TITLE: DATA SHEET FOR REFRIGERATED WATER PUMP(P-021)



## DATA SHEET FOR REFRIGERATED WATER PUMP (P-021)

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TITLE: DA	ATA SH	IEET FO	OR REF	RIGER	ATED V	VATER		-021)						-			تروشیمی ن پتروشیمی	ملی صنایع پ هش و فناور;	شرکت شرکت پژو	
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PROJECT:	PP- PE	PILOT	PLANT

4
No.
شركت ملى صنايع پتروشي
وكتريفيه فليباد

ITLE: DATA UMP(P-021)	SHEET FOR R	REFRIGER	ATED WATER	شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی										
			CENTRIFUG	AL PUMI	P DATA S	SHEET, SI U	NIT							
APPLICABLE T FOR SITE	•	NPC R&	PURCHASE	AS BUILT UNIT SERVICES (000) SREVICE REFRIGERATED WATER PUMP(P-021)										
No. of Req'd:	1 Service	: 1 / Stand by	y											
NOTES : INFO	RMATION BELOW TO	BE COMPLETE	ED O BY PURC	HASER	BY MANUFACTURER D BY MANUFACTURER OR PURCHAS									
		- <u> </u>	DATA SHEETS					REV	ISIONS					
	ITEM NO.	ATTACHED	ITEM NO.		CHED	ITEM NO.		IO. DATE	BY					
PUMP	P-021						-	1						
MOTOR	PM-021				-		Ň	2						
GEAR		0					0	3						
	OVERLAY STANDARD							4 5						
AFFLICABLE														
FLOW, NORM				(m <sup>3</sup> /h)		PE OR NAME		ER + 20% GLYC	OLE					
OTHER		(Note			HAZAR		FLAMMABLE		(5.1.5)					
	SSURE MAX / RATED			(bara)	•		MIN.	NORMAL	MAX.					
DISCHARGE P	RESSURE		4.6		PUMPING T	EMP ( <sup>o</sup> C)	0	2	10					
DIFFERENTIAL	PRESSURE		2.1	(bar)	VAPOUR PI	RESS . (bara)	0.006	0.007	0.012					
DIFF. HEAD	20	(m) NPSHA	>10 (Note 9)	(m)	RELATIVE [	DENSITY (SG):	1.04	1.05	1.05					
PROCESS VAR	RIATIONS (5.1.4)	AAAAAI AA			VISCOSITY	(cP)	2.5	2.36	1.9					
STARTING CO	NDITIONS (5.1.4)	CLOS	SED DELIVERY VALV	E	SPECIFIC H	IEAT, C <sub>P</sub>		3.82	(kj/kg .k.)					
SERVICE:	CONT O IN	TERMITTENT (S	STARTS/DAY)		CHLOR	IDE CONCENTRA	ATION (6.5.2.4)	N/A	(mg/kg)					
-	L OPERATION REQ'D				H <sub>2</sub> S CO	NCENTRATION	N/A (molfr	action) \	WET (5.12.1.12c)					
	Si Si	<mark>TE DATA (5.1</mark>	.3)			E / EROSIVE AGE			(5.12.1.9)					
LOCATION: (5.		-	•											
-	O HEATED	÷	-					S-5 (Note 5	0					
-	CAL AREA CLASSIFIC				O MIN DESIGN METAL TEMP (5.12.4.1)									
-			· · · · · · · · · · · · · · · · · · ·		REDUCED HARDNESS MATERIALS REQ D. (5.12.1.12)     BARREL/CASE C.S IMPELLER C.S									
•	ZATION REQ D.	OTROPIC	ALIZATION REQ D.		-	LAURINE AND			6.3					
SITE DATA (5.	1.30) E <b>1889</b> (mi	) BAROME	ETER <b>810</b>	(mbar)	SHAFT	IMPELLER WEAF		C.S SI 4140						
<b>—</b>	F AMBIENT TEMPS:M			(mbar) (°C)				51 4 1 4 0						
-	E HUMIDITY:MIN / MAX		/ 86	(%)			PERFORM							
	NDITIONS: (5.1.30)		DUST FUMES		PROPOSAL	. CURVE NO.			(r/min)					
	(,	-	•			ER DIA RATED	MAX.	MIN	(mm)					
-					IMPELLER TYPE     CLOSE									
		DRIVER TYPE	E		RATED POWER VTA (kw) EFFICIENCY (%)									
	ON MOTOR	) STEAM TURI	BINE 🔿 GEAR			JM CONTINUOUS	FLOW :							
O OTHER		(Note	1)		THERMAL (m³/h) STABLE (m³/h)									
_					PREFERRED OPER. REGION TO (m <sup>3</sup> /h)									
	MOTOR	DRIVER (6.1.	.1 / 6.1.4)		ALLOWABLE OPER. REGION TO (m <sup>3</sup> /h)									
	CTURER				MAX. HEAD @ RATED IMPELLER									
•	VTA (kv	N)		(r/min)										
FRAME		ENCLOS			NPSHR AT RATED FLOW     (m) (5.1.10     MAX SUCTION SPECIFIC SPEED: 13000 M3/Hr M PDM //5.1.11									
HORIZON			SERVICE FACTOR	-	MAX SUCTION SPECIFIC SPEED : 13000 M3/Hr,M,RPM (5.1.11)									
-	HASE / HERTZ	400 /	3 / 50	0	MAX . SOUND PRESS LEVEL REQ. D 85 (dba) (5.1.16									
TYPE	OT 4 DT 1 1 0 1 (	ASYNCHR	ONOUS			X. SOUND PRES			(dba) (5.1.16)					
	STARTING VOLTAGE				EST MA	X. SOUND POWI			(dba) (5.1.16)					
							1	S (5.1.3) (NOTE 1						
		******			ELECTRICI		OLTAGE	PHASE	HERTZ					
			DOL		DRIVER		400	3	50					
	3 WEIHOD		D.O.L		HEATIN	IG M VOLTAGE DIP	080%	OTHER	(6 4 5)					
						-			(6.1.5)					
BEARINGS (TY	(PE / NUMBER) :	/			STEAM DRIVERS	MAX. PRESS.	MAX. TEMP	MIN. PRESS	6. MIN. TEMP					
		/			HEATING									
	L THRUST CAPACITY	,				VATER: (5 1 19)	SOURCE	1	L					
	(N)	DOWN		(N)										
-					NORM. PRESS. (bar) DESIGN PRESS. (bar)									
					MIN. RET. PRESS. (bar) MAX. ALLOW. D.P. (bar)									
						CONCENTRATIC			(mg/kg)					
		<u> </u>												
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TITLE: DATA SHEET FOR REFRIGERATED WATER PUMP(P-021)

				CE	NTRIFUGAL	PUM	IP DATA SHEET, SI UNIT
1			CONSTRU	JCTION			SURFACE PREPARATION AND PAINT Re
	ROTATION : (VIE)			ID)	]cw 🗌 c	CW	O MANUFACTURER'S STANDARD OTHER SEE BELOW
3	PUMP TYPE : (4.	-					SPECIFICATION NO. 900-SPC-A4-PD-0002
4	CASING MOUNTI		ОН6				PUMP :
5 6				OTHER			FINISH COAT
7	CENTERLINE						BASEPLATE : (6.3.1.7)
. 8	CASING TYPE :						PRIMER
9	SINGLE VOL	ИТЕ 🗌 МІ	JLTIPLE VOLUT		DIFFUSER		FINISH COAT
10	CASE PRESSURE			_	_		DETAILS OF LIFTING DEVICES (6.3.20)
11	O OH6 PUMP S	SUCTION RE	GION DESIGN	ED FOR MAWP (	5.3.6)		SHIPMENT : (7.4.1)
12	MAX. ALLOW	ABLE WOR	KING PRESSU	RE		(bar)	
13		100	( <sup>O</sup> C)				OUTDOOR STORAGE MORE THAN 6 MONTHS
14	HYDRO TES			1.5 x MA	WP	(bar)	) SPARE ROTOR ASSEMBLY PACKAGED FOR :
15	NOZZLE CO		5 : (5.4.2) FLANGE	(Note 7)		_	
16		SIZE	RATING	FACG	POSITION		
17 18	SUCTION	2"	150#	RF		_	HEATING JACKET REQ D. (5.8.9)
	DISCHARGE	_ 1 1/2"	150#	RF			$\square$ COOLING REQ D.
20		=			<u> </u>		COOLING WATER PIPING PLAN (6.5.3.1)
21	PRESSURE	CASING AU	X. CONNECTIO	NS : (5.4.3)			C.W. PIPING:
22			NO.	SIZE (DN)	TYPE		
23	DRAIN			1/2"	VALVED		C.W. PIPING MATERIALS:
24	VENT			1/2"	VALVED		S.STEEL C.STEEL GALVANIZED
25	WARM-UP						COOLING WATER REQUIREMENTS :
26		_					BEARING HOUSING (m <sup>3</sup> /h)
27							HEAT EXCHANGER (m <sup>3</sup> /h)
28		LIHREADS	REQUIRED (5.	4.3.3)			TOTAL COOLING WATER (m <sup>3</sup> /h)
29 30	ROTOR : COMPONEN		TO ISO 1040 C	10(5044)			HEAT MEDIUM : O STEAM O OTHER
	COUPLINGS :(6.2		10 130 1940 6	11.0 (3.9.4.4)			BEARING AND LUBRICATION
32	MANUFACTU		VTA	MODEL S	PACER (Type	тѕк)	BEARING (TYPE / NUMBER ) (5.10.1) :
33	RATING (kw j		)	· • · · · · · · · · · · · · · · · · · ·		· · · · ·	RADIAL /
34	SPACER LEN	NGTH	<b>/TA</b> (mm)		CE FACT.		THRUST /
35		BALANCED	FO ISO 1940-1 (	3 6.3 (6.2.3)			LUBRICATION (5.11.3,5.11.4) :
36				PING DEVICE (6	.2.1.1)		
37							
38					2464		CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) :
39	i i i i i i i i i i i i i i i i i i i				8151		
40 41				+C)	(F	6.2.14a)	
	BASEPLATES:						O PROVISION FOR MOUNTING ONLY (5.10.2.11)
43	API BASEPLA	ATE NUMBE	R		(ANNEX D)	1	FLAT SURFACE REQ D (5.10.2.12)
44	O NON-GROUT	CONSTRU	CTION (6.3.13)				TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6)
45							O PRESSURE GAUGE TYPE
	MECHANICAL SE	AL : (5.8.1)	(Note 4	-			
	CATEGORY			2			
		NT		1			REMARKS :
49				A 11			MASSES
50 51	PLAN			11		******	MASS OF PUMP (kg)
52							MASS OF POWE (kg)
53							MASS OF DRIVER (kg)
54							TOTAL MASS (kg)
55							
56							
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TITLE: DATA SHEET FOR REFRIGERATED WATER PUMP(P-021)

		L PUMP I	DATA SHEET, SI UNIT				
1 SPARE PAR	TS (TABLE 18)		QA INSPECTION AN	ID TESTIN	<mark>g (Cont</mark> .)		Re
2 START-UP O NORMAL M	AINTENANCE		TEST	NON-WIT	WIT	OBSERVE	
3 OTHERS 2 YEARS OF OPERA			HYDROSTATIC (7.3.2)	Õ	•	Q	
	ER REQUIREMENTS		PERFORMANCE (7.3.3)	Õ		Õ	
5 COORDINATION MEETING REQUIRE			O RETEST ON SEAL	0	0	0	
6 MAXIMUM DISCHARGE PRESSURE T	O INCLUDE (5.3.2)		LEAKAGE (7.3.3.2D)	~	•	0	
7 O MAX RELATIVE DENSITY			• NPSH (7.3.4.2)	õ		Õ	
8 O MAX DIA. IMPELLERS AND / OR N	O OF STAGES		O TRUE PEAK VELOCITY	0	0	0	
9 OPERATION TO TRIP SPEED			DATA (7.3.3.4D)	~	~	-	
0 OH3 BEARING HS6 LIFTER (8.1.2.6)			COMPLETE UNIT TEST (7.3.4.3)	Õ	Õ	Q	
11 O CONNECTION DESIGN APPROVAL (5			SOUND LEVEL TEST (7.3.4.4)	Q	•	0	
12 TORSIONAL ANALYSIS REQUIRED (			CLEANLINESS PRIOR TO	•	0	0	
13 O TORSIONAL ANALYSIS REPORT (5.9	9.2.6)		FINAL ASSEMBLY (7.2.2.2)	-	-	-	
PROGRESS REPORTS (9.3.3)			O NOZZLE LOAD TEST (6.3.6)	Q	Q	Õ	
15 OUTLINE OF PROCEDURES FOR OP			CHECK FOR CO-PLANNER	0	0	0	
16 C ADDITIONAL DATA REQUIRING 20 YE			MOUNTING PAD SURFACE (6.3.3)	_	-	-	
PIPING AND A	PPURTENANCES		O MECHANICAL RUN UNIT OIL	0	$\circ$	0	
	TON (6.5.1.6)		TEMP P. STABLE (7.3.4.7.1)				
19 VENT DRAIN	COOLING WATER		○ 4 HR. MECHANICAL RUN AFTER	0	$\circ$	0	
20 MOUNT SEAL RESERVOIR OFF BASE	EPLATE (6.5.1.4)		OIL TEMP STABLE (7.3.4.7.3)				
21 🔲 FLANGES REQ D IN PLACE OF SOCH	KED WELD UNIONS (6.5.2.8)		• 4 HR. MECH. RUN TEST (7.3.4.7.2)	0	$\bullet$	0	
22 🔲 INSTALLATION LIST IN PROPOSAL (9	).2.3L)		O BRG HSG RESONANCE	0	$\circ$	0	
23 CONNECTION BOLTING			TEST (7.3.4.6)				
24 OPTFE COATING OASTM /	A153 GALVANIZED		O AUXILIARY EQUIPMENT	0	0	$\circ$	
25 Opainted SS			TEST (7.3.4.5)				
26 QA INSPECTIO	ON AND TESTING		IMPACT TESTING (5.12.4.3)	0	0	0	
27 SHOP INSPECTION (7.1.4)	(Note 6)		O PER EN 13445				
28 O PERFORMANCE CURVE APPROVAL			O PER ASME V III				
29 TEST WITH SUBSTITUTE SEAL (7.3.3	.2B)		0	0	0	0	
80 🔵 MATERIAL CERTIFICATION REQUIRE	D (5.12.1.8)		O VENDOR KEEP REPAIR AND HT RE	CORDS (7.2	1.1C)		
31 CASING IMPELLER	SHAFT		VENDOR SUBMIT TEST PROCEDUR	RES (7.3.1.2)	9.2.5)		
OTHER SHAFT SLEEVES, INTER	NAL WEARING RINGS, MECH.	SEAL PARTS	O VENDOR SUBMIT TEST DATA WITH	IN 24 HOURS	S (7.3.3.3E)		
33 O CASTING REPAIR PROCEDURE APPI	ROVAL REQ D (5.12.2.5)		O INCLUDE PLOTTED VIBRATION SPI	ECTRA (A			
14 INSPECTION REQUIRED FOR CONN	ECTION WELDS (5.12.3.4e)		SUBMIT INSPECTION CHECK LIST	(7.1.6)			
MAG PARTICLE	QUID PENETRANT						
	TRA SONIC						
17 INSPECTION REQUIRED FOR CASIN	GS (7.2.1.3 / 5.1.2.1.5)						
	QUID PENETRANT						
	TRA SONIC						
40 O HARDNESS TEST REQUIRED :		(7.2.2.3)					
	TION FOR 7.21.3						
12 FOR							
43 METHOD							
15		REMARKS	S				
16							
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PROJECT: PP- PE PILOT PLANT		****** *****
TITLE: DATA SHEET FOR REFRIGERATED WATER PUMP(P-021)	یمی وشیمی	شرکت ملی صنایع پتروش شرکت پژوهش و فناوری پتر
Note 1: ALL ELECTRICAL MOTORS SHALL BE IN ACCORDANCE WITH "TECHNICAL SPECIFIC	L ATION FOR LV MOTOR" DOC.No.	
900-SPC-A4-EE-0005 MOTOR ENCLOSURES SHALL BE OF TOTALLY ENCLOSED FAM	I-COOLED (TEFC)	
Note 2: TYPE OF PROTECTION SHALL BE Aexd		
Note 3: DRY, FLEXIBLE , MULTI DISK ,S.S MEMBRANE SPACER TYPE COUPLING SHALL BE U DRIVER HALF COUPLING SHALL BE MOUNTED BY PUMP MFR.	JSED.	
Note 4: MECHANICAL SEAL SHALL BE AS PER API 682 / ISO 21049 3rd EDITION :2004. VE FOR MECHANICAL SEALS.	NDOR SHALL FILL OUT API 682 (3rd ED.) DATA SHEE	г
Note 5: VENDOR IS REQUIRED TO REVIEW AND CONFIRM.		
Note 6: REFERE TO "INSPECTION & TEST PLAN FOR CENTRIFUGAL PROCESS PUMPS" DOC	.No.: 900-ITP-A4-RE-0001.	
Note 7: ALLOWABLE LOAD AND MOMENTS ON NOZZLES AND FLANGES SHALL BE AS PER	API 610 (10TH ED.)	
Note 8: SPECIAL TOOLS SHALL BE SUPPLIED BY VENDOR IF REQUIRED FOR PRE-COMMISI MAINTANANCE PERIOD.	ONNING,COMMISIONING,START-UP AND	
Note 9: NPSH REQUIRED FOR SELECTED PUMP SHALL BE AT LEAST 1 METER LESS THAN N	PSHA.	
Note 10: DESIGN TEMPRATURE RANGE IS: -30 /100 °C.		
Note 11: ESTIMATED SHUT-OFF PRESSURE IS 5.52 BARA.		
Note 12: Ex-group: ExdIIBT4		
Note 13:REFERE TO "UTILITY CONDITION" DOC.No.: 900-SPC-A4-PR-0006.		
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TITLE: DATA SHEET FOR JACKET RWA PUMP (R251) (P-022)



## DATA SHEET FOR JACKET RWA PUMP (R251) (P-022)

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тіт	LE: DATA	SHEET FOR JACK	ET RWA PUN	/IP (R251) (P-022)							يع پتروشيمى	شرکت ملی صنا			
				CENTRIFUGA	L PUM	P DATA S	SHEET,	SI UN	NIT						
1	APPLICABL	E TO: PROPC	•	URCHASE	🖸 AS B		Rev								
2	FOR SITE		NPC R&	T ARAK - IRAN	UNIT SERVICES (000) SREVICE JACKET RWS PUMP (R251) (P-022)										
4	No. of Req'd		: 1 / Stand by -												
5	NOTES : INF			ETED O BY PURC	HASER BY MANUFACTURER BY MANUFACTURER OR PURCHASE										
6				DATA SHEETS			IONS								
7 8	PUMP	ITEM NO. P-022	ATTACHED	ITEM NO.			ITEM NO	Э.		NO. 1	DATE	BY	-		
9	MOTOR	PM-022	Ŏ			ŏ			ŏ	2					
10	GEAR		0			0			0	3					
11	TURBINE					0			0	4					
12 13	APPLICABL	E OVERLAY STANDA	NG CONDITIC							5 5.1.3	)				
	FLOW, NOR	MAL 15	(m <sup>3</sup> /h) RATE	D <b>16.5</b>	(m <sup>3</sup> /h)	LIQUID TYP	E OR NAM	1E	WAT	ER +	- 20% GLYCO	LE			
15	OTHER		(Note	,		HAZARI	DOUS	0	FLAMMABLE	=	TOXIC	(5.1.5)			
		RESSURE MAX / RAT	TED <b>10.81</b>	/ 2.5	(bara	1) PUMPING T		-	MIN.		NORMAL	MAX.			
		E PRESSURE		4.6 2.1		VAPOUR PF		ra)	10 0.012		25 0.031	55 0.154	-		
	DIFF. HEAD	1.00.00.00.00.00.00	(m) NPSHA	>10 (Note 9)	(m)	RELATIVE D		-	1.01		1.03	1.04			
		ARIATIONS (5.1.4)				VISCOSITY			1.93		1.38	0.78			
			****		Έ	SPECIFIC H				2.3		(kj/kg .k.)			
22 23	~	CONT O INT		IARIS/DAY)					TION (6.5.2.4 N/A (mo		N/A	(mg/kg) ET (5.12.1.12c)			
24		-	TE DATA (5.1)	.3)		-		-			,	(5.12.1.9)			
25	LOCATION:	(5.1.30)				MATERIALS (5.12.1.1)									
26	Ŭ		-	-		ANNEX H CLASS (5.12.1.1) S-5 (Note 5) MIN DESIGN METAL TEMP (5.12.4.1) (°C)									
27 28		RICAL AREA CLASSI	-ICATION (5.1.2 C,T4 DIV	4 / 6.1.4) 2(Note 2)		O REDUCED HARDNESS MATERIALS REQ D. (5.12.1.12)									
20 29	-	RIZATION REQ D.		LIZATION REQ D.						ELLE		C.S			
30	SITE DATA		Ũ				IMPELLER		RINGS		C.S				
31	-	DE <b>1889</b> (m)			(mbar)		****	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		C.S					
32 33	I	OF AMBIENT TEMPS		-28 / 44 / 86	(°C) (%)	DIFFUS	ERS	n	PERFORM		YE				
33 34	-	CONDITIONS: (5.1.30		UST FUMES		PROPOSAL CURVE NO (r/min)									
35	-	-	CORRO	•											
36				_											
37		<u> </u>		-		RATED POWER (kw) EFFICIENC1 (%)									
38 39		Ų	STEAM TURBI ( Note)	-		MINIMUM CONTINUOUS FLOW :           THERMAL         (m³/h)           STABLE         (m³/h)									
40	0					PREFERRED OPER. REGION TO (m <sup>3</sup> /h)									
41			DRIVER (6.1.	1 / 6.1.4)		ALLOWABLE OPER. REGION TO (m <sup>3</sup> /h)									
					(-(	☐ MAX. HEAD @ RATED IMPELLER         (n           nin)         ☐ MAX. POWER @ RATED IMPELLER         (k									
43 44	L A			RE	(r/min)							(kw) (m) (5.1.10)			
45				ERVICE FACTOR		Image: Mark at the provided and the provided and the provided at the pr									
		/ PHASE / HERTZ	400 /	*****	0				/EL REQ. D		85	(dba) (5.1.16)			
		M STARTING VOLTA	ASYNCHRO	DNOUS		EST MA						(dba) (5.1.16)			
48 49	-		GE (6.1.5) TEMP. RISE						R LEVEL TY CONDIT		S (5.1.3)	(dba) (5.1.16)			
						ELECTRICIT	ΓY		LTAGE	r	PHASE	HERTZ			
		D ROTOR AMPS				DRIVER	-		400		3	50			
52	STARTI	NG METHOD		D.O.L		HEATIN	L.		0809	ļ		(6 4 5)			
		(TYPE / NUMBER) :				SYSTEN	MAX. PE		MAX. TEN		OTHER MIN. PRESS.	(6.1.5) MIN. TEMP			
54 55			/			STEAM MAX. PRESS. MAX. TEMP MIN. PRESS. MIN. TE DRIVERS									
56		*****	1			HEATING									
57		AL THRUST CAPACI			COOLING WATER: (5.1.19) SOURCE (N) SUPPLY TEMP. ( <sup>O</sup> C) MAX. RETURN TEMP. ( <sup>O</sup> C)										
58 59	UP	(N)	DOWN		(N) SUPPLY TEMP( <sup>O</sup> C) MAX. RETURN TEMP( <sup>O</sup> C) NORM. PRESS. (bar) DESIGN PRESS. (bar)										
60					MIN. RET. PRESS. (bar) MAX. ALLOW. D.P. (bar										
61					CHLORIDE CONCENTRATION :(m										
62				Document No.	· 000-D	000-DAS-A4-RE-0002 Rev.:							<u> </u>		
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TITLE: DATA SHEET FOR JACKET RWA PUMP (R251) (P-022)

1 CONSTRUCTION SURFACE PREPARATION AND PAINT	Rev
2 ROTATION : (VIEWED FROM COUPLING END) CW CCW MANUFACTURER'S STANDARD OTHER SEE BELOW	
3 PUMP TYPE : (4.1)	
4 OH2 OH3 OH6 OTHER PUMP:	
5 CASING MOUNTING :	
6 💭 CENTERLINE 💭 IN-LINE 🗌 OTHER 🕒 FINISH COAT	
7 BASEPLATE : (6.3.1.7)	
8 CASING TYPE :	
9 SINGLE VOLUTE MULTIPLE VOLUTE DIFFUSER OFINISH COAT	
10 CASE PRESSURE RATING : DETAILS OF LIFTING DEVICES (6.3.20)	
11 O OH6 PUMP SUCTION REGION DESIGNED FOR MAWP (5.3.6) SHIPMENT : (7.4.1)	-
12 MAX. ALLOWABLE WORKING PRESSURE	-
13     @     100     ( <sup>U</sup> C)       • OUTDOOR STORAGE MORE THAN 6 MONTHS	
14 HYDRO TEST PRESSURE	
15 NOZZLE CONNECTIONS : (5.4.2) (Note 7) O HORIZONTAL STORAGE	
16 SIZE FLANGE FACG POSITION O TYPE OF SHIPPING PREPARATION	
17 RATING HEATING AND COOLING	_
18 SUCTION 2" 150# RF O HEATING JACKET REQ D. (5.8.9)	
19 DISCHARGE 11/2" 150# RF COOLING REQ D.	
20 COOLING WATER PIPING PLAN (6.5.3.1)	
21 PRESSURE CASING AUX. CONNECTIONS : (5.4.3) C.W. PIPING:	
22 NO. SIZE (DN) TYPE DIPE TUBING: FITTINGS	
23 C DRAIN 1/2" VALVED C.W. PIPING MATERIALS:	
24 VENT 1/2" VALVED S.STEEL C.STEEL GALVANIZED	
25 WARM-UP COOLING WATER REQUIREMENTS :	
26 BEARING HOUSING (m <sup>3</sup> /h)	
27 MACHINED AND STUDDED CONNECTIONS : (5.4.3.8)	
28 CYLINDRICAL THREADS REQUIRED (5.4.3.3) TOTAL COOLING WATER	
29 ROTOR : HEAT MEDIUM : O STEAM O OTHER	
30 ● COMPONENT BALANCE TO ISO 1940 G 1.0 (5.9.4.4) HEATING PIPING : O TUBING O PIPE	-
31 COUPLINGS :(6.2.2) BEARING AND LUBRICATION	
34 SPACER LENGTH (mm) SERVICE FACT. /	
35       ● COUPLING BALANCED TO ISO 1940-1 G 6.3 (6.2.3)       LUBRICATION (5.11.3,5.11.4) :         36       ○ COUPLING WITH PROPRIETARY CLAMPING DEVICE (6.2.1.1)       □ GREASE       □ OIL	
37       O COUPLING PER ISO 14691 (6.2.4)         38       O COUPLING PER ISO 10441 (6.2.4)	
39       COUPLING PER API 671 (6.2.4)       ○ ASME B151       ○ OIL VISC. ISO GRADE         40       NON SPARK COUPLING GUARD (6.2.14C)       INSTRUMENTATION	-
40     Non Spark Coopling Guard (6.2.14C)       41     Coupling Guard Standard PER       (6.2.14a)     ACCELEROMETER (6.4.2.1)	-
41 O COOPLING GUARD STANDARD PER (6.2.14a) O ACCELEROMETER (6.4.2.1) 42 BASEPLATES: O PROVISION FOR MOUNTING ONLY (5.10.2.11)	
42 BASEPLATES: PROVISION FOR MOUNTING UNLY (5.10.2.11) 43 API BASEPLATE NUMBER (ANNEX D) FLAT SURFACE REQ D (5.10.2.12)	
43 AND ASEFLATE NOWMER (ANNEX D) FLAT SURFACE REG D (5.10.2.12) 44 ONON-GROUT CONSTRUCTION (6.3.13) O TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6)	
45 O OTHER OPERSURE GAUGE TYPE	
46 MECHANICAL SEAL : (5.8.1) (Note 4 & 5)	
47 CATEGORY 2	
48 ARRENGMENT 1 REMARKS :	
49 TYPE A	
50 PLAN 11 MASSES	
51 MASS OF PUMP (kg)	
52 MASS OF BASEPLATE (kg)	
53 MASS OF DRIVER (kg)	
54 TOTAL MASS (kg)	
55	

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TITLE: DATA SHEET FOR JACKET RWA PUMP (R251) (P-022)

	CENTRIFUGAL PU	MP DATA SHEET, SI UNIT				
1 SPARE PARTS (		QA INSPECTION AI	ND TESTIN	IG (CONT.	)	Rev.
2 START-UP O NORMAL MAINTE	NANCE	TEST	NON-WIT	WIT	OBSERVE	
3 OTHERS 2 YEARS OF OPERATION	LIST (Note 8)	HYDROSTATIC (7.3.2)	0		0	
4 OTHER PURCHASER I	REQUIREMENTS	PERFORMANCE (7.3.3)	Ó	Ó	Ó	
5 COORDINATION MEETING REQUIRED (9.1	.3)	O RETEST ON SEAL	Õ	Õ	Õ	
6 O MAXIMUM DISCHARGE PRESSURE TO INC	LUDE (5.3.2)	LEAKAGE (7.3.3.2D)	-			
7 O MAX RELATIVE DENSITY		• NPSH (7.3.4.2)	0	•	0	
8 O MAX DIA. IMPELLERS AND / OR NO OF	STAGES	O TRUE PEAK VELOCITY	ŏ	õ	ŏ	
9 OPERATION TO TRIP SPEED		DATA (7.3.3.4D)	Ũ	U	U	
10 OH3 BEARING HS6 LIFTER (8.1.2.6)		COMPLETE UNIT TEST (7.3.4.3)	0	0	0	
11 O CONNECTION DESIGN APPROVAL (5.12.3.	4)	SOUND LEVEL TEST (7.3.4.4)	õ	ĕ	ŏ	
12 TORSIONAL ANALYSIS REQUIRED (5.9.2.	)	CLEANLINESS PRIOR TO	ě	õ	ŏ	
13 TORSIONAL ANALYSIS REPORT (5.9.2.6)	,	FINAL ASSEMBLY (7.2.2.2)	•	Ŭ	U	
14 PROGRESS REPORTS (9.3.3)		NOZZLE LOAD TEST (6.3.6)	0	0	0	
15 OUTLINE OF PROCEDURES FOR OPTION	AL TESTS (9.2.5)	CHECK FOR CO-PLANNER	ŏ	ŏ	ŏ	
16 ADDITIONAL DATA REQUIRING 20 YEARS		MOUNTING PAD SURFACE (6.3.3)	Ŭ	Ŭ	U	
17 PIPING AND APPU			0	0	0	
18 MANIFOLD PIPING TO SINGLE CONNECTION (	3516)	TEMP P. STABLE (7.3.4.7.1)	Ŭ	Ŭ	0	
	,	○ 4 HR. MECHANICAL RUN AFTER	0	0	0	
20 MOUNT SEAL RESERVOIR OFF BASEPLAT		OIL TEMP STABLE (7.3.4.7.3)	U	$\cup$	$\cup$	
21 C FLANGES REQ D IN PLACE OF SOCKED V		● 4 HR. MECH. RUN TEST (7.3.4.7.2)	0		$\cap$	
22 INSTALLATION LIST IN PROPOSAL (9.2.3L)	, ,	BRG HSG RESONANCE	ŏ	õ	ĕ	
23 CONNECTION BOLTING		TEST (7.3.4.6)	0	$\cup$	$\bigcirc$	
24 OPTE COATING OASTM A153 (			0	0	0	
25 O PAINTED SS	SALVANIZED	TEST (7.3.4.5)	U	$\cup$	$\bigcirc$	
26 QA INSPECTION A		IMPACT TESTING (5.12.4.3)	0	0	0	
27 SHOP INSPECTION (7.1.4)	(Note 6)	PER EN 13445	0	0	0	
28 PERFORMANCE CURVE APPROVAL	(1010 0)					
<u> </u>		~ ~	$\sim$			
			0	O	0	
30 MATERIAL CERTIFICATION REQUIRED (5.1	-			,		
31 CASING IMPELLER	SHAFT					
				(5 (7.3.3.3E)		
34 INSPECTION REQUIRED FOR CONNECTIO		SUBMIT INSPECTION CHECK LIST	(7.1.6)			
35 MAG PARTICLE						
37 INSPECTION REQUIRED FOR CASINGS (7	,					
40 HARDNESS TEST REQUIRED :	(7.2.2.3)					
	FOR 7.21.3					
42 FOR						
43 METHOD						
44						
45	REI	MARKS				
46						
47						
48						
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		client:					
PROJECT: PP- PE PILOT PLANT							
TITLE: DATA SHEET FOR JACKET RWA PU	MP (R251) (P-022)	-	شرکت ملی صنایع پتروش شرکت پژوهش و فناوری پتر				
FOR MECHANICAL SEALS. Note 5: VENDOR IS REQUIRED TO REVIEW AND Note 6: REFERE TO "INSPECTION & TEST PLAN Note 7: ALLOWABLE LOAD AND MOMENTS ON	IRES SHALL BE OF TOTALLY E RANE SPACER TYPE COUPLI UNTED BY PUMP MFR. PI 682 / ISO 21049 3rd EDIT O CONFIRM. FOR CENTRIFUGAL PROCESS NOZZLES AND FLANGES SH VENDOR IF REQUIRED FOR SHALL BE AT LEAST 1 METER 100 °C. 52 BARA.	ENCLOSED FAN-COOLED (TEFC) NG SHALL BE USED. ION :2004. VENDOR SHALL FILL OUT API 682 (3rd E S PUMPS" DOC.No.: 900-ITP-A4-RE-0001. ALL BE AS PER API 610 (10TH ED.) PRE-COMMISIONNING,COMMISIONING,START-UP					
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ROJECT: PP- PE PILOT PLANT	client:
ITLE: DATA SHEET FOR JACKET RWA PUMP (R261) (P-023)	شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی

# DATA SHEET FOR JACKET RWA PUMP (R261) (P-023)

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PROJECT: PP- PE PILOT PLANT TITLE: DATA SHEET FOR JACKET RWA PUMP (R261) (P-023)									client: پېرې مال مالع پتروشيمې شرکت پژوهش و فناورې پتروشيمې											
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TITLE: DATA	A SHEET FOR JAC	KET RWA P	UMP (R261) (P-023)									شر کت ملی صنایع پتر شر کت پژوهش و فناوری	
			CENTRIF			ATA SH	EET,	SI	UNIT				
1 APPLICABL	E TO: PROPC	•	PURCHASE	🖸 AS B	honore and a second sec				0-010-0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Rev
2 FOR 3 SITE			sı - ARAK - IRAN		UNIT		1.4	CK			•	2)	
4 No. of Regid		: 1 / Stand b			SREVICE		JA		ET RWA PU	WIP(	K201) (P-02	3)	
	FORMATION BELOW		-	CHASER	Пву	MANUFAC	TURFR		Π	BY		RER OR PURCHASER	
6	or any critery below	10 02 0000	DATA SHE				TOTIEN					REVISIONS	
7	ITEM NO.	ATTACHED	ITEM NO.		ACHED	ITEM N	NO.		ATTACHED	NO.	DATE	BY	
8 PUMP	P-023				0				0	1			
9 MOTOR	PM-023	•			0				0	2			
# GEAR		0			0				0	3			
# TURBINE		0			0				0	4			
# APPLICABL	E OVERLAY STANDA									5			
#	-			(m <sup>3</sup> /h)									
# FLOW, NOF # OTHER	RMAL 25	(m³/h) RAT ( <b>Not</b> e		(m <sup>3</sup> /h)	HAZAR		E		FLAMMABLE	(+2	0% GLYCO		
	RESSURE MAX / RA		•	(bara		0000	U		FLAMMABLE MIN.		NORMAL	(5.1.5) MAX.	_
# DISCHARG			4.6			TEMP ( <sup>O</sup> C)			10		10RMAL 25	55	
			2.1		VAPOUR P		a)		0.012		0.031	0.154	
# DIFF. HEAD		(m) NPSHA			RELATIVE		-		1.01		1.03	1.04	
	ARIATIONS (5.1.4)				VISCOSITY		i I		1.93		1.38	0.78	
# STARTING	CONDITIONS (5.1.4)	CLOS	ED DELIVERY VALV	'E	SPECIFIC H	HEAT, C <sub>P</sub>		•	:	2.36		(kj/kg .k.)	
			STARTS/DAY)			RIDE CONC	ENTRA	TION	N (6.5.2.4)		N/A	(mg/kg)	
# OPARALI	LEL OPERATION REC				● H <sub>2</sub> S CC	NCENTRA	TION		N/A (mo	lfract	tion)	WET (5.12.1.12c)	
#	SI <sup>-</sup>	<mark>TE DATA (5</mark> .	1.3)		CORROSIV	/E / EROSIV	E AGEN		-	N/A		(5.12.1.9)	
# LOCATION:	· /	•	•						MATERIALS	i (5.1			
-	•	-			-	(HCLASS (			10.1.1		S-5 (Note 5	5) ( <sup>0</sup> C)	
# ELECTI	RICAL AREA CLASSI	C,T4 DIV	.24 / 6.1.4) 2(Note 2)		Ŭ,	SIGN MET				(E 4)	0 1 10)	( C)	
-	RIZATION REQ D.		ALIZATION REQ D.		$\leq$	EL / CASE		C.S			2.1.12) ER	C.S	
# SITE DATA		OTROFIC	ALIZATION REQ D.			IMPELLER				CLLI			
	DE <b>1889</b> (m)	BAROMI	TER <b>810</b>	(mbar)					C.	s	0.0		
	OF AMBIENT TEMPS												
# 🖲 RELATI	VE HUMIDITY:MIN / N	AAX	/ 86	(%)					PERFORM	/AN	CE		
# UNUSUAL (	CONDITIONS: (5.1.30	)	DUST 🌒 FUMES		PROPOSAL	CURVE N	0.					(r/min)	
# OTHER		CORR	DSIVE			ER DIA RA	TED		MA	Х.	MIN	(mm)	
#						1000							
#		DRIVER TYP	-							) EFF	ICIENCI	(%)	
1 1 2	Ų	STEAM TUR	-			JM CONTIN	IUOUS F		2			/3#->	
# OTHER		(Not	e 1)							ABLE		(m³/h) (m³/h)	
#	MOTOR	DRIVER (6.	1/614)								то то	(m <sup>3</sup> /h)	
# MANUF		2				/ABLE OPE IEAD @ RA <sup>·</sup>			*******		IU	(m)	
#		0		(r/min)		OWER @ F						(iii) (kw)	
# FRAME				. ,		AT RATED						(m) (5.1.10)	
# HORIZO			SERVICE FACTOR		MAX SI	UCTION SP	ECIFIC	SPE	ED :	13	000 M3/Hr,N	<b>I,RPM</b> (5.1.11)	
	/ PHASE / HERTZ			0		SOUND PRE					85	(dba) (5.1.16)	
# TYPE		ASYNCHE	ONOUS		EST MAX. SOUND PRESS LEVEL         (dba) (5.1.16)           EST MAX. SOUND POWER LEVEL         (dba) (5.1.16)								
						AX. SOUND						(dba) (5.1.16)	_
		TEMP. RISE			ELECTRIC	TV			LITY CONDI		<u> </u>	UEDT7	
	DAD AMPS				ELECTRICI DRIVE		```		TAGE	-	PHASE 3	HERTZ 50	_
			D.O.L		HEATIN			4		-	5	50	
# UBE						M VOLTAGI	E DIP		80%	6	OOTHER	(6.1.5)	
	(TYPE / NUMBER) :				STEAM		PRESS.		MAX. TEM		MIN. PRES		Ì
# RADIAL		/			DRIVERS								
# THRUS	Τ	/			HEATING		-						
	AL THRUST CAPACI	ITY				NATER: (5	5.1.19)		SOURCE				
	(N)	DOWN		(N)	SUPPLY TE	1.00.00.00.00.00.00.00.00.00					TURN TEMP		
#					NORM. PRI				. ,		NPRESS.	(bar)	
#					MIN. RET. F		DATIO		(bar) MA	X. Al	LLOW. D.P.	(bar)	
#					CHLORIDE	CONCENT	RATION	N :				(mg/kg)	
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PROJECT: PP- PE PILOT PLANT	Client:
TITLE: DATA SHEET FOR JACKET RWA PUMP (R261) (P-023)	ملی صنایع پتروشیمی مال

شر کت

شركت پژوهش و فناورى پتروشيمى

**CENTRIFUGAL PUMP DATA SHEET, SI UNIT** CONSTRUCTION SURFACE PREPARATION AND PAINT Rev CW CCW MANUFACTURER'S STANDARD ROTATION : (VIEWED FROM COUPLING END) OTHER SEE BELOW PUMP TYPE : (4.1) SPECIFICATION NO. 900-SPC-A4-PD-0002 ОН2 ОН3 ОН6 OTHER PUMP : CASING MOUNTING : PRIMER 6 CENTERLINE IN-LINE OTHER FINISH COAT BASEPLATE : (6.3.1.7) CASING TYPE : PRIMER 8 MULTIPLE VOLUTE DIFFUSER 9 SINGLE VOLUTE FINISH COAT 10 CASE PRESSURE RATING : DETAILS OF LIFTING DEVICES (6.3.20) OH6 PUMP SUCTION REGION DESIGNED FOR MAWP (5.3.6) 11 SHIPMENT : (7.4.1) MAX. ALLOWABLE WORKING PRESSURE O DOMESTIC EXPORT EXPORT BOXING REQUIRED 12 (bar 13 @ 100 (<sup>0</sup>C) OUTDOOR STORAGE MORE THAN 6 MONTHS HYDRO TEST PRESSURE 1.5 x MAWP SPARE ROTOR ASSEMBLY PACKAGED FOR : 14 (bar NOZZLE CONNECTIONS : (5.4.2) (Note 7) HORIZONTAL STORAGE **OVERTICAL STORAGE** 15 FLANGE O TYPE OF SHIPPING PREPARATION 16 SIZE FACG POSITION HEATING AND COOLING RATING 17 HEATING JACKET REQ D. (5.8.9) 2 1/2' 150# RF 18 SUCTION DISCHARGE 19 2" 150# RF COOLING REQ D. 20 COOLING WATER PIPING PLAN (6.5.3.1) PRESSURE CASING AUX. CONNECTIONS : (5.4.3) C.W. PIPING: 21 TUBING: 22 NO. SIZE (DN) TYPE O PIPE FITTINGS 23 DRAIN 24 VENT 1/2" VALVED C.W. PIPING MATERIALS: 1/2" VALVED S.STEEL C.STEEL GALVANIZED 25 WARM-UP COOLING WATER REQUIREMENTS : BEARING HOUSING (m<sup>3</sup>/h) 26 MACHINED AND STUDDED CONNECTIONS : (5.4.3.8) HEAT EXCHANGER (m<sup>3</sup>/h) 27 (m<sup>3</sup>/h) 28 O CYLINDRICAL THREADS REQUIRED (5.4.3.3) TOTAL COOLING WATER 29 ROTOR : ◯ STEAM O OTHER HEAT MEDIUM : O <u>TUBING</u> 30 COMPONENT BALANCE TO ISO 1940 G 1.0 (5.9.4.4) HEATING PIPING : **BEARING AND LUBRICATION** 31 COUPLINGS :(6.2.2) 32 MANUFACTURER BEARING (TYPE / NUMBER ) (5.10.1) : MODEL 33 RATING (kw per100 r/min) RADIAL 34 SPACER LENGTH (mm) SERVICE FACT. THRUS COUPLING BALANCED TO ISO 1940-1 G 6.3 (6.2.3) LUBRICATION (5.11.3,5.11.4) : 35 36 COUPLING WITH PROPRIETARY CLAMPING DEVICE (6.2.1.1) GREASE O COUPLING PER ISO 14691 (6.2.4) O PURE OIL MIST D PURGE OIL MIST 37 CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) : 38 O COUPLING PER ISO 14691 (6 10441 (6.2.4) OIL VISC. ISO GRADE 39 COUPLING PER API 671 (6.2.4) O ASME B151 INSTRUMENTATION NON SPARK COUPLING GUARD (6.2.14C) 40 O COUPLING GUARD STANDARD PER (6.2.14a) ACCELEROMETER (6.4.2.1) 41 PROVISION FOR MOUNTING ONLY (5.10.2.11) BASEPLATES: 42 43 API BASEPLATE NUMBER (ANNEX D) FLAT SURFACE REQ D (5.10.2.12) 44 O NON-GROUT CONSTRUCTION (6.3.13) TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6) O OTHER O PRESSURE GAUGE TYPE 45 46 MECHANICAL SEAL : (5.8.1) (Note 4 & 5) 47 CATEGORY 2 ARRENGMENT 48 1 REMARKS : 49 TYPE Α 50 PLAN 11 5 MASS OF PUMP (kg) 52 MASS OF BASEPLATE (kg) 53 MASS OF DRIVER (kg) 54 TOTAL MASS (kg) 55

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TITLE: DATA SHEET FOR JACKET RWA PUMP (R261) (P-023)

	CENTRIFUGAL PUMP DATA SHEET, SI UNIT									
1	SPARE PARTS (TABLE 18)	QA INSPECTION A	ND TESTING (	CONT.)		Rev.				
2	START-UP ONORMAL MAINTENANCE	TEST	NON-WIT	WIT	OBSERVE					
3	OTHERS 2 YEARS OF OPERATION LIST (Note 8)	HYDROSTATIC (7.3.2)	0		0					
4	O OTHER PURCHASER REQUIREMENTS	PERFORMANCE (7.3.3)	0	•	0					
5	COORDINATION MEETING REQUIRED (9.1.3)	O RETEST ON SEAL	0	0	0					
6	MAXIMUM DISCHARGE PRESSURE TO INCLUDE (5.3.2)	LEAKAGE (7.3.3.2D)		-	_					
7	O MAX RELATIVE DENSITY	• NPSH (7.3.4.2)	$\sum_{i=1}^{n}$	•	Õ					
8	MAX DIA. IMPELLERS AND / OR NO OF STAGES		$\bigcirc$	0	0					
9		DATA (7.3.3.4D)	$\frown$	$\sim$	$\sim$					
10	OH3 BEARING HS6 LIFTER (8.1.2.6)		$\sum$	$\mathbf{O}$	0					
11	CONNECTION DESIGN APPROVAL (5.12.3.4)	<ul> <li>SOUND LEVEL TEST (7.3.4.4)</li> <li>CLEANLINESS PRIOR TO</li> </ul>	$\subseteq$		Ö					
12 13	TORSIONAL ANALYSIS REQUIRED (5.9.2.1)	FINAL ASSEMBLY (7.2.2.)		0	0					
13	PROGRESS REPORTS (9.3.3)	NOZZLE LOAD TEST (6.3.6)	$\bigcirc$	0	0					
15	OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)	CHECK FOR CO-PLANNER	$\leq$	õ	Ŏ					
16	ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2.1.1f)	MOUNTING PAD SURFACE (6.3.3)	$\bigcirc$	$\cup$	$\bigcirc$					
17	PIPING AND APPURTENANCES		$\bigcirc$	0	0					
	MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)	TEMP P. STABLE (7.3.4.7.1)		Ũ	Ū.					
19	VENT DRAIN COOLING WATER	O 4 HR. MECHANICAL RUN AFTER	$\bigcirc$	0	0					
20	MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)	OIL TEMP STABLE (7.3.4.7.3)		-	-					
21	FLANGES REQ D IN PLACE OF SOCKED WELD UNIONS (6.5.2.8)	4 HR. MECH. RUN TEST (7.3.4.7.2)	$\bigcirc$	•	0					
22	INSTALLATION LIST IN PROPOSAL (9.2.3L)	O BRG HSG RESONANCE	$\bigcirc$	0	0					
23	CONNECTION BOLTING	TEST (7.3.4.6)								
24	O PTFE COATING O ASTM A153 GALVANIZED	O AUXILIARY EQUIPMENT	$\bigcirc$	0	$\circ$					
25	Opainted SS	TEST (7.3.4.5)								
26	QA INSPECTION AND TESTING	IMPACT TESTING (5.12.4.3)	$\bigcirc$	$\circ$	$\circ$					
27	SHOP INSPECTION (7.1.4) (Note 6)	O PER EN 13445								
28			_	~	0					
29	TEST WITH SUBSTITUTE SEAL (7.3.3.2B)	0	$\bigcirc$	$\circ$	0					
30	MATERIAL CERTIFICATION REQUIRED (5.12.1.8)									
31										
32	OTHER SHAFT SLEEVES, INTERNAL WEARING RINGS, MECH. SEAL PAR CASTING REPAIR PROCEDURE APPROVAL REQ D (5.12.2.5)	O INCLUDE PLOTTED VIBRATION SPEC		3.3E)						
33 34	INSPECTION REQUIRED FOR CONNECTION WELDS (5.12.3.4e)	SUBMIT INSPECTION CHECK LIST (7.1)								
34	MAG PARTICLE ILIQUID PENETRANT	SOBWIT INSPECTION CHECK LIST (7.	1.0)							
36										
37	INSPECTION REQUIRED FOR CASINGS (7.2.1.3 / 5.1.2.1.5)									
38										
39	C RADIOGRAPHIC ULTRA SONIC									
40	O HARDNESS TEST REQUIRED : (7.2.2.3)									
41	O ADDITIONAL SUBSURFACE EXAMINATION FOR 7.21.3									
42	FOR									
43	METHOD									
44										
45	REMARI	(S								
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		client:	4
PROJECT: PP- PE PILOT PLANT			ASP
TITLE: DATA SHEET FOR JACKET RWA PU	JMP (R261) (P-023)		شرکت ملی صنایع پتروش شرکت پژوهش و فناوری پت
Note 1: ALL ELECTRICAL MOTORS SHALL BE II	N ACCORDANCE WITH "TECHNICAL SP	ECIFICATION FOR LV MOTOR" DOC.No.	
900-SPC-A4-EE-0005 MOTOR ENCLOS	SURES SHALL BE OF TOTALLY ENCLOSE	D FAN-COOLED (TEFC)	
Note 2: TYPE OF PROTECTION SHALL BE Aexd	I.		
Note 3: DRY, FLEXIBLE , MULTI DISK ,S.S MEN		L BE USED.	
DRIVER HALF COUPLING SHALL BE M			
Note 4: MECHANICAL SEAL SHALL BE AS PER		14. VENDOR SHALL FILL OUT API 682 (3rd ED.)	
DATA SHEET FOR MECHANICAL SEALS Note 5: VENDOR IS REQUIRED TO REVIEW AN			
Note 6: REFERE TO "INSPECTION & TEST PLAT		" DOC No · 900-ITP-64-RE-0001	
Note 7: ALLOWABLE LOAD AND MOMENTS C			
		/MISIONNING,COMMISIONING,START-UP AND	
MAINTENANCE PERIOD.			
Note 9: NPSH REQUIRED FOR SELECTED PUM	IP SHALL BE AT LEAST 1 METER LESS TH	IAN NPSHA.	
Note 10: DESIGN TEMPRATURE RANGE IS: -10	/100 °C.		
Note 11: ESTIMATED SHUT-OFF PRESSURE IS 5	5.52 BARA.		
Note 12 Ex-group: ExdIIBT4			
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PROJECT:	PP-PF	PII OT	

TITLE: DATA SHEET FOR RCW PUMP (P-031)



# DATA SHEET FOR RCW PUMP (P-031)

client:

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PROJECT	PROJECT: PP- PE PILOT PLANT																			
TITLE: DA	ATA SH	IEET FO	OR RCV	V PUMF	<b>P (P-03</b> 1	)					شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی									
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PI	PROJECT: PP- PE PILOT PLANT										C			
т	TLE: DAT	A SHEET FOR R		P (P-031)	شر کت ملی صنایع پتروشیمی شر کت یژوهش و فناوری پتروشیمی									
				CENTRIEUG	مرتب پروهس و ماوری پیروسیمی AL PUMP DATA SHEET, SI UNIT									
1	APPLICABLE	TO: PROPO	ISAL O	PURCHASE	🖸 AS BU		0	, 0. 0.						Rev
	FOR		NPC R&			UNIT			SERVI					
3				ARAK - IRAN		SREVICE			RCW MAIN	N PU	MP (P-031)			
4	No. of Req'd:	1 Service ORMATION BELOW TO	: 1 / Stand by	~			Y MANUFA		n		ANUFACTURE			
5 6	INUTES . INFO	RMATION BELOW TO	DE COMPLETI	DATA SHEETS				GIUKER				VISIONS	KUHASEK	
7		ITEM NO.	ATTACHED	ITEM NO.		ACHED	ITEM N	NO.	ATTACHED	NO.	DATE		BY	
8	PUMP	P-031				$\geq$			0	1				
9	MOTOR	PM-031				$\sum_{i=1}^{n}$			0	2				
	GEAR TURBINE		$\left  \begin{array}{c} 0 \\ 0 \end{array} \right $						0	3				
		OVERLAY STANDARD	(S): API	610 (10TH EDITION)					Ŭ	5				-
13		OPERATII							LIQUIE	) (5.1	.3)			
14	FLOW, NORM	1AL 80	(m <sup>3</sup> /h) RAT	ED <b>88</b>	(m³/h)	LIQUID TY	/PE OR NA	.ME	WA	TER	+ 20% GLY	COLE		
-	OTHER		(Note			HAZA	RDOUS	0	FLAMMABLE	-		-	(5.1.5)	
	SUCTION PRI	ESSURE MAX / RATED	10.85	5 / 2.5 4	(bara) (bara)	PUMPING	TEMD (°C	1	MIN. 25		NORMAL 35		MAX. 45	_
	DISCHARGE	ALALALA A		1.5	(bara)		PRESS . (b		0.006		0.007		0.012	
-	DIFF. HEAD		(m) NPSHA	>10 (Note 9)	(m)		DENSITY	,	1.04		1.05		1.05	
20	PROCESS VA	RIATIONS (5.1.4)				VISCOSIT	Y (cP)		2.5		2.36		1.9	
		ONDITIONS (5.1.4)		SED DELIVERY VALV	'E		HEAT, $C_P$				.82		(kj/kg .k.)	
				STARTS/DAY)		-			TION (6.5.2.4		N/A		(mg/kg)	
23 24			(5.1.13) TE DATA (5.1	3)			IVE / EROS		N/A (mol		on)	WET (5.1	2.1.12c) (5.12.1.9)	
	LOCATION: (5	-		.0/		CORROS	IVE / EKOS	IVE AGE	MATERIAL		12.1.1)		(3.12.1.9)	
26		,		OR 🔵 UNHEATED			X H CLAS	S (5.12.1.			S-5 (Note	5)		
27	ELECTR	ICAL AREA CLASSIFIC	ATION (5.1.24 /	6.1.4)			ESIGN ME	TAL TEM	P (5.12.4.1)				( <sup>0</sup> C)	
28	-	I GR	C,T4 DIV			$\sim$			IATERIALS R					
29	-	IZATION REQ D.		ALIZATION REQ D.		-			.S IMP			C.S		
30 31	SITE DATA (5	.1.30) E <b>1889</b> (m)	) BAROME	ETER <b>810</b>	(mbar)	CASE		RWEAR	RINGS	AISI 4				
32	-	OF AMBIENT TEMPS:M		-28 / 44	( <sup>0</sup> C)				-		140			
33	i i i	E HUMIDITY:MIN / MA>	-	/ 86	(%)			D	PERFOR	RMA	NCE			
34	UNUSUAL CO	ONDITIONS: (5.1.30)	•	DUST 🌒 FUMES			AL CURVE						(r/min)	
35	-		CORRO	SIVE			LER DIA F				MIN		(mm)	
36 37			DRIVER TYPI	=		- T	LER TYPE		TA (kw)		CLOSE		(0/)	
37	-		) STEAM TURI			1	D POWER IUM CONT			CLLI	CIENCT			
39	i i i		(Note	-			MAL		(m <sup>3</sup> /h) STA	BLE			(m <sup>3</sup> /h)	
40		+				PREF	ERRED OF	PER. REG	SION		то		(m³/h)	
41		-	DRIVER (6.1	.1 / 6.1.4)			WABLE OF				то		(m³/h)	
42 43		LEUKLANA COURSE	v)		(r/min)		HEAD @ R POWER @						(m) (kw)	
43	L.	(KV		URE	(171111)							(m)	(KW) (5.1.10)	
45			IN I	SERVICE FACTOR			SUCTION S		*********	13	8000 M3/Hr,N			
46	-	PHASE / HERTZ	400 /	3 / 5	0				VEL REQ. D		85	(dba	) (5.1.16)	
			ASYNCHR	ONOUS			AX. SOUN						) (5.1.16)	
48 49	-		(6.1.5) TEMP. RISE			L EST N	AAX. SOUN			NS (	5.1.3) (NOTE		) (5.1.16)	
49 50						ELECTRIC		1			PHASE	1	IERTZ	
51		ROTOR AMPS				DRIVE			400		3		50	
52		IG METHOD		D.O.L		HEAT								
53							EM VOLTA		080%		OTHER		(6.1.5)	_
		YPE / NUMBER) :				STEAM		PRESS.	MAX. TEN	1P	MIN. PRES	S. M	MIN. TEMP	
55 56			/			DRIVERS HEATING								
57		L THRUST CAPACITY	,				WATER:	(5.1.19)	SOURCI	E				1
58	UP(N) DOWN(N)					SUPPLY T		/			FURN TEMP.		( <sup>O</sup> C)	
59						NORM. PF	RESS.		(bar) DE	SIGN	PRESS.		(bar)	
60						MIN. RET.	#1.81.81.81.81.81.81.81.81.81.81.81.81.81			X. ALI	LOW. D.P.		(bar)	
61 62						CHLORID	E CONCEN	NIRATIO	N :				(mg/kg)	
			Do	cument No.:								Re	v.: 0	
ĺ			Ow	vner Job No.:								Ту	pe:DAS	
l												Pag	ge 1 of 4	

PROJECT:	PP-	PE	PIL	OT.	PLANT



TITLE: DATA SHEET FOR RCW PUMP (P-031)

CONS	TRUCTION		SURFACE PREPARATION AND PAINT
ROTATION : (VIEWED FROM COUPLING		cw 🗆 ccw	
PUMP TYPE : (4.1) API610	SEND)		SPECIFICATION NO.     900-SPC-A4-PD-0002
	OTHER		PUMP :
		****	PRIMER
			FINISH COAT
			BASEPLATE : (6.3.1.7)
CASING TYPE :			PRIMER
		DIFFUSER	FINISH COAT
CASE PRESSURE RATING :		DITIOSER	
<u>^</u>			DETAILS OF LIFTING DEVICES (6.3.20)
	SOURE		
@ <u>100</u> ( <sup>0</sup> C)			
HYDRO TEST PRESSURE	1.5 x MA	NP (	(bar) SPARE ROTOR ASSEMBLY PACKAGED FOR :
NOZZLE CONNECTIONS : (5.4.2)	(Note 7)	1	
SIZE FLAI	TACO	POSITION	
RAT			HEATING AND COOLING
SUCTION 6" 15			HEATING JACKET REQ D. (5.8.9)
DISCHARGE 4" 15	0# RF		COOLING REQ D.
			COOLING WATER PIPING PLAN (6.5.3.1)
PRESSURE CASING AUX. CONNEC	CTIONS : (5.4.3)	,	C.W. PIPING:
NO.	SIZE (DN)	TYPE	
	1/2"	VALVED	C.W. PIPING MATERIALS:
VENT	1/2"	VALVED	S.STEEL C.STEEL GALVANIZED
WARM-UP			COOLING WATER REQUIREMENTS :
			BEARING HOUSING (m <sup>3</sup> /h)
MACHINED AND STUDDED CONNE	CTIONS : (5.4.3.8)		HEAT EXCHANGER (m <sup>3</sup> /h)
CYLINDRICAL THREADS REQUIRE	D (5.4.3.3)		TOTAL COOLING WATER (m <sup>3</sup> /h)
ROTOR :			
COMPONENT BALANCE TO ISO 19	40 G 1.0 (5.9.4.4)		
COUPLINGS :(6.2.2)			BEARING AND LUBRICATION
MANUFACTURER VTA		ACER (Type TS	K) BEARING (TYPE / NUMBER ) (5.10.1) :
RATING (kw per100 r/min)			
SPACER LENGTH VTA (mm	) SERVIC	E FACT.	
COUPLING BALANCED TO ISO 194			LUBRICATION (5.11.3,5.11.4) :
		2 1 1)	
OCUPLING PER ISO 14691 (6.2.4)			
COUPLING PER ISO 10441 (6.2.4)			CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) :
COUPLING PER API 671 (6.2.4)	O ASME B	151	OIL VISC. ISO GRADE
NON SPARK COUPLING GUARD (6	•		
COUPLING GUARD STANDARD PE		(6.2.1	
BASEPLATES:		(0.2.)	PROVISION FOR MOUNTING ONLY (5.10.2.11)
API BASEPLATE NUMBER		(ANNEX D)	<ul> <li>● FLAT SURFACE REQ D (5.10.2.12)</li> </ul>
~	12)		
NON-GROUT CONSTRUCTION (6.3 OTHER	. 13)		TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6)     PRESSURE GAUGE TYPE
	La 4 9 E)		
	te 4 & 5)		
CATEGORY	2		
ARRENGMENT	1		REMARKS :
TYPE	A		MACOTO
PLAN	11		MASSES
			MASS OF PUMP (kg)
			MASS OF BASEPLATE (kg)
			MASS OF DRIVER (kg)
			TOTAL MASS (kg)
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### TITLE: DATA SHEET FOR RCW PUMP (P-031)

	CENTRIFUGAI	L PUMP DATA SHEET, SI UNIT				
SPARE PAR	TS (TABLE 18)		AND TESTIN	G (CONT	.)	Re
START-UP ONORMAL M	AINTENANCE	TEST	NON-WIT	WIT	OBSERVE	
OTHERS 2 YEARS OF OPERA	TION LIST (Note 8)	HYDROSTATIC (7.3.2)	0		0	
OTHER PURCHAS	ER REQUIREMENTS	PERFORMANCE (7.3.3)	0		0	
COORDINATION MEETING REQUIRE	D (9.1.3)	O RETEST ON SEAL	0	$\circ$	0	
O MAXIMUM DISCHARGE PRESSURE T	O INCLUDE (5.3.2)	LEAKAGE (7.3.3.2D)				
O MAX RELATIVE DENSITY		NPSH (7.3.4.2)	0		$\circ$	
O MAX DIA. IMPELLERS AND / OR N	IO OF STAGES	O TRUE PEAK VELOCITY	0	$\circ$	$\circ$	
OPERATION TO TRIP SPEED		DATA (7.3.3.4D)	_	-	_	
OH3 BEARING HS6 LIFTER (8.1.2.6)		COMPLETE UNIT TEST (7.3.4.3)	Q	0	0	
CONNECTION DESIGN APPROVAL (5		SOUND LEVEL TEST (7.3.4.4)	Q	•	0	
		CLEANLINESS PRIOR TO	•	0	0	
O TORSIONAL ANALYSIS REPORT (5.9	.2.6)	FINAL ASSEMBLY (7.2.2.2)	-	-	-	
PROGRESS REPORTS (9.3.3)		NOZZLE LOAD TEST (6.3.6)	0	0	0	
OUTLINE OF PROCEDURES FOR OP		CHECK FOR CO-PLANNER	0	0	$\circ$	
ADDITIONAL DATA REQUIRING 20 YE		MOUNTING PAD SURFACE (6.3.3	-	-	_	
	PPURTENANCES		0	$\circ$	0	
MANIFOLD PIPING TO SINGLE CONNECT	_ ` ` ` `	TEMP P. STABLE (7.3.4.7.1)				
VENT DRAIN		O 4 HR. MECHANICAL RUN AFTER	0	$\circ$	0	
MOUNT SEAL RESERVOIR OFF BASE	EPLATE (6.5.1.4)	OIL TEMP STABLE (7.3.4.7.3)				
FLANGES REQ D IN PLACE OF SOCK	(ED WELD UNIONS (6.5.2.8)	4 HR. MECH. RUN TEST (7.3.4.7.	2) ()	$\bullet$	0	
INSTALLATION LIST IN PROPOSAL (9	.2.3L)	O BRG HSG RESONANCE	0	$\circ$	0	
CONNECTION BOLTING		TEST (7.3.4.6)				
OPTFE COATING OASTMA	A153 GALVANIZED	O AUXILIARY EQUIPMENT	0	0	0	
O PAINTED SS		TEST (7.3.4.5)				
QA INSPECTIO	ON AND TESTING	IMPACT TESTING (5.12.4.3)	0	0	0	
SHOP INSPECTION (7.1.4)	(Note 6)	O PER EN 13445				
O PERFORMANCE CURVE APPROVAL		O PER ASME V III				
TEST WITH SUBSTITUTE SEAL (7.3.3	.2B)	0	0	0	0	
MATERIAL CERTIFICATION REQUIRE	D (5.12.1.8)	O VENDOR KEEP REPAIR AND HT	RECORDS (7.2	.1.1C)	-	
	SHAFT	VENDOR SUBMIT TEST PROCED	URES (7.3.1.2	/ 9.2.5)		
OTHER SHAFT SLEEVES, INTER	NAL WEARING RINGS, MECH.	SEAL PARTS 🔿 VENDOR SUBMIT TEST DATA WI	THIN 24 HOUR	S (7.3.3.3E	)	
CASTING REPAIR PROCEDURE APPI	ROVAL REQ D (5.12.2.5)	O INCLUDE PLOTTED VIBRATION S	SPECTRA (A			
INSPECTION REQUIRED FOR CONN	ECTION WELDS (5.12.3.4e)	SUBMIT INSPECTION CHECK LIS	ST (7.1.6)			
MAG PARTICLE	UID PENETRANT					
	TRA SONIC					
INSPECTION REQUIRED FOR CASIN	GS (7.2.1.3 / 5.1.2.1.5)					
MAG PARTICLE	UID PENETRANT					
	TRA SONIC					
O HARDNESS TEST REQUIRED :		7.2.2.3)				
O ADDITIONAL SUBSURFACE EXAMINA	TION FOR 7.21.3					
FOR						
METHOD						
		REMARKS				
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PROJECT: PP- PE PILOT PLANT			AND A
TITLE: DATA SHEET FOR RCW PUMP	(P-031)	می ئىيمى	شرکت ملی صنایع پتروشیا شرکت پژوهش و فناوری پترو،
	L BE IN ACCORDANCE WITH "TECHNICAL SPECIFIC		
	NCLOSURES SHALL BE OF TOTALLY ENCLOSED FAN	-COOLED (TEFC)	
Note 2: TYPE OF PROTECTION SHALL BE			
	MEMBRANE SPACER TYPE COUPLING SHALL BE U	ISED.	
DRIVER HALF COUPLING SHALL			
Note 4: MECHANICAL SEAL SHALL BE AS FOR MECHANICAL SEALS.	; PER API 682 / ISO 21049 3rd EDITION :2004. VEI	NDOR SHALL FILL OUT API 682 (3rd ED.) DATA SHE	Ĩ
Note 5: VENDOR IS REQUIRED TO REVIE	W AND CONFIRM.		
Note 6: REFERE TO "INSPECTION & TEST	F PLAN FOR CENTRIFUGAL PROCESS PUMPS" DOC.	.No.: 900-ITP-A4-RE-0001.	
Note 7: ALLOWABLE LOAD AND MOME	NTS ON NOZZLES AND FLANGES SHALL BE AS PER	API 610 (10TH ED.)	
Note 8: SPECIAL TOOLS SHALL BE SUPPL MAINTANANCE PERIOD.	IED BY VENDOR IF REQUIRED FOR PRE-COMMISIC	DNNING,COMMISIONING,START-UP AND	
Note 9: NPSH REQUIRED FOR SELECTED	PUMP SHALL BE AT LEAST 1 METER LESS THAN N	PSHA.	
Note 10: DESIGN TEMPRATURE RANGE IS	5: -30 /100 °C.		
Note 11: ESTIMATED SHUT-OFF PRESSUR	E IS 4.8 BARA.		
Note 12: Ex-group: ExdIIBT4			
Note 13: REFERE TO "UTILITY CONDITION	1" DOC.No.: 900-SPC-A4-PR-0006.		
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PROJECT:	PP-PE	PILOT	PLANT

TITLE: DATA SHEET FOR E-411 COOLING PUMP (P-034)



## DATA SHEET FOR E-411 COOLING PUMP (P-034)

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PROJECT	": PP- F	Pe Pilo	T PLAN	іт							client:							<b>*</b>	20	
TITLE: DA	ATA SH	IEET FO	OR E-41	1 COO	LING P	UMP (P	-034)										تروشیمی ن پتروشیمی	ملی صنایع پ هش و فناورو		
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222
شركت ملى صنايع پتروشيمى
ب کت بژوهش و فناوری بت وشیم

ТІ 03		A SHEET FOR E	-411 COC	DLING PUMP (P-	شرکت ملی صنایع پتروشیمی IP (P- شرکت پژوهش و فناوری پتروشیمی								
	-,			CENTRIFUG	JAL PUM	P DATA S	SHEET, SI UI			<u>, , , , , , , , , , , , , , , , , , , </u>	- , , ,		
2 3	APPLICABLE	NPC R&	NPC R T CENTRE	- ARAK - IRAN	AS BU	ILT UNIT SREVICE			CES (0 ING PU			Rev	
5	No. of Req'd: NOTES : INFC	2 Service : ORMATION BELOW TO				ВУ	MANUFACTURE	х 🖸 т	BY MAN		OR PURCHASER		
6 7		ITEM NO.	ATTACHED	DATA SHEET		ACHED	ITEM NO.	ATTACHED	NO	DATE	SIONS BY	-	
8	PUMP	P-034	•			>		0	1				
	MOTOR	PM-034				-		0	2				
	GEAR							0	3				
		OVERLAY STANDARD	÷					0	4 5			_	
13	NIT EIGNBEE						•						
14	FLOW, NORM	1AL 30	(m <sup>3</sup> /h) RA	ATED 33	(m <sup>3</sup> /h)	LIQUID TYP	PE OR NAME	WA	TER +	20% GLYCO	DLE		
	OTHER		(Not			HAZAR	dous C	) FLAMMABLE		TOXIC	(5.1.5)		
		ESSURE MAX / RATED	10.8		(bara)		CMD ( <sup>0</sup> C)	MIN. 55		NORMAL	MAX.	_	
	DISCHARGE			4	(bara) (bar)		RESS . (bara)	55		70 0.48	80		
				A >10 (Note 9)	(bai)		DENSITY (SG):			0.96			
		RIATIONS (5.1.4)				VISCOSITY	. ,			0.54			
21	STARTING CO	ONDITIONS (5.1.4)	CLO	OSED DELIVERY VAL	VE		IEAT, C <sub>P</sub>		3.82		(kj/kg .k.)		
		CONT O INT		(STARTS/DAY)			IDE CONCENTRA				(mg/kg)		
23		EL OPERATION REQ'D	· ,	4.0)		+ <del>-</del>	NCENTRATION			W			
24		<u> </u>	<mark>E DATA (5</mark>	.1.3)			E / EROSIVE AGE	-		1 1)	(5.12.1.9)		
25 26	LOCATION: (5	0.1.30) HEATED					H CLASS (5.12.1.				1		
27	-	ICAL AREA CLASSIFICA	÷	-			SIGN METAL TEN				0		
28	•		C,T4 DI			$\smile$	ED HARDNESS N						
29		IZATION REQ D.		CALIZATION REQ D.		BARRE	L/CASE C	S.S	ELLER		C.S		
	SITE DATA (5.						IMPELLER WEAR	ALL CALLED CALLED	aassaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	C.S			
31		E 1889 (m)			(mbar) 4 ( <sup>o</sup> C)			Α	ISI 414	0			
32 33	Ξ	OF AMBIENT TEMPS:MI E HUMIDITY:MIN / MAX		28 /44 /86		DIFFUS		PERFOR	MANC	F		_	
	-	DNDITIONS: (5.1.30)				PROPOSAL	. CURVE NO.				(r/min)	-	
35			-				ER DIA RATED	MAX	۲.	MIN	(mm)		
36	-								CLO	OSE			
37			RIVER TYI	-		1	POWER V		EFFICIE	INCY			
38			) STEAM TU	-			JM CONTINUOUS		DI E		(m <sup>3</sup> /h)		
39 40	O OTHER		(Not	(e 1)			IAL		104040404	то	(m /n) (m³/h)		
40 41		MOTOR	DRIVER (6.	1.1 / 6.1.4)			ABLE OPER. REC	A14141414141414141414141414141414141414		то	(m³/h)		
42		CTURER					EAD @ RATED IN				(m)		
43	Ō	VTA (kw	)		(r/min)	MAX. P	OWER @ RATED	IMPELLER			(kw)		
	FRAME					NPSHR AT RATED FLOW(m) (5.1.10)							
				SERVICE FACTOR			JCTION SPECIFIC		1300		<b>RPM</b> (5.1.11)		
46 47	VOLTS/I	PHASE / HERTZ	400 / ASYNCH		50		OUND PRESS LE			85	(dba) (5.1.16) (dba) (5.1.16)		
		I STARTING VOLTAGE					X. SOUND PRES				(dba) (5.1.16) (dba) (5.1.16)		
			TEMP. RISI	E					<mark>NS (5.1</mark> .	.3) (NOTE 13		-	
50	FULL LO	AD AMPS				ELECTRICI	TY VO	OLTAGE	PI	HASE	HERTZ		
51		ROTOR AMPS				DRIVER	RS	400		3	50	_	
52		IG METHOD		D.O.L		HEATIN		0		2000	(2, ( -)		
		YPE / NUMBER) :				SYSTE! STEAM	M VOLTAGE DIP MAX. PRESS.	O80% MAX. TEN	1	OTHER MIN. PRESS.	(6.1.5) MIN. TEMP	_	
54 55	RADIAL	TPE/NUMBER):	/			DRIVERS	MAX. PRESS.	MAX. TEN	IP	MIN. PRESS.	MIN. LEMP		
56			. /			HEATING	<u> </u>	1					
57		L THRUST CAPACITY				COOLING WATER: (5.1.19) SOURCE							
58	UP	(N)	DOWN		(N)								
59						NORM. PRESS(bar) DESIGN PRESS(bar)							
60 61						MIN. RET. F	RESS.		X. ALLO	vv. D.P.	(bar) (mg/kg)		
62						ONEONIDE	CONCENTION				(mg/ng/		
			D	ocument No.:							Rev.: 0		
			0	wner Job No.:							Type:DAS		
											Page 1 of 4		

PROJECT:	PP- PE	PILOT	PLANT



TITLE: DATA SHEET FOR E-411 COOLING PUMP (P-034)

		CEN	TRIFUGAL F	PUM	P DATA SHEET, SI UNIT						
1	CONSTR				SURFACE PREPARATION AND PAINT	Rev					
2 ROTATION : (VIEWED FR		ID)	cw 🗆 cc	W	MANUFACTURER'S STANDARD     OTHER SEE BELOW						
3 PUMP TYPE : (4.1) API 4 OH2 OH3	610 Он6	OTHER			SPECIFICATION NO. 900-SPC-A4-PD-0002  PUMP :						
5 CASING MOUNTING :			****			******					
	IN-LINE				FINISH COAT						
7					BASEPLATE : (6.3.1.7)						
8 CASING TYPE :					• PRIMER						
9 SINGLE VOLUTE	-		DIFFUSER		FINISH COAT     DETAILS OF LIFTING DEVICES (6.3.20)						
		ED FOR MAWP (5	3 6)		SHIPMENT : (7.4.1)						
12 MAX. ALLOWABLE W			.0.0)	(bar)							
13 @ 100	( <sup>O</sup> C)			-	OUTDOOR STORAGE MORE THAN 6 MONTHS						
14 HYDRO TEST PRESS		1.5 x MAW	VP	(bar)	SPARE ROTOR ASSEMBLY PACKAGED FOR :						
15 NOZZLE CONNECTIO	5. 11.05	(Note 7)		٦							
16 SIZI	RATING	17.00	POSITION		U TYPE OF SHIPPING PREPARATION HEATING AND COOLING						
18 SUCTION 3"		RF			HEATING JACKET REQ D. (5.8.9)	_					
19 DISCHARGE 2 1/2		RF		]	COOLING REQ D.						
20				-	COOLING WATER PIPING PLAN (6.5.3.1)						
21 PRESSURE CASING				٦	C.W. PIPING:						
22	NO.	SIZE (DN)	TYPE								
		1/2" 1/2"	VALVED	-	C.W. PIPING MATERIALS:						
24 VENT 25 💭 WARM-UP		1/2	VALVED	-	S.STEEL C.STEEL GALVANIZED COOLING WATER REQUIREMENTS :						
26				1	BEARING HOUSING (m <sup>3</sup> /h)	A					
27 MACHINED AND STU	DDED CONNECTION	ONS : (5.4.3.8)			HEAT EXCHANGER (m <sup>3</sup> /h)						
28 CYLINDRICAL THREA	ADS REQUIRED (5	.4.3.3)			TOTAL COOLING WATER (m <sup>3</sup> /h)						
29 ROTOR :					HEAT MEDIUM : O STEAM O OTHER						
30 COMPONENT BALAN	ICE TO ISO 1940 G	6 1.0 (5.9.4.4)				_					
31 COUPLINGS :(6.2.2)	VTA		ACER (Type T	ek)	BEARING AND LUBRICATION						
32 ● MANUFACTURER 33 □ RATING (kw per100 r/			ACER (Type 1)	onj	BEARING (TYPE / NUMBER ) (5.10.1) : RADIAL /						
34 SPACER LENGTH			E FACT.								
					LUBRICATION (5.11.3,5.11.4) :						
36 O COUPLING WITH PR	OPRIETARY CLAM	IPING DEVICE (6.2	.1.1)		GREASE OIL						
37 O COUPLING PER ISO											
39		O ASME B1	151								
41 COUPLING GUARD S		<del>,</del> ()	(6.2	2.14a)	ACCELEROMETER (6.4.2.1)						
42 BASEPLATES:					O PROVISION FOR MOUNTING ONLY (5.10.2.11)						
43 API BASEPLATE NUN			(ANNEX D)		FLAT SURFACE REQ D (5.10.2.12)						
44 O NON-GROUT CONST	RUCTION (6.3.13)				TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6)						
	1) /Not- 4	2 5)			PRESSURE GAUGE TYPE						
46 MECHANICAL SEAL : (5.8 47 CATEGORY	.1) (Note 4	· & ɔ) 2									
48 ARRENGMENT		- 1			REMARKS :						
49 TYPE		A		-							
50 PLAN		11		-	MASSES						
51					MASS OF PUMP (kg)						
52					MASS OF BASEPLATE (kg)						
53 54					MASS OF DRIVER (kg)						
55					10 1/12 11/100 (NG)						
56											
		1									
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TITLE: DATA SHEET FOR E-411 COOLING PUMP (P-034)

SPARE PAR	TS (TABLE 18)	MP DATA SHEET, SI UNIT QA INSPECTION AN	ND TESTIN	IG (CONT.)	)	R
	AINTENANCE	TEST	NON-WIT	WIT	OBSERVE	
OTHERS 2 YEARS OF OPERA	TION LIST (Note 8)	HYDROSTATIC (7.3.2)	0		0	
OTHER PURCHAS	ER REQUIREMENTS	PERFORMANCE (7.3.3)	0	•	0	
COORDINATION MEETING REQUIRED	0 (9.1.3)	O RETEST ON SEAL	Ó	Ó	Ó	
O MAXIMUM DISCHARGE PRESSURE TO	DINCLUDE (5.3.2)	LEAKAGE (7.3.3.2D)				
O MAX RELATIVE DENSITY		• NPSH (7.3.4.2)	0		0	
O MAX DIA. IMPELLERS AND / OR N	O OF STAGES	TRUE PEAK VELOCITY	õ	ō	ŏ	
OPERATION TO TRIP SPEED		DATA (7.3.3.4D)	Ŭ	0	0	
$\bigcirc$ OH3 BEARING HS6 LIFTER (8.1.2.6)		COMPLETE UNIT TEST (7.3.4.3)	0	0	0	
CONNECTION DESIGN APPROVAL (5.	12 3 4)	SOUND LEVEL TEST (7.3.4.4)	ŏ	Ĭ	ŏ	
TORSIONAL ANALYSIS REQUIRED (5		CLEANLINESS PRIOR TO		ŏ	ŏ	
TORSIONAL ANALYSIS REPORT (5.9.		FINAL ASSEMBLY (7.2.2.2)	•	$\cup$	$\bigcirc$	
PROGRESS REPORTS (9.3.3)	2.6)		$\frown$	$\cap$	$\frown$	
I Contraction of the second se			Ő	Ő	00	00.000.00
OUTLINE OF PROCEDURES FOR OP			0	0	0	1011001100
ADDITIONAL DATA REQUIRING 20 YEA		MOUNTING PAD SURFACE (6.3.3)	$\sim$	$\sim$	$\sim$	
	PPURTENANCES		0	0	0	
MANIFOLD PIPING TO SINGLE CONNECTI		TEMP P. STABLE (7.3.4.7.1)	~	~	~	
	COOLING WATER	○ 4 HR. MECHANICAL RUN AFTER	0	0	0	
MOUNT SEAL RESERVOIR OFF BASE		OIL TEMP STABLE (7.3.4.7.3)	-	_	~	-
FLANGES REQ D IN PLACE OF SOCK		4 HR. MECH. RUN TEST (7.3.4.7.2)	0	•	0	-
INSTALLATION LIST IN PROPOSAL (9.	2.3L)	O BRG HSG RESONANCE	0	0	0	
CONNECTION BOLTING		TEST (7.3.4.6)				
OPTFE COATING OASTM A	153 GALVANIZED	O AUXILIARY EQUIPMENT	0	0	$\circ$	
		TEST (7.3.4.5)				
QA INSPECTIO	N AND TESTING	IMPACT TESTING (5.12.4.3)	0	0	0	
SHOP INSPECTION (7.1.4)	(Note 6)	O PER EN 13445				0.000
		O PER ASME V III				-
TEST WITH SUBSTITUTE SEAL (7.3.3.	2B)	0	0	0	0	
MATERIAL CERTIFICATION REQUIRED		O VENDOR KEEP REPAIR AND HT RE	Ŷ	Ų	Ŭ	
CASING IMPELLER	SHAFT			,		
	NAL WEARING RINGS, MECH. SEAL F					
CASTING REPAIR PROCEDURE APPR		O INCLUDE PLOTTED VIBRATION SP		(1.0.0.0L)		
	UID PENETRANT		(7.1.0)			
	TRA SONIC					-
	TRA SONIC					
HARDNESS TEST REQUIRED :	(7.2.2.3)					
ADDITIONAL SUBSURFACE EXAMINATION	HON FOR 7.21.3					
FOR						-
METHOD						
	REM	MARKS				
	Document No.:			Rev.:	: 0	
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PROJECT: PP- PE PILOT PLANT		client:	4
TITLE: DATA SHEET FOR E-411 COOLI	ING PUMP (P-034)	- ب يىمى	شرکت ملی صنایع پتروشیم شرکت پژوهش و فناوری پتروش
Note 1: ALL ELECTRICAL MOTORS SHALL	BE IN ACCORDANCE WITH "TECHNICAL SPECIFIC	CATION FOR LV MOTOR" DOC.No.	
900-SPC-A4-EE-0005 MOTOR EN	CLOSURES SHALL BE OF TOTALLY ENCLOSED FAI	N-COOLED (TEFC)	
Note 2: TYPE OF PROTECTION SHALL BE	Aexd		
Note 3: DRY, FLEXIBLE , MULTI DISK ,S.S M	MEMBRANE SPACER TYPE COUPLING SHALL BE	JSED.	
DRIVER HALF COUPLING SHALL B	BE MOUNTED BY PUMP MFR.		
Note 4: MECHANICAL SEAL SHALL BE AS	PER API 682 / ISO 21049 3rd EDITION :2004. VE	NDOR SHALL FILL OUT API 682 (3rd ED.) DATA SHE	ET
FOR MECHANICAL SEALS.			
Note 5: VENDOR IS REQUIRED TO REVIEW	W AND CONFIRM.		
Note 6: REFERE TO "INSPECTION & TEST	PLAN FOR CENTRIFUGAL PROCESS PUMPS" DOC	C.No.: 900-ITP-A4-RE-0001.	
Note 7: ALLOWABLE LOAD AND MOMEN	ITS ON NOZZLES AND FLANGES SHALL BE AS PEF	API 610 (10TH ED.)	
Note 8: SPECIAL TOOLS SHALL BE SUPPLI MAINTANANCE PERIOD.	ED BY VENDOR IF REQUIRED FOR PRE-COMMISI	ONNING,COMMISIONING,START-UP AND	
Note 9: NPSH REQUIRED FOR SELECTED F	PUMP SHALL BE AT LEAST 1 METER LESS THAN N	IPSHA.	
lote 10: DESIGN TEMPRATURE RANGE IS:	: -30 /100 °C.		
Note 11: ESTIMATED SHUT-OFF PRESSURE	E IS 4.8 BARA.		
Note 12: Ex-group: ExdIIBT4			
lote 13:REFERE TO "UTILITY CONDITION"	" DOC.No.: 900-SPC-A4-PR-0006.		
r	Document No.:		Rev.: 0
	Document No.: Owner Job No.:		Rev.: 0 Type:DAS

PROJECT:	PP-PE	PILOT	PLANT

TITLE: DATA SHEET FOR E-421 COOLING PUMP (P-035)



## DATA SHEET FOR E-421 COOLING PUMP (P-035)

client:

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PROJECT	": PP- F	Pe Pilo	T PLAN	іт							client:							<b>*</b>	20		
TITLE: DA	ATA SH	IEET FO	OR E-42	21 COO	LING P	UMP (P	-035)										تروشیمی ن پتروشیمی	ملی صنایع پ هش و فناورو			
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شركت ملى صنايع پتروشيمى
ب کت بژوهش و فناوری بت وشیم

TITLE: DA <sup>-</sup> 035)	TA SHEET FOR E	-421 COC	DLING PUMP (P-	شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی							
,			CENTRIFUG	AL PUM	P DATA S	SHEET, SI UI			((5))	· <b>y</b> <u>U</u> <b>y</b> <u>y</u>	
1 APPLICABL 2 FOR 3 SITE	NPC R&	NPC R	) PURCHASE &T - ARAK - IRAN	AS BU			SERVI	CES (000) ING PUMP (	P-035)		Rev
	I: 1 Service FORMATION BELOW TO	: 1 / Stand BE COMPLE			ВУ	MANUFACTURE		BY MANUFAC		OR PURCHASER	
6	ITEM NO.	ATTACHED	DATA SHEET:		CHED	ITEM NO.	ATTACHED	NO. DAT	REVIS	BY	-
8 PUMP	P-035					TEMINO.	O	1	-		
9 MOTOR	PM-035				>		0	2			
10 GEAR		0					0	3			
11 TURBINE		0		C	$\mathbf{D}$		0	4			
	E OVERLAY STANDARD							5			
13 14 FLOW, NOF	OPERATIN	<u>^</u>		(m <sup>3</sup> /h)		PE OR NAME		TER + 20%			<b>_</b>
15 OTHER		anan -	e 11)		HAZAR		FLAMMABLE			(5.1.5)	
	RESSURE MAX / RATED			(bara)	•	0	MIN.		RMAL	MAX.	
17 DISCHARG	E PRESSURE		4	(bara)	PUMPING T	EMP ( <sup>O</sup> C)	55		70	80	
				(bar)	VAPOUR PR	RESS . (bara)		0	.48		
19 DIFF. HEAD	15.3	(m) NPSHA	>10 (Note 9)	(m)	RELATIVE	DENSITY (SG):		0	.96		
	ARIATIONS (5.1.4)				VISCOSITY	(cP)			.54		
	CONDITIONS (5.1.4)		OSED DELIVERY VAL	VE	SPECIFIC H			3.82		(kj/kg .k.)	
			(STARTS/DAY)			IDE CONCENTRA				(mg/kg)	
÷	LEL OPERATION REQ'D	. ,	4.0		+ <del>-</del>	NCENTRATION			W		
24	<u> </u>	<mark>TE DATA (5</mark>	.1.3)			E / EROSIVE AGE				(5.12.1.9)	
25 LOCATION: 26 INDOC	(5.1.30) PR O HEATED					H CLASS (5.12.1.					
-	RICAL AREA CLASSIFIC	÷	-		-	SIGN METAL TEN				( <sup>o</sup> C)	
-		C,T4 DI			$\smile$	ED HARDNESS N					
	RIZATION REQ D.				$\smile$	L/CASE C		ELLER		C.S	
30 SITE DATA		0			CASE /	IMPELLER WEAR			C.S		
31 ALTITU	JDE <b>1889</b> (m)	BARO	METER 810	(mbar)	SHAFT		AND CONTRACTOR OF CALLSEN	ISI 4140			
32 🍎 RANGI	E OF AMBIENT TEMPS:M	IN,MAX.	-28 / 44	( <sup>0</sup> C)	DIFFUS	SERS					
-	IVE HUMIDITY:MIN / MAX		/ 86	<b>i</b> (%)		D	PERFOR				
	CONDITIONS: (5.1.30)	-	DUST FUMES			CURVE NO.				(r/min)	
_		CORR	OSIVE		-	ER DIA RATED	MAX	International Activity of the State	MIN	(mm)	
36 37		ORIVER TY	DE			.er type Power <b>v</b>	<b>TA</b> (1)	CLOSE EFFICIENCY		(0/)	
		) STEAM TU	-		1.2	JM CONTINUOUS		EFFICIENCT			
	R		-			IAL		BLE		(m <sup>3</sup> /h)	
40		(		*****		RRED OPER. REC		то		(m³/h)	
41	MOTOR	DRIVER (6.	1.1 / 6.1.4)		ALLOW	ABLE OPER. REG	GION	то		(m³/h)	
42 MANUI	FACTURER				MAX. H	EAD @ RATED IM	IPELLER			(m)	
43	VTA (kw	0		(r/min)	MAX. P	OWER @ RATED	IMPELLER			(kw)	
44 🗌 FRAME					NPSHR	AT RATED FLOW	/			(m) (5.1.10)	
45 🖸 HORIZ			SERVICE FACTOR			JCTION SPECIFIC				<b>RPM</b> (5.1.11)	
-	/ PHASE / HERTZ	400 /		50		OUND PRESS LE		85		(dba) (5.1.16)	
	JM STARTING VOLTAGE	ASYNCH	RUNUUS			AX. SOUND PRES				(dba) (5.1.16) (dba) (5.1.16)	
49 NINSUL		TEMP. RISI	5				CONDITIO	NS (5.1.3) (N	OTE 13		-
50 0 FULL L					ELECTRICI		DLTAGE	PHASE		HERTZ	-
	D ROTOR AMPS				DRIVER		400	3		50	
	ING METHOD		D.O.L		HEATIN			-			1
53 🖸 LUBE	ALMAN MARK				SYSTEM	VOLTAGE DIP	○80%	Оот	HER	(6.1.5)	
54 BEARINGS	(TYPE / NUMBER) :				STEAM	MAX. PRESS.	MAX. TEM	IP MIN. I	PRESS.	MIN. TEMP	
55 🔲 RADIA		/			DRIVERS						
56 THRUS		/			HEATING						4
	CAL THRUST CAPACITY					VATER: (5.1.19)	-			()	
58 UP(N) DOWN(N)					SUPPLY TEMP.         (°C)         MAX. RETURN TEMP.         (°C)           NORM. PRESS.         (bar)         DESIGN PRESS.         (bar)						
59											
60 61					MIN. RET. PRESS. (bar) MAX. ALLOW. D.P. (bar) CHLORIDE CONCENTRATION : (mg/kg)						
62					CHEORIDE	CONCENTRATIO	· · · · ·			(IIIg/Kg)	
		D	ocument No.:							Rev.: 0	
		0	wner Job No.:							Type:DAS	
										Page 1 of 4	

PROJECT:	PP- PE	PILOT	PLANT



TITLE: DATA SHEET FOR E-421 COOLING PUMP (P-035)

	CE	NTRIFUGAL F	PUM	P DATA SHEET, SI UNIT	
				SURFACE PREPARATION AND PAIN	Rev
2 ROTATION : (VIEWED FROM COUPLING	END)		W	O MANUFACTURER'S STANDARD	
3 PUMP TYPE : (4.1) API610				SPECIFICATION NO. 900-SPC-A4-PD-000	2
4 💭 ОН2 💟 ОНЗ 💟 ОН6				PUMP :	- monomonomonomonomonomonomonomonomonomon
5 CASING MOUNTING :	_			PRIMER	
	OTHER				
				BASEPLATE : (6.3.1.7)	
8 CASING TYPE : 9 SINGLE VOLUTE MULTIPLE VC	иле Г	DIFFUSER		PRIMER     FINISH COAT	
10 CASE PRESSURE RATING :				DETAILS OF LIFTING DEVICES (6.3.20)	
11 O OH6 PUMP SUCTION REGION DES	GNED FOR MAWP	(5.3.6)		SHIPMENT : (7.4.1)	
12 MAX. ALLOWABLE WORKING PRES		()	(bar)		EQUIRED
13 @ <b>100</b> ( <sup>o</sup> C)				OUTDOOR STORAGE MORE THAN 6 MONTHS	
14 HYDRO TEST PRESSURE	1.5 x MA	WP	(bar)	SPARE ROTOR ASSEMBLY PACKAGED FOR :	
15 NOZZLE CONNECTIONS : (5.4.2)	(Note 7)		п	O VERTICAL STORAGE	iE
16 SIZE FLAN	17100	POSITION			
18         SUCTION         4"         150           19         DISCHARGE         3         1/2"         150			-	HEATING JACKET REQ D. (5.8.9)	
20			1	COOLING REQ D. COOLING WATER PIPING PLAN (6.5.3.1)	
21 PRESSURE CASING AUX. CONNEC	TIONS : (5.4.3)			C.W. PIPING:	
22 NO.	SIZE (DN)	TYPE	1		
23 DRAIN	1/2"	VALVED	]	C.W. PIPING MATERIALS:	
24 🖸 VENT	1/2"	VALVED		S.STEEL C.STEEL GALVANIZED	
25 🖸 WARM-UP				COOLING WATER REQUIREMENTS :	
26				BEARING HOUSING	(m³/h)
27 MACHINED AND STUDDED CONNE				HEAT EXCHANGER	(m <sup>3</sup> /h)
28 O CYLINDRICAL THREADS REQUIRED	0 (5.4.3.3)				(m³/h)
29 ROTOR : 30 COMPONENT BALANCE TO ISO 194	0 G 1 0 (5 0 4 4)			HEAT MEDIUM : O STEAM O OTHER HEATING PIPING : O TUBING O PIPE	
31 COUPLINGS :(6.2.2)	io G 1.0 (3.3.4.4)			BEARING AND LUBRICATION	
32 MANUFACTURER VTA	MODEL S	PACER (Type T	SK)	BEARING (TYPE / NUMBER ) (5.10.1) :	
33 RATING (kw per100 r/min)				RADIAL /	
34 SPACER LENGTH VTA (mm)		CE FACT.		THRUST /	
35 COUPLING BALANCED TO ISO 194				LUBRICATION (5.11.3,5.11.4) :	
	AMPING DEVICE (6	.2.1.1)			
37 O COUPLING PER ISO 14691 (6.2.4)					
38 COUPLING PER ISO 10441 (6.2.4) 39 COUPLING PER API 671 (6.2.4)		D161		CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) : OIL VISC. ISO GRADE	
40 NON SPARK COUPLING GUARD (6.		ыы			
41 O COUPLING GUARD STANDARD PEI		(6.2	2.14a)		
42 BASEPLATES:			,	PROVISION FOR MOUNTING ONLY (5.10.2.11)	
43 API BASEPLATE NUMBER		(ANNEX D)		FLAT SURFACE REQ D (5.10.2.12)	
44 O NON-GROUT CONSTRUCTION (6.3	13)			TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6)	
	4 ~ -`			O PRESSURE GAUGE TYPE	
	e 4 & 5)				
47 CATEGORY 48 ARRENGMENT	2			REMARKS :	
49 TYPE	A		-		
50 PLAN	11			MASSES	
51				MASS OF PUMP (kg)	
52				MASS OF BASEPLATE (kg)	
53				MASS OF DRIVER (kg)	
54				TOTAL MASS (kg)	
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TITLE: DATA SHEET FOR E-421 COOLING PUMP (P-035)

SPARE PAR	TS (TABLE 18)	JMP DATA SHEET, SI UNIT QA INSPECTION AI	ND TESTIN	IG (CONT.)		R
START-UP ONORMAL M	· · · · ·	TEST	NON-WIT	WIT	OBSERVE	
OTHERS 2 YEARS OF OPERA	TION LIST (Note 8)	HYDROSTATIC (7.3.2)	0		0	
	ER REQUIREMENTS	PERFORMANCE (7.3.3)	Õ	Õ	Õ	
COORDINATION MEETING REQUIRE	D (9.1.3)	O RETEST ON SEAL	ŏ	õ	õ	
O MAXIMUM DISCHARGE PRESSURE T		LEAKAGE (7.3.3.2D)	Ŭ	0	U	
	0	● NPSH (7.3.4.2)	0		0	
MAX DIA. IMPELLERS AND / OR N	IO OF STAGES		ŏ	ŏ	ĕ	
	O OF STAGES	DATA (7.3.3.4D)	$\cup$	$\cup$	$\cup$	
OH3 BEARING HS6 LIFTER (8.1.2.6)			$\frown$	0	$\bigcirc$	
			0		Õ	
CONNECTION DESIGN APPROVAL (5		SOUND LEVEL TEST (7.3.4.4)	0		00	
TORSIONAL ANALYSIS REQUIRED (		CLEANLINESS PRIOR TO	•	0	0	
O TORSIONAL ANALYSIS REPORT (5.9	.2.6)	FINAL ASSEMBLY (7.2.2.2)	~	~	~	
PROGRESS REPORTS (9.3.3)		O NOZZLE LOAD TEST (6.3.6)	Õ	Õ	Õ	
OUTLINE OF PROCEDURES FOR OP		CHECK FOR CO-PLANNER	0	0	0	
ADDITIONAL DATA REQUIRING 20 YE	ARS RETENTION (7.2.1.1f)	MOUNTING PAD SURFACE (6.3.3)				
PIPING AND A	PPURTENANCES	O MECHANICAL RUN UNIT OIL	0	0	0	
MANIFOLD PIPING TO SINGLE CONNECT	ION (6.5.1.6)	TEMP P. STABLE (7.3.4.7.1)				
	COOLING WATER	4 HR. MECHANICAL RUN AFTER	0	0	0	
		OIL TEMP STABLE (7.3.4.7.3)	-	Ç	Ç	
FLANGES REQ D IN PLACE OF SOCK		• 4 HR. MECH. RUN TEST (7.3.4.7.2)	0		0	
		BRG HSG RESONANCE	-		ĕ	
	.2.JL)	•	0	$\cup$	$\cup$	an a
		TEST (7.3.4.6)	$\sim$	$\sim$	$\sim$	
č ž	A153 GALVANIZED		0	0	0	
O PAINTED SS		TEST (7.3.4.5)	-	-	-	
	ON AND TESTING	IMPACT TESTING (5.12.4.3)	0	0	0	
SHOP INSPECTION (7.1.4)	(Note 6)	O PER EN 13445				
O PERFORMANCE CURVE APPROVAL		O PER ASME V III				
TEST WITH SUBSTITUTE SEAL (7.3.3	.2B)	0	0	0	0	
MATERIAL CERTIFICATION REQUIRE	D (5.12.1.8)	O VENDOR KEEP REPAIR AND HT RE	ECORDS (7.2	2.1.1C)	-	
CASING IMPELLER	SHAFT	VENDOR SUBMIT TEST PROCEDU	RES (7.3.1.2	/ 9.2.5)		
	NAL WEARING RINGS, MECH. SEAL					
CASTING REPAIR PROCEDURE APPI		O INCLUDE PLOTTED VIBRATION SP				
	QUID PENETRANT		(7.1.0)			
	QUID PENETRANT					
	TRA SONIC					
HARDNESS TEST REQUIRED :		3)				
O ADDITIONAL SUBSURFACE EXAMINA	TION FOR 7.21.3					
FOR						
METHOD						
	RE	MARKS				
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VIEW UNDER THE CONCENTER COULDED FOR THE CONTENT TECHNICAL SPECIFICATION FOR UN MOTOR' DOC.No. 300.59C-A44-6.005 MOTOR SHALL BE AND 400 \$2.000.59C-A44-6.005 MOTOR SHALL BE AND 400 \$2.000.59C MOTOR SHALL FLUTTURE CONTRIBUTION 400 \$2.000.59C MOTOR SHALL FLUTTURE 400 \$2.000.59C MOTOR SHALL FLUTUTURE 400 \$2.000.59C MOTOR SHALL 400 \$2.0000.59C MOTOR SHALL 400	PROJECT: PP- PE PILOT PLANT	-	****** *****
BSPC-AF-EE-GOS MOTOR ENCLOSURES SHALL BE OF TOTALLY ENCLOSED FAN-COOLED (TEFC)         bit 2: TYPG PROTECTION SHALL BE ADDI         BS 1: BVF, TELEBRUK MUTTION S, SANUBMENE SPACER TYPE COUPLING SHALL BE USD.         DRIVER HALF COUPLING SHALL BE MOUNTED BY PUMP MFR.         bit 3: BVF, TELEBRUK MUTTION S, SANUBMENE SPACER TYPE COUPLING SHALL BE USD.         DRIVER HALF COUPLING SHALL BE MOUNTED BY PUMP MFR.         bit 5: MINEDING IS REQUIRED TO RAVIEW AND COMPINI.         bit 6: ENTERT CT 0 THESETTON & TSTEPTING IN CONCENTRUAL BE AS FREAME 100 (DTHE DA)         bit 8: ENTERT CT 0 THESETTON RECENTRUE AND RECENTS PUMPS' DOC.No.: 900-07F-AA-RE-000L.         AUXOPABLE LOAD AND MOMENTS ON NOZZES AND FLANCES SHUMPS' DOC.No.: 900-07F-AA-RE-000L.         bit 0: DESING THEMATURE BANCE: EST ON TORIC ENTERTIONAL EST STRAM NESH.         bit 0: DESING THEMATURE BANCE: EST ON TORIC ENTERTIONAL EST ATEL THE LEST THAN NESH.         bit 0: DESING THEMATURE BANCE: EST ON OCT.         bit 0: DESING THEMATURE BANCE: EST ON TON COLTENT THERE LEST THAN NESH.         bit 0: DESING THEMATURE BANCE: EST ON OCT.         bit 0: DESING THEMATURE BANCE: EST ON OCT. NOT: 900-SPC A4-PR-000C.	TITLE: DATA SHEET FOR E-421 COOLING PUMP (P-035)	بمی شیمی	
iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	Note 1: ALL ELECTRICAL MOTORS SHALL BE IN ACCORDANCE WITH "TECHNICAL SPECIFI	L CATION FOR LV MOTOR" DOC.No.	
bit DRV, FLXIBLE, MULITI DISK, S.S. MEMBRANE SPACER TYPE COUPLING SHALL BE USED.       Deriver NALE COUPLING SHALL BE MOUNTED IN YEAR MARE.         bit MICHANECAS ISSUES       Design of State Sta	900-SPC-A4-EE-0005 MOTOR ENCLOSURES SHALL BE OF TOTALLY ENCLOSED FA	N-COOLED (TEFC)	
DRIVER HALF COUPLING SHALL BE KNOWNED BY PUMP MFR.  DOT: MICHANICAL SEALS SHALL BE KNOWNED AND CONTRAIN. DOT: SHORMARCAL SEALS. DOT: SHO	Note 2: TYPE OF PROTECTION SHALL BE Aexd		
FOR MECHANICAL SEALS.         000       SERVEDON'S REQUIRED TO REVIEW AND CONTIRM.         000       SERVEDON'S INSECTION & TEST PLAN FOR CENTRIFUGAL PROCESS PUMPS' DOC NO: :900-TPL-44-RE-0001.         000       SERVEDON'S SHALL BE SUPPLIED BY VENDOR IF REQUIRED FOR PRE-COMMISIONING, COMMISIONING, START-UP AND MAINTAIANCE PERIOD.         000       SERVEDON'S SHALL BE SUPPLIED BY TENDOR IF REQUIRED FOR PRE-COMMISIONING, COMMISIONING, START-UP AND MAINTAIANCE PERIOD.         000       SERVEDON'S SHALL BE SUPPLIED BY TENDOR IF REQUIRED FOR PRE-COMMISIONING, COMMISIONING, START-UP AND MAINTAIANCE PERIOD.         000       SERVEDON'S TRUCTED PUMP SHALL BE AT LEAST 1 METTR LESS THAN NPSHA.         000       SERVEDON'S TRUCTED PUMP SHALL BE AT LEAST 1 METRE LESS THAN NPSHA.         000       SERVEDON'S TRUCTED PUMP SHALL BE AT LEAST 1 METRE LESS THAN NPSHA.         000       SERVEDON'S TRUCTED PUMP SHALL BE AT LEAST 1 METRE LESS THAN NPSHA.         000       SERVEDON'S TRUCTED PUMP SHALL BE AT LEAST 1 METRE LESS THAN NPSHA.         000       SERVEDON'S TRUCTED ON SHORT SCHALL BE AT LEAST 1 METRE LESS THAN NPSHA.         0000000       SERVEDON'S TRUCTED ON SHORT SCHALL BE AT LEAST 1 METRE LESS THAN NPSHA.         000000       SERVEDON'S TRUCTED ON SHORT SCHALL BE AT LEAST 1 METRE LESS THAN NPSHA.         000000       SERVEDON'S TRUCTED ON SHORT SCHALL BE AT LEAST 1 METRE LESS THAN NPSHA.         000000       SERVEDON'S TRUCTED ON SHORT SCHALL BE AT LEAST 1 METRE LESS THAN N		USED.	
bit 6: REFERE TO "INSPECTION & TEST PLAN FOR CENTRIFUGAL PROCESS PUMPS" DOC.No:: 900-ITP-A4.RE-0001.         bit 7: ALLOVABLE LOAD AND MOMENTS ON NOZZES AND FLANGES HALL BE AS PER PIG DI (DTH ED.)         bit 8: SPECIL TODIS SHALL BE SUPPLIED BY VENDOR IF REQUIRED TOR PRE-COMMISIONING,COMMISIONING,START-UP AND MAINTANANCE PERIOD.         00: 00: 90: THEWRATURE FANGE IS: -30 / 100 °C.         bit 10: DESIGN THEWRATURE FANGE IS: -30 / 100 °C.         bit 11: STIMATED BHUT-OFF PRESSURE IS: -88 BARA.         bit 22: Fargroup: Exaline I         bit 23: REFERE TO "UTILITY CONDITION" DOC. No:: 900-SPC-A4-PR-0006.		ENDOR SHALL FILL OUT API 682 (3rd ED.) DATA SHEE	т
ter 2: ALLOWABLE LOAD AND MOMENTS ON NOZZLES AND FLANGES SHALL BE AS PER API 610 (10TH ED.) tote 3: SECULT TOOLS SHALL BE SUPPLIED BY VENDOR IF REQUIRED FOR PRE-COMMISIONNING,COMMISIONING,START UP AND MAINTAAAURE FERIOD. the 10: DISION TEMPARTURE HANGE IS: -30 / 100 °C. THE 11: STINATTOR BUT-OFP PRESSURE IS 4.8 BARA. THE 11: STINATTOR BUT-OFP PRESSURE IS 4.8 BARA. THE 11: STINATTOR BUT-OFP PRESSURE IS 4.8 BARA. THE 13: REFERE TO "UTILITY CONDITION" DOC.NO: 900 SPC-44-PR-0006.    Document No::  Document No::  Document No::	Note 5: VENDOR IS REQUIRED TO REVIEW AND CONFIRM.		
be Signed Colls Shall be Supplied By Vendor IF REQUIRED FOR PRE-COMMISIONNING,COMMISJONING,START-UP AND MINTANANCE PERID. be Signed Statuse For Supplied By Vendor IF REQUIRED FOR PRE-COMMISIONNING,COMMISJONING,START-UP AND MINTANANCE PERID. be Signed Statuse For Supplied By Vendor II REQUIRED FOR PRE-COMMISIONNING,COMMISJONING,START-UP AND MINTANANCE PERID. be Signed Statuse For Supplied By Vendor Supplied By	Note 6: REFERE TO "INSPECTION & TEST PLAN FOR CENTRIFUGAL PROCESS PUMPS" DO	C.No.: 900-ITP-A4-RE-0001.	
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I: I:STIMATED SHUT-OFF PRESSURE IS 4.8 BARA.           the I2: Ex-group: ExtiliBIT4           ske I3:REFERE TO "UTILITY CONDITION" DOC.No.: 900 SPC-A4-PR-0006.             Document No.:           Document No.:           Document No.:           Document No.:           Document No.:           Document No.:             Type:DAS	Note 9: NPSH REQUIRED FOR SELECTED PUMP SHALL BE AT LEAST 1 METER LESS THAN I	NPSHA.	
In 12: Everyoup: ExellisT4           te 13:REFERE TO "UTILITY CONDITION" DOC.No.: 900-SPC-A4-PR-0006.             Document No.:           Document No.:           Owner Job No.:             Type:DAS	Note 10: DESIGN TEMPRATURE RANGE IS: -30 /100 °C.		
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Industria         OPERATING CONDITIONS (5.1.3)         OPERATING CONDITIONS (5.1.3)           IDUDUTIONS (5.1.3)         IDUDUTIONS (5.1.3)         IDUDUTIONS (5.1.4)           IDUDUTIONS (5.1.4)         6.7         1.1         (true)           IDUDUTIONS (5.1.4)         6.7         1.1         (true)         (true)           IDUDUTIONS (5.1.4)         6.7         1.1         (true)         (true)         (true)           IDUDUTIONS (5.1.4)         6.7         1.1         (true)         (true)         (true)         (true)           IDUDUTION (5.1.3)         CONCONS (5.1.4)         0.0         (true)         (true)         (true)           IDUDUTION (5.1.3)         CONCONS (5.1.4)         0.0				-		Ý				
Lip APPLCAUE CONCENT OF THE CONTINUE (S.G.3)         LOUD (S.13)           14 I.C.W. NORMAL         5         (m <sup>1</sup> )         Are to (m <sup>1</sup> )         LUD (S.13)           14 I.C.W. NORMAL         5         (m <sup>1</sup> )         Are to (m <sup>1</sup> )         LUD (S.13)           16 OCC NORMAL SCIENCY 60.PT ELP.         5.0         (m <sup>1</sup> )         LUD (S.13)           16 OCC NORMAL SCIENCY 60.PT ELP.         5.0         (m <sup>1</sup> )         HARE AND (S.13)           17 OF TEAL         3.2         (m <sup>1</sup> )         (m <sup>1</sup> )         (m <sup>1</sup> )           18 INCTION RESSURE MAX (NORMAL         6.0         (m <sup>1</sup> )         (m <sup>1</sup> )         (m <sup>1</sup> )           20 INTEREMITAL PRESSURE         3.2         (m <sup>1</sup> )         (m <sup>1</sup> )         0.6.6           21 INT. HEAD 9 G.O         (m <sup>1</sup> )         (m <sup>1</sup> )         0.6.6         (m <sup>1</sup> )           21 INT. HEAD 9 G.O         (m <sup>1</sup> )         (m <sup>1</sup> )         (m <sup>1</sup> )         0.6.6         (m <sup>1</sup> )           21 INT. HEAD 9 G.O         (m <sup>1</sup> )         (m <sup>1</sup> )         (m <sup>1</sup> )         (m <sup>1</sup> )         0.6.6           22 INT. HEAD 9 G.O         (m <sup>1</sup> )           21 INT. HEAD 9 G.O         (m <sup>1</sup> )         (m <sup>1</sup> ) <td></td> <td></td> <td></td> <td>ŏ</td> <td></td> <td>ŏ</td> <td></td> <td></td> <td></td>				ŏ		ŏ				
I COUNT NORMAL         5         OP/IN         DUID TYEE OF NAME         HEXANE           I COUNT PERSING 40 C. TERM         60.0         PREVING 40 C. TERM         60.0         PREVING 40 C. TERM         60.0           III SUCTOR NESSURE MX. NORMAL         4.3         Bond         PREVING 40 C. TERM         60.0           III SUCTOR NESSURE MX. NORMAL         4.3         Bond         PREVING 40 C. TERM         60.0           III SUCTOR NESSURE MX. NORMAL         6.0         IIII SUCTOR MERSING 10         60.0         IIII SUCTOR MERSING 10         60.0           III SUCTOR NESSURE MX. NORMAL         6.0         IIII SUCTOR MERSING 10         60.0         IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	12	APPLICABLE OVERLAY STANDARD(S) : API 610 (10TH EDITION)					5			
Is 0=0=0=0=0=0=0=0=0=0=0=0=0=0=0=0=0=0=0=	13				•	LIQUID (				
Non-Construic DP, TELEP.         0.3 (cp)         Max. viscosity at min. tamp.         0.6 (cp)           19         SUCTON PERSIDLE MAY NORMAL         6.7 / /         1.1 (trans)           19         SUCTON PERSIDLE MAY NORMAL         6.7 / /         1.1 (trans)           19         SUCTON PERSIDLE MAY NORMAL         6.7 / /         1.1 (trans)           20         PERSIDLE MAY NORMAL         6.0 (m)         0.6 (cp)           21         MAX HEAD & C.O.         6.0 (m)         0.0 (m)         0.0 (m)           21         MAX HEAD & C.O.         6.0 (m)         0.0 (m)         0.0 (m)           21         MAX HEAD & C.O.         6.0 (m)         0.0 (m)         0.0 (m)           22         SOLDB         MAX HEAD & C.O.         2.1 (max)         90 (m)           25         SOLDB         MAX HEAD & C.O.         NA         (max)           26         SOLDB         MAX HEAD & C.O.         NA         (max)           27         SOLDA         MAX HEAD & C.O.         NA         (max)           28         COATONS (S 1.20)         COATONS (S 1.20)         COATONS (S 1.20)         COATONS (S 1.20)           29         MAX HEAD & C.O.         MAX HEAD & C.O.         (MAX)         (S 1.0 (m)				_	-					
Vip Work and the provide methods and the provide method in the pr				HAZA	RDOUS	INFLAMMAE		(5.1.5)	*****	
Ising Submit Pressure         Image: Submit Pressure </td <td></td> <td></td> <td> (cp)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			(cp)							
Dependentity pressure         3.2         (m)         Autor press, (ma)         0.41           20 brf HEAD 8 0-0         0.0         (m) NPSH At 8 0 rad 10 (Nots 9)         (m)         0.53 at AMB           21 MAX HEAD 8 0-0         0.0         (m)         0.53 at AMB         (m)           21 MAX HEAD 8 0-0         0.0         (m)         0.53 at AMB         (m)           21 MAX HEAD 8 0-0         (m)         0.53 at AMB         (m)         0.53 at AMB           21 MAX HEAD 8 0-0         (m)         CLOSED DELIVERY VALVE         SPECIFIC HEAT, C         2.17         (m) MA           21 MAX HEAD 8 0-0         (m)         THE MATA (\$1.3)         (m)         Chick (\$1.50)         (m)         (m) MAX           22 DEVECTED CHART (\$1.30)         INTEGRAT (\$1.31)         INTEGRAT (\$1.32)         (m)         (m) CORROW (\$1.30)         (m)         NM EXAL (\$1.51)         AT (Note 5)         (m)           23 OLICATION (\$1.30)         INTEGRAT (\$1.31)         INTEGRAT (\$1.30)         INTEGRA			(bara)			MIN.	NORMAL	MAX.		
21         DEF         S0.0         (m) NPSHA & 0 rand         10 (Note 9)         (m)           21         DEF         MAX         FEAD         0.66	19	DISCHARGE PRESSURE 4.3	(bara)	PUMPING	TEMP ( <sup>o</sup> C)		30-40			
22 MAX. HEAD & G-D         60.0         (m)         WOOSTY (GP)         0.3 at AMB           22 MAX. HEAD & G-D         0.0         (m)         WOOSTY (GP)         0.3 at AMB           29 MORESS WARKINS (5.14)         CLOSED DELIVERY VALVE         SPECIFIC LEAT. C,         2.17         (w/gk ).           29 SULDS:         0.0         VES         1.1 (brs)         (mgkg)         (mgkg)         (mgkg)           29 SULDS:         0.00         VES         5.11 (brs)         (mgkg)         (mgkg)         (mgkg)           29 SULDS:         0.11 (brs)         0.11 (brs)         0.11 (brs)         (mgkg)         (mgkg)         (mgkg)         (mgkg)           30 OLIDOOR         0.11 (brs)         0.11 (brs)         0.11 (brs)         (mgkg)         (mgkg)         (mgkg)         (mgkg)           31 OLIDOOR         0.11 (brs)         0.11 (brs)         0.11 (brs)         (mgkg)							-			
22       PROCESS VARIATIONS (6: 1.4)       CLOSED DELIVERY VALVE         STARTING CONTONS (6: 1.4)       CLOSED DELIVERY VALVE       SPECIFIC HEAT, C,       2.17       (Myg A)         Stracting Control Not (6: 1.4)       CLOSED DELIVERY VALVE       SPECIFIC HEAT, C,       2.17       (Myg A)         Stracting Control Not (6: 1.4)       Main Endmatchesite       CHLORIDE CONCENTRATION Not (6: 5.2.4)       NAA       (myg A)         Stracting Control Not (6: 1.4)       Stree Data (6: 1.4)       ChLORIDE CONCENTRATION Not (6: 1.2.1)       ChLORIDE CONCENTRATION NOT (7: 1.2.1)			(m)		. ,			1		
24 STARTING CONDITIONS (61.14)       CLOSED DELIVERY VALVE       SPECIFIC HEAT, C.       2.17       (N/49 k.)         25 SOLDS:       NO       YES       Image: Constant of the consta				1300511	, (UF)		U.S AT AIVE	<u> </u>		
22       Solution vasael       11 (bara)         Pressure at usion vasael       NITE (bara)         27       SERVICE:       CONCENTRATION (S1.24.1)         28       DADLEL OPERATION RED (S.1.1)       Charlot (S1.20)         29       DATE DATA (S1.3)       CORRODM: [ERCOVE ACENT       NA         20       DATA (S1.30)       CORRODM: [ERCOVE ACENT       NA       (S12.19)         20       DELECTRICA. AREA (LASSIFCATION (S1.24.1.1)       ATNEX 14.55 (S1.21.1)       ATNEX 14.55 (S1.21.1)       ATNEX 14.55 (S1.21.1)         20       DELECTRICA. AREA (LASSIFCATION (S1.24.1.6.1.4)       East (S1.21.1)       ATNEX 14.55 (S1.21.1)       ATNEX 14.55 (S1.21.1)         21       OLINE CONCENTRATION (S1.24.1.6.1.4)       East (S1.21.1)       ATNEX 14.55 (S1.21.1)       ATNEX 14.55 (S1.21.1)         22       OLINE CONCENTRATION (S1.24.1.6.1.4)       East (S1.21.1)       ATNEX 14.55 (S1.21.1)       ATNEX 14.55 (S1.21.1)         23       ONTERO ALSSIGNATION (S1.24.1.6.1.4)       East (S1.21.1)       ATNEX 14.55 (S1.21.1)       ATNEX 14.55 (S1.21.1)         23       ONTERO ALSSIGNATION (S1.24.1.6.1.4)       East (S1.21.1)       ATNEX 14.55				SPECIFIC	HEAT, C <sub>P</sub>	L	2.17	(kj/kg .k.)	-	
27       SERVICE:       © ONTERNITERIT (STATISDAV)       — OF-LORIDE CONCENTRATION (8:52:4)       NA       (morphy)         20       PARALLEL OPERATION REDD (5:13)       — OF-LORIDE CONCENTRATION (8:52:4)       NA       (morphy)         30       LOCATION: (5:13)       — OF-LORIDE CONCENTRATION (8:52:4)       NA       ((5:12)         31       LOCATION: (5:13)       — OF-LORIDE CONCENTRATION (8:52:4)										
20         PARALLEL OPERATION REOD (5.13)         H = GONCENTRATION NA         (molifaction)         WET (5.12,12,0)           20         SITE DATA (5.13)         CORROSIVE / ROSIVE AGENT         NA         (5.12,0)           21         DIDOOR         O HATEBLAS (5.12,11)         A.7 (Note 5)           22         ELECTENCIAL AREA CLASSIFICATION (5.12,16,14)         HattenLas (5.12,11)         A.7 (Note 5)           23         DELECTENCIAL AREA CLASSIFICATION (5.12,16,14)         Hauten (5.12,11)         A.7 (Note 5)           33         C.1         GR         C.74         DIV         2(Note 2)           34         WINTEREXATION RED D.         TROPICALIZATION RED D.         BRART         BEDUCED HARDINESS MARETAL TEMP (51,22,11)         A.7 (Note 5)           35         FLATTUCE MARIENT TEMPSMINARAX         28         6 (Not 0)         BRART         BRART         BRART         S.S.           30         MUSUAL CONTONS (5,130)         DUILT         FUMES         S.S.         S.S.         S.S.           31         DINUCTION MOTOR         GERATION MARTA         28         GERATION MARTA         S.S.         S.S.           32         O ROLOR DRIVER (6,1.1/6,1.4)         Immetuler Not NAX         MAX         MAX         MAX           34         O HOUCTON M		. ,								
29         SITE DATA (5.1.3)         CORROSKE (ERGUNA CENT         NA         (5.12.19)           30         LOCATION (5.1.30)         AMTERIALS (5.12.1.1)         ATTRIALS (5.12.1.1)         ATTRIALS (5.12.1.1)           31         OLICATION (5.1.30)         OUTDOOR         UNHEATED         AMNEX H CLASS (5.12.1.1)         A.7 (Note 5)           32         ELECTRICAL AREA CLASSIFICATION (5.1.24/ 6.1.4)         EXAMIB 174         Charles (5.1.2.1)         AANNEX H CLASS (5.12.1.1)         BARREL/ CASS         S.5           33         STEE DATA (5.1.30)         TOP/CALIZATION RED D.         TOP/CALIZATION RED D.         Charles (5.1.2)         BARREL/ CASS         S.5           34         MANGE OF AMBIENT TEMPS MINAX,         28         /         46         (************************************		+		Ŧ						
30       DCATION: (5.130)       MATERIALS (5.12.1)       AT(No.05)         31       O INDOOR       O UNDOOR       UNHEATED         32       D. LECTRICAL AREA CLASSIFICATION (5.124 / 6.1.4)       Exist in 154         33       C. I. G. G. C.14       D/V       2(Note 2)         34       O TROPORALIZATION RED D.       O TROPORALIZATION RED D.         35       STED ATA (5.130)       BARMETER       810         36       MATTINUE       1889       (m)       BARMETER         37       RANEG OF AMBIENT TEMPS MIN.MAX.       _22       / 44       (°C)         38       STED ATA (5.130)       DIST       FUMES       PERFORMANCE         39       UNUSULA CONTINUES (S.130)       DIST       FUMES       PERFORMANCE         30       UNUSULA CONTINUES (S.130)       DIST       FUMES       PERFORMANCE         30       OTHER       (Motor)       CORROSIVE       IMPELLER TYPE       COSE         30       INDUCTION MOTOR       STEAM TURBINE       GEAR       (min)       (min)         40       OTHER       (Motor)       IMPELLER TYPE       (Motor)       (min)         41       O MOTOR DRIVER (6.1.1 / 6.1.4)       (Motor)       (min)       (min)       (min)							-			
31       O INDOOR       HEATED       O UNDOOR       UNHEATED         32       O INDOOR       UNHEATED       O UNDOOR       UNHEATED         33       O INDOR       1 G R       AT (Non 5)       O UNDOOR         34       O INTERIZATION RED.       O TROPICALIZATION RED.       O ONDOR       O ONDOR         34       O UNTERIZATION RED.       O TROPICALIZATION RED.       O ONDOR       O ONDOR       O ONDOR         35       STEDATAG.       O TROPICALIZATION RED.       O ONDOR       O ONDOR       O ONDOR       O ONDOR         36       ALITTUDE       1889       (m) DAROMETER       810       (ména)       O DIST OF FUER       O ONDOR       O ONDOR <td></td> <td></td> <td></td> <td>CONTROOP</td> <td></td> <td></td> <td></td> <td>(0.12.1.0)</td> <td></td>				CONTROOP				(0.12.1.0)		
22       ELECTRICAL AREA CLASSIFICATION (5: 1.24 / 6: 1.4)       Examination (5: 1.24 / 6: 1.21: 1.2)       GMIN DESIGN MERAL SREED, (5: 1.21: 1.2)       GMIN DESIGN MERAL SREED, (5: 1.21: 1.2)         34       OWINTERZATION REQ D.       OTROPICALIZATION REQ D.       GMIN DESIGN MERALS SREED, (5: 1.21: 1.2)       BARREL / CASSIFICATION (5: 1.24 / 6: 1.2)         35       SITE DATA (5: 1.20)       BAROMETER       810       (mon)         36       ALTITUDE       1889       (m) BAROMETER       810       (mon)         37       RANGE CF AMEENT TEMPSMINAAX.       28       / 44       (°C)         39       UNUSUAL CONDITIONS (5: 1.30)       DUST       FUMES       PROPOSAL CURVE NO.       (mmn)         39       UNUSUAL CONDITIONS (5: 1.30)       DUST       FUMES       MARED PONCER       MAX         40       OTHER       (Note 1)       MARED PONCER       MAX.       (mmn)         42       ONUCTION MOTOR       OTHER       (Moto 1)       MAX DECONSTRUE       (mmn)         44       OTHER       (Note 1)       HERETALE       (mmn)       MAX POWER RECONSTRUE       (mmn)         45       NDUCTION MOTOR       OTHER       (Moto 1)       HERETALE       (mmn)       MAX POWER RETALE       (mmn)         46       OTHER       (Note					X H CLASS (5.12.1	.1)	A-7 (Note 5		*****	
34       WINTERIZATION REQ D.               TROPICALIZATION REQ D.               EBARREL / CASE       MPELLER              S.S.               STE DATA (5.130)               BARREL / CASE              S.S.               STE DATA (5.130)               BARREL / CASE              S.S.               STE DATA (5.130)               BARREL / CASE              S.S.               STE DATA (5.130)               STE DATA (5.130)               STE DATA (5.130)               STE DATA (5.130)               DIFUER               STE DATA (5.130)               PERFORMANCE               DIFUER               DIFUER               DIFUER               DIFUER               DIFUER               DIFUER               STEAM TURBINE               STEAM TURBINE               STEAM TURBINE               STEAM TURBINE               STEAM TURBINE               MAX.URVORE               MAX.URVORE               MAX.URVORE               MAX.URVORE               MAX.URVORE               MAX.URVORE               MAX.URVORE               STEAM               MAX.URVORE               STEAM	32	ELECTRICAL AREA CLASSIFICATION (5.1.24 / 6.1.4) Exia IIB T4						( <sup>O</sup> C)		
35       Step DATA (6,1.30)       BABOMETER       810 (mbar)         36       MALTTUDE       1889 (m)       BAROMETER       810 (mbar)         37       RARGE OF AMBIENT TEMPSMIN,MAX.       _28       /       44       (°C)         38       StelaTUS HUMIDITYMIN /MAX       _       28       /       44       (°C)         38       StelaTUS HUMIDITYMIN /MAX       _       _       86       (%)       PERFORMANCE         90       OTHER       CORROSIVE       IMPELLER VIPE       CALEX / MAX       (mm)         40       OTHER       CORROSIVE       IMPELLER TYPE       CLOSE       (%)         41	33	CL I GR C,T4 DIV 2(Note 2)								
38       ALTITUDE       1889       (m)       BAROMETER       810       (mon)         37       RAAGE OF AMBIENT TEMPS-MIN,MAX.       28       / 44       (°C)         39       REALTITUE HUMIDITY-MIN, MAX.       / 86       (%)       PERFORMANCE         30       UNUSUAL CONDITIONS. (5.1.30)       D UST       FUMES       PROPOSAL CAVE NO.       (min)         40       OTHER       CORROSIVE       IMPELLER TYPE       EATED POWER       CLOSE       (min)         41       INDUCTON MOTOR       STEAM TURBINE       GEAR       IMMELLER TYPE       CLOSE       (%)         42       INDUCTON MOTOR       STEAM TURBINE       GEAR       IMMELLER TYPE       CLOSE       (%)         44       OTHER       (Note 1)       PREFERENED OPER REGION       TO       (%)         44       MANUFACTURER       MANUFACTURER       IMANUEAD (RATED IMPELLER (M)       (M)         46       VTA       ENCLOSURE       IMAX. SOUND PRESELEVEL (M)       (M)         50       HORZONTAL       VERTICAL       SERVICE FACTOR       IMAX. SOUND PRESELEVEL (M)       (M)         51       VOTA       SERVICE FACTOR       IMAX. SOUND PRESELEVEL (M)       (M) (M)       (M)       (M)         52								S.S.		
37       RANGE OF AMBEINT TEMPS-MIN,MAX.       -28       /       44       (°C)       DIFFUSERS         38       RELATIVE HUMIDITY-MIN JMAX       /       86       (%)       PERFORMANCE         30       UNUSUAL CONTINUAS; (5.1.30)       DUST       FUMES       PERFORMANCE         41       CORROSIVE       IMPELLER NIP       CLOSE       (min)         42       OTHER       CORROSIVE       IMPELLER NIP       CLOSE         43       INDUUCTON MOTOR       STEAM TURBINE       GEAR       IMMULACONTINUOUS FLOW:       (min)         44       OTHER       (Note 1)       PREFERRED OPER. REGION       TO       (min)         44       OTHER       (Note 1)       PREFERRED OPER. REGION       TO       (min)         47       MANUFACTURER       (MANUFACTURER       (min)       MAX.POWER © RATED IMPELLER       (min)         48       VTA       (ww)       eNCLOSURE       (MAX.POWER © RATED IMPELLER       (min)         49       PRAME       eNCLOSURE       MAX.SOUND PRESS LEVEL MED.       65. (dba) (5.1.16)         40       UPSTYPE       ASYNCHRONOUS       EST MAX.SOUND PRESS LEVEL (dba) (5.1.16)       EST MAX.SOUND PRESS LEVEL (dba) (5.1.16)         50       MINIMINIA STARTING VOLTAGE (6.1.5)			(mbar)			RINGS	S.S			
38       RELATIVE HUMIDITYMIN / MAX       /       86       (%)       PERFORMANCE         39       UNUSUAL CONDITIONS. (5.1.30)       DUST       FUMES       PROPOSAL CURVE NO.       (mmin)         41       OTHER       CORROSIVE       Immediate RATED       MAX.       MIN       (mmin)         42       DRIVER TYPE       CLOSE       (mmin)       (mmin)       (mmin)         44       OTHER       (Note 1)       Immediate RATED       (mmin)       (mmin)         44       MOTOR DRIVER (61.1 / 6.1.4)       Immunum Construction Constructions       (min)       (mmin)         44       MANUFACTURER       (mmin)       Immunum Constructions       (min)       (mmin)         47       MANUFACTURER       (min)       Immunum Constructions       (min)       (min)         48       VTA       (wol)       (min)       Immunum Constructions       (min)         49       FRAAME       Immunum Constructions       (min)       Immunum Constructions       (min)         49       FRAME       Immunum Constructions       Immunum Constructions       (min)       Immunum Constructions       (min)         40       FRAME       Immunum Constructions       Immunum Constructins       (min)       Immunum Constr			A DE LA DE							
40       OTHER       CORROSIVE       IMPELLER DIA RATED       MAX.       MIN       (mm)         41       INDUCTION MOTOR       STEAM TURBINE       GEAR       IMPELLER TYPE       INDUCTION MOTOR       (%)         42       OTHER       (Note 1)       IMPELLER TYPE       IMMUM CONTINUOUS FLOW:       (%)         43       OTHER       (Note 1)       IMMUM CONTINUOUS FLOW:       (m <sup>2</sup> /h)       (m <sup>2</sup> /h)         44       OTHER       (Note 1)       IMMUM CONTINUOUS FLOW:       (m <sup>2</sup> /h)       (m <sup>2</sup> /h)         45       MANUFACTURER       IMANUFACTURER       IMAX. DWAR. (#AD @ RATED IMPELLER       (m)         46       VTA       (w)       (m')       (m')       IMAX. SUCTON SPECIFIC SPEED:       13000 M3/H;M,RPM (51.10)         47       MANUFACTURER       IMAX. SOUND PRESS LEVEL REQ. D       85 (dba) (51.16)       1000 M3/H;M,RPM (51.11)         48       VERTICAL       SERVICE FACTOR       MAX. SOUND PRESS LEVEL (dba) (51.16)       13000 M3/H;M,RPM (51.11)         50       MINIMUM STARTING VOLTAGE (6.1.5)       EST MAX. SOUND PRESS LEVEL (dba) (51.16)       1000 M3/H;M,RPM (51.16)         51       USULATION       OTHER       INTUTY CONDITIONS (51.3) (Note 11)       1000 M3/H;M,RPM (51.16)         52       STARTING METHOD       D.O.L						PERFORM	ANCE			
41       Impeller type       CLOSE         42       ORIVER TYPE       CLOSE         43       INDUCTION MOTOR       Stam Turbine       Gear         44       MOTOR OTTAL       MOTOR DRIVER (6.1.1 / 6.1.4)       MINIMUM CONTINUOUS FLOW:       THERMAL         46       MOTOR DRIVER (6.1.1 / 6.1.4)       ALLOWABLE OPER. REGION       TO       (m <sup>3</sup> /h)         47       MANUFACTURER       MAX. HEAD @ RATED IMPELLER       (m)         48       VTA       (w)       MXX. HEAD @ RATED IMPELLER       (m)         49       FRAME       ENCLOSURE       (m)       MAX. POWER @ RATED IMPELLER       (m)         49       FRAME       ENCLOSURE       MAX. SOUND PRESS LEVEL       (dba) (5.1.16)       MAX. SOUND PRESS LEVEL       (dba) (5.1.16)         50       MINIMUM STARTING VOLTAGE (6.1.5)       THEP. RISE       UTILITY CONDITIONS (5.1.3) (Note 11)       MAX. SOUND PRESS LEVEL       (dba) (5.1.16)         51       STARTING METHOD       D.O.L       STARTING MINUS (5.1.3) (Note 11)       ELECTRICITY       VOLTAGE (6.1.5)         52       TYPE / NUMBER) :       ELOKER AMPS       STARTING MINUS (5.1.3) (Note 11)       ELECTRICITY       VOLTAGE (6.1.5)         53       STARTING WETHOD       D.O.L       STERM VOLTAGE DIP       80% OTHER	39	UNUSUAL CONDITIONS: (5.1.30)		PROPOSA	L CURVE NO.			(r/min)		
42       DRIVER TYPE       RATED POWER       VTA       (w) EFFICIENC:       (%)         43       INDUCTION MOTOR       STEAM TURBINE       GEAR       IMINIMUM CONTINUOUS FLOW:       (%)         44       OTHER       (Note 1)       Iminimum Continuous FLOW:       (m)/h)       Iminimum Continuous FLOW:         45       MOTOR DRIVER (6.11/6.1.4)       Iminimum Continuous FLOW:       (m)/h)       Iminimum Continuous FLOW:       (m)/h)         46       MOTOR DRIVER (6.11/6.1.4)       Iminimum Continuous FLOW:       TO       (m)/h)         47       MANUFACTURER       (m)       Iminimum Continuous FLOW:       (m)         48       VTA       (kw)       Iminimum Continuous FLOW:       (m)         49       FRAME       ENCLOSURE       (m)       MAX. POWER @ RATED INPELLER       (kw)         49       PREFERES LEVEL       (hava, Sound PRESS LEVEL       (cbava) (5.1.10)       MAX. SOUND PRESS LEVEL       (cbava) (5.1.16)         50       MINIMUM STARTING VOLTAGE (6.1.5)       Iminimum Starting VOLTAGE (6.1.5)       EST MAX. SOUND PRESS LEVEL       (cbava) (5.1.16)         51       INSULATION       TEMP. RISE       Iminimum Starting VOLTAGE (6.1.5)       Starting VOLTAGE (6.1.5)       Starting VOLTAGE (6.1.5)         52       TYPE       ASYNCHRONOUS		OTHER CORROSIVE				MA		(mm)		
43       INDUCTION MOTOR       O STEAM TURBINE       GEAR       Iminimum Continuous FLOW:         44       O THER       (Note 1)       Iminimum Continuous FLOW:       (m <sup>2</sup> /h)         45       OTHER       (Note 1)       Iminimum Continuous FLOW:       (m <sup>2</sup> /h)         46       MOTOR DRIVER (6.1.1 / 6.1.4)       Iminimum Continuous FLOW:       (m <sup>2</sup> /h)         47       MANUFACTURER       Iminimum Continuous FLOW:       (m <sup>2</sup> /h)         48       MANUFACTURER       Iminimum Control (m <sup>2</sup> /h)       Iminimum Control (m <sup>2</sup> /h)         49       FRAME       Enclosure       Iminimum Artebale OPER, REGION       To       (m <sup>2</sup> /h)         49       FRAME       Enclosure       Iminimum Artebale OPER, REGION       To       (m <sup>2</sup> /h)         49       FRAME       Enclosure       Iminimum Artebale OPER, REGION       To       (m <sup>2</sup> /h)         50       Horizontal       VERTICAL       SERVICE FACTOR       MAX SOUND PRESS LEVEL REO. D       85 (dba) (5.1.6)         51       VOLTS / PHASE / HERTZ       400       / 3       / 50       Iminimum Sound Press Level       (dba) (5.1.6)         52       TYPE       ASYNCHRONOUS       EST MAX SOUND PRESS Level REO. D       85 (dba) (5.1.6)       Iminimum Sound Press Level       (dba) (5.1.6)					ALARLALALALALALALALALA	TA (loui		(0/)		
44       O OTHER       (Note 1)       THERMAL       (m <sup>3</sup> h) STABLE       (m <sup>3</sup> h)         45       MOTOR DRIVER (6.1.1 / 6.1.4)       PREFERRED OPER. REGION       TO       (m <sup>3</sup> h)         46       MOTOR DRIVER (6.1.1 / 6.1.4)       ALLOWABLE OPER. REGION       TO       (m <sup>3</sup> h)         47       MANUFACTURER       ALLOWABLE OPER. REGION       TO       (m <sup>3</sup> h)         48       VTA       (kw)       MAX. HEAD @ RATED IMPELLER       (m)         49       FRAME       ENCLOSURE       (m/m)       MAX. POWER @ RATED IMPELLER       (m)         50       HORIZONTAL       VERTICAL       SERVICE FACTOR       MAX. SOUND SPECIFIC SPEED:       13000 M3/Hr,M,RPM (6.1.1)         51       VOLTS / PHASE / HERTZ       400       3       50       MAX. SOUND PRESS LEVEL       (dba) (5.1.6)         52       TYPE       ASYNCHRONOUS       EST MAX. SOUND PRESS LEVEL       (dba) (5.1.6)       51.3) (Motel 1)         53       MINIMUM STARTING VOLTAGE (6.1.5)       MINIMUM STARTING VOLTAGE (6.1.5)       UIL LOAD AMPS       UIL LOAD AMPS         54       LOCKED ROTOR AMPS       D.O.L       STEAM       MAX. TEMP       MIN. PRESS       MIN. TEMP         56       LOCKED ROTOR AMPS       D.O.L       STEAM       MAX. PRESS       MAX. TEM		*			****************					
46       MOTOR DRIVER (6.1.1 / 6.1.4)       ALLOWABLE OPER. REGION       TO       (m <sup>3</sup> /h)         47       MANUFACTURER       MAX. HEAD @ RATED MMELLER       (m)         48       VTA       (kw)       MAX. HEAD @ RATED IMPELLER       (kw)         49       FRAME       ENCLOSURE       MAX. POWER @ RATED IMPELLER       (kw)         50       HORIZONTAL       VERTICAL       SERVICE FACTOR       MAX. SOUND PRESS LEVEL. RED. D       85       (dba) (5.1.10)         51       VOLTS / PHASE / HERTZ       400       3       /       50       MAX. SOUND PRESS LEVEL. RED. D       85       (dba) (5.1.16)         52       TYPE       ASYNCHRONOUS       EST MAX. SOUND PRESS LEVEL       (dba) (5.1.16)         53       OMINIMUM STARTING VOLTAGE (6.1.5)       EST MAX. SOUND PRESS LEVEL       (dba) (5.1.16)         54       INSULATION       O TEMP. RISE       ELECTRICITY       VOLTAGE       PHASE       HERTZ         56       FULL LOAD AMPS       DRIVERS       400       3       50       HIVERS       400       3       50         57       STARTING METHOD       D.O.L       SYSTEM VOLTAGE DIP       80% OTHER       (6.1.5)       53         58       EARINGS (TYPE / NUMBER) :       DRIVERS       MAX. P							ABLE			
47       MANUFACTURER       (m)         48       VTA       (kw)       (r/min)         49       FRAME       ENCLOSURE       (m)         50       HORIZONTAL       VERTICAL       SERVICE FACTOR       MAX. POWER @ RATED IMPELLER       (kw)         51       VOLTS / PHASE / HERTZ       400       / 3       / 50       MAX. SOUND PRESS LEVEL REQ. D       85       (dba) (5.1.16)         52       TYPE       ASYNCHRONOUS       EST MAX. SOUND PRESS LEVEL REQ. D       85       (dba) (5.1.16)         53       MINIMUM STARTING VOLTAGE (6.1.5)       EST MAX. SOUND POWER LEVEL       (dba) (5.1.16)         54       INSULATION       O TEMP. RISE       UTILITY CONDITIONS (5.1.3) (Note 11)         55       FULL LOAD AMPS       ELECTRICITY       VOLTAGE PHASE       HERTZ         56       LIOBE       SYSTEM VOLTAGE DIP       80%       OTHER       (6.1.5)         58       ELUBE       STRAM       MAX. PRESS.       MAX. TEMP       MIN. TEMP         57       STARTING METHOD       D.O.L       STEAM       MAX. PRESS.       MAX. TEMP       MIN. TEMP         58       BERINGS (TYPE / NUMBER):	45	-		PREF	ERRED OPER. REC	GION	то			
48       VTA       (kw)       (kw)       (kw)       (kw)         49       FRAME       ENCLOSURE       (kw)       (kw)       (kw)         49       HORIZONTAL       VERTICAL       SERVICE FACTOR       MAX. SOUND SPECIFIC SPEED:       13000 M3/Hr,M,RPM       (5.1.10)         50       HORIZONTAL       VERTICAL       SERVICE FACTOR       MAX. SOUND PRESS LEVEL       (b)       (5.1.10)         51       VOLTS / PHASE / HERTZ       400       3       /       50       (b)       (b)       (c)       (c) <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>T0</td><td></td><td></td></td<>							T0			
49       FRAME       ENCLOSURE       INPSHR AT RATED FLOW       (m) (5.1.10)         50       HORIZONTAL       VERTICAL       SERVICE FACTOR       MAX SUCTION SPECIFIC SPEED:       13000 M3/Hr,M,RPM (5.1.11)         51       VOLTS / PHASE / HERTZ       400       / 3       / 50       MAX SOUND PRESS LEVEL REQ. D       85       (dba) (5.1.6)         52       TYPE       ASYNCHRONOUS       EST MAX. SOUND PRESS LEVEL (dba) (5.1.6)       (dba) (5.1.6)         53       MINIMUM STARTING VOLTAGE (6.1.5)       EST MAX. SOUND PWESS LEVEL (dba) (5.1.16)       (dba) (5.1.6)         54       INSULATION       O TEMP. RISE       UTILITY CONDITIONS (5.1.3) (Note 11)       (dba) (5.1.6)         55       FULL LOAD AMPS       ELECTRICITY       VOLTAGE PHASE       HERTZ         56       LOCKED ROTOR AMPS       ELECTRICITY       VOLTAGE PHASE       HERTZ         56       LOCKED ROTOR AMPS       STARTING METHOD       D.O.L       SYSTEM VOLTAGE DIP       80%       OTHER       6.1.5)         59       BEARINGS (TYPE / NUMBER) :       STEAM       MAX. PRESS.       MAX. TEMP       MIN. TEMP         56       THRUST       /       DRIVERS       MAX. TEMP       MIN. TEMP       EACHING       COOLING WATER: (5.1.19)       SOURCE       MAX. RETURN TEMP.       <			(r/min)							
50       HORIZONTAL       VERTICAL       SERVICE FACTOR         51       VOLTS / PHASE / HERTZ       400       /       3       /       50         52       TYPE       ASYNCHRONOUS       EST MAX. SOUND PRESS LEVEL       (dba) (5.1.16)         53       MINIMUM STARTING VOLTAGE (6.1.5)       (dba) (5.1.6)       EST MAX. SOUND PRESS LEVEL       (dba) (5.1.6)         54       INSULATION			(1/110(1)							
51       VOLTS / PHASE / HERTZ       400       /       3       /       50       MAX . SOUND PRESS LEVEL REQ. D       85       (dba) (5.1.6)         52       TYPE       ASYNCHRONOUS       EST MAX. SOUND PRESS LEVEL (dba) (5.1.6)       (dba) (5.1.6)         53       MINIMUM STARTING VOLTAGE (6.1.5)       EST MAX. SOUND POWER LEVEL (dba) (5.1.3) (Note 11)         54       INSULATION       TEMP. RISE       UTILITY CONDITIONS (5.1.3) (Note 11)         55       FULL LOAD AMPS       ELECTRICITY       VOLTAGE       PHASE         56       LOCKED ROTOR AMPS       INVERS       400       3       50         57       STARTING METHOD       D.O.L       SYSTEM VOLTAGE DIP       80%       OTHER       (6.1.5)         58       LUBE       SYSTEM VOLTAGE DIP       80%       OTHER       (6.1.5)         59       BEARINGS (TYPE / NUMBER) :       SYSTEM VOLTAGE DIP       80%       OTHER       (6.1.5)         59       BEARINGS (TYPE / NUMBER) :       SYSTEM VOLTAGE DIP       80%       OTHER       (6.1.5)         50       THRUST       /       SOURCE       EOOLING WATER: (5.1.19)       SOURCE       SOURCE         58       UP       (N)       DOWN       N)       SUPPLY TEMP.       (°C)							13000 M3/Hr,M			
53       MINIMUM STARTING VOLTAGE (6.1.5)       Insulation       TEMP. RISE         54       INSULATION       TEMP. RISE       UTILITY CONDITIONS (5.1.3) (Note 11)         55       FULL LOAD AMPS       ELECTRICITY       VOLTAGE       PHASE       HERTZ         56       LOCKED ROTOR AMPS       D.O.L       BIL       DRIVERS       400       3       50         57       STARTING METHOD       D.O.L       SYSTEM VOLTAGE DIP       80%       OTHER       (6.1.5)         59       BEARINGS (TYPE / NUMBER) :       SYSTEM VOLTAGE DIP       80%       OTHER       (6.1.5)         56       THRUST       /       DRIVERS       DRIVERS       DRIVERS         57       VERTICAL THRUST CAPACITY       DOWN       NIN. TEMP       Rev.: 0         58       UP       NO       DOWN       NO       NO       Type: DAS	51	VOLTS / PHASE / HERTZ 400 / 3 / 50								
54          INSULATION          TEMP. RISE          55          FULL LOAD AMPS          56          LOCKED ROTOR AMPS          57          STARTING METHOD          58          LUBE          59          BEARINGS (TYPE / NUMBER) :          60          RADIAL          71               THRUST         72              VERTICAL THRUST CAPACITY            Max. remp               MIN. TEMP         60               rup              (N)                DOWN              (N)                  Ournert No.::              Rev.: 0                 Owner Job No.:              Type: DAS						LAND CONTRACTOR OF				
55       FULL LOAD AMPS         66       LOCKED ROTOR AMPS         57       STARTING METHOD         58       LUBE         59       BEARINGS (TYPE / NUMBER) :         60       RADIAL         7       VERTICAL THRUST CAPACITY         58       UP         70       NN         71       DOWN         72       STARTING METHOD         73       STEAM         74       MAX. PRESS.         75       MAX. TEMP         75       MIN. PRESS.         75       MIN. PRESS.         75       VERTICAL THRUST CAPACITY         76       OWN         77       VERTICAL THRUST CAPACITY         78       UP         79       NOWN         70       DOWN         71       VERTICAL THRUST CAPACITY         72       VERTICAL THRUST CAPACITY         73       DOWN         74       DOWN         75       VERTICAL THRUST CAPACITY         76       OWN         70       DOWN				LEST N			S (5.1.3) (Note 11			
56     LOCKED ROTOR AMPS       57     STARTING METHOD       58     LUBE       59     BEARINGS (TYPE / NUMBER) :       60     RADIAL       7     VERTICAL THRUST CAPACITY       58     UP       58     UP       0     NN       00     NN       00     Rev.: 0				ELECTRIC						
57       STARTING METHOD       D.O.L       HEATING										
59       BEARINGS (TYPE / NUMBER) :       STEAM       MAX. TEMP       MIN. PRESS.       MIN. TEMP         60       RADIAL       /       DRIVERS       DRIVERS       Image: Constraint of the constration of the constrating and the constrating and the constraint of				HEAT	ING	-				
60     RADIAL     /       56     THRUST     /       57     VERTICAL THRUST CAPACITY     COOLING WATER: (5.1.19)       58     UP     (N)       58     UP       0     DOWN       0     SUPPLY TEMP.       0     MAX. RETURN TEMP.       0     Owner Job No.:							-			
56     THRUST     /       57     VERTICAL THRUST CAPACITY       58     UP       58     UP       0     N)       58     UP       0     Owner       0     Type: DAS					MAX. PRESS.	MAX. TEN	IP MIN. PRESS	. MIN. TEMP		
57       VERTICAL THRUST CAPACITY       COOLING WATER: (5.1.19)       SOURCE         58       UP       (N)       DOWN       (N)         Document No.:         Type: DAS									_	
58         UP         (N)         DOWN         (N)         SUPPLY TEMP.         (°C)         MAX. RETURN TEMP.         (°C)           Document No.:         Document No.:         Rev.: 0           Owner Job No.:         Type: DAS					WATER: (5.1.19)		E			
Owner Job No.: Type: DAS			(N)			( <sup>o</sup> C) MA	X. RETURN TEMP.	( <sup>0</sup> C)		
			Docum	ent No.:				Rev.: 0		
Page 1 of 4			Owner	Job No.:				Type: DAS	8	
								Page 1 of	4	

PROJECT:	PP F	NI OT	PI ANT



TITLE: DATA	SHEET FOR	R FRESH HE	XANE PUMP (	P-343)

				CENTRI	FUGAL PUMP [	DATA	SHEET, SI UNIT	
			CONS				SURFACE PREPARATION AND PAIN	T Rev
1	ROTATION : (VIE	EWED FROM	COUPLING END)		Cw Cc	CW	O MANUFACTURER'S STANDARD OTHER S	EE BELOW
	DESIGN TEMP.: PUMP TYPE : (4.			IGN PRESS.: 10 (barg)			SPECIFICATION NO.     900-SPC-A4-PD-00	02
	🔲 ОН2 🚺			OTHER			PUMP :	
5	CASING MOUNT						• PRIMER	
6	CENTERLIN	IE 🖸 IN-I		OTHER			FINISH COAT	
7	CASING TYPE :						BASEPLATE : (6.3.1.7)	
		LUTE П MU	LTIPLE VOLUTE				PRIMER     FINISH COAT	
	CASE PRESSUR						DETAILS OF LIFTING DEVICES (6.3.20)	
11	OH6 PUMP	SUCTION RE	GION DESIGNED	FOR MAWP (5.3.6)			SHIPMENT : (7.4.1)	
12						(bar)	•	REQUIRED
13 14	@ HYDRO TES		( <sup>0</sup> C)	1.5 x MAW	/D	(bar)	OUTDOOR STORAGE MORE THAN 6 MONTHS SPARE ROTOR ASSEMBLY PACKAGED FOR :	
15	NOZZLE CO			te 7)		(bai)	HORIZONTAL STORAGE OVERTICAL STORA	AGE
16		SIZE	FLANGE	FACG	POSITION			
17			RATING				HEATING AND COOLING	
	SUCTION	3"	150#	RF		1	HEATING JACKET REQ D. (5.8.9)	
	DISCHARGE	2"	150#	RF				
20	DDEOOUDE			. (5.4.2)			COOLING WATER PIPING PLAN (6.5.3.1)	
21 22	PRESSURE	CASING AU	K. CONNECTIONS NO.	: (5.4.3) SIZE (DN)	TYPE	Т		
23	DRAIN			1/2"	VALVED		C.W. PIPING MATERIALS:	
24	VENT			1/2"	VALVED		S.STEEL C.STEEL GALVANIZED	
	WARM-UP						COOLING WATER REQUIREMENTS :	
26				0. (5.4.0.0)				(m³/h) (m³/h)
			ED CONNECTION REQUIRED (5.4.3				HEAT EXCHANGER TOTAL COOLING WATER	(m <sup>3</sup> /h)
	ROTOR :			,			HEAT MEDIUM : O STEAM O OTHER	
	-	NT BALANCE	TO ISO 1940 G 1.	0 (5.9.4.4)				
31	COUPLINGS :(6.	2.2) <b>(N</b>	ote 10)				BEARING AND LUBRICATION	
	MANUFACT			MODEL	SPACER(Type T	SK)	BEARING (TYPE / NUMBER ) (5.10.1) :	Variation
	RATING (kw			VTA			RADIAL /	
34 35		tananananananananananananananananananan	VTA (mm) FO ISO 1940-1 G 6	SERVICE FACTOR			THRUS" / LUBRICATION (5.11.3,5.11.4) :	
	-			IG DEVICE (6.2.1.1)			GREASE OIL	
38		PER ISO 104	141 (6.2.4)				CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) :	
39		PER API 671	(6.2.4)	O ASME B151			OIL VISC. ISO GRADE	
40			GUARD (6.2.14C)				INSTRUMENTATION	
		GUARD STA	NDARD PER			.2.14a)		
	BASEPLATES: API BASEPL		R		(ANNEX D)		<ul> <li>PROVISION FOR MOUNTING ONLY (5.10.2.11)</li> <li>FLAT SURFACE REQ D (5.10.2.12)</li> </ul>	
							TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6)	
							O PRESSURE GAUGE TYPE	
	MECHANICAL SI		(Note 4					
	CATEGORY	1.00.00.00.00.00		2				
	ARRENGME TYPE	:N I		3 A			REMARKS :	
	PLAN	1.00.00.00.00.00		53			MASSES	
	Auxiliary Equipr	ment:		(Note 3)			MASS OF PUMP (kg)	
52							MASS OF BASEPLATE (kg)	
53							MASS OF DRIVER (kg)	
54							TOTAL MASS (kg)	
55 56								
					Document No		.	Rev.: 0
					Owner Job No			Гуре: DAS
								Page 2 of 4

TITLE: DATA SHEET FOR FRESH HEXANE PUMP (P-343)



	CEN'			ТΔ	SHEET, SI UNIT				
1	SPARE PARTS (TABLE 18)	INII OGAL I V				ND TESTING (	CONT.	)	Rev.
2	START-UP ONORMAL MAINTENANCE				TEST	NON-WIT	WIT	OBSERVE	
3	• OTHERS 2 YEARS OF OPERATION LIST (Note 8)				HYDROSTATIC (7.3.2)	0		0	
4	OTHER PURCHASER REQUIREMEN	NTS			PERFORMANCE (7.3.3)	0		0	
5	COORDINATION MEETING REQUIRED (9.1.3)			Ο	RETEST ON SEAL	0	0	0	
6	MAXIMUM DISCHARGE PRESSURE TO INCLUDE (5.3.2)				LEAKAGE (7.3.3.2D)				
7	O MAX RELATIVE DENSITY			•	NPSH (7.3.4.2)	0	•	0	
8	O MAX DIA. IMPELLERS AND / OR NO OF STAGES			Ο	TRUE PEAK VELOCITY	0	$\circ$	0	
9				_	DATA (7.3.3.4D)	0	~	-	
10	OH3 BEARING HS6 LIFTER (8.1.2.6)			~	COMPLETE UNIT TEST (7.3.4.3)	0	Q	Q	
11	CONNECTION DESIGN APPROVAL (5.12.3.4)			-	SOUND LEVEL TEST (7.3.4.4)	0		0	
12	TORSIONAL ANALYSIS REQUIRED (5.9.2.1)			•	CLEANLINESS PRIOR TO	•	0	0	
13	O TORSIONAL ANALYSIS REPORT (5.9.2.6)			$\sim$	FINAL ASSEMBLY (7.2.2.2)		$\cap$		
14	PROGRESS REPORTS (9.3.3)     OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)			-	NOZZLE LOAD TEST (6.3.6)	0	00	0	
15	OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)     ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2.1)	1 15)		-	CHECK FOR CO-PLANNER	0	U	0	
16 17	ADDITIONAL DATA REQUIRING 20 TEARS RETENTION (7.2.     PIPING AND APPURTENANCES			$\sim$	MOUNTING PAD SURFACE (6.3.3) MECHANICAL RUN UNIT OIL	0	0	0	
	MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)			-	TEMP P. STABLE (7.3.4.7.1)	$\smile$	$\cup$	$\bigcirc$	
19				~	4 HR. MECHANICAL RUN AFTER	0	0	0	
20	MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)			$\sim$	OIL TEMP STABLE (7.3.4.7.3)	U	$\cup$	$\bigcirc$	
21	FLANGES REQ D IN PLACE OF SOCKED WELD UNIONS (6.5	5.2.8)		•	4 HR. MECH. RUN TEST (7.3.4.7.2)	0	$\bullet$	0	
22	INSTALLATION LIST IN PROPOSAL (9.2.3L)	,		-	BRG HSG RESONANCE	ŏ	Ο	ŏ	
23	CONNECTION BOLTING			-	TEST (7.3.4.6)	-	-	-	
24	O PTFE COATING O ASTM A153 GALVANIZED			Ο	AUXILIARY EQUIPMENT	0	Ο	0	
25					TEST (7.3.4.5)				
26	QA INSPECTION AND TESTING	i		$\bigcirc$	IMPACT TESTING (5.12.4.3)	0	Ο	0	
27	SHOP INSPECTION (7.1.4) (Note 6)				O PER EN 13445	_			
28	O PERFORMANCE CURVE APPROVAL			~	O PER ASME V III	-	~	-	
29	TEST WITH SUBSTITUTE SEAL (7.3.3.2B)			$\mathbf{O}$		_ O	$\circ$	0	
30	MATERIAL CERTIFICATION REQUIRED (5.12.1.8)			-	VENDOR KEEP REPAIR AND HT R		,		
31		SHAFT		-	VENDOR SUBMIT TEST PROCEDU				
32	OTHER SHAFT SLEEVES, INTERNAL WEARING RINGS			~	VENDOR SUBMIT TEST DATA WITH		.3.3.3E	)	
33	CASTING REPAIR PROCEDURE APPROVAL REQ D (5.12.2.5				INCLUDE PLOTTED VIBRATION SP	-			
34 35	MAG PARTICLE LIQUID PENETRANT	.40)			SUBMIT INSPECTION CHECK LIST	(7.1.6)			
36									
37	INSPECTION REQUIRED FOR CASINGS (7.2.1.3 / 5.1.2.1.5)								
38									
39	RADIOGRAPHIC ULTRA SONIC								
40	O HARDNESS TEST REQUIRED :	(7	7.2.2.3)						
41	O ADDITIONAL SUBSURFACE EXAMINATION FOR 7.21.3								
42	FOR								
43	METHOD								
44									
45			REMARK	(S					-
46 47									
47 48									
40 49									
49 50									
51									
52									
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56									
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			-				_	-	
		Owner Job I	No.:				Тур	be: DAS	
							Pag	ge 3 of 4	

PROJECT:	PP PILOT PLANT		client:
TITLE: DAT	A SHEET FOR FRESH HEXANE PUMP (P-343)		شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی
Note 1:	ALL ELECTRICAL MOTORS SHALL BE IN ACCORDA	NCE WITH "TECHNICAL SPECIF	ICATION FOR LV
	MOTOR" DOC.No.900-SPC-A4-EE-0005 MOTOR E (TEFC)	ENCLOSURES SHALL BE OF TOT	ALLY ENCLOSED FAN-COOLED
Note 2:	TYPE OF PROTECTION SHALL BE Aexd		
Note 3:	IN PUMP BODY SHALL BE INSTALLED A TEMPERA	ATURE AND A PRESSURE SENSI	BLE ELEMENTS
	TO CHECK IRREGULAR WORKING CONDITION: be	oth instruments shall be suppli	ed by
	Vendor and they shall be transmitted to DCS (ite	em TRAS3406, PRAS3406)	
	the set alarm of the instruments shall be defined	d by Vendor.	
Note 4:	MECHANICAL SEAL SHALL BE AS PER API 682 / IS 682 (3rd ED.) DATA SHEET FOR MECHANICAL SE		YENDOR SHALL FILL OUT API
Note 5:	VENDOR IS REQUIRED TO REVIEW AND CONFIRM	М.	
Note 6:	REFERE TO "INSPECTION & TEST PLAN FOR CENT	TRIFUGAL PROCESS PUMPS"	
	DOC.No.: 900-ITP-A4-RE-0001.		
Note 7:	ALLOWABLE LOAD AND MOMENTS ON NOZZLES	SAND FLANGES SHALL BE AS PE	ER API 610 (10TH ED.)
Note 8:	SPECIAL TOOLS SHALL BE SUPPLIED BY VENDOR COMMISIONNING,COMMISIONING,START-UP A		
	MAINTANANCE PERIOD.		
Note 9:	NPSH REQUIRED FOR SELECTED PUMP SHALL BE	AT LEAST 1 METER LESS THAN	I NPSHA.
Note 10:	DRY, FLEXIBLE , MULTI DISK ,S.S MEMBRANE SP	ACER TYPE COUPLING SHALL BE	E USED.
	DRIVER HALF COUPLING SHALL BE MOUNTED B	Y PUMP MFR.	
Note 11:	REFERE TO "UTILITY CONDITION" DOC.No.: 900-	SPC-A4-PR-0006.	

Document No.:	Rev.: 0
Owner Job No.:	Type: DAS

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PROJECT: PP PILOT PLANT	client:
TITLE: DATA SHEET FOR PROPANE CONDENSED PUMP (P-361)	شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی
	OPANE CONDENSED (P-361)

ocument No.:300-DAS-A4-RE-0033 Rev.: 0 vner Job No.: Type: DAS Page A	Rev.: 0			
Owner Job No.: Type: DAS				
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client:

پی شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی

TITLE: DATA SHEET FOR PROPANE CONDENSED PUMP (P-361)

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Client:



E: DAT	A SHEET FOR PROF	PANE CONDE	NSED PUMP (P-					-		ÿ
				IP DATA	SHEET,	SI UNIT				
	TO: PROPOSAL	•	JRCHASE	🖸 AS BU						Rev
DR		NPC R&T		****	UNIT					
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OW NORM				(m <sup>3</sup> /h)		E OR NAME				-
THER				<b>,</b>	_	inclusion of the second s	FLAMMABL	~~~~~~	(5.1.5)	*****
JCTION PR	ESSURE MAX / RATED	28	/ 19	(bara)	-	_	MIN.	NORM	AL MAX.	
		:		(bara)					)	
		( ) )		(bar)				-		_
	*****	(m) NPSHA	3 (Note 9)	(m)						
		CLO	OSED DELIVERY VALVE							
ERVICE:	CONT	INTERMITTENT (ST					ATION (6.5.2.			
		ITE DATA (5.1.3)			CORROSIVE				(5.12.1.9)	
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			UNHEATED			H CLASS (5.12.1	.1)	A-7 (Not		*****
			2(Note 2)		-				· · ·	
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-			ER <b>810</b>	(mbar)	SHAFT					
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								CLOSE		
	۲	DRIVER TYPE			RATED	POWER V	' <b>TA</b> (kw	) EFFICIENC)	(%)	
-	ON MOTOR	•	-					*****		
) OTHER		(Note 1)								
	мотон	R DRIVER (6.1.1 /	6.1.4)				and the second s			
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		(kw)		(r/min)					(kw)	
FRAME									(m) (5.1.10)	
_	PHASE / HERTZ							85		
5	I STARTING VOLTAGE (6.1.5								(dba) (5.1.16)	
		TEMP. RISE						<mark>S (5.1.3) (Note</mark>		
_					ELECTRICIT	ry v		PHASE	HERTZ	_
	-		<b>D Z</b> ·				400	3	50	_
	IG METHOD		D.O.L				$\bigcirc$		D (645)	-
							-			
	,	/			DRIVERS					
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UP	(N)	DOWN		_(N)			A14			
						ALEXANDER AND ADDRESS AND ADDRESS AND	a.a		(mg/kg)	
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									Page 1 of	4
	PPLICABLE DR	PPLICABLE TO: PROPOSAL DR TE NPC F P. of Req'd: 1 Service : 1 DTES : INFORMATION BELOW TO BE CA ITEM NO. JMP P-361 DTOR PM-361 EAR JRBINE PPLICABLE OVERLAY STANDARD(S) : OPERAT OW, NORMAL 3 THER JCTION PRESSURE MAX / RATED SCHARGE PRESSURE FF. HEAD 63.1 ROCESS VARIATIONS (5.1.4) TARTING CONDITIONS (5.1.4) ERVICE: CONT PARALLEL OPERATION REQD (5.1.1) SCATION: (5.1.30) INDOOR HEATED ELECTRICAL AREA CLASSIFICATION CL I GR WINTERIZATION REQD. TE DATA (5.1.30) ALTITUDE BRANGE OF AMBIENT TEMPS:MIN,MA RELATIVE HUMIDITY:MIN / MAX NUSUAL CONDITIONS: (5.1.30) OTHER NOTOR MANUFACTURER VTA FRAME HORIZONTAL VERTICAL VOLTS / PHASE / HERTZ TYPE NINJUM STARTING VOLTAGE (6.1.5) INSULATION FULL LOAD AMPS LOCKED ROTOR AMPS STARTING METHOD LUBE CARINGS (TYPE / NUMBER) :	PPLICABLE TO: PROPOSAL OPL PR NPC R&T CENTRE - AF PROPORT CENTRE - AF PROPOSAL CENTRE	CENTRIFUGAL PUR         PPLICABLE TO:       PROPOSAL       PURCHASE         NPC RAT         NPC RAT         NPC RAT CENTRE - ARAK - IRAN         Dates: INFORMATION BELOW TO BE COMPLETED       BY PURCHASE         OTOR       PM-261       OTOR       PM-361       OTOR       PM-361       OTOR       PM-361       OTOR       PM-361       OTOR       PM-361       OTOR       PM-261       OTEM NO.         OTTOR       PM-261       OTEM NO.         OTOR       PM-361       OTOR       PM-261       OTEM NO.         OTOR       PM-361       OTOR       PM-261       OTEM NO.         OTOR       PM-261       OTEM NO.       OTEM NO.         OTOR       PM-261       OTEM NO.       OTEM CONDITIONS (6.1.3)         OTOR       OTEM CONDITIONS (6.1.4)         OTEM CONDITIONS (5.1.4)       CLOSED DELIVERY VALVE	CRUTRIFUGAL PUPP DATA         PPLICABLE TO:       PROPOSAL       PURCHASE       AS BUI         NPC RAT       NPC RAT       Implementation of the complementation of the co	CENTRIFUGAL PURP DATA SHEETS.         PPLCAGELE TO:       PROPOSAL       PURC RAT       UNIT         DX Regid:       Service:       INFC RAT       INFC RAT         Imp:       P3361       Inten NO.       ATTACHED       Inten NO.         DTOR       PM-381       Inten NO.       ATTACHED       Inten NO.         Imp:       PAI-381       Inten NO.       ATTACHED       Inten NO.         Inten NO.       OPERATING CONDITIONS (5.1.3)       Inten NO.       Inten NO.         Inten NO.       OPERATING CONDITIONS (5.1.3)       Inten NO.       Inten NO.         Inten NO.       Inten NO.       Inten NO.       Inten NO.       Inten NO.         Inten NO.       OPERATING CONDITIONS (5.1.4)       Inten NO.       Inten NO.         Inten NO.       Inten NO.       Inten NO.       Inten NO.       Inten NO.         Inten NO.       Inten NO.       Inten NO.       Inten NO.       Inten NO.         Inten NO.	PLICABLE TO:       PROPOSAL       PUNCHASE       AS BUIL         PLICABLE TO:       PROPOSAL       POR CAT CENTRE - ARAK - IRAN       SREVICE       PIN         Te       MC RAT CENTRE - ARAK - IRAN       SREVICE       PIN         Te       MC RAT CENTRE - ARAK - IRAN       SREVICE       PIN         To RE       MARC RAT CENTRE - ARAK - IRAN       SREVICE       PIN         To RE       MARC RAT CENTRE - ARAK - IRAN       SREVICE       PIN         To RE       PIN.561       OU       OU       PIN         To REAL       // Mindy       TTEM NO.       TTACHED       Intem NO.         TRANK       PIN.561       OU       OU       PIN.561       OU       PIN         Service       OPEN INCOMING S(5.1.3)       OUD TYPE OR NAME       PINARE DESURE       PINARE DESURE       PINARE DESURE       PINARE DESURE       PINARE DESURE       PINARE DESURE       PINARE DESURE ARAK / RATED       PINARE DESURE	PURCURATE OF PROPOSAL       PURCURATE       PUR		

PROJECT: PP PILOT PLANT	Clien	Client:							
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TITLE: DATA SHEET FOR PROPANE CONDENSED 361)	PUMP (P-	صنایع پتروشیمی و فناوری پتروشیمی							
CENTRI	IFUGAL PUMP DAT	A SHEET, SI UNIT							
CONSTRUCTION		SURFACE PREPARATION AND PAINT	Rev						
2 ROTATION : (VIEWED FROM COUPLING END)	□cw □ccw	O MANUFACTURER'S STANDARD OTHER SEE B	SELOW						
3 PUMP TYPE : (4.1) API610 4 OH2 OH3 OH6 OTHER		SPECIFICATION NO. 900-SPC-A4-PD-0002     PUMP :							
5 CASING MOUNTING :		PRIMER							
6 CENTERLINE IN-LINE OTHER		BASEPLATE : (6.3.1.7)							
8 CASING TYPE :		• PRIMER							
10 CASE PRESSURE RATING : 11 OOH6 PUMP SUCTION REGION DESIGNED FOR MAWP (5.3.6)		DETAILS OF LIFTING DEVICES (6.3.20)     SHIPMENT : (7.4.1)							
12 MAX. ALLOWABLE WORKING PRESSURE	(ba	ar) ODMESTIC EXPORT EXPORT BOXING REC	QUIRED						
13     @     100     (°C)       14     ■     HYDRO TEST PRESSURE     1.5 x MAV	ND (b)	OUTDOOR STORAGE MORE THAN 6 MONTHS ar) SPARE ROTOR ASSEMBLY PACKAGED FOR :							
15 NOZZLE CONNECTIONS : (5.4.2) (Note 7)	WF (Da	ar) SPARE ROTOR ASSEMBLY PACKAGED FOR : O HORIZONTAL STORAGE O VERTICAL STORAGE							
16 SIZE FLANGE FACG	POSITION								
17 RATING									
18         SUCTION         2"         300#         RF           19         DISCHARGE         1"         300#         RF		O HEATING JACKET REQ D. (5.8.9)							
20		COOLING WATER PIPING PLAN (6.5.3.1)							
21 PRESSURE CASING AUX. CONNECTIONS : (5.4.3)									
22 NO. SIZE (DN) 23 DRAIN 1/2"	TYPE VALVED	PIPE TUBING: FITTINGS     C.W. PIPING MATERIALS:							
24 VENT 1/2"	VALVED	S.STEEL C.STEEL GALVANIZED							
25 🖸 WARM-UP		COOLING WATER REQUIREMENTS :							
26 27 MACHINED AND STUDDED CONNECTIONS : (5.4.3.8)		BEARING HOUSING	(m³/h) (m³/h)						
28 CYLINDRICAL THREADS REQUIRED (5.4.3.3)		TOTAL COOLING WATER	(m³/h)						
29 ROTOR :									
30 COMPONENT BALANCE TO ISO 1940 G 1.0 (5.9.4.4)									
31 COUPLINGS :(6.2.2) (Note 11) 32 ▲ MANUFACTURER VTA MODEL	SPACER(Type TSK)								
33 RATING (kw per100 r/min) VTA									
34 SPACER LENGTH VTA (mm) SERVICE FACTOR	2	//							
35		LUBRICATION (5.11.3,5.11.4) :							
37 O COUPLING PER ISO 14691 (6.2.4)									
38 COUPLING PER ISO 10441 (6.2.4)		CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) :							
39 COUPLING PER API 671 (6.2.4) ASME B151		OIL VISC. ISO GRADE							
40 NON SPARK COUPLING GUARD (6.2.14C) 41 COUPLING GUARD STANDARD PER	(6 2 14	a) ACCELEROMETER (6.4.2.1)							
42 BASEPLATES:	(0.2.14	O PROVISION FOR MOUNTING ONLY (5.10.2.11)							
	(ANNEX D)	FLAT SURFACE REQ D (5.10.2.12)							
44 O NON-GROUT CONSTRUCTION (6.3.13) 45 O OTHER		TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6)     PRESSURE GAUGE TYPE							
46 MECHANICAL SEAL : (5.8.1) (Note 4 & 5)									
47 CATEGORY 2		DENADI/0 -							
48 ARRENGMENT 3 49 TYPE A		REMARKS :							
50 PLAN 53		MASSES							
51 Auxiliary Equipment: (Note 13)		MASS OF PUMP (kg)							
52 53		MASS OF BASEPLATE (kg) MASS OF DRIVER (kg)							
54		TOTAL MASS (kg)							
55									
56									
	Document No.: 3	00-DAS-A4-RE-0033 Rev	<i>ı</i> . 0						
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TITLE: DATA SHEET FOR PROPANE CONDENSED PUMP (P-361)



CEN	ITRIFUGAL PUMP DA				
SPARE PARTS (TABLE 18)		QA INSPECTION AN	D TESTING (CO	ONT.)	Rev.
2 START-UP ONORMAL MAINTENANCE		TEST	•	WIT OBSERVE	-
3 OTHERS 2 YEARS OF OPERATION LIST (Note 8)		HYDROSTATIC (7.3.2)	0	• 0	
4 OTHER PURCHASER REQUIREM	ENTS	PERFORMANCE (7.3.3)	0	• 0	
5 COORDINATION MEETING REQUIRED (9.1.3)		O RETEST ON SEAL	0	0 0	
6 MAXIMUM DISCHARGE PRESSURE TO INCLUDE (5.3.2)		LEAKAGE (7.3.3.2D)	-		
7 O MAX RELATIVE DENSITY		• NPSH (7.3.4.2)	Ö	$\bullet$ $\circ$	
8 MAX DIA. IMPELLERS AND / OR NO OF STAGES			0	0 0	
9 OPERATION TO TRIP SPEED 10 OH3 BEARING HS6 LIFTER (8.1.2.6)		DATA (7.3.3.4D)  COMPLETE UNIT TEST (7.3.4.3)	0	$\circ$ $\circ$	
10 OH3 BEARING HS6 LIFTER (8.1.2.6) 11 OCONNECTION DESIGN APPROVAL (5.12.3.4)		SOUND LEVEL TEST (7.3.4.4)	Ŏ	$ \bigcirc  \circ \\  $	
12 TORSIONAL ANALYSIS REQUIRED (5.9.2.1)		CLEANLINESS PRIOR TO	-	ŏŏ	
13 O TORSIONAL ANALYSIS REPORT (5.9.2.6)		FINAL ASSEMBLY (7.2.2.2)	•	0 0	
14 PROGRESS REPORTS (9.3.3)		NOZZLE LOAD TEST (6.3.6)	0	0 0	
15 OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)		CHECK FOR CO-PLANNER		ŏŏ	
16 ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2	.1.1f)	MOUNTING PAD SURFACE (6.3.3)	-		
17 PIPING AND APPURTENANCE	S	O MECHANICAL RUN UNIT OIL	0	0 0	
18 MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)		TEMP P. STABLE (7.3.4.7.1)			
19 VENT DRAIN COOLING WATER		O 4 HR. MECHANICAL RUN AFTER	0	0 0	
20 MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)		OIL TEMP STABLE (7.3.4.7.3)			
21 FLANGES REQ D IN PLACE OF SOCKED WELD UNIONS (6	.5.2.8)	• 4 HR. MECH. RUN TEST (7.3.4.7.2)	0		
22 INSTALLATION LIST IN PROPOSAL (9.2.3L)		O BRG HSG RESONANCE	0	0 0	
		TEST (7.3.4.6)	0	~ ~	
24 O PTFE COATING O ASTM A153 GALVANIZED			0	0 0	
25 PAINTED SS 26 QA INSPECTION AND TESTIN	G	TEST (7.3.4.5)	0	$\sim$	
26 QA INSPECTION AND TESTIN 27 ● SHOP INSPECTION (7.1.4) (Note 6)	0	IMPACT TESTING (5.12.4.3)     O PER EN 13445	0 (		
28 O PERFORMANCE CURVE APPROVAL		O PER ASME V III			
29 TEST WITH SUBSTITUTE SEAL (7.3.3.2B)			0 0		
30 MATERIAL CERTIFICATION REQUIRED (5.12.1.8)		VENDOR KEEP REPAIR AND HT REC	-		
31 CASING MINPELLER	SHAFT	<ul> <li>VENDOR REEF REFAIL AND THREE</li> <li>VENDOR SUBMIT TEST PROCEDUR</li> </ul>			
32 OTHER SHAFT SLEEVES, INTERNAL WEARING RING		VENDOR SUBMIT TEST DATA WITHI			
33 O CASTING REPAIR PROCEDURE APPROVAL REQ D (5.12.2		O INCLUDE PLOTTED VIBRATION SPE			
34 INSPECTION REQUIRED FOR CONNECTION WELDS (5.12.		SUBMIT INSPECTION CHECK LIST (			
35 MAG PARTICLE LIQUID PENETRANT					
36 RADIOGRAPHIC ULTRA SONIC					
37 INSPECTION REQUIRED FOR CASINGS (7.2.1.3 / 5.1.2.1.5)					
38 MAG PARTICLE ILQUID PENETRANT					
39 RADIOGRAPHIC ULTRA SONIC					
40 HARDNESS TEST REQUIRED :	(7.2.2.3)				
41 O ADDITIONAL SUBSURFACE EXAMINATION FOR 7.21.3					
42 FOR					
43 METHOD					
44	REMAR	k 2			
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PUMP (P-361)

TITLE: DATA SHEET FOR PROPANE CONDENSED



		Owner Job No.:	Type: DAS
		Document No.: 300-DAS-A4-RE-0033	Rev. 0
	the set diam of the instruments shall		
	Vendor and they shall be transmitted the set alarm of the instruments shall		
		DITION: both instruments shall be supplied by	
Note 13:		A TEMPERATURE AND A PRESSURE SENSIBLE ELEM	ΛΕΝΤS
Note 12:			
	DRIVER HALF COUPLING SHALL BE MC		
Note 11:	DRY, FLEXIBLE , MULTI DISK ,S.S MEM	BRANE SPACER TYPE COUPLING SHALL BE USED.	
Note 10:		100 °C. Also design pressure is: 35 Barg.	
Note 9:		P SHALL BE AT LEAST 1 METER LESS THAN NPSHA.	
	MAINTANANCE PERIOD.		
Note 8:	SPECIAL TOOLS SHALL BE SUPPLIED BY COMMISIONNING,COMMISIONING,ST		
Note 7:		N NOZZLES AND FLANGES SHALL BE AS PER API 62	l0 (10TH ED.)
<del>.</del>	DOC.No.: 900-ITP-A4-RE-0001.		
Note 6:	REFERE TO "INSPECTION & TEST PLAN	FOR CENTRIFUGAL PROCESS PUMPS"	
Note 5:	VENDOR IS REQUIRED TO REVIEW AN		
Note 4:	MECHANICAL SEAL SHALL BE AS PER A 682 (3rd ED.) DATA SHEET FOR MECHA	API 682 / ISO 21049 3rd EDITION :2004. VENDOR ANICAL SEALS.	SHALL FILL OUT API
Note 3:	ESTIMATED SHUT-OFF PRESSURE IS 26	5.4 BARA.	
Note 2:	TYPE OF PROTECTION SHALL BE Aexd		
		5 MOTOR ENCLOSURES SHALL BE OF TOTALLY EN	
Note 1:	ALL ELECTRICAL MOTORS SHALL BE IN	ACCORDANCE WITH "TECHNICAL SPECIFICATION	FOR LV

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TITLE: DATA SHEET FOR STEAMER SCRUBBER PUMP (P-611)



# DATA SHEET FOR STEAMER SCRUBBER PUMP (P-611) Rev.: 0 Document No.: 600-DAS-A4-RE-0044 Type: DAS Owner Job No.: Page A

# TITLE: DATA SHEET FOR STEAMER SCRUBBER PUMP (P-611)

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5 6	NOTES : INI	FORMATION BELO	W TO BE COMPLI	DATA SHEET		RL	BY MANUF	ACTURE	R 🖵 BY	MAN	UFACTURE	<u>R OR PUR(</u> ISIONS	CHASER		
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10	GEAR		Ō		Č	5			Ō	3					
11	TURBINE		0			$\overline{)}$			0	4					
12	APPLICABL	E OVERLAY STAND								5					
13				· · ·	/h)				LIQUID (		,				
14 15	FLOW, NOF	RMAL <b>15</b>	(m³/h) RATED	D <u>16.5</u> (m <sup>3</sup>	/11)		TYPE OR NA ZARDOUS		FLAMMAB				1.5)	$\vdash$	
		RESSURE MAX / R	ATED 7.5	/ 1.5	(bara)			C	MIN.		NORMAI		1.5) 1AX.	⊢┨	
17		E PRESSURE	3.5 (N		(bara)	PUMPIN		;)			60				
18	DIFFERENT	IAL PRESSURE	2	,	(bar)	VAPOU	R PRESS . (I	bara)			0.2				
19	DIFF. HEAD		(m) NPSHA	>10 (Note 9)	(m)		VE DENSITY	′ (SG):			0.98				
		ARIATIONS (5.1.4)					SITY (cP)				0.46 at 60	-	1		
					<u> </u>		IC HEAT, CI LORIDE CON			<b>4.3</b>	53 N/A	· ·	'kg .k.) g/kg)	$\vdash$	
22												WET (5.12.	o o,		
24			E DATA (5.1.3)			-	SIVE / EROS			N/A			12.1.9)		
25	LOCATION:	(5.1.30)							<b>TERIALS</b>	(5.12					
26		R OHEATED					NEX H CLAS				S-4 (Note	,	000		
27	-		,	,			I DESIGN ME DUCED HAR						( <sup>0</sup> C)		
28 29		GR GR		· · ·			RREL / CASE				ER (5.12.1.1	<sup>2)</sup> C.S.			
30	SITE DATA		Onterlease	izanon neg b.			SE / IMPELLE	ER WEAI							
31		DE <b>1889</b> (n	n) BAROMET	ER <b>810</b> (ml	bar)	П SH									
32		OF AMBIENT TEM					FUSERS								
33	-	VE HUMIDITY:MIN /		/ 86	- ' '				PERFORM	<mark>/ANC</mark>	)E				
34		CONDITIONS: (5.1.3		JST 🌑 FUMES			SAL CURVE			A \/			nin)		
35 36	OTHER		CORROSIVE				PELLER DIA I PELLER TYPI		IVI/	AX.			(mm)		
30 37		D	RIVER TYPE				TED POWER		TA (k)		FICIEN(		(%)		
				NE () GEAR					· ·	,			_()		
39	OTHER			U U			ERMAL		(m <sup>3</sup> /h) ST	ABL		(m <sup>3</sup>	³/h)		
40	-						EFERRED O			-	TO		³/h)		
41			DRIVER (6.1.1 /	6.1.4)			OWABLE O				то	(m³	³/h)		
42				1.1	(in)		X. HEAD @ F						_(m)		
43 44	FRAME			(r/m RF	11(1)		X. POWER @ SHR AT RAT					(m (5.1	(kw) 1 10)	⊢┤	
44 45							X SUCTION			130	00 M3/Hr.N			$\vdash$	
46		/ PHASE / HERTZ				MA	X . SOUND F	RESS LI	EVEL REQ.		85		(5.1.16)		
47	TYPE		ASYNCHRONO	US			T MAX. SOUI					(dba) (	(5.1.16)		
48	-	IM STARTING VOLT				DES	T MAX. SOU					. , ,	(5.1.16)		
49			TEMP. RISE					1		<u> </u>	1.3) (Note			$\mid$	
50						ELECT			LTAGE		PHASE	HER			
51 52				.0.L			IVERS ATING		400	$\vdash$	3	50	)	—	
52		NG METHOD	U						080				1 5)	⊢┤	
53 54		(TYPE / NUMBER) :				STEAM		AGE DIP PRESS.	MAX. TE		OTHER MIN. PRES		1.5) . TEMP	$\vdash$	
54 55			/			DRIVER		NE33.	WAA. IE	IVII <sup></sup>		ی. iviiiN.		⊢┤	
56			/			HEATIN			1			1			
57		AL THRUST CAPA					IG WATER:		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	-			0		
58	UP	(N)	DOWN	(N)			Y TEMP.		-		ETURN TEM	IP.	( <sup>O</sup> C)		
59 60							PRESS.		- ' '		N PRESS.		(bar)	⊢┤	
60 61							T. PRESS.	NTRATIC	- ' '	<i>н</i> λ. Α	LLOW. D.P.		_(bar) g/kg)	⊢┤	
62						OFILOT						(,	9/119/		
				_								I_	-		
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PRO	JE	CT:	PP-	PE	PIL	от	PL	ANT
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PROJECT: PP	- PE PILOT	PLANT					chent.			<u>*</u>				
TITLE: DATA S (P-611)	SHEET FOR	STEAMER	SCRU	BBER PUMP	•					شرکت ملی صنایع پت شرکت پژوهش و فناوری				
			CENT	RIFUGAL PU		ATA SH	IFFT, SI	UNIT						
1		CONSTRUCT								IT Re				
2 ROTATION : (VIE	EWED FROM CO	OUPLING END)		]cw 🗆 d	CW			R'S STANDARD	OTHER S					
3 PUMP TYPE : (4		,	_			SPE	CIFICATION	I NO.	900-SPC-A4-P	D-0002				
4 🚺 ОН2 🚺	онз 🖸	оне	OTHER			PUMP :								
5 CASING MOUNT							PRIMER							
6 💽 CENTERLIN	ie 🖸 in-l	INE	OTHER				FINISH COA	.т						
7						BASEPLATE : (6.3.1.7)								
8 CASING TYPE :			-	_		PRIMER								
		LTIPLE VOLUTE	E L	DIFFUSER		-	FINISH COA							
10 CASE PRESSUR						DETAILS OF LIFTING DEVICES (6.3.20								
				P (5.3.6)		SHIPMENT : (7.4.1)								
12 MAX. ALLOV 13 @	WABLE WORKIN 150	( <sup>O</sup> C)			(bar)	ž		RAGE MORE THA		REQUIRED				
	ST PRESSURE	_( 0)	1.5 x M		(bar)	-								
	ONNECTIONS : (	542) <b>(N</b> (	ote 7)		(bar)									
16	SIZE	FLANGE	FACG	POSITION		O HORIZONTAL STORAGE O VERTICAL STORAGE								
17	OILL	RATING	1760	1 conton		<u> </u>								
18 SUCTION	1 1/2"	150#	RF			HEATING AND COOLING								
19 DISCHARGE	1"	150#	RF				DLING REQ I	D.						
20								COOLING REQ D. COOLING WATER PIPING PLAN (6.5.3.						
21 PRESSURE	PRESSURE CASING AUX. CONNECTIONS : (5.4.3)													
22		NO.	SIZE (DN						TTINGS					
23 DRAIN								IALS:	-					
	VENT 1/2" VALVED								GALVANIZED					
	WARM-UP							EQUIREMENTS :		(m <sup>3</sup> /h)				
26 27 MACHINED			C . (E 1 2 0	\				RING HOUSIN		(m <sup>3</sup> /h)				
28 CYLINDRIC			•	)				COOLING WATE	D	(m <sup>3</sup> /h)				
29 ROTOR :	AL THREADS RI	EQUINED (5.4.3	.3)											
	NT BALANCE TO	) ISO 1940 G 1 (	) (5 9 4 4)											
31 COUPLINGS :(6.		ote 11)	(0.0.1.1)			112/1111								
32 MANUFACT	URER	VTA 🔴	MODEL	SPACER(Type	тѕк)	BEARING (TYPE / NUMBER ) (5.10.1) :								
33 RATING (kw	v per100 r/min)	VT.	Α				DIAL		/					
34 SPACER LE	NGTH	VTA (mm)	SERV	ICE FACTOR		│ RADIAL / │ THRUST /								
35 COUPLING	BALANCED TO	ISO 1940-1 G 6.	.3 (6.2.3)			LUBRICA	ATION (5.11.	3,5.11.4) :						
36 O COUPLING	WITH PROPRIE	TARY CLAMPIN	IG DEVICE	(6.2.1.1)				OIL						
37 O COUPLING		. ,												
			~			CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) :								
39 COUPLING		,		B151										
					0.0.4.4-)	0 400								
	GUARD STAND	ARD PER _		(	6.2.14a)	ž		ER (6.4.2.1)						
42 BASEPLATES: 43 API BASEPL				(ANNEX D	、 、	-		R MOUNTING ON REQ D (5.10.2.12	,					
44 O NON-GROU		ION (6 3 13)			)	2			-) WELLS) (8.1.3.					
45 OTHER		1014 (0.3.13)				-	SSURE GAL		WEELO) (0.1.3.					
46 MECHANICAL S	FAL : (5.8.1)	(Note 4 8	k 5)											
47 CATEGORY		, <b>.</b>	2											
	ARRENGMENT 1							REMARKS :						
49 TYPE	TYPE A													
50 PLAN	PLAN 31								SES					
51								MASS OF PUMP (kg)						
52							SS OF BASE							
53 54								MASS OF DRIVER (kg) TOTAL MASS (kg)						
I				ſ	Docum	ocument No.: 600-DAS-A4-RE-0044 Rev.:								
				c	Owner	Job N	Type: DAS							

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PR	OJE	CT:	PP-	ΡE	PIL	ΟТ	PL.	ANT

# TITLE: DATA SHEET FOR STEAMER SCRUBBER PUMP (P-611)



CENTRIFUGAL PUMP DATA SHEET, SI UNIT												
1 SPARE PARTS (TABLE 18)			QA INSPECTION AND 1	ESTING (CC	NT.)		Rev.					
2 START-UP ONORMAL MAINTENANCE			TEST N	ION-WIT	VIT	OBSERVE						
3 OTHERS 2 YEARS OF OPERATION LIST (Note 8)		$\bullet$	HYDROSTATIC (7.3.2)	0		0						
4 OTHER PURCHASER REQUIREMENTS		$\bullet$	PERFORMANCE (7.3.3)	0		$\circ$						
5 COORDINATION MEETING REQUIRED (9.1.3)		Ο	RETEST ON SEAL	0 (	C	0						
6 O MAXIMUM DISCHARGE PRESSURE TO INCLUDE (5.3.2)		_	LEAKAGE (7.3.3.2D)		_	~						
7 OMAX RELATIVE DENSITY			NPSH (7.3.4.2)	0		Õ						
8 O MAX DIA. IMPELLERS AND / OR NO OF STAGES		$\circ$	TRUE PEAK VELOCITY	0 (	C	0						
9 OPERATION TO TRIP SPEED		~	DATA (7.3.3.4D)	~	~	$\sim$						
10 OH3 BEARING HS6 LIFTER (8.1.2.6)		$\bigcirc$	COMPLETE UNIT TEST (7.3.4.3)		$\sum_{i=1}^{n}$	0						
			SOUND LEVEL TEST (7.3.4.4)	0		0						
12 TORSIONAL ANALYSIS REQUIRED (5.9.2.1)			CLEANLINESS PRIOR TO		)	0						
<ul> <li>13 O TORSIONAL ANALYSIS REPORT (5.9.2.6)</li> <li>14 PROGRESS REPORTS (9.3.3)</li> </ul>		$\cap$	FINAL ASSEMBLY (7.2.2.2)	$\cap$		$\bigcirc$						
15 OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)		K	NOZZLE LOAD TEST (6.3.6) CHECK FOR CO-PLANNER	_	$\sum_{n}$	0						
16 Additional data requiring 20 years retention (7.2.1.1f)		$\cup$	MOUNTING PAD SURFACE (6.3.3)	<u> </u>		$\bigcirc$						
17 PIPING AND APPURTENANCES		0	MECHANICAL RUN UNIT OIL		$\mathbf{C}$	0						
18 MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)		$\sim$	TEMP P. STABLE (7.3.4.7.1)	0 (		$\cup$						
19 VENT DRAIN COOLING WATER		$\cap$	4 HR. MECHANICAL RUN AFTER	0 (	$\mathbf{c}$	0						
20 MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)		$\sim$	OIL TEMP STABLE (7.3.4.7.3)	$\sim$ (	-	$\smile$						
21 FLANGES REQ D IN PLACE OF SOCKED WELD UNIONS (6.5.2.8)			4 HR. MECH. RUN TEST (7.3.4.7.2)			0						
22 INSTALLATION LIST IN PROPOSAL (9.2.3L)		Õ	BRG HSG RESONANCE	ŏč	)	ŏ						
23 CONNECTION BOLTING		•	TEST (7.3.4.6)			U						
24 O PTFE COATING O ASTM A153 GALVANIZED		Ο	AUXILIARY EQUIPMENT	0 (	$\mathbf{)}$	0						
25 O PAINTED SS		_	TEST (7.3.4.5)									
26 QA INSPECTION AND TESTING		$\Box$	IMPACT TESTING (5.12.4.3)	0 (	)	0						
27 SHOP INSPECTION (7.1.4) (Note 6)			O PER EN 13445									
28 O PERFORMANCE CURVE APPROVAL		-	O PER ASME V I			_						
29 TEST WITH SUBSTITUTE SEAL (7.3.3.2B)		$\mathbf{O}$		0 (	-	0						
30 MATERIAL CERTIFICATION REQUIRED (5.12.1.8)			VENDOR KEEP REPAIR AND HT F	,	,							
31 CASING MIMPELLER SHAFT			VENDOR SUBMIT TEST PROCEDU									
32 OTHER SHAFT SLEEVES, INTERNAL WEARING RINGS, MECH.	. SEAL PARTS	-	VENDOR SUBMIT TEST DATA WIT		5 (7.3.3	3.3E)						
33 CASTING REPAIR PROCEDURE APPROVAL REQ D (5.12.2.5)		$\bigcirc$	INCLUDE PLOTTED VIBRATION S SUBMIT INSPECTION CHECK LIST									
34       INSPECTION REQUIRED FOR CONNECTION WELDS (5.12.3.4e)         35       MAG PARTICLE         100       LIQUID PENETRANT			SUBMIT INSPECTION CHECK LIS	1 (7.1.6)								
36 RADIOGRAPHIC ULTRA SONIC												
37 INSPECTION REQUIRED FOR CASINGS (7.2.1.3 / 5.1.2.1.5)												
38 MAG PARTICLE ILIQUID PENETRANT												
39 RADIOGRAPHIC ULTRA SONIC												
	(7.2.2.3)											
41 O ADDITIONAL SUBSURFACE EXAMINATION FOR 7.21.3												
42 FOR												
43 METHOD												
44		-										
45	REMARKS											
46												
47												
48												
49 50												
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### client:

# پی مرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی

# TITLE: DATA SHEET FOR STEAMER SCRUBBER PUMP (P-611)

- Note 1: ALL ELECTRICAL MOTORS SHALL BE IN ACCORDANCE WITH "TECHNICAL SPECIFICATION FOR LV MOTOR" DOC.No.900-SPC-A4-EE-0005 MOTOR ENCLOSURES SHALL BE OF TOTALLY ENCLOSED FAN-COOLED (TEFC)
- Note 2: TYPE OF PROTECTION SHALL BE Aexd
- Note 3: ESTIMATED SHUT-OFF PRESSURE IS 4.2 BARA.
- Note 4: MECHANICAL SEAL SHALL BE AS PER API 682 / ISO 21049 3rd EDITION :2004. VENDOR SHALL FILL OUT API 682 (3rd ED.) DATA SHEET FOR MECHANICAL SEALS.
- Note 5: VENDOR IS REQUIRED TO REVIEW AND CONFIRM.
- Note 6: REFERE TO "INSPECTION & TEST PLAN FOR CENTRIFUGAL PROCESS PUMPS" DOC.No.: 900-ITP-A4-RE-0001.
- Note 7: ALLOWABLE LOAD AND MOMENTS ON NOZZLES AND FLANGES SHALL BE AS PER API 610 (10TH ED.)
- Note 8: SPECIAL TOOLS SHALL BE SUPPLIED BY VENDOR IF REQUIRED FOR PRE-COMMISIONNING, COMMISIONING, START-UP AND MAINTANANCE PERIOD.
- Note 9: NPSH REQUIRED FOR SELECTED PUMP SHALL BE AT LEAST 1 METER LESS THAN NPSHA.
- Note 10: DESIGN TEMPRATURE RANGE IS: -10 /150 °C. Also design pressure is: 10 Barg.
- Note 11: DRY, FLEXIBLE , MULTI DISK ,S.S MEMBRANE SPACER TYPE COUPLING SHALL BE USED. DRIVER HALF COUPLING SHALL BE MOUNTED BY PUMP MFR.
- note 12: Ex-group : ExdIIBT4
- Note 13: REFERE TO "UTILITY CONDITION" DOC.No.: 900-SPC-A4-PR-0006.

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TITLE: DATA SHEET FOR DRYER SCRUBBER PUMP (P-621)



client:

# DATA SHEET FOR DRYER SCRUBBER PUMP (P-621)

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Owner Job No.:	Type: DAS
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# TITLE: DATA SHEET FOR DRYER SCRUBBER PUMP (P-621)

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شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی

Page B

PR	OJECT:	PP- PE PILOT	PLANT					clie	ent:		<u></u>		
TIT	LE: DAT) P-62)		DRYER SC	RUBBER PUMP								شرکت ملی صنا شرکت پژوهش و ف	
	`						SHEET	, SI UN	NIT				
	APPLICABLE FOR	TO: PROPO	DSAL OF NPC R&T		AS BU	UNIT		Rev					
-	SITE No. of Req'd:		T CENTRE - A			SREVICE DRYER SCRUBBER PUMP							
5				TED O BY PURCH	IASER	R BY MANUFACTURER BY MANUFACTURER OR PU REVISIONS							R
6 7		ITEM NO.	ATTACHED	DATA SHEETS	ATT	ACHED	ITEM	NO.	ATTACHED	NO.	REVIS DATE	IONS BY	
8	PUMP	P-621				<u>Ó</u>			Ó	1			
	MOTOR GEAR	PM-621				$\overset{\bigcirc}{\circ}$			$\overline{0}$	2			
		OVERLAY STANDA				0			0	4 5			
13		OVERLAT STANDA	<b>IG CONDITION</b>	NS (5.1.3)					LIQUID (	5.1.3	,		
	FLOW, NORI OTHER	MAL <b>15</b>	(m <sup>3</sup> /h) RATE	D <b>16.5</b> (m <sup>3</sup> /	'n)		YPE OR NA ARDOUS		FLAMMABLE			(5.1.5)	_
		RESSURE MAX / RAT	TED <b>7</b>	/ 1.3	(bara)			Ŭ	MIN.		NORMAL	(0.1.0) MAX.	
		PRESSURE		4.8 3.5	()	-	G TEMP( <sup>O</sup> ( 2 PRESS . (I	,			40 0.073		_
19	DIFF. HEAD	35.40	(m) NPSHA	12.7 (Note 8)	(m)	RELATIV	E DENSITY	,			1		
		ARIATIONS (5.1.4)	CLOSE	D DELIVERY VALVE		VISCOSI	TY(cP) C HEAT,C <sub>r</sub>	5		4.	0.65 at 40 ( 31	2 1 (kj/kg .k.)	
22	SERVICE:		TERMITTENT (S			● CHL	ORIDE CON		ATION (6.5.2.4	<u> </u>	N/A	(mg/kg)	
23 24		EL OPERATION REC	2'D (5.1.13) <mark>Έ DATA (5.1.3</mark>	3)		-	CONCENTE SIVE / EROS			lfract N/A		(ET (5.12.1.12c) (5.12.1.9)	
												· · · · · · · · · · · · · · · · · · ·	
26 27	<ul><li>INDOOR</li><li>ELECTR</li></ul>	ICAL AREA CLASSIF		R OUNHEATED					.1) MP (5.12.4.1)		S-4 (Note 4) -10	( <sup>0</sup> C)	
28	CL			2(Note 2)		$\sim$					D. (5.12.1.12)	C.S.	
29 30	SITE DATA (	IZATION REQ D. 5.1.30)		LIZATION REQ D.					. <b>S.</b> IMP R RINGS		-R	0.3.	
31		E <b>1889</b> (m OF AMBIENT TEMPS		(	bar) ( <sup>o</sup> C)	SHA	FT						
	-	E HUMIDITY:MIN / M		<u>-28</u> / <u>44</u> / <u>86</u>	(%)		USERS	D	PERFORM	1AN	CE		
	UNUSUAL C	ONDITIONS: (5.1.30)	•		-				MAN	~		(r/min)	
36	OTHER		CORROS										
37 38			STEAM TURB	INE O GEAR			ED POWER MUM CONT	-		) EFF		(%)	
	OTHER		(Note '	0					(m <sup>3</sup> /h) STA	BLE		(m <sup>3</sup> /h)	
40 41			DRIVER (6.1.1	/ 6.1.4)			FERRED O OWABLE OI				то то	(m <sup>3</sup> /h) (m <sup>3</sup> /h)	
42			•				. HEAD @ F	RATED IN	MPELLER			(m)	
		VTA (k)		(r/m JRE	in)		. POWER @ HR AT RAT		N IMPELLER			(kw) (m) (5.1.10)	
45	HORIZO	NTAL OVERTIO	CAL 🖸 S	SERVICE FACTOR		MAX	SUCTION	SPECIFIC	C SPEED :		000 M3/Hr,M,	<b>RPM</b> (5.1.11)	
46 47	VOLTS /	PHASE / HERTZ	400 / ASYNCHRO	<u>3</u> / <u>50</u> NOUS			. SOUND F MAX. SOUN		EVEL REQ. D SS LEVEL		85	(dba) (5.1.16) (dba) (5.1.16)	
48	Ōмілімил	I STARTING VOLTA	GE (6.1.5)				MAX. SOUN		ER LEVEL	0./-	4.0) (11-4-40	(dba) (5.1.16)	
		TION C	JTEMP. RISE			ELECTR		1	ONDITION OLTAGE	5 (5.	1.3) (Note 12 PHASE	HERTZ	
51		ROTOR AMPS		DOL		DRI	/ERS		400		3	50	
	STARTIN			D.O.L			TING TEM <u>VOLTA</u>	GE DIP	080%		OTHER	(6.1.5)	
54		TYPE / NUMBER) :				STEAM DRIVERS		PRESS.	MAX. TEN	IP	MIN. PRESS	MIN. TEMP	
56			/			HEATING	3						
57 58		AL THRUST CAPACIT (N)		(N)			G WATER: TEMP.		SOURC ( <sup>O</sup> C) MAX		TURN TEMP.	( <sup>0</sup> C)	
59		(**)		(N)		NORM. F	RESS.		(bar) DE	SIGN	PRESS.	(bar)	
60 61							T. PRESS. DE CONCEI		<u> </u>	X. AL	LOW. D.P.	(bar) (mg/kg)	
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												Page 1 of	4

PROJECT: PP-	PE PILO	T PLANT				client:						
			0.00000			شرکت ملی صنایع پتروشیمی						
TITLE: DATA S (P-621)	HEETFO		SCRUBE			سر تک ملی صنایع پیروسیمی شرکت پژوهش و فناوری پتروشیمی						
			CENT	RIFUGAL PU	JMP	P DATA SHEET, SI UNIT						
1		CONSTRUC	TION			SURFACE PREPARATION AND PAINT	Rev					
2 ROTATION : (VIE	WED FROM	COUPLING EN	ID)	cw 🛛 ccv	N	O MANUFACTURER'S STANDARD OTHER SEE BELOW						
3 PUMP TYPE : (4.1						SPECIFICATION NO. 900-SPC-A4-PD-0002						
4 OH2		ОН6	OTHER									
6 CENTERLINE			OTHER			FINISH COAT						
7						BASEPLATE : (6.3.1.7)						
8 CASING TYPE :												
9 SINGLE VOL		LTIPLE VOLUT	E L	DIFFUSER		<ul> <li>FINISH COAT</li> <li>DETAILS OF LIFTING DEVICES (6.3.20)</li> </ul>						
		GION DESIGNI	ED FOR MAW	P (5.3.6)		SHIPMENT : (7.4.1)						
12 MAX. ALLOW				. ,	(bar)							
13 @		( <sup>O</sup> C)				OUTDOOR STORAGE MORE THAN 6 MONTHS						
14 HYDRO TES		-	1.5 x MA	WP	(bar)							
15 NOZZLE CO	SIZE	: (5.4.2) <b>(N</b> FLANGE	FACG	POSITION		O HORIZONTAL STORAGE O VERTICAL STORAGE						
17		RATING				HEATING AND COOLING						
18 SUCTION	1 1/2"	150#	RF			HEATING JACKET REQ D. (5.8.9)						
19 DISCHARGE	1"	150#	RF									
20 21 PRESSURE		. CONNECTIO	NG · (5 4 2)			COOLING WATER PIPING PLAN (6.5.3.1)						
21 PRESSORE		NO.	SIZE (DN)	TYPE								
23 💭 DRAIN			1/2"	VALVED		C.W. PIPING MATERIALS:						
24 💭 VENT			1/2"	VALVED		S.STEEL C.STEEL GALVANIZED						
25 🖸 WARM-UP 26						COOLING WATER REQUIREMENTS : BEARING HOUSING (m <sup>3</sup> /h)						
27 MACHINED A	AND STUDDE		ONS : (5.4.3.8)	)		HEAT EXCHANGER (m <sup>3</sup> /h)						
28 O CYLINDRICA	L THREADS	REQUIRED (5.	.4.3.3)			TOTAL COOLING WATER (m <sup>3</sup> /h)						
29 ROTOR :						HEAT MEDIUM : O STEAM O OTHER HEATING PIPING : O TUBING O PIPE						
30 COMPONEN 31 COUPLINGS :(6.2		TO ISO 1940 G ote 10)	6 1.0 (5.9.4.4)			HEATING PIPING : UTUBING PIPE BEARING AND LUBRICATION						
	<i>,</i> <b>,</b>	•	MODEL SF	ACER(Type TS	SK)	BEARING (TYPE / NUMBER ) (5.10.1) :						
33 🔲 RATING (kw				-		RADIAL /						
34 SPACER LEN		VTA (mm		E FACTOR								
			. ,	(0.0.4.4)		LUBRICATION (5.11.3,5.11.4) :						
36 COUPLING V 37 COUPLING F			PING DEVICE	: (6.2.1.1)								
38 O COUPLING F		. ,				CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) :						
39 COUPLING F		. ,	O ASME B	151		OIL VISC. ISO GRADE						
			łC)	10.0	140							
41 COUPLING C	JUARD STAN	IUAKU PER		(6.2	.14a)	ACCELEROMETER (6.4.2.1)     PROVISION FOR MOUNTING ONLY (5.10.2.11)						
43 API BASEPLATES.	ATE NUMBER	२		(ANNEX D)		FLAT SURFACE REQ D (5.10.2.12)						
44 O NON-GROUT	CONSTRUC					TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6)						
		AL	<u> </u>			O PRESSURE GAUGE TYPE						
46 MECHANICAL SE 47 CATEGORY		(Note 3	& 4) 2									
48 ARRENGME			1		-	REMARKS :						
49 💽 TYPE			Α									
50 PLAN			31		-							
51 52						MASS OF PUMP (kg) MASS OF BASEPLATE (kg)						
53						MASS OF DRIVER (kg)	L					
54					Docu	ument TOTAL MASS (kg)						
					Document No.: 600-DAS-A4-RE-0046 Rev.: 0							
					Owner Job No.: Type: DA							
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# TITLE: DATA SHEET FOR DRYER SCRUBBER PUMP (P-621)



CENTRIFUGAL PUMP DAT	A SHEET, SI UNIT
	OA INSPECTION AND TESTING (CONT.)

1	SPARE PARTS (TABLE 18)	QA INSPECTION AND TESTING (CONT.)								
2	START-UP ONORMAL MAINTENANCE		TEST	NON-WIT	WIT	OBSERVE				
3	• OTHERS 2 YEARS OF OPERATION LIST (Note 7)		HYDROSTATIC (7.3.2)	0		0				
4	OTHER PURCHASER REQUIREMENTS		PERFORMANCE (7.3.3)	$\bigcirc$		0				
5	COORDINATION MEETING REQUIRED (9.1.3)	С	RETEST ON SEAL	0	Ο	0				
6	O MAXIMUM DISCHARGE PRESSURE TO INCLUDE (5.3.2)		LEAKAGE (7.3.3.2D)							
7	Omax relative density		NPSH (7.3.4.2)	0		0				
8	OMAX DIA. IMPELLERS AND / OR NO OF STAGES	Č	TRUE PEAK VELOCITY	Õ	Õ	Õ				
9	OPERATION TO TRIP SPEED	-	DATA (7.3.3.4D)	U U	0	Ū				
10	OH3 BEARING HS6 LIFTER (8.1.2.6)	C	) COMPLETE UNIT TEST (7.3.4.3	$)$ $\bigcirc$	Ο	0				
11	CONNECTION DESIGN APPROVAL (5.12.3.4)	ĕ	SOUND LEVEL TEST (7.3.4.4)	Ō	Ō	Ō				
12	TORSIONAL ANALYSIS REQUIRED (5.9.2.1)	ē	CLEANLINESS PRIOR TO	ē	Ō	Ō				
13	O TORSIONAL ANALYSIS REPORT (5.9.2.6)	_	FINAL ASSEMBLY (7.2.2.2)			_				
14	PROGRESS REPORTS (9.3.3)	C	) NOZZLE LOAD TEST (6.3.6)	0	Ο	0				
15	OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)	C	) CHECK FOR CO-PLANNER	0	0	0				
16	ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2.1.1f)		MOUNTING PAD SURFACE (6.3	3.3)						
17	PIPING AND APPURTENANCES	C	MECHANICAL RUN UNIT OIL	0	0	0				
18	MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)		TEMP P. STABLE (7.3.4.7.1)							
19	VENT DRAIN COOLING WATER	С	) 4 HR. MECHANICAL RUN AFTE	r ()	0	0				
20	MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)		OIL TEMP STABLE (7.3.4.7.3)							
21	FLANGES REQ D IN PLACE OF SOCKED WELD UNIONS (6.5.2.8)		4 HR. MECH. RUN TEST (7.3.4.7	7.2))	•	0				
22	INSTALLATION LIST IN PROPOSAL (9.2.3L)	С	) BRG HSG RESONANCE	0	0	0				
23	CONNECTION BOLTING		TEST (7.3.4.6)							
24	O PTFE COATING O ASTM A153 GALVANIZED	C	) AUXILIARY EQUIPMENT	0	0	0				
25			TEST (7.3.4.5)							
26	QA INSPECTION AND TESTING		IMPACT TESTING (5.12.4.3)	0	0	0				
27	SHOP INSPECTION (7.1.4) (Note 5)		O PER EN 13445							
28	O PERFORMANCE CURVE APPROVAL		O PER ASME V I							
29	TEST WITH SUBSTITUTE SEAL (7.3.3.2B)	С	l	0	0	0				
30	MATERIAL CERTIFICATION REQUIRED (5.12.1.8)		VENDOR KEEP REPAIR AND H	T RECORDS (7	.2.1.1C	)				
31	CASING IMPELLER SHAFT		VENDOR SUBMIT TEST PROCE	EDURES (7.3.1.	2/9.2.5	5)				
32	OTHER SHAFT SLEEVES, INTERNAL WEARING RINGS, MECH. SEAL PA		) VENDOR SUBMIT TEST DATA	WITHIN 24 HOL	JRS (7.3	3.3.3E)				
33	CASTING REPAIR PROCEDURE APPROVAL REQ D (5.12.2.5)	С	INCLUDE PLOTTED VIBRATION	SPECT A						
34	INSPECTION REQUIRED FOR CONNECTION WELDS (5.12.3.4e)		SUBMIT INSPECTION CHECK L	IST (7.1.6)						
35	MAG PARTICLE									
36	🖸 RADIOGRAPHIC 🛛 🔲 ULTRA SONIC									
37	INSPECTION REQUIRED FOR CASINGS (7.2.1.3 / 5.1.2.1.5)									
38	MAG PARTICLE									
39	🖸 RADIOGRAPHIC 🛛 🔲 ULTRA SONIC									
40	O HARDNESS TEST REQUIRED : (7.2.2.3)									
41	O ADDITIONAL SUBSURFACE EXAMINATION FOR 7.21.3									
42	FOR									
43	METHOD									
44										
45	REM/	ARKS								
46										
47										
48										
49										
50										
51										
52 53										
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	Ow	ner Jol	o No.:	Т	Type: DAS					
					F	Page 3 of	4			

TITLE: DATA SHEET	FOR DRYER SCRUBBER PUMP
(P-621)	



- Note 1: ALL ELECTRICAL MOTORS SHALL BE IN ACCORDANCE WITH "TECHNICAL SPECIFICATION FOR LV MOTOR" DOC.No.900-SPC-A4-EE-0005 MOTOR ENCLOSURES SHALL BE OF TOTALLY ENCLOSED FAN-COOLED (TEFC)
- Note 2: TYPE OF PROTECTION SHALL BE Aexd
- Note 3: MECHANICAL SEAL SHALL BE AS PER API 682 / ISO 21049 3rd EDITION :2004. VENDOR SHALL FILL OUT API 682 (3rd ED.) DATA SHEET FOR MECHANICAL SEALS.
- Note 4: VENDOR IS REQUIRED TO REVIEW AND CONFIRM.
- Note 5: REFERE TO "INSPECTION & TEST PLAN FOR CENTRIFUGAL PROCESS PUMPS" DOC.No.: 900-ITP-A4-RE-0001.
- Note 6: ALLOWABLE LOAD AND MOMENTS ON NOZZLES AND FLANGES SHALL BE AS PER API 610 (10TH ED.)
- Note 7: SPECIAL TOOLS SHALL BE SUPPLIED BY VENDOR IF REQUIRED FOR PRE-COMMISIONNING, COMMISIONING,START-UP AND MAINTANANCE PERIOD.
- Note 8: NPSH REQUIRED FOR SELECTED PUMP SHALL BE AT LEAST 1 METER LESS THAN NPSHA.
- Note 9: DESIGN TEMPRATURE RANGE IS: -10 /150 °C. Also design pressure is: 10 Barg.
- Note 10: DRY, FLEXIBLE , MULTI DISK ,S.S MEMBRANE SPACER TYPE COUPLING SHALL BE USED. DRIVER HALF COUPLING SHALL BE MOUNTED BY PUMP MFR.
- note11: Ex-group : ExdIIBT4
- Note 12: REFERE TO "UTILITY CONDITION" DOC.No.: 900-SPC-A4-PR-0006.

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PROJE	CT: PP-	PE PIL	OT PLANT
			••••=/

TITLE: DATA SHEET FOR JACKET RWA PUMP (P-711)



client:

# DATA SHEET FOR JACKET RWA PUMP (P-711)

Document No.: 700-DAS-A4-RE-0047	Rev.: 0
Owner Job No.:	Type: DAS
	Page A

	PROJECT: PP- PE PILOT PLANT								-711)						client: میرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی					
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client:

شركت ملى صنايع پتروشيمي

ТІТ	LE: DATA	SHEET FOR J	ACKET RWA	A PUMP (P-71	1)				-	ىركت ملى صنايع پتروش ت پژوهش و فناورى پتر	
			C	ENTRIFUGAL	PUMP	DATA SH	HEET, SI UN	<u> </u>	<i>ر ۳ی</i>	, ,	
1	APPLICABLE	TO: PROPOS		RCHASE	AS BU		,				Rev
2	FOR	_	NPC R&T			UNIT		7	00		
3	SITE	NPC R&	CENTRE - AR	AK - IRAN		SREVICE		JACKET	RWA PUMP		
4	No. of Req'd:	1 Service :	1 / Stand by	-							
5	NOTES : INFO	ORMATION BELOW TO	D BE COMPLETE			BY	MANUFACTURE	R 🗋 В'		R OR PURCHASER	
6 7		ITEM NO.	ATTACHED	DATA SHEETS		ACHED	ITEM NO.	ATTACHED		/ISIONS BY	
8	PUMP	P-711		TTEMINO.	AID		TEMINO.		1	DI	
9	MOTOR	PM-711				ŏ		Ŏ	2		
10	GEAR		Õ			$\cap$		$\overline{O}$	3		
11	TURBINE		Õ			ŏ		Ŏ	4		
12	APPLICABLE	OVERLAY STANDAR		(10TH EDITION)	$\Lambda_{-}$				5		
13			G CONDITIONS	· · ·	/2						
	FLOW, NORM	MAL 8	(m <sup>3</sup> /h) RATED	8.8	(m³/h)	~	E OR NAME		ater + 20%Glyc		
	OTHER		<b>7.5</b>	/ 1.25	(1)	OHAZARI	Dous C			(5.1.5)	_
16 17	DISCHARGE	ESSURE MAX / RATEI		.6	(bara) (bara)	PUMPING T	EME ( <sup>O</sup> C)	MIN. 10	NORMAI 30	L MAX. 55	
		AL PRESSURE		35	(baru)		RESS . (bara)	0.01	0.04	0.15	
	DIFF. HEAD	28.80	(m) NPSHA	10.4 (Note 8)	(m)		DENSITY (SG):	1.01	1.02	1.04	
		RIATIONS (5.1.4)				VISCOSITY	. ,	1.93	1.24	0.76	
21 22				DELIVERY VAL	VE	SPECIFIC H	IEAT, C <sub>P</sub> IDE CONCENTR	ATION (6.5.2.4	3.92 4) N/A	(kj/kg .k.) (mg/kg)	
23		EL OPERATION REQ'E		RTO/DAT)	*****		NCENTRATION			WET (5.12.1.12c)	*****
24			E DATA (5.1.3)			-	E / EROSIVE AG	101001000000000000000000000000000000000	N/A	(5.12.1.9)	
25	LOCATION: (	,						MATERIALS			
26		$\cup$	$\cup$	UNHEATED		<u> </u>	H CLASS (5.12.1		S-4 (Note		
27	•	ICAL AREA CLASSIFI				-	SIGN METAL TEI		****	( <sup>O</sup> C)	
28			C,T4 DIV	2(Note 2)					REQ D. (5.12.1.12)	C.S.	
29 30	SITE DATA (5	IZATION REQ D.	OTROPICALIZ	ATION REQ D.			IMPELLER WEA		PELLER	0.3.	
31		,	BAROMETE	२ 810	(mbar)						
32	-	OF AMBIENT TEMPS:		28 / 44	(110a1) ( <sup>0</sup> C)		FRS				
33	<b>X</b>	E HUMIDITY:MIN / MA		/ 86	(%)						
34	-	DNDITIONS: (5.1.30)	DU			PROPOSAL	CURVE NO.	-		(r/min)	********
35	OTHER		CORROSIV				ER DIA RATED	MA	XMIN	l(mm)	
36									CLOSE	(0/)	
37 38			RIVER TYPE	E O GEAR				· · · · ·	) EFFICIENC1	(%)	
39	OTHER		(Note 1)	GEAR		THERM		(m <sup>3</sup> /h) ST/	ABLE	(m <sup>3</sup> /h)	
40	<u> </u>						RRED OPER. RE	GION	то	(m <sup>3</sup> /h)	
41			RIVER (6.1.1 / 6	6.1.4)			ABLE OPER. RE		то	(m <sup>3</sup> /h)	
42					(		EAD @ RATED IN			(m)	
43		VTA (kw)			(r/min)		OWER @ RATED			(kw)	
44							AT RATED FLOW		12000 142/11-	(m) (5.1.10)	
45 46		NTAL VERTICA PHASE / HERTZ		RVICE FACTOR 3 /	50		OUND PRESS LE			<b><i>I</i>,RPM</b> (5.1.11) (dba) (5.1.16)	
40	TYPE		ASYNCHRON				X. SOUND PRES			(dba) (5.1.16)	
48	i A	M STARTING VOLTAG					X. SOUND POW			(dba) (5.1.16)	
49		_	TEMP. RISE						<mark>S (5.1.3) (Note 1</mark>		
50	FULL LO	•				ELECTRICI		OLTAGE	PHASE	HERTZ	
51		ROTOR AMPS				DRIVER		400	3	50	
52		IG METHOD		D.O.L		HEATIN		<u> </u>			
53 54		YPE / NUMBER) :				SYSTEN STEAM	M VOLTAGE DIP MAX. PRESS.	080% MAX. TEN		(6.1.5) SS. MIN. TEMP	-
54 55		TE / NOWDER).	/			DRIVERS	WINA, I NEOO.				1
56			/			HEATING					
57							VATER: (5.1.19)	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		/ <sup>0</sup> 0\	
58 59	UP	(N)	DOWN		(N)	SUPPLY TEI NORM. PRE			X. RETURN TEMP SIGN PRESS.	P( <sup>0</sup> C) (bar)	
60						MIN. RET. P			X. ALLOW. D.P.	(bar)	
61							CONCENTRATIO			(mg/kg)	
-	1				Docur		700-DAS-A		7	Rev.: 0	
					Owne	r Job No.	:			Type: DAS	
					<u> </u>					Page 1 of 4	
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PROJECT: PP	P- PE PILO	T PLANT				client:					
TITLE: DATA	SHEET FO	R JACKET	RWA PU	MP (P-711)	)	مت ملی صنایع پتروشیمی پژوهش و فناوری پتروشیمی					
			CENT	RIFUGAL P	UMP	DATA SHEET, SI UNIT					
1		CONSTRUC				SURFACE PREPARATION AND PAINT	Rev				
2 ROTATION : (VI 3 PUMP TYPE : (4	.1) API610		, <u> </u>	cw C	CW	MANUFACTURER'S STANDARD     OTHER SEE BELOW       SPECIFICATION NO.     900-SPC-A4-PD-0002					
		оне	OTHER			PUMP:					
5 CASING MOUN 6 CENTERLIN 7			OTHER			PRIMER     FINISH COAT BASEPLATE : (6.3.1.7)					
8 CASING TYPE :						PRIMER					
9 SINGLE VO		LTIPLE VOLUTE	: 🗆	DIFFUSER		FINISH COAT					
10 CASE PRESSUR	RE RATING :					DETAILS OF LIFTING DEVICES (6.3.20)					
		BION DESIGNED		(5.3.6)		SHIPMENT : (7.4.1)					
12 MAX. ALLO			E		(bar)						
	180 ST PRESSURE	( <sup>0</sup> C)	1.5 x MA		(h = r)						
	ST PRESSURE	*****	ote 6)		(bar)	SPARE ROTOR ASSEMBLY PACKAGED FOR :					
16	SIZE	FLANGE	FACG	POSITION		O TYPE OF SHIPPING PREPARATION	Senenenenenenen				
17	OIZE	RATING	1700	roomon		HEATING AND COOLING					
18 SUCTION	2"	150#	RF			HEATING JACKET REQ D. (5.8.9)					
19 DISCHARGE	1 1/2"	150#	RF			COOLING REQ D.					
20						COOLING WATER PIPING PLAN (6.5.3.1)					
	E CASING AUX.			TYPE							
22 23 DRAIN		NO.	SIZE (DN) 1/2"	VALVED		C.W. PIPING MATERIALS:					
24 VENT			1/2"	VALVED		S.STEEL C.STEEL GALVANIZED					
25 WARM-UP						COOLING WATER REQUIREMENTS :					
26				•		BEARING HOUSING (m <sup>3</sup> /h)	)				
27 MACHINED						HEAT EXCHANGER (m <sup>3</sup> /h)	)				
	CAL THREADS	REQUIRED (5.4	.3.3)			TOTAL COOLING WATER(m <sup>3</sup> /h)					
29 ROTOR :			0 (5 0 4 4)								
30 COMPONE 31 COUPLINGS :(6		ote 10)	.0 (5.9.4.4)								
32 MANUFACT	, <b>.</b>		MODEL SI	PACER(Type	TSK)	BEARING (TYPE / NUMBER ) (5.10.1) :					
33 RATING (kv	w per100 r/min)	VT	Ά			RADIAL /					
34 SPACER LE	ENGTH	VTA (mm)		E FACTOR							
35 COUPLING	BALANCED TO	O ISO 1940-1 G (	6.3 (6.2.3)			LUBRICATION (5.11.3,5.11.4) :					
			ING DEVICE (	(6.2.1.1)							
38 COUPLING 39 COUPLING				151		CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) :					
40 NON SPAR			-	151		INSTRUMENTATION					
41 COUPLING			,	(6	5.2.14a)	ACCELEROMETER (6.4.2.1)					
42 BASEPLATES:		v				O PROVISION FOR MOUNTING ONLY (5.10.2.11)					
43 API BASEP		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		(ANNEX D	)	FLAT SURFACE REQ D (5.10.2.12)	Senenenenenenen				
44 O NON-GROL	JT CONSTRUC	TION (6.3.13)				TEMP GAUGES (WITH THERMO WELLS) (8.1.3.6)					
45 OTHER 46 MECHANICAL S	SEAL · (5.8.1)	(Note 3 8	2 4)			O PRESSURE GAUGE TYPE					
47 CATEGOR		(	2				tenene tenenenenenenen				
			1			REMARKS :					
49 TYPE			Α								
50 PLAN			11			MASSES					
51											
52 53						MASS OF BASEPLATE (kg)					
54						TOTAL MASS (kg)					
•				D	)ocum	ent No.: 700-DAS-A4-RE-0047 Rev.: 0	)				
				с	Owner	Job No.: Type: [	DAS				
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			client:			
PF	ROJECT: PP- PE PILOT PLANT			4		
				ST.	2	
тг	ILE: DATA SHEET FOR JACKET RWA PUMP (P-711)		ئىيمى	ی صنایع پترون	شر کت مل	
••	TEL. DATA SHEET FOR JACKET RWA FOMF (F-711)		روشیمی	نی و فناوری پ <sup>ت</sup>	شركت پژوهن	ù
	CENTRIFUGAL PUMP D	ATA SHEET. SI UNIT				
1	SPARE PARTS (TABLE 18)		AND TESTING	(CONT.)		Rev
2	START-UP ONORMAL MAINTENANCE	TEST	NON-WIT	WIT C	DBSERVE	
3	OTHERS 2 YEARS OF OPERATION LIST (Note 7)	HYDROSTATIC (7.3.2)	0	•	0	
4	OTHER PURCHASER REQUIREMENTS	PERFORMANCE (7.3.3)	Õ		Õ	
5			0	0	0	
6 7	O MAXIMUM DISCHARGE PRESSURE TO INCLUDE (5.3.2) OMAX RELATIVE DENSITY	LEAKAGE (7.3.3.2D) NPSH (7.3.4.2)	0		0	
, 8	MAX DIA. IMPELLERS AND / OR NO OF STAGES		ŏ	Ŏ	ŏ	
9	OPERATION TO TRIP SPEED	DATA (7.3.3.4D)	Ũ	Ŭ	Ŭ	
10	OH3 BEARING HS6 LIFTER (8.1.2.6)	COMPLETE UNIT TEST (7.3	3.4.3)	0	$\circ$	
11	CONNECTION DESIGN APPROVAL (5.12.3.4)	SOUND LEVEL TEST (7.3.4	.4) ()	•	Ō	
12	TORSIONAL ANALYSIS REQUIRED (5.9.2.1)	CLEANLINESS PRIOR TO	$\bullet$	0	$\circ$	
13	O TORSIONAL ANALYSIS REPORT (5.9.2.6)	FINAL ASSEMBLY (7.2.2.2)	,	$\sim$	$\sim$	
14 15	PROGRESS REPORTS (9.3.3)     OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)	NOZZLE LOAD TEST (6.3.6     CHECK FOR CO-PLANNER	-	$\bigcirc$	$\mathbf{O}$	
15	ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2.1.1f)	MOUNTING PAD SURFACE	-	0	0	
17	PIPING AND APPURTENANCES		· · ·	$\cap$	$\bigcirc$	
	MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)	TEMP P. STABLE (7.3.4.7.1	•	Ŭ	Ŭ	
19		4 HR. MECHANICAL RUN A		0	$\circ$	
20	MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)	OIL TEMP STABLE (7.3.4.7.	.3)			
21	FLANGES REQ D IN PLACE OF SOCKED WELD UNIONS (6.5.2.8)	4 HR. MECH. RUN TEST (7		•	0	
22	INSTALLATION LIST IN PROPOSAL (9.2.3L)	BRG HSG RESONANCE	0 (	0	$\circ$	~~~~~~~~~
		TEST (7.3.4.6)	$\sim$		$\sim$	
24	O PTFE COATING OASTM A153 GALVANIZED PAINTED OSS		0 (	$\supset$	0	
25 26	QA INSPECTION AND TESTING	TEST (7.3.4.5)		0	0	
27	SHOP INSPECTION (7.1.4) (Note 5)	O PER EN 13445		0	$\bigcirc$	
28	O PERFORMANCE CURVE APPROVAL	O PER ASME V III				
29	TEST WITH SUBSTITUTE SEAL (7.3.3.2B)	0		С	$\bigcirc$	
30	MATERIAL CERTIFICATION REQUIRED (5.12.1.8)	VENDOR KEEP REPAIR AN	•	,		
31	CASING IMPELLER SHAFT	VENDOR SUBMIT TEST PR		,		
32	OTHER SHAFT SLEEVES, INTERNAL WEARING RINGS, MECH. SEAL PARTS			JRS (7.3.3.3	E)	
33 34	CASTING REPAIR PROCEDURE APPROVAL REQ D (5.12.2.5)	INCLUDE PLOTTED VIBRA     SUBMIT INSPECTION CHE				
34 35	MAG PARTICLE		CK LIST (7.1.0)			
36						
37	INSPECTION REQUIRED FOR CASINGS (7.2.1.3 / 5.1.2.1.5)					
38	MAG PARTICLE					
39	RADIOGRAPHIC ULTRA SONIC					
40	O HARDNESS TEST REQUIRED : (7.2.2)	3)				
41 42	ADDITIONAL SUBSURFACE EXAMINATION FOR 7.21.3					
42 43	FOR					
43 44						
45	R	EMARKS				
46						
47						
48					****	
49 50						
50 51						
52						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	Docum	ent No.: 700-DAS-A4-RE	-0047	Rev	·.: 0	
	Owner	Job No.:		Тур	e: DAS	
				Pag	e 3 of 4	4

PROJECT: F	PP- PE PILOT PLANT	client:
TITLE: DATA	SHEET FOR JACKET RWA PUMP (P-711)	شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی
Note 1:	ALL ELECTRICAL MOTORS SHALL BE IN ACCORDANCE WITH "TECHNICAL S	PECIFICATION FOR LV
	MOTOR" DOC.No.900-SPC-A4-EE-0005 MOTOR ENCLOSURES SHALL BE O	F TOTALLY ENCLOSED
	FAN-COOLED (TEFC)	$\wedge$
Note 2:	TYPE OF PROTECTION SHALL BE Aexd	<u>/2</u>
Note 3:	MECHANICAL SEAL SHALL BE AS PER API 682 / ISO 21049 3rd EDITION :20	04. VENDOR SHALL
	FILL OUT API 682 (3rd ED.) DATA SHEET FOR MECHANICAL SEALS.	
Note 4:	VENDOR IS REQUIRED TO REVIEW AND CONFIRM.	
Note 5:	REFERE TO "INSPECTION & TEST PLAN FOR CENTRIFUGAL PROCESS PUMP	S" DOC.No.: 900-ITP-A4-RE-0001.
Note 6:	ALLOWABLE LOAD AND MOMENTS ON NOZZLES AND FLANGES SHALL BE	AS PER API 610 (10TH ED.)
Note 7:	SPECIAL TOOLS SHALL BE SUPPLIED BY VENDOR IF REQUIRED FOR PRE-CO	MMISIONNING,
	COMMISIONING, START-UP AND MAINTANANCE PERIOD.	
Note 8:	NPSH REQUIRED FOR SELECTED PUMP SHALL BE AT LEAST 1 METER LESS	THAN NPSHA.
Note 9:	DESIGN TEMPRATURE RANGE IS: -50 /180 °C. ALSO DESIGN PRESSU	JRE IS: 10 Barg.
Note 10:	DRY, FLEXIBLE , MULTI DISK ,S.S MEMBRANE SPACER TYPE COUPLING SHA	ALL BE USED.
	DRIVER HALF COUPLING SHALL BE MOUNTED BY PUMP MFR.	
note11:	Ex-group ExdIIBT4	
Note 12:	REFERE TO "UTILITY CONDITION" DOC.No.: 900-SPC-A4-PR-0006.	

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TITLE: DATA SHEET FOR JACKET RWA PUMP (P-712)



client:

# DATA SHEET FOR JACKET RWA PUMP (P-712)

	Page A
Owner Job No.:	Type: DAS
Document No.: 700-DAS-A4-RE-0048	Rev.: 0

PROJECT: PP- PE PILOT PLANT TITLE: DATA SHEET FOR JACKET RWA PUMP (P-712)								client: مرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی												
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T I I	LE: DAT	A SHEET FOR		RWA PUMP (P-71	2)							ملی صنایع پترو وهش و فناوری پ	
				CENTRIFUGAL			SHEET, SI	UNIT					
	APPLICABLE	TO: PROP			🗋 AS BU	ILT							Rev
	FOR		NPC R&			UNIT			700				
3	SITE			ARAK - IRAN		SREVICE	E	J	ACKET RW	/A P	UMP		
4	No. of Req'd:		e: 1 / Stand by	-			1		~				
5	NOTES : INFO	ORMATION BELOW	TO BE COMPL	ETED BY PURC			BY MANUFAC	CTURER	О ВҮ М.	ANUF		OR PURCH	ASER
6			T	DATA SHEET	1			- 1			1	SIONS	
7	DUMD	ITEM NO.	ATTACHED	ITEM NO.	ATT	ACHED	ITEM N	0.	ATTACHED	-	DATE	BY	
8	PUMP	P-712				$\prec$			0	1			
	MOTOR	PM-712				$\prec$			8	2			
	GEAR TURBINE		$+\times$		$\rightarrow$	$\prec$			$\overline{0}$	_			
	-	OVERLAY STANDA			+	$\mathcal{I}$			0	4 5			
12 13					2				IQUID (5.1.	-			_
	FLOW, NORM		(m <sup>3</sup> /h) RATE		n <sup>3</sup> /h)	ד מונוסנו	YPE OR NAM				0%Glycol	<u>م</u>	
	OTHER				,		ARDOUS		FLAMMABLE			(5.1.5)	
	-	ESSURE MAX / RA	TED 7.5	/ 1.25	(bara)			– – – – – – – – – – – – – – – – – – –	MIN.	Ī	NORMAL	, ,	_
	DISCHARGE			4.4	(bara)	PUMPIN	G TEMP ( <sup>O</sup> C)	F	10		30	55	
		AL PRESSURE		3.15	(bara)		R PRESS . (bai		0.01		0.04	0.15	
	DIFF. HEAD		(m) NPSHA	10.4 (Note 8)	(m)		E DENSITY (S	· ·	1.01	-	1.02	1.04	
-		ARIATIONS (5.1.4)		( ),	. /	VISCOSI	,	ŕŀ	1.93	1	1.24	0.76	
			CLOSE	D DELIVERY VALVE			CHEAT, CP	L	:	3.92		(kj/kg .k	<.)
						CHL	ORIDE CONC	ENTRAT	ION (6.5.2.4)		N/A	(mg/kg)	
23		EL OPERATION RE		· _			CONCENTRA					VET (5.12.1.12	
24		S S	ITE DATA (5.1	1.3)			SIVE / EROSI\			N/A		(5.12.1	.9)
25	LOCATION: (	5.1.30)							ERIALS (5.1				
26		HEATED		R 🛑 UNHEATED		ANN	NEX H CLASS	(5.12.1.1)		S-	-4 (Note 4	)	
27	ELECTR	ICAL AREA CLASSI	FICATION (5.1.	24 / 6.1.4)		<b>MIN</b>	DESIGN MET	AL TEMP	(5.12.4.1)		-50	( <sup>0</sup> C)	1
28	CL	GR	C,T4 DIV	2(Note 2)		ORED	UCED HARD	NESS MA	TERIALS RE	QD.	(5.12.1.12)		
29	WINTER	IZATION REQ D.		LIZATION REQ D.		BAR	REL / CASE	C.S	S. IMP	ELLE	R	C.S.	
30	SITE DATA (5						SE / IMPELLEF	R WEAR F	RINGS				
31		DE <b>1889</b> (m			mbar)		\FT						
32	RANGE	OF AMBIENT TEMP	S:MIN,MAX.	-28 / 44	( <sup>O</sup> C)	DIFI	USERS						
33	RELATIV	/E HUMIDITY:MIN / I	MAX	/ 86	(%)				RFORMAN	ICE			
	UNUSUAL CO	ONDITIONS: (5.1.30)	) 🔴 I	DUST   FUMES			SAL CURVE N					(r/min)	
35	OTHER		CORRO	SIVE			ELLER DIA RA			-	MIN	(mm	ı)
36				-			ELLER TYPE						
37			DRIVER TYP				ED POWER			EFF		(%)	
38		ION MOTOR					IMUM CONTIN		LOW: (m <sup>3</sup> /h) STA			(m <sup>3</sup> /h)	
39 40	O UTHER		(Note	1)			RMAL	'	-	-	то	(m <sup>3</sup> /h)	
40 41			DRIVER (6.1	1/61/)			OWABLE OPE		-			(m <sup>3</sup> /h)	
							(. HEAD @ RA		-			(m)	
42 43			w	(r	/min)		(. POWER @					(iii) (kw)	
44	FRAME			,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		SHR AT RATE					(m) (5.1.10)	
44 45				SERVICE FACTOR			SUCTION SF			1300	0 M3/Hr M	_(iii) (5.1.10) , <b>RPM</b> (5.1.11)	· · · · · · · · · · · · · · · · · · ·
46		PHASE / HERTZ	400 /			L 1	( . SOUND PR				85	(dba) (5.1.1)	
47	TYPE		ASYNCHR				MAX. SOUNE				~~	(dba) (5.1.1) (dba) (5.1.1)	-
48	-	M STARTING VOLTA					MAX. SOUNE					(dba) (5.1.1	
49		FION (	TEMP. RISE						DITIONS (5	i.1.3)	) (Note 12	)	
50	FULL LO					ELECTR			LTAGE		HASE	HERTZ	
51		ROTOR AMPS				DRI	VERS	4	400		3	50	
52		NG METHOD		D.O.L		HEA	TING						
53	C LUBE					SYS	TEM VOLTAG	SE DIP	080%	5	()OTHER	(6.1.5)	
54	BEARINGS (1	TYPE / NUMBER) :				STEAM	MAX. P	RESS.	MAX. TEM	P N	MIN. PRES	S MIN. TEM	1P
55			/			DRIVER	S						
56			/			HEATING	3						
57		AL THRUST CAPAC	ITY			COOLIN	G WATER: (5	,	SOURCE	=			
58	UP	(N)	DOWN	1)	N)	SUPPLY		(			TURN TEM	IF( <sup>O</sup> C)	
59						NORM. F		(	. ,		PRESS.	(bar	)
50							T. PRESS.		. ,	X. AL	LOW. D.P.		
51						CHLORI	DE CONCENT	RATION :				(mg/kg)	)
52					Doc	ument	No.: 700-D	045-04	-RE-0048	2		Rev.:	
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شرکت ملی صنایع پتروشیمی
شركت پژوهش و فناورى پتروشيمى

Rev

client:

25		PE PILO	I PLANI						G	VQ.
тіт	TLE: DATA S	HEET FO		r wa pu	JMP (P-712)				ع پتروشیمی اوری پتروشیمی	رکت ملی صنای ت پژوهش و فنا
				CENT	RIFUGAL PU	MP	DATA SHEET, SI UNI	T		
1			CONSTRUC	TION			SURFACE	PREPAR/	ATION AND PAIN	Г
2	ROTATION : (VIE	WED FROM	COUPLING EN	D)	cw ccv	V	O MANUFACTURER'S STA		OTHER SE	
3	PUMP TYPE : (4.	1)					SPECIFICATION NO	90	00-SPC-A4-PD-000	)2
4	ОН2	онз 🖸	оне 🖸	OTHER			PUMP :			
5	CASING MOUNT						PRIMER			
6	CENTERLIN	e 🖸 in-l		OTHER			FINISH COAT			
7							BASEPLATE : (6.3.1.7)			
8	CASING TYPE :						PRIMER			
9		UTE 🗌 MU	LTIPLE VOLUT	E	DIFFUSER		FINISH COAT			
10	CASE PRESSUR	E RATING :					DETAILS OF LIFTIN	G DEVICES	S (6.3.20)	
11	<u> </u>				'P (5.3.6)		SHIPMENT : (7.4.1)	-		
12				RE		(bar)	ě ·	-	EXPORT BOXING	REQUIRED
13		180	( <sup>0</sup> C)				OUTDOOR STORAGE N			
14			-	1.5 x M/	AWP	(bar)	SPARE ROTOR ASSEMBLY	_	_	
15	NOZZLE CO			lote 6)		l		-	) VERTICAL STORA	٩GE
16		SIZE	FLANGE	FACG	POSITION					
17			RATING						D COOLING	
	SUCTION	2"	150#	RF			HEATING JACKET REQ	D. (5.8.9)		
	DISCHARGE	1 1/2"	150#	RF						
20								IG PLAN (6.	.5.3.1)	
21		CASING AUX					C.W. PIPING:	IC. F		
22			NO.	SIZE (DN) 1/2"	TYPE VALVED		C.W. PIPING MATERIALS:	IG: FI	ITTINGS	
				1/2"	VALVED		S.STEEL C.S.	TEEI	GALVANIZED	
	WARM-UP			1/2	VALVED		COOLING WATER REQUIRE			
26			L							(m <sup>3</sup> /ł
		AND STUDDE		ONS · (5 4 3 8	)		HEAT EXC			(m <sup>3</sup> /r
					/		TOTAL COOLIN			(m <sup>3</sup> /ł
	ROTOR :		,	,			HEAT MEDIUM : OST	EAM		
		IT BALANCE	TO ISO 1940 G	1.0 (5.9.4.4)			HEATING PIPING : OTU			
31	COUPLINGS :(6.2	2.2) <b>(No</b>	ote 10)	. ,			BEAR	ING AND	LUBRICATION	
32		URER	VTA	MODEL SI	PACER(Type TS	K)	BEARING (TYPE / NUMBER )	) (5.10.1) :		
33	RATING (kw	per100 r/min)	V	ГА	_				/	
34	SPACER LEI	NGTH	VTA (mm	) 🖸 SERVIC	E FACTOR				/	
35		BALANCED T	O ISO 1940-1 (	G 6.3 (6.2.3)			LUBRICATION (5.11.3,5.11.4	):		
				PING DEVICE	E (6.2.1.1)		GREASE			
			( )					PURE OIL		
				$\sim$				R PREFER	RENCE (5.10.2.2) :	
			. ,	O ASME B	151				NTATION	
				iC)	<i>ia</i> -		-		NTATION	
		JUARD STAN	NDARD PER		(6.2	.14a)	ă ș		((5.40.0.44)	
	BASEPLATES:		D		(ANNEX D)		<ul> <li>PROVISION FOR MOUN</li> <li>FLAT SURFACE REQ D</li> </ul>		r (5.10.2.11)	
			-				TEMP GAUGES (WITH T	. ,	FUS) (8136	
		roonontoe	0.0.10)						· · · · · · · · · · · · · · · · · · ·	
	MECHANICAL SE	=AL · (5.8.1)	(Note 3	& 4)						
	CATEGORY		(1.510 0	2						
	ARRENGME			1			REMARKS :			
49				A						
50				11				MASS	SES	
51							MASS OF PUMP (kg)			
52							MASS OF BASEPLATE (	kg)		
53							MASS OF DRIVER (kg)			
54							TOTAL MASS (kg)			
						Do	cument No.: 700-DAS	ን-A4-RE	-0048	Rev.: (
						Ow	vner Job No.:			Type:

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شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی

TITLE: DATA SHEE	T FOR JACKET	RWA PUMP (	P-712)
			· · ·,

CENTRIFUGAL PUMP DATA SHEET, SI UNIT										
1 SPARE PARTS (TABLE 18)	QA INSPECTION AND TESTING (CONT	<b>.)</b> Rev								
2 START-UP ONORMAL MAINTENANCE	TEST NON-WIT WIT	OBSERVE								
3 OTHERS 2 YEARS OF OPERATION LIST (Note 7)	HYDROSTATIC (7.3.2)	<u> </u>								
4 OTHER PURCHASER REQUIREMENTS	PERFORMANCE (7.3.3)	0								
5 COORDINATION MEETING REQUIRED (9.1.3)	O RETEST ON SEAL	0 _								
6 MAXIMUM DISCHARGE PRESSURE TO INCLUDE (5.3.2)	LEAKAGE (7.3.3.2D)									
7 OMAX RELATIVE DENSITY	• NPSH (7.3.4.2)	0								
8 OMAX DIA. IMPELLERS AND / OR NO OF STAGES		0								
9 OPERATION TO TRIP SPEED	DATA (7.3.3.4D)									
10 OH3 BEARING HS6 LIFTER (8.1.2.6)	O COMPLETE UNIT TEST (7.3.4.3)	<u> </u>								
11 O CONNECTION DESIGN APPROVAL (5.12.3.4)	SOUND LEVEL TEST (7.3.4.4)									
12 TORSIONAL ANALYSIS REQUIRED (5.9.2.1)	CLEANLINESS PRIOR TO									
13 O TORSIONAL ANALYSIS REPORT (5.9.2.6)	FINAL ASSEMBLY (7.2.2.2)	_								
14 PROGRESS REPORTS (9.3.3)	O NOZZLE LOAD TEST (6.3.6)	0								
15 OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)	CHECK FOR CO-PLANNER									
16 ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2.1.1f)	MOUNTING PAD SURFACE (6.3.3)									
17 PIPING AND APPURTENANCES	O MECHANICAL RUN UNIT OIL O O									
18 MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)	TEMP P. STABLE (7.3.4.7.1)	_								
19 VENT DRAIN COOLING WATER	○ 4 HR. MECHANICAL RUN AFTER ○ ○									
20 MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)	OIL TEMP STABLE (7.3.4.7.3)	_								
21 FLANGES REQ D IN PLACE OF SOCKED WELD UNIONS (6.5.2.8)	• 4 HR. MECH. RUN TEST (7.3.4.7.2)	0								
22 INSTALLATION LIST IN PROPOSAL (9.2.3L)	O BRG HSG RESONANCE	0								
23 CONNECTION BOLTING	TEST (7.3.4.6)	_								
24 O PTFE COATING O ASTM A153 GALVANIZED		0								
25 ○ PAINTED ■ SS	TEST (7.3.4.5)	_								
26 QA INSPECTION AND TESTING										
27 SHOP INSPECTION (7.1.4) (Note 5)	O PER EN 13445									
28 O PERFORMANCE CURVE APPROVAL		_								
29 TEST WITH SUBSTITUTE SEAL (7.3.3.2B)	0 0 0									
30 MATERIAL CERTIFICATION REQUIRED (5.12.1.8)	VENDOR KEEP REPAIR AND HT RECORDS (7.2.1.1									
31 CASING IMPELLER SHAFT	VENDOR SUBMIT TEST PROCEDURES (7.3.1.2 / 9.1									
32 OTHER SHAFT SLEEVES, INTERNAL WEARING RINGS, MECH. SEAL PARTS	_ VENDOR SUBMIT TEST DATA WITHIN 24 HOURS (	7.3.3.3E)								
33 CASTING REPAIR PROCEDURE APPROVAL REQ D (5.12.2.5)	INCLUDE PLOTTED VIBRATION SPECTR/A									
34 INSPECTION REQUIRED FOR CONNECTION WELDS (5.12.3.4e)	SUBMIT INSPECTION CHECK LIST (7.1.6)									
35 MAG PARTICLE LIQUID PENETRANT										
37 INSPECTION REQUIRED FOR CASINGS (7.2.1.3 / 5.1.2.1.5)										
41 O ADDITIONAL SUBSURFACE EXAMINATION FOR 7.21.3										
42 FOR										
43 METHOD										
44										
	MARKS									
46										
47										
48										
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PROJECT: PP- PE PILOT PLANT	PRO	JECT	: PP-	PE	PIL	ОΤ	PLANT
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client:

#### TITLE: DATA SHEET FOR JACKET RWA PUMP (P-712)

Note 1: ALL ELECTRICAL MOTORS SHALL BE IN ACCORDANCE WITH "TECHNICAL SPECIFICATION FOR LV MOTOR" DOC.No.900-SPC-A4-EE-0005 MOTOR ENCLOSURES SHALL BE OF TOTALLY ENCLOSED FAN-COOLED (TEFC)

- Note 2: TYPE OF PROTECTION SHALL BE Aexd
- Note 3: MECHANICAL SEAL SHALL BE AS PER API 682 / ISO 21049 3rd EDITION :2004. VENDOR SHALL FILL OUT API 682 (3rd ED.) DATA SHEET FOR MECHANICAL SEALS.
- Note 4: VENDOR IS REQUIRED TO REVIEW AND CONFIRM.
- Note 5: REFERE TO "INSPECTION & TEST PLAN FOR CENTRIFUGAL PROCESS PUMPS" DOC.No.: 900-ITP-A4-RE-0001.
- Note 6: ALLOWABLE LOAD AND MOMENTS ON NOZZLES AND FLANGES SHALL BE AS PER API 610 (10TH ED.)
- Note 7: SPECIAL TOOLS SHALL BE SUPPLIED BY VENDOR IF REQUIRED FOR PRE-COMMISIONNING, COMMISIONING, START-UP AND MAINTANANCE PERIOD.
- Note 8: NPSH REQUIRED FOR SELECTED PUMP SHALL BE AT LEAST 1 METER LESS THAN NPSHA.
- Note 9: DESIGN TEMPRATURE RANGE IS: -50 /180 °C. ALSO DESIGN PRESSURE IS: 10 Barg.
- Note 10: DRY, FLEXIBLE , MULTI DISK ,S.S MEMBRANE SPACER TYPE COUPLING SHALL BE USED. DRIVER HALF COUPLING SHALL BE MOUNTED BY PUMP MFR.
- note11: Ex-group : ExdIIBT4
- Note 12: REFERE TO "UTILITY CONDITION" DOC.No.: 900-SPC-A4-PR-0006.

Document No.: 700-DAS-A4-RE-0048	Rev.: 0
Owner Job No.:	Type: DAS
	Page 4 of 4

PROJECT: PP-PE PILOT PLANT	
DOC. TITLE :	شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی
DATA SHEET FOR CWS PUMP	Page 1 Of 5

## DATA SHEET FOR CWS PUMP

0	2021-12-29	K.A	M.N	AA.SH	IFA
Rev.	Date	Prepared By	Checked By	Approved By	Status

DATA SHEET FOR CWS PUMP

DOC. TITLE :

# شرکت پژوهش و فناوری پتروشیمی

Page 2 Of 5

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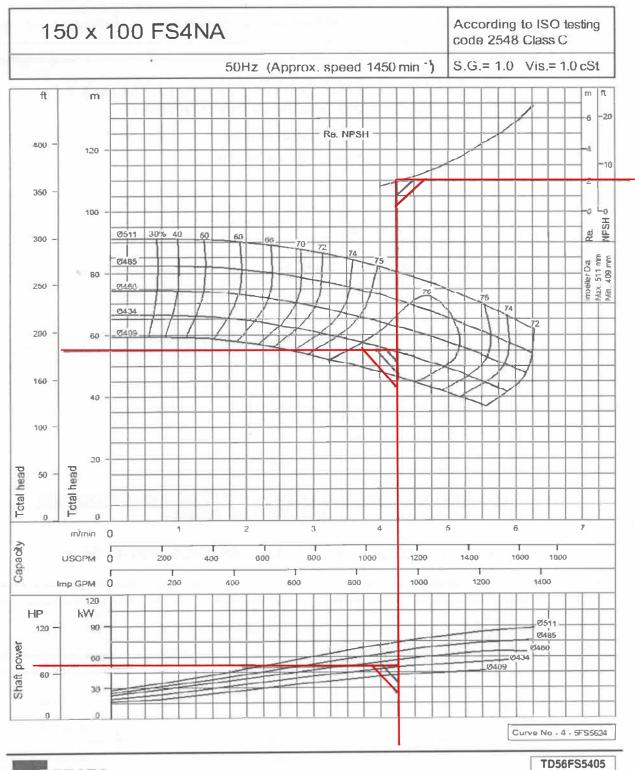
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		PROJ	ECT: PP-PE	PILOT PLANT			0
	DOC. TIT	LE:				، پتروشیمی	شرکت ملی صنایہ
		DA	TA SHEET FOR	CWS PUMP			شرکت پژو هش و فناو e 3 Of 5
						- ug	
APPLICABLE TO: Proposal SITE: PP-PE PILOT PLANT SERVICE: CWS PUMP TYPE: CENTRIFUGAL			PURCHASE	AS-BUILT EQUIP TAG No. : .DRIVER TYPE MAIN/SPAR VENDOR:		QTY. N EL :150 X 100 FS4N	IAIN/SPARE : 1
	OPERA	ING CONDITION, EA	ACH PUMP			PERFORM	NCE
HEAD RATED <b>55</b> m PRESSURE (barg) DISCHARGE @ RATED CON SUCTION MIN / NORMAL / MAX	DITION	5.5 bara @ 0.0 barg	TT. LIQUI m NORM. FLOW	D: COOLING WATER	SPEED NPSH REC EFFICIENC RATED PO MAX RATE	Y <b>76</b> % WER 6 D IMPELLER 7	6.0 Kw <b>'5.0</b> Kw
DIFFERENTIAL PRESSURE AT (RATED VAPOR PRESSURE 1.0 SUCTION TEMPERATURE MAX / NOR DENSITY AT NORMAL TEMPERATURE VISCOSITY AT NORMAL TEMPERATURE HYDRAULIC POWER 45	02 bara MAL / MIN RE Kw	50/17/0 998 1.002	NPSHA 4 m °C kg/m cP		MIN CONT THERMAL ROTATION	RATED IMPELLER NUOUS FLOW RA 75.0 m <sup>3</sup> /h COUPLING END PRESSURE	
CAUSE OF CORROSION / EROSION	Suspend	led solid CONSTRUCTION	TOXIC				
	IZE 150	RATING 150#	FACING RF	LOCATION END			
	100	150#	RF	ТОР			
CASE - MOUNT CENTRE LIN - SPLIT AXIAL RADIAL TYPE - PRESSURE MAW 20 ba - CONNECTION VENT IMPELLER DIA. RATED TYPE CLOSED	rg <sup>o</sup> (	CRAIN ☐ MAX	OT IGLE DOUBLE DROTEST 30 PRESSURE GAUGE 169 mm	BRACKET DIFFUSER barg <sup>o</sup> C		SHOP TE: NON WIT PERF NON WIT HYDRO NON WIT NPSHR SHOP INSPECTION DISMANTLE & INSP DTHER	WIT PERF
MOUNT DETWEEN BEARIN	IG		OVERHUNG				
BEARING TYPE ■ RADIA LUBRICATION ■ RING OIL	L ANTI-FR		THRUST ANTI- MIST IFLING	FRICTION ER DPRESSURE	CASI	MATERI	AL CAST IRON
COUPLING TYPE / MFR FLEXI	BLE				IMPE	LER	BRONZE
BASE PLATE DRIVER HALF SUPPLIED BY	SEPARA PUMP N		COMMON WI	TH DRIV.		WEAR RINGS	CAST IRON
PACKING: MFR & TYPE		SIZ	E/ No. OF RINGS		SHAF	Т	AISI 4140
MECH SEAL: MFR & MODEL EE MFR CODE	ARA		API CLASS CODE	11	SLEE THRC	VE SEAL	N.A. N.A.
		UXILIARY PIPING N			GLAN	D	N.A.
CW PIPE PLAN CU TOTAL COOLING WATER REQ.D PACKING COOLING INJECTION REC AXXERNAL SEAL FLUSH FLUID AUXILIARY SEAL PIPE		m³/h □ m³/h	TUBING SIGHT FLOW IND RI m <sup>3</sup> /h bar barg SEAL BING PIPE	PIPE EQ.D FLUSH PLAN		ERN RING PLATE	N.A. ST-37-2
AUXILIARY SEAL QUENCH FLUID							
		DRIVER	ELECTRIC MOTOR	2	PUMF	WEIGH	Tkg
KW RPM			75.0 1450		MOTO		kg
MFR			VEM		ENGI		kg kg
VOLT/PH/H	Z		380 / 3 / 50		SKID		kg
REMARKS							
1) MOTOR PROTECTION : IP 55							

## Ebara End Suction Volute Pump

## Performance Curve 4 Poles (20/27)



EBARA

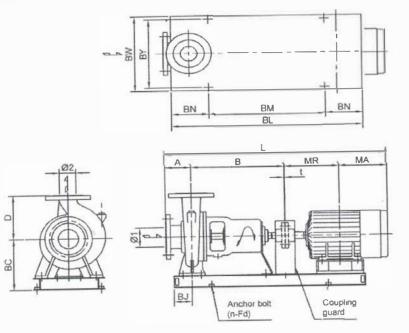


Model **FSA** 

# Ebara End Suction Volute Pump

## Dimension - Pump With Motor (16 Bar Model) 4 Poles Drive

Pump

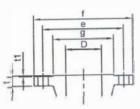


Flange



Model FSA

50 Hz



Dim	ens	ion ·	Flan	ie (J	15 1	K R	F)
D mm	t mm	e mm	0 mm	t1 mm	t mm	n	h mm
100	225	185	160	2	26	8	23
150	305	260	230	2	28	12	25
200	350	305	275	2	30	12	25
250	430	380	345	2	34	12	27

#### Dimension - Pump (Steel baseplate)

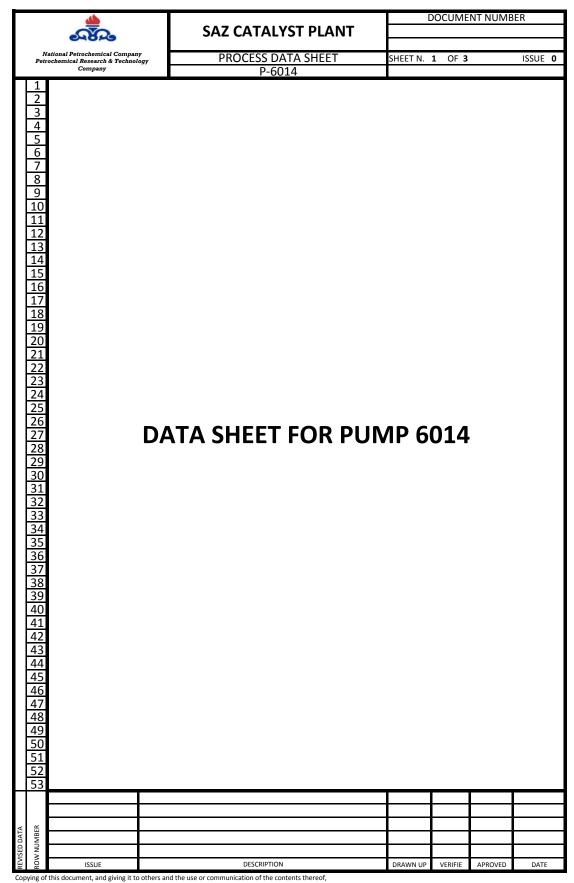
inchision -	Motor	Si	-	Common Rasa				Total																
Model	kW	φl	¢2	A	в	D	wt kg	Frame	MR	MA	wt kg	BC	BJ	BL	BM	BN1	BN2	BY1	BY2	n-Fd	wt kg	t	L	wt kg
150x100 FSNA	55 75 90	150	100	180	670	450	365	250SC 250MC 280SC	482.5	428	520 580 660	525	130	1500 1530 1600		150	150	580	640	6-M20	156 170 175	4	1736.5 1774_5 1876	112
200x150 FSLA	75 90	200	150	162	670	450	336	250MC 280SC	482 5 544 0	428 478	580 660	465	130	1530 1600	2x615 2x650	150	150	580	640	6-M20	150 145	4	1756.5 1858	
	110			-				280MC	569.5	502.5	720	525		1670				580	640	6-M20	176		1928	14
200x150 FSNA	132	200	150	182	670	560	488	315SC 315MC	589 614.5	527 552.5	920 1030		130	1680 1730		150	150	650	720	6-M22	200 220	4	1972 2023	16
250x200 FSLA	90 110 132 150	250	200	180	670	560	505	280SC 280MC 315SC 315MC	569 5 589	502.5 527	660 720 920 1030		185	1680 1730 1740 1790	2x700 2x705		165	690	760	6-M22	250 255 235 240	4	1876 1928 1970 2021	14
250x200 FSNA	185 225 260 300 335		200	200	200	820	630	315MB 315CB 355AB 355CB	741.0 779 0	1116	1800	610	185	2300	2x945	175	175		760 	6-M22	290 340 330 365	4	2191 2881 3004 3194 3250	3

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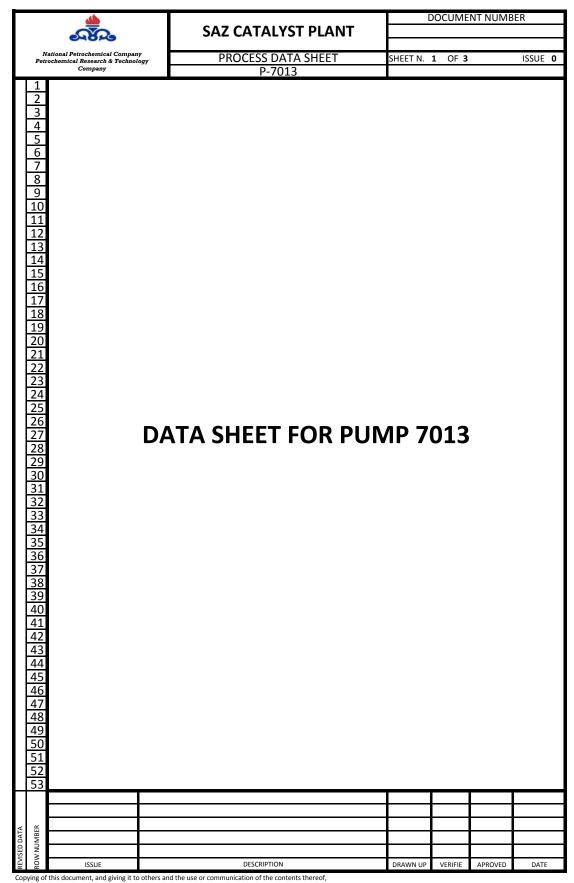
#### Page 5 of 5

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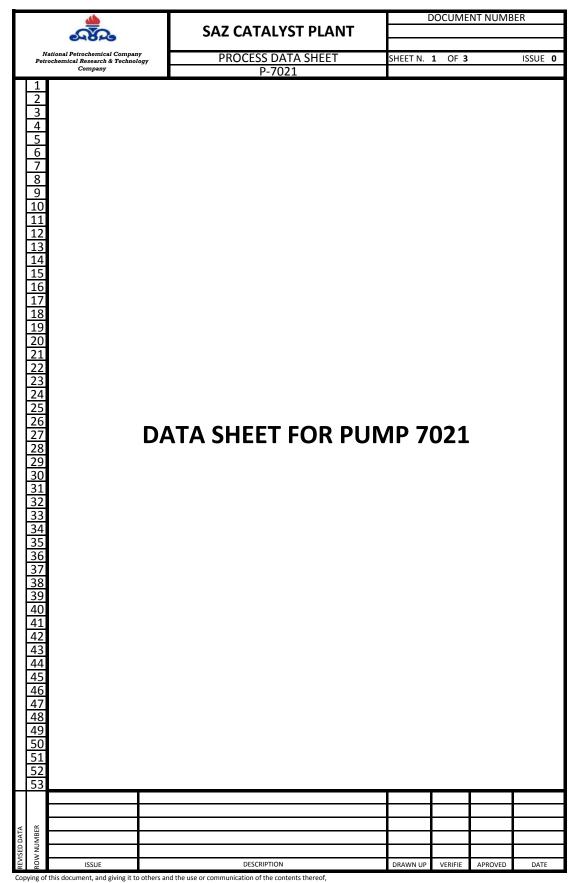
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లార్లాల	PROCESS DATA SH	FFT	4	
National Petrochemical Company			SHEET N. 2 OF 3	ISSUE (
ochemical Research & Technology Company	P-6014			10002
1 SERVICE HOT WATE	R PUMP		QUANTITY <b>1</b>	
2 TYPE CENTRIFU			PLANT UNIT 600	
3 INSTALATION OUTDOOR	SERVICE TYPE COI	NTINUOUS	INCLUDED IN	
4 SUMP DATA m				
5 ORIENTATION HORIZONTA	L DEPTH		MIN.SUMB.	
6 AREA CLASSIFICATION	CLASS	DIVISION	GROUP	
7	PROCESS		011001	
8 PUMPED LIQUID	HOT WATER			
9 SUSPENDED SOLID	NO	% BY WT		
10 SOLID NATURE	NO	70 DT VVT		
	SIZE mu	DENCITY	kg/m3	
<ul><li>11 PARTICLE</li><li>12 PUMPING TEMPERATURE(PT)</li></ul>		DENSITY MAX.	kg/m <sup>3</sup> 130 AT MIN. PT	50
13 DENSITY (kg/m <sup>3</sup> )	AT NOR. 100	AT MAX PT	AT MIN. PT	50
			AT MIN: FT	
14 VISCOSITY (mpa s)	AT NOR PT 0.52	AT MAX PT		
15 VAPOR PRESSURE (bar)	AT NOR.PT 0.52	AT MAX PT	5.4151	
16 CAPACITY (m <sup>3</sup> /h)		RATED 20		-
17 SUCTION PRESSURE (barg)		RATED 2	MAX	4
18 DISCHARGE PRESSURE (barg)		RATED 5		
<b>19</b> DIFFERENTIAL PRESSURE (bar)		RATED		
20 MANOMETRIC HEAD		RATED		
21 NPSH (m)	AVAILABLE 7.5		REQUIRED	
22 PERFORMANCE HEAD				
23	BODY			
24 DESIGN PRESSURE (barg)	COND.1 <b>10</b>	COND.2	F.V.REQUIRED	YES
25 DESIGN TEMPERATURE (°C )	COND.1 <b>160</b>	COND.2	F.V TEMP	
26 MDMT @	@			
27 MATERIAL (IN CONTACT WITH	,			
28 IMPELLER	ТҮРЕ	MATERIAL C.	S	
29 COLLIN/HEATING	REQUIRED	FLUID		
<b>30</b> PRESSURE (barg)	NORMAL	MAX.		
31 TEMPERATURE °C	NORMAL	MAX.		
32	SEAL			
33 TYPE		51.110	MATERIAL	
34 FLUSHING	REQUIRED	FLUID		
35 PRESSURE (barg)	NORMAL	MAX.		
36 TEMPERATURE(°C)	NORMAL	MAX.	FACING	
37 RATING AND FACING	DN	RATING	FACING	
38 39 SUCTION FLANGE	NOZZL		FACING	
<b>39</b> SUCTION FLANGE <b>40</b> DISCHARGE FLANGE	2½" 2"	RATING 150#	FACING	RF
		RATING 150#	FACING	RF
41 VENT	DN	RATING	FACING	
42 DRAIN		RATING	FACING	
43 DRIVER	TYPE ELECTRIC (Ex-T3) IPS	5		
44 POWER	ABSORBED ESTIM.		MOTOR NOMINAL ESTIM.	
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		28	26	PROCESS DATA SHEET	
	Nat Petro	tional Petrochem chemical Researc Compar	ch & Technology	P-6014	SHEET N. 3 OF 3 ISSUE 0
	1	SERVICE	HOT WATER P		QUANTITY 1
	2	SERVICE	HOT WATER P		PLANT UNIT 600
	3				
	4			NOTE	
	5	GENERAL N	OTES.		
	6 7	OLIVEIAL IN	0113.		
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	9	DATA SHEET	I NOTES:		
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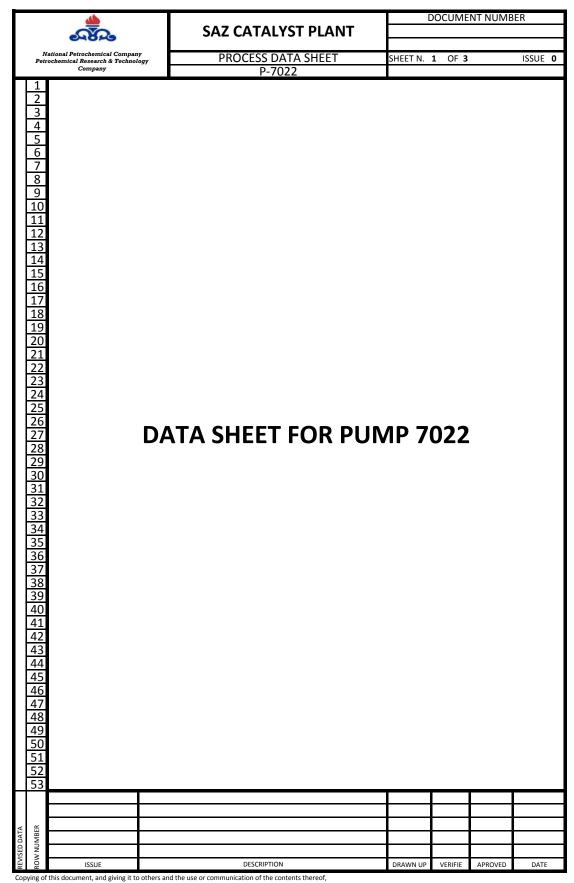
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6-8-6	PROCESS DATA SHE	FT	4	
National Petrochemical Company			SHEET N. 2 OF 3	ISSUE
rochemical Research & Technology Company	P-7013			
1 SERVICE NaOH			QUANTITY <b>1</b>	
2 TYPE CENTRIFU	GAL		PLANT UNIT 700	
3 INSTALATION OUTDOOR	SERVICE TYPE CONT	INUOUS	INCLUDED IN	
4 SUMP DATA m				
5 ORIENTATION HORIZONTA	L DEPTH		MIN.SUMB.	
6 AREA CLASSIFICATION	CLASS	DIVISION	GROUP	
7	PROCESS DA	ТА		
8 PUMPED LIQUID	NaOH			
9 SUSPENDED SOLID	NO	% BY WT		
10 SOLID NATURE				
11 PARTICLE	SIZE mu	DENSITY	kg/m³	
12 PUMPING TEMPERATURE(PT) (		MAX.	<b>40</b> AT MIN. PT	
13 DENSITY (kg/m <sup>3</sup> )	AT NOR.PT <b>880</b>	AT MAX PT	AT MIN. PT	
14 VISCOSITY (mpa s)	AT NOR.PT 0.43	AT MAX PT		
15 VAPOR PRESSURE (bar)	AT NOR.PT	AT MAX PT		
16 CAPACITY (m <sup>3</sup> /h)		RATED 2	MIN	
17 SUCTION PRESSURE (barg)		RATED 0	MAX	1
18 DISCHARGE PRESSURE (barg)		RATED 3		
<b>19</b> DIFFERENTIAL PRESSURE (bar)		RATED		
20 MANOMETRIC HEAD		RATED		
21 NPSH (m)	AVAILABLE 4.9		REQUIRED	
22 PERFORMANCE HEAD				
23	BODY			
24 DESIGN PRESSURE (barg)		OND.2	F.V.REQUIRED	YES
25 DESIGN TEMPERATURE (°C )		OND.2	F.V TEMP	
26 MDMT @ 27 MATERIAL (IN CONTACT WITH L				
		MATERIAL SS		
28 IMPELLER 29 COLLIN/HEATING		MATERIAL SS FLUID		
<b>30</b> PRESSURE (barg)	REQUIRED NORMAL	MAX.		
<b>31</b> TEMPERATURE °C	NORMAL	MAX.		
32	SEAL			
33 TYPE			MATERIAL	
34 FLUSHING	REQUIRED	FLUID		
35 PRESSURE (barg)	NORMAL	MAX.		
<pre>36 TEMPERATURE(°C )</pre>	NORMAL	MAX.		
37 RATING AND FACING	DN	RATING	FACING	
38	NOZZLE			
39 SUCTION FLANGE		ATING 150#	FACING	RF
40 DISCHARGE FLANGE		ATING <b>150</b> #	FACING	RF
41 VENT		ATING	FACING	
42 DRAIN		ATING	FACING	
43 DRIVER	TYPE ELECTRIC (Ex-T3) IP55			
44 POWER	ABSORBED ESTIM.		MOTOR NOMINAL ESTIM.	
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e25Ce	PROCESS DATA SHEET	-
National Petrochemical Company Petrochemical Research & Technology Company	P-7011	SHEET N. 3 OF 3 ISSUE 0
1 SERVICE NaOH		QUANTITY 1
2		PLANT UNIT 700
3	NOTE	
5	NOTE	
6 GENERAL NOTES:		
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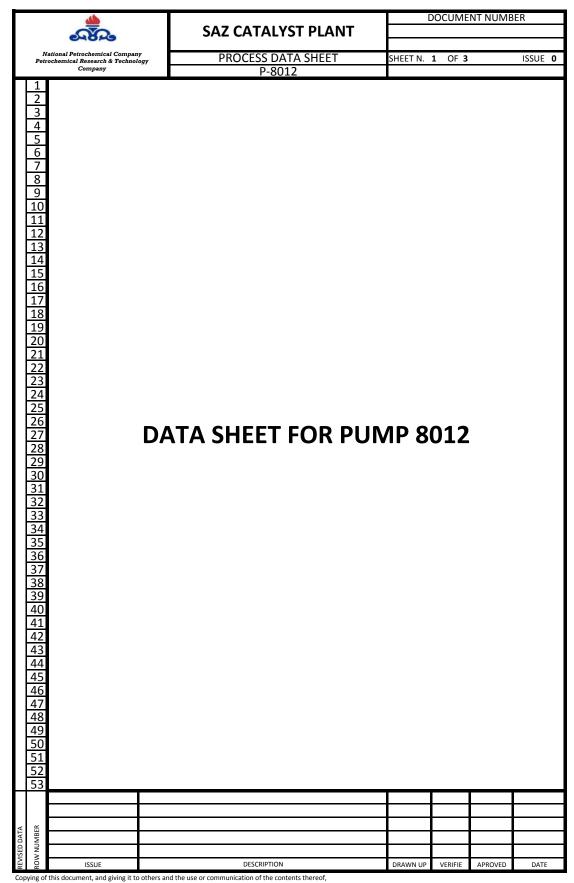
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	PROCESS DATA SH	ET	[	
National Petrochemical Company chemical Research & Technology Company	P-7021		SHEET N. 2 OF 3	SSUE
1 SERVICE WAL			QUANTITY <b>1</b>	
2 TYPE CENTRIFUG	AL		PLANT UNIT 700	
3 INSTALATION OUTDOOR	SERVICE TYPE CON	TINUOUS	INCLUDED IN	
4 SUMP DATA m				
5 ORIENTATION HORIZONTAL	DEPTH		MIN.SUMB.	
6 AREA CLASSIFICATION	CLASS	DIVISION	GROUP	
	PROCESS D	AIA		
8 PUMPED LIQUID     9 SUSPENDED SOLID	YES	% BY WT	0.5	
10 SOLID NATURE		76 DT WT	0.5	
11 PARTICLE	SIZE mu	DENSITY	kg/m³	
12 PUMPING TEMPERATURE(PT) (°		MAX.	70 AT MIN. PT	50
13 DENSITY (kg/m <sup>3</sup> )	AT NOR.PT 860	AT MAX PT	AT MIN. PT	
14 VISCOSITY (mpa s)	AT NOR.PT 0.24	AT MAX PT		
15 VAPOR PRESSURE (bar)	AT NOR.PT 0.50	AT MAX PT		
<b>16</b> CAPACITY (m³/h)		RATED 4	MIN	
17 SUCTION PRESSURE (barg)		RATED 0	MAX	1
18 DISCHARGE PRESSURE (barg)		RATED 4		
19 DIFFERENTIAL PRESSURE (bar)		RATED		
20 MANOMETRIC HEAD 21 NPSH (m)	AVAILABLE 6	RATED		
21 NPSH (m) 22 PERFORMANCE HEAD	AVAILADLE 0		REQUIRED	
22 FERIORIMANCE HEAD	BODY			
24 DESIGN PRESSURE (barg)		COND.2	F.V.REQUIRED	YES
25 DESIGN TEMPERATURE (°C )		COND.2	F.V TEMP	
26 MDMT @	@			
27 MATERIAL (IN CONTACT WITH LI	QUID) C.S			
28 IMPELLER	ТҮРЕ	MATERIAL CS		
29 COLLIN/HEATING	REQUIRED	FLUID		
30 PRESSURE (barg)	NORMAL	MAX.		
<b>31</b> TEMPERATURE °C <b>32</b>	NORMAL	MAX.		
33 TYPE	JLAL		MATERIAL	
34 FLUSHING	REQUIRED	FLUID		
<b>35</b> PRESSURE (barg)	NORMAL	MAX.		
<pre>36 TEMPERATURE(°C )</pre>	NORMAL	MAX.		
37 RATING AND FACING	DN	RATING	FACING	
38 SUCTION FLANCE	NOZZLE		EA CINIC	
<b>39</b> SUCTION FLANGE <b>40</b> DISCHARGE FLANGE		RATING 150#	FACING FACING	RF RF
40 DISCHARGE FLANGE 41 VENT		RATING <b>150#</b> RATING	FACING	٨F
41 VENT 42 DRAIN		RATING	FACING	
43 DRIVER	TYPE ELECTRIC (Ex-T3) IP5		Theme	
44 POWER	ABSORBED ESTIM.	-	MOTOR NOMINAL ESTIM.	
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<b>e</b> 35e	PROCESS DATA SHEET	-
National Petrochemical Company Petrochemical Research & Technology Company	P-7021	SHEET N. 3 OF 3 ISSUE 0
1 SERVICE WAL		QUANTITY 1
2		PLANT UNIT 700
3 4	NOTE	
5	NOTE	
6 GENERAL NOTES:		
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9 DATA SHEET NOTES:		
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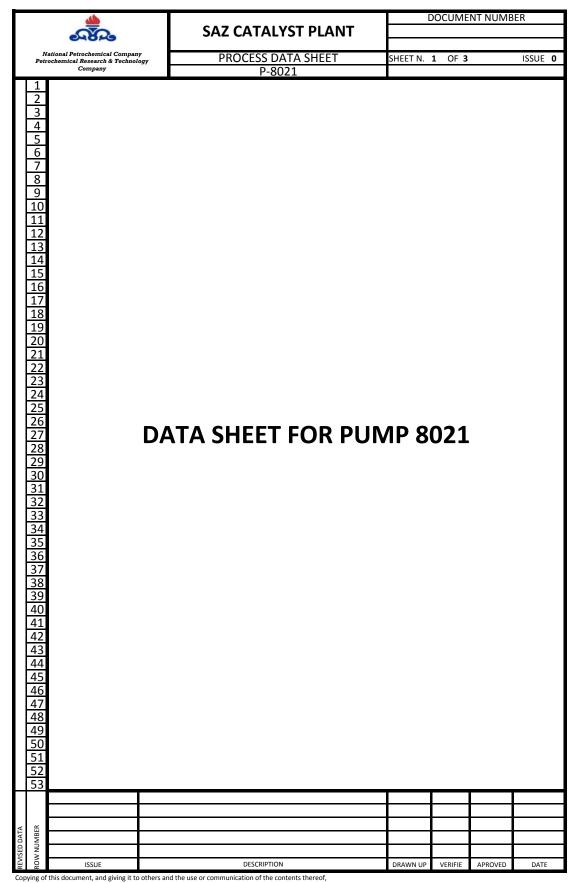
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64866	PROCESS DATA S	HEET	4	
National Petrochemical Company			SHEET N. 2 OF 3	ISSUE
ochemical Research & Technology Company	P-7022			13302
1 SERVICE HEXANE			QUANTITY <b>1</b>	
2 TYPE CENTRIFU	GAL		PLANT UNIT 700	
3 INSTALATION OUTDOOR	SERVICE TYPE C	ONTINUOUS	INCLUDED IN	
4 SUMP DATA m				
5 ORIENTATION HORIZONTA	L DEPTH		MIN.SUMB.	
6 AREA CLASSIFICATION	CLASS	DIVISION	GROUP	
7	PROCES	S DATA		
8 PUMPED LIQUID	HEXANE			
9 SUSPENDED SOLID	NO	% BY WT		
10 SOLID NATURE				
11 PARTICLE	SIZE n	nu DENSITY	kg/m³	
12 PUMPING TEMPERATURE(PT) (	°c) NOR. 40	MAX.	70 AT MIN. PT	40
13 DENSITY (kg/m <sup>3</sup> )	AT NOR.PT 850	AT MAX PT	AT MIN. PT	
14 VISCOSITY (mpa s)	AT NOR.PT 0.24	AT MAX PT		
15 VAPOR PRESSURE (bar)	AT NOR.PT 0.35	AT MAX PT		
16 CAPACITY (m <sup>3</sup> /h)		RATED 2	MIN	
17 SUCTION PRESSURE (barg)		RATED 0	MAX	1
18 DISCHARGE PRESSURE (barg)		RATED 4		
19 DIFFERENTIAL PRESSURE (bar)		RATED		
20 MANOMETRIC HEAD		RATED		
<b>21</b> NPSH (m)	AVAILABLE 5.9		REQUIRED	
22 PERFORMANCE HEAD				
23	BOI	DY		
24 DESIGN PRESSURE (barg)	COND.1 6	COND.2	F.V.REQUIRED	YES
25 DESIGN TEMPERATURE (°C )	COND.1 100	COND.2	F.V TEMP	
26 MDMT @	@			
27 MATERIAL (IN CONTACT WITH I	IQUID) C.S			
28 IMPELLER	ТҮРЕ	MATERIAL CS		
29 COLLIN/HEATING	REQUIRED	FLUID		
30 PRESSURE (barg)	NORMAL	MAX.		
31 TEMPERATURE °C	NORMAL	MAX.		
32 33 TYPE	SE/	AL	MATERIAL	
34 FLUSHING	REQUIRED	FLUID	IVIATERIAL	
35 PRESSURE (barg)	NORMAL	MAX.		
36 TEMPERATURE(°C )	NORMAL	MAX.		
37 RATING AND FACING	DN	RATING	FACING	
38	NOZ			
39 SUCTION FLANGE	1"	RATING <b>150</b> #	FACING	RF
40 DISCHARGE FLANGE	- 3⁄4"	RATING <b>150</b> #	FACING	RF
41 VENT	DN	RATING	FACING	
42 DRAIN	DN	RATING	FACING	
43 DRIVER	TYPE ELECTRIC (Ex-T3) I			
44 POWER	ABSORBED ESTIM.		MOTOR NOMINAL ESTIM.	
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۵.	SAZ CATALYST PLANT	DOCUMENT NUMBER
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National Petrochemical Company	PROCESS DATA SHEET	SHEET N. 3 OF 3 ISSUE 0
Petrochemical Research & Technology Company	P-7022	SHEET N. 3 OF 3 ISSUE 0
1 SERVICE HEXANE		QUANTITY 1
2		PLANT UNIT 700
3		
4	NOTE	
5 6 GENERAL NOTES:		
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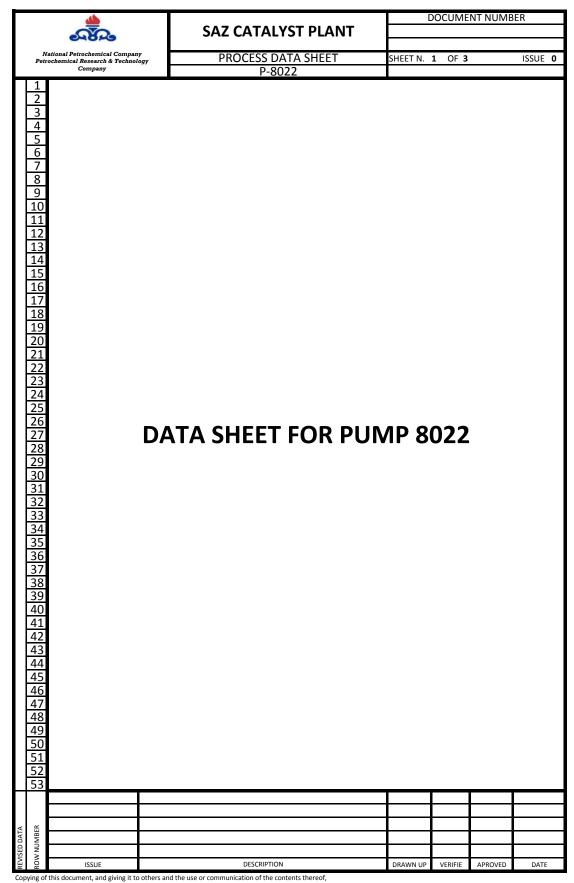
	SAZ CATALYST	PLANT	DOCUMENT NUM	IBER
640×9	PROCESS DATA S	SHEET		
National Petrochemical Company rochemical Research & Technology Company	P-8012		SHEET N. 2 OF 3	ISSUE
	F-0012		-	
1 SERVICE HEXANE 2 TYPE CENTRIFUE			QUANTITY 1	
2 TYPE CENTRIFUE 3 INSTALATION OUTDOOR	GAL SERVICE TYPE C		PLANT UNIT 800 INCLUDED IN	
4 SUMP DATA m	SERVICE ITPE C	.0111110003	INCLODED IN	
5 ORIENTATION HORIZONTA	L DEPTH		MIN.SUMB.	
6 AREA CLASSIFICATION	CLASS	DIVISION	GROUP	
7	PROCES			
8 PUMPED LIQUID	HEXANE			
9 SUSPENDED SOLID	NO	% BY WT		
10 SOLID NATURE				
11 PARTICLE		nu DENSITY	kg/m³	
12 PUMPING TEMPERATURE(PT) (		MAX.	70 AT MIN. PT	40
13 DENSITY (kg/m <sup>3</sup> )	AT NOR.PT 850	AT MAX PT	AT MIN. PT	
14 VISCOSITY (mpa s)	AT NOR.PT 0.24	AT MAX PT		
15 VAPOR PRESSURE (bar)	AT NOR.PT 0.45	AT MAX PT	D 4151	
<ul><li>16 CAPACITY (m<sup>3</sup>/h)</li><li>17 SUCTION PRESSURE (barg)</li></ul>		RATED 4 RATED 0	MIN MAX	1
18 DISCHARGE PRESSURE (barg)		RATED 0	IVIAX	1
19 DIFFERENTIAL PRESSURE (bar)		RATED		
20 MANOMETRIC HEAD		RATED		
<b>21</b> NPSH (m)	AVAILABLE 5.9	101120	REQUIRED	
22 PERFORMANCE HEAD				
23	BO	DY		
24 DESIGN PRESSURE (barg)	COND.1 6	COND.2	F.V.REQUIRED	YES
25 DESIGN TEMPERATURE (°C )	COND.1 100	COND.2	F.V TEMP	
26 MDMT @	@			
27 MATERIAL (IN CONTACT WITH L				
28 IMPELLER	ТҮРЕ	MATERIAL CS		
29 COLLIN/HEATING	REQUIRED	FLUID		
30PRESSURE(barg)31TEMPERATURE°C	NORMAL NORMAL	MAX. MAX.		
32	SE			
33 TYPE			MATERIAL	
34 FLUSHING	REQUIRED	FLUID		
35 PRESSURE (barg)	NORMAL	MAX.		
<pre>36 TEMPERATURE(°C )</pre>	NORMAL	MAX.		
37 RATING AND FACING	DN	RATING	FACING	
38 39 SUCTION FLANGE	NO2		EACING	pr
40 DISCHARGE FLANGE	1½" 1"	RATING <b>150#</b> RATING <b>150#</b>	FACING FACING	RF RF
41 VENT	DN	RATING	FACING	in.
42 DRAIN	DN	RATING	FACING	
43 DRIVER	TYPE ELECTRIC (Ex-T3)			
44 POWER	ABSORBED ESTIM.		MOTOR NOMINAL ESTIM.	
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National Petrochemical Company	PROCESS DATA SHEET	SHEET N. <b>3</b> OF <b>3</b> ISSUE <b>0</b>
Petrochemical Research & Technology Company	P-8012	SHEET N. 3 OF 3 ISSUE 0
1 SERVICE HEXANE		QUANTITY 1
2		PLANT UNIT 800
3		
4 5	NOTE	
6 GENERAL NOTES:		
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8 9 10 10		
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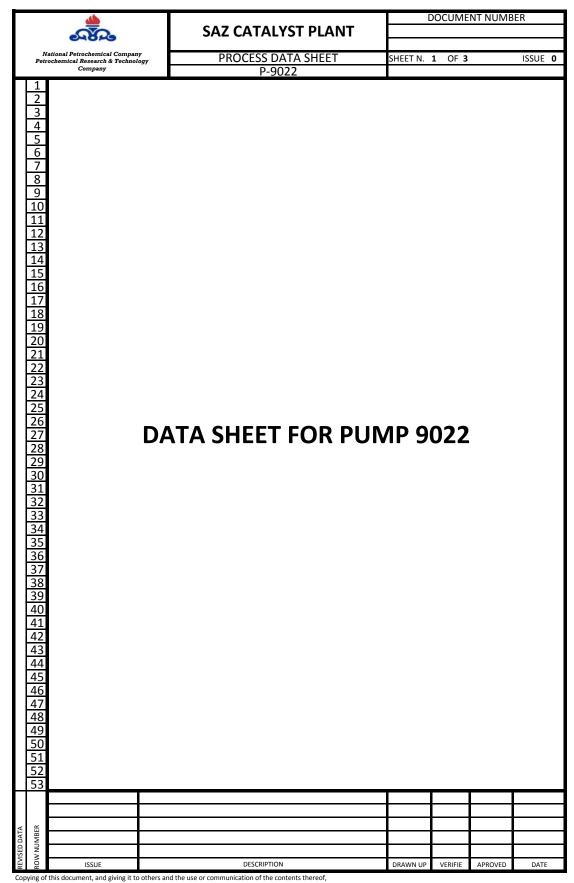
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<u>रु</u>	PROCESS DATA SH	FFT	4	
National Petrochemical Company			SHEET N. 2 OF 3	ISSUE
rochemical Research & Technology Company	P-8021			ISSUE
1 SERVICE HEXANE			QUANTITY <b>1</b>	
2 TYPE CENTRIFU	GAL		PLANT UNIT 800	
3 INSTALATION OUTDOOR	SERVICE TYPE CON	TINUOUS	INCLUDED IN	
4 SUMP DATA m				
5 ORIENTATION HORIZONTA	L DEPTH		MIN.SUMB.	
6 AREA CLASSIFICATION	CLASS	DIVISION	GROUP	
7	PROCESS D	ΑΤΑ		
8 PUMPED LIQUID	HEXANE			
9 SUSPENDED SOLID	NO	% BY WT		
10 SOLID NATURE				
11 PARTICLE	SIZE mu	DENSITY	kg/m³	
12 PUMPING TEMPERATURE(PT) (		MAX.	70 AT MIN. PT	25
13 DENSITY (kg/m <sup>3</sup> )	AT NOR.PT 850	AT MAX PT	AT MIN. PT	
14 VISCOSITY (mpa s)	AT NOR.PT 0.24	AT MAX PT		
15 VAPOR PRESSURE (bar)	AT NOR.PT 0.40	AT MAX PT		
16 CAPACITY (m <sup>3</sup> /h)		RATED 2	MIN	
17 SUCTION PRESSURE (barg)		RATED 0	MAX	1
18 DISCHARGE PRESSURE (barg)		RATED 4		
19 DIFFERENTIAL PRESSURE (bar)		RATED		
20 MANOMETRIC HEAD		RATED		
<b>21</b> NPSH (m)	AVAILABLE 5.9		REQUIRED	
22 PERFORMANCE HEAD				
23	BODY			
24 DESIGN PRESSURE (barg)	COND.1 6	COND.2	F.V.REQUIRED	YES
25 DESIGN TEMPERATURE (°C )	COND.1 100	COND.2	F.V TEMP	
26 MDMT @	@			
27 MATERIAL (IN CONTACT WITH I	IQUID) C.S			
28 IMPELLER	ТҮРЕ	MATERIAL CS		
29 COLLIN/HEATING	REQUIRED	FLUID		
<b>30</b> PRESSURE (barg)	NORMAL	MAX.		
<b>31</b> TEMPERATURE °C	NORMAL	MAX.		
32	SEAL			
33 TYPE		FLUID	MATERIAL	
34 FLUSHING	REQUIRED			
35 PRESSURE (barg)	NORMAL	MAX.		
<ul><li>36 TEMPERATURE(°C )</li><li>37 RATING AND FACING</li></ul>	NORMAL DN	MAX. RATING	FACING	
37 RATING AND FACING 38	NOZZLE		FACING	
39 SUCTION FLANGE		RATING <b>150</b> #	FACING	RF
40 DISCHARGE FLANGE		RATING 150#	FACING	RF
41 VENT		RATING	FACING	
42 DRAIN		RATING	FACING	
43 DRIVER	TYPE ELECTRIC (Ex-T3) IP5		TAGING .	
44 POWER	ABSORBED ESTIM.	-	MOTOR NOMINAL ESTIM.	
45	ABOONDED ESTIMI.			
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National Petrochemical Company	PROCESS DATA SHEET	SHEET N. 3 OF 3 ISSUE 0
Petrochemical Research & Technology Company	P-8021	SHEET N. 3 OF 3 ISSUE 0
1 SERVICE HEXANE		QUANTITY 1
2		PLANT UNIT 800
3		
4	NOTE	
5 6 GENERAL NOTES:		
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11 12 13		
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లార్లాల	PROCESS DATA	SHEET		
National Petrochemical Company			SHEET N. 2 OF 3	ISSUE
rochemical Research & Technology Company	P-8022	2		
1 SERVICE WASTE			QUANTITY <b>1</b>	
2 TYPE CENTRIFU	GAL		PLANT UNIT 800	
3 INSTALATION OUTDOOR	SERVICE TYPE	CONTINUOUS	INCLUDED IN	
4 SUMP DATA m				
5 ORIENTATION HORIZONTA	L DEPTH		MIN.SUMB.	
6 AREA CLASSIFICATION	CLASS	DIVISION	GROUP	
7	PROCE	SS DATA		
8 PUMPED LIQUID	WASTE			
9 SUSPENDED SOLID	NO	% BY WT		
10 SOLID NATURE				
11 PARTICLE	SIZE	mu DENSITY	kg/m³	
12 PUMPING TEMPERATURE(PT) (	°c) NOR. 60	MAX.	80 AT MIN. PT	60
13 DENSITY (kg/m <sup>3</sup> )	AT NOR.PT 880	AT MAX PT	AT MIN. PT	
14 VISCOSITY (mpa s)	AT NOR.PT 0.29	AT MAX PT		
15 VAPOR PRESSURE (bar)	AT NOR.PT 0.30	AT MAX PT		
16 CAPACITY (m <sup>3</sup> /h)		RATED 1	MIN	-
17 SUCTION PRESSURE (barg)		RATED 0	MAX	1
18 DISCHARGE PRESSURE (barg)		RATED 4		
19 DIFFERENTIAL PRESSURE (bar)		RATED		
<b>20</b> MANOMETRIC HEAD <b>21</b> NPSH (m)	AVAILABLE 2.8	RATED		
22 PERFORMANCE HEAD	AVAILABLE 2.8		REQUIRED	
23		ODY		
23 24 DESIGN PRESSURE (barg)	COND.1 6	COND.2	F.V.REQUIRED	YES
25 DESIGN TEMPERATURE (°C )	COND.1 0	COND.2	F.V.REQUIRED	163
26 MDMT @	@	COND.2		
27 MATERIAL (IN CONTACT WITH L				
28 IMPELLER	ТҮРЕ	MATERIAL CS		
29 COLLIN/HEATING	REQUIRED	FLUID		
30 PRESSURE (barg)	NORMAL	MAX.		
<b>31</b> TEMPERATURE °C	NORMAL	MAX.		
32	S	EAL		
33 TYPE			MATERIAL	
34 FLUSHING	REQUIRED	FLUID		
35 PRESSURE (barg)	NORMAL	MAX.		
<ul><li>36 TEMPERATURE(°C )</li><li>37 RATING AND FACING</li></ul>	NORMAL DN	MAX. RATING	FACING	
38			TACING	
39 SUCTION FLANGE	1/2"	RATING <b>150</b> #	FACING	RF
40 DISCHARGE FLANGE	1/2"	RATING 150#	FACING	RF
41 VENT	DN	RATING	FACING	
42 DRAIN	DN	RATING	FACING	
43 DRIVER	TYPE ELECTRIC (Ex-T3)			
44 POWER	ABSORBED ESTIM.		MOTOR NOMINAL ESTIM.	
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SAZ CATALYST PLANT     DOCUMENT NUMBER       PROCESS DATA SHEET     PROCESS DATA SHEET       Process Data Sheet     SHEET N. 3 OF 3 ISSUE       1     SERVICE     WASTE       1     SERVICE     QUANTITY 1       2     PLANT UNIT 800       3     Other State       4     NOTE       5     6       6     GENERAL NOTES:       7     8       9     10       14     Other State	<b>4</b>	
National Petrochemical Research & Technology Company     P-8022       1     SERVICE     WASTE       2     QUANTITY     1       2     PLANT UNIT     800       3	<b>232</b> 2	
2         PLANT UNIT         800           3         4         NOTE           4         Server and the server a	trochemical Research & Technology	Nati Petroc
3         NOTE           5         6           6         GENERAL NOTES:           7         8           9         DATA SHEET NOTES:		
4     NOTE       5     6       6     7       8     9       10     DATA SHEET NOTES:		
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18 19	9	19
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21 22 23 24 25	1	21
23	3	23
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<u>25</u> 26	5	25
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28 29	8	28
29	9	29
30	<u>0</u> 1	30
31 32 33	2	32
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38	8	38
39         40         41         42         43         44         45	0	40
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ergre	PROCESS DATA		1	
National Petrochemical Company			SHEET N. 2 OF 3	ISSUE
rochemical Research & Technology Company	P-9022	2	SHEET N. 2 OF S	13301
1 SERVICE HEXANE			QUANTITY <b>1</b>	
2 TYPE CENTRIFU	GAL		PLANT UNIT 900	
3 INSTALATION OUTDOOR	SERVICE TYPE	CONTINUOUS	INCLUDED IN	
4 SUMP DATA m				
5 ORIENTATION HORIZONTA	L DEPTH		MIN.SUMB.	
6 AREA CLASSIFICATION	CLASS	DIVISION	GROUP	
7	PROCE	SS DATA		
8 PUMPED LIQUID	HEXANE			
9 SUSPENDED SOLID	NO	% BY WT		
10 SOLID NATURE				
11 PARTICLE	SIZE	mu DENSITY	850 kg/m³	
12 PUMPING TEMPERATURE(PT) (	°c) NOR. 25	MAX.	40 AT MIN. PT	25
13 DENSITY (kg/m <sup>3</sup> )	AT NOR.PT 850	AT MAX PT	AT MIN. PT	
14 VISCOSITY (mpa s)	AT NOR.PT 0.24	AT MAX PT		
15 VAPOR PRESSURE (bar)	AT NOR.PT 0.20	AT MAX PT		
16 CAPACITY (m <sup>3</sup> /h)		RATED 15	MIN	
17 SUCTION PRESSURE (barg)		RATED 0	MAX	1
18 DISCHARGE PRESSURE (barg)		RATED 4		
19 DIFFERENTIAL PRESSURE (bar)		RATED		
20 MANOMETRIC HEAD		RATED		
<b>21</b> NPSH (m)	AVAILABLE 5.1		REQUIRED	
22 PERFORMANCE HEAD				
23	B	ODY		
24 DESIGN PRESSURE (barg)	COND.1 6	COND.2	F.V.REQUIRED	YES
25 DESIGN TEMPERATURE (°C )	COND.1 70	COND.2	F.V TEMP	
26 MDMT @	@			
27 MATERIAL (IN CONTACT WITH L	IQUID) C.S			
28 IMPELLER	TYPE	MATERIAL CS		
29 COLLIN/HEATING	REQUIRED	FLUID		
<b>30</b> PRESSURE (barg)	NORMAL	MAX.		
<b>31</b> TEMPERATURE °C	NORMAL	MAX.		
32	S	EAL		
33 TYPE			MATERIAL	
34 FLUSHING	REQUIRED	FLUID		
<b>35</b> PRESSURE (barg)	NORMAL	MAX.		
36 TEMPERATURE(°C)	NORMAL	MAX.	54.0110	
37 RATING AND FACING	DN	RATING	FACING	
38 39 SUCTION FLANGE	2½"	RATING 150#	EACING	БГ
40 DISCHARGE FLANGE	2%	RATING 150#	FACING FACING	RF RF
40 DISCHARGE FLANGE	2 DN	RATING 150#	FACING	١٨٢
42 DRAIN	DN TYPE ELECTRIC (Ex-T3)	RATING	FACING	
43 DRIVER 44 POWER	TYPE ELECTRIC (Ex-T3) ABSORBED ESTIM.	11 33	MOTOR NOMINAL ESTIM.	
44 POWER 45	ADJUKDED EJTIVI.		WOTOR NOWIINAL ESTIM.	
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National Petrochemical Company	PROCESS DATA SHEET	SHEET N. 3 OF 3 ISSUE 0
Petrochemical Research & Technology Company	P-9022	SHEEL N. 3 OF 3 ISSUE 0
1 SERVICE HEXANE		QUANTITY 1
2		PLANT UNIT 900
3		
4	NOTE	
5 6 GENERAL NOTES:		
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8 9 data sheet notes: 10		
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11 12 13		
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PROJECT: PP-PE PILOT PLANT	Client:
Title: Inspection and Test Plan for Centrifugal Process	شرکت ملی صنایع پتروشیمی
Pumps	شرکت پژوهش و فناوری پتروشیمی

# **INSPECTION & TEST PLAN FOR CENTRIFUGAL PROCESS PUMPS**

Document No.: 900-ITP-A4-RE-0001	Rev.: 0
Owner Job No.:	Type : ITP
Contract Job No.:	Page A



# Title: Inspection and Test Plan for Centrifugal Process Pumps

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Document No.: 900-ITP-A4-RE-0001	Rev.: 0
Owner Job No.:	Type : ITP
Contract Job No.:	Page B



# Title: Inspection And Test Plan for Centrifugal Process Pumps

شركت ملى صنايع پتروشيمي
شرکت پژوهش و فناوری پتروشیمی

No.	Inspection/Test Items	Procedure &	Ir	ispeo	cted E	Зy
110.		Standards	0	Ρ	v	(
1	Pre-inspection meeting required for above 100 Kw	Relevant Spec.	Х	Х	X	
2	Mill test reports	Relevant material Spec.	R	R	R	
3	Material identification and markings	Approved procedure and drawings	S	S	М	
4	Material test certificate in accordance with "Engineering Specification for Centrifugal Process Pumps"	Approved procedure	R	R	М	
5	Material compliance certificate for gaskets, valves, piping items, etc.	Approved procedure	R	R	М	
6	Manufacture's test certificate/calibration certificate for instruments	Approved procedure and drawings	R	R	М	
7	Storage of materials and welding consumables	Approved procedure and drawings	S	S	М	
8	Sub order verification for Bought out items like drivers, piping etc.	Approved procedure	R	R	М	
9	Inspection of Bought out items at sub vendor's works for drivers, piping etc.	Approved procedure and drawings	R	R	М	
10	Non-destructive testing personal qualifications	Approved Qualification Certificate	R	R	М	
11	RT,UT,MT or PT( Review of all radiographs ) ( Note 1) ( * )	Approved procedure	R	R	М	
12	Execution of major repairs, NDE after repair (Note 3)	Approved procedure and drawings	Н	H	М	
13	Welder Qualifications for pressure casing (records or welder's list) Note: If inspector doubt welder's ability Inspector may requested welder for new qualification test	ASME Sec. IX or equivalent standards	R	R	М	
14	Weld preparation and fit-up (Note 3)	Approved procedure and drawings	s	S	М	I
15	Workman ship, Cleanliness	Approved procedure and drawings	S	S	М	
16	Heat treatment execution (If applicable) ( ** )	Approved procedure	R	R	М	
17	Adherence to approved procedures (welding, heat treatment, etc)	ASME Sec. IX or equivalent standards	s	s	м	
18	Adherence to agreed inspection plan	Approved procedure and drawings	S	S	М	
19	Balancing test	Approved procedure	R	R	М	
20	Visual and dimensional inspection at assembled condition before performance test	Approved procedure and drawings	w	w	М	
21	Clearance and run out test (If applicable)	Approved procedure and drawings	R	R	М	
22	Hydrostatic test of casing and barrel	Min 1.5 times of design Pres./ Approved procedure	н	н	М	
23	Pneumatic test for casing (when specified)	Min 1.1 times of design Pres./ Approved procedure	w	w	М	
24	Performance test (Note 2)	Approved procedure	н	н	М	
25	Mechanical running test with vibration and bearing temperature measurement (Note 2)	Approved procedure	н	н	М	
26	Dismantling inspection for casing internal, sleeve type bearings after test run (when specified) $(^{\ast\ast\ast})$	No defect shall be observed	w	w	м	
27	NPSH test (when NPSHA-NPSHR is less than 1.0 m.) (Note 2)	Approved procedure	н	Н	м	
28	Motor test (when provided) Note : Inspection and witness is required for drivers of 175 Kw and above. Inspection (but no witnessing) is required for drivers below 175Kw	Approved procedure and drawings	w	w	м	
29	Hydrostatic test of lube oil unit, when provided	Approved procedure and drawings	W	W	М	I
30	Shop running test for lube oil unit, when provided	Approved procedure and drawings	W	W	М	
31	Visual (cleanliness) and dimensional inspection for lube oil unit after run test	Approved procedure and drawings	s	s	М	
32	Sound level test	Approved procedure	н	Н	М	I
33	Installation of wiring and conduit (ex proof examination if required)	Approved procedure and drawings	s	s	м	
34	Other test as specified	Approved procedure and drawings	W	W	М	T
<b></b>	Surface preparation prior to painting, coating,			1		Т

Document No.: 900-ITP-A4-RE-0001	Rev.: 0
Owner Job No.:	Type : ITP
Contract Job No.: 08-831-87-308	Page 1 OF 2



# Title: Inspection And Test Plan for Centrifugal Process Pumps

1			1	1	1	1 1
36	Painting, Coating, Lining ,preservation, Pickling and Passivating	Approved procedure and drawings	S	S	М	X
37	Dimensional check of skid, location of lifting lugs, location of anchor bolts.	Approved procedure and drawings	S	S	М	X
38	Function, setting and calibration of instruments and controls	Approved procedure and drawings	R	R	М	X
39	Aux. Items check (spare parts, glands, cables, etc)	Approved procedure and drawings	S	S	М	
40	Name plate, tagging, marking	Approved procedure and drawings	s	S	М	
41	Final visual inspection	Approved procedure and drawings	W	Н	М	
42	Controlling spare parts of equipment	Approved procedure and drawings	R	S	М	
43	Preparation for shipment	Approved procedure and drawings	Н	Н	М	
44	Documentation review prior to release	Approved procedure and drawings	R	R	М	X

Note 1 : According to engineering spec. for Centrifugal Process Pumps.

Note 2 : Required test shall be done for all pumps, but witness is required for one per same item.

Note 3 : Shall be done as per approved WPS/PQR.

Note 4 : This is only a indicative ITP and vendor shall prepare a detailed ITP in line with above and specific technical requirement of applicable design code.

Note 5 : Vendor shall ensure that all test and measuring instruments are duty calibrated and calibration shall be valid at the time of inspection.

Note 6 : Pump drivers shall be inspected at manufactures shop as per relevant inspection & test plan. Note 7 : No shipment of goods may be effected unless an "Inspection relevant certificate" has been submitted to seller

- \* Inspector may request to witness the test.
- \*\* Inspector may request to witness the execution.
- \*\*\*- Mechanical seal will not be dismantled after the test run. In case it is needed it will be discussed case by case.

#### **Abbreviation:**

- P: Purchaser
- O: Owner

- W: WitnessR: Review of documentsX: Required
- M: Vendor's inspection and testH: Hold PointS: Witness, but spot checkbasis

- V: Vendor
- C: Certificate/Data to be provided by Vendor

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Owner Job No.:	Type : ITP
Contract Job No.: 08-831-87-308	Page 2 OF 2





## **PP-PE Pilot Plant**



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#### INSTRUCTION FOR VENDOR DOCUMENTATION

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### **PP-PE Pilot Plant**



Title:

INSTRUCTION FOR VENDOR DOCUMENTATION

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#### CONTENTS

- 1. Purpose
- 2. Definition
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- 4. Instructions concerning vendor's data books presentation
  - 4.1 Language / units
  - 4.2 Size of documents
  - 4.3 Class of documents
  - 4.4 Books form
  - 4.5 Identification
  - 4.6 Internal presentation
  - 4.7 Vendor documents numbering
- 5. Number of vendor's data books per purchase order
- 6. Delivery time
- 7. Transmittal of documentation
- 8. Documents for engineering
  - 8.1 Vendor drawing and documentation list
  - 8.2 Plate arrangement drawing and material list
  - 8.3 General arrangements drawing
  - 8.4 Detail drawings
  - 8.5 Calculation notes
  - 8.6 Spare parts list
- 9. Description of inspection and / or acceptance documents
  - 9.1 Material certificates
  - 9.2 Welders qualification
  - 9.3 Hydraulic test report
- 10. Issuance schedule





#### 1. <u>Purpose</u>

The purpose of this procedure is to give instructions for preparation of Vendor's data book (mechanical catalogue) applicable to the contract.

### 2. Difinition

VENDOR	Companies Awarded by Owner for Procurement Services, Inspection Affairs or Transportation, Providing of Project's goods, following up all transport activities from VENDOR workshop to final destination as defined in the purchase order.
OWNER:	Petrochemical Research & Technology Company

#### 3. <u>Content</u>

The Vendor's Data Book shall contain comprehensive detailed information covering design and engineering, inspection and testing, installation, operation and maintenance manual of the equipment and accessories included in, and supplied for the plant.

In addition, VENDOR shall submit the drawings and documents according to the "LIST OF DOCUMENTS REQUIRED FROM VENDOR "given in the requisition / purchase order.

For a sample of the contents of VENDOR's data book refer to Attachment No. 1.

#### 4. Instructions Concerning Vendor's Data Books Presentation

#### 4.1 Language / Units

All documents and drawings for design and fabrication shall be written in English as well as all Maintenance and Operating Instructions.

All units and dimensions shall be in the metric system except for the following:

- Size of pipe and valve (Inch)
- Flange rating (Pound)

If necessary, other units and dimensions shall be used with OWNER approval.





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#### 4.2 Size Of Documents

• All drawings shall be prepared on ISO standard size sheets, i.e.

	U	1 1	
A0	:	840 x 1188 mm	
A1	:	594 x 840 mm	
A2	:	420 x 594 mm	
A3	:	297 x 420 mm	
A4	:	210 x 297 mm	

- Size A0 should be used only with OWNER approval. Larger sizes are not allowed.
- In general all drawings shall be reduced to 297 mm x random length size for convenience in handling.
- All documents other than drawings shall be prepared on standard A3 or A4 size sheets suitable for insertion in an A4 hard-core binder.
- All reduced drawings, data, etc. shall be legible.

#### **4.3 Class Of Documents**

All drawings / data submitted must be of good quality that will allow production of legible copies.

• Documents submitted to OWNER for comments:

These documents give all data necessary to understand operation and to appraise the construction method, assembly, disassembly, fastening and connections of equipment. They clearly indicate the scope of supply and specify all details necessary for installation.

• Final documents:

These documents are certified, "As built" documents finally reviewed without comment by OWNER.

OWNER comments on VENDOR documentation shall in no way relieve the VENDOR of his responsibility especially concerning the design of the equipment or facilities.

#### 4.4 Books Form

All the documentation shall be inserted in A4 (297 mm x 210 mm) white color binder (Punch holes shall be two).

Other types, such as folders or boxes with loose sheets, are not acceptable.

The thickness of each volume shall under no circumstance exceed that of a normal file (7 cm). The paper level inside each file shall be at least 5 mm below the opening point of the binder.





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Drawings and documents with sizes larger than A3 will be folded in plastic jackets inserted in the file, with opening upward.

### 4.5 Identification

Each Vendor's data book shall be identified on its back and on the cover by a standard label, the format of which is given in Attachment No.2.

#### 4.6 Internal Presentation

All drawings and documents shall be written in English. Cardboard division sheets shall separate different groups of documents, sheets and directions. At least rigid index sheets with numbering shall separate the different chapters.

The wording and presentation of the reports will be controlled with utmost care.

Consequently, any loose presentation, which may give the OWNER impression of careless work, will be rejected. This applies in particular to:

- All manuscripts or type texts with handwritten comments (except for technical documents on OWNER or Vendor's standard forms).
- All texts in any language other than English, unless they are transmitted together with a translation in compliance with the above requirement.
- All copies that might be questionable: writing too light, dark background areas, dark edge due to poor centering, titled copy, perforation marks, etc.

#### 4.7. Vendor Document Numbering

In addition to the Vendor's document number, VENDOR shall add OWNER's document number.

The block shown here below will be placed on each "first page" of specification, data sheet and each drawing in addition to the Vendor's label.

National Petr	ochemical Company / Petrochemical Reso PP-PE Pilot Plant	earch &	Technolo	gy Company
	Owner Project No.	Rev.	Date	Signature
NPC-RT	Owner Doc/Dwg. No.			
<b>PP-PE Pilot Plant</b>	Sh. Of			





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All other pages of the specifications and data sheets shall have the following block.

Project No.	Owner Project No.	Rev. Sh. Of					
OWNER DOC. No.							

#### 5. <u>Number Of Vendor's Data Books Per Purchase Order</u>

If the purchase order includes several separate requisitions or covers several items, which are to be shipped with different vessels, the VENDOR shall supply as many separate Vendor's data books, as there are separate requisitions and/or shipments.

If the requisition covers a large number of items, a common part and specific chapters by item may be planned in agreement with OWNER.

VENDOR shall prepare:

- 10 Copies of the complete VENDOR Data Book.
- Copy of electronic file in CD
- 2 Reproducible copy of final drawings / documents

#### 6. <u>Delivery Time</u>

Documents submitted for review are forwarded in compliance with the dates specified on the Attachment # 2 of requisition.

Final documents shall be forwarded 15 days after receipt of documents commented by OWNER.

Delivery dates are mandatory and a payment installment may be conditioned by the receipt of documents and/or drawings (refer to the order provisions).

#### 7. <u>Transmittal Of Documentation</u>

All drawings and documents shall be transmitted with a transmittal note to the address indicated in the Purchase contract. Purchase order number should be clearly indicated.

Any drawing, which is unreadable, will be returned without fail to the VENDOR who shall in no case use this as an excuse for delivery delay.

Any revision made on documentation should be highlighted with a cloud mark.





 Title:
 INSTRUCTION FOR VENDOR DOCUMENTATION

#### 8. <u>Documents For Engineering</u>

This paragraph is to clarify OWNER requirements concerning the presentation of some essential engineering documents and drawings submitted for approval. The items indicated below refer to the items listed in the "LIST OF DOCUMENTS REQUIRED FROM THE VENDOR" shown in the attachment # 2 of requisition.

#### 8.1 Vendor Drawing And Documentation List

The VENDOR'S shall provide an exhaustive list of the documentation to be delivered. It should be sent together with the first issue of documents.

#### 8.2 Plate Arrangement Drawing And Material List

This drawing shall be in proper scale.

The plate arrangement drawing or sketch shall indicated as a minimum:

- A general outline of the equipment (shells, heads, supports, skirt, lugs, saddles, stiffeners,etc.);
- For columns, shell / cone / skirt development including all internal & external attachments;
- Position of circumferential and longitudinal weld seams in accordance with plates sizes;
- Head shape (and plate arrangement in case of composed head);
- Shape of reduction cone (straight flange, knuckle radius, etc.);
- Plate thickness after plate forming;
- Material specification;
- Material list

Approval of this document enables order of main materials to be finalized.

The material list for nozzles shall be presented in schedule form. It shall be established from the nozzles list shown on the engineering arrangement drawing or process data sheet, and shall include:

- Identification (or item), quantity and diameter of nozzles;
- Type, rating, facing and material of flanges;
- Schedule or thickness of nozzle necks;
- Diameter, thickness and material of reinforcements;
- Material, thickness, rating of blind flanges (if any);
- Diameter, quantity, length, thread type, material of stud bolts and nuts;
- Definition, rating, materials of gaskets





This document is prepared from information known when equipment is ordered. Its approval will allow the above accessories to be supplied.

Any modifications of one of the items listed above will involve revision of the documents and be followed by new approval.

After approval, the material list shall be transferred on the VENDOR general arrangement drawing.

Note: these documents do not apply to storage tanks.

#### 8.3 Item: General Arrangement Drawing

The VENDOR can start fabrication only after receiving OWNER approval of this document as a minimum.

This drawing shall be in proper scale.

This drawing shall give the following technical information:

- Main dimensions, overall length, minimum thickness of major components;
- Design code, design pressure and temperature, hydrostatic test pressure, non-destructive tests, heat treatment, etc.;
- Corresponding material specification;
- Location and orientation of weld seams (shells, heads, skirt, etc.);
- Shape of heads or, type/ angle of roof for storage tanks;
- Location, orientation of nozzle gussets and other external welded Attachments;
- Location & orientation of internals (trays supports, coils, demisters, baffles, etc.);
- List of nozzles and connections in accordance with material list (dia., type, rating, schedule, etc.);
- Gaskets and bolting (type, material, etc.);
- All information of scope of supply;
- All information on anchoring system;
- Fabricated weight;
- Empty weight;
- Hydro test weight;
- Operating weight;
- Net weight of removable parts;
- Type of paint and its surface preparation;
- North direction;
- List of detail drawings;
- Insulation / fire proofing support detail;
- Note: OWNER guide drawings shall not be used as construction drawings.





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#### 8.4 Detail Drawings

These drawings shall include references to general arrangement drawing and show:

- Detail of all accessories, internal and external attachment (gussets, etc.): With weld geometry and specification in accordance with approved welding procedure;
- Weight and dimension of removable internals;
- Part list of the various elements;
- Weld geometry and specification in accordance with approved welding procedure;
- All information required on manufacturer name plate;
- Insulation / Fire proofing support detail;
- All construction details not covered above;

All this information may be shown on general arrangement drawing, at Vendor's choice.

#### 8.5 Calculation Notes

Calculation notes shall be in accordance with general arrangement drawing. VENDOR shall establish calculation notes for each equipment. They shall in all cases be included in "manufacturer file".

These documents shall be clearly marked with identification numbers as other VENDOR documents.

They shall include full reference to information sources (codes, formulas, etc.) used for design.

These documents shall be transmitted for review / approval to OWNER. These documents shall be approved prior to general arrangement drawing approval. OWNER approval shall in no case relieve the VENDOR from his responsibilities.

#### 8.6 Spare Parts List

SPARE PARTS LIST AND INTERCHANGEABILITY RECORD (SPIR form) to be filled out by VENDOR according to it's filling procedure.

#### 9. Description Of Inspection And/Or Acceptance Documents

This paragraph clarifies OWNER requirements for documents relating to inspection and acceptance of equipment.

The items indicated below refer to the items listed in the "LIST OF DOCUMENTS REQUIRED FROM THE VENDOR" included in the requisition.





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#### 9.1 Material Certificates

All pressurized parts shall be considered as main components requiring certificates type 3 .1. B including:

- Shell, heads, cones
- Skirt, saddles, support brackets
- Tubes, flanges, forging, internal piping, nozzle necks
- Bolting for nozzle and shell flanges
- Welding material

#### 9.2 Welders Qualification

This document shall contain all the information concerning:

- Welders (name, number, mark)
- Welding procedure
- Base material (specification, thickness, etc.)
- Welding material (specification, diameter, etc.)
- Electrode type
- Destructive tests results (bending, tensile, impact tests)

All information required on the QW 484 forms given by ASME section IX shall be considered as a minimum.

#### 9.3 Hydraulic Test Report

This document shall contain the following information:

- Type and volume of equipment
- Contained gas analysis
- Description of equipment (length, width or diameter, nature of base material, thickness)
- Construction number and date
- Hydrostatic test pressure in letters
- Date of inspection (before test) and inspector's name
- Hydrostatic test data
- Signatures of inspectors

#### 10. <u>Issuance Schedule</u>

Final Vendor's data books should normally be shipped to the OWNER as per agreed delivery schedule specified in PO of the relevant equipment.

Such final Vendor's data books shall be an integral part of the Vendor's services set forth in the purchase order and the following precautions must be taken in order to meet the above shipping requirements:





At the latest 2 months before the scheduled delivery date, the VENDOR shall transmit the Vendor's data book model to OWNER for comments and approval.

The model shall be in conformity with the final internal and external presentation and shall contain all documents required for the final report.

A non- completed form will replace the final acceptance documents, which do not exist at that stage.

Note: Recommendation for handling, transport and storage shall be shipped in box together with the equipment.





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# ATTACHMENT # 1

# VENDOR DATA BOOK'S CONTENT (SAMPLE)





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### PART 1: General Descripton Of The Equipment

- 1.1. OWNER's requisition
- 1.2. General description including OWNER's specifications and data sheets and drawings

#### PART 2: Recommendations For Storage, Handling And Lifting

- 2.1. Special precautions for handling prior erection (1)
- 2.2. Recommendations for storage prior and during erection

### PART 3: Erection

- 3.1. List of components to be erected/installed on site
- 3.2. Detailed schedule of the erection including hypothesis taken into account
- 3.3. Procedures for erection and installation of the equipment
- 3.4. Schedule of connection points detailing locations and dimensions
- 3.5. Electrical terminal wiring diagrams
- 3.6. Details of site assembly, and filed welds
- 3.7. List of special tools for site erection and assembly
- 3.8. Procedures for site assembly, leveling and welding
- 3.9. Welding specifications for field welds
- 3.10. List of checks and tests to be performed on site
- 3.11. Site testing and acceptance procedures
- 3.12. Procedures for preparation of the equipment for commissioning (including the calibration of instruments)
- 3.13. List of works to be implemented on site instead of Vendor's shop (When required)
- 3.14. Weight (empty, full of water)

#### PART 4 : Start-Up Running Instructions

- 4.1. General
- 4.2. Principle
- 4.3. Operation
- 4.4. Description of the apparatus
- 4.5. Commissioning
- 4.6. Running instructions





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#### **PART 5 : Maintenance Instructions**

- 5.1. Maintenance
- 5.2. Safety instructions
- 5.3. General maintenance
- 5.4. Lubricant table and equivalence
- 5.5. Trouble shooting check lists and diagrams
- 5.6. Maintenance Schedule

#### **PART 6:** Spare Parts (2), (6)

- 6.1. Spare parts for erection, precommissioning, commissioning and start-up
- 6.2. Spare parts for 2 years operation
- 6.3. Sectional drawings

#### PART 7: Manufacturer's Documents / Drawings (3)

- 7.1. List of drawings (4)
- 7.2. Manufacturer's data report
- 7.3. Drawings (5)
- 7.4. Calculation notes
- 7.5. Curves and technical data (including P.W.H.T. if applicable)
- 7.6. MANUFACTURER name plate photography

#### **PART 8: Quality Assurance And Manufacturing Documents**

- 8.1. Material test certificates
- 8.2. Welding Inspection controls and test reports
- 8.3. Welding procedure specification
- 8.4. Welding procedure qualification reports
- 8.5. Welder qualification reports
- 8.6. Weld identification
- 8.7. Plate identification sketch with heat numbers
- 8.8. Certificate of shop inspection (before hydrostatic test)
- 8.9. X-Ray identification
- 8.10. Radiographic procedure qualification
- 8.11. Radiographic reports along with radiographs
- 8.12. Batch test certificates from manufactures for electrodes
- 8.13. Hydrostatic and other test results and reports (such as visual control and N.D.T., etc.).
- 8.14. Precommissioning / commissioning check Lists & procedures
- 8.15. All other requirements as specified in the respective specifications





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#### Remarks

- (1) Including a copy of transportation drawing
- (2) No spare parts price must be incorporated in this book
- (3) Only issues approved by as "FINAL"
- (4) Only the drawings included in this part 7.
- (5) Drawings larger than A3 format must be folded and inserted in individual plastic skirts.
- (6) Sufficient information to be prepared for spare parts Such as: materials of construction sizes / three proposed Vendor's, etc.





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# ATTACHMENT # 2

VENDOR'S DATA BOOK

COVER

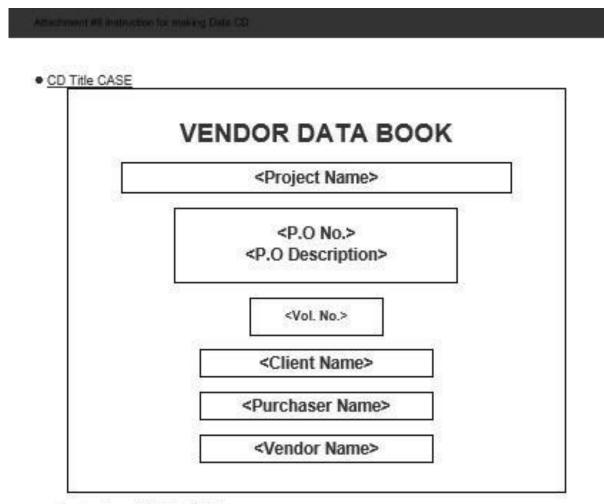




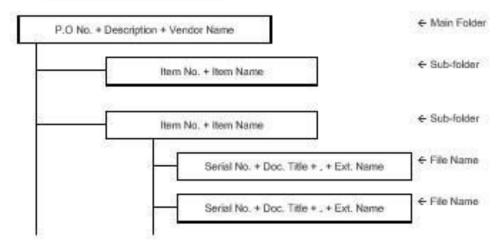
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Construction of the Data Folder







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#### PACKING AND MARKING PROCEDURE

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## **CONTENTS**

- 1. Scope
- 2. Purpose
- 3. Definitions
- 4. Packing for Equipment and Materials
- 5. Packing and Marking for Electrical Panels And Instruments





Title: PACKING AND MARKING PROCEDURE

#### 1. <u>Scope</u>

1.1 This procedure gives the information for Packing and Marking and it is to be applied to vendors for the preparation, protection and packaging of materials, equipment, requiring export shipments for the PP-PE Pilot Plant Project to be built in Petrochemical Research & Technology Company, Arak/Iran.

The following instructions are intended as minimum requirements, and adherence to these instructions in no way, absolves or relieves Vendors of any responsibility or obligation outlined in the Purchase Order.

#### 2. <u>Purpose</u>

This document defines the criteria required by the Project in relation to the packing and marking of both Project's Equipment and materials including Electrical Panels and Instruments.

#### 3. **Definitions**

OWNER	Petrochemical Research & Technology Company
PROJECT	PP-PE Pilot Plant
GOODS	All kind of materials and equipment to be incorporated in the Project.
VENDOR	Companies Awarded by Owner for Procurement Services, Inspection Affairs or Transportation, Providing of Project's goods, following up all transport activities from VENDOR workshop to final destination as defined in the purchase order.

#### 4. <u>Packing For Equipment And Materials</u>

- 4.1 Equipment and material shall be exported packed in compliance with General Purchase Conditions and the best established practice for overseas construction jobs in accordance with the following directives. In the event of any divergence between this specification and the established practice, this specification shall govern.
  - 4.1.1. "Seaworthy and tropical proof " according to international standard.
  - 4.1.2 Packing and conservation of goods shall be sufficient to protect them from damage during transit from point of manufacture to the delivery at job site under conditions





#### Title: PACKING AND MARKING PROCEDURE

which may involve multiple handling, extended storage, exposure to moisture and the possibility of pilferage. The contents must withstand one year transit conditions without suffering damage and Vendors shall give recommendations for a further two(2) years storage under SITE conditions.

Required storage facilities and procedure shall be advised by manufacturer/seller in advance.

- 4.1.3 The packing of the equipment and materials shall be carried out in order to comply with transport conditions.
- 4.1.4 Individual packages shall be kept as small in bulk as possible.
- 4.1.5 Individual packages exceeding a gross weight of 3,000 kgs shall be avoided, if possible.
- 4.1.6 Kind and dimension of packages shall be chosen to suit overseas transport in containers and to fully utilize the size of containers.
- 4.1.7 The following inside dimension of containers are to be observed : 40-feet-containers : 1195x220x205 cms.
  20-feet-containers : 595x220x205 cms.

#### 4.2 Modes of Packing

In accordance with the nature of the contents, the following modes of packing shall be considered:

- a) wooden cases
- b) wooden crates
- c) skid-construction (for vessels etc.)
- d) non-returnable steel drums (export variety)
- e) non-returnable cable reels
- f) bales
- g) 20 ft 40 ft non-refundable containers

#### 4.3 General Rules for Packing

4.3.1 Cases and crates shall be made from new, sound and seasoned lumber. Sheathing shall be of min 24 mm thickness.

If so required for static reasons, thicker sheathing shall be used, in accordance with size and weight of the package. Timber crates and boxes shall be strong enough to withstand without any damage, transport on ship board at sea and numerous handling between the works and the port of origin and between the port of destination and the site.





#### Title: PACKING AND MARKING PROCEDURE

- 4.3.2 Cases and crates with gross weight up to 1,000 kgs shall be provided with bottom cleats of min. 40 mm thickness to ensure clearance for handling by forklift. Cases and crates exceeding gross weight of 1,000 kgs shall be provided with skid runners, number and size according to weight of package.
- 4.3.3 The contents of cases shall be protected by waterproof and strong plastic foil which shall be sealed by welding. An adequate quantity of moisture absorbent (silica gel) shall be added to protect the contents for sufficiently long time from corrosion.
- 4.3.4 Felt, cellophane paper, polyester cuttings, crepe cellulose and some equally efficient materials may be used for padding or cushioning.Wood shavings and other paper shall not be used for padding or cushioning.
- 4.3.5 Materials shall be protected against corrosion during transit as necessary. All bright and machined parts shall be coated with a recognized rust preventative suited to the particular application concerned. All internal parts of machinery shall be treated with lubricant containing rust and oxidation inhibitors to protect equipment from any damage possible. Such lubricants shall be compatible with those which will subsequently be used in service and shall be identified by appropriate tagging.
- 4.3.6 When required, materials shall be painted or coated in accordance with the particulars contained in the purchase order and/or specifications.
- 4.3.7 All flanges, machined working surfaces and threaded parts of all equipment shall be suitably protected . All flanged connections of vessels shall be protected by metal plates correctly gasketed by wooden plugs or plastic caps suitably secured in position.
- 4.3.8 Units or parts belonging to main equipment but separately packed shall be clearly marked for easy identification with the main equipment to which they relate.
- 4.3.9 Packages containing "FRAGILE" articles shall be appropriately packed and in addition to the words "FRAGILE-HANDLE WITH CARE" being stenciled on two opposite sides, internationally recognized symbols shall also be used "This Side Up".
- 4.3.10 Pipe, structural steel sections and plates shall be strapped in bundles of convenient size and weight for handling. Rolled and shaped plates shall be provided with suitable bracing to eliminate distortion during transit, and shall be bundled in uniform lengths. The weight of each bundle shall be within the breaking strain of the steel wrapping. Each bundle shall be marked with a metal tag ,hard stamped, secured under steel wrapping. A 2000 kg limitation shall be imposed for lifts in this category. Where praticable long lengths shall be limited to 12.2 meters to avoid long length carriers. All small steel sections, handraíl stanchions, gusset plates etc. shall be boxed.
- 4.3.11 Black steel pipes with an outside diameter of up to 168.3 mm shall be bundled by strapping cleats above and below the load, with boards between each pipe layer and secured by bolts.





Black steel pipes exceeding the above outside diameter shall be treated as an individual package and marked accordingly.

All black steel pipes shall be protected by means of TECTYL spray. The pipe ends shall be closed with plastic caps.

If, in case of pipes with large diameters, the pipe ends cannot be closed with plastic caps, the interior of the pipes shall also be protected and sprayed with TECTYL.

- 4.3.12 Bitumen coated pipes shall be prepared, packed and handled according to established practice.
- 4.3.13 Stainless steel pípes shall be packed in wooden cases. Protection with TECTYL is not necessary.
- 4.3.14 All valves and fittings (pipe elbows, flanges,etc.) shall be suitably protected and their method of shipment shall be:
  - a) All valves and fittings shall be suitably packed and shipped in metal strapped or wood re-enforced waterproof wooden cases with metal corner protection .
  - b) All treaded fittings shall be greased and provided with plastic caps.
  - c) Control valves shall be packed in wooden cases having adequately designed interior support with interior water proof protection .
- 4.3.15 Apparatus and vessels shall, where possible, be packed on skid constructions and secured with adjustable steel straps. All unprotected surfaces shall be sprayed with TECTYL. Manholes and other major openings shall be protected with either plastic caps or wooden lids, which shall be firmly secured. Smaller openings shall be closed with plastic plugs.
- 4.3.16 All vessel internals and items not installed by the vendor at works including accessories such as small parts, bolts, nuts, gaskets etc. shall be packed in wooden cases separately for each vessel or apparatus and marked with the same item number as the vessel/apparatus in order to protect all parts from loss or damage in transit. Internals, bolts and gaskets for service/ testing operations shall be supplied with the vessels/items by the vendor and all internals, boxed separately and marked according to marking procedures. Each item shall be supplied correctly and identified for field installation by others.
- NOTE: It is imperative that all these items be clearly listed on the packing list.
- 4.3.17 Fire bricks, special tiles and insulation refractories shall be boxed after sealing in a polyethylene liner. These boxes shall be skid mounted. Instructions regarding storage prior to installation shall be stenciled on each box with particular reference to adverse weather/temperature/humidity conditions.
- 4.3.18 All electrical motors whether coupled or uncoupled, generatorors and electrical equipment shall have all openings sealed with protective tape, shall be packed in suitable weather proof skid mounted boxes, and protected from moisture ingress by desiccant as described above.





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Items with brushes shall be brushed and rust removed before shipment. All electrical equipment shall be suitably protected to withstand 1 year transit

conditions and Vendors shall give recommendations for a further, 2 years storage under site conditions Batteries shall be shipped dry with electrolyte packed separately and shall include

Batteries shall be shipped dry with electrolyte packed separately and shall include charging instructions.

- 4.3.19 All electronic and pneumatic instruments to be packed in accordane with given instructions and must be suitably protected to withstand 1 year transit conditions and Vendors are to give recommendations for a further 2 years storage under site conditions.
- 4.3.20 Pipeline / vessel insulation shall be packed in double water-proof wooden plywood cases and secured to pallets.Drums of insulation mastic will also be shipped on pallets.
- 4.3.21 Spare parts for two years operation, which shall be individually tagged, must be covered with a suitable preservative and wrapped with greaseproof paper and be packed in separate cases from the base item. The cases are to bear the markings as specified and in addition the words "SPARE PARTS FOR TWO YEARS OPERATION".
- 4.3.22 Commissioning spares shall be individually tagged and marked "COMMISSIONING SPARES" and shall be packed and shipped with the base item.
- 4.3.23 All vessels/heat exchangers or items of such kind shall be dried, thoroughly cleaned inside and be free of all dirt and loose materials.
- 4.3.24 Should any materials be scheduled to be freighted as deck cargo, additional packing instructions may be required; the Vendor will advise, for vessels and columns, which shipment cradles will be used throughout the transportation. Cradles to be secured to vessels and columns, by strapping.
- 4.3.25 Paper bags suitably boxed, or water tight Steel Drums will be used for shipping cement, special aggregate, etc. Paperbags must not be less substantial then 60 lbs outer wall, 40 lbs inner wall and one moisture craft inner wall.
- 4.3.26 Unless otherwise specified, all export cases, boxes, bundles and containers are to be securely metal strapped with a minimum of two unanealed steel straps in each of two right angled and opposite directions, or where applicarle wood re-enforced.
- NOTE: Should consignments arrive at the shipment point of origin visually damaged, the shipping agent will advise and await instruction before onward shippings.
- 4.3.27 All bulk items, lighting, fittings, cable glands, switches etc. are to be packed in batches sufficient for a specific volume of work.





- 4.3.28 Cases and crates shall, according to their weight and size , be provided with two or more steel straps made of unannealed steel, applied with a stretching tool and secured with crimped steel seals.
- 4.3.29 Fittings (valves, pipe elbows, flanges, etc.) must be packed in wooden cases and must be protected.
- 4.3.30 Accessories for apparatus and vessels (small parts, bolts, nuts, washers, gaskets, etc.) are to be packed in wooden cases, separatelly for each apparatus or vessel. These cases must be marked with the same item No. as the apparatus/vessel to which it belongs (see also Item 5 packing lists).

All commissioning spare parts to be packed separately, being the packing marked with the relevant main item.

#### 4.4 Marking of Packages

National Petrochemical Company Petrochemical Research & Technology Co.

- 4.4.1 All packages shall be clearly stencilled on two opposite sides with black, indelible and seawater proof paint, as follows:Wherever possible, the stenciled characters shall be 8 cms high.In case the surfaces of a package are too small to permit stenciling, sheet metal tags shall be embossed with the above marking and shall be securely fastened on two opposite ends of the package.
- 4.4.2 If necessary, packages shall be additionally marked with cautionary symbols on two opposite ends.
  - 4.4.3 Packages which may be stored in the open but under a tarpaulin, shall be marked with a red "double roof" symbol.
  - 4.4.4 Packages which are to be stored in closed and dry places shall be marked with a red "double roof" symbol.
- 4.4.5 The system of package-numbering shall be indicated to the OWNER in due course of time.
- 4.4.6 The gross weight shall be determined by the party who is responsible for the packing of the items/materials.
- 4.4.7 Example for marking of packages is shown in attach 1.

#### 4.5 Packing list

The packing lists shall be prepared on standard forms : The necessary number of forms will be made available to OWNER, who shall advise about the quantity required. The packing list forms shall be filled in ENGLISH language.





National Petrochemical Company Petrochemical Research & Technology Co.

OWNER shall supply VENDOR with a specimen packing list showing how it is to be filled in.

At the same time OWNER shall be informed of the package numbers required for marking the packages. one column of the packing list shall be filled in with OWNER "ITEM NO. " These item numbers shall be taken from the order form. Special attention shall be paid to the order form that the item number is correctly attributed to the goods to which it belongs . If any question should arise in this respect VENDOR shall contact the OWNERS Representative.

Special care shall be taken that all accessory parts loose or detachable, belonging to the main item under dispatch, shall also be individually listed in the packing list. In the event these accessory parts are not listed in the packing list, they shall be considered by OWNER as not delivered.

Two copies of the packing list in a water-proof plastic envelope shall securely be mailed under a galvanized steel sheet on the outer surface of the package The final packing list in 2-folds shall be available in OWNERS office 10 (TEN) working days prior to dispatch of the goods from the manufacturer's premises.

#### 4.6 Liability and Guarantee

The party responsible for the packing shall be fully liable for and guarantee proper, sufficient and adequate packing, completeness of the contents, protection of the contents for a storage time of 12 month starting from the date when the equipment is loaded on the ship, and the correct preparation of the packing list.

All cost whatever resulting from inadeguate or insufficient packing shall be fully charged to the responsible party.

#### 5. <u>Packing And Marking For Electrical Panels And Instruments</u>

#### 5.1 Scope

This section covers the method for packaging of electric and instrument panels for export delivery, which are to be provided with full protection against physical damage and atmospheric attack during transit and possible long periods under adverse storage conditions which may extend to two years.

#### 5.2 General

This specification is for the package Vendor's guidance only.

Vendor shall remain fully responsible for selecting suitable materials for proper packaging and shall comply with the latest issues of the following European or British Standards: Where standards conflict with this specification, specification shall govern.

- Packing Code
- Silica gel for use as desiccant for packages
- Method of determining the permeability of materials used for packaging.





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The Vendor shall provide written instructions for the removal of protective coatings and devices.

#### 5.3 Method

5.3.1 The instrument or panel which shall be thoroughly clean, dry and free from rust shall be totally enclosed in a polythene shroud after sharp projections on the instrument or panel have been padded . Silica gel or other approved desiccant shall be strapped inside the shroud, but shall not come into contact with the paint work. After the desiccant is strapped into position, the open ends of the shroud shall be heat

After the desiccant is strapped into position, the open ends of the shroud shall be heat sealed , only leaving an opening large enough for the insertion of an air extracting pipe. After extraction of the air from the shroud, the opening shall be completely sealed.

5.3.2 Packing Case Materials

- All wood shall be thoroughly seasoned and thoroughly sound without knots, knot holes, shakes and checks .

- Wood which can cause metallic such as oak , western red cedar and sweet chestnut shall not be used .

- The case shall be of sill base type. All sheating shall be tongued and grooved.

5.3.3 Packing Case Lining

The packing case shall be lined with completely multilayer waterproof.

The lining shall have as few joints as possible. If joints are necessary, the pieces shall be overlapped so that any rain water which may penetrate the case is shed automatically when the case is upright. Overlaps shall be 75 mm minimum Joints shall be made with Bostik 'C".

- 5.3.4 Securing Instruments or Panels Inside Packing Case.
  a) The instrument or panel shall be completely secured by wooden battens faced with suitable rubber or other shock absorbing materials.
  b) Wood, wool and other hydroscopic shall not be used.
  c) Hay and straw shall not be used.
- 5.3.5 Sealing of Packing Case

After nailing, joints in the case shall be sealed with Bostik Sealing Compound and the outside bound with steel strapping .

#### 5.4 Marking of Packing Cases

- 5.4.1 Cases which are for Carriage by sea shall be marked "HOLD STORAGE".
- 5.4.2 All cases shall be marked to indicate the correct way up and bear the marking described here in above.





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## ATTACHMENT No.1

### MARKING OF PACKAGES

**PROJECT** :

**PROJECT No. :** 

L/C No. :

**OWNER** :

**ORDERED BY** :

**ORDER No. :** 

FINAL DESTINATION : Pouyesh Site, Arak / Iran

**STORAGE CODE :** 

**DIMENSION :** L x W x H

**GROSS WEIGHT** :

**NET WEIGHT :** 

PACKAGE No. : \_\_\_\_OF\_\_\_\_.

MADE IN :

Description	Qty.
Shaft (with key)	1 pc
Impeller	1 pc
Shaft Sleeve	2 pcs
Gasket & O-Ring	2 sets
Mechanical Seal	2 pcs
Bearing	2 sets
Wear Ring	2 sets





Title: SPARE PARTS PROCEDURE

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#### Title: SPARE PARTS PROCEDURE

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These instructions outline the requirements for providing original manufacturer's precommissioning, commissioning and two years operation spare parts for a PP-PE Pilot Plant to be built in Petrochemical Research & Technology Company, Arak/Iran.

### CONTENTS

- 1) General information
- 2) Definitions
- 3) Spare parts required
- 4) Required information
- 5) Identification
- 6) Packing and protection
- 7) Special storage items

#### Attachments:

- 1. Erection, precommissioning, commissioning and start-up phase spare parts
- 2. Two years operation spare parts
- 3. Guidelines for the compilation of Spare Parts Interchangeability Record (SPIR)
- 4. SPIR form





Title: SPARE PARTS PROCEDURE

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#### 1) <u>General Information</u>

These instruction outline the requirements for providing original manufacture's precommissioning, commissioning and two years operation spare parts for PP-PE Pilot Plant to be built in Petrochemical Research & Technology Company, Arak/Iran.

The Vendor is obliged to provide with an original equipment manufacturer spare parts data package, containing full and complete spare parts information and prices for each item of equipment supplied.

The Vendor shall recommend those spare parts that are deemed necessary on the basis of Vendor's recommendations and experience.

#### 2) <u>Definitions</u>

- 2.1 "Erection, Precommissioning, Commissioning and start-up spare parts" are those material, equipment or components necessary during the erection, precommissioning, commissioning and start-up activities of the Plant.
- 2.2 "Operating Spare Parts" are spare parts material, equipment or components necessary for the continuous operation of the plant after commissioning completion for a period of two years.
- 2.3 GOODS: All kind of materials and equipment to be incorporated in the Project.
- 2.4 VENDOR: Companies Awarded by Owner for Procurement Services, Inspection Affairs or Transportation, Providing of Project's goods, following up all transport activities from VENDOR workshop to final destination as defined in the purchase order.
- 2.5 OWNER: Petrochemical Research & Technology Company.

#### 3) Spare Parts Required

3.1 <u>Capital spare parts</u>

Capital spare parts are defined in documentation prepared by technical department.

3.2 Erection, precommissioning, commissioning and start-up Spare Parts

Vendor is requested to submit a Spare Parts proposal togheter with base quotation. Such spare parts shall be packed in separate boxes and shipped together with the main equipment/material purchased in order to be available at the site together with the base order supply.

Minimum required quantities are shown in attachment 1.





Title: SPARE PARTS PROCEDURE

#### 3.3 <u>Two years operation spare parts</u>

Vendor is requested to submit a Operation Spare Parts quotation based on his experience together with base quotation

The necessary and sufficient two years spare parts include those parts that are normally required to mantain the plant in a satistactory working condition for a period of two years of continuous operation after plant start-up.

These Operation Spare Parts shall be packed in separate boxes.

Guidelines for selection of two years spare parts are shown in attachment 2.

#### 4) <u>Required Information</u>

- 4.1 All information and drawings must be in English language.
- 4.2 Data sheets, engineering drawings. manufacturer's catalogs and operating and maintenance manuals required to identify the function of and fully describe all parts associated with the equipment
- 4.3 The interchangeability of spare parts must be completely assured between all units contained on the parent equipment purchase order.
- 4.4 The Vendor shall guarantee the spare parts in accordane with the requirements requested for the parent equipment.
- 4.5 The offer must be valid for supply either for total or partial quantities.
- 4.6 All Spare Parts list shall be filled-in using the attached "Spare Parts Card" according also to the instructions attached herein.
   Photocopied or hand-written documents are not acceptable.
   Twelve (12) months price validity is required

#### 5) <u>Identification</u>

All spare parts shall be individually identified by one of the following methods:

- 5.1 A stainless steel label imprinted with letterine approximately 6 mm (1/4) high and secured to the part with S.S. wire.
- 5.2 Inscribing with an electric spark erosion pencil
- 5.3 On large items inscribing with non-fading,moisture resistant marking ink, figures/ letters to be at least 25 mm (1) high. Ink shall be Pannier 1001 Yellow Industrial or equal.

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Title: SPARE PARTS PROCEDURE

- 5.4 Items such as Ball Bearings which in actual storage will remain in their packing may be identified with an adhesive label firmly attached to the outside of the carton.
- 5.5 Alternative methods which are standard industrial practice may be used provided SP's approval has been obtained in writing in advance. Stamping directly into spare parts will not be allowed.
- 5.6 The following shall appear on each spare or spare part label: Manufacturer's real part number. Short description (one word will suffice if space is limited). Tag number of equipment (if applicale).

#### 6) <u>Packing And Protection</u>

- 6.1 Packing protection and marking of the packing container shall be as described in Project Packing and Marking Procedure 000-PCR-PRC-0002. Spare parts shall be packed separately from main equipment and the packing containers shall clearly be marked "erection, precommissioning, commissioning, and start-up spare parts" or "two years operating spare parts" as applicale. The following additional comments apply :
- 6.2 Packing cases and other shipping containers must be capable of giving adequate protection to contents for a period of one year after despatch from Vendor work-shop (i.e. cases may after receipt at the Plant Site be stored outside before being unpacked).
- 6.3 Two years operating spares are to be protected and packed in such a manner as to ensure a minimum shelf life of four years in an un-air-conditioned warehouse sited in extremely dusty heavy industrial and coastal area with salt pollution location where the maximum shade temperature may exceed -14 +45 C. and where relative humidity reaches 90%.
- 6.4 Consumables items such as bolts and nuts shall be adequately oiled to prevent corrosion.
- 6.5 Other unpackaged items shall be protected by a rust preservative oil, hard drying type. if the nature of the item permits the removal of the deposited tar oil skin by means of petroleum based solvents or the use of hot dip strippable coating.
- 6.6 Any protection for stainless steel parts shall not contain chlorides or harmful metal salts such as Zinc, Lead, Copper. etc. Also marking paint or ink shall not contain similar harmful components.
- 6.7 Electronic and instrument parts shall be packed in sealed clear plastic bags along with a bagged amount of dessicant.

#### 7) <u>Special Storage Items</u>





Title: SPARE PARTS PROCEDURE

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- 7.1 Vendor must advise of any spares which cannot be stored under the conditions stated in para.6.2 and which require special storage conditions
- 7.2 Special Storage Items are to be clearly labelled with storage instructions such as: STORE IN A COOL DRY PLACE AT C
   STORE IN DARK PLACE
   KEEP HUMIDITY BELOW %
   etc.
- 7.3 Owner must be notified of all such items without delay before order placement since a restricted shelf life may require an amendment to order quantity and an appropriata re-ordering procedure.





Title: SPARE PARTS PROCEDURE

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## ATTACHMENT 1

## ERECTION, PRECOMMISSIONING, COMMISSIONING AND START UP SPARE PARTS

1) <u>FURNACES</u>
--------------------

,		
	Gaskets for coil:	50%
	-Burner Tiles	100%
	-Burner Tips	5%
	-Fire eyes	10%
	-Gas valves seat	100%
	-Solenoid valves	25%
2)	EXCHANGERS, REACTORS & DRUMS/TANKS	
	Gaskets for Girth Flange, M/H& H/H	100%
	Stud Bolts and Nuts for the Above	5%(Min. 2 Sets)
	Field-Installed Trays:	
	-Bolts and Nuts	15% (Min. 2 Sets)
	-Washers (Metal and Asb.)	20% (Min. 2 Sets)
	-Tray Clamps	10% (Min. 2 Sets)
	-Asb. Rope and Tape	25% (Min. 2 Sets)
	Field-Installed Internals, Piping and Other Bolted Internals:	
	Stud Bolts (Alloy and C.S.)	10% (Min. 2 Sets)
	Washers and Nuts	10% (Min. 2 Sets)
	Packing:	
	-Inert Balls	15%
	-Raschig Rings / Sllotted Rings	15%
	-Gaskets Sets And O-Rings	100%
	-Fan for Air Cooler	

#### 3) STEEL STRUCTURE AND PLATFORM

Bridge Crane:

-Bolts & Washers





#### Title:SPARE PARTS PROCEDURE

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-Gashels	10%
-Contactors	5%
-Tension Springs	10%
-Fuse Elements	10%
-Gaskets	10%
-Oil Seals	25%
-Relays	5%
-Collectors	1 set Each Size
-Contact Shoes	1 set Each Size
-Limit Switches	1 set Each Size
-Welding Rod	10%

## 4) <u>MACHINERY / PACKAGES</u>

5)

Please see the relevant engineering specifications of each equipment for commissioning spares.

Electrical Equipment:	See item 9
Instrumentation:	
- Control panel	See item 10
- Board instruments	See item 10
- Field Transmitters	See item 10
- Field instruments	See item 10
- Others	0%
H.V.A.C.	
Bolts, Nuts, Gaslets for Field installation of Pipe/Duct	5%
Rotating Equipment	See item 5
Heat Exchangers	0%
Filter Element	1 Set Each Size/Material
Electrical	See Item 9
Instrumentation:	
-Control panel	See Item 10
-Board Instruments	See Item 10
-Field Transmitters	See Item 10



3" to 6"

## **PP-PE Pilot Plant**



#### Title: SPARE PARTS PROCEDURE

	-Field Instruments		See Item 10		
	-Others		5%		
6)	SPECIAL EQUIPMENT				
	Heat Exchanger		See Item 2		
	Rotating Equipment		See Item 5		
	Filter Element		1 Set Each Size/Mat'l		
	Piping		0%		
	Electrical		See Item 9		
	Instrumentation:				
	-Control panel		See Item 10		
	-Board Instruments		See Item 10		
	-Field Transmitters		See Item 10		
	-Field Instruments	See Item 10			
	-Others		0%		
7)	<u>PIPING</u>				
	Gaskets, all sizes		20%		
	Stud Bolts less than1"		15%		
	Stud Bolts 1" to 1 7/8"		10%		
	Stud Bolts 2" and over		5% 10%		
	Welding Rods				
	Coating and Wrapping		10%		
		Carbon Steel	Allow/SS	Cast Iron	
	Ding 2" and balance		Alloy/SS		
	Pipe 2" and below	15%	4%	0%	

8" and over	5%	1%	5%
(*) Valves 2" and below			
screwed and welded	10%	5%	0%
(*) flanged	2%	2%	0%

10%

2%

5%

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Title: SPARE PARTS PROCEDURE

(*) Valves 3" to 10"	2%	2%	0%	
(*) Valves over 10"	0%	0%	0%	
(*) Flanges up to 12"	5%	3%	0%	
(*)14" and over	2%	2%	0%	
(*) Fittings welded up to 2"	10%	6%	0%	
(*)2 ½" to 10"	5%	3%	0%	
(*)12" and over	3%	2%	0%	
(*) Fittings Screwed up to 2"				
(*) 3" and over	5%	3%	0%	
(*)Flanged all sizes	5%	3%	0%	
(*) Hub and Spigot 3" to 12"	0%	0%	5%	
(*) 4" and over	0%	0%	3%	

Note: as indicated with (\*), where the percent gives the quantity consisting of a whole number plus a decimal less than 0.5, the decimal portion will be dropped; where the decimal portion is 0.5 and more, the next higher whole number quantity will be selected.

# 8) <u>ELECTRICAL EQUIPMENT</u>

Switchgear, Motor Control Centers MV/LV:	
-Fuse elements	50%
-Bulb for Signal Lamps	50%
Local Control Panels & control stations:	
-Fuse elements	50%
-Bulb for Signal Lamps	50%
Electirc Motors:	
-Grease Nipples where applicable	10%+power
-Grease Nipples where applicable Lighting Fixtures	10%+power terminal (in J.B.) 2% 3%
	terminal (in J.B.) 2%
Lighting Fixtures	terminal (in J.B.) 2% 3%
Lighting Fixtures Flag Relay	terminal (in J.B.) 2% 3% 2%
Lighting Fixtures Flag Relay Time Relay	terminal (in J.B.) 2% 3% 2% 2%

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## Title: SPARE PARTS PROCEDURE

		_
Fixed Contacts	15%	
Coils for Contactors	10%	
Boucholz Relay	one of each type and size	
Thermometer		
Local Control Station:	5%	
-Ammeter		
-Push button	5%	
-Selector Switch	5%	
UPS:		
-Fuse	*	
-MCB (miniature circuit breaker)	*	
-SCR	*	
-DIOD	*	
-Transistor	*	
-Control cards	*	
-Signaling lamps	*	
-Batteries	*	
Battery Charger:		
-Fuse	*	
-MCB(miniature circuit breaker)	*	
-SCR	*	
-DIOD	*	
-Transistor	*	
-Control cards	*	
-Signaling lamps	*	
-Batteries	*	
Fire Alarm System	*	
Telephone System	*	
Paging System	*	
Radio System	*	
Emergency Diesel Generator	*	

Sockets (400V, 230V, 24V)





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## Title: SPARE PARTS PROCEDURE

Plugs(400V, 230V,24V)	5%
Portable 110V AC, 50Hz, with transformer	5% each type
Socket and plug (ex-type)	
Hand lamp 24V AC, 50Hz(ex-type)	10 no.

All special tools, equipment and spare parts required for commissioning and start-up shall be provided. These are the spare parts that VENDORS shall recommend based on experience.

# 9) <u>INSTRUMENTATION</u>

For control Panel:	
- Bulbs For Signal Lamps	50%
- Fuse Elements	50%
Boards instruments:	
- Fuse elements	50%
- Chart paper for recorders	3 boxes each type
- Ink for Recorder	7 sets each type
- Pens for Recorders	50%
Field transmitters:	
- Gasket	15%
Field instruments:	
- Air pressure regulators	5%
- Temperature Indicators	10% each range
- Pressure gauges	10% each range
Solenoid Valves	2% each type(min 1 set)
Selonoid coils	3 coil each type
Valve positioners	2% each type(min 1 set)
Cable – Single Pair	20%
Cable – Multi Pair	15%
Cable Glands	20%
Junction Boxes – Large	1 min.
Pipe and Tube	10%



#### SPARE PARTS PROCEDURE Title:

Fittings all type	15% each size
Valves	20%
Manifold Valves	10% each size
Cable Tray	20%
DCS:	
- Bulbs for signal lamps	50%
- Fuse elements	50%
- Printer paper, Chart paper	4 boxes each type
- Printer Ribbon	10 sets each type
- Blank Floppy disks/magnetic tape cartridge	10 pieces
Gas Chromatograph:	
-Filter elements	10%
-Calibration gas cylinders	1 cylinder (100 liter) each type
-Standard gas cylinders	1 cylinder (100 liter) each type
-Other gas cylinders	1 cylinder (100 liter) each type
Other Analyzers:	
-Filter Elements	10%
-Calibration Gas Cylinders	1 cylinder (100 liter) each type
-Standard gas cylinders	1 cylinder (100 liter) each type
-Other gas cylinders	1 cylinder (100 liter) each type

# 10) PAINT AND INSULATION

Paint	10%
Insulation material	10%
Insulation Band & Seal	10%
Insulating Cement	10%
Insulation Sheet Metal	15%
Insulation Wire	10%

# 11) <u>UTILITY EQUIPMENT</u>

Heat Exchanger, Vessel, Tank and Tower



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## Title: SPARE PARTS PROCEDURE

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Rotating Equipment	See item 5
Filter Elements	1 Set Each Size/Mat'l
Piping	0%
Electrical	See item 9
Insturmentation :	
-Control panel	See item 10
-Board Instruments	See item 10
-Field Instruments	See item 10
-Others	0%





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# ATTACHMENT 2

# **GUIDELINES FOR SELECTION OF 2 YEARS OPERATION SPARE PARTS**

Spare parts for equipment are shown in the following tables:

- Table 1 Spare parts for machinery/packages.
- Table 2 Spare parts for electrical equipment
- Table 3 Spare parts for instruments
- Table 4 Spare parts for pressure vessels and heat exchangers
- Table 5 Spare parts for piping.





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# TABLE 1

# SPARE PARTS FOR MACHINERY / PACKAGES

Note 1: Please see the relevant engineering specifications of each equipment for recommended 2-years spares.

Note 2: Please see tables 2 and 3 of attachment-2 for the electrical and instrument spare parts requirements of machinery / packages for 2 -years.



Title: SPARE PARTS PROCEDURE شرکت بژوبش و فناوری بتروسی

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# TABLE 2

# MINIMUM SPARE PART FOR ELECTRICAL EQUIPMENT

Item:		<u>Quantities</u>
1) Switchgears:	MV Fuses	15%
	Protecting and Flag Relay	2%
	Time Relay	2%
	Lamps	10%
	Space Heaters	10%
	L.V. Fuses	2%
	Auxiliary Relays	1%
	Moving Contacts	15%
	Fixed Contacts	15%
	Circuit Breakers(MCCB,M	CB) 10%
	Contactors	15%
	Metering	15%
	СТ	20%
	PT	20%
2)Power Motors Control Center	L.V. Fuses	15%
	Time Delayed Relays	8%
	Lamps	10%
	Space Heaters 10%	
	Terminal Blocks 7%	
	Auxiliary relays	To be
	Contactors	determined later
	Thermal	in conjunction
	overload Relays	with the equipment vendor
	Isolators for each trip	21%
	Current Setting	11%





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## SPARE PARTS PROCEDURE

	Motor Cir	cuit Br	akers			
	Complete	Complete Unit for Each			15%(min 1)	
	Type & Si	Type & Size(incoming & bus tie)				
	Moving C	ontacts	20%			
	Fixed Cor	ntacts			20	9%
	Metering				15	5%
	СТ				20	)%
	PT				20	)%
	Circuit Br	eaker		one p	er each	n type
3) Transformers :	Bucholz R	elays		one e	ach typ	e & size
	Thermome	ter			10	)%
	Bushing H	V/LV			50	)%
	Measuring	and cir	ntrol dev	vices	20	)%
	CT of natu	ral resi	stor	10% (0	of each	type)
4) Power Material:	a) Local Co	ontrol S	tations	5%		
	b) Sockets	400V A	AC		10	9%
	c) Plugs 40	0V AC			10	%
5) Lighting Materials:	a) Switches	•			10	%
	b) Fuses				30	%
	c) Sockets(	230 V,	24V)		10	%
	d) Plugs(23	0 V, 24	V)		10	9%
	e) Lighting	Fixture	es		10	)%
	f) Ballast L	f) Ballast Lamps		5%		
	g) Lamps				20	%
	h) Portable	110V /	AC,50H	z with		
	transformer	t (ex-ty	pe)sock	et and p	lug 10	)%
	i) hand amp	o 24V A	AC, 50H	Iz (ex-ty	rpe)	
6) Motors:						
No of Machines	1	2	3	4	5	more
set of Bearing	1	1 1 1 2		2	40%	
Fan, terminal, blocks, sp	ace heater (MV)	per typ	e			5%





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SPARE PARTS PROCEDURE

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7) UPS:

	Fuses	30%
	MCB(miniator circuit breaker	r) 15%
	SCR	30%
	Signaling lamps and protection	on
	device	15%
	DIOD	10%
	Transistor	30%
	Control cards	one per each type
	Batteries	5%
	Isolator switch	
	(make before break)	one per each type
8)Battery charger:		
	Fuse	30%
	MCB	15%
	SCR	30%
	DIOD	10%
	Signaling lamp	15%
	Control cards	one per each type
	Batteries	5%
9)Telephoned system		*
10) Paging system		*
11) Radio system		*
12) Fire alarm system		*
13) Neutral grounding system		*
14) Bus duct		*

These are the spare parts required for two years operation. Vendor shall recommend the spares based on their experience.

(\*)The Quantities indicated are only preliminary estimation, so the firm quantities will be specified later in conjunction with recommendations of equipment vendors.

The quantities which shall be ordered by VENDOR shall be approved By OWNER.





Title: SPARE PARTS PROCEDURE

# TABLE 3 SPARE PARTS FOR INSTRUMENTS

Item	Quantities
Flow Instruments	To be determined
Level Instruments	in conjunction with
	the equipment Vendor
Temperature Instruments	(based on Vendor's
	experience on similar
Pressure Instruments	type of plant)
Analyzers	
Control Valves : Valve Bodies	None unless service
	is corrosive or erosive.
	For corrosive or
	erosive services,
	shall be determined
	in conjunction with
	the equipment Vendor.
Valve Plugs	1 of each size/min.
	15% or 1
Seat Rings	1 of each size/min.
	25% or 1
Actuators	10% (min 1 per type / size)
Valve Stems	1 of each diameter.
	These vary in length
	depending on valve
	size. Purchase the
	longest of each dia.
	These can be cut to
	the correct size.





# **PP-PE Pilot Plant**



#### Title: SPARE PARTS PROCEDURE

Stem packings	3 boxes of each size used/min. 20%
Grease	3 boxes of each type
	used/min. 20%
Diaphragms	1 of each size used
	min. 20%
Blank Orifice Plates	
Dial Thermometers	
Manual Loading Stations	
Instrument Air Filters	
(Regulation sets)	
Pressure Gauges	
Pressure Switches	
Plug-in Assemblies for Elect. Instr.	
Plug-in Assemblies for Pneum. Instr.	10%
Seal, Condensate and Vent Pots	(for all)
Solenoid Valves	
Thermocouples	
Thermowells	
Signal Lights	
Pneumatic relay and/or boosh(if any)	
Valve Positioners	10%
I/P Convertes	(for all)





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DCS/ESD/PLC (for each system the following items):

× 5	
-I/O cards	5% for each type (min 1 for each type)
-Main cards	one set
-Power supply (AC, if any )	one set
-Power supply (DC, if any)	one set
-Barriers cards	5% for each type (min 1 for each type)
On-line gaschromatographs:	
-Main mother board	one set
-Column	one per type





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# <u>TABLE 4</u> <u>SPARE PARTS FOR</u> <u>PRESSURE VESSELS & HEAT EXCHANGERS</u>

ITEM	<u>QUANTITIES</u>
1) Heat Exchangers-Shell and Tube	
(U Type included)	
- Tubes	Straight tubes sufficient to retube the
	largest bundle of each tube size and
	material.
- Bolts and nuts	(Special or Alloy) of each exchanger
	minimum one set.
- Gaskets	200%
2) Pressure Vessels	
- Gaskets	200%
- Bolts and nuts	10% (Special, Alloy or size 2" diam or
	greater), minimum one set.
3) Air Cooled Exchangers	
- Plugs	Steel 1%; Non-ferrous 2%
	(min. one number)
- Plug Gaskets	5% (min. one number)
-Cover plate gaskets	10%
-Tube support boxes	10% (min. one number)
4) Number of Air-fin Coolers Using Part.	1 2 3 4 5 6 7 or more
(i) V-Belts-Sheaves (Driven &	2 Driver) 0 0 0 0 0 0 0 1
- Set of Belts	1 2 3 4 5 6 100%
(ii) Fan Shaft Bearing (Upper	
	of Air Fins
(iii) Speed Reducers (Gear Bo	x) Shaft





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and pinion										
- Bearing Set	1 1 1 2 2 3 50% of No									
	of Air Fins									
- O-Rings, Seals, Lock-washers, Locknuts										
(iv) Couplings – Complete Coupling,										
-Flanges, Gaskets, Seals	1 1 1 1 1 1 1									
(v) Fan Assemblies	1 2 3 4 5 6 100% of No									
	of Air Fins									
-Automatic Pitch Control										
-Hub Assembly Parts Guide Bushing,	,									
-Pithc Blocks, O-Rings, Clam Gasket	S									
(vi) Bolt Assembles, Fork, Pins	1 2 3 4 5 6 100% of No									
	of Air Fins									
(vii) Flexible Hose, Rotary Union	1 1 1 1 1 1 2									
(viii) Automatic or Manual Adjustments:										
- Blade Retention Clamps, Pitch,	1 1 1 2 2 2 30% of No									
	of Air Fins									
Change Forks, Puch Rod, Stub,(with pi	lot tubes),Bearing									
Retainer Rings										
(ix) Spring Housing Gasket, Diaphragm,	1 1 1 1 2 2 20% of No									
Blade Retainer Ring, Thrust	of Air Fins									
cover Gasket										
(x) Hub Assembly with Blades	0 0 0 0 0 0 0 1 (b)									
(*) NOTES										
(a) Quantities shown are for each size and	type of part									
(b) Twenty units or more										
(c) The parts listed are the principal parts	only. Other parts shall be									
considered for recommendation in qua	ntities consistent with the									
above table.										





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# 5) Plate type Exchangers

Plat gasket	100%
Flow Plate	10%
Nozzle Gasket	200%
Glue (1 Kg. Pot)	1
Special spanner tool	1 for each size/type





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# <u>TABLE 5</u> <u>SPARE PARTS FOR PIPING</u>

Item	Quantities
Valves up to $1 \frac{1}{2}$ "	5% for each size, type and material
	complete units
Valves from 2" to 6"	2% (minimum 2 pieces) for each size, type
	and material
Valves above 6" to 10"	1 piece for each size, type and material
	complete units
Valves above 10"	1 only if installed valves quantity is more than 30
Valves up to 10"	
Gland packing and	
bonnet gasket	10%
Valves from 2" to 10	2 for each type, size and material set of
	changeable inner parts
Valves above 10"	1 for each type, size and material
Set interchangeable	
inner parts: bonnet gasket and	1
stem packing	
Piping gaskets and bolts	
set for each size and type	10%





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# ATTACHMENT 3

# GUIDELINES FOR THE COMPILATION OF SPARE PARTS INTERCHANGEABILITY RECORD (SPIR)

The manufacturer/supplier shall complete the following parts of th SPIR form as per listed sequence and in the English language:

- Line 1: PLANT registration/item number or tag number of equipment/instruments, etc. as stated on requisitions and/or Purchase Orders.
- Line 2: Mode, type or other identification of eqipment/instruments, etc. ordered.
- Line 3: Serial number of each equipment/instruments, etc. ordered.
- Line 6: Purchase Order number reference of equipment/instruments, etc.
- Line 6a: Unit of measure, i.e. No., set, pair, kg,roll, etc.
- Line 4: Number of identical equipment, etc. of particular model or type being supplied against Purchase Order number mentioned under line 6.
- Line 8: Parts description of all component parts considered by supplier as being required for maintenance of equipment, etc. listed in lines 1, 2 and 3. However, all items specified in the appropriate equipment list shall be shown separately.
- Col. 9: Drawing number/part number as per supplier's parts list or drawing.
- Col. 10: Part identification number shoeing interchangeability within equipment manufacturer's organization.
- Note: Identical parts, regardless of whether they have the same part number or drawing number, should be shown only once (see also line 5).
- Col.11: Material specification of parts listed in column 8.
- Line 5: Enter in appropriate sqare the nuber of parts (listed in column) fitted in each applicable unit. For groups of identical units, denote quantity per unit below quantity shown in line 4.
- Col. 7: Total number of identical parts listed in colimn 8 for all equipment, etc. For identical units multiply quantity in line 5 by number in same column in line 4 and enter overall total of each line in column 7.





- Col.12: Total spar parts recommended for 2 years operation and commissioning period.
- Col.18: Unit price (up to two decimals) for recommended spare parts of column 12.
- Col.20: Original identification number for all items of third party manufacture (bought-out items) such as : ball/-roller bearings, mechanical seals, coplings, bearing lock nuts, bearing lock washers, V-bels, bolts/nuts, gaskets, O-rings, and the like. These items should be fully identified by manufacturers' numbers, types, sizes, etc.
- V for: Vital equipment, a breakdown of which would mean an immediate and serious interruption of vital operations in field or plant and with which no risk in the ordering and stocking of spare parts can be justified.
- E for: Essential equipment, engaged in primary operations, but with which a calculated risk can be taken in ordering and stocking of spare parts.
- A for: Auxiliary, general purpose and stand-by equipment, for secondary operations, the temporary lack of spare parts would not have a serious effect.
   Under this heading also comes the equipment of which there is a large number of units in used, thus ensuring a sufficient degree of protection in case of failure of one or more units.

The Owner MESC project team should complete the following part of the SPIR form

- Col.16: For allocation of the final MESC number.
- Col.17: For the classification of spare parts, i.e.:
- C for: Parts wearing out or deteriorating during normal operations, thus shown a fairly regular consumption.
- Q for: Parts not normal stocked, but ordered on request only.
- I for: Insurance items.
- O for: Temporary code number.

THE VENDOR SHALL COMPLETE THE FOLLOWING PART OF THE SPIR FORM:

Col.13: VENDOR'S recommended spare parts for 2 years operation.





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- Col.14: VENDOR'S recommended spare parts for the precommissioning, commissioning and start-up period.
- Col.22: This column has to be filled out for the respective parts purchase order-item reference. This number should be tagged to the respective material fro easy identification upon receipt at site.
- Col.19: Total price (up to 2 decimals) of the spare parts for 2 years operation and the commissionng period based upon the quantities approved by the OWNER'S Project Engineer (see column 15)

NOTE: Columns 15, 17 and 21 should be left blank, these are for OWNER's use. THE OWNER'S PROJECT ENGINEER SHOULD COMPLETE THE FOLLOWING PART OF SPIR FORM:

- Col.15: Final quantity to be ordered and Approved by the OWNER's Project Engineer.
- Col.21: This column has to be used to indicate the equipment classe, i.e.

# IMPORTANT NOTE:

The necessary provisions shall be made to fix the prices of spare parts for all equipment and materials for future purchasig of the spare parts by OWNER more than which shall be purchased by VENDOR for two years operations of the PLANT all EQUIPMENT AND MATERIALS for future purchasing of the spare

# ATTACHMENT 4

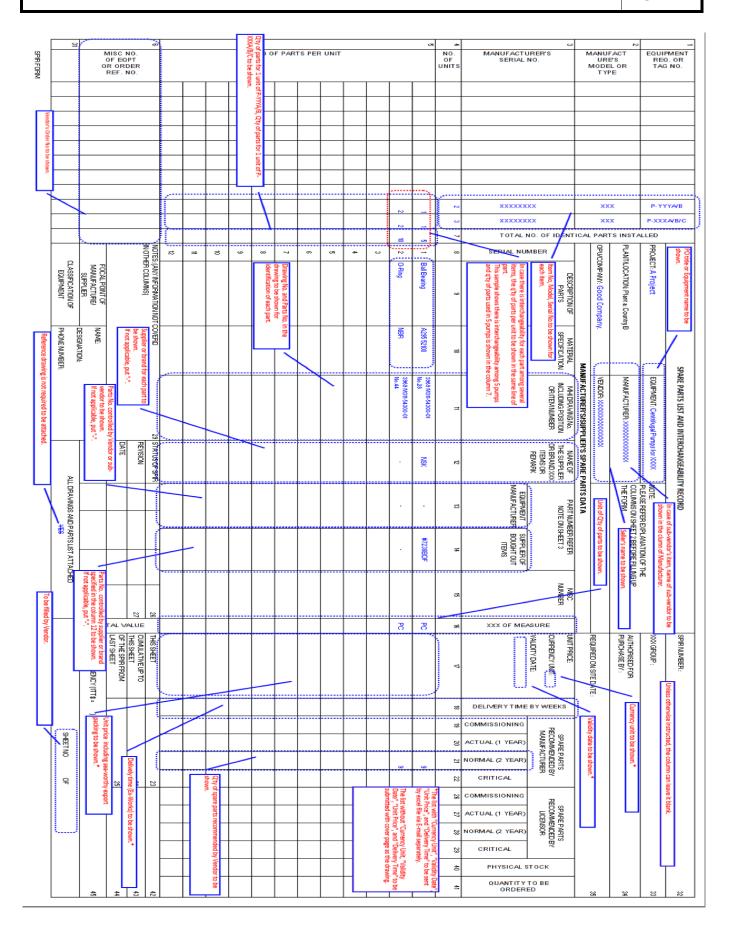




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## SPARE PARTS PROCEDURE



TITLE: TECHNICAL SPECIFICATION FOR LV MOTOR



# **TECHNICAL SPECIFICATION FOR LV MOTOR**

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## TITLE: TECHNICAL SPECIFICATION FOR LV MOTOR



## CONTENTS

- 1. GENERAL
- 2. DESIGN CHARACTERISTICS
- 3. QUALITY ASSURANCE AND PREPARATION FOR SHIPMENT

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#### TITLE: TECHNICAL SPECIFICATION FOR LV MOTOR



#### 1. <u>GENERAL</u>

#### SCOPE

- 1.1.1 This specification covers the minimum requirements for design, construction, inspection and testing of industrial type low voltage, 50 Hz squirrel cage induction motors for PP&PE PILOT PLANT of Research and Technology Center of petrochemical Co. Arak, Iran..
- 1.1.2 The scope covers motors for use in class I Divisions 1 & 2, or equivalent, in classified areas and also for general purpose industrial use in safe areas. The motors are mainly intended for centrifugal pump drives, cooling fans and compressors.
- 1.1.3 Detailed specific design requirements for each motor or group of motors are given in Data Sheets.

#### 1.2 STANDARDS & CODES

- 1.2.1 All motors shall generally be designed, manufactured and tested in accordance with the latest edition of International Electrotechnical Commission (IEC) standard and Iranian Petroleum Standard(IPS).
- 1.2.2 Metric SI system of units shall be applied to all dimensions and relevant documents.

#### 1.3 LANGUAGE

1. All correspondences and submittals shall be in English.

#### 1.4 SITE CONDITIONS

The equipment and all its components shall be entirely suitable for the site conditions specified as below:

44°C

1.4.1	Temperature
	a) Max. ambient temperature

	<ul> <li>b) Min. ambient temperature</li> <li>c) Design temperature for outdoor equipment</li> <li>d) Equipment exposed to sunlight 83°C</li> </ul>	-28°C 50°C
1.4.2	Relative humidity	Max. 86% in Jan.
1.4.3	Altitude above sea level	1889 m
1.4.4	Wind velocity	Max. 120 Km/h
1.4.5	Seismic factor	In acc. With zone 3 of UBC
1.4.6	Special atmosphere	Dusty & corrosive

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#### 1.5 DOCUMENTS PRIORITY

In the event of any conflict between this specification, the data sheets, drawings, codes and standards, the priority shall be given in the following order.

- a) Purchase order
- b) Data sheets and/or drawings
- c) This specification
- d) Codes and standards

In any case vendor shall refer the matter with purchaser and obtain clarification before proceeding with any work.

#### 2. DESIGN CHARACTERISTICS

#### 2.1 RATING AND APPLICATION

2.1.1 Voltage and output rating shall be:

RATING	VOLTAGE	PHASE
Below 0.25 KW	230 V	1
0.25 KW and above	400 V	3

- 2.1.2 Performance duty of motors shall be "S1" according to IEC 34-1, unless stated otherwise.
- 2.1.3 All equipment covered by this specification shall be designed for severe duty outdoors, totally unprotected from weather unless otherwise specified and for use in a corrosive atmosphere. Motor frames shall be cast iron or steel. Aluminum frames are not acceptable.
- 2.1.4 Motor driving compressors and reciprocating pumps shall be sized so that the product of the motor name plate rating and the motor service factor shall be at least 110% of the greatest horsepower required (including gear and etc.) for any of the compressor and reciprocating pump operating conditions.
- 2.1.5 Motors driving centrifugal pumps shall have horsepower rating at least equal to the following percentage of pump design point brake horsepower:

Motor Rating (KW)	Percent of Pump BHP
18.5 and less	125
22 to 55	115
75 and above	110

#### 2.2 SUPPLY VARIATIONS

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Motors shall be capable of operating continuously at their rated torque under the above conditions at any frequency between minus 2% and plus 2% of the nominal frequency together with any voltage between minus 10% and plus 10% of the nominal rating.

## 2.3 STARTING CONDITIONS

- 2.3.1 Unless otherwise specified, motors shall be designed for direct-on-line starting.
- 2.3.2 Motors shall be capable of two normal starts in succession under the above conditions with the motor at normal running temperature, also a minimum of 3 starts/hour, equally spaced, during normal running conditions.
- 2.3.3 Starting characteristics shall meet the requirements of IEC 34-12.
- 2.3.4 The pull up torque at nominal volts shall not be less than 0.5 times the locked rotor torque and not less than 0.5 times the rated load torque for motors rated less than 100 KW.
- 2.3.5 For motors rated 100 KW and above, the pull up torque at nominal volts shall not be less than 0.5 times the locked rotor torque and not less than 0.3 times the rated load torque.
- 2.3.6 Motors shall be able to overcome starting load inertia as well as accelerating the load to rated speed under both rated and at 20% reduced voltage conditions during starting without injurious heating.
- 2.3.7 When motors are furnished separately or with the driven equipment as a package, the torque characteristics and speed specified shall be the responsibility of the driven equipment vendor.
- 2.3.8 Unless otherwise specified, all motors are for coupled service.

## 2.4 ENCLOSURE

- 2.4.1 Unless otherwise specified, all motor enclosures shall be of Totally Enclosed Fan-Cooled (TEFC) construction. For outdoor use shall additionally be weatherproof without further protection and equivalent to IP 54 per IEC 34-5.
- 2.4.2 Motor enclosures shall be suitable for the area classification in which they are to be installed.
- 2.4.3 For general purpose use in class I Div.1 classified areas all motors to be explosion-proof flameproof.
- 2.4.4 For general purpose use in class I Div. 2 classified areas all motors to have type of protection "e" (increased safety) or "n" (non-sparking).
- 2.4.5 All single phase motors in classified areas shall be explosion-proof.
- 2.4.6 All motors specified suitable for classified areas shall be certified by an approved and official certifying agency/authority such as UL, FM, BASEEFA, etc.
- 2.4.7 The maximum surface temperature class in classified areas shall be as stated in the Data Sheets
- 2.4.8 Outdoor motors shall be rated for continuous operation under the direct sunlight.

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- 2.4.9 Where specified in Data Sheets, anti-condensation space heaters for use on 230 V single phase, 50 Hz shall be provided. Terminations are to be brought-out to a cable box separate from the main power lead cable box.
- 2.4.10 All motors shall be provided with means for preventing the accumulation of moisture inside the motor.
- 2.4.11 All motors exceeding 20 kg in weight shall be equipped with suitable lifting eyes.

## 2.5 COOLING

- 2.5.1 Unless otherwise specified, method of cooling shall be totally Enclosed Fan Cooled (TEFC) and to be suitable for either direction of rotation of the motor. On motors with unidirectional fans, the direction of rotation shall be clearly and permanently marked by an arrow on the non driving end.
- 2.5.2 The flow direction of the external air shall be from the non-driving end.
- 2.5.3 Fans for motors shall be of brass, bronze or aluminium. Aluminium alloy fans shall not contain more than 0.2% copper. Fans shall be inherently balanced.
- 2.5.4 Plastic, fiberglass or other non-metallic fans are not acceptable.

#### 2.6 STATOR WINDINGS

- 2.6.1 The motor windings shall be braced to prevent any excessive movement during transportation and all operating conditions.
- 2.6.2 Windings of three phase motors up to and including 75 KW shall be connected in delta. Winding of motors larger than 75 KW shall have six winding ends brought out to the terminal box for either delta or star connection.
- 2.6.3 Aluminum stators are not acceptable.

## 2.7 INSULATION AND TEMPERATURE RISE LIMITS

- 2.7.1 The stator windings shall be fully insulated for an unearthed system.
- 2.7.2 Unless otherwise specified, the insulation shall be class F according to IEC-85. The temperature rise as measured by increase in resistance method shall not exceed 80 °C for all type of motors, based on 50 °C maximum ambient shade temperature and maximum continuous rating.
- 2.7.3 The method of application and details of the insulating material shall be clearly stated in Vendor proposal documents.
- 2.7.4 All windings shall have a tropicalised finish or have an extra insulation coating (double dip and bake).

## 2.8 ROTOR

2.8.1 Rotors shall be free of inherent axial thrust. They shall be statically and dynamically balanced.

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- a. With full driven key or
- b. With motor half couplings keyed on the shaft.
- 2.8.2 Except for motors ordered as spares or replacements, supply of half couplings or pulleys will be in the responsibility of the driven machines manufacturer and shall be delivered rough or pilot bored to the motor manufacturer to finish bore, fit and balance.
- 2.8.3 Balancing by means of lead or other unstable material is not acceptable. If solder is used, it shall have a melting point not less than 185°C.
- 2.8.4 Rotor bars shall be securely located in their slots throughout their length.
- 2.8.5 Brazed copper or copper alloy cage construction is preferred for all rotors. However, cast aluminum rotor cages are acceptable as an alternative for all small motors with ratings up to and including 45 KW.

#### 2.9 BEARINGS AND LUBRICATION

- 2.9.1 For horizontally mounted motors, preferred types of bearing and lubrication are ball and roller with grease (lithium base).
- 2.9.2 For vertically mounted motors, bearing type and lubrication shall generally be as in clause 2.9.1 above except for larger machines vendor should put forward alternative proven design.
- 2.9.3 Grease lubricated bearings shall be packed with grease before dispatch.
- 2.9.4 Oil lubricated ball/roller bearings shall be provided with constant level oilers.
- 2.9.5 Fractional horsepower motors supplied with sealed pre-lubricated ball/roller bearings shall be factory sealed, long life type and trouble free guaranteed for five years normal operation under site condition.
- 2.9.6 The calculated life (ISO B10 "90% survival" under the estimated bearing loads) should comply with the following requirement:

Up to 75 KW	15000 hrs.
001070100	10000 113.

75 KW and above 25000 hrs.

#### 2.10 VIBRATION AND NOISE LEVELS

- 2.10.1 Motors at all speed should be balanced in accordance with the limits of vibration as per IEC 34-14.
- 2.10.2 Motor noise emission rate for the driven equipment shall not exceed the noise level specified in IEC 34-9.

#### 2.11 SHAFT AND FRAME SIZE

2.11.1 Shafts and frames shall be designed in accordance with IEC 34-7.

#### 2.12 CABLE CONNECTION AND TERMINATION

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- 2.12.1Terminal boxes shall be located on the left hand side of the motor when viewed from the non-drive end and shall have means for entry from any of the four directions separated by 90°, vertical or horizontal.
- 2.12.2 An earthing terminal of the same capacity as the line terminal shall be fitted externally to the terminal box. Cable boxes are to be adequately designed to withstand internal faults. It may be assumed that all 400 V motors will be protected by MCCB's.
- 2.12.3It shall be possible in all forms of cable entry to withdraw the motor without breaking or stressing the seal or cable.
- 2.12.4Conduit entries are to be tapped ISO. Tapped entries on all motors shall provide not less than 5 full threads.
- 2.12.5 Type and size of cables for the main supply, anti condensation heaters and P.T.C. detectors, where applicable, shall be as specified in Data Sheets. All cable boxes shall be equipped with necessary terminal blocks, cable lugs, explosion proof/weatherproof and corrosion resistant brass compression type cable glands to receive the incoming cables.
- 2.12.6Terminal markings and phase rotation shall be "A-B-C" counter clockwise.
- 2.12.7All cable terminal boxes shall be made of steel or cast iron. All cover joints shall be fitted with gaskets of polychloroprene or like material to prevent the ingress of moisture and dust. The enclosure shall be suitable for the area classification in which it is to be installed and its degree of protection shall not be less than IP 55 to IEC.

#### 2.13 THERMAL PROTECTION

2.13.1When specified in Data sheets single phase motors shall be fitted with an automatic reset thermal overcurrent device (T.O.C) in the interior of the motor.

The device shall be matched to the particular application and duty of the "drive" and to be ambient compensated for the highest temperature likely to be encountered inside the motor under site service condition. Motors thus fitted shall carry a warning plate, in English, stating that such a device is fitted and to isolate at the starter or control switch before approaching the motor.

2.13.2Where specified in Data Sheets, three phase motors shall be fitted with six thermal detectors, two per phase of the positive temperature coefficient (P.T.C) type adapted to the temperature rise of the winding and wired out to a separate terminal box.

Vendor shall supply the temperature/time relationship curve with the motor test certificate.

#### 2.14 RADIO INTERFERENCE

2.14.1Where specified in data sheets, motors shall be fitted with radio interference suppression device in compliance with B.S.800.

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## 2.15 SERIAL NUMBER AND RATING PLATES

- 2.15.1 The serial number shall be stamped permanently on a non-removable part of the frame.
- 2.15.2Rating plates shall be stainless steel or alternatively of a non-corrosive alloy. They shall be fixed to a non-removable part of the frame and show:
  - Maker's name
  - Frame size and serial number
  - Class of rating (continuous or short time)
  - Type of protection, gas group(s), temp. class
  - Class of insulation
  - Type of connection (star or delta)
  - Volts, phase, frequency
  - Output in KW at full power at tested temperature
  - Full load current and full load speed
  - Efficiency and power factor at full load
  - Type of enclosure (TEFC, other)
  - Type and size of bearings
  - Standards (IEC or other)
  - Purchase order No. and year of ordering
  - Locked rotor torque in % FLT
  - Locked rotor current in % FLC
  - Net weight
  - Type of the Lubricant(Grease)
  - The lubrication period and the quantity of injection lubricant in every time
- 2.15.3 A separate nameplate shall be fixed to the frame indicating purchaser's tag number.

## 2.16 FINISH

- 2.16.1 Prepared surfaces shall be free from rust, scale, sand, dust and grease before painting.
- 2.16.2 Finish shall be suitable for highly corrosive and dusty environments.

#### 3. QUALITY ASSURANCE AND PREPARATION FOR SHIPMENT

## 3.1 INSPECTION

Purchaser reserves the right for inspection at any stage of manufacturing, testing or preparation for shipment. Purchaser inspection shall not relieve vendor of his commitments under the terms of purchase documents and this specification.

## 3.2 ITP FORMS

The inspection and test plan (ITP) forms covers the minimum verifications, checks, and tests required for LV motors to comply with codes, specification, and/or contractual requirements.

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#### 3.3 PREPARATION FOR SHIPMENT

- 3.3.1 Unless otherwise specified, preparation for shipment shall be in accordance with the manufacturer's standard. The manufacturer shall be solely responsible for the adequacy of the preparation for shipment employed with respect to materials and applications, and provide materials to their commercial carrier systems.
- 3.3.2 Electric motors shall be shipped with bearings lubricated.
- 3.3.3 Silicagel or similar dehydrating compound shall be enclosed in each motor package. Vents shall be waterproof sealed.
- 3.3.4 Rotors shall be locked.

#### 3.4 GUARANTEE

Unless exception is recorded by Vendor in his proposal, it shall be understood that Vendor agrees to the guarantee terms described below:

All equipments and component parts shall be guaranteed by Vendor against defective material, design and workmanship when operated under normal condition for 12 months after being placed in specified service but not exceeding 18 months after date of shipment. If any mal-performance or defects occurs during the guarantee period, Vendor shall make available repaired, altered or replacement parts free of any charges whatsoever direct on the purchaser's job site. Vendor shall make available free of charge to the purchaser qualified representatives as he deems necessary to supervise the removal, repair and replacement of the defective parts in such manner that the guarantee be maintained.

The guarantee period for repaired or replaced parts shall be 12 months after start up of repaired equipment but not more than 18 months after the repaired parts and/or equipment are shipped. The guarantee period for the remaining equipment whose operation is dependent upon the proper performance of the repaired part shall be extended by the number of days of fraction thereof that the equipment had been inoperative because of defects. Field labor charges for works during the guarantee period shall be subjected to negotiation between purchaser and Vendor.

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PROJECT: PP-PE PILOT PLANT	Client:	
TITLE: UTILITY CONDITION	شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی	
Document No.: 900-SPC-A4-PR-0006	Rev.: 00	
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Client:



شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی

TITLE: UTILITY CONDITION

		Lingunger	no autino monto	Querented	
	Purity	Licensor	requirements	Guaranted %mol N <sub>2</sub>	
	Oxyger	n 10	ppm. vol. max	10	
	Water	20	ppm. vol. max	5	
	Dew Po			°C	
High Pre	essure				
		Max.	Nor.	Min.	
	Pressure (barg):				
	Temperature (°C)				
	Mechanical desig				
		Pressure			
		Tempera	iture (°C):		
Bottle: 15	50/180 bar				
Medium	Pressure	NIT			
		Max.	Nor.	Min.	
	Pressure (barg):	7	6.1	4	
	Temperature (°C)	: Amb	Amb	Amb	
	Mechanical desig	n conditions	e.		
	Meenanical desig	Pressure		8	
			iture (°C):	-30/+100	
Low Pre	ssure	NIL			
		Max.	Nor.	Min.	
	Pressure (barg):	4	3.5		
	Temperature (°C)	: Amb	Amb		
	Mechanical desig	n conditions	s:		
	meenamear deerg	Pressure		5	
		Tempera	ture (°C):	100	
			-		
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ob No.:					Type : SP

PROJECT: PP-PE PILOT PLANT	23°C2		
	شر کت ملی صنای شر کت پژوهش و فنا		
Air Specification			
Supply conditions at Pilot Plant Battery Limit (B.L.)			
Licensor requirementsGuarantedOilfreefreeDustfreefreeDew point (°C)- 40 °C			
Instrument air INA			
Pressure (barg):       8.5       6.6       4.5         Temperature (°C):       Amb.       Amb.       Amb.         Mechanical design conditions:       Pressure (barg):       10/35         Temperature (°C):       100			
Plant Air or Utility Air UTA			
Max.Nor.Min.Pressure (barg):9.56.8Temperature (°C):Amb.Amb.Mechanical design conditions:Pressure (barg):10Temperature (°C):100			
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PROJECT:	PP-PF	PII OT	ΡΙ ΔΝΤ

Client:



شرکت پژوهش و فناوری پتروشیمی

TITLE: UTILITY CONDITION

Header c	onditions at Pilot Pla	nt Battery Lin	nit (B.L.):		
High Pre		VAILABLE			
IIIGH FR	<u>essure</u> NOTA				
		Max.	Nor.	Min.	
	Pressure (barg):				
	Temperature (°C):				
	Mechanical design	conditions:			
		Pressure (b			
		Temperatu	re (°C):		
Medium	Pressure	MPS			
		Max.	Nor.	Min.	
	Pressure (barg):	25	20	18	
	Temperature (°C)	sat.+ 30		sat.	
	Calculated Temp.	( 226 - 256	220 - 250	210 - 240	
	min. = sat.				
	max. = sat. + 30°C	;			
	Mechanical design			<u> </u>	
		Pressure (b		30 256	
		Temperatu	e ( C).	230	
Low Pre	essure (LPS)	LPS			
	[	Max.	Nor.	Min.	
	Pressure (barg):	6.5	5.5	5	
	Temperature (°C):		162	sat.	
		aanditiana			
	Mechanical design	Pressure (b	pard).	10	
		Temperatu		185	
		• <b>•••</b>		<u> </u>	
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	0-SPC-A4-PR-0006				

PROJECT: PP-PE PILOT PLANT	Client: شرکت ملی صنایع پتروشیمی شرکت پژوهش و فناوری پتروشیمی				
TITLE: UTILITY CONDITION					
Water Specification					
Cooling Water (CW) CWS/CWR (1) Specification: suitably treated to inhibit biological gro	wth, corrosion and scaling				
(2) Supply and return conditions at Pilot Plant Battery Lir	nit (B.L.):				
Pressure (barg) Temperat					
Supply:         6 / 5.5 / 2.5         max/nor/min         27           Return:         2.5         norm         37	max				
Return: 2.5 norm 37	max				
(3) Mechanical design conditions:	. I				
Pressure (barg) 10	4				
Temperature (°C) 185	J IIII				
<u>Industrial Water</u> IWA (1) Specification: filtered water suitable for process (2) Supply conditions at Pilot Plant Battery Limit (B.L.)					
Pressure (barg) 5 Temperature (°C) Amb.	max				
Temperature (°C) Amb.	max				
(3) Mechanical design conditions:	, I				
Pressure (barg): 6 Temperature (°C): 100	┥ ║				
	J III				
Demineralized Water DWA					
(1) Supply conditions at Pilot Plant Battery Limit (B.L.)					
Pressure (barg) 8 Temperature (°C) 70	max max				
(2) Mechanical design conditions: Pressure (barg): 10 Temperature (°C): 185	}				
	-				
Document No.: 900-SPC-A4-PR-0006	Rev : 00				
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## **PP-PE Pilot Plant**



National Petrochemical Company Petrochemical Research & Technology Co.

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# SPECIFICATION FOR PAINTING





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**REFERENCE SPECIFICATION** 

METEOROLOGICAL CONDITIONS ON SITE

PAINT SYSTEM

QUALITY CONTROL REQUIREMENTS

**GENERAL REQUIREMENTS** 

COLOUR

**GUARANTEES** 





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#### 1 SCOPE

The scope of this specification is the description of the Preparation and Painting Work for Piping Equipment, Supports, Fixed Roof Tanks, Machinery, main packages (supply as loose material), etc. to be carried out for the units covered by the subject job.

#### 2 **REFERENCE SPECIFICATIONS**

#### 2.1 International Specifications

- Standard ISO 8501-1 : 1988
- European Scale of Rusting Degrees
- ASTM American Society for Testing and Material
- RAL 840 HR, RAL F2
- SSPC(Steel Structure Painting Council)

#### 2.2 Particular Job Specification

SPC-JV-GA-E-60701

#### 3 METEOROLOGICAL CONDITIONS ON SITE

- Temperature : Min. –28°C : Max. +40°C
- Relative Humidity : Min. 30% : Max. 86%
- Type of environment: Industrial Marine





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#### PAINT SYSTEMS 4

The various applicable paint systems are the following:

Uninsulated carbon and alloy steel surfaces of Piping (pipes, fittings, flanges, 4.1 valves), Supports, Equipment (vessels, exchangers, columns, etc.) and Tanks with operating temperature up to 70°C.

SYSTEM SYMBOL

PREPARATION SYMBOL

F	

22

04

F

Blast cleaning grade Sa 2½ as per Standard ISO 8501-1:1988 or as per SSPC VIS-1 dearee SP 10. Bast cleaning profile 25÷ 30 microns

ANTI CORROSION PRIMER SYMBOL

22

04

One

1st COAT

One coat of Ethyl Silicate Zinc-Rich with solvent. D.F.T. 75 microns

**FINISH SYMBOL** 

Chlorinated

1st COAT

Unsaponifiable Pure

Rubber D.T.F. 40 microns

coat

of

2nd COAT One coat of Modified Alkyd Chlorinated Rubber D.T.F. 40 microns

#### TOTAL DRY FILM THICKNESS : 155 microns

Note: Valves, Shop Fabricated Equipment primerized at Mfr's

shop, after erection and before finish coats application, shall be treated as follows:





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- wash-ups:	The surface shall be washed with fresh water if the substrate has
-	been contaminated with chloride, powder etc, during its transpor-
	tation, storage and erection.
	The surface shall be used a doubt house blands a short order as

The surface shall be washed with unchloride solvent, where strictly necessary, to remote traces of grease, oil, etc.

touch-ups: The surface shop primed having mechanical damages or rusting (inclusive of weld seam), shall be prepared and treated by a powerful wire brushing to the degree St3 per Standard ISO 8501-1: 1988.
 The touch-ups shall then be done, using two pack epoxy zinc-rich

primer in two coats, d.f.t. 30 µm for each coat.





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**4.2** Uninsulated carbon and alloy steel surfaces of Piping (pipes, fittings, flanges, valves) and Equipment (vessels, exchangers, columns, etc.) with operating temperature from 71°C to 200°C.

SYSTEM SYMBOL

PREPARATION SYMBOL

22 31 F

F

Blast cleaning grade Sa 2½ as per Standard ISO 8501-1:1988 or as per SSPC VIS-1 degree SP 10. Bast cleaning profile 25÷ 30 microns

ANTI CORROSION PRIMER SYMBOL

22

1st COAT

One coat of Ethyl Silicate Zinc-Rich with solvent. D.F.T. 75 microns

FINISH SYMBOL

31

Doint	1st COAT	One	coat	of	Acrylic	Silicone	Aluminium	
Paint		D.F.T	<sup>-</sup> . 25 m	nicro	ons			
Paint	2nd COAT	One	coat	of	Acrylic	Silicone	Aluminium	
raint		D.F.T. 25 microns						
	TOTAL DRY I	FILM T	HICN	ESS	S : 125 m	nicrons		

Note: Valves and Equipment primerized at Mfr's shop, after erection and before finish coats application, shall be treated as follows:





Title:SPECIFICATION FOR PAINTINGDoc. No. 900-SPC-A4-PD-0002
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- wash-ups: The surface shall be washed with fresh water if the substrate has been contaminated with chloride, powder etc, during its transportation, storage and erection.

The surface shall be washed with unchloride solvent, where strictly necessary, to remote traces of grease, oil, etc.

- touch-ups: The surface shop primed having mechanical damages or rusting (inclusive of weld seam), shall be prepared and treated by a powerful wire brushing to the degree St3 per Standard ISO 8501-1: 1988.

The touch-ups shall then be done, using two pack epoxy zinc-rich primer in two coats, d.f.t. 30  $\mu$ m for each coat.





Title:

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1st COAT

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**4.3** Uninsulated carbon and alloy steel surfaces of Piping (pipes, fittings, flanges, valves) and Equipment (vessels, exchangers, columns, etc.) with operating temperature from 201°C to 400°C.

SYSTEM SYMBOL

PREPARATION SYMBOL

22 32 F

F

Blast cleaning grade Sa 2½ as per Standard ISO 8501-1:1988 or as per SSPC VIS-1 degree SP 10. Bast cleaning profile 25÷ 30 microns

ANTI CORROSION PRIMER SYMBOL

22
----

One coat of Ethyl Silicate Zinc-Rich with solvent. D.F.T. 75 microns

FINISH SYMBOL

32

Deint	1st COAT	One	coat	of	Acrylic	Silicone	Aluminium	
Paint		D.F.T	<sup>-</sup> . 20 m	nicro	ons			
Paint	2nd COAT	One	coat	of	Acrylic	Silicone	Aluminium	
Faint		D.F.T. 20 microns						
	nicrons							

Note: Valves and Equipment primerized at Mfr's shop, after erection and before finish coats application, shall be treated as follows:

Petrochemical Research & Technology (N.P.C-RT)		-PE PILOT PLANT	مرد می رو می	کی ایسی کی
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b	been contaminated ation, storage and e The surface s	washed with fresh water if the su with chloride, powder etc, during i rection. shall be washed with unchloride s y necessary, to remote traces of g	ts transpor- olvent, where	
(1	inclusive of weld se powerful wire brushi 1988. The te	amed having mechanical damages am), shall be prepared and treate ng to the degree St3 per Standard puch-ups shall then be done, using er, d.f.t. 50-75 μm for each coat.	d by a d ISO 8501-1:	

Petrochemical Research & Technology Co. (N.P.C-RT)	PP-PE PILOT PLANT	یک محکمت ما منایا تبزیم شکرکت بزویش و خاود می بتروشی
Title: SPECIFICATION F	OR PAINTING Doc. No. 900-SPC-A4-PD-0002	Page 10 of 18
	nsulated carbon and alloy steel surfaces of Pi quipment (vessels, exchangers, columns, e	

temperature from -25 up to 400°C.

SYSTEM SYMBOL		22 01 F
PREPARATION SYMBOL		F
		Blast cleaning grade Sa 2½ as per Standard ISO 8501-1:1988 or as per SSPC VIS-1 degree SP 10. Bast cleaning profile 25÷ 30 microns
ANTI CORROSION PRIMER	R SYMBOL	22
	1st COAT	One coat of Ethyl Silicate Zinc-Rich with solvent. D.F.T. 75 microns
FINISH SYMBOL		01
	1st COAT	
	2nd COAT	
	TOTAL DRY	FILM THICNESS : 75 microns
Notes: Pipes, Fittings and F preparation and antio	•	e completely painted at site (surface er).

Valves and Equipment shall be completely painted at Manufacturer's shop (surface preparation and anticorrosive primer).

Petrochemica	al Research & Technology Co. (N.P.C-RT)	PP-PE PILOT PLANT	مونی بروین بروینی	بی می		
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**4.5** Hot and cold insulated carbon and alloy steel surfaces of Piping (pipes, fittings, flanges, valves) and Equipment (vessels, exchangers, columns, etc.) with operating temperature from 400 up to 650°C.

SYSTEM SYMBOL

PREPARATION SYMBOL

Blast cleaning grade Sa 2½ as per Standard ISO 8501-1:1988 or as per SSPC VIS-1 degree SP 10. Bast cleaning profile 25÷ 30 microns

ANTI CORROSION PRIMER SYMBOL

<u> </u>
----------

22

F

01

F

1st COAT One coat of Special High Temperature Resistant Coating with solvent. D.F.T. 75 microns

FINISH SYMBOL

01

1st COAT --

2nd COAT --

TOTAL DRY FILM THICNESS : 75 microns

Notes: Pipes, Fittings and Flanges shall be completely painted at site (surface preparation and anticorrosive primer).

Valves and Equipment shall be completely painted at Manufacturer's shop (surface preparation and anticorrosive primer).





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## 4.6 Machinery, Electrical and Instrument Items

Machinery, Electrical, Instrument and Skid mounted packages shall be completely painted (surface preparation, anticorrosive primer, finish coats) according to Manufacturer's Standard.

Manufacturer shall carry out the complete paint system in compliance with the environment where the steel surfaces will work and shall issue the necessary recommendations for retouching, repairing and renewal of the shop painted surfaces.





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#### 5 QUALITY CONTROL REQUIREMENTS

The following inspections and testings shall be performed during and on completion of application of the paint system:

- Visual examination of surface preparation in accordance with Standard ISO 8501-1:1988

- Check of blast cleaning profile using a suitable profile meter
- Check of paints documentation
- Check of expiry dates of the priming and finishing coats
- Check of meteorological and environmental conditions
- Visual examination of appearance and uniformity of the painted surface

- Check of top coating and drying time, in accordance with the directions of the paint Manufacturer

- Check of paint drying and polymerization

- Check of dry film thickness by suitable non-destructive instruments such as "MIKROTEST, DIAMETER" or equivalent

- Check of adhesion (on the finishing) according ASTM-D-3359. Degrees lower than 3A and/or 3B are not accepted.

If, during the above mentioned inspections, painting defects (such as dripping, blistering, mudcracking, over thickness and dry spay) or conditions of preparation, thickness, etc. not conform to the requirements would be ascertained, the Applicator shall, at his own care and expense, bring back the faulty surfaces to the acceptability degree.

-Workshop and field quality control plan for painting shall be performed in compliance with SPC N. JV-ZA-E-09623





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#### 6 GENERAL REQUIREMENTS

- The abrasive to be used shall be chloride-free siliceouns sand (marine sand excluded) or metal grit.
- Blast cleaning and painting shall not be carried out on wet surfaces.
- No acid washes or other cleaning solutions or solvents shall be used on metal surfaces after they have been blast cleaned.
- The surface preparation of all steel surfaces to be coated shall be free of mill scale, rust corrosion product, oxides, paint, oil or other foreign matter.
- Only dry blast cleaning procedures shall be allowed. The compressed air used for blasting shall be free of detrimental amount of water and oil.

- The primer shall be applied immediately after the completion of the blast cleaning.

- Before applying the paint, the fitness of the preparation of the surfaces to be painted shall be ascertained.
- The painting work shall be carried out carefully, by suitable labour.
- Application of painting system (number of coats, thickness, etc.) shall be in accordance with this specification.
- Each coat of paint shall be of a different colour, so as to produce a contrast which will ensure through covering of the next coat.

- Paints, either supplied already mixed (one component) or with the components in separate containers (two components) shall be properly mixed before use so as to make them homogeneous and consistent.

- No thinner shall be added to the paints, unless specifically approved by the Paint Manufacturer. In such a case, the type of thinner used and its amount shall be in accordance with the Paint Manufacturer's recommendations.





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- The thinner shall be added during the process of mixing and homogenixing of the paints.

- Paints shall be stored in well-ventilated rooms, far away from heat sources, open flames, sparks, and protected from sun rays.

- The system symbols shown in this specification are codes for computer purpose only.

- Insulated stainless steel piping and equipment will not be painted.

- Uninsulated stainless steel and hot dip galvanized surfaces shall not be painted.

- Touch-ups on welded areas of hot dip galvanized surfaces shall be treated as follow:

-surface preparation:

Remove oil, grease and any other foreign material from surface by wash with a suitable chlorine-free solvent, in accordance to SSPC-SP1 standard, on all complete galvanized areas near welding damaged surfaces.

Hand or power tool cleaning for welded surfaces where hot dip galvanized surfaces is damaged, in accordance to SSPC-SP2 standard, in order to remove all welding slags.

-paint application:

A single coat of two-pack epoxy surface tolerant mastic,CARBOLINE 15 type or equivalent,with a thickness of 125 microm (DFT) applied on prepared dry surface including a suitable lateral overlapping on galvanized areas of about 50 mm on each side.





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#### 7 COLOURS

The colours for the top coats listed below shall be in accordance with RAL 840 HR, RAL F2 code.

- Surface of uninsulated piping and equipment with an operating temperature up to 70°C (Firefighting excluded)	GRAY	RAL-7035		
- Surface of uninsulated piping and equipment with an operating temperature over 70°C	ALUMINIUM	RAL-9006		
- Piping and Equipment for firefighting purpose	RED	RAL-3002		
- Pipe supports	GREEN	RAL-6002		
- Tanks	WHITE	RAL-9010		
<ul> <li>Uninsulated Machinery with operating temperature up to 70°C</li> </ul>	GRAY	RAL-7035		
<ul> <li>Uninsulated Machinery with operating temperature over 70°C</li> </ul>	ALUMINIUM	RAL-9006		
- Motors	BLUE	RAL-5012		
- Baseplates	BLACK	RAL-9005		
- Electrical Motors and Alternators	BLUE	RAL-5012		
- Transformers	GRAY	RAL-7035		
- Switchboards and Electric Control Panels	GRAY	RAL-7035		
- Electrical and Instrument bulk material	Manufacturer's Std.			





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#### 8 guarantees

8.1 The Applicator shall assure that the surface preparation and application of hte painting products shall be carried out according to this specification.

8.2 The guarantee period shall last as indicated in the specification. During the guarantee period the rusting degees, according to the European

Scale of Rusting Degrees, shall not exceed the value indicated here under:

after 12 months	Re1
after 24 months	Re2

All the other defects such as "blistering", peeling, etc. even without the presence of rust, are not admitted during the period of guarantee as they can give rise to corrosion, adherence defects, film degrading.



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Engineering Specification for Site Conditions

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# Engineering Specification for Site Conditions



## **PP-PE Pilot Plant**



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1 GENERAL

#### 2 DEFINITIONS/ABBREVEATIONS

**3** LOCATION

#### **4** SITE CONDITION

- 4.1 Temperature
- 4.2 Humidity
- 4.3 Barometric Pressure
- 4.4 Rainfall
- 4.5 Snow
- 4.6 Wind
- 4.7 Design data for Air Conditioning
  - 4.7.1 Summer
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  - 4.7.3 Fresh Air changes
  - 4.7.4 Pressurization
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- **△ 6 ELACTRICAL POWER SPECIFICATIONS**





Title: Engineering Specification for Site Conditions

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#### 1. GENERAL

This engineering specification covers general information regarding site data and climatic conditions. The equipment supplied must be able to withstand the ambient conditions as described below for transport, storage and operation of the plant.

#### 2. DEFINITIONS/ABBREVEATIONS

OWNER	Petrochemical Research & Technology Company
VENDOR	Companies Awarded by Owner for Procurement Services, Inspection Affairs or Transportation, Providing of Project's goods, following up all transport activities from VENDOR workshop to final destination as defined in the purchase order.
EQUIPMENT	Means any equipment, material and components to be permanently installed in the PLANT and special tools, test equipment and erection-, pre-commissioning-, commissioning-, start-up-, two years- and capital- spare-parts
CONTRACT	Means contract between OWNER and VENDOR
PURCHASE ORDER	Means document of commitment between Owner and
	VENDOR for the supply of EQUIPMENT
PLANT	Means the area within battery limits
SITE	Means the area NPC-RT, ARAK/IRAN

#### 3 LOCATION

The town of Arak is situated about 300 km south-west of Tehran/Iran. The site for NPC-RT Complex is located 22 km South-west of Arak.

#### 4 SITE CONDITION

Materials shall be protected against corrosion during transit as necessary, when required, materials shall be painted or Coated in accordance with Particulars Contained in the purchase order and/or specification.



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#### 4.1 Temperature

<ul><li>Ambient Temperature</li><li>Highest maximum on record</li></ul>	44ºc
Lowest minimum on record	-28ºc
- Design temperature	
<ul> <li>Process design dry bulb</li> </ul>	Max. 40ºc Min16ºc
<ul> <li>Process design wet bulb</li> </ul>	21ºc
<ul> <li>Mechanical design of equipment,</li> </ul>	Max. 44ºc
steel structures, civil works,	Min. –28
<ul> <li>Design temperature for outdoor</li> </ul>	50°c
electrical and instrument equipment	
<ul> <li>Design temperature for air coolers</li> </ul>	40ºc
Winterizing	-21ºc
<ul> <li>Design temperature for equipment</li> </ul>	
exposed to sunlight	83⁰c
<ul> <li>Soil temperature for cable sizing</li> </ul>	30°c
<ul> <li>Design temperature for electrical</li> </ul>	
equipment in substations	45°c
Design temperature for chillers and	40°c
condensing unit refrigeration	

#### 4.2 Humidity

- relative in January

Max. 86%

#### 4.3 Barometric Pressure

•	Min. / Max.	802 / 818 millibars
•	Average	810 millibars

### 4.4 Rainfall

- Design	Max. 80 mm (24 hours)
	Max.40mm (1 hour)
- Sewer design	40 mm/h

Rainy season months are November through April.





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#### 4.5 Snow

- Snow load

 $175 \text{ kg/m}^2$ 

#### 4.6 Wind

- Prevailing wind direction West-East
- Wind velocity at 10 m above grade 120 km/h max .
- Wind loads as per UBC 1985 edition chapter 23 vol. 1.

Wind force "H"-The wind force shall be computed as the product of the design wind pressure "P", the project area of the windward face "A", the appropriate shape factor "C", and the standard projected area increase factor "I".

Thus H = PACI

Where H = Wind Force (kg)

- P = Design Wind Pressure (kg/m<sup>2</sup>) (see table 2.1)
- A = Projected Area of the Windward Face  $(m^2)$
- C = Shape Factor (see table 2.2)
- I = Project Area Increase Factor (see table 2.2)

#### Table 2.1 - Design Wind Pressure "p"

Height Zone	"p"
(M.)	Kg/m²
0-10	100
10-20	120
20-30	133
30&up	150

#### Table 2.2-Factor "I"

Surface	Typical use	<u>C</u>	<u>1</u>
Cylindrical	Process vessels		
24" thru. 30" Dia. 36" thru. 48" Dia. 54" thru. 72" Dia. 78" thru. 96" Dia 102" and up Spherical Flat Steel or concrete open structure: Wind normal to one of the sides Wind acting on corners:	Storage vessels (any diameter) Closed structure	0.6 0.6 0.6 0.6 0.6 1.0 2.2	1.50 1.37 1.28 1.20 1.18 1.1 1.0 1.0

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<ul> <li>- 3 cornered structures</li> <li>- 4 cornered structures</li> <li>- Individual elements:</li> <li>Cylindrical sections with</li> <li>diameter equal to or less</li> </ul>		d structures elements: sections with	2.2 2.4	1.0 1.0	
	than 2 inch		0.8 1.3	1.0 1.0	

#### 4.7 Design data for Air Conditioning

#### 4.7.1 Summer

- Technical offices and control rooms

<ul><li>Indoor required temp. (dry bulb)</li><li>Relative humidity</li></ul>	25 °C ± 50% ±	
<ul><li>Electrical Substations</li><li>Indoor required temp. (dry bulb)</li><li>Relative humidity</li></ul>	35 °C ± 1 50% ± 10	•
- Outdoor temperature (dry / wet bulb)	37/21ºc	

#### 4.7.2 Winter

 $\sqrt{1}$ 

<ul> <li>Technical Offices and control Rooms</li> <li>Indoor required temp. (dry bulb)</li> <li>Relative humidity</li> <li>Electrical Substations</li> <li>Indoor required temp. (dry bulb)</li> </ul>	22 ºC ± 1 ºC 45% ± 5% 2 ºc min.
- Outdoor temperature	-16 <sup>o</sup> c

### 4.7.3 Fresh Air Changes

<ul> <li>Minimum for air conditioning system</li> <li>Sanitary rooms</li> <li>Battery rooms</li> </ul>	25 m <sup>3</sup> /h person 37 m <sup>3</sup> /h m <sup>2</sup> surface
- Kitchens - Toilets	15 cph 15 cph 20 cph



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#### 4.7.4 Pressurization

- Technical offices, control rooms	
electrical substation	5 mm w.g.
- Closed warehouses	2 mm w.g.
	0

- Cold storage warehouses 3 mm w.g.

#### 4.8 Earth Quake

Seismic factor in accordance with zone 3 of UBC , latest edition.

#### 4.9 Others

- Frost line	:	1.0 m below grade level
- Water table	:	Approx. 15 m below grade level
- Thunder and lighting	:	To be considered
- Sand storm	:	To be considered
- Altitude above sea level	:	1888.48 m
- Ground resistivity	:	400 Ohm.m

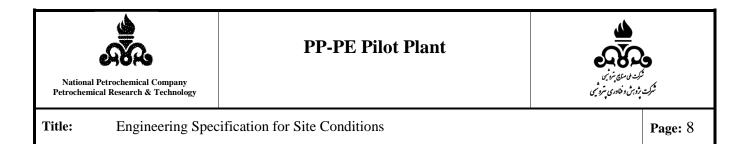
#### **SPECIFICATION OF UTILITIES** 5

Run- off coefficients shall be as follows:

<ul> <li>Buildings and shelter roof</li> <li>Asphalt roads and yards concrete</li> </ul>	1.00
paved areas	0.85
- Macadamized roadways	0.40
- Unpaved areas	0.20

- Unpaved areas

Unless otherwise deduced from soil report.



#### 6 ELECTRICAL POWER SPECIFICATIONS

## \* Circuit Voltage

- A. C. contro	ol circuit	
Voltage :	400 Volt	
Frequency:	50Hz	
<u>Phase</u> :	3-phase	single-phase
Wire:	3-wire	2-wire
*Instrument circuit		
A.C.		
Voltage:	110 Volt	
Frequency:	50Hz	
<u>Phase</u> :	□ 3-phase	single-phase
Wire:	3-wire	2-wire
D.C.		
Voltage:	24 Volt	