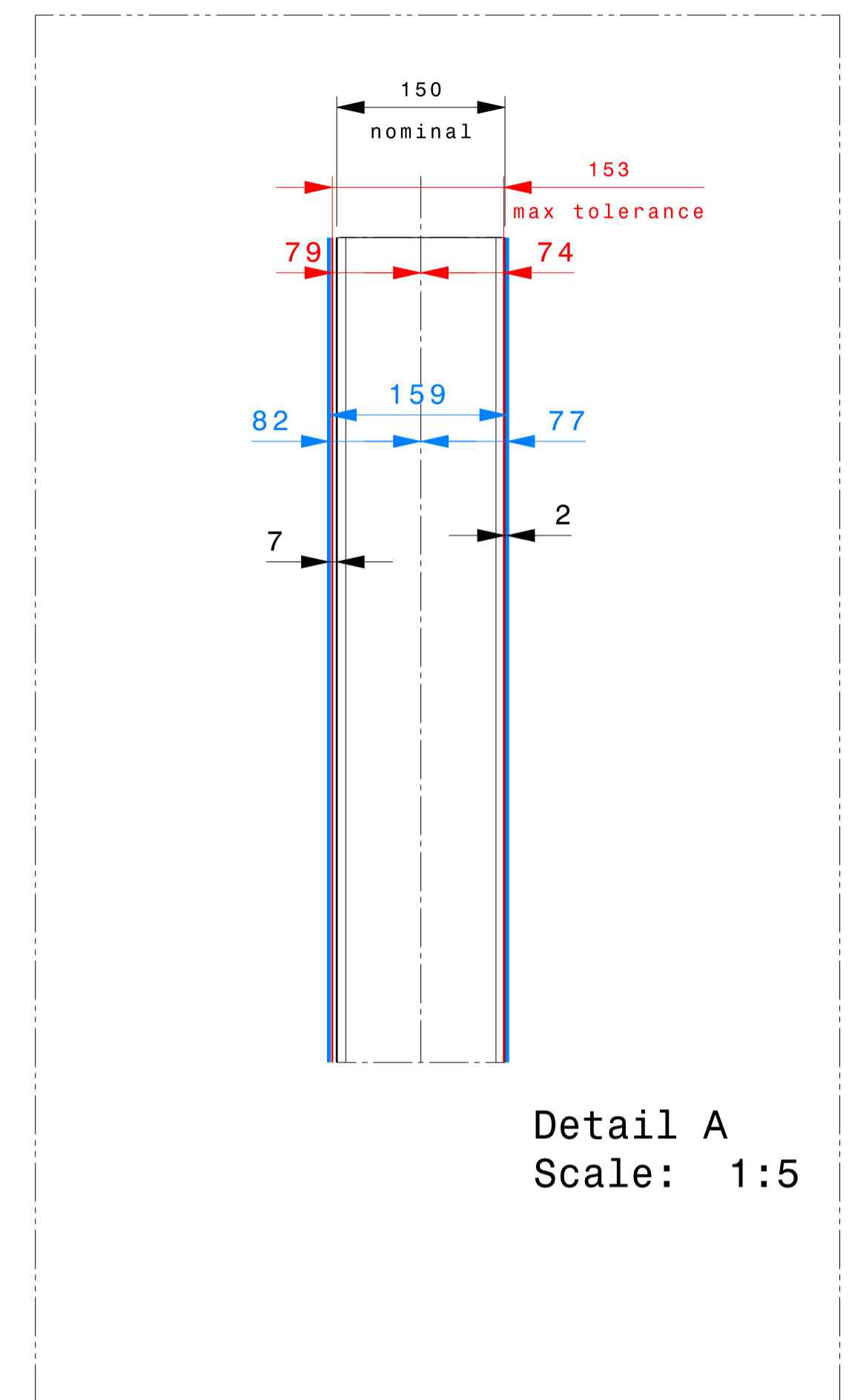
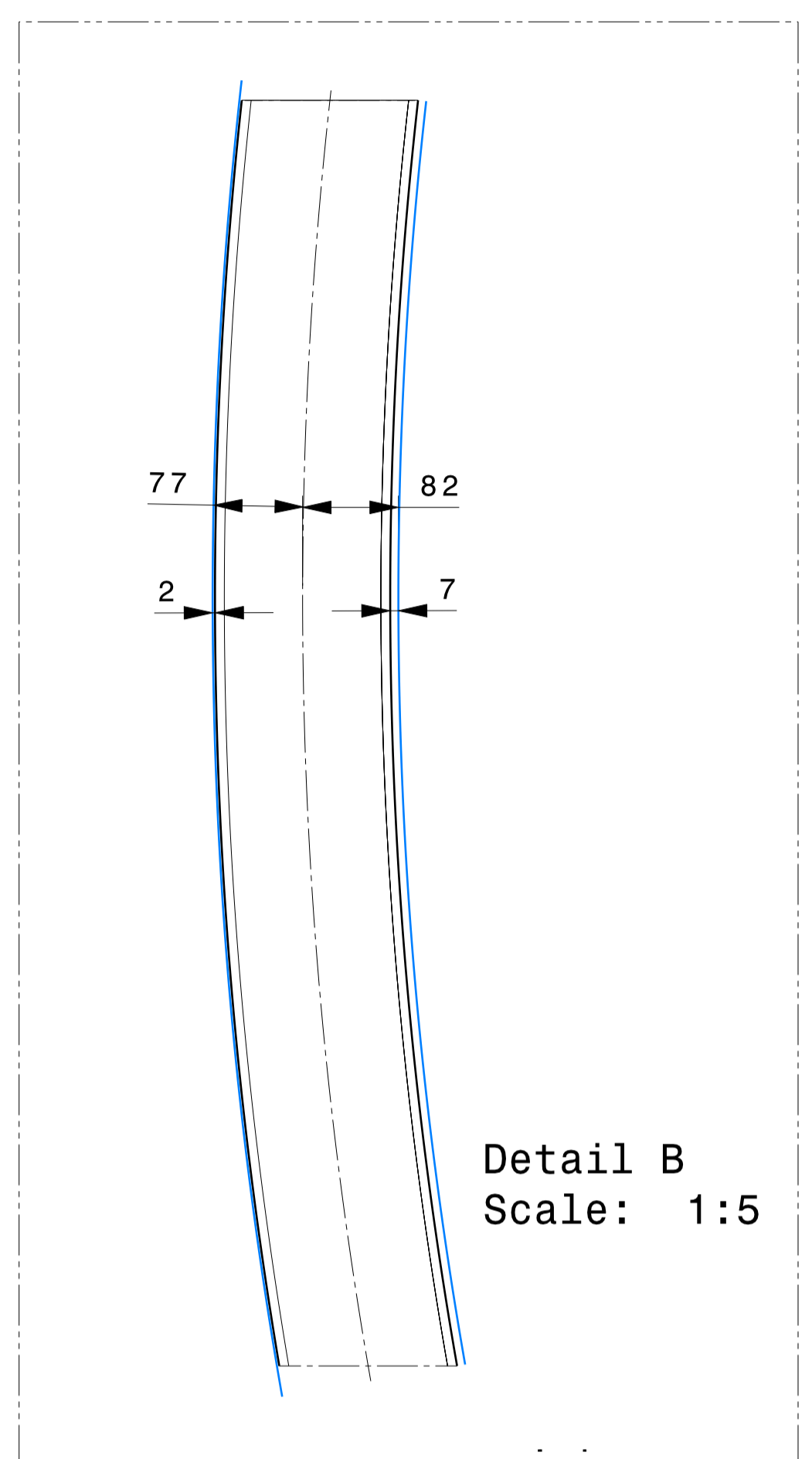
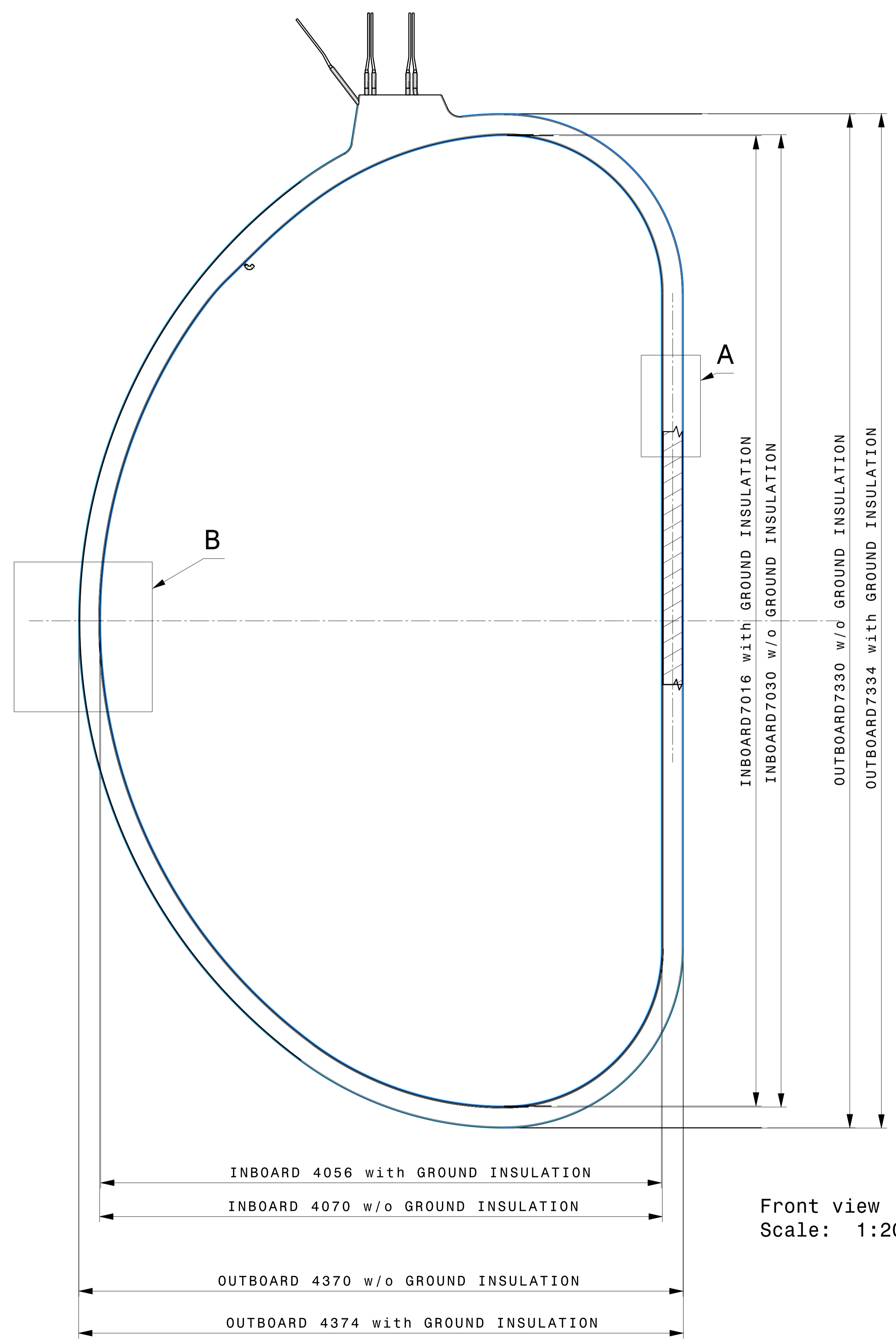


GAUGE SUGGESTION

NOTE:  
 DIMENSIONS SHOW MAXIMUM BOUNDS WITHIN WHICH WINDING PACK MUST FIT.  
 IT IS SUGGESTED THAT A GAUGE BE MANUFACTURED MEETING THESE DIMENSIONS  
 TO CONFIRM THE WINDING PACK GEOMETRY AS SHOWN  
 Gauge for winding pack without 0.5mmx2  
 insulation tape on double pancake

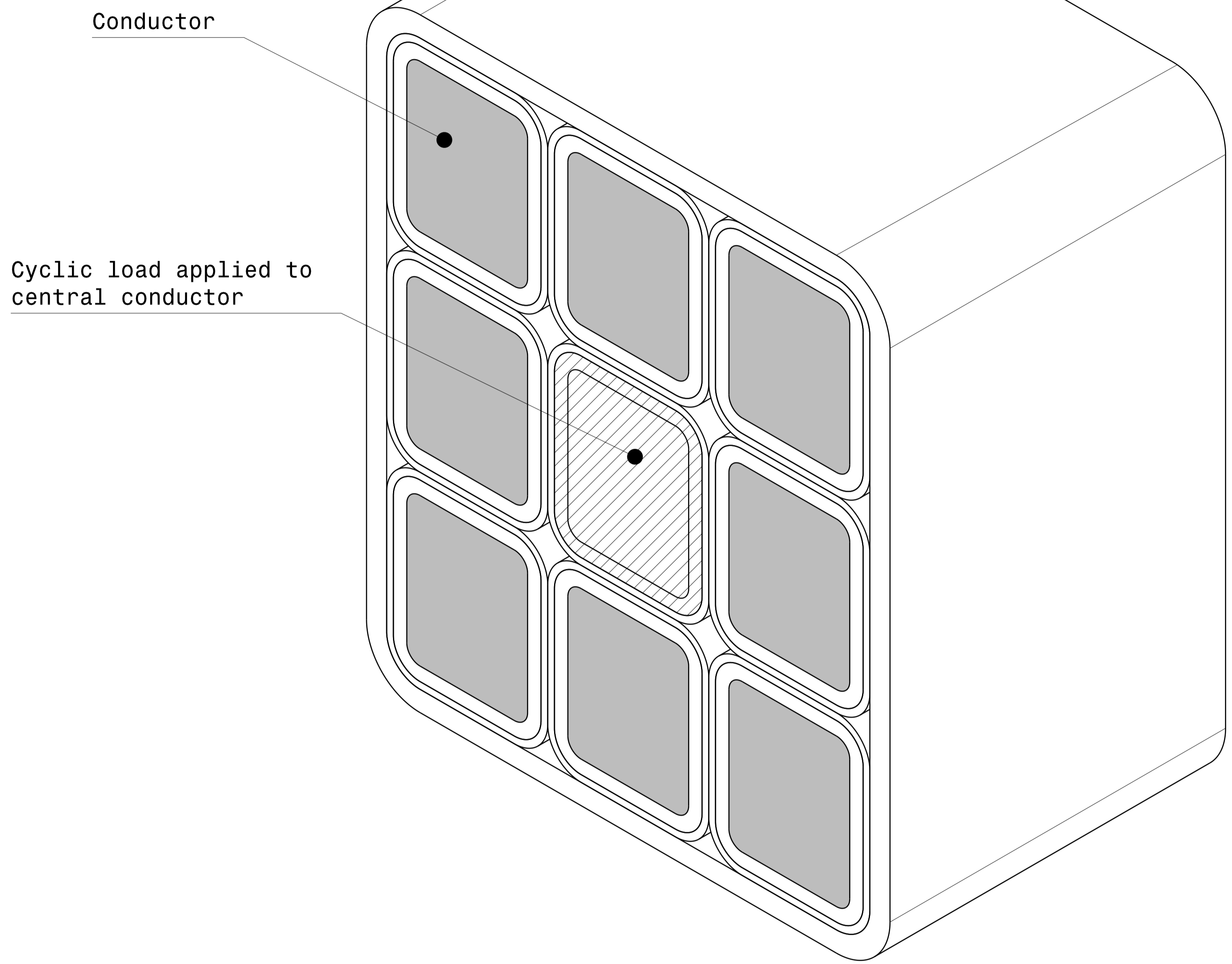
DMS:		Ref to 3D CatProduct:	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011		REVIEWED BY	DRAWING TITLE <b>WINDING PACK IDEAL SHAPE</b>
FIRST ISSUE DATE 20-01-2011		CONTROLLED BY A. CUCCHIARO	
SHEET SIZE A1		DRAWN BY G. BROLATTI	CODE ENEA ID: DD-JT60TF-NCO
FIRST ANGLE PROJECTION	WBS 3 LEVELS	010202	Drawing Number 503111
			SHEET 02
			REVISION 01
			MATURITY

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



DMS:		Ref to 3D CatProduct:010202-203111_01	
<small>CONFIDENTIAL UNLESS AUTHORISED</small> The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.	APPROVED BY A. CUCCHIARO	Fusion Italy-Frascati Research Centre	CUSTOMER: Fusion-for-Energy
	REVIEWED BY		DRAWING TITLE WINDING PACK TOLERANCE
REV DATE 03-10-2011	CHECKED BY	CODE ENEA ID: DD-JT60TF-NCO	
FIRST ISSUE DATE 20-01-2011	CONTROLLED BY A. CUCCHIARO	SHEET REVISION MATURITY	
SCALE	DRAWN BY G. BROLATTI	010202	503111 03 01
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS 3 LEVELS	Drawing Number 503111

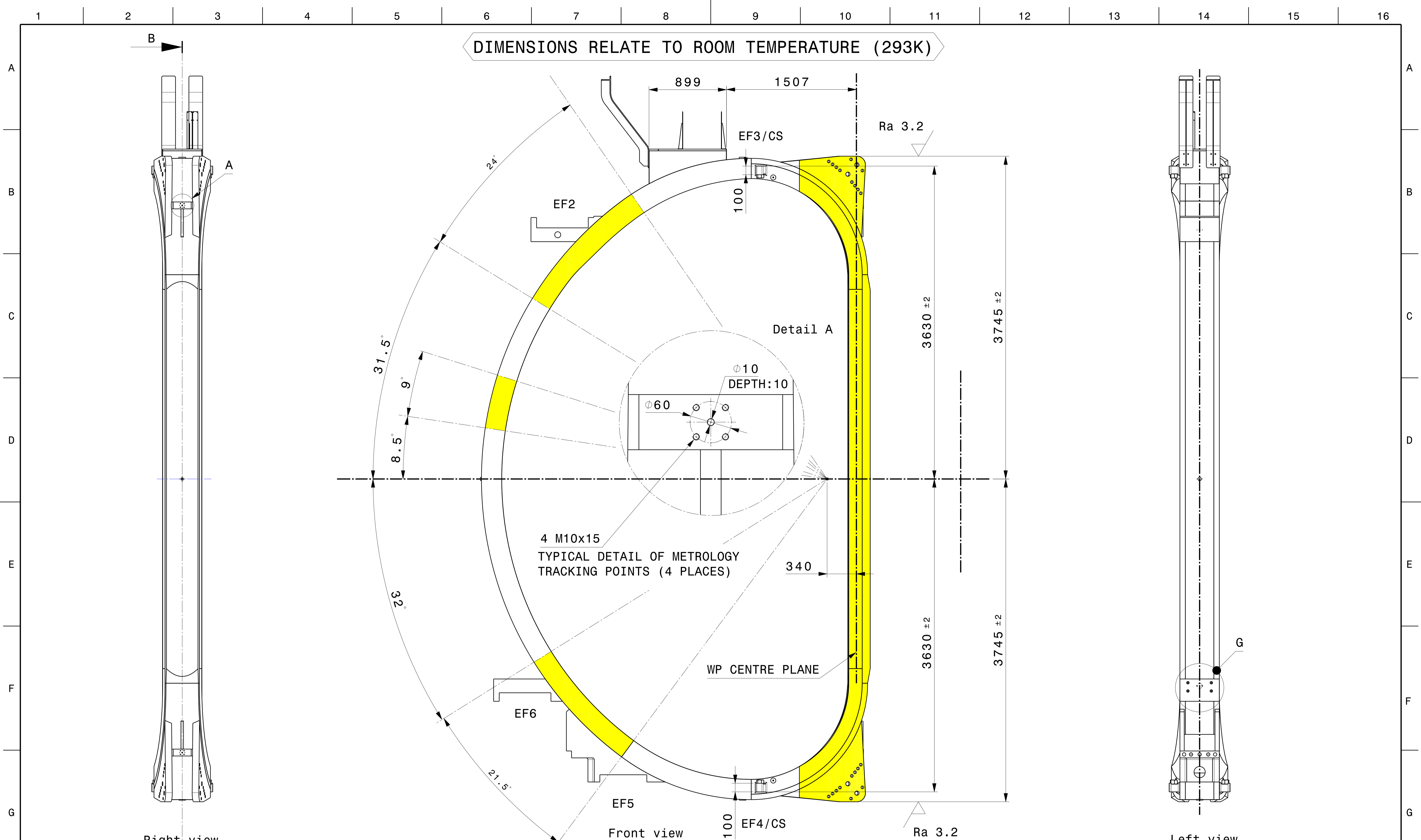
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



**Note:**  
 - Central conductor shall be mechanically supported across plane of loading.  
 - Conductors should be geometrically similar to actual conductor, but do not need to be actual conductor.

DMS:				Ref to 3D CatProduct:			
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY <b>A. CUCCHIARO</b>		<b>Fusion</b> <small>Italy-Frascati Research Centre</small>		CUSTOMER: <b>Fusion-for-Energy</b>	
REV DATE		CHECKED BY		DRAWING TITLE <b>WINDING PACK</b> <i>3x3 layout for insulation testing</i>			
FIRST ISSUE DATE <b>20-01-2011</b>		CONTROLLED BY <b>A. CUCCHIARO</b>		CODE ENEA ID: <b>DD-JT60TF-NCO</b>			
SHEET SIZE <b>A1</b>		FIRST ANGLE PROJECTION 		WBS <b>010202</b>		DRAWING Number <b>503112</b>	
				SHEET <b>01</b>		REVISION <b>00</b>	
				MATURITY			

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



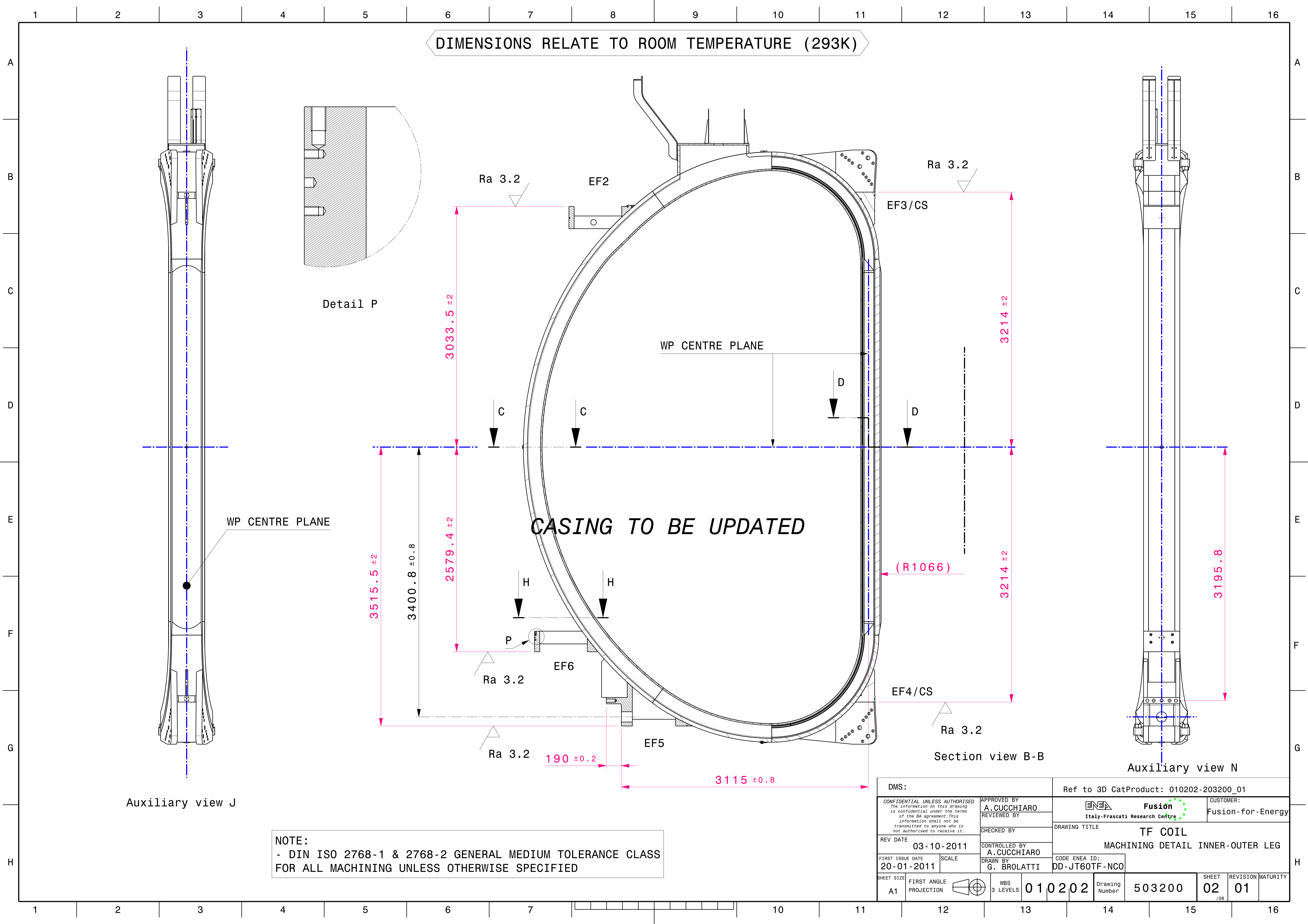
Final location & detail of metrology tracking points to be confirmed after consultation with JAEA

NOTE:  
 - DIN ISO 2768-1 & 2768-2 GENERAL MEDIUM TOLERANCE CLASS  
 FOR ALL MACHINING UNLESS OTHERWISE SPECIFIED

DMS:		Ref to 3D CatProduct: 010202-203200_01	
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011		REVIEWED BY	DRAWING TITLE TF COIL
FIRST ISSUE DATE 20-01-2011		CHECKED BY	MACHINING DETAIL INNER-OUTER LEG
SCALE		CONTROLLED BY A. CUCCHIARO	CODE ENEA ID: DD-JT60TF-NCO
DRAWN BY G. BROLATTI		SHEET SIZE A1	
FIRST ANGLE PROJECTION		SHEET REVISION MATURITY 01 01	
WBS LEVELS 3		Drawing Number 503200	
010202		/08	



DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



Auxiliary view J

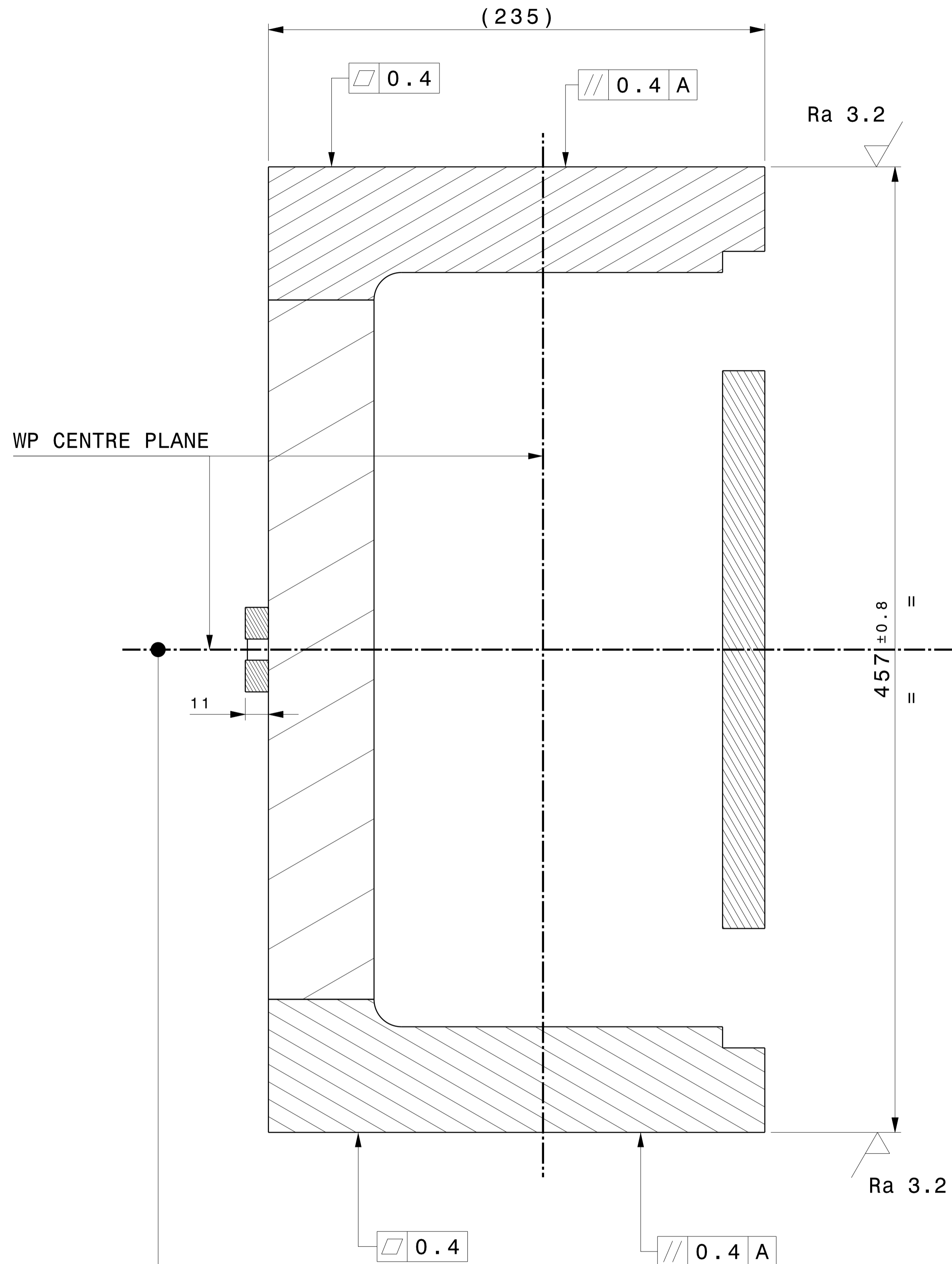
NOTE:  
 - DIN ISO 2768-1 & 2768-2 GENERAL MEDIUM TOLERANCE CLASS  
 FOR ALL MACHINING UNLESS OTHERWISE SPECIFIED

DMS:		Ref to 3D CatProduct: 010202-203200_01	
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011		REVIEWED BY	DRAWING TITLE TF COIL MACHINING DETAIL INNER-OUTER LEG
FIRST ISSUE DATE 20-01-2011		CHECKED BY	
SCALE		CONTROLLED BY A. CUCCHIARO	CODE ENEA ID: DD-JT60TF-NCO
DRAWN BY G. BROLATTI		SHEET SIZE A1	
FIRST ANGLE PROJECTION		WBS LEVELS 3	010202
Drawing Number 503200		SHEET 02	REVISION 01
MATERIALITY			

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

ADDITIONAL MATERIAL FOR MACHINING

SEE DRAWING 010202-503201



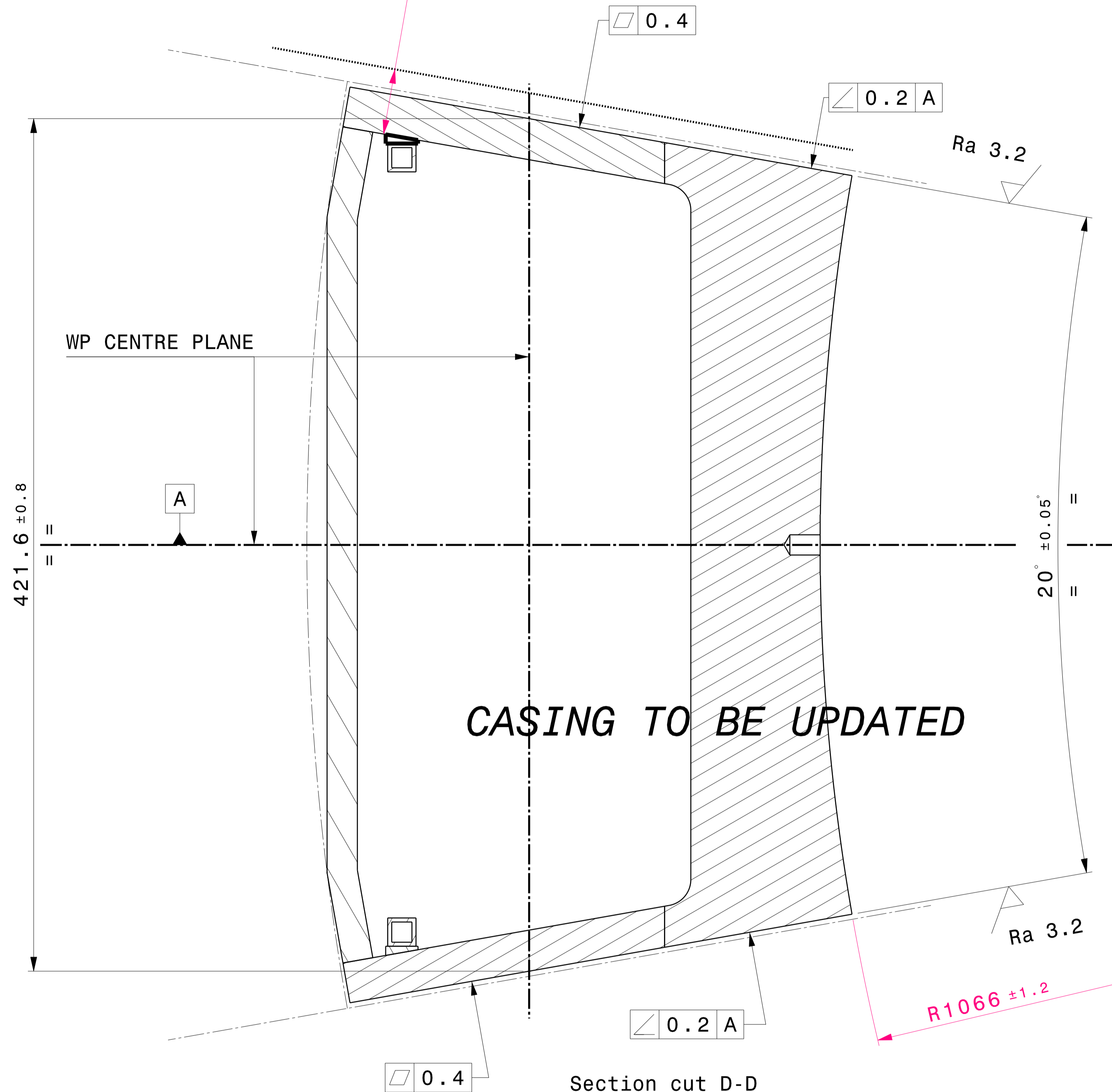
Section cut C-C

TYPICAL MACHINING SECTION CURVED LEG

CENTRE LINE OF TF WINDING PACK  
AS MEASURED AFTER INSERTION

NOTE:

- DIN ISO 2768-1 & 2768-2 GENERAL MEDIUM TOLERANCE CLASS FOR ALL MACHINING UNLESS OTHERWISE SPECIFIED
- WP CENTRE PLANE DEFINED BY MARKING POINTS ON WP SURFACE



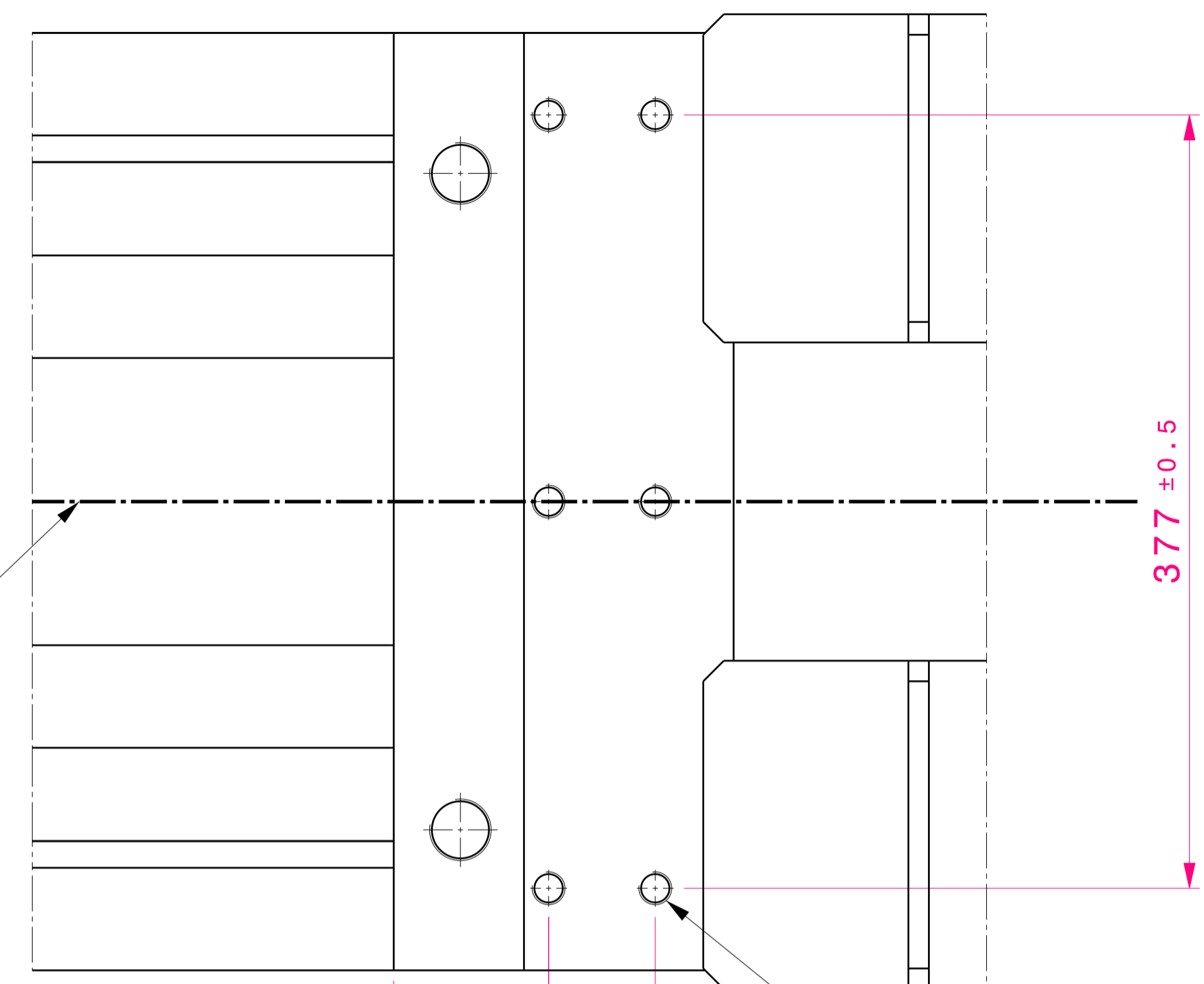
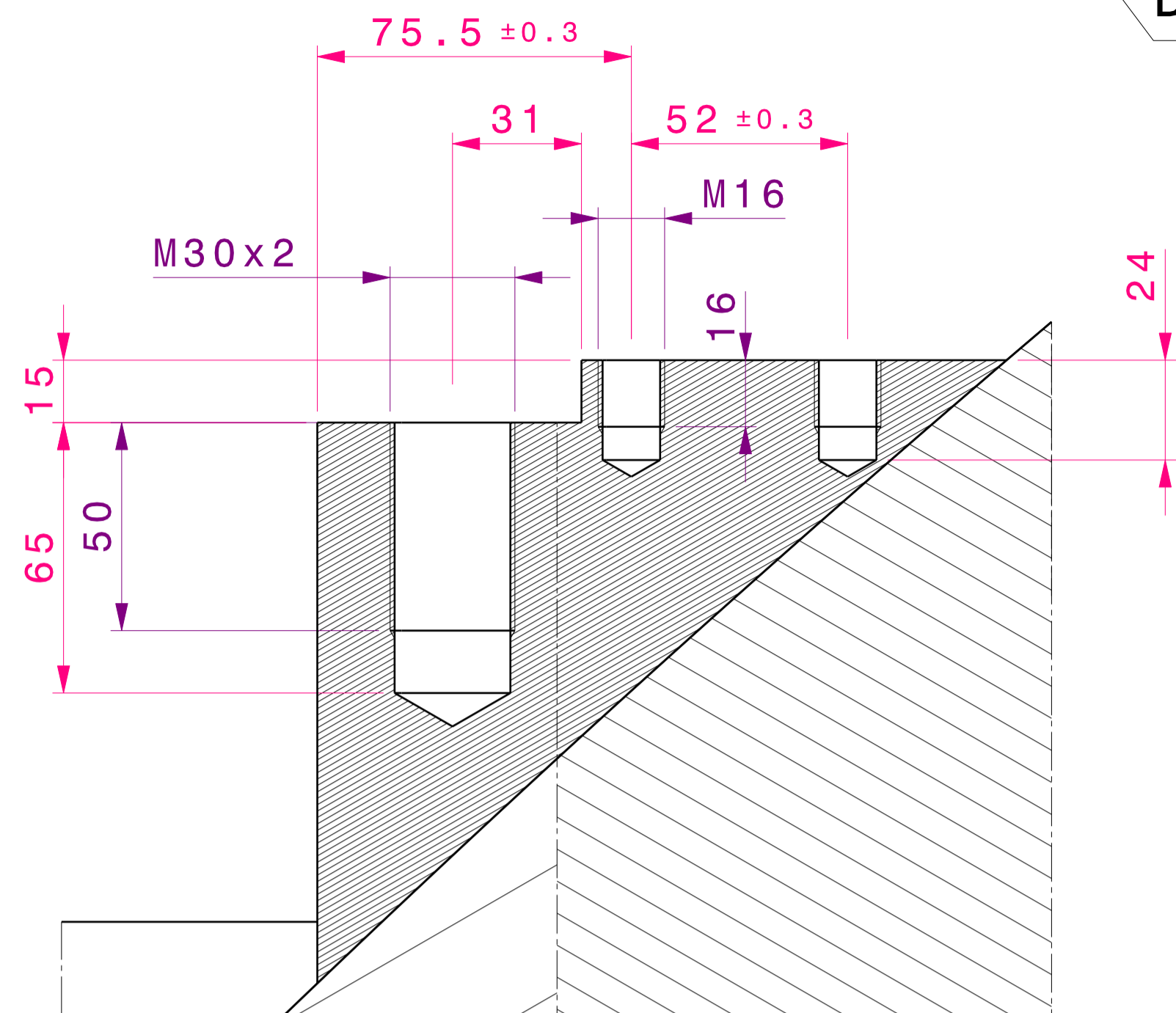
CASING TO BE UPDATED

Section cut D-D

TYPICAL MACHINING SECTION STRAIGHT LEG

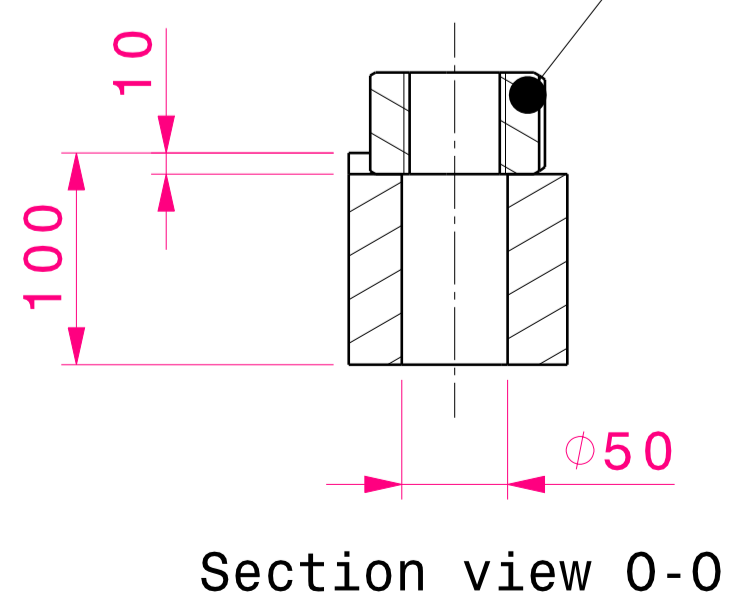
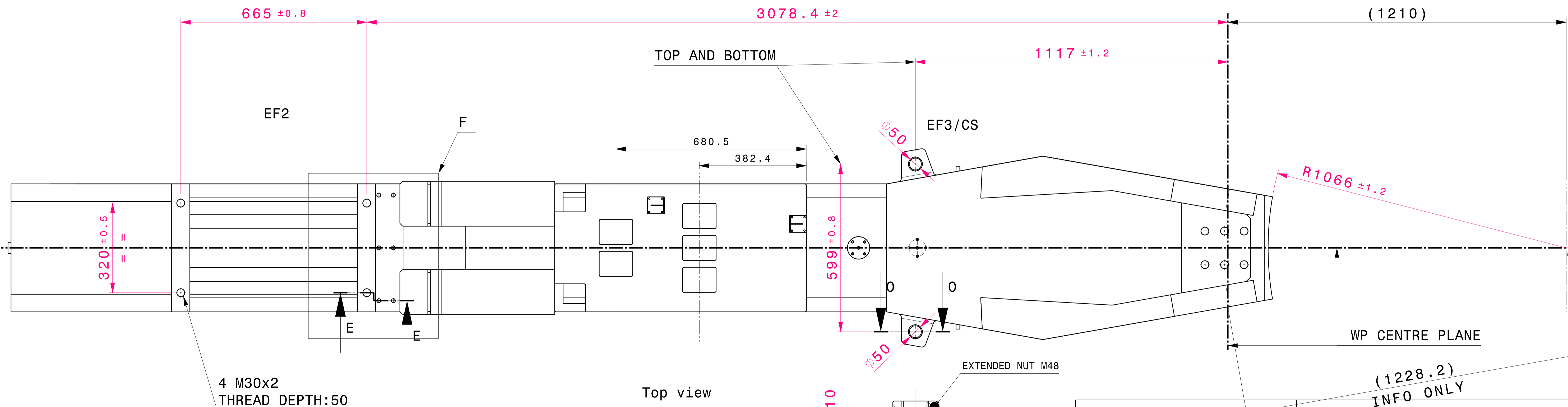
DMS:		Ref to 3D CatProduct: 010202-203200_01	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011		REVIEWED BY	DRAWING TITLE TF COIL MACHINING DETAIL INNER-OUTER LEG
FIRST ISSUE DATE 20-01-2011		CHECKED BY	
SCALE		CONTROLLED BY A. CUCCHIARO	CODE ENEA ID: DD-JT60TF-NCO
DRAWN BY G. BROLATTI		SHEET REVISION MATURITY	
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS LEVELS 3	010202
Drawing Number 503200		SHEET REVISION MATURITY 03 01	

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



WP CENTRE PLANE

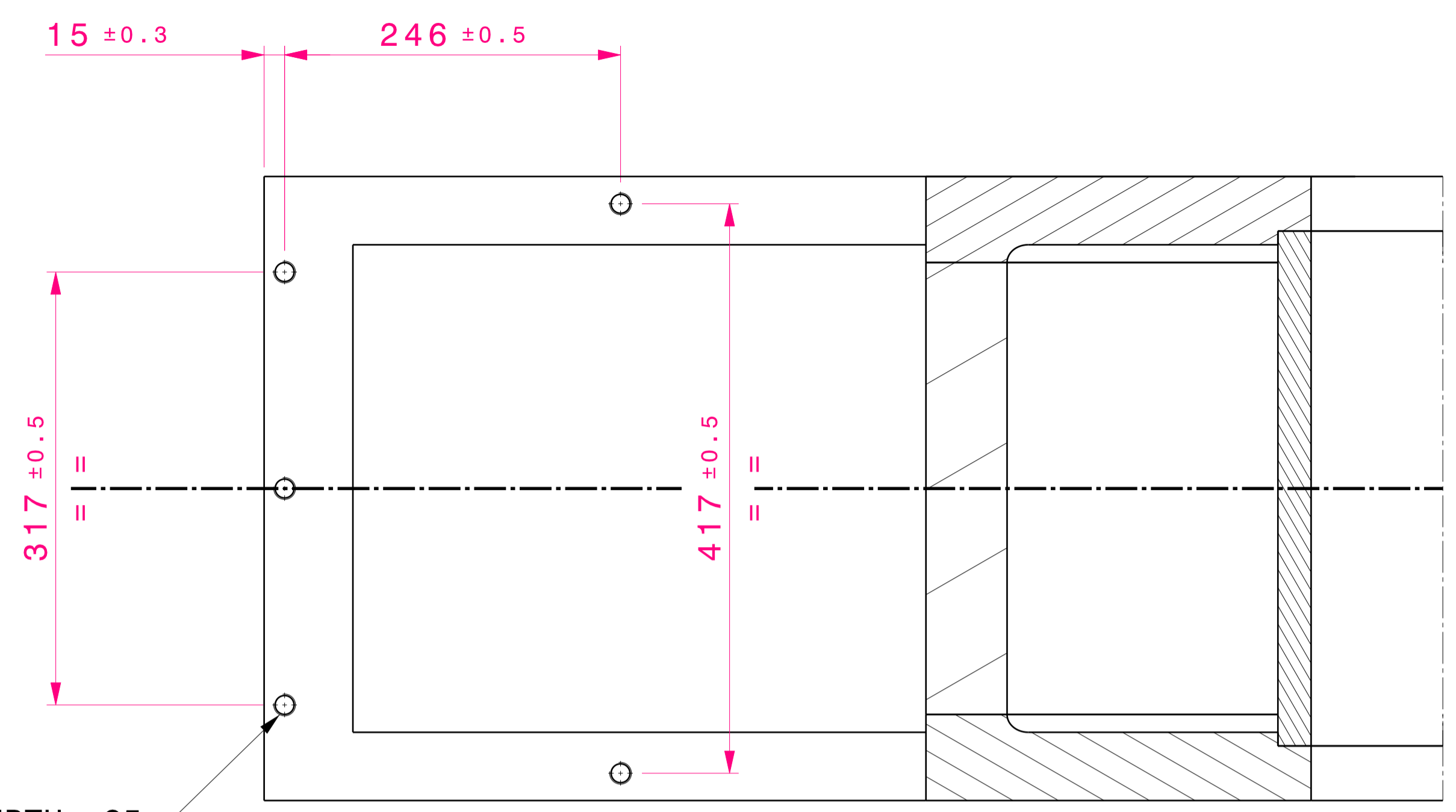
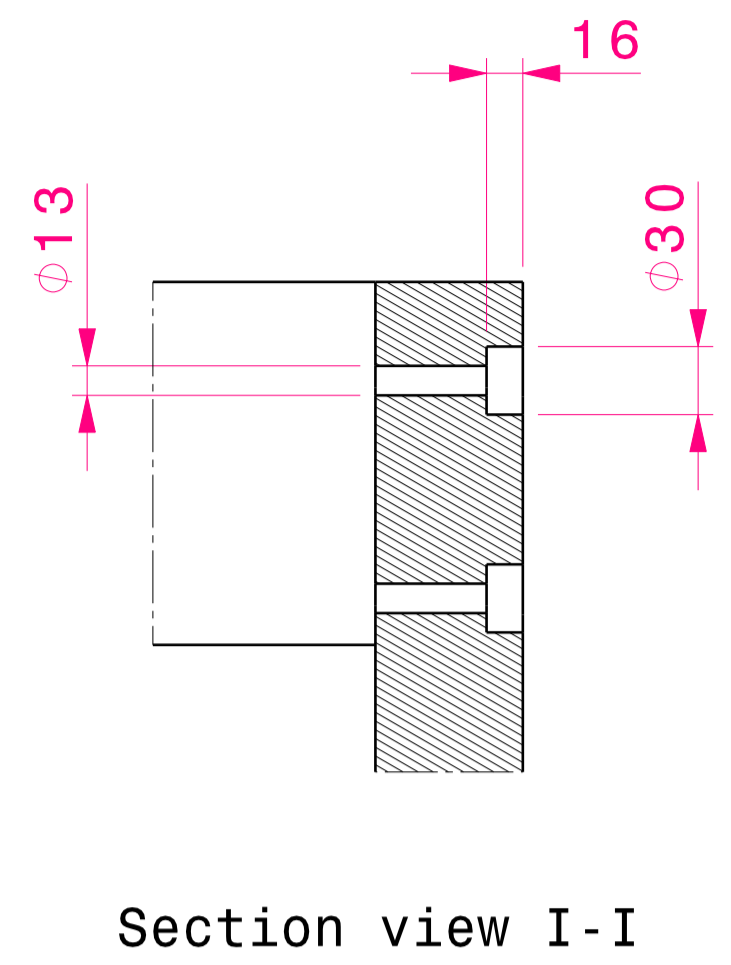
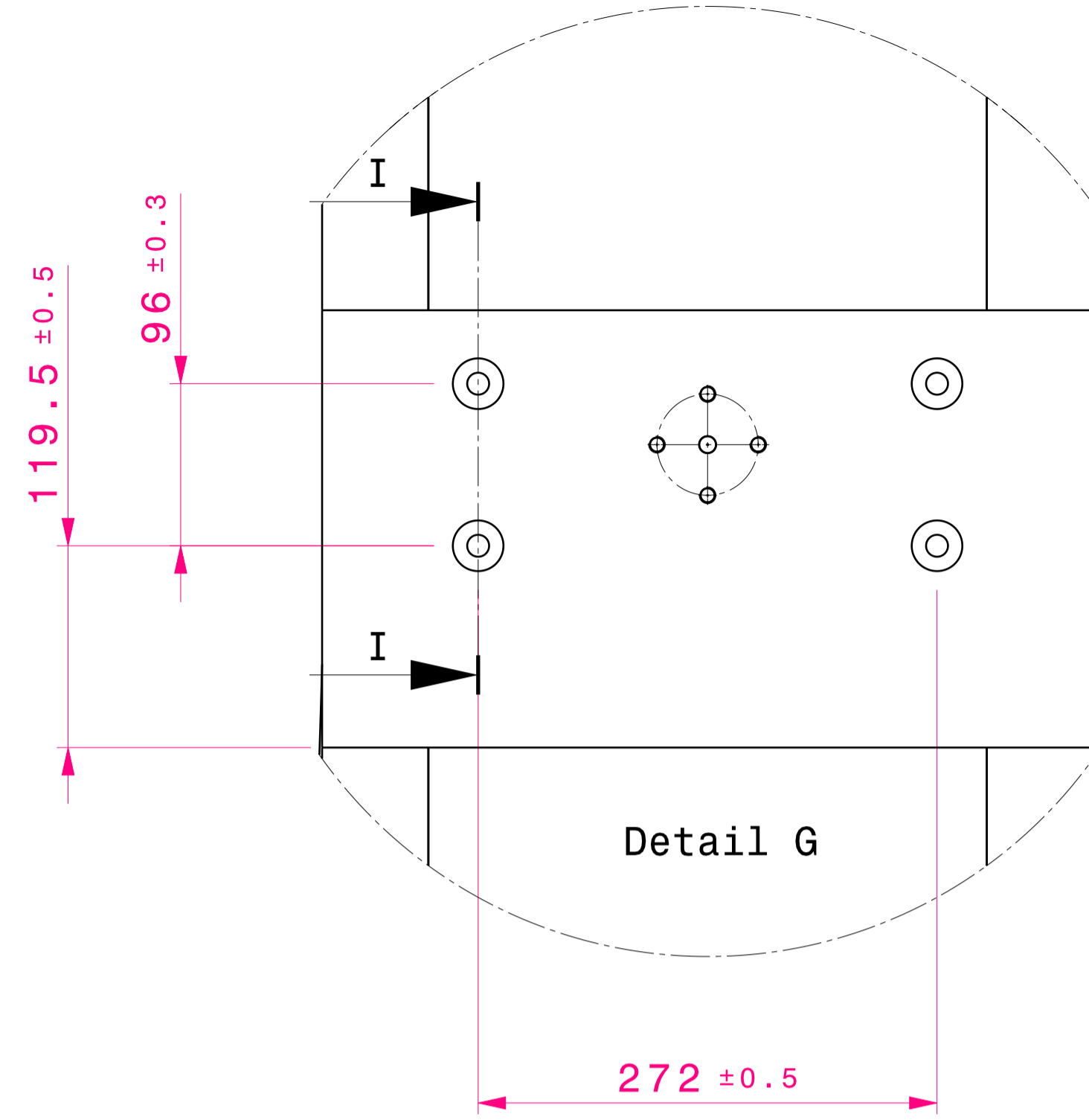
CASING TO BE UPDATED



NOTE:  
- DIN ISO 2768-1 & 2768-2 GENERAL MEDIUM TOLERANCE CLASS FOR ALL MACHINING UNLESS OTHERWISE SPECIFIED

DMS:		Ref to 3D CatProduct: 010202-203200_01	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE		REVIEWED BY	DRAWING TITLE TF COIL
FIRST ISSUE DATE 20-01-2011		CHECKED BY	CODE ENEA ID: DD-JT60TF-NCO
SCALE		CONTROLLED BY A. CUCCHIARO	MACHINING DETAIL INNER-OUTER LEG
SHEET SIZE A1		DRAWN BY G. BROLATTI	
FIRST ANGLE PROJECTION	WBS LEVELS 3	010202	Drawing Number 503200
			SHEET 04
			REVISION 01
			MATURITY

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

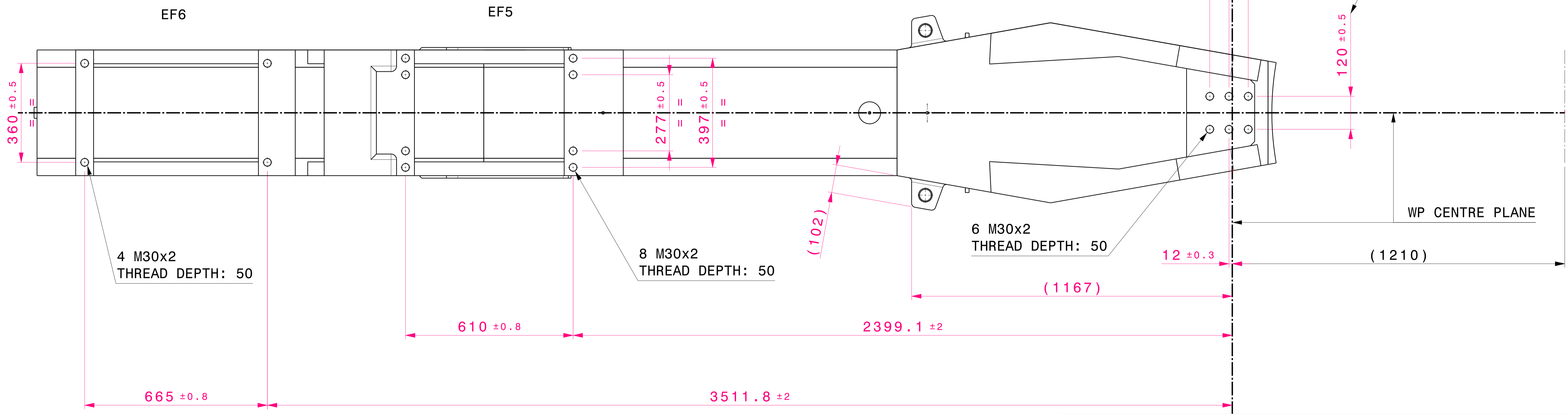


5 M16x2  
THREAD DEPTH: 25

Section view H-H

CASING TO BE UPDATED

EF4/CS

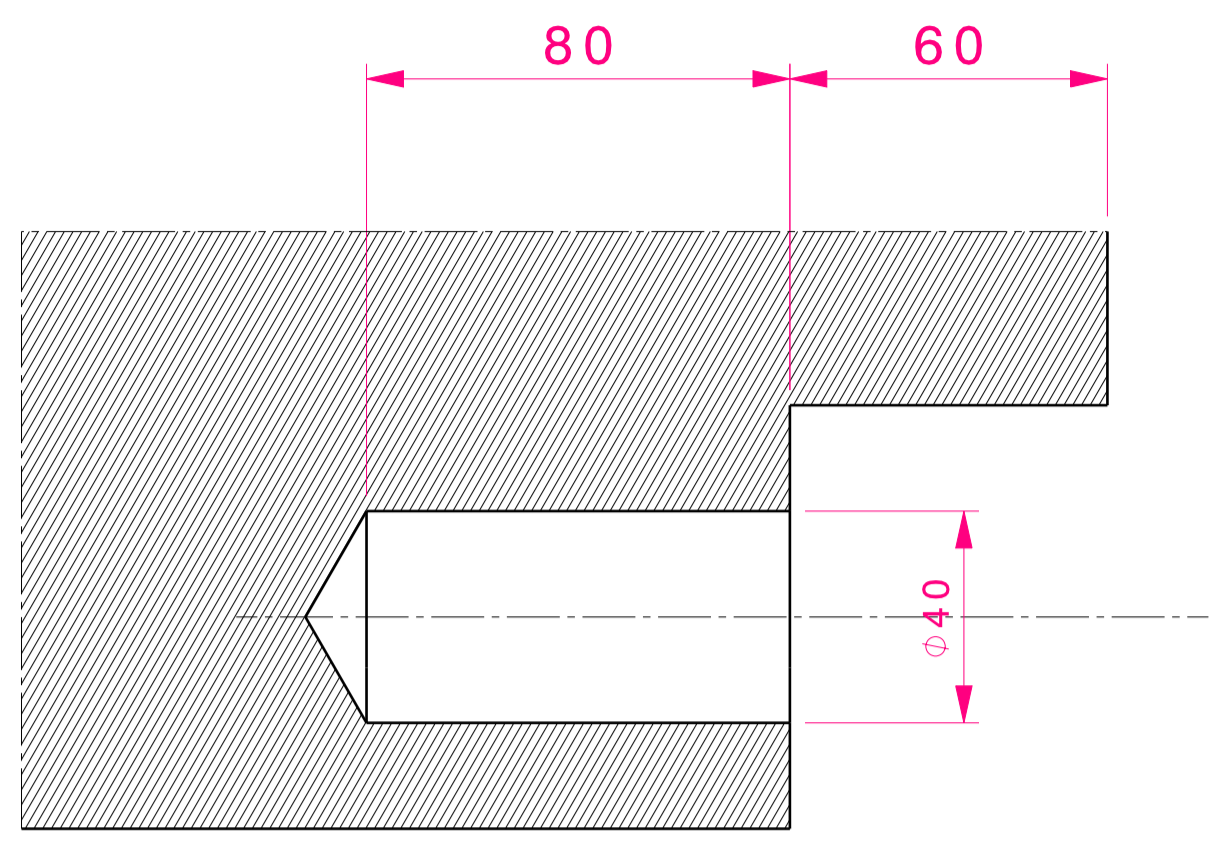
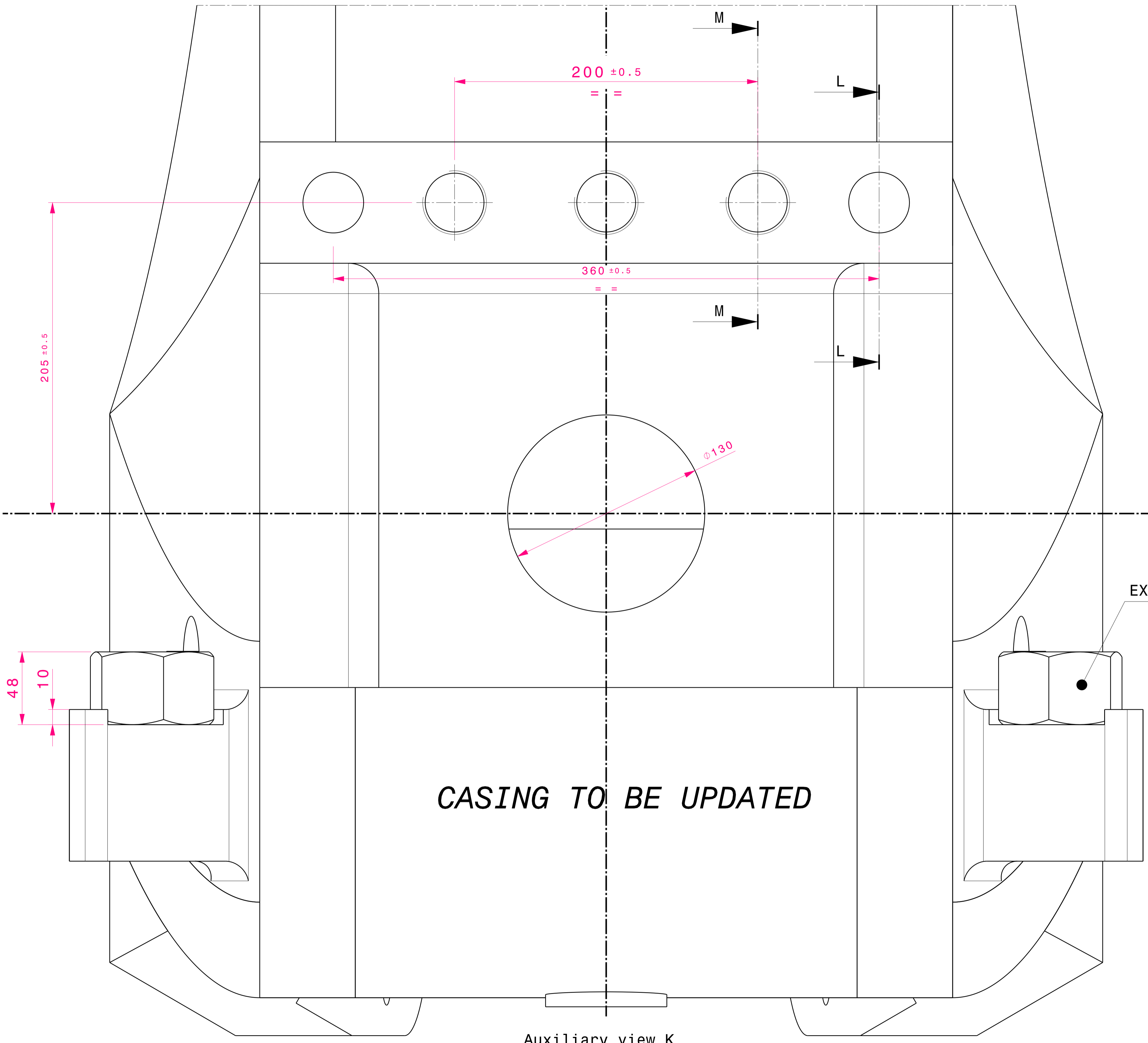


Bottom view

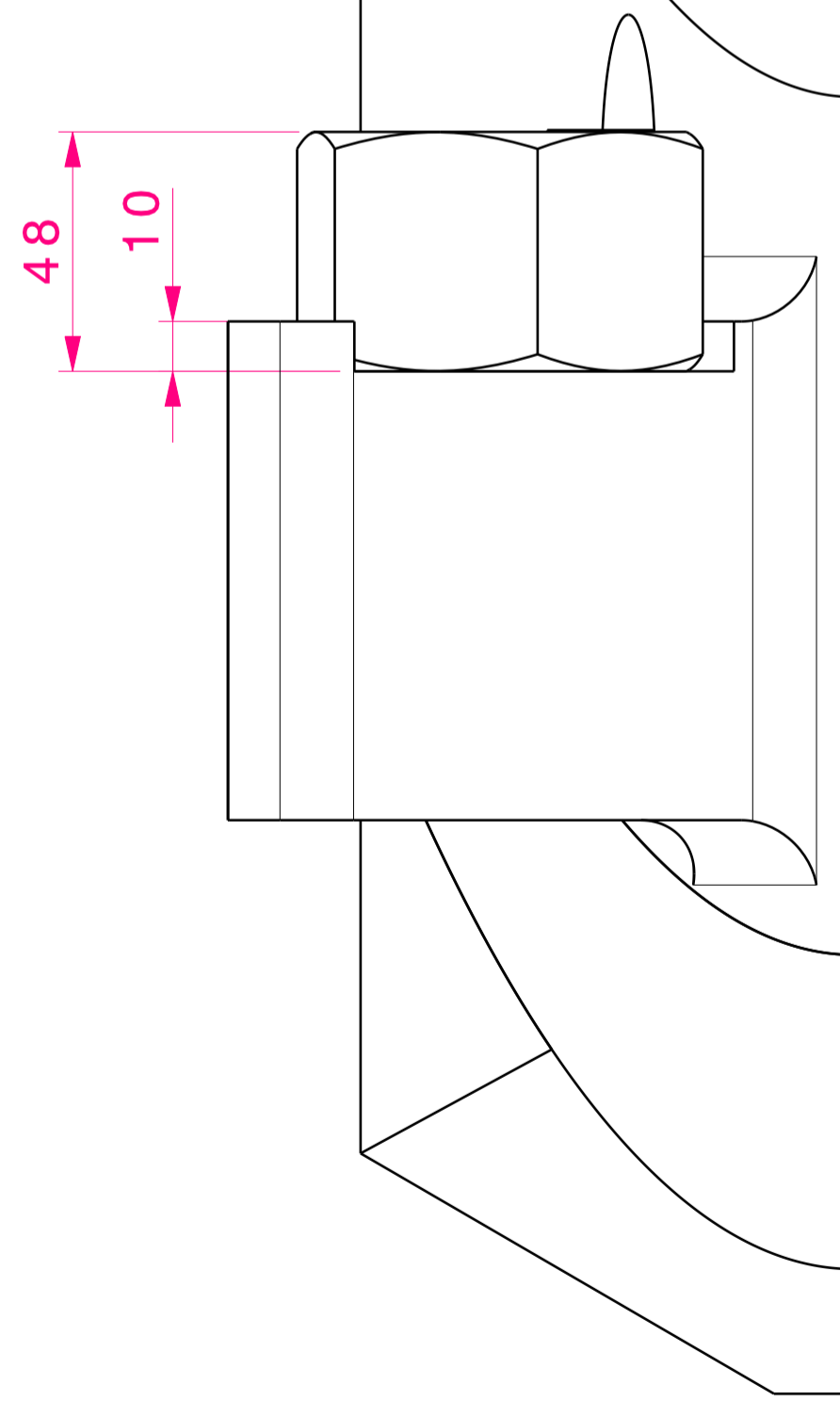
NOTE:  
- DIN ISO 2768-1 & 2768-2 GENERAL MEDIUM TOLERANCE CLASS  
FOR ALL MACHINING UNLESS OTHERWISE SPECIFIED

DMS:		Ref to 3D CatProduct: 010202-203200_01	
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.	APPROVED BY A. CUCCHIARO	<b>Fusion</b> Italy-Frascati Research Centre	CUSTOMER: Fusion-for-Energy
	REVIEWED BY		DRAWING TITLE TF COIL
REV DATE 03-10-2011	CHECKED BY	MACHINING DETAIL INNER-OUTER LEG	
FIRST ISSUE DATE 20-01-2011	CONTROLLED BY A. CUCCHIARO	CODE ENEA ID: DD-JT60TF-NCO	
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS LEVELS 3 LEVELS	010202
		Drawing Number 503200	SHEET 05
			REVISION 01
			MATURITY

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

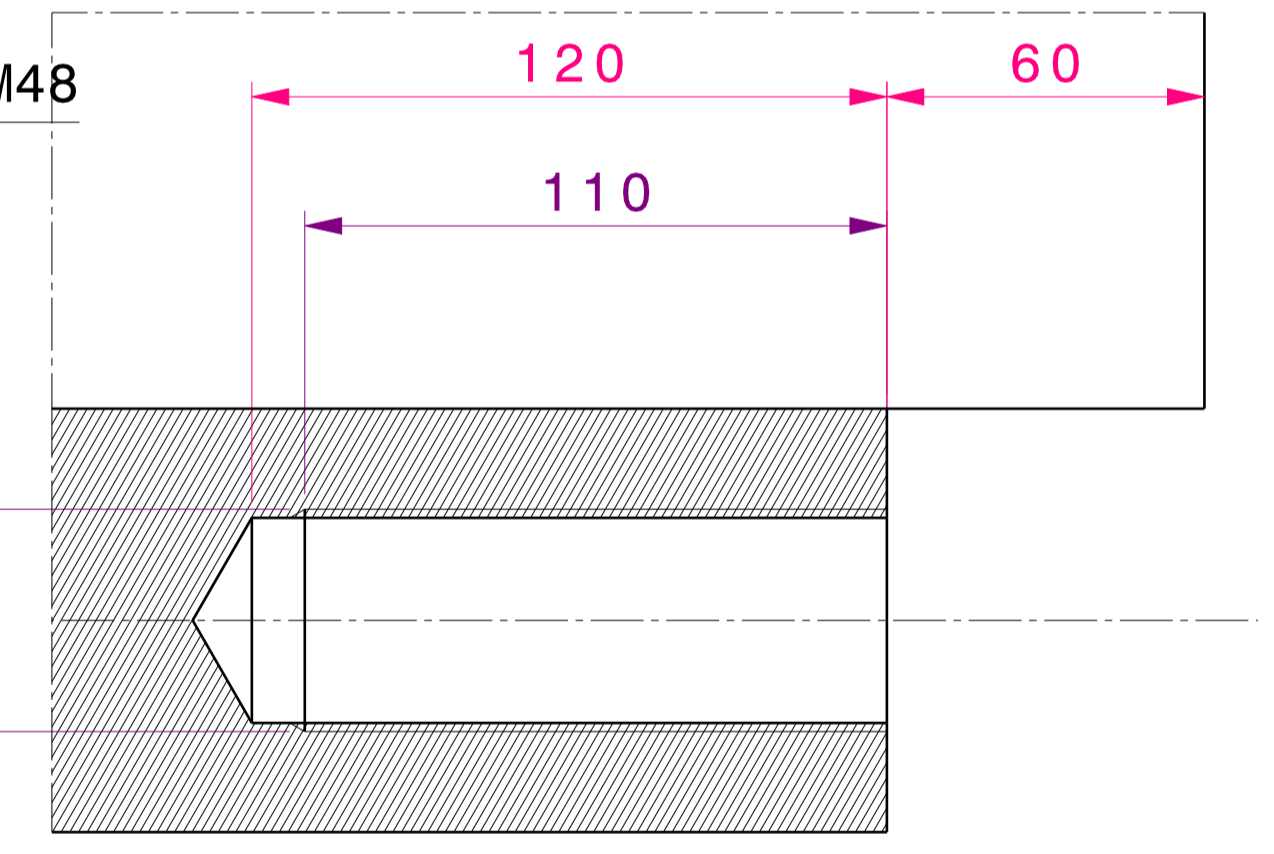


Section view L-L



Auxiliary view K

EXTENDED NUT M48



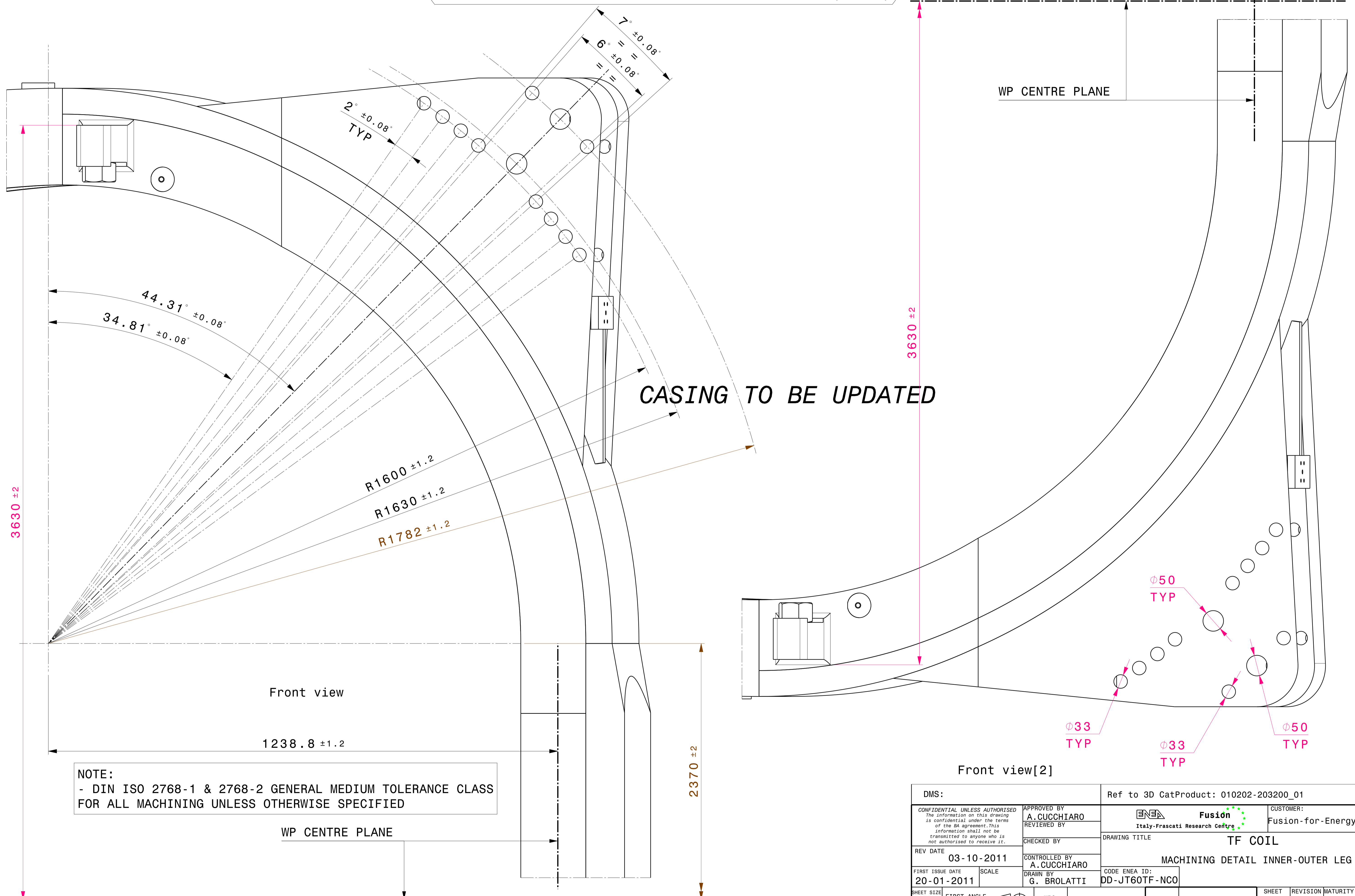
Section view M-M

**CASING TO BE UPDATED**

NOTE:  
- DIN ISO 2768-1 & 2768-2 GENERAL MEDIUM TOLERANCE CLASS  
FOR ALL MACHINING UNLESS OTHERWISE SPECIFIED

DMS:		Ref to 3D CatProduct: 010202-203200_01	
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.	APPROVED BY A. CUCCHIARO	<b>Fusion</b> Italy-Frascati Research Centre	CUSTOMER: Fusion-for-Energy
	REVIEWED BY		DRAWING TITLE TF COIL
REV DATE 03-10-2011	CONTROLLED BY A. CUCCHIARO	MACHINING DETAIL INNER-OUTER LEG	
FIRST ISSUE DATE 20-01-2011	SCALE	CODE ENEA ID: DD-JT60TF-NCO	
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS LEVELS 3	010202
		Drawing Number 503200	SHEET 06
			REVISION 01
			MATURITY

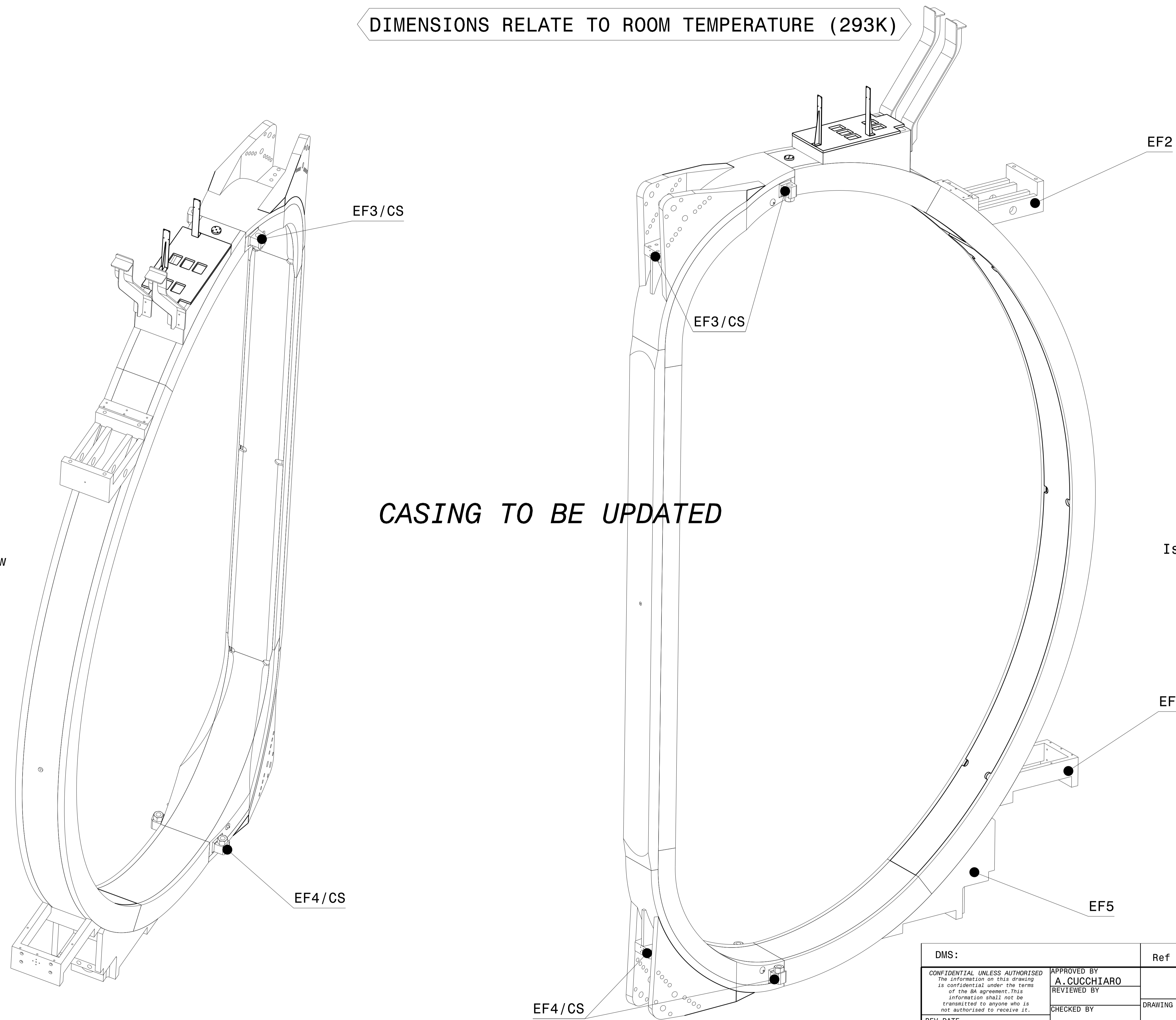
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



NOTE:  
 - DIN ISO 2768-1 & 2768-2 GENERAL MEDIUM TOLERANCE CLASS  
 FOR ALL MACHINING UNLESS OTHERWISE SPECIFIED

DMS:		Ref to 3D CatProduct: 010202-203200_01	
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011		REVIEWED BY	DRAWING TITLE TF COIL
FIRST ISSUE DATE 20-01-2011		CHECKED BY	MACHINING DETAIL INNER-OUTER LEG
SCALE		CONTROLLED BY A. CUCCHIARO	CODE ENEA ID: DD-JT60TF-NCO
DRAWN BY G. BROLATTI		SHEET REVISION MATURITY	
SHEET SIZE A1	FIRST ANGLE PROJECTION	WBS LEVELS 3	010202 Drawing Number 503200
		SHEET 07	REVISION 01
		Maturity	

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



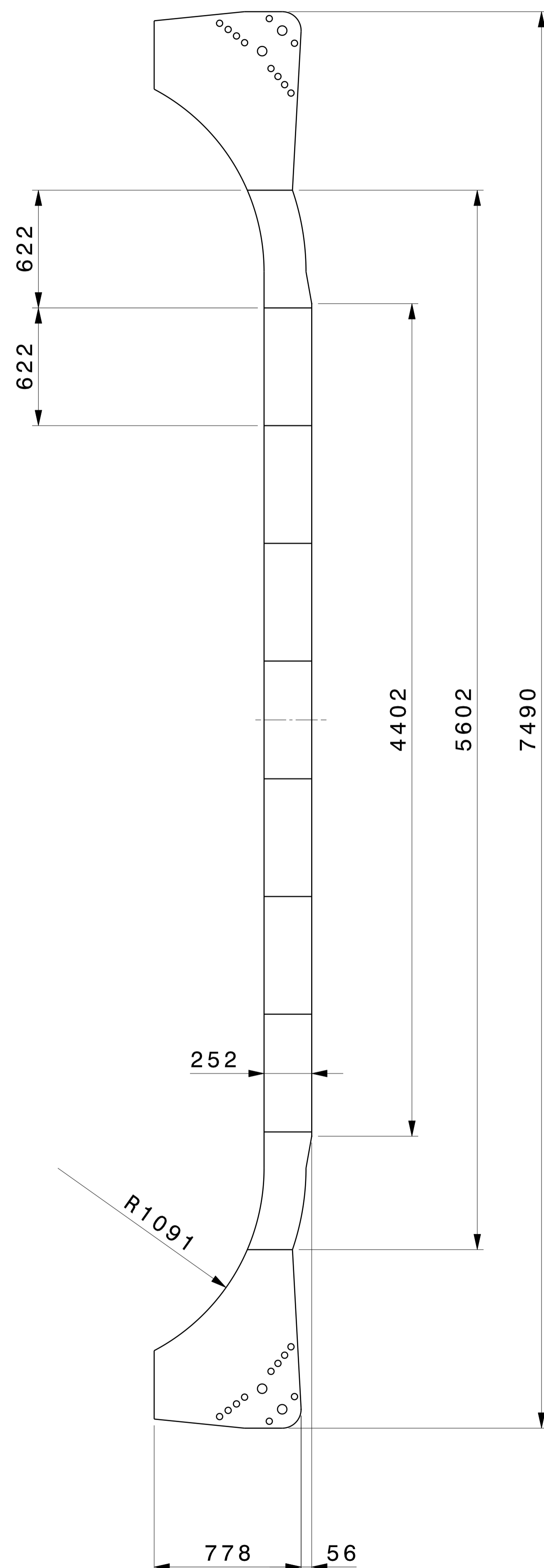
Isometric view

Isometric view

**CASING TO BE UPDATED**


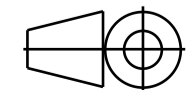
DMS:		Ref to 3D CatProduct:010202-203200_01	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>	CUSTOMER: <b>Fusion-for-Energy</b>
REV DATE <b>03-10-2011</b>		REVIEWED BY	DRAWING TITLE <b>TF COIL</b>
FIRST ISSUE DATE <b>20-01-2011</b>		CHECKED BY	
SCALE		CONTROLLED BY <b>A. CUCCHIARO</b>	MACHINING DETAIL INNER-OUTER LEG
DRAWN BY <b>G. BROLATTI</b>		CODE ENEA ID: <b>DD-JT60TF-NCO</b>	
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION	WBS LEVELS <b>3</b>	010202
Drawing Number <b>503200</b>	SHEET <b>08</b>	REVISION <b>01</b>	MATURITY

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



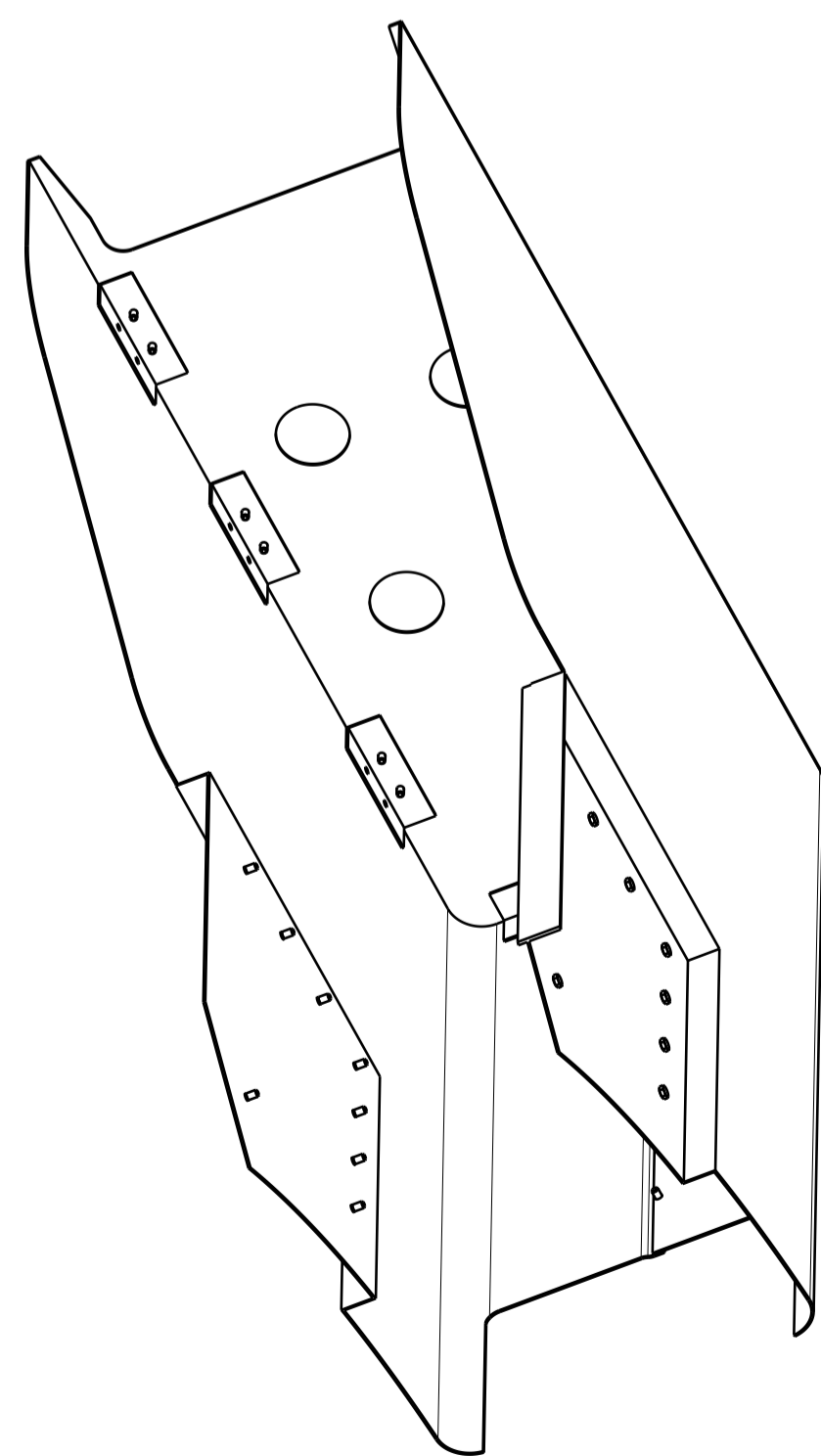
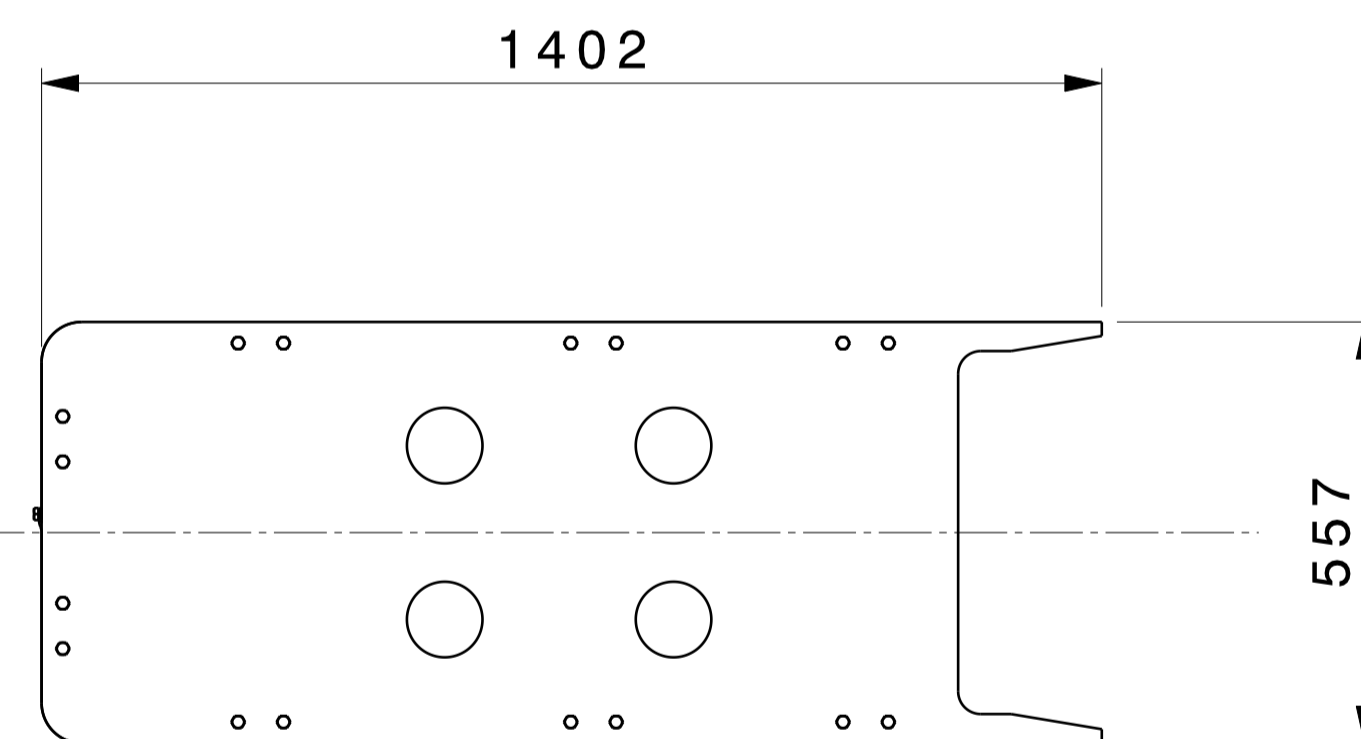
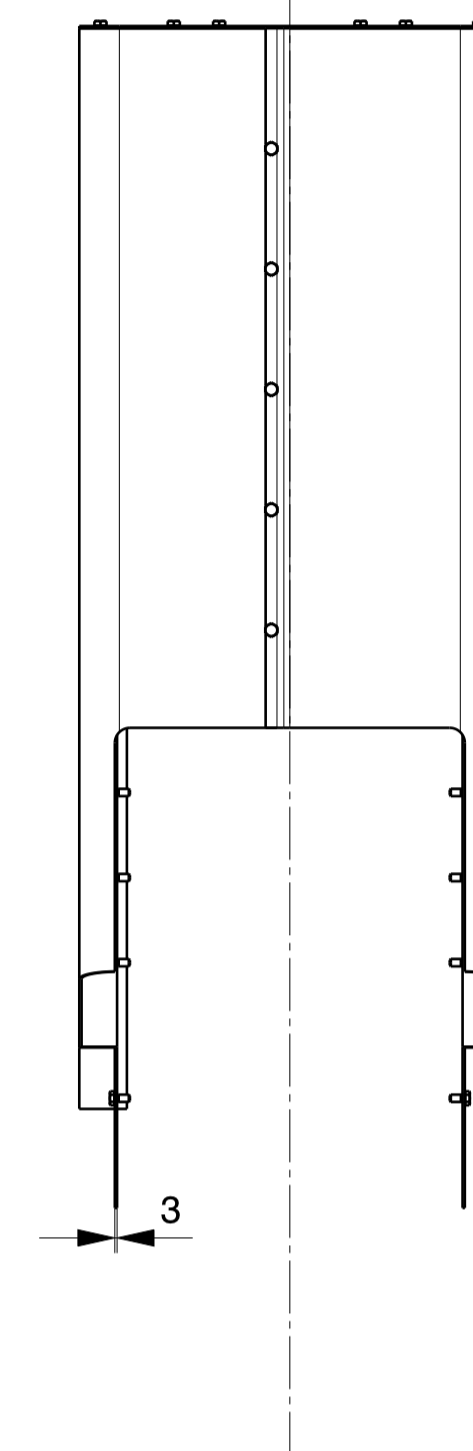
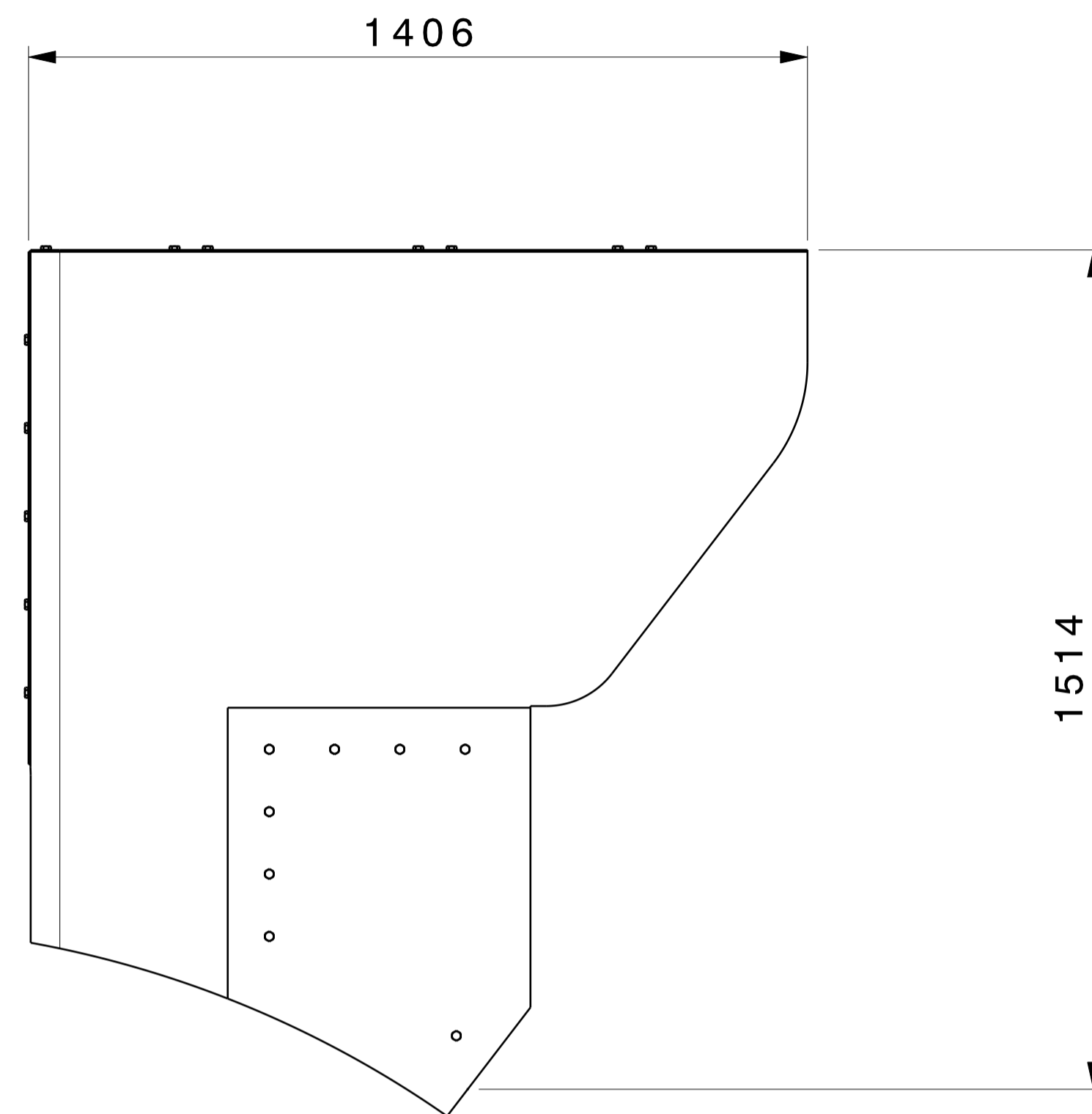
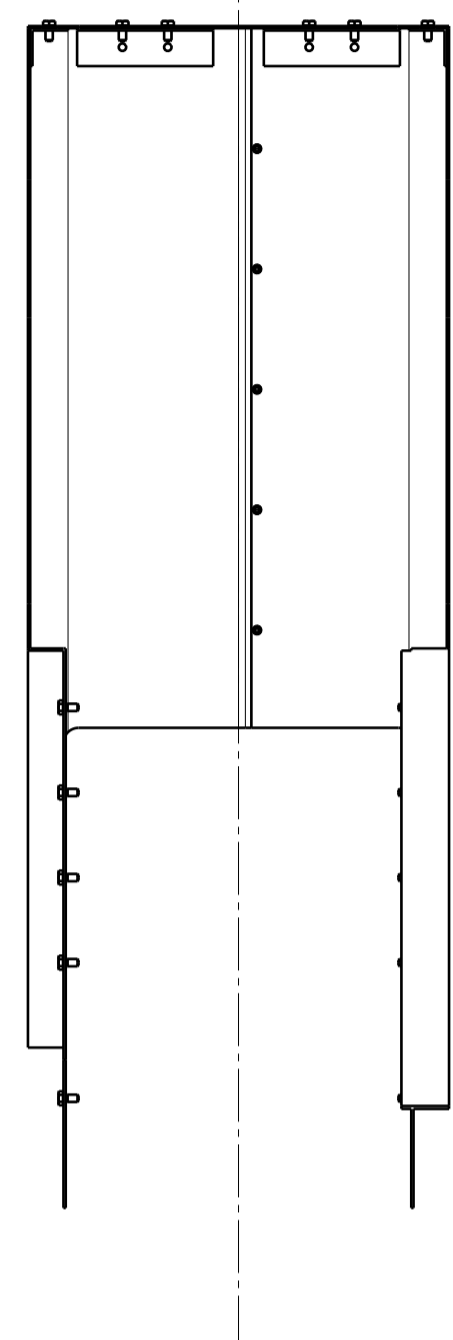
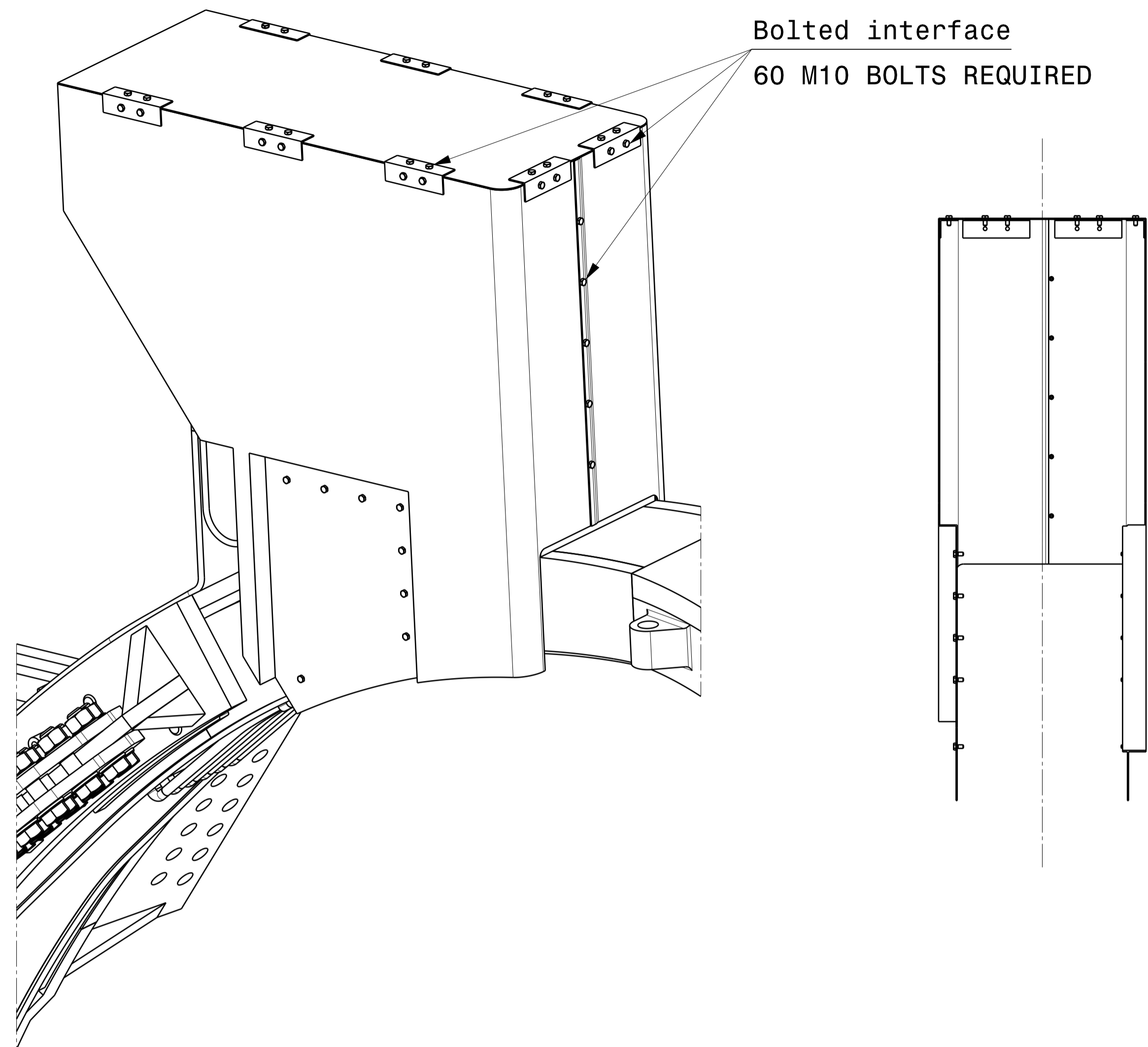
NOTE: FOR BOLT & PIN PATTERN REFER TO DRAWING NUMBER 010202-503200

**CASING TO BE UPDATED**

DMS:		Ref to 3D CatProduct:010202-103201_01				
<small>CONFIDENTIAL UNLESS AUTHORISED</small> <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY	 <b>Fusion</b> <small>Italy-Frascati Research Centre</small>		CUSTOMER:	
		REVIEWED BY			Fusion-for-Energy	
		REV DATE	03-10-2011	CHECKED BY	DRAWING TITLE	
FIRST ISSUE DATE		SCALE	DRAWN BY		CODE ENEA ID:	
20-01-2011			G. BROLATTI		DD-JT60TF-NCO	
SHEET SIZE	FIRST ANGLE PROJECTION	WBS LEVELS	010202	Drawing Number	503201	
A1		3				
				SHEET	REVISION	MATURITY
				01	01	



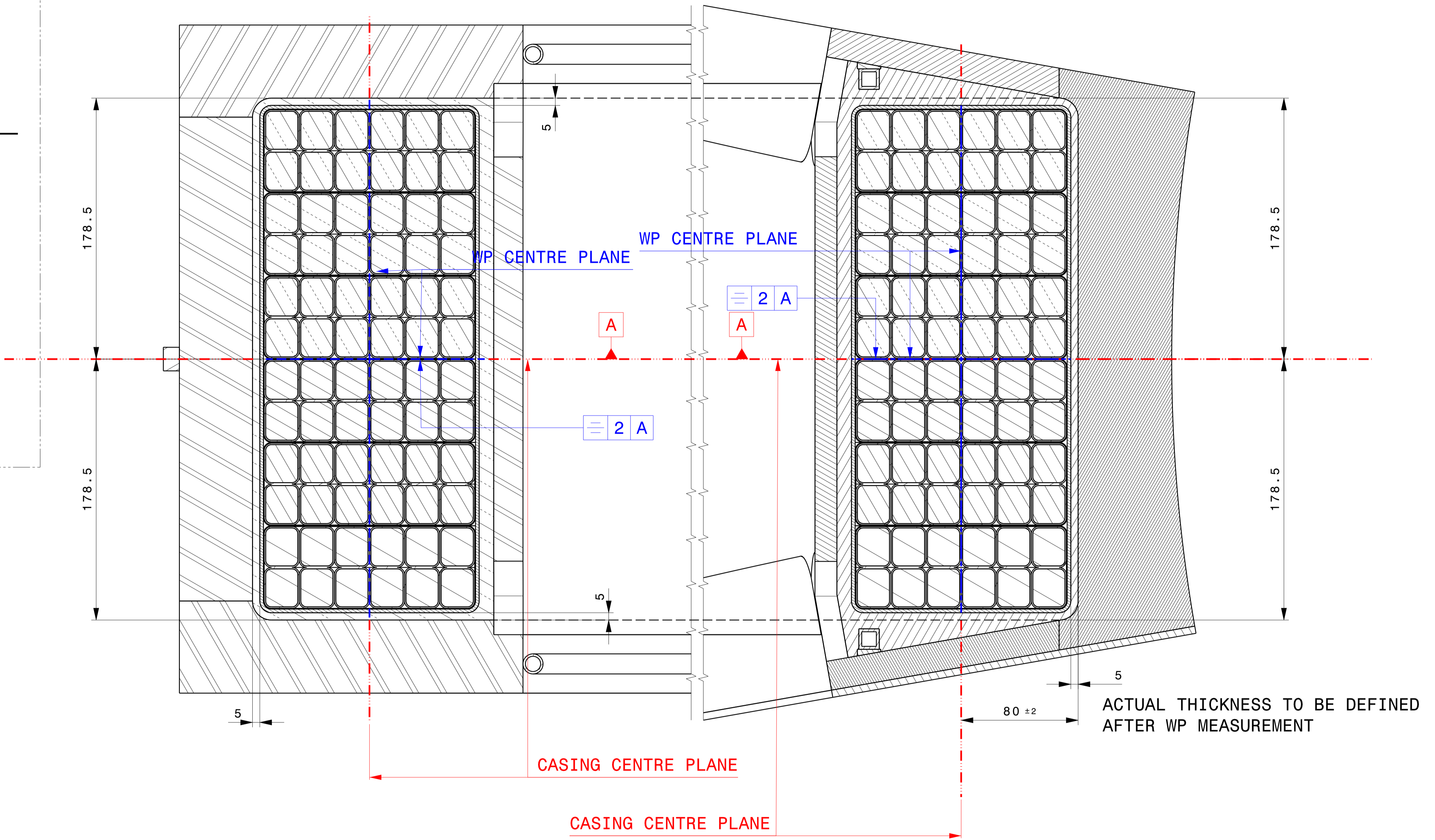
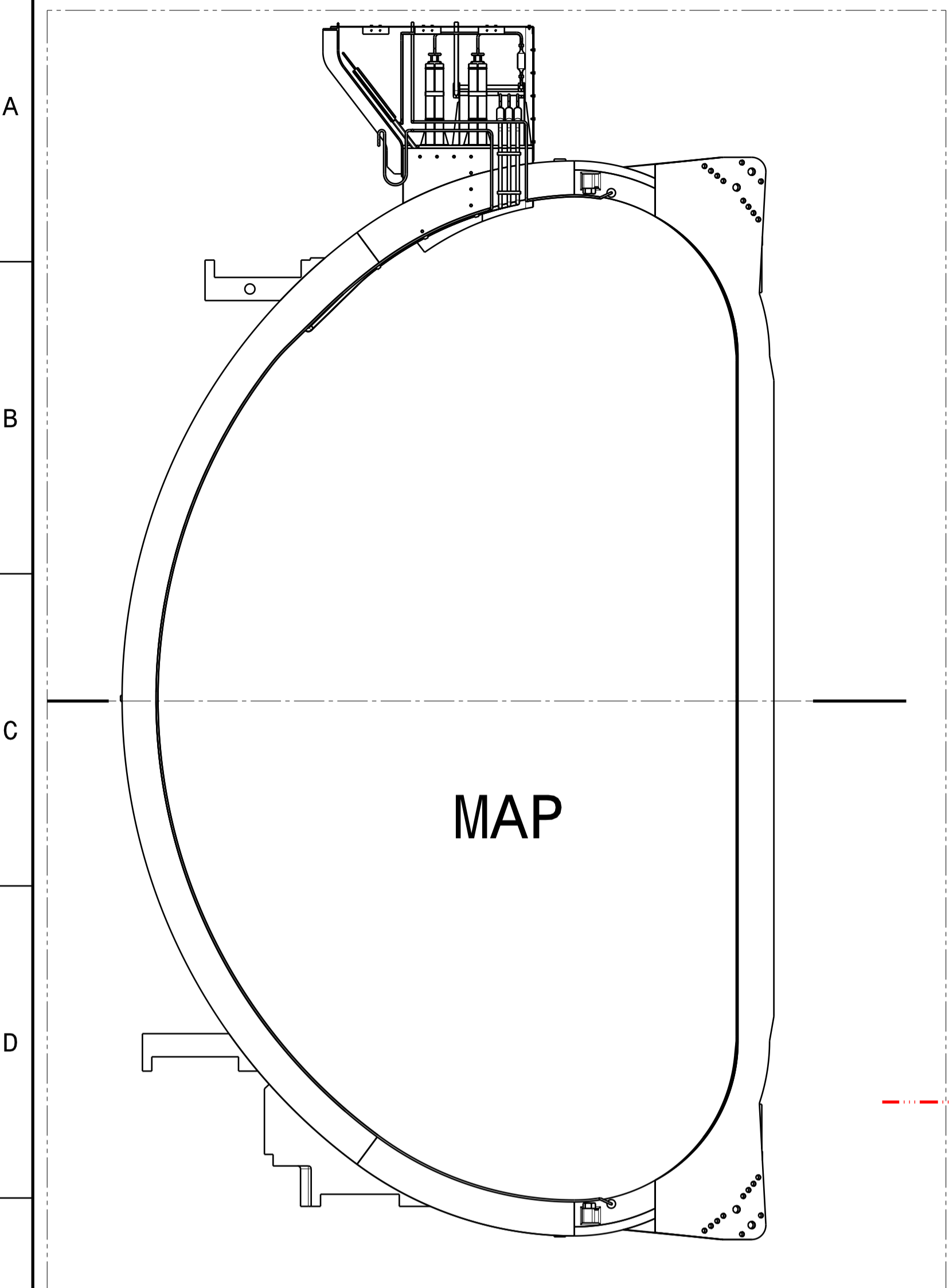
**DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)**



**NOTE:**  
 - CONCEPTUAL DESIGN ONLY, FINAL DESIGN TO BE DEVELOPED BY CONTRACTOR  
 - SUITABLE STIFFENERS WILL BE REQUIRED TO ENSURE STABILITY OF STRUCTURE DURING HANDLING AND TRANSPORT  
 - BOLTED CONSTRUCTION TO ALLOW ASSEMBLY/DISASSEMBLY FOR SHIPMENT/INSTALLATION ON MACHINE

DMS:		Ref to 3D CatProduct:010202-203202_01	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>	CUSTOMER: <b>Fusion-for-Energy</b>
		REVIEWED BY	DRAWING TITLE <b>TF COIL COVER</b>
		CHECKED BY	
REV DATE <b>03-10-2011</b>		CONTROLLED BY <b>A. CUCCHIARO</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>
FIRST ISSUE DATE <b>20-01-2011</b>	SCALE	DRAWN BY <b>G. BROLATTI</b>	
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION	WBS LEVELS <b>3</b>	Drawing Number <b>503202</b>
		<b>010202</b>	SHEET <b>01</b>
			REVISION <b>01</b>
			MATURITY

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



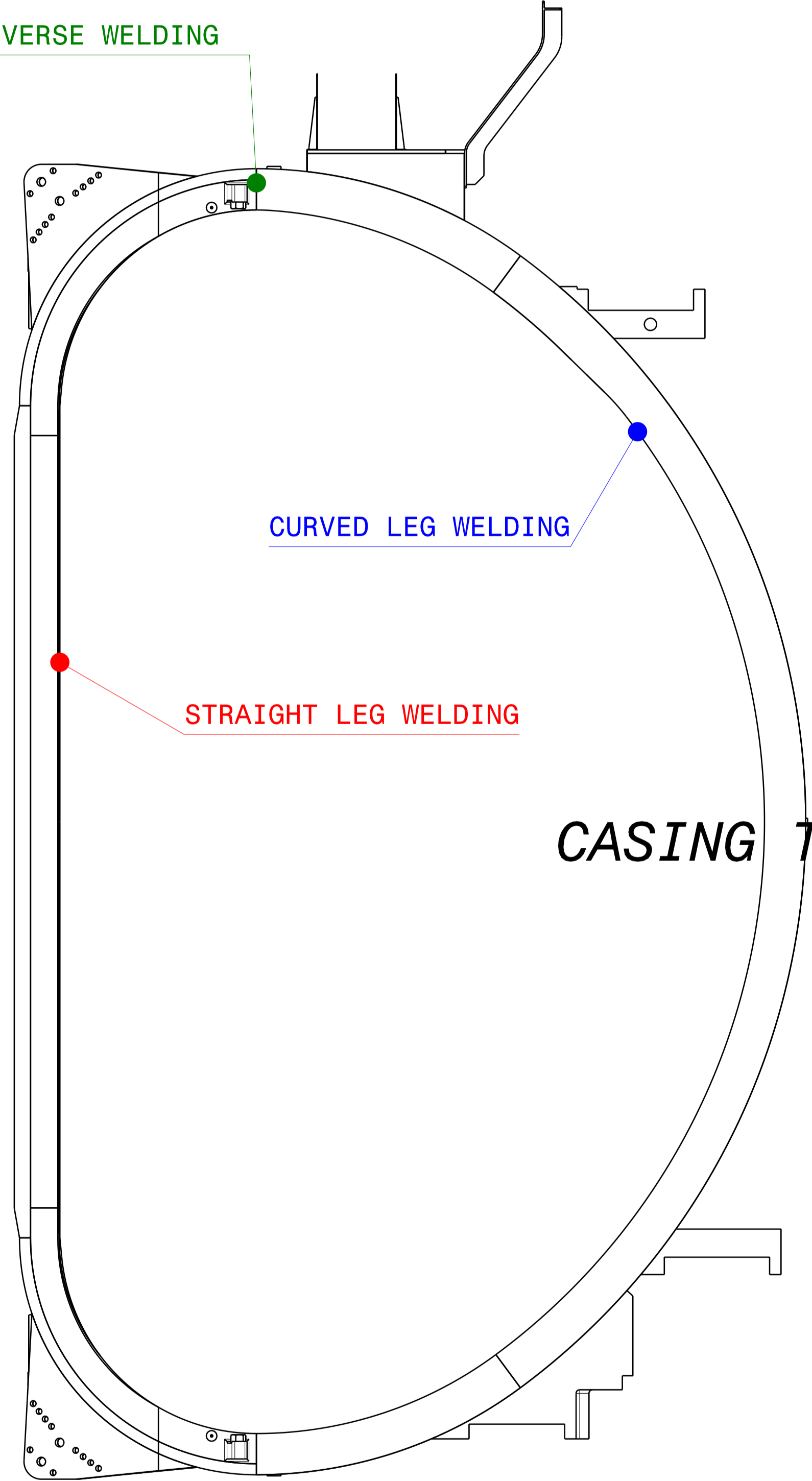
**CASING TO BE UPDATED**

NOTE:  
 REFERENCE SURFACE B IS DEFINED AS THE TOP & BOTTOM OF THE STRAIGHT LEG ONLY.  
 A PROJECTED REFERENCE IS REQUIRED TO DEFINE THIS SURFACE ALONG THE LENGTH OF THE STRAIGHT LEG.

DMS:		Ref to 3D CatProduct:010202-203203_01	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>	CUSTOMER: <b>Fusion-for-Energy</b>
REV DATE <b>03-10-2011</b>		REVIEWED BY	DRAWING TITLE <b>WINDING PACK SPACER ALLOCATION BETWEEN CASING &amp; WP</b>
FIRST ISSUE DATE <b>20-01-2011</b>		CONTROLLED BY <b>A. CUCCHIARO</b>	
SCALE		DRAWN BY <b>G. BROLATTI</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION	WBS LEVELS <b>3</b>	010202
Drawing Number <b>503203</b>		SHEET <b>01</b>	REVISION <b>01</b>
Maturity			

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

TRANSVERSE WELDING



Front view

CASING TO BE UPDATED

NOTE:  
 RESPONSABILITY OF THE CONTRACTOR INCLUDES  
 - WELD DETAIL DESIGN  
 - FINAL WELDING

JOINT VERTICAL PORT

CURVED LEG CLOSURE PLATE

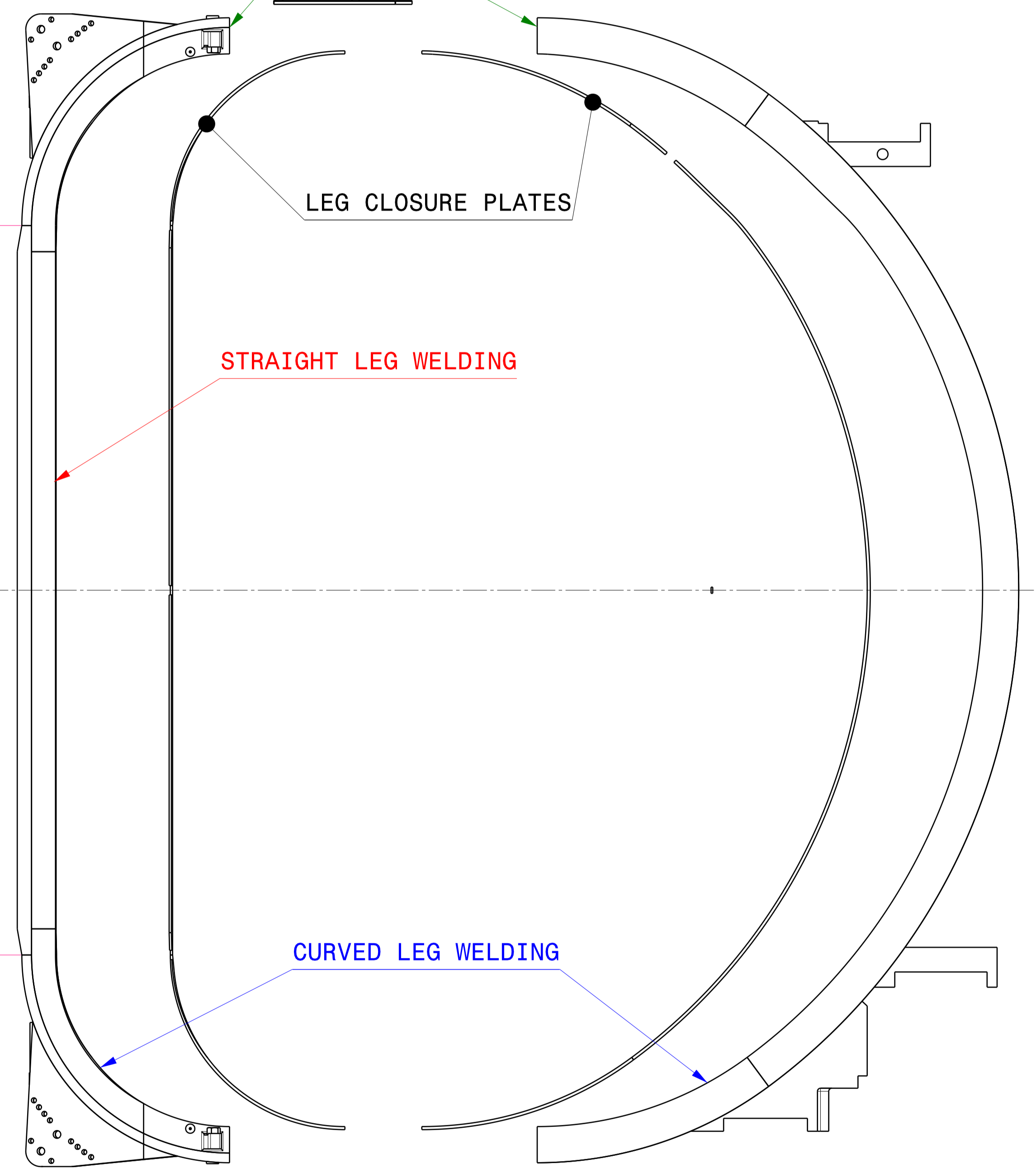
TRANSVERSE WELDS

LEG CLOSURE PLATES

STRAIGHT LEG WELDING

STRAIGHT LEG WELDING

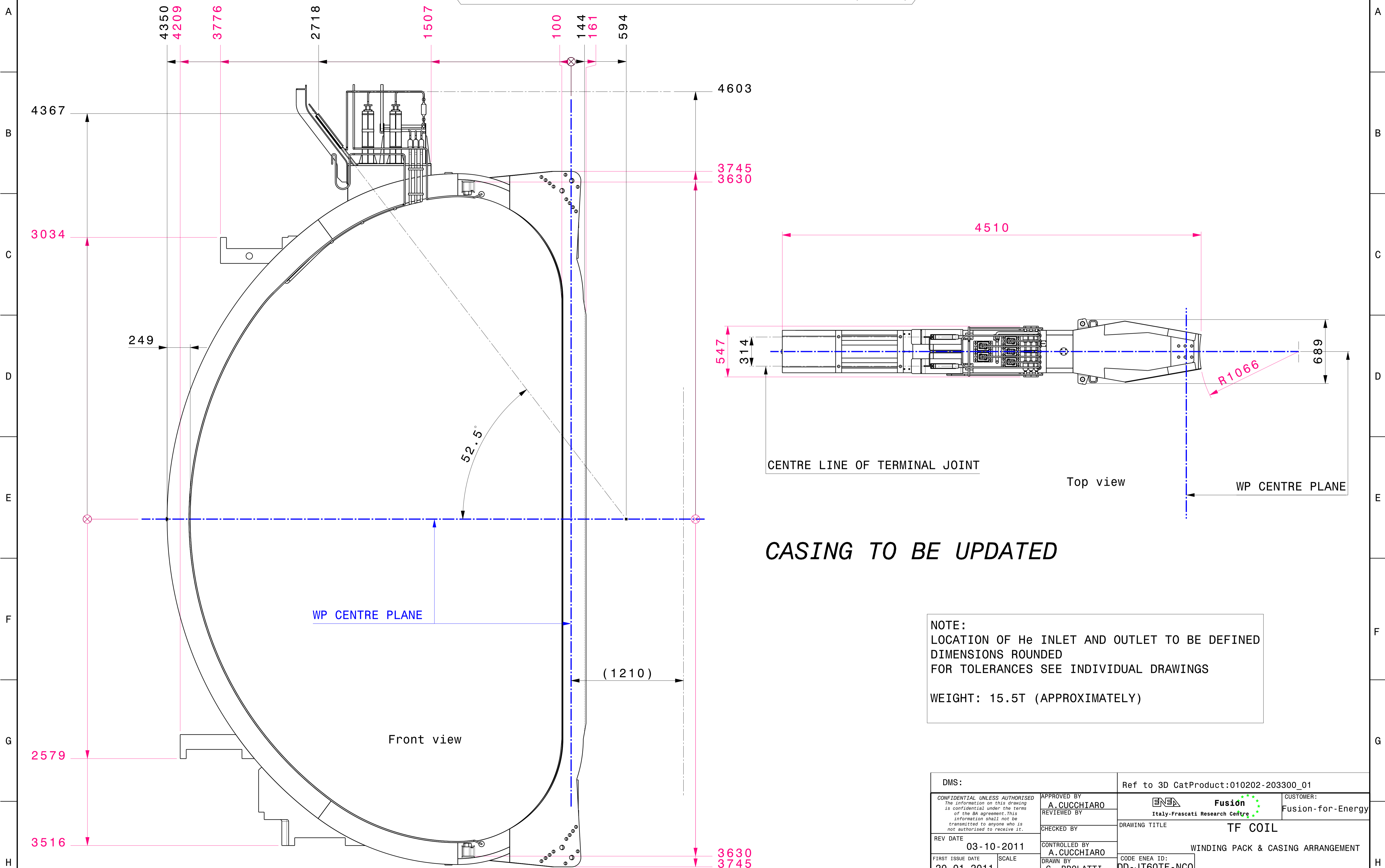
CURVED LEG WELDING



Front view


DMS:		Ref to 3D CatProduct: 010202-203204_01	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY A. CUCCHIARO	CUSTOMER: Fusion-for-Energy
REV DATE 03-10-2011		REVIEWED BY	DRAWING TITLE <b>CASING WELDING LAYOUT</b>
FIRST ISSUE DATE 20-01-2011		CONTROLLED BY A. CUCCHIARO	
SHEET SIZE A1		DRAWN BY G. BROLATTI	CODE ENEA ID: DD-JT60TF-NCO
FIRST ANGLE PROJECTION	WBS LEVELS 3	010202	Drawing Number 503204
			SHEET 01
			REVISION 01
			MATURITY

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

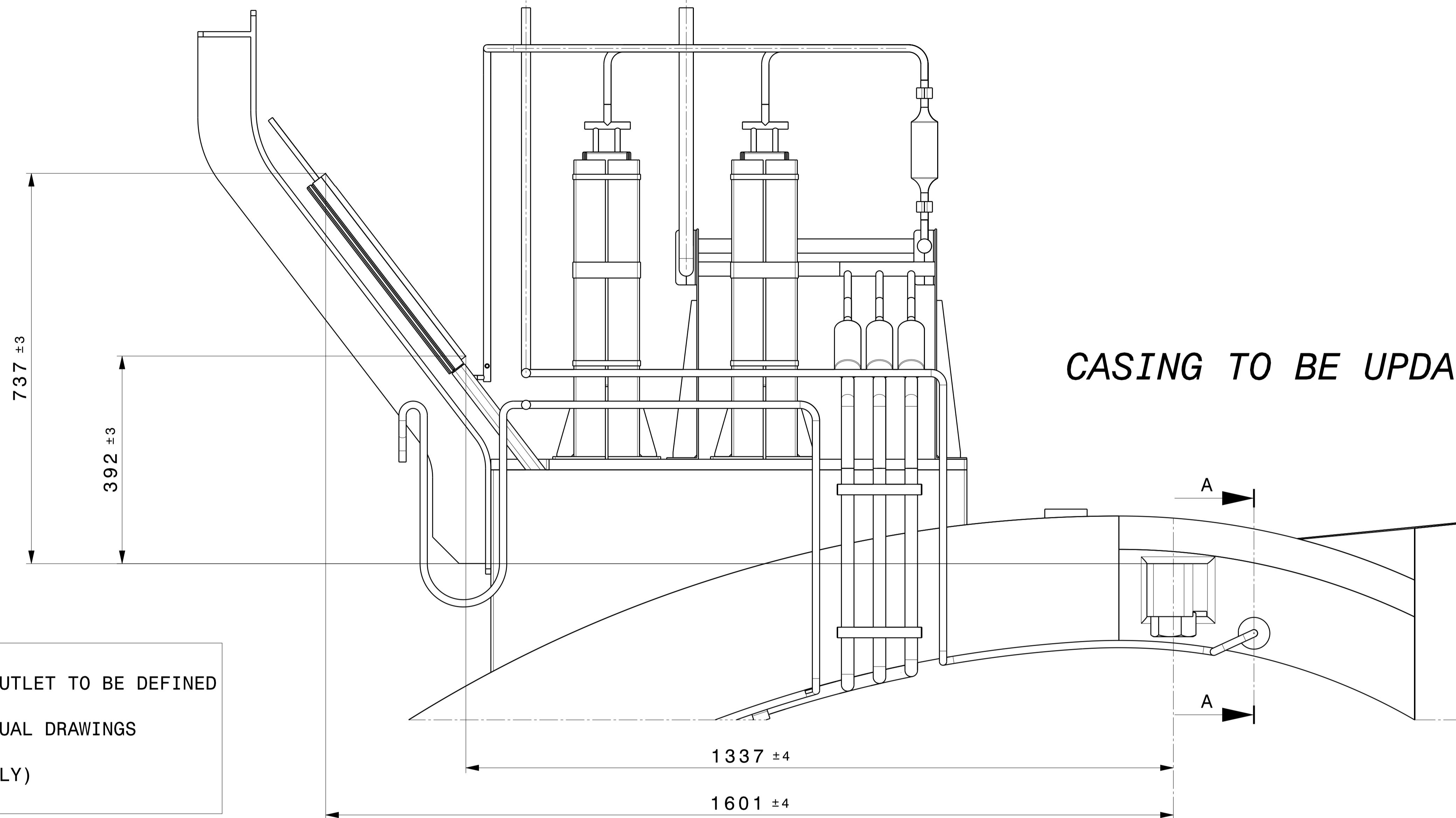


**CASING TO BE UPDATED**

NOTE:  
 LOCATION OF He INLET AND OUTLET TO BE DEFINED  
 DIMENSIONS ROUNDED  
 FOR TOLERANCES SEE INDIVIDUAL DRAWINGS  
 WEIGHT: 15.5T (APPROXIMATELY)

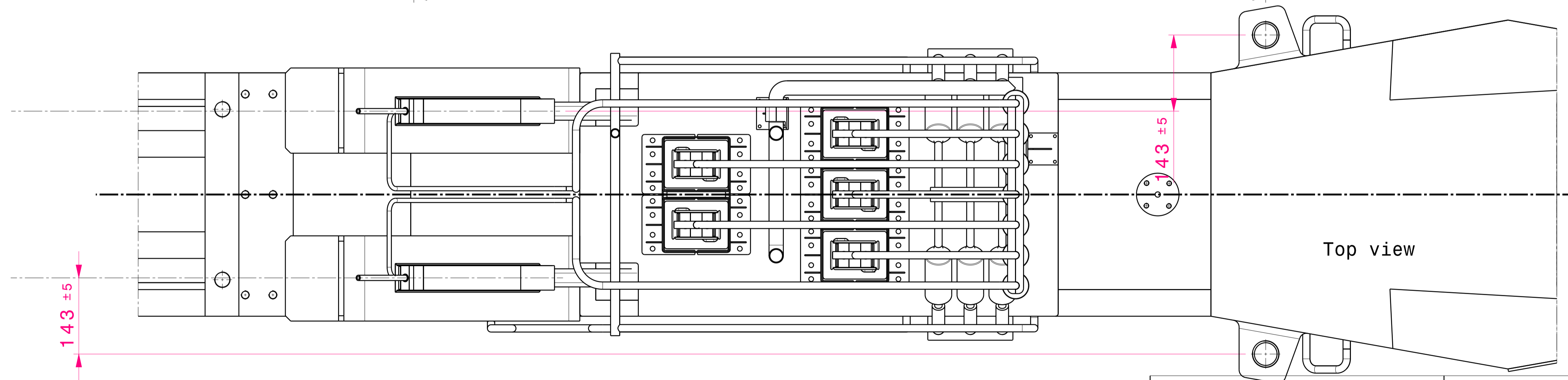
DMS:		Ref to 3D CatProduct:010202-203300_01	
CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.	APPROVED BY <b>A. CUCCHIARO</b>	 <b>Fusion</b> Italy-Frascati Research Centre	CUSTOMER: Fusion-for-Energy
	REVIEWED BY		DRAWING TITLE <b>TF COIL</b>
REV DATE <b>03-10-2011</b>	CONTROLLED BY <b>A. CUCCHIARO</b>	WINDING PACK & CASING ARRANGEMENT	
FIRST ISSUE DATE <b>20-01-2011</b>	DRAWN BY <b>G. BROLATTI</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>	
SHEET SIZE <b>A1</b>	FIRST ANGLE PROJECTION	WBS LEVELS <b>010202</b>	Drawing Number <b>503300</b>
		SHEET <b>01</b>	REVISION <b>01</b>
			MATURITY

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



CASING TO BE UPDATED

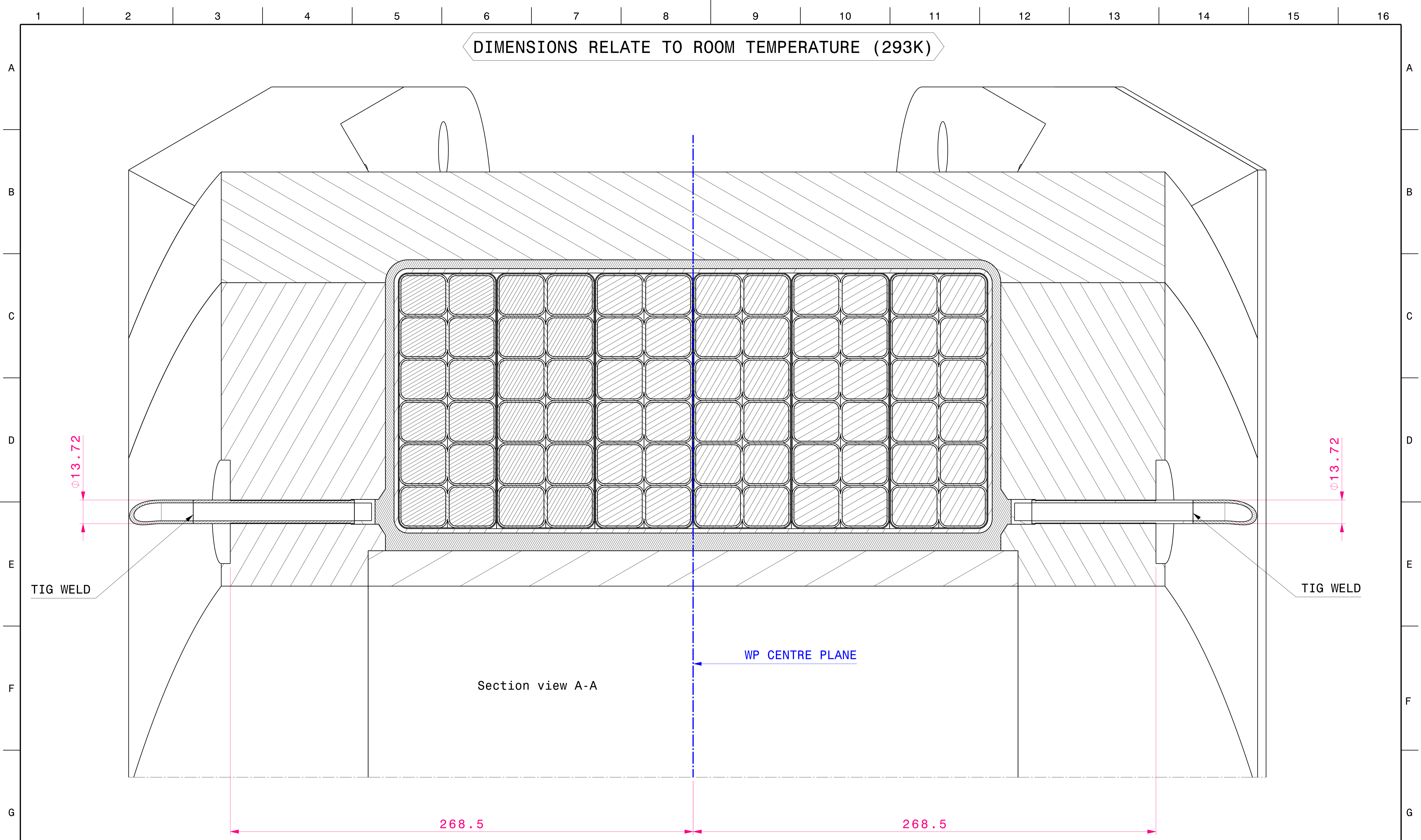
NOTE:  
 LOCATION OF He INLET AND OUTLET TO BE DEFINED  
 DIMENSIONS ROUNDED  
 FOR TOLERANCES SEE INDIVIDUAL DRAWINGS  
 WEIGHT: 15.5T (APPROXIMATELY)



Top view

DMS:		Ref to 3D CatProduct:010202-203300_01		
<small>CONFIDENTIAL UNLESS AUTHORISED</small> The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.	APPROVED BY	Fusion Italy-Frascati Research Centre		CUSTOMER:
	REVIEWED BY			Fusion-for-Energy
REV DATE	03-10-2011	CHECKED BY	DRAWING TITLE	
FIRST ISSUE DATE	20-01-2011	CONTROLLED BY	TF COIL	
SCALE		DRAWN BY	WINDING PACK & CASING ARRANGEMENT	
SHEET SIZE	A1	WBS	010202	CODE ENEA ID: DD-JT60TF-NCO
FIRST ANGLE PROJECTION		LEVELS	3	Drawing Number
			503300	SHEET
				REVISION
				02
				01
				MATURITY
				03

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



Section view A-A

WP CENTRE PLANE

TIG WELD

TIG WELD

268.5

268.5

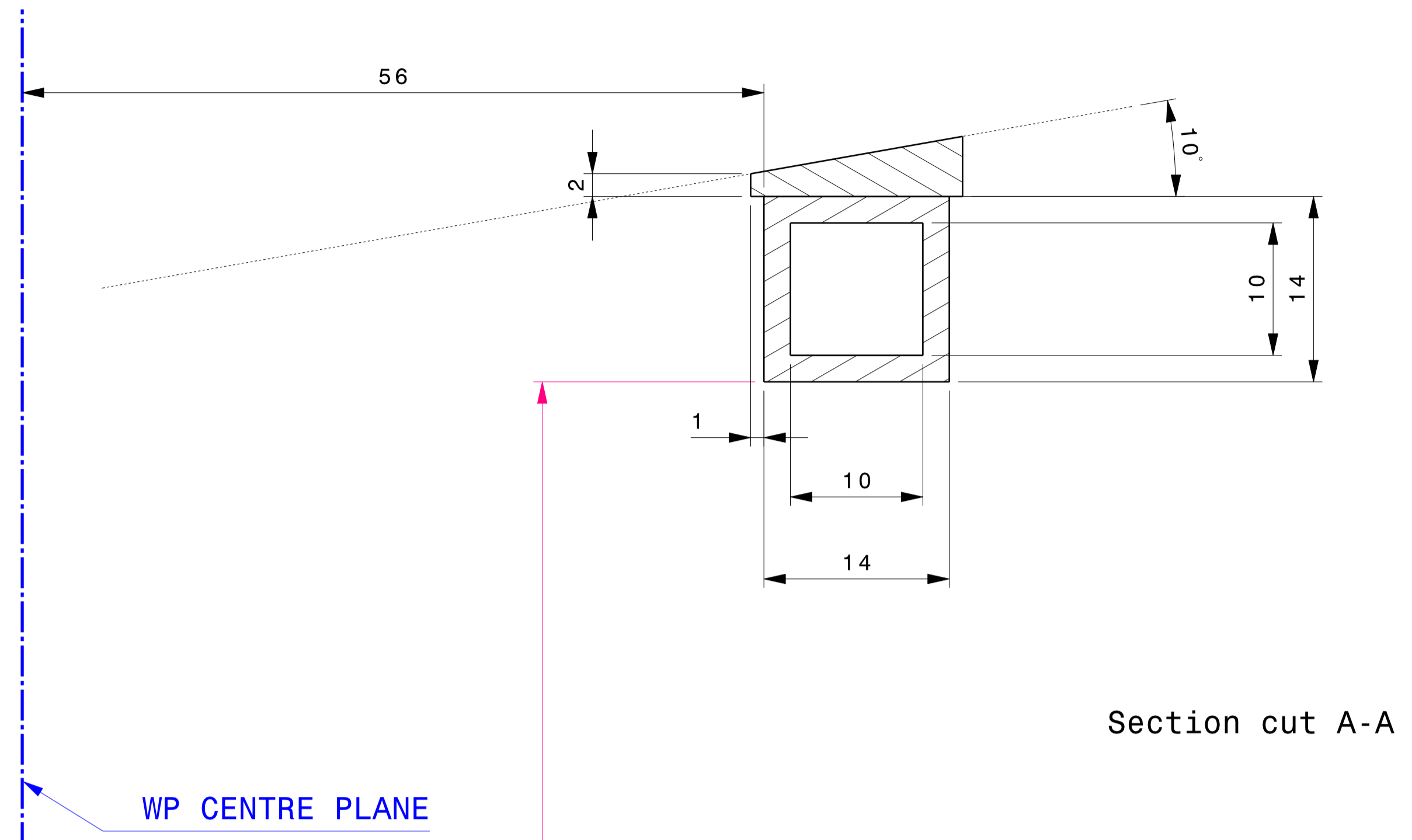
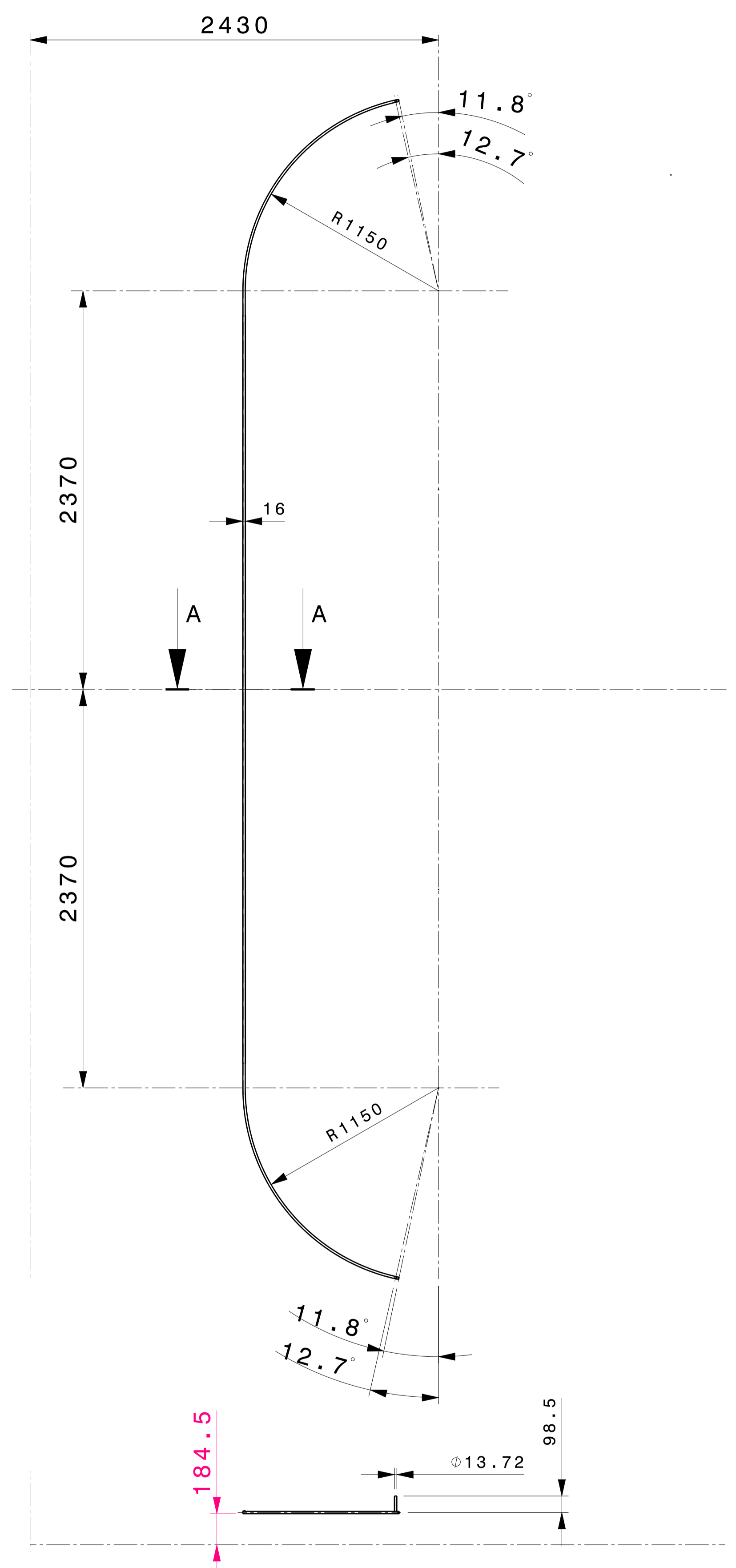
$\phi 13.72$

$\phi 13.72$


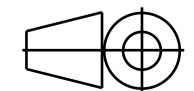
**CASING TO BE UPDATED**

DMS:		Ref to 3D CatProduct:010202-203300_01	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>	CUSTOMER: Fusion-for-Energy
REV DATE <b>03-10-2011</b>		REVIEWED BY	DRAWING TITLE <b>TF COIL</b>
FIRST ISSUE DATE <b>20-01-2011</b>		CHECKED BY	
SCALE		CONTROLLED BY <b>A. CUCCHIARO</b>	WINDING PACK & CASING ARRANGEMENT
SHEET SIZE <b>A1</b>		DRAWN BY <b>G. BROLATTI</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>
FIRST ANGLE PROJECTION	WBS LEVELS <b>3</b>	<b>010202</b>	Drawing Number <b>503300</b>
			SHEET <b>03</b>
			REVISION <b>01</b>
			MATURITY

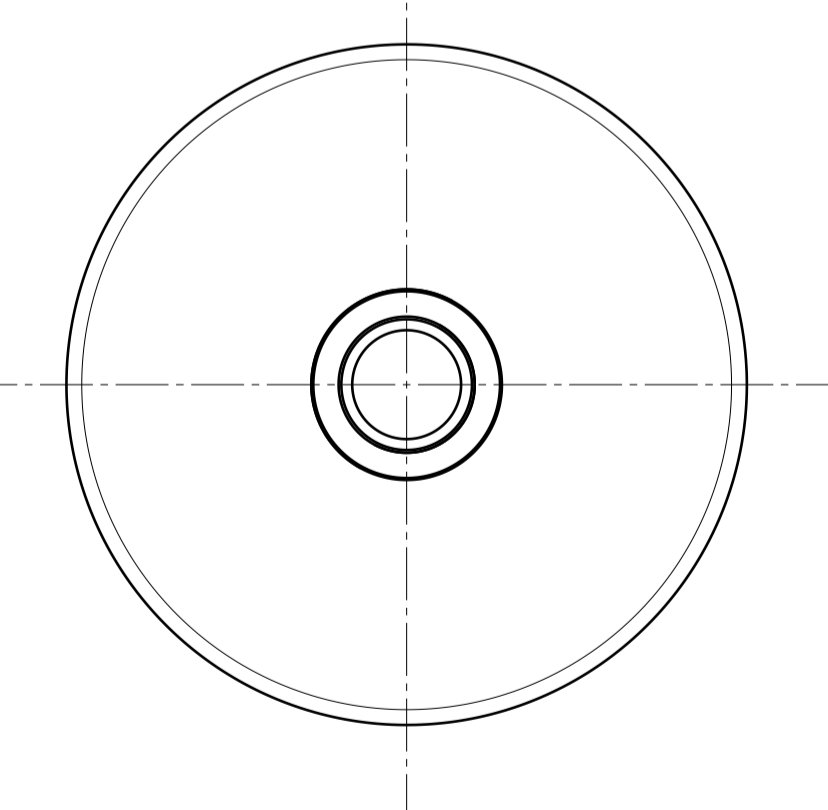
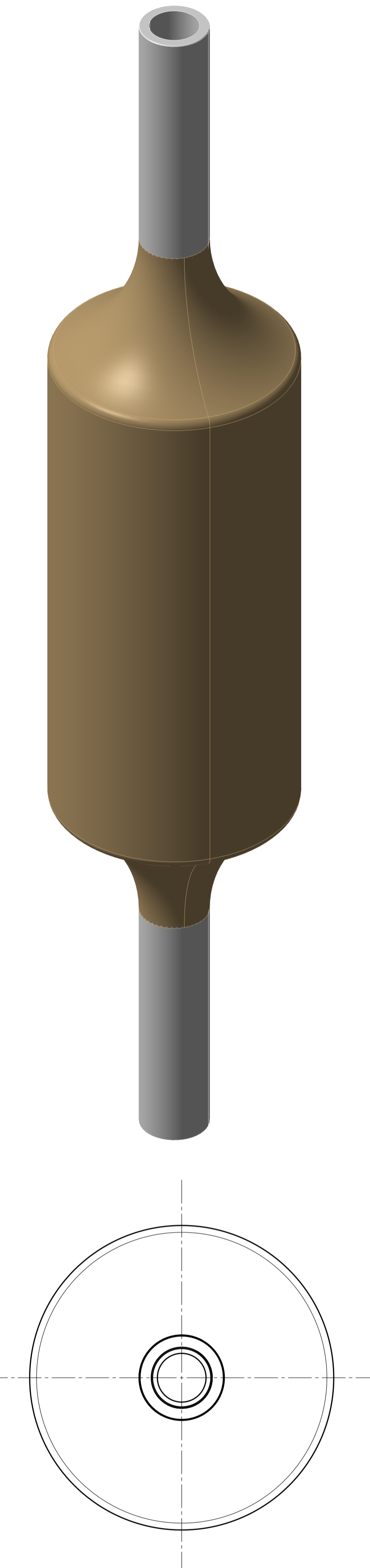
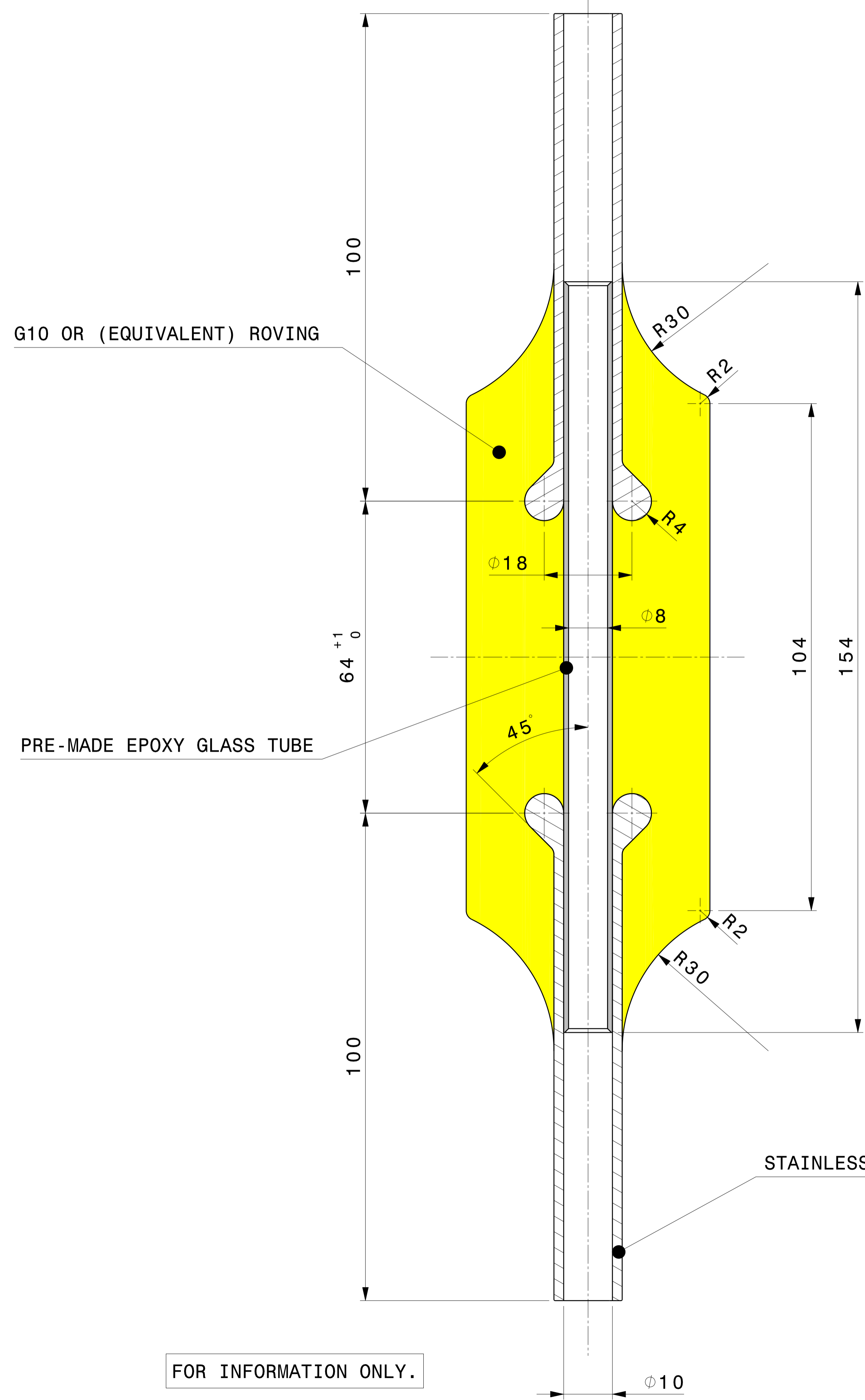
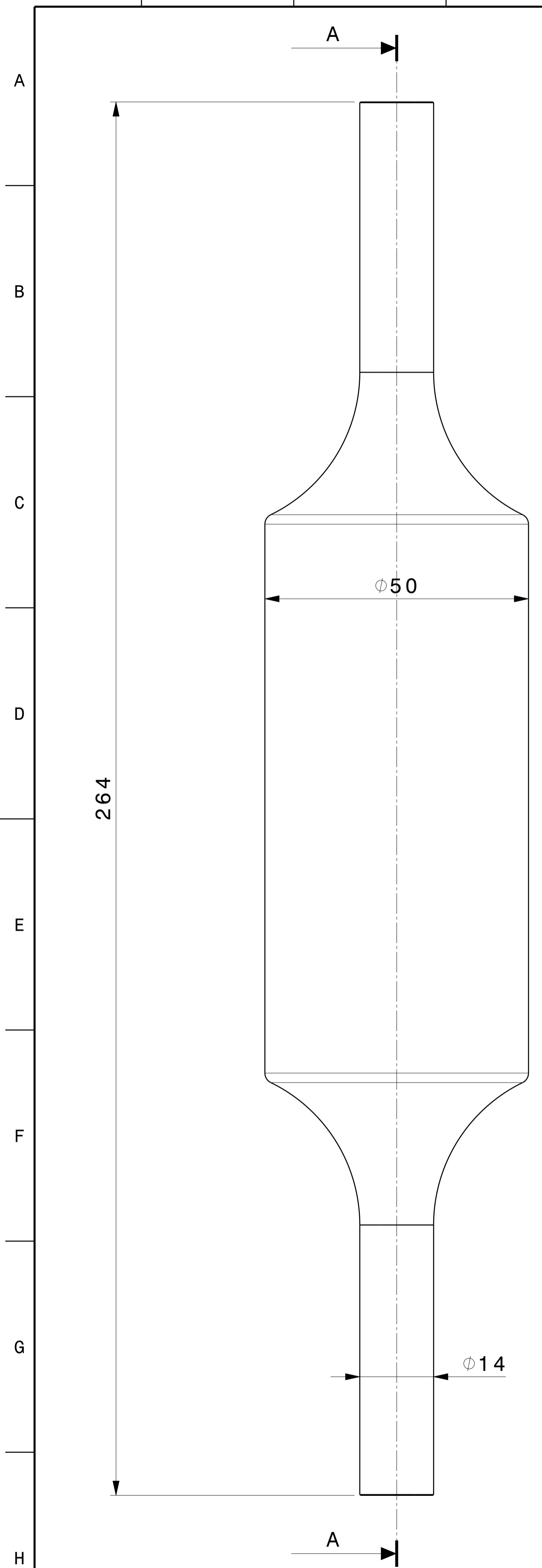
DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



**PIPE TO BE MODIFIED-SEE  
DRAWING 010301-503006**

DMS:		Ref to 3D CatProduct:010202-203301_01				
<small>CONFIDENTIAL UNLESS AUTHORISED</small> <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY	 <b>Fusion</b> <small>Italy-Frascati Research Centre</small>		CUSTOMER:	
		REVIEWED BY			Fusion-for-Energy	
REV DATE	03-10-2011	CHECKED BY	DRAWING TITLE			
FIRST ISSUE DATE	20-01-2011	CONTROLLED BY	CASING INNER HELIUM COOLING			
SCALE		DRAWN BY	CODE ENEA ID:	DD-JT60TF-NCO		
SHEET SIZE	A1	WBS LEVELS	010202	Drawing Number	503301	
FIRST ANGLE PROJECTION				SHEET	REVISION	MATURITY
				01	01	

DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)



G10 OR (EQUIVALENT) ROVING

PRE-MADE EPOXY GLASS TUBE

STAINLESS STEEL TUBE

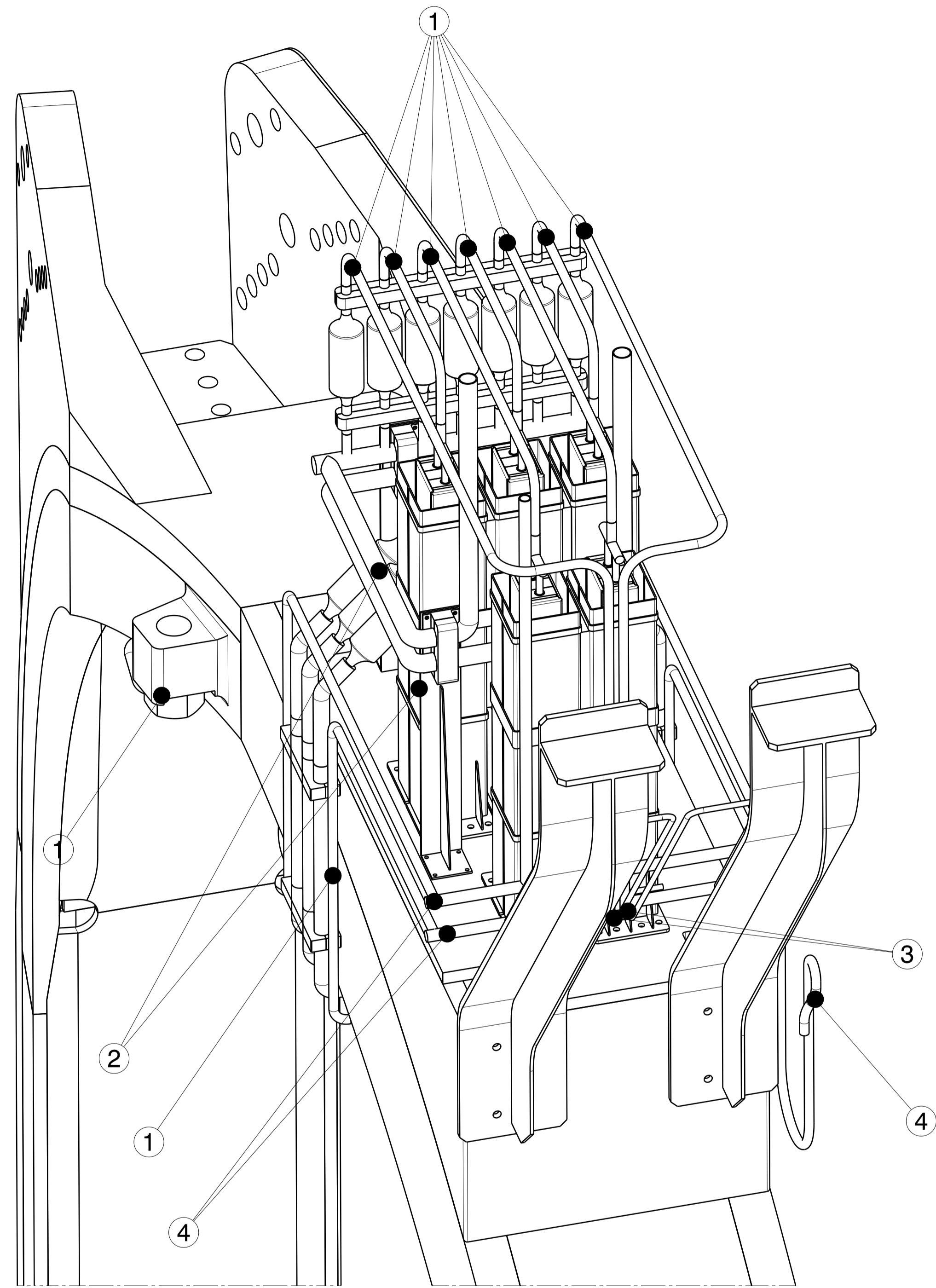
FOR INFORMATION ONLY.

DMS:		Ref to 3D CatProduct:010202-203302_01	
CONFIDENTIAL UNLESS AUTHORISED <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>		APPROVED BY <b>A. CUCCHIARO</b>	CUSTOMER: <b>Fusion-for-Energy</b>
REV DATE <b>03-10-2011</b>		REVIEWED BY	DRAWING TITLE <b>WINDING PACK INSULATION BREAK</b>
FIRST ISSUE DATE <b>20-01-2011</b>		CHECKED BY	
SCALE		CONTROLLED BY <b>A. CUCCHIARO</b>	CODE ENEA ID: <b>DD-JT60TF-NCO</b>
DRAWN BY <b>G. BROLATTI</b>		SHEET SIZE <b>A1</b>	
FIRST ANGLE PROJECTION		WBS <b>3 LEVELS</b>	Drawing Number <b>503302</b>
SHEET SIZE <b>A1</b>		SHEET <b>01</b>	REVISION <b>01</b>
MATERIALITY		MATERIALITY	

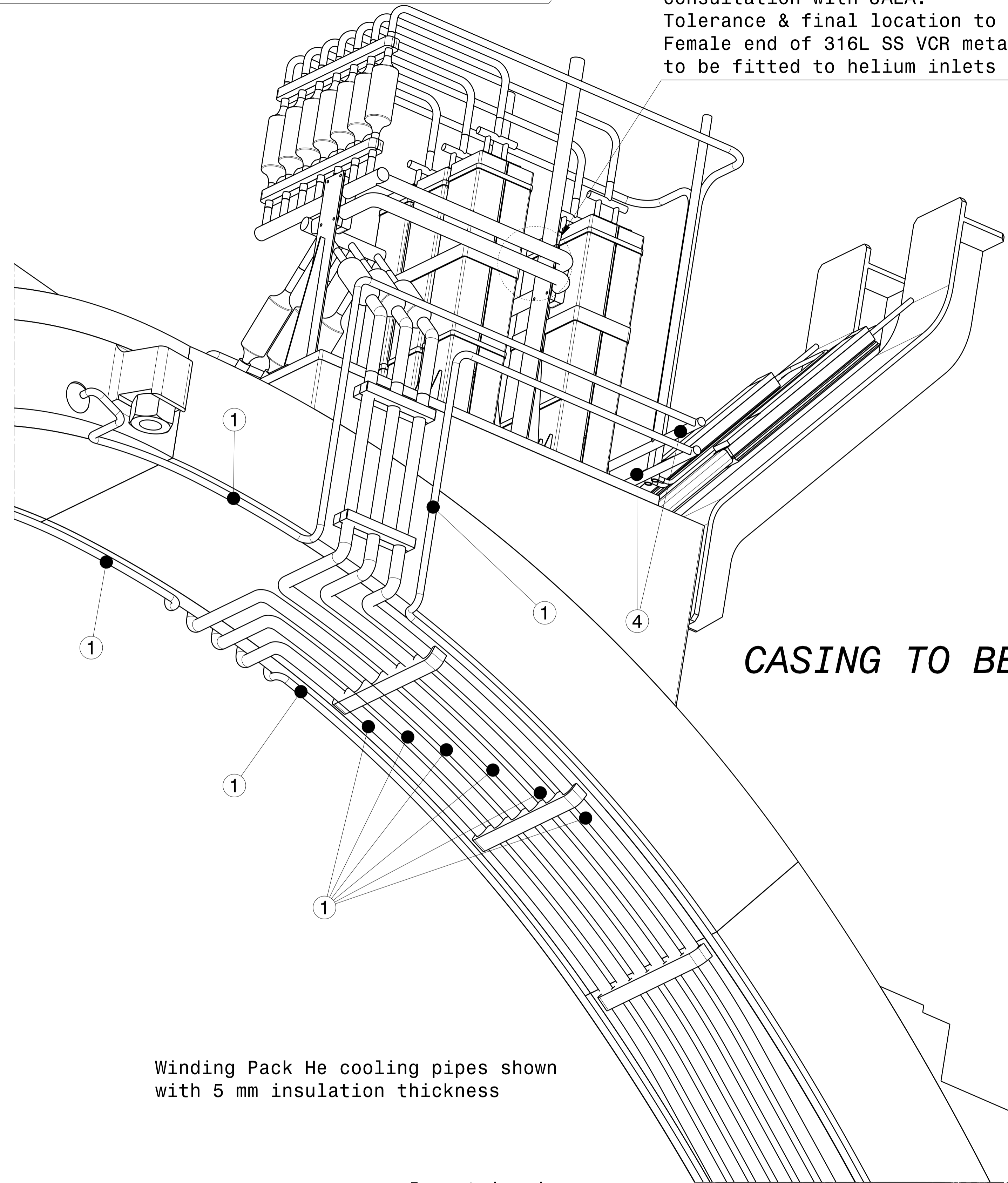


DIMENSIONS RELATE TO ROOM TEMPERATURE (293K)

Final location of inlet & outlet to be defined after consultation with JAEA.  
 Tolerance & final location to be +/-5mm  
 Female end of 316L SS VCR metal gasket face seal to be fitted to helium inlets and outlets



Isometric view




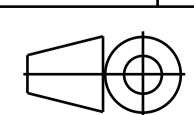
Winding Pack He cooling pipes shown with 5 mm insulation thickness

Isometric view

CASING TO BE UPDATED

Note: Pipe length given for reference.  
 Final lengths to be delivered during detail design.

Item Nr	Description	Length
4	ISO Pipe $\phi$ 17.2-14 (3/8")	2.5 m
3	ISO Pipe $\phi$ 8-6	1.9 m
2	ISO Pipe $\phi$ 26.9-23.7 (3/4")	2.5 m
1	ANSI/AMSE Pipe $\phi$ 13.72 - 10.42 (1/4")	48 m

DMS:		Ref to 3D CatProduct:010202-203303_01	
<small>CONFIDENTIAL UNLESS AUTHORISED</small> <small>The information on this drawing is confidential under the terms of the BA agreement. This information shall not be transmitted to anyone who is not authorised to receive it.</small>	APPROVED BY	 <b>Fusion</b> <small>Italy-Frascati Research Centre</small>	CUSTOMER:
	REVIEWED BY		Fusion-for-Energy
	CHECKED BY		DRAWING TITLE
REV DATE	03-10-2011	CONTROLLED BY	TF COIL HELIUM COOLING
FIRST ISSUE DATE	20-01-2011	DRAWN BY	CODE ENEA ID:
		G. BROLATTI	DD-JT60TF-NCO
SHEET SIZE	FIRST ANGLE PROJECTION	WBS LEVELS	010202
A1		3 LEVELS	Drawing Number
			503303
			SHEET
			01
			REVISION
			01
			MATURITY
			A