

IDM UID 8U77NB
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EXTERNAL REFERENCE / VERSION

Report

Arrangement 5 - CVNB Charging Pump #1 and #2(26CVNB-PL-5701/26CVNB-PL-5711) Equipment Summary

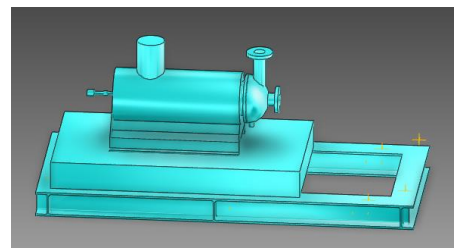
This document provides a summary of CVNB Charging Pump #1 and #2(26CVNB-PL-5701/26CVNB-PL-5711)

Approval Process			
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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>			
Arrangement 5 - CVNB Charging Pump #1 and #2(26CVNB-PL-5701/26CVNB-PL-5711) Equipment Summary (8U77NB)			
<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	13 Mar 2023	The first version for review.
v2.0	Signed	27 Mar 2023	Updated based on the reviewer's comment.
v2.1	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.
v2.2	Approved	03 Apr 2023	Design pressure is corrected from 6.0 MPa to 2.6 MPa.

OPERATIONAL NARRATIVE

CVNB Charging pumps recirculate primary water in Volume control tank to the circuit of NBI (Neutral Beam Injector) PHTS (Primary Heat Transfer System) during 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>	2 (1 working + 1 standby)
<i>Driver:</i>	Electric motor, fixed speed
<i>Approx. Footprint:</i>	1.0 m x 2.5 m
<i>Approx. Height:</i>	1.0 m
<i>Approx. Weight:</i>	10 000 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>	EP / Bolting
<i>Component configuration</i>	Mounted on baseplate
<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: 26CVNB / GBS: 14-L4-21

Functional Reference: 26CVNB-PL-5701/26CVNB-PL-5711

REFERENCE DOCUMENTS

Sizing calculation: ITER_D_UDKM38_v2.0

PID: ITER_D_XJ36P5_v2.3

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

CVNB – Charging pump #1 & #2 (26CVNB-PL-5701/5711)

PARAMETERS

Parameter	Value
Nominal Temperature (°C)	38
Nominal inlet pressure (MPa)	0.26
Type of Operation	Continuous
Design Temperature (°C)	100
Design Pressure (MPa, abs)	2.6
Nominal head (m-WC)	89
Nominal mass flowrate (kg/s)	25.7
Maximal shut-off head (m-WC)	100
Available NPSHa (m-WC)	23
Shaft power (kW)	70
Motor Voltage (V)/Phase(-)/Cycle (Hz)	400 / 3 / 50
Thermal insulation thickness (mm)	50

SENSOR

I&C Tag	Type of sensor
26CVNB-MV-5712	Inboard Pump Vibration
26CVNB-MV-5711	Outboard Pump Vibration
26CVNB-MV-5713	Inboard Motor Vibration
26CVNB-MV-5714	Outboard Motor Vibration
26CVNB-MT-5715	Motor Winding Temperature #1
26CVNB-MT-5716	Motor Winding Temperature #2
26CVNB-MT-5717	Motor Winding Temperature #3
26CVNB-MT-5714	Outboard Motor Bearing Temperature
26CVNB-MT-5713	Inboard Motor Bearing Temperature
26CVNB-MT-5712	Inboard Pump Bearing Temperature
26CVNB-MT-5711	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, and Pump PL-5703 is stand-by.