DATA SHEET FOR TRUCK UNLOADING PUMPS (P-4003 A/B)

Page	00	01	02	03	04	05	06	07	Page	00	01	02	03	04	05	06	07
1	✓								41								
2	✓								42								
3	✓								43								
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5	✓								45								
6	✓								46								
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26									66								
27									67								
28									68								
29									69								
30									70								
31									71								
32									72								
33									73								
34									Appendix								
35									1								
36									2								
37									3								
38									4								

Document Revision

FOR : Iran National Copper Industry Co.

SITE: Bandar Abbas Sulfuric Acid Transport Terminal Project (EPC&O) SREVICE **Sulfuric Acid**

No. of Req'd: **2** Service: **2** / Stand by : PUMP TYPE= **VS4**

NOTES : INFORMATION BELOW TO BE COMPLETED: ○ BY PURCHASER ☐ BY MANUFACTURER ◯ BY MANUFACTURER OR PURCHASER

● DATA SHEETS

	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED
PUMP	**P-4003 A/B**	●		○		○
MOTOR	**MP-4003 A/B**	●		○		○

APPLICABLE OVERLAY STANDARD(S) : **API 610 - 10TH**

REVISIONS

NO.	DATE	BY

● OPERATING CONDITIONS

FLOW, NORMAL **60** (m^3/h) RATED **75** (m^3/h)

MNIMUM (m3/h)

SUCTION PRESSURE MAX / RATED **0** / (barg)

DISCHARGE PRESSURE **4** (barg)

DIFFERENTIAL PRESSURE **4.0 @ 50 m3/hr & 3.5 @ 75 m3/hr** (bar)

DIFF. HEAD **22** (m) NPSHA **4.5** (m)

PROCESS VARIATIONS

STARTING CONDITIONS **OPEN VALVE**

SERVICE: ○ CONT ● INTERMITTENT (STARTS/DAY)

○ PARALLEL OPERATION REQ'D

● SITE DATA (NOTE 5)

LOCATION: (5.1.30)

○ INDOOR ○ HEATED ● OUTDOOR ○ UNHEATED

● ELECTRICAL AREA CLASSIFICATION

ZONE GR TC **Safe**

○ WINTERIZATION REQ'D ○ TROPICALIZATION REQ'D

SITE DATA

● ALTITUDE **16.5** (m) BAROMETER **1** (bar)

● RANGE OF AMBIENT TEMPS:MIN. / MAX. **4** / **47.6** (^{O}C)

● RELATIVE HUMIDITY:MIN. / MAX. **27** / **95** (%)

UNUSUAL CONDITIONS: (5.1.30) ● DUST ○ FUMES

● OTHER

● DRIVER TYPE

● INDUCTION MOTOR ○ STEAM TURBINE ○ GEAR

○ OTHER

○ MOTOR DRIVER

◯ MANUFACTURER

☐ (kw) ☐ (r/min)

☐ FRAME ● ENCLOSURE **IP 55**

◯ HORIZONTAL ● VERTICAL ● SERVICE FACTOR **1**

● VOLTS / PHASE / HERTZ **400** / **3** / **50**

● TYPE **Induction, Squirrel Cage**

● MINIMUM STARTING VOLTAGE (6.1.5) **80%**

● INSULATION **F** ● TEMP. RISE **B**

◯ FULL LOAD AMPS

◯ LOCKED ROTOR AMPS

● STARTING METHOD **VFD**

◯ LUBE

BEARINGS (TYPE / NUMBER) :

☐ RADIAL /

☐ THRUST /

☐ VERTICAL THRUST CAPACITY

UP (N) DOWN (N)

● LIQUID

LIQUID TYPE OR NAME **Sulfuric Acid**

● HAZARDOUS ○ FLAMMABLE

	MIN. TEMP.	NORMAL. TEMP.	MAX. TEMP.
PUMPING TEMP (^{O}C)	**5**	**45**	
VAPOUR PRESS . (barA)	**0.01**	**0.01**	
RELATIVE DENSITY (SG):	**1.868**	**1.84**	
VISCOSITY (cp)	**38.87**	**12**	

SPECIFIC HEAT, C_P

◯ CHLORIDE CONCENTRATION

◯ H_2S CONCENTRATION WET

CORROSIVE / EROSIVE AGENT

MATERIALS NOTE 2

● MIN DESIGN METAL TEMP: -4 (^{O}C) MATERIAL CLASS:

■ CASE **CF-8M** CASE GASKET **TEFLON OR GRAPHITE**

■ IMPELLER **CF-8M**

■ SHAFT **Duplex**

■ BEARING **CAST IRON GT25**

☐ SHAFT SEAL **VTS**

☐ WEAR RING **CF-8M**

● PERFORMANCE

PROPOSAL CURVE NO. (r/min)

☐ IMPELLER DIA RATED MAX. MIN. (mm)

■ IMPELLER TYPE **Closed**

☐ RATED POWER (kw) EFFICIENCY (%)

☐ MINIMUM CONTINUOUS FLOW :

☐ THERMAL (m^3/h) STABLE (m^3/h)

☐ PREFERRED OPER. REGION TO (m^3/h)

☐ ALLOWABLE OPER. REGION TO (m^3/h)

☐ MAX. HEAD @ RATED IMPELLER (m)

☐ MAX. POWER @ RATED IMPELLER (kw)

☐ NPSHR AT RATED FLOW (m)

■ MAX SUCTION SPECIFIC SPEED : **220 (rpm, m3/s, m)**

■ MAX . SOUND PRESS LEVEL REQ'D **<85@1.0 m** (dba)

○ ● UTILITY CONDITIONS

ELECTRICITY	VOLTAGE	PHASE	HERTZ
DRIVERS	**400**	**3**	**50**
HEATING			

SYSTEM VOLTAGE DIP ● 80% ○ OTHER

STEAM	MAX. PRESS.	MAX. TEMP	MIN. PRESS.	MIN. TEMP
DRIVERS				
HEATING				

COOLING WATER: SOURCE

SUPPLY TEMP. (^{O}C) MAX. RETURN TEMP. (^{O}C)

NORM. PRESS. (bar) DESIGN PRESS. (bar)

MIN. RET. PRESS. (bar) MAX. ALLOW. D.P. (bar)

CHLORIDE CONCENTRATION : (mg/kg)

CONSTRUCTION

ROTATION : (VIEWED FROM COUPLING END) ☐ CW ☐ CCW

PUMP TYPE : (4.1)

◯ VS1 ◯ VS2 ◯ VS3 ● VS4 _____

CASING MOUNTING :

☐ SUMP COVER PLATE ☐ SEPARATE MOUNTI

☐ IN LINE ☐ SEPARATE SOLE PLATE

CASING TYPE :

☐ SINGLE VOLUTE ☐ MULTIPLE VOLUTE ☐ DIFFUSER

CASE PRESSURE RATING :

◯ OH6 PUMP SUCTION REGION DESIGNED FOR MAWP (5.3.6)

■ MAX. ALLOWABLE WORKING PRESSURE _____ (bar)

@ **40** (°C)

☐ HYDRO TEST PRESSURE **1.5 X MAWP** (bar)

☐ NOZZLE CONNECTIONS :

	SIZE	FLANGE RATING	FACG	POSITION
SUCTION				
DISCHARGE		**#150**	**RF**	**TOP**

PRESSURE CASING AUX. CONNECTIONS :

	NO.	SIZE (DN)	TYPE
● DRAIN			**VTS**
● VENT			**VTS**
◯ WARM-UP			

◯ MACHINED AND STUDDED CONNECTIONS :

◯ CYLINDRICAL THREADS REQUIRED

ROTOR :

● COMPONENT BALANCE TO ISO 1940 G 1.0 (5.9.4.4)

COUPLINGS :(6.2.2)

◯ MANUFACTURER _____ ● MODEL

☐ RATING (kw per100 r/min) _____

◯ SPACER LENGTH _____ (mm) ● SERVICE FACT. **MIN 1.5**

◯ COUPLING BALANCED TO ISO 1940-1 G 6.3

◯ COUPLING WITH PROPRIETARY CLAMPING DEVICE

◯ COUPLING PER ISO 14691

◯ COUPLING PER ISO 14691

◯ COUPLING PER API 671 ◯ ASME B151

● NON SPARK COUPLING GUARD (6.2.14C)

◯ COUPLING GUARD STANDARD PER _____

BASEPLATES:

☐ API BASEPLATE NUMBER _____

◯ NON-GROUT CONSTRUCTION (6.3.13)

● OTHER **Common baseplate for pump, driver and sealing system**

SEAL TYPE:

● SEAL MANUFACTURER _____

● SEAL/AUXILIARY PLAN **11/61 OR 14 /61**

REMARK: _____

SEAL PLAN SHALL BE FINALIZED BY VENDOR.

SURFACE PREPARATION AND PAINT

● MANUFACTURER'S STANDARD

SPECIFICATION NO. _____

PUMP :

● PRIMER _____

● FINISH COAT _____

BASEPLATE : _____

● PRIMER _____

● FINISH COAT _____

● DETAILS OF LIFTING DEVICES _____

SHIPMENT :

◯ DOMESTIC ● EXPORT ● EXPORT BOXING REQUIRED

● OUTDOOR STORAGE MORE THAN 6 MONTHS

REMARK:

HEATING AND COOLING

◯ HEATING JACKET REQ D.

◯ COOLING REQ D.

◯ COOLING WATER PIPING PLAN _____

C.W. PIPING:

◯ PIPE ◯ TUBING: FITTINGS _____

C.W. PIPING MATERIALS:

◯ S.STEEL ◯ C.STEEL ◯ GALVANIZED

COOLING WATER REQUIREMENTS :

☐ BEARING HOUSING _____

HEAT EXCHANGER _____

TOTAL COOLING WATER _____

HEAT MEDIUM : ◯ STEAM ◯ OTHER

HEATING PIPING : ◯ TUBING ◯ PIPE

BEARING AND LUBRICATION

BEARING (TYPE / NUMBER) :

☐ RADIA _____ /

☐ THRUS _____ /

LUBRICATION :

◯ GREASE ● OIL

◯ PURGE OIL MIST ◯ PURE OIL MIST

● CONSTANT LEVEL OILER PREFERENCE : _____

◯ OIL VISC. ISO GRADE

INSTRUMENTATION

◯ ACCELEROMETER _____

◯ PROVISION FOR MOUNTING ONLY

● FLAT SURFACE REQ D

◯ TEMP GAUGES

◯ PRESSURE GAUGE TYPE

REMARKS :

☐ MASSES

MASS OF PUMP (kg) _____

MASS OF BASEPLATE (kg) _____

MASS OF DRIVER (kg) _____

TOTAL MASS (kg)

SPARE PARTS (TABLE 18)

- (●) START-UP ( ) NORMAL MAINTENANCE
- (●) SPECIFY **2 YEARS OPERATION**

OTHER PURCHASER REQUIREMENTS

- (●) COORDINATION MEETING REQUIRED
- (●) MAXIMUM DISCHARGE PRESSURE TO INCLUDE
  - (●) MAX RELATIVE DENSITY
  - (●) MAX DIA. IMPELLERS AND / OR NO. OF STAGES
  - ( ) OPERATION TO TRIP SPEED
- ( ) CONNECTION DESIGN APPROVAL
- ( ) TORSIONAL ANALYSIS REQUIRED
- ( ) TORSIONAL ANALYSIS REPORT
- (●) PROGRESS REPORTS
- ( ) OUTLINE OF PROCEDURES FOR OPTIONAL TESTS
- ( ) ADDITIONAL DATA REQUIRING 20 YEARS RETENTION
- MANIFOLD PIPING TO SINGLE CONNECTION
  - (■) VENT (▣) VENT (▣) COOLING WATER
- (▣) MOUNT SEAL RESERVOIR OFF BASEPLATE
- (■) FLANGES REQ D IN PLACE OF SOCKET WELD UNIONS

VERTICAL PUMPS

- ( ) PUMP THRUST : (+)UP (-)DOWN
  - AT MIN. FLOW _____ (N) _____ (N)
  - AT RATED FLOW _____ (N) _____ (N)
  - MAX THRUST _____ (N) _____ (N)
- (▣) SOLE PLATE REQ D. _____ (m) X _____ (m)
- ( ) SEPARATE MOUNTING PLATE REQUIRED
- ( ) SOLE PLATE THICKNESS _____ (mm)

COLUMN PIPE : (■) FLANGED ( ) THREADED

- ( ) DIAMETER _____ (mm) LENGTH _____ (m)

GUIDE BUSHINGS ( ) ( )

- ( ) NUMBER _____
- ( ) LINE SHAFT BEARING SPACING _____ (mm)

GUIDE BUSHINGS LUBE :

- ( ) WATER ( ) OIL
- ( ) GREASE ( ) PUMPAGE

LINESHAFT : (■) OPEN (▣) ENCLOSED

- ( ) LINE SHAFT DIAMETER : _____ (mm)
- ( ) TUBE DIAMETER : _____ (mm)

LINESHAFT COUPLING :

- ( ) LINE SHAFT DIAMETER : ( ) SLEEVE & KEY ( ) THREADED
- ( ) SUCTION CAN THICKNESS _____ (mm)
  - ( ) LENGTH _____ (m)
  - ( ) DIAMETER _____ (m)
- ( ) SUCTION STRAINER TYPE _____
- ( ) FLOAT & ROD ( ) FLOAT SWITCH

VERTICAL PUMPS (CONT.)

- ( ) PUMP AND STRUCTURE DYNAMIC ANALYSIS
- ( ) DRAIN PIPED TO SURFACE

QA INSPECTION AND TESTING

- (●) SHOP INSPECTION (●) PERF. CURVE APPROVAL
- (▣) TEST WITH SUBSTITUTE SEAL

TEST	NON-WIT	WIT	OBSERVE
(●) HYDROSTATIC TEST OF BOWLS AND COLUMN	( )	(●)	( )
(●) HYDROSTATIC	( )	(●)	( )
(●) PERFORMANCE	( )	(●)	( )
( ) RETEST ON SEAL LKGE	( )	( )	( )
( ) NPSH	( )	( )	( )
( ) COMPLETE UNIT TEST	( )	( )	( )
( ) SOUND LEVEL TEST	( )	( )	( )
( ) CLEANLINESS PRIOR TO FINAL ASSEMBLY	( )	( )	( )
( ) MECHANICAL RUN UNTIL OIL TEMP STABLE	( )	( )	( )
( ) 4 HR. MECH. RUN TEST	( )	(●)	( )
( ) TRUE PEAK VELOCITY DATA	( )	( )	( )
( ) RESONANCE TEST	( )	( )	( )
( ) AUXILIARY EQUIPMENT TEST (7.3.4.5)	( )	( )	( )
(▣) IMPACT TESTING	( )	( )	( )

- ( ) PER EN 13445
- ( ) PER ASME VIII

- (●) VENDOR KEEP REPAIR AND HT RECORDS
- (●) VENDOR SUBMIT TEST PROCEDURES
- (●) VENDOR SUBMIT TEST DATA WITHIN 24 HOURS
- ( ) INCLUDE PLOTTED VIBRATION SPECTRA
- (●) RECORD FINAL ASSEMBLY RUNNING CLEARANCES
- (●) COMPLETION OF INSPECTION CHECK LIST
- (●) MATERIAL CERTIFICATION REQUIRED
  - (●) CASING (●) IMPELLER (●) SHAFT
  - (●) OTHER **WEAR RING**
- (●) CASTING REPAIR PROCEDURE APPROVAL REQ D
- (▣) INSPECTION REQUIRED FOR CONNECTION WELDS
  - (■) MAG PARTICLE (■) LIQUID PENETRANT
  - (▣) RADIOGRAPHIC (▣) ULTRASONIC
- (▣) INSPECTION REQUIRED FOR CASTINGS
  - (■) MAG PARTICLE (■) LIQUID PENETRANT
  - (▣) RADIOGRAPHIC (▣) ULTRASONIC
- ( ) HARDNESS TEST REQUIRED

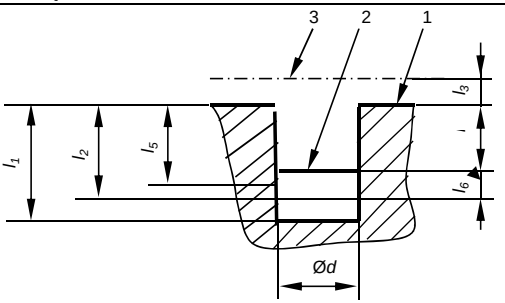
KEY

1	GRADE
2	LOW LIQUID LEVEL
3	CENTERLINE OF DISCHARGE
l_1	SUMP DEPTH
l_2	PUMP LENGTH
l_3	CENTERLINE DISCHARGE HEIGHT
l_4	HEIGHT OF GRADE ABOVE LOW LIQUID LEVEL
l_5	DATUM ELEVATION ,FIRST-STAGE IMPELLER
l_6	SUBMERGENCE REQUIRED
Ød	SUMP DIAMETER

REFER TO HYDRAULIC INSTITUTE STANDARDS FOR DEFINITIONS

- (●) l_1 _____ (m)
- (●) Ød _____ (m)
- (●) l_4 _____ (m)
- ( ) l_2 _____ (m)
- ( ) l_6 _____ (m)
- ( ) l_3 _____ (m)
- ( ) l_5 (m)

SUMP ARRANGEMENT



Rev

	REMARKS	
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1	**1) VTS: Vendor to Advise**	
2	**2) Material to be confirmed by Vendor.**	
3	**3) Electrical motor thermal protection shall be provided by vendor.**	
4	**4) Electric Motor shall be supplied according to low voltage induction motors DOC.NO: 71I1-BD-40-EL-SP-0012.**	
5	**5) Refer to site condition: 71I1-BD-40-PR-RR-0003.**	
6	**6) Special Tools Shall Be Supplied by Vendor (if required)**	
7	**7) Vendor Shall Consider and Supply All Necessary Instruments for Safe Operation and Start-up.**	
8	**8) Mechanical Seal Data Sheet Shall Fill In by Vendor as per API 682**	
9	**9) Allowable Loads on Flanges Shall be at Least TWO TIMES of API 610.**	
10	**10) Purchaser/Company Shall Have the Right to Dismantle the Pumps After Mechanical Running Test, If the Test Do**	
11	**Not Meet API 610 Requirements.**	
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