Mechanical Data Sheet for 60000 BPD Turbo Pump

Note			Rev
	APPLICABLE TO: **PROPOSAL**	APPLICABLE NTL/INTNTL STANDARD: **API 610, 11th edition 2010**	
	FOR **NATIONAL IRANIAN SOUTH OIL COMPANY (NISOC)**	UNIT	
	SITE **PRODUCTION INCREASE OF 27 RESERVOIRS -PAZANAN**	SERVICE	
1	NO. REQ **1** PUMP SIZE	TYPE **CENTRIFUGAL** No. STAGES	
	MANUFACTURER	MODEL SERIAL NO.	

LIQUID CHARACTERISTICS

	Units	Maximum	Minimum
2 LIQUID TYPE OR NAME :		**Oil+Water**	
VAPOR PRESSURE :	bar a	**1.1**	
RELATIVE DENSITY :		**0.828 at normal temp.**	
SPECIFIC HEAT :	kcal/(kg-K)		
VISCOSITY :	cP	**2.44 at normal temp.**	

Note Max & min values refer only to the property listed

SERVICE : **INTERMITTENT**

- IF INTERMITTENT NO. OF STARTS :
- PUMPS OPERATE IN:

CORROSION DUE TO : (6.12 **(Note 10)** **Yes**

EROSION DUE TO : (6.12.1.9) **No**

H2S CONCENTRATION (ppm) : (6.12.1.1 **200**

OPERATING CONDITIONS (6.1.2)

	Units	Maximum	Rated	Normal	Minimum
NPSHa Datum:			**Center Line of Impeller**		
PUMPING TEMPERATURE :	°C			**53**	
1 FLOW :	m³/h		**440**	**400**	
DISCHARGE PRESS. : (6.3.2)	bar a		**54.7**		
SUCTION PRESSURE :	bar a	**1.8**(Note11)		**1.345**(Note8)	
DIFFERENTIAL PRESSURE :	bar		**53.3**		
DIFFERENTIAL HEAD :	m		**657.0**		
$NPSH_A$:	m		***(Note 18)***		
HYDRAULIC POWER :	kw		**651.0**		

CHLORIDE CONCENTRATION (ppm) :

PARTICULATE SIZE (DIA IN MICRONS)

PARTICULATE CONCENTRATION (PPM)

HAZARDOUS AGENTS **YES**

FLAMMABLE **YES**

CONTAMINATION OF LIQUID HANDLED ALLOWED **NO**

AIR ENTRAINMENT ALLOWED **NO**

LEAKS ALLOWED **YES**

15 SITE AND UTILITY DATA

LOCATION:

OUTDOOR **UNHEATED**

MOUNTED AT : **GRADE**

9 **ELECTRIC AREA CLASSIFICATION:** 6.1.22 ZONE

GROUP TEMP CLASS

SITE DATA :

ELEVATION (MSL) : **23** m BAROMETER : **1** bar a

RANGE OF AMBIENT TEMPS: MIN / MAX **-2** / **52** °C

RELATIVE HUMIDITY: MIN / MAX **10** / **89** %

UNUSUAL CONDITIONS:

UTILITY CONDITIONS :

ELECTRICITY :	DRIVERS	HEATING	CONTROL	SHUTDOWN
VOLTAGE				
PHASE				
HERTZ				

COOLING WATER :

		INLET	RETURN	DESIGN
TEMP	°C		MAX	
PRESS.	barg		MIN	

SOURCE

COOLING WATER CHLORIDE CONCENTRATION: ppm

INSTRUMENT AIR : MAX barg MIN barg

STEAM

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

PERFORMANCE

5 PROPOSAL CURVE NO.	RPM		
As Tested Curve No.			
IMPELLER DIA RATED	MAX.	MIN.	mm
RATED POWER	kw	EFFICIENCY	(%)
1 RATED CURVE BEP FLOW (at rated impeller dia)			m3/h
MIN FLOW : THERMAL	m3/h	STABLE	m3/h
PREFERRED OPERATING REGION		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 :			m
CL PUMP TO U/S BASEPLATE			m
NPSH MARGIN AT RATED FLOW :			m
SPECIFIC SPEED (6.1.9)		METRIC	
SUCTION SPECIFIC SPEED LIMIT		METRIC **213**	
SUCTION SPECIFIC SPEED		METRIC	
MAX. ALLOW. SOUND PRESS. LEVEL REQD		**85 @ 1m**	(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)

Driver Type	**GAS TURBINE**
GEAR	**YES**
VARIABLE SPEED REQUIRED	
SOURCE OF VARIABLE SPEED	
OTHER	**(Note 1)**
MANUFACTURER	
NAMEPLATE POWER	kw
Nominal RPM	
RATED LOAD RPM	
FRAME OR MODEL	
ORIENTATION	**HORIZONTAL**
LUBE	
BEARING TYPE:	
RADIAL	**/**
THRUST	**/**
STARTING METHOD	**Closed-Valve (Unloaded) Start**
SEE DRIVER DATA SHEET	**(Note 14)**
INSULATION / TEMP. RISE	

CONSTRUCTION

API PUMP TYPE: BB3 [Based on API 610 definitions]

NOZZLE CONNECTIONS: (6.5.5)

	Size	Facing	Rating	Position
SUCTION				SIDE
DISCHARGE				SIDE

PRESSURE CASING AUX. CONNECTIONS: (6.4.3.2)

	No.	Size	Type	Facing	Rating	Posn.
BALANCE/LEAK OFF						
DRAIN	1					
VENT	1					
PRESSURE GAGE						
TEMP GAGE						
WARM-UP LINE						

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):
SPECIAL FITTINGS FOR TRANSITIONING (6.4.3.3): NO
CYLINDRICAL THREADS REQUIRED (6.4.3.8): NO
GUSSET SUPPORT REQUIRED:
MACHINED AND STUDDED CONNECTIONS (6.4.3.12): NO
VS 6 DRAIN: N/A
DRAIN TO SKID EDGE: Yes

MATERIAL (6.12.1.1)

APPENDIX H CLASS: D-1
MIN DESIGN METAL TEMP (6.12.4.1): -2 °C
REDUCED-HARDNESS MATERIALS REQ'D (6.12.1.12.):
Applicable Hardness Standard (6.12.1.12.3):
BARREL :
CASE : Duplex
DIFFUSERS:
IMPELLER : Duplex
IMPELLER WEAR RING : Hard-Faced Duplex
CASE WEAR RING : Hard-Faced Duplex
SHAFT: Duplex
Bowl (if VS-type):
Inspection Class: Level 2

BEARINGS AND LUBRICATION (6.10.1.1)

BEARING (TYPE / NUMBER): (6.11.4)
RADIAL /
THRUST /
REVIEW AND APPROVE THRUST BEARING SIZE : (9.2.5.2.4)

LUBRICATION : (6.10.2.2) (6.11.3) (9.6.1) RING OIL
PRESSURE LUBE SYSTEM TO ISO 10438- (9.2.6.5)
ISO 10438 DATA SHEETS ATTACHED
Pressurized Lube Oil System mtd on pump baseplate
Location of Pressurized Lube Oil System mounted on baseplate :

INTERCONNECTING PIPING PROVIDED BY: Supplier

OIL VISC. ISO GRADE VG
CONSTANT LEVEL OILER : REQUIRED

CASING MOUNTING: CENTERLINE
CASING TYPE: (6.3.10)
OH3 BACKPULLOUT LIFTING DEVICE REQD. (9.1.2.6)

CASE PRESSURE RATING:
MAWP : (6.3.6) bar g @ °C
HYDROTEST : 1.5*MAWP barg @ Amb. °C

HYDROTEST OH PUMP AS ASSEMBLY
SUCT'N PRESS. REGIONS DESIGNED FOR MAWP: YES
ROTATION: (VIEWED FROM COUPLING END)
- IMPELLERS INDIVIDUALLY SECURED :
- 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 G2.5: Yes
SHRINK FIT -LIMITED MOVEMENT IMPELLERS (9.2.2.3)

COUPLING:(7.2.3) (7.2.13.f)
MANUFACTURER
MODEL: Non-Sparking
RATING (POWER/100 RPM)
SPACER LENGTH mm
SERVICE FACTOR: min 1.5
RIGID: No
COUPLING WITH HYDRAULIC FIT (7.2.10)
COUPLING BALANCED TO ISO 1940-1 G2.5
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)
Window on Coupling Guard

BASEPLATE (Note 7)

API BASEPLATE NUMBER :
BASEPLATE CONSTRUCTION (7.3.14)
BASEPLATE DRAINAGE (7.3.1)
MOUNTING :
NON-GROUT CONSTRUCTION : (7.3.1
VERTICAL LEVELING SCREWS : REQUIRED

LONGITUDINAL DRIVER POSITIONING SCREWS : REQUIRED
SUPPLIED WITH : GROUT AND VENT HOLES: YES
DRAIN CONNECTION: YES
MOUNTING PADS SIZED FOR BASEPLATE LEVELING (7.3.5): YES
MOUNTING PADS TO BE MACHINED (7.3.6)
PROVIDE SPACER PLATE UNDER ALL EQUIPMENT FEET
OTHER

REMARKS :

Note	INSTRUMENTATION (Note 16)	
	SEE ATTACHED API-670 DATA SHEET	
	ACCELEROMETER (7.4.2.1)	
	Number of Accelerometers	
	Mounting Location of Accelerometers	
	PROVISION FOR MTG ONLY (6.10.2.10)	YES
	Number of Accelerometers	
	Mounting Location of Accelerometers	
	FLAT SURFACE REQUIRED (6.10.2.11)	
5	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	

SEAL SUPPORT SYSTEM MOUNTING	
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)	
SEE ATTACHED ISO 21049/API 682 DATA SHEET	
ADDITIONAL CENTRAL FLUSH PORT (6.8.9)	
HEATING JACKET REQ'D. (6.8.11)	NO
API FLUSHING PLAN	31+53B

HEATING AND COOLING (6.1.17)		
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	
MANIFOLD PIPING FOR PURCHASER CONNECTION (7.5.1.6)	
VENT	YES
DRAIN	Yes
COOLING WATER	Yes
TAG ALL ORIFICES (7.5.2.4)	
SOCKET WELD CONN ON SEAL GLAND (7.5.2.8)	

Rev

Note	SURFACE PREPARATION AND PAINT	
	MANUFACTURER'S STANDARD	
	OTHER (SEE BELOW)	Yes
	SPECIFICATION NO.	1560-00-GEN-PI-SPC-0001
	PUMP:	
	PUMP SURFACE PREPARATION	Supplier
	PRIMER	Supplier
	FINISH COAT	Supplier
	BASEPLATE:	
	BASEPLATE SURFACE PREPARATION	Supplier
	PRIMER:	Supplier
	FINISH COAT	Supplier
	DETAILS OF LIFTING DEVICES	
	SHIPMENT: (8.4.1)	
	EXPORT BOXING REQUIRED	YES
	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	Yes

WEIGHTS kg

ITEM No	PUMP	DRIVER	GEAR	BASE	TOTAL

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
CONNECTION DESIGN APPROVAL (9.2.1.4)	YES
TORSIONAL ANALYSIS / REPORT (6.9.2.10)	
PROGRESS REPORTS	Yes
OUTLINE OF PROC FOR OPTIONAL TESTS (10.2.5)	
ADDITIONNAL DATA REQUIRING 25 YEARS RETENTION	
LATERAL ANALYSIS REQUIRED (9.1.3.4) (9.2.4.1.3)	
MODAL ANALYSIS REQUIRED (9.3.9.2)	
DYNAMIC BALANCE ROTOR (6.9.4.4)	YES
INSTALLATION LIST IN PROPOSAL (10.2.3.l)	
VFD STEADY STATE DAMPED RESPONSE ANALYSIS	
TRANSIENT TORSIONAL RESPONSE (6.9.2.4)	
BEARING LIFE CALCULATIONS REQUIRED (6.10.1.6)	
IGNITION HAZARD ASSMT TO EN 13463-1 (7.2.13.e)	
CASING RETIREMENT THICKNESS DRAWING (10.3.2.3)	
FLANGES RQD IN PLACE OF SKT WELD UNIONS (7.5.2.8)	
INCLUDE PLOTTED VIBRATION SPECTRA (6.9.3.3)	YES
CONNECTION BOLTING (7.5.1.7)	SS
CADMIUM PLATED BOLTS PROHIBITED	
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 10)		
SHOP INSPECTION (8.1.1)		YES
PERFORMANCE CURVE		
& DATA APPROVAL PRIOR TO SHIPMENT.		Yes
TEST WITH SUBSTITUTE SEAL (8.3.3.2.b)		
MATERIAL CERTIFICATION REQUIRED	CASING	YES
(6.12.1.8)	IMPELLER	Yes
	SHAFT	Yes
	OTHER	
CASTING REPAIR WELD PROCEDURE APPR REQD		YES
(6.12.2.5) (6.12.3.1)		
INSPECTION REQUIRED FOR CONNECTION WELDS (6.12.3.4.d)		
(6.12.3.4.e)	MAG PARTICLE	
	RADIOGRAPHY	YES
	LIQUID PENETRANT	YES
	ULTRASONIC	
INSPECTION REQUIRED FOR CASTINGS		
	MAG PARTICLE	
	RADIOGRAPHY	YES
	LIQUID PENETRANT	YES
	ULTRASONIC	
HARDNESS TEST REQUIRED FOR WEAR PARTS		YES
ADDNL SUBSURFACE EXAMINATION (6.12.1.5) (8.2.1.3)		YES
FOR		Shaft
METHOD		Ultrasonic
PMI TESTING REQUIRED (8.2.2.8)		YES
COMPONENTS TO BE TESTED		impeller
RESIDUAL UNBALANCE TEST (J.4.1.2)		YES
NOTIFICATION OF SUCCESSFUL SHOP		
PERFORMANCE TEST (8.1.1.c) (8.3.3.5)		
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)		8.3.3.2
TEST DATA POINTS TO (8.3.3.3)		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)		
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)		NON-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)		WIT
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)		WIT
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		

Note | Rev

VERTICAL TYPE _____

REMARK _____

VERTICAL PUMPS

	(+) 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)

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 ____

RESONANCE TEST ____

STRUCTURAL ANALYSIS (9.3.5) ____

DRIVER ALIGNMENT SCREWS ____

SUCTION CAN

SUCTION CAN THICKNESS ____ mm

LENGTH ____ m

DIAMETER ____ mm

SEPARTATE MOUNTING PLATE ____

PROVIDE SEPARATE SOLEPLATE ____

DRAIN PIPED TO SURFACE ____

BOWL HEAD CALCULATION REQUIRED ____

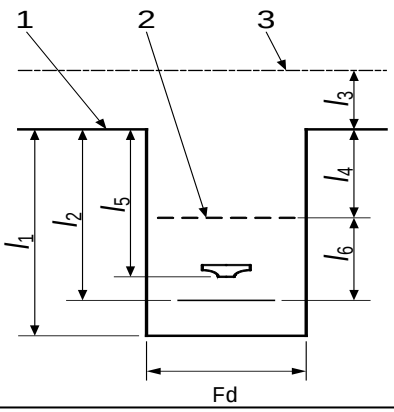
MATERIALS (additional)

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

SUMP DIMENSIONS :

GRADE ELEVATION	1 ____	m
LOW LIQUID LEVEL	2 ____	m
C.L. OF DISCHARGE	3 ____	m
SUMP DEPTH	l_1 ____	m
PUMP LENGTH	l_2 ____	m
GRADE TO DISCH.	l_3 ____	m
GRADE TO LOW LIQUID LVL	l_4 ____	m
GRADE TO 1ST STG IMPL'R.	l_5 ____	m
SUBMERGENCE REQ'D	l_6 ____	m
SUMP DIAMETER	F*d* ____	m



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 **Required**

WELDING PROCEDURE QUALIFICATION **Required**

NON-PRESSURE RETAINING STRUCTURAL WELDING SUCH AS BASEPLATES OR SUPI

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

No.	
1	One gas turbine driven pump in operation.
2	Liquid charecteristics are in normal temperature. Presence of dissolved gases in process fluid.
3	Suction Line Diameter/Rating:14"/#600 Discharge Line Diameter/ Rating: 12"/#600
4	Design condition (design pressure will be finalized in detail design): Pressure: 65 barg Temperature: -2°C / 52°C
5	Mechanical seal plan will be finalized in detail design stage.
6	Baseplate shall be common to complete line shaft including pump,gear and gas turbine.
7	This document is prepared based on document NO."1560-PZ-DU1-PR-DSH-0001" Rev.00.
8	Based on 5 psig as pump suction pressure (downstream of strainer); atmospheric pressure is 1010 mbar.
9	***Refer to hazardous area classification layout, all instrumentation and electrical devices shall be suitable for: Zone:2,Gas Group:IIA , Temperature Class:T3***
10	Casing corrosion allowance for carbon steel is 3mm.
11	Based on 10 meter as Storage Production Tank height to pump suction nozzle.
12	The Material shall be followed in accordance with Nace MR0175/ISO15156.
13	Fuel gas specification is as below :

Methane	0.83827	I-Pentane	0.0029	H2S	0.0006
Ethane	0.0527	N-Pentane	0.003	CO	0.018
Propane	0.027	N-Hexane	0.0027	H2O	0.0047
I-Butane	0.0043	C7+	0	N2	0.0378
N-Butane	0.0091	Pressure	22 barg	Temperature	46 ^{0}C

14	Refer to gas specification for gas turbine doc. No. "1560-00-GEN-MA-SPC-0009".Mechanical datashhet for gas turbine driver will be prepare in detail design stage.
15	For more detail refer to Basic Engineering Design Data (BEDD) doc. No. "1560-SM-PZ-PU#1-PR-DBA-0001"
16	MMS shall be considered for driver and driven equipment by vendor. Instrumentation shall be in accordance with API 670 and as minimum for pump, one TT per each bearing and two VT per each radial bearing shall be supplied by vendor. Type of instruments will be finalized at detail design stage.
17	***Pump type is preliminary and will be finalized in detail design***
18	***For NPSH-A refer to document NO."1560-PZ-DU1-PR-DSH-0001" final revision.***