

WORLD ENERGY RENEWABLES PROJECT

MECHANICAL EQUIPMENT DATA SHEET FOR 18-P-356A/B

PRODUCT FRACTIONATOR REBOILER CIRCULATION PUMP

Document Number A8KM-18-059-540078-A

Fluor Project No: A8KM

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API 610
CENTRIFUGAL PUMP DATA SHEET

Doc. No.: A8KM-18-059-540078-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-356A/B		
Revision:	1	Date:	7-Mar-24
Unit:	Renewable Jet Fuel Unit B		
P.O. No.:	4505610423		
Inquiry No.:	4-601E-RQ		
Sheet	2	of	7

REV

CLIENT:	World Energy Paramount		PROJECT:	World Energy Renewables Project		
SERVICE :	Product Fractionator Reboiler Circulation Pump	FACILITY:	World Energy Paramount	SITE :	Paramount, CA	
NO. REQ'D :	2x100% (Note 2.1)	PUMP SIZE :	OHH 6x8x26-1	API TYPE :	OH2	NO. STAGES : 1
MANUFACTURER :	Sulzer Pumps			MODEL :	OHH	SERIAL NO. : 650961 / 650962

REV: 1

APPLICABLE TO : ○ PROPOSALS ○ PURCHASE ● AS-BUILT

GENERAL

PUMPS OPERATE IN :	Note 2.1	NO. MOTOR DRIVEN :	Two (2)	NO. TURBINE DRIVEN :	N/A
WITH :		PUMP ITEM NO. :	18-P-356A/B	PUMP ITEM NO. :	
GEAR ITEM NO. :	N/A	MOTOR ITEM NO. :	18-P-356AM/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:			Diesel Product (Note 2.7)	
VAPOR PRESSURE :	psi (a)		36.9	
RELATIVE DENSITY :			0.524	
SPECIFIC HEAT :	BTU/lbm °F		0.795	
VISCOSITY :	cP		0.133	

SERVICE :	CONTINUOUS (Note 2.1)
*IF INTERMITTENT, NO. OF STARTS / DAY :	
CORROSION DUE TO: (6.12.1.9) :	
EROSION DUE TO: (6.12.1.9) :	Note 2.10
H_2S CONCENTRATION (ppmw) (6.12.1.12)	
WET (YES / NO) :	NO
CHLORIDE CONCENTRATION (ppmw) :	
PARTICULATE SIZE (DIA. IN MICRONS) :	
PARTICULATE CONCENTRATION (ppmw)	
MECHANICAL DESIGN TEMPERATURE (°F)	700

OPERATING CONDITIONS (6.1.2)

	UNITS	MAXIMUM	RATED	NORMAL	MINIMUM
NPSHa DATUM :		C.L. IMPELLER (Note 2.2)			
PUMPING TEMP.:	°F	675	624.0		
FLOW :	gpm		2203.2	1917.0	817.6
DISCHARGE PRESS:	psi(g)		172.3		
SUCTION PRESSURE :	psi(g)	62.9	30.1		
DIFFERENTIAL PRESS.:	psi		142.3		
DIFFERENTIAL HEAD :	ft		627.4		
$NPSH_A$:	ft	(Note 2.2)	30.30	Excludes Req'd Margin (Note 2.2)	
HYDRAULIC POWER :	hp		276 (Note 2.8)		

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 :	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)

MINIMUM RETURN PRESSURE : 35 psi(g)

MAXIMUM ALLOWABLE ΔP : 10 psi

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.
2.2	Pump centerline is 28" above top of foundation.
	Minimum NPSH margin shall be the greater of 2-ft. or 15% of NPSHR (UOP Spec.).
	Note that NPSHa credits sub-cooling by the pump suction exchanger (18-X-361).
2.3	Pump Control Method: Flow control.
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	Mechanical data sheets are based on process data sheets 18-P-356A/B, Product Fractionator Reboiler Circulation Pumps, Rev. C1. Any fluid
	properties or cooling water properties not indicated on those process data sheets were obtained via internal squad check, as well as the
	mechanical design temperature.
2.6	The head-capacity curve shall continuously rise to Minimum Continuous Stable Flow (UOP Specification).
2.7	On startup pump will initially see startup oil. Estimated properties of startup oil are: Temperature: 60 °F, SG: 0.79, Viscosity: 4.1 cP. Motor shall be
	rated to handle this startup oil at rated conditions.
2.8	Based on start-up oil case.
2.9	When process fluid is flashed at atmospheric pressure, the fluid is 57 wt% vapor. ASTM D-86 IBP is estimated at approximately 389 °F.
2.10	Pumped fluid may have Catalyst Fines present at startup.
2.11	Pour point can be as high as 75°F during startup prior to establishing isomerization reactor performance for on-spec diesel production.
2.12	Top suction nozzle required. Transition elbow bolted to pump suction flange with extended pedestal to support transition elbow and pump case.

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Doc. No.: A8KM-18-059-540078-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-356A/B		
Revision:	1	Date:	7-Mar-24
Unit:	Renewable Jet Fuel Unit B		
P.O. No.:	4505610423		
Inquiry No.:	4-601E-RQ		
Sheet	3 of 7		

REV

PERFORMANCE

PROPOSAL CURVE NO.:	OHH 55-3-3-11	RPM	1785			
TEST CURVE NO.:	M-13547 / M-13548					
IMPELLER DIA.: RATED:	24.59	MAX:	26.69	MIN:	21.25	in
RATED POWER:	409	hp	EFFICIENCY:	68	%	
RATED CURVE BEP FLOW: (at rated impeller dia.)				2202	gpm	
MIN. FLOW: THERMAL :		gpm	STABLE :	822	gpm	
PREFERRED OPERATING REGION: (6.1.12)	1541	to	2422	gpm		
ALLOWABLE OPERATING REGION:	822	to	2831	gpm		
MAX. HEAD @ RATED IMPELLER:				726	ft	
MAX. POWER @ RATED IMPELLER: (6.8.9)				477	hp	
NPSHR at CL IMPELLER for RATED FLOW :				12	ft	
CL PUMP TO LOWER SIDE OF BASEPLATE:				2.2	ft	
NPSH MARGIN at RATED FLOW :				16.3	ft	
SPECIFIC SPEED:			gpm,rpm,ft	668		
SUCTION SPECIFIC SPEED LIMITATION:			gpm,rpm,ft	(Note 3.1)		
SUCTION SPECIFIC SPEED: (6.1.9):			gpm,rpm,ft	10888		
MAX. ALLOW. SOUND PRESS. LEVEL / EST.: (6.1.14) @ 3 ft				85 / 84	dBA	
MAX. ALLOW. SOUND POWER LEVEL / EST.: (6.1.14) @ 3 ft				/	dBA	
MAX. DISCHARGE PRESSURE: (6.3.2)				306	psig	
BASIS: (6.3.2.a, b or c)						

DRIVER (7.1.5)

DRIVER TYPE:	INDUCTION MOTOR		
GEAR:	NO		1
VARIABLE SPEED REQUIRED:	NO		
SOURCE OF VARIABLE SPEED:	N/A		1
OTHER:	TEFC / IP55		1
MANUFACTURER:	GE		1
NAMEPLATE POWER:	500	hp	1
NOMINAL RPM:	1800		1
RATED LOAD RPM:	1785		1
FRAME OR MODEL:	5013 S		1
ORIENTATION:	HORIZONTAL		1
LUBE:	GREASE		
BEARING TYPE:	BALL		
RADIAL: (Qty / Brg. Number)	1 / 6320ZC3		
THRUST: (Qty / Brg. Number)	1 / 6320ZC3		
STARTING METHOD:	CLOSED VALVE (UNLOADED) START		
DRIVER DATA SHEET:	ATTACHED		
ACCESSORIES:			

CONSTRUCTION

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

NOZZLE CONNECTIONS: (6.4.2)

	SIZE	FACING	RATING	POSITION
SUCTION	8"	RF	300	TOP (Note 2.12)
DISCHARGE	6"	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"	SWF	RF	300	BOTTOM
VENT (IF NOT SELF VENT)						
PRESSURE GAUGE	--					
TEMP GAUGE	--					
WARM-UP LINE*	1		BW			BOTTOM

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

DRAIN VALVE SUPPLIED BY:	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

CASING MOUNTING:	CENTERLINE
CASING TYPE:	MULTIPLE VOLUTE
OH3 BACKPULLOUT LIFING DEVICE REQ'D: (9.1.2.6)	NO
CASE PRESSURE RATING: (Note 3.3)	
MAWP: (6.3.5)	530 psig @ 700 °F
HYDROTEST: (8.3.2.6)	796 psig @ AMB °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)	
- 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)	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:	1298 XTSR 71-XL
RATING: (POWER/100 RPM)	28.01
SPACER LENGTH:	10 in
ACTUAL SF AT MOTOR NAMEPLATE:	1.79
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

3.1	Suction specific speeds above 11,000 for hydrocarbons and 9,500 for > 50% water solutions (USC units) are not allowed (UOP Specification).
3.2	Manifold & terminate drain piping with a gate valve at edge-of-skid.
3.3	Nameplate for MAWP at the mechanical design temperature; 700 °F.
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.
3.6	Include 3 case RTD's for warm-up monitoring. Pump vendor to provide fitted thermal insulation blanket for pump casing and piping sections (drain/warm-up).

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Doc. No.: A8KM-18-059-540078-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-356A/B		
Revision:	1	Date:	7-Mar-24
Unit:	Renewable Jet Fuel Unit B		
P.O. No.:	4505610423		
Inquiry No.:	4-601E-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)	NO
APPLICABLE HARDNESS STANDARD: (6.12.1.12.3)	N/A
BARREL:	--
CASE:	A216 GR. WCB (PWHT)
DIFFUSERS:	
IMPELLER:	A743 GR CA6NM (<290 HB ; <28 HRc)
IMPELLER / CASE WEAR RING:	GR. CA40 (275-300 HB)/ 11-13% CR (400-450 HB)
SHAFT:	A582 TYP 416 COND T (255-302 HB)
BOWL (IF VS TYPE):	--
INSPECTION CLASS: (API/ISO TABLE 14)	LEVEL 3

BEARINGS AND LUBRICATION (6.10.1)

BEARING (TYPE / NUMBER):	
RADIAL:	BALL / 6222 / C3
THRUST:	BALL / 7320 / B-XL-MP-UB
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:	VG 46
CONSTANT LEVEL OILER: (6.10.2.2)	REQUIRED

INSTRUMENTATION

SEE ATTACHED API-670 DATA SHEET:	NO
ACCELEROMETER OR VELOMETER: (7.4.2.1):	NO
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)	YES (Note4.8)
QUANTITY:	
MOUNTING LOCATIONS:	
VIBRATION PROXIMITY PROBES FOR HYDRODYNAMIC BEARINGS:	
PROVISION-ONLY FOR VIB. PROBES: (7.4.2.2)	N/A
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:	NO
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)	Sloped Deck Drain Pan
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)	N/A
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.

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

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

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P.O. No.:	4505610423		
Inquiry No.:	4-601E-RQ		
Sheet	5 of 7		REV

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:	
PRIMER:	
FINISH COAT:	
BASEPLATE: **High Durability Coating, Compliant with ISO 12944-5, C4 Environment**	
SURFACE PREPARATION:	
PRIMER:	
FINISH COAT:	

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:	
START-UP:	YES
NORMAL MAINTENANCE:	YES

WEIGHTS lb

ITEM No.	PUMP	DRIVER	ACCESSORY	BASE	TOTAL
18-P-356A/B	3708	7150	351	3936	15145

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	NO
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)	NO
MODAL ANALYSIS REQUIRED FOR VS PUMPS: (9.3.9.2)	NO
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)	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
	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
AUX CONN. BW	RADIOGRAPHY:	YES
	LIQUID PENETRANT:	NO
	ULTRASONIC:	NO
INSPECTION REQUIRED FOR CASTINGS: (TABLE 14)		
	MAG PARTICLE:	YES
	RADIOGRAPHY:	YES
	LIQUID PENETRANT:	NO
	ULTRASONIC:	NO
HARDNESS TEST REQUIRED: (8.2.2.7)	(NACE SERVICES)	N/A
ADDITIONAL SUBSURFACE EXAMINATION: (6.12.1.5)(8.2.1.3)		NO
FOR:		
METHOD:		
PMI TESTING REQUIRED: (8.2.2.8)		N/A
COMPONENTS TO BE TESTED:	See Note 6.4	
RESIDUAL UNBALANCE TEST: (J.4.1.2)		NO
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:		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)		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)		
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	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:		NON-WIT
1 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)		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-18-059-540078-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-356A/B		
Revision:	1	Date:	7-Mar-24
Unit:	Renewable Jet Fuel Unit B		
P.O. No.:	4505610423		
Inquiry No.:	4-601E-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 glands, pipe & valves, is required per Project Specification A8KM-PP-000-500512-A, Positive Material Identification (PMI).
6.5	Mechanical run testing is required
	for each pump until bearing oil temperature stabilization. Mechanical run test shall be one (1) hour at Rated point for single-stage pumps with
	vibration recordings at 10-minute intervals, and four (4) hours for multi-stage pumps with plotted vibration spectra at 30 minute intervals.
	All Witnessed testing requires ten (10) Buyer's business days advance notice.
6.6	Deleted.
	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	Provide casing thermocouples for monitoring of pump casing warm-up.

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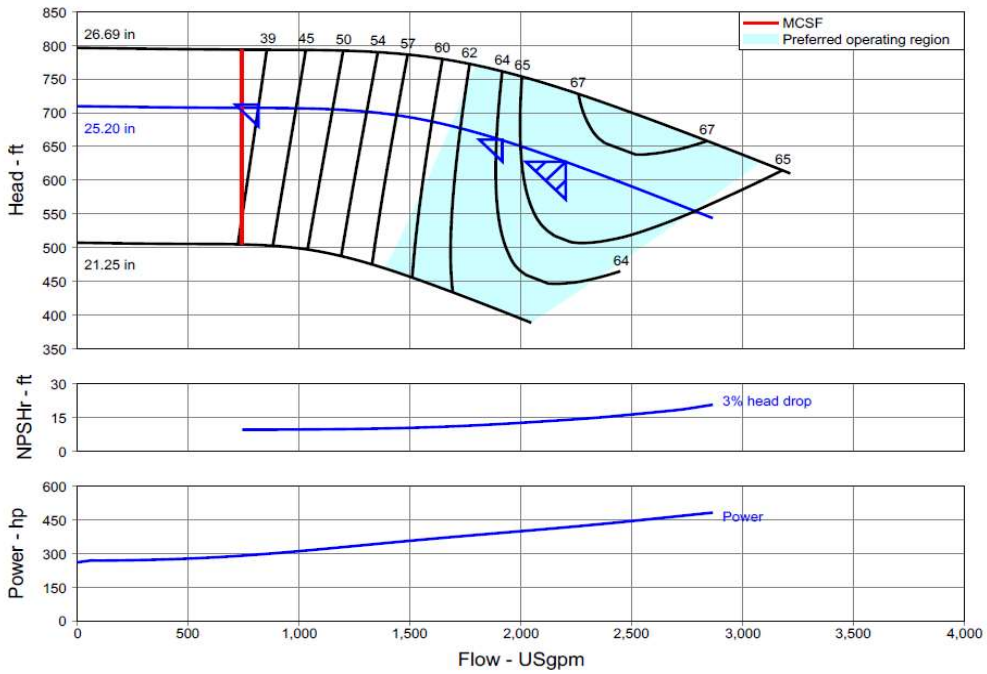
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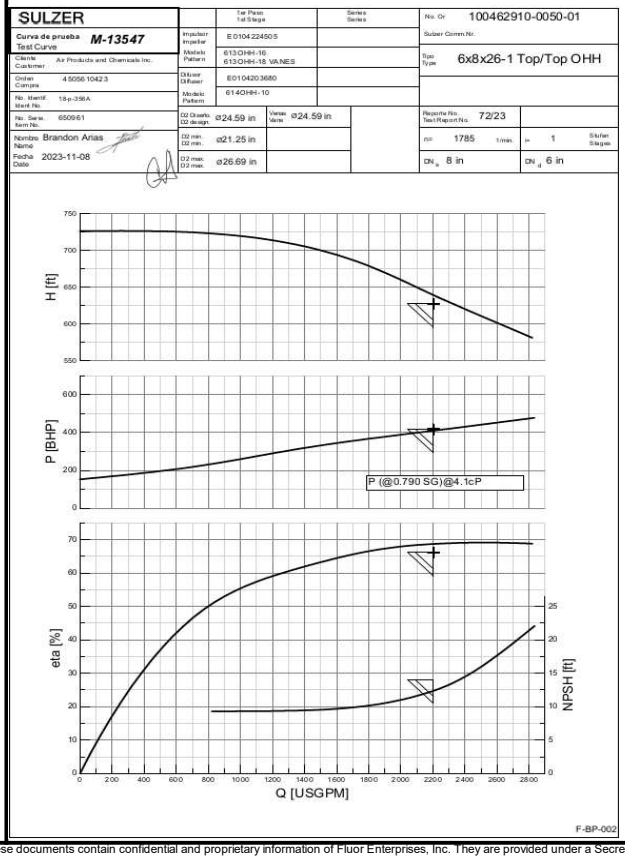
PUMP DATASHEET ANNEX

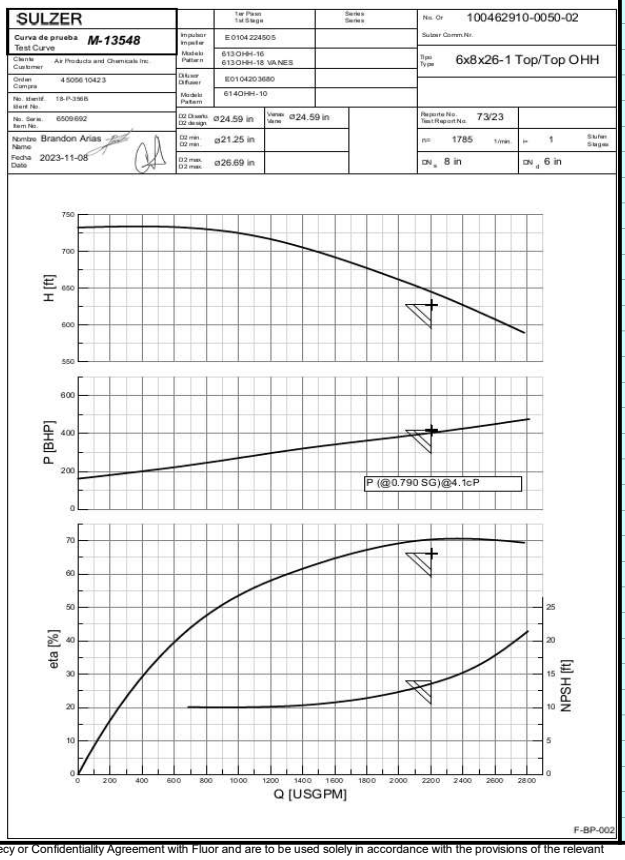
Contract:	A8KM		
Item No:	18-P-356A/B		
Revision:	1	Date:	7-Mar-24
Unit:	Renewable Jet Fuel Unit B		
P.O. No.:	4505610423		
Inquiry No.:	4-601E-RQ		
Sheet	7	of	7

REV 0

PROPOSAL AND TEST PUMP CURVE







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