

Report

Arrangement 5 - CVBD Letdown cooler(26CVBD-HX-5116) Equipment Summary

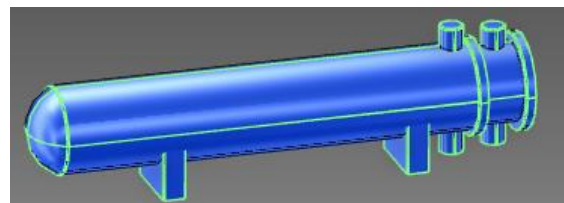
This document provides a summary of CVBD Letdown cooler(26CVBD-HX-5116)

Approval Process			
	<i>Name</i>	<i>Action</i>	<i>Affiliation</i>
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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 Letdown cooler(26CVBD-HX-5116) Equipment Summary (8SD82J)			
<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	In Work	12 Mar 2023	The first version for review.
v1.1	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 Letdown cooler provide cooling function for 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 decrease the temperature to be compatible with degasifier and demineralizer.

**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>	Shell & Tube Heat exchanger
<i>Number of equipment:</i>	1
<i>TEMA Type:</i>	NFU (Horizontal)
<i>TEMA Class:</i>	Class R
<i>Approx. Footprint:</i>	1.0 m x 3.6 m
<i>Approx. Height:</i>	1.2 m
<i>Approx. Weight:</i>	11 000 kg (wet)
<i>Approx. volume:</i>	0.8 m ³
<i>Service Fluid:</i>	Demineralized Water
<i>Material (Shell, tube, tubesheet, channel):</i>	304L or 316L with composition requirement: cobalt <0.20 wt%, Niobium < 0.1 wt% and Tantalum < 0.05 wt%.
<i>Anchoring system</i>	Structure / Bolting
<i>Component configuration</i>	Alone
<i>Design Life Time:</i>	20 years

ENVIRONMENTAL CONDITIONS

<i>Integrated Dose Rate 20yrs:</i>	≤ 100 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-HX-5116

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>	Oversea packing per ASME NQA-1 Level C, DAP at ITER site

CVBD – Letdown cooler (26CVBD-HX-5116)

SIZING PARAMETERS

(Case 1 – Max duty case)

Parameter	Shell side	Tube side
<i>Fluid</i>	Demineralized water	Demineralized water
<i>Inlet Temperature (°C)</i>	31	60
<i>Outlet Temperature (°C)</i>	40	50
<i>Inlet Pressure (MPa,a)</i>	0.8	1.5
<i>HX Mass flow (kg/s)</i>	50	45
<i>Allowable Pressure Drop (MPa)</i>	0.05	0.05
<i>Fouling resistance (m² K/W)</i>	1E-04	4E-05
<i>Heat Duty (kW)</i>	1890	
<i>Design Pressure (MPa,a)</i>	5.0	5.0
<i>Design Temperature (°C)</i>	270	270
<i>Number pass per shell</i>	2	2
<i>Inlet Nozzle size</i>	DN150 (N4) / SCH 80S	DN200 (N1) / SCH 80S
<i>Outlet Nozzle size</i>	DN150 (N3) / SCH 80S	DN150 (N2) / SCH 80S
<i>Thermal insulation thickness (mm)</i>	50	50

Notes:

1. The exchanger shall be sized to fulfil Case 1.
2. Approximate footprint is based on 3d model approved configuration.
3. Nozzles are butt-welded to piping.
4. Minimum documentation shall include: Quality plans, Qualification 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.
5. 26CVBD-HX-5746 is installed at the upstream of 26CVBD-HX-5116.

