

## Report

### Arrangement 5 - CVBD Inlet filter(26CVBD-FI-5303/5304/5490/5497) Equipment Summary

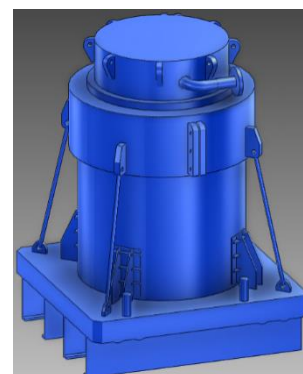
This document provides a summary of CVBD Inlet filter(26CVBD-FI-5303/5304/5490/5497) Since the fluid is nitrogen during maintenance (water flashing with nitrogen), fluid type is Gas /Group 2.

Approval Process			
	Name	Action	Affiliation
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Document Security: Internal Use RO: Lioce Donato			
Read Access	LG: Arrangement 5 Cost Estimation, LG: USDA Arrangement 5, LG: Management, GG: IO DDGs (and Senior Advisors), AD: IO_Director-General, AD: External Management Advisory Board, AD: OBS - Project Control Office (PCO), AD: IDM_Controller, AD: OBS - Procurement & Contracts Division (PCD), AD: Auditors, p...		

<i>Change Log</i>			
<b>Arrangement 5 - CVBD Inlet filter(26CVBD-FI-5303/5304/5490/5497) Equipment Summary (8T2LJG)</b>			
<i><b>Version</b></i>	<i><b>Latest Status</b></i>	<i><b>Issue Date</b></i>	<i><b>Description of Change</b></i>
v0.0	In Work	10 Mar 2023	
v1.0	Signed	13 Mar 2023	The first version for review.
v2.0	Signed	27 Mar 2023	Updated based on the reviewer's comment.
v2.1	Approved	29 Mar 2023	Updated based on the reviewer's comment. The native word file with revision track with respect to the first version is attached.

**OPERATIONAL NARRATIVE**

CVBD Inlet filter removes suspended solid from let-down flow from the circuit of IBED (Integrated loop of Blanket, ELM-VS, and Divertor) PHTS (Primary Heat Transfer System) during plasma and baking operation, in order to control water quality.

**Disclaimer:**

- Contents of this document have been assembled, reviewed and approved as for Information Only,
- May not be used for purchasing, fabrication or construction,
- May not be used as verified input to any document (may be used as unverified assumption).

**PHYSICAL ATTRIBUTES**

<i>Commodity Type:</i>	Pre-confined Mechanical filter
<i>Number of equipment:</i>	4 (installed in parallel)
<i>Approx. Footprint:</i>	1.5 m x 1.5 m
<i>Approx. Height:</i>	1.3 m
<i>Approx. Weight:</i>	10 000 kg (wet)
<i>Material (Housing and filter element):</i>	304L or 316L with composition requirement: cobalt <0.20 wt%, Niobium < 0.1 wt% and Tantalum < 0.05 wt%.
<i>Anchoring system</i>	EP / rollers and pin lock
<i>Component configuration</i>	Mounted on baseplate
<i>Design Life Time:</i>	20 years

WBS: Chemical &amp; Volume Control System

PBS: 26CVBD / GBS: 11-L4-04

Functional Reference: 26CVBD-FI-5303/5304/5490/5497

**REFERENCE DOCUMENTS**

Sizing calculation: ITER\_D\_WEP5KL\_v2.2,  
ITER\_D\_WVXWFF\_v5.1

PID: ITER\_D\_XGXS95\_v2.4

**ENVIRONMENTAL CONDITIONS**

<i>Integrated Dose Rate 20yrs:</i>	≤ 200 Gy
<i>Magnetic Field:</i>	≤ 105 mT
<i>Normal temperature</i>	5 – 35 °C
<i>Normal Humidity</i>	40 – 60 %
<i>Normal Pressure relative to atm:</i>	-0.14 kPa
<i>Accidental Temperature</i>	130 °C
<i>Accidental Pressure relative to atm:</i>	-5 to +100 kPa
<i>Accidental Humidity</i>	100 %

**DESIGN CODES AND SHIPPING**

<i>French Law Pressure Category / Nuclear Class:</i>	ESPN / IV / N3
<i>European Law:</i>	PED
<i>Fluid Type / Fluid group</i>	Gas / Group 2
<i>Conformity Assessment Module:</i>	IV, module G
<i>Construction Codes:</i>	ASME VIII Div2
<i>Safety Class:</i>	SIC-1
<i>Quality Class:</i>	QC-1
<i>Seismic Class:</i>	SC1 (S)
<i>Fire:</i>	Eurocode 2h
<i>Shipping Information:</i>	Oversea packing per ASME NQA-1 Level C, DAP at ITER site

## CVBD – Inlet Filter (26CVBD-FI-5303/5304/5490/5497)

**PARAMETERS**

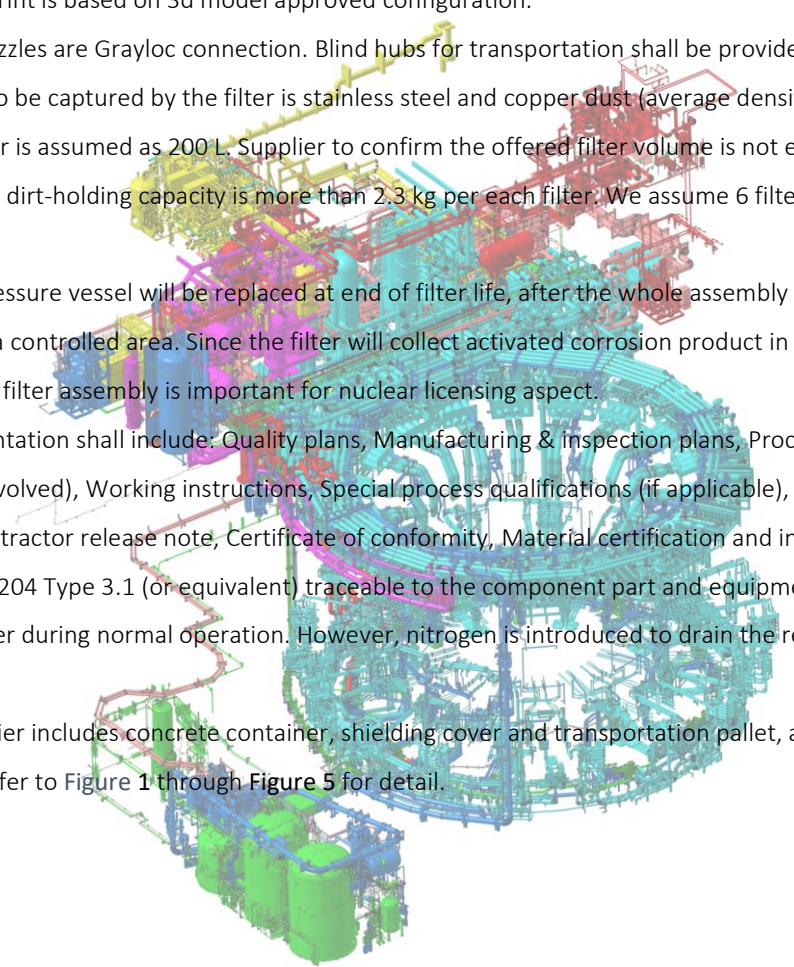
Parameter	Value
Nominal Temperature (°C)	50
Design Temperature (°C)	100
Nominal Pressure (MPa)	1.50
Design Pressure (MPa)	1.80
Nominal mass flowrate (kg/s)	11.5 (each)
Process fluid	Demineralized Water
Filtration performance	5 µm @ 98% efficiency
Contained radiation level (GBq)	101
Allowable Pressure Drop @ fouled condition (kPa)	320
Thermal insulation thickness (mm)	50

**NOZZLE SCHEDULE**

I.D.	DN / Schedule	Service
N1	65 / 40S	Inlet
N2	65 / 40S	Outlet

## Notes:

1. Approximate footprint is based on 3d model approved configuration.
2. Inlet and Outlet nozzles are Grayloc connection. Blind hubs for transportation shall be provided.
3. Expected particle to be captured by the filter is stainless steel and copper dust (average density is 8000 kg/m<sup>3</sup>).
4. Volume of one filter is assumed as 200 L. Supplier to confirm the offered filter volume is not exceeding 200 L.
5. Supplier to confirm dirt-holding capacity is more than 2.3 kg per each filter. We assume 6 filter elements are embedded in each filter unit.
6. The whole filter pressure vessel will be replaced at end of filter life, after the whole assembly including transportation pallet is moved to a controlled area. Since the filter will collect activated corrosion product in the primary circuit, the qualification of the filter assembly is important for nuclear licensing aspect.
7. Minimum documentation shall include: Quality plans, Manufacturing & inspection plans, Procedures, Calculation note (where design is involved), Working instructions, Special process qualifications (if applicable), Operator qualifications, As-built drawings, Contractor release note, Certificate of conformity, Material certification and inspection documents according to EN 10204 Type 3.1 (or equivalent) traceable to the component part and equipment.
8. Service fluid is water during normal operation. However, nitrogen is introduced to drain the remaining water before the filter replacement.
9. The scope of Supplier includes concrete container, shielding cover and transportation pallet, as well as filter housing pressure vessel. Refer to Figure 1 through Figure 5 for detail.



## CVBD – Inlet Filter (26CVBD-FI-5303/5304/5490/5497)

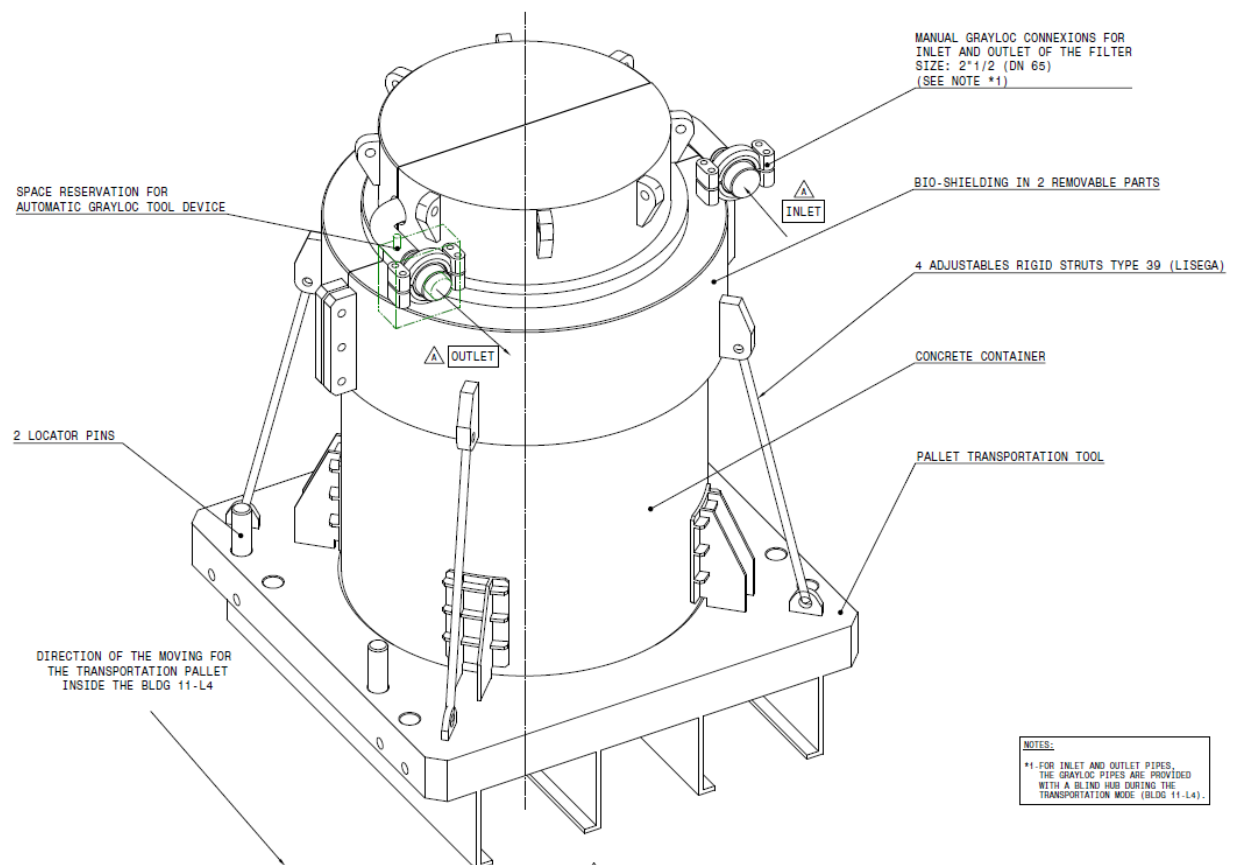


Figure 1 Isometric View of Filter Assembly

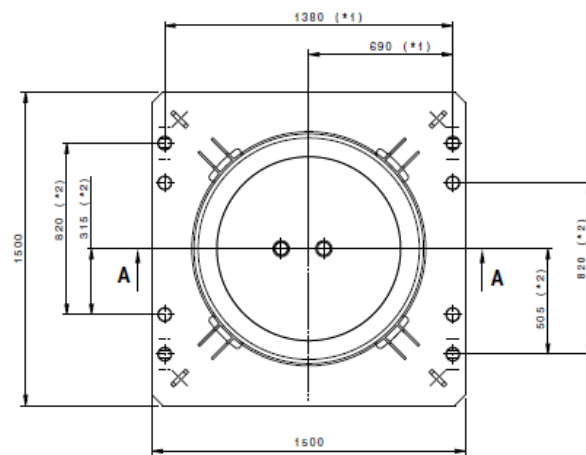
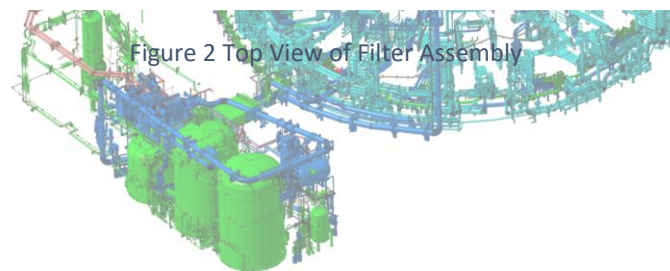
**TOP VIEW**

Figure 2 Top View of Filter Assembly

## CVBD – Inlet Filter (26CVBD-FI-5303/5304/5490/5497)

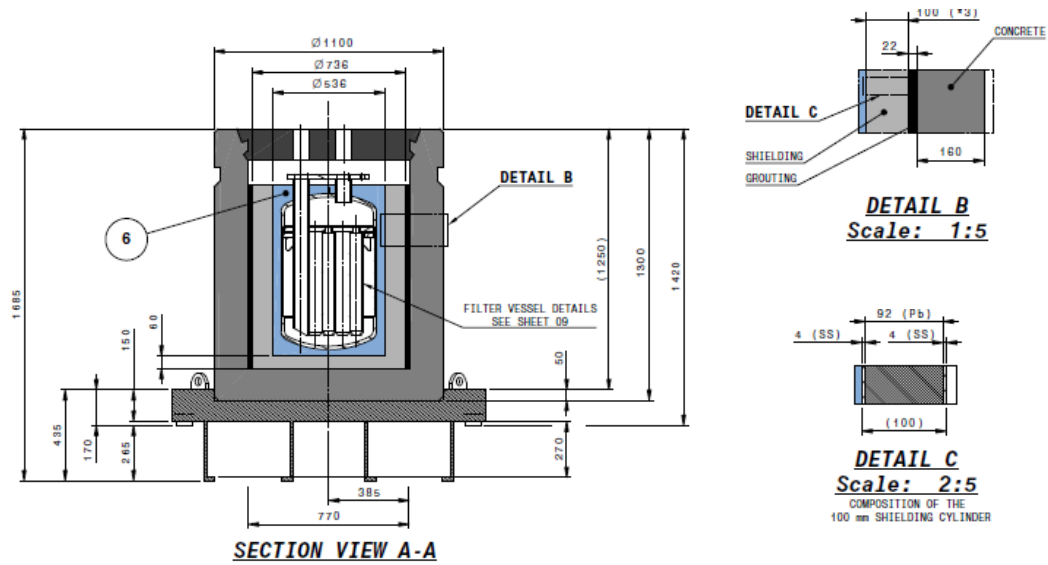


Figure 3 Section View of Filter Assembly

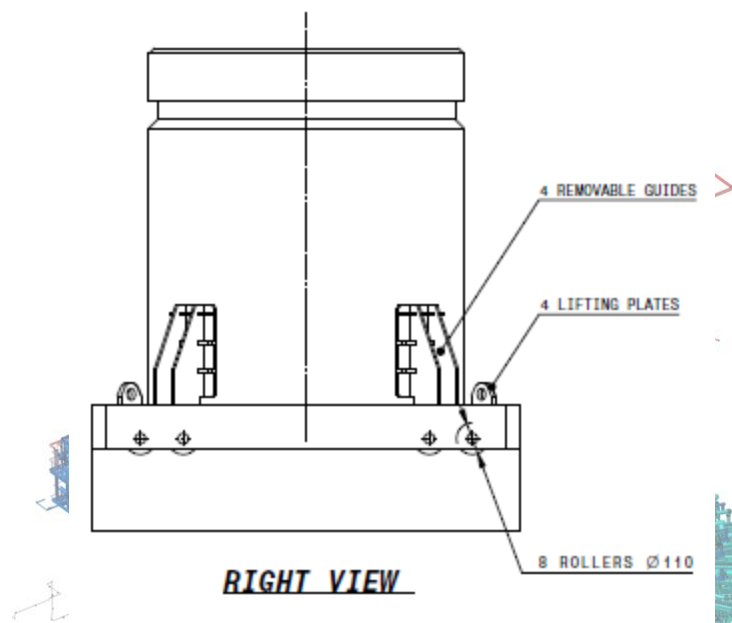
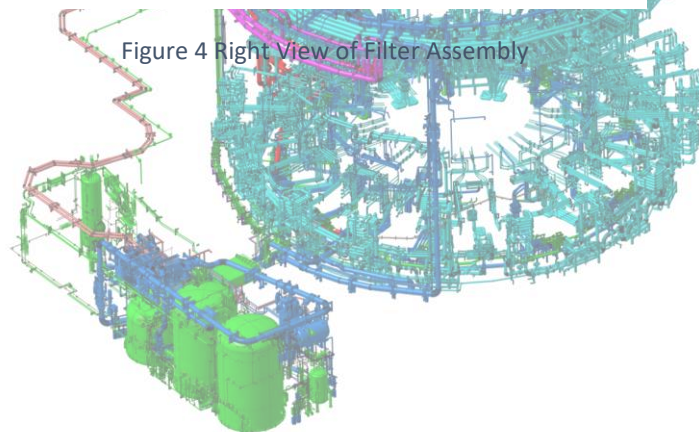


Figure 4 Right View of Filter Assembly





## CVBD – Inlet Filter (26CVBD-FI-5303/5304/5490/5497)

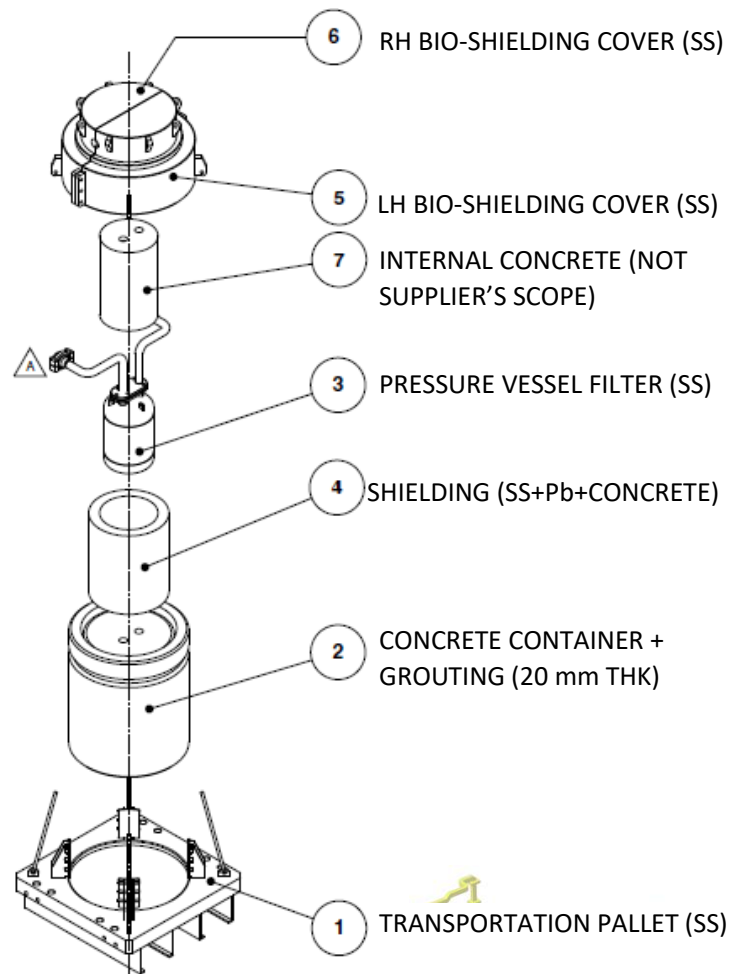


Figure 5 Exploded View of Filter Assembly

