

Report

Arrangement 5 - CVBD Charging Pump 2(26CVBD-PL-5703) Equipment Summary

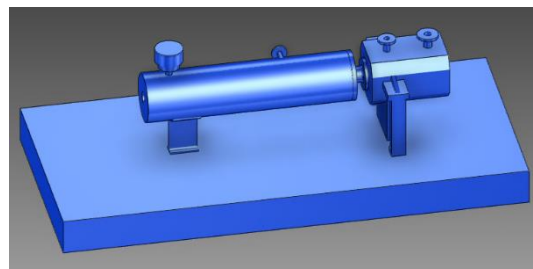
This document provides a summary of CVBD Charging Pump 2(26CVBD-PL-5703)

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 Charging Pump 2(26CVBD-PL-5703) Equipment Summary (8SD797)			
<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.
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 Charging pump #2 recirculates primary water in Volume control tank to 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>	Canned motor pump
<i>Number of equipment</i>	1
<i>Driver:</i>	Electric motor, fixed speed
<i>Approx. Footprint:</i>	1.5 m x 3.3 m
<i>Approx. Height:</i>	1.0 m
<i>Approx. Weight:</i>	15 000 kg (wet)
<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>	Platform / Bolting
<i>Component configuration</i>	Mounted on baseplate
<i>Design Life Time:</i>	20 years

ENVIRONMENTAL CONDITIONS

<i>Integrated Dose Rate 20yrs:</i>	≤ 10 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-PL-5703

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 (piping system):</i>	ESPN / N3
<i>Fluid Type / Fluid group</i>	Liquid/ Group 2
<i>Construction Codes:</i>	API 685
<i>Safety Class:</i>	SIC-1
<i>Quality Class:</i>	QC-1
<i>Seismic Class:</i>	SC1 (SF)
<i>Fire:</i>	Eurocode 2h
<i>Shipping Information:</i>	Oversea packing per ASME NQA-1 Level C, DAP at ITER site

CVBD – Charging pump #2 (26CVBD-PL-5703)

PARAMETERS

Parameter	Value
Nominal Temperature (°C)	50
Nominal inlet pressure (MPa)	0.51
Type of Operation	Continuous
Design Temperature (°C)	100
Design Pressure (MPa, abs)	6.0
Nominal head (m-WC)	379
Nominal mass flowrate (kg/s)	5
Maximal shut-off head (m-WC)	500
Available NPSHa (m-WC)	50.7
Shaft power (kW)	50
Motor Voltage (V)/Phase(-)/Cycle (Hz)	400 / 3 / 50
Thermal insulation thickness (mm)	50

SENSOR

Instrument Tag	Type of sensor
26CVBD-MV-5713	Inboard Pump Vibration
26CVBD-MV-5715	Outboard Pump Vibration
26CVBD-MV-5711	Inboard Motor Vibration
26CVBD-MV-5709	Outboard Motor Vibration
26CVBD-MT-5720	Motor Winding Temperature #1
26CVBD-MT-5721	Motor Winding Temperature #2
26CVBD-MT-5722	Motor Winding Temperature #3
26CVBD-MT-5723	Outboard Motor Bearing Temperature
26CVBD-MT-5724	Inboard Motor Bearing Temperature
26CVBD-MT-5725	Inboard Pump Bearing Temperature
26CVBD-MT-5726	Outboard Pump Bearing Temperature

PERFORMANCE TEST

Type of Test	
Performance tests according to the Codes	Required
Six-point testing (shut-off, MCF, 95-9% of rated flow, 100–105% of rated flow, the best efficiency flow, and maximum allowable flow).	Required
Mechanical run test at rated for 4 hours	Required
NPSH test	Required
Record of vibration at each test	Required

NOZZLE SCHEDULE

I.D.	DN / Schedule	Service
N1	80 / 40S	Inlet
N2	80 / 40S	Outlet
N3	25/40S	Casing drain

Notes:

- Motor shall be selected to cover end-of-curve of the pump.
- The connected piping is subject to French ESPN/PED Order, but the pump is excluded from French ESPN/PED Order. Supplier to refer to Article 1, section 2.(j) of DIRECTIVE 2014/68/EU. Pump will be subject to Directive 2006/42/EC known as the Machinery Directive.
- Approximate footprint is based on 3d model approved configuration.
- Nozzles are flanged. Counter flanges with a pipe stub that will be butt-welded to inlet/outlet piping shall be provided.
- Motor shall have fully encapsulated winding system as described in IEC 60034-1 and IEC 60072. Minimum insulation class shall be in accordance with the API 685.
- 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.
- Pump PL-5701 operates during plasma/standby/baking mode and PL-5703 operates during baking mode when the head requirements are higher. Utilizing two separate pumps for the main operating modes of CVBD reduces the demand on either pump and allows for a smaller pump to be used for plasma operation.