



WORLD ENERGY PARAMOUNT

World Energy Renewables Project

Paramount, California

MECHANICAL EQUIPMENT DATASHEET

Document Number A8KM-18-096-540064-A

Rev. G, 16-MAR-2023

EN203076-FLUOR-XXX-XXXXX



World Energy Renewables Project

RENEWABLE JET FUEL UNIT B

MECHANICAL EQUIPMENT DATA SHEET FOR 18-P-355A/B

STRIPPER REFLUX PUMP

Document Number A8KM-18-096-540064-A



Fluor Project No: A8KM

G	11-Jan-2023	As-Built	8	AGU	CGO	
F	12-Jan-2023	Issued for Approval	8	AGU	CGO	
E	28-Nov-2022	Issued for Approval	6	AGU	CGO	
D	14-Oct-2021	Issued for Purchase	11	CP	JF AD ME	BT
C	26-May-2021	Issued for Quotation	10	JF	JPK AD ME	BT
B	12-May-2021	Issued for Client Review	10	JF	JPK AD ME	BT
A1	11-May-2021	Re-Issued for Internal Review	10	JF	JPK	
A1	11-May-2021	Issued for Internal Review	10	JF	JPK	
REV	DATE	DESCRIPTION	PAGES	ORIG	CHK'D	APPV'D


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PAB1004565270010-01_Z22_000_05048w3 di-gep-4 MARTSAR 2023-03-17T10:30:48 1.000 NP


 		API 610 CENTRIFUGAL PUMP DATA SHEET				Contract: A8KM																					
						Item No: 18-P-355A/B																					
						Revision: G Date: 16-Mar-23																					
						Unit: Renewable Jet Fuel Unit B																					
				P.O. No.:		Inquiry No.: 4-601D-RQ																					
				Note: This data sheet has been modified from that in the annex of API Standard 610, 11th Edition.		Sheet 2 of 8																					
CLIENT: World Energy Paramount PROJECT: World Energy Renewables Project																											
SERVICE: Stripper Reflux Pump		FACILITY: World Energy Renewables Plant		SITE: Paramount, CA																							
NO. REQ'D: 2 x 100% (Note 2.1)		PUMP SIZE: 2x3x7.5A-1		API TYPE: OH2		NO. STAGES: One (1)																					
MANUFACTURER: Sulzer		MODEL: OHH		SERIAL NO.: 649501 / 649502																							
APPLICABLE TO: <input type="radio"/> PROPOSALS <input type="radio"/> PURCHASE <input checked="" type="radio"/> AS-BUILT																											
GENERAL																											
PUMPS OPERATE IN: N/A		NO. MOTOR DRIVEN: Two (2)		NO. TURBINE DRIVEN: N/A																							
WITH:		PUMP ITEM NO.: 18-P-355A/B		PUMP ITEM NO.:																							
GEAR ITEM NO.: N/A		MOTOR ITEM NO.: 18-P-355AM/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				SERVICE: CONTINUOUS																							
LIQUID TYPE OR NAME: Stripper Reflux				*IF INTERMITTENT, NO. OF STARTS / DAY:																							
VAPOR PRESSURE: psi (a) 35.2				CORROSION DUE TO: (6.12.1.9):																							
RELATIVE DENSITY: 0.665 0.643				EROSION DUE TO: (6.12.1.9):																							
SPECIFIC HEAT: BTU/lbm °F				H₂S CONCENTRATION (ppmw) (6.12.1.12): 166																							
VISCOSITY: cP 0.44 0.34				WET (YES / NO): YES																							
OPERATING CONDITIONS (6.1.2)																											
UNITS MAXIMUM RATED NORMAL MINIMUM				CHLORIDE CONCENTRATION (ppmw):																							
NPSHa DATUM: C.L. IMPELLER (Note 2.2)				PARTICULATE SIZE (DIA. IN MICRONS):																							
PUMPING TEMP.: °F 160 110				PARTICULATE CONCENTRATION (ppmw):																							
FLOW: gpm 131.3 114.2 39.6				MECHANICAL DESIGN TEMPERATURE (°F): 300																							
DISCHARGE PRESS: psi(g) 82.6				Flash vapor at atmospheric pressure is 3 - 4 wt%																							
SUCTION PRESSURE: psig(g) 106.2 24.6				Pump is in wet sour service																							
DIFFERENTIAL PRESS.: psi 58.0				Water and HCl are present																							
DIFFERENTIAL HEAD: ft 201.1																											
NPSH_A: ft (Note 2.2) 14.4 Excludes Req'd Margin																											
HYDRAULIC POWER: hp 4.4																											
SITE AND UTILITY DATA (6.1.2)																											
LOCATION: OUTDOOR UNHEATED				COOLING WATER: SOURCE: COOLING TOWER																							
MOUNTED AT: GRADE <input type="radio"/> TROPICALIZATION REQ'D				SUPPLY TEMP.: 80 °F MAX. ALLOW. RETURN TEMP.: 120 °F																							
ELECTRICAL AREA CLASSIFICATION: <input type="radio"/> NON HAZARDOUS				NORM. PRESS.: 45 psi(g) DESIGN PRESS.: 120 psi(g)																							
CLASS: CL. I, B/C/D DIVISION: 2 TEMP CODE: T3C				MAXIMUM RETURN PRESSURE: 35 psi(g)																							
SITE DATA:				MAXIMUM ALLOWABLE ΔP: 10 psi																							
ELEVATION (MSL): 69 ft BAROMETER: 14.7 psia				CHLORIDE CONCENTRATION: < 840 ppm DESIGN T: 150 °F																							
RANGE OF AMBIENT TEMPS: MIN. / MAX.: 35 / 105 °F				INSTRUMENT AIR: MAX.: psi(g) MIN.: psi(g)																							
RELATIVE HUMIDITY: MIN. / MAX.: Average = / 54 %				MECH. DESIGN: psi(g) °F																							
UNUSUAL CONDITIONS:				STEAM:																							
UTILITY CONDITIONS:				<table border="1"> <thead> <tr> <th colspan="2">DRIVERS</th> <th colspan="2">HEATING</th> </tr> </thead> <tbody> <tr> <td>TEMP: °F</td> <td>MAX.:</td> <td></td> <td></td> </tr> <tr> <td></td> <td>MIN.:</td> <td></td> <td></td> </tr> <tr> <td>PRESS.:</td> <td>MAX.:</td> <td></td> <td></td> </tr> <tr> <td></td> <td>MIN.:</td> <td></td> <td></td> </tr> </tbody> </table>				DRIVERS		HEATING		TEMP: °F	MAX.:				MIN.:			PRESS.:	MAX.:				MIN.:		
DRIVERS		HEATING																									
TEMP: °F	MAX.:																										
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ELECTRICITY:	DRIVERS	HEATING	CONTROL	INSTRUMENTS																							
VOLTAGE:	460	120	120	24 VDC																							
PHASE:	3	1	1																								
HERTZ:	60	60	60																								
NOTES																											
2.1 2 x 100% pumps; 1 operating and 1 spare.																											
2.2 NPSHa calculation based on 3' above grade. Please see Sheet 3 for actual as-built pump centerline from bottom baseplate. G																											
Minimum NPSH margin shall be the greater of 2 feet or 15% of NPSHA (UOP Specification) G																											
Deleted.																											
2.3 Pump Control Method: Level control cascading to 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.																											
Deleted. G																											
2.6 The head-capacity curve shall continuously rise to minimum continuous stable flow (UOP Specification).																											

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						P.O. No.: 4-601D-RQ		
				Sheet	3	of	8	REV


PERFORMANCE										DRIVER (7.1.5)																																																										
PROPOSAL CURVE NO.: OHH 52-1-1-11 RPM 3520										DRIVER TYPE: INDUCTION MOTOR																																																										
TEST CURVE NO.: M-13409 / M-13410										GEAR: NO																																																										
IMPELLER DIA.: 7.36 MAX: 7.5 MIN: 4.5 in										VARIABLE SPEED REQUIRED: NO																																																										
RATED POWER: 8.69 hp EFFICIENCY: 51.65 %										SOURCE OF VARIABLE SPEED: N/A																																																										
RATED CURVE BEP FLOW: (at rated impeller dia.) 160.3 gpm										OTHER: TEFC / IP56																																																										
MIN. FLOW: THERMAL : gpm STABLE : 32.56 gpm										MANUFACTURER: ABB																																																										
PREFERRED OPERATING REGION: (6.1.12) 112.2 to 192.3 gpm										NAMEPLATE POWER: 15 hp																																																										
ALLOWABLE OPERATING REGION: 32.56 to 200 gpm										NOMINAL RPM: 3600																																																										
MAX. HEAD @ RATED IMPELLER: 222.6 ft										RATED LOAD RPM: 3520																																																										
MAX. POWER @ RATED IMPELLER: (6.8.9) 11.3 hp										FRAME OR MODEL: 256T																																																										
NPSHR at CL IMPELLER for RATED FLOW : 5.9 ft										ORIENTATION: HORIZONTAL																																																										
CL PUMP TO LOWER SIDE OF BASEPLATE: 1.67 ft										LUBE: GREASE																																																										
NPSH MARGIN at RATED FLOW : 8.5 ft										BEARING TYPE: ANTI-FRICTION																																																										
SPECIFIC SPEED: gpm,rpm,ft 847										RADIAL: (Qty / Brg. Number) / 45BC03X30X																																																										
SUCTION SPECIFIC SPEED LIMITATION gpm,rpm,ft (Note 3.1)										THRUST: (Qty / Brg. Number) / 45BC03X30X																																																										
SUCTION SPECIFIC SPEED: (6.1.9): gpm,rpm,ft 10410										STARTING METHOD: CLOSED VALVE (UNLOADED) START																																																										
MAX. ALLOW. SOUND PRESS. LEVEL / EST.: (6.1.14) @ 3 ft 85 / 70 dBA										DRIVER DATA SHEET: ATTACHED																																																										
MAX. ALLOW. SOUND POWER LEVEL / EST.: (6.1.14) @ 3 ft / dBA										ACCESSORIES:																																																										
MAX. DISCHARGE PRESSURE: (6.3.2) 170.3 psig																																																																				
BASIS: (6.3.2.a, b or c)																																																																				
CONSTRUCTION																																																																				
API PUMP TYPE: OH2 [Based on API 610 Definitions]										CASING MOUNTING: CENTERLINE																																																										
NOZZLE CONNECTIONS: (6.4.2)										CASING TYPE:																																																										
										OH3 BACKPULLOUT LIFING DEVICE REQ'D: (9.1.2.6) NO																																																										
<table border="1"> <thead> <tr> <th></th> <th>SIZE</th> <th>FACING</th> <th>RATING</th> <th>POSITION</th> </tr> </thead> <tbody> <tr> <td>SUCTION</td> <td>3"</td> <td>RF</td> <td>300</td> <td>END</td> </tr> <tr> <td>DISCHARGE</td> <td>2"</td> <td>RF</td> <td>300</td> <td>TOP</td> </tr> </tbody> </table>											SIZE	FACING	RATING	POSITION	SUCTION	3"	RF	300	END	DISCHARGE	2"	RF	300	TOP	CASE PRESSURE RATING: (Note 3.3)																																											
	SIZE	FACING	RATING	POSITION																																																																
SUCTION	3"	RF	300	END																																																																
DISCHARGE	2"	RF	300	TOP																																																																
										MAWP: (6.3.5) 640 psig @ 300 °F																																																										
										HYDROTEST: (8.3.2.6) 960 psig @ --- °F																																																										
PRESSURE CASING AUX. CONNECTIONS: (6.4.1.2)(6.4.3.1)(6.4.3.2)(6.4.3.12)										Hydrotest at 1.5 x MAWP of the Pump Assembly.																																																										
<table border="1"> <thead> <tr> <th></th> <th>NO.</th> <th>SIZE</th> <th>TYPE</th> <th>FACING</th> <th>RATING</th> <th>POSITION</th> </tr> </thead> <tbody> <tr> <td>BALANCE/LEAK OFF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DRAIN (Note 3.2)</td> <td>1</td> <td>0.75"</td> <td>BWF</td> <td>RF</td> <td>300</td> <td>BOTTOM</td> </tr> <tr> <td>VENT (IF NOT SELF VENTING)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>PRESSURE GAUGE</td> <td>--</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>TEMP GAUGE</td> <td>--</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>WARM-UP LINE*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>											NO.	SIZE	TYPE	FACING	RATING	POSITION	BALANCE/LEAK OFF							DRAIN (Note 3.2)	1	0.75"	BWF	RF	300	BOTTOM	VENT (IF NOT SELF VENTING)							PRESSURE GAUGE	--						TEMP GAUGE	--						WARM-UP LINE*							HYDROTEST OH PUMP AS ASSEMBLY: YES									
	NO.	SIZE	TYPE	FACING	RATING	POSITION																																																														
BALANCE/LEAK OFF																																																																				
DRAIN (Note 3.2)	1	0.75"	BWF	RF	300	BOTTOM																																																														
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PRESSURE GAUGE	--																																																																			
TEMP GAUGE	--																																																																			
WARM-UP LINE*																																																																				
										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:																																																										
*VENDOR TO ADVISE WARM-UP FLOW IF REQUIRED: gpm										SHAFT FLEXIBILITY INDEX (SFI): (9.1.1.3) 85 (Note 6.11)																																																										
DRAIN VALVE SUPPLIED BY: PURCHASER										FIRST CRITICAL SPEED, WET: (MULTI-STAGE) N/A RPM																																																										
DRAINS MANIFOLDED: N/A										COMPONENT BALANCE TO ISO 1940 G1.0: (6.9.4.4) YES																																																										
VENT VALVE SUPPLIED BY:										SHRINK FIT LIMITED MOVEMENT IMPELLERS: (9.2.2.3) N/A																																																										
VENTS MANIFOLDED: N/A																																																																				
THREADED CONNS FOR PIPELINE SERVICE & < 50°C: (6.4.3.1) N/A										COUPLING & GUARD: (7.2.2) (Notes 3.4)																																																										
SPECIAL FITTINGS FOR TRANSITIONING: (6.4.3.3) NO										MANUFACTURER: Rexnord																																																										
CYLINDRICAL THREADS REQUIRED: (6.4.3.8) NO										MODEL: Series 71																																																										
										RATING: (POWER/100 RPM)																																																										
MACHINED AND STUDDED CONNECTIONS: (6.4.3.12) NO										SPACER LENGTH: 5 in																																																										
TYPE VS6 DRAIN CONN.: (9.3.13.5) N/A										ACTUAL SF AT MOTOR NAMEPLATE: 1.5 minimum																																																										
DRAIN TO SKID EDGE: YES										RIGID: N/A																																																										
BOLTING CONFORMANCE: (6.1.29.1) YES										COUPLING WITH HYDRAULIC FIT: (7.2.10) NO																																																										
(ISO 261, ISO 262, ISO 724, ISO 965 OR ANSI/ASME B1.1) ASME B1.1										COUPLING BALANCED TO ISO 1940-1 G6.3: (7.2.3) G2.5																																																										
SEAL FLUSH CASING CONNS. w/ SECONDARY SEALING REQ'D: (6.4.3.3) NO										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																																																										
AUX. PIPING TERMINATIONS:										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 valve by others.																																																																				
Deleted.																																																																				
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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		Sheet	4	of	8	REV


CONSTRUCTION (CONT'D)			
MATERIAL (6.12.1.1)		BASEPLATE OR SOLE PLATE	
APPENDIX H CLASS: S-8: CS / 316L SS		API BASEPLATE NUMBER:	
MINIMUM DESIGN METAL TEMP: (6.12.4.1) 32 °F		BASEPLATE CONSTRUCTION: (7.3.14) FULL TOP DECKING	
REDUCED HARDNESS MATERIALS REQ'D: (6.12.1.12.1) YES		BASEPLATE DRAINAGE: (7.3.1) Sloping Deck Drain Pan	
APPLICABLE HARDNESS STANDARD: (6.12.1.12.3) MR0103		MOUNTING: GROUTED	
BARREL:		NON-GROUT CONSTRUCTION: (7.3.13) NOT REQUIRED	
CASE: A216 GR. WCB (PWHT)		VERTICAL LEVELING SCREWS: REQUIRED	
DIFFUSERS:		HORIZONTAL DRIVER POSITIONING SCREWS: REQUIRED	
IMPELLER: A743/A351 GR.CF3M		SUPPLIED WITH: - GROUT VENT HOLES YES	
IMPELLER / CASE WEAR RING: 316L / C6HF // A890 GR.1B NACE		- DRAIN CONNECTION YES	
SHAFT: A276 TYPE 316 COND. A		MOUNTING PADS SIZED FOR BASEPLATES LEVELING: (7.3.5) YES	
BOWL (IF VS TYPE):		MOUNTING PADS OR SOLE PLATE TO BE MACHINED: (7.3.6) YES	
INSPECTION CLASS: (API/ISO TABLE 14) LEVEL 2		PROVIDE SPACER PLATE UNDER ALL EQUIP. FEET: (7.3.6)	
OTHER: Furnish two (2) diagonally opposed grounding provisions per Note 6.9.			
BEARINGS AND LUBRICATION (6.10.1)			
BEARING (TYPE / NUMBER):			
RADIAL: BALL / 6310			
THRUST: BALL / 7311			
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			
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.			
4.8) Pumps with A/F bearings shall have a minimum 1" diameter flat surface for a magnetic-based vibration transducer (UOP specification).			
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) YES (Note 4.8)			
QUANTITY: TWO			
MOUNTING LOCATIONS:			
VIBRATION PROXIMITY PROBES FOR HYDRODYNAMIC BEARINGS:			
PROVISION-ONLY FOR VIB. PROBES: (7.4.2.2) NO			
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)			
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) Category 2			
HEATING AND COOLING			
COOLING REQUIRED: (6.1.17) YES			
COOLING WATER PIPING PLAN: Plan M			
CLG WATER PIPING CONSTR.: TAAG2			
FITTINGS TYPE:			
COOLING WATER PIPING MATERIALS: Killed CS			
CLG WTR REQMTS: (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 PURCHASER CONN.: (7.5.1.6)			
VENTS: N/A			
DRAINS: N/A			
COOLING WATER: YES			
TAG ALL ORIFICES: (7.5.2.4) N/A			
SOCKET WELD CONN. ON SEAL GLAND: (7.5.2.8) NO			

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		API 610				Contract:		A8KM		
		CENTRIFUGAL PUMP DATA SHEET				Item No:		18-P-355A/B		
		Doc. No.: A8KM-18-096-540064-A				Revision:		G Date: 16-Mar-23		
						Unit:		Renewable Jet Fuel Unit B		
		Note: This data sheet has been modified from that in the annex of API Standard 610, 11th Edition.				P.O. No.:				
Inquiry No.:						4-601D-RQ				
				Sheet		5	of		8	REV

SURFACE PREPARATION AND PAINT						INSPECTION & TEST					
2	MANUFACTURER'S STANDARD:					SHOP INSPECTION: (8.1.1)				YES	
3	OTHER (SEE BELOW)					PERFORMANCE CURVE & DATA APPROVAL PRIOR TO SHIPMENT:				YES	
4	SPECIFICATION NUMBER:	A8KM-PP-00-500520-A				TEST WITH SUBSTITUTE SEAL: (8.3.3.2.b)				NO	
5	PUMP: Meets ISO 12944-5, C4 Environment					MATERIAL CERT. REQUIRED: (6.12.1.8) CASING:				YES	
6	PUMP SURFACE PREPARATION:	SSPC-SP 10)				IMPELLER:				YES	
7	PRIMER:	Hempadur AvantGuard 750				SHAFT:				YES	
8	FINISH COAT:	Hempathane 55610				OTHER: See Note 6.3				YES	
9	BASEPLATE OR SOLE PLATE: Meets ISO 12944-5, C4 Environment					CASTING REPAIR PROCED. APPROVAL REQ'D: (6.12.2.5)(6.12.3.1)				Note 6.7	
10	SURFACE PREPARATION:	SSPC-SP 10)				INSPECTION REQ'D FOR CONN. WELDS: (6.12.3.4.d.e)					
11	PRIMER:	Hempadur AvantGuard 750				MAG PARTICLE:				YES	
12	FINISH COAT:	Hempathane 55610				(BW Piping) RADIOGRAPHY:				YES	
13	DETAILS OF LIFTING DEVICES:					LIQUID PENETRANT:				NO	
14	SHIPMENT: (8.4.1)	(Note 6.8)				ULTRASONIC:				NO	
15	EXPORT BOXING REQUIRED					INSPECTION REQUIRED FOR CASTINGS: (TABLE 14)					
16	OUTDOOR STORAGE UP TO 6 MONTHS:	YES				MAG PARTICLE:				YES	
17	SPARE ROTOR ASSEMBLY PACKAGED FOR:					RADIOGRAPHY:				YES	
18	ROTOR STORAGE ORIENTATION: (9.2.8.2)	N/A				LIQUID PENETRANT:				YES	
19	SHIP'G & STORAGE CONTAINER FOR VERT. STORAGE: (9.2.8.3)	N/A				ULTRASONIC:				YES	
20	N2 PURGE: (9.2.8.4)	N/A				HARDNESS TEST REQUIRED: (8.2.2.7) (NACE SERVICES)				YES	
21	SPARE PARTS: (Note 6.1)					ADDITIONAL SUBSURFACE EXAMINATION: (6.12.1.5)(8.2.1.3)				NO	
22	START-UP:	YES				FOR:					
23	NORMAL MAINTENANCE:	YES				METHOD:					
24						PMI TESTING REQUIRED: (8.2.2.8)				YES	
25	WEIGHTS lb					COMPONENTS TO BE TESTED: See Note 6.4					
26	ITEM No.	PUMP	DRIVER	ACCESSORY	BASE	TOTAL	RESIDUAL UNBALANCE TEST: (J.4.1.2)				NO
27	18-P-355A	333	239	690	1218	2480	NOTIFICATION OF SUCCESSFUL SHOP PRELIM. TEST: (8.1.1.c)(8.3.3.5)				NO
28	18-P-355B	333	239	690	1218	2480	BASEPLATE TEST: (7.3.21)				NO
29							HYDROSTATIC TEST OF CASING/HEAD:				NON-WIT
30							HYDROSTATIC TEST OF BOWLS & COLUMN: (9.3.13.2)				N/A
31	OTHER PURCHASER REQUIREMENTS					PERFORMANCE TEST: (Note 6.5)				NON-WIT	
32	COORDINATION MEETING REQUIRED: (10.1.3)	YES				TEST IN COMPLIANCE WITH: (8.3.3.2)				8.3.3.2	
33	MAXIMUM DISCHARGE PRESSURE TO INCLUDE:					TEST DATA POINTS TO: (8.3.3.3)				8.3.3.3	
34	MAX RELATIVE DENSITY:	YES				TEST TOLERANCES TO: (8.3.3.4)				TABLE 16	
35	OPERATION TO TURBINE TRIP SPEED OR ASD OVERSPEED:	N/A				NPSH TEST PTS./RETEST: (8.3.4.3.1)(8.3.4.3.4)				N/A	
36	MAX DIA. IMPELLERS AND / OR NO. OF STAGES:	NO				NPSH TEST-1ST STAGE ONLY: (8.3.4.3.2)				N/A	
37	CONNECTION DESIGN APPROVAL: (9.2.1.4) (BB Pumps)	N/A				NPSH TESTING TO HI 1.6 : (8.3.4.3.3)				NON-WIT	
38	TORSIONAL ANALYSIS / REPORT: (6.9.2.10) (REQ'D IF GEAR OR VFD)	N/A				PERFORMANCE TEST LIMITED TO 110% SITE NPSHA: (8.3.3.6)				NO	
39	PROGRESS REPORTS:	YES				RETEST ON SEAL LEAKAGE: (8.3.3.2.d)				NO	
40	OUTLINE OF PROCEDURE FOR OPTIONAL TESTS: (10.2.5)	YES				RETEST REQUIRED AFTER FINAL HEAD ADJ.: (8.3.3.7.b)(Multistg)				N/A	
41	ADDITIONAL DATA REQUIRING 20 YEARS RETENTION: (8.2.1.1)	NO				COMPLETE UNIT TEST: (8.3.4.4.1)				N/A	
42	LATERAL ANALYSIS REQUIRED: (9.1.3.4)(9.2.4.1.3)	N/A				SOUND LEVEL TEST: (8.3.4.5) FOR INFORMATION ONLY				NON-WIT	
43	MODAL ANALYSIS REQUIRED FOR VS PUMPS: (9.3.9.2)	N/A				CLEANLINESS PRIOR TO FINAL ASSEMBLY: (8.2.2.6)				NON-WIT	
44	DYNAMIC BALANCE ROTOR ASSEMBLY TO ISO G1.0: (9.2.4.2.3)	N/A				LOCATION OF CLEANLINESS INSPECTION: @ SUPPLIERS					
45	INSTALLATION LIST IN PROPOSAL: (10.2.3.I)	NO				NOZZLE LOAD TEST:				NO	
46	VFD STEADY STATE DAMPED RESPONSE ANALYSIS: (6.9.2.3)	N/A				CHECK FOR CO-PLANAR MOUNTING PAD SURFACES:				NON-WIT	
47	TRANSIENT TORSIONAL RESPONSE: (6.9.2.4)	N/A				MECH. RUN TEST AT RATED CAPACITY UNTIL OIL TEMP STABLE: (8.3.4.2.1)				NON-WIT	
48	BEARING SELECTION & LIFE CALCS PER (6.10.1.1) & (6.10.1.6):	YES				1 HR. MECH RUN TEST AT RATED CAPACITY AFTER OIL TEMP STABLE:				YES	
49	IGNITION HAZARD ASSESSMENT TO EN 13463-1 FOR EXPLOSIVE ATM: (7.2.15)	N/A				4 HR. MECH RUN TEST AT RATED CAPACITY: (8.3.4.2.2)				N/A	
50	CASING RETIREMENT THICKNESS DWG: (10.3.2.3)	NO				BEARING HSG. RESONANCE TEST: (8.3.4.7)				N/A	
51	FLANGES REQ'D IN PLACE OF SOCKET WELD UNIONS: (7.5.2.8)	YES				STRUCTURAL RESONANCE TEST: (9.3.9.2)				N/A	
52	INCLUDE PLOTTED VIBRATION SPECTRA FOR PERF. TEST: (6.9.3.3)	YES				REMOVE / INSPECT HYDRODYN. BRGS. AFTER TEST: (9.2.7.5)				N/A	
53	CONNECTION BOLTING: (7.5.1.7)	PAINTED				AUXILIARY EQUIPMENT TEST: (8.3.4.6)				N/A	
54	CADMIUM PLATED BOLTS PROHIBITED:	YES				EQUIP. TO BE INCLUDED IN AUX. TESTS:					
55	VENDOR TO KEEP REPAIR AND HT RECORDS: (8.2.1.1.c)	YES				LOCATION OF AUX. EQUIPMENT TEST:					
56	VENDOR TO SUBMIT TEST PROCEDURES: (8.3.1.1)	YES									
57	VENDOR SUBMIT INSPECTION CHECK LIST: (8.1.5)	YES									
58	TEST REQUIREMENTS PER 8.3.3.5a THROUGH 8.3.3.5d:	YES				IMPACT TEST: (6.12.4.3) PER EN 13445				N/A	
59	DISASSEMBLE AND INSPECT AFTER TEST: (8.3.3.8)	NO				PER ASME SECTION VIII				N/A	
60						REMOVE CASING AFTER TEST:				N/A	

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		API 610 CENTRIFUGAL PUMP DATA SHEET		Contract:		A8KM		
				Item No:		18-P-355A/B		
		Doc. No.: A8KM-18-096-540064-A		Revision:		G	Date:	16-Mar-23
				Unit:		Renewable Jet Fuel Unit B		
		Note: This data sheet has been modified from that in the annex of API Standard 610, 11th Edition.		P.O. No.:				
		Inquiry No.:		4-601D-RQ				
		Sheet	6	of	8	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:																											
<table border="1"> <thead> <tr> <th>TYPE OF INSPECTION</th> <th>METHOD</th> <th>FOR FABRICATIONS</th> <th>FOR CASTINGS</th> </tr> </thead> <tbody> <tr> <td>RADIOGRAPHY</td> <td></td> <td></td> <td></td> </tr> <tr> <td>ULTRASONIC INSPECTION</td> <td></td> <td></td> <td></td> </tr> <tr> <td>MAGNETIC PARTICLE INSPECTION</td> <td></td> <td></td> <td></td> </tr> <tr> <td>LIQUID PENETRANT INSPECTION</td> <td></td> <td></td> <td></td> </tr> <tr> <td>VISUAL INSPECTION (ALL SURFACES)</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				TYPE OF INSPECTION	METHOD	FOR FABRICATIONS	FOR CASTINGS	RADIOGRAPHY				ULTRASONIC INSPECTION				MAGNETIC PARTICLE INSPECTION				LIQUID PENETRANT INSPECTION				VISUAL INSPECTION (ALL SURFACES)			
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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.																										
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 is required for alloy pressure containing parts, including seal glands, pipe, and valves, per Project Specification A8KM-PP-000-500512-A, Positive Material Identification.																										
6.5	Mechanical run testing is required for each pump. Mechanical run test shall be one (1) hour at Rated point for single-stage pumps, with vibration recordings at 10 minute intervals.																										
6.6	Deleted.																										
6.7	Deleted.																										
6.8	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.																										
6.9	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.																										
6.10	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.																										
6.11	Pumps must comply with Honeywell UOP Pump Specification 5-11-13 CENTRIFUGAL PUMPS dated 06Jul16 and Motor specification 7-12-6 ELECTRIC MOTORS dated 03Jun15. (UOP Pump service)																										
	The value of the overhung pump shaft flexibility, ISF, for the given pump size factor, Kt, shall not exceed 1.2 times the equation (K.5) (US units). (UOP Specification)																										

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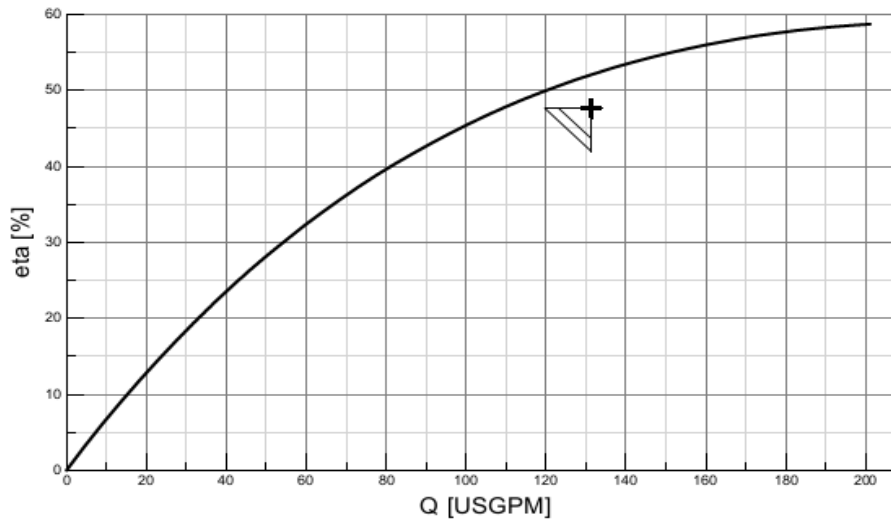
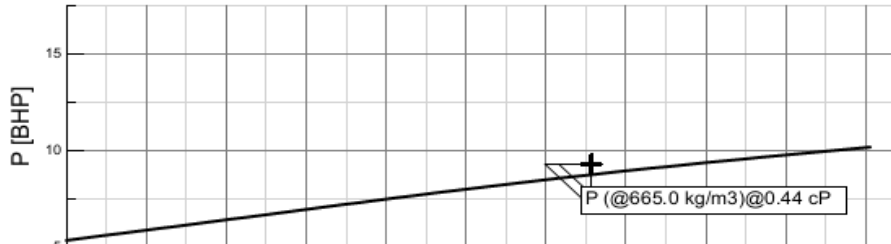
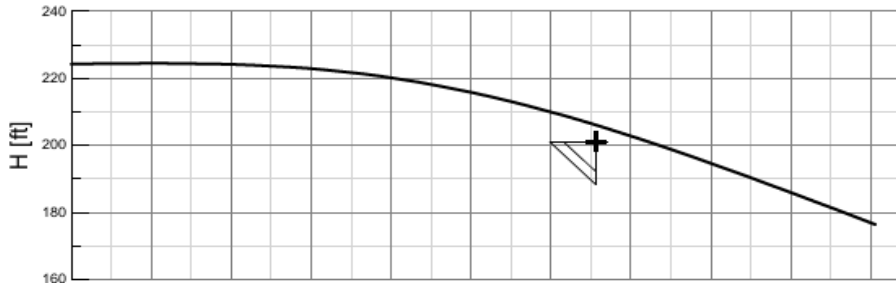
**PUMP DATASHEET
ANNEX**

Contract:	A8KM		
Item No:	18-P-355A/B		
Revision:	G	Date:	16-Mar-23
Unit:	Renewable Jet Fuel Unit B		
P.O. No.:			
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REV

TESTED PUMP CURVE No: M-13409 PUMP TAG & SERIAL NO: 18-P-355 A 6496501

SULZER		1er Paso 1st Stage	Series Series	No. Or 100456527-0010-01
Curva de prueba M-13409		Impulsor Impeller	D10692	Sulzer Comm.Nr.
Test Curve		Modelo Pattern	213OHH-01	
Cliente Customer		Diffusor Diffuser	D10690	Tipo Type
AIR PRODUCTS AND CHEMICALS		Modelo Pattern	214OHH-01	2x3x7.5A-1 OHH
Orden Compra				
4505551384				
No. Identif. Ident No.				
18-P-355 A				
No. Serie Item No.		D2 Diseño. D2 design.	Venas Vane	Reporte No. Test Report No.
649501		Ø7.36 in	Ø7.36 in	207/22
Nombre Name		D2 min. D2 min.		Fecha dated
Gerardo Endoqui		Ø4.50 in		..
Fecha Date		D2 max. D2 max.		
2022-07-09		Ø7.50 in		
				n= 3520 1/min. i= 1 Stufen Stages
				DN _s 3 in DN _d 2 in



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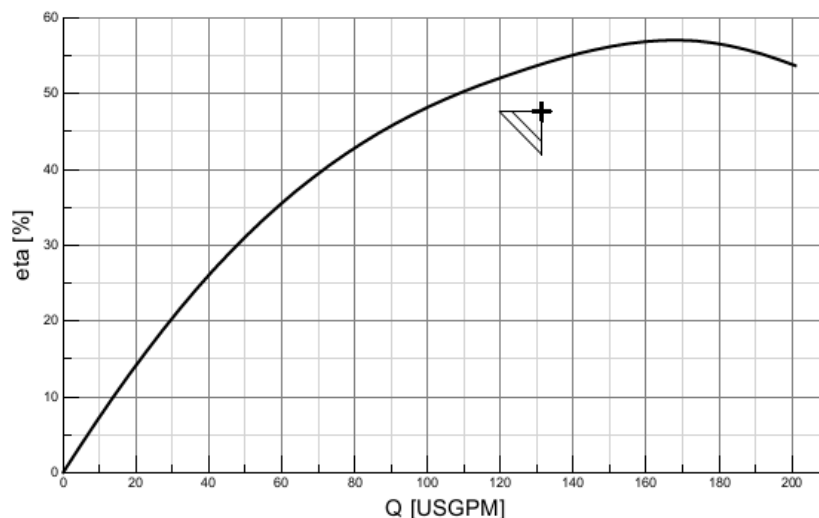
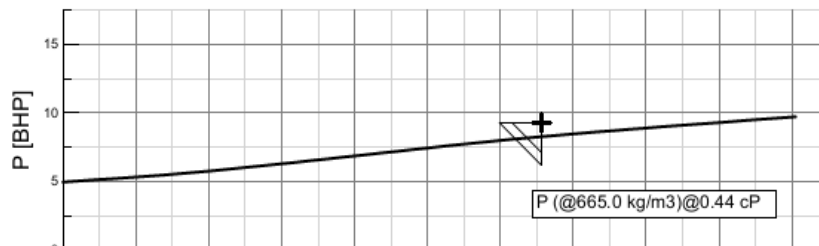
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ANNEX**

Contract:	A8KM		
Item No:	18-P-355A/B		
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Unit:	Renewable Jet Fuel Unit B		
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REV

TESTED PUMP CURVE No: M-13410 PUMP TAG & SERIAL NO: 18-P-355 B 6496502

SULZER		1st Paso 1st Stage	Series	No. Or 100456527-0010-02
Curva de prueba Test Curve M-13410		Impulsor Impeller	D10692	Sulzer Comm.Nr.
Cliente Customer: AIR PRODUCTS AND CHEMICALS		Modelo Pattern	213OHH-01	Tipo Type 2x3x7.5A-1 OHH
Orden Compra 4505551384		Difusor Diffuser	D10690	
No. Identif. Ident No. 18-P-355 B		Modelo Pattern	214OHH-01	
No. Serie Item No. 649502		D2 Diseño. D2 design.	Ø7.36 in	Reporte No. Test Report No. 208/22
Nombre Name Gerardo Endoqui		D2 mín. D2 min.	Ø4.50 in	Fecha dated ..
Fecha Date 2022-07-09		D2 max. D2 max.	Ø7.50 in	n= 3520 1/min. j= 1 Stufen Stages
				DN _s 3 in DN _d 2 in



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