ASME B73.3 SEALLESS PUMP DATA SHEET

Contract:	A8KM
Item No.:	18-P-1858 / 1858S
Revision:	1
Date:	5-May-2023
P.O No.	SM00004856
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ISSUED FOR: ☐ PROPOSAL ☑ PURCHASE ☐ AS BUILT

SITE: World Energy Renewables Project / Paramount California

ITEM NAME:	Off-Spec Aqueous Ammonia Re-run Pump	CLIENT	World Energy Paramount
ITEM TAG NO.:	18-P-1858 & 18-P-1858S	PROJECT NO.:	A8KM
SERVICE:	Off-Spec Aqueous Ammonia Re-run Pump	PURCHASER ORDER NO.:	SM00004856
UNIT:	Aqueous Ammonia System	SUPPLIER/LOCATION:	Sundyne HMD Kontro / Eastbourne, UK
TYPE	Magnetic Drive Pump	SUPPLIER ORDER/SERIAL NOS.:	840606-840607

DATA PROVIDED BY: ● PURCHASER ■ SUPPLIER ◆ SUPPLIER IF NOT BY PURCHASER

● GENERAL

NO. REQ.:	1 x 100% Note 2.3	◆ PUMP SIZE:	1.5 x 1 x 8	◆ MODEL:	GSA 1.5x1x8-L3 DA4
NUMBER MOTOR DRIVEN:	One (1)	NUMBER TURBINE DRIVEN:	N/A		
MOTOR ITEM NUMBER:	18-P-1858M	TURBINE ITEM NUMBER	N/A	GEARBOX ITEM NUMBER:	N/A
MOTOR PROVIDED BY:	Pump Supplier	TURBINE PROVIDED BY:	N/A	GEARBOX PROVIDED BY:	N/A
MOTOR MOUNTED BY:	Pump Supplier	TURBINE MOUNTED BY:	N/A	GEARBOX MOUNTED BY:	N/A

● OPERATING CONDITIONS

	RATED	MAX.	NORMAL	MIN.	
NPSHa Datum	C.L.Impeller				
CAPACITY:	25				gpm
SUCTION PRESSURE:	0.6	55			psig
DISCHARGE PRESSURE:	56.7				psig
DIFFERENTIAL PRESSURE:	56.2				psi
DIFFERENTIAL HEAD:	142				ft
HYDRAULIC POWER	0.8				HP
AT DESIGNATED CAPACITY:	RATED	MAX.	NORMAL	MIN.	
OPERATING TIME:					%
NPSH AVAILABLE:	10.3	Excludes Req'd 3ft Margin			ft

SYSTEM DESIGN:
☑ STAND ALONE OPERATION ☐ PARALLEL OPERATION
☐ SERIES OPERATION WITH ITEM NUMBER:
SUCTION PRESSURE MIN/MAX: / psig

SERVICE:
☐ CONTINUOUS ☑ INTERMITTENT: STARTS/DAY

SYSTEM CONTROL METHOD:
☐ SPEED ☐ FLOW ☑ LEVEL ☐ TEMPERATURE
☐ PRESSURE ☐ PIPE FRICTION RESISTANCE ONLY

■ PERFORMANCE

PERFORMANCE CURVE NO.: K6-13/60-2

MEASURED AT CAPY.:	RATED	MAX.	NORMAL	MIN.
NPSH REQ'D.:	4.44			

TOTAL DIFFERENTIAL HEAD @ RATED IMPELLER: 142
MAX. DIFFERENTIAL HEAD @ RATED IMPELLER: 192
MINIMUM CONTINUOUS FLOW:
THERMAL: GPM STABLE: 5.9 GPM
ALLOWABLE OPERATING REGION: 5.9 TO: 35.1 GPM

BEST EFFICIENCY POINT FOR RATED IMPELLER: 27 GPM
SUCTION SPECIFIC SPEED: 6202
IMPELLER DIA.: RATED: 7 MAX.: 8.15 MIN.: 5.51
PUMP RATED POWER: 6.53 BHP EFFICIENCY: 12.9
MAXIMUM POWER @ RATED IMPELLER: 6.9 BHP
CASE PRESSURE RATING:
X MAX. ALLOWABLE WORKING PRES.: 256 PSIG @ 150 °F
X HYDROSTATIC TEST PRESSURE: 424 PSIG
CONTAINMENT SHELL PRESSURE RATING:
X MAX. ALLOWABLE WORKING PRES.: 256 PSIG @ 150 °F
X HYDROSTATIC TEST PRESSURE: 424 PSIG

● PUMPED FLUID

PUMPED FLUID: 19 wt% Aqueous Ammonia

	RATED	MAX.	NORMAL	MIN.	
PUMPING TEMP.:	100				°F
AT DESIGNATED TEMP.:					
SPECIFIC GRAVITY:	0.91				
VAPOR PRESSURE:	11.2				psia
VISCOSITY:	0.41				cP
SPECIFIC HEAT:					btu/lb°F

☐ VAPOR PRESSURE VS TEMPERATURE CURVE PROVIDED

LIQUID: ☑ HAZARDOUS ☐ FLAMMABLE
CORROSIVE / EROSIVE AGENT:
CHLORIDE CONCENTRATION: ppm
H_2S CONCENTRATION: ppm
OTHER:
% SOLIDS: MAX. PARTICLE SIZE: in

● SITE CONDITIONS

LOCATION:
☐ INDOOR ☐ HEATED ☐ UNDER ROOF
☑ OUTDOOR ☐ UNHEATED ☐ PARTIAL SIDES
ALTITUDE: 69 m
RANGE OF AMBIENT TEMPS. MIN./MAX.: 35 / 104 °F

UTILITY CONDITIONS:
VOLTAGE: 460
PHASE: 3
HERTZ: 60

ELECTRICAL CLASSIFICATION:
CL.: I GR.: B/C/D DIV.: 2 TEMP: T3C
☐ NON HAZARDOUS ☐ WINTERIZATION REQUIRED

● NOTES:

2.1. Pump centerline is assumed to be 3'-0" above grade and 27" above top of foundation.

2.2. Pump supports shall meet design load requirements per Project Spec. A8KM-PP-000-400002-A, Structural Data for Mechanical Equipment, and A8KM-PP-000-200001-A, Plant Site Data Sheet.

2.3 One (1) Warehouse Spare Pump shall be supplied along with the Working Pump.

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MAGNETIC DRIVE PUMPS

☑ MAGNETIC COUPLING
☐ EDDY CURRENT
☐ SOFT START REQUIRED

MAGNET SIZED TO HANDLE:
☑ RATED CAPACITY ☐ BEP ☐ FULL LOCKED MOTOR TORQUE

CONTAINMENT SHELL:

RADIAL CLEARANCE TO OUTER MAGNET RING: 0.036 in
RADIAL CLEARANCE TO INNER ROTOR: 0.033 in
MAGNET & BEARING FLUSHING (INT. / EXT.): INT
EDDY CURRENT LOSSES THROUGH SHELL: 1 KW
HEAT GENERATION IN THE SHELL:
DECOUPLE TORQUE: 30.979 lb ft SAFETY FACTOR:
LOCKED ROTOR TORQUE: lb ft

	OUTER	INNER	
MOUNTING METHOD:	Bonded	Bonded/Potted	
TEMP. LIMITATION:	302	302	°F
HERMETICALLY SEALED:	No	Yes	
NUMBER OF MAGNETS:	Proprietary	Proprietary	
TOTAL TORQUE:			lb ft

EXTERNAL ROTOR BEARINGS:
◆ MANUFACTURER:

COUPLING END BEARING TYPE / NO.:

IMPELLER END BEARING TYPE / NO.:

LUBRICATION: ☐ GREASE ☐ FLINGER ☑ CONSTANT LEVEL OILER
OTHER: ☑ 3/4in BULLS EYE SIGHT GLASS ☑ HOUSING VENT
(Note 3.2) ☑ ESCO SINGLE PIECE SIGHT GLASS FOR OIL DRAIN
☑ MAGNETIC DRAIN PLUG IN HOUSING REQUIRED

BEARING ISOLATORS: Inpro
OIL VISCOSITY ISO GRADE: 68

COUPLING: (Note 3.5)
MANUFACTURER: John Crane TYPE: Flexible Disc
SIZE: TSKS 0013 MODEL: Metastream TSKS
SPACER LENGTH: 100
◆ COUPLING GUARD: ☐ MANUFACTURER'S STANDARD
☑ NON-SPARK COUPLING GUARD REQUIRED
MATERIAL IF NOT SPECIFIED BY PURCHASER:

CANNED MOTOR PUMPS

☐ SOFT START REQ'D
☐ STATOR LINER: ☐ SECONDARY CONTAINMENT TO FULL PRESSURE RATING REQUIRED
RADIAL CLEARANCE TO ROTOR: in
◆ LINER TO CASING SEALING METHOD:
☐ SEAL WELDED ☐ OTHER:
HEAT GENERATION IN THE LINER: btu/hr
LOCKED ROTOR TORQUE: lb ft
◆ STATOR CAVITY:
☐ DRY ☐ OIL FILLED ☐ OTHER:
☐ ROTOR BEARINGS:
IMPELLER END BEARING TYPE:
OUTBOARD END BEARING TYPE:

NOTES:

MOTOR DRIVER

MANUFACTURER: BALDOR
HORSEPOWER: 10 SPEED: 3500 rpm
FRAME: 215 T ENCLOSURE: Cl.1 Div.2 Gr. A,B,C,D T3C
TYPE: SERVICE FACTOR: 1.15
NOTE:

MECHANICAL DATA

PUMP MUST MEET ASME B73.3 DIMENSIONAL REQUIREMENTS:
☑ YES ☐ NO

NOZZLE CONNECTIONS:

	SIZE	RATING	FACING
SUCTION:	1 1/2"	150#	RF
DISCHARGE:	1"	150#	RF
VENT			
DRAIN:	0.5"	☐ Threaded	☑ Welded and Flanged

IMPELLER TYPE:
☑ CLOSED ☐ OPEN ☐ SEMI-OPEN
☐ OTHER:

CASING MOUNTING:
☑ FOOT ☑ CENTERLINE ☐ VERTICAL IN-LINE
☑ CONTAINMENT SHELL / STATOR LINER PRESSURE RATING: 256 @ 150F

PAINT AND SHIPMENT PREPARATION

PUMP:	BASEPLATE:
☑ MANUFACTURER'S STD.	☑ MANUFACTURER'S STD.
☑ OTHER: Note 3.3	☑ OTHER: Note 3.3

SHIPMENT:
☑ DOMESTIC ☐ EXPORT ☐ EXPORT BOXING REQ'D.
NUMBER OF MONTHS OF STORAGE: 12 (Note 3.4)
☐ TOTAL WEIGHT: 1100 lbs

INSPECTION AND TESTING

☐ FINAL INSPECTION REQUIRED N/A
☐ DAYS NOTIFICATION REQUIRED: N/A

TEST	NON.-WITNESSED	WITNESSED	CERTIFICATE
HYDROSTATIC:	☑	☐	☑
PERFORMANCE:	☑	☐	☑
NPSHR: ~~(Note 3.1)~~	☐	☐	☐
VIBRATION:	☑	☐	☑
OTHER:	☐	☐	☐

☐ DISMANTLE AND INSPECT AFTER TEST
☑ CASTING REPAIR PROCEDURE APPROVAL REQUIRED

MATERIAL CERTIFICATION REQUIRED:
☑ CASING ☑ COVER ☑ IMPELLER ☑ SHAFT
☑ OTHER: *As per the Inspection & Test Plan (ITP)*

INSPECTION REQUIRED FOR CONNECTION WELDS:
☑ MANUFACTURER'S STANDARD ☐ NDT INSPECTION

INSPECTION REQUIRED FOR CASTINGS:
☑ MANUFACTURER'S STANDARD ☐ NDT INSPECTION
☐ OTHER:

MANUFACTURER DOCUMENTATION REQUIREMENTS

FOR DATA REQUIREMENTS REFER TO: Attached SDDC form
REMARKS:

3.1.Deleted
3.2. Constant level oiler shall be Trico ~~or equivalent.~~
3.3. Manufacturer's standard paint in compliance with ISO 12944-5 C4 is required.
3.4. Crating/packaging sufficient for 12 months of storage is required for equipment shipping from overseas.
3.5.Deleted
3.6 Standard oil bath lubrication will be supplied for bearing housing

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~~◆ COOLING OR HEATING PIPING (N/A)~~

~~NAME OF FLUID:~~

~~SUPPLY TEMP. NORM: °F~~

~~ALLOWABLE TEMP. RISE: °F~~

~~Cl_2 ppmw~~

~~SUPPLY PRESSURE: psig~~

~~MAX. ALLOWABLE ΔP: psi~~

~~☐ GALVANIZED PIPE ☐ STAINLESS STEEL TUBING~~

~~☐ SIGHT FLOW INDICATOR~~

~~☐ OUTLET SHUT-OFF VALVE~~

~~REMARKS:~~

◆ **PIPING PLANS: ASME B73.3**

HEATING AND COOLING PIPING PLAN:

PUMP FLUID CIRCULATION PLAN: 101 or 111

◆ **MATERIALS**

MATERIAL CLASS CODE:	316L SS
CASING:	316L SS
IMPELLER:	316L SS
CASE / IMPELLER WEAR RINGS:	316LSS
SHAFT:	316L SS
CONTAINMENT SHELL:	316L SS / Alloy C 276
STATOR LINER:	N/A
MAGNET (OUTER DRIVE RING):	Samarium Cobalt (Fully Encapsulated)
INNER ROTOR:	N/A
SLEEVE BEARING:	Silicon Carbide
THRUST BEARING:	Silicon Carbide
DRIVER BEARING HOUSING:	Carbon Steel
WETTED FASTENERS:	316LSS
BASEPLATE:	Carbon Steel
COUPLING GUARD:	Non-Spark Brass
ELECTRICAL PENETRATION SEALANT:	

REMARKS:

● **INSTRUMENTATION**

LEAK DETECTOR – SECONDARY CONTAINMENT BY:

☐ PURCHASER ☑ SUPPLIER

◆ MAKE / MODEL: Level Switch - Magnetrol

VIBRATION MONITORING BY:

☐ PURCHASER ☐ SUPPLIER

MAKE / MODEL:

MOTOR LOAD PROTECTION BY:

☑ PURCHASER ☐ SUPPLIER

☐ MAKE / MODEL:

☐ MINIMUM FLOW BYPASS PROVIDED BY PURCHASER

◆ TEMPERATURE & PRESSURE:

☐ TEMPERATURE GAUGES

☐ THERMOWELLS

☐ PRESSURE GAUGES

☐ CONTAINMENT SHELL TEMPERATURE PROBES -MDP, CMP

☐ CANNED MOTOR WINDING THERMOSTATS

☐ BEARING WEAR INDICATOR - CMP

NOTES:-

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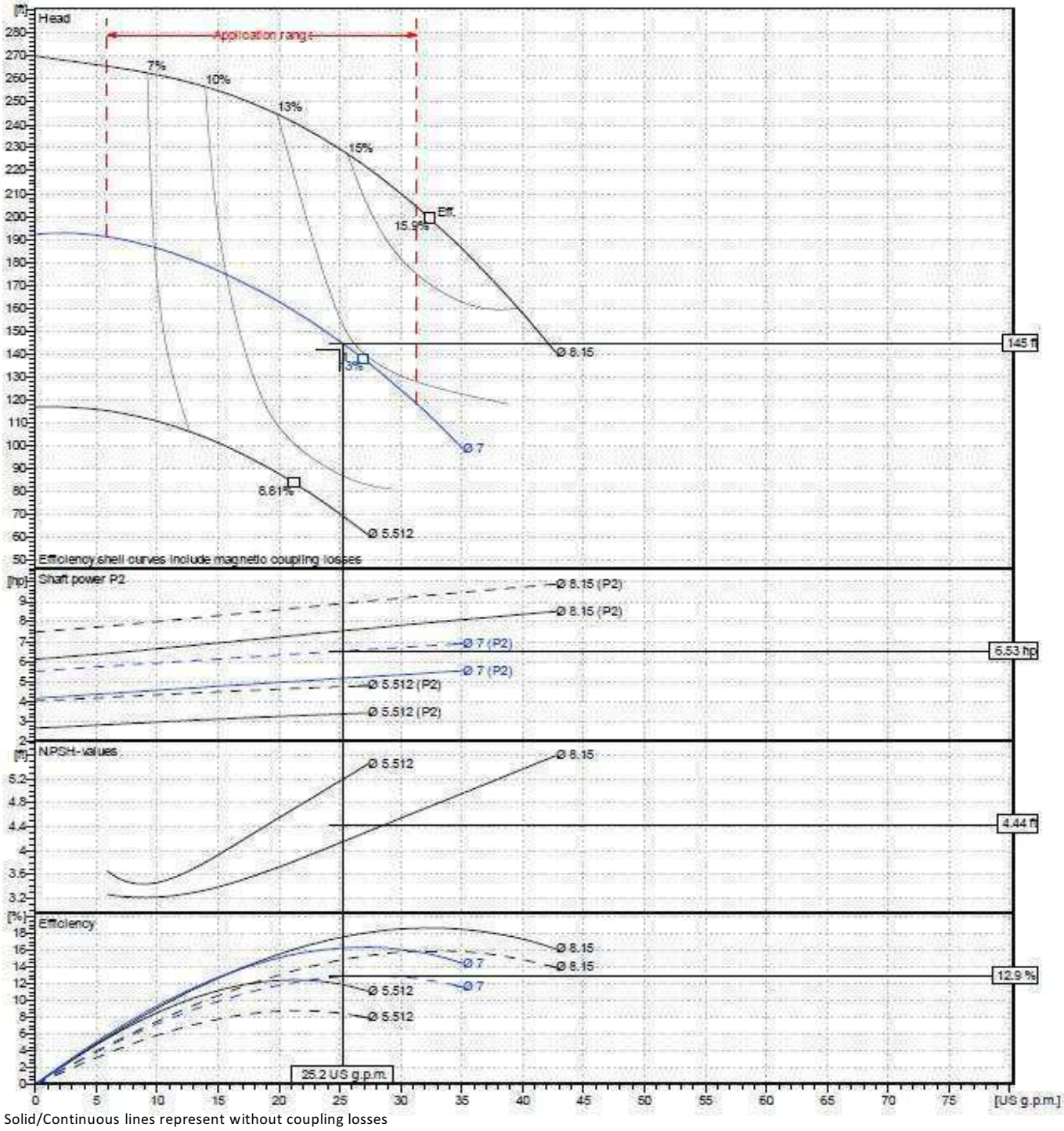
Impeller

	Ø	Flow US g.p.m. Operation Range		η	Head ft		Shaft power P2 hp		
	inch	Min.	Max.	Max.	H(Q=0)	η Max.	P2(Q=0)	Max.	η Max.
Actual	7	5.9	31.3	27	192	138	5.52	6.9	6.6
Min.	5.51	/	/	21.3	117	83.6	4.03	4.79	4.78
Max.	8.15	/	/	32.4	270	199	7.49	9.89	9.01

Performance curve	K6-13/60-2		
Impeller type	Radial Vane		
Direction of rotation	Clockwise from the drive end		
Impeller construction	Closed		
Impeller Eye Area	4.0951 sq in	NSS (US unit)	6202
Frequency	60 Hz Hz	Speed	3500 rpm

Power data referred to: 19 wt% Aqueous Ammonia [100%] ; 100°F; 0.91kg/dm³; 0.451cSt



Note 1: Solid/Continuous lines represent without coupling losses

Note 2: Dashed lines represent with coupling losses