DOC NUMBER: **569-DB7B-MEC-711-003**	CLIENT NUMBER: **PRD-MEC-DSH-018**
CLIENT: **TAKEDA**	
PROJECT: **BURITI EPCVM PROJECT**	

DATA SHEET
CENTRIFUGAL PUMP
CHILLED WATER PUMP - PROCESS
P-PCH-7B-3 / P-PCH-7A-4

REV	DATE	DESCRIPTION	EXEC	CHECK	APPROV
0	30/JUL/2021	ISSUED FOR CONSTRUCTION	ASO	LUIS	RSP
B	16/JUN/2021	90% DD ISSUE	ASO	LUIS	RSP
A	08/FEB/2021	30% DD ISSUE	ASO	LUIS	MAJ

1. REVISION HISTORY

Rev	Reason For Change
A	ORIGINAL ISSUE
B	PAGE 3, line 2.2: changed from normal to design
	PAGE 3, line 2.3 to 2.12: added values for minimum and maximum conditions
	PAGE 3, line 2.3: changed operation flow from 136.0 m^3/h to 283.0 m^3/h for design condition
	PAGE 3, line 2.5: changed temperature from 5°C to 4°C
	PAGE 3, line 2.6: changed viscosity from 1.52 cP to 1.57 cP
	PAGE 3, line 2.7: changed vapour pressure from 0.009 bar abs to 0.0081 bar abs
	PAGE 3, line 2.8: changed suction pressure from 0.04 barg to 0.1162 barg for design condition
	PAGE 3, line 2.9: changed discharge pressure from 2.16 barg to 2.036 barg for design condition
	PAGE 3, line 2.10: changed differential pressure from 2.12 barg to 1.949 barg for design condition
	PAGE 3, line 2.11: changed total head from 22.0 mH2O to 20.0 mH2O for design condition
	PAGE 3, line 2.12: changed NPSH available from 10.50 mH2O to 11.43 mH2O for design condition
	PAGE 3, note 4: changed temperature from 1°C to 0°C
	PAGE 3: added note 5
	PAGE 5: added note 6
0	ISSUED FOR CONSTRUCTION

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TITLE

CENTRIFUGAL PUMP - P-PCH-7B-3 / P-PCH-7B-4

SHEET: 3/5

REV.: 0

1	**GENERAL**					
1.1	**ITEM Nº:**	P-PCH-7B-3 / 4	**QUANTITY:**	2		
1.2	**SERVICE:**	CHILLED WATER - PROCESS				
1.3	**LOCAL:**	DRUG SUBSTANCE BUILDING (7B)				
1.4	**PUMP TYPE:**	CENTRIFUGAL				
1.5	**MANUFACTURER:**	Note 1				
1.6	**MODEL:**	Note 1	**MANUFACTURING STANDARD:**	ASME B 73.1		
1.7	**APLICABLE:**	PURPOSE				
1.8	**DRIVING:**	ELECTRIC MOTOR				

2	**OPERATION CONDITIONS (Note 1 / 4)**			
2.1	**FLUID:**			
2.2		**MINIMUM**	**DESIGN**	**MAXIMUM**
2.3	**OPERATION FLOW (m³/h):**	47.9	283.0	215.0
2.4	**DENSITY AT OPERATION TEMPERATURE (kg/m³):**	1,000	1,000	1,000
2.5	**OPERATION TEMPERATURE (°C):**	4.0	4.0	4.0
2.6	**VISCOSITY AT OPERATION TEMPERATURE (cP):**	1.57	1.57	1.57
2.7	**WATER VAPOUR PRESSURE AT OPERATION TEMP.(bar abs):**	0.0081	0.0081	0.0081
2.8	**SUCTION PRESSURE (bar g):**	0.1614	0.1162	0.1358
2.9	**DISCHARGE PRESSURE (bar g):**	1.899	2.036	1.999
2.10	**DIFFERENTIAL PRESSURE (bar):**	1.7671	1.949	1.8923
2.11	**TOTAL HEAD (mH20):**	18.020	20.0	19.296
2.12	**NPSH AVAILABLE (mH2O):**	11.90	11.43	11.63
2.13	**OPERATION:** CONTINUOUS	**CYCLE (h/day):** 24 e 365	**INSTALLATION:** SHELTERED	

3.0	**CONSTRUCTION**					
3.1	**IMPELLER (note 2):**	**CONSTRUCTION:**	**TYPE:** RADIAL	**ARRAGEMENT:** OVERHUNG	**TYPE:** CLOSED	
3.2		**STAGES:** SIMPLE	**QUANTITY:** 1	**SUCTION:** SIMPLE		
3.3	**BIPARTITE CASING (note 3):** RADIAL	**SUPPORT:** FOOT	**VOLUTE:** SIMPLE	**DIFFUSER:** NO		

3.4	**CONNECTIONS:**	**DN**	**PN/CLASS**	**STANDARD**	**NUMBER**	**FACE**
3.5	**SUCTION:**	note 1	150#	ASME/ANSI	B16.5	RF
3.6	**DISCHARGE:**	note 1	150#	ASME/ANSI	B16.5	RF
3.7	**CASING DRAIN:**	note 1	3000#	ASME/ANSI	B1.20.1 (NPT)	-

3.8	**AUXILIARY CONNECTIONS:**	**TYPE:**	**PURGE**	**PRES. INDICATOR**	**TEMP. INDICATOR**
3.9		**SUPPLY**	Yes	No	No
3.10		**DN:**	note 1	-	-
3.11	**LUBRICATION BEARINGS:** note 1				

4.0	**PERFORMANCE (note 1)**	
4.1	**CURVE Nº:**	**MAX. AMT ROTOR SELECTED (mm):**
4.2	**REQUIRED NPSH (mcl):**	**BEST EFFICIENCY POINT (m³/h):**
4.3	**EFFICIENCY (%):**	**MINIMUM STABLE FLOW (m³/h):**
4.4	**BRAKE HORSEPOWER - BHP (kW/CV):**	**DIAMETER MÍN/SELEC./MÁX. (mm):**
4.5	**MAX. POWER SELECTED IMPELLER (kW/CV):**	**SOUND PRESSURE (dB):**
4.6	**ROTATION (RPM):**	**LOAD GD² (kg. M2):**
4.7	**VIEW COUPLING ROTATION:**	

NOTES:

1) To be filled by supplier.

2) The impeller must be dynamically and statically balanced.

3) Back Pull Out.

4) The equipment shall be able to operate with propylene glycol at 0°C.

5) Pumps with variable water flow.

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TITLE	CENTRIFUGAL PUMP - P-PCH-7B-3 / P-PCH-7B-4	SHEET:	4/5
		REV.:	0

5	**SEALING (Note 1)**		
5.1	**SHAFT SEALING:**	*MECHANICAL SEAL*	
6	**GASKET**		
6.1	**MATERIAL:**	*N/A*	
6.2	**MAX. TEMPERATURE (°C):**	*N/A*	
6.3	**MAX. PRESSURE CHAMBER (kgf/cm² / MPa):**	*N/A*	
6.4	**MAX. PERIPHERAL SPEED (m/s):**	*N/A*	
7	**MECHANICAL SEAL (note 2)**		
7.1	**SEALING PLAN:**		
7.2	**CONSTRUCTION STANDARD:**	*ASME B73.1 or EN 12756 or similar*	
7.3	**SEAL SIZE:**		
7.4	**CONSTRUCTION:**		
7.5	**TYPE:**		
7.6	**MODEL:**		
7.7	**MANUFACTURER:**		
7.8	**SUPPLY OF THE SEALING SYSTEM:**	*PUMP MANUFACTURER*	
8	**MATERIAL OF MECHANICAL SEAL (note 2)**		
8.1		**INTERNAL**	**EXTERNAL**
8.2	**ROTARY RING:**		
8.3	**STATIONARY RING:**		
8.4	**SECONDARY SEALING:**		
8.5	**SPRING / BELLOWS:**		
8.6	**BODY:**		
9	**COOLING (note 2)**		
9.1	**PLAN:**		
9.2	**FLOW (m³/h):**		
9.3	**PRESSURE (kgf/cm²):**		
9.4	**BEARINGS:**		
9.5	**OVERLAY:**		
9.6	**GASKET BOX:**		
9.7	**PEDESTAL:**		
10	**SEALING INJECTION (note 2)**		
10.1	**SEALING PLAN:**		
10.2	**FLOW (m³/h):**		
10.3	**PRESSURE (kgf/cm²):**		
10.4	**FLUID:**		
10.5	**FLUID TEMPERATURE (°C):**		
11	**AUXILIARY SEALING**		
11.1	**PLAN:**	*N/A*	
11.2	**FLOW (m³/h):**	*N/A*	
11.3	**PRESSURE (kgf/cm²):**	*N/A*	
11.4	**FLUID:**	*N/A*	
11.5	**FLUID TEMPERATURE (°C):**	*N/A*	
12	**HEATING**		
12.1	**HEATING SYSTEM:**	*NOT REQUIRED*	
12.2	**FLUID:**	*N/A*	

NOTAS:

1) The Supplier shall provide the Data Sheet for the Mechanical Seal and the Sealing System separately.

2) To be filled by supplier.

NUMBER:	569-DB7B-MEC-711-003	CLIENT NR:	PRD-MEC-DSH-018

TITLE

CENTRIFUGAL PUMP - P-PCH-7B-3 / P-PCH-7B-4

SHEET: 5/5

REV.: 0

13	**COUPLING (note 4)**				
13.1	**MODEL:**	note 1			
13.2	**TYPE:**	FLEXIBLE			
13.3	**SIZE:**	note 1			
13.4	**DISPLACEMENT (mm):**	5.0			
13.5	**MANUFACTURER:**	note 1			
14	**MATERIALS**				
14.1	**CASING:**	A48CL 30B OR SIMILAR			
14.2	**IMPELLER:**	A48CL 30B OR SIMILAR			
14.3	**SHAFT:**	SAE 1045			
14.4	**SHAFT SLEEVE:**	AISI 316			
14.5	**LANTERN RING:**	N/A			
14.6	**METALLIC BASE:**	ASTM A36			
14.7	**COUPLING PROTECTION:**	BRASS			
14.8	**CASE WEAR RING:**	AISI 316			
14.9	**IMPELLER WEAR RING:**	AISI 316			
14.10	**AUXILIARY PIPING:**	AISI 316			
14.11	**NAMEPLATE:**	AISI 304			
15	**DRIVER 2) 3)**				
15.1	**TYPE:**	ELECTRIC MOTOR (TFVE)	**INSULATION CLASS:**	F	
15.2	**POWER (CV):**	note 1	**SERVICE FACTOR:**	1.25	
15.3	**ROTATION (RPM):**	1800	**ZONE / TEMP. CLASS / GROUP:**	N/A	
15.4	**TENSION (V)**	220/380/440	**PROTECTION:**	IP55	
15.5	**N° OF PHASES :**	3	**CONSTRUCTIVE FORM / ASSEMBLY:**	B3D	
15.6	**FREQUENCY (Hz):**	60	**MANUFACTURER:**	ACCORDING TO VENDOR LIST	
15.7	**SPEED CONTROL:**	Yes (note 6)	**SCOPE:**	PUMP MANUFACTURER	
17	**TESTS**				
17.1	**HIDROSTATIC:**	CERTIFIED			
17.2	**PERFORMANCE:**	CERTIFIED			
17.3	**MECHANICAL OPERATION:**	CERTIFIED			
17.4	**NPSH:**	CERTIFIED			
17.5	**DISASSEMBLY AFTER TEST:**	CERTIFIED			
17.6	**HIDROSTATIC TEST PRESSURE (bar g):**	note 1			
17.7	**CASING DESIGN PRESSURE (bar g):**	note 1			
18	**WEIGHTS**				
18.1	**PUMP (kg):**	note 1	**DRIVER (kg):**	note 1	
18.2	**COUPLING (kg):**	note 1	**BASE (kg):**	note 1	
18.3	**COUPLING PROTECTION (kg):**	note 1	**TOTAL (kg):**	note 1	
19	**PAINTING**				
19.1	**SPECIFICATION:**	note 1			
19.2	**SCHEME:**	note 1			

NOTAS:

1) To be filled by supplier.

2) The Supplier shall provide the Data Sheet for Electric Motor separately.

3) The motor must be dimensioned to meet the demand corresponding to all operating points of the characteristic curve, referring to the selected impeller.

4) The coupling protection must comply with NR-12.

5) Reference document: PRD-MEC-TSP-005 (TECHNICAL SPECIFICATION – WATER PUMPS)

6) The electric motor has a frequency inverter to enable balancing and control water flow.The frequency inverter shall be supplied with communication protocol in Ethernet and compatible with the Wonderware platform (BMS System).