CLIENT:	511036
PROJECT:	
Requisition No.:	511036-000-45-MR-5411-0002
Service:	HLS Feed Pumps
45ED-5411 Tag No.:	3A-P-135A/B

CENTRIFUGAL PUMP DATA SHEET

							Rev
APPLICABLE TO:	PURCHASE		APPLICABLE NTL/INTNTL STANDARD:	API-610	11th Edition		
FOR			UNIT	100			
SITE			SERVICE	HLS Feed			
NO. REQ	2 (Note 1)	PUMP SIZE D 14X18X27	TYPE	Centrifugal	No. STAGES	1	
MANUFACTURER	CPC PUMPS		MODEL	HDR	SERIAL NO.	2987E-1,2	1

LIQUID CHARACTERISTICS

	Units	Minimum	Normal Operation	Normal Operation (Max Temp)
LIQUID TYPE OR NAME :			HLS Feed	
VAPOR PRESSURE :	kPaa		47.2	57.8
SPECIFIC GRAVITY :		1	0.971	
SPECIFIC HEAT :	kJ/(kg-K)			
VISCOSITY :	cP	1.5	0.35	

OPERATING CONDITIONS (6.1.2) (Note 3)

	Units	Minimum	Normal Operation	Operation (Max Temp)
NPSHa Datum:			C.L. Impeller	
PUMPING TEMPERATURE :	°C	5	79	85
VOLUMETRIC FLOW (Normal / Rated) :	am^3/h		987.3 / 1086	
TOTAL DISCHARGE PRESSURE : (6.3.2)	kPaa		1093	
TOTAL SUCTION PRESSURE :	kPaa		105.8	
DIFFERENTIAL PRESSURE :	kPa		987	
DIFFERENTIAL HEAD :	m		103.6	
$NPSH_A$ (Note 5) :	m		5	
HYDRAULIC POWER :	kW		297.8	

SERVICE :	CONTINUOUS
PUMPS OPERATE IN:	PARALLEL
CORROSION DUE TO : (6.12.1.9)	(Note 2)
EROSION DUE TO : (6.12.1.9)	(Note 2)
H2S CONCENTRATION (ppm) : (6.12.1.12)	(Note 2)
CHLORIDE CONCENTRATION (ppm) :	(Note 2)
PARTICULATE SIZE (DIA IN MICRONS)	
PARTICULATE/TDS CONCENTRATION (PPM)	(Note 2)

SITE AND UTILITY DATA

LOCATION: INDOOR / HEATED

MOUNTED AT : GRADE ○ TROPICALISATION REQD

ELECTRIC AREA CLASSIFICATION: 6.1.22 ZONE 2 — CLASS I — GROUP IIA — TEMP CLASS T2C

SITE DATA :

ELEVATION (MSL) : 611 m **BAROMETER :** 94.00 kPaa

RANGE OF AMBIENT TEMPS: MIN / MAX: 10 / 39 °C

RELATIVE HUMIDITY: MIN / MAX: 2.5 / 100 %

UNUSUAL CONDITIONS:

UTILITY CONDITIONS :

ELECTRICITY :	DRIVERS	HEATING	CONTROL	SHUTDOWN
VOLTAGE	4000		120	
PHASE	3		1	
HERTZ	60		60	

COOLING MEDIUM :

		INLET		RETURN	DESIGN
TEMP	°C	40	MAX	100	145
PRESS.	kPag	900	MIN	760	1500
SOURCE		TEG / H20 (60/40 wt%)			

COOLING WATER CHLORIDE CONCENTRATION: N/A ppm

INSTRUMENT AIR : MAX 760 kPag MIN 550 kPag

STEAM

		DRIVERS	HEATING
TEMP °C	Max		
	Min		
PRESS. kPag	Max		
	Min		

PERFORMANCE (*)

PROPOSAL CURVE NO.	HR-4293-4M			
As Tested Curve No.				
IMPELLER DIA.:	RATED 705	MAX. 721	MIN. 572	mm
RATED POWER	378.6 kW	EFFICIENCY	81.2	(%)
RATED CURVE BEP FLOW (at rated impeller dia)			1240	m^3/h
MIN FLOW :	THERMAL ____ m^3/h	STABLE	490	m^3/h
PREFERRED OPERATING REGION (6.1.11)		860 to	1480	m^3/h
ALLOWABLE OPERATING REGION		490 to	1540	m^3/h
MAX HEAD @ RATED IMPELLER			114.5	m
MAX POWER @ RATED IMPELLER	(6.8.9)		487.7	kW
NPSH3 AT RATED FLOW :			3.36	m
CL PUMP TO U/S BASEPLATE			1.187	m
NPSH MARGIN AT RATED FLOW :				m
SPECIFIC SPEED (6.1.9)		m3/s, rpm, m	15	
SUCTION SPECIFIC SPEED LIMIT			213	
SUCTION SPECIFIC SPEED		m3/s, rpm, m	174	
MAX. ALLOW. SOUND PRESS. LEVEL REQD (6.1.14)			85	(dBA)
EST MAX SOUND PRESS. LEVEL			85	(dBA)
MAX. SOUND POWER LEVEL REQ'D (6.1.14)				
EST MAX SOUND POWER LEVEL				

DRIVER (7.1.5) (*)

Driver Type	MOTOR
GEAR	NO
VARIABLE SPEED REQUIRED	NO
SOURCE OF VARIABLE SPEED	N/A
OTHER	
MANUFACTURER	Teco Westinghouse
NAMEPLATE POWER	700 HP kW
Nominal RPM	1200
RATED LOAD RPM	
FRAME OR MODEL	
ORIENTATION	HORIZONTAL
LUBE	
BEARING TYPE:	
RADIAL	
THRUST	
STARTING METHOD	
SEE DRIVER DATA SHEET	DS-CL03A-P-100-PM135

REVISION	E	0	1	2	Tag No. 3A-P-135 A/B HLS Feed Pump	PAGE
DESCRIPTION	Issued for Quoation	Issued for Purchase	As Purchased	As Purchased		
PREPARED BY	AH	RS	JS	AM/CPC		
CHECKED BY	CS / SS	CS	SR	SR/CPC		
APPROVED BY	CS	CS		SR/CPC	Data Sheet Number DS-CL03A-G-100-P135	2 OF 9
DATE	14/Feb/13	15/Jul./13	21/Nov/13	16/Jun/14		

Requisition No.: 511036-000-45-MR-5411-0002
Service: HLS Feed Pumps
45ED-5411 | Tag No.: 3A-P-135A/B

CONSTRUCTION

API PUMP TYPE: BB2

NOZZLE CONNECTIONS: (6.5.5) (Note 6)

	Size	Facing	Rating #	Position
SUCTION (Note-4)	18"	RF	300	SIDE
DISCHARGE (Note- 4)	14"	RF	300	SIDE

PRESSURE CASING AUX. CONNECTIONS: (6.4.3.2)

	No.	Size	Type	Facing	Rating #	Posn.
BALANCE/LEAK OFF						
DRAIN (Note 3 & 13)	1	3/4"	SW	RF	300	END
VENT	1	3/4"	SW	RF	300	TOP
PRESSURE GAGE						
TEMP GAGE						
WARM-UP LINE						

Drain Valve Supplied By: SUPPLIER
DRAINS MANIFOLDED: SUPPLIER
VENT Valve Supplied By:
VENTS MANIFOLDED:
THREADED CONS FOR PIPELINE SERVICE & < 50°C (6.4.3.2):
SPECIAL FITTINGS FOR TRANSITIONING (6.4.3.3):
CYLINDRICAL THREADS REQUIRED (6.4.3.8):
GUSSET SUPPORT REQUIRED: YES
MACHINED AND STUDDED CONNECTIONS (6.4.3.12):
VS 6 DRAIN:
DRAIN TO SKID EDGE: YES

CASING MOUNTING: FOOT
CASING TYPE: (6.3.10) MULTIPLE VOLUTE
OH3 BACKPULLOUT LIFTING DEVICE REQD. (9.1.2.6):
CASE PRESSURE RATING:
MAWP : (6.3.6) 3755.00 kPag @ 85.00 °C
HYDROTEST : 6210.00 kPag @ Amb. °C
HYDROTEST OF PUMP AS ASSEMBLY: NO
SUCT'N PRESS. REGIONS DESIGNED FOR MAWP:
ROTATION: (VIEWED FROM COUPLING END): CCW 1
* IMPELLERS INDIVIDUALLY SECURED : 1
* BOLT OH 3/4/5 PUMP TO PAD / FOUNDATION :
* PROVIDE SOLEPLATE FOR OH 3/4/5 PUMPS
ROTOR:
SHAFT FLEXIBILITY INDEX (SFI) (9.1.1.3):
First Critical Speed Wet (Multi stage pumps only):
COMPONENT BALANCE TO ISO 1940 G1.0: YES
SHRINK FIT -LIMITED MOVEMENT IMPELLERS (9.2.2.3): N / A

COUPLING:(7.2.3) (7.2.13.f)
MANUFACTURER: Metastream
MODEL: TSCS - 0740
RATING (POWER/100 RPM): 74
SPACER LENGTH: 203 mm 1
SERVICE FACTOR: 1.5
RIGID: NO
COUPLING WITH HYDRAULIC FIT (7.2.10):
COUPLING BALANCED TO ISO 1940-1 G6.3 (7.2.3):
COUPLING WITH PROPRIETARY CLAMPING DEVICE (7.2.11):
COUPLING IN COMPLIANCE WITH (7.2.4):
COUPLING GUARD STANDARD PER (7.2.13.a):
Window on Coupling Guard:

MATERIAL (6.12.1.1)

APPENDIX H CLASS: S-6
MIN DESIGN METAL TEMP (6.12.4.1) (Note 4): -29 °C
REDUCED-HARDNESS MATERIALS REQ'D (6.12.1.12.1):
Applicable Hardness Standard (6.12.1.12.3):
BARREL :
CASE : A 216 Gr WCB
DIFFUSERS:
IMPELLER : A487 Gr CA6NM
IMPELLER WEAR RING : 12% Chrome (Note 16)
CASE WEAR RING : 12% Chrome (Note 16)
SHAFT: AISI 4140
Bowl (if VS-type):
Inspection Class: As Per Material Requisition

BASEPLATE

API BASEPLATE NUMBER : NON-STD 1
BASEPLATE CONSTRUCTION (7.3.14): FULL TOP DECKING 1
BASEPLATE DRAINAGE (7.3.1): Entire Baseplate Drain Rim 1
MOUNTING :
NON-GROUT CONSTRUCTION : (7.3.13): REQUIRED
VERTICAL LEVELING SCREWS : REQUIRED
LONGITUDINAL DRIVER POSITIONING SCREWS : REQUIRED
SUPPLIED WITH : • GROUT AND VENT HOLES
• DRAIN CONNECTION
MOUNTING PADS SIZED FOR BASEPLATE LEVELING (7.3.5): YES
MOUNTING PADS TO BE MACHINED (7.3.6): YES
PROVIDE SPACER PLATE UNDER ALL EQUIPMENT FEET:
OTHER
(NOTE 7)

REMARKS :
COUPLING GUARD SHALL BE NON SPARK MATERIAL

BEARINGS AND LUBRICATION (6.10.1.1)

BEARING (TYPE / NUMBER): (6.11.4)
RADIAL / Deep Groove No. 6317
THRUST 40 deg. Angular contact / No. 7315
REVIEW AND APPROVE THRUST BEARING SIZE : (9.2.5.2.4)

LUBRICATION : (6.10.2.2) (6.11.3) (9.6.1) FLOOD
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:
OIL VISC. ISO GRADE: ISO VG68 1
CONSTANT LEVEL OILER : TRICO 1

REVISION	E	0	1	2
DESCRIPTION	Issued for Quoation	Issued for Purchase	As Purchased	As Purchased
PREPARED BY	AH	RS	JS	RS
CHECKED BY	CS / SS	CS	SR	SR/CPC
APPROVED BY	SP	CS		CS
DATE	14/Feb/13	15/Jul./13	21/Nov/13	16/Jun/14

Tag No. 3A-P-135 A/B
HLS Feed Pump

PAGE

Data Sheet Number: DS-CL03A-G-100-P135

CLIENT:	
PROJECT:	
Requisition No.:	511036-000-45-MR-5411-0002
Service:	HLS Feed Pumps
Tag No.:	3A-P-135A/B

45ED-5411

CENTRIFUGAL PUMP DATA SHEET

INSTRUMENTATION

Note	Item	Ref.	Value
	SEE ATTACHED API-670 DATA SHEET		NO
	ACCELEROMETER (7.4.2.1)		NOTE 14
	Number of Accelerometers		
	Mounting Location of Accelerometers		
	PROVISION FOR MTG ONLY	(6.10.2.10)	
	Number of Accelerometers		
	Mounting Location of Accelerometers		
	FLAT SURFACE REQUIRED	(6.10.2.11)	YES
	Number of Accelerometers		
	Mounting Location of Accelerometers		
	VIBRATION PROBES (7.4.2.2)		
	PROVISIONS FOR VIB. PROBES		
	NUMBER PER RADIAL BEARING		
	NUMBER PER AXIAL BEARING		
	MONITORS AND CABLES SUPPLIED BY (7.4.2.4)		
	TEMPERATURE (7.4.2.3)		
	PROVISIONS FOR TEMP PROBES		
	RADIAL BEARING TEMP.		
	NUMBER PER RADIAL BEARING		
	THRUST BEARING TEMP.		
	NUMBER PER THRUST BEARING ACTIVE SIDE		
	NUMBER PER THRUST BEARING INACTIVE SIDE		
	TEMP. GAUGES (WITH THERMOWELLS) (9.1.3.6)		
	PRESSURE GAUGE TYPE		

Remarks

Loop powered vibration transmitter, 2-wire analog input, 4-20 Ma DC,
Explosion proof shall be supplied on each bearing housing and wired to
Junction Box for both pump and motor on DE and NDE

SEAL SUPPORT SYSTEM MOUNTING

Item	Ref.	Value	Rev
SEAL SUPPORT SYSTEM MOUNTED ON PUMP BASEPLATE	(7.5.1.4)	YES	
IDENTIFY LOCATION ON BASEPLATE			
INTERCONNECTING PIPING BY		Supplier	

MECHANICAL SEAL (6.8.1) (Note 10)

Item	Ref.	Value	Rev
SEE ATTACHED ISO 21049/API 682 DATA SHEET		YES	
ADDITIONAL CENTRAL FLUSH PORT	(6.8.9)		
HEATING JACKET REQ'D.	(6.8.11)		

HEATING AND COOLING (6.1.17)

Item		Value	Rev
COOLING REQ'D			
COOLING WATER PIPING PLAN			
COOLING WATER PIPING			
	FITTINGS		
COOLING WATER PIPING MATERIALS			
COOLING WATER REQUIREMENTS:			
	BEARING HOUSING	m³/h	
	HEAT EXCHANGER	m³/h	
TOTAL COOLING WATER		m³/h	
HEATING MEDIUM			
OTHER			
HEATING PIPING			

PIPING & APPURTENANCES

Item	Value	Rev
MANIFOLD PIPING FOR PURCHASER CONNECTION (7.5.1.6)		
VENT	N / A	
DRAIN	YES	
COOLING MEDIUM	N / A	
TAG ALL ORIFICES (7.5.2.4)		
SOCKET WELD CONN ON SEAL GLAND (7.5.2.8)		2

REVISION	E	0	1	2
DESCRIPTION	Issued for Quoation	Issued for Purchase	As Purchased	As Purchased
PREPARED BY	AH	RS	JS	RS
CHECKED BY	CS / SS	CS	SR	SR/CPC
APPROVED BY	SP	CS		CS
DATE	14/Feb/13	15/Jul./13	21/Nov/13	16/Jun/14

Tag No. 3A-P-135 A/B
HLS Feed Pump

Data Sheet Number: DS-CL03A-G-100-P135

CLIENT:	
PROJECT:	
Requisition No.:	511036-000-45-MR-5411-0002
Service:	HLS Feed Pumps
45ED-5411	Tag No.: 3A-P-135A/B

CENTRIFUGAL PUMP DATA SHEET

Note	SURFACE PREPARATION AND PAINT	
	MANUFACTURER'S STANDARD	YES
	OTHER (SEE BELOW)	
	SPECIFICATION NO.	
	PUMP:	
	PUMP SURFACE PREPARATION	
	PRIMER	
	FINISH COAT	
	BASEPLATE:	
	BASEPLATE SURFACE PREPARATION	
	PRIMER:	
	FINISHCOAT	
	DETAILS OF LIFTING DEVICES	LIFTING EYE (LOW TEMP.)
	SHIPMENT: (8.4.1)	DOMESTIC
	EXPORT BOXING REQUIRED	As Applicable
	OUTDOOR STORAGE MORE THAN 6 MONTHS	YES
	SPARE ROTOR ASSEMBLY PACKAGED FOR:	
	ROTOR STORAGE ORIENTATION (9.2.8.2)	
	SHIPPING & STORAGE CONTAINER FOR VERT STORAGE (9.2.8.3)	
	N2 PURGE (9.2.8.4)	
	SPARE PARTS	
	START-UP	YES
	NORMAL MAINTENANCE	

EST. WEIGHTS kg

ITEM No	PUMP	DRIVER	GEAR	BASE	TOTAL
	4136	2186		2136	8458

OTHER PURCHASER REQUIREMENTS

COORDINATION MEETING REQUIRED (10.1.3)	NO
MAXIMUM DISCHARGE PRESSURE TO INCLUDE	
MAX RELATIVE DENSITY	YES
OPERATION TO TRIP SPEED	NO
MAX DIA. IMPELLERS AND/OR NO OF STAGES	NO
CONNECTION DESIGN APPROVAL (9.2.1.4)	NO
TORSIONAL ANALYSIS / REPORT (6.9.2.10)	NO
PROGRESS REPORTS	YES
OUTLINE OF PROC FOR OPTIONAL TESTS (10.2.5)	NO
ADDITIONNAL DATA REQUIRING 20 YEARS RETENTION (8.2.1.1)	YES
LATERAL ANALYSIS REQUIRED (9.1.3.4) (9.2.4.1.3)	NO
MODAL ANALYSIS REQUIRED (9.3.9.2)	NO
DYNAMIC BALANCE ROTOR (6.9.4.4)	NO
INSTALLATION LIST IN PROPOSAL (10.2.3.l)	YES
VFD STEADY STATE DAMPED RESPONSE ANALYSIS (6.9.2.3)	
TRANSIENT TORSIONAL RESPONSE (6.9.2.4)	NO
BEARING LIFE CALCULATIONS REQUIRED (6.10.1.6)	NO
IGNITION HAZARD ASSMT TO EN 13463-1 (7.2.13.e)	NO
CASING RETIREMENT THICKNESS DRAWING (10.3.2.3)	NO
FLANGES RQD IN PLACE OF SKT WELD UNIONS (7.5.2.8)	YES
INCLUDE PLOTTED VIBRATION SPECTRA (6.9.3.3)	YES
CONNECTION BOLTING (7.5.1.7)	
CADMIUM PLATED BOLTS PROHIBITED	NO
VENDOR TO KEEP REPAIR AND HT RCDS (8.2.1.1.c)	NO
VENDOR SUBMIT TEST PROCEDURES (8.3.1.1)	NO
SUBMIT INSPECTION CHECK LIST (8.1.5)	NO

TEST			Rev
SHOP INSPECTION (8.1.1)			
PERFORMANCE CURVE & DATA APPROVAL PRIOR TO SHIPMENT.		YES	
TEST WITH SUBSTITUTE SEAL (8.3.3.2.b)		NO	
MATERIAL CERTIFICATION REQUIRED (6.12.1.8)	CASING	YES	
	IMPELLER	YES	
	SHAFT	YES	
	OTHER (Wear Rings)	YES	
CASTING REPAIR WELD PROCEDURE APPR REQD (6.12.2.5) (6.12.3.1)		YES	
INSPECTION REQUIRED FOR CONNECTION WELDS (6.12.3.4.d) (6.12.3.4.e)	MAG PARTICLE	YES	
	RADIOGRAPHY	NO	
	LIQUID PENETRANT	NO	1
	ULTRASONIC	NO	
INSPECTION REQUIRED FOR CASTINGS	MAG PARTICLE	YES	
	RADIOGRAPHY	NO	
	LIQUID PENETRANT	NO	1
	ULTRASONIC		
HARDNESS TEST REQUIRED (8.2.2.7)			
ADDNL SUBSURFACE EXAMINATION (6.12.1.5) (8.2.1.3)			
	FOR		
	METHOD		
PMI TESTING REQUIRED (8.2.2.8)		YES	
COMPONENTS TO BE TESTED		Pump Shaft / Impeller / Seal Sleeve / Seal Gland	
RESIDUAL UNBALANCE TEST (J.4.1.2)			
NOTIFICATION OF SUCCESSFUL SHOP PERFORMANCE TEST (8.1.1.c) (8.3.3.5)		YES	1
BASEPLATE TEST (7.3.21)			
HYDROSTATIC		WIT	
HYDROSTATIC TEST OF BOWLS & COLUMN (9.3.13.2)			
PERFORMANCE TEST		WIT	
TEST IN COMPLIANCE WITH (8.3.3.2)			
TEST DATA POINTS TO (8.3.3.3)			
TEST TOLERANCES TO (8.3.3.4)			
NPSH (8.3.4.3.1) (8.3.4.3.4)		WIT	
NPSH-1ST STG ONLY (8.3.4.3.2)			
NPSH TESTING TO HI 1.6 OR ISO 9906 (8.3.4.3.3)			
TEST NPSHA LIMITED TO 110% SITE NPSHA (8.3.3.6)			
RETEST ON SEAL LEAKAGE (8.3.3.2.d)		WIT	
RETEST REQUIRED AFTER FINAL HEAD ADJ (8.3.3.7.b)		WIT	
COMPLETE UNIT TEST (8.3.4.4.1)			
SOUND LEVEL TEST (8.3.4.5)		WIT	
CLEANLINESS PRIOR TO FINAL ASSEMBLY (8.2.2.6)		WIT	
LOCATION OF CLEANLINESS INSPECTION			
NOZZLE LOAD TEST			
CHECK FOR CO-PLANAR MOUNTING PAD SURFACES			
MECHANICAL RUN TEST UNTIL OIL TEMP STABLE			
4 HR. MECH RUN AFTER OIL TEMP STABLE (8.3.4.2.1)			
4 HR. MECH RUN TEST (8.3.4.2.2)			
BRG HSG RESONANCE TEST (8.3.4.7)			
STRUCTURAL RESONANCE TEST (9.3.9.2)			
REMOVE / INSPECT HYDRODYNAMIC BEARINGS AFTER TEST (9.2.7.5)			
AUXILIARY EQUIPMENT TEST (8.3.4.6)			
EQUIPMENT TO BE INCLUDED IN AUXILLIARY TESTS			
LOCATION OF AUXILIARY EQUIPENT TEST			
IMPACT TEST (6.12.4.3)	PER EN 13445		
	PER ASME SECTION VIII		
REMOVE CASING AFTER TEST			

REVISION	E	0	1	2		
DESCRIPTION	Issued for Quoation	Issued for Purchase	As Purchased	As Purchased	Tag No. 3A-P-135 A/B HLS Feed Pump	PAGE
PREPARED BY	AH	RS	JS	RS		
CHECKED BY	CS / SS	CS	SR	SR/CPC		
APPROVED BY	SP	CS		CS		
DATE	14/Feb/13	15/Jul./13	21/Nov/13	16/Jun/14	Data Sheet Number: DS-CL03A-G-100-P135	5 OF 9

	Requisition No.:	511036-000-45-MR-5411-0002
45ED-5411	Service:	HLS Feed Pumps
	Tag No.:	3A-P-135A/B

CENTRIFUGAL PUMP DATA SHEET

Note	PRESSURE VESSEL DESIGN CODE REFERENCES	Rev
	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)

ALTERNATE WELDING CODES AND STANDARDS _____

WELDING REQUIREMENT (APPLICABLE CODE OR STANDARD) _____

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 _____

ALTERNATIVE MATERIAL INSPECTIONS AND ACCEPTANCE CRITERIA (SEE TABLE 14) (8.2.2.5)

TYPE OF INSPECTION	METHOD	FOR FABRICATIONS	FOR CASTINGS
RADIOGRAPHY			
ULTRASONIC INSPECTION			
MAGNETIC PARTICLE INSPECTION			
LIQUID PENETRANT INSPECTION			
VISUAL INSPECTION (all surfaces)			

REMARKS :

REVISION	E	0	1	2	Tag No. 3A-P-135 A/B HLS Feed Pump		PAGE
DESCRIPTION	Issued for Quoation	Issued for Purchase	As Purchased	As Purchased			
PREPARED BY	AH	RS	JS	RS			
CHECKED BY	CS / SS	CS	SR	SR/CPC			
APPROVED BY	SP	CS		CS	Data Sheet Number	DS-CL03A-G-100-P135	6 OF 9
DATE	14/Feb/13	15/Jul./13	21/Nov/13	16/Jun/14			

	CLIENT:	
	PROJECT:	
	Requisition No.: 511036-000-45-MR-5411-0002	
	Service: HLS Feed Pumps	
45ED-5411	Tag No.: 3A-P-135A/B	

NOTES

Note		Rev
	(*) Seller to complete data sheet.	
	1) 2 x 100%	
	2) Max.Chloride: 1140 ppmv, max; H2S : 6 ppmv; CO2: 8 ppmv	
	3) All piping shall be extended to the edge of the skid and provided with flanged connection including drain.	
	4) The lifting lugs shall be designed for -45°C.	
	5) Seller to consider appropriate margin on NPSH available stated but not less than 1.0 m.	
	6) Suction and discharge nozzles shall meet 2 x API 610 Table 5 allowable nozzle loads.	
	7) Baseplate shall be heavy duty construction and prepared for mounting on steel structure.	
	8) Mechanical seal selections shall be confirmed by the Seller based on seal manufacturer's recommendation for the process fluid parameters. Mechanical seal and seal chamber shall be designed to withstand the shut off pressure+suction head of the pump.	
	9) The pump shall be designed, fabricated, tested and inspected in accordance with the requirements of API 610-11th edition and MEG specification MEG-ENG-MEC-SP-3201.	
	10) Equipment shall be packed for 12 months outside storage. - NOT RECOMMENDED	
	11) Pump should not be stored in freezing condition when wetted with water.	
	12) Refer to P&ID included with the Material Requisition for instrumentation and miscellaneous piping requirements.	
	13) Seller shall provide casing drain as per following; Socket welded Nipple made of ASTM A106 Gr B seamless, Sch. 160, supported with two-plane gussets. Gusset plates shall be 6 mm THK minimum, in 2 planes (90 o apart), having the same metallurgy as pump casing. Flanges shall be ASTM A105N, Class 300 RF. Valve shall be gate valve, Class CL 300 RF to ASME B16.5. Forged body with integral flanges, ASTM A105N, Bolted Bonnet, OS & Y, Solid Wedge,API Trim 12, integral or renewable seats, regular port, design to API 602.	
	14) Non-lubricated flexible disc spacer type couplings shall be furnished.	
	15) Pump lubrication shall be: Unpressurized Lube Oil (Trico Oiler).	
	16) The hardness of the casing wear rings and impeller wear rings shall differ at least 50HB to avoid galling.	
	17) Reduced Shut Off head tolerance accepted i.e. +7.0 - 10.0 to ensure that 1310 kPa maximum discharge pressure is not exceeded.(assuming 105.8 suction pressure)	
	18) Shut off differential pressure shall be less than 1310 kPa.	
	19) The sleeve outer surface shall be hard faced with Chrome Oxide at the location of of O-ring to avoide fretting.	

	CLIENT:	Project No. 511036	
	PROJECT:		
	Requisition No.: 511036-000-45-MR-5411-0002		
	Service: HLS Feed Pumps		
45ED-5411	Tag No.: 3A-P-135A/B		

MECHANICAL SEAL DATA SHEET (Page 1)

Rev

DATA SUPPLIED ○ CUSTOMARY UNITS ● SI UNITS | HARDWARE SUPPLIED ○ CUSTOMARY UNITS ● SI UNITS

○ INDICATES DATA COMPLETED BY PURCHASER | ☐ BY SEAL VENDOR | ◎ BY SEAL VENDOR OR PURCHASER

○ ◎ DEFAULT SELECTION

SEAL SPECIFICATION - (REF 4.1, FIGURES 1 TO 6)

CATEGORY ○ SEAL CATEGORY 1 (4.1.1) ● SEAL CATEGORY 2 (4.1.1) | ● SEAL CODE (ANNEX D) **C2A1A32**

TYPE (CODE-CW) ◎ TYPE A (3.74) ◎ TYPE B (3.74) ◎ ALTERNATIVE STATIONARY (TYPE A & B)
◎ TYPE C (3.75) ◎ ALTERNATIVE ROTATING (TYPE C) ◎ SINGLE SPRING (TYPE A)

ARR'G'T		DEFAULT CONFIGURATION	ALTERNATE DESIGN	FLUSH PLANS (SEE ANNEX G)
1 (3.2)		◎ 1CW-FX	● 1CW-FL ◎ DIST. FLUSH ◎ ALTERNATIVE BUSH	◎ 01 ◎ 11 ◎ 14 ◎ 23 ● 32 ◎ 50 ◎ 61 ◎ 02 ◎ 13 ◎ 21 ◎ 31 ◎ 41 ◎ 51 ◎ 62
2 (3.3)	BUFFER	LIQUID ◎ 2CW-CW	◎ FX ◎ DIST. FLUSH ◎ TANGENTIAL LBO CONN'N	◎ 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 (3.4)	BARRIER	LIQUID ◎ 3CW-FB	◎ 3CW-BB ◎ FX ◎ 3CW-FF ◎ TANG. LBO	◎ 01 ◎ 13 ◎ 53A ◎ 54 ◎ 74 ◎ 02 ◎ 14 ◎ 53B ◎ 61
	BARRIER	GAS ◎ 3NC-BB	◎ 3NC-FF ◎ 3NC-FB	◎ 11 ◎ 32 ◎ 53C ◎ 62

SLEEVE-SHAFT DRIVE SET-SCREW ONTO SHAFT ◎ ALTERNATIVE (6.1.3.13) - SPECIFY

MATERIALS (REFERENCE 6.1.6 & ANNEX B)

SECONDARY SEALS	SEAL FACES	METAL BELLOWS	SPRINGS	METAL PARTS
● FKM ◎ FFKM	● CARBON VS SIC	◎ UNS N10276 (TYPE B)	● UNS N10276	● UNS S31600/ S31635
◎ SPIRAL-W GASKET	◎ SIC VS SIC	◎ UNS N07718 (TYPE C)	OR N06455	◎ UNS N10276
◎ NBR	◎ SS-SIC ◎ RB-SIC	◎ UNS N08020	◎ UNS S31600	◎ UNS N08020
◎ OTHER:	◎ VS	◎ OTHER:	OR S31635	◎ OTHER:

MECHANICAL SEAL DATA

● SEAL VENDOR **John Crane**
○ DATA REQUIREMENTS FORM (ANNEX J)
■ SIZE/TYPE **1648 - Z**
☐ SEAL DRAWING NUMBER
■ VENDOR'S SEAL CODE **X P147 1 X D81 H**
☐ MODIFIED FACES FOR PUMP PERFORMANCE TEST

☐ ALTERNATE SEAL FOR PUMP PERFORMANCE TEST
☐ DYNAMIC SEALING PRESSURE RATING (3.19) _____ kPag
☐ STATIC SEALING PRESSURE RATING (3.69) _____ kPag
☐ MAXIMUM ALLOWABLE TEMPERATURE (3.40) _____ °C
● MINIMUM DESIGN METAL TEMPERATURE (6.1.6.11.1) **-29** °C

SEAL CHAMBER DATA (REFERENCE 6.1.2.4)

ASME B73.1 & 2 CYLINDRICAL ◎ TAPERED ● ISO 13709 ◎ ISO 3069-C ◎ OTHER, SPECIFY _____
○ BOLT-ON CHAMBER (6.1.2.5) ◎ SEAL CHAMBER FLUSH PORT REQ'D ◎ SEAL CHAMBER VENT REQ'D
◎ FLOATING THROAT BUSH ◎ FIXED THROAT BUSH ◎ CHAMBER HEATING/COOLING ◎ H ◎ C

PUMP DATA

PUMP DESIGN ● MANUFACTURER **CPC PUMPS** ● MODEL **HDR** ○ FRAME/SIZE **C38** ● CASE MATERIAL **S-6**
PUMP OPERATING PRESSURE ● SUCTION PRESSURE (RATED) **105.8** kPaa ● DISCHARGE PRESSURE **1093** kPaa
SEAL CHAMBER ○ NORMAL _____ kPag ○ MIN / MAX (3.42) _____ / _____ kPag ○ MSSP (3.44) _____ kPag
SHAFT ● HORIZONTAL ○ VERTICAL ● DIA. **98** mm ● SHAFT SPEED **1200** RPM
SHAFT DIRECTION (FROM DRIVER): ○ CW ● CCW

FLUID DATA - (FOR QUENCH, BUFFER AND BARRIER FLUID DATA, SEE PAGE 2)

PUMPED STREAM

● TYPE OR NAME **Produced Water** CONC'N _____ %
● DISSOLVED CONTAMINANT ● H_2S **6** ml/m³ ● WET
● Cl **1140 mg/L** ● CO2 **8 ppmv** @ _____ wppm
○ SOLID CONTAMINANT _____
○ CONCENTRATION (% BY WT, OR PPM) _____
● PUMPING TEMPERATURE
MIN **5** °C NORMAL **79** °C MAX **85** °C
● RELATIVE DENSITY (TO WATER @ 25 °C) AT REF. TEMP.
@ NORMAL TEMP **0.971** @ MAX TEMP _____
● ABSOLUTE VAPOR PRESSURE AT REFERENCE TEMP.
NORMAL TEMP **47.2** kPaa MAX TEMP **57.8** kPaa
○ ATMOSPHERIC BOILING POINT. _____ °C
● VISCOSITY @ NORMAL PUMPING TEMP. **0.35** cP

● HAZARDOUS ○ FLAMMABLE ○ _____
○ FLUID SOLID @ AMBIENT
○ SOLIDIFIES @ _____ °C POUR POINT _____ °C
○ PUMPED STREAM SOLIDIFIES UNDER SHEAR
○ PUMPED STREAM CONTAINS AGENTS THAT POLYMERIZE
SPECIFY AGENTS _____ @ TEMP _____ °C
○ PUMPED STREAM CAN PLATE OUT OR DECOMPOSE:
SPECIFY CONDITIONS _____
● PUMPED STREAM IS REGULATED FOR FUGITIVE OR OTHER EMISSIONS. REGULATION LEVEL **10** ml/m³
○ SPECIAL PUMP CLEANING PROCEDURES
SPECIFY; _____
○ ALTERNATE PROCESS FLUIDS & CONCENTRATION (INCL. COMMISSIONING)

FLUSH FLUID (PLAN 32) If flush fluid is pumpage, then flush fluid data is not required.

○ TYPE OR NAME **Utility water** CONC'N _____ %
○ SEAL VENDOR REVIEW REQUIRED
○ FLUID TEMPERATURE
MIN **5** °C NORMAL **5** °C MAX **15** °C
○ RELATIVE DENSITY (TO WATER @ 25 °C) AT REF. TEMP.
@ NORMAL TEMP **1** @ MAX TEMP **1**

● ABSOLUTE VAPOR PRESSURE AT REFERENCE TEMP.
NORMAL TEMP **0.9** kPa a MAX TEMP **1.7** kPa
○ ATMOSPHERIC BOILING POINT. _____ °C
● VISCOSITY @ NORMAL PUMPING TEMP. **1.5** Pa.s
☐ FLOW RATE REQ'D MAX/MIN _____ / _____ l/min
☐ PRESSURE REQ'D MAX/MIN _____ / _____ kPag

REVISION	E	0	1	2	Tag No. 3A-P-135 A/B HLS Feed Pump		PAGE
DESCRIPTION	Issued for Quoation	Issued for Purchase	As Purchased	As Purchased			
PREPARED BY	AH	RS	JS	RS			
CHECKED BY	CS / SS	CS	SR	SR/CPC			
APPROVED BY	SP	CS		CS	Data Sheet Number	DS-CL03A-G-100-P135	8 OF 9
DATE	14/Feb/13	15/Jul./13	21/Nov/13	16/Jun/14			

	Requisition No.: 511036-000-45-MR-5411-0002	
	Service: HLS Feed Pumps	
45ED-5411	Tag No.: 3A-P-135A/B	

MECHANICAL SEAL DATA SHEET (Page 2)

Rev

○ INDICATES DATA COMPLETED BY PURCHASER ☐ BY SEAL VENDOR ◉ BY SEAL VENDOR OR PURCHASER

☑ ○ DEFAULT SELECTION

FLUID DATA - (QUENCH, BUFFER AND BARRIER FLUID DATA, LIQUID AND GAS)

QUENCH MEDIUM

☑ TYPE OR NAME

☑ SUPPLY TEMPERATURE MAX/MIN ____ / ____ °C

☐ FLOW RATE REQ'D MAX/MIN ____ / ____ l/min

BUFFER/BARRIER MEDIUM

☑ TYPE OR NAME ____

○ PURCHASER SELEC'N ☐ SEAL VENDOR SELEC'N

○ SEAL VENDOR REVIEW ☐ PURCHASER REVIEW

☐ FLOW RATE REQ'D MAX/MIN. ____ / ____ l/min

☑ SUPPLY PRESSURE MAX/MIN. ____ / ____ kPag

☑ FLUID OPERATING TEMPERATURE

MIN ____ °C NORMAL ____ °C MAX ____ °C

☑ RELATIVE DENSITY (TO WATER @ 25 °C) AT REF. TEMP. ____

@ NORMAL TEMP ____ @ MAX TEMP ____

☑ ABSOLUTE VAPOR PRESSURE AT REFERENCE TEMP.

NORMAL TEMP ____ kPag MAX TEMP ____ kPag

☑ ATMOSPHERIC BOILING POINT (LIQUID) ____ °C

☑ VISCOSITY @ NORMAL TEMP (LIQUID) ____ Pa.s

☑ SPECIFIC HEAT CAPACITY @ CONSTANT PRESSURE

FOR LIQUID @ NORMAL TEMPERATURE ____ J/Kg.K

SITE AND UTILITIES (Note-A)

◉ CONTROL VOLTAGE 120 V PHASE 1 HERTZ 60

◉ AREA CLASSIFICATION CL I GR IIA ZN 2

◉ DESIGN AMBIENT MIN./MAX. 10 / 39 °C

○ COOLING GLYCOL/WATER SUPPLY T ____ °C ○ Cl_2 ____ ml/m^3

○ COOLING GLYCOL/WATER PRESS. NORM /DES. ____ / ____ kPag

○ ATEX (EC DIRECTIVE 94/9/EC) GR ____ CAT. ____ TCLASS ____

ACCESSORIES (CLAUSES 8 AND 9)

GENERAL

◉ JOINT USER/VENDOR LAYOUT OF EQUIPMENT (8.1.4)

◉ PIPE TAPER THREADS (8.1.9)

○ SPECIAL REQUIREMENTS FOR HAZARDOUS SERVICE

○ SPECIAL CLEANING AND DECONTAMINATION REQ'TS

○ UTILITY MANIFOLD CONNECTIONS REQUIRED (8.4.4)

○ TYPE AND SPEC. OF HEAT TRACING (8.6.5.8)

○ THERMAL RELIEF VALVES REQUIRED (9.8.3)

COOLING SYSTEM (PLAN 21, 22, 23, 41, 53B, 53C)

○ HEAT EXCHANGER SUPPLIER

☑ WATER COOLED ☑ AIR COOLED ○ ISO 15649

☑ EQUIPMENT REFERENCE/CODE

○ COOLING WATER LINES SUPPLIER

○ TUBING ○ GALVANISED PIPING (8.4.2)

☑ COOLING WATER FLOW RATE ____ l/min

○ SIGHT FLOW INDICATORS (8.4.3) ○ OPEN ○

PLAN 11, 13, 14, 21, 23, 31, 32, AND 41 SYSTEMS

◉ CONNECTING LINES SUPPLIER Pump Seller

◉ TUBING ○ PIPING (8.5.2.2)

○ RESTRICTION ORIFICE NIPPLE IN FLUSH LINE (8.5.2.4)

○ CYCLONE SEPARATOR SUPPLIER

◉ PLAN 32 EQUIPMENT SUPPLIER Pump Seller / John Crane

◉ PLAN 32 FLOW IND'R ○ PLAN 32 TEMPERATURE IND'R

PLAN 52 AND 53 SYSTEMS

☑ STANDARD (FIG G.27) ☑ ALTERNATE (FIG G.28)

☐ DIMENSIONAL VARIATIONS TO STANDARD (FIG G.27)

☐ DIMENSIONAL VARIATIONS TO ALTERNATE (FIG G.28)

○

☑ ALTERNATE FABRICATION STANDARD

○ PRIMARY EQUIPMENT SUPPLIER

☑ SUPPLIER REFERENCE/CODE

○ CONNECTING LINES SUPPLIER

○ TUBING ○ PIPING (8.5.4.4.9)

PLAN 52 AND 53 SYSTEMS CONTINUED

○ EQUIPMENT SUPPORT SUPPLIER

○ FILLING SYSTEM SUPPLIER

○ ASME CODE STAMP REQUIRED

○ EN 13445 OR OTHER CODE APPLICABLE

☑ RESERVOIR CAPACITY (8.5.4.3) ____ Lit.

☑ NLL TO GLAND PLATE HEIGHT (8.5.4.2) ____ mm

☐ RESERVOIR MAWP (3.41) ____ kPag @ ____ °C

☑ SET PRESSURE RANGE, MAX/MIN ____ / ____ kPag

☑ SYSTEM HOLD-UP PERIOD (PLANS 53B & 53C) ____ DAYS

○ TEMPERATURE INDICATOR (PLAN 53B & 53C)

PRESSURE SWITCH (8.5.4.2.h) TO ACTIVATE ON;

☑ RISING PRESSURE (ARR 2) SET @ ____ kPag

☑ FALLING PRESSURE (ARR 3) SET @ ____ kPag

☑ HIGH LEVEL ALARM REQUIRED (8.5.4.2.i)

○

○ TEST BASED H/Q CURVE FOR INTERNAL CIRC. DEVICE

○ EXTERNAL CIRCULATING PUMP (8.6.3.1)

PLAN 72 AND 74 SYSTEM

○ EQUIPMENT SUPPLIER

○ HIGH FLOW ALARM SWITCH (8.6.6.5)

PLAN 75 AND 76 SYSTEM

○ EQUIPMENT SUPPLIER

○ HIGH LEVEL ALARM SWITCH FOR PLAN 75 (8.6.5.3)

○ TEST CONNECTION (8.6.5.4)

INSTRUMENTATION

◉ USER SPECIFICATION REFERENCE FOR INSTRUMENTATION/CONTROLS Note A

PRESSURE GAUGES (9.4);

○ OIL FILLED PRESSURE GAUGES (9.4.3)

PRESSURE SWITCHES (9.5.2); ○ TRANSMITTERS (9.5.2.3)

LEVEL SWITCHES (9.5.3);

○ HYDROSTATIC ○ CAPACITANCE ○ ULTRASONIC

LEVEL INDICATORS (9.6) ○ TRANSMITTER (9.5.3.2)

○ WELD PAD ○ EXTERNAL, REMOVABLE (9.6.2)

FLOW INSTRUMENTS (9.7); ○ TRANSMITTER (9.7.3)

INSPECTION AND TESTING

○ PURCHASER PARTICIPATION IN INSPECTION & TEST SPECIFY;

○ INSPECTOR'S CHECK LIST (10.1.7 & ANNEX H)

○ OPTIONAL QUALIFICATION TESTING REQ'D (10.3.1.1.2)

○ PURCHASER APPROVAL REQUIRED FOR WELDED CONNECTION DESIGNS, (6.1.6.10.5.d)

○ HARDNESS TEST (10.2.3.k) REQUIRED FOR;

○ 100% INSPECTION OF ALL WELDS (6.1.6.10.5.a) USING;

○ MAGNETIC PARTICLE ○ LIQUID PENETRANT

○ RADIOGRAPHIC ○ ULTRASONIC

○ OPTIONAL QUALIFICATION TESTING REQ'D (10.3.1.1.2)

☑ MODIFIED FACES FOR PUMP TEST (10.3.5.1) SEE PG. 1, LINE 30

☑ ALTERNATE SEAL PUMP TEST (10.3.5.2) SEE PG. 1, LINE25

NOTES:

A) Refer to P&IDs included with Material Requisition

B) Seller to fill in missing data.

REVISION	E	0	1	2	Tag No. 3A-P-135 A/B HLS Feed Pump		PAGE
DESCRIPTION	Issued for Quoation	Issued for Purchase	As Purchased	As Purchased			
PREPARED BY	AH	RS	JS	RS			
CHECKED BY	CS / SS	CS	SR	SR/CPC			
APPROVED BY	SP	CS		CS	Data Sheet Number	DS-CL03A-G-100-P135	9 OF 9
DATE	14/Feb/13	15/Jul./13	21/Nov/13	16/Jun/14			