Mechanical Data Sheet For Crude Oil Main Pumps (P-6001A~L)

Rev	Description	Date	Prepared	Checked	Approved
A02	APPROVE FOR DESIGN	1-May-2019	E.DAVOODIPOOR	M.SAFFARZADEH	A.ESKANDARLU
A01	APPROVE FOR DESIGN	17-Mar-2019	E.DAVOODIPOOR	M.SAFFARZADEH	A.ESKANDARLU
A00	ISSUE FOR APPROVAL	5-Mar-2019	E.DAVOODIPOOR	M.SAFFARZADEH	A.ESKANDARLU

GOREH-JASK Crude Oil Pipeline and JASK Storage Tanks Construction Program

JASK Crude Oil Storage Tanks Project

Mechanical Data Sheet For Crude Oil Main Pumps

Project	Unit	Phase	Discipline	Doc. Type	Serial	Revision
325260	00	EB	ME	DS	0005	A02

Contract No:

LIST OF REVISED PAGES

REV. / PAGE	A00	A01	A02		REV. / PAGE					REV. / PAGE					REV. / PAGE				
1	*				51					101					151				
2	*				52					102					152				
3	*	*	*		53					103					153				
4	*	*	*		54					104					154				
5	*				55					105					155				
6	*				56					106					156				
7	*				57					107					157				
8	*				58					108					158				
9	*		*		59					109					159				
10					60					110					160				
11					61					111					161				
12					62					112					162				
13					63					113					163				
14					64					114					164				
15					65					115					165				
16					66					116					166				
17					67					117					167				
18					68					118					168				
19					69					119					169				
20					70					120					170				
21					71					121					171				
22					72					122					172				
23					73					123					173				
24					74					124					174				
25					75					125					175				
26					76					126					176				
27					77					127					177				
28					78					128					178				
29					79					129					179				
30					80					130					180				
31					81					131					181				
32					82					132					182				
33					83					133					183				
34					84					134					184				
35					85					135					185				
36					86					136					186				
37					87					137					187				
38					88					138					188				
39					89					139					189				
40					90					140					190				
41					91					141					191				
42					92					142					192				
43					93					143					193				
44					94					144					194				
45					95					145					195				
46					96					146					196				
47					97					147					197				
48					98					148					198				
49					99					149					199				
50					100					150					200				

JASK Crude Oil Storage Tanks Project

Mechanical Data Sheet For Crude Oil Main Pumps

Project	Unit	Phase	Discipline	Doc. Type	Serial	Revision
325260	00	EB	ME	DS	0005	A02

Contract No: P47

						Rev
APPLICABLE TO:	PROPOSAL		APPLICABLE STANDARD:	API-610		
FOR	PETROLEUM ENGINEERING AND DEVELOPMENT COMPANY (PEDEC)		UNIT	P-6001A~L(NOTE 6)		
SITE	JASK CRUDE OIL STORAGE TANKS PROJECT		SERVICE	CRUDE OIL		
NO. REQ	10 + 2	PUMP SIZE NOTE 1	TYPE	CENTRIFUGAL	No. STAGES 7 (NOTE 1)	A02
MANUFACTURER	AS PER AVL		MODEL	NOTE 1	SERIAL NO. NOTE 1	

LIQUID CHARACTERISTICS

	Units	Maximum	Minimum	Rated
LIQUID TYPE OR NAME :	CRUDE OIL			
VAPOR PRESSURE :	bar a	0.6		
RELATIVE DENSITY :				0.880
SPECIFIC HEAT :	kJ/(kg-K)	1.964	1.774	1.774
VISCOSITY :	mPa. s	27		

SERVICE : CONTINUOUS

PUMPS OPERATE IN: PARALLEL

CORROSION DUE TO : (6.12.1.9) TRACE OF CHLORIDE

EROSION DUE TO : (6.12.1.9)

H2S CONCENTRATION (ppm) : (6.12.1.12) >60

CHLORIDE CONCENTRATION (ppm) : >50

PARTICULATE SIZE (DIA IN MICRONS) LATER

PARTICULATE CONCENTRATION (PPM) NEGLIGIBLE

OPERATING CONDITIONS (6.1.2)

	Units	Maximum	Rated	Normal	Minimum	
PUMPING TEMPERATURE :	°C	40	40		15	
FLOW :	m³/h		1056	960		
DISCHARGE PRESSURE : (6.3.2)	bar g		14.93			
SUCTION PRESSURE :	bar g	7.9	0.23		0.23	
DIFFERENTIAL PRESSURE :	bar		14.7			
DIFFERENTIAL HEAD :	m		170.5			A02
$NPSH_A$:	m		7.7			
HYDRAULIC POWER :	kW		431.2			

SITE AND UTILITY DATA

LOCATION: OUTDOOR / UNHEATED / UNDER ROOF

MOUNTED AT : GRADE m TROPICALISATION REQD

ELECTRIC AREA CLASSIFICATION: 6.1.22 ZONE 1

GROUP IIA TEMP CLASS T3

SITE DATA :

ELEVATION (MSL) : 5 m **BAROMETER :** 760 mmHg

RANGE OF AMBIENT TEMPS:MIN / MAX 6 / 50 °C

RELATIVE HUMIDITY: MIN / MAX 35 / 93 %

UNUSUAL CONDITIONS: DUST

UTILITY CONDITIONS :

ELECTRICITY :	DRIVERS	HEATING	CONTROL	SHUTDOWN
VOLTAGE	6000 V	230		
PHASE	3PH	1PH		
HERTZ	50Hz	50Hz		

COOLING WATER : NOT APPLICABLE

	INLET	RETURN	DESIGN
TEMP °C		MAX	
PRESS bar g		MIN	

SOURCE

COOLING WATER CHLORIDE CONCENTRATION: ppm

INSTRUMENT AIR : MAX kg/cm²g MIN bar g

STEAM

		DRIVERS	HEATING
TEMP °C	Max		
	Min		
PRESS. bar g	Max		
	Min		

PERFORMANCE(NOTE 1)

PROPOSAL CURVE NO.	RPM		
As Tested Curve No.			
IMPELLER DIA.: RATED	MAX.	MIN.	mm
RATED POWER	<627 kW	EFFICIENCY >68	(%)
RATED CURVE BEP FLOW (at rated impeller dia)			m³/h
MIN FLOW : THERMAL	m³/h	STABLE <370	m³/h
PREFERRED OPERATING REGION (6.1.11)		to	m³/h
ALLOWABLE OPERATING REGION		to	m³/h
MAX HEAD @ RATED IMPELLER			m
MAX POWER @ RATED IMPELLER	(6.8.9)		kW
NPSH3 AT RATED FLOW :		< 6.5	m
CL PUMP TO U/S BASEPLATE			m
NPSH MARGIN AT RATED FLOW :		>2 (NOTE 10)	m
SPECIFIC SPEED (6.1.9)	m3/s, rpm, m		
SUCTION SPECIFIC SPEED LIMIT			
SUCTION SPECIFIC SPEED	m3/s, rpm, m	< 213 SI	
MAX. ALLOW. SOUND PRESS. LEVEL REQD (6.1.14)		85dB	(dBA)
EST MAX SOUND PRESS. LEVEL			(dBA)
MAX. SOUND POWER LEVEL REQ'D (6.1.14)			
EST MAX SOUND POWER LEVEL			

DRIVER (7.1.5)-NOTE 13

Driver Type	MOTOR	
GEAR	NO	
VARIABLE SPEED REQUIRED	NO	
SOURCE OF VARIABLE SPEED		A02
OTHER	NO	
MANUFACTURER	AS PER AVL	A02
NAMEPLATE POWER	1000 kW	A02
Nominal RPM	1500	
RATED LOAD RPM	NOTE 1	
FRAME OR MODEL	NOTE 1	
ORIENTATION	VERTICAL	A02
LUBE	GREASE-Li BASE	
BEARING TYPE:	ANTI-FRICTION	
RADIAL	NOTE 1 / NOTE 1	
THRUST	NOTE 1 / NOTE 1	
STARTING METHOD	Open Valve (Fully-Loaded)	
SEE DRIVER DATA SHEET	LATER	

JASK Crude Oil Storage Tanks Project

Mechanical Data Sheet For Crude Oil Main Pumps

Project	Unit	Phase	Discipline	Doc. Type	Serial	Revision
325260	00	EB	ME	DS	0005	A02

CONSTRUCTION

API PUMP TYPE: VS6 **[Based on API 610 definitions]**

SEE ALSO PAGE 5

NOZZLE CONNECTIONS: (6.5.5)

	Size	Facing	Rating	Position
SUCTION	NOTE 1	RF	300	SIDE
DISCHARGE	NOTE 1	RF	300	SIDE

PRESSURE CASING AUX. CONNECTIONS: (6.4.3.2)

	No.	Size	Type	Facing	Rating	Posn.
BALANCE/LEAK OFF	NOT APPLICABLE					
DRAIN	1	NOTE 1	SWF	RF	300	SIDE
VENT	1	NOTE 1	SWF	RF	300	SIDE
PRESSURE GAGE	NOT APPLICABLE					
TEMP GAGE	NOT APPLICABLE					
WARM-UP LINE	NOT APPLICABLE					

Drain Valve Supplied By	SUPPLIER
DRAINS MANIFOLDED	YES
VENT Valve Supplied By	SUPPLIER
VENTS MANIFOLDED	YES
THREADED CONS FOR PIPELINE SERVICE & < 50°C (6.4.3.2)	NO
SPECIAL FITTINGS FOR TRANSITIONING (6.4.3.3)	NO
CYLINDRICAL THREADS REQUIRED (6.4.3.8)	NO
GUSSET SUPPORT REQUIRED	NO
MACHINED AND STUDDED CONNECTIONS (6.4.3.12)	NO
VS 6 DRAIN	External
DRAIN TO SKID EDGE	YES

MATERIAL (6.12.1.1)

APPENDIX H CLASS	A-8
MIN DESIGN METAL TEMP (6.12.4.1)	-2 °C
REDUCED-HARDNESS MATERIALS REQ'D (6.12.1.12.1)	YES
Applicable Hardness Standard (6.12.1.12.3)	MR0103
BARREL :	NOTE 1
BOWL :	NOTE 1
DIFFUSERS	NOTE 1
IMPELLER :	NOTE 1
IMPELLER WEAR RING :	NOTE 1
CASE WEAR RING :	NOTE 1
SHAFT:	NOTE 1
Bowl (if VS-type)	NOTE 1
Inspection Class	Level 3

BEARINGS AND LUBRICATION (6.10.1.1)

BEARING (TYPE / NUMBER): (6.11.4)

RADIAL	SLEEVE	/	NOTE 1
THRUST	ROLLER	/	NOTE 1

REVIEW AND APPROVE THRUST BEARING SIZE : (9.2.5.2.4)	NO
LUBRICATION : (6.10.2.2) (6.11.3) (9.6.1)	FLOOD
PRESSURE LUBE SYSTEM TO ISO 10438-	(9.2.6.5)
ISO 10438 DATA SHEETS ATTACHED	
Pressurized Lube Oil System mtd on pump baseplate	N / A
Location of Pressurized Lube Oil System mounted on baseplate :	N/A
INTERCONNECTING PIPING PROVIDED BY	Supplier
OIL VISC. ISO GRADE	VG NOTE 1
CONSTANT LEVEL OILER :	REQUIRED

CASING MOUNTING:	VERTICAL
CASING TYPE: (6.3.10)	DIFFUSER
OH2 BACKPULLOUT LIFTING DEVICE REQD. (9.1.2.6)	NO

CASE PRESSURE RATING:

MAWP : (6.3.6)	40	bar g	@	85	°C
HYDROTEST :	60	bar g	@	38	°C

HYDROTEST VS PUMP AS ASSEMBLY		
SUCT'N PRESS. REGIONS DESIGNED FOR MAWP	YES	
ROTATION: (VIEWED FROM COUPLING END)	CCW	
• IMPELLERS INDIVIDUALLY SECURED :	YES	
• BOLT OH 3/4/5 PUMP TO PAD / FOUNDATION :	NO	A02
• PROVIDE SOLEPLATE FOR OH 3/4/5 PUMPS	NO	A02

ROTOR:

SHAFT FLEXIBILITY INDEX (SFI) (9.1.1.3)	NOTE 1
First Critical Speed Wet (Multi stage pumps only)	YES
COMPONENT BALANCE TO ISO 1940 G1.0	YES
SHRINK FIT -LIMITED MOVEMENT IMPELLERS (9.2.2.3)	NO

COUPLING:(7.2.3) (7.2.13.f)

MANUFACTURER	AS PER AVL
MODEL	NOTE 1
RATING (POWER/100 RPM)	NOTE 1
SPACER LENGTH	>125 mm
SERVICE FACTOR	MIN 1.5
RIGID	N / A
COUPLING WITH HYDRAULIC FIT (7.2.10)	N / A
COUPLING BALANCED TO ISO 1940-1 G6.3 (7.2.3)	YES
COUPLING WITH PROPRIETARY CLAMPING DEVICE (7.2.11)	
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

BASEPLATE(NOTE 1)

API BASEPLATE NUMBER :	
BASEPLATE CONSTRUCTION (7.3.14)	
BASEPLATE DRAINAGE (7.3.1)	
MOUNTING :	GROUTED
NON-GROUT CONSTRUCTION : (7.3.13)	REQUIRED
VERTICAL LEVELING SCREWS :	REQUIRED
LONGITUDINAL DRIVER POSITIONING SCREWS :	REQUIRED
SUPPLIED WITH : I GROUT AND VENT HOLES	YES
I DRAIN CONNECTION	YES
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	YES
OTHER	

REMARKS :

JASK Crude Oil Storage Tanks Project

Mechanical Data Sheet For Crude Oil Main Pumps

Project	Unit	Phase	Discipline	Doc. Type	Serial	Revision
325260	00	EB	ME	DS	0005	A02

Contract No: P47

Note	INSTRUMENTATION		
	SEE ATTACHED API-670 DATA SHEET		N / A
	ACCELEROMETER (7.4.2.1)		
	Number of Accelerometers		
	Mounting Location of Accelerometers		
	PROVISION FOR MTG ONLY	(6.10.2.10)	N / A
	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		N / A
	NUMBER PER RADIAL BEARING		
	NUMBER PER AXIAL BEARING		
			N / A
	MONITORS AND CABLES SUPPLIED BY (7.4.2.4)		
	TEMPERATURE (7.4.2.3)		
	PROVISIONS FOR TEMP PROBES		N / A
	RADIAL BEARING TEMP.		N / A
	NUMBER PER RADIAL BEARING		
	THRUST BEARING TEMP.		N / A
	NUMBER PER THRUST BEARING ACTIVE SIDE		
	NUMBER PER THRUST BEARING INACTIVE SIDE		
	TEMP. GAUGES (WITH THERMOWELLS) (9.1.3.6)		N / A
	PRESSURE GAUGE TYPE		
	Remarks		

SEAL SUPPORT SYSTEM MOUNTING		
SEAL SUPPORT SYSTEM MOUNTED ON PUMP BASEPLATE	(7.5.1.4)	YES
IDENTIFY LOCATION ON BASEPLATE		
SHALL BE INSTALLED ON MOUNTING PLATE		
INTERCONNECTING PIPING BY		Supplier

MECHANICAL SEAL (6.8.1)-NOTE 2		
SEE ATTACHED ISO 21049/API 682 DATA SHEET		NO
ADDITIONAL CENTRAL FLUSH PORT	(6.8.9)	N / A
HEATING JACKET REQ'D.	(6.8.11)	N / A

HEATING AND COOLING (6.1.17)-NOTE 11		Rev
COOLING REQ'D	YES	A02
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	
MANIFOLD PIPING FOR PURCHASER CONNECTION (7.5.1.6)	
VENT	YES
DRAIN	YES
COOLING WATER	N / A
TAG ALL ORIFICES (7.5.2.4)	YES
SOCKET WELD CONN ON SEAL GLAND (7.5.2.8)	NO

GOREH-JASK Crude Oil Pipeline and JASK Storage Tanks Construction Program

JASK Crude Oil Storage Tanks Project

Mechanical Data Sheet For Crude Oil Main Pumps

Project	Unit	Phase	Discipline	Doc. Type	Serial	Revision
325260	00	EB	ME	DS	0005	A02

Contract No: P47

Note	SURFACE PREPARATION AND PAINT	
	MANUFACTURER'S STANDARD	
	OTHER (SEE BELOW)	YES
	SPECIFICATION NO.	WILL BE ISSUED DURING ENGINEERING DESIGN
	PUMP:	
	PUMP SURFACE PREPARATION	LATER
	PRIMER	LATER
	FINISH COAT	LATER
	MOUNTING PLATE:	
	MOUNTING PLATE SURFACE PREPARATION	LATER
	PRIMER:	LATER
	FINISH COAT	LATER
	DETAILS OF LIFTING DEVICES	LATER
	SHIPMENT: (8.4.1)	
	EXPORT BOXING REQUIRED	YES
	OUTDOOR STORAGE MORE THAN 6 MONTHS	YES
	SPARE ROTOR ASSEMBLY PACKAGED FOR(IF REQUIRED)	
	ROTOR STORAGE ORIENTATION (9.2.8.2)	HORIZONTAL
	SHIPPING & STORAGE CONTAINER FOR VERT STORAGE (9.2.8.3)	
	N2 PURGE (9.2.8.4)	NO
	SPARE PARTS (NOTE 3)	
	START-UP	YES
	NORMAL MAINTENANCE	YES

WEIGHTS kg

ITEM No	PUMP	DRIVER	GEAR	MOUNTING PLATE	TOTAL
VTS	VTS	VTS	NOT APPLICABLE	VTS	#VALUE!

OTHER PURCHASER REQUIREMENTS

COORDINATION MEETING REQUIRED (10.1.3)	YES
MAXIMUM DISCHARGE PRESSURE TO INCLUDE	
MAX RELATIVE DENSITY	YES
OPERATION TO TRIP SPEED	YES
MAX DIA. IMPELLERS AND/OR NO OF STAGES	YES
TORSIONAL ANALYSIS / REPORT (6.9.2.10)	YES
PROGRESS REPORTS	YES
OUTLINE OF PROC FOR OPTIONAL TESTS (10.2.5)	YES
ADDITIONNAL DATA REQUIRING 20 YEARS RETENTION (8.2.1.1)	
	YES
LATERAL ANALYSIS REQUIRED (9.1.3.4) (9.2.4.1.3)	YES
MODAL ANALYSIS REQUIRED (9.3.9.2)	YES
DYNAMIC BALANCE ROTOR (6.9.4.4)	YES
INSTALLATION LIST IN PROPOSAL (10.2.3.l)	YES
VFD STEADY STATE DAMPED RESPONSE ANALYSIS (6.9.2.3)	
	NO
TRANSIENT TORSIONAL RESPONSE (6.9.2.4)	YES
BEARING LIFE CALCULATIONS REQUIRED (6.10.1.6)	YES
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)	NO
CONNECTION BOLTING (7.5.1.7)	SS
CADMIUM PLATED BOLTS PROHIBITED	YES
VENDOR TO KEEP REPAIR AND HT RCDS (8.2.1.1.c)	YES
VENDOR SUBMIT TEST PROCEDURES (8.3.1.1)	YES
SUBMIT INSPECTION CHECK LIST (8.1.5)	YES

TEST(NOTE 4)			Rev
SHOP INSPECTION (8.1.1)		Yes	
PERFORMANCE CURVE & DATA APPROVAL PRIOR TO SHIPMENT.		YES	
TEST WITH SUBSTITUTE SEAL (8.3.3.2.b)		NO	
MATERIAL CERTIFICATION REQUIRED (6.12.1.8)	CASING	YES	
	IMPELLER	YES	
	SHAFT	YES	
	OTHER	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	YES	
	LIQUID PENETRANT	YES	
	ULTRASONIC	YES	
INSPECTION REQUIRED FOR CASTINGS	MAG PARTICLE	YES	
	RADIOGRAPHY	YES	
	LIQUID PENETRANT	YES	
	ULTRASONIC	YES	
HARDNESS TEST REQUIRED (8.2.2.7)		YES	
ADDNL SUBSURFACE EXAMINATION (6.12.1.5) (8.2.1.3)		YES	
	FOR	LATER	
	METHOD	AS PER DETAIL ENGINEERING DESIGN SPECIFICATION	
PMI TESTING REQUIRED (8.2.2.8)		YES	
COMPONENTS TO BE TESTED			
RESIDUAL UNBALANCE TEST (J.4.1.2)		YES	
NOTIFICATION OF SUCCESSFUL SHOP PERFORMANCE TEST (8.1.1.c) (8.3.3.5)		YES	
BASEPLATE TEST (7.3.21)		NO	
HYDROSTATIC		WIT	
HYDROSTATIC TEST OF BOWLS & COLUMN (9.3.13.2)			
PERFORMANCE TEST		WIT	
TEST IN COMPLIANCE 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 (8.3.4.3.1) (8.3.4.3.4)		WIT	
NPSH-1ST STG ONLY (8.3.4.3.2)		WIT	
NPSH TESTING TO HI 1.6 OR ISO 9906 (8.3.4.3.3)		WIT	
TEST NPSHA LIMITED TO 110% SITE NPSHA (8.3.3.6)		YES	
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)		WIT	
SOUND LEVEL TEST (8.3.4.5)		WIT	
CLEANLINESS PRIOR TO FINAL ASSEMBLY (8.2.2.6)		WIT	
LOCATION OF CLEANLINESS INSPECTION		@ SUB-SUPPLIER'S	
NOZZLE LOAD TEST		WIT	
CHECK FOR CO-PLANAR MOUNTING PAD SURFACES		WIT	
MECHANICAL RUN TEST UNTIL OIL TEMP STABLE		WIT	
4 HR. MECH RUN AFTER OIL TEMP STABLE (8.3.4.2.1)		WIT	
4 HR. MECH RUN TEST (8.3.4.2.2)			
BRG HSG RESONANCE TEST (8.3.4.7)		NON-WIT	
STRUCTURAL RESONANCE TEST (9.3.9.2)		NON-WIT	
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	WIT	
REMOVE CASING AFTER TEST		WIT	

VERTICAL PUMP SUPPLEMENTAL DATA SHEET

VERTICAL TYPE (FIG 1.1) **VS6**

REMARKS

VERTICAL PUMPS-NOTE 1

	(+) UP	(-) DOWN
PUMP THRUST:		
STATIC THRUST	N	N
AT MIN FLOW	N	N
AT RATED FLOW	N	N
AT MAX FLOW	N	N
MAX THRUST	N	N
SOLEPLATE REQUIRED		
SOLEPLATE Length x Width	m X	m
SOLEPLATE THICKNESS		mm
MOUNTING FLANGE REQUIRED		
COLUMN PIPE:		
DIAMETER		mm
LENGTH		m
NUMBER		
SPACING		m
GUIDE BUSHINGS:		
NUMBER		
LINE SHAFT BEARING SPACING		mm
GUIDE BUSHING LUBE:		

VERTICAL PUMPS (CONT'D)-NOTE 1

LINE SHAFT:		
LINE SHAFT DIAMETER		mm
TUBE DIAMETER		mm
LINE SHAFT COUPLING:		
LINESHAFT CONNECTION		
• SUCTION STRAINER TYPE		
• LEVEL CONTROL		
IMPELLER COLLETS ACCEPTABLE		
HARDENED SLEEVES UNDER BEARINGS (9.3.10.5)		
RESONANCE TEST		
STRUCTURAL ANALYSIS (9.3.5)		
DRIVER ALIGNMENT SCREWS		
SUCTION CAN		
SUCTION CAN THICKNESS		mm
LENGTH		m
DIAMETER		mm
SEPARTATE MOUNTING PLATE (9.3.8.3.1)		
PROVIDE SEPARATE SOLEPLATE (9.3.8.3.3)		
DRAIN PIPED TO SURFACE (9.3.13.5)		
BOWL HEAD CALCULATION REQUIRED		

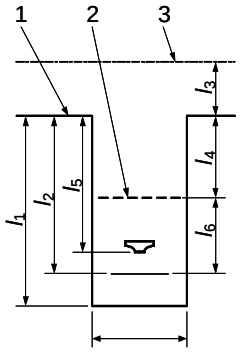
MATERIALS (additional)-NOTE 1

SUCTION CAN / BARREL:		LINESHAFT SLEEVES :		
DISCHARGE HEAD : •		BEARING RETAINER :		
BOWL SHAFT :		SHAFT ENCLOSING TUBE :		
LINESHAFT :		DISCHARGE COLUMN :		
LINESHAFT HARDFACING :		**PRESSURE RATING:**	**MAWP**	**HYDRO**
BELLMOUTH :		HEAD		
BOWL BEARING :		COLUMN PIPE		
LINESHAFT BEARING :		BOWL		

SUMP ARRANGEMENT-NOTE 7

SUMP DIMENSIONS :

GRADE ELEVATION	1	LATER	m
LOW LIQUID LEVEL	2	NOT APPLICABLE	m
C.L. OF DISCHARGE	3	NOTE 1	m
SUMP DEPTH	l_1	9	m
PUMP LENGTH	l_2	8	m
GRADE TO DISCH.	l_3	1	m
GRADE TO LOW LIQUID LVL	l_4	NOT APPLICABLE	m
GRADE TO 1ST STG IMPL'R.	l_5	NOTE 1	m
SUBMERGENCE REQ'D	l_6	NOT APPLICABLE	m
SUMP DIAMETER	Φd	1	m



Φd

Note		Rev
	PRESSURE VESSEL DESIGN CODE REFERENCES	
	THESE REFERENCES MUST BE LISTED BY THE MANUFACTURER	
	CASTING FACTORS USED IN DESIGN (TABLE 3) — YES	
	SOURCE OF MATERIAL PROPERTIES — YES	
	WELDING AND REPAIRS	
	THESE REFERENCES MUST BE LISTED BY THE PURCHASER. (DEFAULT TO TABLE 10 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 — YES	
	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 :

NOTES

	Note		Rev
2		NOTE 1: VENDOR IS TO SPECIFY(VTS)	
3		NOTE 2: PLAN 13+53B IS RECOMMENDED. AIR-COOLED HEAT EXCHANGER SHALL APPLY IN PLAN 53B.	
5		NOTE 3: VENDOR SHALL FOLLOW AND SUPPLY TABLE 20 OF API 610, 11TH EDITION FOR START-UP AND NORMAL MAINTENANCE (TYPICALLY TWO YEARS). NORMAL MAINTENANCE PERIOD,WHICH IS ASSUMED TWO YEARS AT THIS STAGE, WILL BE FINALIZED DURING DETAIL ENGINEERING DESIGN.	
6		NOTE 4:VENDOR SHALL FOLLOW TEST AND INSPECTION PROCEDURE AND STEPS TO BE TAKEN AS PER THE APPROVED INSPECTION AND TEST PLAN. MEANWHILE BE STRICTLY ADVISED THAT NPSH TEST SHALL BE PERFORMED REGARDLESS OF NPSH MARGIN SUFFICIENCY.	
7		NOTE 5:HEAD RATIO THAT IS DEFINED AS SHUTOFF HEAD PER RATED HEAD FOR DESIGN & TEST CASES SHALL BE WITHIN 110 % TO 120 % .MAXIMUM DISCHARGE PRESSURE SHALL NOT EXCEED 17.64 BARG.	
8		NOTE 6:THIS DATA SHEET IS APPLICABLE TO P-6002A~L AND P-6003A~L, AS WELL.	
9		NOTE 7:SUMP DIMENSIONS IN DEPTH AND DIAMETER ARE PROVISIONAL AND ARE SUBJECT TO CHANGE DURING DETAIL ENGINEERING DESIGN.	
10		NOTE 8:FOR EACH PUMP STATION(FOR 12 SETS OF PUMPS), 6 SETS OF NITROGEN CHARGING KITS SHALL BE SUPPLIED BY VENDOR. EACH CHARGING KIT IS CONSISTING OF THE FOLLOWING ITEMS: 1. REGULATING VALVE(1 SET) 2. PRESSURE GUAGE(2 SETS) BEFORE AND AFTER REGULATING VALVE 3. QUICK COUPLING 4. PIPE AND TUBE SETS 5. TRANSPORTER EQUIPMENT 6. N2 CYLINDER	A02
11		NOTE 9: FOR EACH SET OF PUMP, ONE SET OF HANDPUMP FOR REFILLING PURPOSES SHALL BE SUPPLIED AND INSTALLED BY VENDOR. IN THIS CASE 36 SETS OF HANDPUMPS SHALL BE SUPPLIED BY VENDOR(12 SETS FOR EACH PUMP STATION).	A02
12		NOTE 10: NPSH MARGIN AT THE END CURVE OF THIS PUMP SHALL BE AT LEAST POSITIVE.	A02
13		NOTE 11: FOR ANY SORT OF COOLING PURPOSES, AIR COOLED SYSTEM SHALL APPLY.	A02
14		NOTE 12: NON-METAL PARTS(GASKET, RUBBER,...) SHALL BE ASBESTOS-FREE.	A02
15		NOTE 13: ELECTRICAL MOTOR SHALL BE OF EEXD IIC T4. INSULATION "CLASS F" AND TEMPERATURE RISE "CLASS B" SHALL BE CONSIDERED.	A02
16		NOTE 14: ANY SORT OF ELECTRONIC TRANSMITTERS SUCH AS PRESSURE TRANSMITTER SHALL BE OF EEXia IIC T4.	A02
17		NOTE 15: DURING THE OPERATION OF EACH PUMP, BEARING METAL/OIL TEMPERATURE AND VIBRATION MEASUREMENTS SHALL BE TAKEN AT LEAST TWO TIMES A DAY. HOWEVER, THE NECESSITY OF MACHINERY MONITORING SYSTEM SHALL BE RECONGIZED BY DETAIL ENGINEERING CONTRACTOR.	A02
18		NOTE 16: FOR EACH ELECTRICAL MOTOR, 6 Nos. OF RTD FOR WINDING TEMPERATURE SHALL BE CONSIDERED BY PUMP VENDOR.	A02