

Design Report

Arrangement 5 - PHBD Baking Pump (26PHBD-PL-1900) Equipment Summary

This document provides a summary of PHBD Baking Pump (26PHBD-PL-1900)

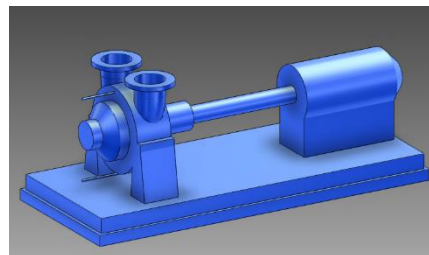
Approval Process			
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Document Security: Internal Use RO: Lioce Donato			
Read Access	LG: Arrangement 5 Cost Estimation, LG: USDA Arrangement 5, LG: Management, GG: IO DDGs (and Senior Advisors), AD: IO_Director-General, AD: External Management Advisory 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 - PHBD Baking Pump (26PHBD-PL-1900) Equipment Summary (YVTEU2)			
<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	change ESPN classification

PL-1900 – Baking Pump

OPERATIONAL NARRATIVE

The baking pump (PL-1900) is used to circulate the cooling water to clients during water baking operation, Divertor gas baking operation and anti-freeze protection in idle mode. Baking pump will be set at fixed pump curve for heating up, cooling down, and water baking during water 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

Commodity Type:	BB2 PUMP
Type:	Electrical Motor
Approx. Footprint:	4.5 m x 1.9 m
Approx. Height:	2 m
Approx. Weight:	40 000 kg
Service Fluid:	Demineralized Water
Material Notes:	304L / 316L with composition requirement: cobalt <0.20 wt%, Niobium < 0.1 wt% and Tantalum < 0.05 wt%.
Anchoring system	Embedded Plates. Adequate anchoring to be designed by supplier
Component configuration	Mounted on baseplate
Design Life Time:	20 years
Special Attributes:	- No VFD needed, direct start - Pump Motor Water Cooled - Dual Seal Assembly API 53B or 53C seal plan - Motor shall be equipped with space heater

WBS: IBED System

PBS: 26PHBD

Functional Reference: 26PHBD-PL-1900

GBS: 11-L4-04

REFERENCE DOCUMENTS

Sizing calculation: ITER_D_PAVZLW_v3.3

PID: ITER_D_SNJ3LL_v4_2

DESIGN CODES AND SHIPPING

French Law Pressure Category / Nuclear Class:	ESPN / N2 (piping)
Fluid Type / Fluid group	Gas/Group 2
Related Codes:	API 610
Safety Class:	SIC-1
Quality Class:	QC-1
Seismic Class:	SC1 (S)
Fire:	Eurocode 2h
Shipping Information:	Oversea packing per ASME NQA-1 Level C, DAP at ITER site

ENVIRONMENTAL CONDITIONS

Dose Rate:	≤ 0.1 kGy/h
Integrated Dose Rate 20yrs:	10 kGy
Magnetic Field:	84 mT
Normal temperature	12 – 35 °C
Normal Humidity	≤ 65 %
Normal Pressure relative to atm:	-0.14 kPa
Accidental Temperature	130 °C
Accidental Pressure relative to atm:	-5 to +100 kPa
Accidental Humidity	100 %

PARAMETERS

Parameter	Value
Nominal Temperature (°C)	240
Design Temperature (°C)	270
Nominal Inlet Pressure (MPa)	3.44
Design Pressure (MPa)	5.0
Nominal mass flowrate (kg/s)	491
Available NPSHa (m)	14
Pump Head (m)	126
Shaft Power (75% efficiency) (MW)	0.86
Motor Voltage (kV)/Phase(-)/Cycle (Hz)	6.6 / 3 / 50
Thermal insulation thickness (mm)	50

PL-1900 – Baking Pump

PARAMETERS Motor Cooler and Bearing Cooler

Parameter	Value
HX motor cooler Flow (kg/s)	1.7
HX motor cooler Allowable DP (MPa)	0.1
HX motor cooler Heat Load (kW)	73
HX bearing cooler Flow (kg/s)	0.2
HX bearing cooler Allowable DP (MPa)	0.1
HX bearing cooler Heat Load (kW)	10

SENSORS/INSTRUMENTATIONS

I.D.	Service
MT 1900	Outboard Pump Bearing Temperature
MV 1900	Outboard Pump Vibration
MT 1901	Inboard Pump Bearing Temperature
MV 1901	Inboard Pump Vibration
MT1902	Inboard Motor Bearing Temperature
MV 1902	Inboard Motor Vibration
MT 1903	Outboard Motor Bearing Temperature
MV 1903	Outboard Motor Vibration
MT 1904	Motor Winding Temperature
MT 1905	Motor Winding Temperature
MT 1906	Motor Winding Temperature
MI 1900	Motor Electrical Current (One per Phase)
MI 1901	
MI 1902	
ME 1900	
ME 1901	
ME 1902	

NOZZLE SCHEDULE**PUMP**

I.D.	DN / Schedule	Service
N1	400 / 80	Inlet
N2	400 / 80	Outlet
N10	25 / 40S	Casing Vent
N12	25 / 40S	Casing Drain

SEAL COOLER HX-1903

I.D.	DN / Schedule	Service
N1	25 / 40S	Inlet
N2	25 / 40S	Outlet

BEARING COOLER HX-1902 (if needed)

I.D.	DN / Schedule	Service
N1	25 / 40S	Inlet
N2	25 / 40S	Outlet

PUMP MOTOR COOLER HX-1901

I.D.	DN / Schedule	Service
N1	50 / 40S	Inlet
N2	50 / 40S	Outlet

DUAL SEAL ASSEMBLY

I.D.	DN / Schedule	Service
N/A	15 / 40S	Seal Fluid Makeup

Notes:

1. Approximate footprint is based on 3d model approved configuration.
2. All nozzles are flanged.
3. Support shall be accounted in the vendor estimate.
4. The connected piping is subject to French ESPN/PED Order, but the pump is excluded from the French ESPN/PED Order. Supplier to refer to Article 1, section 2.(j) of DIRECTIVE 2014/68/EU
5. For Floor Response spectra please refer to Cover Main Document
6. Direct Start motor: Motor Control Centre and cables to the motor are out of scope.
7. Pump is mounted on the embedded plates in the concrete floor (no grouting under the skid, no concrete plinth to attach the pump).
8. Double pressurized mechanical seals with seal injection are required. API Seal Plan 53B or 53C. Mechanical seal injection skid system to be provided by the pump vendor and mounted on the pump skid.

