

WORLD ENERGY RENEWABLES PROJECT

MECHANICAL EQUIPMENT DATA SHEET FOR 18-P-359A/B

RECYCLE OIL PUMPS

Fluor Project No: A8KM

REV	DATE	DESCRIPTION	PAGES	ORIG	CHK'D	APPV'D
1	5-Apr-2024	As Built				
D1	21-Dec-2022	Re-Issued for Purchase	23	VH	JF AD ME	BT
D	24-Nov-2021	Issued for Purchase	23	CP	JF AD ME	BT
C	29-Jul-2021	Issued for Quotation	22	JDM	JF AD ME	BT
B	12-Jul-2021	Issued for Client Review	22	JDM	JF AD ME	BT
A	15-Feb-2021	Issued for Internal Review	10	JDM		

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API 610
CENTRIFUGAL PUMP DATA SHEET

Doc. No.: A8KM-18-089-540072-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-359A/B		
Revision:	1	Date:	5-Apr-24
Unit:	Renewable Jet Fuel Unit B		
P.O. No.:	4-601-PO-11		
Inquiry No.:	4-601F-RQ		
Sheet	2	of	7

REV

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

SERVICE : Recycle Oil Pumps | FACILITY: World Energy Paramount | SITE : Paramount, CA

NO. REQ'D : 2 x 100% (Note 2.1) | PUMP SIZE : BBT-D 6x8x18B | API TYPE : BB2 | NO. STAGES : Two (2)

MANUFACTURER : Sulzer Pumps | MODEL : BBT-D | SERIAL NO. : 650963/650964 1

APPLICABLE TO : ○ PROPOSALS ○ PURCHASE ● AS-BUILT

GENERAL

PUMPS OPERATE IN :	Note 2.1	NO. MOTOR DRIVEN :	Two (2) - VFD	NO. TURBINE DRIVEN :	N/A
WITH :		PUMP ITEM NO. :	18-P-359A/B	PUMP ITEM NO. :	
GEAR ITEM NO. :	N/A	MOTOR ITEM NO. :	18-P-359AM/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:		Recycle Oil (Hydrocarbon)		
VAPOR PRESSURE :	psi (a)	764.7	764.7	(Saturated)
RELATIVE DENSITY :		0.739 @ 100°F	0.569	
SPECIFIC HEAT :	BTU/lbm °F		0.7021	
VISCOSITY :	cP	2.119 @100°F	0.25	

SERVICE : CONTINUOUS (Note 2.1)

*IF INTERMITTENT, NO. OF STARTS / DAY :

CORROSION DUE TO: (6.12.1.9) : Note 2.7

EROSION DUE TO: (6.12.1.9) :

H_2S CONCENTRATION (ppmw) (6.12.1.12) : Note 2.7

WET (YES / NO) : NO

CHLORIDE CONCENTRATION (ppmw) : Note 2.7

PARTICULATE SIZE (DIA. IN MICRONS) :

PARTICULATE CONCENTRATION (ppmw) :

MECHANICAL DESIGN TEMPERATURE (°F) 600

OPERATING CONDITIONS (6.1.2)

	UNITS	MAXIMUM	RATED: 1-PUMP	NORM: 2-PUMP	MIN: 2-PUMP
NPSHa DATUM :		C.L. IMPELLER (Note 2.2)			
PUMPING TEMP.:	°F	500	450		100 (tracing)
FLOW :	gpm		2460.8 one pump	961.3 ea. pump	384 ea. pump
DISCHARGE PRESS:	psi(g)		1231.9		
SUCTION PRESSURE :	psi(g)	987.1	757.4		
DIFFERENTIAL PRESS.:	psi		474.6		
DIFFERENTIAL HEAD :	ft		1925.7		
$NPSH_A$:	ft	(Note 2.9)	31.0	32.9	(Note 2.2)
HYDRAULIC POWER :	hp		680.9		

a.) Maximum density is based on the system static maintenance temperature of 100°F (no pumping). Motor sizing shall be based on the rated specific gravity and rated speed per API-610 requirements. Pumping system is warmed close to the rated operating temperature prior to pump start-up.

b.) Catalyst fines may be present at start-up.

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 : T3

SITE DATA:

El 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 :	4000	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 D1

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

INSTRUMENT AIR : MAX. : N/A psi(g) | MIN. : psi(g)

MECH. DESIGN: psi(g) °F

STEAM :

		DRIVERS	HEATING
TEMP : °F	MAX. :	N/A	N/A
	MIN. :		
PRESS. : psig	MAX. :		
	MIN. :		

NOTES

2.1 Each pump shall be sized for the Rated conditions; 2 x 100% pumps. Normal capacity operation is 2 x 50% pumps in parallel, synchronized with individual VFD's furnished by the pump Supplier; If one 50% pump drops out, the remaining pump becomes a 100% pump. Rated TDH is based on a single 100% pump with FCV control at motor slip speed. For parallel VFD operation, the Controlling Case FCV will be wide open, other FCV's will be pass balance throttled.

Operating speeds shall be based on the following pump heads:

Rated = 1925.7 ft.; Normal = 1738.8 ft.; Minimum = 484.7 ft. See variable speed curve included on last sheet. D1

H-Q curve shall rise continuously to Minimum Continuous Stable Flow (UOP Specification).

2.2 Pump centerline is 32" above top of foundation.

Minimum NPSH margin shall be the greater of 2-ft. or 15% of NPSHR (UOP Spec.)

31.0 feet NPSHA at Rated Flow includes agreed Process credits. NPSHA at Normal Flow (2 pumps running) is 32.9 feet.

2.3 Pump Control Method: Flow control valve for single pump operation at Rated capacity or VFD for parallel pumps operation at all other capacities.

2.4 This is a UOP Pump Service. Governing Project Specifications are: #1; Honeywell/UOP Standard Specification 5-11-13, Centrifugal Pumps.

#2; Project Specification A8KM-PP-000-50626-A, Centrifugal Pumps for Petroleum and Natural Gas Industries - API 610.

2.5 The system static head is a constant for each Case and is a negative value (< 0).

2.6 The Normal Case Hydrogen Partial Pressure is 425 psia.

2.7 The Normal Case Composition of Corrosive Components:

Per Process Data Sheets, CO2 = 0.71 mol%, H2S = 0.05 mol%. HCl = 11 ppmv

Per UOP Data Sheets, H2 = >4.9 mol%, H2O = 3.7 mol%, NH3 = 238 mol ppm, Cl^- = 85 ppmw.

2.8 Water Dew Point: Max. 331°F. Pour Point: 75°F. The standby pump must be maintained above the water dew point to prevent free water formation. Refer to Note 3.2.

2.9 Deleted. D1

2.10 When the liquid is flashed to 0 psig (atmospheric), the estimated flash vaporization is 27 wt% vapor. Estimated ASTM D-86 5% cut point is 281° F.

2.11 Operating temperature is maintained at 450°F minimum, which is above the 406°F maximum salt point temperature.

2.12 Each process pump motor driver will be fed by an alternate, independent power supply.

2.13 Deleted.

Deleted.

Deleted.

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Unit:	Renewable Jet Fuel Unit B		
P.O. No.:	4-601-PO-11		
Inquiry No.:	4-601F-RQ		
Sheet	3 of 7		

PERFORMANCE

		REV
PROPOSAL CURVE NO.:	90623-C RPM 3576	
TEST CURVE NO.:	M-13810/11	
IMPELLER DIA.: RATED:	17.16 MAX: 18.0 MIN: 14.38 in	
RATED POWER:	1033 hp EFFICIENCY: 65.9 %	
RATED CURVE BEP FLOW: (at rated impeller dia.)	2135 gpm	
MIN. FLOW: THERMAL :	gpm STABLE : 695 gpm	
PREFERRED OPERATING REGION: (6.1.12)	1495 to 2562 gpm	
ALLOWABLE OPERATING REGION:	695 to 2557 gpm	
MAX. HEAD @ RATED IMPELLER:	2699 ft	
MAX. POWER @ RATED IMPELLER: (6.8.9)	1015 hp	
NPSHR at CL IMPELLER for RATED FLOW :	26.7 ft	
CL PUMP TO LOWER SIDE OF BASEPLATE:	2.66 ft	
NPSH MARGIN at RATED FLOW :	4.3 ft	
SPECIFIC SPEED:	gpm,rpm,ft 845	
SUCTION SPECIFIC SPEED LIMITATION:	gpm,rpm,ft (Note 3.1)	
SUCTION SPECIFIC SPEED: (6.1.9):	gpm,rpm,ft 11120	
MAX. ALLOW. SOUND PRESS. LEVEL / EST.: (6.1.14) @ 3 ft	85 / 85 dBA	
MAX. ALLOW. SOUND POWER LEVEL / EST.: (6.1.14) @ 3 ft	/ dBA	
MAX. DISCHARGE PRESSURE: (6.3.2)	1919 psig	
BASIS: (6.3.2.a, b or c)		

DRIVER (7.1.5)

		REV
DRIVER TYPE:	INDUCTION MOTOR	1
GEAR:	NO	1
VARIABLE SPEED REQUIRED:	YES	
SOURCE OF VARIABLE SPEED:	VFD MOTOR (FURNISH VFD)	
OTHER:	TEAAC/ IP55	1
MANUFACTURER:	GE	1
NAMEPLATE POWER:	1250 hp	1
NOMINAL RPM:	3600	1
RATED LOAD RPM:	3564	1
FRAME OR MODEL:	8213	1
ORIENTATION:	HORIZONTAL	
LUBE:	OIL	
BEARING TYPE:	SLEEVE	
RADIAL: (Qty / Brg. Number)	1 / EM-ZLB 9S-100	1
THRUST: (Qty / Brg. Number)	1 / EM-ZLB 9S-100	1
STARTING METHOD:	OPEN VALVE / VFD	
DRIVER DATA SHEET:	ATTACHED	
ACCESSORIES:		
Motors shall be Inverter Duty rated. Refer to motor data sheets, pages 11-22.		

CONSTRUCTION

API PUMP TYPE: BB2 [Based on API 610 Definitions]

NOZZLE CONNECTIONS: (6.4.2)

	SIZE	FACING	RATING	POSITION
SUCTION	8"	RF	1500	TOP
DISCHARGE	6"	RF	1500	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)	3	0.75"	BW	RF	1500	BOTTOM
VENT (IF NOT SELF VENT)	1	0.75"	BW	RF	1500	TOP
PRESSURE GAUGE	--					
TEMP GAUGE	--					
WARM-UP LINE*	1	0.75"	BW		1500	BOTTOM

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

		REV
	SUPPLIER	
DRAINS MANIFOLDED:	YES	
VENT VALVE SUPPLIED BY:	SUPPLIER	
VENTS MANIFOLDED: (SCHEDULE 160-UOP SPEC.)	YES	
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: (SCHEDULE 160-UOP SPEC.)	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	

		REV
CASING MOUNTING:	CENTERLINE	
CASING TYPE:	MULTIPLE VOLUTE	
OH3 BACKPULLOUT LIFING DEVICE REQ'D: (9.1.2.6)	N/A	
CASE PRESSURE RATING: (Note 3.3)		
MAWP: (6.3.5)	1920 psig @ 600 °F	
HYDROTEST: (8.3.2.6)	2880 psig @ 100 °F	1
Hydrotest at 1.5 x MAWP of the Pump Assembly.		
HYDROTEST OH PUMP AS ASSEMBLY:	N/A	
SUCTION PRESS. REGIONS DESIGNED FOR MAWP:	YES	
ROTATION: (VIEWED FROM COUPLING END)		
- IMPELLERS INDIVIDUALLY SECURED:		D1
- BOLT OH 3/4/5 PUMP TO PAD / FOUNDATION:	N/A	
- PROVIDE SOLEPLATE FOR OH 3/4/5 PUMPS:	N/A	
ROTOR:		1
SHAFT FLEXIBILITY INDEX (SFI): (9.1.1.3)		
FIRST CRITICAL SPEED, WET: (MULTI-STAGE)	RPM	
COMPONENT BALANCE TO ISO 1940 G1.0: (6.9.4.4)	YES	
SHRINK FIT LIMITED MOVEMENT IMPELLERS: (9.2.2.3)	NO	1
COUPLING & GUARD: (7.2.2) (Note 3.4)		
MANUFACTURER:	Rexnord	
MODEL:	XTST71	
RATING: (POWER/100 RPM)		
SPACER LENGTH:	16 in	1
ACTUAL SF AT MOTOR NAMEPLATE:	2.38	
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: (7.2.11)	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

		REV
3.1	Suction specific speeds above 11,000 for hydrocarbons and 9,500 for > 50% water solutions (USC units) require specific approval by the Buyer (UOP Specification).	
3.2	Manifold & terminate drain piping with a gate valve at edge-of-skid. Manifold vents & terminate with a gate valve.	D1
	Buyer will bypass the discharge check vave with an orifice and block valves and route to discharge nozzle, for flowing out	D1
	the suction nozzle for warm up. Customer connections shall be flanged. Drains & vents shall be Alloy 625 up to an Alloy 625 block valve. Piping downstream of valves may	
	be carbon steel. Alloy 625 is a UOP requirement, for protection against potential standing free water condensation and corrosion during start-up & shut-down.	
3.3	Nameplate for MAWP at mechanical design temperature. Mechanical design pressure shall be 1850 psig minimum for multi-pump block-in condition.	
3.4	Coupling guards shall be non-sparking.	
3.5	Pumps are in hazardous service due to temperature (over 400 F), so no socket welded case connections are allowed. Butt welded or	
	integrally flanged case connections are required.	

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Revision:	1	Date:	5-Apr-24
Unit:	Renewable Jet Fuel Unit B		
P.O. No.:	4-601-PO-11		
Inquiry No.:	4-601F-RQ		
Sheet	4	of	7

REV

CONSTRUCTION (CONT'D)

MATERIAL (6.12.1.1)

APPENDIX H CLASS:	S-6: CS / 12% Cr
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)	Max. 200 BHN
BARREL:	--
CASE:	ASTM A-216 GR. WCB PWHT& <200 HBN
DIFFUSERS:	N/A
IMPELLER:	ASTM A-487 GR. CA6NM CL. B
IMPELLER / CASE WEAR RING:	ASTM A-487 GR. CA6NM CL. B / 12% CR. / N-5 HF
SHAFT:	A479 TP 410
BOWL (IF VS TYPE):	--
INSPECTION CLASS: (API/ISO TABLE 14)	LEVEL 3

BEARINGS AND LUBRICATION (6.10.1)

BEARING (TYPE / NUMBER):	
RADIAL:	BALL / 6218 MC3
THRUST:	BALL / 7315 BXLMPUB
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:	Not Applicable
INTERCONNECTING PIPING PROVIDED BY:	SUPPLIER
OIL VISC. ISO GRADE:	
CONSTANT LEVEL OILER: (6.10.2.2)	REQ'D

INSTRUMENTATION

SEE ATTACHED API-670 DATA SHEET:	NO
ACCELEROMETER OR VELOMETER: (7.4.2.1):	ACCELEROMETER (A/F Brgs)
QUANTITY:	TWO (2) per bearing (4 per pump)
MOUNTING LOCATIONS:	Metrix vibration instr. in each bearing housing
DETECTORS REQUIRED:	YES
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)	YES (NOTE 4.8)
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 BALL BEARINGS: (7.4.2.3)	
PROVISION-ONLY FOR TEMPERATURE PROBES:	NO
RADIAL BEARING TEMPERATURE PROBES:	Dual Element RTD
QUANTITY PER RADIAL BEARING:	1
THRUST BEARING TEMPERATURE PROBES:	Dual Element RTD
QUANTITY PER THRUST BEARING ACTIVE SIDE:	1
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)	Sloped Deck Drain Pain
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)	YES
4.2) PROVISIONS FOR PURE OR PURGE MIST: (6.11.3)	IF STD
4.3) PRESS. / CIRC. LUBE SYSTEM: 9.2.6.1)	Not Required
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. D1

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

4.8) Pumps with A/F bearings shall have a minimum 1" diameter flat surface for a magnetic-based vibration transducer (UOP Specification). D1

SEAL SUPPORT SYSTEM MOUNTING

BARRIER/BUFFER RESERV. MTD ON PUMP BASEPL.:(7.5.1.4)	NO
IDENTIFY LOCATION ON BASEPLATE:	
INTERCONNECTING PIPING BY:	NOTE 9.2
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:	N/A
MAX. CHAMBER PRESS.: (6.8.13) STATIC: DYN.: psig	
SEAL CATEGORY: (6.8.1)	Category 2 (API-610)

HEATING AND COOLING

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

PIPING & APPURTENANCES

MANIFOLD PIPING SYS. FOR PURCHASHER CONN.: (7.5.1.6)	
VENTS INCL. VALVES:	YES
DRAINS & WARM-UP PIPING WHEN REQ'D INCL.VALVES	YES
COOLING WATER INCL. VALVES & SFI's:	
TAG ALL ORIFICES: (7.5.2.4)	YES
SOCKET WELD CONN. ON SEAL GLAND: (7.5.2.8)	NO

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Sheet	5	of	7

REV

SURFACE PREPARATION AND PAINT

MANUFACTURER'S STANDARD:	NO
OTHER (SEE BELOW)	YES
SPECIFICATION NUMBER:	A8KM-PP-000-500520-A
PUMP: **High Durability Coating, Compliant with ISO 12944-5, C4 Environment**	
PUMP SURFACE PREPARATION:	SSPC-SP 10
PRIMER:	Versiline CUI 56990
FINISH COAT:	
BASEPLATE: **High Durability Coating, Compliant with ISO 12944-5, C4 Environment**	
SURFACE PREPARATION:	SSPC-SP 10
PRIMER:	Hempadur AvantGuard 750 Zinc Rich Primer
FINISH COAT:	Hempathane 55610 Polyurethane
DETAILS OF LIFTING DEVICES:	Calcs & NDE Req'd for Lifts > 20,000 LBS
SHIPMENT: (8.4.1)	(Note 6.8)
EXPORT BOXING REQUIRED	
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-359A	6486	13100	450	5681	26077
18-P-359B	6486	13100	450	5681	26077

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:	NO
MAX DIA. IMPELLERS AND / OR NO. OF STAGES:	NO
CONNECTION DESIGN APPROVAL: (9.2.1.4) (BB Pumps)	NO
TORSIONAL ANALYSIS / REPORT: (6.9.2.10) (REQ'D IF GEAR OR VFD	YES
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)	YES
MODAL ANALYSIS REQUIRED FOR VS PUMPS: (9.3.9.2)	NO
DYNAMIC BALANCE ROTOR ASSEMBLY TO ISO G1.0: (9.2.4.2.3)	YES
INSTALLATION LIST IN PROPOSAL: (10.2.3.l)	NO
VFD STEADY STATE DAMPED RESPONSE ANALYSIS: (6.9.2.3)	NO
TRANSIENT TORSIONAL RESPONSE: (6.9.2.4)	NO
BEARING SELECTION & LIFE CALCS PER (6.10.1.1) & (6.10.1.6):	YES
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)			
MATERIAL CERT. REQUIRED: (6.12.1.8)	CASING:	YES	
	IMPELLER:	YES	1
	SHAFT:	YES	1
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)			1
	MAG PARTICLE:	100%	1
	RADIOGRAPHY:	100%	1
	LIQUID PENETRANT:	NO	
	ULTRASONIC:	NO	
INSPECTION REQUIRED FOR CASTINGS: (FOLLOW TABLE 14 LEVEL III)			
	MAG PARTICLE:	YES	
	RADIOGRAPHY:	YES	
	LIQUID PENETRANT:	NO	
	ULTRASONIC:	NO	
HARDNESS TEST REQUIRED: (8.2.2.7)	(HYDROGEN SERVICE)	YES	
ADDITIONAL SUBSURFACE EXAMINATION: (6.12.1.5)(8.2.1.3)		YES	
FOR:	AUXILIARY PIPING		
METHOD:	FOLLOW TABLE 14 LEVEL III FOR SOCKET OR BUTT WELD		
PMI TESTING REQUIRED: (8.2.2.8)		YES	
COMPONENTS TO BE TESTED:	See Note 6.4		
RESIDUAL UNBALANCE TEST: (J.4.1.2)		NON-WIT	
NOTIFICATION OF SUCCESSFUL SHOP PRELIM. TEST:(8.1.1.c)(8.3.3.5)		NO	1
BASEPLATE TEST: (7.3.21)		NO	1
HYDROSTATIC TEST OF CASING/HEAD:		NON-WIT	
HYDROSTATIC TEST OF BOWLS & COLUMN: (9.3.13.2)		N/A	
PERFORMANCE TEST:		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)		AGREED LIMITS	
NPSH TEST PTS./RETEST: (8.3.4.3.1)(8.3.4.3.4)		WIT	
NPSH TEST-1ST STAGE ONLY: (8.3.4.3.2)		YES	
NPSH TESTING TO HI 1.6 : (8.3.4.3.3)			
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)		NON-WIT	
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)		WIT	
4 HR. MECH RUN TEST AT RATED CAPACITY AFTER OIL TEMP STABLE:		N/A	
4 HR. MECH RUN TEST AT RATED CAPACITY: (8.3.4.2.2)(Note 6.5)		WIT	
BEARING HSG. RESONANCE TEST: (8.3.4.7)		NON-WIT	
STRUCTURAL RESONANCE TEST: (9.3.9.2)		NON-WIT	
REMOVE / INSPECT HYDRODYN. BRGS. AFTER TEST: (9.2.7.5)		N/A	
AUXILIARY EQUIPMENT TEST: (8.3.4.6)		N/A	
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-18-089-540072-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-359A/B		
Revision:	1	Date:	5-Apr-24
Unit:	Renewable Jet Fuel Unit B		
P.O. No.:	4-601-PO-11		
Inquiry No.:	4-601F-RQ		
Sheet	6 of 7		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:	YES
POSTWELD HEAT TREATMENT OF CASING FABRICATION WELDS:	YES

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	**Deleted.**	
6.2	**Deleted.**	
	Deleted.	
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 any alloy pressure containment parts, incl. seal gland, pipe & valves, is req'd per Project Specification A8KM-PP-000-500512-A, Positive Material**	
	Identification (PMI).	
6.5	**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~~	D1
	~~pumps, with vibration recordings at 10-minute intervals; and~~ for at least four (4) hours for multi-stage pumps, with plotted vibration spectra at	D1
	30 minute intervals. All Witnessed testing requires ten (10) Buyer's business days advance notice.	
6.6	**Deleted.**	
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 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.	
6.10	**Include 2 case RTD's for warm-up monitoring. Pump vendor to provide fitted thermal insulation blanket for pump casing and piping**	
	sections (drain & balance line).	D1

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PUMP DATASHEET
ANNEX

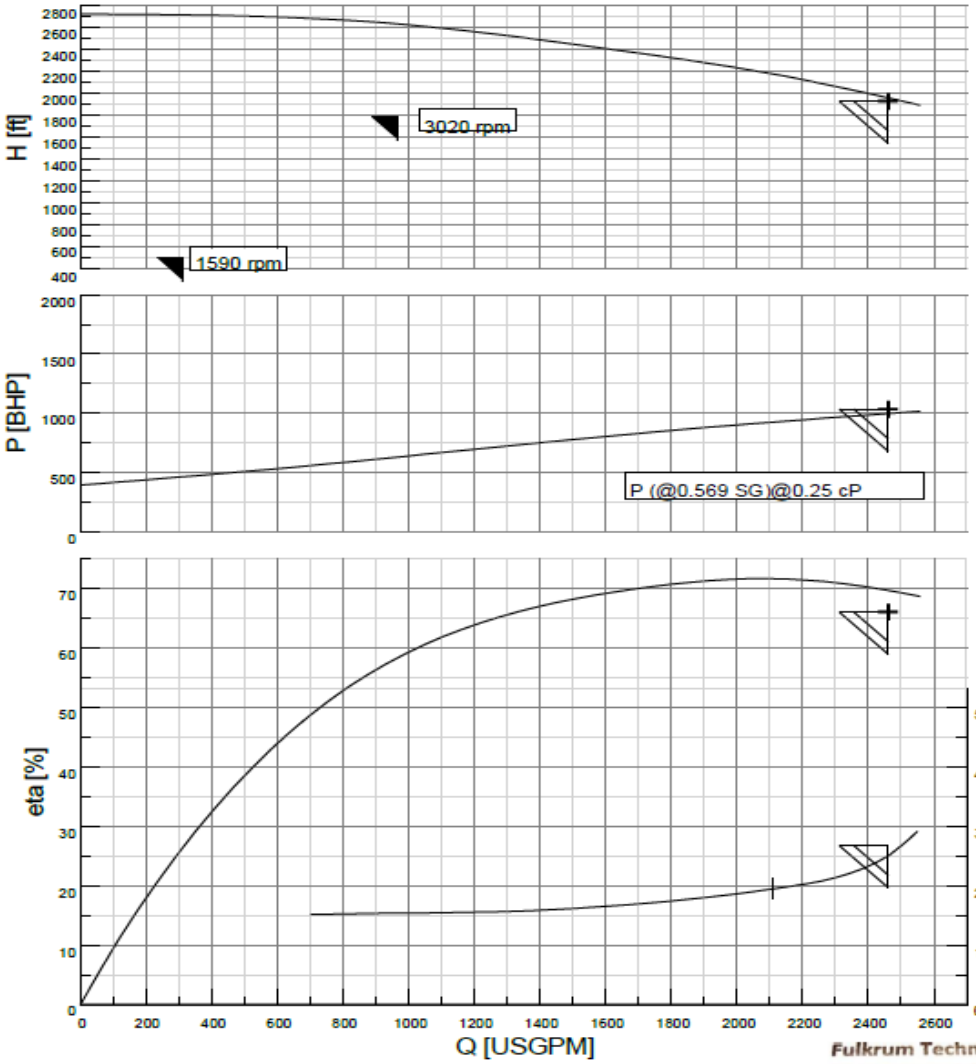
Contract:	**A8KM**			
Item No:	**18-P-359A/B**			
Revision:	**1**	**Date:**	**5-Apr-24**	
Unit:	**Renewable Jet Fuel Unit B**			
P.O. No.:	**4-601-PO-11**			
Inquiry No.:	**4-601F-RQ**			
Sheet	23	**of**	7	**REV**

PUMP CURVE

SULZER

Curva de prueba / Test Curve	M-13810	Impulsor / Impeller	1er Paso / 1st Stage: EY10434 ... — Series / Series: EY10435...
Cliente / Customer	Air Products and Chemicals Inc.	Modelo / Pattern	0613BBTD-21 — 0613BBTD-19
Orden Compra	4505610423	Difusor / Diffuser	204508662/63... — 204508664...
No. Identif. / Ident No.	18-P-359A	Modelo / Pattern	614BBTD-05 w/-07 llp mod
No. Serie. / Item No.	650963	D2 Diseño / D2 design.	ø17.16 in — Venas / Vane: ø17.16 in
Nombre / Name	Brandon Arias	D2 min. / D2 min.	ø14.38 in
Fecha / Date	2024-03-08	D2 max. / D2 max.	ø18.00 in

No. Or	100462910-0060-01
Sulzer Comm.Nr.	
Tipo / Type	6X8x18B BBTD
Reporte No. / Test Report No.	50/24
n=	3576 1/min. — i= 2 Stufen / Stages
DN s	8 in — DN d 6 in



Fulkrum Technical Resources
☐ Reviewed ☐ Monitored
☑ Witnessed
F-GR-002

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