Base Load Power Hub (BLPH)

TDS - Desalination Unit (SWRO) - A-50007

Document Number: 123A90-DDL-MAC-DS-50022

Document Class: 2

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Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
00	ISSUE FOR REVIEW (IFR)
01	ACCEPTED FOR CONSTRUCTION (AFC)

HOLDS LIST

No.	Description
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General Notes

1) The DesalinationUnit is a Seawater Reverse Osmosis (SWRO) Unit and is sized to provide nominally 0.82 Sm3/h of fresh water to meet the demand of the downstream Electrolyser Package. The Desalination Unit is designed to have CIP facilities (which will defined in the package vendor documentation)in order to selfclean when necessary (i.e., when the pressure drop across the membranes is above the acceptable threshold, the flow through the membranes decreases beyond acceptable bounds or there is increased salt content in the permeate). The necessary chemicals required for CIP functionality will be provided by the vendor, and inadequate quantities such that restocking during BLPH's 2-year life will not be required.

2) The Desalination Unit is Included in Water Treatment Package A-50000 (WTP)

3) The Desalination Unit, being part of WTP, shall be selected by WTP Supplier that, in order to cope Fresh Water charateristics, according to K559-2254-PM-PLN-003, para 8.3.2 Fresh Water Quality, WTP Vendor is allowed to pursue alternative solutions respect to the Note 1) that shall not be considered strictly mandatory

4) According to the criterion explained in the above Note 3) WTP supplier shall provide this Data Sheet duly filled in.

Rev
1
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1

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APPLICABLE TO: ○ PROPOSAL ● PURCHASE ○ AS BUILT

FOR **Crosswind** UNIT WATER SYSTEM

SITE **BLPH - Hollandse Kust Noord (HKN)**

SERVICE **DESALINATED SEAWATER**

MANUFACTURER SERIAL NO.

NOTE: INFORMATION TO BE COMPLETED BY: ○ PURCHASER ☐ MANUFACTURER ◯ PURCHASER OR MANUFACTURER

OPERATING DATA

- ○ SOURCE **Filtered Sea Water Tank** ○ INTAKE
- ● SUPPLY FLOW: NORMAL 2 DESIGN (m³/h) (total)
- ● SUPPLY PRESSURE MIN: (°C) MAX: **TBC** (barG)
- ○ WATER TEMPERATURE: MIN: **1,3** (°C) MAX: **23** (°C)
- ● PRODUCT FLOW- NORMAL 0,8 (m³/h) DESIGN (m³/h) each unit
- ○ PRODUCT PRESSURE MIN: **3** (°C) MAX: **TBC (1)** (barG)
- ● PRODUCT WATER USE: Fresh Water Tank Supply
- ○ REDUNDANCY

SCOPE (2)

● RO SKIDS	● FEED PUMPS
● CARTRIDGE FILTER	● HIGH PRESSURE PUMPS
● ON -SKID PIPING AND VALVES	● INTERCONNECTING PIPING
○ CLEAN-IN-PLACE SYSTEM	● INSTRUMENTS AND CONTROLS
○ DECARBONATOR SYSTEM	● CHEMICAL FEED SYSTEMS
○ PRODUCT SURGE TANK	○ POST-TREATMENT SYSTEMS
○ ENERGY RECVY DEVICE	● CONTAINERIZED

MEMBRANE DETAILS

- ◯ ELEMENT MANUFACTURER / MODEL
- ◯ AREA / ELEM (m²)

GUARANTEE CONDITIONS (RO)

- ○ OPERATING PERIOD **2** Years
- ○ PROD. WATER TDS - MAX. (ppm) 1ST PASS 2ND PASS

SUPPLIER DESIGN BASIS

◯ NUMBER OF PASSES: ◯ SINGLE ◯ DOUBLE

RO PERFROMANCE	1ST PASS	2ND PASS
ARRAY CONFIG.		
ELEMENT / PV		
FEED FLOW	(m³/h)	(m³/h)
FEED PRESS	(barG)	(barG)
PROD FLOW	(m³/h)	(m³/h)
CONC. FLOW	(m³/h)	(m³/h)
CONC. PRESS	(barG)	(barG)
RECOVERY	(%)	(%)
AVG. FLUX	(l/m²/hr)	(l/m²/hr)
FOUL FACTOR	(%)	(%)
SALT PASS INCR.	(%)	(%)
PROD BACK PRESS	(barG)	(barG)

ENERGY RECOVRY DEVICE

- ☐ TYPE ☐ MANF.
- ☐ NUMB. R'QD ☐ ENERGY RECOVERED (HP)

PRESSURE VESSEL DETAILS

- ☐ MANUFACTURER:
- ● ASME DESIGN ○ ASME CODE STAMP REQUIRED
- ○ FEED PIPING CONNECTION - ○ END ○ SIDE
- ○ MATERIAL OF CONSTRUCTION ☐ DESIGN TEMP: (°C)

	1ST PASS	2ND PASS
NUM. REQUIRED:		
DIAMETER:	(mm)	(mm)
LENGTH	(mm)	(mm)
HYD TEST PRESS:	(barG)	(barG)
DESIGN PRESS:	(barG)	(barG)

CHEMICAL INJECTION

◯ BISULFITE	◯ FIRST PASS	◯ SECOND PASS	◯ OTHER
◯ ACID	◯ FIRST PASS	◯ SECOND PASS	◯ OTHER
◯ CAUSTIC	◯ FIRST PASS	◯ SECOND PASS	◯ OTHER
◯ AITISCALENT	◯ FIRST PASS	◯ SECOND PASS	◯ OTHER
◯	◯ FIRST PASS	◯ SECOND PASS	◯ OTHER
◯	◯ FIRST PASS	◯ SECOND PASS	◯ OTHER

Notes

(1) Vendor to advise actual data (not less than 3 barg)

(2) The scope is indicative. Vendor shall propose the best and efficient solution by including components suitable to reach water characteristics

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MECHANICAL COMPONENTS

CARTRIDGE FILTER

- ○ ITEM NUMBER _____ ○ NUMBER OF UNITS _____
- ☐ MANUFACTURER / MODEL NO.: _____
- ☐ DIFF. PRESSURE - CLEAN: _____ (bar) MAX: _____ (bar)
- ☐ FILTER REMOVAL RATING: _____ micron FILTER LENGTH _____ (mm)
- MATERIALS OF CONSTRUCTION:
- ☐ HOUSING: _____ ☐ FILTER ELEMENTS: _____
- FILTER VALVES REQUIRED: ○ VENT ○ DRAIN ○ ISOLATION

PIPING AND VALVES

PIPING	MATERIAL	MATERIAL SPECIAL R'QMTS
◯ 1ST PASS HIGH PRESS.		
◯ 1ST PASS LOW PRESSURE		
◯ 2ND PASS HIGH PRESS.		
◯ 2ND PASS LOW PRESSURE		

RELIEF VALVES

- ☐ NUMBER PROVIDED: _____ ☐ SET PRESSURE: _____ (psig)
- ☐ MANUFACTURER / MODEL NO.: _____
- ☐ MATERIALS OF CONSTRUCTION:

VALVES (1st PASS)	TYPE	SIZE	M or A	RATING	SPECIAL
◯ PUMP INLET					
◯ 1ST STAGE INLET					
◯ PRODUCT OUTLET					
◯ PRODUCT DUMP					
◯ REJECT OUTLET					
◯ FLUSH IN / OUT					
◯ CLEANING IN / OUT					
◯ ISOLATION					

VALVES (2nd PASS)	TYPE	SIZE	M or A	RATING	SPECIAL
◯ PUMP INLET					
◯ 1ST STAGE INLET					
◯ PRODUCT OUTLET					
◯ PRODUCT DUMP					
◯ REJECT OUTLET					
◯ FLUSH IN / OUT					
◯ CLEANING IN / OUT					
◯ ISOLATION					

SUPPLY PUMP (1st PASS) DATA SHEET # _____

- ○ ITEM NUMBER _____ ○ NUMBER OF PUMPS _____
- ☐ MANUFACTURER / MODEL NO.: _____
- ◯ TYPE: _____ ☐ MULTI-STAGE _____ #
- ☐ RATED FLOW: _____ (m³/h) ☐ HEAD: _____ (m)
- ◯ MATERIALS OF CONSTRUCTION:

MOTOR DATA SHEET # _____

- ○ ITEM NUMBER _____ ○ NUMBER OF MOTORS _____
- ◯ MANUFACTURER:
- ☐ POWER _____ (kW) ☐ SPEED _____ (rpm) ☐ SERV. FACTOR _____
- ☐ FRAME SIZE _____ ☐ ENCLOSURE _____
- ○ VOLTS _____ (V) PHASE _____ HERTZ _____

SUPPLY PUMP (2nd PASS) DATA SHEET # _____

- ○ ITEM NUMBER _____ ○ NUMBER OF PUMPS _____
- ☐ MANUFACTURER / MODEL NO.: _____
- ◯ TYPE: _____ ☐ MULTI-STAGE _____ #
- ☐ RATED FLOW: _____ (m³/h) ☐ HEAD: _____ (m)
- ◯ MATERIALS OF CONSTRUCTION:

MOTOR DATA SHEET # _____

- ○ ITEM NUMBER _____ ○ NUMBER OF MOTORS _____
- ◯ MANUFACTURER:
- ☐ POWER _____ (kW) ☐ SPEED _____ (rpm) ☐ SERV. FACTOR _____
- ☐ FRAME SIZE _____ ☐ ENCLOSURE _____
- ○ VOLTS _____ (V) PHASE _____ HERTZ _____

◯ CONNECTIONS

		NO.	SIZE	RATING / FACING / TYPE
a	SUPPLY 1st PASS			
b	PRODUCT 1st PASS			
c	REJECT 1st PASS			
d	DRAIN 1st PASS			
e	SUPPLY 2nd PASS			
f	PRODUCT 2nd PASS			
g	REJECT 2nd PASS			
h	DRAIN 2nd PASS			
i	CLEANING			
j				

MISCELLANEOUS

- ○ SHOP COATING ○ INSPECTION ○ FINISH PAINTING: (1) _____ ● HYDROTEST
- ○ SANDBLAST ● SPOT RADIOGRAPHY (PER CODE) ○ PMI

NOTES

(1) C3 according to specification 123A90-DDL-MAT-SP-60006Coating and Painting spec

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Control Panel and Instrument Data Sheet

Scope of Supply

- ○ PLC, operating software, and instrumentation only (DCS Control)
- ● Complete Control System including: _____
- ○ Instrument only
- ○ Other: _____

Operator Panel (MMI)

- ○ Location ○ Outdoors ● Sheltered ○ Indoors
- ○ Mounting ○ Free Standing Console ○ Console Mount
- ○ Proximity to Demin Unit ○ With the Unit ○ Local Control room ○ Main Control room
- Communication with PLC: ☐ Profinet ☐ Integral ☐ Hard-wired **with Safety System**
- CRT Display: ☐ Screen Size _____ ☐ High Resolution ☐ Colour Graphics ☐ Keyboard Type
- CONSOLE: ○ IEC Rating **IP 31 min.** Material **AISI 316**
- ☐ Dimension s ☐ Length _____ (mm) ☐ Width _____ (mm) ☐ Height _____ (mm)
- _____ ☐ Weight _____ (kg) ☐ Wall Thickness _____ (mm)
- ☐ Electrical Load ☐ Power _____ (kW) ○ Volts 230 ○ Phase 1P+N+PE ○ Hertz 50
- ○ Special Provisions ○ Sun & rain shield for display ○ See-through door for display ○ Printer
- ○ Air conditioner ○ Heater

Programmable Logic Controller (PLC)

- ☐ Manufacturer _____ ☐ Model No. _____ ○ Location ○ Outdoors ○ Sheltered ○ Indoors
- ○ Proximity to Unit ○ With the Unit ○ Local Control room ○ Main Control room ○ Other _____
- ☐ I/O Information

	Inputs		Outputs	
	Required	Wired Spare	Required	Wired Spare
☐ analog (4-20mA DC)				
☐ discrete (120 VAC)				
☐ discrete (24 VDC)				
☐ isolated discrete (120 VAC, triac)				
Total				

- ☐ Communication with Operator Console: ☐ RS-232 Port ☐ Integral ☐ Hard Wired
- ☐ Communication with main DCS: ☐ RS-232 Port ☐ Integral ☐ Hard Wired
- ☐ Electrical Load ☐ Power _____ (kW) ○ Volts 230 ○ Phase 1P+N+PE ○ Hertz 50
- ☐ Enclosure ○ IEC Rating _____ ☐ Material _____
- ☐ Dimension s ☐ Length _____ (mm) ☐ Width _____ (mm) ☐ Height _____ (mm)
- ☐ Number of Compartment _____ ☐ Weight _____ (kg) ☐ Wall Thickness _____ (mm)
- ◯ Terminal Block Mfr. _____ ☐ Type ☐ Number
- ○ Special Provisions ○ Ventilation fan ○ Air conditioner ○ Heater
- ○ Screen and filter ○ Louvers ○ Rain shield over access door
- ○ Redundant CPU ○ UPS ○ Programming device & software
- ○ Internal fluorescent lights ○ Light Switch ○ Convenience outlet

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Control Panel and Instrument Data Sheet

DESIGN, MANUFACTURE, AND TESTING SHALL CONFORM TO KBR SPECIFICATION: _____

Locally Mounted Analysers and Instruments — Electrical Classification ○ CL ○ Div ○ Gr ○ Unclassified _____

	◯ Manufacturer	☐ Model No	☐ Qty	○ Location of Monitoring Points
○ Differential Pressure Transmitters				
○ Differential Pressure Switches				
○ Pressure Transmitters				
○ Pressure Indicators				
○ Temperature Indicators				
○ Temperature Transmitters				
○ Flow Transmitters				
○ Flow Indicators				
○ Level Transmitters				
○ Silica Analyzer				
○ Sodium Analyzer				
○ Conductivity Analysers / Transmitters				
○ pH Analysers / Transmitters				

Control Strategies and Interfaces

○ Service Flow Control — ○ External (by purchaser) Product tank inlet flow regulated by level control; ○ Internal (by supplier) Individual unit effluent valves regulated independently

○ Low Flow Control System: — ○ None; ○ Recirculation

○ Cleaning System Control: — ◯ By, ◯ Manual — Supplied by : ○ Purchaser ○ Supplier

○ Emergency Shutdown: _____

○ Panel Testing: _____

NOTES:

Instruments shall be explosion-proof EEx(d)-certified and be suitable for use in hazardousarea zone 2, gas group 2C (or 2B+H2), Temperature Class T1 max.sur

Instrumentation 4-20mA shall be 24 Vdc loop powered Smart HART Revision 7

instrumentation that is part of the SIS, including final elements (e.g., valves), shall, as a minimum, be certified for use in a Safety Integrity Level (SIL) 2 SIF with a mini

of two of two(2) years (to be developed during HAZOP and LOPA exercises).

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CLEANING EQUIPMENT (One system for the Package)

TYPE - ◯ CLEAN-IN-PLACE ◯ REMOVE FOR CLEANING

☐ NUMBER OF RO TUBES TO BE CLEANED SIMULTANEOUSLY: _____

☐ CLEANING SYSTEM FLOWRATE _____ (m³/h)

SCOPE - ● SOLUTION TANK ● CLEANING PUMP ● PIPING ● CARTRIDGE FILTER ● CONNECTORS ● VALVES ○ SOLUTION HEATER ● INSTRUMENTATION ● PLATFORM

Cleaning Solution Tank ○ Item Number _____

☐ Dimensions - Diameter _____ (mm) Height _____ (mm)

☐ Volume Nominal _____ (m³) Working _____ (m³)

☐ Wall Thickness _____ (mm)

◯ Corrosion Allowance _____ (mm)

◯ Materials of Construction _____

Solution Pump

○ Item Number _____ ○ Number of Units _____

◯ Manufacturer / Model Number _____

☐ Type _____

☐ Rated Flow _____ (m³/h) ☐ Head _____ (bar)

◯ Materials of Construction _____

Filter ○ Item Number _____ ○ Nbr of Units _____

◯ Manufacturer / Model Number _____

○ Filter Valves Required: Vent / Drain / Isolation

○ ASME Code stamp (if required)

☐ Delta P - Clean: _____ (bar) Maximum: _____ (bar)

☐ Filter Removal Rating _____ micron

◯ Materials of Construction Housing: _____ Element: _____

Motor

○ Item Number _____

◯ Manufacturer _____

☐ Power _____ ☐ Speed _____ (rpm) ☐ Service Factor _____

☐ Frame size _____ Enclosure _____

○ Volts _____ (V) ○ Phase _____ ○ Hertz _____

Cleaning Solution Immersion Heater

○ Item Number _____ ○ Number of Units _____

☐ Manufacturer / Model Number _____

☐ Heat Duty: _____ (kW) ☐ Flux Density: _____ (W/in²)

☐ Mounting: _____ ☐ Enclosure _____

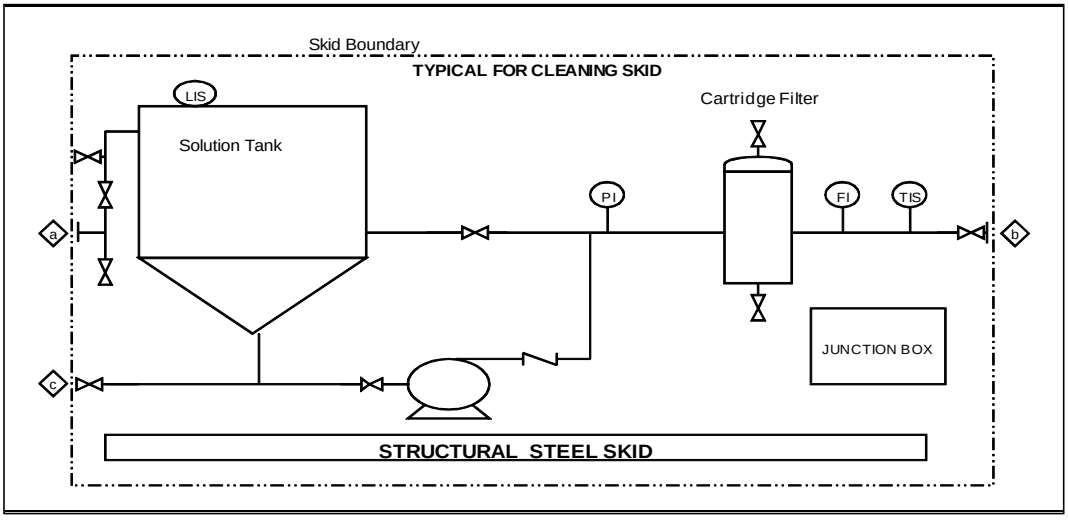
☐ Thermostat ☐ Temperature Control Range: _____

○ Volts _____ (V) ○ Phase _____ ○ Hertz _____

☐ Materials of Construction

Instruments	Location	Manufacturer
◯ Flow Indicator	Filter Discharge	
◯ Pressure Gauge	Pump Discharge	
◯ Level Indicating Switch	Tank	
◯ Thermometer	Tank	
◯ Temp. Indicating Switch	Tank	

Miscellaneous	TYPE	MATERIAL	DESCRIPTION	SPECIAL REQUIREMENTS	Connections		NO.	SIZE	RATING	FACING	TYPE
◯ PIPING					a	INLET					
◯ VALVES					b	OUTLET					
◯ CONNECTORS					c	CONC.					



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NOTE: INFORMATION TO BE COMPLETED BY: ○ PURCHASER ☐ MANUFACTURER ☒ PURCHASER OR MANUFACTURER

DESIGN, MANUFACTURE & TESTING SHALL CONFORM TO: KBR SPECIFICATIONS: OTHER:

NO. PUMPS REQ'D NO.MOTORS REQ'D ITEM NO. PROVIDED BY: MTD. BY

SERVICE NO. TURBINES REQ'D ITEM NO. PROVIDED BY: MTD. BY

PUMP MANUFACTURER SIZE AND TYPE NO.STAGES

SERIAL NUMBER(s)

OPERATING CONDITIONS, EACH PUMP

○ LIQUID ○ Flow Rate (m³/h) @ PT NOR. RATED:

☒ DISCHARGE PRESSURE: (barG)

○ PT, NOR (°F) MAX ☒ SUCT.PRESS (barG) NOR. RATED:

○ SP.GR.AT PT ☒ DIFF.PRESS (barG) NOR. #

○ VAP.PRESS. AT PT (mbarA) ☒ DIFF.HEAD (m) NOR. #

○ VIS AT PT, (mPa-s) ○ NPSHA AT BOTTOM OF BASEPLATE, (m)

○ CORROSION / EROSION CAUSED BY

☒ HYD. HP

PERFORMANCE

☐ PROPOSAL CURVE NUMBER

☐ (rpm) ☐ MIN. CONT. (m³/h)

☐ EFF.-N/R ☐ BHP -RATED.

☐ BHP RATED IMP. NOR.

☐ Max. Head Rated Imp. Nor.

☐ NPSHR (Water at Bottom of Baseplate), (m)

☐ Rotation (Viewed from Coupling End)

☐ Suction Specific Speed

CONSTRUCTION

NOZZLES	SIZE	RATING	FACING	LOCATION	FINISH
SUCTION					
DISCHARGE					

☐ **CASE** - MOUNT: ☐ HORIZONTAL: ☐ C.L. ☐ FOOT ☐ BRACKET
☐ VERTICAL ☐ INLINE ☐ PIT
- SPLIT: ☐ AXIAL ☐ RADIAL
- TYPE: ☐ VOLUTE: ☐ SINGLE ☐ DOUBLE ☐ DIFFUSER
- PRESSURE: ☐ MAWP (barG) @ (°C)
☐ HYDROTEST (barG)

☐ **IMPELLE**I - DIAIAM: ☐ RATED (m) MAX: (m) MIN: (m)
- TYPE: ☐ CLOSED
- SUCT: ☐ SINGLE ☐ DOUBLE
- MOUNT: ☐ BETWEEN BEARING ☐ OVERHUNG

☐ **BEARING** -TYPE / IDENTIFYING NO. -(OR SIZE)
☐ RADIAL
☐ THRUST

☐ **LUBE** ☐ FLOOD ☐ RING ☐ FLINGER ☐ PRESSURE ☐ GREASE
☐ MIST ☐ PURE ☐ PURGE

☐ **COUPLING:** MANUFACTURER: MODEL: SIZE:
SPACER LENGTH:
☐ RATED (kW) @ (rpm)
○ DRIVER HALF MOUNTED BY -
○ PUMP MANUFACTURE ○ DRIVER MANUFACTURE ○ PURCHASER

☐ **SHAFT SEALING DATA**
☒ MECHANICAL SEAL: ☒ API CLASS CODE:
☐ MANUFACTURER: TYPE:
☐ MANUFACTURE CODE:
☐ SEAL PLAN

☐ **APROX WEIGHT** ☐ PUMP & BASE: (kg)
☐ MOTOR: (kg) TURBINE: (kg)

MATERIALS

○ API 610 CLASS
☒ CASING
☒ IMPELLER(S)
☒ CASE WEAR RINGS:
☒ IMPELLER WEAR RINGS:
☒ SHAFT:
☒ SLEEVE:
☒ BASEPLATE:
☒ BASEPLATE TYPE:
○ BASEPLATE STD. NO. ○ API: ○ ANSI:
○ BASEPLATE CONST: ○ STAND. ○ HEAVY DUTY

AUXILIARY PIPING

○ API CW PLAN: ○ CS ○ SS ○ CU ○ GALV
○ TUBE ○ PIPE ○ SIGHT FLOW
○ OUTLET SHUTOFF VALVE
☐ CW IN (barG) @ (°C)
☐ CW OUT (barG) @ (°C)
☐ FLOW PER PUMP (m³/h)
○ MAX ALLOW DP (barG)
○ PRIMARY SEAL FLUSH PLAN
○ PRI. PIPING ○ CS ○ SS ○ TUBE ○ PIPE
○ SEC. PIPING ○ CS ○ SS ○ TUBE ○ PIPE
○ EXTERNAL SEAL FLUSH FLUID
(m³/h) (barG) TI PS FI
○ AUXILIARY SEAL QUENCH FLUID
(m³/h) (barG) (°C)
○ PIPING ASSEMBLY ○ THREADED ○ FLANGED
○ SEAL WELDED ○ SOCKET WELDED
○ CASE DRAINS: SIZE: (m) ○ PLUGGED ○ FLANGE
○ VENTS: SIZE: (m) ○ PLUGGED ○ FLANGE

FOR SHOP TESTS

	REQ	WIT	OBS	BY*
HYDRO	○	○	○	
PERF.	○	○	○	
NPSH	○	○	○	
OTHER	○	○	○	

* I : KBR INSPECTOR, E : KBR ENGINEER, C : CLIENT

NOTES

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Applicable to : ○ Proposal ● Purchase ○ As Built | PAGE ____ OF ____ REQ'N NO. ____

DESIGN, MANUFACTURE & TESTING SHALL CONFORM TO SPECIFICATION : ____

FOR **CROSSWIND** UNIT **WATER SYSTEM**

SITE **BLPH - Hollandse Kust Noord (HKN)**

SERVICE ____ DRIVEN EQUIPMENT TYPE ____ DRIVEN EQUIP. ITEM NO.: ____ QUANTITY: ____

MANUFACTURER ____ MODEL: ____ SERIAL NO. ____ FRAME NO: ____

NOTE: INFORMATION TO BE COMPLETED BY: ○ PURCHASER ☐ MANUFACTURER ◯ PURCHASER OR MANUFACTURER

OPERATING CONDITIONS (1)

Site Data: Marine Enviroment

○ Altitude: ○ Less than ____ ● Other 23.31 (m)

○ Ambient Temperature: Min/Max 8,4 ____ / 25 (°C)

Electrical Characteristics:

○ Volts 400 ○ Phase 3 ○ Hertz 50

Starting Voltage: ○ Full ○ Reduced ____ %

○ Volt Dip +10/-20 % ○ Loaded ○ Unloaded

Installation: ○ Indoor ● Outdoor

Operating Mode ○ Continuous ○ Standby ○ Intermittent ○ Alter.

Electrical Area Classification ____ ● Unclassified

○ Class ____ ○ Group ____ ○ Division ____

○ Unusual Conditions ○ Dust ○ Fumes

○ Gasses/Vapours ____

○ Ignition Temp ____ (°C) ○ Temperature Code ____

PERFORMANCE

Nameplate Power ____ (kW) ____ (rpm)

Load	Current (AMPS)	Efficiency	Power Factor
Full			
75%			
50%			
Locked Rotor			

☐ No Load Current: ____ (A)

☐ Starts per Hour: ____ Hot ____ Cold

☐ Full Load Torque: ____ (N-m)

☐ L. R. Torque: ____ %FLT

☐ Breakdown Torque: ____ %FLT

☐ Acceleration Time: ____ (sec)

CONSTRUCTION FEATURES

Enclosure ○ TEFC ○ WP1 ○ WP2 ○ Explosion Proof ○ Other

Insulation Class ○ B ● F ○ Other ○ Non-Hygroscopic ○ Tropicalized

○ Temperature Rise: ____ (°C) Above ____ (°C) By: ____ @ ____ S.F.

○ NEMA Torque Design ○ A ○ B ○ C ○ D

◯ Locked rotor kVA Code ____

Mounting

○ Horizontal ○ Foot Mounted ○ Flange Mounted

○ Vertical ○ Shaft Up ○ Shaft Down ○ With Canopy

Coupling

○ Supplied By ____ ○ Mounted By ____

○ Suitable for Belt Drive

Bearing type ☐ Ball ☐ Roller ☐ Sleeve

Bearing Lubrication ◯ **Grease** ◯ **Ring Oil** ○ **Oil Mist**

Grease Fitting ◯ **Plugged** ○ **Alemite** ○ **Other**

Bearing Shielding ◯ Single ◯ Double ◯ Sealed for Life

Motor Rotation (facing end opposite shaft extension)

○ CW ○ CCW ○ Bidirectional

Fan ○ Reversible ○ Unidirectional

○ Non-Sparking ○ Aluminium ○ Non-Metallic

Main Terminal Box Location ◯ F-1 ◯ F-2

○ Space Heater **(2)** ☐ ____ (kW)

○ Volts 230 ○ Pha: 1P+N+PE ○ Hertz 50

○ Max. Sheath Temperature ____ (°C)

○ Winding Temperature Detectors

○ No. per Phase ____ Type: RTD

○ Bearing temperature Detectors

○ Location ____ Type: ____

○ Separate JB for Space Heaters, Winding/Bearing Detectors

○ Adjustable Frequency Drive

◯ Speed range: From ____ (rpm) to: ____ (rpm)

Materials of Construction

◯ Frame

◯ Junction Box

○ Copper Bar Rotor

○ Stainless Steel Filters

○ Differential Pressure Switch for Inlet Filters

○ Vertical Jackscrews

Ground Connection

○ Drilled and tapped Hole in Conduit Box

○ Ground Lug ☐ Size ____ (mm)

Motor Thrust Load ○ None ○ ____ (N)

Thrust Direction ○ Toward ○ Away

☐ Motor Thrust Rating

Nameplate Material ○ 316 SS ○ Other

TESTING & MISCELLANEOUS

Testing	Required	Witness
Routine Test	○	○
Complete Test	○	○
Noise Test	○	○
Certified Results	○	○

☐ Weight Net ____ (kg) Shipping ____ (kg)

Painting ○ Mfr. Std. ○ Other ○ IEEE 841

Noise Design

○ Max sound Pressure Level @ ____ (m) ____ dBA

☐ Expected Sound Pressure Level @ ____ (m) ____ dBA

Notes:

(1) Refer to pump DS

(2) Vendor to install space heater if necessary according to enviromental conditions (Ref. IOGP S-703 par. 11.3.6.1)

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OPERATING CONDITIONS

- Service: Desalination Unit
- Temperature: 1.3 - 22.7 (°C)
- Source of Water: Filtered Sea Water Tank
- Type of Water Treatment:
- Intermediate 1 =
- Intermediate 2 =
- Intermediate 3 =

WATER ANALYSIS

Constituent			Water In	Intermediate 1	Intermediate 2	Product Water Spec 1	Product Water Spec 2
			Filtered Sea Water				
Calcium	(Ca)	(ppm)					
Magnesium	(Mg)	(ppm)					
Sodium	(Na)	(ppm)					
Potassium	(K)	(ppm)					
Total Cations as CaCO3		(ppm)					
Bicarbonate	(HCO_3)	(mg/l)					**<90**
Carbonate	(CO_3)	(ppm)					
Hydroxide	(OH)	(ppm)					
Chloride	(Cl)	(ppm)					
Sulphate	(SO_4)	(ppm)					
Phosphate	(PO_4)	(ppm)					
Nitrate	(NO_3)	(ppm)					
Total Anions as CaCO3		(ppm)					
Total Hardness		(ppm)					
Phenolphthalein Alkalinity		(ppm)					
Methyl Orange Alkalinity		(ppm)					
Total Alkalinity as CaCO3		(ppm)					
Iron (Total)		(ppm)					
Copper (Total)		(ppm)					
Manganese		(ppm)					
Aluminium		(ppm)					
Nitrogen, Argon, Helium (Total)		(%mol)					**0,1**
Carbon Dioxide, Free		(ppm)					
Silica		(ppm)					
Turbidity		NTU					
Total Suspended Solids		(ppm)					
Colour		Hazen					
Chlorine, Free		(mg/l)				**<0.5**	**<1**
pH (@ 25°C)		Units					
Conductivity		µmhos/cm				**<703**	**<1000**
Total Dissolved Solids		(mg/l)					**<350**
Total Organic Carbon as TOC		(ppm)				**<3**	**<5**
Silt Density Index (SDI)						**<3**	**<5**
Langelier Index							
Ryznar Index							
Oily Matter		(ppm)					

Notes

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OPERATING CONDITIONS

Service _____

Temperature _____ (°C)

Source of Water _____

Type of Water Treatment _____

Process Description

Intermediate 1 = _____

Intermediate 2 = _____

Intermediate 3 = _____

Waste Water Analysis/Limits

Constituent		Water In	Intermediate 1	Intermediate 2	Intermediate 3	Effluent Limits
BOD5	(ppm)					
COD	(ppm)					
Chromium (total)	(ppm)					
Chromium (hexavalent)	(ppm)					
Copper	(ppm)					
Iron	(ppm)					
Cyanide Total	(ppm)					
Cyanide Free	(ppm)					
Lead	(ppm)					
Nickel	(ppm)					
Mercury	(ppm)					
Vanadium	(ppm)					
Phenol	(ppm)					
Benzene	(ppm)					
Benzo(a)pyrene	(ppm)					
Sulphides	(ppm)					
Total Nitrogen	(ppm)					
Total Phosphorus	(ppm)					
Temperature Increase	(°C)					

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