

IDM UID 8FETDV
VERSION CREATED ON / VERSION / STATUS 30 Mar 2023 / 2.1 / Approved
EXTERNAL REFERENCE / VERSION

Design Report

Arrangement 5 - PHBD Pressurizer (26PHBD-PZ-1001) Equipment Summary

This document provides a summary of PHBD Pressurizer (26PHBD-PZ-1001)

Approval Process			
	<i>Name</i>	<i>Action</i>	<i>Affiliation</i>
<i>Author</i>	Basili L.	30 Mar 2023:signed	IO/DG/CNST/PLD/MID/TCWS
<i>Co-Authors</i>	West S.	30 Mar 2023:signed	IO/DG/CNST/PLD/MID/TCWS
<i>Reviewers</i>	Berruyer F.	04 Apr 2023:recommended (Short Cycle)	IO/DG/CNST/PLD/MID/TCWS
	Ciampichetti A.		IO/DG/CNST/PLD/MID/TCWS
	Gao J.	04 Apr 2023:recommended (Short Cycle)	IO/DG/CORP/FPD/PCD/CAL
	Ghirelli N.		IO/DG/CNST/PLD/MID/TCWS
	Sharan S.	04 Apr 2023:recommended (Short Cycle)	IO/DG/CNST/PLD/MID/TCWS
	Van hove W.	30 Mar 2023:recommended (Short Cycle)	ORNL - Oak Ridge National Laborator...
<i>Previous Versions Reviews</i>	Ricou E.	28 Mar 2023:recommended v2.0	IO/DG/CNST/PLD/MID/TCWS
<i>Approver</i>	Lioce D.	07 Apr 2023:approved	IO/DG/CNST/PLD/MID/TCWS
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...		

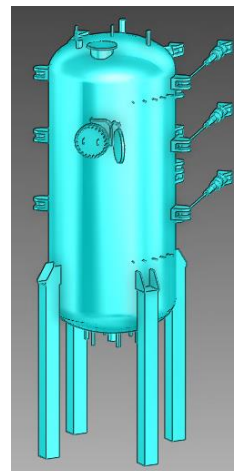
<i>Change Log</i>			
Arrangement 5 - PHBD Pressurizer (26PHBD-PZ-1001) Equipment Summary (8FETDV)			
<i>Version</i>	<i>Latest Status</i>	<i>Issue Date</i>	<i>Description of Change</i>
v1.0	Signed	13 Mar 2023	
v2.0	Signed	27 Mar 2023	new version to implement reviewers' comments
v2.1	Approved	30 Mar 2023	deleted the cubicles, that are in electrical scope

OPERATIONAL NARRATIVE

The pressurizer has the function to keep the cooling water in a sub cooled liquid state, accommodate the system fluid expansion and contraction associated with the different modes of operation, control the client pressure within the operational range and perform overpressure protection.

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>	TANK
<i>Type:</i>	Vertical Vessel
<i>Approx. Footprint:</i>	3.8m x 3.8m (w/o supports)
<i>Approx. Height:</i>	10 m (w/o supports), 12.5 (with supports)
<i>Approx. Weight (dry):</i>	100 000 kg
<i>Inside Diameter:</i>	3.2 m
<i>Approx. Tank Volume:</i>	59.6 m ³
<i>Service Fluid:</i>	Demineralized water
<i>Material Notes:</i>	304L / 316L with composition requirement: cobalt < 0.20 wt%, Niobium < 0.1 wt% and Tantalum < 0.05 wt%.
<i>Anchoring system</i>	Embedded Plates, additional seismic support with struts to the wall is possible
<i>Component configuration</i>	Alone or Skid
<i>Design Life Time:</i>	20 years
<i>Special attributes (1):</i>	Spray nozzle included
<i>Special attributes (2):</i>	Back up Heater included
<i>Special attributes (3):</i>	Proportional Heater included

ENVIRONMENTAL CONDITIONS

<i>Dose Rate:</i>	≤ 0.1 kGy/h
<i>Integrated Dose Rate 20yrs:</i>	10 kGy
<i>Magnetic Field:</i>	84 mT
<i>Normal temperature</i>	12 – 35 °C
<i>Normal Humidity</i>	≤ 65 %
<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: IBED-PHTS

PBS: 26PHBD

Functional Reference: 26PHBD-PZ-1001

GBS: 11-L4-04

REFERENCE DOCUMENTS

Sizing calculation: ITER_D_PAVZLW_v3.3

PID: ITER_D_SNJ3LL_v4_2

DESIGN CODES AND SHIPPING

<i>French Law Pressure Category / Nuclear Class:</i>	ESPN/N2
<i>European Law:</i>	PED
<i>Fluid Type / Fluid group</i>	Gas/Fluid group 2
<i>Conformity Assessment:</i>	Cat 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>	Heavy Exceptional Load (HEL), Oversea packing per ASME NQA-1 Level C, DAP at ITER site

PARAMETERS

Parameter	Value
Operating Temperature (°C)	209
Design Temperature (°C)	270
Pressurizer Operating Pressure (MPa)	1.9
Design Pressure (MPa)	5.0
Proportional Heater Power (MW)	0.4
Level during POS (%)	45
Back Heater Power (MW)	2.4
Total Heaters Capacity (MW)	2.8
Spray Continuous Flow (kg/s)	0.3
Maximum Spray Flow (kg/s)	4.9
Heater Voltage (V)/Phase(-)/Cycle (Hz)	400/3/50

NOZZLE SCHEDULE

I.D.	DN / Schedule	Service
N01	DN50 / 40S	CVBD pressure spray
N02	DN150 / 40S	PORV
N04	DN100 / 40S	Relief Valve
N08	DN50 / 40S	Connection to PRT
N10	DN150 / 40S	PORV
N12	TBD	Manway
N14	Thermowell	Sensor MT
N16	DN15 / 40S	Sampling
N18	DN200 / 80S	Surge Line
N20	TBD	Proportional Heater
N22	TBD	Backup Heater
N24	DN15 / 40S	Sensor ML
N26	DN15 / 40S	Sensor ML
N28	DN15 / 40S	Sensor ML
N30	DN15 / 40S	Sensor ML
N32	DN15 / 40S	Sensor ML
N34	DN15 / 40S	Sensor ML
N36	DN15 / 40S	Sensor ML
N38	DN15 / 40S	Sensor ML
N40	Thermowell	Sensor MT

Notes:

1. Approximate footprint is based on 3d model approved configuration.
2. All nozzles are butt-welded.
3. Support shall be accounted in the vendor estimate.
4. The pressurizer shall be provided with a proportional heater, a backup heater and sprays. Heater rods are inserted from the bottom and shall be replaceable. Spray nozzle in the top.
5. For the Floor Response Spectra please refer to Cover Main Document

