
# WORLD ENERGY RENEWABLES PROJECT

## MECHANICAL EQUIPMENT DATA SHEET FOR 18-P-1847A/B

## FLARE KNOCK OUT DRUM PUMP

## Document No. A8KM-18-073-540117-A

## Fluor Project No: A8KM

| REV | DATE | DESCRIPTION | PAGES | ORIG | CHK'D | APPV'D |
|---|---|---|---|---|---|---|
| G | 23-Jan-2023 | Issued for Approval | 10 | MH | OG | LR |
| F | 15-Dec-2022 | Issued for Approval | 10 | MH | OG | LR |
| E | 14-Oct-2022 | Issued for Approval | 10 | MH | OG | LR |
| D | 16-Aug-2021 | Issued for Purchase | 11 | CP | JF<br>AD<br>KW | BT |
| C | 1-Mar-2021 | Issued for Quotation | 10 | LV | JF<br>AD<br>KW | BT |
| B | 4-Feb-2021 | Issued for Client Review | 10 | LV | JDM<br>AD<br>KW | BT |
| A | 1-Feb-2021 | Issued for Internal Review | 10 | LV | JDM | |

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# API 610
# CENTRIFUGAL PUMP DATA SHEET

Doc. No.: A8KM-18-073-540117-A

Note: This data sheet has been modified from that in the annex of API Standard 610, 11th Edition.

| | | | |
|---|---|---|---|
| Contract: | A8KM | | |
| Item No: | 18-P-1847A/B | | |
| Revision: | G | Date: | 23-Jan-23 |
| Unit: | Utilities and Offsites | | |
| P.O. No.: | 4505515682 | | |
| Inquiry No.: | 4-601B-RQ | | |
| Sheet | 2 | of | 10 |

REV

CLIENT: World Energy Paramount | PROJECT: World Energy Renewables Project

SERVICE : Flare Knock Out Drum Pump | FACILITY: World Energy Renewables Plant | SITE : Paramount, CA

NO. REQ'D : Two (2) (Note 2.1) | PUMP SIZE : 1x2-7 | API TYPE : OH2 | NO. STAGES : One (1)

MANUFACTURER : ITT GOULDS | MODEL : 3700 | SERIAL NO. : GM03A771-1-2

APPLICABLE TO : ○ PROPOSALS ● PURCHASE ○ AS-BUILT

## GENERAL

| | | | | | |
|---|---|---|---|---|---|
| PUMPS OPERATE IN : | N/A | NO. MOTOR DRIVEN : | Two (2) | NO. TURBINE DRIVEN : | N/A |
| WITH : | | PUMP ITEM NO. : | 18-P-1847A/B | PUMP ITEM NO. : | |
| GEAR ITEM NO. : | N/A | MOTOR ITEM NO. : | 18-P-1847AM/BM | TURBINE ITEM NO. : | |
| GEAR PROVIDED BY : | | MOTOR PROVIDED BY : | Pump Supplier | TURBINE PROVIDED BY : | |
| GEAR MOUNTED BY : | | MOTOR MOUNTED BY : | Pump Supplier | TURBINE MOUNTED BY : | |
| GEAR DATA SHEET NO. : | | MOTOR DATA SHEET NO. : | Attached | TURBINE DATA SHEET NO. : | |

## LIQUID CHARACTERISTICS

| | UNITS | MAXIMUM | RATED | MINIMUM |
|---|---|---|---|---|
| LIQUID TYPE OR NAME: | | Sour Water / Slops | | |
| VAPOR PRESSURE : | psi (a) | | 14.7 | |
| RELATIVE DENSITY : | | 1.0 (Note 2.7) | 0.7 (Note 2.7) | |
| SPECIFIC HEAT : | BTU/lbm °F | | 1.0 | |
| VISCOSITY : | cP | | 1.000 | |

SERVICE : INTERMITTENT*

*IF INTERMITTENT, NO. OF STARTS / DAY : Variable

CORROSION DUE TO: (6.12.1.9) : H2S

EROSION DUE TO: (6.12.1.9) :

$H_2S$ CONCENTRATION (ppmw) (6.12.1.12 : <1000 (Note 2.9)

WET (YES / NO) : Yes

CHLORIDE CONCENTRATION (ppmw) :

PARTICULATE SIZE (DIA. IN MICRONS) :

PARTICULATE CONCENTRATION (ppmw

MECHANICAL DESIGN TEMPERATURE (°F) min. 450*

*Per process email clarification 1/6/21, maximum pumping temperature is 250°F & mechanical design temp. is 450°F.

## OPERATING CONDITIONS (6.1.2)

| | UNITS | MAXIMUM | RATED | NORMAL | MINIMUM |
|---|---|---|---|---|---|
| NPSHa DATUM : | | C.L. IMPELLER (Note 2.2) | | | |
| PUMPING TEMP.: | °F | 250 | 200 | | |
| FLOW : | gpm | | 50 | 50 | |
| DISCHARGE PRESS: | psi(g) | | 43 (HC) | | |
| SUCTION PRESSURE : | psig(g) | 11 (Water) | 2.2 (HC) | | |
| DIFFERENTIAL PRESS.: | psi | | 41.1 (HC) | | |
| DIFFERENTIAL HEAD : | ft | | 135.7 (HC) | | |
| $NPSH_A$ : | ft | (Note 2.2) | 8.0 | Excludes Req'd 3ft Margin | |
| HYDRAULIC POWER : | hp | | 1.2 | | |

## SITE AND UTILITY DATA (6.1.2)

LOCATION: OUTDOOR | UNHEATED

MOUNTED AT: GRADE ○ TROPICALIZATION REQ'D

ELECTRICAL AREA CLASSIFICATION: ○ NON HAZARDOUS

CLASS : CL. I, B/C/D | DIVISION : 2 | TEMP CODE : T3C

SITE DATA:

ELEVATION (MSL): 69 ft | BAROMETER : 14.7 psia

RANGE OF AMBIENT TEMPS: MIN. / MAX. : 35 / 105 °F

RELATIVE HUMIDITY: MIN. / MAX. : Average = / 54 %

UNUSUAL CONDITIONS :

UTILITY CONDITIONS:

| ELECTRICITY : | DRIVERS | HEATING | CONTROL | INSTRUMENTS |
|---|---|---|---|---|
| VOLTAGE : | 460 | 120 | 120 | 24 VDC |
| PHASE : | 3 | 1 | 1 | |
| HERTZ : | 60 | 60 | 60 | |

COOLING WATER : SOURCE : COOLING TOWER

SUPPLY TEMP. : 80 °F | MAX. ALLOW. RETURN TEMP.: 120 °F

NORM. PRESS. : 45 psi(g) | DESIGN PRESS. : 120 psi(g)

MAXIMUM RETURN PRESSURE : 35 psi(g)

MAXIMUM ALLOWABLE ΔP 10 psi

CHLORIDE CONCENTRATION : < 840 ppm | DESIGN T: 150 °F

INSTRUMENT AIR : MAX. : psi(g) | MIN. : psi(g)

MECH. DESIGN: psi(g) °F

STEAM :

| | | | DRIVERS | HEATING |
|---|---|---|---|---|
| TEMP : | °F | MAX. : | | |
| | | MIN. : | | |
| PRESS. : | psig | MAX. : | | |
| | | MIN. : | | |

## NOTES

2.1 2 x 100% pumps; 1 operating and 1 spare.

2.2 NPSHA based on Goulds Outline Drawing AFMD21003/18-P-1847 A/B with actual centerline height of 19" to bottom of baseplate.

Deleted.

2.3 Pump Control Method: Level control cascades to flow control.

2.4 Governing Project Specification: A8KM-PP-000-50626-A, Centrifugal Pumps for Petroleum and Natural Gas Industries - API 610.

2.5 At Rated capacity, the system static head is 45.9% of total system head (total is inclusive of the control valve).

2.6 Mechanical data sheets are based on process data sheets 18-P-1847A/B, Flare Knock Out Drum Pump, Rev. A1. Any fluid properties or cooling water properties not indicated on those process data sheets were obtained via internal squad check. Mechanical design temperature was obtained via email.

2.7 Motor sizing shall be based on water, 1.0 S.G. Pumpage may be hydrocarbons (HC), water, or mixed phase. Impeller sizing is based on HC's.

2.8 Deleted.

2.9 During normal operation, the H2S concentration is expected to be well below 1,000 ppmw. However, during an upset condition, the H2S level may temporarily spike but is not expected to exceed 1,000 ppmw.

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| Unit: | Utilities and Offsites | | |
| P.O. No.: | 4505515682 | | |
| Inquiry No.: | 4-601B-RQ | | |
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## PERFORMANCE

| | | | | |
|---|---|---|---|---|
| PROPOSAL CURVE NO.: | 3026-2 | RPM | 3520 | |
| TEST CURVE NO.: | | | | |
| IMPELLER DIA.: RATED: | 6.08 | MAX: 7.00 | MIN: 5.00 | in |
| RATED POWER: | 3.8 | hp | EFFICIENCY: 31.1 | % |
| RATED CURVE BEP FLOW: (at rated impeller dia.) | | | 58.4 | gpm |
| MIN. FLOW: THERMAL : | | gpm | STABLE : 5.4 | gpm |
| PREFERRED OPERATING REGION: (6.1.12) | 40.9 | to | 70.1 | gpm |
| ALLOWABLE OPERATING REGION: | 5.4 | to | 72.3 | gpm |
| MAX. HEAD @ RATED IMPELLER: | | | 158.7 | ft |
| MAX. POWER @ RATED IMPELLER: (6.8.9) | | | 4.4 | hp |
| NPSHR at CL IMPELLER for RATED FLOW : | | | 4 | ft |
| CL PUMP TO LOWER SIDE OF BASEPLATE: | | | 1.58 | ft |
| NPSH MARGIN at RATED FLOW : | | | 4 | ft |
| SPECIFIC SPEED: | | gpm,rpm,ft | 559 | |
| SUCTION SPECIFIC SPEED LIMITATION | | gpm,rpm,ft | (Note 3.1) | |
| SUCTION SPECIFIC SPEED: (6.1.9): | | gpm,rpm,ft | 10069 | |
| MAX. ALLOW. SOUND PRESS. LEVEL / EST.: (6.1.14) @ 3 ft | | | 85 / 54.7 | dBA |
| MAX. ALLOW. SOUND POWER LEVEL / EST.: (6.1.14) @ 3 ft | | | / | dBA |
| MAX. DISCHARGE PRESSURE: (6.3.2) | | | 55 | psig |
| BASIS: (6.3.2.a, b or c) | | | | |

## DRIVER (7.1.5)

| | | | |
|---|---|---|---|
| DRIVER TYPE: | INDUCTION MOTOR | | |
| GEAR: | NO | | |
| VARIABLE SPEED REQUIRED: | NO | | |
| SOURCE OF VARIABLE SPEED: | N/A | | |
| OTHER: | TEFC / IP55 | | |
| MANUFACTURER: | NIDEC / US MOTORS | | |
| NAMEPLATE POWER: | 7.5 | hp | |
| NOMINAL RPM: | 3600 | | |
| RATED LOAD RPM: | 3523 | | |
| FRAME OR MODEL: | 213T | | |
| ORIENTATION: | HORIZONTAL | | |
| LUBE: | GREASE | | |
| BEARING TYPE: | ANTI-FRICTION | | |
| RADIAL: (Qty / Brg. Number) | 1 | / | 6208-J/C3 |
| THRUST: (Qty / Brg. Number) | 1 | / | 6208-J/C3 |
| STARTING METHOD: | CLOSED VALVE (UNLOADED) START | | |
| DRIVER DATA SHEET: | | | |
| ACCESSORIES: | | | |

NOTE: Minimum motor size shall be 5 hp.

## CONSTRUCTION

API PUMP TYPE: OH2 [Based on API 610 Definitions]

NOZZLE CONNECTIONS: (6.4.2)

| | SIZE | FACING | RATING | POSITION |
|---|---|---|---|---|
| SUCTION | 2" | RF | 300 | END |
| DISCHARGE | 1" | RF | 300 | TOP |

PRESSURE CASING AUX. CONNECTIONS: (6.4.1.2)(6.4.3.1)(6.4.3.2)(6.4.3.12)

| | NO. | SIZE | TYPE | FACING | RATING | POSITION |
|---|---|---|---|---|---|---|
| BALANCE/LEAK OFF | | | | | | |
| DRAIN (Note 3.2) | 1 | 0.75" | BW | RF | 300 | BOTTOM |
| VENT (IF NOT SELF VENT) | | | | | | |
| PRESSURE GAUGE | -- | | | | | |
| TEMP GAUGE | -- | | | | | |
| WARM-UP LINE* | | | | | | |

*VENDOR TO ADVISE WARM-UP FLOW IF REQUIRED: gpm

| | |
|---|---|
| DRAIN VALVE SUPPLIED BY: | PURCHASER |
| DRAINS MANIFOLDED: | N/A |
| VENT VALVE SUPPLIED BY: | N/A |
| VENTS MANIFOLDED: | N/A |
| THREADED CONNS FOR PIPELINE SERVICE & < 50°C:(6.4.3.2 | N/A |
| SPECIAL FITTINGS FOR TRANSITIONING: (6.4.3.3) | NO |
| CYLINDRICAL THREADS REQUIRED: (6.4.3.8) | NO |
| GUSSET SUPPORT REQUIRED: (6.4.3.10) | YES |
| MACHINED AND STUDDED CONNECTIONS: (6.4.3.12) | NO |
| TYPE VS6 DRAIN CONN.: (9.3.13.5) | N/A |
| DRAIN TO SKID EDGE: | YES |
| BOLTING CONFORMANCE:: (6.1.29.1) | YES |
| (ISO 261, ISO 262, ISO 724, ISO 965 OR ANSI/ASME B1.1) | ASME B1.1 |
| SEAL FLUSH CASING CONNS. w/ SECONDARY SEALING REQD: (6.4.3.3) | NO |
| | |
| AUX. PIPING TERMINATIONS: | RFWN |

| | | | | | |
|---|---|---|---|---|---|
| CASING MOUNTING: | CENTERLINE | | | | |
| CASING TYPE: | Single Volute | | | | |
| OH3 BACKPULLOUT LIFING DEVICE REQ'D: (9.1.2.6) | NO | | | | |
| CASE PRESSURE RATING: (Note 3.3) | | | | | |
| MAWP: (6.3.5) | 615 | psig | @ | 450 | °F |
| HYDROTEST: (8.3.2.6) | 1110 | psig | @ | 100 | °F |

Hydrotest at 1.5 x MAWP of the Pump Assembly.

| | |
|---|---|
| HYDROTEST OH PUMP AS ASSEMBLY: | YES |
| SUCTION PRESS. REGIONS DESIGNED FOR MAWP: | YES |
| ROTATION: (VIEWED FROM COUPLING END) | CCW |
| - IMPELLERS INDIVIDUALLY SECURED: | N/A |
| - BOLT OH 3/4/5 PUMP TO PAD / FOUNDATION: | N/A |
| - PROVIDE SOLEPLATE FOR OH 3/4/5 PUMPS: | N/A |
| ROTOR: | |
| SHAFT FLEXIBILITY INDEX (SFI): (9.1.1.3) | |
| FIRST CRITICAL SPEED, WET: (MULTI-STAGE) | N/A RPM |
| COMPONENT BALANCE TO ISO 1940 G1.0: (6.9.4.4) | YES |
| SHRINK FIT LIMITED MOVEMENT IMPELLERS: (9.2.2.3) | N/A |

COUPLING & GUARD: (7.2.2) (Note 3.4)

| | |
|---|---|
| MANUFACTURER: | Rexnord |
| MODEL: | Series XTSR71 494 |
| RATING: (POWER/100 RPM) | |
| SPACER LENGTH: | 5 in |
| ACTUAL SF AT MOTOR NAMEPLATE: | 5.73 |
| RIGID: | N/A |
| COUPLING WITH HYDRAULIC FIT: (7.2.10) | NO |
| COUPLING BALANCED TO ISO 1940-1 G6.3: (7.2.3) | G2.5 |
| COUPLING WITH PROPRIETARY CLAMPING DEVICE: (7.2.1 | N/A |
| COUPLING IN COMPLIANCE WITH: (7.2.4) | API 610 COMPLIANT |
| COUPLING GUARD STANDARD PER: (7.2.13.a) | ANSI B15.1 |
| WINDOW ON COUPLING GUARD: | YES |

## NOTES

| | |
|---|---|
| 3.1 | Suction specific speeds greater than 11,000 for hydrocarbons and 9,000 for water (USC units) require specific approval by the Buyer. |
| 3.2 | ~~Terminate drain piping with bellow seal gate valve at edge-of-skid. Bellow seal gate valves shall be per Project specification, A8KM-PP-000-600027-A, Bellow Seal Valve Criteria. Customer connections shall be flanged.~~ |
| 3.3 | Nameplate for MAWP at mechanical design temperature. |
| 3.4 | Coupling guards shall be non-sparking. |
| 3.5 | Deleted. |
| | Deleted. |

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| Revision: | G | Date: | 23-Jan-23 |
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| Inquiry No.: | 4-601B-RQ | | |
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## CONSTRUCTION (CONT'D)

### MATERIAL (6.12.1.1)

| | | |
|---|---|---|
| APPENDIX H CLASS: | S-8: CS / 316L SS | NACE |
| MINIMUM DESIGN METAL TEMP: (6.12.4.1) | 32 | °F |
| REDUCED HARDNESS MATERIALS REQ'D: (6.12.1.12.1) | YES | |
| APPLICABLE HARDNESS STANDARD: (6.12.1.12.3) | MR0103 | |
| BARREL: | | |
| CASE: | CS | |
| DIFFUSERS: | | |
| IMPELLER: | 316L SS | |
| IMPELLER / CASE WEAR RING: | HF 316LSS W/ COLMONOY#6 | |
| SHAFT: | 316SS | |
| BOWL (IF VS TYPE): | | |
| INSPECTION CLASS: (API/ISO TABLE 14) | LEVEL 2 | |

### BEARINGS AND LUBRICATION (6.10.1)

| | | | |
|---|---|---|---|
| BEARING (TYPE / NUMBER): | | | |
| RADIAL: | BALL | / | 6210 C3 |
| THRUST: | BALL | / | 7310 BEGAM |
| REVIEW AND APPROVE THRUST BEARING SIZE: (9.2.5.2.4) | NO | | |
| LUBRICATION TYPE: (6.11.3)(6.11.4)(9.2.6.1) | Ring oil | | |
| PRESSURE LUBE SYSTEM TO ISO 10438- | | (9.2.6.4) | N/A |
| ISO 10438 DATA SHEETS ATTACHED | | | |
| PRESSURIZED LUBE OIL SYSTEM MTD. ON PUMP BASEPLATE: | N/A | | |
| LOCATION OF PRESSURIZED LUBE OIL SYSTEM MOUNTED ON BASEPLATE: | | | |
| INTERCONNECTING PIPING PROVIDED BY: | N/A | | |
| OIL VISC. ISO GRADE: | 68 | | |
| CONSTANT LEVEL OILER: (6.10.2.2) | REQUIRED | | |

### INSTRUMENTATION

| | |
|---|---|
| SEE ATTACHED API-670 DATA SHEET: | NO |
| ACCELEROMETER OR VELOMETER: (7.4.2.1): | |
| QUANTITY: | |
| MOUNTING LOCATIONS: | |
| DETECTORS REQUIRED: | |
| THRD'D PROVISIONS ONLY PER ANSI/API 670: (6.10.2.10) | |
| QUANTITY: | |
| MOUNTING LOCATIONS: | |
| FLAT SURFACE REQ'D FOR MAGNETIC P/U's: (6.10.2.11) | NO |
| QUANTITY: | |
| MOUNTING LOCATIONS: | |
| VIBRATION PROXIMITY PROBES FOR HYDRODYNAMIC BEARINGS: | |
| PROVISION-ONLY FOR VIB. PROBES: (7.4.2.2) | NO |
| QUANTITY PER RADIAL BEARING: | |
| QUANTITY PER THRUST BEARING: | |
| VIBR. MONITORS & CABLES SUPPLIED BY: (7.4.2.4) | |
| TEMP. DETECTORS FOR HYDRODYNAMIC BEARINGS: (7.4.2.3) | |
| PROVISION-ONLY FOR TEMPERATURE PROBES: | N/A |
| RADIAL BEARING TEMPERATURE PROBES: | N/A |
| QUANTITY PER RADIAL BEARING: | |
| THRUST BEARING TEMPERATURE PROBES: | N/A |
| QUANTITY PER THRUST BEARING ACTIVE SIDE: | |
| QUANTITY PER THRUST BEARING INACTIVE SIDE: | |
| THRD'D T/W's FOR GEARBOX TEMP GAGES: (9.1.3.6) | N/A |
| PRESSURE GAGE TYPE: | |
| TEMP. MONITORS & CABLES SUPPLIED BY: (7.4.2.4) | |

### BASEPLATE OR SOLE PLATE

| | |
|---|---|
| API BASEPLATE NUMBER: | |
| BASEPLATE CONSTRUCTION: (7.3.14) | FULL TOP DECKING |
| BASEPLATE DRAINAGE: (7.3.1) | ENTIRE BASEPLATE DRAIN RIM |
| MOUNTING: | GROUTED |
| NON-GROUT CONSTRUCTION: (7.3.13) | NOT REQUIRED |
| VERTICAL LEVELING SCREWS: | REQUIRED |
| HORIZONTAL DRIVER POSITIONING SCREWS: | REQUIRED |
| SUPPLIED WITH: - GROUT VENT HOLES | YES |
| - DRAIN CONNECTION | YES |
| MOUNTING PADS SIZED FOR BASEPLATES LEVELING: (7.3.5) | YES |
| MOUNTING PADS OR SOLE PLATE TO BE MACHINED: (7.3.6) | YES |
| PROVIDE SPACER PLATE UNDER ALL EQUIP. FEET: (7.3.6) | |
| OTHER: | Furnish two (2) diagonally opposed grounding provisions per Note 6.9. |

### NOTES

| | |
|---|---|
| COATINGS REQ'D: (6.12.1.10) | -- |
| 4.1) SYNTHETIC OIL REQ'D: (6.10.2.12) | NO |
| 4.2) PROVISIONS FOR PURE OR PURGE MIST: (6.11.3) | IF STD |
| 4.3) PRESS. / CIRC. LUBE SYSTEM: 9.2.6.1) | |
| 4.4) CONST. LEVEL OILER PREFERENCE: (6.10.2.2) | (Note 4.6) |

**4.5) Bearing housing isolators shall be Inpro or Equal.**

**4.6) Bearing housing oilers shall be Trico 8-oz. constant-level sight feed. Provide a minimum 1" NPS bullseye level gauge.**

**4.7) Oil drains shall be furnished with an ESCO single-piece sight glass.**

### SEAL SUPPORT SYSTEM MOUNTING

| | |
|---|---|
| BARRIER/BUFFER RESERV. MTD ON PUMP BASEPL.:(7.5.1.4) | YES |
| IDENTIFY LOCATION ON BASEPLATE: | |
| INTERCONNECTING PIPING BY: | SUPPLIER |
| RESERVOIR(S) SHIPPED SEPARATELY: | YES |

### MECHANICAL SEAL (6.8)

| | |
|---|---|
| SEE ATTACHED API 682 DATA SHEET: | SEE PAGE 7 |
| ADDITIONAL CENTRAL FLUSH PORT: (6.8.9) | |
| HEATING OR COOLING JACKET REQ'D: | |
| MAX. CHAMBER PRESS.: (6.8.13) STATIC: | DYN.: psig |
| SEAL CATEGORY: (6.8.1) | |

### HEATING AND COOLING

| | | |
|---|---|---|
| COOLING REQUIRED: (6.1.17) | See page 8 Seals | |
| COOLING WATER PIPING PLAN: | Plan M | |
| CLG WATER PIPING CONSTR.: | See page 8 Seals | |
| FITTINGS TYPE: | | |
| COOLING WATER PIPING MATERIALS: | | |
| CLG WTR REQMNTS: (BOTH ENDS IF DOUBLE ENDED) | | |
| BEARING HOUSING(S): | | gpm |
| SEAL SUPPORT: (HX, BUFFER, BARRIER, ETC.) | 6.6 | gpm |
| TOTAL COOLING WATER: | 6.6 | gpm |
| HEATING MEDIUM: | N/A | |
| OTHER: | | |
| HEATING MEDIUM PIPING CONSTRUCTION: | | |

### PIPING & APPURTENANCES

| | |
|---|---|
| MANIFOLD PIPING SYS. FOR PURCHASHER CONN.: (7.5.1.6) | |
| VENTS: | N/A |
| DRAINS: | N/A |
| COOLING WATER: | N/A |
| TAG ALL ORIFICES: (7.5.2.4) | YES |
| SOCKET WELD CONN. ON SEAL GLAND: (7.5.2.8) | NO |

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## SURFACE PREPARATION AND PAINT

| | |
|---|---|
| MANUFACTURER'S STANDARD: | NO |
| OTHER (SEE BELOW) | YES |
| SPECIFICATION NUMBER: | A8KM-PP-00-500520-A |
| PUMP: **High Durability Coating, Compliant with ISO 12944-5, C4 environment** | |
| PUMP SURFACE PREPARATION: | SSPC-SP-6 |
| PRIMER: | SEE DOC# EN207123-BG-9V3-00178 |
| FINISH COAT: | SEE DOC# EN207123-BG-9V3-00178 |
| BASEPLATE: **High Durability Coating, Compliant with ISO 12944-5, C4 environment** | |
| SURFACE PREPARATION: | SSPC-SP-6 |
| PRIMER: | SEE DOC# EN207123-BG-9V3-00178 |
| FINISH COAT: | SEE DOC# EN207123-BG-9V3-00178 |

| | | |
|---|---|---|
| DETAILS OF LIFTING DEVICES: | Calcs & NDE Req'd for Lifts > 20,000 LBS | |
| SHIPMENT: (8.4.1) | (Note 6.8) | EXPORT |
| EXPORT BOXING REQUIRED | | YES |
| OUTDOOR STORAGE UP TO 6 MONTHS: | | YES |
| SPARE ROTOR ASSEMBLY PACKAGED FOR: | | |
| ROTOR STORAGE ORIENTATION: (9.2.8.2) | | N/A |
| SHIP'G & STORAGE CONTAINER FOR VERT. STORAGE: (9.2.8.3) | | N/A |
| N2 PURGE: (9.2.8.4) | | N/A |
| SPARE PARTS: (Note 6.1) | | |
| START-UP: | | YES |
| NORMAL MAINTENANCE: | | YES |

## WEIGHTS lb

| ITEM No. | PUMP | DRIVER | ACCESSORY | BASE | TOTAL |
|---|---|---|---|---|---|
| 18-P-1847A/B | 227 | 160 | 820 | 798 | 2005 |
| | | | | | |
| | | | | | |

## OTHER PURCHASER REQUIREMENTS

| | |
|---|---|
| COORDINATION MEETING REQUIRED: (10.1.3) | YES |
| MAXIMUM DISCHARGE PRESSURE TO INCLUDE: | |
| MAX RELATIVE DENSITY: | YES |
| OPERATION TO TURBINE TRIP SPEED OR ASD OVERSPEED: | N/A |
| MAX DIA. IMPELLERS AND / OR NO. OF STAGES: | NO |
| CONNECTION DESIGN APPROVAL: (9.2.1.4) (BB Pumps) | N/A |
| TORSIONAL ANALYSIS / REPORT: (6.9.2.10) (REQ'D IF GEAR OR VFD) | N/A |
| PROGRESS REPORTS: | YES |
| OUTLINE OF PROCEDURE FOR OPTIONAL TESTS: (10.2.5) | YES |
| ADDITIONAL DATA REQUIRING 20 YEARS RETENTION: (8.2.1.1) | NO |
| LATERAL ANALYSIS REQUIRED: (9.1.3.4)(9.2.4.1.3) | N/A |
| MODAL ANALYSIS REQUIRED FOR VS PUMPS: (9.3.9.2) | N/A |
| DYNAMIC BALANCE ROTOR ASSEMBLY TO ISO G1.0: (9.2.4.2.3) | N/A |
| INSTALLATION LIST IN PROPOSAL: (10.2.3.l) | NO |
| VFD STEADY STATE DAMPED RESPONSE ANALYSIS: (6.9.2.3) | N/A |
| TRANSIENT TORSIONAL RESPONSE: (6.9.2.4) | N/A |
| BEARING SELECTION & LIFE CALCS PER (6.10.1.1) & (6.10.1.6): | NO |
| IGNITION HAZARD ASSESSMENT TO EN 13463-1 FOR EXPLOSIVE ATM: (7.2.15) | N/A |
| CASING RETIREMENT THICKNESS DWG: (10.3.2.3) | NO |
| FLANGES REQ'D IN PLACE OF SOCKET WELD UNIONS: (7.5.2.8) | YES |
| INCLUDE PLOTTED VIBRATION SPECTRA FOR PERF. TEST: (6.9.3.3) | YES |
| CONNECTION BOLTING: (7.5.1.7) | PAINTED |
| CADMIUM PLATED BOLTS PROHIBITED: | YES |
| VENDOR TO KEEP REPAIR AND HT RECORDS: (8.2.1.1.c) | YES |
| VENDOR TO SUBMIT TEST PROCEDURES: (8.3.1.1) | YES |
| VENDOR SUBMIT INSPECTION CHECK LIST:(8.1.5) | YES |
| TEST REQUIREMENTS PER 8.3.3.5a THROUGH 8.3.3.5d: | YES |
| DISASSEMBLE AND INSPECT AFTER TEST: (8.3.3.8) | NO |

## INSPECTION & TEST

| | | |
|---|---|---|
| SHOP INSPECTION: (8.1.1) | | YES |
| PERFORMANCE CURVE & DATA APPROVAL PRIOR TO SHIPMENT: | | YES |
| TEST WITH SUBSTITUTE SEAL: (8.3.3.2.b) | | NO |
| MATERIAL CERT. REQUIRED: (6.12.1.8) | CASING: | YES |
| | IMPELLER: | YES |
| | SHAFT: | YES |
| OTHER: | See Note 6.3 | YES |
| CASTING REPAIR PROCED. APPROVAL REQ'D: (6.12.2.5)(6.12.3.1) | | Note 6.7 |
| INSPECTION REQ'D FOR CONN. WELDS: (6.12.3.4.d,e) | | |
| | MAG PARTICLE: | YES |
| | RADIOGRAPHY: | NO |
| | LIQUID PENETRANT: | NO |
| | ULTRASONIC: | NO |
| INSPECTION REQUIRED FOR CASTINGS: (TABLE 14) | | |
| | MAG PARTICLE: | YES |
| | RADIOGRAPHY: | NO |
| | LIQUID PENETRANT: | NO |
| | ULTRASONIC: | NO |
| HARDNESS TEST REQUIRED: (8.2.2.7) | (NACE SERVICES) | YES |
| ADDITIONAL SUBSURFACE EXAMINATION: (6.12.1.5)(8.2.1.3) | | NO |
| FOR: | | |
| METHOD: | | |
| PMI TESTING REQUIRED: (8.2.2.8) | | YES |
| COMPONENTS TO BE TESTED: | See Note 6.4 | |
| RESIDUAL UNBALANCE TEST: (J.4.1.2) | | N/A |
| NOTIFICATION OF SUCCESSFUL SHOP PRELIM. TEST: (8.1.1.c)(8.3.3.5) | | NO |
| BASEPLATE TEST: (7.3.21) | | NO |
| HYDROSTATIC TEST OF CASING/HEAD: | | NON-WIT |
| HYDROSTATIC TEST OF BOWLS & COLUMN: (9.3.13.2) | | N/A |
| PERFORMANCE TEST: | ~~(Note 6.5)~~ | NON-WIT |
| TEST IN COMPLANCE WITH: (8.3.3.2) | | 8.3.3.2 |
| TEST DATA POINTS TO: (8.3.3.3) | | 8.3.3.3 |
| TEST TOLERANCES TO: (8.3.3.4) | | TABLE 16 |
| NPSH TEST PTS./RETEST: (8.3.4.3.1)(8.3.4.3.4) | ~~See Note 6.6~~ | N/A |
| NPSH TEST-1ST STAGE ONLY: (8.3.4.3.2) | | N/A |
| NPSH TESTING TO HI 1.6 : (8.3.4.3.3) | ~~(Note 6.6)~~ | |
| PERFORMANCE TEST LIMITED TO 110% SITE NPSHA: (8.3.3.6) | | NO |
| RETEST ON SEAL LEAKAGE: (8.3.3.2.d) | | NO |
| RETEST REQUIRED AFTER FINAL HEAD ADJ.: (8.3.3.7.b)(Multistg) | | N/A |
| COMPLETE UNIT TEST: (8.3.4.4.1) | | N/A |
| SOUND LEVEL TEST: (8.3.4.5) | FOR INFORMATION ONLY | NON-WIT |
| CLEANLINESS PRIOR TO FINAL ASSEMBLY: (8.2.2.6) | | NON-WIT |
| LOCATION OF CLEANLINESS INSPECTION: | @ SUPPLIERS | |
| NOZZLE LOAD TEST: | | NO |
| CHECK FOR CO-PLANAR MOUNTING PAD SURFACES: | | NON-WIT |
| MECH. RUN TEST AT RATED CAPACITY UNTIL OIL TEMP STABLE: (8.3.4.2.1) | | YES |
| 4 HR. MECH RUN TEST AT RATED CAPACITY AFTER OIL TEMP STABLE: | | NO |
| 1 HR. MECH RUN TEST AT RATED CAPACITY: (8.3.4.2.2) | | NON-WIT |
| BEARING HSG. RESONANCE TEST: (8.3.4.7) | | N/A |
| STRUCTURAL RESONANCE TEST: (9.3.9.2) | | N/A |
| REMOVE / INSPECT HYDRODYN. BRGS. AFTER TEST: (9.2.7.5) | | N/A |
| AUXILIARY EQUIPMENT TEST: (8.3.4.6) | | NO |
| EQUIP. TO BE INCLUDED IN AUX. TESTS: | | |
| LOCATION OF AUX. EQUIPMENT TEST: | | |
| IMPACT TEST: (6.12.4.3) | PER EN 13445 | N/A |
| | PER ASME SECTION VIII | N/A |
| REMOVE CASING AFTER TEST: | | N/A |

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# API 610
# CENTRIFUGAL PUMP DATA SHEET

Doc. No.: A8KM-18-073-540117-A

Note: This data sheet has been modified from that in the annex of API Standard 610, 11th Edition.

| | | | |
|---|---|---|---|
| Contract: | A8KM | | |
| Item No: | 18-P-1847A/B | | |
| Revision: | G | Date: | 23-Jan-23 |
| Unit: | Utilities and Offsites | | |
| P.O. No.: | 4505515682 | | |
| Inquiry No.: | 4-601B-RQ | | |
| Sheet | 6 | of | 10 |

REV

## PRESSURE VESSEL DESIGN CODE REFERENCES

THESE REFERENCES MUST BE LISTED BY THE MANUFACTURER:

CASTING FACTORS USED IN DESIGN: (TABLE 3)

SOURCE OF MATERIAL PROPERTIES:

## WELDING AND REPAIRS

THESE REFERENCES MUST BE LISTED BY THE PURCHASER (DEFAULT TO TABLE 11 IF NO PURCHASER PREFERENCE IS STATED)

ALTERNATIVE WELDING CODES AND STANDARDS:

WELDING REQUIREMENT: (APPLICABLE CODE OR STANDARD) **DEFAULT PER TABLE 11**

WELDER/OPERATOR QUALIFICATION:

WELDING PROCEDURE QUALIFICATION:

NON-PRESSURE RETAINING STRUCTURAL WELDING SUCH AS BASEPLATES OR SUPPORTS:

MAGNETIC PARTICLE OR LIQUID PENETRANT EXAMINATION OF PLATE EDGES:

POSTWELD HEAT TREATMENT:

POSTWELD HEAT TREATMENT OF CASING FABRICATION WELDS:

## MATERIAL INSPECTION

THESE REFERENCES MUST BE LISTED BY THE PURCHASER DEFAULT TO TABLE 14: **YES**

ALTERNATIVE MATERIAL INSPECTIONS AND ACCEPTANCE CRITERIA:

| TYPE OF INSPECTION | METHOD | FOR FABRICATIONS | FOR CASTINGS |
|---|---|---|---|
| RADIOGRAPHY | | | |
| ULTRASONIC INSPECTION | | | |
| MAGNETIC PARTICLE INSPECTION | | | |
| LIQUID PENETRANT INSPECTION | | | |
| VISUAL INSPECTION (ALL SURFACES) | | | |

## NOTES

**6.1** Provide a Start-up Spare Parts List and 2-yrs. Operating Spares List, inclusive of coupling and motor parts.

**6.2** Pump Supplier shall provide pump performance curves, General Arrangement drawing sized for the driver, completed data sheets & Bill of Material, and un-priced Sub-Supplier buyouts with the Proposal.

**6.3** CMTR's are required for pressure casings & covers, impellers, wear rings & shaft. Include all QA documents in Quality Data Books.

**6.4** PMI of alloy pressure containment parts, incl. pipe & valves, is required per Project Specification A8KM-PP-000-500512-A, Positive Material Identification (PMI).

**6.5** ~~Witnessed performance testing is required when specified and when a witnessed NPSH test is required.~~ Mechanical run testing is required for each pump. Mechanical run test shall be until oil temperature stabilization at Rated point for at least one (1) hour for single-stage pumps with vibration recordings at 10-minute intervals, and for multi-stage pumps with plotted vibration spectra at 30 minute intervals for at least four (4) hours. ~~All Witnessed testing requires ten (10) Buyer's business days advance notice.~~

**6.6** ~~A Witnessed NPSH test is required if NPSH margin over quoted NPSHR is less than 3 ft. at 110% of Rated capacity. A minimum 3 ft. margin is preferred when possible.~~

**6.7** Minor defects of a surface nature in the pressure casting (amounting to less than 20% of the wall thickness and less than 10 in$^2$ [65 cm$^2$] in total area) may be repaired without Buyer's approval. See Project Pump Specification A8KM-PP-000-50626-A.

**6.8** Export Boxing is required for Ocean Transit only. Supplier shall include as applicable to their scope and place of manufacture in relation to destination of equipment. All boxing shall be protective of the weather elements.

**6.9** Baseplate grounding tabs or lugs shall be 1/4" thick steel with at least one (1) 9/16" dia. hole provided. If two (2) are provided, they shall be 9/16" dia. spaced 1-3/4" on center. Where Stainless Steel grounding pads are provided, they shall be threaded with one (1) 1/2"-13 hole, or either two (2), or four (4), 1/2"-13 holes, all spaced 1-3/4" on center.

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# API 682 MECHANICAL SEAL DATA SHEET

Doc. No.: A8KM-18-073-540117-A

Note: This data sheet has been modified from that in the annex of API Standard 682, Third Edition. (See Note 9.3)

| | | | |
|---|---|---|---|
| Contract: | A8KM | | |
| Item No: | 18-P-1847A/B | | |
| Revision: | G | Date: | 23-Jan-23 |
| Unit: | Utilities and Offsites | | |
| P.O. No.: | 4505515682 | | |
| Inquiry No.: | 4-601B-RQ | | |
| Sheet | 7 | of | 10 |

REV

**Client:** World Energy Paramount **Project:** World Energy Renewables Project

**Service:** Flare Knock Out Drum Pump **Facility:** World Energy Renewables Plant

**No. Seals Required per Pump:** Two (2) **Site:** Paramount, CA

**NOTES:** Information Below to be Completed : ○ By Purchaser ■ By Manufacturer ☒ By Manufacturer or Purchaser

## Seal Specification - (Ref. 4.1, Figures 1 to 6)

| | | | | | |
|---|---|---|---|---|---|
| **CATEGORY** | ○ Seal Category 1 | ● Seal Category 2 | ○ Seal Category 3 | ☒ Seal Code (Annex D) | 23A-PIN-040-53B |
| **TYPE** (CODE CW) | ■ Type A (3.1.90) | ☒ Type B (3.1.91) | ☒ Alternate Stationary (Type A&B) | | |
| | ☒ Type C (3.1.92) | ☒ Alternate Rotating (Type C) | ☒ Single Spring (Type A) | | |

| **ARRANGEMENT** | Default Configuration | Alternate Design | Flush Plans (See Annex G) |
|---|---|---|---|
| 1 (3.1.2) | Single: ☒ 1CW-FX | ☒ 1CW-FL ☒ Dist. Flush; ☒ Alternative Bush | ☒ 01 ☒ 13 ☒ 23 ☒ 50 ☒ 62; 02 ☒ 14 ☒ 31 ☒ 51; ☒ 11 ☒ 21 ☒ 32 ☒ 61 |
| 2 (3.1.3) | Buffer: Liquid ☒ 2CW-CW | ☒ FX ☒ Dist. Flush; ☒ Tangential LBO Connection | ☒ 01 ☒ 13 ☒ 23 ☒ 41 ☒ 62 ☒ 75; ☒ 02 ☒ 14 ☒ 31 ☒ 52 ☒ 71 ☒ 76 |
| | Buffer: Gas ☒ 2CW-CS | ☒ 2NC-CS ☒ FX ☒ Dist. Flush | ☒ 11 ☒ 21 ☒ 32 ☒ 61 ☒ 72 |
| 3 (3.1.4) | Barrier: Liquid ■ 3CW-FB | ☒ 3CW-BB ☒ FX; ☒ 3CW-FF ☒ Tang. LBO Conn. | ☒ 01 ☒ 13 ☒ 32 ☒ 53C ☒ 62; ☒ 02 ☒ 14 ☒ 53A ☒ 54 ☒ 74 |
| | Barrier: Gas ☒ 3NC-BB | ☒ 3NC-FF ☒ 3NC-FB | ☒ 11 ☒ 23 ■ 53B ☒ 61 |

**SLEEVE-SHAFT DRIVE** ● Set-Screw Onto Shaft ☒ Alternative (6.1.3.15) Specify : DRIVE COLLAR

## MATERIALS (REFERENCE 6.1.6 & ANNEX B) (Note 7.3)

| SECONDARY SEALS | SEAL FACES | METAL BELLOWS | SPRINGS | METAL PARTS |
|---|---|---|---|---|
| ☒ FKM ● FFKM | ● CARBON vs SIC | ☒ UNS N10276 (TypeB) | ● UNS N10276 or UNS N06455 | ☒ UNS S31600 / S31635 |
| ☒ Spiral Wound Gasket | ☒ SIC vs SIC | ☒ UNS N07718 (TypeC) | ☒ UNS S31600 or UNS S31635 | ☒ UNS N10276 |
| ☒ EPM / EPDM ☒ NBR | ☒ SS-SIC ☒ RB-SIC | ☒ UNS N08020 | | ☒ UNS N08020 |
| ☒ Other : | ☒ vs | ☒ Other : | | ● Other : Duplex 2205, 316SS |

## MECHANICAL SEAL DATA

| | | | |
|---|---|---|---|
| ● Seal Vendor : | FLOWSERVE | ■ Dynamic Sealing Pressure Rating (3.1.27) : | 750 psig |
| ○ Data Requirements Form (Annex J) | | ■ Static Sealing Pressure Rating (3.1.84) : | 1125 psig |
| ■ Size / Type : | 2.250/2.250 / QBBW/QBQW | ■ Maximum Allowable Temperature (3.1.51) : | 0 - 400 °F |
| ■ Seal Drawing No.: | EN207123-BG-9V3-00071 (D0558317) | ● Min. Design Metal Temperature (6.1.6.11.1) : | 32 °F |
| ■ Vendor's Seal Code : | FA9X/5A9X | ☐ Generated Heat at Normal Conditions : | BTU/hr |
| ☐ Modified Faces For Pump Performance Test | | ☐ Heat Soak at Normal Conditions : | BTU/hr |
| ☐ Alternative Seal For Pump Performance Test | | ☐ Total Seal Axial Thrust on Shaft : | lb |

## SEAL CHAMBER DATA (REFERENCE 6.1.2.4)

■ API 610 ☒ ASME B73.1&2 ☒ Cylindrical ☒ Tapered ☒ ISO 3069-C ☒ Other :

○ Bolt-On Chamber (6.1.2.5) ☒ Seal Chamber Flush Port Req'd ☒ Seal Chamber Vent Req'd

☒ Floating Throat Bushing ☒ Fixed Throat Bushing ☒ Chamber Heating ☒ Chamber Cooling

## PUMP DATA

■ Manufacturer : ITT Goulds ■ Model : 3700SA ■ Size : 1X2-7 ☒ Case Material : CS (NACE)

Pump Operating Pressure : ● Discharge Press. (Rated) : 43.0 psig ● Suction Press. (Rated) : 2.2 psig

Seal Chamber Press.: ■ Norm.: 17.5 psig ☐ Min/Max (MDSP 3.1.53): / psig ☐ MSSP (3.1.55) : psig

Shaft: ☒ Horizontal ☒ Vertical ■ Diameter : 40 mm ■ Shaft Speed : 3520 RPM

■ Shaft Rotation (Viewed From Driver) : ■ CCW ☐ CW

## NOTES

| | |
|---|---|
| 7.1 | Pump Supplier shall consult seal Manufacturer for finalization of seal flushing Plans. |
| 7.2 | Seal Manufacturer shall consider the Liquid Characteristics and Operating Conditions on sheet 2. |
| 7.3 | Seal Manufacturer shall recommend seal face material, elastomers and spring material based on pumped fluid properties. |
| 7.4 | Refer to 8ES-2DG1 - "WEP Instrumentation & Electrical Standard Vendor List," for Instrumentation. |
| 7.5 | Deleted. |
| | Deleted. |
| 7.6 | Baseplates shall be sized for mounting of seal flush systems on-base. Seal flush systems shall not interfere with pump maintenance. |
| | Plan 53B systems shall be pre-piped and removed for shipping. |

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# API 682 MECHANICAL SEAL DATA SHEET

Doc. No.: A8KM-18-073-540117-A

Note: This data sheet has been modified from that in the annex of API Standard 682, Third Edition. (See Note 9.3)

| | | | |
|---|---|---|---|
| Contract: | A8KM | | |
| Item No: | 18-P-1847A/B | | |
| Revision: | G | Date: | 23-Jan-23 |
| Unit: | Utilities and Offsites | | |
| P.O. No.: | 4505515682 | | |
| Inquiry No.: | 4-601B-RQ | | |
| Sheet | 8 | of | 10 |

REV

## FLUID DATA

**PUMPED STREAM (PLANS 01, 02, 11, 12, 13, 14, 21, 23, 31, 41)**

- ○ Type or Name : SOUR WATER/SLOPS  Conc'n : ____ %
- ○ Dissolved Contaminant ○ $H_2S$ : ____ ppmw ○ Wet
- (Note 2.9) ○ $Cl_2$ : ____ ppm ○ Other : ____ @ ____ wt%
- ○ Solid Contaminant : ____
- ○ Conc'n (Mass Fract. or PPM) : ____
- ○ Fluid Temp.: Min 250 °F Norm ____ °F Max ____ °F
- ○ Spec. Gravity : @ Norm. Temp.: 0.7 @ Min. Temp.: ____
- ○ Vapor Pressure : @ Norm Temp.: 14.7 psi(a)
  @ Max Temp.: ____ psi(a)
- ○ Atmospheric Boiling Point : ____ °F
- ○ Viscosity : Normal : 1.000 cP Max.: ____ cP

- ○ Hazardous ○ Flammable ○ ____
- ○ Fluid Solid at Ambient ○ Solidifies @ : ____ °F
  ○ Pour Point : ____ °F
- ○ Pumped Stream Solidifies Under Shear
- ○ Pumped Stream Contains Agents That Polymerize
  Specify Agents : ____ @ Temp : ____ °F
- ○ Pumped Stream Can Plate Out or Decompose :
  Specify Conditions : ____
- ○ Pumped Stream is Regulated For Fugitive or Other Emissions
  Regulation Level : ____ wt%
- ○ Special Pump Cleaning Procedures : ____
- ○ Alt. Process Fluids (incl. Commissioning) Specify : ____

**FLUSH FLUID (PLAN 32)**

- ○ Type or Name : ____ Conc'n : ____ %
- ○ Seal Vendor Review Required
- ○ Fluid Temp : Min ____ °F Norm ____ °F Max ____ °F
- ○ Spec. Gravity : @ Norm. Temp.: ____ @ Max. Temp.: ____

- ○ Vapor Press: @ Norm. Temp: ____ psi(a) @ Max. Temp: ____ psi(a)
- ○ Viscosity @ Normal Temperature : ____ cP
- ○ Atmospheric Boiling Point: ____ °F
- ☐ Flow Rate Req'd Max. / Min.: ____ / ____ gpm
- ☐ Pressure Req'd Max. / Min.: ____ / ____ psig

**QUENCH MEDIUM (PLAN 62)**

- ☒ Type or Name : ____

- ☒ Supply Temperature Max. / Min. : ____ / ____ °F
- ☐ Flow Rate Req'd (@STP for gas) Max. / Min. : ____ / ____ gpm

**BUFFER / BARRIER MEDIUM (PLAN 52, 53, 54, 72, 74)**

- ■ Type or Name : DURACLEAR
- ● Purchaser Selection ☐ Seal Vendor Selection
- ● Seal Vendor Review ☐ Purchaser Review
- ■ Flow Rate Req'd (@STP for Gas) Max. / Min.: ____ / ____ gpm
- ☒ Supply Pressure Max. / Min.: ____ / ____ psig
- ☒ Fluid Temperature :
  Min.: ____ °F Normal : ____ °F Max.: ____ °F

- ☒ Specific Gravity:
  @ Normal Temperature : ____ @ Max. Temp. : ____
- ☒ Vapor Pressure at :
  Normal Temp.: ____ psia Max. Temp.: ____ psia
- ☒ Atmospheric Boiling Point : ____ °F
- ☒ Viscosity at Normal Pump Temperature : ____ cP
- ☒ Specific Heat Capacity at Const. Press.: ____ BTU/lb°F
- ■ Cooling / Heating Required : Yes

## SITE AND UTILITIES

- ● Control Voltage : V : 120 Ph : 1 Hz : 60
- ● Area Class: Cl.: I Gr.: B/C/D Div.: 2
- ● Design Ambient (Min. / Max.) : 35 / 105 °F
- ○ ATEX (Ex Directive 94/9/EC) : Gr.: ____ Cat.: ____ T-CLASS: T3C

- ● Cooling Water Supply Temp. Norm.: 80 °F ● Cl⁻ : < 840 ppmw
- ● Cooling Water Supply Press. Norm./Design: 45 / 120 psi(g)
- ● Cooling Water Allowable Pressure Drop : 10.0 psi
- ● Cooling Water AllowableTemp. Rise : 40.0 °F

## ACCESSORIES (Clauses 8 and 9)

**GENERAL**

- ○ Joint User / Vendor Layout of Equipment (8.1.3)
- ○ Pipe Taper Threads (8.2.13) ○ ISO 7 ○ ASME B1.20.1
- ○ Special Requirements For Hazardous Service
  Define : ____
- ○ Special Cleaning and Decontamination Requirements
- ○ Utility Manifold Connections Required (8.2.24)
- ○ Type and Spec. of Heat Tracing (8.3.9.1.1) :
  ____
- ○ Thermal Relief Valves Required (9.8.3)

**PLAN 11, 12, 13, 14, 21, 23, 31, 32 and 41 SYSTEMS**

- ○ Connecting Line Supplier : ____
  ○ Tubing ○ Piping (8.3.5.2) ____
- ○ Restriction Orifice Nipple in Flush Line (8.3.5.4)
- ○ Cyclone Seperator Supplier : ____
- ○ Plan 32 Equipment Supplier : ____
- ○ Plan 32 Flow Indicator ○ Plan 32 Temp. Indicator
  ○ Plan 23 Temp. Indicator

**COOLING SYSTEMS (PLAN 21,22,23,41,52,53B,53C)** (Note 8.3) G

- ● Heat Exchanger Supplier : FLOWSERVE
  ■ Water Cooled ☒ Air Cooled ○ ISO 15649
- ■ Equipment Reference / Code : PLAN 53B
- ● Cooling Water Line Supplier: PUMP SUPPLIER
  ○ Tubing ○ Galvanized Piping (8.2.21) ○ Gal CS Piping
- ● Sight Flow Indicators (8.2.22) ○ Open ● Closed
- ■ Cooling Water Flow Requirement & Equipment Pressure Drop:
  ☐ Primary Equipment : ____ gpm ΔP : ____ psi
  ■ Secondary Equipment : ____ gpm ΔP : ____ psi

**PLAN 72 and 74 SYSTEMS**

- ○ Equipment Supplier : ____
- ○ High Flow Alarm Switch (8.3.10.5)

**PLAN 75 and 76 SYSTEMS**

- ○ Equipment Supplier : ____
- ○ High Level Alarm Switch For Plan 75 (8.3.9.3.3)
- ○ Test Connection (8.3.9.3.4)

## NOTES

| | | |
|---|---|---|
| 8.1 | Pump Supplier has unit responsibility for the furnishing of all instruments & equipment associated with seal flush Plans. | |
| 8.2 | Orifice size shall be stamped on each orifice, with direction of flow indicated. Orifice assembly shall be tagged with Buyer's orifice tag number. | |
| 8.3 | ~~When cooling is required, cooling water piping shall be 3/4" schedule 80 galvanized pipe, or 3/4" minimum O.D. tubing x 0.095" wall in~~ | F |
| | ~~304 SS or 316 SS material, inclusive of compression fittings. See sheet 2 Utility Data for cooling water chlorides content and adjust accordingly.~~ | F |
| | Cooling water piping to follow Material Pipe Class TAAG2 | F |

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# API 682 MECHANICAL SEAL DATA SHEET

Doc. No.: A8KM-18-073-540117-A

Note: This data sheet has been modified from that in the annex of API Standard 682, Third Edition. (See Note 9.3)

| | | | |
|---|---|---|---|
| Contract: | A8KM | | |
| Item No: | 18-P-1847A/B | | |
| Revision: | G | Date: | 23-Jan-23 |
| Unit: | Utilities and Offsites | | |
| P.O. No.: | 4505515682 | | |
| Inquiry No.: | 4-601B-RQ | | |
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## ACCESSORIES (Clauses 8 and 9) CONTINUED

**PLAN 52 AND 53 SYSTEMS** (Note 8.2, Note 9.1)

- ■ Standard (Fig. G.35) ☒ Alternative (Fig. G.36)
- ☐ Dimensional Variations To Standard Figure G.35 :
- ☐ Dimensional Variations To Standard Figure G.36 :
- ☒ Alternative Fabrication Standard :
- ● Primary Equipment Supplier : FLOWSERVE
- ☐ Supplier Reference / Code : PLAN 53B
- ● Connecting Line Supplier : PUMP SUPPLIER
- ● Tubing ○ SCH. 80 Piping (8.2.9)
- ● Equipment Support Supplier : PUMP SUPPLIER
- ● Filling System Supplier : BUYER
- ● ASME Code Stamp Required PLAN 53B

- ○ EN 13445 or Other Code Applicable :
- ☒ Reservoir Capacity (8.3.6.2.5a) : gal
- ☒ NLL to Gland Plate Height (8.3.6.2.2) : ft
- ☐ Reservoir MAWP (3.1.52) : 690 psig @ 240 °F
- ☒ Set Pressure Range, Max. / Min.: / psig
- ☒ System Hold-Up Period (Plans 53B & 53C) : days
- ● Temperature Indicator (Plan 53B & 53C)
- ○ Pressure Alarm Setting (8.3.6.2.3) to Activate on :
  - ☒ Rising Pressure (Arr 2) Set at : psig
  - ☒ Falling Pressure (Arr 3) Set at : psig
- ☒ Low Level Alarm Setting Required
- ☒ High Level Alarm Setting Required (8.3.6.2.4)
- ○ Test Based H / Q Curve For Internal Circulating Device
- ○ External Circulating Pump (8.3.7)

## INSTRUMENTATION

- ● User Specification Reference For Instrumentation / Controls : (Note 7.4)

Pressure Gauges (9.4)
- ● Oil Filled Pressure Gauges (9.4.3)

Pressure Transmitters (9.5.2) ○ Switches in Lieu of Transmitters

Level Transmitters (9.5.3) ○ Switches in Lieu of Transmitters

○ Hydrostatic (Std. Option, 9.5.3) ○ Capacitance ○ Ultrasonic

Level Indicators (9.6)

○ Weld Pad (Std. Option, 9.6.1) ○ External, Removable (9.6.2)

Flow Instruments (9.7) : ● Transmitters (9.5.4)

## INSPECTION AND TESTING

- ○ Purchaser Participation in Inspection & Test
  Specify :
- ○ Inspector's Check List (10.1.7 & Annex H)
- ○ Purchaser Approval Req'd For Welded Connection Design (6.1.6.10.5)
- ● Hardness Test (10.2.3k) Required For : Welds

- ○ 100% Inspection of All Welds (6.1.6.10.5) Using :
  - ○ Magnetic Particle ○ Liquid Penetrant
  - ○ Radiographic ○ Ultrasonic
- ○ Optional Qualification Testing Required (10.3.2)
- ☒ Mod. Faces For Pump Test (10.3.6.1), Seal Page 1, Line 32
- ☒ Alternate Seal Pump Test (10.3.6.2), Seal Page 1, Line 33

## NOTES

**9.1 Seal flush systems and supports shall meet load requirements per Project specification A8KM-PP-000-40002-A, Structural Data For Mechanical Equipment and A8KM-PP-000-20001-A, Plant Site Data Sheet.**

**9.2 Seal Data Sheets are in the API-682, 3rd Edition format. Paragraph references are to API-682, 4th Edition. Pump seals shall be in full compliance with API-682, 4th Edition.**

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**PUMP DATASHEET**
**ANNEX**

| | | | |
|---|---|---|---|
| **Contract:** | **A8KM** | | |
| **Item No:** | **18-P-1847A/B** | | |
| **Revision:** | **G** | **Date:** | **23-Jan-23** |
| **Unit:** | **Utilities and Offsites** | | |
| **P.O. No.:** | **4505515682** | | |
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## PROPOSAL PUMP CURVE