JADA-55342DW0101
ITER_D_6NDP6N

Assembly drawings of PoPola in-vessel components of EP10

ITER Project Japan Domestic Agency

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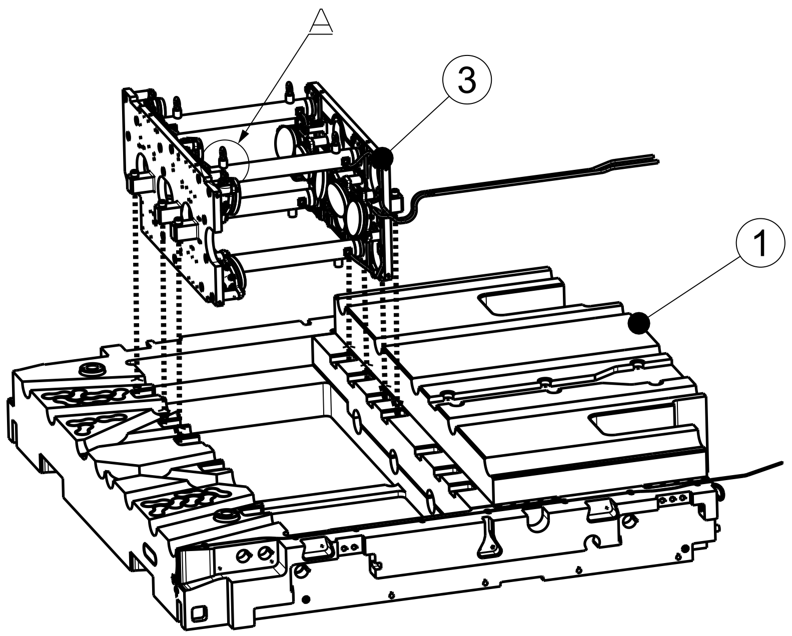
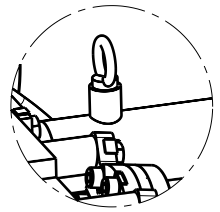
Change log

Brunch no. (date) (IDM version)	Change description	Author
- (8 Mar 2022) (6NDP6N v1.0)	The first version	R. Imazawa

QTY.	Part number	NAME OF PART
1	1	EP10_DSM2_RIGHT
1	2	EP10_DSM2_LEFT
1	3	EPP_UPPER_MIRROR_MODULE_ASM
1	4	EPP_LOWER_MIRROR_MODULE

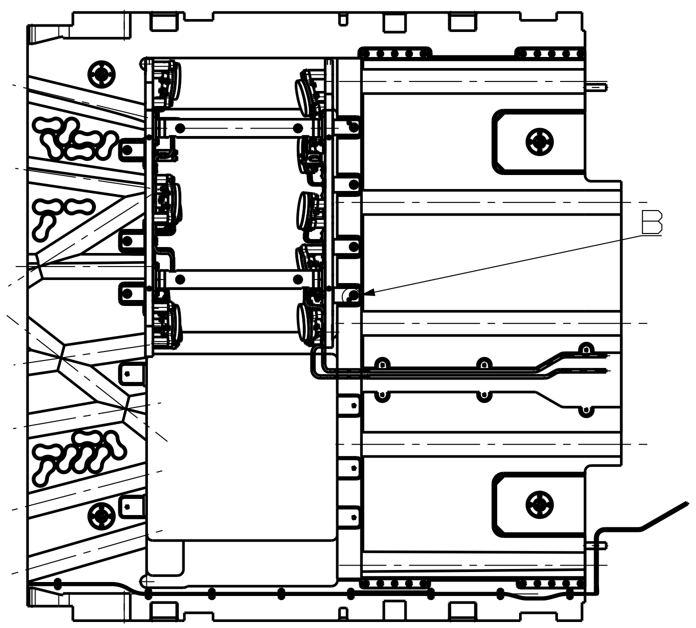
1. To place UEMM

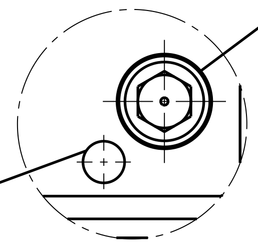




Part A Details (1 : 6)
Eye bolt (M10, x4)

2. To tighten captive bolts by using hex key





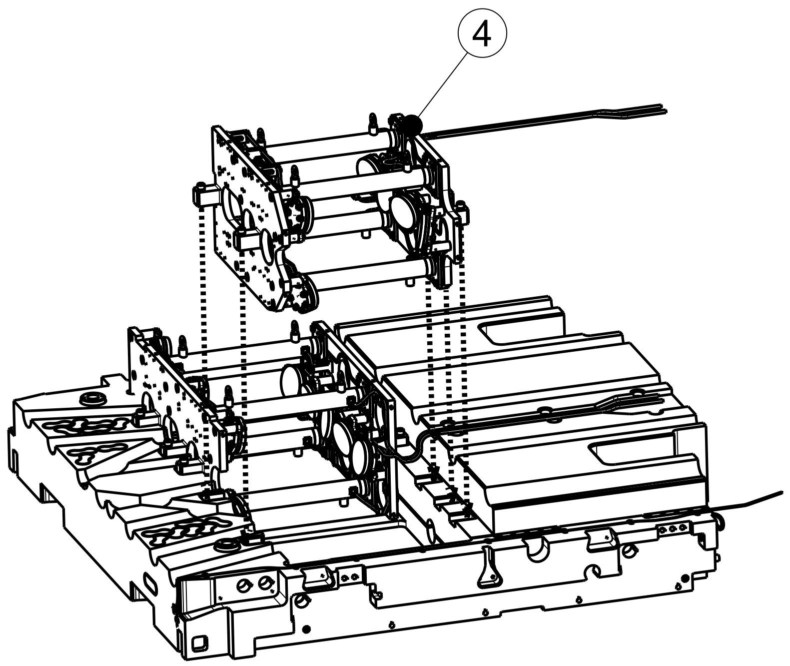
Captive bolt (M12, x7)

pin hole (Φ11, x2)

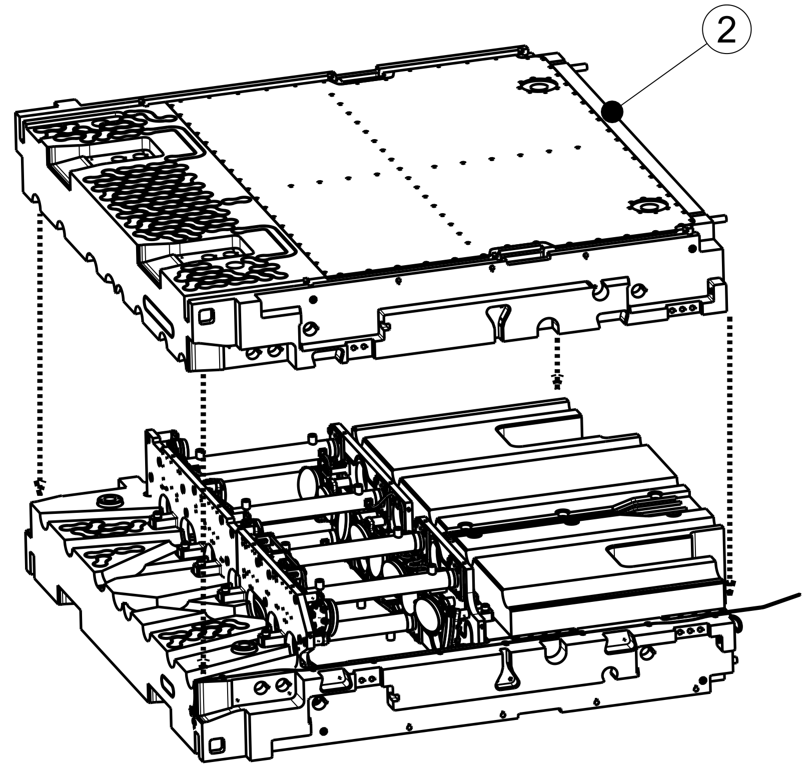
Part B Details (1 : 2)

Note :
Pin hole of UEMM fit guide pins of DSM.

3. To install LEMM in the same manner with UEMM.



4. To assembly DSM



Note :
Port Integrator will assembly DSM.
Assembly of DSM is beyond the scope of this drawing.

DRAWN BY	DATE	DRAWING TITLE			
Jun Takamizawa	2022/03/08	Assembly Drawing (PoPola in-EPP10 mirror module)			
CHECKED BY Ryota Imazawa	DATE 2022/03/08	SIZE A3	SCALE 1:25	SHEET 1/1	REV 0

JADA-55342TS0102
ITER_D_696RYF

55.C6 Manufacturing Assessment of PoPola Mirror Modules in Equatorial Port Plug 10

ITER Project Japan Domestic Agency

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Change log

Date Revision number (IDM number)	Author	Comments
28 Sep. 2021 0 (696RYF v1.0)	R. Imazawa	

1 Outline

This document clarifies manufacturing procedure of the mirror module in equatorial port plug (EPP10) in order to justify the manufacturability.

The mirror module is called EMM (EPP Mirror Module) and consists of two parts. The upper part is called UEMM (Upper EMM) and the lower one is called LEMM (Lower EMM). Figure 1-1 shows the overview of EMM.

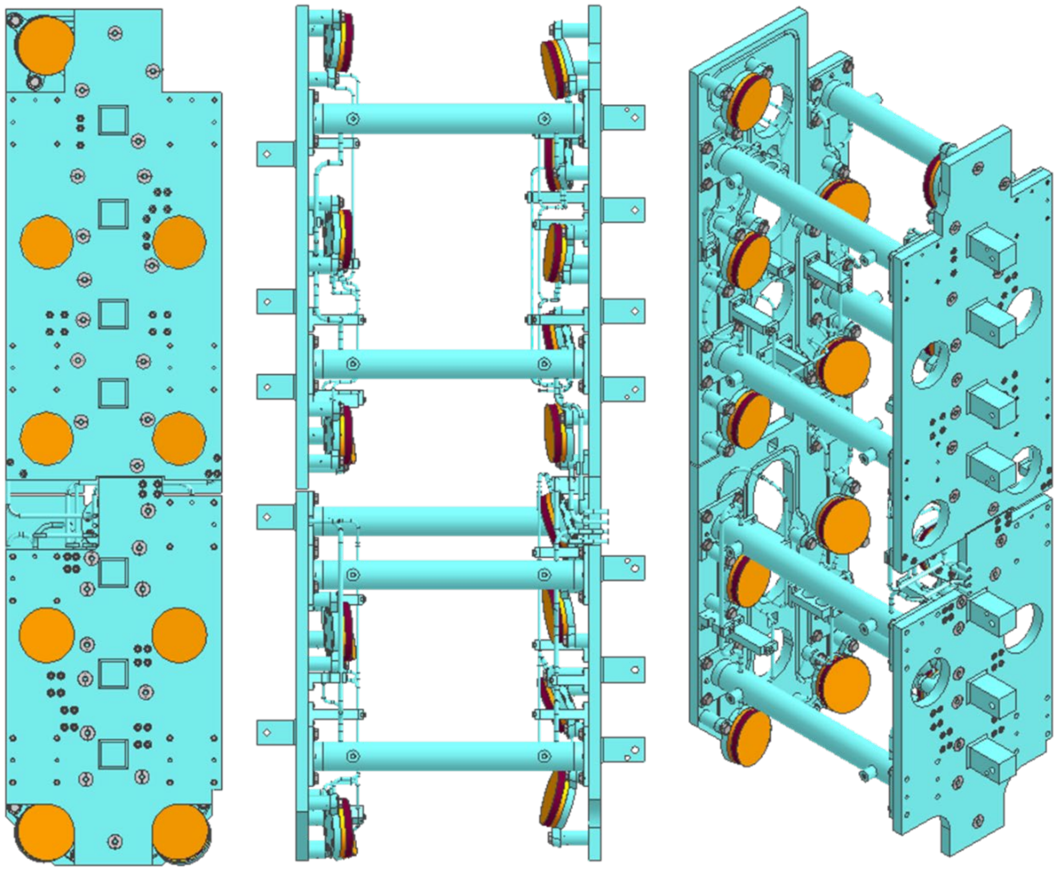


Figure 1-1. Overview of EMM

2 Overview of Manufacturing Process

Figure 2-1 shows the Gantt chart of manufacturing EMM, which is divided to three parts;

— manufacturing of mirrors (described in Section 3),
— manufacturing of other components (described in Section 4) and
— the assembly (described in Section 5).

The manufacturing of mirrors and that of other components will be carried out in parallel. The lead time is approximately 18 months in total. The authors supposed that delivery time of tungsten bolts will be three months and that of SS316LN-IG material will be long as approximately one year.

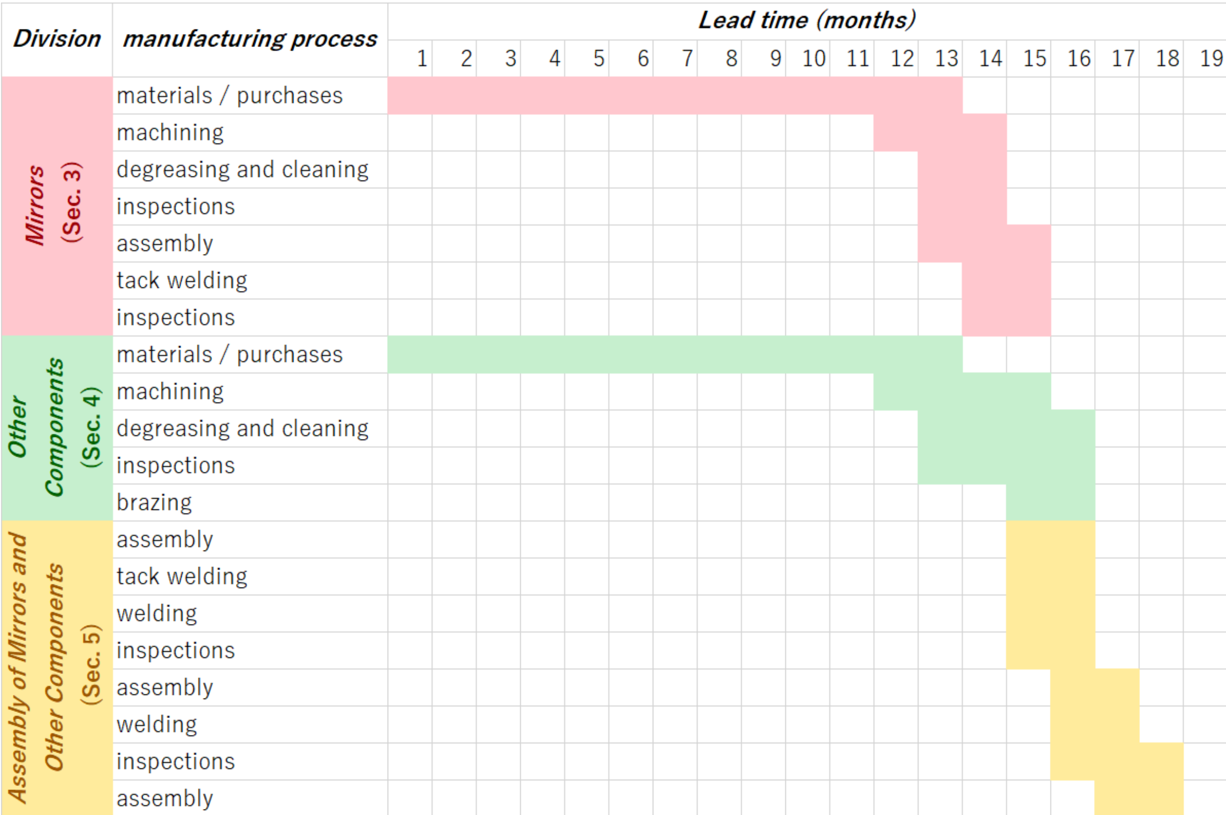


Figure 2-1 Gantt chart of manufacturing EMM

Figure 2-2 shows the list of the drawings, and the drawings highlighted by pink, green and yellow referred by Section 3, Section 4 and Section 5, respectively. The drawings are attached to this document separately. The manufacturing process of EMM is classified into 0th to 7th levels, and the drawings of each level are shown in Figure 2-2. This drawing structure means that a part that is specified by a drawing at a certain level is composed by parts that are specified by drawings at lower level. For instance, the part of 0EMM-001 is composed by the parts of 1UEMM-001 and 1LEMM-001. Then, the part of 1UEMM-001 is composed by the parts of 2UEMM-001, 2UEMM-002, 2EMM-001 and 2EMM-002.

When the drawing numbers are in bold in Figure 2-2, it means that the drawing is just for the representative part and that drawings of similar parts are omitted here. Taking into account the purpose of this document that is only to specify the manufacturing procedure, the drawings for the all similar parts are not necessary because the similar parts will be manufactured with the same machine, the same manufacturing procedure and same special process such as welding.

When the drawing numbers are in red in Figure 2-2, it means that the same drawing can be used for different products because the parts of the same drawing can be used for both LEMM and UEMM.

ITEM	Manufacturing proces Title /Quantity	0	1	2	3	4	5	6	7
EMM	EMM final assembly drawing / 1	0EMM-001							
	UEMM final assembly drawing / 1		1UEMM-001						
	UEMM M1 base plate second assembly drawing / 1			2UEMM-001					
	UEMM M1 base plate first assembly drawing / 1				3UEMM-001				
	UEMM M1 base plate brazing process drawing / 1					4UEMM-001			
	UEMM M1 base plate / 1						5UEMM-001		
	Mirror assembly / 5					4EMM-001			
	Tungsten mirror / 5						5EMM-001		
	Mirror mount assembly / 5						5EMM-002		
	Mirror HIP process drawing / 5							6EMM-001	
	Heatsink / 5								7EMM-001
	Cooling pipe / 5								7EMM-002
	Shells for HIP joint / 5								7EMM-003
	Pipe support / 7					4EMM-002			
	Rod / 15					4EMM-003			
	Reducer / 2				3EMM-001				
	1/4-inch pipe / 6				3EMM-002				
UEMM	UEMM M2 base plate second assembly drawing / 1			2UEMM-002					
	UEMM M2 base plate first assembly drawing / 1				3UEMM-002				
	UEMM M2 base plate brazing process drawing / 1					4UEMM-002			
	UEMM M2 base plate / 1						5UEMM-002		
	Mirror assembly / 5					4EMM-001			
	Tungsten mirror / 5						5EMM-001		
	Mirror mount assembly / 5						5EMM-002		
	Mirror HIP process drawing / 5							6EMM-001	
	Heatsink / 5								7EMM-001
	Cooling pipe / 5								7EMM-002
	Shells for HIP joint / 5								7EMM-003
	Pipe support / 6					4EMM-002			
	Rod / 15					4EMM-003			
	Reducer / 2				3EMM-001				
	1/4-inch pipe / 6				3EMM-002				
	Connecting rod / 4			2EMM-001					
	Interface pipe / 2			2EMM-002					
	LEMM final assembly drawing / 1		1LEMM-001						
	LEMM M1 base plate second assembly drawing / 1			2LEMM-001					
	LEMM M1 base plate first assembly drawing / 1				3LEMM-001				
	LEMM M1 base plate brazing process drawing / 1					4LEMM-001			
	LEMM M1 base plate / 1						5LEMM-001		
	Mirror assembly / 4					4EMM-001			
	Tungsten mirror / 4						5EMM-001		
	Mirror mount assembly / 4						5EMM-002		
	Mirror HIP process drawing / 4							6EMM-001	
	Heatsink / 4								7EMM-001
	Cooling pipe / 4								7EMM-002
	Shells for HIP joint / 4								7EMM-003
	Pipe support / 6					4EMM-002			
	Rod / 12					4EMM-003			
	Reducer / 2				3EMM-001				
	1/4-inch pipe / 5				3EMM-002				
LEMM	LEMM M2 base plate second assembly drawing / 1			2LEMM-002					
	LEMM M2 base plate first assembly drawing / 1				3LEMM-002				
	LEMM M2 base plate brazing process drawing / 1					4LEMM-002			
	LEMM M2 base plate / 1						5LEMM-002		
	Mirror assembly / 4					4EMM-001			
	Tungsten mirror / 4						5EMM-001		
	Mirror mount assembly / 4						5EMM-002		
	Mirror HIP process drawing / 4							6EMM-001	
	Heatsink / 4								7EMM-001
	Cooling pipe / 4								7EMM-002
	Shells for HIP joint / 4								7EMM-003
	Pipe support / 5					4EMM-002			
	Rod / 12					4EMM-003			
	Reducer / 2				3EMM-001				
	1/4-inch pipe / 5				3EMM-002				
	Connecting rod / 4			2EMM-001					
	Interface pipe / 2			2EMM-002					

Figure 2-2 List of drawings for EMM at each manufacturing level. (The drawings highlighted by pink, green and yellow referred by Section 3, Section 4 and Section 5, respectively)

3 Manufacturing of Mirrors

This section describes materials, material dimensions, quantity, processing time, processing machines, manufacturing procedure, inspection and cleaning procedures of the parts that are described as the mirrors in Figure 2-1.

3.1 Heatsink

Title (Drawing number)	Heatsink (7EMM-001)
Materials	CuCrZr
Material dimensions	φ130×15t
Quantity	19 (including one sample for tests)
Processing time	4 hours per heatsink
Processing machine	Multi-tasking CNC machine (Okuma Corporation MULTUSB300 or equivalent)

Manufacturing procedure

① A manufacturer will shape the heatsink, will cut the grooves and will finish it adjusting the thickness.

② The manufacturer will degrease the heatsinks with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the heatsinks.

③ The manufacturer will confirm whether major dimensions comply with the drawings.

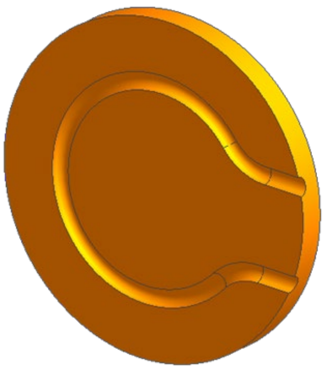


Figure 3-1 Heatsink

3.2 Cooling pipe

Title (Drawing number)	Cooling pipe (7EMM-002)
Materials	SS316LN-IG
Material dimensions	φ6.35×1t-285L
Quantity	19 (including one sample for tests)
Processing time	2 hours per pipe
Processing machine	CNC Pipe Bender (OPTON. Co. Ltd S-ECO 15 or equivalent)

Manufacturing procedure

① The manufacturer will shape pipes with CNC pipe bender and will cut them.

② The manufacturer will degrease the pipes with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the pipes.

③ The manufacturer will confirm whether major dimensions comply with the drawings.

④ The manufacturer will cover the entrance of the pipe to prevent adhesion of foreign objects.

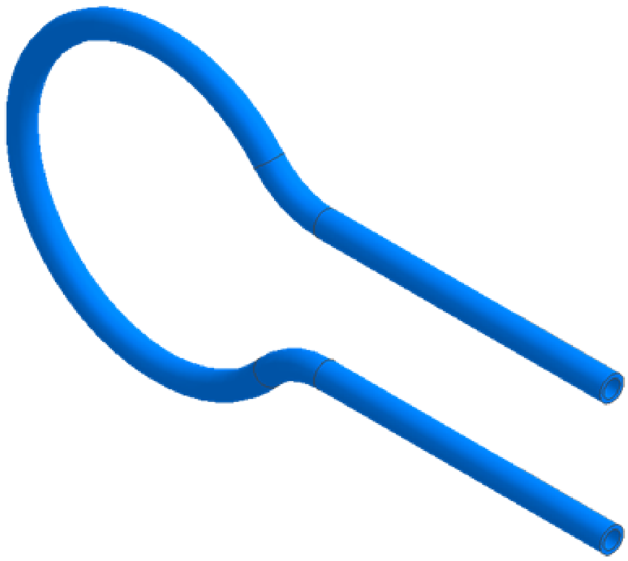


Figure 3-2 Cooling pipe

3.3 Shells for HIP joint

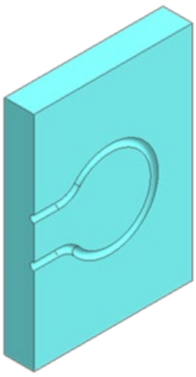
Title (Drawing number)	Shells for HIP joint (7EMM-003)
Materials	SS316LN-IG
Material dimensions	20t×140×195 30t×140×195
Quantity	19 set (including one sample for tests)
Processing time	9 hours per set of shells
Processing machine	CNC Pipe Bender (OPTON. Co. Ltd S-ECO 15 or equivalent)

Manufacturing procedure

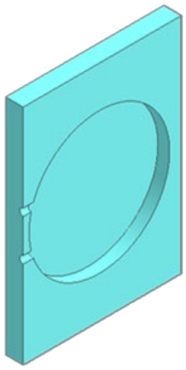
① The manufacturer will finish the shape and will cut the grooves.

② The manufacturer will degrease the shells with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the shells.

③ The manufacturer will confirm whether major dimensions comply with the drawings.



(a) Bottom shell



(b) Top shell

Figure 3-3 Shells for HIP joint

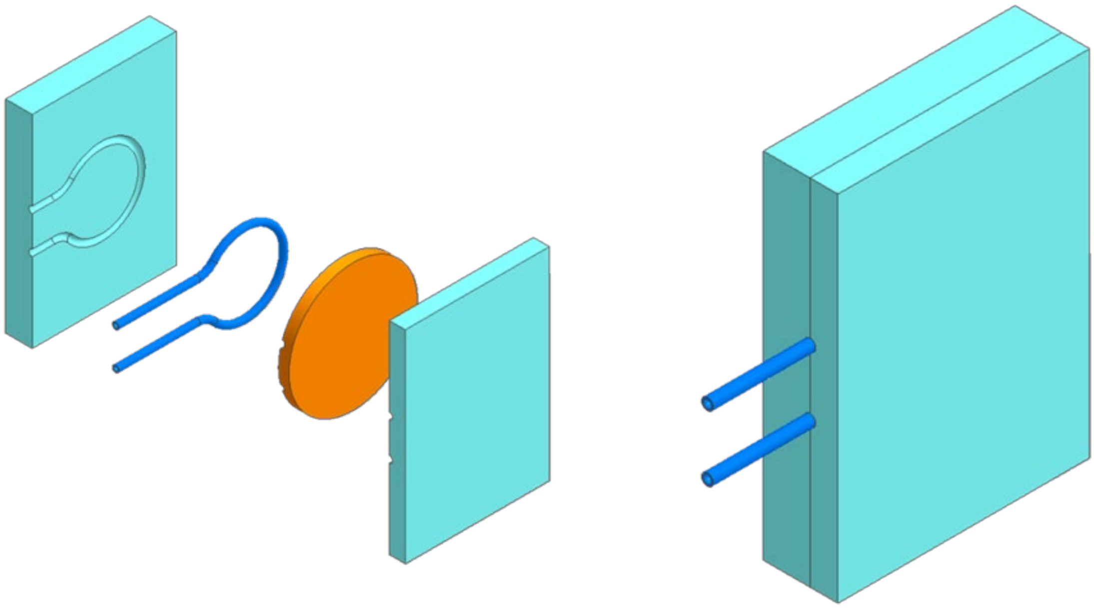
3.4 Mirror HIP process

Title (Drawing number)(*)	Mirror HIP process (6EMM-001)
Materials	SS316LN-IG, CuCrZr
Material dimensions(*)	-
Quantity	19 sets (including one sample for tests)
Processing time	Total one month
Processing machine	-

[Notes] The drawing 6EMM-001 is a representative one, and the material dimensions is applicable to just 6EMM-001. The manufacturer shall prepare all drawings of the mirror HIP processes and shall evaluate the material dimensions for all the mirror HIP processes.

Manufacturing procedure

① The manufacturer will assemble the heatsink (7EMM-001 described in Section 3.1), cooling pipe (7EMM-002 described in Section 3.2) and shells for HIP joint (7EMM-003 described in Section 3.3) and will weld the shells by full-circled welding.
② The manufacturer will carry out HIP.
③ The manufacturer will confirm whether major dimensions comply with the drawings.
④ The manufacturer will cut a sample to check milli-meter order defect by visual inspection.
⑤ The manufacturer will check any defect in the pipe by using an endoscope.
⑥ When the surface is dirty, the manufacturer will clean it with ethanol-based cleaning solution.
⑦ The manufacturer will cover the entrance of the pipe to prevent adhesion of foreign objects.



(a) Before assembly (b) After assembly

Figure 3-4 Mirror HIP process

3.5 Mirror Mount Assembly

Title (Drawing number)(*)	Mirror mount assembly (5EMM-002)
Materials	SS316LN-IG
Material dimensions(*)	-
Quantity	18
Processing time	45 hours per mirror mount assembly
Processing machine	— General purpose latch (DMG MORI CO., LTD. MH-1500G or equivalent) — Wire-cut electric discharge machine (Mitsubishi Electric Corporation MV2400R or equivalent) — Vertical CNC milling machine (OKK PCV-50 or equivalent) — Horizontal CNC milling machine (TOSHIBA MACHINE CO., LTD. BTD-200QE or equivalent)

[Notes] The drawing 5EMM-002 is a representative one, and the material dimensions is applicable to just 5EMM-002. The manufacturer shall prepare all drawings of the mirror mount assemblies and shall evaluate the material dimensions for all the mirror mount assemblies.

Manufacturing procedure

① The manufacturer will cut the joined parts described in Section 3.4 and will shape the mirror mount assembly roughly by WEDM (Wire-cut Electric Discharge Machine).

② The manufacturer will finish the outer shape (e.g. cylindrical parts) with the pipe left (see the middle of Figure 3-5).

③ The manufacturer will apply water pressure of 7.0 MPaG to the pipe and check any defect on it. After inspections, the manufacturer will cut the pipe at the specified length.

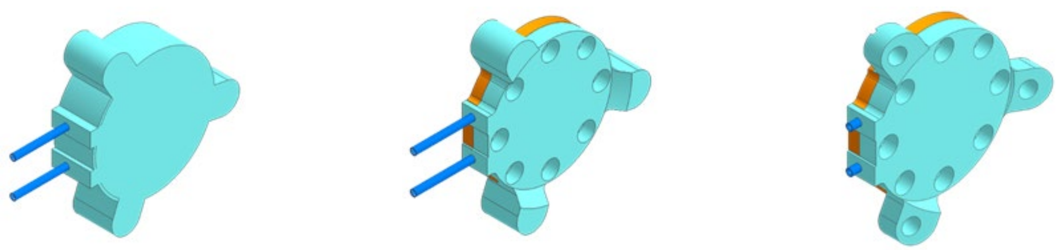
④ The manufacturer will fix the joined parts on the processing machine at an angle specified in drawing and will cut three tabs.

⑤ The manufacturer will drill holes in the tabs and will cut ventilation grooves on the tabs.

⑥ The manufacturer will degrease the assemblies with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the assemblies.

⑦ The manufacturer will confirm whether major dimensions comply with the drawings.

⑧ The manufacturer will clean the inside of the pipes and will cover the entrance of the pipes to prevent adhesion of foreign objects.



(a) After WEDM cutting (b) After rough shaping (c) After final shaping

Figure 3-5. Mirror mount assembly

3.6 Tungsten Mirror

Title (Drawing number)	Tungsten mirror (5EMM-001)
Materials	Pure tungsten
Material dimensions	φ125×20t
Quantity	18 (9 flat mirrors and 9 curvature mirrors)
Processing time	30 hours per mirror
Processing machine	— Vertical CNC milling machine (MAKINO V33 or equivalent) — Oscar Type polishing machine or equivalent

Manufacturing procedure

① The manufacturer will shape the mirror, will cut internal threads and will adjust the thickness with a vertical CNC milling machine.
② The manufacturer will polish the surface of the mirrors roughly by using Oscar type polishing machine with rough abrasive.
③ The manufacturer will finish the surface of the mirrors with fine abrasive.
④ The manufacturer will clean the surface to remove dusts with cleaning fluid (alcohol) and with lens cleaning paper dedicated for optical elements. The manufacturer will pay attention so as not to damage the characteristics of the surface state or material, and the cleaning procedure will be minimized. The manufacturer will take pictures of the mirror surface in high-resolution before and after cleaning to compare them.
⑤ The manufacturer will confirm whether major dimensions comply with the drawings.
⑥ The manufacture will check the surface roughness with laser interferometer at arbitrary area with a diameter of 60 mm. The measurement will be several times and the measurement area will be overlapped.
⑦ The manufacturer will measure the curvature radius with CMM (Coordinate Measuring Machine) to calculate the focal length.
⑧ The manufacturer will measure the reflectivity of the mirrors by using a laser, a detector etc.
⑨ The manufacturer will protect the surface of the mirror with plastic film of FUTAMURA CHEMICAL CO., LTD. (self-adhesive OPP film FSA or equivalent).

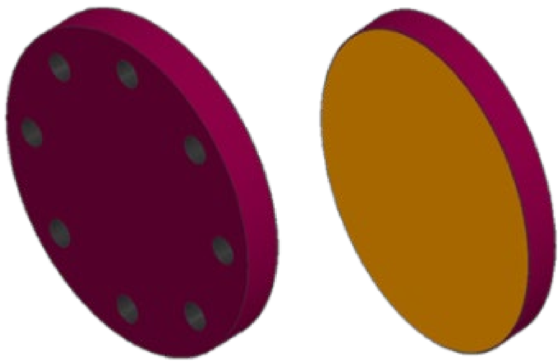


Figure 3-6 Tungsten Mirror

3.7 Mirror assembly

Title (Drawing number)(*)	Mirror assembly (4EMM-001)
Materials	W, CuCrZr, SS316LN-IG
Material dimensions(*)	-
Quantity	18
Processing time	1.5 hours per mirror assembly
Processing machine	TIG welding machine (DAIHEN Corporation DT300P or equivalent)

[Notes] The drawing 4EMM-001 is a representative one, and the material dimensions is applicable to just 4EMM-001. The manufacturer shall prepare all drawings of the mirror assembly and shall evaluate the material dimensions for all the mirror assemblies.

Manufacturing process

① The manufacturer will protect the surface of the tungsten mirror with plastic film of FUTAMURA CHEMICAL CO., LTD. (self-adhesive OPP film FSA or equivalent).

② The manufacturer will join the tungsten mirror (described in Section 3.5) and the mirror mount assembly (described in Section 3.6) with DLC coated Tungsten bolts.

③ The manufacturer will put a washer on each tungsten bolt and will weld at four points between the mirror mount assembly and the washer to prevent loosening of the bolts.

④ The manufacturer will check the thermal distribution of the surface of the mirror by using an infrared camera to check any cold spot when cooling water temperature is rapidly changed.

⑤ When the surface is dirty, the manufacturer will clean it with ethanol-based cleaning solution.

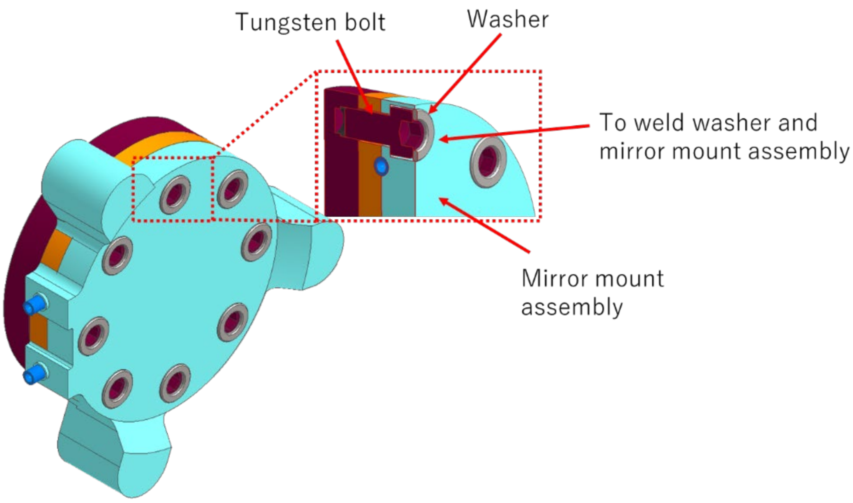


Figure 3-7 Assembly of tungsten mirror and mirror mount assembly

4 Manufacturing of Other Components

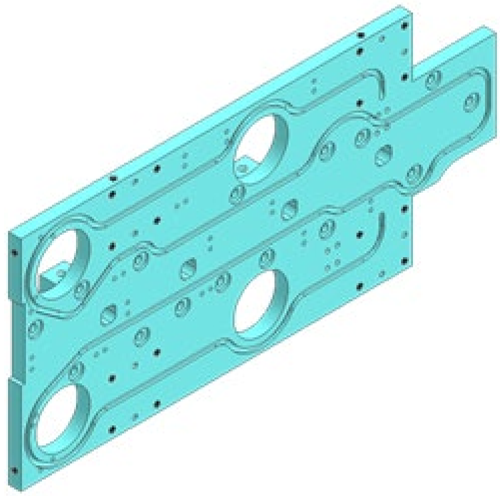
This section describes materials, material dimensions, quantity, processing time, processing machines, manufacturing procedure, inspections and cleaning procedures of the components other than mirrors that was called “other components” in Figure 2-1.

4.1 Base Plate

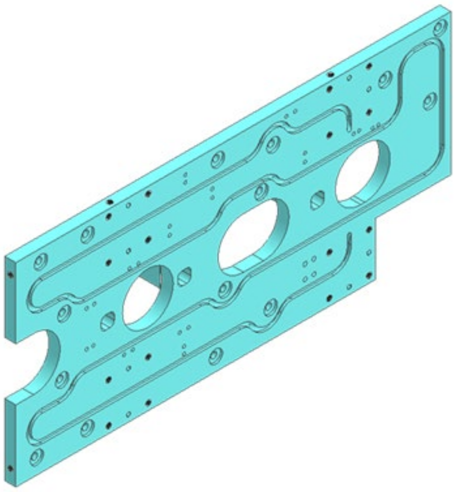
Title (Drawing number)	UEMM M1 base plate (5UEMM-001) LEMM M1 base plate (5LEMM-001) UEMM M2 base plate (5UEMM-002) LEMM M2 base plate (5LEMM-002)
Materials	SS316LN-IG
Material dimensions	125t x 450 x 970 (5UEMM-001) 125t x 450 x 750 (5LEMM-001) 115t x 450 x 995 (5UEMM-002) 115t x 450 x 765 (5LEMM-002)
Quantity	4
Processing time	150 hours per plate
Processing machine	― Electric discharge machine (Mitsubishi Electric Corporation MV2400R or equivalent) ― Vertical CNC milling machine (OKK MCV820 or equivalent) ― Horizontal CNC milling machine (TOSHIBA MACHINE CO., LTD. BTD-200QE or equivalent)

Manufacturing procedure

① The manufacturer will cut the shape roughly from the material plate and will remove the internal stress by heat treatment (immediate cooling after 1050 to 1150 degrees Celsius heating).
② The manufacturer will cut the grooves on the base plate and will drill the holes in the plate.
③ The manufacturer will finish the outer shape of the base plate and will drill counterbores in the plate.
④ The manufacturer will confirm whether major dimensions comply with the drawings.
⑤ The manufacturer will degrease the plates with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the plates.

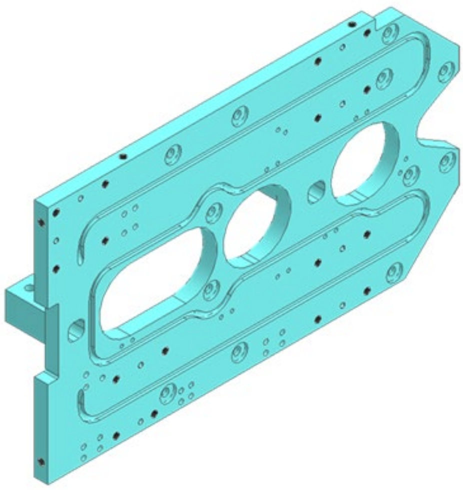


(a) 5UEMM-001

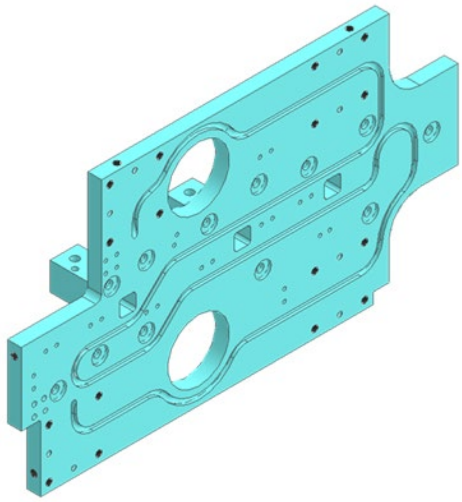


(b) 5UEMM-002

Figure 4-1 Base plates of UEMM



(a) 5LEMM-001



(b) 5LEMM-002

Figure 4-2 Base plates of LEMM

4.2 Base Plate Brazing Process

Title (Drawing number)	UEMM M1 base plate brazing process (4UEMM-001) LEMM M1 base plate brazing process (4LEMM-001) UEMM M2 base plate brazing process (4UEMM-002) LEMM M2 base plate brazing process (4LEMM-002)
Materials	SS316LN-IG
Material dimensions	-φ9.53×1t-3200～4950L （total 16000mm）
Quantity	4
Processing time	3 months (total)
Processing machine	— CNC Pipe Bender (OPTON. Co. Ltd S-ECO 15 or equivalent) — Automatic welding machine (SWAGELOK orbital welding system series 4,5 or equivalent) — Spot welding machine (DAIHEN Corporation UP-8S or equivalent)

Manufacturing procedure

① The manufacturer will shape separated pipes roughly by using CNC pipe bender first. Then, the manufacturer will fit the bent pipes actually with the grooves of the base plate described in Section 4.1 and will adjust the shape of pipes by hand.

② The manufacturer will join the separated pipes. The type of welding is a butt welding, and an automatic welding machine will be used. After welding, RT inspection will be carried out to check welding joints.

③ The manufacturer will fit the joined pipe into the groove of the base plate and will braze the pipe to the base plate injecting BNi-6 (brazing material) between the pipe and the groove. The groove will be 2 milli meter larger than the outer diameter of the pipe, and the manufacturer shall fulfill the gap between the pipe and the groove with the brazing material.

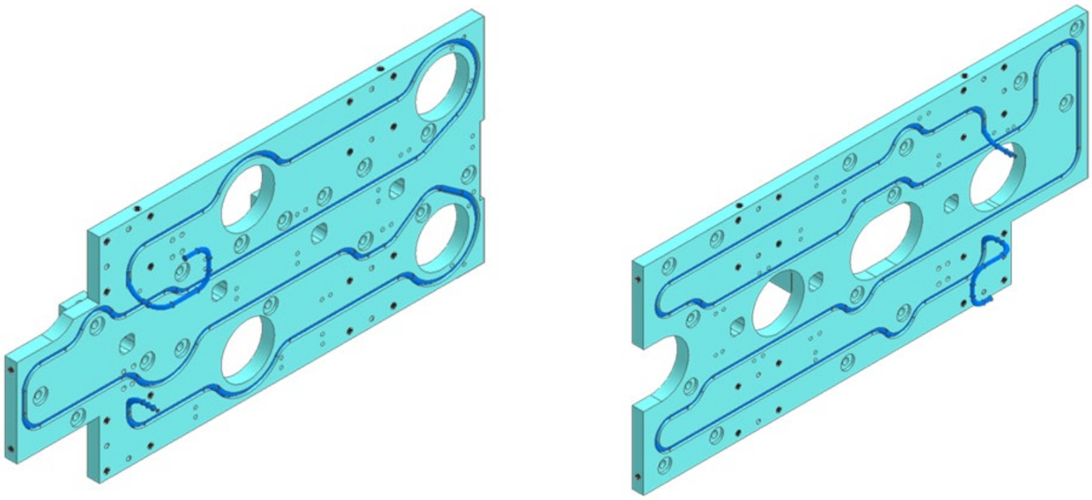
④ After brazing the manufacturer will join a reducer (3EMM-001) and the pipe. The type of welding is a butt welding, and the automatic welding machine. After welding, RT inspection will be carried out to check welding joints.

⑤ The manufacturer will vacuum the pipe, will spray Helium gas on welded parts and will check if helium flows into the pipe by using a residual gas analyzer.

⑥ The manufacturer will apply water pressure of 7.0 MPaG pressure to the pipe and check any defect on it.

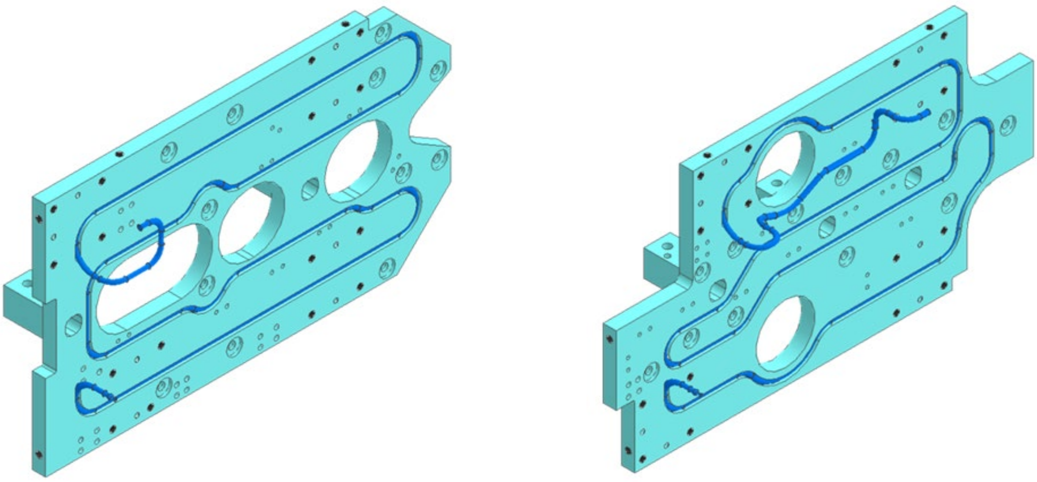
⑦ When the surface is dirty, the manufacturer will clean it with ethanol-based cleaning solution.

⑧ The manufacturer will clean the inside of the pipes and will cover the entrance of the pipes to prevent adhesion of foreign objects.



(a) 4UEMM-001 (b) 4UEMM-002

Figure 4-3. UEMM base plate brazing process



(a) 4LEMM-001 (b) 4LEMM-002

Figure 4-4. LEMM base plate brazing process

4.3 Pipe Support

Title (Drawing number) (*)	Pipe support (4EMM-002)
Materials	SS316LN-IG
Material dimensions (*)	40t×50×90 15t×25×40
Quantity	29
Processing time	12 hours per part
Processing machine	— Wire-cut electric discharge machine (Mitsubishi Electric Corporation MV2400R or equivalent) — Horizontal CNC milling machine (TOSHIBA MACHINE CO., LTD. BTD-200QE or equivalent) — Vertical milling machine (SHIZUOKA VHR-A or equivalent)

[Notes] The drawing 4EMM-002 is a representative one, and the material dimensions is applicable to just 4EMM-002. The manufacturer shall prepare all drawings of the pipe supports and shall evaluate the material dimensions for all the pipe supports.

Manufacturing procedure

① The manufacturer will cut the shape roughly from the material plate by WEDM and will finish the outer shape.
② The manufacturer will drill holes and will thread them with a tap.
③ The manufacturer will degrease the pipe supports with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the pipe supports.
④ The manufacturer will confirm whether major dimensions comply with the drawings.

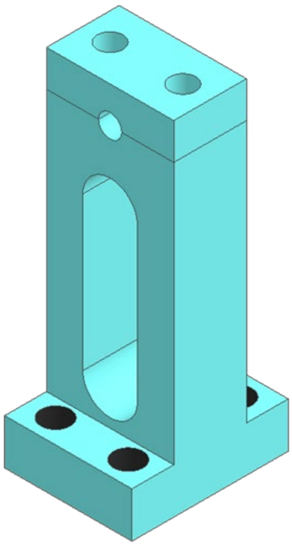


Figure 4-5. Example of pipe support

4.4 Rod

Title (Drawing number) (*)	Rod (4EMM-003)
Materials	SS316LN-IG
Material dimensions(*)	φ35-86L
Quantity	54
Processing time	2 hours per rod
Processing machine	— General purpose latch (DMG MORI CO., LTD. MH-1500G or equivalent) — Vertical milling machine (SHIZUOKA VHR-A or equivalent)

[Notes] The drawing 4EMM-003 is a representative one, and the material dimensions is applicable to just 4EMM-003. The manufacturer shall prepare all drawings of the rods and shall evaluate the material dimensions for all the rods.

Manufacturing procedure

① The manufacturer will cut the material, will shape it and will make internal and external thread.

② The manufacturer will degrease the rods with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the rods.

③ The manufacturer will confirm whether major dimensions comply with the drawings.

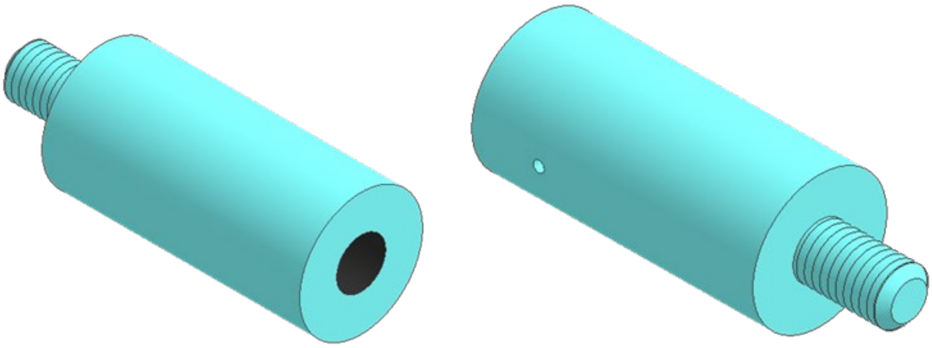


Figure 4-6. Rods

4.5 Reducer

Title (Drawing number)	Reducer (3EMM-001)
Materials	SS316LN-IG
Material dimensions	φ15-25L
Quantity	8
Processing time	2 hours per reducer
Processing machine	General purpose latch (DMG MORI CO., LTD. MH-1500G or equivalent)

Manufacturing procedure

① The manufacturer will finish the outside shape first and will finish the inside shape.

② The manufacturer will degrease the reducers with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the reducers.

③ The manufacturer will confirm whether major dimensions comply with the drawings.

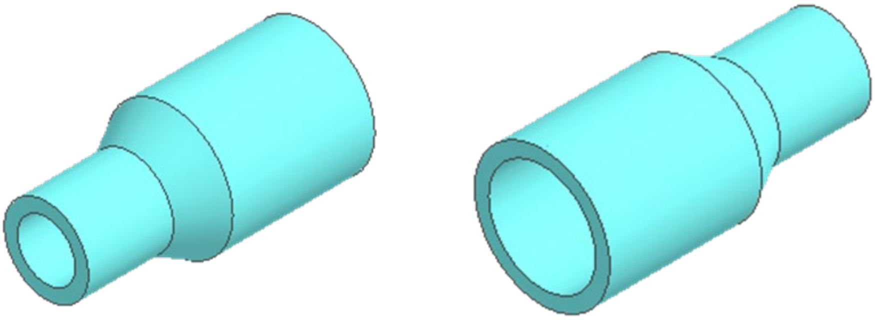


Figure 4-7. Reducer

4.6 1/4-inch cooling pipe

Title (Drawing number) (*)	1/4-inch cooling pipe (3EMM-002)
Materials	SS316LN-IG
Material dimensions(*)	φ6.35×1t-160L - 740L
Quantity	22
Processing time	2 hours per pipe
Processing machine	CNC Pipe Bender (OPTON. Co. Ltd S-ECO 15 or equivalent)

[Notes] The drawing 3EMM-002 is a representative one, and the material dimensions is applicable to just 3EMM-002. The manufacturer shall prepare all drawings of the 1/4-inch cooling pipes and shall evaluate the material dimensions for all the 1/4-inch cooling pipes.

Manufacturing procedure

① The manufacturer will shape pipes with CNC pipe bender and will cut them.
② The manufacturer will degrease the pipes with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the pipes.
③ The manufacturer will confirm whether major dimensions comply with the drawings.
④ The manufacturer will clean the inside of the pipes and will cover the entrance of the pipe to prevent adhesion of foreign objects.

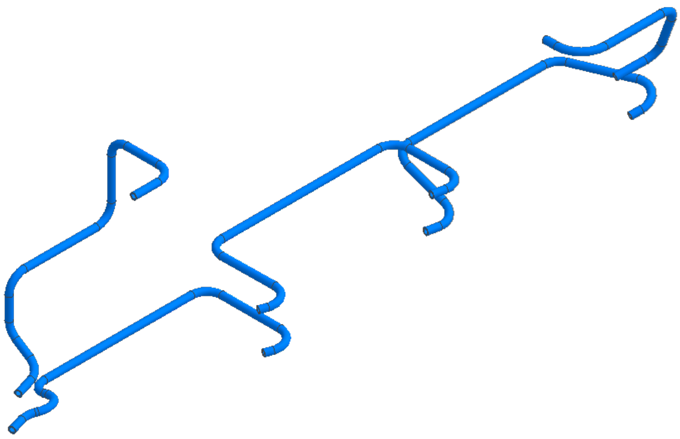


Figure 4-8. 1/4-omcj cooing pipe

4.7 Connecting Rod

Title (Drawing number) (*)	Connecting rod (2EMM-001)
Materials	SS316LN-IG
Material dimensions(*)	φ60×15t-520L φ25-35L 45t×125×125
Quantity	8
Processing time	2.5 months (total)
Processing machine	— Vertical CNC milling machine (MAKINO V33 or equivalent) — TIG welding machine (DAIHEN Corporation DT300P or equivalent)

[Notes] The drawing 2EMM-001 is a representative one, and the material dimensions is applicable to just 2EMM-001. The manufacturer shall prepare all drawings of the connecting rods and shall evaluate the material dimensions for all the connecting rods.

Manufacturing procedure

① End plate: The manufacturer will cut the material, will shape the plate part at the dimensions of 15x125x125 mm to be finished after following procedure of welding, and will shape the part connected to the rod (Figure 4-9). The manufacturer will confirm whether major dimensions comply with the drawings.

② Rod: The manufacturer will cut the material at the specified length and will finish the shape of the end part of the rod (Figure 4-10). The manufacturer will confirm whether major dimensions comply with the drawings.

③ Pipe with flange: The manufacturer will finish the outside shape and will finish the inside shape (Figure 4-11). The manufacturer will confirm whether major dimensions comply with the drawings.

④ The manufacturer will degrease the parts described in the previous procedures (the end plates, the rods and the pipes with flange) with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of them.

⑤ The manufacturer will join the rod and the end plates by TIG welding (Figure 4-12). The total number of the weld passes are six to ten, and weld overlay is necessary. During the welding process, the manufacturer will carry out visual inspection at every pass and PT inspection at several passes to confirm whether the welding joints are full penetrated.

⑥ The manufacturer will join the rod and the pipes with flange by TIG welding (Figure 4-13). The total number of the weld passes are one to three, and weld overlay is necessary. The manufacturer will carry out visual inspection at every pass during the welding process and then will carry out PT inspection after welding to confirm whether the welding joints are full penetrated.

⑦ The manufacturer will carry out RT inspection to check any defect on the welded joint.

⑧ The manufacturer will weld the bosses to the rod and will carry out visual inspection and PT inspection (Figure 4-14).

⑨ The manufacturer will finish the shape of both end plates at the dimension of 120x120 mm and will finish the length between the both plates 570 mm with 0.1 mm parallelism.

⑩ The manufacturer will drill holes in the end plates and will add cutout to the end plates (Figure 4-15).

⑪ The manufacturer will confirm whether major dimensions comply with the drawings.

⑫ The manufacturer will degrease the connecting rods with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the connecting rods.

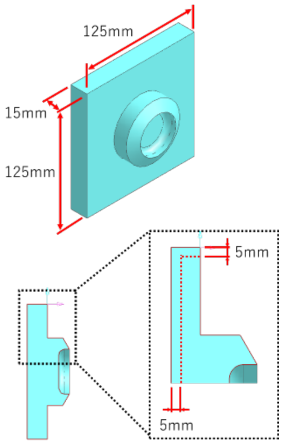


Figure 4-9 End plate

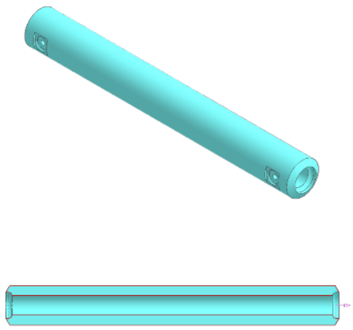


Figure 4-10 Rod

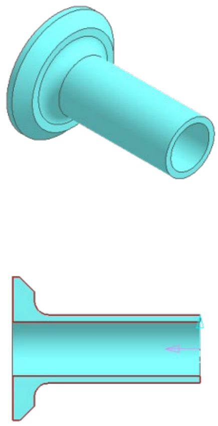


Figure 4-11 Pipe with flange

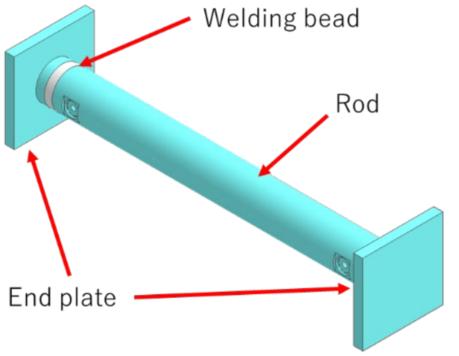


Figure 4-12 Welding rod and end plates

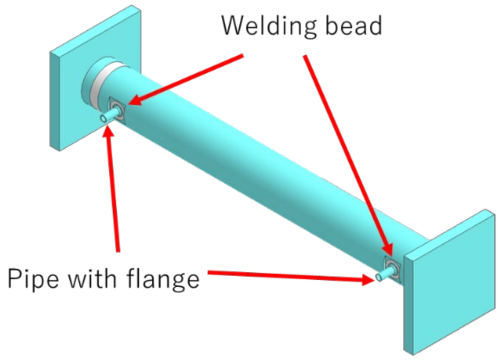


Figure 4-13 Welding rod and pipes with flange

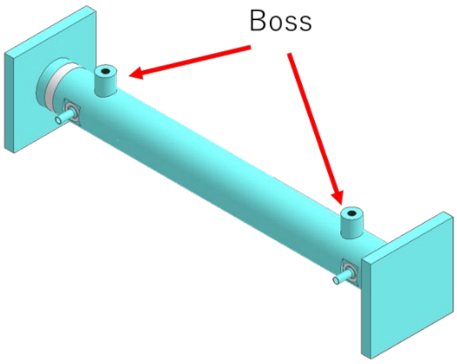


Figure 4-14 Welding rod and bosses

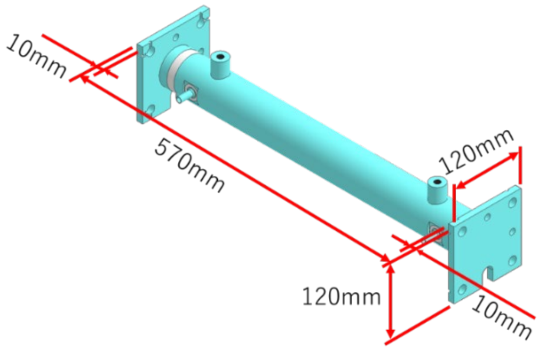


Figure 4-15 Final process of end plates

4.8 Interface pipe

Title (Drawing number) (*)	Interface pipe (2EMM-002)
Materials	SS316LN-IG
Material dimensions (*)	φ9.53×1t-240～615L
Quantity	4
Processing time	2 hours per pipe
Processing machine	CNC Pipe Bender (OPTON. Co. Ltd S-ECO 15 or equivalent)

[Notes] The drawing 2EMM-002 is a representative one, and the material dimensions is applicable to just 2EMM-002. The manufacturer shall prepare all drawings of the interface pipes and shall evaluate the material dimensions for all the interface pipes.

Manufacturing procedure

① The manufacturer will shape pipes with CNC pipe bender and will cut them.

② The manufacturer will degrease the pipes with neutral detergent first and will clean them with ethanol-based cleaning solution so as not to remain processing oil on the surface of the pipes.

③ The manufacturer will confirm whether major dimensions comply with the drawings.

④ The manufacturer will clean the inside of the pipes and will cover the entrance of the pipes to prevent adhesion foreign objects.

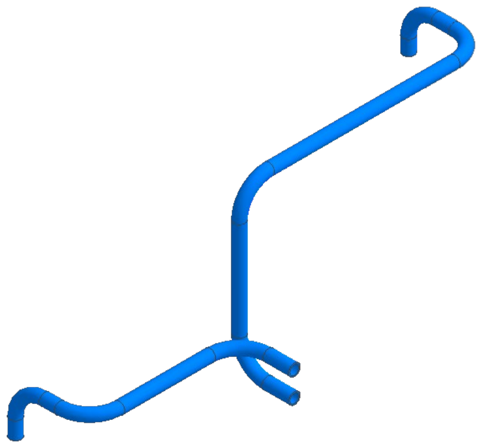


Figure 4-16. Interface pipe

5 Assembly of Mirrors and Other Components

This section describes materials, material dimensions, quantity, processing time, processing machines, manufacturing procedure, inspections and cleaning procedures of the manufacturing procedure that was called "the assembly of mirrors and other components" in Figure 2-1.

5.1 UEMM/LEMM Base Plate First Assembly

Title (Drawing number)	UEMM M1 base plate first assembly (3UEMM-001) LEMM M1 base plate first assembly (3LEMM-001) UEMM M2 base plate first assembly (3UEMM-002) LEMM M2 base plate first assembly (3LEMM-002)
Materials	W, CuCrZr, SS316LN-IG
Material dimensions	-
Quantity	4
Processing time	10 hours per assembly
Processing machine	TIG welding machine (DAIHEN Corporation DT300P or equivalent)

Manufacturing procedure

① The manufacturer will assemble the mirror assemblies (4EMM-001 described in Section 3.7), the pipe supports (4EMM-002 described in Section 4.3), the rods (4EMM-003 described in Section 4.4) and the base plates brazed to the cooling pipe (4UEMM-001, 4UEMM-002, 4LEMM-001, and 4LEMM-002 described in Section 4.2).
[Note]The manufacturer shall protect the surface of the Tungsten mirror (5EMM-001) with plastic film of FUTAMURA CHEMICAL CO., LTD. (self-adhesive OPP film FSA or equivalent).

② The manufacturer will change the position of the assemblies by using a crane. Then, the manufacturer will put washers and will conduct tack welding to prevent loosening of rods.

③ When the surface is dirty, the manufacturer will clean it with ethanol-based cleaning solution.

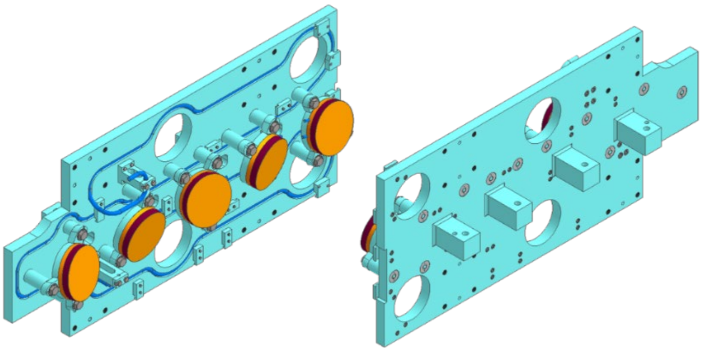


Figure 5-1. First assembly of 3UEMM-001

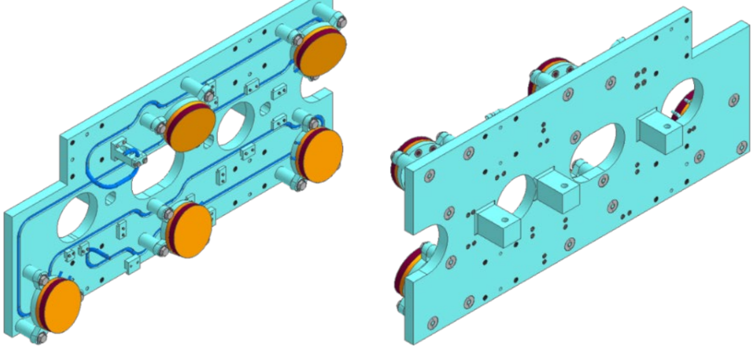


Figure 5-2. First assembly of 3UEMM-002

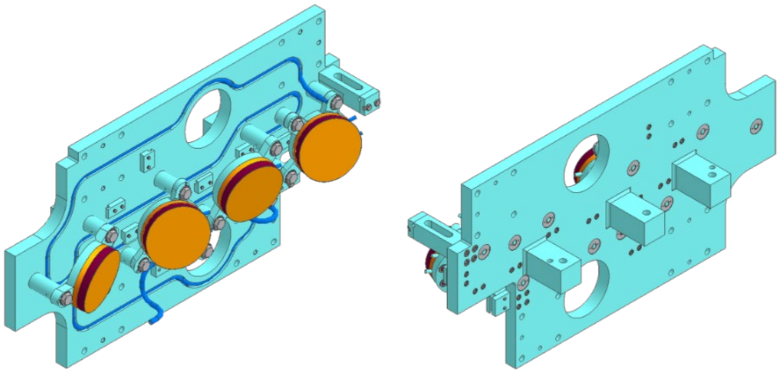


Figure 5-3. First assembly of 3LEMM-001

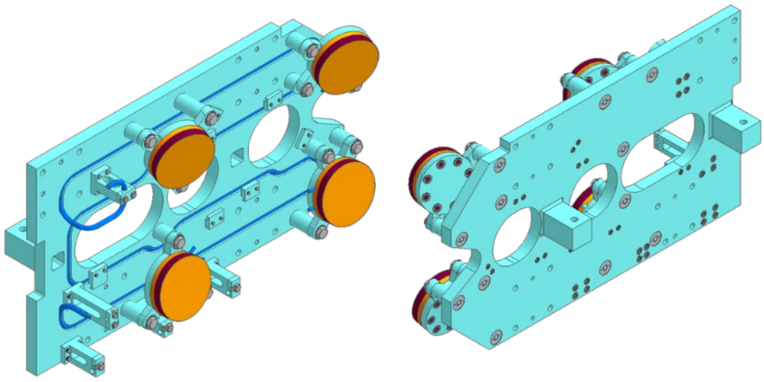


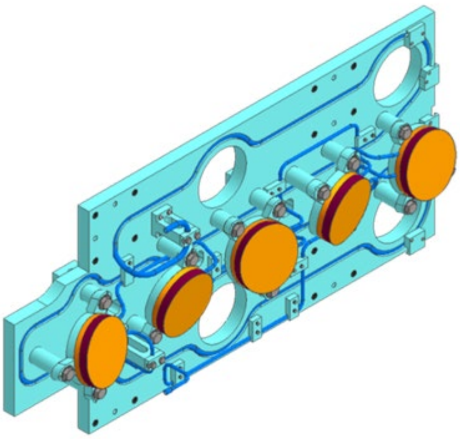
Figure 5-4. First assembly of 3LEMM-002

5.2 UEMM/LEMM Base Plate Second Assembly

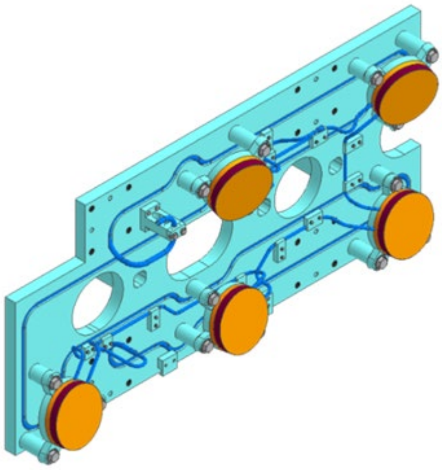
Title (Drawing number)	UEMM M1 base plate second assembly (2UEMM-001) LEMM M1 base plate second assembly (2LEMM-001) UEMM M2 base plate second assembly (2UEMM-002) LEMM M2 base plate second assembly (2LEMM-002)
Materials	W, CuCrZr, SS316LN-IG
Material dimensions	-
Quantity	4
Processing time	40 hours per assembly
Processing machine	Automatic welding machine (SWAGELOK orbital welding system series 4,5 or equivalent)

Manufacturing procedure

① The manufacturer will weld the reducers (3EMM-001 described in Section 4.5) and the 1/4-inch cooling pipes (3EMM-002 described in Section 4.6) and will weld the pipes of the mirror assemblies (4EMM-001 described in Section 3.7) and the 1/4-inch cooling pipes. The type of welding is a butt welding, and the automatic welding machine will be used.
② After welding, RT inspection will be carried out to check welding joints.
③ The manufacturer will apply water pressure of 7.0 MPaG to the pipe and check any defect on it.
④ The manufacturer will vacuum the pipe, will spray Helium gas on welded parts and will check if helium flows into the pipe by using a residual gas analyzer.
⑤ When the surface is dirty, the manufacturer will clean it with ethanol-based cleaning solution.
⑥ The manufacturer will cover the entrance of the pipes to prevent adhesion of foreign objects.

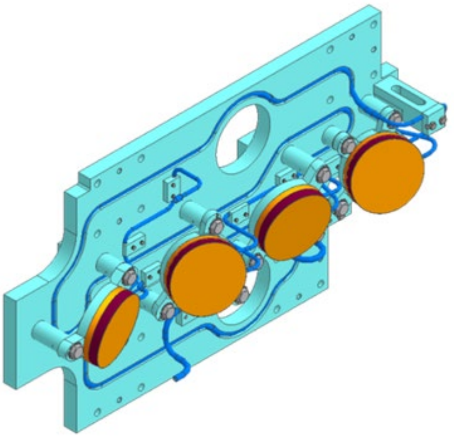


(a) 2UEMM-001

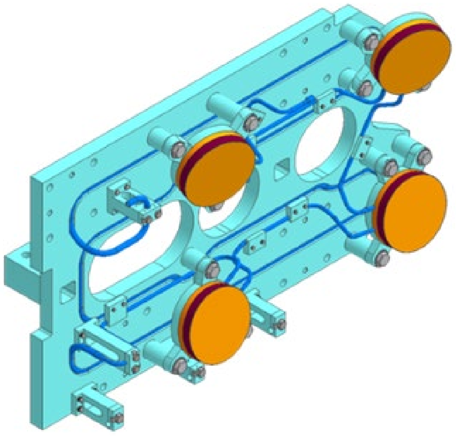


(b) 2UEMM-002

Figure 5-5. Second assembly of UEMM



(a) 2LEMM-001



(b) 2LEMM-002

Figure 5-6. Second assembly of LEMM

5.3 UEMM/LEMM Final Assembly

Title (Drawing number)	UEMM final assembly (1UEMM-001) LEMM final assembly (1LEMM-001)
Materials	W, CuCrZr, SS316LN-IG
Material dimensions	-
Quantity	4
Processing time	35 hours per assembly
Processing machine	Automatic welding machine (SWAGELOK orbital welding system series 4,5 or equivalent)

Manufacturing procedure

① The manufacturer will assemble the connecting rods (2EMM-001 described in Section 4.7) and the base plates after the second assembly (2UEMM-001, 2UEMM-002, 2LEMM-001 and 2LEMM-002 described in Section 5.2)
[Note]The manufacturer shall protect the surface of the Tungsten mirror (5EMM-001) with plastic film of FUTAMURA CHEMICAL CO., LTD. (self-adhesive OPP film FSA or equivalent).

② The manufacturer will attach a jig to the four connecting rods to lift it by using a crane (see Figure 5-7 and Figure 5-8).

③ The manufacturer will tilt it by 90 degrees and will place it slowly on the wood. Then, the manufacturer will connect eyebolts to the tabs of the connecting rods, which is on the side of the base plate, and will change the position of the sling belt (Figure 5-9 and Figure 5-10).

④ The manufacturer will tilt it by 90 degrees in the same way as the previous procedure and will place it on the wood with the jig attached and with the connecting rods downward (see Figure 5-11 and Figure 5-12).

⑤ The manufacturer will lift the base plate assembly (with the connecting rods) vertically and will remove the jig (see Figure 5-13).

⑥ The manufacturer will lift down the base plate assembly with the connecting rods onto the other base plate assembly and will bolt them (see Figure 5-14).

⑦ The manufacturer will weld the connecting rods and the interface pipes (2EMM-002 described in 4.8). The type of welding is a butt welding, and the automatic welding machine will be used.

⑧ The manufacturer will vacuum the pipe, will spray Helium gas on welded parts and will check if helium flows into the pipe by using a residual gas analyzer.

⑨ The manufacturer will apply water pressure of 7.0 MPaG to the pipe and check any defect on it.

⑩ When the surface is dirty, the manufacturer will clean it with ethanol-based cleaning solution.

⑪ The manufacturer will cover the entrance of the pipes to prevent adhesion of foreign objects.

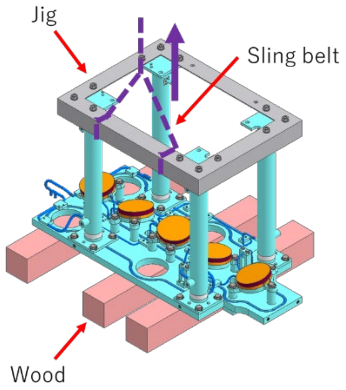


Figure 5-7. Assembly 1

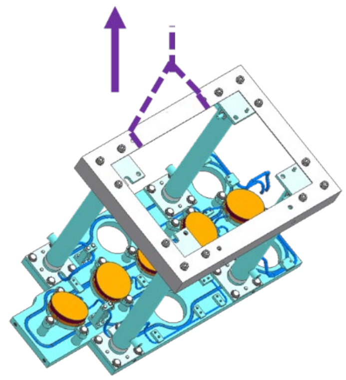


Figure 5-8. Assembly 2

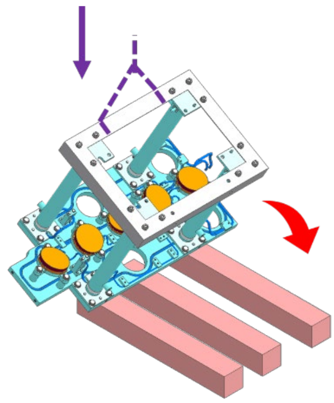


Figure 5-9. Assembly 3

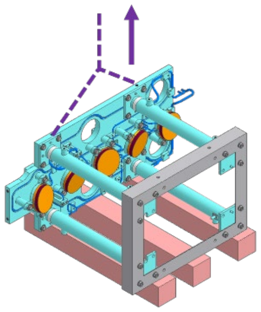


Figure 5-10. Assembly 4

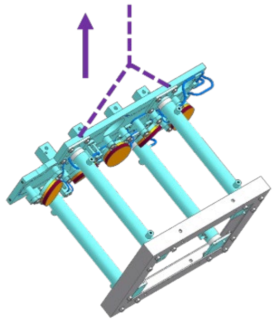


Figure 5-11. Assembly 5

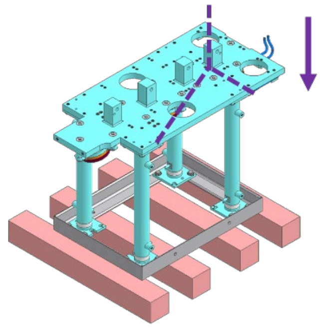


Figure 5-12. Assembly 6

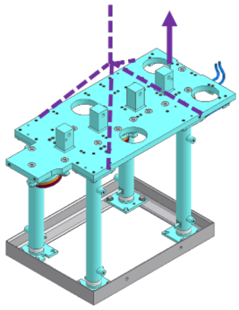


Figure 5-13. Assembly 7

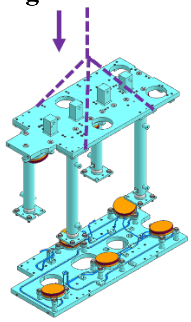


Figure 5-14. Assembly 8

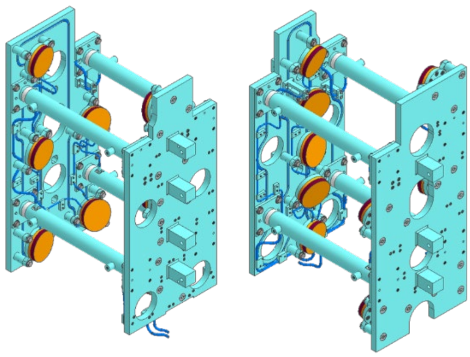


Figure 5-15. UEMM after final assembly

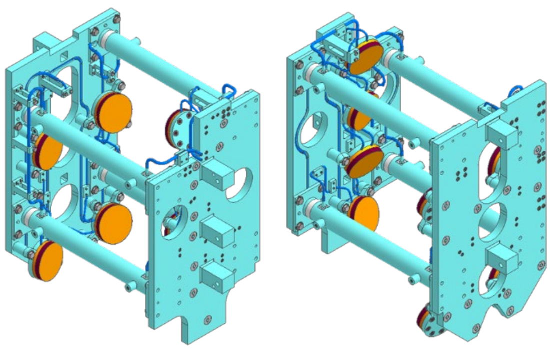


Figure 5-16. LEMM after final assembly

5.4 Mirror Angle Adjustment

The manufacturer will adjust the mirror angle so that the laser light beam reflected by the mirrors will reach the targets. The manufacturer will set the EMM, the laser incident position and the targets at the same position of the EMM installed at ITER site, vacuum windows and retroreflectors, respectively. When setting them, the manufacturer will use a laser tracker. The manufacturer will adjust the angle of the mirrors by inserting shims between the base plates and the rods.

5.5 Baking Procedure for Degassing

The manufacturer will bake out the products in vacuum to degas. The baking temperature will be 240 degrees Celsius, and the baking duration will be 24 hours. The details shall be in accordance with Section 26.2 of ITER Vacuum Handbook (ITER_D_2EZ9UM v2.5).

5.6 EMM Final Assembly

Title (Drawing number)	EMM final assembly (0UEMM-001)
Materials	W, CuCrZr, SS316LN-IG
Material dimensions	-
Quantity	1
Processing time	-
Processing machine	-

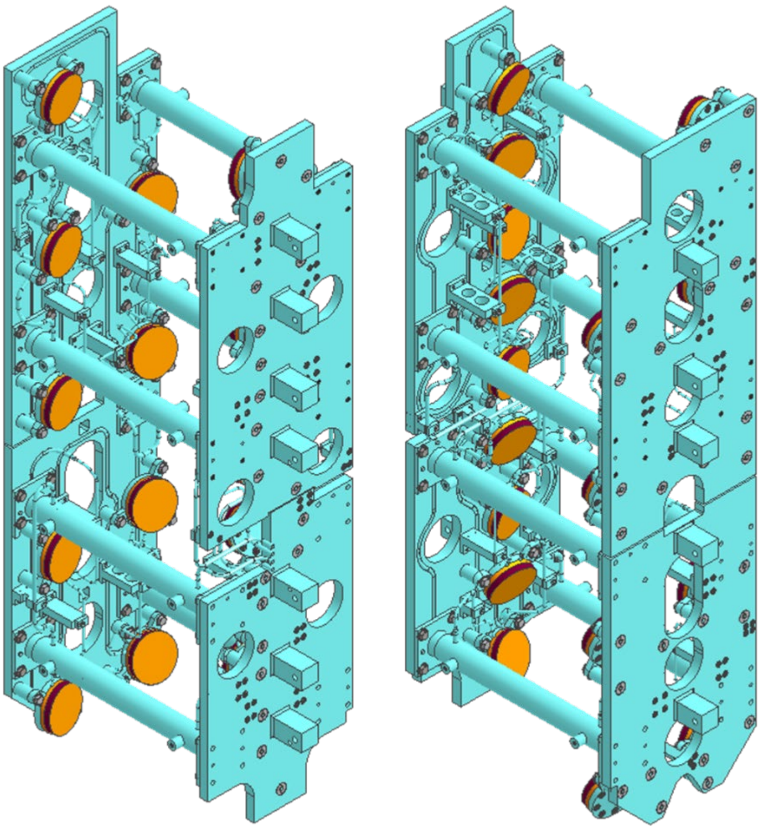


Figure 5-17. EMM

6 Conclusion

This report shows how to manufacture, inspect and assemble EMM. Since there is no unclear manufacturing process, it can be reasonably concluded that EMM is manufacturable.

Appendix A. List of purchases

Table 0-1 shows the list of purchases such as bolts and washers used for EMM.

Table 0-1. List of purchases for EMM

Parts	Model number	Material	Qty.	Manufacturer
Washer	FWSUS-D17.5-V10-T2	SS316L	144	MISUMI Group Inc.
Toothed lock washer	AW02	SS304	118	Nikki Trading Corp.
Washer	FWSUS-D15-V10-T2	SS316L	90	MISUMI Group Inc.
Washer with ventilation grooves	SWAS-12-VF	SS304	54	Nabeya Bi-tech Kaisha
Hexagon socket head cap screw (DLC coated)	M10-20L (custom made products)	W	144	KOYO
Hexagon head bolt	M12-25L	SS316L	54	Not specified
Hexagon head bolt	M12-30L	SS316L	64	Not specified
Hexagon socket head cap screw	M8-20L	SS316L	3	Not specified
Hexagon socket head cap screw	M8-25L	SS316L	87	Not specified

JADA-55342PL0101
ITER_D_69765M

Factory Qualification Test Plan of PoPola Mirror Modules in Equatorial Port Plug 10

ITER Project Japan Domestic Agency

This document was prepared for FDR. The factory qualification test plan will be updated by a contractor who will be determined after tendering the manufacturing of PoPola mirror module in Equatorial Port Plug 10.

	Name	Affiliation	Date	Signature
Reviewers	IMAZAWA Ryota (TRO)	Plasma Diagnostics Group	17-Nov-2021	今澤 良太
Reviewers	YOKOYAMA Masahito	Plasma Diagnostics Group	18-Nov-2021	横山 真仁
Approver	HATAE Takaki (RPGL)	Plasma Diagnostics Group	19-Nov-2021	波多江 仰紀

Change log

Brunch no. (date) (IDM number)	Change description
- (17 Nov 2021) (69765M_v1_0)	First version

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1. Purpose

This document is a plan ("Factory Qualification Test Plan") prepared for the necessary qualification tests prior to manufacturing EPP mirror module (EMM) of 55.C6 Poloidal Polarimeter (PoPola). Figure 1 shows an overview of the PoPola in-vessel components. Especially, components in the scope of this documents are the mirror module in EPP10, which is called EMM.

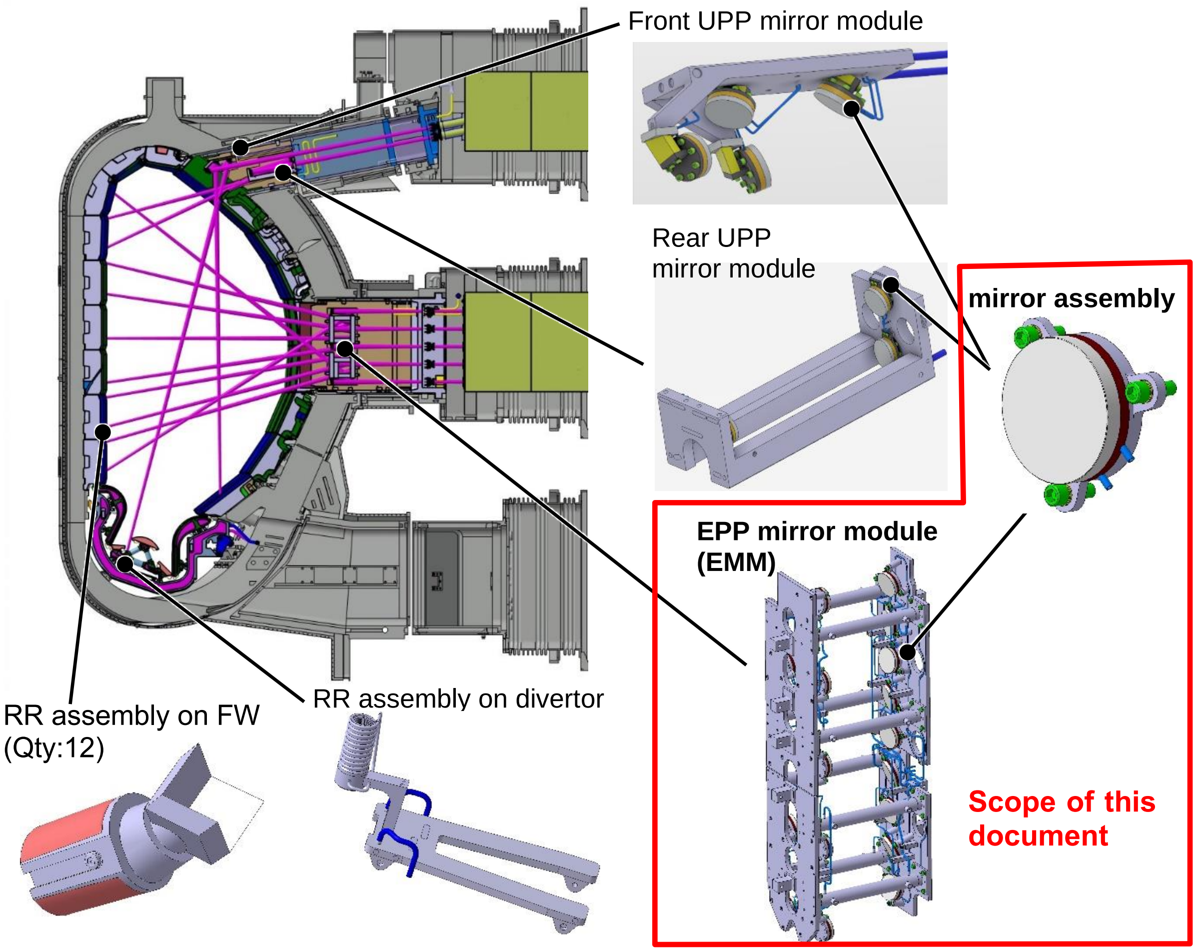

Figure 1 PoPola in-vessel components

2. Abbreviations

Abbreviations of words in this document are shown in Table 1.

Table 1 the abbreviations in this document

EMM	EPP Mirror Module
EPP	Equatorial Port Plug
EPP10	Equatorial Port Plug 10
IVH	ITER Vacuum Handbook
PoPola	Poloidal Polarimeter
TCWS	Tokamak Cooling Water System

3. References

[1] Technical Description of PoPola Mirror Modules in Equatorial Port Plug 10, ITER_D_696XRM v1.0 (or JADA-55342DE0101)
[2] Technical Specification of in-EPP10 components, ITER_D_696KB9 v1.0 (or JADA-55342TS0106)
[3] Summary report justifying ESPN classification, ITER_D_696J63 v1.0 (or JADA-55342DE0103)
[4] ITER Vacuum Handbook Appendix 4 Accepted Fluids, ITER_D_2ELN8N (ver.1.5)
[5] ITER Vacuum Handbook Appendix 17, ITER_D_2EXDST (ver. 2.2)
[6] ITER Vacuum Handbook (IVH), ITER_D_2EZ9UM (ver. 2.5)

4. System Description

PoPola is a diagnostic system to identify the magnetic field distributions inside the plasma by using a Far Infrared Red (FIR) laser with its wavelength of 118.8μm by measuring changes in polarization status of the FIR laser passing through the plasma. EMM, which is one of the components of this diagnostic system, is a reflective mirror installed into the vacuum vessel to propagate the probing laser beams.

EMM consists of mirror assemblies, connecting rods, baseplates, and pipes. Figure 2 and Figure 3 show overview of components and assemblies. Technical description [1] provides the detailed explanation about each component, and technical specification [2] provides the detailed specification that the manufacturer shall comply with.

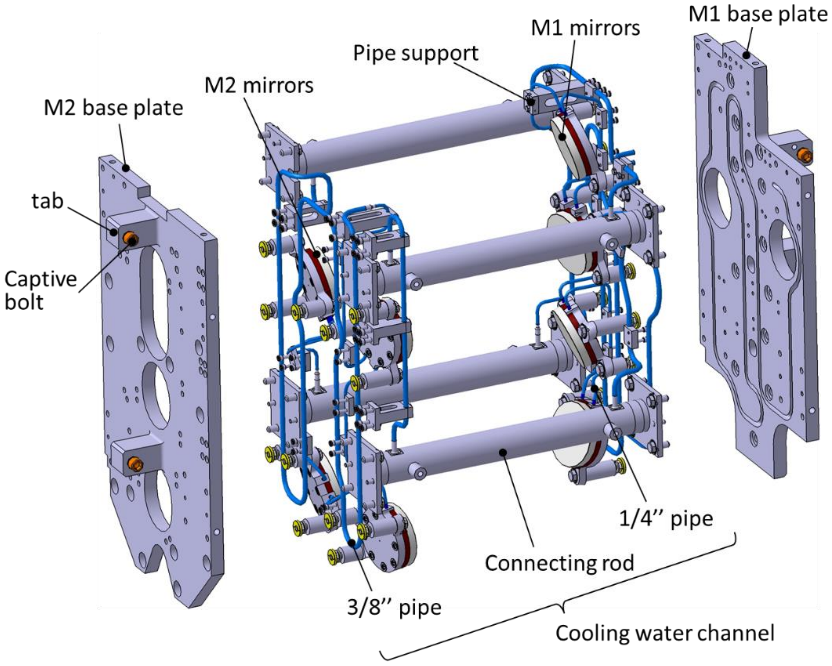

Figure 2. Components of EMM

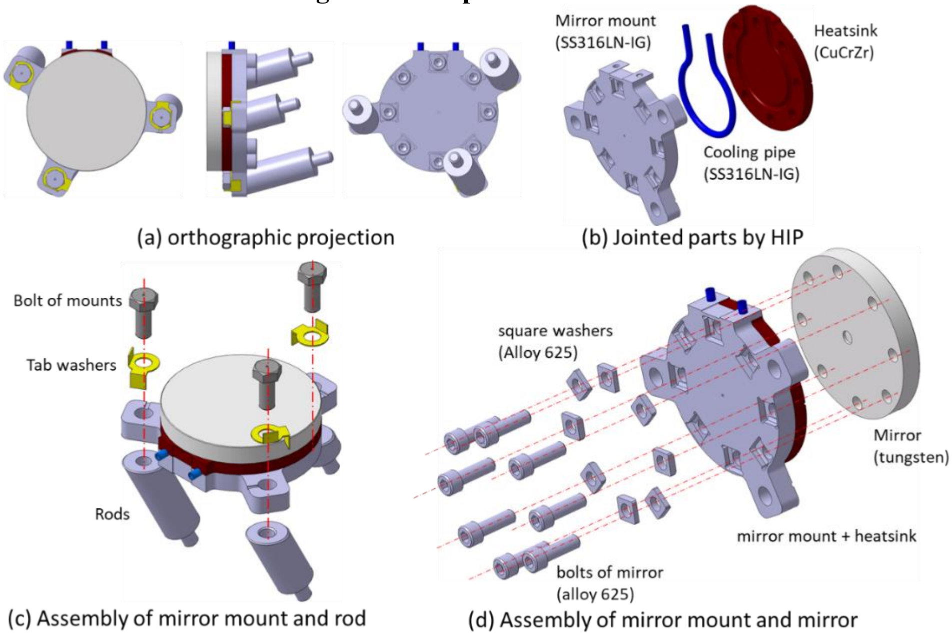

Figure 3. Components associated with mirror mount.

5. Factory qualification test plan for CCR

5.1. Classification of component

Table 2 shows classifications related to the manufacturing of EMM.

EMM shall satisfy the requirements of ESP/ESPN because it uses the cooling water supplied from Tokamak Cooling Water System. The ESPN category is N3 Category 0. Reference [3] provides the justification of the categorization.

"RCC-MRx 2012" is the manufacturing standards to be applied to EMM. The RCC-MRx equipment class is N3.

Table 2 Classification of CBRR

Quality class	QC1
Vacuum class	VAC-1A
RCC-MRx equipment class	$N3_{RX}$
ESPN class	$N3_{ESPN}$ Cat.0

5.2. Qualification test items

Table 3 shows the items of Qualification test to be carried out. The details of each qualification is explained in the following subsections.

Table 3 List of factory qualification test

No.	Components	Purpose of the qualification	Section
(1)	Connecting Rod	— Establishment of welding procedure — Establishment of inspection plan	5.2.1
(2)	Baseplate	— Establishment of the brazing procedure — Evaluation of outgas rate — Evaluation of cooling capability	5.2.2
(3)	Mirror Assembly	— Establishment of HIP procedure — Evaluation of outgas rate	5.2.3

5.2.1. Qualification of Manufacturing Connecting Rod

(1) Testing outline

The manufacturer will make a mockup of the connecting rod by using the same manufacturing process applied to the products. Then, the manufacturer will test the welding joint and the outgas rate.

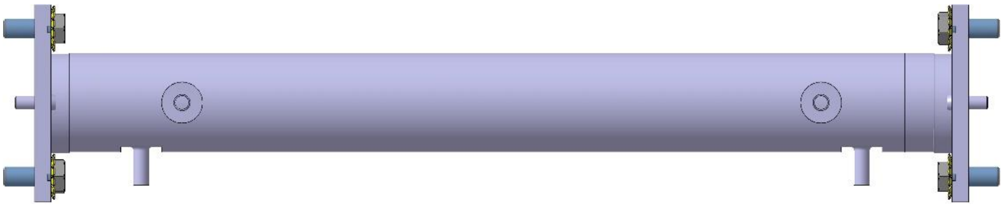

Figure 4. Connecting Rod

(2) Important documents

i. Technical specification of EMM [2]
ii. IVH [6], IVH Annexes and IVH appendixes.
iii. RCC-MRx (TOME 2 “MATERIALS”, TOME 4 “WELDING”)

(3) Testing procedure

The testing sample shall be manufactured complying with the manufacturing work plan that will be approved by ITER Organization before starting qualification test program. The manufacturing work plan will specify the following processes:

A. Dimensions
B. Material specifications
C. Machining tools and cutting oil
D. Welding procedure
E. Welding inspection procedure (visual inspection, penetrant testing, radiographic testing, ultrasonic testing, pressure test, helium leak test, transverse tensile test, impact test, metallographic examination, and hardness test)
F. Visual and dimensional inspection procedure
G. Cleaning procedure
H. Test procedure of outgassing rate

Regarding these procedures, the requirements described in the technical specification of EMM [2] shall be complied with.

(4) Evaluation criteria

The evaluation criteria of the qualification are the same as the specification applied to the product [2].

5.2.2. Qualification of Manufacturing Baseplate

(1) Testing outline

The manufacturer will make a mockup of the baseplate by using the same manufacturing process applied to the products. Then, the manufacturer will test the welding joint, the brazing joint and the outgas rate.

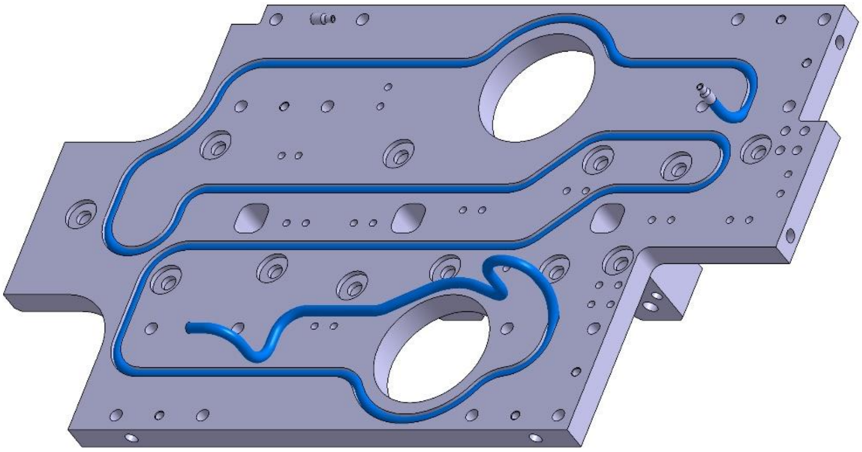

Figure 5. Baseplate

(5) Important documents

i. Technical specification of EMM [2]
ii. IVH [6], IVH Annexes and IVH appendixes.
iii. RCC-MRx (TOME 2 "MATERIALS", TOME 4 "WELDING", RF 7300 "BRAZED ASSEMBLIES")

(2) Testing procedure

The testing sample shall be manufactured complying with the manufacturing work plan that will be approved by ITER Organization before starting qualification test program. The manufacturing work plan will specify the following processes:

A. Dimensions
B. Material specifications
C. Machining tools and cutting oil
D. Welding procedure
E. Welding inspection procedure (visual inspection, penetrant testing, radiographic testing, ultrasonic testing, pressure test, helium leak test, transverse tensile test, impact test, metallographic examination, and hardness test)
F. Brazing procedure
G. Brazing inspection procedure (visual inspection and thermal response test)
H. Visual and dimensional inspection procedure
I. Cleaning procedure
J. Test procedure of outgassing rate

Regarding these procedures, the requirements described in the technical specification of EMM [2] shall be complied with.

(3) Evaluation criteria

The evaluation criteria of the qualification are the same as the specification applied to the product [2].

5.2.3. Qualification of Manufacturing Mirror Assembly

(1) Testing outline

The manufacturer will make a mockup of the mirror assembly by using the same manufacturing process applied to the products. Then, the manufacturer will test the HIP joint and the outgas rate.

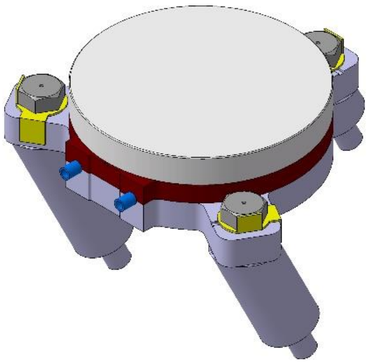

Figure 6. Mirror assembly

(6) Important documents

i. Technical specification of EMM [2]
ii. IVH [6], IVH Annexes and IVH appendixes.
iii. RCC-MRx (TOME 2 "MATERIALS")

(2) Testing procedure

The testing sample shall be manufactured complying with the manufacturing work plan that will be approved by ITER Organization before starting qualification test program. The manufacturing work plan will specify the following processes:

A. Dimensions
B. Material specifications
C. Machining tools and cutting oils
D. HIP procedure
E. HIP inspection procedure (destructive examination)
F. Visual and dimensional inspection procedure
G. Cleaning procedure
H. Test procedure of outgassing rate

Regarding these procedures, the requirements described in the technical specification of EMM [2] shall be complied with.

In order to inspect the HIP joint, destructive examination is necessary. Thus, the two mockups of the HIP joint are necessary. One is used for the destructive examination, and the other is used for the test of the outgassing rate.

(3) Evaluation criteria

The evaluation criteria of the qualification are the same as the specification applied to the product [2].

5.2.4. Common Notices to Qualification

This section gives common notices that is applicable to several qualification described in Table 3.

— When measuring the outgassing rate, a high precision gas measuring device will be used, and the principle of the device shall be a dynamic flow method (see Reference [5]).

— This document was prepared for FDR, and cutting oils and cleaning fluids are not determined yet at this moment. The cutting oils and cleaning fluids will be specified by a contractor who will be determined after tendering the manufacturing of PoPola EMM. If the contractor would specify a special fluid, the acceptance for use of the fluid will be checked by ITER Vacuum responsible officer in accordance with IVH.

— RCC-MRx RS3231.2 requires the destructive tests. The manufacturer can make the destructive tests by using welded coupons or can make the destructive tests by using the mockups that are made for Sections 5.2.1 and 5.2.2.

JADA-55342TS0107-1
ITER_D_697JYU

Technical Specification of PoPola Ex-vessel Components Interfacing with Port Integrator of EP10

ITER Project Japan Domestic Agency

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Change log

Brunch no. (date) (IDM version)	Change description	Author
- (22 Dec 2021) (697JYU v1.0)	The first version.	R. Imazawa
1 (31 May 2022) (697JYU v1.1)	- Version of the reference documents were updated. - Sub SRD was added to the reference documents. - “Chemical Composition and Impurity Requirements” (REYV5V, v2.3) was added to the reference documents.	R. Imazawa

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1. Purpose

This document provides all specifications that a manufacturer will need to comply with when they fabricate the ex-vessel components of 55.C6 PoPola interfacing directly with the port integrator of Equatorial Port 10 (EP10).

2. Definition

The definitions of abbreviations are given in ITER Abbreviations (2MU6W5). Some special abbreviations used in this document are defined by Table 1.

Table 1. the abbreviations in this document

EP	Equatorial Port
EPP	Equatorial Port Plug
ISMB	Inter-Space Mirror Box
ISS	Interspace Support Structure
JIS	Japanese Industrial Standards
PCMB	Port Cell Mirror Box
PCSS	Port Cell Support Structure
PoPola	PBS.55.C6 Poloidal Polarimeter
MQP	Management and Quality Proigram

3. References

[1] Technical Description of PoPola Ex-vessel Components Interfacing with Port Integrator of EP10, ITER_D_697PKJ (or JADA-55342DE0102)
[2] Sub-System Requirement Document sSRD-55.C6: Polarimeter Poloidal, ITER_D_WYPRU9 v2.2
[3] Chemical composition and impurity requirements for materials, ITER_D_REYV5V v2.3
[4] Drawing of ISMB: ITER_D_5KNZXS_v3
[5] Drawing of PCMB: ITER_D_5UAAH9_v2
[6] Drawing of beam-alignment retroreflector: ITER_D_68ZK5H_v2
[7] Drawing of transmission pipe penetrating bio-shield plug: ITER_D_6AJ9RT_v2
[8] Drawing of duct (transmission pipe in PCSS): ITER_D_6CNJHQ_v2
[9] Drawing of duct support: ITER_D_6NDEX4_v3
[10] Drawing of supports of optical transmission line in PCSS: ITER_D_6CZZLY_v1
[11] Assembly drawing of in-vessel component: to be uploaded to SMDD: ITER_D_6NDP6N_v1
[12] Assembly drawing of ex-vessel component: to be uploaded to SMDD: ITER_D_6NE666_v2
[13] 55.C6.00 PFD ITER_D_9XK2LM
[14] 55.C6.EA PID ITER_D_S93GA7
[15] 55.C6 EB PID ITER_D_S99KLH
[16] 55.C6.00 SLD ITER_D_RUXPR5
[17] 55.C6.EA CBD ITER_D_S99BXY
[18] 55.C6.EB CBD ITER_D_S97AUF
[19] Interface Sheet (IS) between Tokamak Building (PBS 62.11) & Diagnostic Building (PBS 62.74) and Diagnostic (PBS 55), ITER_D_34GS5D v9.2
[20] Optical Analysis and Design of PBS.55.C6 PoPola, ITER_D_RC2LB5 v2.1 (or JADA-55332TS0022-2)
[21] 55 C6 Manufacturing Assessment of PoPola Mirror Box in Interspace, ITER_D_696H9R v1.0 (or JADA-55342TS0103)
[22] 55 C6 Manufacturing Assessment of PoPola Mirror Box in Port Cell, ITER_D_696QTS v1.1 (or JADA-55342TS0104-1)

4. System Description

The primary aim of the PoPola is to measure the change of polarization of injected far-infrared (FIR) laser light in order to identify the profile of plasma current, or equivalently safety factor. There are thirteen PoPola measurement channels to accomplish this measurement task. Each channel is comprised of a set of optical components that launch a laser beam from Equatorial Port Plug 10 (EPP10) or Upper Port Plug 10 (UPP10) across the plasma to a retroreflector. Figure 1 and Figure 2 an overview of the PoPola viewing chords and the PoPola ex-vessel components, respectively. Components in the scope of this documents are ex-vessel components interfacing directly with the port integrator of EP 10. The major PoPola components in this area is ISMB (interspace mirror box) and PCMB (port cell mirror box). ISMB and PCMB house optical components such as mirrors and confine dry air that absorbs the FIR laser.

References [1] and [2] provide design description of the components and requirements applicable to entire PoPola system.

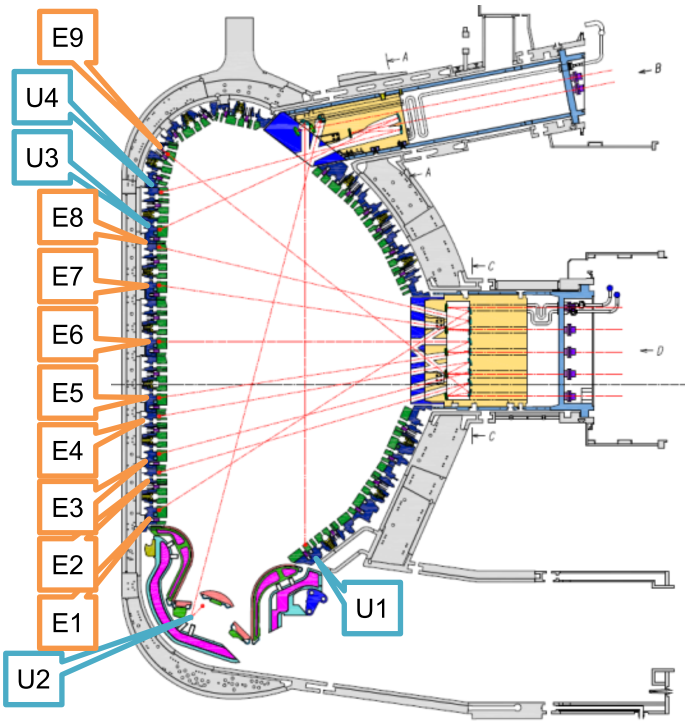


Figure 1 Overview of PoPola viewing chords

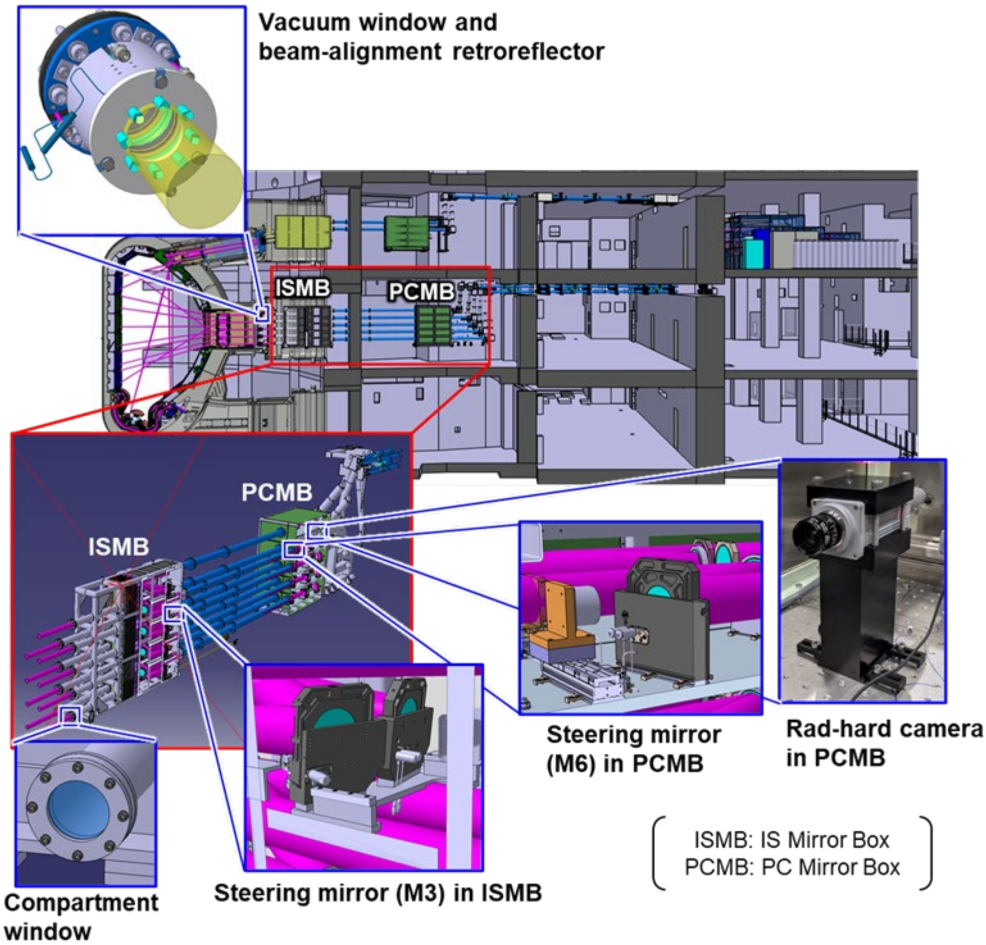
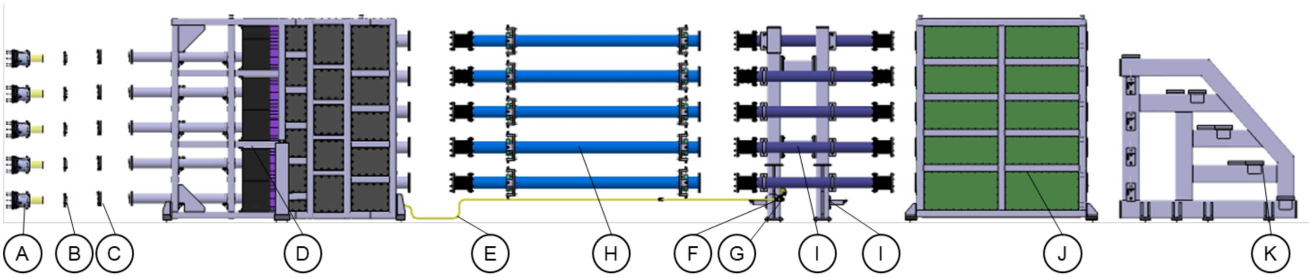


Figure 2 PoPola ex-vessel components interfacing directly with the port integrator of EP10.

the components in the scope of this documents are the ex-vessel components interfacing directly with the port integrator of EP10. The detailed list of the components in this scope is shown in Figure 3. Functional reference number in Figure 3 follows the naming rule shown in Figure 4. Figure 5 and Figure 6 show overview and dimension of ISMB and PCMB.



	Name	FR
A	Vacuum window *Just for information.* *This is in IO scope.*	55C6EA-WA-1100 (for E1) 55C6EB-WA-2100 (for E2) 55C6EA-WA-3100 (for E3) 55C6EB-WA-4100 (for E4) 55C6EA-WA-5100 (for E5) 55C6EA-WA-6100 (for E6) 55C6EA-WA-7100 (for E7) 55C6EB-WA-8100 (for E8) 55C6EA-WA-9100 (for E9)
B	Beam-alignment retroreflector	55C6EA-RR-1100 (for E1) 55C6EB-RR-2100 (for E2) 55C6EA-RR-3100 (for E3) 55C6EB-RR-4100 (for E4) 55C6EA-RR-5100 (for E5) 55C6EA-RR-6100 (for E6) 55C6EA-RR-7100 (for E7) 55C6EB-RR-8100 (for E8) 55C6EA-RR-9100 (for E9)
C	Compartment window [1]	55C6EA-WA-1200 (for E1) 55C6EB-WA-2200 (for E2) 55C6EA-WA-3200 (for E3) 55C6EB-WA-4200 (for E4) 55C6EA-WA-5200 (for E5) 55C6EA-WA-6200 (for E6) 55C6EA-WA-7200 (for E7) 55C6EB-WA-8200 (for E8) 55C6EA-WA-9200 (for E9)

	Name	FR
D	ISMB	55C6EA-WMA-0200
E	Exhaust line [1]	55C6EA-PI-0200
F	Valve [1]	55C6EA-VR-0300
G	Purge valve [1]	55C6EA-VG-0301
H	Transition pipe penetrating bio-shield plug	55C6EA-PI-1200 (for E1) 55C6EB-PI-2200 (for E2) 55C6EA-PI-3200 (for E3) 55C6EB-PI-4200 (for E4) 55C6EA-PI-5200 (for E5) 55C6EA-PI-6200 (for E6) 55C6EA-PI-7200 (for E7) 55C6EB-PI-8200 (for E8) 55C6EA-PI-9200 (for E9)
I	Transition pipe in PCSS (or, simply, “Duct”)	55C6EA-PI-1306 (for E1) 55C6EB-PI-2306 (for E2) 55C6EA-PI-3306 (for E3) 55C6EB-PI-4306 (for E4) 55C6EB-PI-5306 (for E5) 55C6EA-PI-6306 (for E6) 55C6EA-PI-7306 (for E7) 55C6EB-PI-8306 (for E8) 55C6EA-PI-9306 (for E9)
J	Duct Support	55C6EA-ZJ-0301
K	PCMB	55C6EA-WMA-0300
L	Transmission line support	55C6EA-ZJ-0300

(Note 1) They are parts of ISMB

Figure 3. Components in the scope of this document.

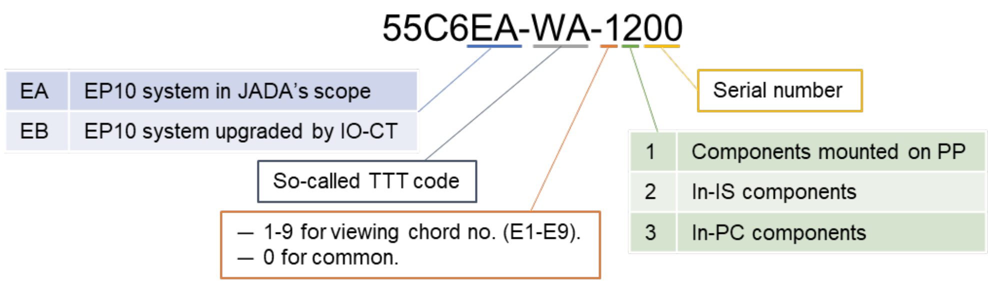


Figure 4. PoPola FR naming rule

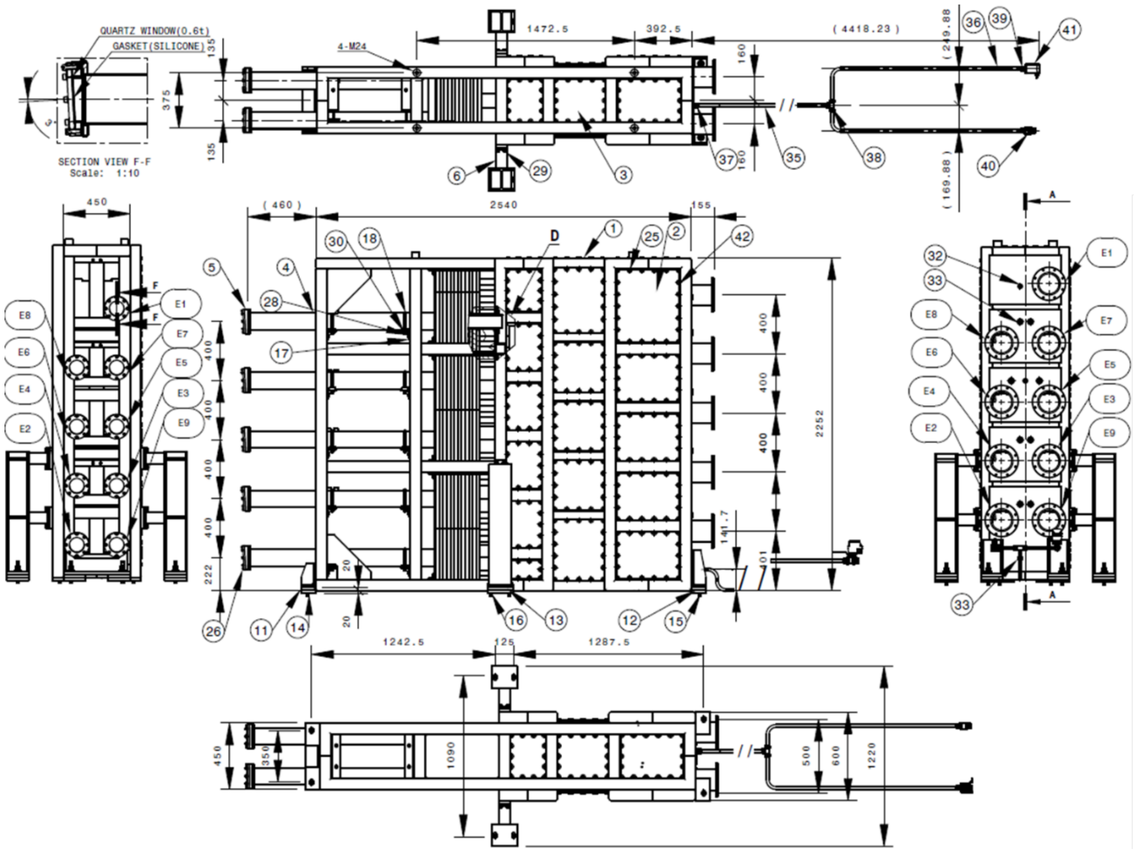


Figure 5. Overview and dimension of ISMB [4]

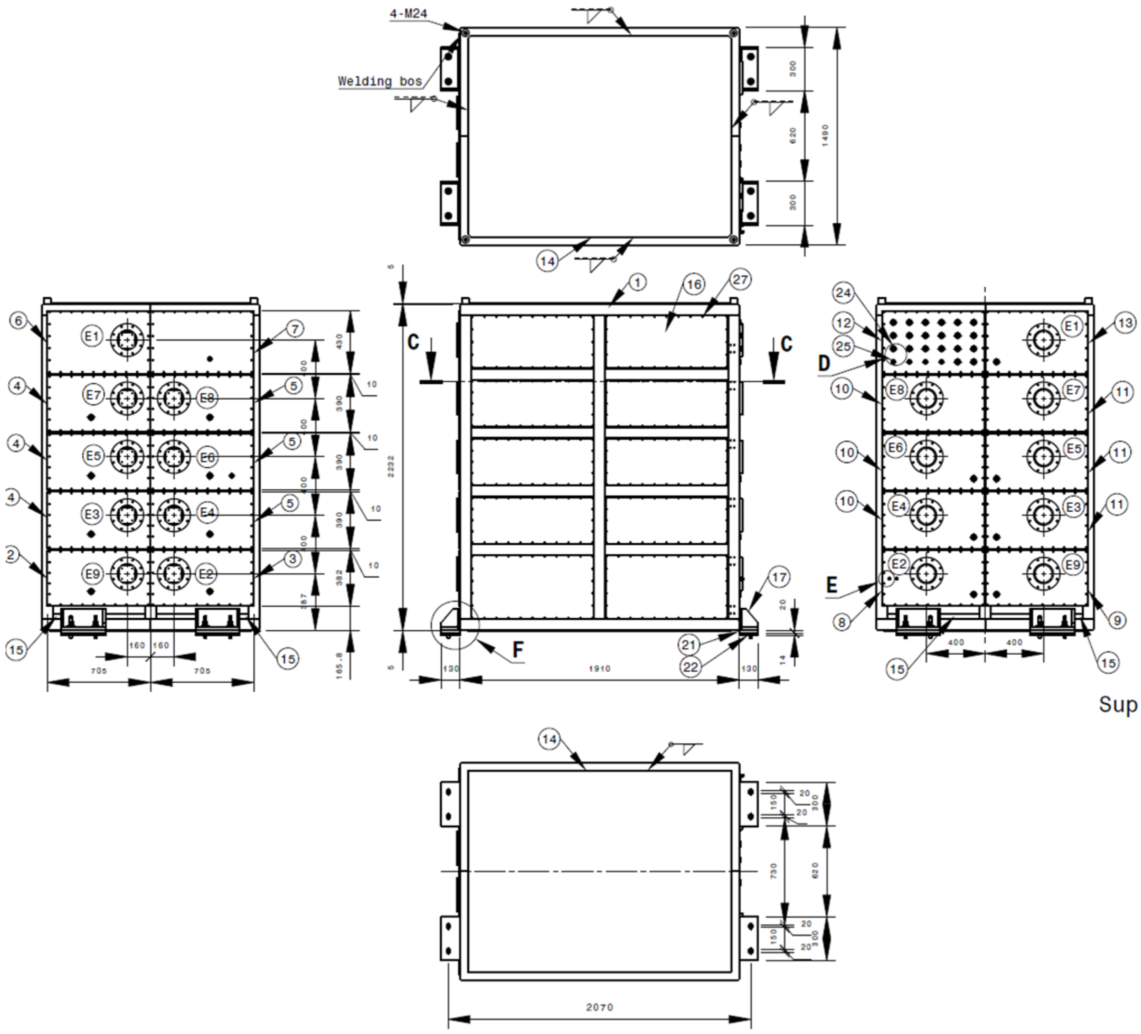


Figure 6. Overview and dimension of PCMB [5]

5. Technical Specification

5.1. Functional Specifications

Optical function

— To transmit the FIR laser of wavelength of 118.8 μm.

Mechanical function

— To keep the dew-point temperature less than -30°C.
— To maintain the structural integrity under the expected loads such as seismic event.

5.2. Environmental Specifications

The environmental conditions for PoPola components in the port cell are given in Table 2.

Table 2 Environmental parameters copied from IS-55-62 [19]

Interface number	Principal Interface	PBS	Location	L - Environmental Parameters
55_11/74_167	Port Cell Support Structure (PCSS) and its Pay Load	55.QA	11-L1-C10	Lab parameters - max 20°C
55_11/74_174	Interspace Support Structure (ISS) & its Payload	55.QA	11-L1-C10	design for max 50°C Dust: normal laboratory humidity: design for < 20% (normal laboratory)

5.3. Design Specifications

(1) Equipment Class

The classifications of ex-vessel components interfacing directly with the port integrator of EP 10 (see Figure 3) are shown in Table 3.

Table 3. Classifications of the ex-vessel components interfacing directly with the port integrator of EP 10

Safety Class	Safety Function	Seismic Class	Quality Class	Vacuum Class	RH Class	ESP/ESPN
Non-SIC	N	SC2	QC3	N/A	N/A	N/A

(2) Applicable codes and standards
- (a) The International Organization for Standardization (ISO)
- (b) Japan Industrial Standards (JIS)
- (c) RCC-MRx (for design)

(3) Dimensions

See the drawings [4] – [12].

(4) Parts and materials

The drawings [4] – [12] specify materials, weights and model name of COTS. Table 4 shows the summary of the material list.

With regards to the material, a supplier shall provide material certification. It should be noted that the impurity amount shall follow Reference [3].

With regards to COTS, a supplier shall provide “Certification of Conformity”, which certificates that a product comply with applicable standards and with specifications described in a catalogue and a datasheet.

With regards to material of electrical cable, insulation material of the cables shall be Polyimide, which is halogen free and resistant to radiation.

Table 4 Material list of PoPola ex-vessel components

No.	Material	Component name
1	SS316L @ port interspace SS304L @ port cell	Structural member such as frames and gusset plates.
2	B_4C	Neutron shielding
3	Lead	Gamma shielding
4	Z-cut crystalline quartz	Compartment window
5	Aluminum alloy	Housing of COTS such as piezo actuator and rad-hard camera
6	Glass (e.g. BK7) with Gold coating	Mirror

(5) Welding requirements

"Standard quality requirements (Annex C)" of JIS Z 3400:2013 "Quality requirements for fusion welding of metallic materials" shall be applied. This standard is technically equivalent with ISO 3834-3:2005 "Quality requirements for fusion welding of metallic materials — Part 3: Standard quality requirements".

According to requirements specified in JADA's MQP document ("ITER Project Quality Classification Determination Procedure", JADA-01D004-4), a manufacturer shall conduct 100 % visual inspection, 10 % volumetric inspection and 10 % surface inspection. This document does not specify methods of surface and volumetric inspection, which a manufacturer will specify in "Manufacturing and Inspection Plan".

A manufacturer shall qualify welding procedure and shall finalize welding procedure specification (WPS) by manufacturing readiness review (MRR). After closure of MRR, the manufacturer shall make products following the WPS.

(6) Assembly and installation requirements

"Optical Analysis and Design of PBS.55.C6 PoPola" [20] clarifies the acceptable error of manufacturing and assembly. The summaries are as follows.

— Tolerance of mirror position: ±5 mm and ±0.16°
— Tolerance of on-site position of ISMB and PCMB: ±5 mm and ±0.16°

References [11] and [12] are the assembly drawings of in-vessel and ex-vessel components. A port integrator of Equatorial Port 10 will install PoPola components into EPP10, ISS, bio-shield plug and PCSS.

(7) Airtightness requirements

According to the description in "Optical Analysis and Design of PBS.55.C6 PoPola" [20], the dew-point temperature inside the optical transmission lines needs to be -30°C or less. Since PoPola system let the compressed air (which comes from PBS.65) flow through the transmission line, the transmission line needs to be airtight.

Requirements to the transmission line shown in Figure 2 is that the dew-point temperature inside the optical transmission lines needs to be -30°C or less[1] under the conditions below.

— All components in the scope of this document are assembled.
— Open flanges to be connected with pipes going to gallery are closed.
— Supplied dry air is at dew point of – 40°C and is at flowrate of 1.62 m^3/hr.

[1] The requirement of low dew-point temperature can be satisfied only when the surface is clean and the equipment is air-tight. This document specifies only the dew-point temperature instead of specifying the air-tightness and cleanliness separately.

JADA-55342DE0102
ITER_D_697PKJ

Technical Description of PoPola Ex-vessel Components Interfacing with Port Integrator of EP10

ITER Project Japan Domestic Agency

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Approver	HATAE Takaki (RPGL)	Plasma Diagnostics Group	4-Jan-2021	波多江 仰紀

Change log

Brunch no. (date) (IDM version)	Change description
- (21 Dec 2021) (697PKJ)	First version
	–
	–

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Abbreviations:

See ITER_D_2MU6W5 for abbreviations that are standard in ITER. Other special abbreviations are given below.

- ESP: French regulation for Pressure Equipment
- ESPN: French regulation for Nuclear Pressure Equipment
- FIR: Far Infrared Ray
- ISMB: Interspace Mirror Box
- PCMB: Port Cell Mirror Box
- PoPola: PBS.55.C6 Poloidal Polarimeter
- StIR: Structural integrity report

Reference:

[1] sub-SRD-55.C6, ITER_D_WYPRU9
[2] Technical Specification of PoPola Components in Interspace and Port cell, ITER_D_697JYU (or JADA-55342TS0107)
[3] IS-55.C6-55.QA-001 Physical & Functional Interfaces between Poloidal Polarimeter and Diagnostics Equatorial Port 10, ITER_D_UDPYGC
[4] SDC-IC, ITER_D_222RHC
[5] Load specifications, ITER_D_QWUFY2
[6] Components Classification BOM, ITER_D_RBZBEQ
[7] Optical Analysis and Design of PBS.55.C6 PoPola, ITER_D_RC2LB5 (or JADA-55332TS0022-1)
[8] Technical notes on laser transmittance of window for PBS.55.C6, ITER_D_V3PJBZ
[9] Drawing of ISMB: ITER_D_5KNZXS
[10] Drawing of PCMB: ITER_D_5UAAH9
[11] Assembly drawing: to be uploaded to SMDD
[12] 55.C6.00 PFD ITER_D_9XK2LM
[13] 55.C6.EA PID ITER_D_S93GA7
[14] 55.C6 EB PID ITER_D_S99KLH
[15] 55.C6.00 SLD ITER_D_RUXPR5
[16] 55.C6.EA CBD ITER_D_S99BXY
[17] 55.C6.EB CBD ITER_D_S97AUF
[18] 55.C6 Experimental evaluation of dry air consumption, ITER_D_3YLFPE (or JADA-55342GD0003-1)
[19] Nuclear shielding requirements of PoPola in EP10 and UP10, ITER_D_6KE955 (or JADA-55342TS0108)
[20] D15.04.04A-02 EP10 Engineering analysis reports and calculations - Section A Neutronic Analysis, F4E_D_3K92G4 v5.0
[21] Structural Integrity Report, ITER_D_3DYHEQ
[22] Maintenance and inspection plan, ITER_D_RTP6D8 (or JADA-55342TS0035)
[23] 55.C6 - PoPola Decommissioning plan, ITER_D_RU2C32 (or JADA-55332TS0039)
[24] 55.C6 – Radwaste Checklist, ITER_D_SL8AMY
[25] 55 C6 Manufacturing Assessment of PoPola Mirror Box in Interspace, ITER_D_696H9R (or JADA-55342TS0103)
[26] 55 C6 Manufacturing Assessment of PoPola Mirror Box in Port Cell, ITER_D_696QTS (or JADA-55342TS0104)
[27] D15.02.06 EP10 Assembly & test plan, F4E_2JY2BS
[28] D15.03.05 EP10 Decommissioning plan, F4E_2JXQGG
[29] ITER Decommissioning Plan - Annex to the PDD, ITER_D_229DKY

1 Introduction

The primary aim of the PoPola is to measure the change of polarization of injected far-infrared (FIR) laser light in order to identify the profile of plasma current, or equivalently safety factor. There are thirteen PoPola measurement channels to accomplish this measurement task. Each channel is comprised of a set of optical components that launch a laser beam from Equatorial Port Plug 10 (EPP10) or Upper Port Plug 10 (UPP10) across the plasma to a retroreflector. Figure 1 and Figure 2 show an overview of the PoPola viewing chords and the PoPola ex-vessel components, respectively. Components in the scope of this document are ex-vessel components interfacing directly with the port integrator of Equatorial Port 10. The major PoPola components in this area is ISMB (interspace mirror box) and PCMB (port cell mirror box). ISMB and PCMB house optical components such as mirrors and confine dry air that absorbs the FIR laser light.

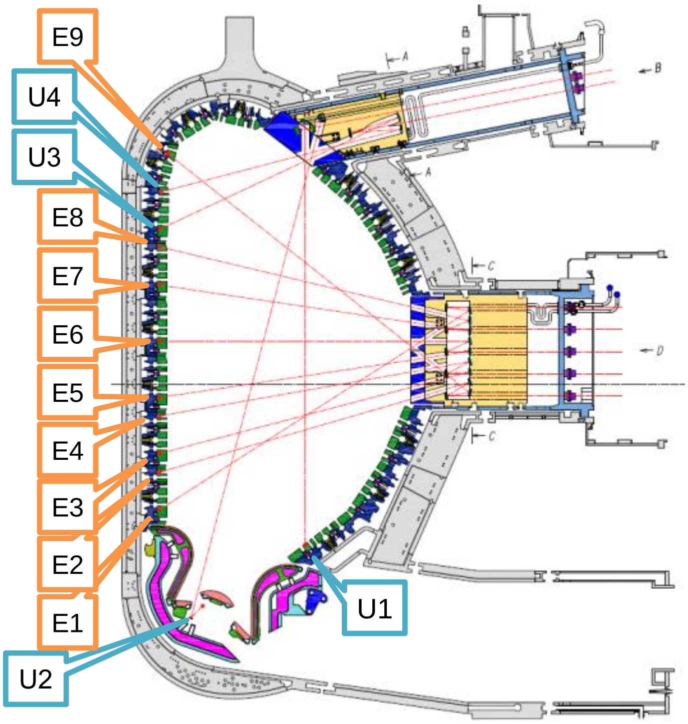


Figure 1 Overview of PoPola viewing chords

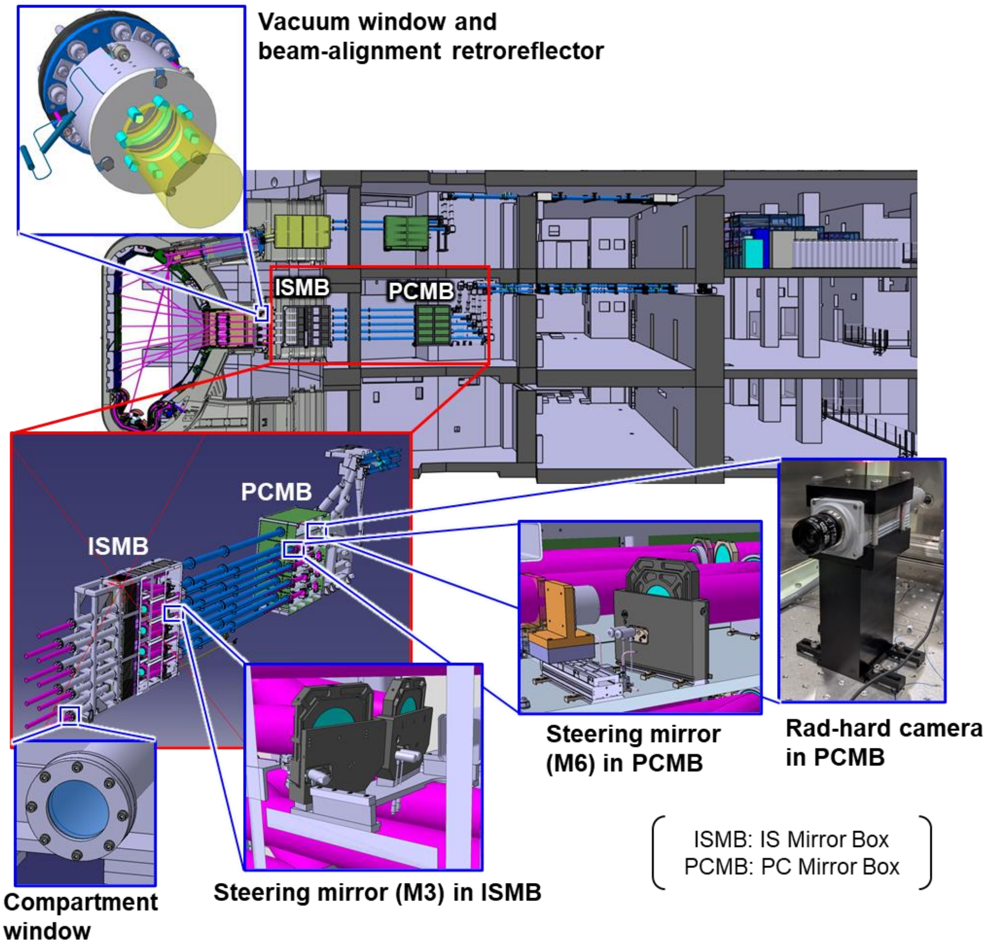


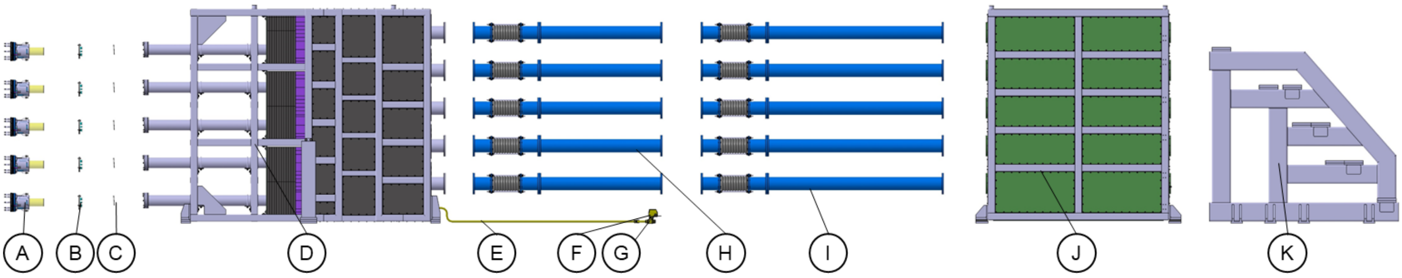
Figure 2 PoPola ex-vessel components interfacing directly with the port integrator of Equatorial Port 10.

2 Purpose

The purpose of this document is to provide design description of the ex-vessel components interfacing directly with the port integrator of Equatorial Port 10.

3 Scope

As explained in Sections 1 and 2, the components in the scope of this documents are the ex-vessel components interfacing directly with the port integrator of Equatorial Port 10. The detailed list of the components in this scope is shown inFigure 3. Functional reference number in Figure 3 follows the naming rule shown inFigure 4. Figure 5 and Figure 6 show overview and dimension of ISMB and PCMB.



	Name	FR
A	Vacuum window *Just for information.* *This is in IO scope.*	55C6EA-WA-1100 (for E1) 55C6EB-WA-2100 (for E2) 55C6EA-WA-3100 (for E3) 55C6EB-WA-4100 (for E4) 55C6EA-WA-5100 (for E5) 55C6EA-WA-6100 (for E6) 55C6EA-WA-7100 (for E7) 55C6EB-WA-8100 (for E8) 55C6EA-WA-9100 (for E9)
B	Beam-alignment retroreflector	55C6EA-RR-1100 (for E1) 55C6EB-RR-2100 (for E2) 55C6EA-RR-3100 (for E3) 55C6EB-RR-4100 (for E4) 55C6EA-RR-5100 (for E5) 55C6EA-RR-6100 (for E6) 55C6EA-RR-7100 (for E7) 55C6EB-RR-8100 (for E8) 55C6EA-RR-9100 (for E9)
C	Compartment window	55C6EA-WA-1200 (for E1) 55C6EB-WA-2200 (for E2) 55C6EA-WA-3200 (for E3) 55C6EB-WA-4200 (for E4) 55C6EA-WA-5200 (for E5) 55C6EA-WA-6200 (for E6) 55C6EA-WA-7200 (for E7) 55C6EB-WA-8200 (for E8) 55C6EA-WA-9200 (for E9)

	Name	FR
D	ISMB	55C6EA-WMA-0200
E	Exhaust line	55C6EA-PI-0200
F	Valve	55C6EA-VR-0300
G	Purge valve	55C6EA-VG-0301
H	Transition pipe (penetrating bio - shield plug)	55C6EA-PI-1200 (for E1) 55C6EB-PI-2200 (for E2) 55C6EA-PI-3200 (for E3) 55C6EB-PI-4200 (for E4) 55C6EA-PI-5200 (for E5) 55C6EA-PI-6200 (for E6) 55C6EA-PI-7200 (for E7) 55C6EB-PI-8200 (for E8) 55C6EA-PI-9200 (for E9)
I	Transition pipe (in PCSS)	55C6EA-PI-1306 (for E1) 55C6EB-PI-2306 (for E2) 55C6EA-PI-3306 (for E3) 55C6EB-PI-4306 (for E4) 55C6EA-PI-5306 (for E5) 55C6EA-PI-6306 (for E6) 55C6EA-PI-7306 (for E7) 55C6EB-PI-8306 (for E8) 55C6EA-PI-9306 (for E9)
J	PCMB	55C6EA-WMA-0300
K	Transmission line support	55C6EA-ZJ-0300

Figure 3. Components in the scope of this document.

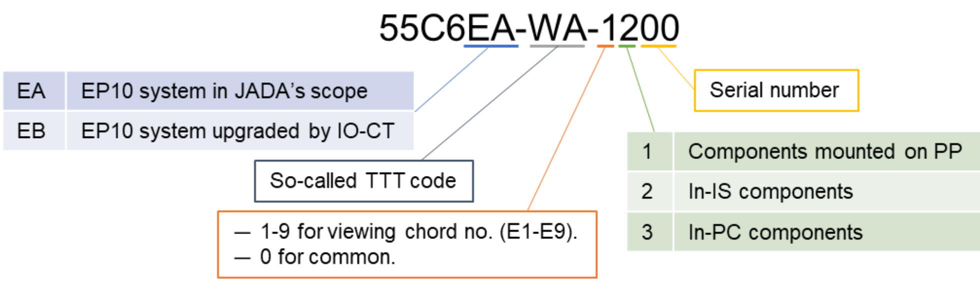


Figure 4. PoPola FR naming rule

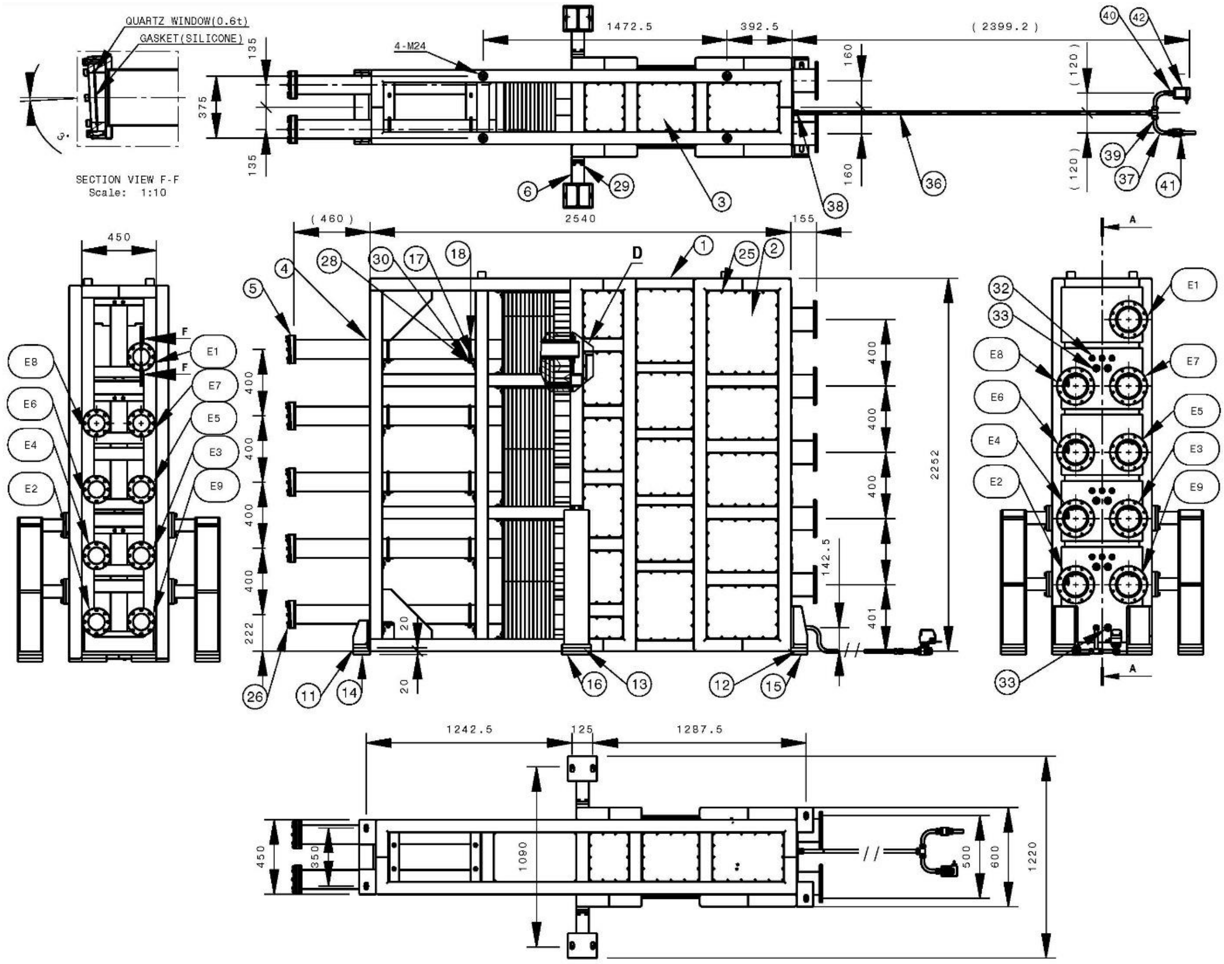


Figure 5. Overview and dimension of ISMB [9]

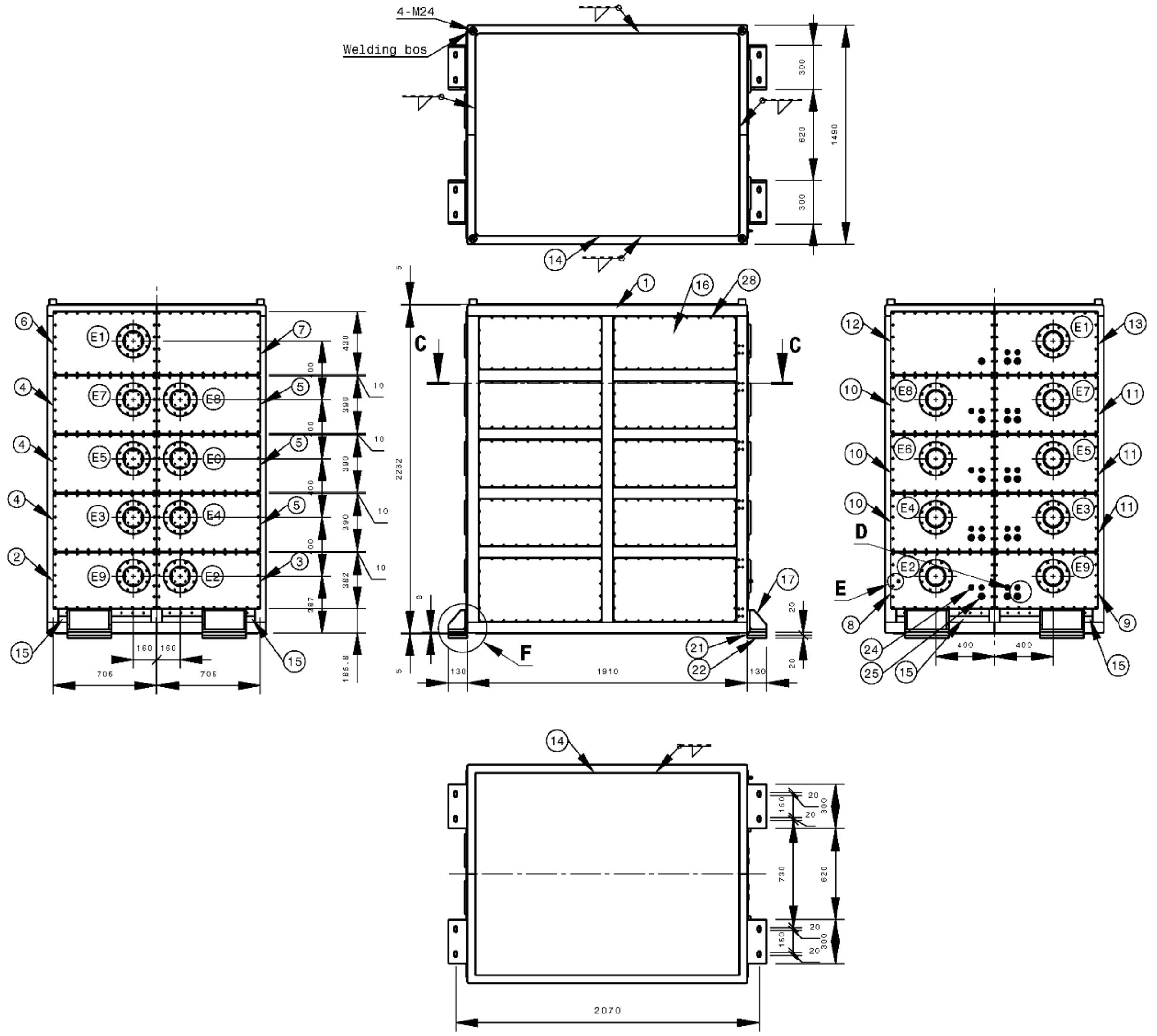


Figure 6. Overview and dimension of PCMB [10]

4 Requirements

Applicable documents regarding the requirements are as follows.

- sub-SRD-55.C6 [1]
- Technical Specification of PoPola Components in Interspace and Port cell [2]
- IS-55.C6-55.QA-001 Physical & Functional Interfaces between Poloidal Polarimeter and Diagnostics Equatorial Port 10 [3]
- RCC-MRx (for design) [4]
- Load specifications [5]

The ISMB and PCMB's functions are as follows.

- To transmit the FIR laser beam.
- To keep the dew-point temperature less than -30°C.

Requirements depend on the classification of the component. "Components Classification BOM" [6] provides the component classification, which are shown in Table 1.

Table 1 Classification table of PoPola components in interspace and port cell (Copy from BOM [6])

Safety Class	Safety Function	Seismic Class	Quality Class	Vacuum Class	RH Class	ESP/ESPN
Non-SIC	N	NSC	QC3	N/A	N/A	N/A

5 Design Description

Nine viewing chords pass through Equatorial Port 10. Each viewing chord is transmitted by using two mirrors (called M3 and M4) in ISMB and two mirrors (called M5 and M6) in PCMB. The M6 mirror is concave spherical mirror, while other mirrors are flat ones. The M3 and M6 mirrors are steering mirrors, while other mirrors are fixed ones. Detailed data such as focal length of the M6 mirror and justification can be found in "Optical Analysis and Design of PBS.55.C6 PoPola" [7].

5.1 Mechanical components

ISMB houses the M3 mirrors and the M4 mirrors. The M3 mirrors are steering mirrors that use piezo actuators. For shielding the piezo actuator from neutron and gamma radiation, ISMB includes blocks made of B_4C and lead (see details in Section 5.5). Figure 7 shows the exploded view of ISMB. The side enclosure consists of three plates (B_4C plate, lead plate and SS plate) and captive bolts. They are integrated to be one component for easy maintenance in the interspace. Figure 8 shows the design of the integrated side enclosure.

A window attached to ISMB is called as a compartment window (CW). The material, thickness and clear aperture of the CW is z-cut crystalline quartz, 0.5 mm and 100 mm, respectively. The CW is slightly inclined, and the angle between the optical axis and the axis of quartz disc is 3°. Reference [8] provides the optical property of the CW, and Reference [7] provides the evaluation results of the total transmission including the compartment window.

The total weight of ISMB including mirrors and shielding blocks is 3490 kg. The breakdown of the weight is as follows. The weight of the lead blocks is 930 kg, the weight of the B_4C blocks is 566 kg, and the weight of the frame is 1500 kg.

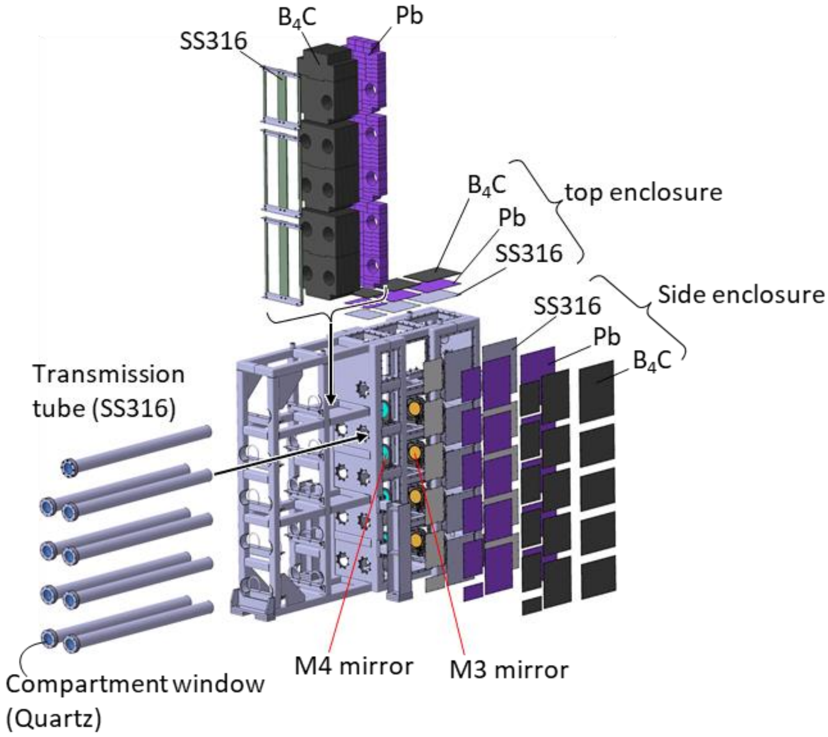


Figure 7. Exploded view of ISMB

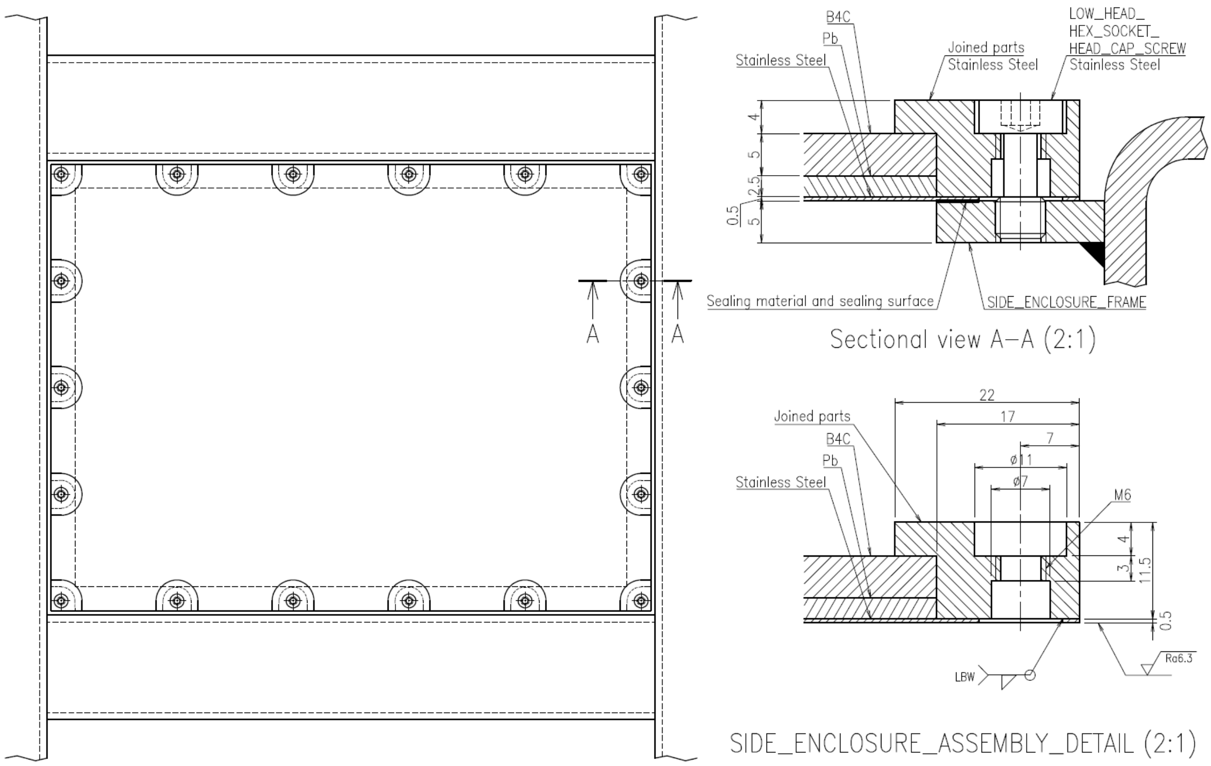


Figure 8. Detail of Side enclosure of ISMB.

PCMB houses the M5 mirrors and the M6 mirrors. The M6 mirror is a steering mirror that uses piezo actuator. In addition to the mirrors, PCMB houses radiation-hardness cameras, movable mirrors and movable retroreflectors. These additional components are used just when the probing laser beam position is adjusted. Figure 9 shows the exploded view of PCMB. The total weight including mirrors is 3780 kg.

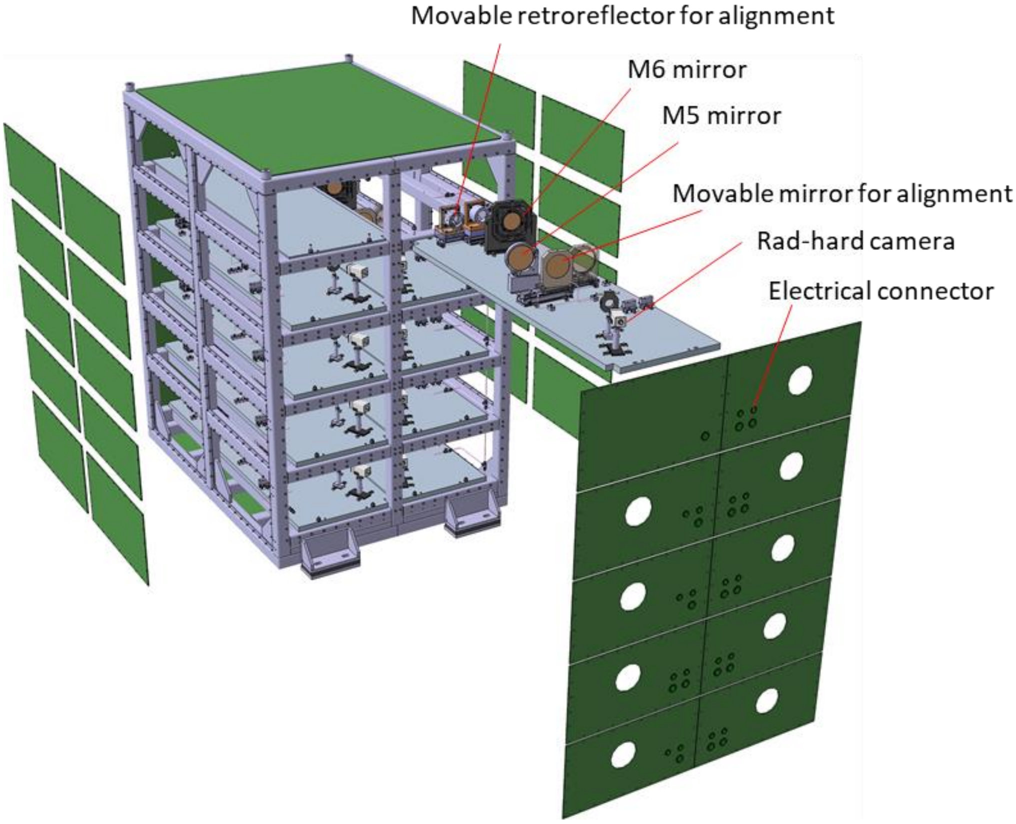


Figure 9. Exploded view of PCMB.

5.2 Interfaces

Mechanical interface

ISMB and PCMB are bolted to ISS and PCSS, respectively. Figure 10 shows the position of bolts. The bold size is M16. The holes on ISS and PCSS are threaded, while those of ISMB and PCSS are through holes. Since the through holes of ISMB and PCMB are elongated, the position of ISMB and PCMB can be adjusted within the clearance of the through hole.

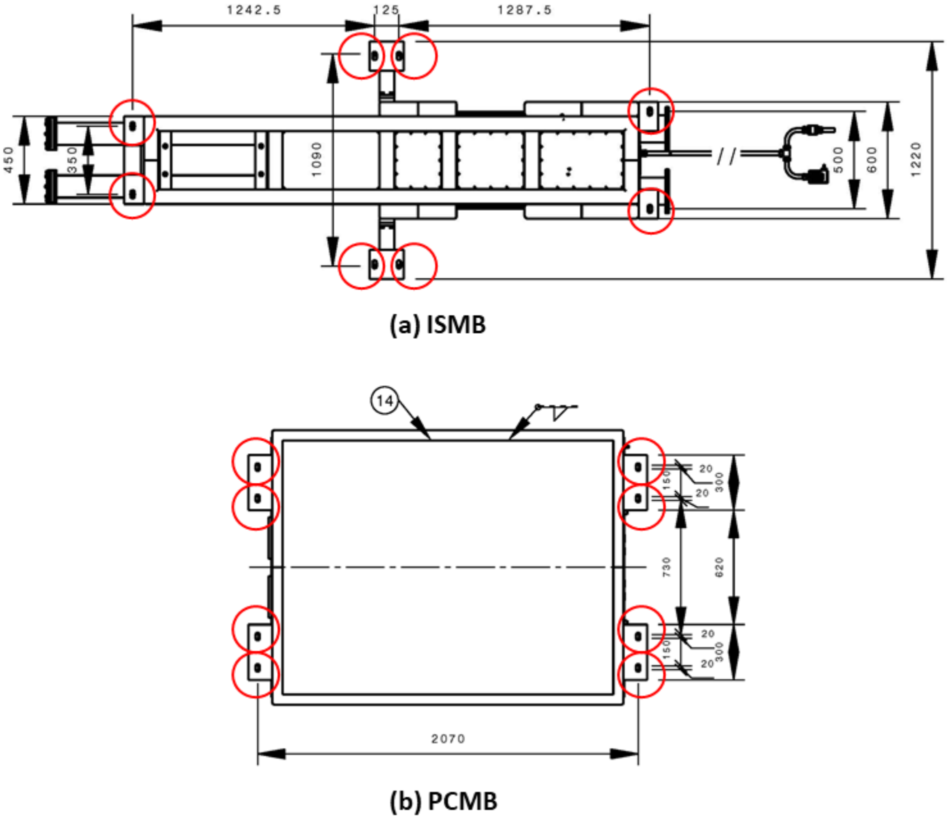


Figure 10 Mechanical interfacing points of (a) ISMB and (b) PCMB

The beam-alignment retroreflectors are bolted to the vacuum windows. Figure 11 shows the exploded view of the beam-alignment retroreflector. Tab washers are used for prevention of bolt loosening.

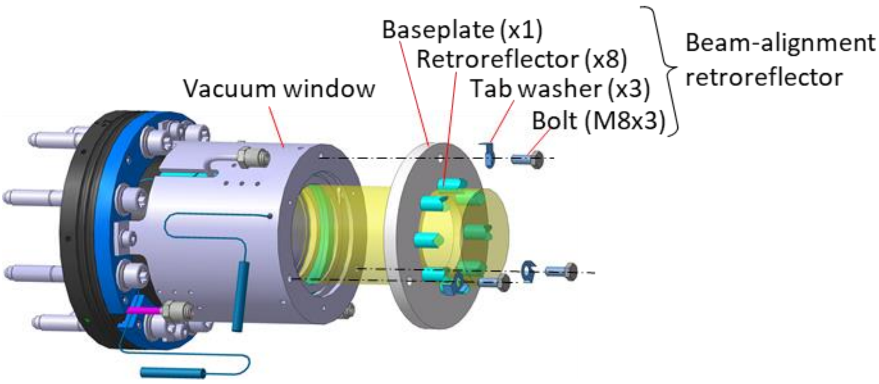


Figure 11 Beam-alignment retroreflector

Electrical interface [17]

Both ISMB and PCMB have electrical interface. On the plates of ISMB and PCMB, SOURIAU's push-pull connectors are mounted. The model number of the connectors are RESC-F-3-M12 or RESC-F-4-M18. The connectors are developed for nuclear industry and are resistant to the radiation of $1x10^8$ (rad).

Gas interface [13]

PCMB has interface with regard to compressed air. The compressed air is used to operate pneumatic stages in PCMB and to keep dew-point temperature in the transmission lines below -30°C. Section 5.4 explains the details of humidity in the transmission lines.

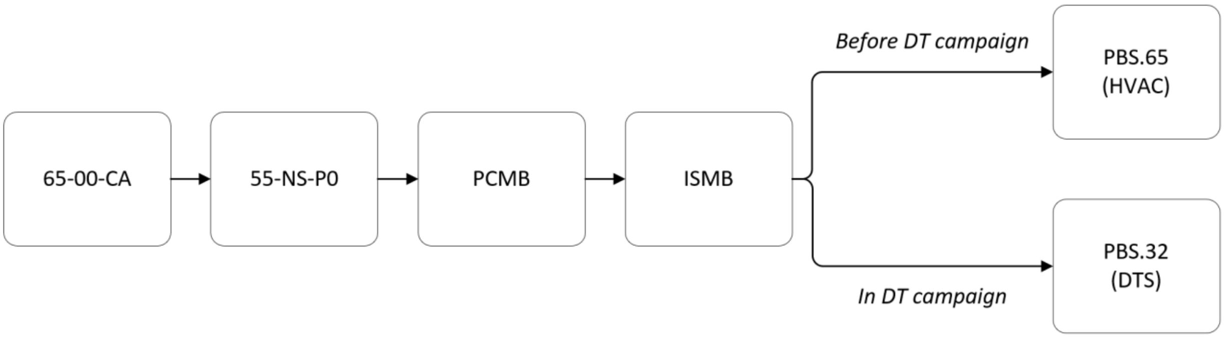
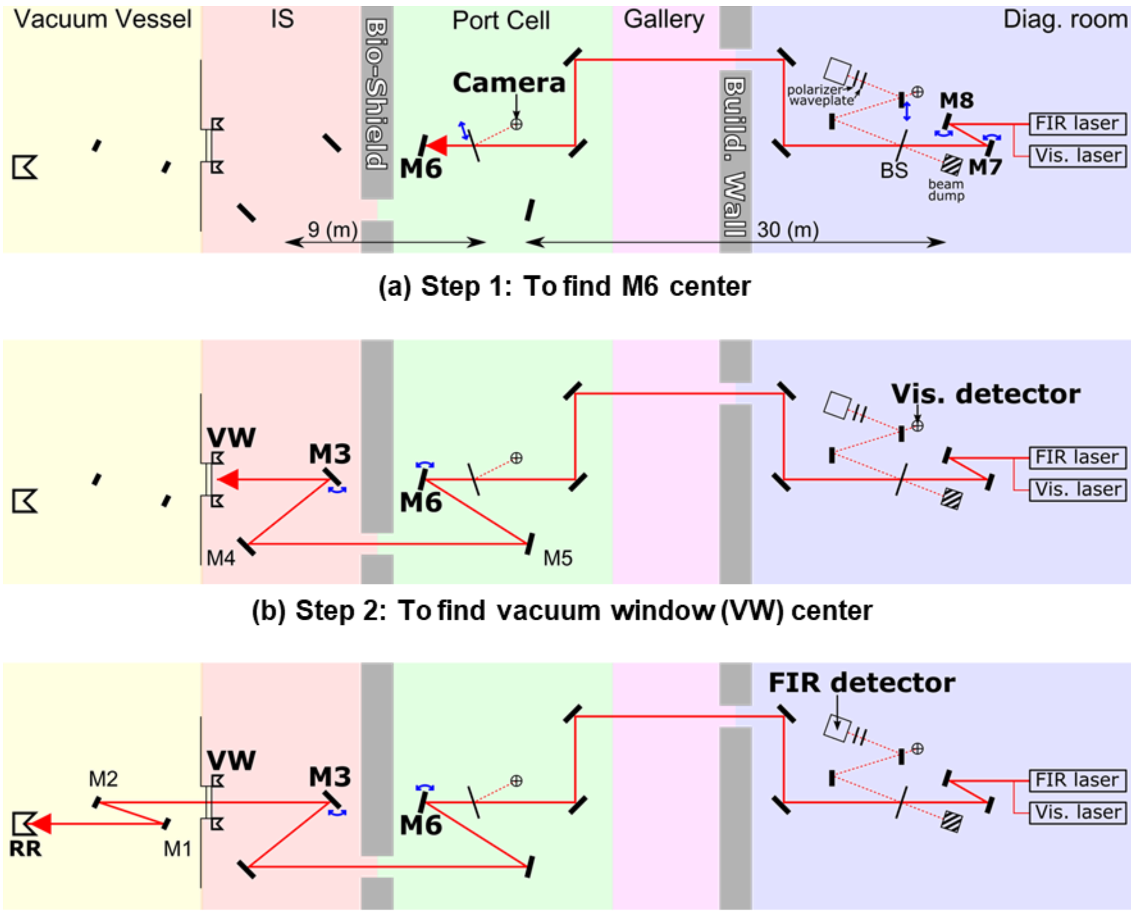


Figure 12. Flow of compressed air.

5.3 Alignment of beam position of probing laser

When the position of the probing laser beam is adjusted, the alignment procedure can be divided into three steps (see Figure 13). In the first step, the center of the M6 mirror is identified by using the visible laser and the radiation harness camera. Next, the center of the vacuum window is identified by using the visible laser and the beam-alignment retroreflector mounted on the vacuum window. Finally, the center of the retroreflector in the vacuum vessel is identified by using the FIR laser. Reference [7] explains the details of the alignment procedure. Table 2 provides information of in-ISMB and in-PCMB components that are used for the beam-position alignment



(a) Step 1: To find M6 center

(b) Step 2: To find vacuum window (VW) center

(c) Step 3: To find retroreflector (RR) center

Figure 13. Procedure of beam-position alignment

Table 2. Information of in-ISMB and in-PCMB components that are used for the beam-position alignment

Component name	Description
M3 mirror	Flat and steering mirror. Manufacturer: FMD, Model: MHG130MH_PZA12-Light Location: ISMB
M4 mirror	Flat and fixed mirror. Manufacturer: FMD, Model: MHG130MH_800N Location: ISMB
M5 mirror	Flat and fixed mirror. Manufacturer: FMD, Model: MHG400IH_635N Location: PCMB
M6 mirror	Concave and steering mirror. Manufacturer: FMD, Model: MHG400IH_PZA12 Location: PCMB
Piezo actuator	Attached to M3 mirrors and M6 mirrors Manufacturer: Newport, Model: PZA 12 Neutron hardness: 3.5×10^{15} (cm^{-2}) Gamma hardness: 1 MGy
Radiation-hard camera	Manufacturer: ThermoFisher Scientific, Model: CID8725DX6 Location: PCMB Radiation hardness: 30 kGy
Pneumatic stage and auxiliary components	Manufacturer: SMC, Model: MXQ20-150CS (together with SMC SYJA7140 (5 port valve), SMC AS2200 (speed controller) and MISUMI MSSL2 (silencer)) Location: PCMB

5.4 Dry-air confinement

In order to avoid vapor's absorption of the FIR laser, the humidity inside the optical transmission lines need to be low. According to the description in "Optical Analysis and Design of PBS.55.C6 PoPola" [7], the dew-point temperature inside the optical transmission lines needs to be -30°C or less. PoPola system let the compressed air, which comes from PBS.65, flow through the transmission line.

Figure 14 illustrated the flow of the dry air. The compressed air flows at 1.62 m^3/hour during normal operation and 5.4 -— 10 m^3/hour during purge [18]. Since a finite leak occurs and vapor is released from the components inside the optical train and from the surface of the enclosure, steady supply of the compressed air is necessary during normal operation. Necessary flow rate for purge depends on the allowable maximum duration for purge. When the flow rate for purge is 5.4 m^3/hour, it would take 5.5 hours to reach dew point of -30°C.

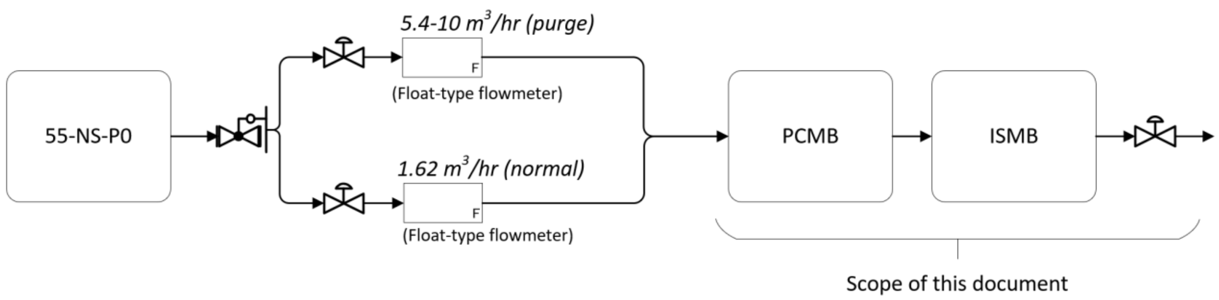


Figure 14. Dry air flow

5.5 Neutron and gamma shielding

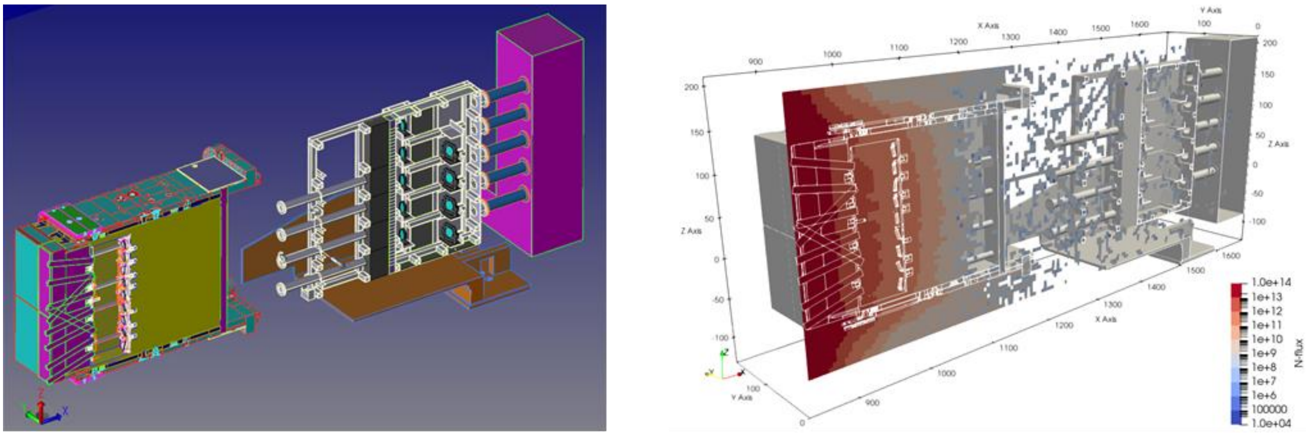
Reference [19] explains the requirements of the irradiation shielding. Summary is as follows.

- For neutron shielding, the thickness of B_4C needs to be 24 cm or more in the interspace.
- For gamma shielding, the thickness of leads needs to be 9 cm or more in the interspace.

– The shielding is unnecessary in the port cell.

Following this guideline, the thickness of B_4C blocks in the front part of ISMB is 30 cm and that of lead block in the front part of ISMB is 10 cm.

JADA made neutronics analysis to validate the shielding design. Figure 15 shows the MCNP model and results of neutron flux. Table 3 shows several parameters of piezo actuators in ISMB. The absorbed dose is evaluated as 1.4 kGy (=0.297 (Gr/hr) x 4700 (hr)).



(a) MCNP model (b) Neutron flux

Figure 15. Neutronics analysis for piezo actuators in ISMB (MCNP v5.1.60, FENDL v3.1c, C-model v.R181031, NPS: 10^9)

Table 3. Irradiation parameters of Piezo actuator in ISMB (without safety factor)

Parameter	Value	Error
Neutron flux	<5.02x10^7 ($cm^{-2}s^{-1}$)	1.1 %
Photon flux	<1.11x10^7 ($cm^{-2}s^{-1}$)	28.5 %
Absorbed dose	<0.297 (Gy/h)	19.7 %

JADA also made neutronics analysis of the port cell. The previous neutronics analysis shown in Figure 15 provides the neutron flux coming to the bio-shield plug, which is shown in Figure 16. The neutron flux coming to the bio-shield plug was used as neutron source for making neutronics analysis in the port cell. Figure 17 shows the MCNP model, the results of neutron flux during plasma operation and the results of SDDR (shut-down dose rate) after 24 hours in the port cell. Table 4 shows the absorbed dose per hour both during plasma operation and after the plasma shutdown. The absorbed dose during plasma operation is higher than that after the plasma shutdown.

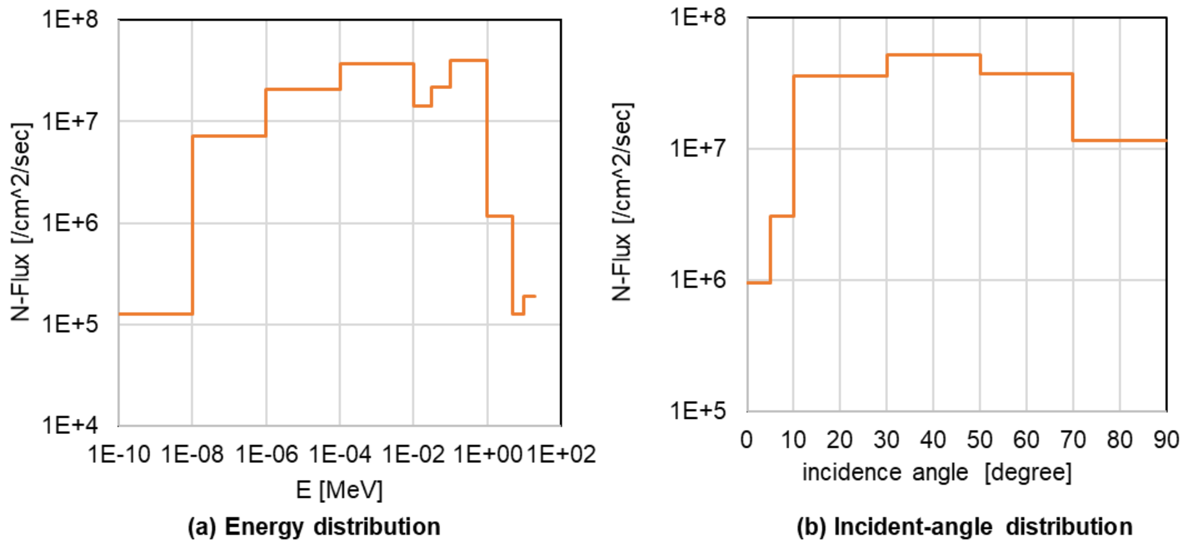


Figure 16 Neutron flux coming to PoPola penetration in the bio-shield plug.

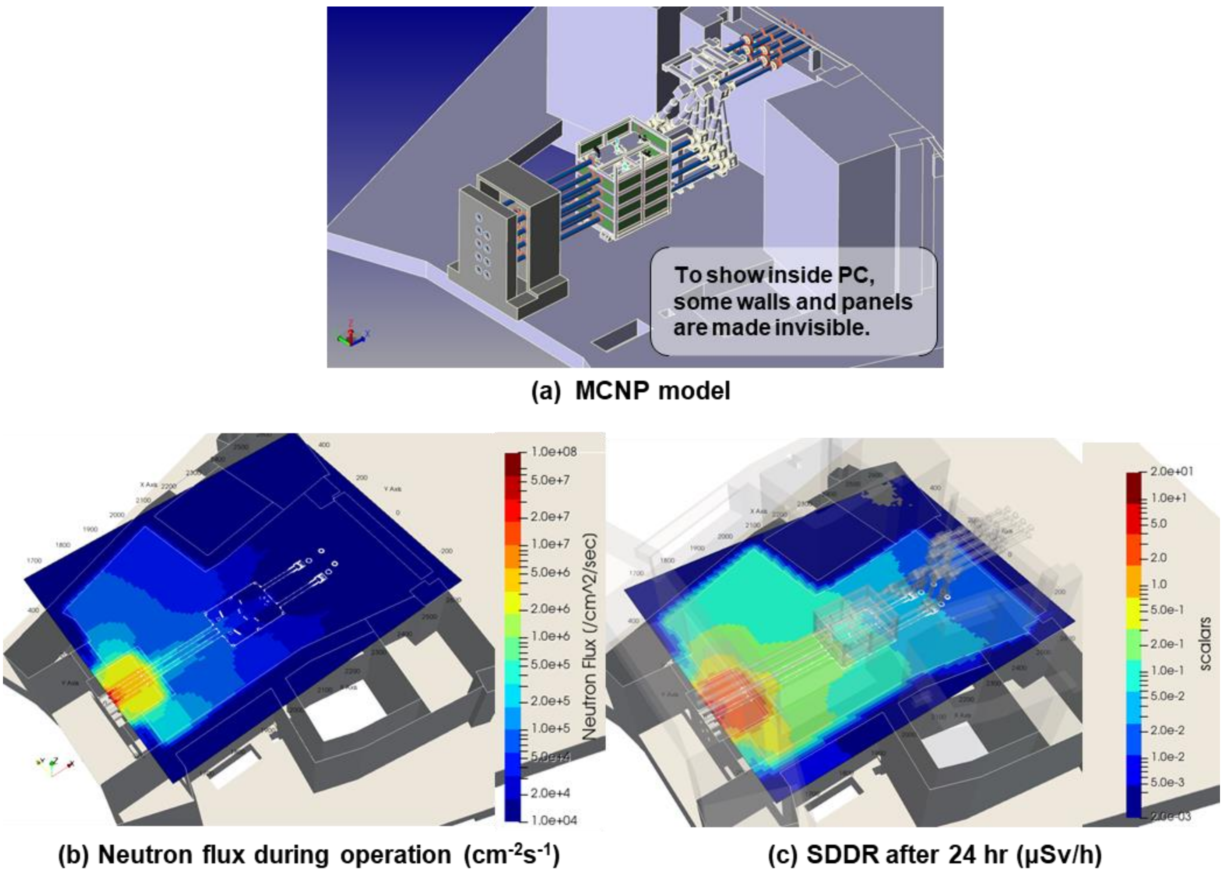


Figure 17 Neutronics analysis in the port cell

Table 4. Absorbed dose of components in PCMB (without safety factor)

component	Absorbed dose per hour during plasma operation	Absorbed dose per hour due to gamma after shutdown.
Piezo actuator	<7.23x10^{-4} (Gy/h) (Error: 6.25%)	<1.39x10^{-7} (Gy/h) (Error: 1.01%)
Rad-hard camera	<2.04x10^{-4} (Gy/h) (Error: 3.66%)	<5.67x10^{-8} (Gy/h) (Error: 0.86%)

Comparing JADA's results (i.e. Figure 17) to the port integrator's results [20], SDDR of JADA's results is roughly 5 times smaller than that of the port integrator's results. JADA's MCNP model includes only PoPola, while the port integrator's MCNP model includes 55.C1 CPTS, 55.C2 ETS, ISS including common shielding and PCSS. Thus, it is obvious that the results of the neutronics analysis are not the same. The author applies safety factor of 50 to JADA's results. So, the absorbed dose taking into account the safety factor of 50 can be summarized as shown in Table 5. The absorbed dose in Table 5 is smaller than the radiation hardness shown in Table 2. Therefore, it is reasonably concluded that the PoPola components are sufficiently shielded from the irradiation.

Table 5. Absorbed dose (applying safety factor of 50 to JADA's neutronics results)

Component	Location	Absorbed dose for 4700-hour plasma discharge
Piezo actuator	ISMB	70 kGy
Piezo actuator	PCMB	170 Gy
Rad-hard camera	PCMB	48 Gy

5.6 Drawings diagrams and BOM

The documents below also provide the detailed information about the design.

- Component drawing [9], [10]
- Assembly drawing [11]
- Components Classification BOM for CCR [6]
- 55.C6.00 PFD [12]
- 55.C6.EA PID [13]
- 55.C6.EB PID [14]
- 55.C6.00 SLD [15]
- 55.C6.EA CBD [16]
- 55.C6.EB CBD [17]

5.7 Notes on vacuum vessel movement

The vacuum vessel will move because of thermal expansion. According to CAD data of DET-05063-A, displacement of the closure plate of the equatorial port due the thermal expansion is about 19-20 mm. (The displacement varies at measuring points) Taking into account this displacement, in-vessel laser beam path is not identical with the ex-vessel laser beam path at room temperature. As shown in Figure 18 (a), the offset between the in-vessel and ex-vessel laser path is 19 mm. At room temperature. Some of retroreflectors on the vacuum window are visible form M3 mirror in ISMB. When the vacuum vessel is at operating temperature, all of the retroreflectors are visible from M3 mirror. Figure 18 (b) and (c) illustrates the relative position of the retroreflectors from the compartment window.

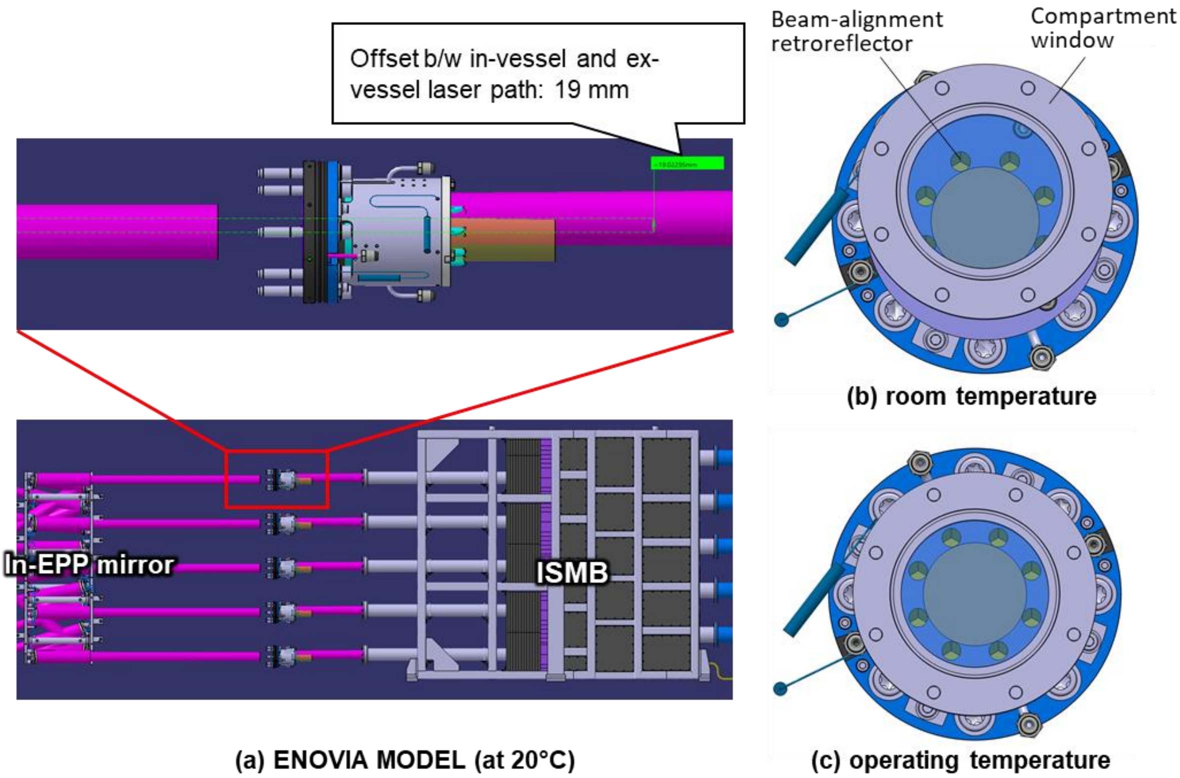


Figure 18. Relative position between in-vessel and ex-vessel components

6 Manufacturing

Reports [25] and [26] clarify the manufacturing process of ISMB and PCMB.

The manufacturing error and the assembly error are not the concerns for ex-vessel components, while they are the concerns for in-vessel components. When assembling the mirrors in ISMB or PCMB, the mirror position can be adjusted within the clearance of bolt holes. Even after on-site assembly is completed, the assembly error can be compensated the steering mirrors in both ISMB and PCMB. The detailed evaluation can be found in “Optical Analysis and Design of PBS.55.C6 PoPola” [7].

7 Assembly and Installation

7.1 Procedure

The port integrator will install ISMB to ISS and will install PCMB to PCSS. The assembly procedure of the port integrator’s installation is given by Reference [27]. Figure 19 shows the assembly procedure copied from Reference [27].

As shown in Figure 20, bellows are inserted between the bio-shield plug and ISMB/PCMB in order to compensate the assembly error.

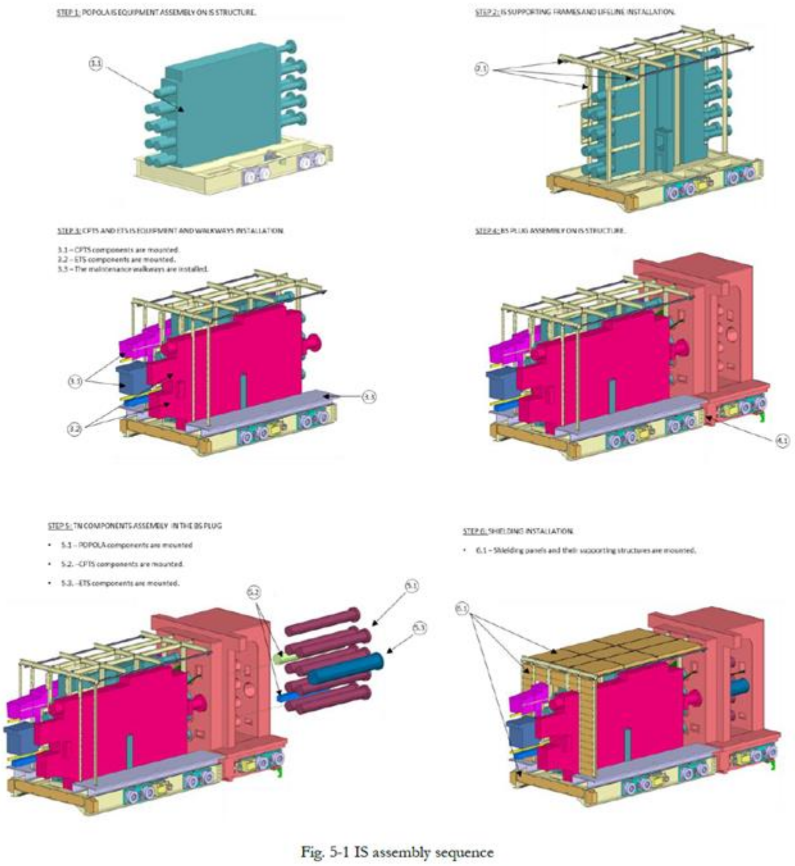


Figure 19. Assembly procedure copied from [27]

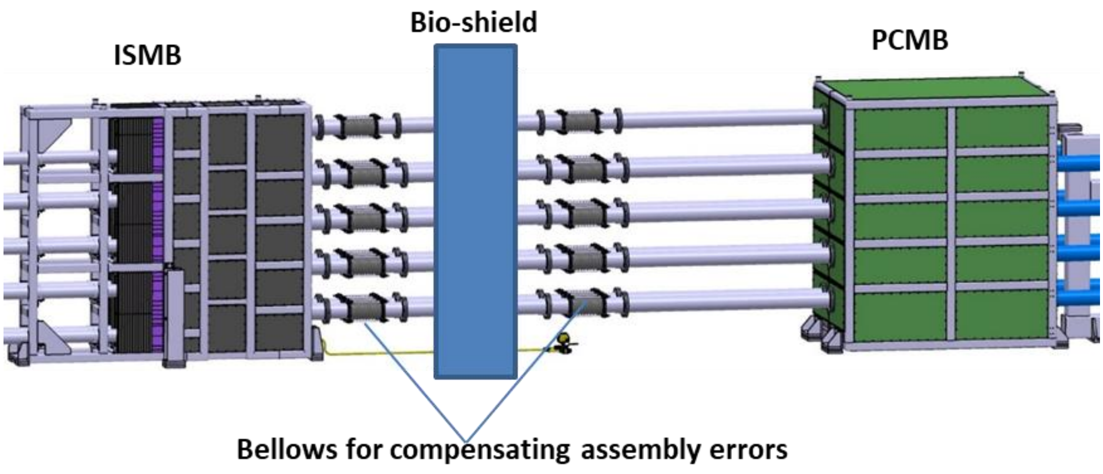


Figure 20. Bellows are inserted between the bio-shield plug and ISMB/PCMB in order to compensate the assembly error.

7.2 Boss for lift

Four bosses are welded to both ISMB and PCMB in order to lift up them. For lift, a simple eye bolt should not be used because the thread size of the boss is M24, the weight of PCMB is 3780 kg, and the weight of ISMB is 3490 kg, Instead, a swivel eye bolt (equivalently, swivel ring or swivel host ring) should be used. Examples of the swivel bolt are as follows.

– Example 1
  - Manufacturer: CODIPRO
  - Model: DSR M 24 UP

    - Weight will: 4.40 ton
  - Example 2
    - Manufacturer: McMASTER-CARR
    - Model: 3005T245
    - Weight will: 4.625 ton
  - Example 3
    - Manufacturer: RUD
    - Model: Load ring VLBG-PLUS 4,5t M24 with ICE-bolt (8504659)
    - Weight will: 4.50 ton

As shown in above, the swivel bolt for M24 has sufficient weight will.

8 Operation, Maintenance and Decommissioning

Operation plan

- To let compressed air continuously flow thorough the optical transmission line. (See Section 5.4)
- To supply electrical power to ISMB and PCMB.
- If the beam position changes after plasma discharge, for instance, due to plasma disruption, the alignment of the laser beam position will be carried out remotely before the start of the next plasma discharge.

Maintenance and inspection plan [22]

- There is no preventive maintenance scheduled in Equatorial Port10.
- The corrective maintenance is to replace the mirror mount in case of failure of piezo actuator.
- The alignment of the laser beam position is impossible during LTM for two reasons. First, when the vacuum vessel is at room temperature, only some of the retroreflectors on the vacuum window is visible from the M3 mirror in ISMB (see Section 5.7). Second, when the vacuum vessel is fulfilled with atmosphere, the FIR laser beam is absorbed by vapor of the atmosphere.

Decommissioning plan [23], [29]

- In-ISS and in-PCSS components will move to hot cell together with ISS and PCSS for hands on treatment and packaging.
- Common procedures as follows
  - Open the Upper Port Cell Door – Hands on operation
  - Disconnect link between component and building
  - Remove PCSS by trolley
  - Remove Bio shield plug
  - Remove ISS by a trolley
- Checklist for radwaste inventories is in IDM [24].

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REV No.	DETAILS OF MODIFICATION	SHEET No.	GRID REF	DATE	DCR No.
--A	A shape of beam alignment RR basement and tab washer is changed	2~3	---	14.04.22	---

REV No.	DETAILS OF MODIFICATION	SHEET No.	GRID REF	DATE	DCR No.

DRW CAD ID: 5KKLGU	APPROVED BY: IOKIK	ITER Organization	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KJNVZ	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	
LINKED 3D ID: 5KJNZX	DRAWN BY: MUKAER		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_BEAM_ALIGMENT_RR 2nd TITLE LINE - CATIA PARAMETER 3rd TITLE LINE - CATIA PARAMETER	
DATE OF ISSUE: 15 Feb 22 / PT MATURITY: DD / PT VERSION: ---	QUALITY CLASS: ---	DOCUMENT TYPE: Assembly or Installation Drawing	
DR STATUS: W / SCALE: 1:1 / PT STATUS: DD			
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA / DRAWING NUMBER: 015685 / SHEET: 01 / N°OF SHEETS: 03	REVISION: ---

Spacereservation for the banner

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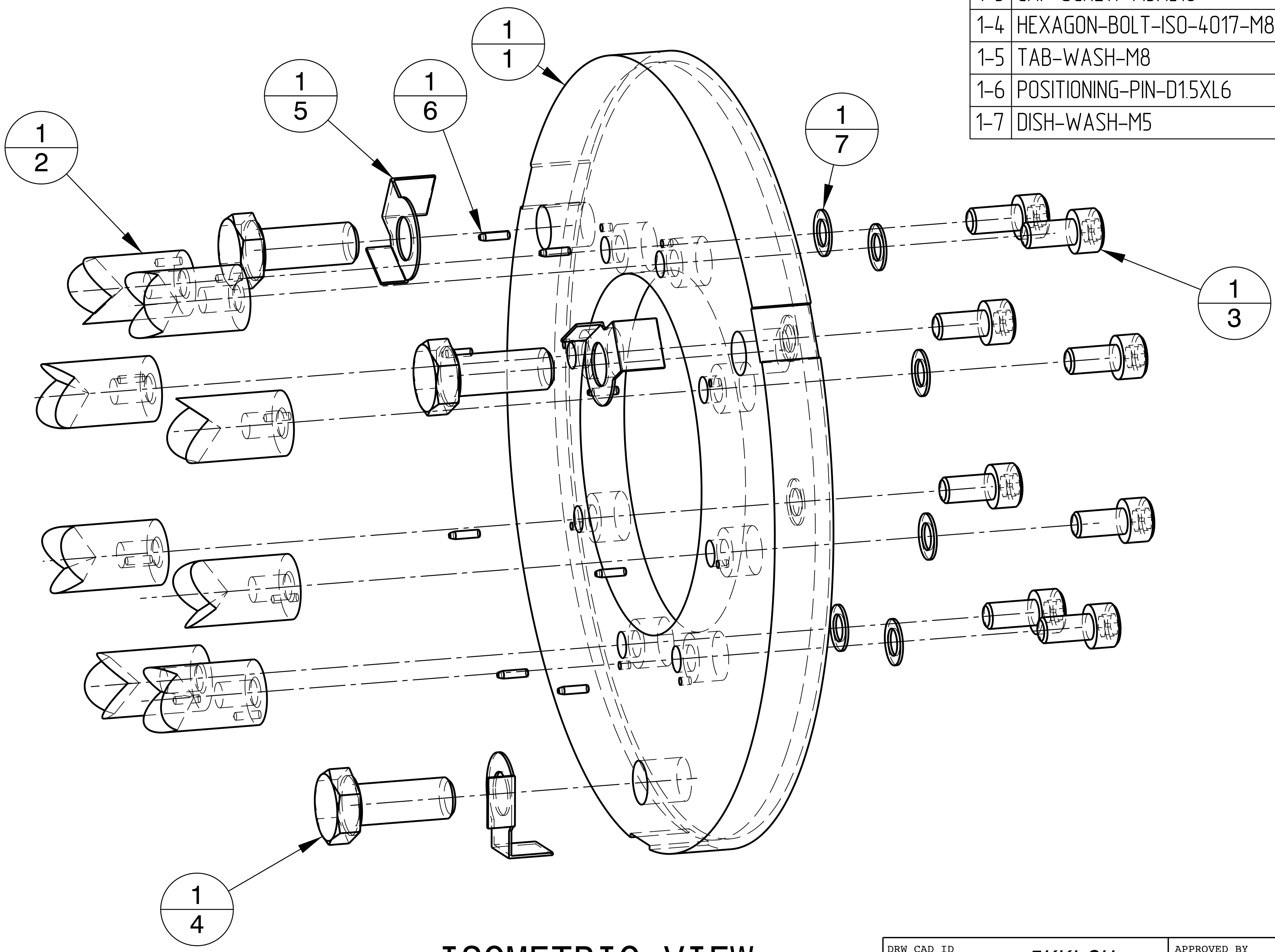
No.	Name	Material	QUANTITY	REMARKS
01	BEAM-ALIGNMENT-RR-ASSY		9Set	Sheet2
1-1	BEAM-ALIGNMENT-RR-BASEMENT	Aluminium alloy 5052	9	Sheet3
1-2	BEAM-ALIGN-RR	Aluminium alloy 1050-H24	72	
1-3	CAP-SCREW-M5XL10	SS316	72	
1-4	HEXAGON-BOLT-ISO-4017-M8X20	SS316	27	
1-5	TAB-WASH-M8	SS316	27	
1-6	POSITIONING-PIN-D1.5XL6	SS316	72	
1-7	DISH-WASH-M5	SS316	72	



ISOMETRIC VIEW
Scale: 1:1

Chord ID	Functional Reference No.
E1	55C6EA-RR-1100
E2	55C6EB-RR-2100
E3	55C6EA-RR-3100
E4	55C6EB-RR-4100
E5	55C6EA-RR-5100
E6	55C6EA-RR-6100
E7	55C6EA-RR-7100
E8	55C6EB-RR-8100
E9	55C6EA-RR-9100

DRW CAD ID: 5KKLGU
LINKED EV5 PT ID: 5KJNVZ
LINKED 3D ID: 5KJNZX
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE: 15 Feb 22 | PT MATURITY: DD | PT VERSION: - - -
DR STATUS: W | SCALE: 1:1 | PT STATUS: DD
THIRD ANGLE PROJECTION

APPROVED BY: IOKIK
TECHNICAL REF: - - -
DRAWN BY: MUKAER
SAFETY CLASS: - - -
QUALITY CLASS: - - -

ITER Organization
-
When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable.
When received during tender phase treat as confidential.

LEGAL OWNER
iter
china EU india japan korea russia USA

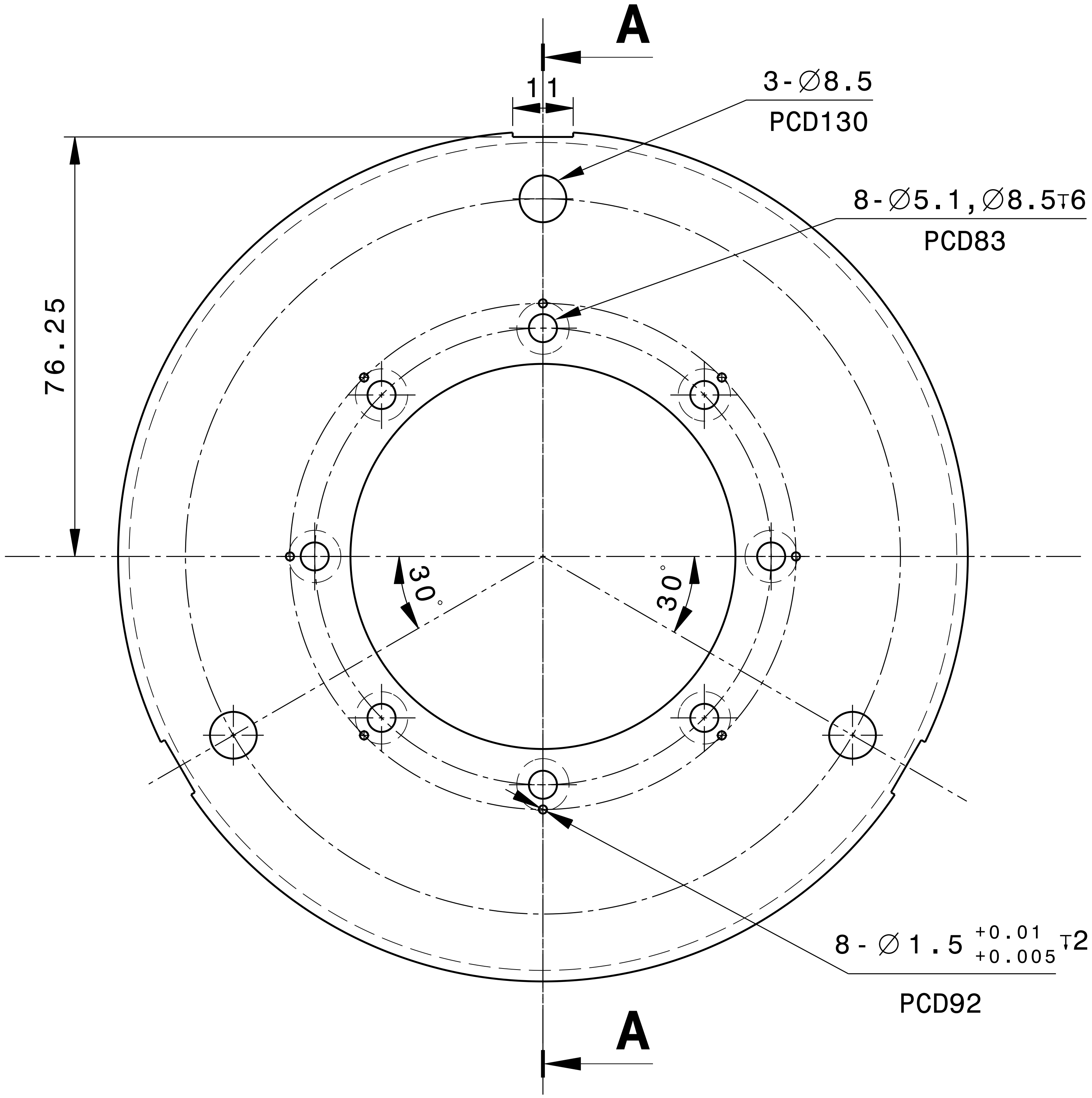
DRAWING TITLE
C6_EP10_BEAM_ALIGMENT_RR
BEAM-ALIGNMENT-RR-ASSY 1/2
3rd TITLE LINE - CATIA PARAMETER

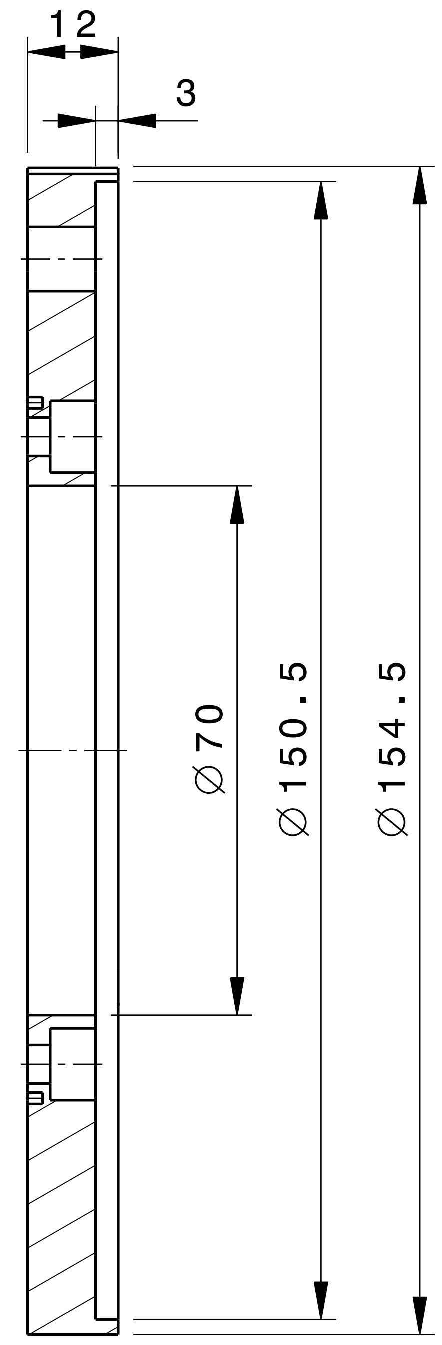
DOCUMENT TYPE
Assembly or Installation Drawing

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015685	02	03	- - -

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
1-1	BEAM-ALIGNMENT-RR-BASEMENT	Aluminium alloy 5052	9	Sheet3





SECTION VIEW A-A

NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs
2.After processing,perform degreasing cleaning

DRW CAD ID: 5KKLGU			APPROVED BY: IOKIK	ITER Organization: -	LEGAL OWNER
LINKED EV5 PT ID: 5KJNVZ			TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	iter china EU india japan korea russia USA
LINKED 3D ID: 5KJNZX					
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A			DRAWN BY: MUKAER	DRAWING TITLE: C6_EP10_BEAM_ALIGMENT_RR BEAM-ALIGNMENT-RR-ASSY 2/2 3rd TITLE LINE - CATIA PARAMETER	
DATE OF ISSUE: 15 Feb 22	PT MATURITY: DD	PT VERSION: ---	SAFETY CLASS: ---		
DR STATUS: W	SCALE: 1:1	PT STATUS: DD	QUALITY CLASS: ---	DOCUMENT TYPE: Assembly or Installation Drawing	
THIRD ANGLE PROJECTION					

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015685	03	03	---

Spacereservation for the banner

Spacereservation for the banner

REV No.	DETAILS OF MODIFICATION	SHEET No.	GRID REF	DATE	DCR No.
--C	Added new movable mirror model	2~3	---	16.03.23	---
--B	Design of dry air pipe was changed	45	---	15.04.22	---
--A	Design of side enclosure was changed	25~32	---	14.03.22	---
	Position and total number of electrical feedthrough were changed	17~20	---	14.03.22	---

DRW CAD ID	5KFAUZ
LINKED EV5 PT ID	5KF8XZ
LINKED 3D ID	5KF92K
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	04 Apr 23
PT MATURITY	DD
PT VERSION	--C
DR STATUS	DD
SCALE	1:1
PT STATUS	DD
APPROVED BY	IOKIK
TECHNICAL REF	---
DRAWN BY	---
SAFETY CLASS	---
QUALITY CLASS	---
ITER Organization	-
DRAWING TITLE	C6_EP10_IS_MIRROR_BOX
DOCUMENT TYPE	---
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015676
SHEET	01
N°OF SHEETS	45
REVISION	--C

THIRD ANGLE PROJECTION

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LEGAL OWNER

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REV No.	DETAILS OF MODIFICATION	SHEET No.	GRID REF	DATE	DCR No.

Spacereservation for the banner

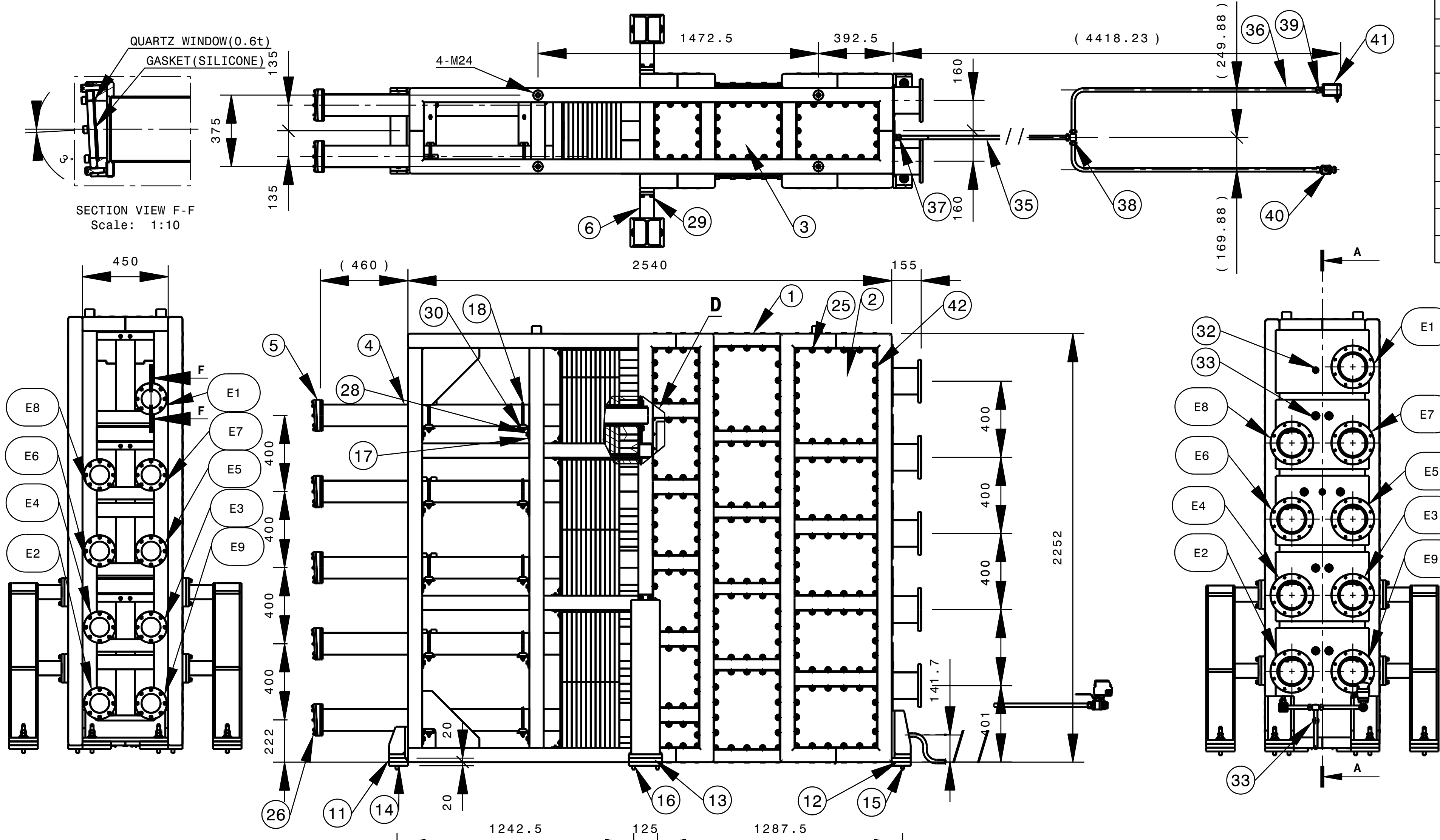
Spacereservation for the banner

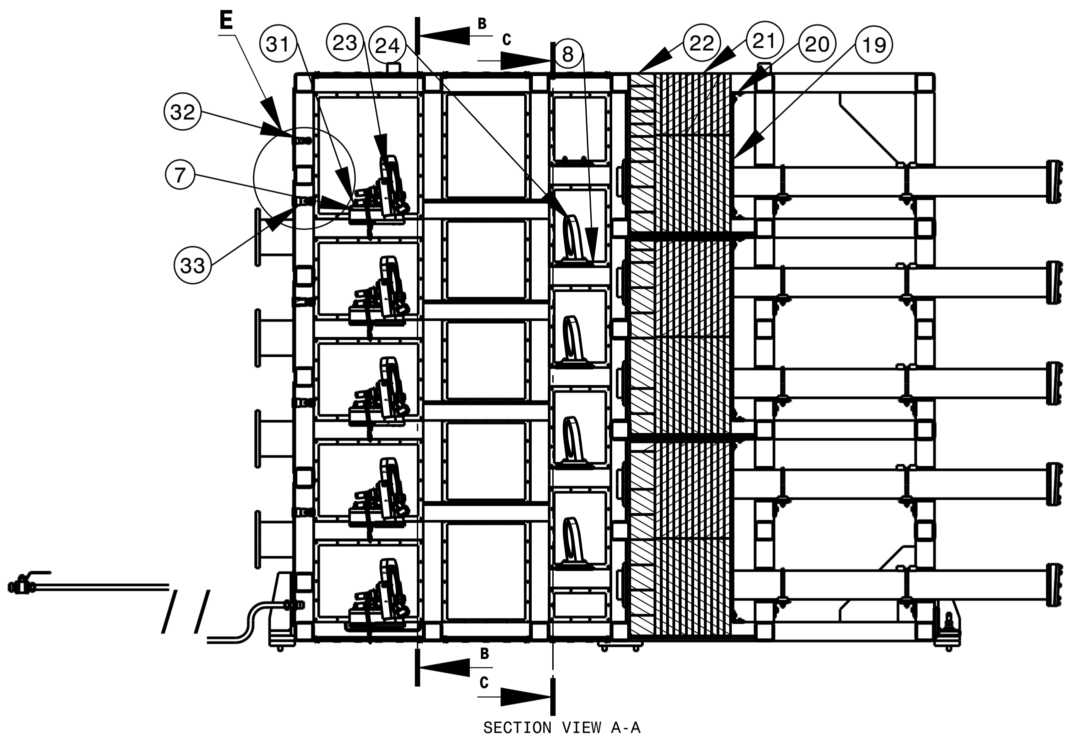
No.	Name	Material	QUANTITY	REMARKS
21	NEUTRON-SHIELDING-BLOCK	B4C	1set	Sheet42
22	GAMMA-RAY-SHIELDING-BLOCK	Pb	1set	Sheet43-44
23	M3-MIRROR-ASSY		4set	MHG130MH-PZA12-LIGHT(FMD)
24	M4-MIRROR-ASSY		9set	MHG130MH-800N(FMD)
25	LOW-HEAD-ACTIVE-SCREW-M6XL12.5	SS316L	616	Sheet32
26	HEX-SOCKET-HEAD-BOLT-M8XL25	SS316L	72	
27	HEX-BOLT-M8XL20	SS316L	72	
28	HEX-BOLT-M10XL20	SS316L	20	
29	HEX-BOLT-M12XL35	SS316L	8	
30	HEX-NUT-M10	SS316L	36	
31	HEX-NUT-M12	SS316L	40	
32	RECEPTACLE-CONNECTOR-01		9	RESC-F-4(SOURIAU)

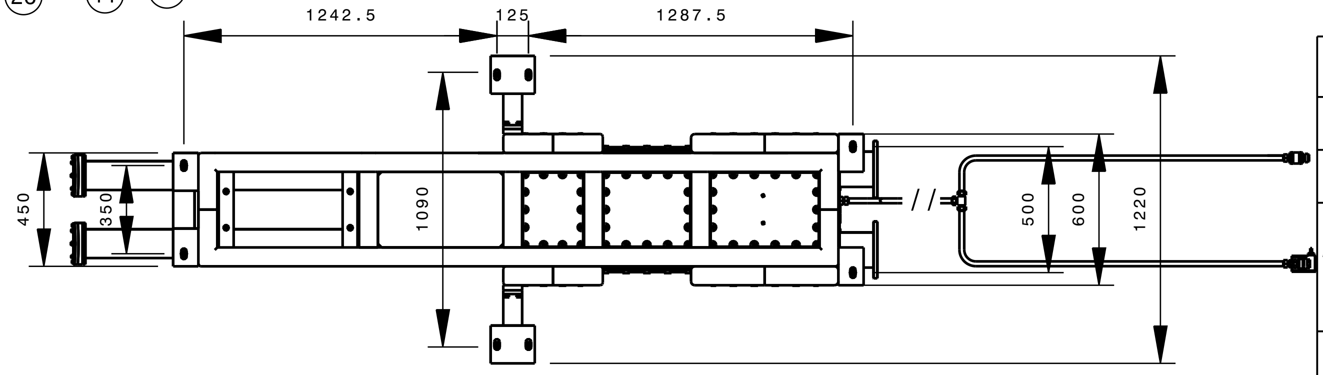
No.	Name	Material	QUANTITY	REMARKS
11	ANTI-VIBRATION-PAD-TYPE1	NR	2	Sheet39
12	ANTI-VIBRATION-PAD-TYPE2	NR	2	
13	ANTI-VIBRATION-PAD-TYPE3	NR	2	
14	SPACER-TYPE1	SS316L	2	
15	SPACER-TYPE2	SS316L	2	
16	SPACER-TYPE3	SS316L	2	
17	FRONT-TRANSMISSION-TUBE-RECEIVER	SS316L	10	Sheet40
18	U-BOLT-ASSY	SS316L	18	
19	B4C-STOPPER	SS316L	1	Sheet41
20	RIGHT-TRNSMISSION-TUBE-RECEIVER	SS316L	6	

No.	Name	Material	QUANTITY	REMARKS
01	ISMB-FRAME	SS316L	1set	Sheet4-24
02	PLATE-OF-SIDE-ENCLOSURE	B4C,Pb,SS316L	2set	Sheet25-28
03	BOTTOM-CLOSURE-PLATE	B4C,Pb,SS316L	2set	Sheet29-31
04	TRANS-MISSION-TUBE	SS316L	9set	Sheet33
05	COMPARTMENT-WINDOW-ASSEMBLY	SS316L,QUARTZ,SILICONE	9set	Sheet34
06	SIDE-SUPPORT	SS316L	2set	Sheet35
07	M3-MIRROR-BASE	SS316L	5set	Sheet36
08	M4-MIRROR-BASE	SS316L	5set	Sheet37
09	FRONT-ENCLOSURE-FLANGE	SS316L	9	Sheet38
10	FRONT-ENCLOSURE-RUBBER	EPDM	9	

No.	Name	Material	QUANTITY	REMARKS
33	RECEPTACLE-CONNECTOR-02		7	RESC-F-3(SOURIAU)
34	DEW-POINT-TEMPERATURE-SENSOR		1	QT-1 Sensor Module A (Graviton)
35	DRY-AIR-RELEASE-PIPE-01	SS316L	1	Sheet45
36	DRY-AIR-RELEASE-PIPE-02	SS316L	2	
37	BULIHEAD-MALE-CONNECTOR	SS316	1	
38	UNION-TEE	SS316	1	
39	MALE-CONNECTOR	SS316	1	
40	BALL-VALVE	SS316	1	
41	ELECTRIC-VALVE		1	
42	JOINEDPARTSASSY	SS316		Sheet32
43	M3-MIRROR-ASSY		5Set	MHG130MH-PZA12-LIGHT(FMD)



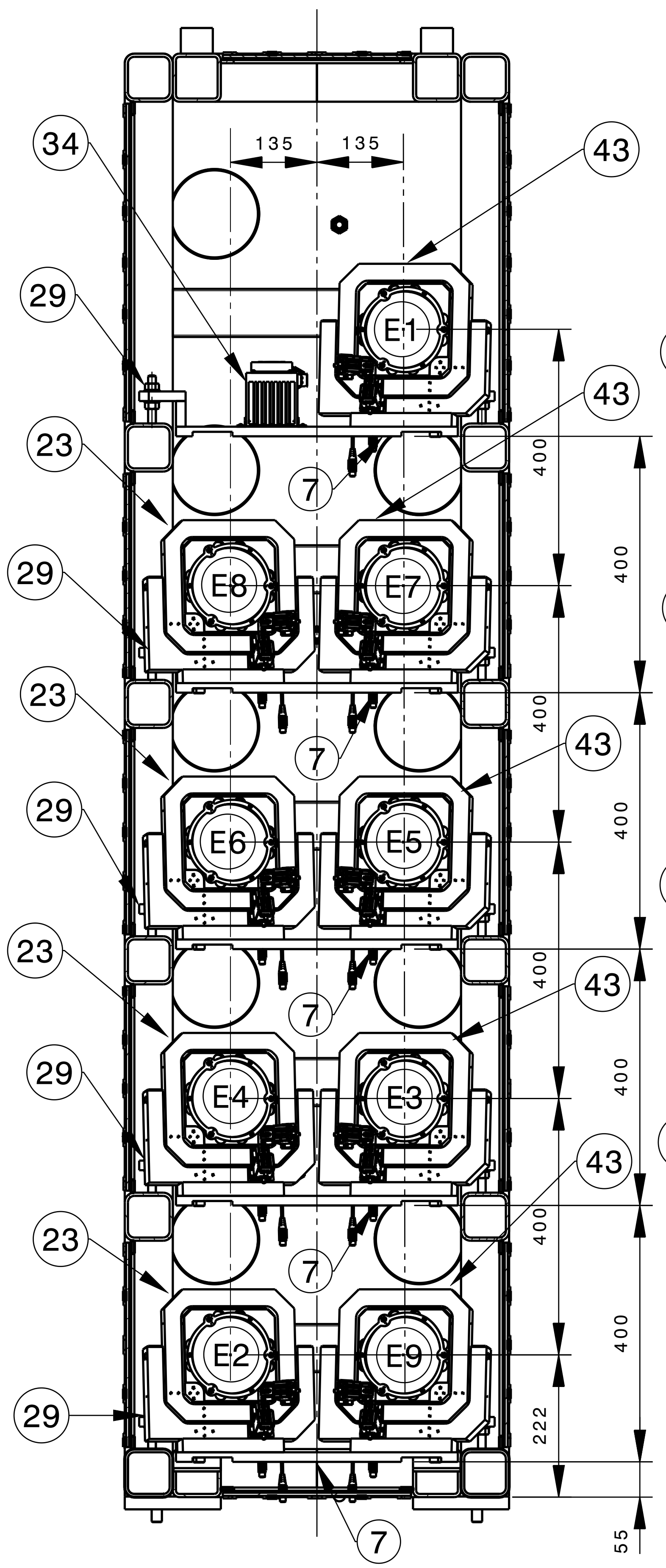




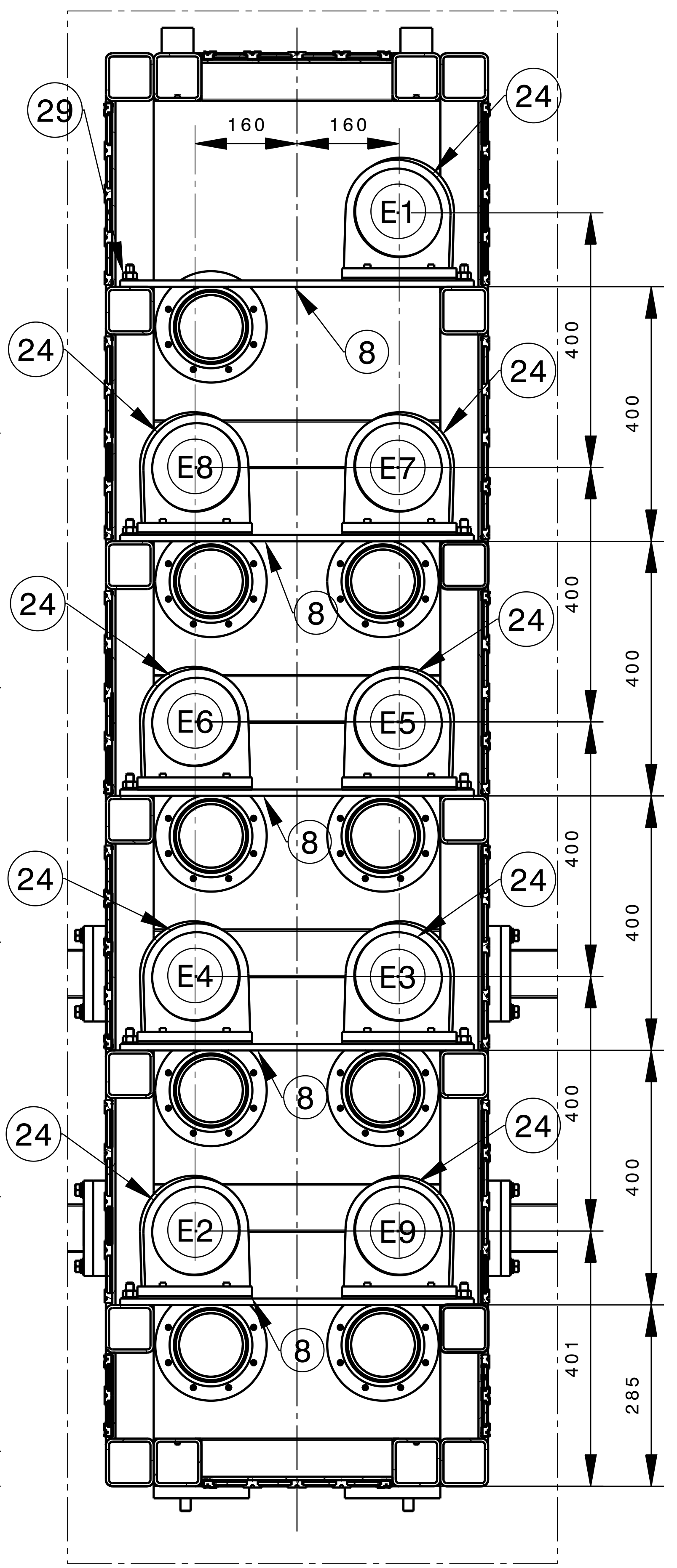
NOTE

1.Attach the EPDM seal to the frame before installing the closing plate
2.The number in the ellipse indicates the line-of-sight number
3.Function reference number of ISMB is 55C6EA-WMA-0200
4.Function reference number of compartment window is described in Sheet34.

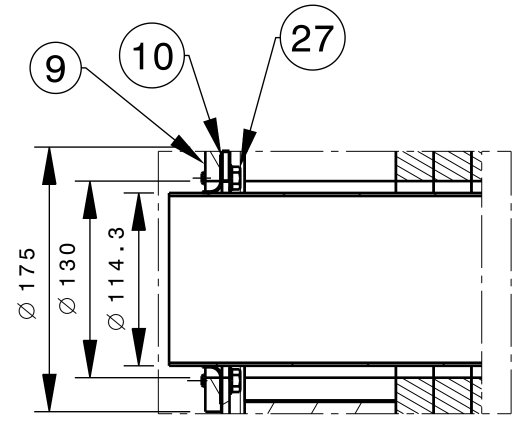
DRW CAD ID	5KFAUZ	APPROVED BY	IOKIK	ITER Organization	LEGAL OWNER
LINKED EV5 PT ID	5KF8XZ	TECHNICAL REF	---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	iter china EU india japan korea russia USA
LINKED 3D ID	5KF92K	DRAWN BY	---	DRAWING TITLE C6_EP10_IS_MIRROR_BOX	
PBS TITLE Diagnostics Poloidal Polarimeter PoPola Eq system A		SAFETY CLASS	---		
DATE OF ISSUE 04 Apr 23	PT MATURITY DD / PT VERSION --C	QUALITY CLASS	---	DOCUMENT TYPE ---	
DR STATUS DD	SCALE 1:30 / PT STATUS DD				
THIRD ANGLE PROJECTION		FORMAT A3	PBS NUMBER 55 C6 EA	DRAWING NUMBER 015676	SHEET 02 / N°OF SHEETS 45 / REVISION --C



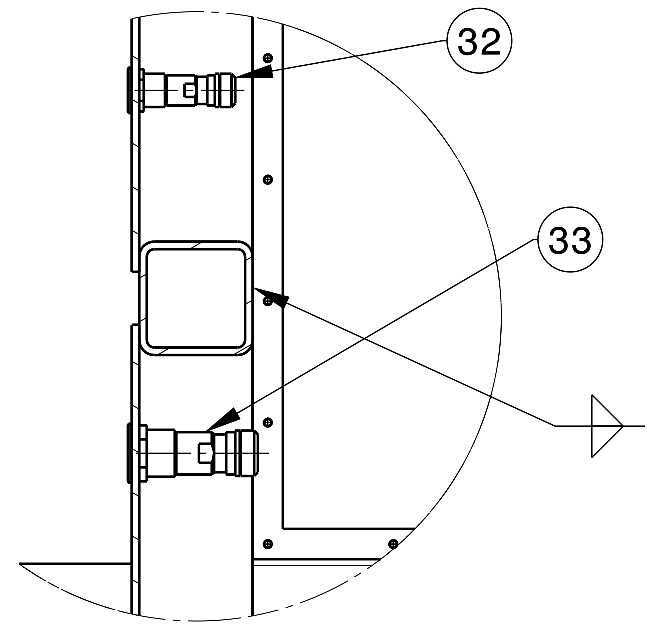
SECTION VIEW B-B



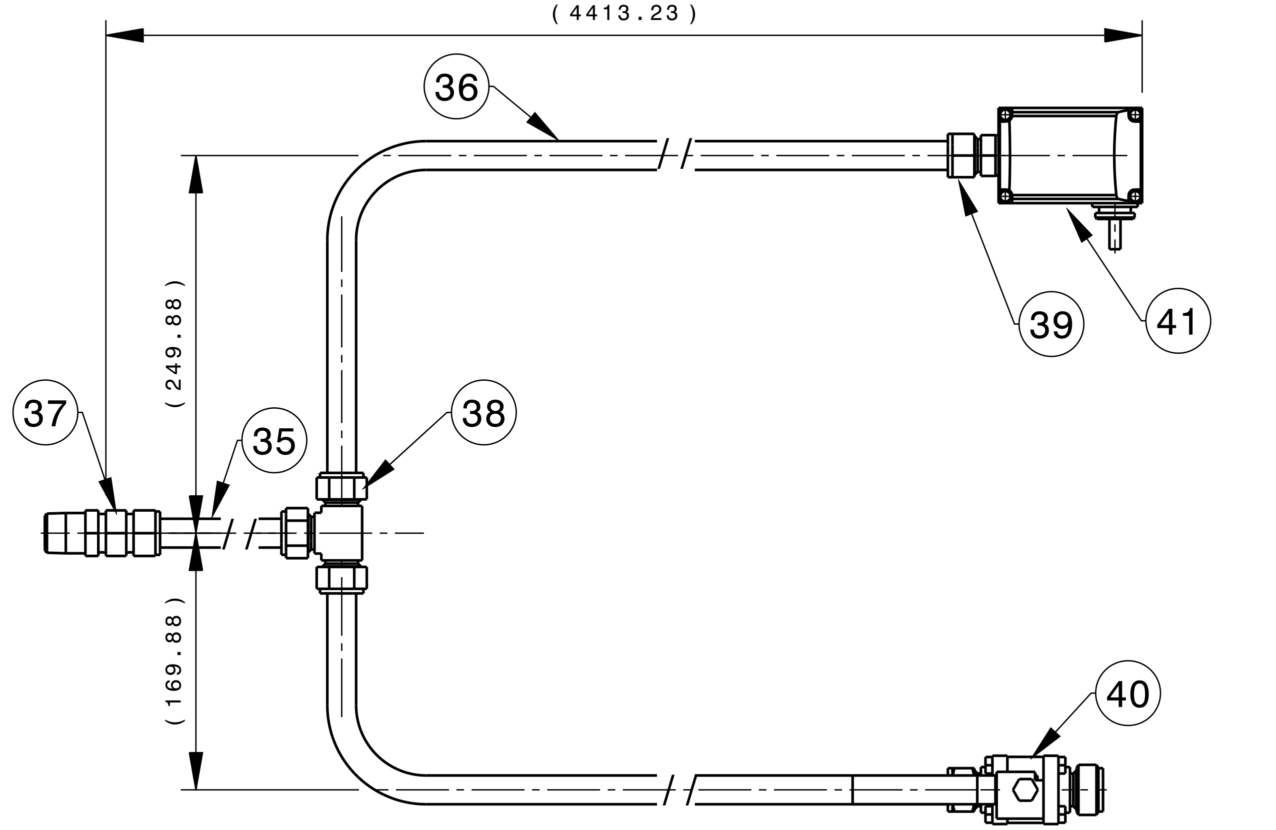
SECTION VIEW C-C



DETAIL D



DETAIL E



DRW CAD ID	5KFAUZ	APPROVED BY: IOKIK	ITER Organization
LINKED EV5 PT ID	5KF8XZ	TECHNICAL REF: ---	-
LINKED 3D ID	5KF92K	DRAWN BY: ---	

When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.

LEGAL OWNER: iter — china EU india japan korea russia USA

PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A

DATE OF ISSUE	PT MATURITY	PT VERSION
04 Apr 23	DD	--C

DR STATUS	SCALE	PT STATUS
DD	1:10	DD

SAFETY CLASS: ---

QUALITY CLASS: ---

DRAWING TITLE: C6_EP10_IS_MIRROR_BOX OVERALL_ASEEMBLY_DRAWING(2/2) 3rd TITLE LINE - CATIA PARAMETER

DOCUMENT TYPE: ---

THIRD ANGLE PROJECTION

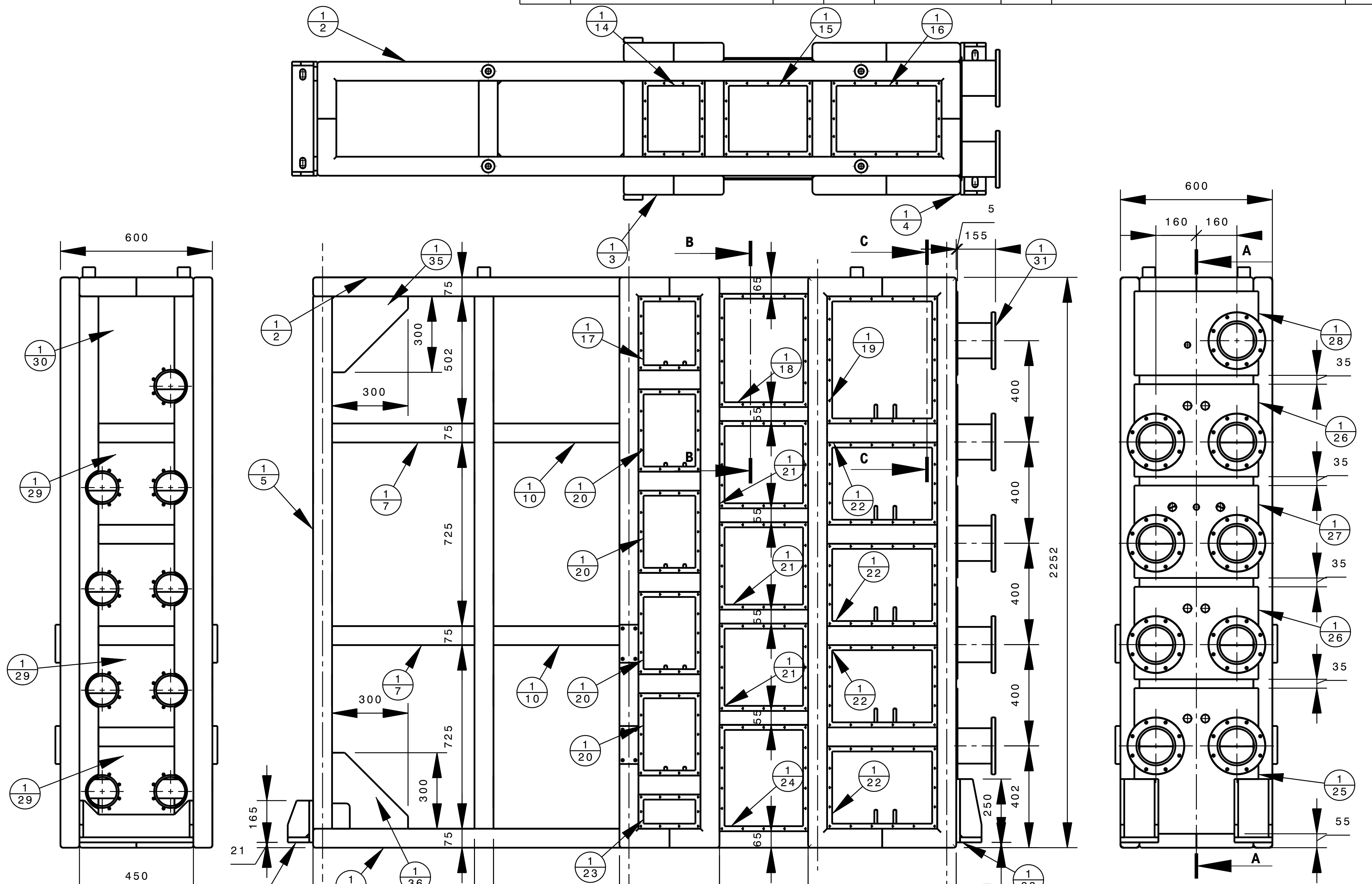
FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	03	45	--C

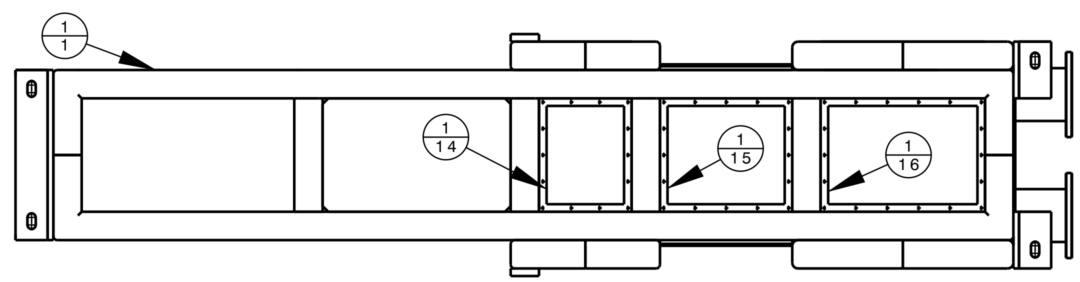
No.	Name	Material	QUANTITY	REMARKS
1-31	TUBE-OF-REAR-ENCLOSURE	SS316L	9	Sheet16-19
1-32	REAR-SUPPRT-BRACKET-ASSY-01	SS316L	1set	Sheet21
1-33	FRONT-SUPPRT-BRACKET-ASSY-02	SS316L	2set	Sheet22
1-34	RADIATION-SHIELDING-BLOCK-RECEIVING-PLATE	SS316L	3	Sheet23
1-35	GUS-PLATE-01	SS316L	2	
1-36	GUS-PLATE-02	SS316L	2	

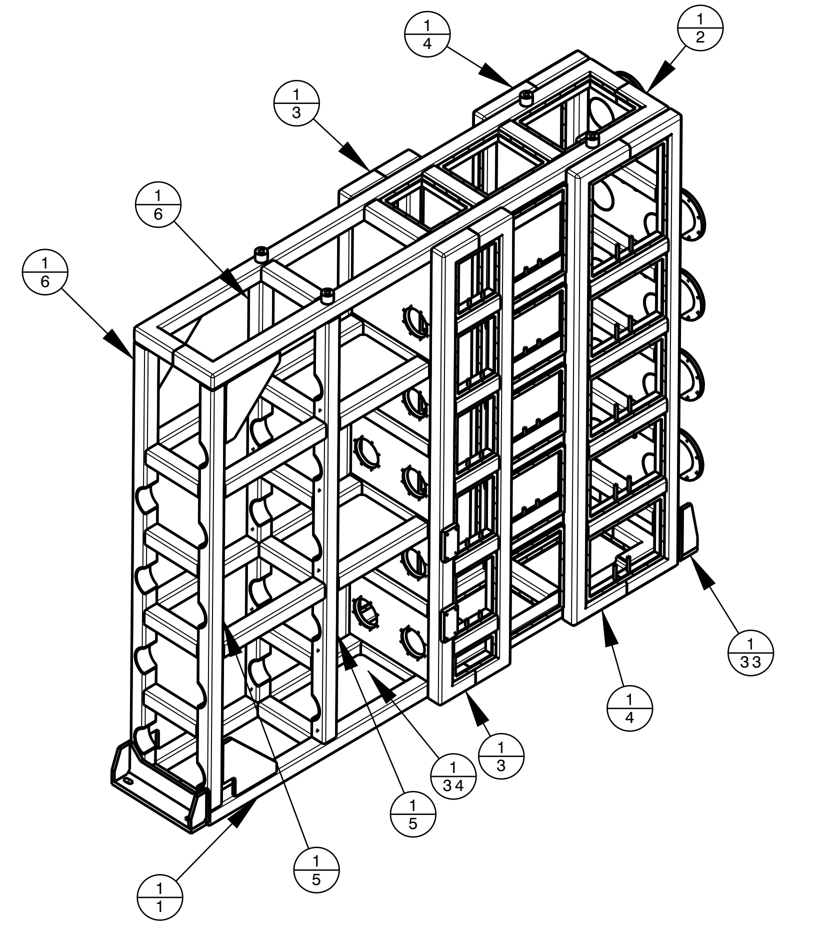
No.	Name	Material	QUANTITY	REMARKS
1-21	SIDE-ENCLOSURE-FRAME-05	SS316L	6	Sheet15
1-22	SIDE-ENCLOSURE-FRAME-06	SS316L	8	
1-23	SIDE-ENCLOSURE-FRAME-07	SS316L	2	
1-24	SIDE-ENCLOSURE-FRAME-08	SS316L	2	
1-25	PLATE-OF-REAR-ENCLOSURE-01	SS316L	1	Sheet16
1-26	PLATE-OF-REAR-ENCLOSURE-02	SS316L	2	Sheet17
1-27	PLATE-OF-REAR-ENCLOSURE-03	SS316L	1	Sheet18
1-28	PLATE-OF-REAR-ENCLOSURE-04	SS316L	1	Sheet19
1-29	PLATE-OF-FRONT-ENCLOSURE-01	SS316L	4	Sheet20
1-30	PLATE-OF-FRONT-ENCLOSURE-02	SS316L	1	

No.	Name	Material	QUANTITY	REMARKS
1-11	BEAM-05	SS316L	8	Sheet13
1-12	BEAM-06	SS316L	8	
1-13	BEAM-07	SS316L	8	
1-14	BOTTOM-ENCLOSURE-FRAME-01	SS316L	2	Sheet14
1-15	BOTTOM-ENCLOSURE-FRAME-02	SS316L	2	
1-16	BOTTOM-ENCLOSURE-FRAME-03	SS316L	2	
1-17	SIDE-ENCLOSURE-FRAME-01	SS316L	2	Sheet15
1-18	SIDE-ENCLOSURE-FRAME-02	SS316L	2	
1-19	SIDE-ENCLOSURE-FRAME-03	SS316L	2	
1-20	SIDE-ENCLOSURE-FRAME-04	SS316L	8	

No.	Name	Material	QUANTITY	REMARKS
1-1	BOTTOM-FRAME	SS316L	1set	Sheet7
1-2	TOP-FRAME	SS316L	1set	Sheet8
1-3	SIDE-FRAMEA	SS316L	2set	Sheet9
1-4	SIDE-FRAMEB	SS316L	2set	Sheet10
1-5	PILLAR-WITH-CYLINDRICAL-CUTOUTS-A	SS316L	2set	Sheet11
1-6	PILLAR-WITH-CYLINDRICAL-CUTOUTS-B	SS316L	2set	Sheet12
1-7	BEAM-01	SS316L	4	Sheet13
1-8	BEAM-02	SS316L	10	
1-9	BEAM-03	SS316L	9	
1-10	BEAM-04	SS316L	4	





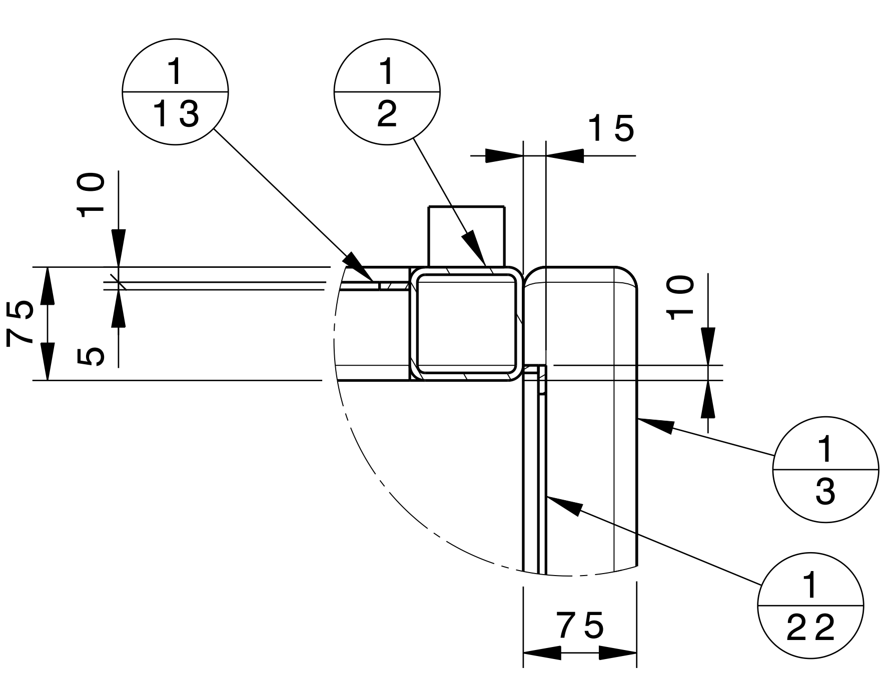


ISOMETRIC VIEW
Scale: 1:30

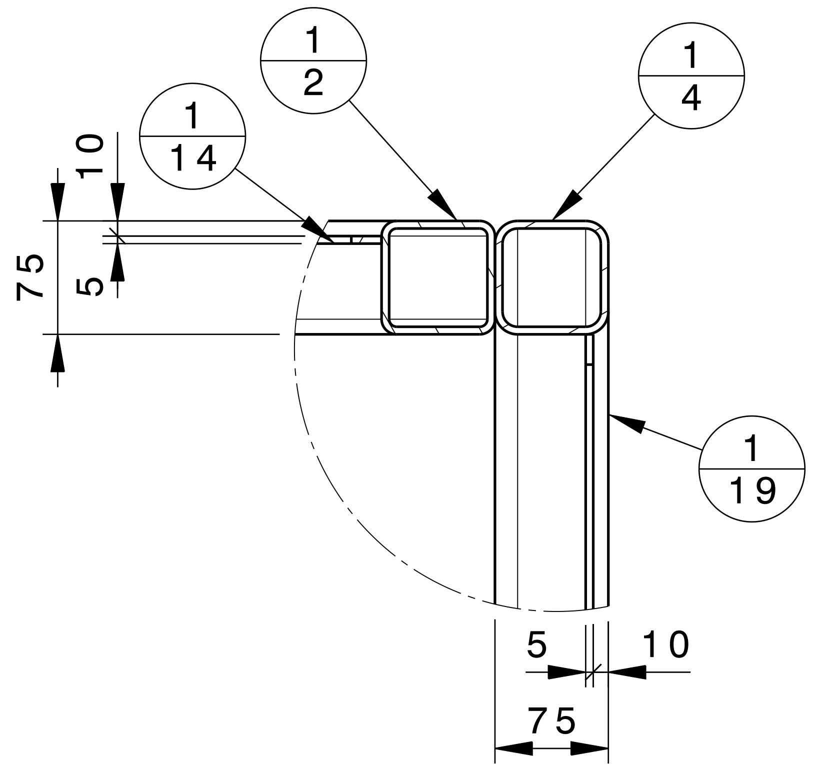
DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization	LEGAL OWNER
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	iter china EU india japan korea russia USA
LINKED 3D ID: 5KF92K	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX ISMB_FRAME(1/3) 3rd TITLE LINE - CATIA PARAMETER	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---		
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---	
DR STATUS: DD / SCALE: 1:20 / PT STATUS: DD			
THIRD ANGLE PROJECTION	FORMAT: A3 / PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676 / SHEET: 04 / N°OF SHEETS: 45	REVISION: --C

Spacereservation for the banner

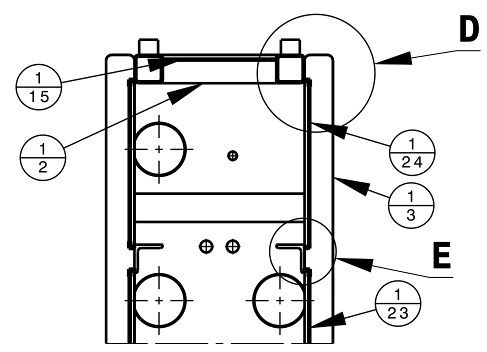
Spacereservation for the banner



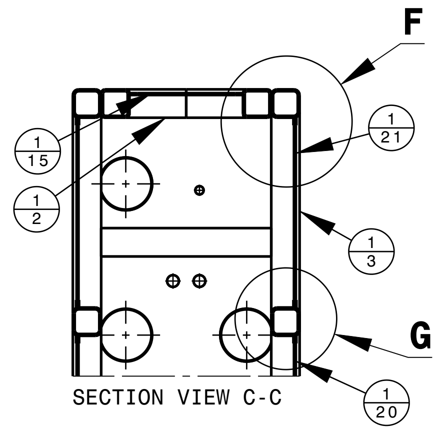
DETAIL D
Scale: 1:5



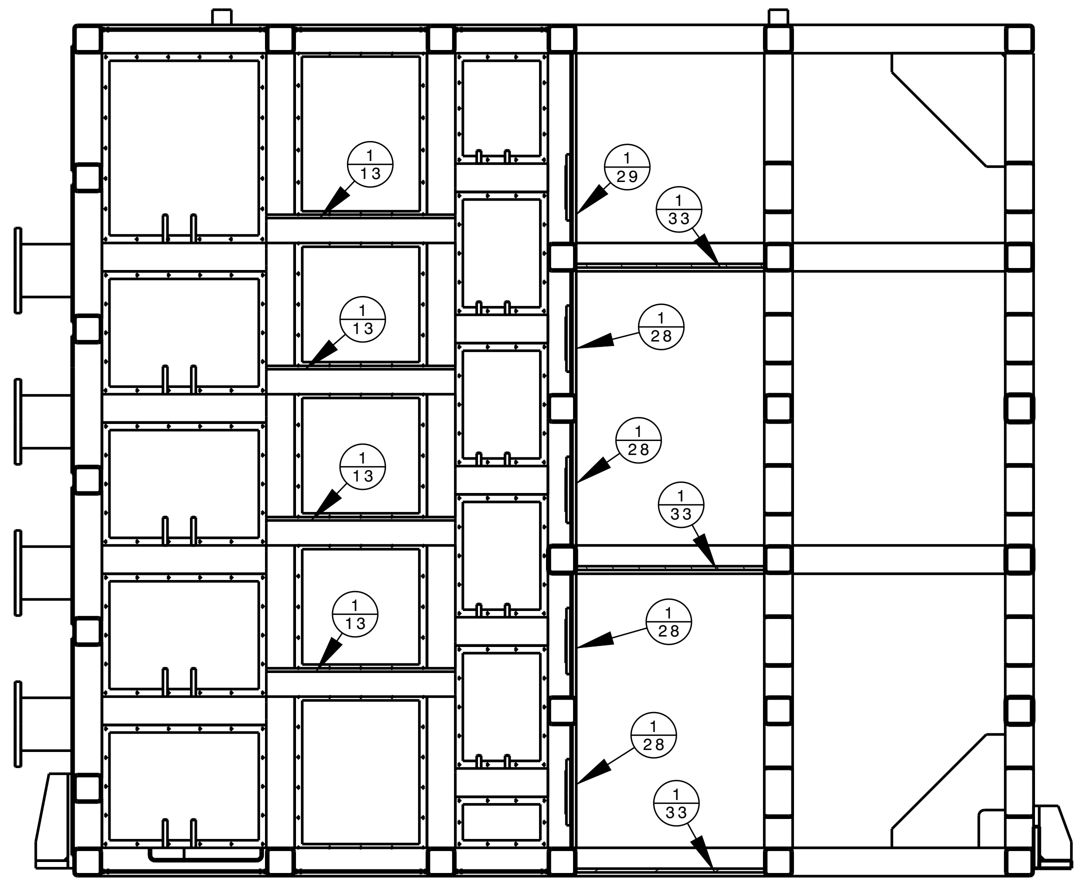
DETAIL F
Scale: 1:5



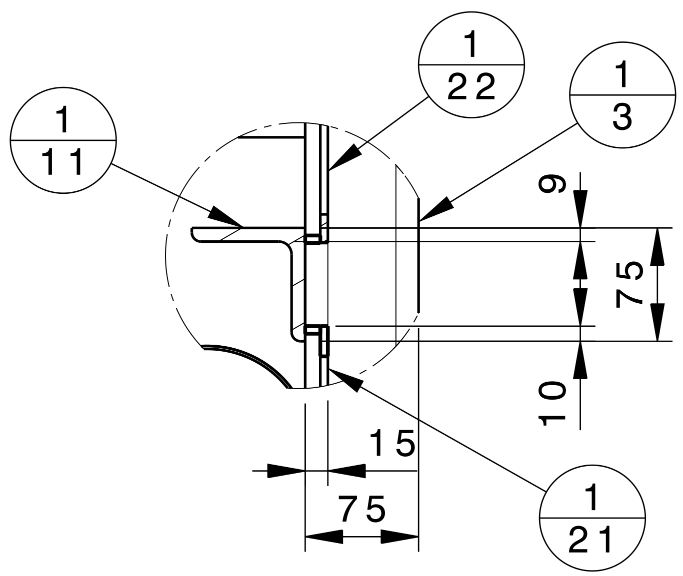
SECTION VIEW B-B



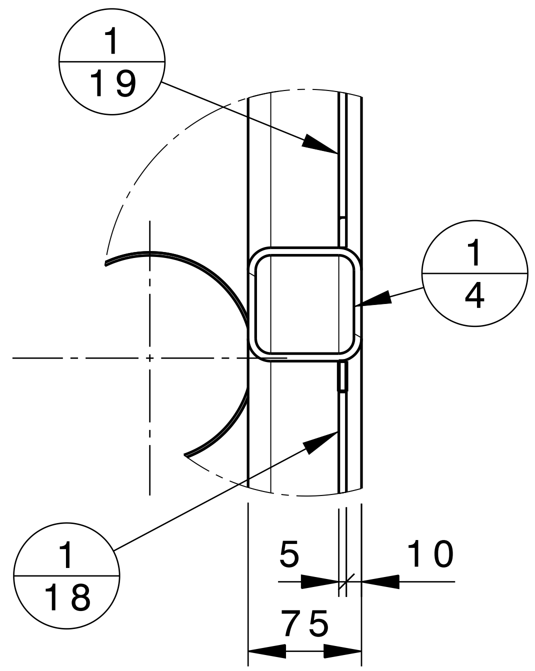
SECTION VIEW C-C



SECTION VIEW A-A



DETAIL E
Scale: 1:5

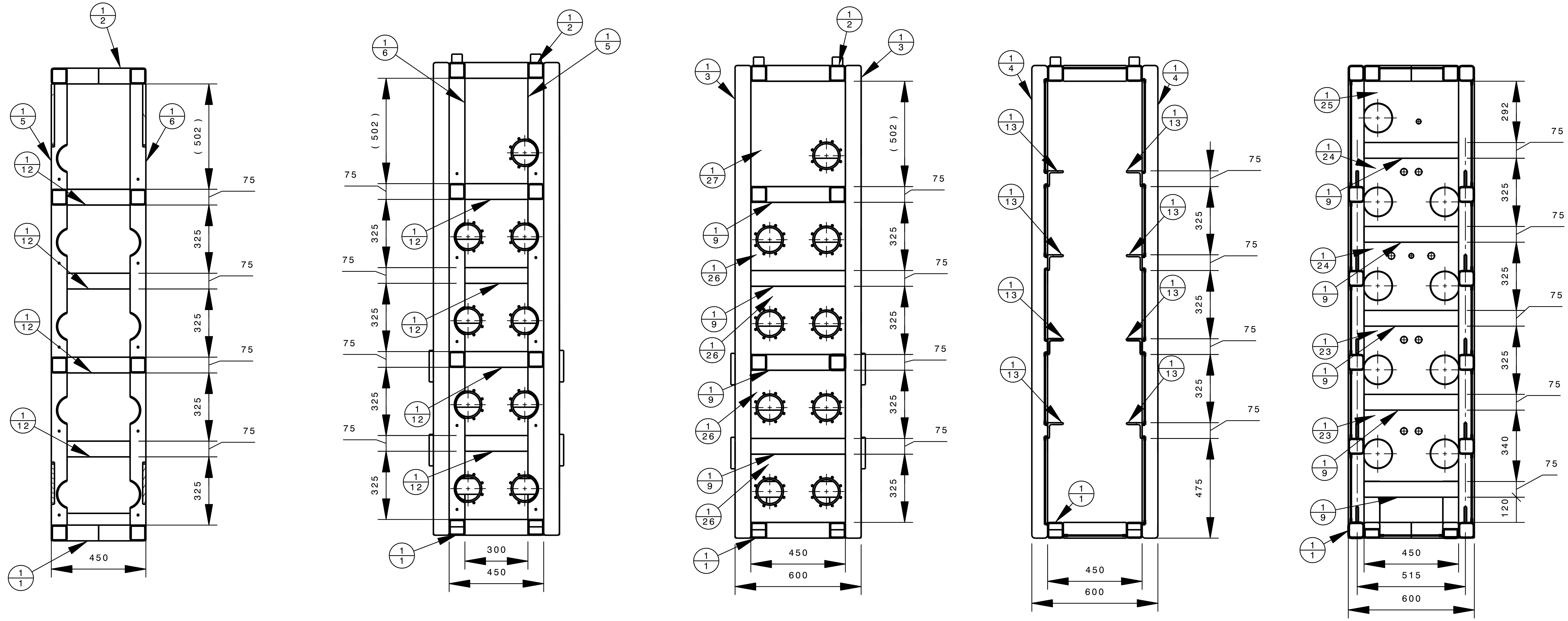


DETAIL G
Scale: 1:5

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization		LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		
LINKED 3D ID: 5KF92K				
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX ISMB_FRAME 2/3 3rd TITLE LINE - CATIA PARAMETER		
	SAFETY CLASS: ---			
DATE OF ISSUE: 04 Apr 23; PT MATURITY: DD; PT VERSION: --C	QUALITY CLASS: ---			
DR STATUS: DD; SCALE: 1:10; PT STATUS: DD		DOCUMENT TYPE: ---		
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 05; N°OF SHEETS: 45; REVISION: --C

Spacereservation for the banner

Spacereservation for the banner



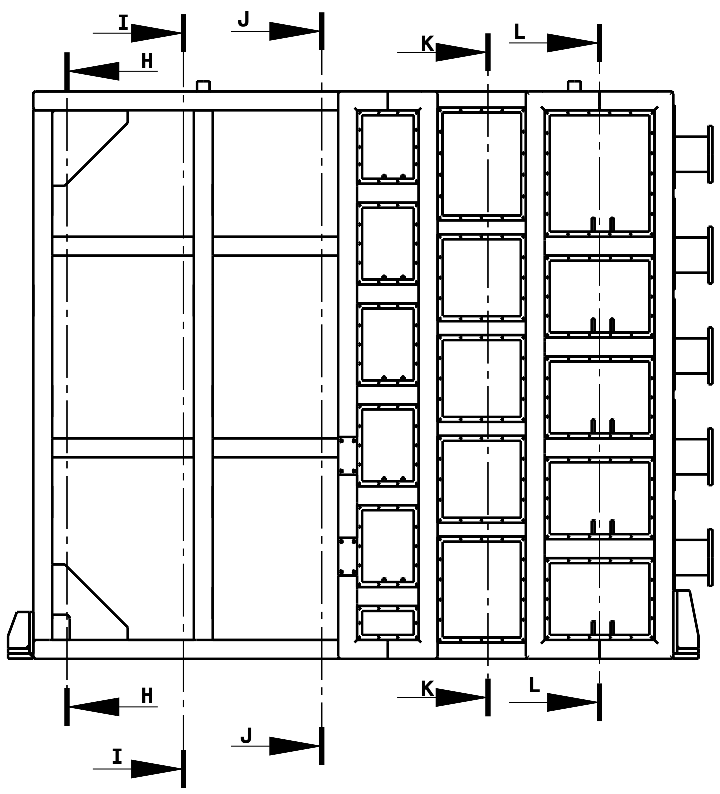
H-H Cross Section

I-I Cross Section

J-J Cross Section

K-K Cross Section

L-L Cross Section



FRONT VIEW
Scale: 1:30

DRW CAD ID: 5KFAUZ

LINKED EV5 PT ID: 5KF8XZ

LINKED 3D ID: 5KF92K

PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A

DATE OF ISSUE	PT MATURITY	PT VERSION
04 Apr 23	DD	--C
DR STATUS	SCALE	PT STATUS
DD	1:20	DD

THIRD ANGLE PROJECTION

APPROVED BY: IOKIK

TECHNICAL REF: ---

DRAWN BY: ---

SAFETY CLASS: ---

QUALITY CLASS: ---

ITER Organization

-

When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable.
When received during tender phase treat as confidential.

LEGAL OWNER

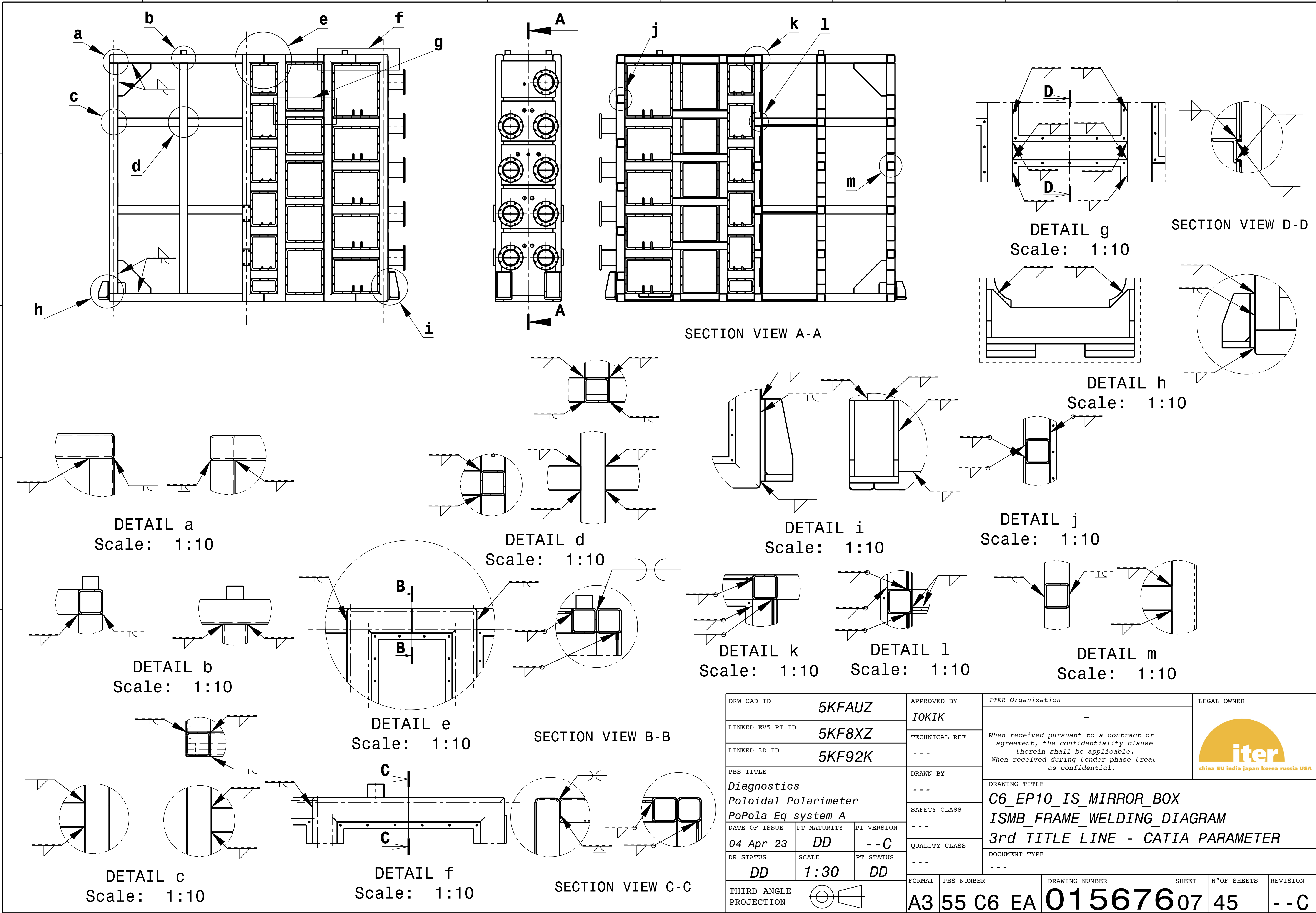
iter
china EU india japan korea russia USA

DRAWING TITLE: C6_EP10_IS_MIRROR_BOX ISMB_FRAME(3/3) 3rd TITLE LINE - CATIA PARAMETER

DOCUMENT TYPE: ---

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	06	45	--C

Spacereservation for the banner



DRW CAD ID	5KFAUZ
LINKED EV5 PT ID	5KF8XZ
LINKED 3D ID	5KF92K
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	04 Apr 23
PT MATURITY	DD
PT VERSION	--C
DR STATUS	DD
SCALE	1:30
PT STATUS	DD
APPROVED BY	IOKIK
TECHNICAL REF	---
DRAWN BY	---
SAFETY CLASS	---
QUALITY CLASS	---
DRAWING TITLE	C6_EP10_IS_MIRROR_BOX ISMB_FRAME_WELDING_DIAGRAM 3rd TITLE LINE - CATIA PARAMETER
DOCUMENT TYPE	---
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015676
SHEET	07
N°OF SHEETS	45
REVISION	--C

THIRD ANGLE PROJECTION

ITER Organization

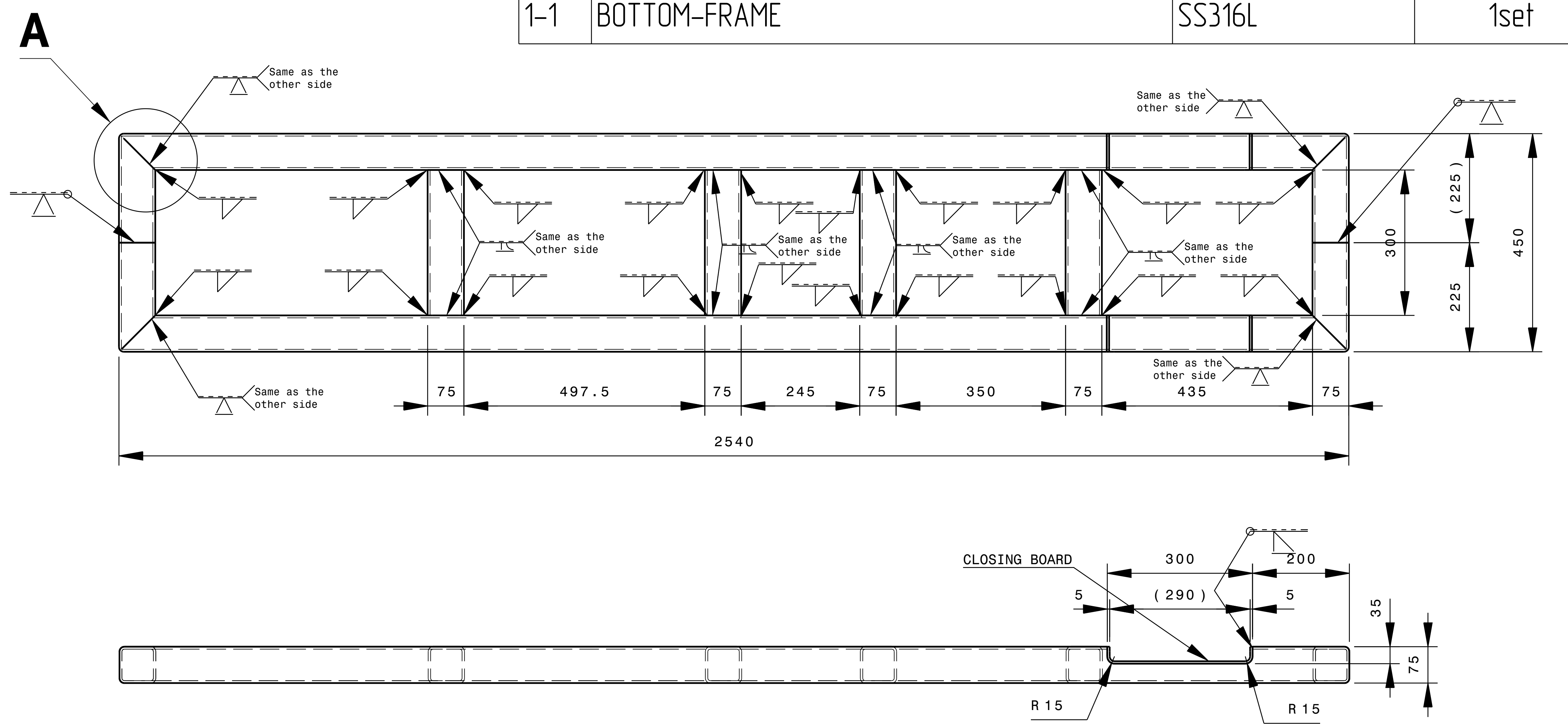
-

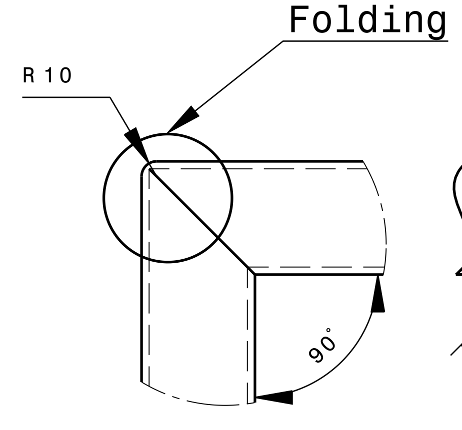
LEGAL OWNER

iter china EU india japan korea russia USA

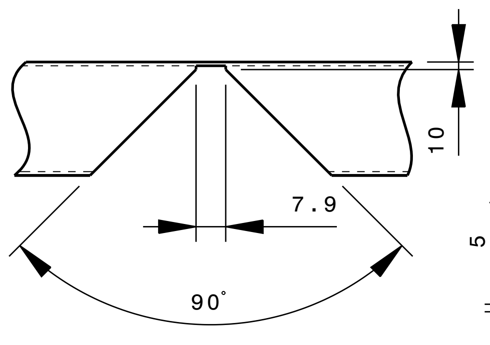
No.	Name	Material	QUANTITY	REMARKS
1-1	BOTTOM-FRAME	SS316L	1set	

1 - 1

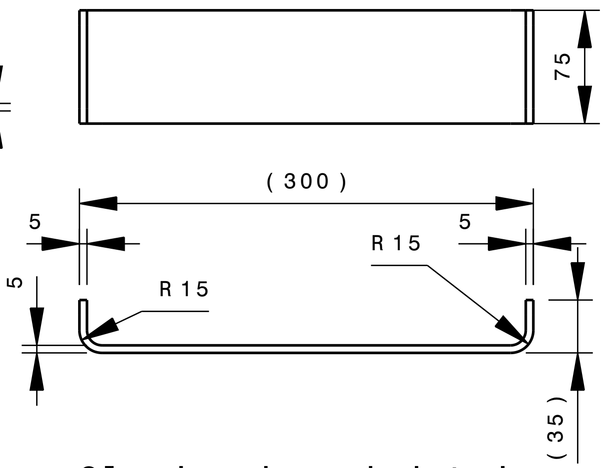




DETAIL A
Scale: 1:5



Folded part processing details
Scale: 1:5



Closing board detais

NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

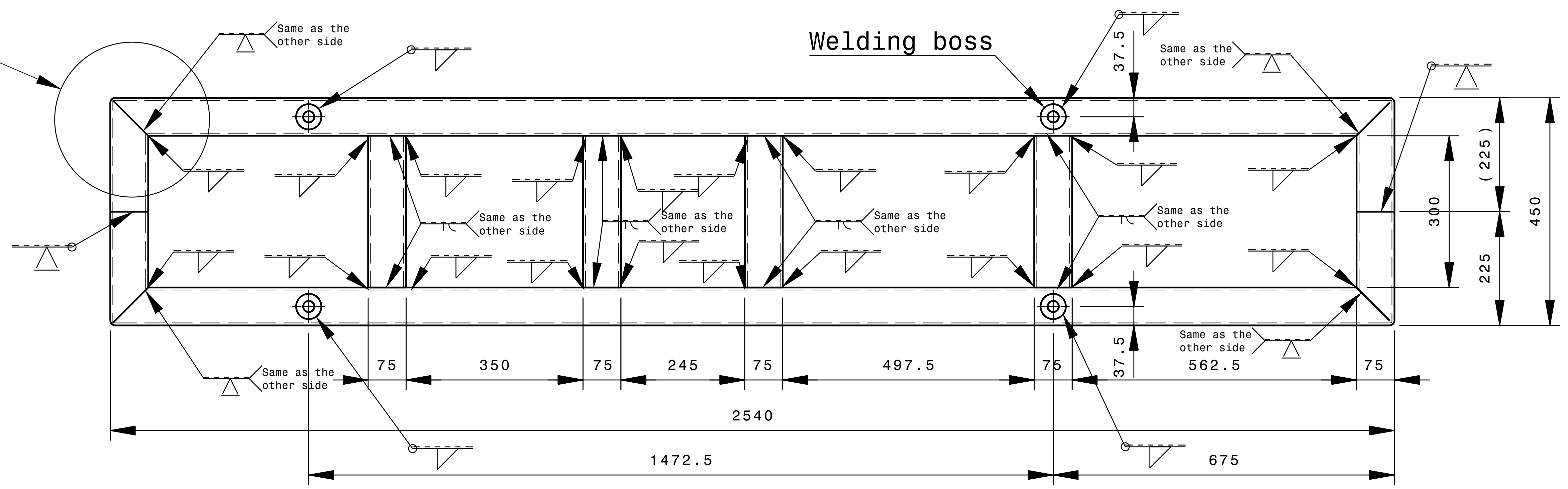
General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

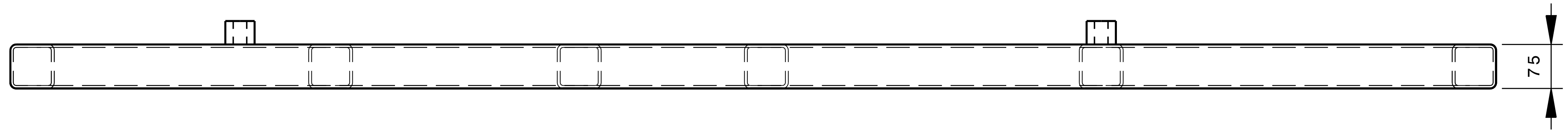
DRW CAD ID: 5KFAUZ			APPROVED BY: IOKIK	ITER Organization: - When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.
LINKED EV5 PT ID: 5KF8XZ			TECHNICAL REF: ---	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED 3D ID: 5KF92K			DRAWN BY: ---	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A			SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX BOTTOM_FRAME 3rd TITLE LINE - CATIA PARAMETER
DATE OF ISSUE: 04 Apr 23	PT MATURITY: DD	PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---
DR STATUS: DD	SCALE: 1:10	PT STATUS: DD		
THIRD ANGLE PROJECTION				

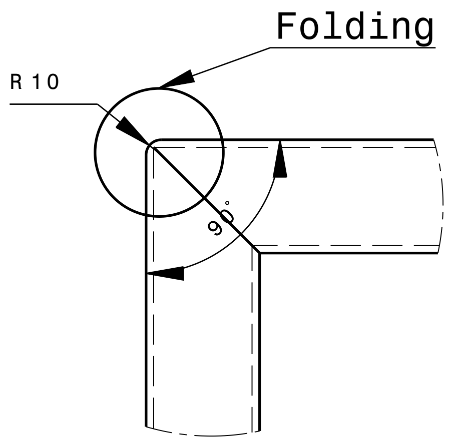
FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	08	45	--C

No.	Name	Material	QUANTITY	REMARKS
1-2	TOP-FRAME	SS316L	1set	

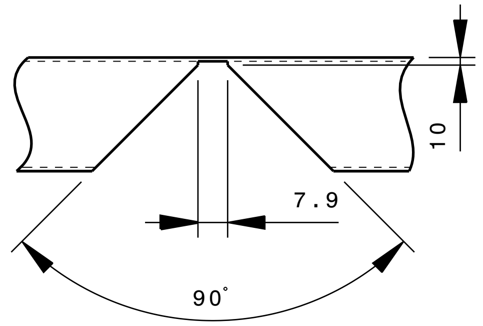
1-2



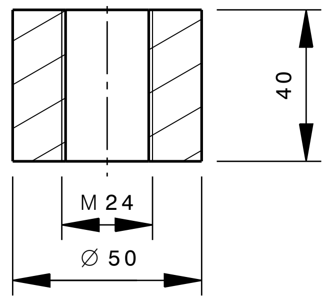




DETAIL A
Scale: 1:5



Folded part processing details
Scale: 1:5



Welding boss detail
Scale: 1:2

NOTE

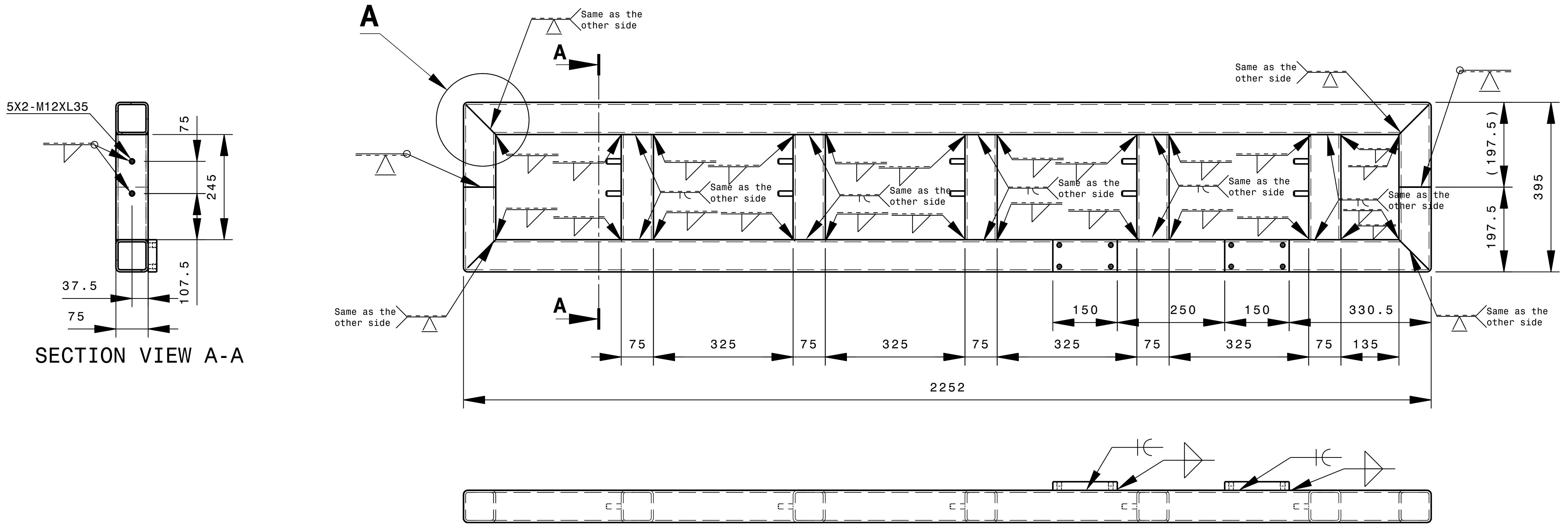
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: - When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	LEGAL OWNER: iter china EU india japan korea russia USA	
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---			
LINKED 3D ID: 5KF92K	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX TOP_FRAME 3rd TITLE LINE - CATIA PARAMETER		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---			
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---		
DR STATUS: DD / SCALE: 1:10 / PT STATUS: DD				
THIRD ANGLE PROJECTION	FORMAT: A3 / PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 09 / N°OF SHEETS: 45	REVISION: --C

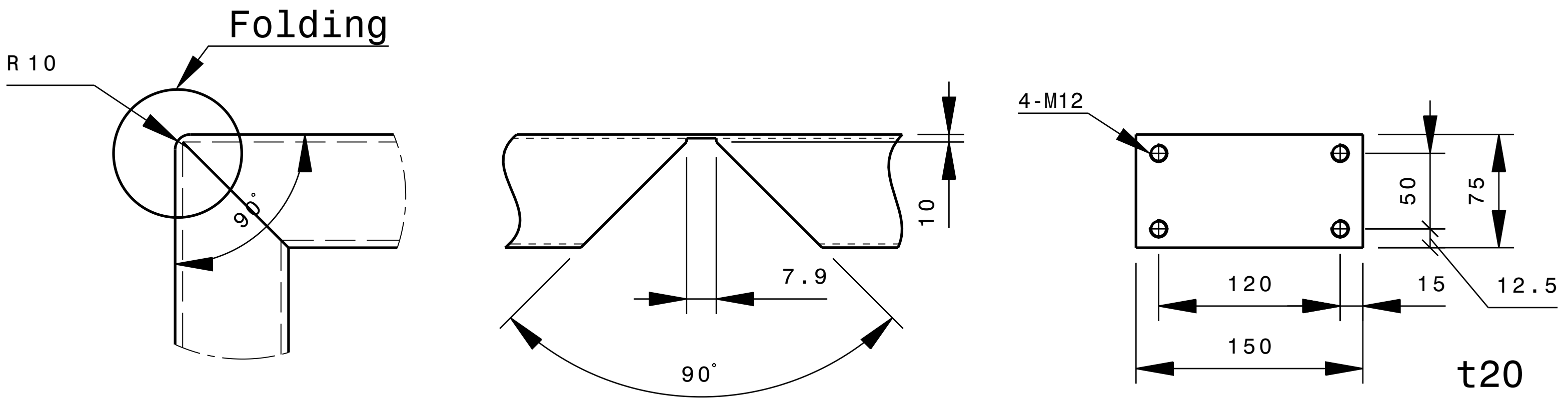
No.	Name	Material	QUANTITY	REMARKS
1-3	SIDE-FRAME-A	SS316L	2set	

1-3



NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning
3.Two sets of SIDE-FRAME-A will be manufactured,but they are not the same.The position of"thread plate"is different.When assembling ISMB frame as shown in sheet3,the threaded plates are always outside.



DETAIL A
Scale: 1:5

Folded part processing details
Scale: 1:5

Threaded plate details
Scale: 1:5

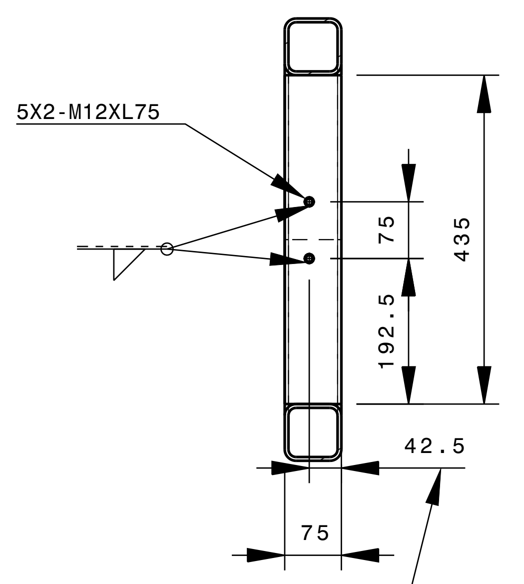
General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization		LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		
LINKED 3D ID: 5KF92K	DRAWN BY: ---			
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX SIDE_FRAME_A 3rd TITLE LINE - CATIA PARAMETER		
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---		
DR STATUS: DD / SCALE: 1:10 / PT STATUS: DD				
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 10 / N°OF SHEETS: 45 / REVISION: --C

No.	Name	Material	QUANTITY	REMARKS
1-4	SIDE-FRAME-B	SS316L	2set	

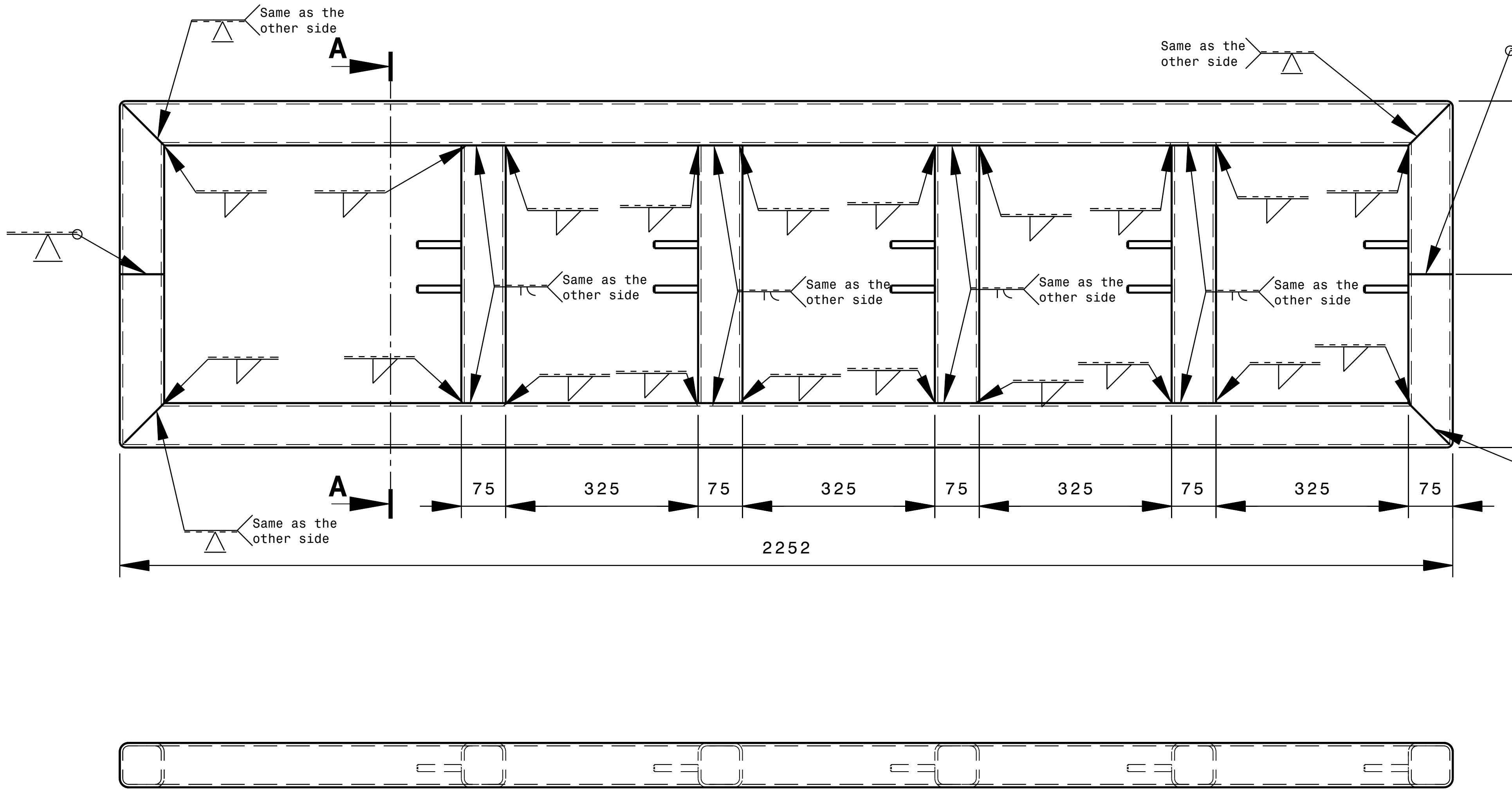
1-4

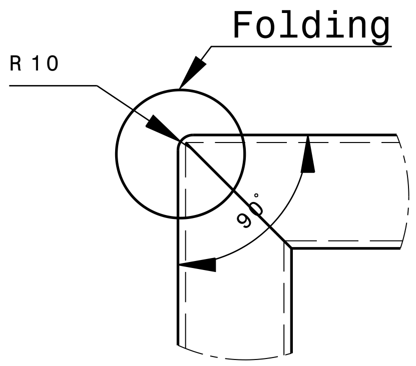
General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5



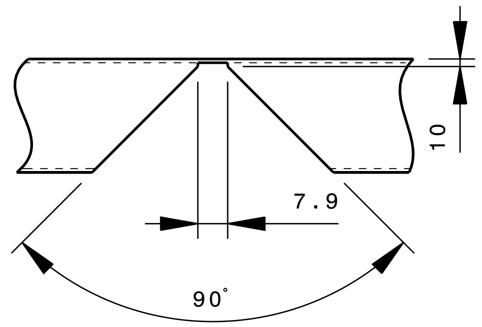
Making 2 sets with different left and right(M12 bolts are not at the center of square pipe).Be careful when assembling according to sheet3-6.

SECTION VIEW A-A
Scale: 1:10





DETAIL A
Scale: 1:5



Folded part
processing details
Scale: 1:5

NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

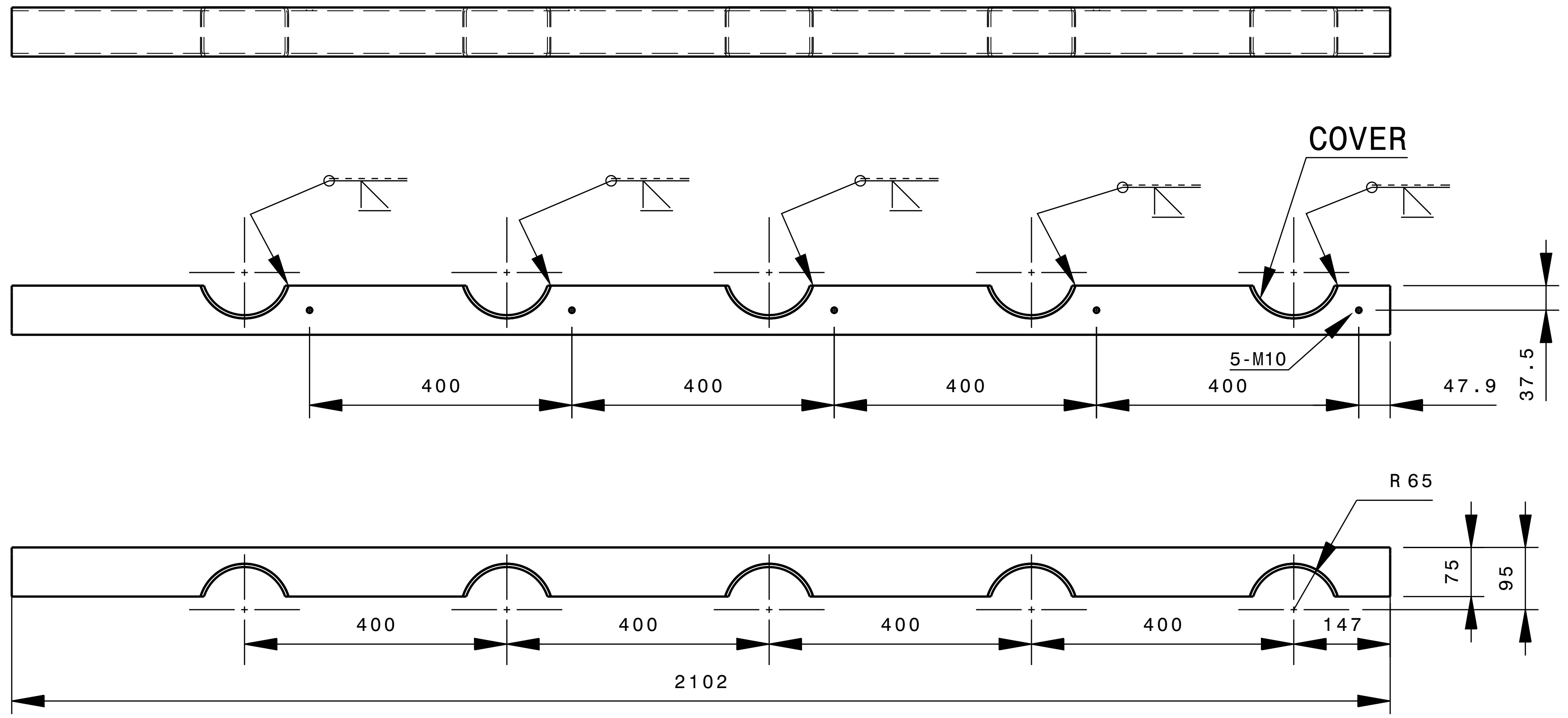
2.After processing,perform degreasing cleaning

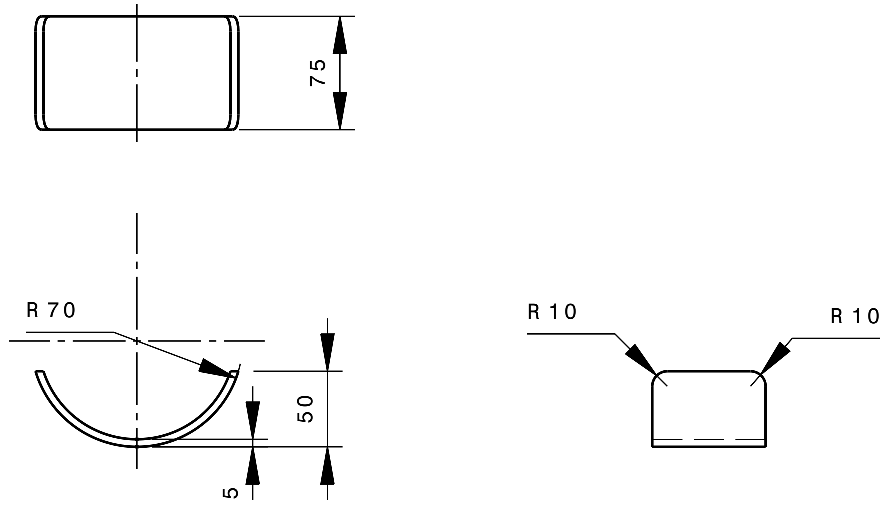
DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: -	LEGAL OWNER: iter china EU india japan korea russia USA	
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		
LINKED 3D ID: 5KF92K	DRAWN BY: ---			
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX SIDE_FRAME_B 3rd TITLE LINE - CATIA PARAMETER		
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---		
DR STATUS: DD / SCALE: 1:10 / PT STATUS: DD				
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 11 / N°OF SHEETS: 45 / REVISION: --C

No.	Name	Material	QUANTITY	REMARKS
1-5	PILLAR-WITH-CYLINDRICAL-CUTOUTS-A	SS316L	2set	

1-5

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5





COVER DETAIL
Scale:1:5

NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning
3.Two sets of PILLAR-WITH-CYLINDRICAL-CUTOUTS-A will be manufactured,but they are not the same.The surface with M10 thread is opposite.When assembling ISMB frame as shown in sheet3,the surface with M10 threads always faces PILLAR-WITH-CYLINDRICAL-CUTOUTS-B.

DRW CAD ID: *5KFAUZ*
LINKED EV5 PT ID: *5KF8XZ*
LINKED 3D ID: *5KF92K*
PBS TITLE: *Diagnostics Poloidal Polarimeter PoPola Eq system A*
DATE OF ISSUE: *04 Apr 23* | PT MATURITY: *DD* | PT VERSION: *--C*
DR STATUS: *DD* | SCALE: *1:10* | PT STATUS: *DD*
THIRD ANGLE PROJECTION

APPROVED BY: *IOKIK*
TECHNICAL REF: ---
DRAWN BY: ---
SAFETY CLASS: ---
QUALITY CLASS: ---

ITER Organization
-
When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.

LEGAL OWNER
iter
china EU india japan korea russia USA

DRAWING TITLE
C6_EP10_IS_MIRROR_BOX
PILLAR_WITH_CYLINDRICAL_CUTOUT_A
3rd TITLE LINE - CATIA PARAMETER

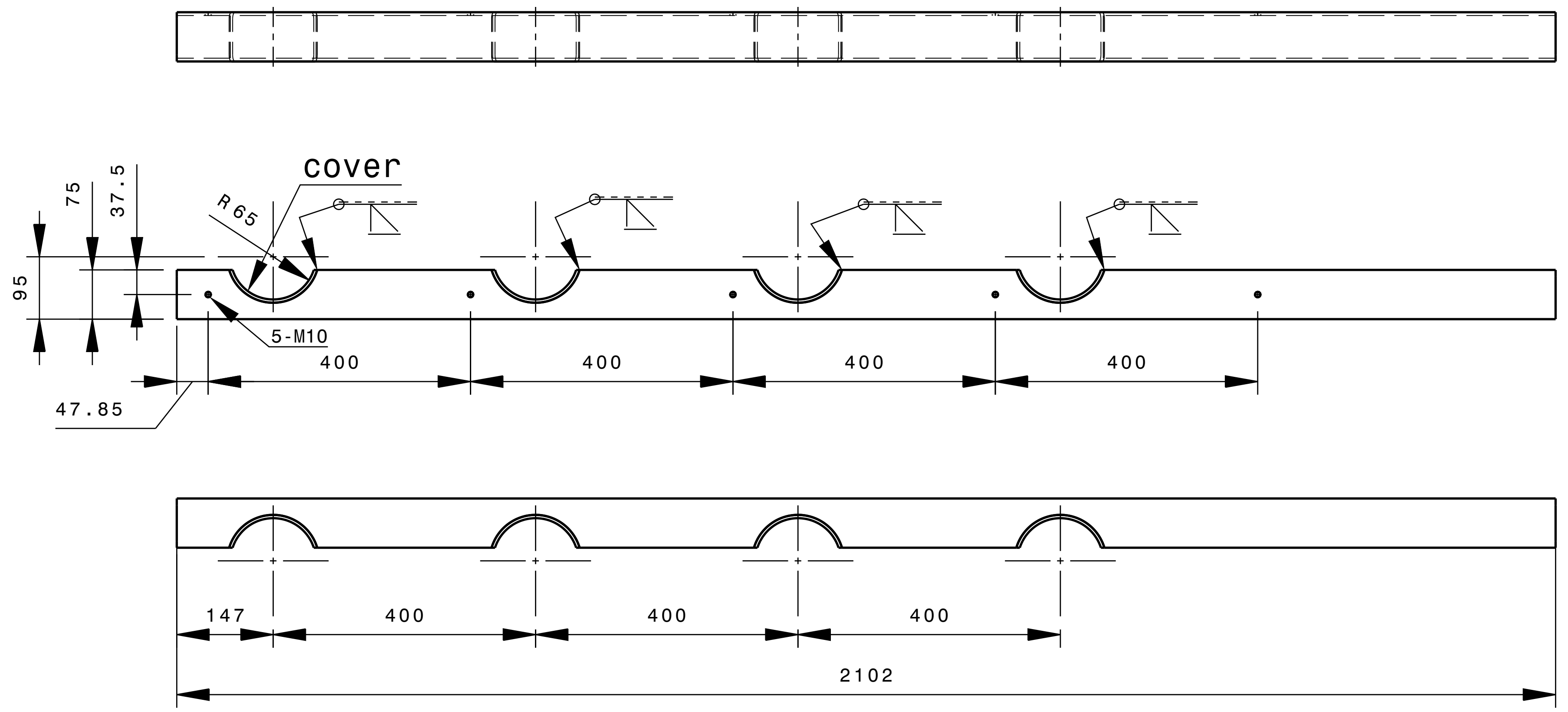
DOCUMENT TYPE: ---

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	12	45	--C

No.	Name	Material	QUANTITY	REMARKS
1-6	PILLAR-WITH-CYLINDRICAL-CUTOUTS-B	SS316L	2set	

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

1-6

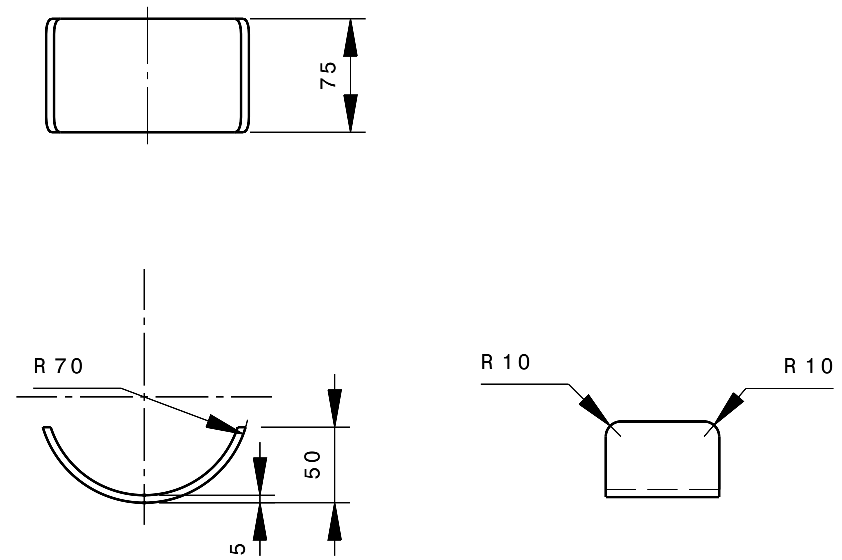


NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

3.Two sets of PILLAR-WITH-CYLINDRICAL-CUTOUTS-B will be manufactured,but they are not the same.The surface with M10 thread is opposite.When assembling ISMB frame as shown in sheet3,the surface with M10 threads always faces PILLAR-WITH-CYLINDRICAL-CUTOUTS-A.



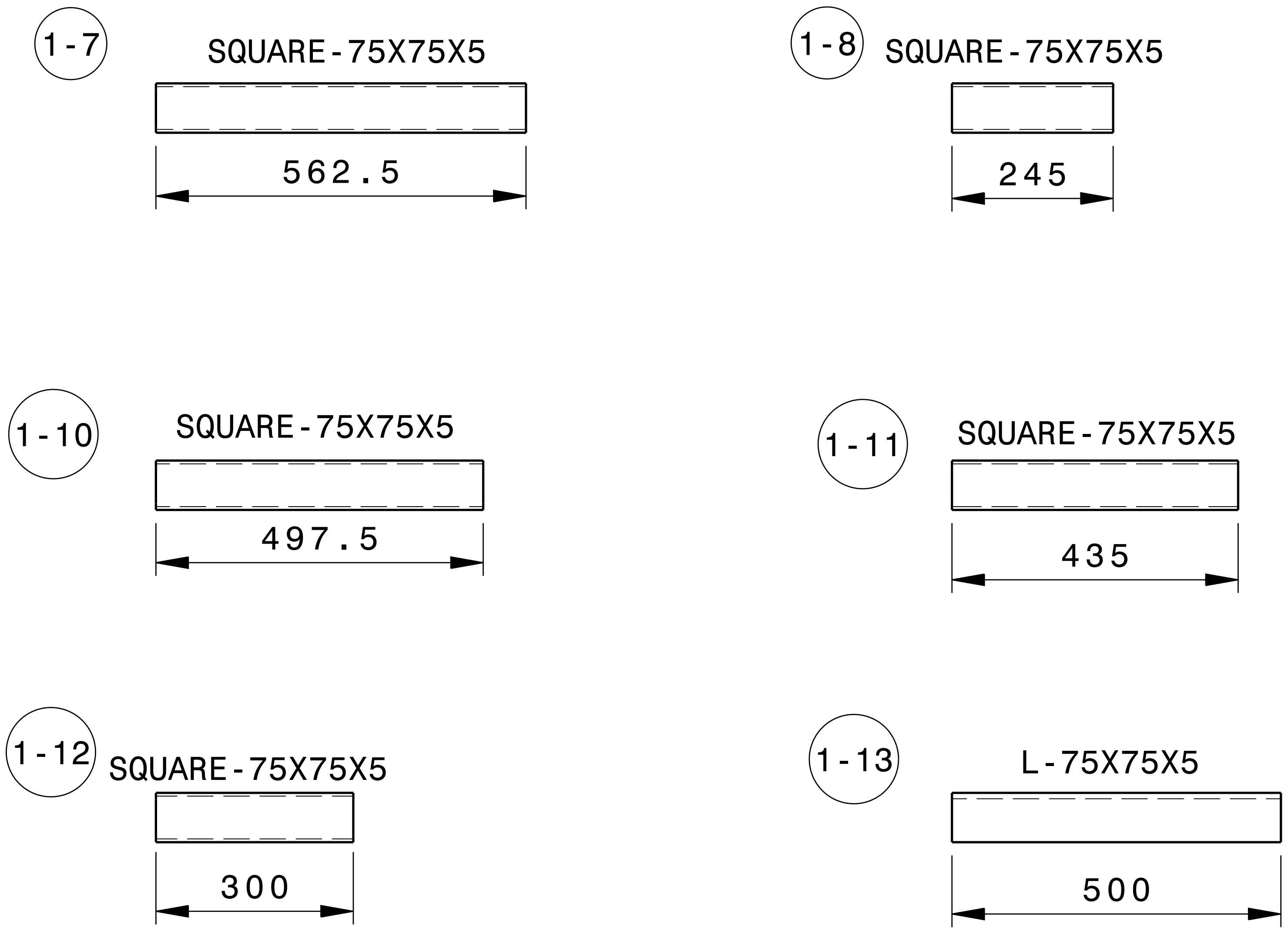
COVER DETAIL
Scale:1:5

DRW CAD ID	5KFAUZ
LINKED EV5 PT ID	5KF8XZ
LINKED 3D ID	5KF92K
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	04 Apr 23
PT MATURITY	DD
PT VERSION	--C
DR STATUS	DD
SCALE	1:10
PT STATUS	DD
APPROVED BY	IOKIK
TECHNICAL REF	---
DRAWN BY	---
SAFETY CLASS	---
QUALITY CLASS	---
ITER Organization	-
LEGAL OWNER	iter china EU india japan korea russia USA
DRAWING TITLE	C6_EP10_IS_MIRROR_BOX PILLAR_WITH_CYLINDRICAL_CUTOUT_B 3rd TITLE LINE - CATIA PARAMETER
DOCUMENT TYPE	---
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015676
SHEET	13
N°OF SHEETS	45
REVISION	--C

THIRD ANGLE PROJECTION

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

No.	Name	Material	QUANTITY	REMARKS
1-7	BEAM-01	SS316L	4	
1-8	BEAM-02	SS316L	10	
1-9	BEAM-03	SS316L	9	
1-10	BEAM-04	SS316L	4	
1-11	BEAM-05	SS316L	8	
1-12	BEAM-06	SS316L	8	
1-13	BEAM-07	SS316L	8	



NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

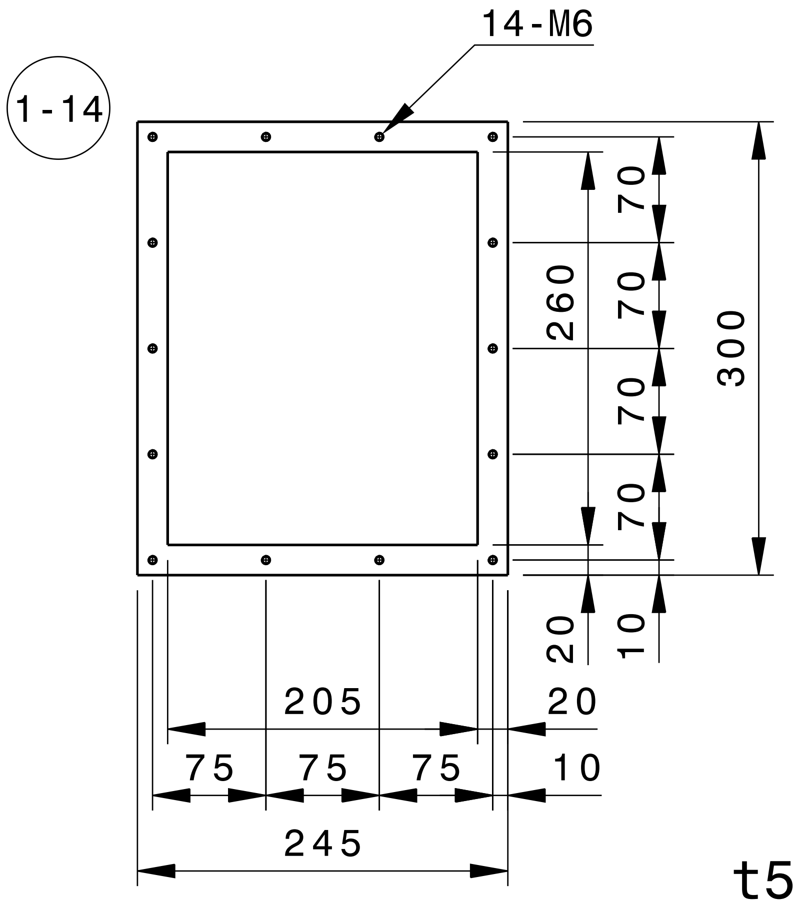
DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: -	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	
LINKED 3D ID: 5KF92K	DRAWN BY: ---		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX BEAM 3rd TITLE LINE - CATIA PARAMETER	
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---	
DR STATUS: DD / SCALE: 1:10 / PT STATUS: DD			
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA / DRAWING NUMBER: 015676	SHEET: 14 / N°OF SHEETS: 45 / REVISION: --C

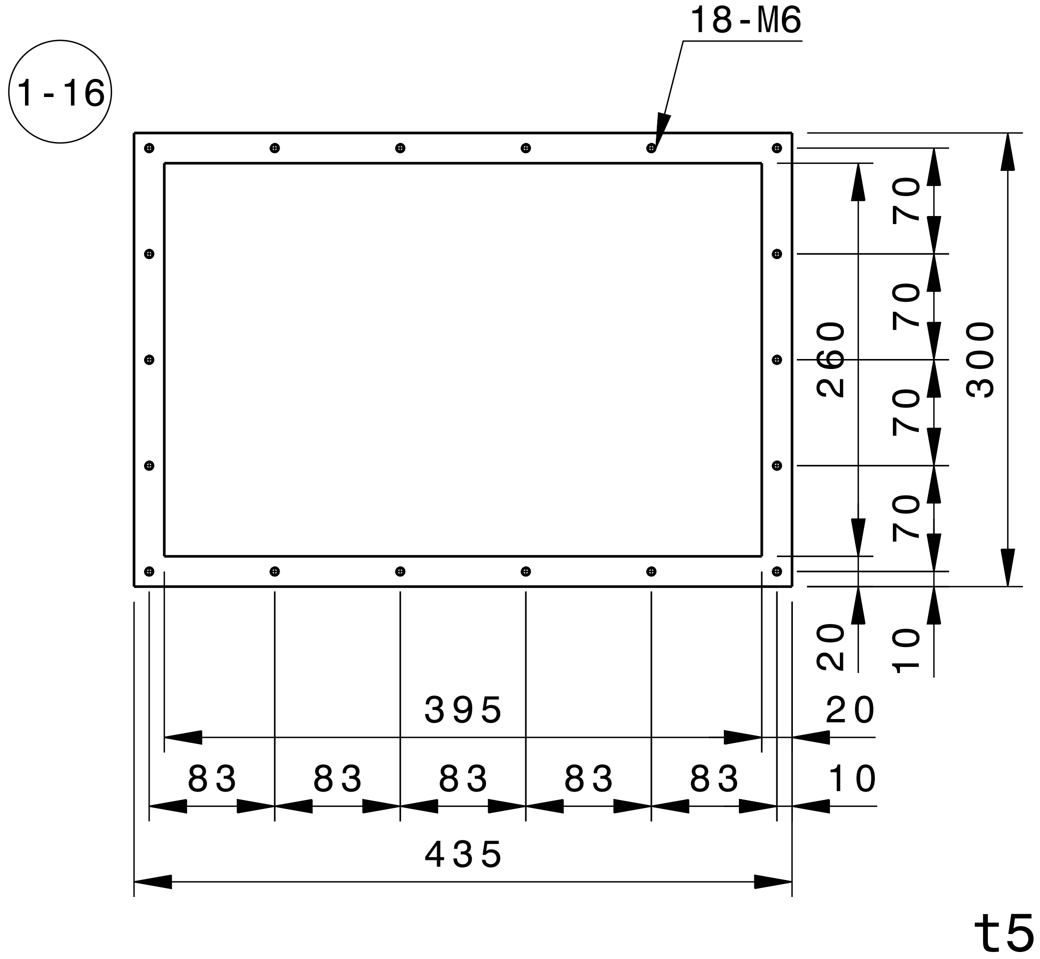
Spacereservation for the banner

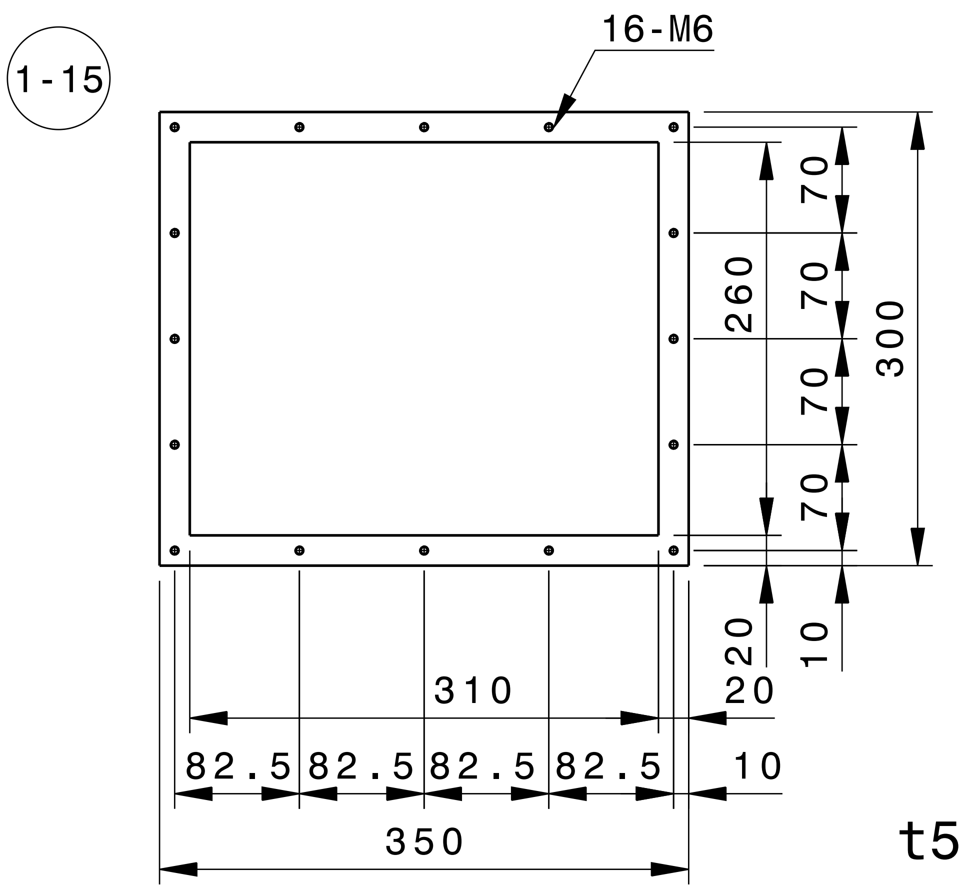
Spacereservation for the banner

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
1-14	TOP-AND-BOTTOM-ENCLOSURE-FRAME-01	SS316L	2	
1-15	TOP-AND-BOTTOM-ENCLOSURE-FRAME-02	SS316L	2	
1-16	TOP-AND-BOTTOM-ENCLOSURE-FRAME-03	SS316L	2	







NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID	5KFAUZ
LINKED EV5 PT ID	5KF8XZ
LINKED 3D ID	5KF92K
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	04 Apr 23
PT MATURITY	DD
PT VERSION	--C
DR STATUS	DD
SCALE	1:5
PT STATUS	DD
APPROVED BY	IOKIK
TECHNICAL REF	---
DRAWN BY	---
SAFETY CLASS	---
QUALITY CLASS	---
ITER Organization	-
LEGAL OWNER	iter china EU india japan korea russia USA
DRAWING TITLE	C6_EP10_IS_MIRROR_BOX TOP_AND_BOTTOM_ENCLOSURE_FRAME 3rd TITLE LINE - CATIA PARAMETER
DOCUMENT TYPE	---
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015676
SHEET	15
N°OF SHEETS	45
REVISION	--C

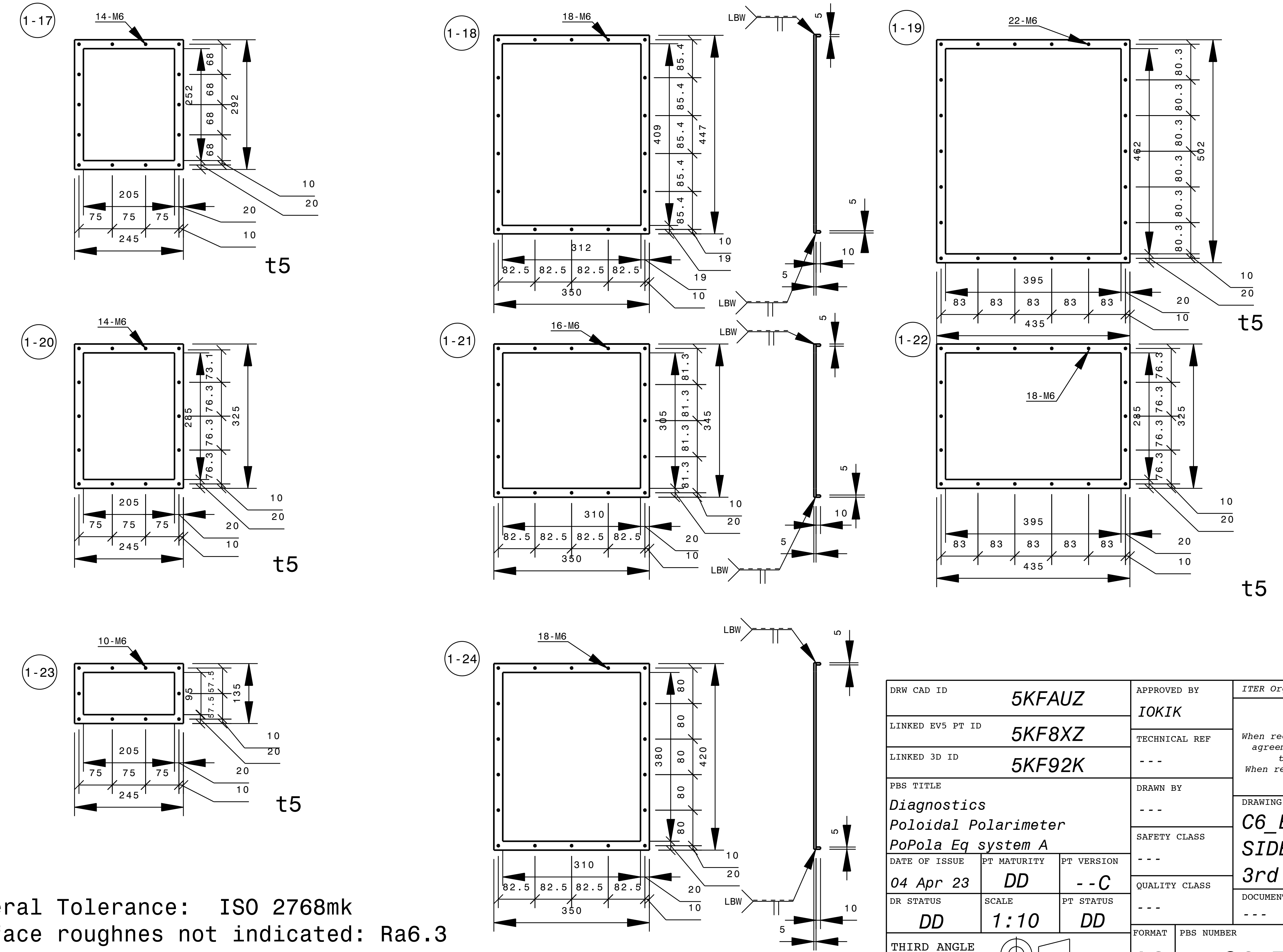
THIRD ANGLE PROJECTION

NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

No.	Name	Material	QUANTITY	REMARKS
1-17	SIDE-ENCLOSURE-FRAME-01	SS316L	2	
1-18	SIDE-ENCLOSURE-FRAME-02	SS316L	2	
1-19	SIDE-ENCLOSURE-FRAME-03	SS316L	2	
1-20	SIDE-ENCLOSURE-FRAME-04	SS316L	8	
1-21	SIDE-ENCLOSURE-FRAME-05	SS316L	6	
1-22	SIDE-ENCLOSURE-FRAME-06	SS316L	8	
1-23	SIDE-ENCLOSURE-FRAME-07	SS316L	2	
1-24	SIDE-ENCLOSURE-FRAME-08	SS316L	2	



General Tolerance: ISO 2768mk

Surface roughnes not indicated: Ra6.3

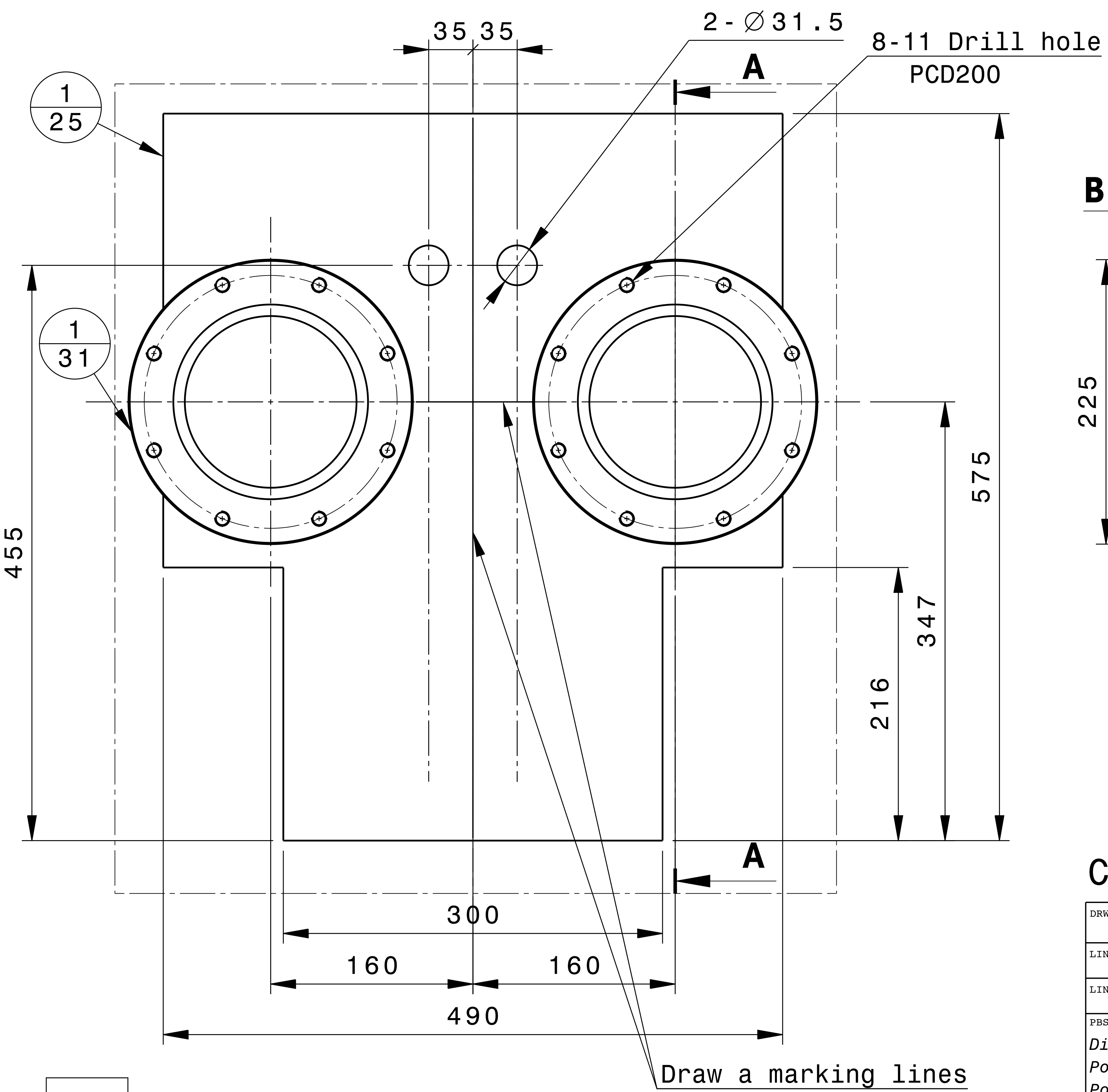
DRW CAD ID: 5KFAUZ			APPROVED BY: IOKIK	ITER Organization: - When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ			TECHNICAL REF: ---		
LINKED 3D ID: 5KF92K			DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX SIDE_ENCLOSURE_FRAME 3rd TITLE LINE - CATIA PARAMETER	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A			SAFETY CLASS: ---		
DATE OF ISSUE: 04 Apr 23	PT MATURITY: DD	PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---	
DR STATUS: DD	SCALE: 1:10	PT STATUS: DD			
THIRD ANGLE PROJECTION			FORMAT: A3	PBS NUMBER: 55 C6 EA; DRAWING NUMBER: 015676	SHEET: 16; N°OF SHEETS: 45; REVISION: --C

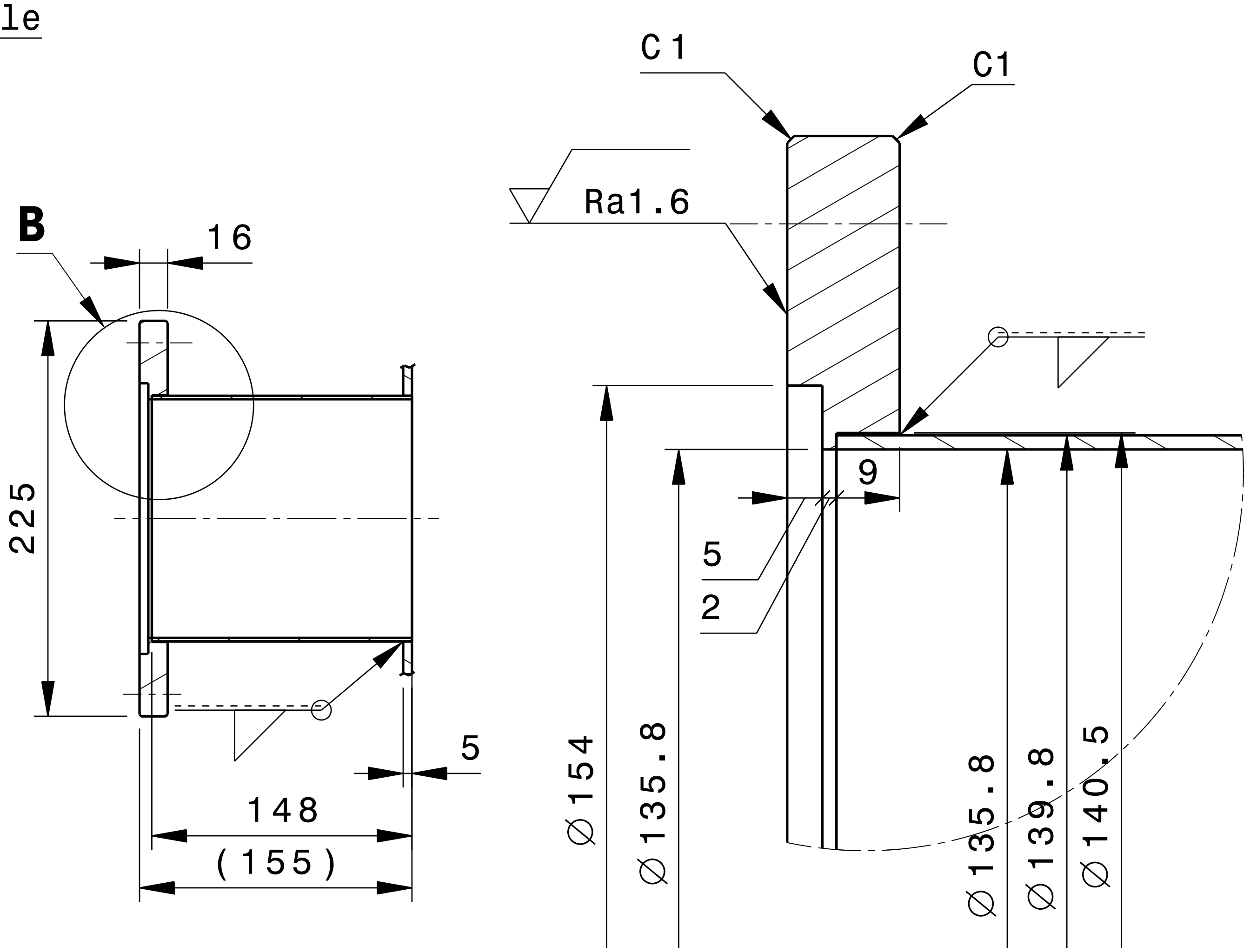
Spacereservation for the banner

Spacereservation for the banner

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
1-25	PLATE-OF-REAR-ENCLOSURE-01	SS316L	1	
1-31	TUBE-OF-REAR-ENCLOSURE	SS316L	2	





DETAIL B
Scale: 1:1

CROSS SECTION A-A

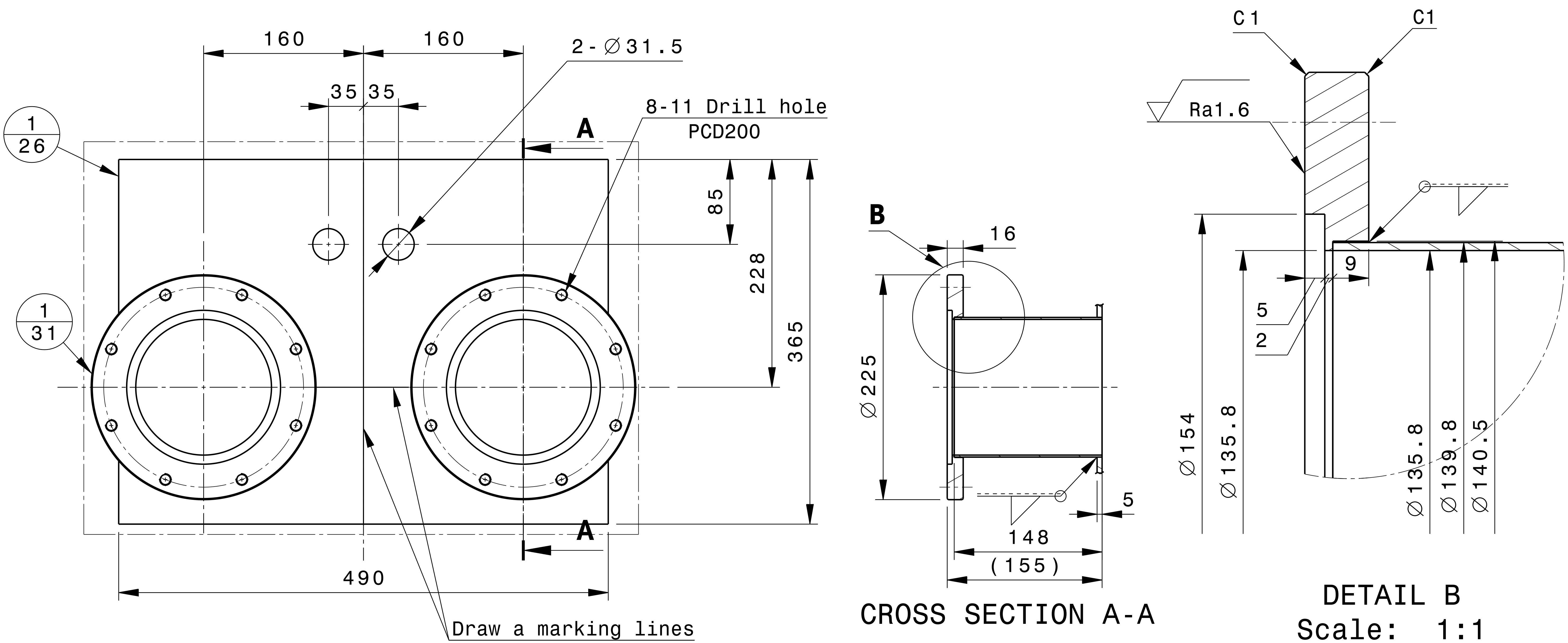
NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: - When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---			
LINKED 3D ID: 5KF92K	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX REAR_ENCLOSURE_01 3rd TITLE LINE - CATIA PARAMETER		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---			
DATE OF ISSUE: 04 Apr 23 · PT MATURITY: DD · PT VERSION: --C	QUALITY CLASS: ---			
DR STATUS: DD · SCALE: 1:4 · PT STATUS: DD	DOCUMENT TYPE: ---			
THIRD ANGLE PROJECTION	FORMAT: A3 · PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 17 · N°OF SHEETS: 45	REVISION: --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
1-26	PLATE-OF-REAR-ENCLOSURE-02	SS316L	2	
1-31	TUBE-OF-REAR-ENCLOSURE	SS316L	4	



CROSS SECTION A-A

DETAIL B
Scale: 1:1

NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID	5KFAUZ	APPROVED BY	IOKIK
LINKED EV5 PT ID	5KF8XZ	TECHNICAL REF	---
LINKED 3D ID	5KF92K	DRAWN BY	---
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS	---
DATE OF ISSUE	04 Apr 23	PT MATURITY	DD
PT VERSION	--C	QUALITY CLASS	---
DR STATUS	DD	SCALE	1:4
PT STATUS	DD	THIRD ANGLE PROJECTION	

ITER Organization
-
When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.

LEGAL OWNER
iter
china EU india japan korea russia USA

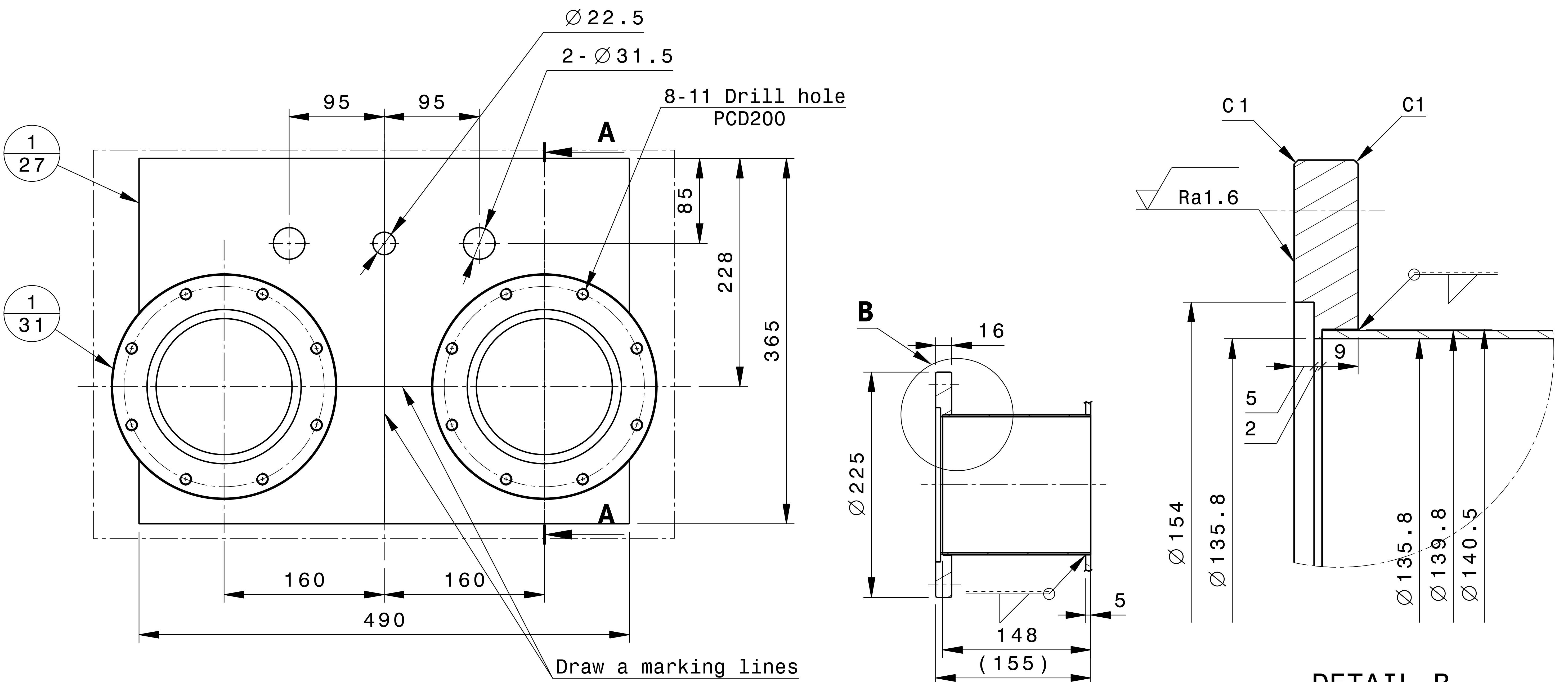
DRAWING TITLE
C6_EP10_IS_MIRROR_BOX
REAR_ENCLOSURE_02
3rd TITLE LINE - CATIA PARAMETER

DOCUMENT TYPE

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	18	45	--C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
1-27	PLATE-OF-REAR-ENCLOSURE-03	SS316L	1	
1-31	TUBE-OF-REAR-ENCLOSURE	SS316L	2	



CROSS SECTION A-A

DETAIL B
Scale: 1:1

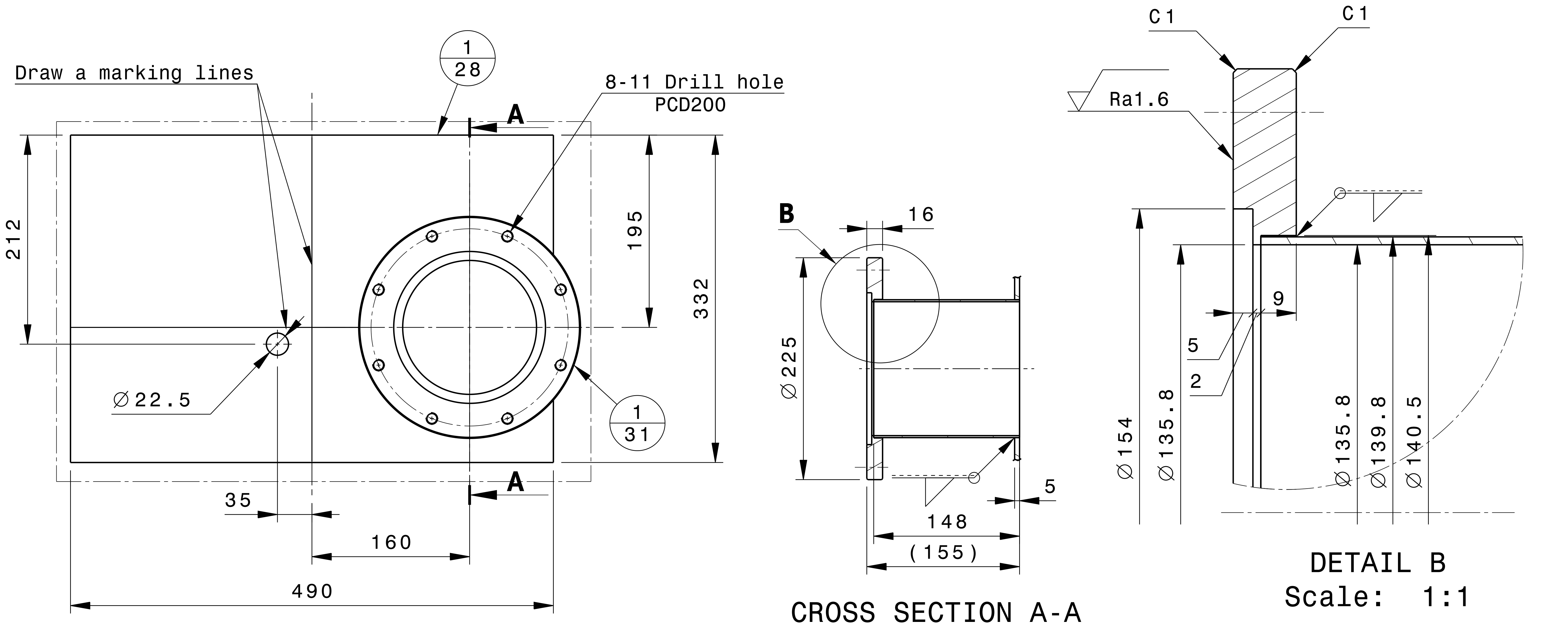
NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID	5KFAUZ	APPROVED BY IOKIK	ITER Organization		LEGAL OWNER
LINKED EV5 PT ID	5KF8XZ	TECHNICAL REF ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		iter china EU india japan korea russia USA
LINKED 3D ID	5KF92K	DRAWN BY ---	DRAWING TITLE C6_EP10_IS_MIRROR_BOX REAR_ENCLOSURE_03 3rd TITLE LINE - CATIA PARAMETER		
PBS TITLE Diagnostics Poloidal Polarimeter PoPola Eq system A		SAFETY CLASS ---			
DATE OF ISSUE 04 Apr 23	PT MATURITY DD	PT VERSION --C	QUALITY CLASS ---	DOCUMENT TYPE ---	
DR STATUS DD	SCALE 1:4	PT STATUS DD			
THIRD ANGLE PROJECTION		FORMAT A3	PBS NUMBER 55 C6 EA	DRAWING NUMBER 015676	SHEET 19 / N°OF SHEETS 45 / REVISION --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
1-28	PLATE-OF-REAR-ENCLOSURE-04	SS316L	1	
1-31	TUBE-OF-REAR-ENCLOSURE	SS316L	2	



NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID	5KFAUZ	
LINKED EV5 PT ID	5KF8XZ	
LINKED 3D ID	5KF92K	

PBS TITLE
Diagnostics
Poloidal Polarimeter
PoPola Eq system A

DATE OF ISSUE	PT MATURITY	PT VERSION
04 Apr 23	DD	--C
DR STATUS	SCALE	PT STATUS
DD	1:4	DD

THIRD ANGLE PROJECTION

APPROVED BY: IOKIK
TECHNICAL REF: ---
DRAWN BY: ---
SAFETY CLASS: ---
QUALITY CLASS: ---

ITER Organization
-
When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable.
When received during tender phase treat as confidential.

LEGAL OWNER
iter
china EU india japan korea russia USA

DRAWING TITLE
C6_EP10_IS_MIRROR_BOX
REAR_ENCLOSURE_04
3rd TITLE LINE - CATIA PARAMETER

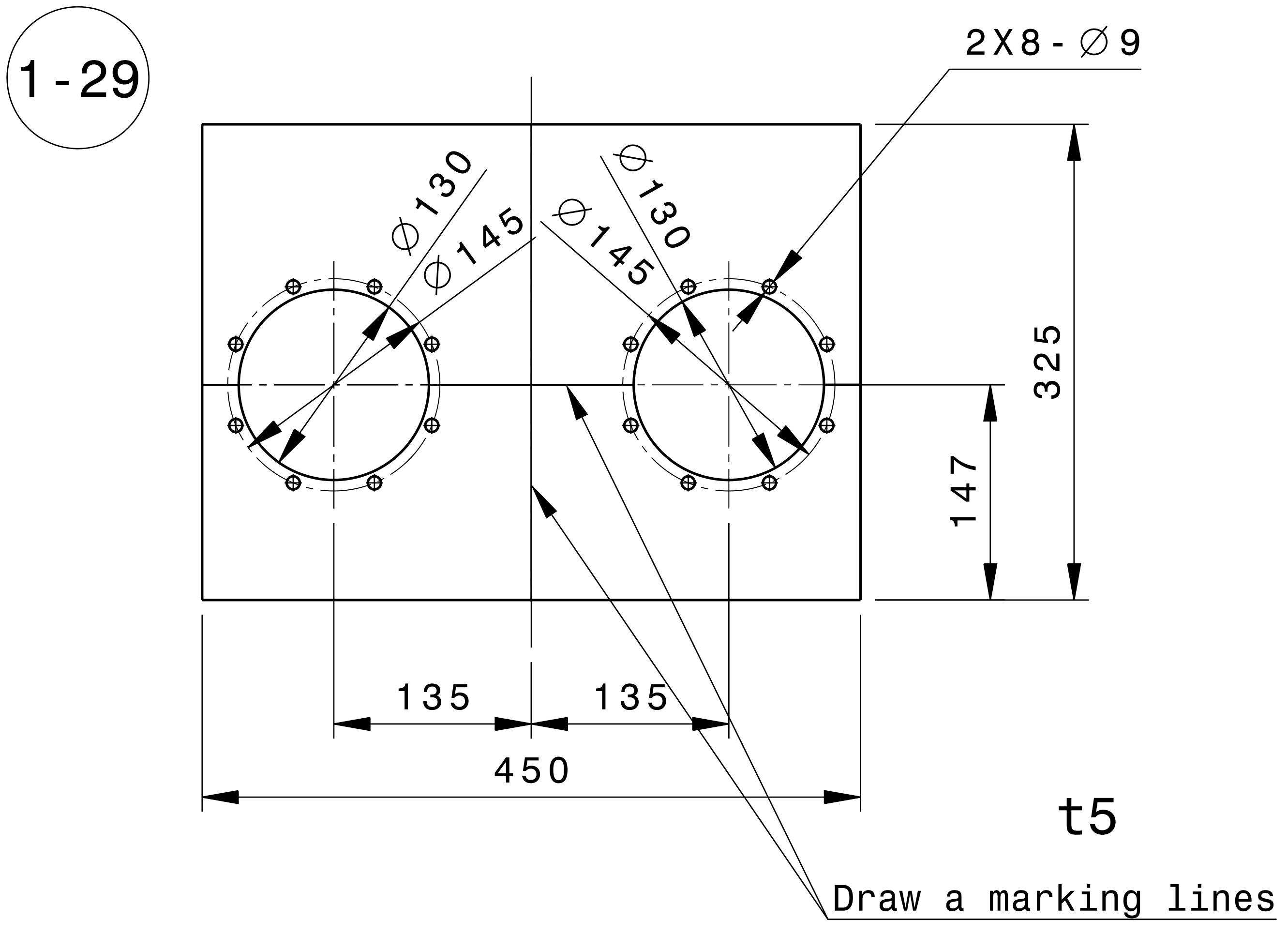
DOCUMENT TYPE

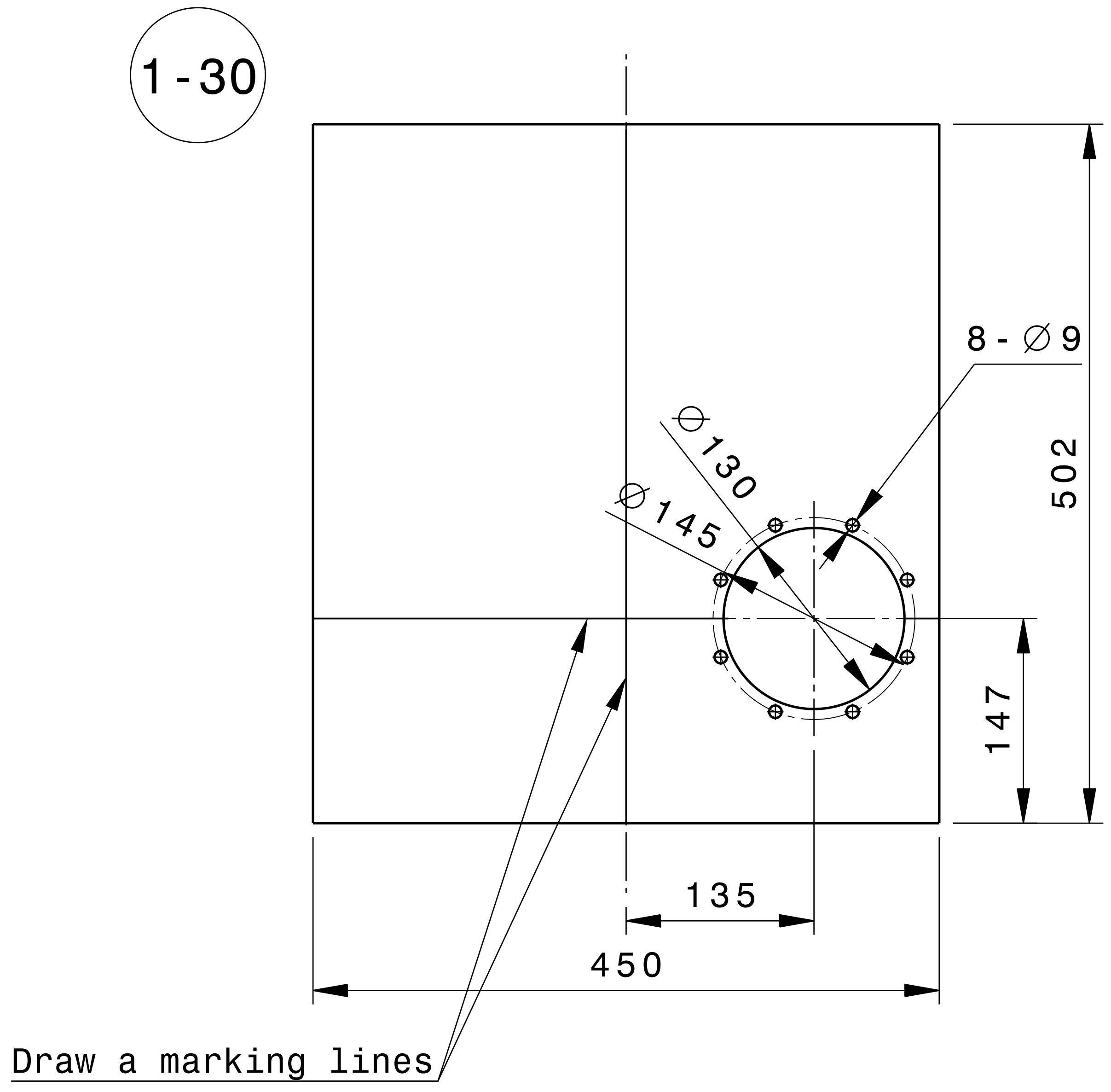
FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	20	45	--C

Spacereservation for the banner

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
1-29	PLATE-OF-FRONT-ENCLOSURE-01	SS316L	4	
1-30	PLATE-OF-FRONT-ENCLOSURE-02	SS316L	1	





NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

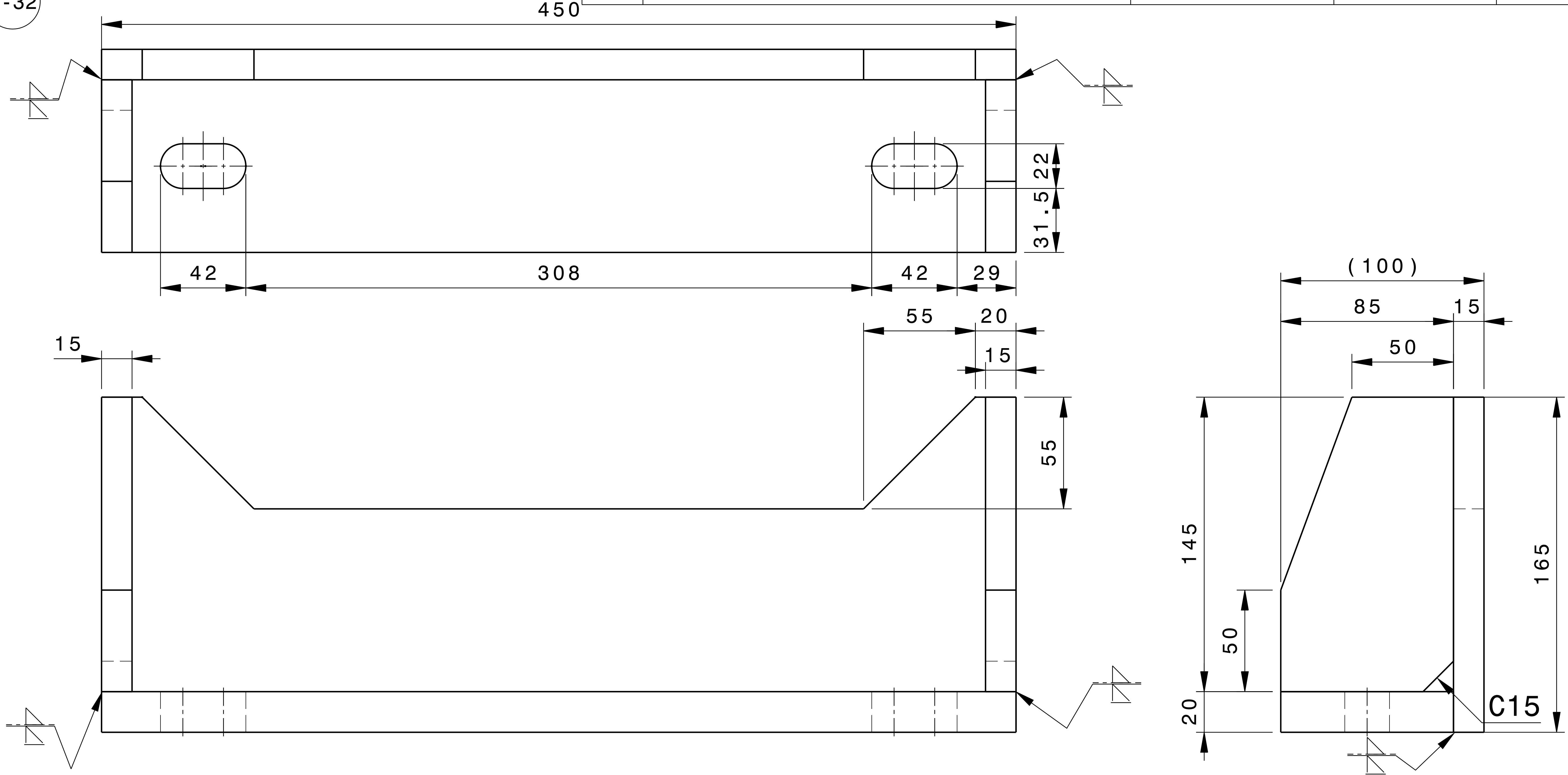
2.After processing,perform degreasing cleaning

DRW CAD ID	5KFAUZ
LINKED EV5 PT ID	5KF8XZ
LINKED 3D ID	5KF92K
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	04 Apr 23
PT MATURITY	DD
PT VERSION	--C
DR STATUS	DD
SCALE	1:5
PT STATUS	DD
THIRD ANGLE PROJECTION	
APPROVED BY	IOKIK
TECHNICAL REF	---
DRAWN BY	---
SAFETY CLASS	---
QUALITY CLASS	---
ITER Organization	-
LEGAL OWNER	iter china EU india japan korea russia USA
DRAWING TITLE	C6_EP10_IS_MIRROR_BOX PLATE_OF_FRONT_ENCLOSURE 3rd TITLE LINE - CATIA PARAMETER
DOCUMENT TYPE	---
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015676
SHEET	21
N°OF SHEETS	45
REVISION	--C

Spacereservation for the banner

No.	Name	Material	QUANTITY	REMARKS
1-32	FRONT-SUPPORT-BRACKET-ASSY	SS316L	1set	

1-32



General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

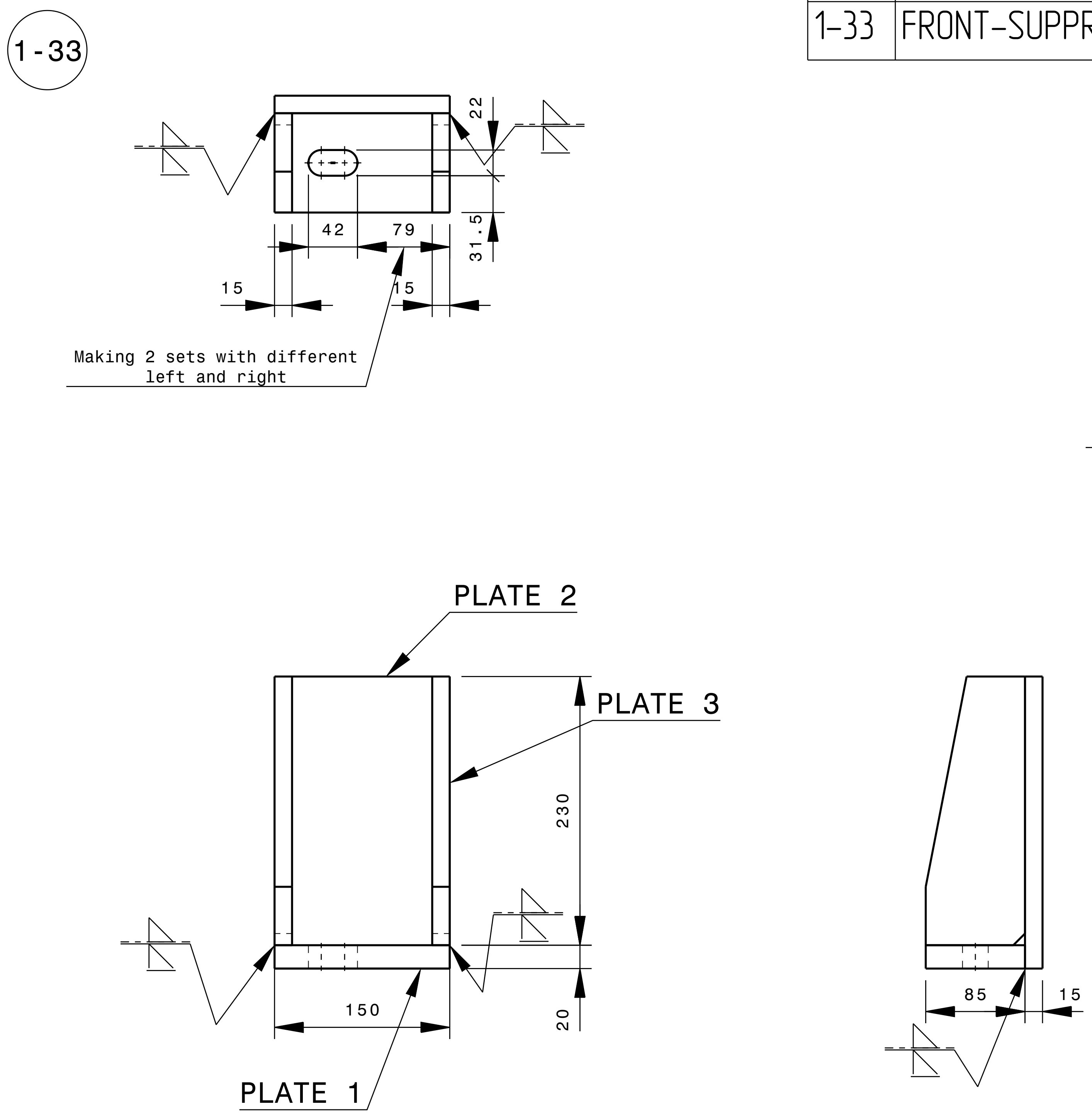
NOTE

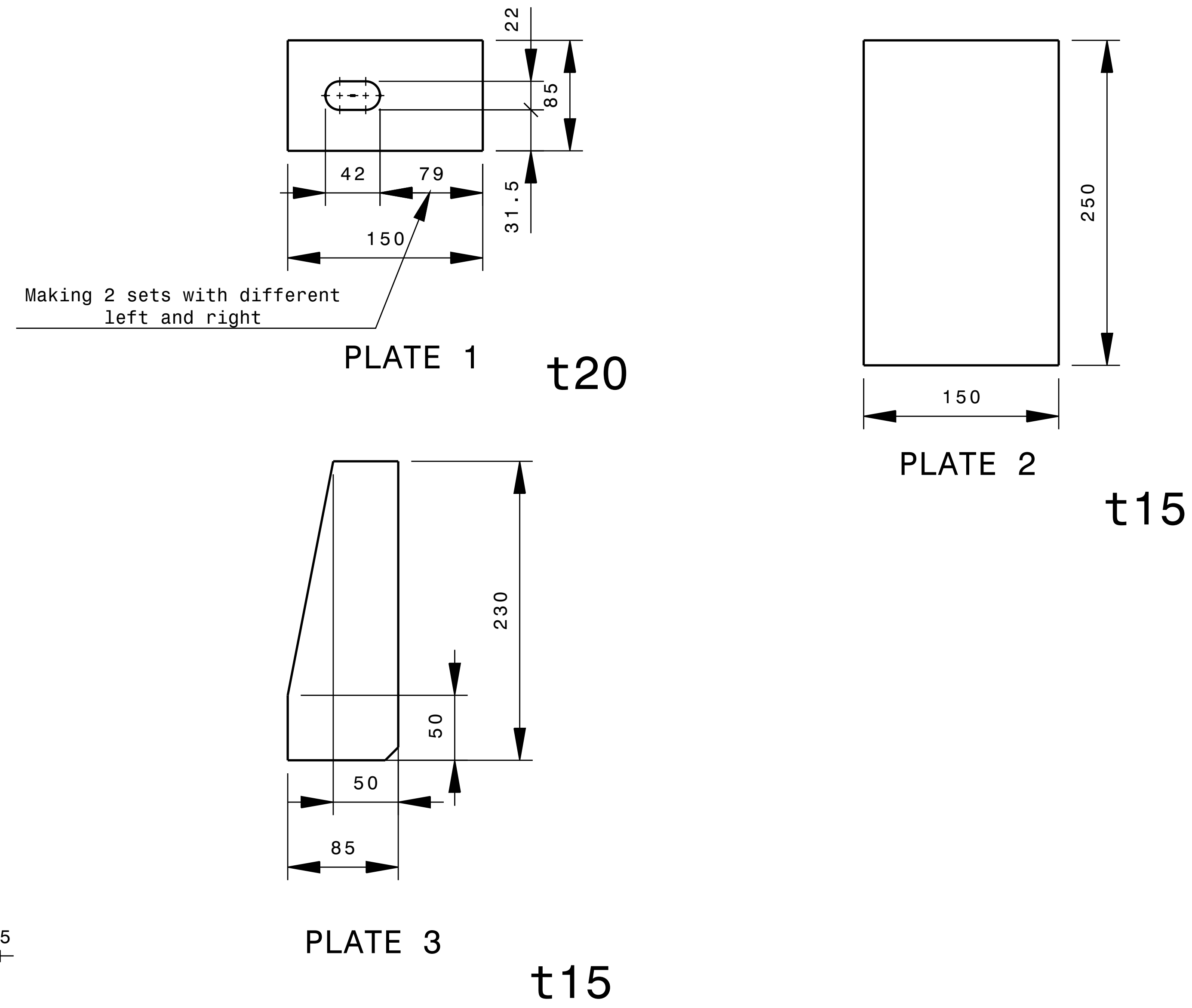
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning
3.Welding beads should not interfere washer around long holes

DRW CAD ID: 5KFAUZ			APPROVED BY: IOKIK	ITER Organization: - When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.
LINKED EV5 PT ID: 5KF8XZ			TECHNICAL REF: ---	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED 3D ID: 5KF92K			DRAWN BY: ---	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A			SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX FRONT_SUPPORT_BRACKET_ASSY 3rd TITLE LINE - CATIA PARAMETER
DATE OF ISSUE: 04 Apr 23	PT MATURITY: DD	PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---
DR STATUS: DD	SCALE: 1:2	PT STATUS: DD		
THIRD ANGLE PROJECTION				

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	22	45	--C

No.	Name	Material	QUANTITY	REMARKS
1-33	FRONT-SUPPRT-BRACKET-ASSY-02	SS316L	2set	





General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

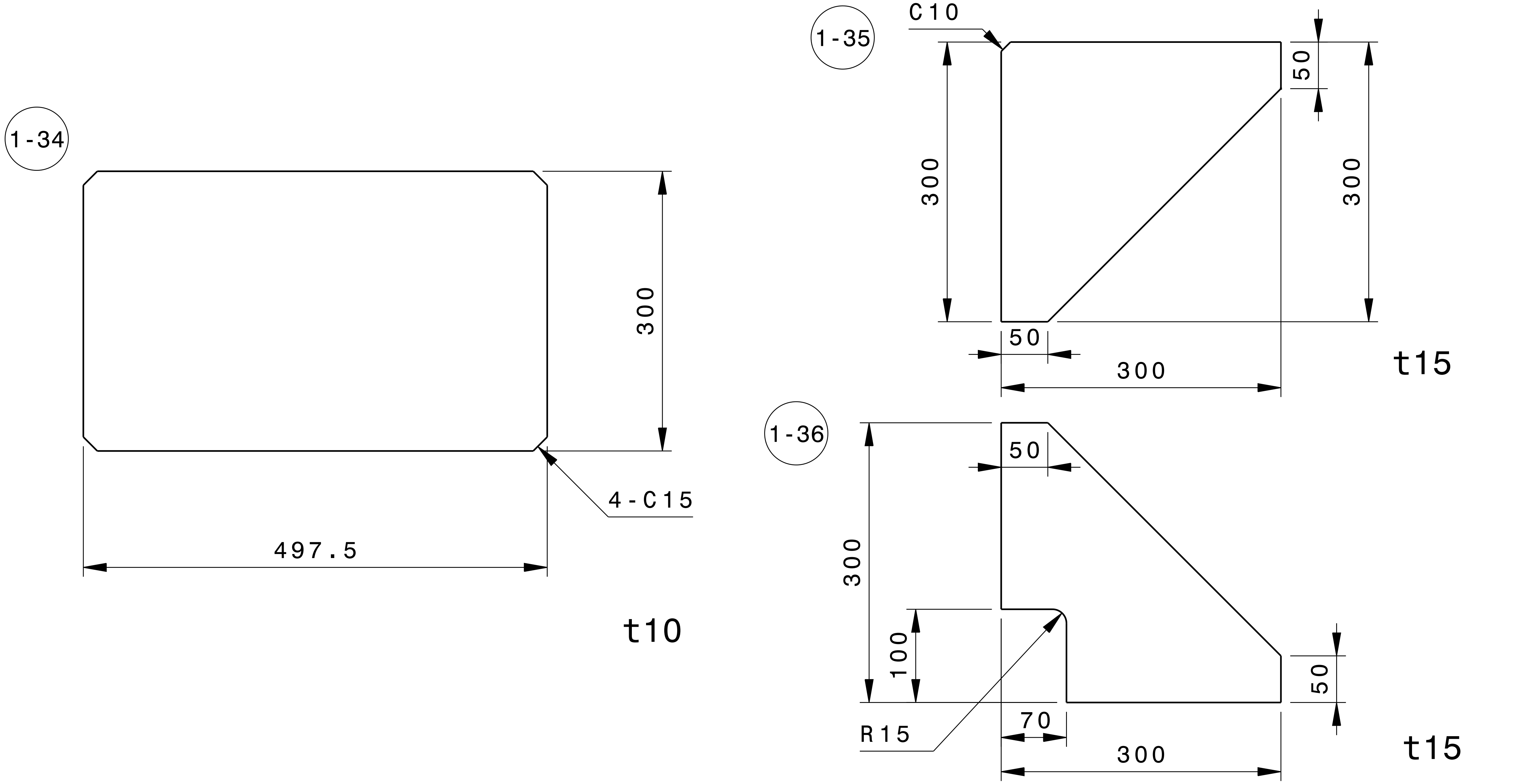
NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning
3.Welding beads should not interfere washer around long holes

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: -
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.
LINKED 3D ID: 5KF92K	DRAWN BY: ---	LEGAL OWNER: iter china EU india japan korea russia USA
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX FRONT-SUPPORT-BRACKET-ASSY 3rd TITLE LINE - CATIA PARAMETER
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---
DR STATUS: DD / SCALE: 1:5 / PT STATUS: DD		
THIRD ANGLE PROJECTION		

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	23	45	--C

No.	Name	Material	QUANTITY	REMARKS
1-34	RADIATION-SHIELDING-BLOCK-RECEIVING-PLATE	SS316L	3	
1-35	GUS-PLATE-01	SS316L	2	
1-36	GUS-PLATE-02	SS316L	2	

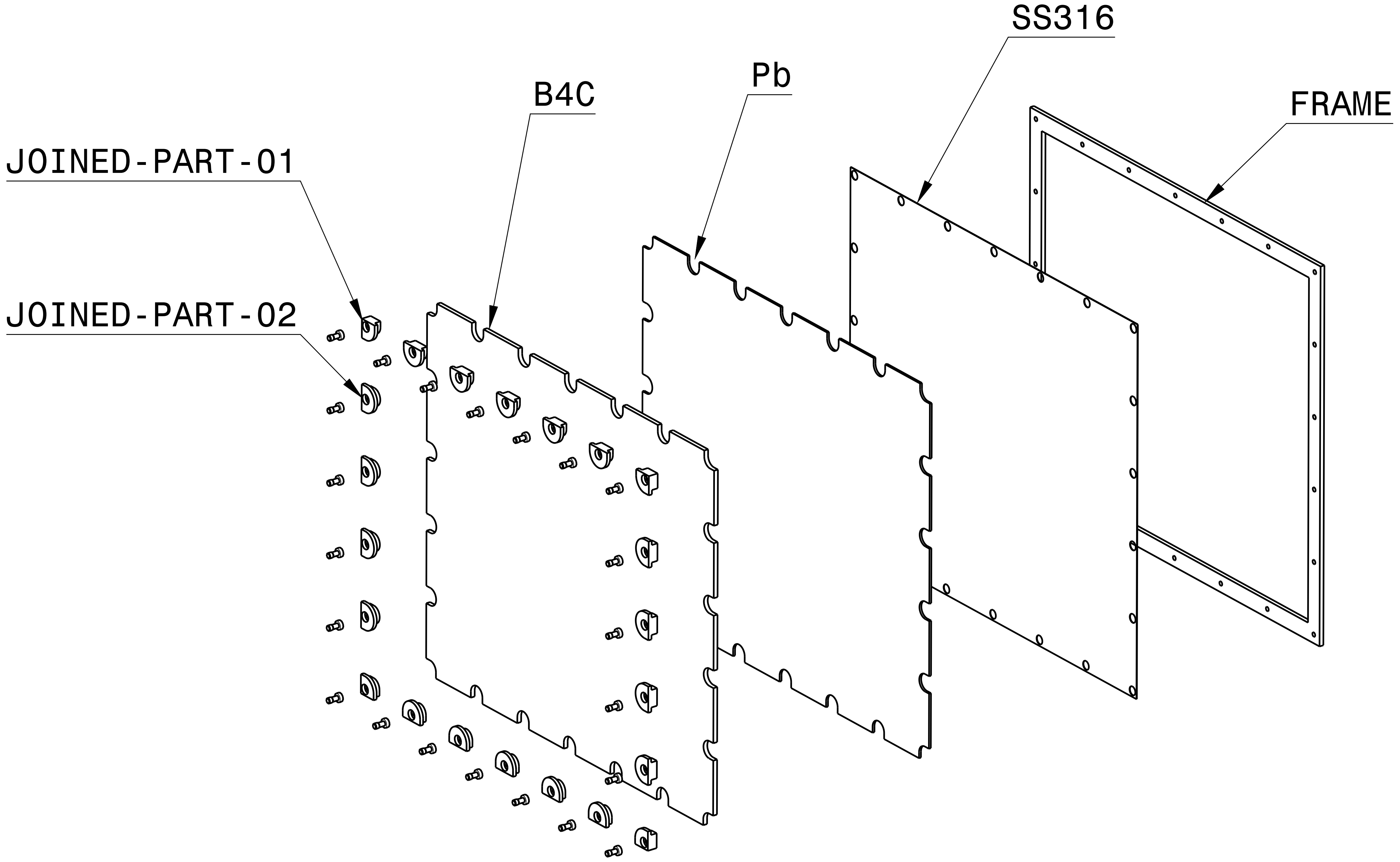


General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID	5KFAUZ
LINKED EV5 PT ID	5KF8XZ
LINKED 3D ID	5KF92K
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	04 Apr 23
PT MATURITY	DD
PT VERSION	--C
DR STATUS	DD
SCALE	1:5
PT STATUS	DD
THIRD ANGLE PROJECTION	
APPROVED BY	IOKIK
TECHNICAL REF	---
DRAWN BY	---
SAFETY CLASS	---
QUALITY CLASS	---
ITER Organization	-
LEGAL OWNER	iter china EU india japan korea russia USA
DRAWING TITLE	C6_EP10_IS_MIRROR_BOX GUSSET_PLATE 3rd TITLE LINE - CATIA PARAMETER
DOCUMENT TYPE	---
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015676
SHEET	24
N°OF SHEETS	45
REVISION	--C



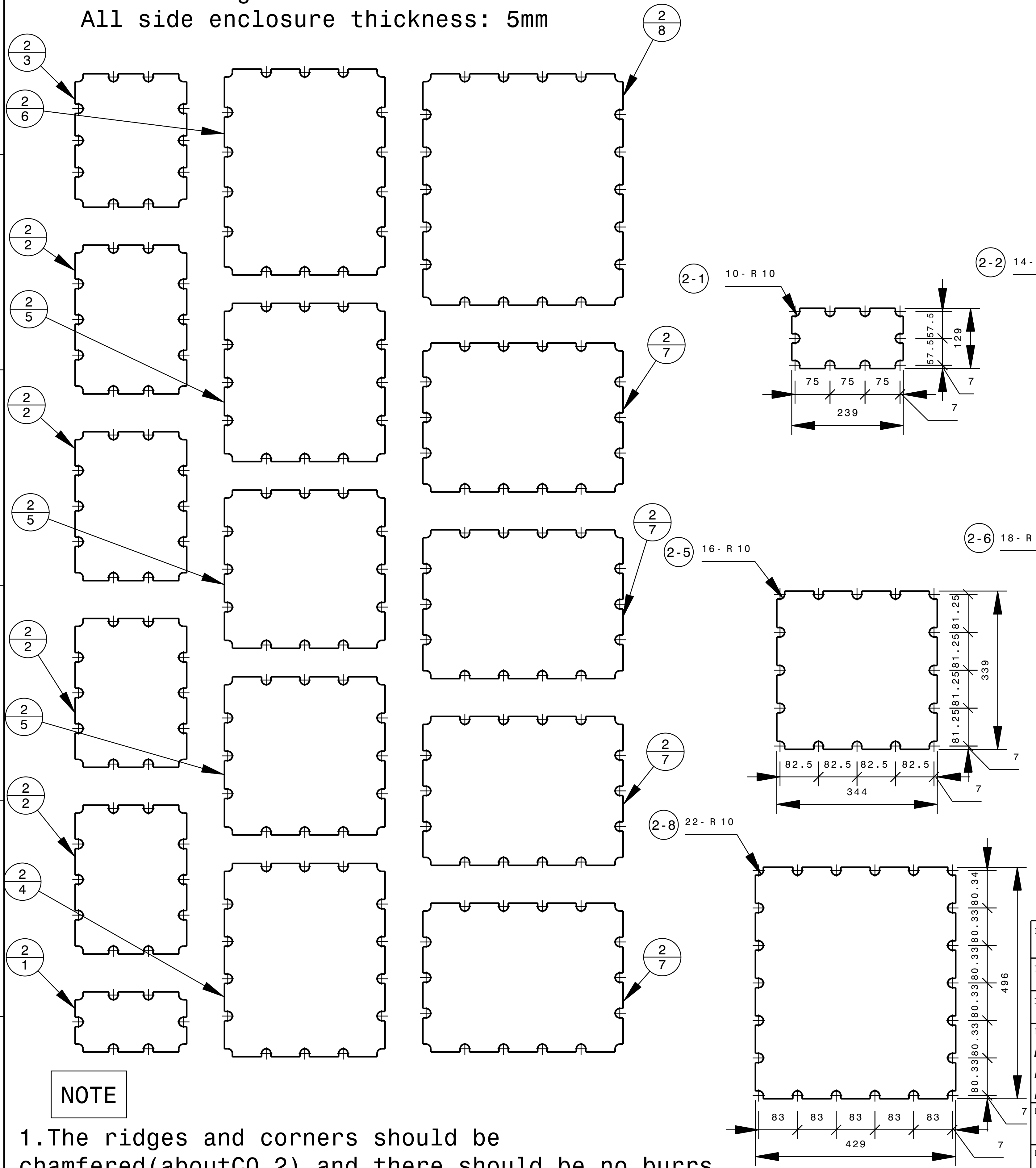
NOTE

1.This drawing illustrates how to fix side enclosures to ISMB."FRAME"in the drawing is welded to ISMB,and ISMB is not illustrated here.Sheet EPDM shall be inserted between"SS316"plate and"FRAME"for making air tight boundary.
2.JOINED-PART-01 and 02 are welded to the plate of SS316

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization	LEGAL OWNER	
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	iter china EU india japan korea russia USA	
LINKED 3D ID: 5KF92K	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX SIDE_ENCLOSURE_ASSY 3rd TITLE LINE - CATIA PARAMETER		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---			
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---		
DR STATUS: DD / SCALE: 1:5 / PT STATUS: DD				
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 25 / N°OF SHEETS: 45 / REVISION: --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3
All side enclosure thickness: 5mm

No.	Name	Material	QUANTITY	REMARKS
2-1	PLATE-OF-SIDE-ENCLOSURE-01	B4C	2	
2-2	PLATE-OF-SIDE-ENCLOSURE-02	B4C	8	
2-3	PLATE-OF-SIDE-ENCLOSURE-03	B4C	2	
2-4	PLATE-OF-SIDE-ENCLOSURE-04	B4C	2	
2-5	PLATE-OF-SIDE-ENCLOSURE-05	B4C	6	
2-6	PLATE-OF-SIDE-ENCLOSURE-06	B4C	2	
2-7	PLATE-OF-SIDE-ENCLOSURE-07	B4C	8	
2-8	PLATE-OF-SIDE-ENCLOSURE-08	B4C	2	



NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

DRW CAD ID	5KFAUZ	APPROVED BY	IOKIK
LINKED EV5 PT ID	5KF8XZ	TECHNICAL REF	---
LINKED 3D ID	5KF92K	DRAWN BY	---
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS	---
DATE OF ISSUE: 04 Apr 23	PT MATURITY: DD	PT VERSION: --C	QUALITY CLASS: ---
DR STATUS: DD	SCALE: 1:10	PT STATUS: DD	

THIRD ANGLE PROJECTION

ITER Organization
-
When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable.
When received during tender phase treat as confidential.

LEGAL OWNER
iter
china EU india japan korea russia USA

DRAWING TITLE
C6_EP10_IS_MIRROR_BOX
SIDE_ENCLOSURE
3rd TITLE LINE - CATIA PARAMETER

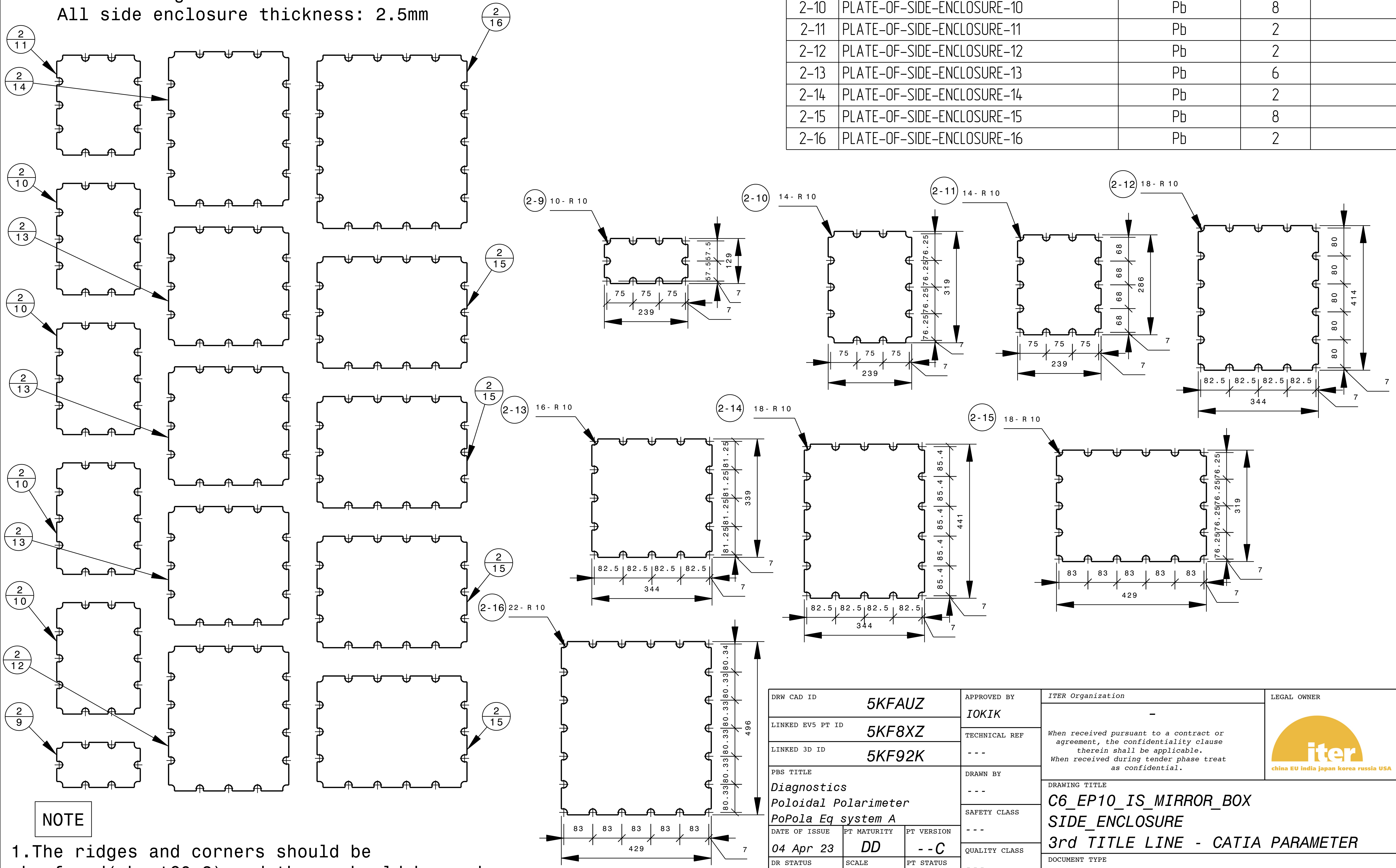
DOCUMENT TYPE

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	26	45	--C

Spacereservation for the banner
Spacereservation for the banner

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3
All side enclosure thickness: 2.5mm

No.	Name	Material	QUANTITY	REMARKS
2-9	PLATE-OF-SIDE-ENCLOSURE-09	Pb	2	
2-10	PLATE-OF-SIDE-ENCLOSURE-10	Pb	8	
2-11	PLATE-OF-SIDE-ENCLOSURE-11	Pb	2	
2-12	PLATE-OF-SIDE-ENCLOSURE-12	Pb	2	
2-13	PLATE-OF-SIDE-ENCLOSURE-13	Pb	6	
2-14	PLATE-OF-SIDE-ENCLOSURE-14	Pb	2	
2-15	PLATE-OF-SIDE-ENCLOSURE-15	Pb	8	
2-16	PLATE-OF-SIDE-ENCLOSURE-16	Pb	2	



NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

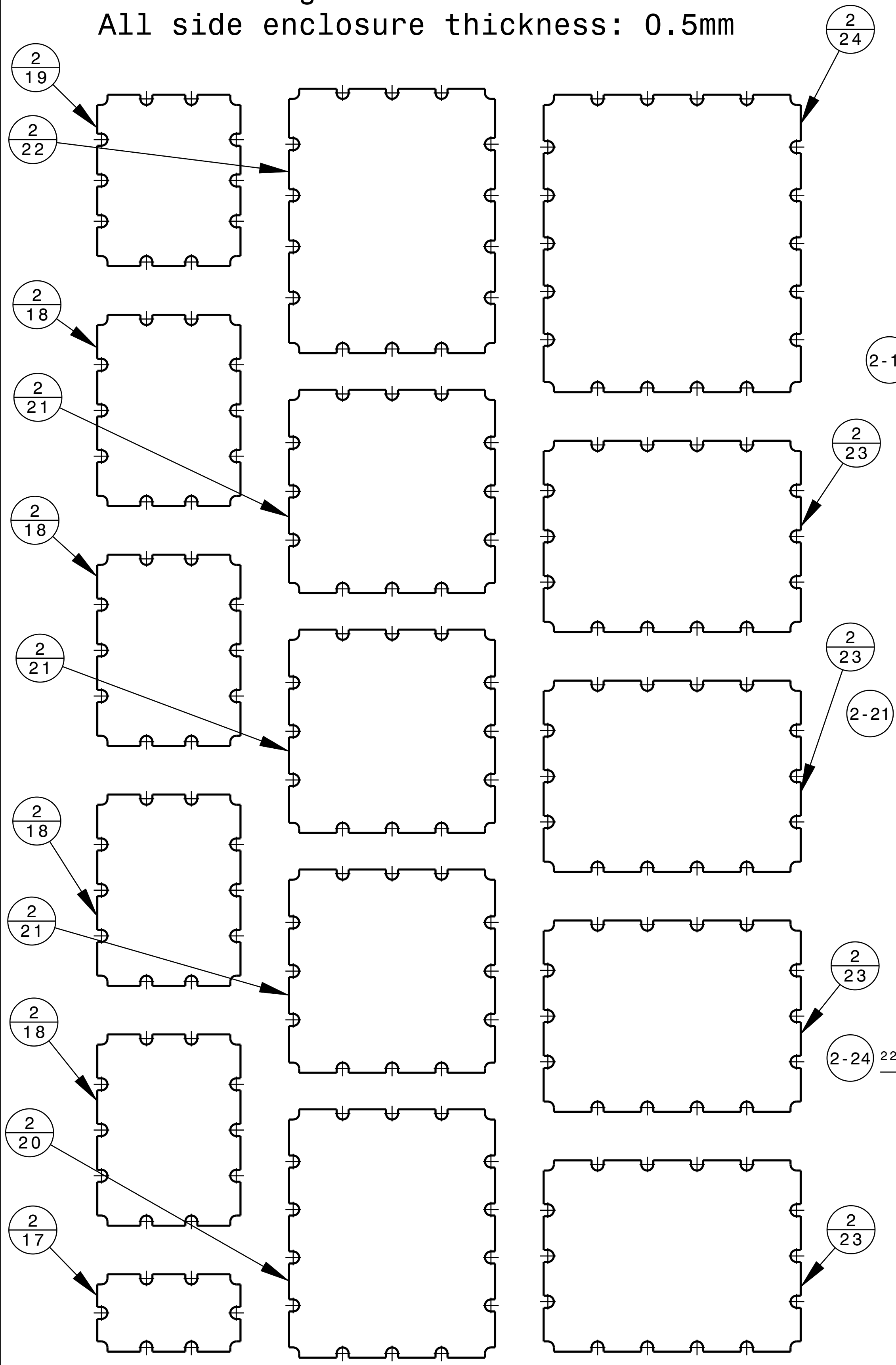
DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: -		LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		
LINKED 3D ID: 5KF92K	DRAWN BY: ---			
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX SIDE_ENCLOSURE 3rd TITLE LINE - CATIA PARAMETER		
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---		
DR STATUS: DD / SCALE: 1:10 / PT STATUS: DD				
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 27 / N°OF SHEETS: 45 / REVISION: --C

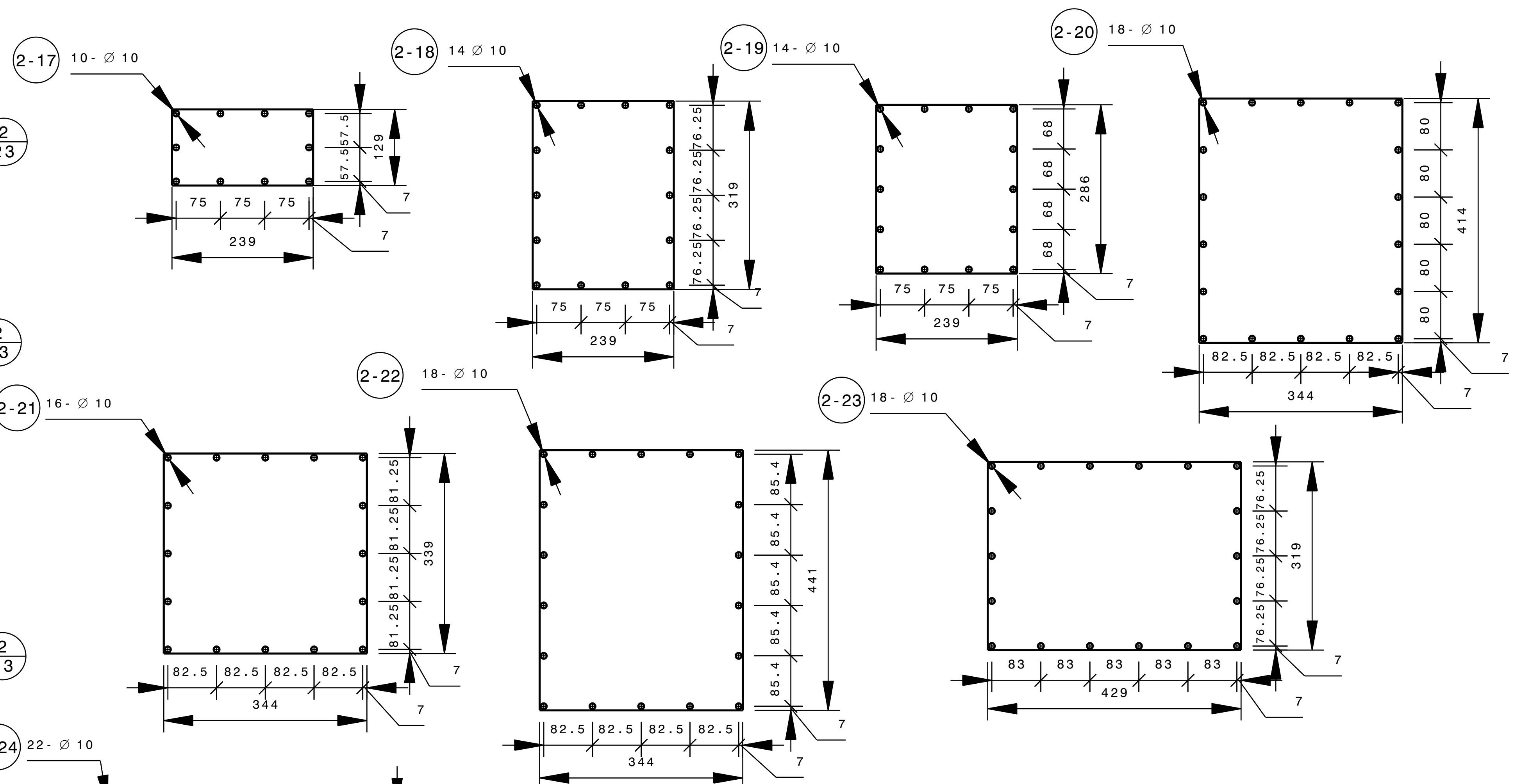
Spacereservation for the banner

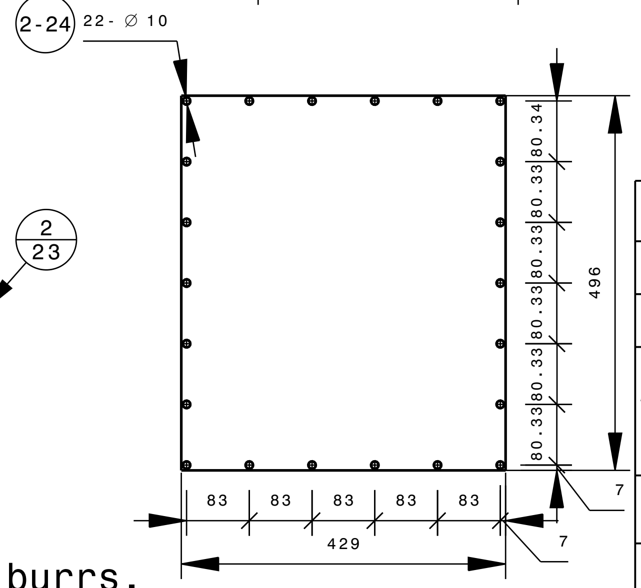
Spacereservation for the banner

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3
All side enclosure thickness: 0.5mm

No.	Name	Material	QUANTITY	REMARKS
2-17	PLATE-OF-SIDE-ENCLOSURE-17	SS316L	2	
2-18	PLATE-OF-SIDE-ENCLOSURE-18	SS316L	8	
2-19	PLATE-OF-SIDE-ENCLOSURE-19	SS316L	2	
2-20	PLATE-OF-SIDE-ENCLOSURE-20	SS316L	2	
2-21	PLATE-OF-SIDE-ENCLOSURE-21	SS316L	6	
2-22	PLATE-OF-SIDE-ENCLOSURE-22	SS316L	2	
2-23	PLATE-OF-SIDE-ENCLOSURE-23	SS316L	8	
2-24	PLATE-OF-SIDE-ENCLOSURE-24	SS316L	2	







NOTE

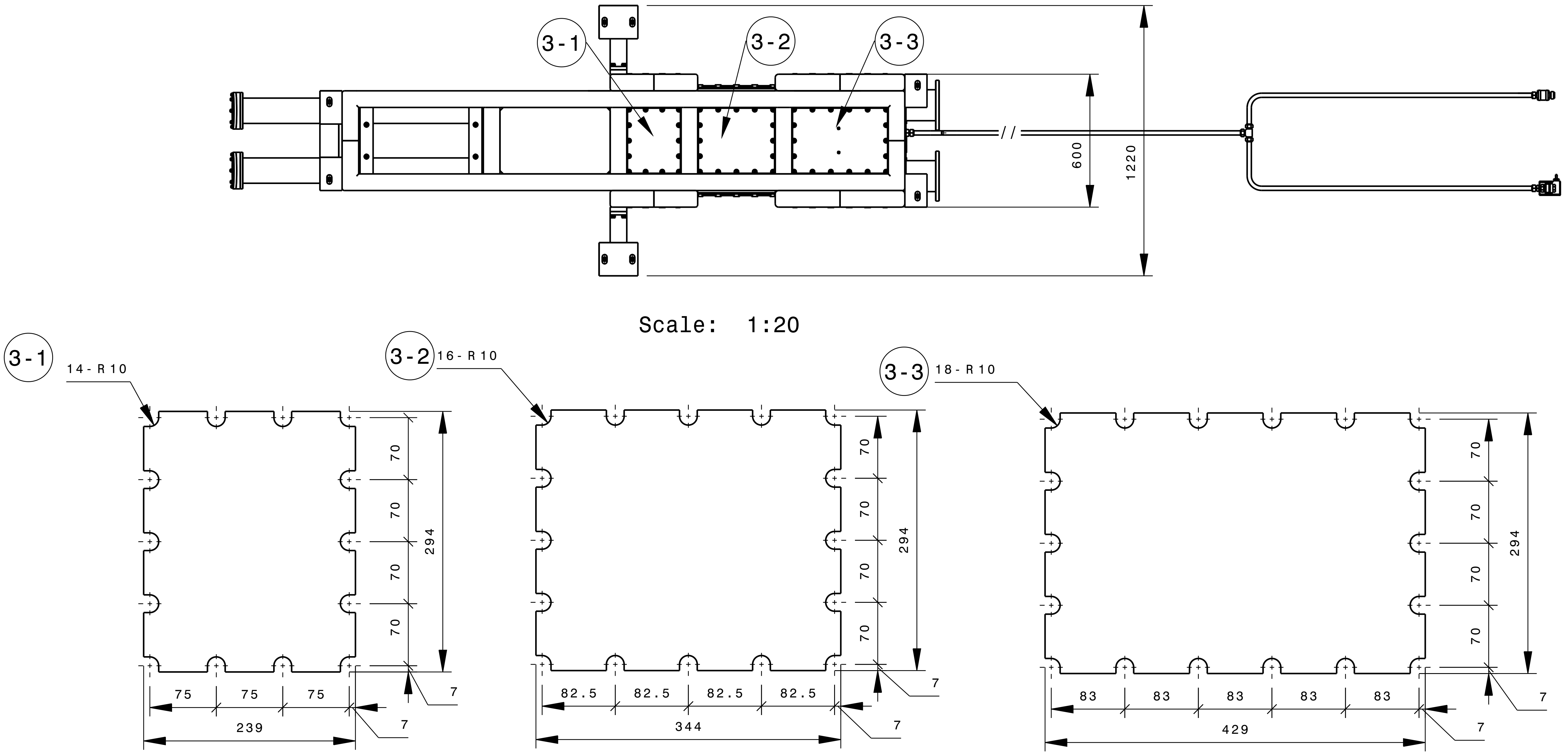
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: -	LEGAL OWNER: iter china EU india japan korea russia USA	
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		
LINKED 3D ID: 5KF92K	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX SIDE_ENCLOSURE 3rd TITLE LINE - CATIA PARAMETER		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---			
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---		
DR STATUS: DD / SCALE: 1:10 / PT STATUS: DD				
THIRD ANGLE PROJECTION	FORMAT: A3 / PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 28 / N°OF SHEETS: 45	REVISION: --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3
All side enclosure thickness: 5mm

No.	Name	Material	QUANTITY	REMARKS
3-1	TOP-AND-BOTTOM-ENCLOSURE-PLATE-01	B4C	2	
3-2	TOP-AND-BOTTOM-ENCLOSURE-PLATE-02	B4C	2	
3-3	TOP-AND-BOTTOM-ENCLOSURE-PLATE-03	B4C	2	



NOTE

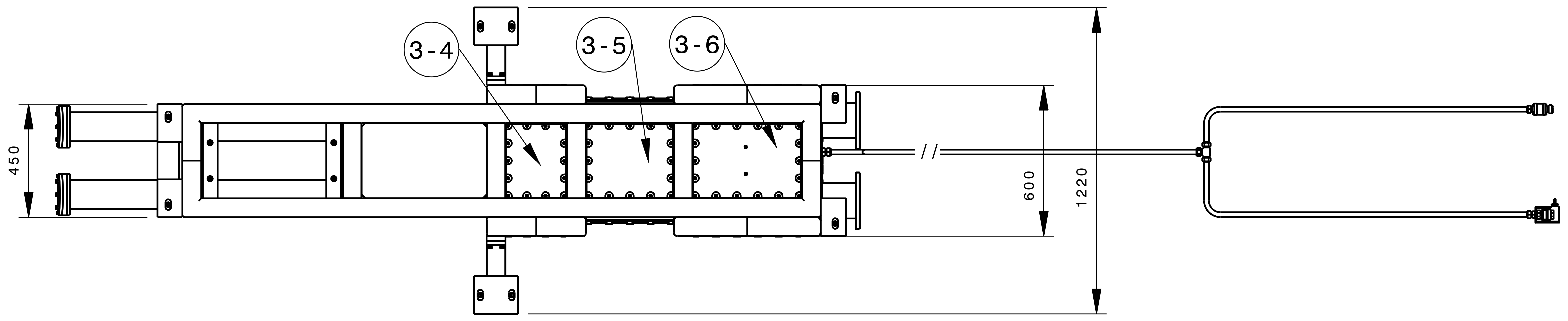
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

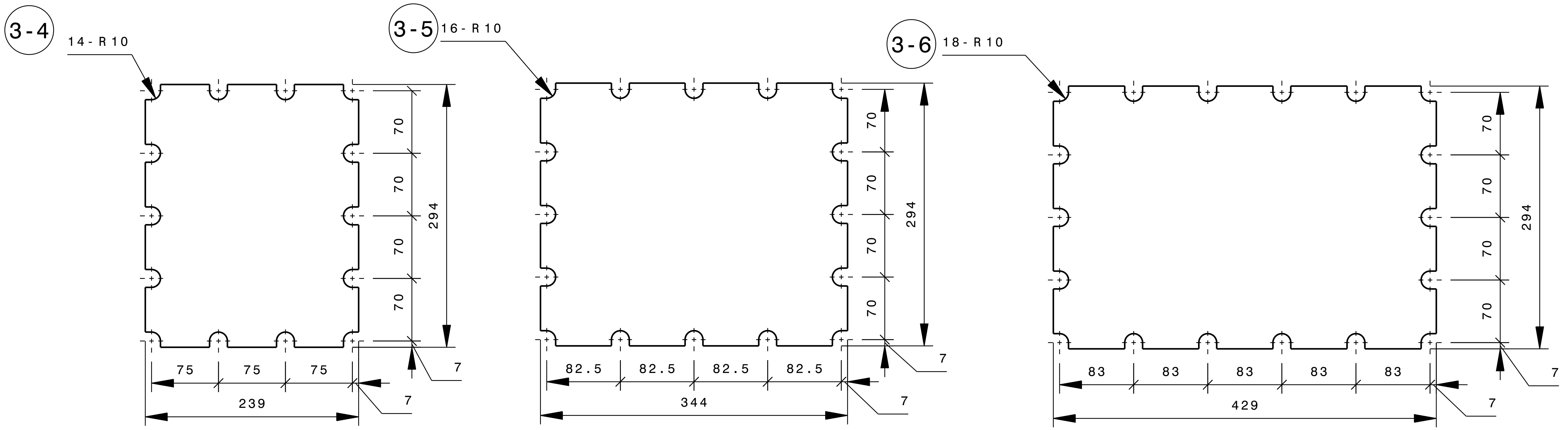
DRW CAD ID	5KFAUZ
LINKED EV5 PT ID	5KF8XZ
LINKED 3D ID	5KF92K
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	04 Apr 23
PT MATURITY	DD
PT VERSION	--C
DR STATUS	DD
SCALE	1:5
PT STATUS	DD
THIRD ANGLE PROJECTION	
APPROVED BY	IOKIK
TECHNICAL REF	---
DRAWN BY	---
SAFETY CLASS	---
QUALITY CLASS	---
ITER Organization	-
LEGAL OWNER	iter china EU india japan korea russia USA
DRAWING TITLE	C6_EP10_IS_MIRROR_BOX TOP_AND_BOTTOM_ENCLOSURE 3rd TITLE LINE - CATIA PARAMETER
DOCUMENT TYPE	---
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015676
SHEET	29
N°OF SHEETS	45
REVISION	--C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3
All side enclosure thickness: 2.5mm

No.	Name	Material	QUANTITY	REMARKS
3-4	TOP-AND-BOTTOM-ENCLOSURE-PLATE-04	Pb	2	
3-5	TOP-AND-BOTTOM-ENCLOSURE-PLATE-05	Pb	2	
3-6	TOP-AND-BOTTOM-ENCLOSURE-PLATE-06	Pb	2	



Scale: 1:20



NOTE

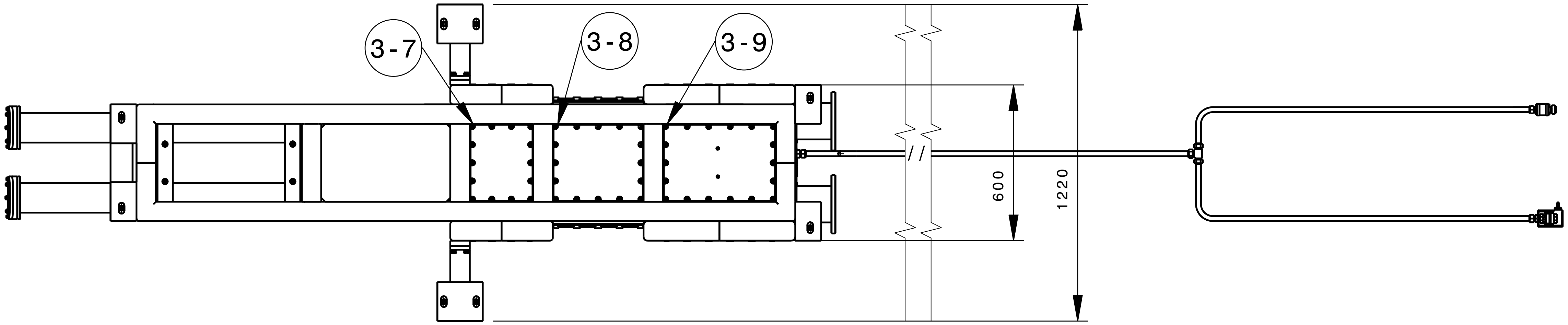
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

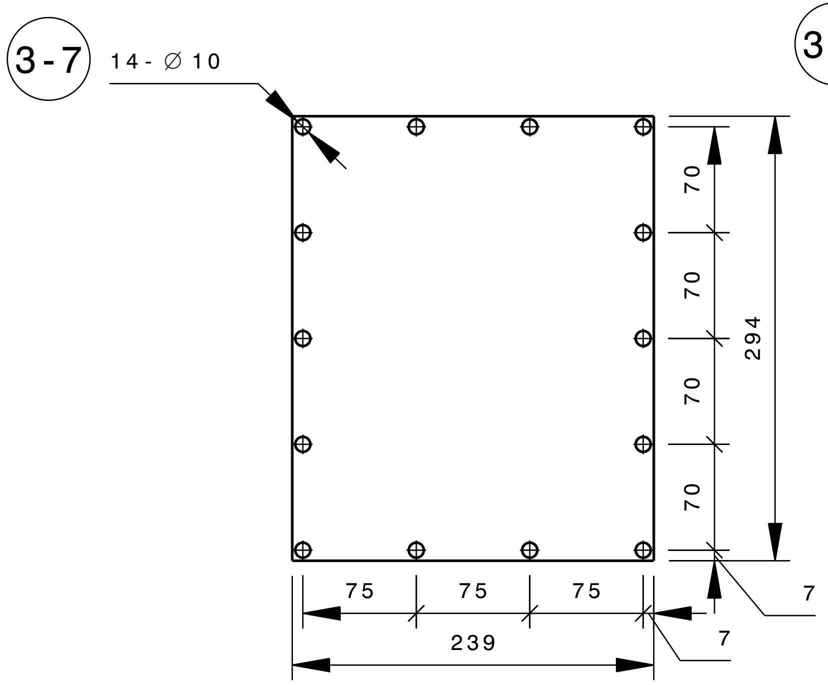
DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization		LEGAL OWNER
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		iter china EU india japan korea russia USA
LINKED 3D ID: 5KF92K	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX TOP_AND_BOTTOM_ENCLOSURE 3rd TITLE LINE - CATIA PARAMETER		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---			
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---		
DR STATUS: DD / SCALE: 1:5 / PT STATUS: DD				
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 30 / N°OF SHEETS: 45 / REVISION: --C

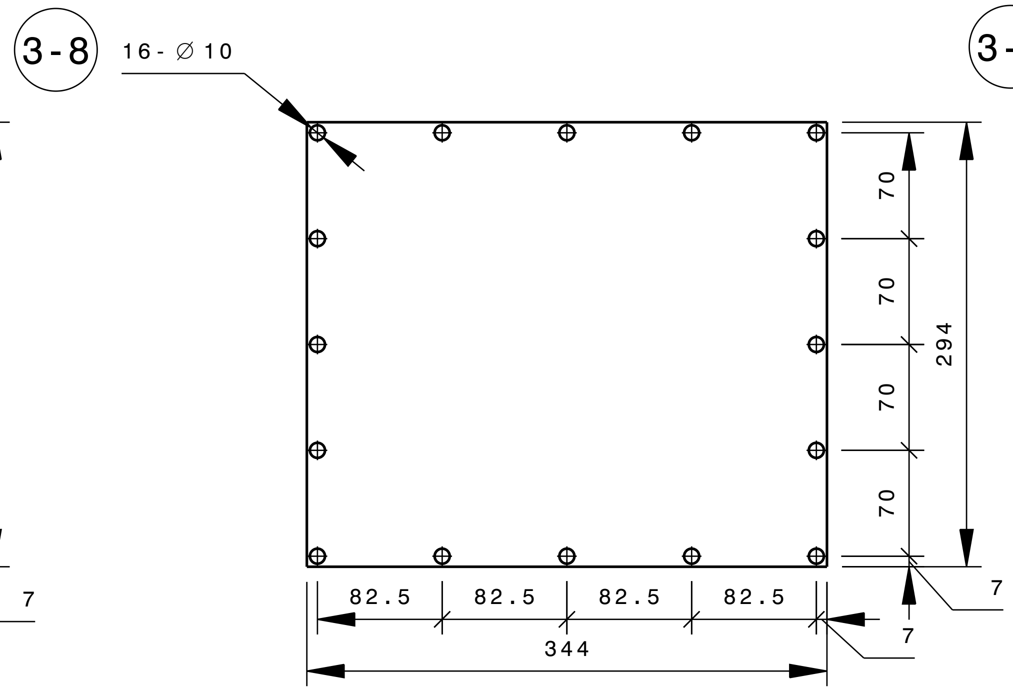
General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3
All side enclosure thickness: 0.5mm

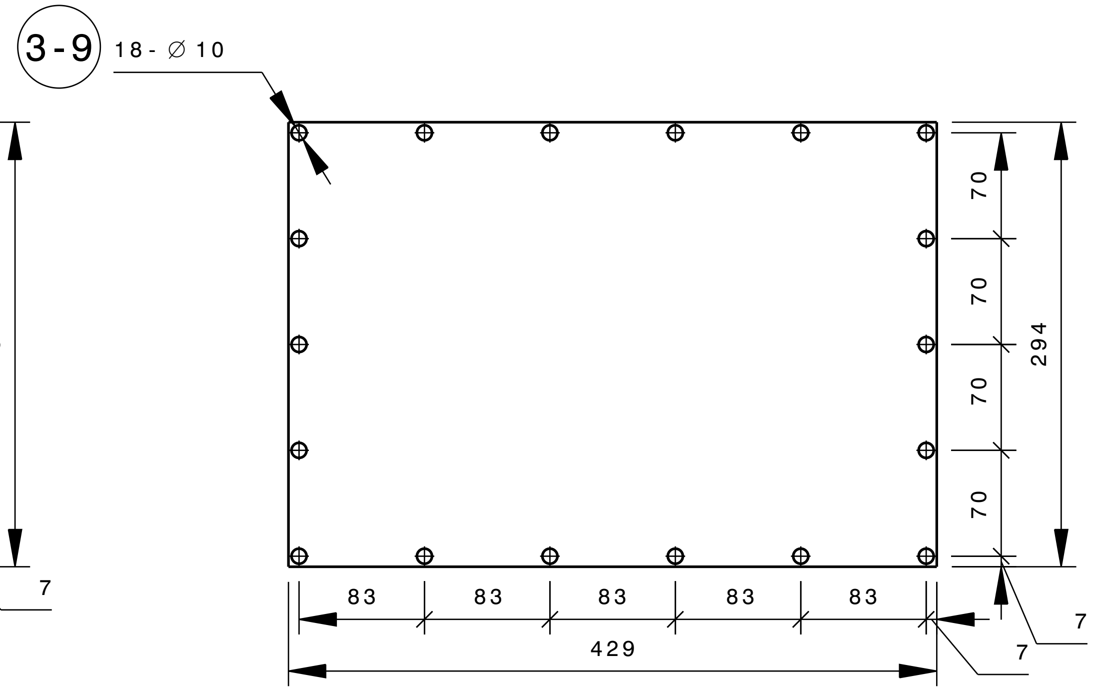
No.	Name	Material	QUANTITY	REMARKS
3-7	TOP-AND-BOTTOM-ENCLOSURE-PLATE-07	SS316L	2	
3-8	TOP-AND-BOTTOM-ENCLOSURE-PLATE-08	SS316L	2	
3-9	TOP-AND-BOTTOM-ENCLOSURE-PLATE-09	SS316L	2	



Scale: 1:20







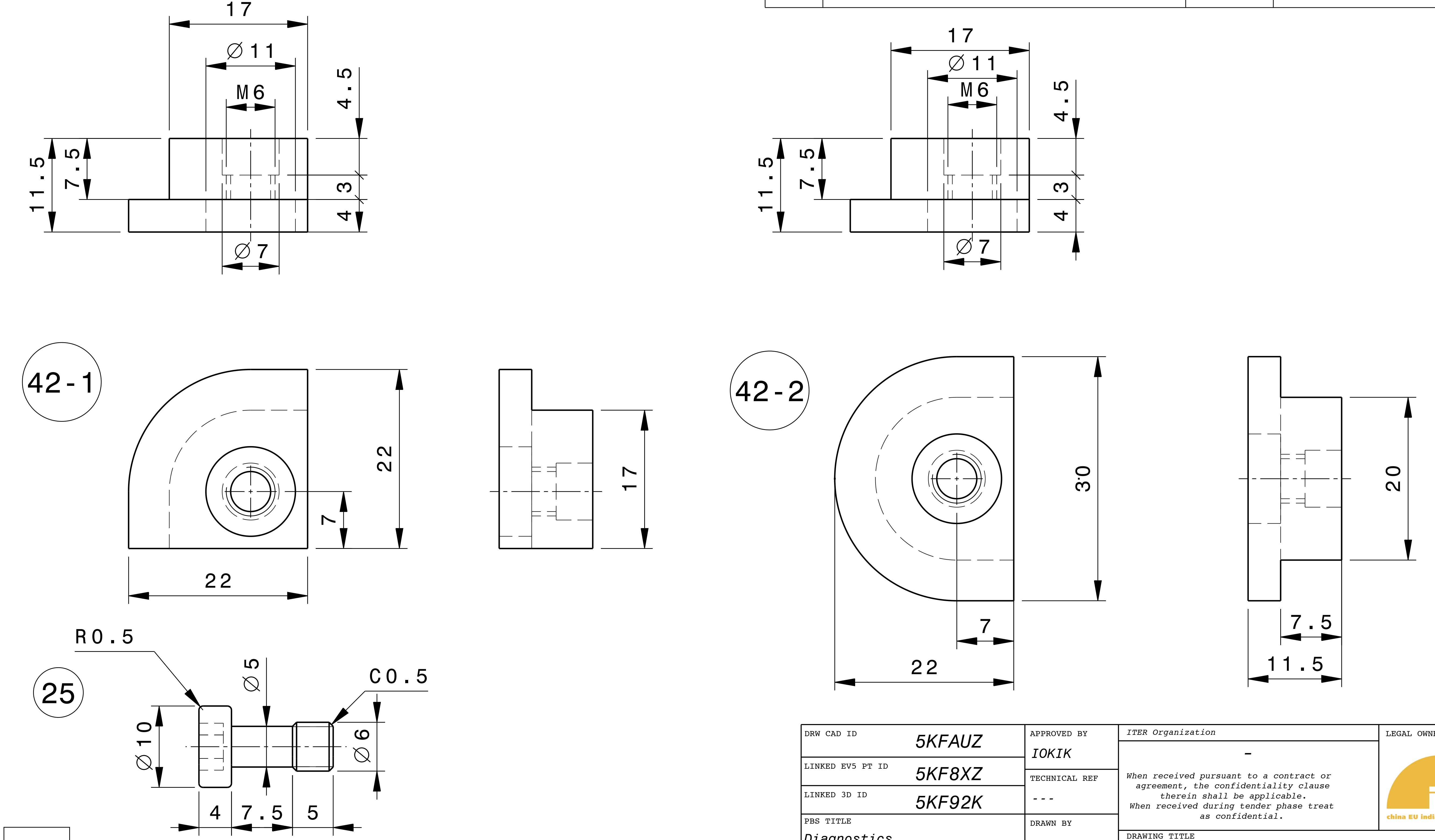
NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: - When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	LEGAL OWNER: iter china EU india japan korea russia USA	
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---			
LINKED 3D ID: 5KF92K	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX TOP_AND_BOTTOM_ENCLOSURE 3rd TITLE LINE - CATIA PARAMETER		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---			
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---		
DR STATUS: DD / SCALE: 1:5 / PT STATUS: DD				
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 31 / N°OF SHEETS: 45 / REVISION: --C

No.	Name	Material	QUANTITY	REMARKS
42-1	JOINED-PART-01	SS316L	152	
42-2	JOINED-PART-02	SS316L	460	
25	LOW-HEAD-ACTIVE-SCREW-M6X12.5			



NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

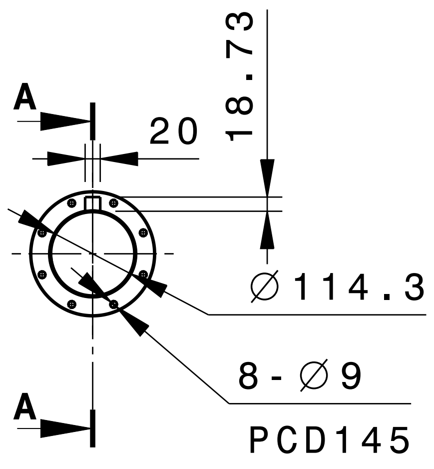
DRW CAD ID 5KFAUZ	APPROVED BY IOKIK	ITER Organization	LEGAL OWNER	
LINKED EV5 PT ID 5KF8XZ	TECHNICAL REF ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	iter china EU india japan korea russia USA	
LINKED 3D ID 5KF92K	DRAWN BY ---			
PBS TITLE Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS ---	DRAWING TITLE C6_EP10_IS_MIRROR_BOX JOINED_PARTS 3rd TITLE LINE - CATIA PARAMETER		
DATE OF ISSUE 04 Apr 23 / PT MATURITY DD / PT VERSION --C	QUALITY CLASS ---	DOCUMENT TYPE ---		
DR STATUS DD / SCALE 2:1 / PT STATUS DD				
THIRD ANGLE PROJECTION	FORMAT A3	PBS NUMBER 55 C6 EA	DRAWING NUMBER 015676	SHEET 32 / N°OF SHEETS 45 / REVISION --C

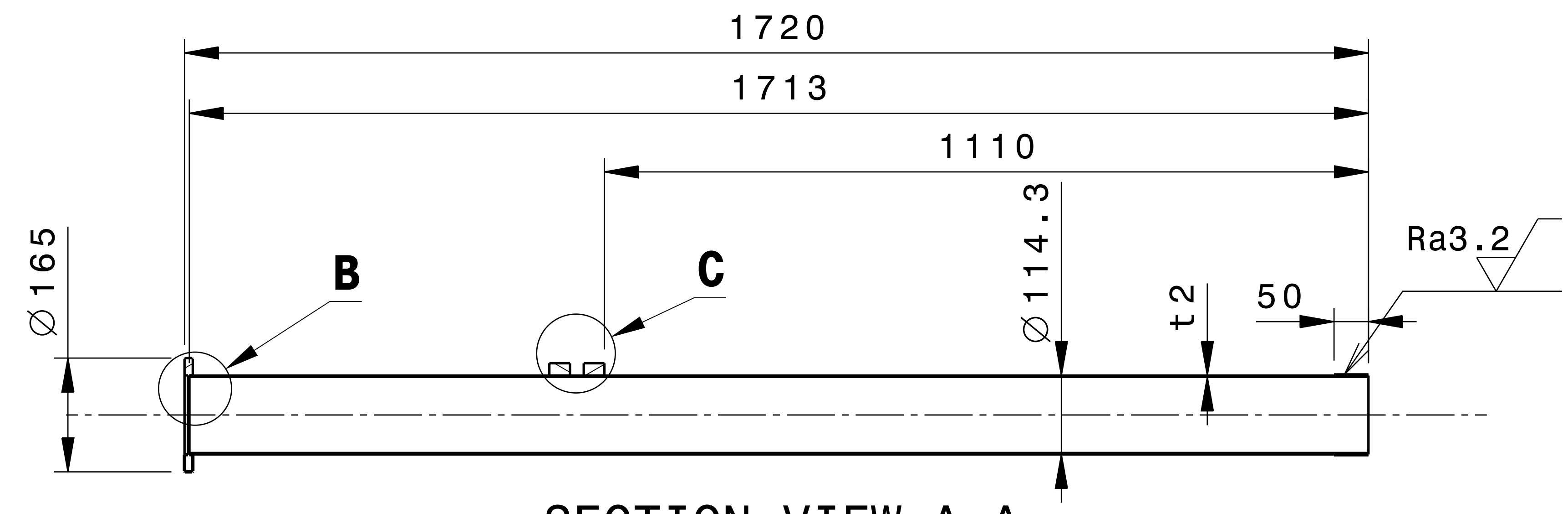
Spacereservation for the banner

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

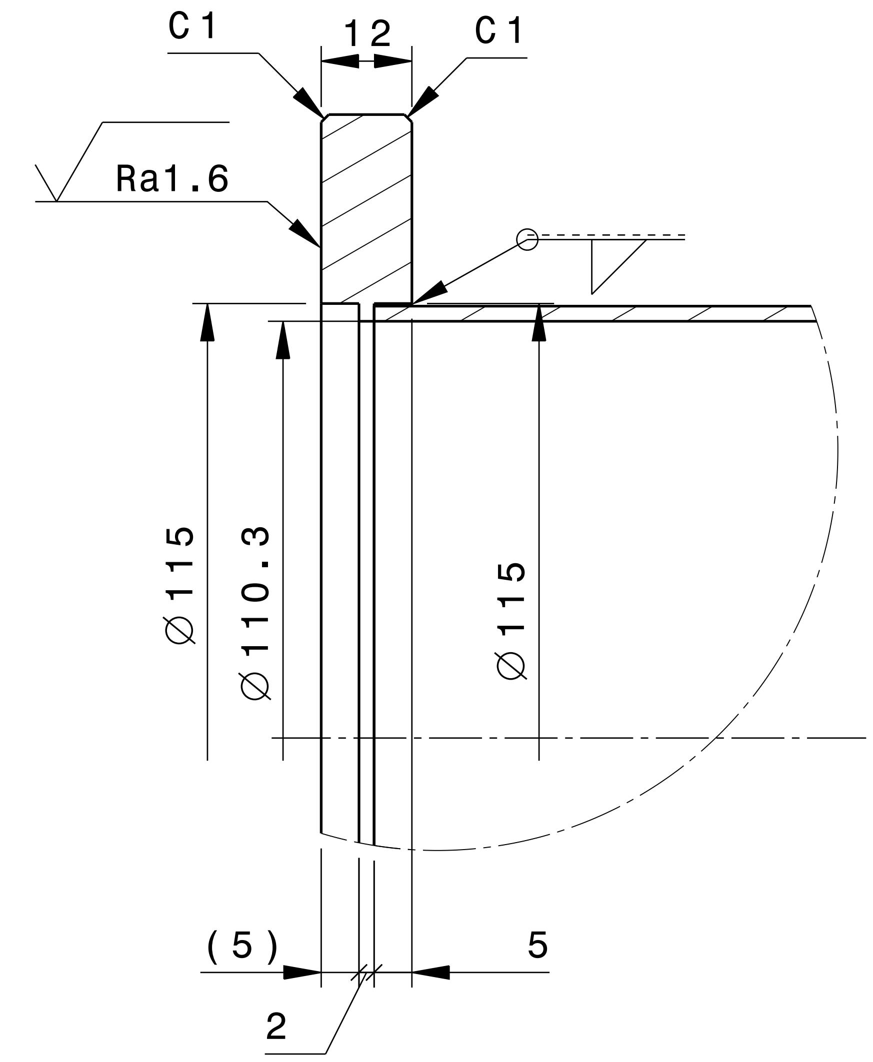
No.	Name	Material	QUANTITY	REMARKS
04	TRANSMISSION-TUBE	SS316L	9set	

4

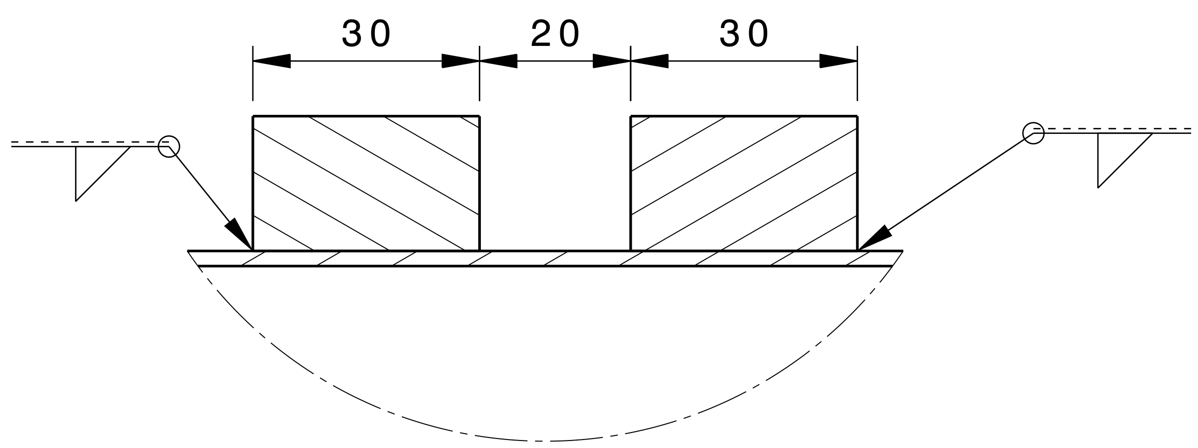




SECTION VIEW A-A



DETAIL B
Scale: 1:1



DETAIL C
Scale: 1:1

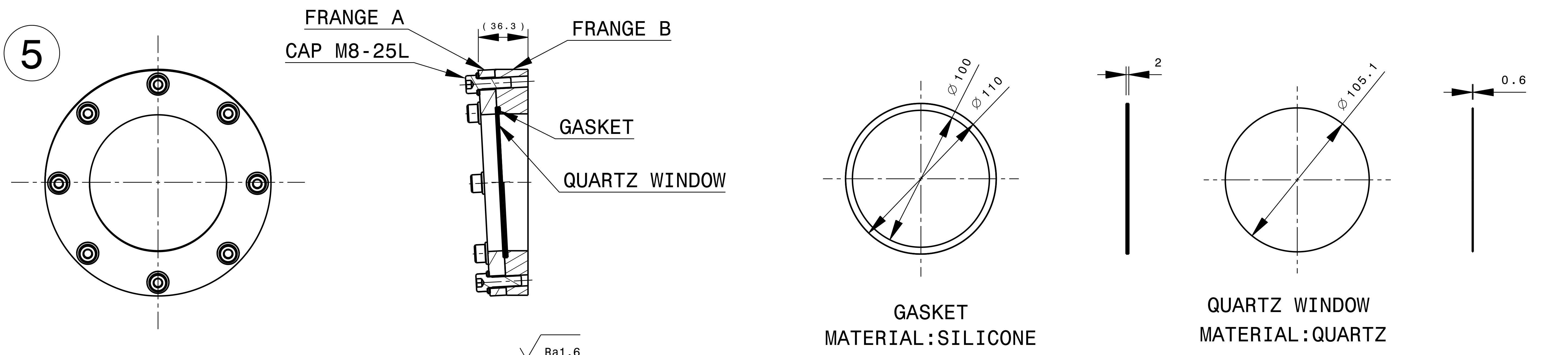
NOTE

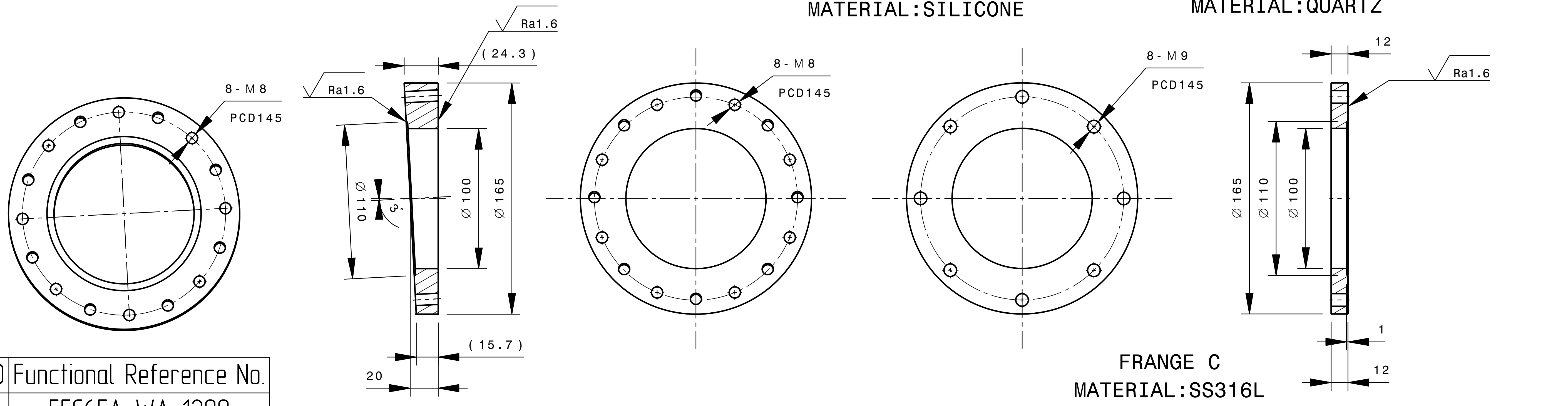
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: -	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	
LINKED 3D ID: 5KF92K	DRAWN BY: ---		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX TRANSMISSION_TUBE 3rd TITLE LINE - CATIA PARAMETER	
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---	
DR STATUS: DD / SCALE: 1:10 / PT STATUS: DD			
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA / DRAWING NUMBER: 015676	SHEET: 33 / N°OF SHEETS: 45 / REVISION: --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
05	COMPARTMENT-WINDOW-ASSEMBLY	SS316L,QUARTZ,SILICONE	9set	





FRANGE B
MATERIAL:SS316L

Chord ID	Functional Reference No.
E1	55C6EA-WA-1200
E2	55C6EB-WA-2200
E3	55C6EA-WA-3200
E4	55C6EB-WA-4200
E5	55C6EA-WA-5200
E6	55C6EA-WA-6200
E7	55C6EA-WA-7200
E8	55C6EB-WA-8200
E9	55C6EA-WA-9200

NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID	5KFAUZ	APPROVED BY	IOKIK
LINKED EV5 PT ID	5KF8XZ	TECHNICAL REF	---
LINKED 3D ID	5KF92K	DRAWN BY	---
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS	---
DATE OF ISSUE: 04 Apr 23	PT MATURITY: DD	PT VERSION: --C	QUALITY CLASS: ---
DR STATUS: DD	SCALE: 1:3	PT STATUS: DD	
THIRD ANGLE PROJECTION			

ITER Organization

-

When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.

LEGAL OWNER

iter
china EU india japan korea russia USA

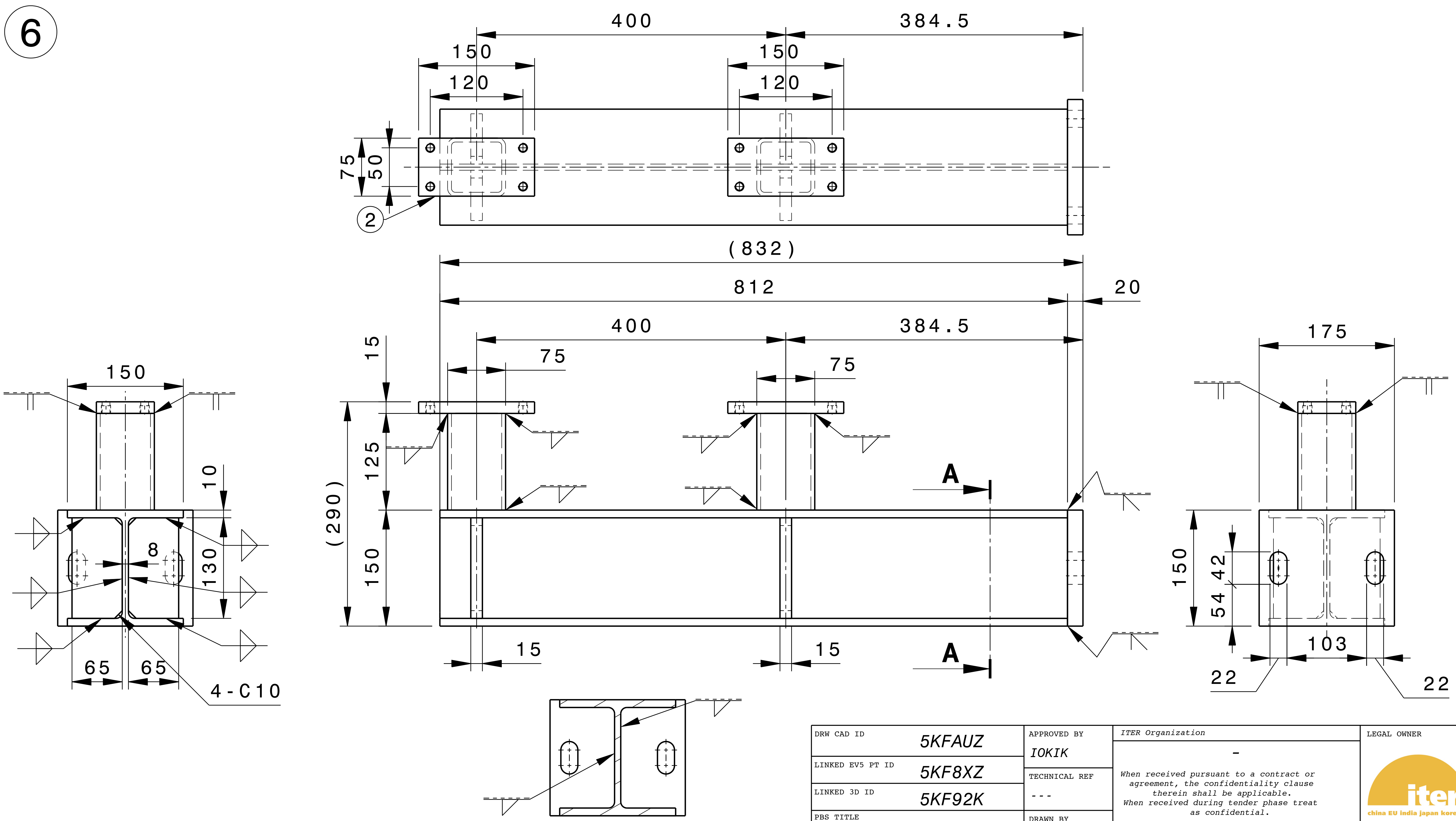
DRAWING TITLE
C6_EP10_IS_MIRROR_BOX
COMPARTMENT_WINDOW_ASSEMBLY
3rd TITLE LINE - CATIA PARAMETER

DOCUMENT TYPE

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015676	34	45	--C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

No.	Name	Material	QUANTITY	REMARKS
06	SIDE-SUPPORT	SS316L	2	



SECTION VIEW A-A

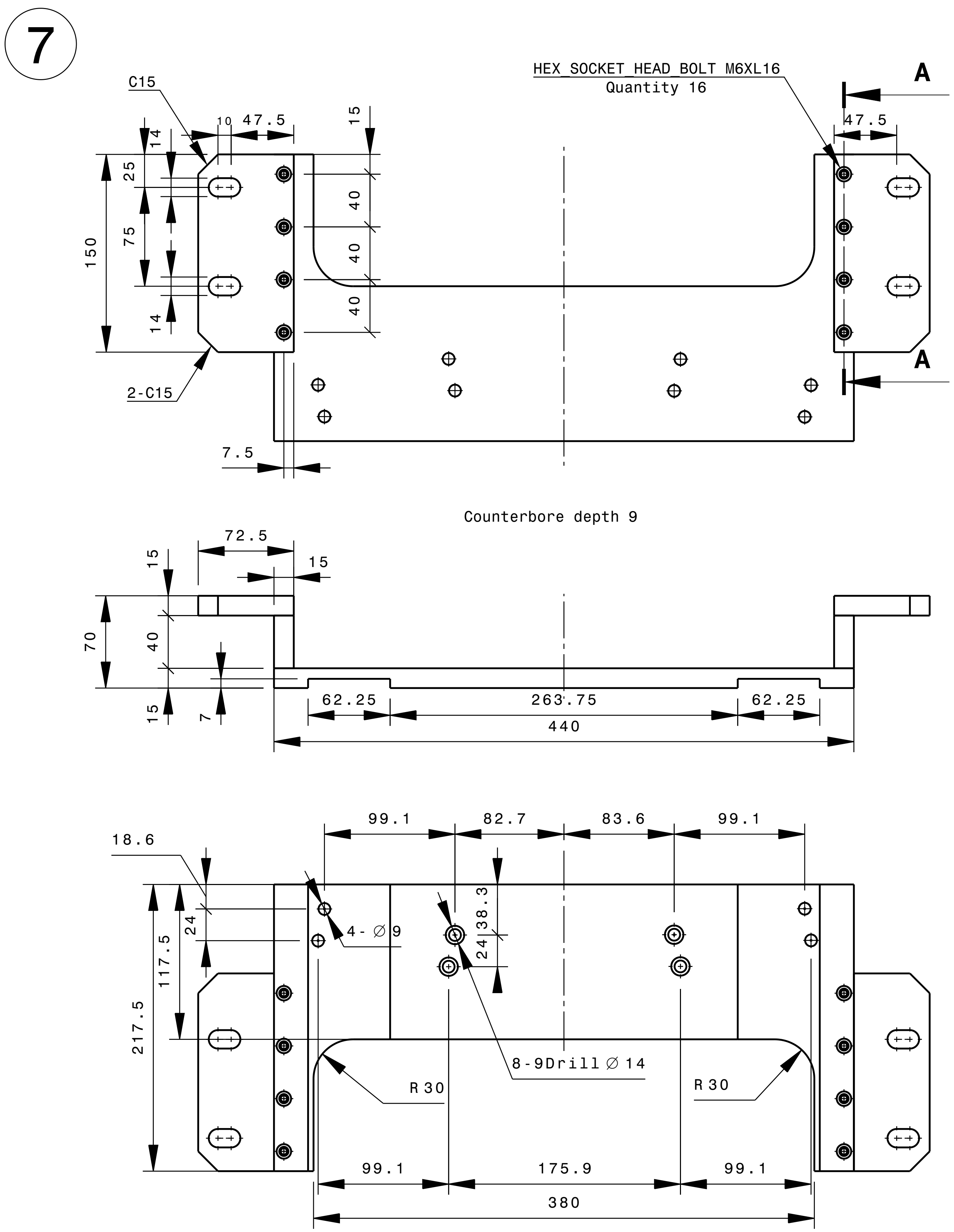
NOTE

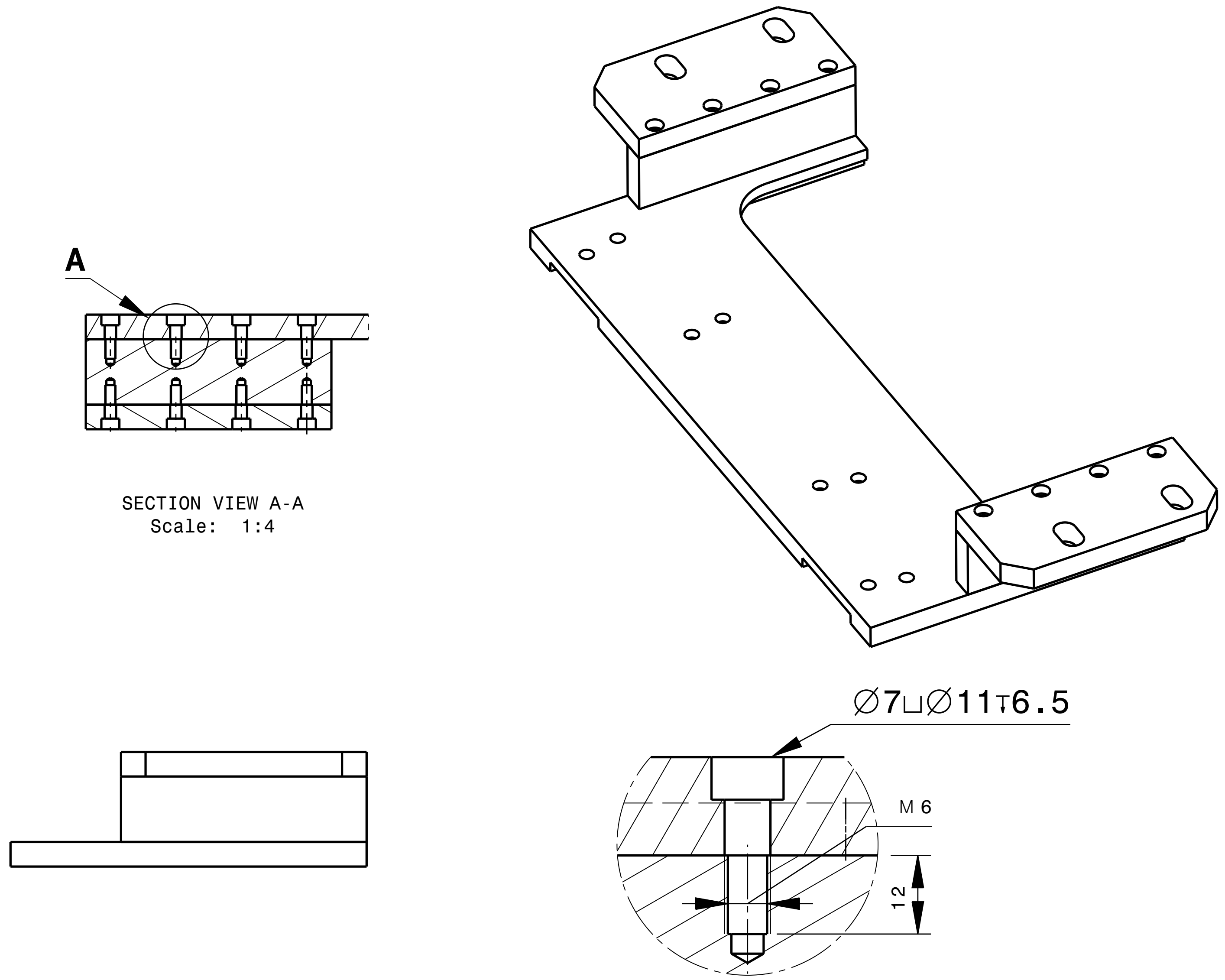
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID: 5KFAUZ			APPROVED BY: IOKIK	ITER Organization: – When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.
LINKED EV5 PT ID: 5KF8XZ			TECHNICAL REF: ---	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED 3D ID: 5KF92K			DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX SIDE_SUPPORT 3rd TITLE LINE - CATIA PARAMETER
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A			SAFETY CLASS: ---	
DATE OF ISSUE: 04 Apr 23	PT MATURITY: DD	PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---
DR STATUS: DD	SCALE: 1:5	PT STATUS: DD		
THIRD ANGLE PROJECTION			FORMAT: A3	PBS NUMBER: 55 C6 EA; DRAWING NUMBER: 015676; SHEET: 35; N°OF SHEETS: 45; REVISION: --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
07	M3-MIRROR-BASE	SS316L	5set	





DETAIL A
Scale: 1:1

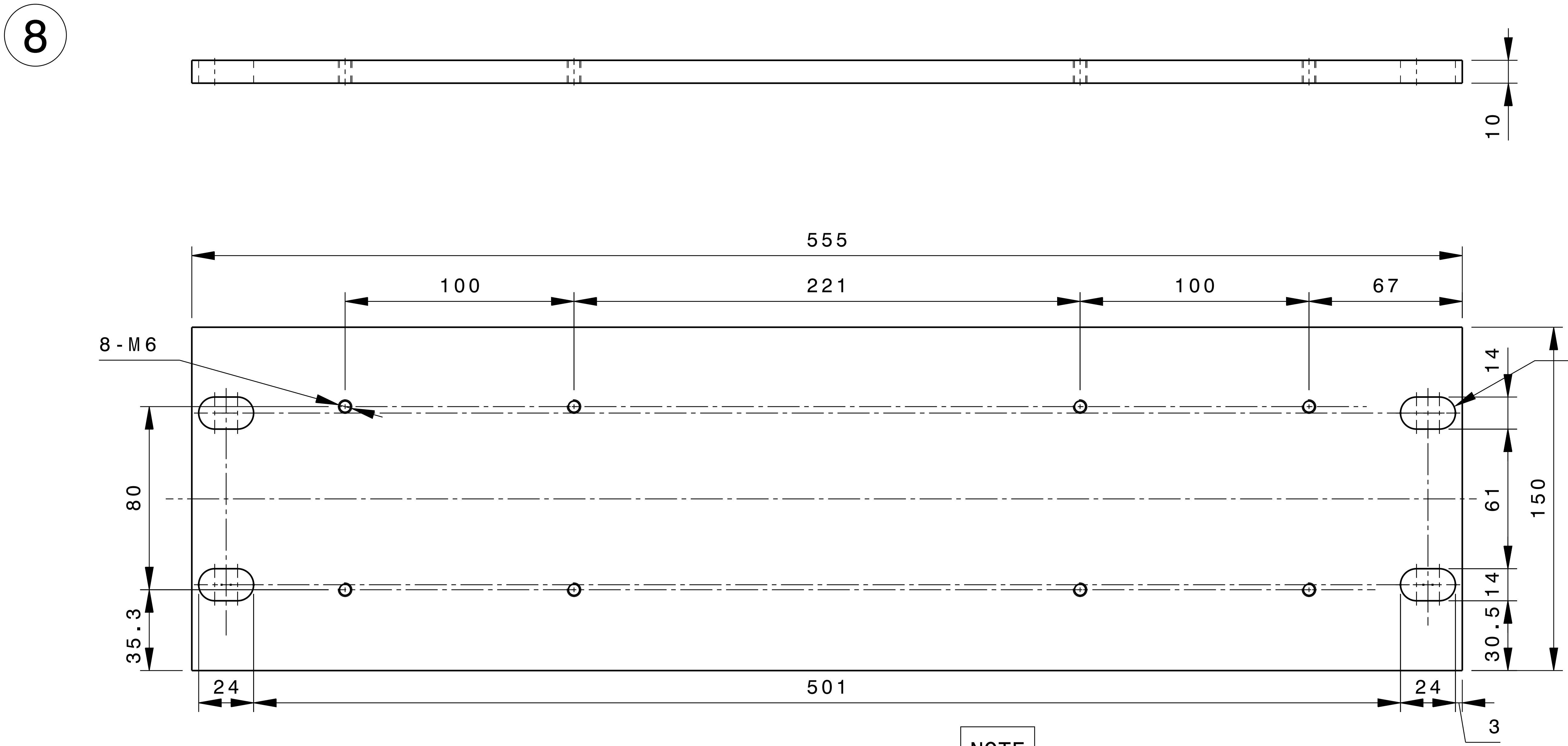
NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: -	LEGAL OWNER: iter china EU india japan korea russia USA	
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		
LINKED 3D ID: 5KF92K	DRAWN BY: ---			
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX M3_MIRROR_BASE 3rd TITLE LINE - CATIA PARAMETER		
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---			
DR STATUS: DD / SCALE: 1:4 / PT STATUS: DD		DOCUMENT TYPE: ---		
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 36 / N°OF SHEETS: 45 / REVISION: --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
08	M4-MIRROR-BASE	SS316L	5set	



NOTE

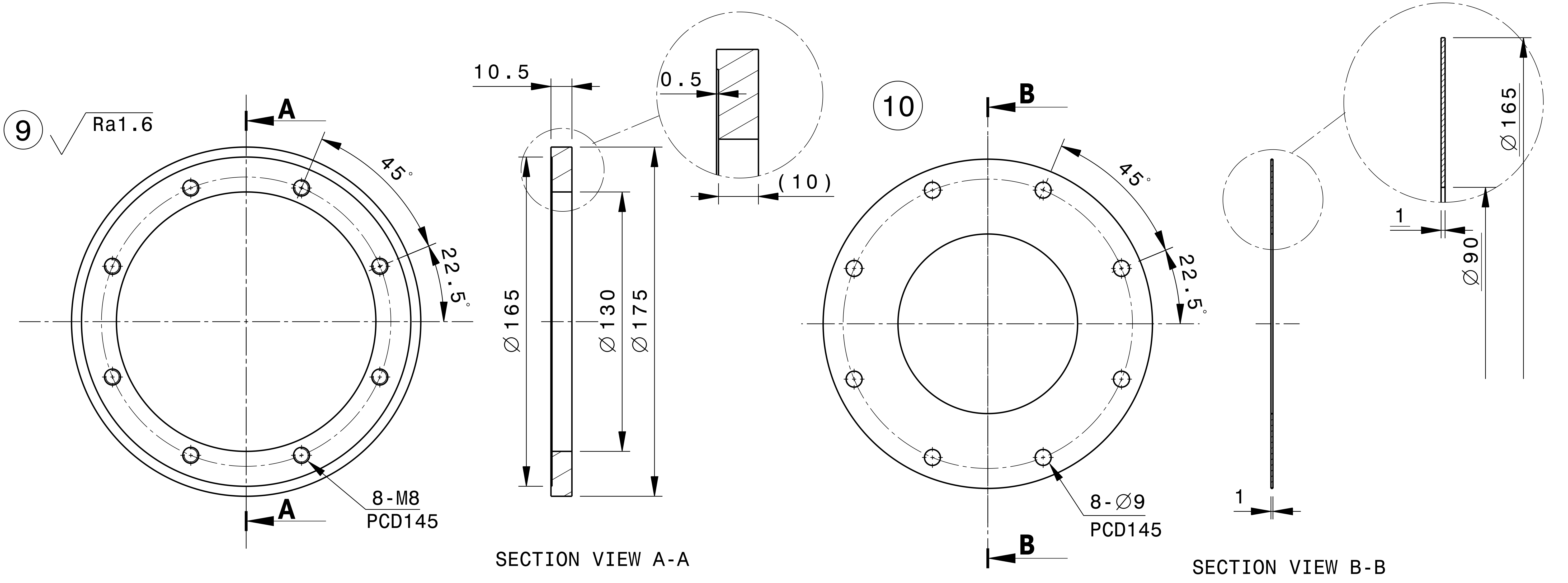
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID 5KFAUZ	APPROVED BY IOKIK	ITER Organization -	LEGAL OWNER iter china EU india japan korea russia USA	
LINKED EV5 PT ID 5KF8XZ	TECHNICAL REF ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		
LINKED 3D ID 5KF92K	DRAWN BY ---			
PBS TITLE Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS ---	DRAWING TITLE C6_EP10_IS_MIRROR_BOX M4_MIRROR_BASE 3rd TITLE LINE - CATIA PARAMETER		
DATE OF ISSUE 04 Apr 23 / PT MATURITY DD / PT VERSION --C	QUALITY CLASS ---	DOCUMENT TYPE ---		
DR STATUS DD / SCALE 1:2 / PT STATUS DD	FORMAT A3	PBS NUMBER 55 C6 EA	DRAWING NUMBER 015676	SHEET 37 / N°OF SHEETS 45 / REVISION --C
THIRD ANGLE PROJECTION				

Spacereservation for the banner

Spacereservation for the banner

No.	Name	Material	QUANTITY	REMARKS
09	FRONT-ENCLOSURE-FLANGE	SS316L	9	
10	FRONT-ENCLOSURE-RUBBER	EPDM	9	



General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

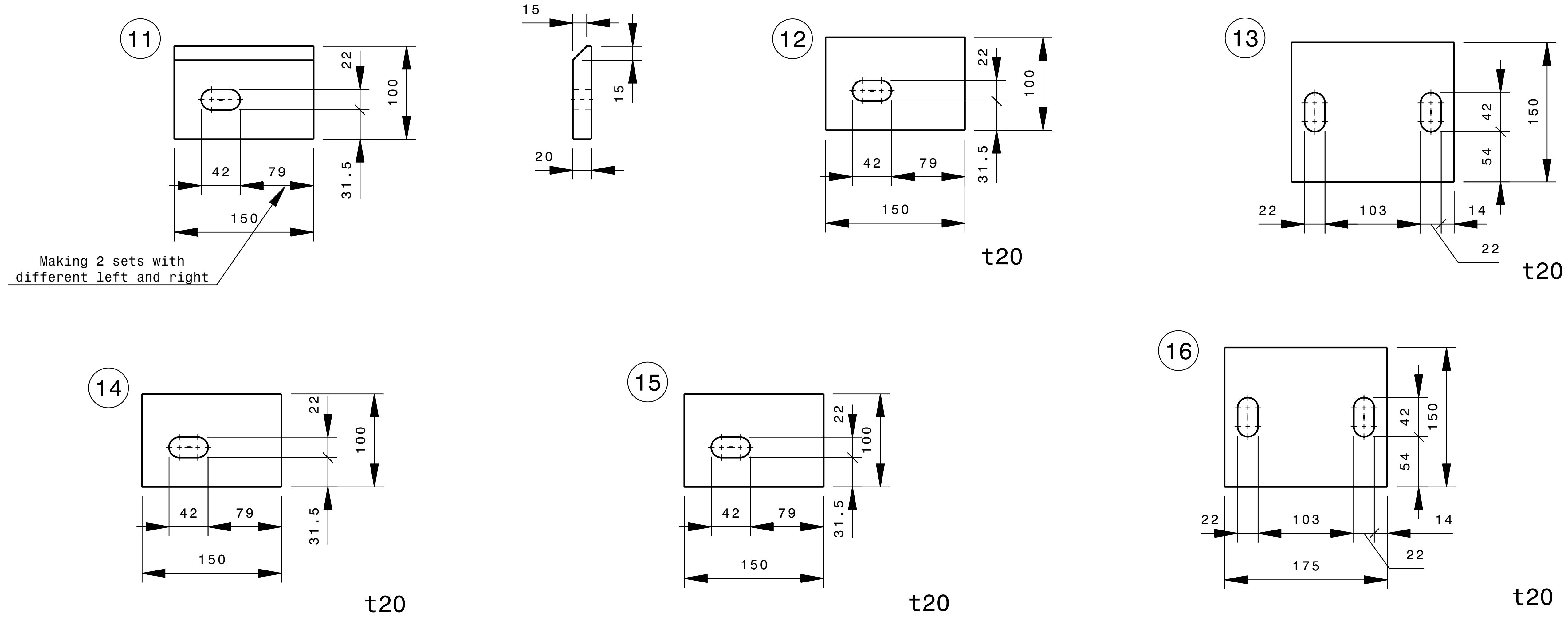
NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: -	LEGAL OWNER	
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	iter china EU india japan korea russia USA	
LINKED 3D ID: 5KF92K	DRAWN BY: ---			
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX FRONT_ENCLOSURE_ATTACHMENT 3rd TITLE LINE - CATIA PARAMETER		
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---		
DR STATUS: DD / SCALE: 1:2 / PT STATUS: DD				
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676	SHEET: 38 / N°OF SHEETS: 45 / REVISION: --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

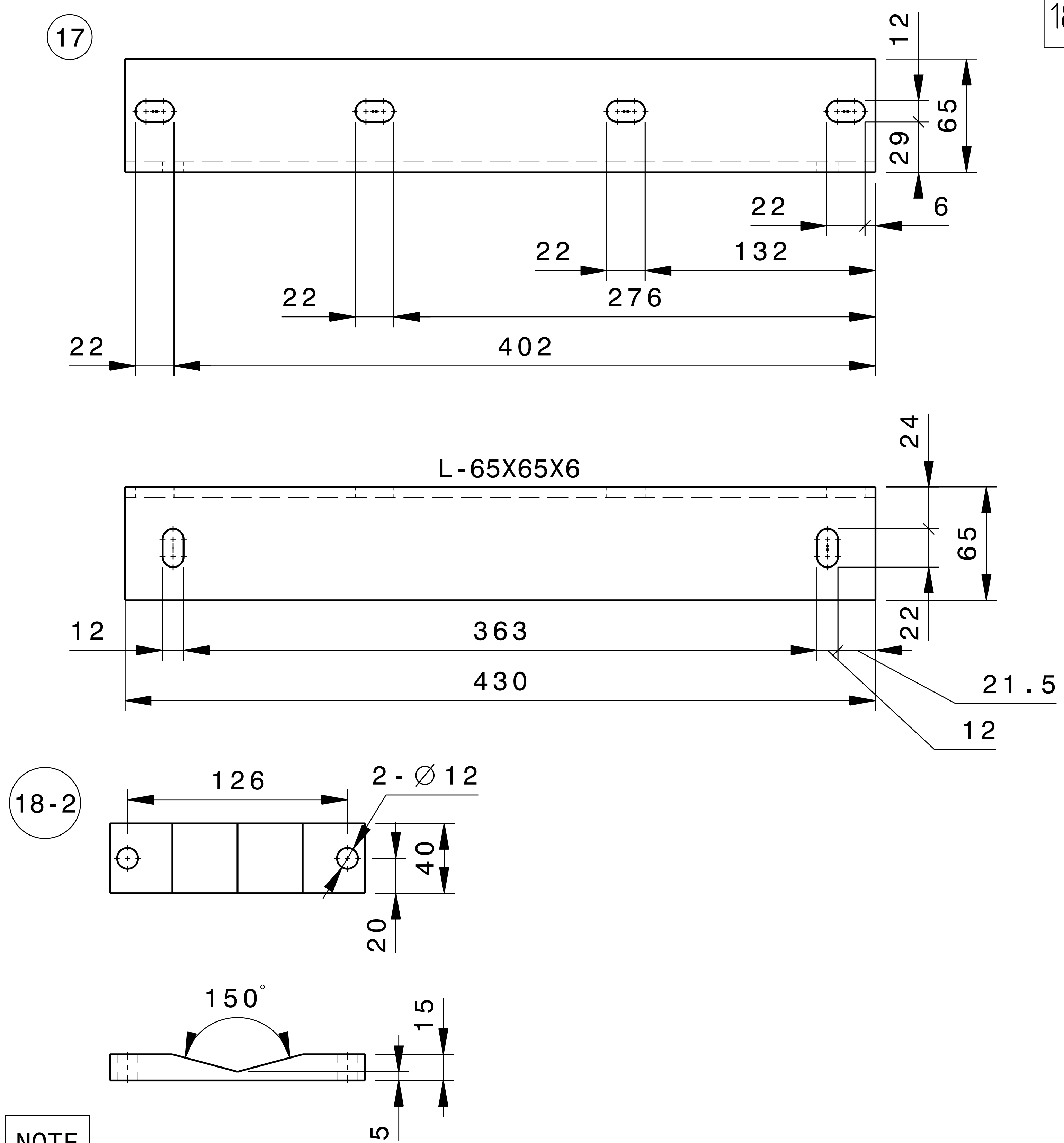
No.	Name	Material	QUANTITY	REMARKS
11	ANTI-VIBRATION-PAD-TYPE1	NR	2	
12	ANTI-VIBRATION-PAD-TYPE2	NR	2	
13	ANTI-VIBRATION-PAD-TYPE3	NR	2	
14	SPACER-TYPE1	SS316L	2	
15	SPACER-TYPE2	SS316L	2	
16	SPACER-TYPE3	SS316L	2	

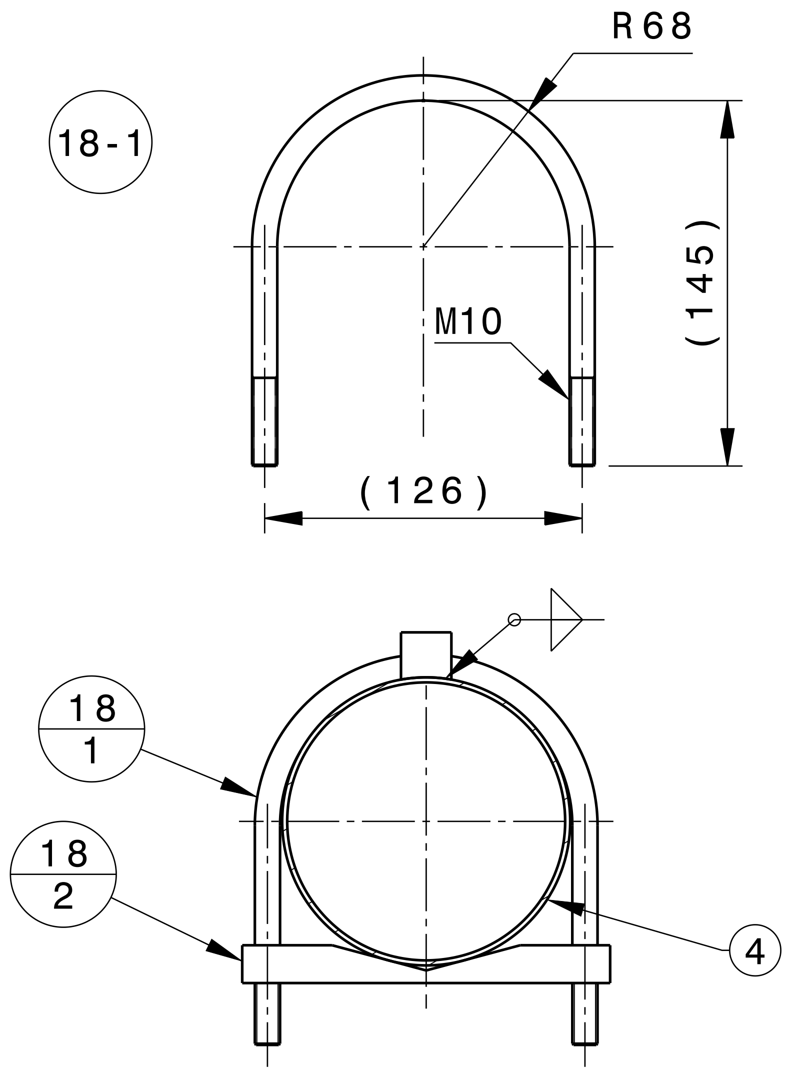


DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization: - When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---		
LINKED 3D ID: 5KF92K	DRAWN BY: ---		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX PAD_AND_SPACER 3rd TITLE LINE - CATIA PARAMETER	
DATE OF ISSUE: 04 Apr 23 · PT MATURITY: DD · PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---	
DR STATUS: DD · SCALE: 1:5 · PT STATUS: DD			
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA · DRAWING NUMBER: 015676	SHEET: 39 · N°OF SHEETS: 45 · REVISION: --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

No.	Name	Material	QUANTITY	REMARKS
17	FRONT-TRANSMISSION-TUBE-RECEIVER	SS316L	10	
18-1	U-BOLT	SS316L	18	
18-2	LOWER-CLAMP	SS316L	18	





ASSEMBLY DIAGRAM
Scale: 1:3

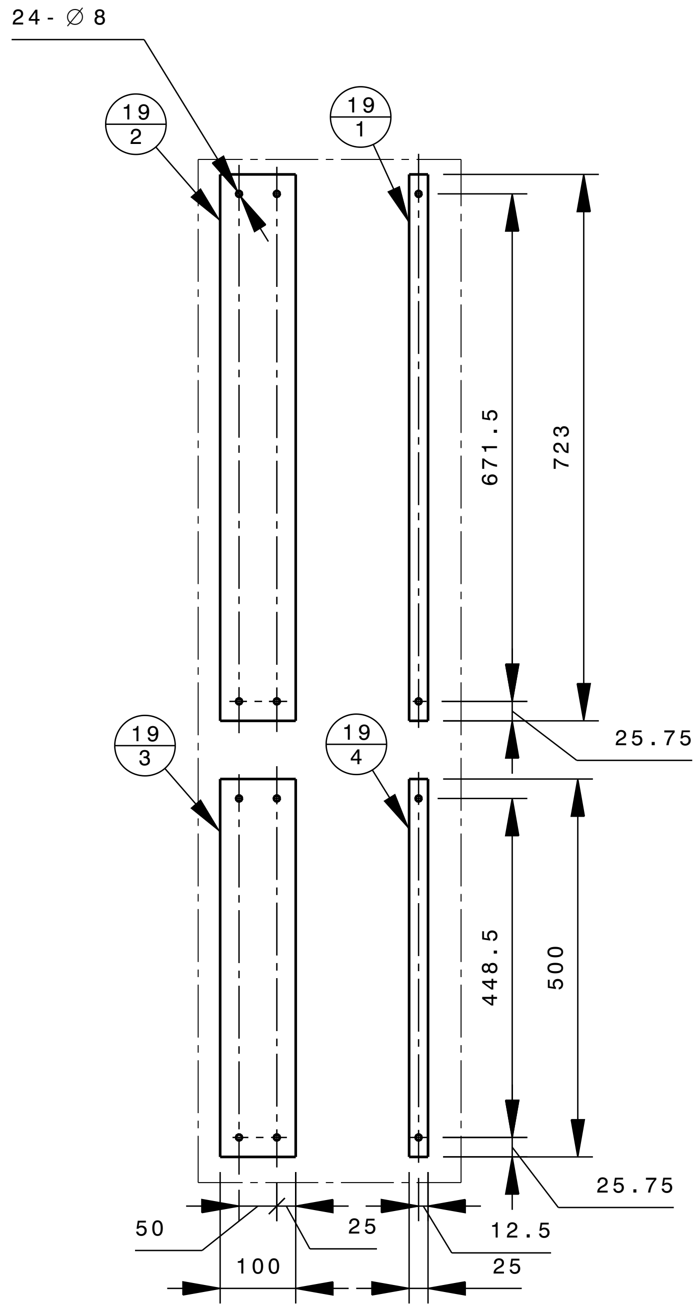
NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.
2.After processing,perform degreasing cleaning

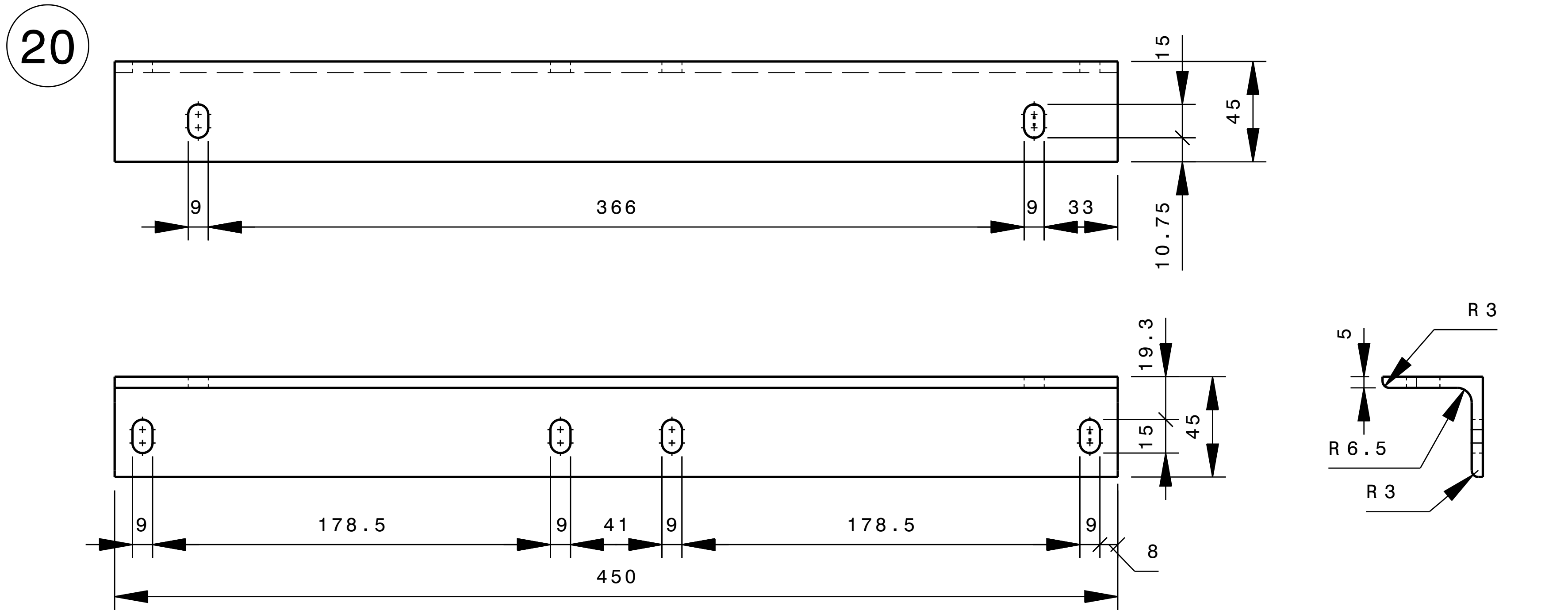
DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	
LINKED 3D ID: 5KF92K	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX U_BOLT_ASSY 3rd TITLE LINE - CATIA PARAMETER	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---		
DATE OF ISSUE: 04 Apr 23 / PT MATURITY: DD / PT VERSION: --C	QUALITY CLASS: ---		
DR STATUS: DD / SCALE: 1:3 / PT STATUS: DD	DOCUMENT TYPE: ---		
THIRD ANGLE PROJECTION	FORMAT: A3 / PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676 / SHEET: 40 / N°OF SHEETS: 45	REVISION: --C

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

No.	Name	Material	QUANTITY	REMARKS
19-1	B4C-STOPPER-01	SS316L	4	
19-2	B4C-STOPPER-02	SS316L	2	
19-3	B4C-STOPPER-03	SS316L	1	
19-4	B4C-STOPPER-04	SS316L	2	
20	RIGHT-TRNSMISSION-TUBE-RECEIVER	SS316L	6	



t10



Scale 1:3

NOTE

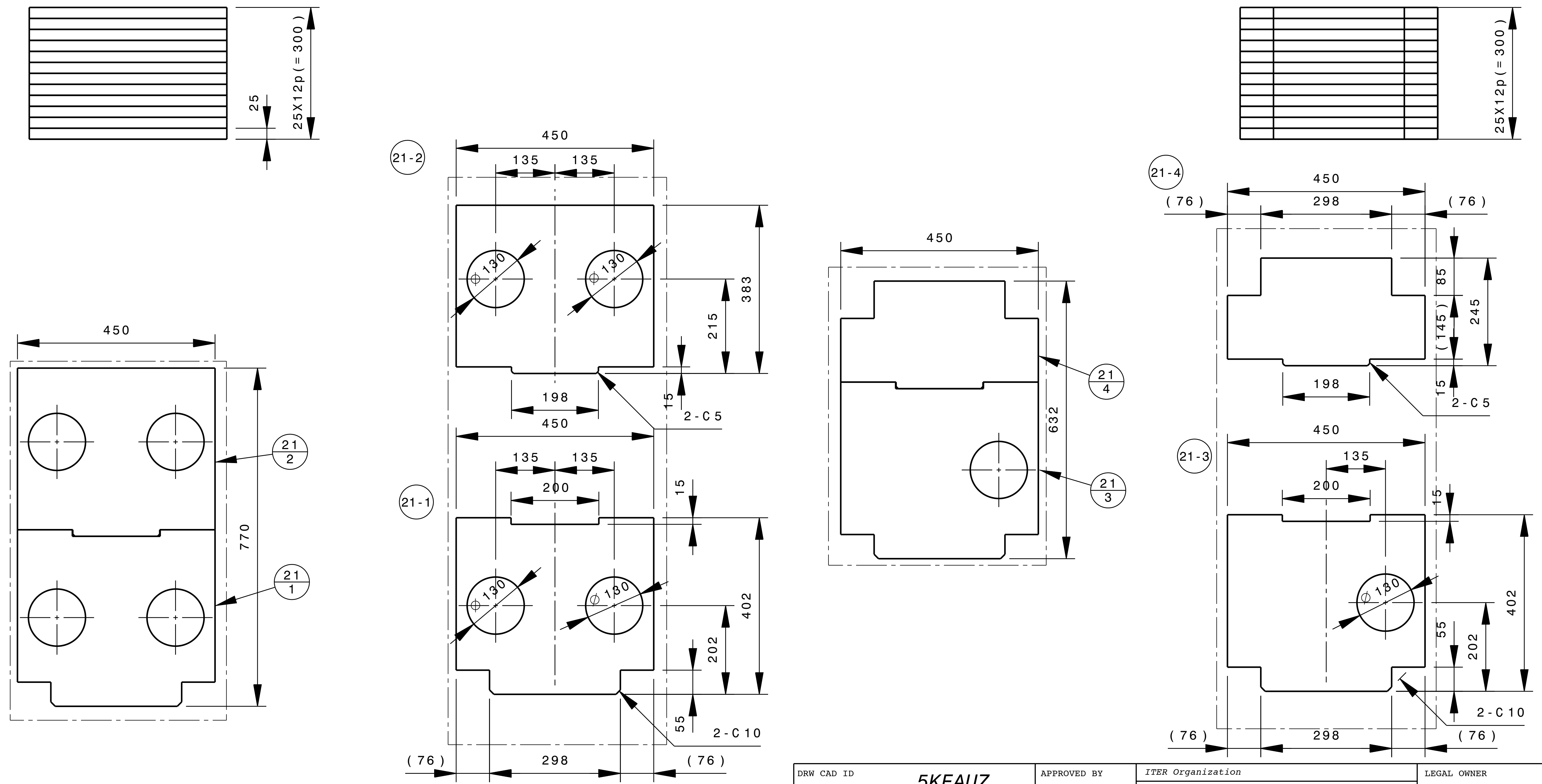
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

DRW CAD ID	5KFAUZ
LINKED EV5 PT ID	5KF8XZ
LINKED 3D ID	5KF92K
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	04 Apr 23
PT MATURITY	DD
PT VERSION	--C
DR STATUS	DD
SCALE	1:10
PT STATUS	DD
THIRD ANGLE PROJECTION	
APPROVED BY	IOKIK
TECHNICAL REF	---
DRAWN BY	---
SAFETY CLASS	---
QUALITY CLASS	---
ITER Organization	-
LEGAL OWNER	iter china EU india japan korea russia USA
DRAWING TITLE	C6_EP10_IS_MIRROR_BOX SHIELDING_BLOCK_STOPPER 3rd TITLE LINE - CATIA PARAMETER
DOCUMENT TYPE	---
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015676
SHEET	41
N°OF SHEETS	45
REVISION	--C

General Tolerance: ISO 2768mk

No.	Name	Material	QUANTITY	REMARKS
21-1	NEUTRON-SHIELDING-BLOCK-01	B4C	2set	
21-2	NEUTRON-SHIELDING-BLOCK-02	B4C	2set	
21-3	NEUTRON-SHIELDING-BLOCK-03	B4C	1set	
21-4	NEUTRON-SHIELDING-BLOCK-04	B4C	1set	



NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

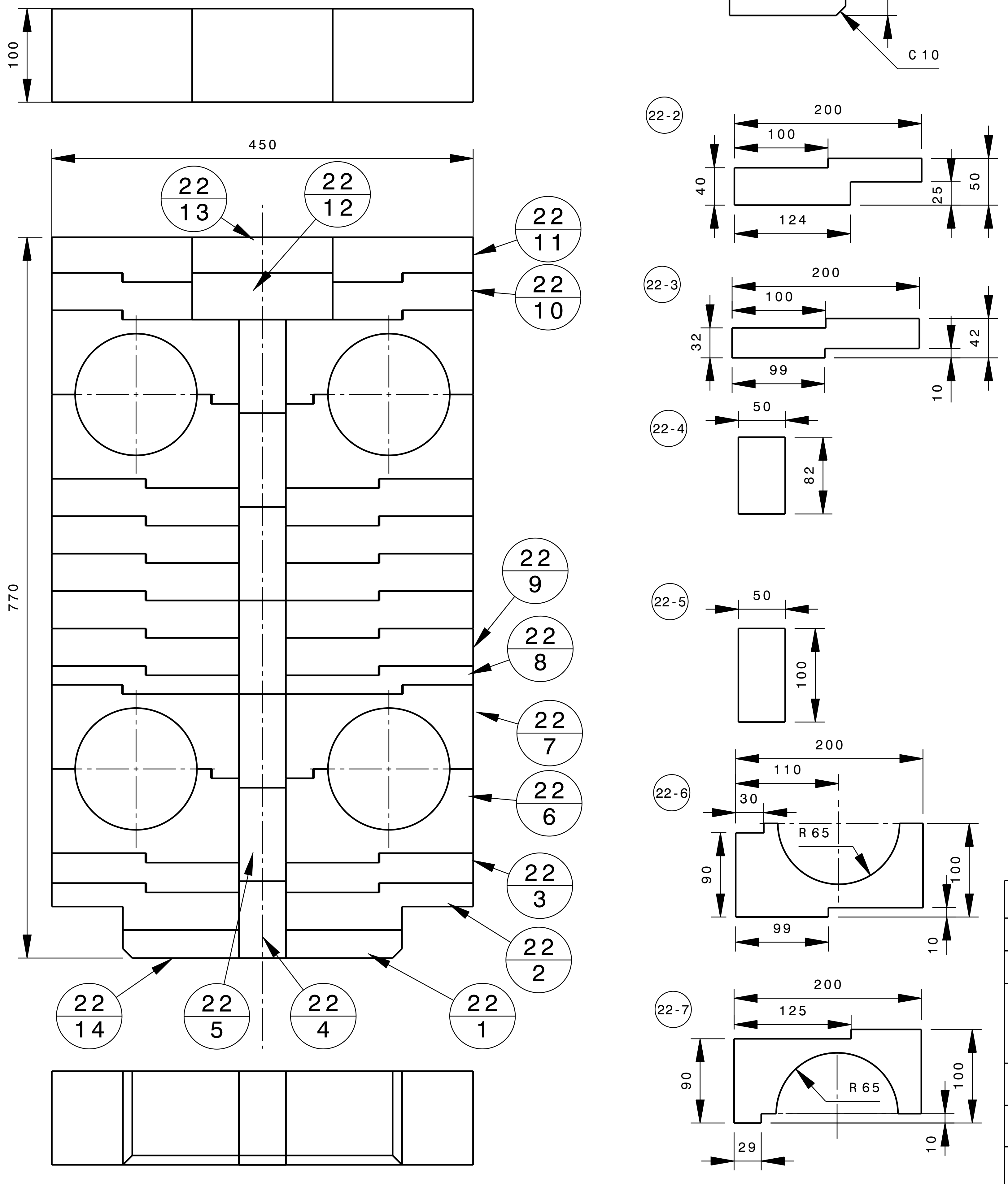
2.After processing,perform degreasing cleaning

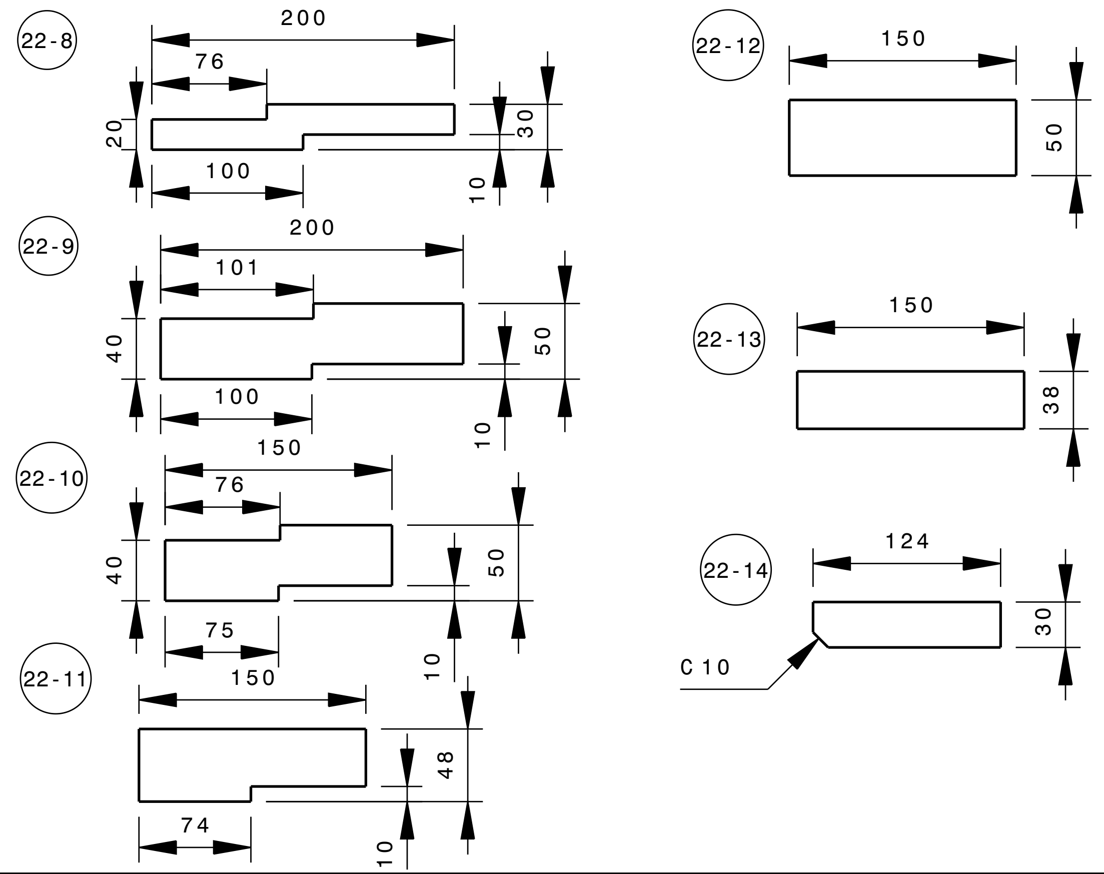
DRW CAD ID 5KFAUZ	APPROVED BY IOKIK	ITER Organization - When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	LEGAL OWNER iter china EU india japan korea russia USA
LINKED EV5 PT ID 5KF8XZ	TECHNICAL REF ---		
LINKED 3D ID 5KF92K			
PBS TITLE Diagnostics Poloidal Polarimeter PoPola Eq system A	DRAWN BY ---	DRAWING TITLE C6_EP10_IS_MIRROR_BOX NEUTRON_SHIELDING_BLOCK 3rd TITLE LINE - CATIA PARAMETER	
DATE OF ISSUE 04 Apr 23 / PT MATURITY DD / PT VERSION --C	SAFETY CLASS ---		
DR STATUS DD / SCALE 1:10 / PT STATUS DD	QUALITY CLASS ---	DOCUMENT TYPE ---	
THIRD ANGLE PROJECTION	FORMAT A3 / PBS NUMBER 55 C6 EA	DRAWING NUMBER 015676 / SHEET 42 / N°OF SHEETS 45	REVISION --C

Spacereservation for the banner

22

General Tolerance: ISO 2768mk
Create 2sets

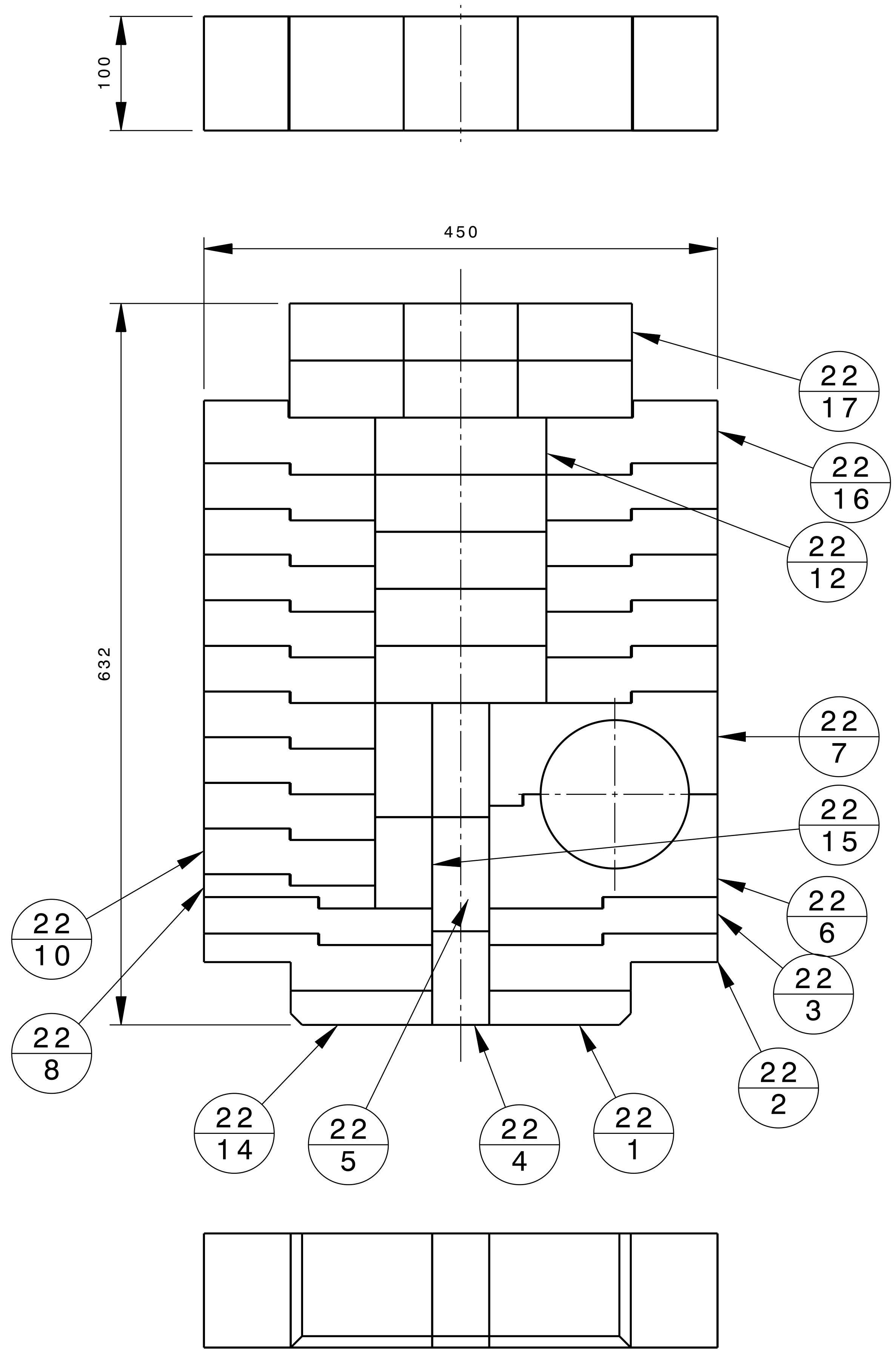


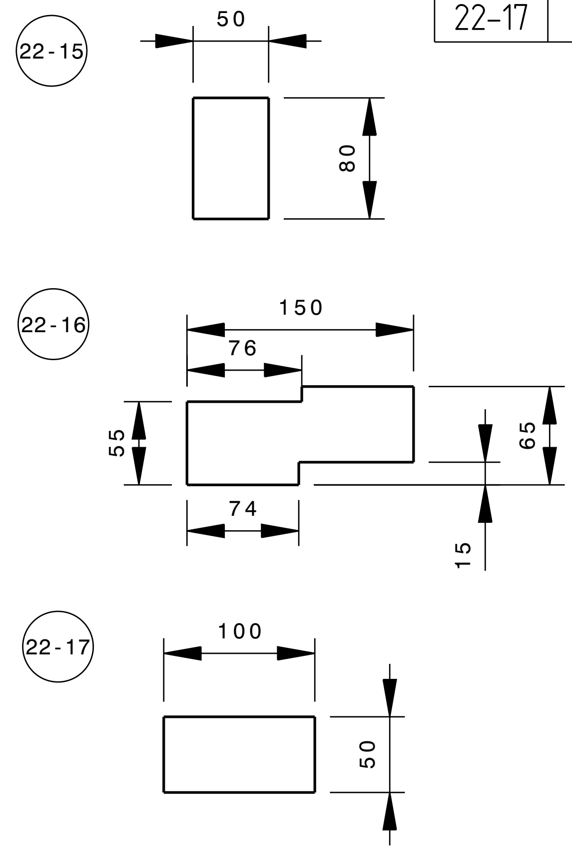


No.	Name	Material	QUANTITY	REMARKS
22-1	GAMMA-RAY-SHIELDING-BLOCK-01	Pb	1	
22-2	GAMMA-RAY-SHIELDING-BLOCK-02	Pb	2	
22-3	GAMMA-RAY-SHIELDING-BLOCK-03	Pb	2	
22-4	GAMMA-RAY-SHIELDING-BLOCK-04	Pb	1	
22-5	GAMMA-RAY-SHIELDING-BLOCK-05	Pb	6	
22-6	GAMMA-RAY-SHIELDING-BLOCK-06	Pb	4	
22-7	GAMMA-RAY-SHIELDING-BLOCK-07	Pb	4	
22-8	GAMMA-RAY-SHIELDING-BLOCK-08	Pb	2	
22-9	GAMMA-RAY-SHIELDING-BLOCK-09	Pb	10	
22-10	GAMMA-RAY-SHIELDING-BLOCK-10	Pb	2	
22-11	GAMMA-RAY-SHIELDING-BLOCK-11	Pb	2	
22-12	GAMMA-RAY-SHIELDING-BLOCK-12	Pb	1	
22-13	GAMMA-RAY-SHIELDING-BLOCK-13	Pb	1	
22-14	GAMMA-RAY-SHIELDING-BLOCK-14	Pb	1	

DRW CAD ID: 5KFAUZ	APPROVED BY: IOKIK	ITER Organization	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	
LINKED 3D ID: 5KF92K	DRAWN BY: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX GAMMA_RAY_SHIELDING_BLOCK 1/2 3rd TITLE LINE - CATIA PARAMETER	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---		
DATE OF ISSUE: 04 Apr 23; PT MATURITY: DD; PT VERSION: --C	QUALITY CLASS: ---	DOCUMENT TYPE: ---	
DR STATUS: DD; SCALE: 1:5; PT STATUS: DD			
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015676; SHEET: 43; N°OF SHEETS: 45; REVISION: --C

General Tolerance: ISO 2768mk
Create 1sets



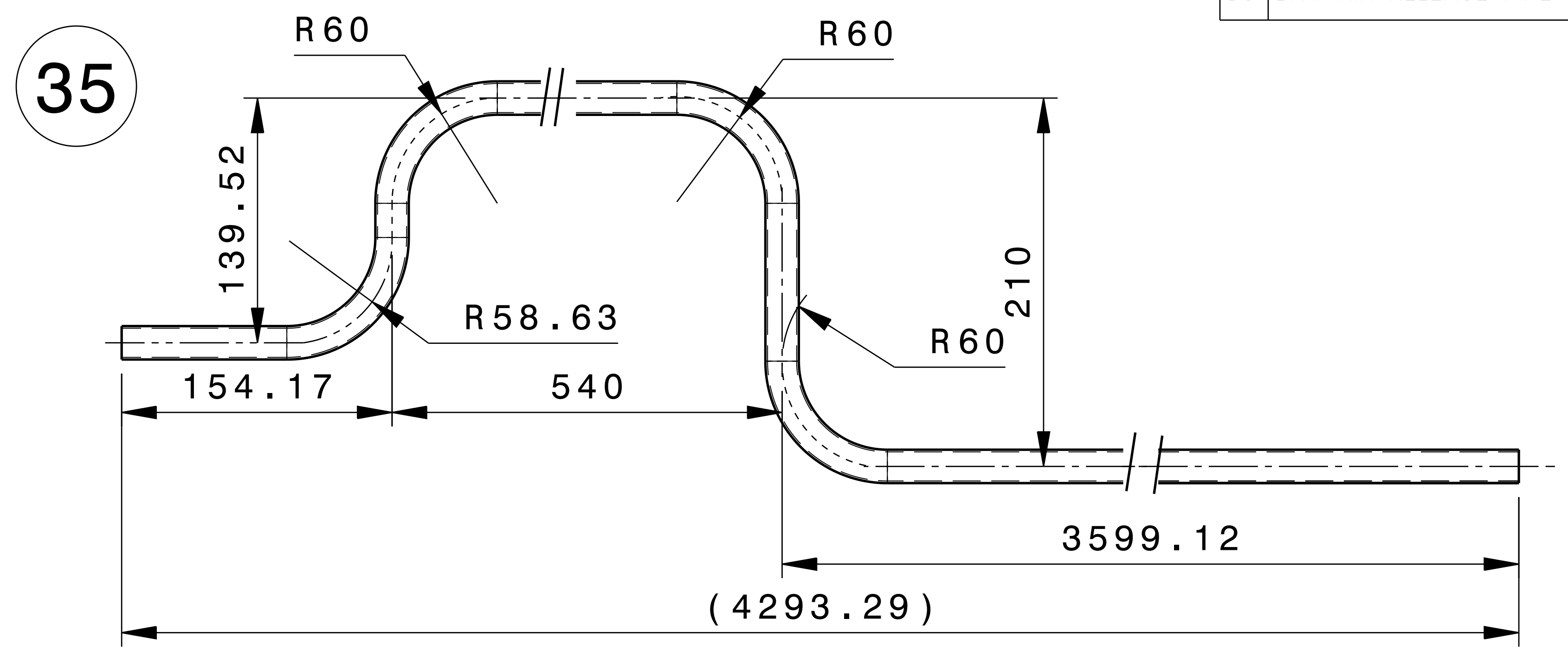


No.	Name	Material	QUANTITY	REMARKS
22-1	GAMMA-RAY-SHIELDING-BLOCK-01	Pb	1	
22-2	GAMMA-RAY-SHIELDING-BLOCK-02	Pb	2	
22-3	GAMMA-RAY-SHIELDING-BLOCK-03	Pb	2	
22-4	GAMMA-RAY-SHIELDING-BLOCK-04	Pb	1	
22-5	GAMMA-RAY-SHIELDING-BLOCK-05	Pb	2	
22-6	GAMMA-RAY-SHIELDING-BLOCK-06	Pb	1	
22-7	GAMMA-RAY-SHIELDING-BLOCK-07	Pb	1	
22-8	GAMMA-RAY-SHIELDING-BLOCK-08	Pb	1	
22-10	GAMMA-RAY-SHIELDING-BLOCK-10	Pb	14	
22-12	GAMMA-RAY-SHIELDING-BLOCK-12	Pb	5	
22-14	GAMMA-RAY-SHIELDING-BLOCK-14	Pb	1	
22-15	GAMMA-RAY-SHIELDING-BLOCK-15	Pb	1	
22-16	GAMMA-RAY-SHIELDING-BLOCK-16	Pb	10	
22-17	GAMMA-RAY-SHIELDING-BLOCK-17	Pb	6	

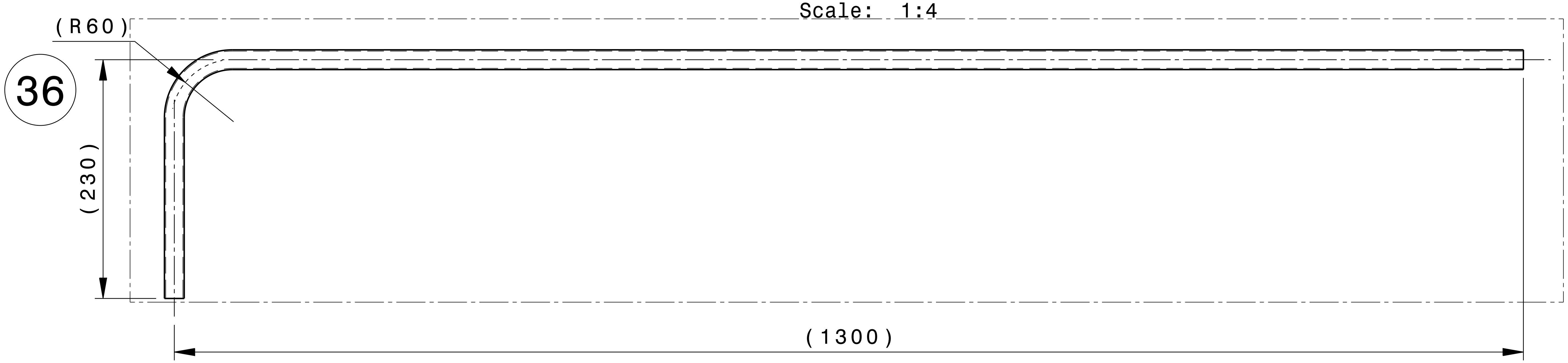
DRW CAD ID	5KFAUZ
LINKED EV5 PT ID	5KF8XZ
LINKED 3D ID	5KF92K
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	04 Apr 23
PT MATURITY	DD
PT VERSION	--C
DR STATUS	DD
SCALE	1:5
PT STATUS	DD
THIRD ANGLE PROJECTION	
APPROVED BY	IOKIK
TECHNICAL REF	---
DRAWN BY	---
SAFETY CLASS	---
QUALITY CLASS	---
ITER Organization	-
LEGAL OWNER	iter china EU india japan korea russia USA
DRAWING TITLE	C6_EP10_IS_MIRROR_BOX GAMMA_RAY_SHIELDING_BLOCK 2/2 3rd TITLE LINE - CATIA PARAMETER
DOCUMENT TYPE	---
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015676
SHEET	44
N°OF SHEETS	45
REVISION	--C

Spacereservation for the banner

No.	Name	Material	QUANTITY	REMARKS
35	DRY-AIR-RELEASE-PIPE-01	SS316L	1	
36	DRY-AIR-RELEASE-PIPE-02	SS316L	2	



TOP VIEW
Scale: 1:4



NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs.

2.After processing,perform degreasing cleaning

DRW CAD ID: 5KFAUZ			APPROVED BY: IOKIK	ITER Organization	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KF8XZ			TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	
LINKED 3D ID: 5KF92K			DRAWN BY: ---		
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A			SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_IS_MIRROR_BOX DRY-AIR-RELEASE-PIPE 3rd TITLE LINE - CATIA PARAMETER	
DATE OF ISSUE: 04 Apr 23	PT MATURITY: DD	PT VERSION: --C	QUALITY CLASS: ---		
DR STATUS: DD	SCALE: 1:4	PT STATUS: DD		DOCUMENT TYPE: ---	
THIRD ANGLE PROJECTION			FORMAT: A3	PBS NUMBER: 55 C6 EA; DRAWING NUMBER: 015676	SHEET: 45; N°OF SHEETS: 45; REVISION: --C

Spacereservation for the banner

REV No.	DETAILS OF MODIFICATION	SHEET No.	GRID REF	DATE	DCR No.
--B	Change the shape of bellows	2~3	---	22.03.23	---
--A	Change the length of piping and add bracket assy	2~4	---	18.04.22	---

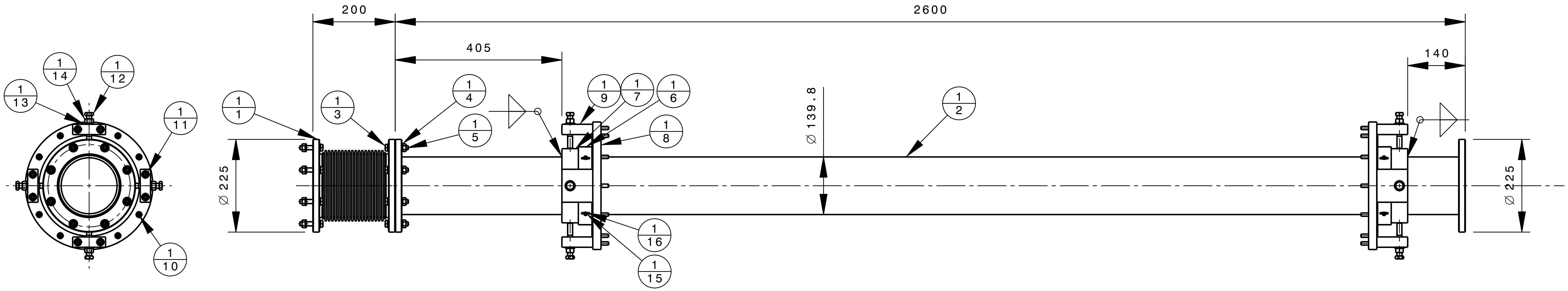
DRW CAD ID	5KJPQB
LINKED EV5 PT ID	5KJNSJ
LINKED 3D ID	5KJNWG
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE	22 Nov 23
PT MATURITY	DD
PT VERSION	--B
DR STATUS	DD
SCALE	1:1
PT STATUS	DD
APPROVED BY	BELOGLS
TECHNICAL REF	---
DRAWN BY	YUS2
SAFETY CLASS	---
QUALITY CLASS	---
ITER Organization	-
LEGAL OWNER	iter china EU india japan korea russia USA
DRAWING TITLE	C6_EP10_TRANS_PIPE_BIO_SHIELD
DOCUMENT TYPE	Assembly Drawing
FORMAT	A3
PBS NUMBER	55 C6 EA
DRAWING NUMBER	015682
SHEET	01
N°OF SHEETS	04
REVISION	--B

THIRD ANGLE PROJECTION

When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.

No.	Name	Material	QUANTITY	REMARKS
1-11	CYLIDER-HEAD-SCREW-M10X80	SS316	16	
1-12	CYLIDER-HEAD-SCREW-M12X80	SS316	8	
1-13	WASHER-M12	SS316	8	
1-14	HEXAGON-NUT-M12	SS316	8	
1-15	CYLINDER-HEAD-SCREW-M4X16	SS316	16	
1-16	WASHER-M4	SS316	16	

No.	Name	Material	QUANTITY	REMARKS
01	IS-CHORD		9Set	Sheet1
1-1	BELLOWS	SS316L	9	Sheet2
1-2	OPT-TRANS-PIPE-2600	SS316L	9	
1-3	HEXAGON-BOLT-M10X50	SS316	16	
1-4	WASHER-M10	SS316	32	
1-5	HEXAGON-NUT-M12	SS316	16	
1-6	BOLT-MOUNTING-PARTS-01	SS316L	36	
1-7	BOLT-MOUNTING-PARTS-02	SS316L	18	
1-8	BASE-FLANGE	SS316L	18	
1-9	BRACKET	SS316L	18	
1-10	CYLIDER-HEAD-SCREW-M8X30	SS316	24	



Chord ID	Functional Reference No.
E1	55C6EA-PI-1200
E2	55C6EA-PI-2200
E3	55C6EA-PI-3200
E4	55C6EB-PI-4200
E5	55C6EA-PI-5200
E6	55C6EA-PI-6200
E7	55C6EA-PI-7200
E8	55C6EB-PI-8200
E9	55C6EA-PI-9200

DRW CAD ID 5KJPQB
LINKED EV5 PT ID 5KJNSJ
LINKED 3D ID 5KJNWG
PBS TITLE
Diagnostics
Poloidal Polarimeter
PoPola Eq system A
DATE OF ISSUE 22 Nov 23 | PT MATURITY DD | PT VERSION --B
DR STATUS DD | SCALE 1:10 | PT STATUS DD
THIRD ANGLE PROJECTION

APPROVED BY BELOGLS
TECHNICAL REF ---
DRAWN BY YUS2
SAFETY CLASS ---
QUALITY CLASS ---

ITER Organization
-

LEGAL OWNER
iter
china EU india japan korea russia USA

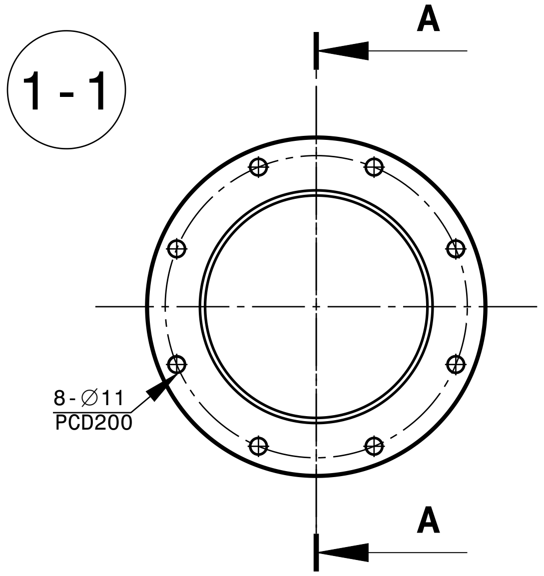
DRAWING TITLE
C6_EP10_TRANS_PIPE_BIO_SHIELD
IS_CHORD 1/3

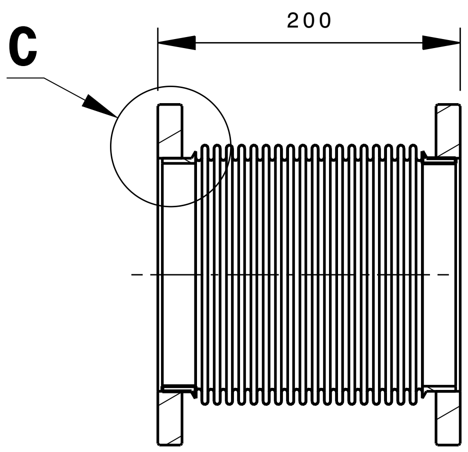
DOCUMENT TYPE
Assembly Drawing

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015682	02	04	--B

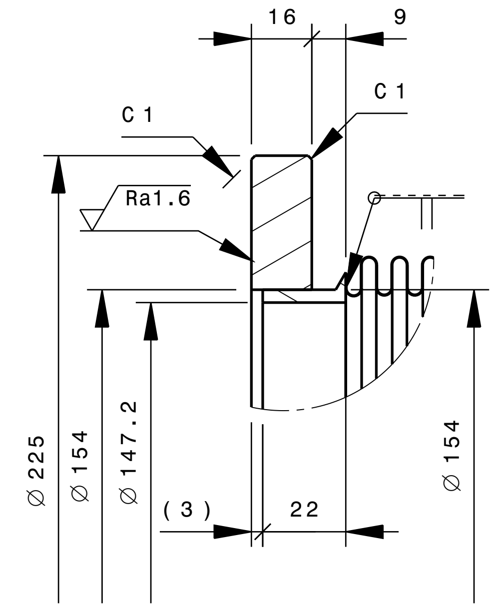
General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
1-1	BELLOWS	SS316L	9	Sheet2
1-2	OPT-TRANS-PIPE-2600	SS316L	9	

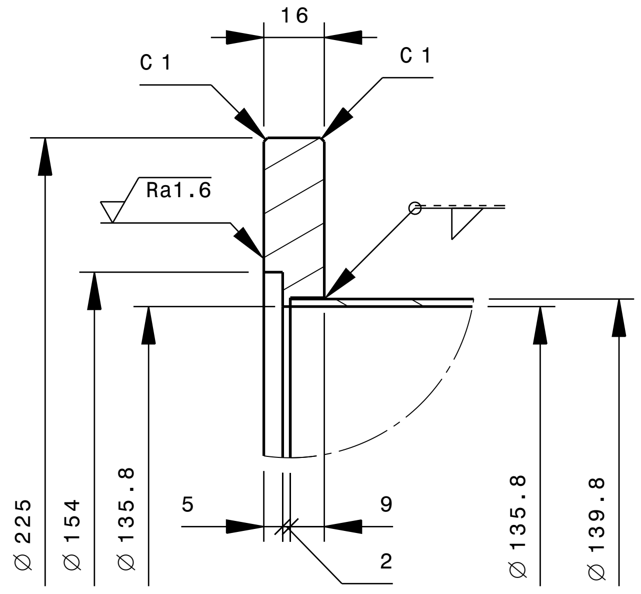




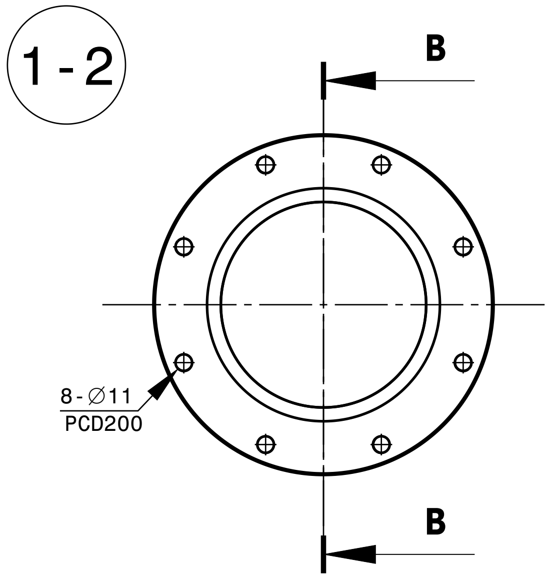
SECTION VIEW A-A

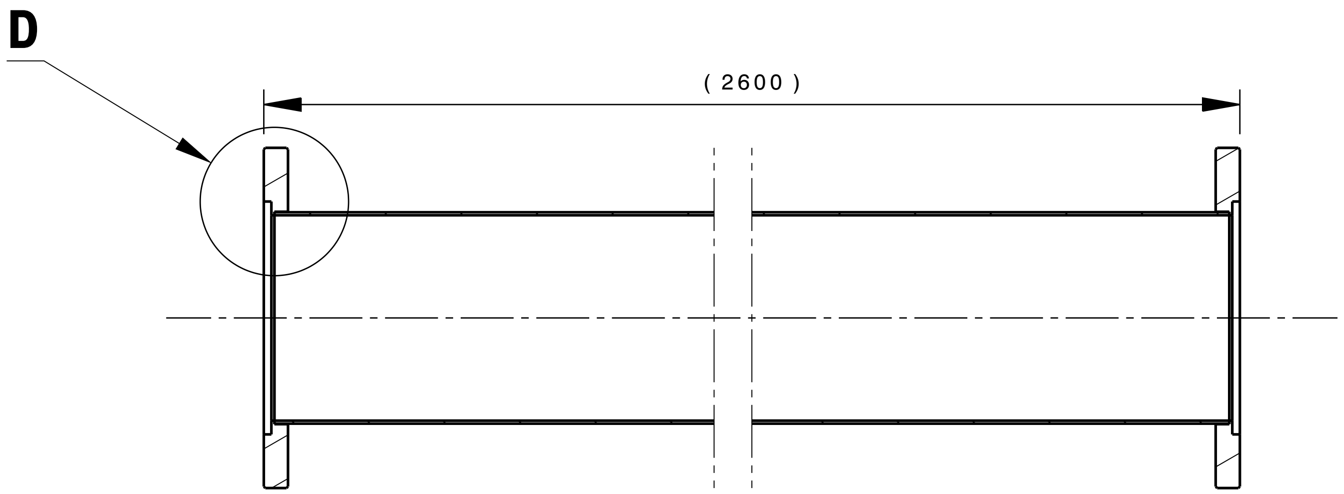


DETAIL C
Scale: 1:2



DETAIL D
Scale: 1:2





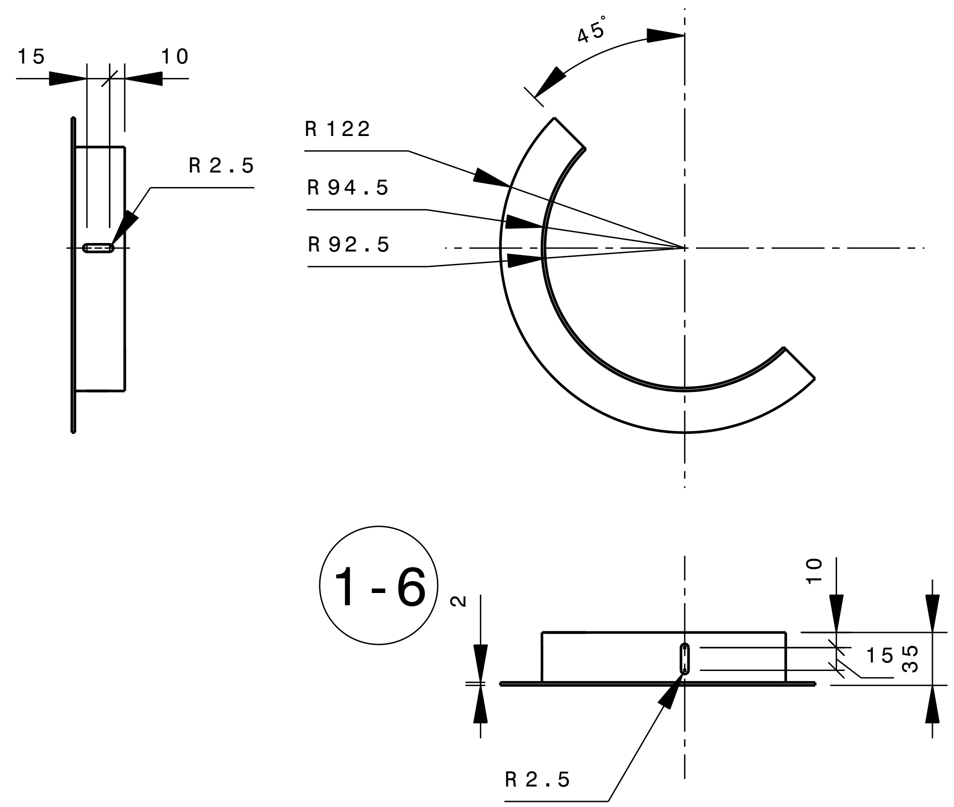
SECTION VIEW B-B

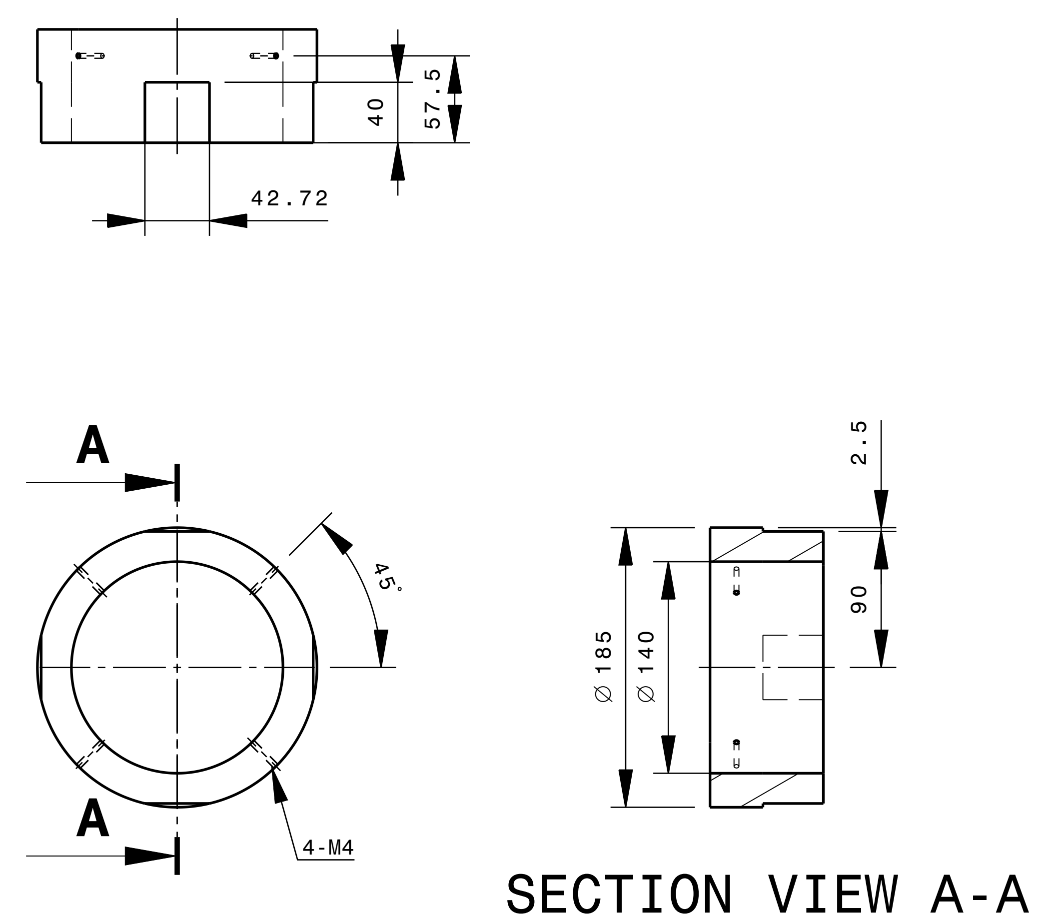
NOTE

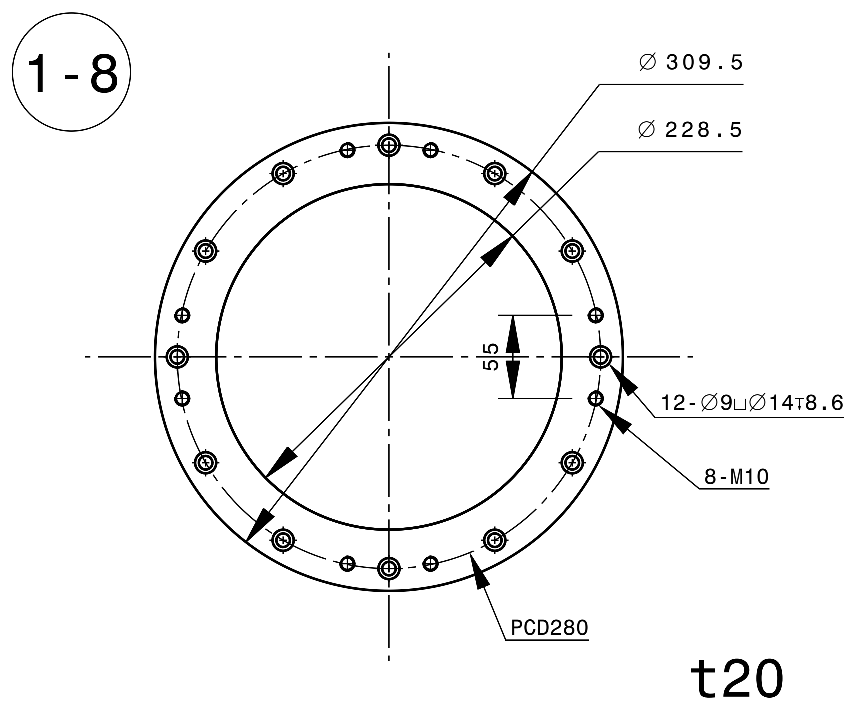
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs
2.After processing,perform degreasing cleaning

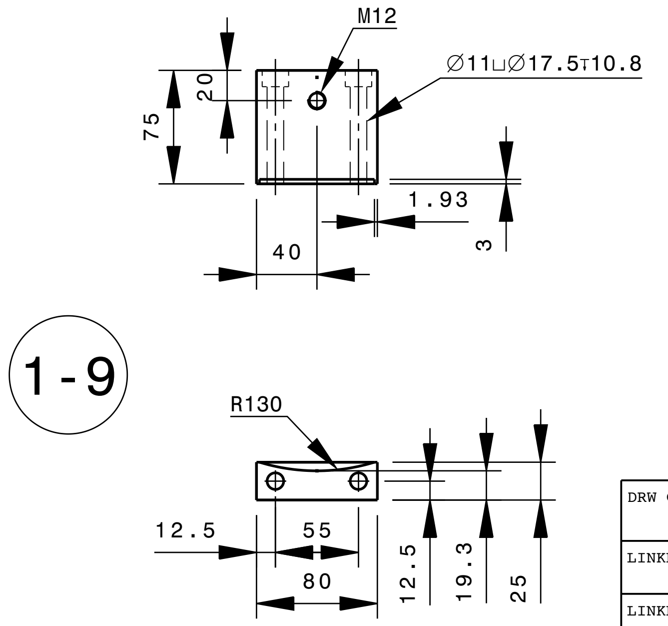
DRW CAD ID: 5KJPQB	APPROVED BY: BELOGLS	ITER Organization	LEGAL OWNER: iter china EU india japan korea russia USA	
LINKED EV5 PT ID: 5KJNSJ	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.		
LINKED 3D ID: 5KJNWG	DRAWN BY: YUS2			
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DRAWING TITLE: C6_EP10_TRANS_PIPE_BIO_SHIELD IS_CHORD 2/3		
DATE OF ISSUE: 22 Nov 23 / PT MATURITY: DD / PT VERSION: --B	QUALITY CLASS: ---			
DR STATUS: DD / SCALE: 1:5 / PT STATUS: DD		DOCUMENT TYPE: Assembly Drawing		
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015682 / SHEET: 03 / N°OF SHEETS: 04	REVISION: --B

No.	Name	Material	QUANTITY	REMARKS
1-6	BOLT-MOUNTING-PARTS-01	SS316L	36	
1-7	BOLT-MOUNTING-PARTS-02	SS316L	18	
1-8	BASE-FLANGE	SS316L	18	
1-9	BRACKET	SS316L	18	









DRW CAD ID	5KJPQB	APPROVED BY	BELOGLS
LINKED EV5 PT ID	5KJNSJ	TECHNICAL REF	---
LINKED 3D ID	5KJNWG	DRAWN BY	YUS2
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS	---
DATE OF ISSUE: 22 Nov 23	PT MATURITY: DD	PT VERSION: --B	QUALITY CLASS: ---
DR STATUS: DD	SCALE: 1:5	PT STATUS: DD	

ITER Organization

-

When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.

LEGAL OWNER

china EU india japan korea russia USA

DRAWING TITLE: C6_EP10_TRANS_PIPE_BIO_SHIELD IS_CHORD 3/3

DOCUMENT TYPE: Assembly Drawing

THIRD ANGLE PROJECTION

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015682	04	04	--B

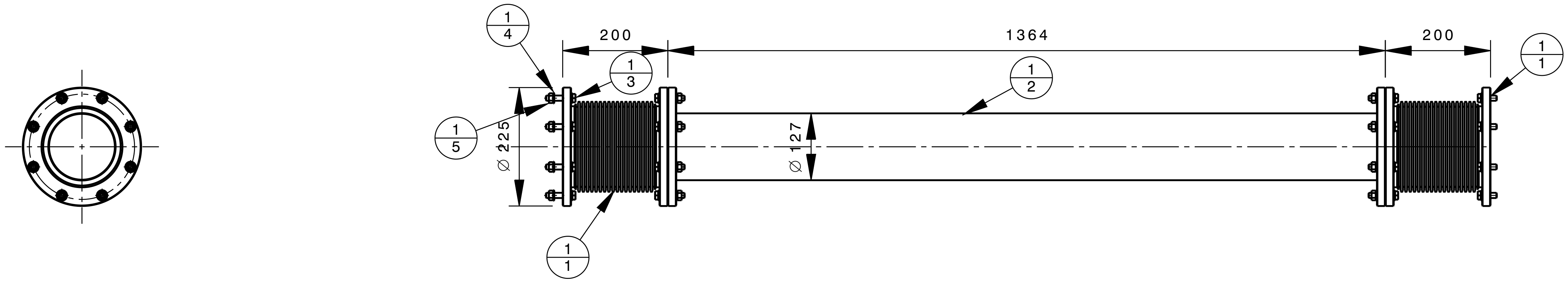
REV No.	DETAILS OF MODIFICATION	SHEET No.	GRID REF	DATE	DCR No.
--B	Change the shape of bellows	2~3	---	22.03.23	---
--A	Length of DUCT is changed	2~3	---	13.04.22	---

REV No.	DETAILS OF MODIFICATION	SHEET No.	GRID REF	DATE	DCR No.

DRW CAD ID: 5KJQ6U	APPROVED BY: BELOGLS	ITER Organization	LEGAL OWNER
LINKED EV5 PT ID: 5KJNT2	TECHNICAL REF: ---	- When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	iter china EU india japan korea russia USA
LINKED 3D ID: 5KJNXY	DRAWN BY: YUS2	DRAWING TITLE: C6_EP10_TRANSITION_PIPE_PCSS PCSS_CHORD_B 1/2 3rd TITLE LINE - CATIA PARAMETER	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	DOCUMENT TYPE: Assembly Drawing	
DATE OF ISSUE: 19 Jul 23; PT MATURITY: DD; PT VERSION: --B	QUALITY CLASS: ---		
DR STATUS: DD; SCALE: 1:1; PT STATUS: DD			
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA; DRAWING NUMBER: 015684; SHEET: 01	N°OF SHEETS: 03; REVISION: --B

Spacereservation for the banner

No.	Name	Material	QUANTITY	REMARKS
01	PCSS-CHORD		9Set	Sheet2
1-1	BELLOWS	SS316L	18	Sheet3
1-2	DUCT-L1364	SS304	9	
1-3	HEXAGON-BOLT-M10X50	SS304	32	
1-4	WASHER-M10	SS304	64	
1-5	HEXAGON-NUT-M12	SS304	24	



Chord ID	Functional Reference No.
E1	55C6EA-PI-1306
E2	55C6EA-PI-2306
E3	55C6EA-PI-3306
E4	55C6EB-PI-4306
E5	55C6EA-PI-5306
E6	55C6EA-PI-6306
E7	55C6EA-PI-7306
E8	55C6EB-PI-8306
E9	55C6EA-PI-9306

DRW CAD ID: 5KJQ6U
LINKED EV5 PT ID: 5KJNT2
LINKED 3D ID: 5KJNXY
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A
DATE OF ISSUE: 19 Jul 23 | PT MATURITY: DD | PT VERSION: --B
DR STATUS: DD | SCALE: 1:10 | PT STATUS: DD
THIRD ANGLE PROJECTION

APPROVED BY: BELOGLS
TECHNICAL REF: ---
DRAWN BY: YUS2
SAFETY CLASS: ---
QUALITY CLASS: ---

ITER Organization
-

LEGAL OWNER
iter china EU india japan korea russia USA

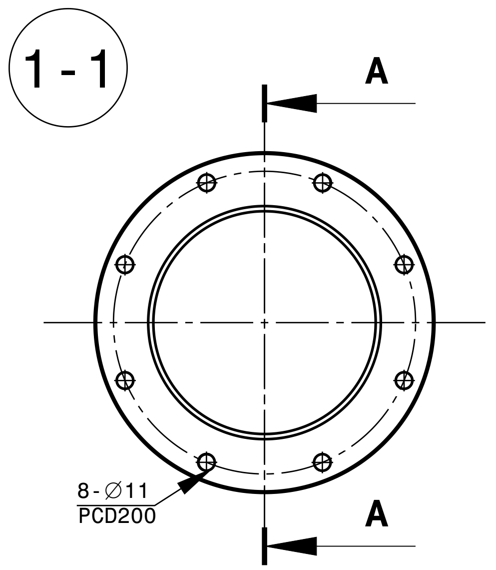
DRAWING TITLE: C6_EP10_TRANSITION_PIPE_PCSS
PCSS_CHORD_B 1/2
3rd TITLE LINE - CATIA PARAMETER

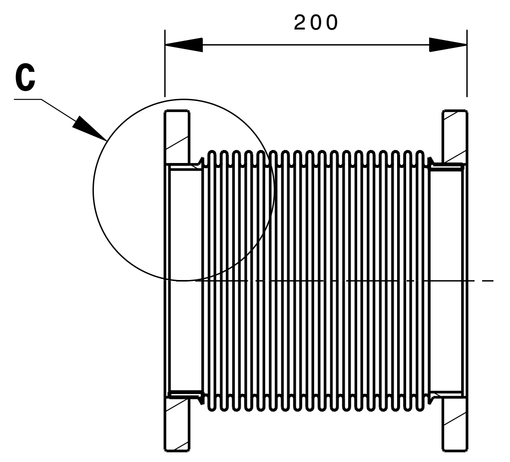
DOCUMENT TYPE: Assembly Drawing

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015684	02	03	--B

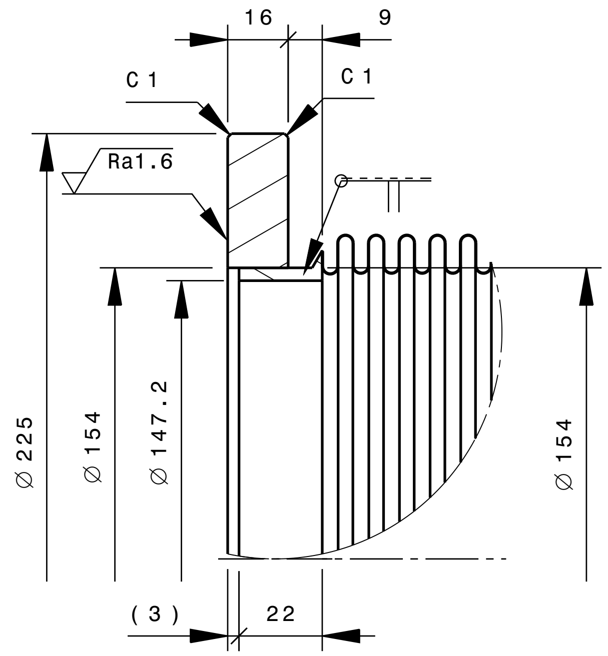
General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra6.3

No.	Name	Material	QUANTITY	REMARKS
1-1	BELLOWS	SS316L	18	Sheet2
1-2	DUCT-L1364	SS304	9	

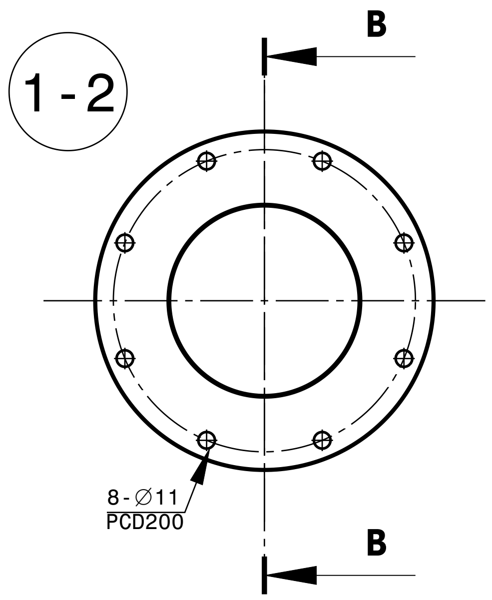


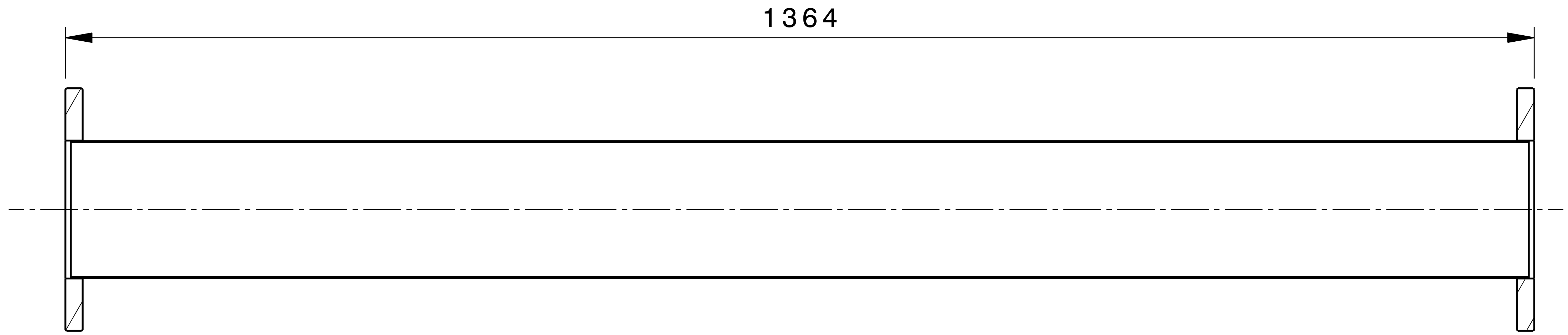


SECTION VIEW A-A



DETAIL C
Scale: 1:2





SECTION VIEW B-B

NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs
2.After processing,perform degreasing cleaning

DRW CAD ID	5KJQ6U	APPROVED BY	BELOGLS
LINKED EV5 PT ID	5KJNT2	TECHNICAL REF	---
LINKED 3D ID	5KJNXY	DRAWN BY	YUS2
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS	---
DATE OF ISSUE	19 Jul 23	QUALITY CLASS	---
PT MATURITY	DD	PT VERSION	--B
DR STATUS	DD	SCALE	1:5
PT STATUS	DD		

THIRD ANGLE PROJECTION

ITER Organization
-
When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.

LEGAL OWNER: iter china EU india japan korea russia USA

DRAWING TITLE
C6_EP10_TRANSITION_PIPE_PCSS
PCSS_CHORD_B 2/2
3rd TITLE LINE - CATIA PARAMETER

DOCUMENT TYPE
Assembly Drawing

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015684	03	03	--B

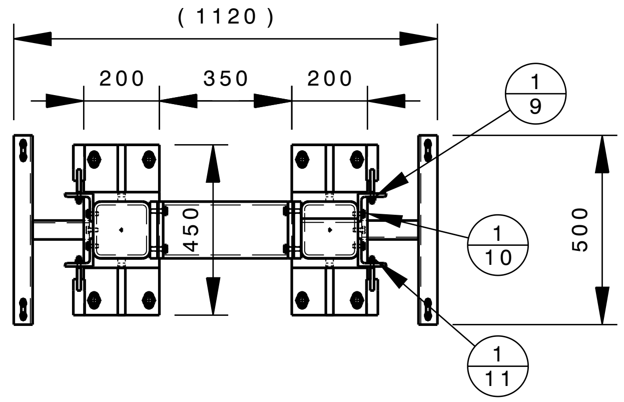
REV No.	DETAILS OF MODIFICATION	SHEET No.	GRID REF	DATE	DCR No.
--B	Change the shape of the pillar and add connecting rod	2~3	---	19.04.22	---
--A	A shape of gusset plates of item 1-1 is changed	2~3	---	29.03.22	---

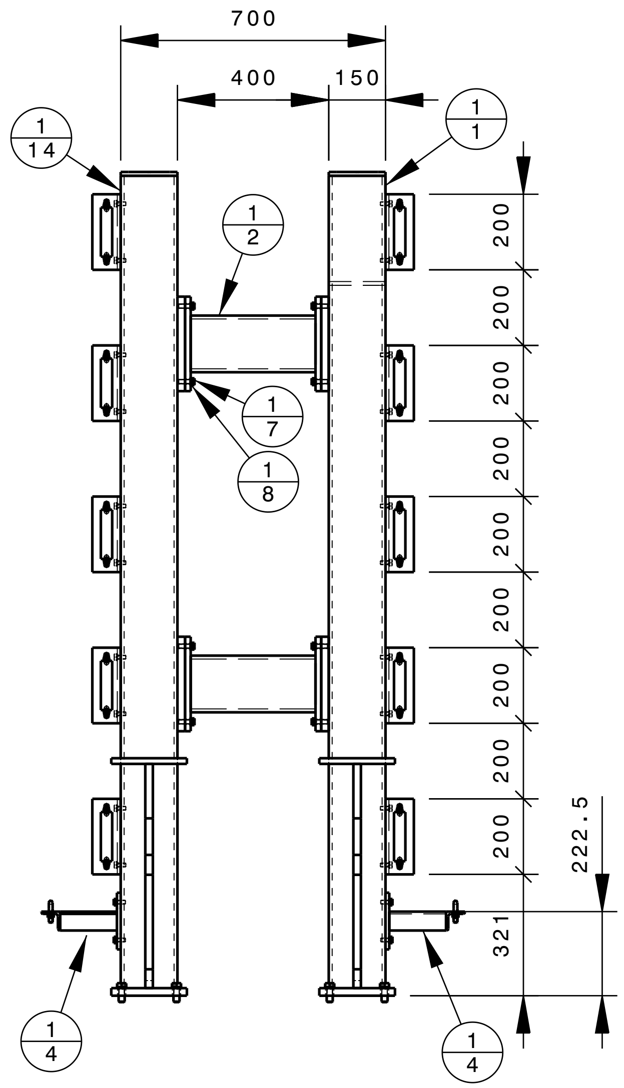
DRW CAD ID: 5KK55N	APPROVED BY: IOKIK	ITER Organization: -	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KK53M	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	
LINKED 3D ID: ------	DRAWN BY: MUKAER	DRAWING TITLE: C6_EP10_DUCT_SUPPORT	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---		
DATE OF ISSUE: 13 Apr 22; PT MATURITY: DD; PT VERSION: --B	QUALITY CLASS: ---	DOCUMENT TYPE: Assembly or Installation Drawing	
DR STATUS: W; SCALE: 1:1; PT STATUS: W			
THIRD ANGLE PROJECTION	FORMAT: A3	PBS NUMBER: 55 C6 EA; DRAWING NUMBER: 015688	SHEET: 01; N°OF SHEETS: 04; REVISION: --B

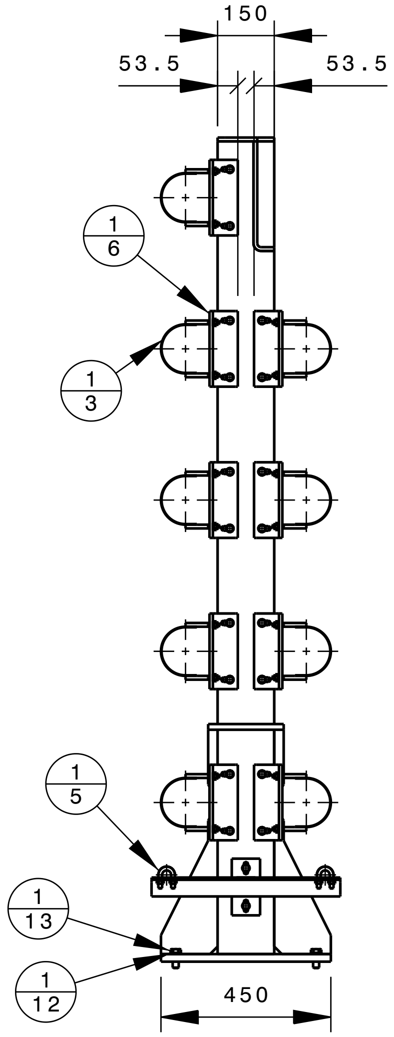
REV No.	DETAILS OF MODIFICATION	SHEET No.	GRID REF	DATE	DCR No.

Spacereservation for the banner

Spacereservation for the banner







No.	Name	Material	8	REMARKS
01	DUCT-SUPPORT		1set	Sheet2
1-1	PILLAR-01	SS304L	1	Sheet3
1-2	CONNECTING-ROD	SS304	2	
1-3	DUCT-BAND	SS304	18	Sheet4
1-4	DRY-AIR-PIPE-SUPPORT	SS304L	2	
1-5	U-BOLT-15A	SS304L	4	
1-6	ANGLE-SUPPORT	SS304	18	
1-7	HEXAGON-BOLT-M12X35	SS304	16	
1-8	M12-WASHER	SS304	16	
1-9	M10-WASHER	SS304	84	
1-10	HEXAGON-BOLT-M10X25	SS316	38	
1-11	HEXAGON-NUT-M10	SS304	44	
1-12	M16-WASHER	SS304	8	
1-13	HEXAGON-BOLT-M16X40	SS304	8	
1-14	PILLAR-02	SS304L	1	

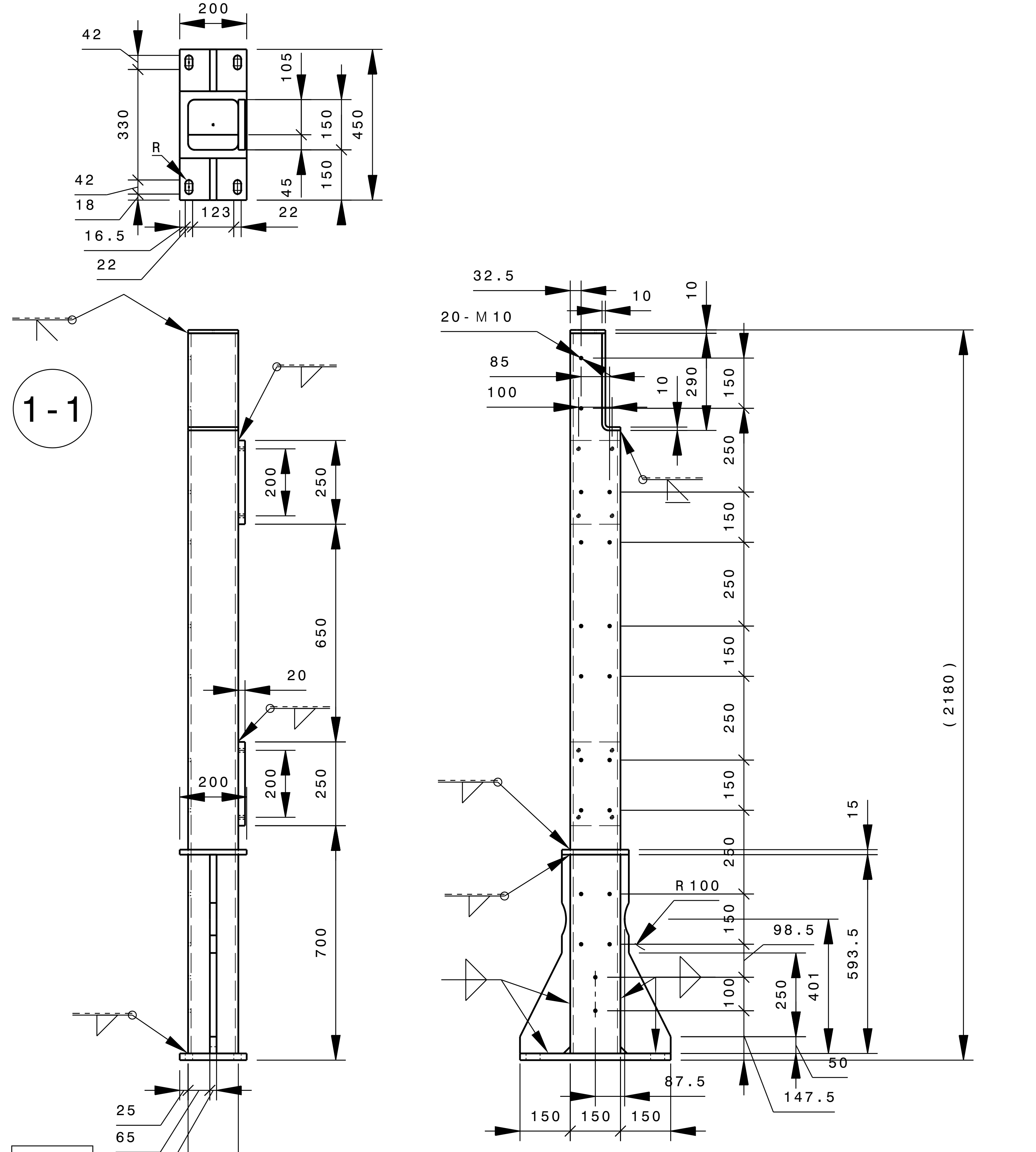
NOTE

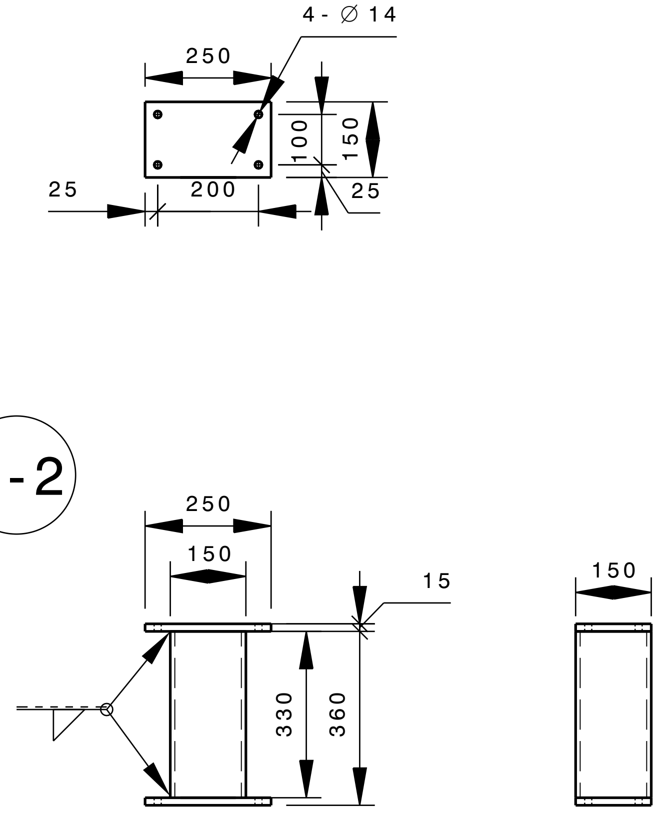
Functionla reference number is 55C6EA-ZJ-0301

DRW CAD ID: 5KK55N	APPROVED BY: IOKIK	ITER Organization	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KK53M	TECHNICAL REF: ---	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	
LINKED 3D ID: ------	DRAWN BY: MUKAER	DRAWING TITLE: C6_EP10_DUCT_SUPPORT DUCT_SUPPORT 1/3 3rd TITLE LINE - CATIA PARAMETER	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---		
DATE OF ISSUE: 13 Apr 22 / PT MATURITY: DD / PT VERSION: --B	QUALITY CLASS: ---	DOCUMENT TYPE: Assembly or Installation Drawing	
DR STATUS: W / SCALE: 1:20 / PT STATUS: W	FORMAT: A3 / PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015688 / SHEET: 02	N°OF SHEETS: 04 / REVISION: --B
THIRD ANGLE PROJECTION			

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

No.	Name	Material	8	REMARKS
1-1	PILLAR-01	SS304L	1	Sheet3
1-2	CONNECTING-ROD	SS304	2	





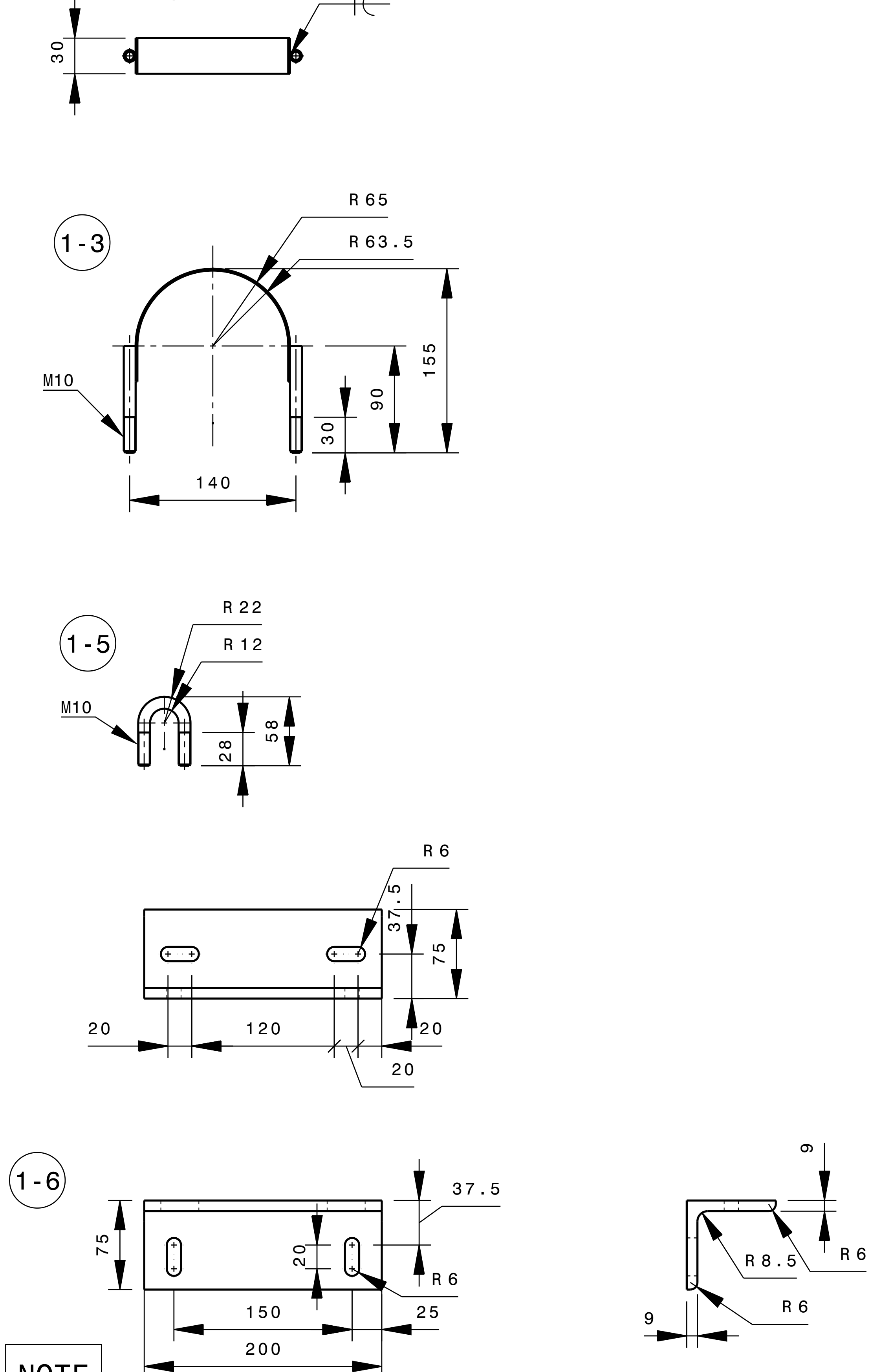
NOTE

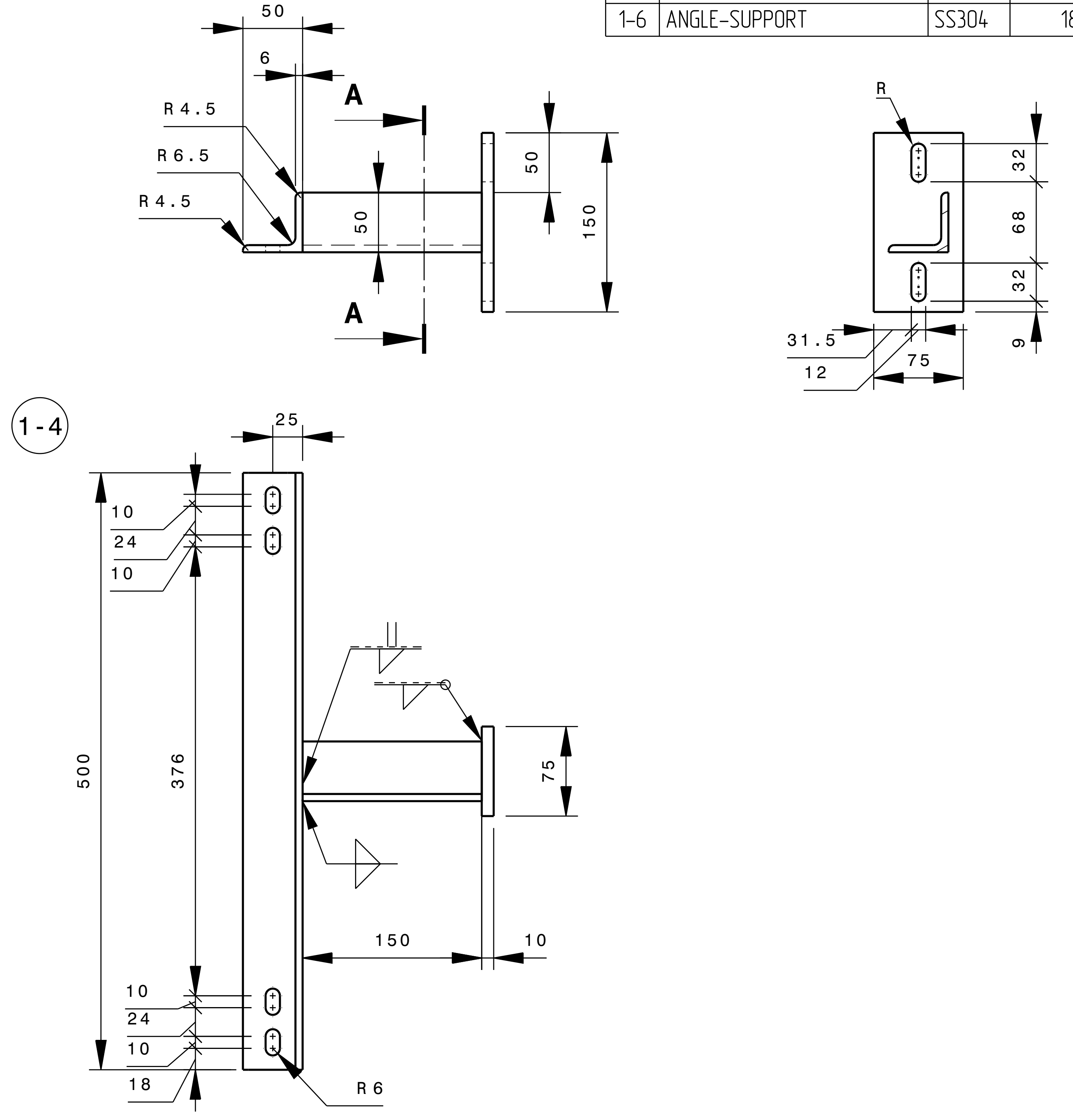
1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs
2.After processing,perform degreasing cleaning

DRW CAD ID: 5KK55N	APPROVED BY: IOKIK	ITER Organization: - When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.	LEGAL OWNER: iter china EU india japan korea russia USA
LINKED EV5 PT ID: 5KK53M	TECHNICAL REF: ---		
LINKED 3D ID: ------	DRAWN BY: MUKAER	DRAWING TITLE: C6_EP10_DUCT_SUPPORT DUCT_SUPPORT 2/3 3rd TITLE LINE - CATIA PARAMETER	
PBS TITLE: Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---		
DATE OF ISSUE: 13 Apr 22; PT MATURITY: DD; PT VERSION: --B	QUALITY CLASS: ---	DOCUMENT TYPE: Assembly or Installation Drawing	
DR STATUS: W; SCALE: 1:15; PT STATUS: W			
THIRD ANGLE PROJECTION	FORMAT: A3; PBS NUMBER: 55 C6 EA	DRAWING NUMBER: 015688; SHEET: 03; N°OF SHEETS: 04	REVISION: --B

General Tolerance: ISO 2768mk
Surface roughnes not indicated: Ra12.5

No.	Name	Material	8	REMARKS
1-3	DUCT-BAND	SS304	18	Sheet4
1-4	DRY-AIR-PIPE-SUPPORT	SS304L	2	
1-5	U-BOLT-15A	SS304L	4	
1-6	ANGLE-SUPPORT	SS304	18	





NOTE

1.The ridges and corners should be chamfered(aboutC0.2),and there should be no burrs
2.After processing,perform degreasing cleaning

DRW CAD ID	5KK55N	APPROVED BY: IOKIK	ITER Organization
LINKED EV5 PT ID	5KK53M	TECHNICAL REF: ---	-
LINKED 3D ID	------	DRAWN BY: MUKAER	When received pursuant to a contract or agreement, the confidentiality clause therein shall be applicable. When received during tender phase treat as confidential.
PBS TITLE	Diagnostics Poloidal Polarimeter PoPola Eq system A	SAFETY CLASS: ---	LEGAL OWNER

DATE OF ISSUE	PT MATURITY	PT VERSION	QUALITY CLASS
13 Apr 22	DD	--B	---

DR STATUS	SCALE	PT STATUS
W	1:5	W

THIRD ANGLE PROJECTION

DRAWING TITLE
C6_EP10_DUCT_SUPPORT
DUCT_SUPPORT 3/3
3rd TITLE LINE - CATIA PARAMETER

DOCUMENT TYPE
Assembly or Installation Drawing

FORMAT	PBS NUMBER	DRAWING NUMBER	SHEET	N°OF SHEETS	REVISION
A3	55 C6 EA	015688	04	04	--B

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