

Report

Arrangement 5 - CVBD Volume control tank(26CVBD-TA-5601) Equipment Summary

This document provides a summary of CVBD Volume control tank(26CVBD-TA-5601)

Approval Process			
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Document Security: Internal Use RO: Lioce Donato			
<i>Read Access</i>	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>			
Arrangement 5 - CVBD Volume control tank(26CVBD-TA-5601) Equipment Summary (8SFA8A)			
<i>Version</i>	<i>Latest Status</i>	<i>Issue Date</i>	<i>Description of Change</i>
v0.0	In Work	10 Mar 2023	
v1.0	Signed	12 Mar 2023	The first version for review.
v1.1	Signed	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.
v2.0	Approved	04 Apr 2023	The anchoring system is revised to EPs.

OPERATIONAL NARRATIVE

CVBD Volume Control Tank (VCT) is suction tank of CVCS (Chemistry and Volume Control System) charging pump. The CVBD VCT behaves as a surge tank for the circuit of IBED (Integrated loop of Blanket, ELM-VS, and Divertor) PHTS (Primary Heat Transfer System) during baking operation.

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>	Cylindrical Vessel
<i>Number of equipment:</i>	1
<i>Type:</i>	Vertical Vessel
<i>Type of Head:</i>	80:10 dished head
<i>Inner Diameter:</i>	2.2m
<i>Approx. Height:</i>	cylinder: 3.5 m Overall: 5.3 m with skirt
<i>Approx. Weight:</i>	29 000 kg (wet)
<i>Tank Volume:</i>	15.8 m ³
<i>Service Fluid:</i>	Demineralized Water
<i>Material Notes:</i>	Vessel, Internals: 304L or 316L with composition requirement: cobalt <0.20 wt%, Niobium < 0.1 wt% and Tantalum < 0.05 wt%.
<i>Anchoring system</i>	Embedded plates / Bolting
<i>Component configuration</i>	Alone
<i>Design Life Time:</i>	20 years

ENVIRONMENTAL CONDITIONS

<i>Integrated Dose Rate 20yrs:</i>	≤ 1 Gy
<i>Magnetic Field:</i>	≤ 35 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 %

WBS: Chemical & Volume Control System

PBS: 26CVBD / GBS: 14-L4-21

Functional Reference: 26CVBD-TA-5601

REFERENCE DOCUMENTS

Sizing calculation: ITER_D_WEP5KL_v2.2

PID: ITER_D_XGXS95_v2.4

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>	Conventional Exceptional Load (CEL), Oversea packing per ASME NQA-1 Level C, DAP at ITER site

CVBD – Volume Control Tank (26CVBD-TA-5601)

PARAMETERS

Parameter	Value
Nominal Temperature (°C)	50
Design Temperature (°C)	100
Nominal Pressure (MPa)	0.50
Design Pressure (MPa)	1.20
Nominal mass flowrate (kg/s)	45
Thermal insulation thickness (mm)	70

NOZZLE SCHEDULE

I.D.	DN / Schedule	Service
N1	150 / 40S	Inlet
N2	150 / 40S	Outlet
N3	25 / 40S	Nitrogen supply
N4	25 / 40S	Vent
N5	150 / 40S	Pump min. flow
N6	80 / 40S	Overpressure protection device
N7	600 (TBD)	Manway
N8	80/40S	Saturated water/steam
N9	25/40S	Demineralized water
N14	15/40S	Online hydrogen monitor
N16	50/40S	Drain
N10/N11	15/40S	Level instrument
N20/N21	15/40S	Level instrument
N30/N31	15/40S	Level instrument
N40/N41	15/40S	Level instrument
N00/N01	15/40S	Level instrument
TBD	-	Thermowell

Notes:

1. Approximate footprint is based on 3d model approved configuration.
2. All nozzles are butt-welded.
3. Support/skirt shall be accounted in the vendor estimate. The approximate clearance between tank bottom and floor is 0.8 m.
4. Internal pipe shall be provided for Nozzle N1.
5. Internal pipe with sparger shall be provided for Nozzle N8.
6. Vortex breaker shall be provided for nozzle N2 in the bottom.
7. Minimum documentation shall include: Quality plans, Manufacturing & inspection plans, Procedures, Calculation note, Working instructions, Special process qualifications (if applicable), Welders and NDE personnel qualifications, Design and As-built drawings, Contractor release note, Material certification and inspection documents according to EN 10204 Type 3.1 (or equivalent) traceable to the component part and equipment.

