

**ENGINEERING STANDARD
FOR
TECHNICAL EVALUATION
OF
MACHINERIES**

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0. INTRODUCTION

The aim of this Standard is to provide a general guidance for technical evaluation of machineries in bids.

General requirements to be concerned in technical evaluation of machineries are covered in Section 3 and specifics requirements in Appendix A.

Quotation Analysis Report Tables are given in Appendix A as a reference for comparison of different supplier's offerings.

Attention shall be paid that, although many subjects regarding the technical evaluation of machineries are discussed in this Standard but for each individual case Company's Engineer should consider the specific conditions and requirements concerned with that case, and prepare the quotation analysis reports accordingly.

1. SCOPE

This Standard covers general requirements and guidance for technical evaluation of machineries such as pumps, compressors, drivers and auxiliaries, for Iranian petroleum Industries.

2. REFERENCES

Throughout this Standard the following standards and codes are referred to. The editions of these standards and codes that are in effect at the time of publication of this standard shall, to the extent specified herein, form a part of this Standard.

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-M-PM-105	"Centrifugal Pumps for Process Services"
IPS-M-PM-115	"Centrifugal Pumps for General Services"
IPS-M-PM-125	"Centrifugal Fire Water Pumps"
IPS-M-PM-130	"Positive Displacement Pumps - Reciprocating"
IPS-M-PM-135	"Light Duty Centrifugal Pumps"
IPS-M-PM-140	"Positive Displacement Pumps - Rotary"
IPS-M-PM-150	"Positive Displacement Pumps - Controlled Volume"
IPS-M-PM-160	"Vacuum Pumps"
IPS-M-PM-170	"Centrifugal Compressors for Process Services"
IPS-M-PM-180	"Package Integrally Geared Centrifugal Compressors for Utility & Instrument Air Services"
IPS-M-PM-190	"Axial Flow Centrifugal Compressors"
IPS-M-PM-200	"Reciprocating Compressors for Process Services"
IPS-M-PM-210	"Reciprocating Compressors for Utility & Instrument Air Services"
IPS-M-PM-220	"Positive Displacement Compressors-Rotary"
IPS-M-PM-230	"Special Purpose Centrifugal Fans for Special Purpose Application"
IPS-M-PM-235	"General Purpose Centrifugal Fans"
IPS-M-PM-240	"General Purpose Steam Turbines"
IPS-M-PM-250	"Special Purpose Steam Turbines"
IPS-M-PM-260	"Combustion Gas Turbines"
IPS-M-PM-290	"Reciprocating Internal Combustion Engines"
IPS-M-PM-330	"Mixers"

3. GENERAL REQUIREMENTS

3.1 Delivery Time

Delivery time shall meet project schedule. The closer delivery times to project schedule shall be considered as priority in evaluation of equipment provided that this does not jeopardize the guarantee period.

3.2 Vendor's Experience and Reputation

Vendors shall be reputed and experienced in manufacture of equipment and ancillaries . The more reputed and experienced vendors and subvendors are preferred and shall have preference in evaluation.

3.3 Interchangeability

Regarding cost saving, the interchangeability of equipment parts is an essential factor when evaluating machineries. Those equipment which have been purchased and their reliability approved by Iranian Oil Ministry previously, shall be preferred, and preceded when evaluating machineries.

The interchangeability of parts shall also be considered in bulk procurement of machineries for specific projects.

3.4 Guarantee and Warranty

Supplied equipment shall be guaranteed for proper performance, material and workmanship.

Longer guarantee periods are preferred and Company's engineer shall consider it as a priority when preparing Quotation Analysis Reports.

3.5 After Sales Services

Vendors shall guarantee after sales services of the equipment. Those companies which have service shops in I.R. Iran are preferred.

After sales services cover any repair and technical guidance by the manufacturer and its previous behavior, after purchasing the equipment.

3.6 Spare Parts Guarantee

Vendor shall guarantee the supply of spare parts for the equipment at least for ten years after the date of shipment. The price of the spare parts shall be kept at a reasonable value regarding the inflation effects.

Vendors that guarantee the supply of spare parts for longer period shall be preceded in technical evaluation of machineries.

3.7 Size and Weight

For each machine the Company's engineer shall study all aspects of size and weight of equipment and consider any suitable preferences.

3.8 Ease of Dismanting and Repair

Repair time and costs may be reduced by proper design of equipment for ease of dismantling and repair. Company's Engineer shall study repair and disassembling details of the equipment. Equipment that is easily disassembled and repaired shall be preceded in technical evaluation.

3.9 Efficiency and Energy Consumption

Low efficiency and high energy consumption of the equipment will increase the operation costs. Equipment with high efficiency and low energy consumption is desirable and shall be preceded in technical evaluation of machineries.

4. COMPLIANCE WITH STANDARDS

Company's Engineer should check the compliance of the equipment with appropriate data sheets and Standards, as listed in Table 1.

In case of deviations from related standard, Company's Engineer shall indicate them in QAR.

5. SUMMARY

Company's Engineer shall indicate in Quotation Analysis Report the preference of equipment quoted, according to general requirements noted in section 1 and also specific requirements indicated in appropriate standard.

Rotating machines may be sorted according to their compliance with IPS Standards in order to facilitate procurement procedure.

TABLE 1

EQUIPMENT	APPROPRIATE IPS No.
Centrifugal Pumps for Process Services	IPS-M-PM-105
Centrifugal Pumps for General Services	IPS-M-PM-115
Centrifugal Fire Water Pumps	IPS-M-PM-125
Positive Displacement Pumps-Reciprocating	IPS-M-PM-130
Light Duty Centrifugal Pumps	IPS-M-PM-135
Positive Displacement Pumps-Rotary	IPS-M-PM-140
Positive Displacement Pumps-Controlled Volume	IPS-M-PM-150
Vacuum Pumps	IPS-M-PM-160
Centrifugal Compressors for Process Services	IPS-M-PM-170
Package Integrally Geared Centrifugal for Utility & Instrument Air Services	IPS-M-PM-180
Axial Flow Centrifugal Compressors	IPS-M-PM-190
Reciprocating Compressors for Process Services	IPS-M-PM-200
Reciprocating Compressors for Utility & Instrument Air Services	IPS-M-PM-210
Positive Displacement Compressors-Rotary	IPS-M-PM-220
Special Purpose Centrifugal Fans for Special Purpose Application	IPS-M-PM-230
General Purpose Centrifugal Fans	IPS-M-PM-235
General Purpose Steam Turbines	IPS-M-PM-240
Special Purpose Steam Turbines	IPS-M-PM-250
Combustion Gas Turbines	IPS-M-PM-260
Reciprocating Internal Combustion Engines	IPS-M-PM-290
Mixer	IPS-M-PM-330

APPENDICES

APPENDIX A

QUOTATION ANALYSIS REPORTS

**IRANIAN PETROLEUM STANDARDS
A1-QUOTATION ANALYSIS REPORT
FOR CENTRIFUGAL PUMPS**

ISSUE
PREPPI

OPERATING CONDITION		QUOTATION ANALYSIS REPORT FOR CENTRIFUGAL PUMP	
PUMPING LIQUID:		PROJECT: _____	
PT (PUMPING TEMP):	____ °F		
SPECIFIC GRAVITY AT PUMPING TEMP:	____		
VAPOR PRESSURE AT PT: _____ KG/CM ² /PSIA			
VIScosity AT PT: _____ CP, CEN			
CORROSION/EROSION CAUSED BY:		CLIENT: _____	
CAPACITY: NORMAL _____ M ³ /HR, GPM			
_____ KUPD _____ M ³ /HR, GPM			
DIFFERENTIAL HEAD _____ MET			
DISCHARGE PRESS _____ KG/CM ² /PSIG			
SUCTION PRESS _____ KG/CM ² /PSIG		LOCATION: _____	

DIFFERENTIAL PRESS _____ KG/CM ² /PSIG			

HYDRAULIC POWER _____ KW, HP			
MAX SUCTION PRESS _____ KG/CM ² /PSIG		UNIT NO.: _____	
NPSH AVAILABLE _____ MET			

ITEM NO.: _____		SERVICE: _____	

DESCRIPTION	VENDOR'S NAME		
	LOCATION		
MODEL/NO. OF STAGE	<input type="checkbox"/> HORIZ.	<input type="checkbox"/> VERT	
TYPE OF DRIVER/ROTATION	<input type="checkbox"/> MOTOR	<input type="checkbox"/> TORR	
PUMP SPEED	_____ R.P.M.	<input type="checkbox"/> YES	<input type="checkbox"/> YES
CASE NELL	<input type="checkbox"/> RADIAL	<input type="checkbox"/> AXIAL	<input type="checkbox"/> YES
VOLUTE TYPE	SINGLE OR DOUBLE	<input type="checkbox"/> SINGLE <input type="checkbox"/> DOUBLE	<input type="checkbox"/> SINGLE <input type="checkbox"/> DOUBLE
CASE SUPPORT	CENTERLINE	<input type="checkbox"/> YES	<input type="checkbox"/> YES
SHAFT SUPPORT	<input type="checkbox"/> OVERHUNG	<input type="checkbox"/> BETWEEN BRG	<input type="checkbox"/> OVERHUNG <input type="checkbox"/> BETWEEN
NOZZLE SIZE, RATING, FACE & LOC.			
DIS. SIZE RATING, FACE & LOC.			
EFF. AT RATED/CAPACITY AT R.P.	%	M ³ /HR, GPM	
BRHP. AT RATED/MAX.	KW, HP	KW, HP	
DRIVER POWER		KW, HP	
NPSH REQUIRED (IN WATER 2% IF DROP)		M, FT	
SUCTION APPLIED SPEED @ R.P.	(WITH MAX IMPELLER) M ³ /MIN, M, RPM		
HEAD RESERV./HEAD RISE TO SHUT OFF	MIN. 5%	%	
MIN. FLOW RATE - THERMAL/STABLE	M ³ /HR, GPM	M ³ /HR, GPM	
MAX. ALLOW WORK. PRESS./TEMP.	KG/CM ² /PSIG	°C, °F	
HYDRO. TEST PRESS. (AT 15%)	KG/CM ² /PSIG		
IMPELLER TYPE	<input type="checkbox"/> OPEN	<input type="checkbox"/> CLOSE	<input type="checkbox"/> YES
	<input type="checkbox"/> S. SUCTION	<input type="checkbox"/> D. SUCTION	<input type="checkbox"/> SINGLE <input type="checkbox"/> DOUBLE
IMPELLER DIA. MIN./MAX.	MM, INCH	MM, INCH	<input type="checkbox"/> SINGLE <input type="checkbox"/> DOUBLE
RATED		MM, INCH	
CUT. WATER DIA.		MM, INCH	
MECHANICAL SEAL - API CODE / NBR			
API AUX. PIPE PLAN.			
SEAL FLUSH/QUENCH			
COOLING WATER			
CASING DRAIN CONN.	PROVIDE W/VALVE & FLANGE	<input type="checkbox"/> YES	<input type="checkbox"/> YES
CASING VENT CONN.	PROVIDE W/VALVE & FLANGE	<input type="checkbox"/> YES	<input type="checkbox"/> YES <input type="checkbox"/> NOT REQ'D
BEARING TYPE OR NO. RADIAL / THRUST	<input type="checkbox"/> BALL	<input type="checkbox"/> BALL	<input type="checkbox"/> YES <input type="checkbox"/> NOT REQ'D
	<input type="checkbox"/> SLEEVE	<input type="checkbox"/> TILT-PAD	<input type="checkbox"/> YES
LUBRICATION SYSTEM	<input type="checkbox"/> FLOOD	<input type="checkbox"/> OIL RING	<input type="checkbox"/> YES
	<input type="checkbox"/> FORCED FEED	<input type="checkbox"/> FLINGER	<input type="checkbox"/> YES
COUPLING WITH GUARD	NON-LUBE FLEX. W/ NON-SPARK GUARD	<input type="checkbox"/> YES	<input type="checkbox"/> YES
MEMO/MODEL NO.			
BASEPLATE TYPE	<input type="checkbox"/> COMMON	<input type="checkbox"/> STEEL FABR.	<input type="checkbox"/> YES
	<input type="checkbox"/> HEAVY-DUTY		<input type="checkbox"/> YES
WATER VENT HOLES	<input type="checkbox"/> REQ'D	<input type="checkbox"/> YES	<input type="checkbox"/> YES
DRAIN CONNECTION	<input type="checkbox"/> REQ'D	<input type="checkbox"/> YES	<input type="checkbox"/> YES
SHIM LEAVE	MAX _____ DR (A)		
MATERIALS - API SPECIFICATION			
CASING/IMPELLER			
IMPELLER WEARING / CASE WEARING			
SHAFT / SHAFT SLEEVE			
INNER PARTS / THROAT RUSH			
THROATLE RUSH			
DEVIATIONS FROM IHS STD.			
TEST AND INSPECTIONS			
EVALUATION RISKING	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C
TOTAL PRICE	IN USD \$		
DELIVERY (IN FACTORY)			

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IRANIAN PETROLEUM STANDARDS
A3-QUOTATION ANALYSIS REPORT
FOR RECIPROCATING COMPRESSOR

ISSUE
PREP'D

OPERATION CONDITIONS				QUOTATION ANALYSIS REPORT				SKETCH
ITEM NO. (OVERALL STAGE) _____ GAS COMPRESSED _____ CORROSION DUE TO _____ RELATIVE HUMIDITY _____ MOLE WT% AT INTAKE _____ CF (CY. VOLUME) SUCTION/DISCHARGE _____ INLET TEMP. °C / °F _____ INLET PRESS. KG/CM ² A, PSIG _____ MIN. ΔP BETWEEN STGS. KG/CM ² A, PSIG _____ ACTUAL DISCH. TEMP. °C / °F _____ DISCHARGE PRESS. KG/CM ² A, PSIG _____ PRESSURE RATIO _____ Z: SUCTION DISCHARGE _____ RATED PER API CAPACITY TOLERANCE (±%) BHP TOLERANCE (±%) _____ KG. HR., LB. HR. WET _____ INLET M ³ /HR. FT ³ /MIN. CORRECTED: _____ NM ³ /HR. MMSCFD OR SCF/M _____				PROJECT _____ CLIENT _____ LOCATION _____ UNIT NO. _____ ITEM NO. _____ SERVICE _____				
DESCRIPTION		VENDOR'S NAME		LOCATION				
MANUFACTURER'S MODEL								
NO. OF STAGE / TYPE / DA OR SA		<input type="checkbox"/> LUBE <input type="checkbox"/> NON-LUBE		<input type="checkbox"/> DA <input type="checkbox"/> SA		<input type="checkbox"/> YES <input type="checkbox"/> YES		
NO. OF CYL. (PACK) STAGE / RPM		RPM						
CAPACITY CONTROL, SUC. VALVE UNLOADER		<input type="checkbox"/> PNEUM. <input type="checkbox"/> MAN. <input type="checkbox"/> AUTO				<input type="checkbox"/> YES		
ENTIRE UNLOADER / CLEARANCE SYSTEM BY _____		<input type="checkbox"/> VENDOR / PROVIDE				<input type="checkbox"/> YES <input type="checkbox"/> YES		
BORE / STROKE		MM IN						
CLEARANCE % / VOL. EFF.		%						
PISTON SPEED		M/S FPM						
ROD LOAD: RATED (GAS FORCE) / D		TON LB						
RATED (GAS & INERTIAL) / D		TON LB						
MAX. ALLOW. / D		TON LB						
CYLINDER DESIGN PRESS / ROD DIA		KG/CM ² PSIG MM IN						
DISCH. TEMP. / MAX. ALLOW.		°C °F						
NOZZLE AT DAMPER SIZE / SUCTION								
ANSI RATING / FACING								
VALVE TYPE / RFR								
NO. PER STAGE / SUCTION								
GAS VELOCITY / FEET		M/S FPM MM IN						
MATERIALS		IN ASTM INTL NO.						
CYLINDER / LINER								
PISTON / PISTON RING / RIDER RING								
PISTON ROD PACKING								
VALVE SEAT / PLATE SPRING								
GASKET / VALVE AD								
GASKET / VALVE								
CRANK CASE / CRANK SHAFT								
CRANK HEAD								
MAIN BEARING TYPE / NO.								
ATK		KW HP		%				
RIP / RATED / DESIGN / EFF.		AT		KW HP		%		
DRIVER POWER / SPEED		AT		KW HP		%		
COUPLING TYPE / MTR								
RUNNING COST PER YEAR		USD / KW						
TORSIONAL ANALYSIS		<input type="checkbox"/> REQUIRED		<input type="checkbox"/> YES <input type="checkbox"/>				
ROD PACKING / NO. / IN								
LUBRICATION / OILING		<input type="checkbox"/> FORCE LUBE <input type="checkbox"/> NON LUBE <input type="checkbox"/> JACK		<input type="checkbox"/> YES <input type="checkbox"/> YES				
DISTANCE / PIECE		<input type="checkbox"/> EXTRA LONG <input type="checkbox"/> TWO COMPARTMENT		<input type="checkbox"/> YES <input type="checkbox"/> YES				
COVER		<input type="checkbox"/> NO HO COVER <input type="checkbox"/> WITH HO COVER		<input type="checkbox"/> YES <input type="checkbox"/> YES				
FRAME / LUBE / TYPE		<input type="checkbox"/> SPLASH <input type="checkbox"/> PRESSURE SYSTEM		<input type="checkbox"/> YES <input type="checkbox"/> YES				
OIL PUMP / DRIVER MAIN / AUXILIARY		<input type="checkbox"/> GRANK <input type="checkbox"/> MOTOR <input type="checkbox"/> MOTOR <input type="checkbox"/> MOTOR		<input type="checkbox"/> YES <input type="checkbox"/> YES				
DRIVER POWER MAIN / AUX		KW HP						
OIL COOLER / EXP. / FUSE / STAT. / CODE		<input type="checkbox"/> OPEN <input type="checkbox"/> IN <input type="checkbox"/> IN <input type="checkbox"/> IN						
VALVE		<input type="checkbox"/> IN <input type="checkbox"/> IN <input type="checkbox"/> IN						
REFILL VALVE / LIFTING		VENDOR SUPPLY		<input type="checkbox"/> YES <input type="checkbox"/> YES				
LUBRICATOR / DRIVER / LANK / CAPACITY		KW HP		GAL				
DAMPER - ANSI / DESIGN CODE		API APPROX		<input type="checkbox"/> YES <input type="checkbox"/> YES				

Q.A.R FOR RECIPROCATING COMPRESSOR

DESCRIPTION	VENDOR MODEL					
SCOPE OF SUPPLY	VENDOR SUPPLY					
DRIVERS MAIN & AUX	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES		
SPEED CHANGER/BASE PLATE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES		
TEMPERATURE/BOILERS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES		
COUPLING/GAUGES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES		
FLY WHEEL & GAUGES	<input type="checkbox"/>		<input type="checkbox"/> YES			
SHOCK JACK SCREWS	<input type="checkbox"/>		<input type="checkbox"/> YES			
INTER COOLER/M/APPY CODE	<input type="checkbox"/>		<input type="checkbox"/> YES			
AFTER COOLER/M/APPY CODE	<input type="checkbox"/>		<input type="checkbox"/> YES			
SUCKER/SUCKER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES		
INTERSTAGE PIPING/RELIEF VALVE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES		
SEPARATE MOISTURE W/ TRAPS	<input type="checkbox"/>		<input type="checkbox"/> YES			
INTER CONNECTING AUX. PIPING	<input type="checkbox"/>		<input type="checkbox"/> YES			
LUBE OIL SYSTEM	<input type="checkbox"/>		<input type="checkbox"/> YES			
AIR RECEIVER TYPE	<input type="checkbox"/>		<input type="checkbox"/> YES			
AIR DRYER TYPE	<input type="checkbox"/>		<input type="checkbox"/> YES			
AIR FILTER	<input type="checkbox"/>		<input type="checkbox"/> YES			
PACKING/VENT SEPARATOR	<input type="checkbox"/>		<input type="checkbox"/> YES			
W/ VALVE, LG, RN	<input type="checkbox"/>		<input type="checkbox"/> YES			
GIT FLOW INDICATOR	<input type="checkbox"/>		<input type="checkbox"/> YES			
VIBRATION ACCELEROMETER	<input type="checkbox"/>		<input type="checkbox"/> YES			
INSTRUMENT PANEL	<input type="checkbox"/>		<input type="checkbox"/> YES			
INSTRUMENTS & WIRING	<input type="checkbox"/>		<input type="checkbox"/> YES			
TURNING DEVICE/ SPECIAL/ TOOLS/ W/ R/ N/ S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES		
CONSTRUCTION SPARE PARTS	<input type="checkbox"/>		<input type="checkbox"/> YES			
MAINTENANCE SPARE PARTS	<input type="checkbox"/>		<input type="checkbox"/> YES			
OTHER MAINTENANCE REQUEST IN US SPEC/REQ.	<input type="checkbox"/>		<input type="checkbox"/> YES			
INSTRUMENT INDICATION	AS PER IPS SPEC.		<input type="checkbox"/> YES			
ALARM	AS PER IPS SPEC.		<input type="checkbox"/> YES <input type="checkbox"/>			
TRIP & INTERLOCK	AS PER IPS SPEC.		<input type="checkbox"/> YES <input type="checkbox"/>			
UTILITY CONSUMPTION WATER	M ³ /H					
STEAM	TON/H					
N ₂	NM ³ /H					
AIR	NM ³ /H					
NOISE LEVEL	DB(A)					
TEST & INSPECTION			AS PER IPS SPEC. SEE BELOW			
DELIVERY (EX-FACTORY)						
OTHERS						
EXCEPTIONS TO SPEC.						
TEST & INSPECTION						
INSTRUMENTATION						
SCOPE OF SUPPLY						
TECHNICAL EVALUATION RANKING	QA	QB	QC	QD		
PRICE COMPRESSOR W/CONS.	USD \$					
SPARE	USD \$					
GEAR	USD \$					
DRIVER	USD \$					
TOTAL	USD \$					
MAINTENANCE S. PARTS	USD \$					
GLAND TOTAL	USD \$					

**ISSUE
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SKETCH**

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ISSUED DATE
PREP'D

11

ISSUED 1
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12

FANS AND BLOWERS

I:
P

OPERATION CONDITIONS (EACH UNIT)				CASE 1				QUOTATION ANALYSIS REPORT FAN & BLOWER					
CAPACITY	NAME, MIN/CED						PROJECT _____ CLIENT _____ LOCATION _____ UNIT NO. _____ ITEM NO. _____ SERVICE _____						
WEIGHT FLOW	K/MIN, L/MIN												
SUCT. PRESS. (STATIC)	MM/HG, IN/HG												
SUCT. PRESS. (TOTAL)	MM/HG, IN/HG												
SUCT. TEMP.	°C, °F												
DISCH. PRESS. (STATIC)	MM/HG, IN/HG												
DISCH. PRESS. (TOTAL)	MM/HG, IN/HG												
DISCH. TEMP.	°C, °F												
DIFF. PRESS. (STATIC)	MM/HG, IN/HG												
DIFF. PRESS. (TOTAL)	MM/HG, IN/HG												
LEGEND: NOT PREFERABLE							PREFERABLE						
DESCRIPTION				SPEC				VENDOR LOCATION					
TYPE OF FAN													
MODEL / NO. OF STAGE													
BHP / EFFICIENCY				KW HP				%					
BLOWER SPEED (CRITICATED SPEED) / CRIT. TO RATED SPEED				%				%					
DRIVER / SPEED / POWER				M.T.				M.T.					
IMPELLER TYPE / CONSTRUCTION				<input type="checkbox"/> OPEN <input type="checkbox"/> CLOSE				<input type="checkbox"/> WELDED <input type="checkbox"/> YES <input type="checkbox"/> YES					
TIP SPEED / DIA				M/S FPM				MM IN					
SHAFT SEAL				<input type="checkbox"/> GLAND PACKING <input type="checkbox"/> BALL <input type="checkbox"/> GREASE <input type="checkbox"/> FORCED				<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/> YES					
BEARING TYPE / RADIAL / THRUST				<input type="checkbox"/> BALL <input type="checkbox"/> GREASE <input type="checkbox"/> FORCED				<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/> YES					
LUBRICATION				<input type="checkbox"/> GREASE <input type="checkbox"/> FORCED				<input type="checkbox"/> YES <input type="checkbox"/> YES					
NOZZLE NO. / DIN / SIZE / RATING													
FANING LOCATION													
COUPLING TYPE / MFR													
MATERIAL													
CANINE IMPELLER													
SHAFT / SHAFT / FIVE													
CORR. ALLOW / THICKNESS OF				MM IN									
WEIGHT: FAN & BASE / MOTOR / TOTAL				TON LB									
DIMENSION: MAX / X				M FT									
SCOPE OF SUPPLY				VENDOR SUPPLY									
DRIVER / BASE PLATE								YES YES					
SPEED CHANGER / MFR								YES YES					
COUPLING / GEAR								YES YES					
ANCHOR BOLT / SIDE JACK								YES YES					
SCREWS								YES YES					
DUCT & STACK				LIST C				YES YES					
DAMPEN & CONTROLLER				<input type="checkbox"/> REC <input type="checkbox"/> DIS				<input type="checkbox"/> DIS <input type="checkbox"/> MANUAL <input type="checkbox"/> AUTO					
SUCKING FILTER / AXES PIPING				<input type="checkbox"/> YES <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
TURNING OIL SYSTEM				<input type="checkbox"/> YES <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
INSTRUMENT PANEL				<input type="checkbox"/> YES <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
BEARING TEMP.				<input type="checkbox"/> YES <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
PRESS. GAGE / SUC. DIS.				<input type="checkbox"/> YES <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
TURNING DEVICE / SPECIAL TOOLS / WREN				<input type="checkbox"/> YES <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
CONSTRUCTION SPARE PARTS				<input type="checkbox"/> YES <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
MAINTENANCE SPARE PART				<input type="checkbox"/> YES <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
OTHER AUXILIARIES IN DIS				<input type="checkbox"/> YES <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
SPEC / REQ.													
OTHERS													
FUEL / COOLING WATER				GPM M ³ /H									
BUFFER GAS				<input type="checkbox"/> N ₂ <input type="checkbox"/> YES				<input type="checkbox"/> YES <input type="checkbox"/> YES					
OTHERS													
NOISE LEVEL				DB (A)									
TEST AND INSPECTION								<input type="checkbox"/> AS PER IPS <input type="checkbox"/> SPEC. <input type="checkbox"/> NO SEE <input type="checkbox"/> BELOW					
EXCEPTIONS TO SPEC													
TEST AND INSPECTION													
SCOPE OF SUPPLY													
DELIVERY (EX-FACTORY)													
PRICE - BLOWER													
DRIVER													
TOTAL													
MAINTENANCE SPARE PARTS													
GLAND TOTAL													
EVALUATION RANKING				<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D									

IRANIAN PETROLEUM STANDARDS
A8-QUOTATION ANALYSIS REPORT FOR
LUBE OR SEAL OIL SYSTEM

I:
P

DESCRIPTION		VENDOR LOCATION		THIS IS A PART OF Q.A.R.F	
DESIGN		<input type="checkbox"/> LUBE OIL SYSTEM <input type="checkbox"/> SEAL OIL SYSTEM			
TYPE		<input type="checkbox"/> API 614 <input type="checkbox"/> SEPARATED <input type="checkbox"/> COMBINED		<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/> YES	
SYSTEM API 614 FIG. NO.		<input type="checkbox"/> A <input type="checkbox"/> A <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/> YES	
SEAL SEATTLE OIL PRESS.		KG / CM ² PSIG			
SYSTEM DESIGN PRESS.		KG / CM ² PSIG			
OIL RESERVOIR ARRANGEMENT API 614 FIG. NO.		<input type="checkbox"/> A <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/> YES	
CHARGE CAPACITY / RETEN. TIME		L GAL. MIN.		<input type="checkbox"/> YES <input type="checkbox"/> MIN.	
MATERIAL / INTERIOR COAT		<input type="checkbox"/> PER SPEC. <input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	
ACCESSORIES					
PUMP & DRIVER QUANTITY		<input type="checkbox"/> CENTRI. <input type="checkbox"/> POSI. DIS.		<input type="checkbox"/> YES <input type="checkbox"/>	
PUMP TYPE / CASE MATERIAL		STEEL		<input type="checkbox"/> YES <input type="checkbox"/>	
MFR / MODEL NO.					
CAPACITY / DISCH. PRESS.		M ³ / HR. GPM		KG / CM ² PSIG	
SPEED / RHP / DHP		RPM KW HP		KW HP	
H.V. SET PRESS. - R.V. SET		KG / CM ² PSIG		KW HP	
COUPLING TYPE / MFR		<input type="checkbox"/> FLEX. DISK <input type="checkbox"/> RIGID		<input type="checkbox"/> YES <input type="checkbox"/>	
MFR. SEAL CODE / MFR. DRIVER TYPE MAIN / STAND BY		T M		<input type="checkbox"/> YES <input type="checkbox"/>	
MFR. MAIN / STAND BY		T M		<input type="checkbox"/> YES <input type="checkbox"/>	
OIL COOLER - CODE		<input type="checkbox"/> TEMA - C <input type="checkbox"/> A <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/> YES	
ARRANGEMENT API 614 FIG. NO.		<input type="checkbox"/> TEMA - AET <input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	
TYPE / DESIGN PRESS.		KG / CM ² PSIG			
DUTY / SURFACE AREA		KGAL / MIN. RTU / HR. MIN. IN.		M ² FT ²	
TUBE - O.D. / BWG					
MATERIAL - SHEET / COIL / PIPE					
FILTER - CODE		<input type="checkbox"/> ASME <input type="checkbox"/> A - 11 <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/>	
ARRANGEMENT API 614 FIG. NO.		<input type="checkbox"/> A - 11 <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/>	
FILTRATION ELEMENT MATERIAL		KG / CM ² PSIG		KG / CM ² PSIG	
A.P. CLEAN / COIL / PIPE		KG / CM ² PSIG		KG / CM ² PSIG	
DESIGN PRESS.		KG / CM ² PSIG			
ACCUMULATOR - CODE		<input type="checkbox"/> ASME <input type="checkbox"/> A <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/>	
ARRANGEMENT API 614 FIG. NO.		<input type="checkbox"/> A <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/>	
QUANTITY / MFR		L GAL. MIN.			
EFFECTIVE CAPA. TOTAL / RUN DOWN					
MATERIAL - SHEET / BLADDER		<input type="checkbox"/> VALVE, REGULATION <input type="checkbox"/> NOT REQUIRED AND PG. <input type="checkbox"/> ASME <input type="checkbox"/> A - 17 <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/>	
CHARGING ASSEMBLY					
OVERHEAD TANK - CODE		<input type="checkbox"/> A - 17 <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/>	
ARRANGEMENT API 614 FIG. NO.		<input type="checkbox"/> A - 17 <input type="checkbox"/> OPTION -		<input type="checkbox"/> YES <input type="checkbox"/>	
NO. OF BARRIER / DESIGN PRESS.		KG / CM ² PSIG			
MATERIAL - TANK / BLADDER					
TOTAL BARRIER CAPACITY - EFFECTIVE		15 MIN. 15 MIN.		<input type="checkbox"/> YES <input type="checkbox"/> MIN. <input type="checkbox"/> MIN.	
RUNDOWN TANK		<input type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED		<input type="checkbox"/> YES <input type="checkbox"/>	
RETENTION TIME / MATERIAL		MIN.			
DRAIN TRAP - QTY / MATERIAL		<input type="checkbox"/> A - 19 <input type="checkbox"/> OPT.		<input type="checkbox"/> A - 20 <input type="checkbox"/> MANUAL	
ARRANGEMENT API 614 FIG. NO.		<input type="checkbox"/> ASME <input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	
RETENTION TIME / CAPA. / CODE		HRS. L / GAL.		<input type="checkbox"/> YES <input type="checkbox"/>	

Q.A.R FOR LUBE OR SEAL OIL SYSTEM

[illegible]

A9- QUOTATION ANALYSIS REPORT FOR CENTRIFUGAL COMPRESSORS

ITEM NO. (SERVICE)	ITERATION CONDITIONS	QUOTATION ANALYSIS REPORT	(1/2)	SKETCH
GAS COMPRESSED _____ CORROSIVE DUE TO _____ RELATIVE HUMIDITY _____ MOL. WT. AT INTAKE _____ C.F.C. VALUE _____ SUC. DISCH. DISCHARGE _____ INLET TEMP. °C _____ INLET PRESS. KPA (A, PSIA) _____ MIN. FLOW TWO STAGES KPA (A, PSIA) _____ A.C. AT DISCH. TEMP. °C _____ DISCHARGE PRESS. KPA (A, PSIA) _____ PRESSURE RATIO _____ SECTION DISCHARGE _____ RATED PER A.P. (CAPACITY TOLERANCE -0%, MIN. TOLERANCE -0%) _____ K.G. ROLLER WET _____ INLET MOTOR RPM (CORRECTED) _____ N°/HR. MIN. MOTOR RPM _____		PROJECT _____ CLIENT _____ LOCATION _____ UNIT No. _____ ITEM NO. _____ SERVICE _____		
DESCRIPTION		VENDOR		
		LOCATION		
MANUFACTURER'S MODEL				
N° OF STAGE				
SPEEDS: RATED (MIN./MIN)				
PROCESS CONTROL		INLET THRO. THRO. THRO. (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
ESTIMATED SURGE AT RATED SPEED: INLET CAP./DIS. PRESS. (A)		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
ANTI SURGE BYPASS		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
INLET PRESS (A)		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
INLET TEMP.		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
DISCHARGE PRESS (A)		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
DIS. TEMP./MAX. ALLOW. DIS. TEMP.		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
RULP REQUIRED (ALL TONES INCLUDE)		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
POLY. HEAD/POLY. EFF. (AT RATED)		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
GUARANTEED POINT		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
INLET CAPACITY/HEAD		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
NOZZLE AT SUC. DIS.		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
SIZE		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
ANALYZING/ANALYZING		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
LATERAL CRITICAL SPEED		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
FIRST TO MAX. CONT. SPEED		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
FIRST TO MIN. CONT. SPEED		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
SECOND TO MAX. CONT. SPEED		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
TORSIONAL VIB. ANALYSIS		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
LATERAL VIB. ANALYSIS		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
VIB. DETECTION/AL. POS. DETC.		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
BEARING TEMP. DEVICES		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
NO. PERBURG (RATED/THROST)		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
DRIVER/POWER/SPED		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
COUPLING TYPE/MTR		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
RUNNING COST PER YEAR		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
REPAIR BEARING		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
TYPE/LOAD (A) (ALLOW)		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
THRUST BEARING		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
TYPE/LOAD (A) (ALLOW)		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
THRUST COILAR		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
BEARING HOUS. CONST. TYPE/PLT		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
SHAFT SEAL TYPE/MTR		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		
INNER OIL LEAKAGE		(INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.) (INLET THRO. THRO. THRO.)		

O.A.R FOR CENTRIFUGAL COMPRESSOR (2/2)

DESCRIPTION		VENDOR		LOCATION			Q.A.R. FOR CENTRIFUGAL COMPRESSORS		
		NAME	ADDRESS	CITY	STATE	COUNTRY	DATE	BY	REMARKS
OIL PUMP DRIVER MAINS / AUX. / START									
DRIVER POWER MAINS / START		KW							
OIL COOLER TYPE		UNIT	TYPE	YES			YES		
GEAR TYPE / RATING / SPEED RATIO		KW							
NOISE LEVEL		DB(A)							
TEST & INSPECTION		AS PER ITS SPEC		YES			YES		
UTILITY CONSUMPTION: WATER		M ³ /H							
STEAM		TONS/H							
AIR		M ³ /H							
ELECTRICITY		KW							
SCOPE OF SUPPLY									
DRIVER MODEL/NO.		1		YES			YES		
BASE PLATE / TEMPLATE / ANCHOR BOLT		1		YES			YES		
COUPLING / GARDEN		1		YES			YES		
INTER / AFTER COOLER		1		YES			YES		
LUB / SEAL OIL SYSTEM		1		YES			YES		
INTER STAGE PIPING / ORifice VALVE		1		YES			YES		
INST PANEL, MODEL / MTR		YES		YES			YES		
INSTRUMENTS & WIRING		YES		YES			YES		
COMMISSIONING SPARE PART		1		YES			YES		
TOW YEARS SPARE PART		1		YES			YES		
OTHER AUX REQ. IN ITS SPEC		1		YES			YES		
WEIGHTS: COMP / GEAR / DRIVER		KG							
MAX. WEIGHT FOR MAINTENANCE		KG							
TOTAL SHIPPING WEIGHT		KG							
SPACE L x W x H		M							
DELIVERY (EX-FACTORY)									
EXCEPTIONS TO SPEC									
1. TEST & INSPECTION									
2. INSTRUMENTATION									
3. SCOPE OF SUPPLY									
EVALUATION RANKING		1. A		1. B					
PRICE: COMPRESSOR - W/		1. C		1. D					
COMMISSIONING SPARE / GEAR / DRIVER									
ALL ACCESSORIES / REQ. TOTAL		USD							
TOW YEARS SPARE PARTS		USD							
G. T. AND TOTAL		USD							

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QUESTION AND ANSWER (Q&A)

DESCRIPTION	VENDOR			LOCATION						
TURBINATION:WET/DRY AND/DRY				YES	YES	YES				
TURBOIL SYSTEM										
1-SEPARATE COMMS WITH DRIVEN	YES	YES		YES	YES					
2-MOUNTING ARRANGEMENT	ON CONSOLE	ON BASE PLATE		YES	YES					
3-MAIN/STAND-BY/EMER OIL PUMP	YES	YES	YES	YES	YES	YES				
4-STAINLESS STEEL PIPING	DOWN STREAM FILTER	COMPLETE SYSTEM		YES	YES					
TURBOIL SYSTEM IN ACC WITH IPS-M-PM-220	YES			YES	YES		USE ATTACHED DEVIATION LIST			
GAS TURBINE CHARACTERISTICS										
ISO RATING	KW									
FUEL RATED SPEED	RPM	RPM								
TURBINE INLET/EXHAUST TEMPERATURE	°C	°C								
MAX. COMP. PRESSURE	RPM									
MIN. ALLOWABLE SPEED	RPM									
PLANT/ISO RATED CRUISE SPEED	RPM	RPM	RPM							
CRUISE/ISO RATED CRUISE SPEED	RPM	RPM	RPM							
MAIN GEAR BOX LOSSES	KW									
INLET/EXHAUST LOSSES	KW									
SHAFT	1 SINGLE	1 TWO		1 SINGLE	1 TWO					
COMPRESSOR STAGE NOS										
COMPRESSOR CASING SPLIT	1 HOR	1 VER		1 HOR	1 VER					
COMPRESSOR ROTOR	1 SOLID	1 BUILT UP		1 SOLID	1 BUILT UP					
MAX. ALLOW. TEMP./PRESS OF COMP	°C	BAR								
MAX TIP SPEED OF COMPRESSOR	M/S									
TURBINE STAGE NOS										
TURBINE CASING SPLIT	1 HOR	1 VER		1 HOR	1 VER					
TURBINE ROTOR	1 SOLID	1 BUILT UP		1 SOLID	1 BUILT UP					
MAX. ALLOW. TEMP./PRESS OF TURBINE	°C	BAR								
MAX. TRIP SPEED OF TURBINE	M/S									
RADIAL/THRUST BEAR TYPE										
MAX. THRUST LOAD/THRUST CAPACITY	"	"								
AIR COMP. ROTOR/STATOR BEAD MAT.										
COMBUSTOR LINERS: MAT.										
TURBINE 1ST STAGE STATOR/ROTOR MAT.										
TURBINE 2ND STAGE STATOR/ROTOR MAT.										
WHEEL MATERIAL										
LOCAL /REMOTE INSTR PANEL	YES	YES		YES	YES					
GOVERNOR TYPE	1 MECH	1 HYD		1 MECH	1 HYD					
GOVERNOR SPEED RANGE (MAX/MIN) FOR VARIABLE SPEED	RPM / RPM									
CONTROL PANEL MOUNTING	1 INSTR. CAB	1 DEFE. STAND. ING	1 MANUAL STAD	YES	YES	YES				
COMMISSIONING / TWO YEARS MAINT	YES	YES		YES	YES					
TOTAL SHIPPING MASS	KG									
MAX ERECTION MASS	KG									
MAX MAINTENANCE MASS	KG									
INSTALLED LENGTH/DIA/HT/HEIGHT	M									
PROPOSAL IS IN ACC. WITH IPS-M-PM-220				YES	YES		USE ATTACHED DEVIATION LIST			
DELIVERY ON EX-WORKS										
INSPECTION AND TESTS										
EXCEPTIONS TO SPEC										

IRANIAN PETROLEUM STANDARDS
A11- QUOTATION ANALYSIS REPORT FOR
EXPANSION TURBINES

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OPERATING CONDITIONS				PROJECT				QUOTATION ANALYSIS REPORT				(1/2)				EXPANSION TURBINE				SKETCH			
				CLIENT																			
				LOCATION																			
				UNIT No.																			
				ITEM No.																			
				SERVICE																			
DESCRIPTION				VENDOR																			
				LOCATION																			
RATE FLOW				NM ³ /H																			
WEIGHT FLOW WEIGHT				KG/H																			
DISCHARGE PRESS./TEMP.				BAR °C																			
POWER/ SPEED				KW RPM																			
HEAD/ EFFICIENCY (EXPANDER)																							
HEAD/ EFFICIENCY (COMPRESSOR)																							
MAX. CONT. SPEED/IMP. SPEED				RPM RPM																			
MAX. TIP SPEED (EXPANDER)				M/SEC																			
MAX. TIP SPEED (COMPRESSOR)				M/SEC																			
LATERAL CRITICAL SPEEDS (DAMPED)																							
FIRST / SECOND / THIRD / FOURTH				RPM RPM RPM RPM																			
TORSIONAL CRITICAL SPEEDS:																							
FIRST / SECOND / THIRD / FOURTH																							
CASING SPLIT (EXPANDER)				RADIAL AXIAL				YES YES															
MATERIAL																							
THICKNESS / CORK ALLOW				MM MM																			
CASING SPLIT (COMPRESSOR)				RADIAL AXIAL				YES YES															
MATERIAL																							
THICKNESS / CORK ALLOW				MM MM																			
EXP./COMP. MAX. WORKING PRESS.				BARG BARG																			
EXP./COMP. MAX. DESIGN PRESS.				BARG BARG																			
EXP./COMP. TEST PRESS.				BARG BARG																			
MAX. OPER. TEMP.				°C																			
MAX. CASING CAPACITY				M ³ /H																			
EXP./COMP. IMPELLER DIA.				MM MM																			
TYPE OF IMPELLER				OPEN SEMI-OPEN FULL-OPEN				YES YES YES															
EXP./COMP. IMPELLER MAT.																							
SHAFT DIA. # IMPELLERS (EXP./COMP.)				MM MM																			
SHAFT MATERIAL																							
SHAFT/IMPELLER HARDNESS				BHN BHN																			
SHAFT/IMPELLER YIELD POINT				BAR BAR																			
EXP. SIDE LABYRINTH TYPE / MAT.																							
COMP. SIDE " " "																							
SHAFT SEALS TYPE																							
SHAFT STEEVES MATERIAL SEALS																							
SETTING OF PRESSURE SEALS				BARG																			
BUFFER GAS SYSTEM REQUIRED				YES				YES															
BUFFER GAS TYPE																							
MAX. BUFFER GAS FLOW (PER SEAL)				KG/MIN. # BAR AP																			
INNER OIL LEAK				M ³ /DAY/SEAL																			
BEARING HOUS. TYPE				HORIZONTAL				YES YES															
BEARING HOUS. SPLIT				HORIZONTAL				YES YES															
RADIAL BEARING TYPE				DANTE FRICTION DISC/FLYER FLYER				YES YES YES															

Q.A.R FOR EXPANSION TURBINE (2/2)

DESCRIPTION	VENDOR						
	LOCATION						
BEARING / SMP DEVICES	THRST STOR	THRST COUPLE	THRST ATTACH ED	YES	YES	YES	
THRST BEARING MAX/TOT LOAD	BAR		BAR				
AREA / N° PADS	MM²						
THRST COLLAR	INTEGRAL	REPLACEABLE		YES	YES		
VIBRATION DETECTOR							
MFR / MODEL / TYPE							
N° AT EACH SHAFT BEARING							
AXIAL POSITION DETECTOR							
MFR / TYPE / MODEL							
N° AT EACH SEAL BEARING							
TUBE & SEAL OIL CONFIRM TO IPS-M-PM-220				YES	OR SEE ATTACHED DEVIATION LIST		
APPC. CONFIRM TO IPS-M-PM-220				YES	OR SEE ATTACHED DEVIATION LIST		
INSPECTION & TEST CONFIRM TO ATTACHED DATA SHEET					OR SEE ATTACHED DEVIATION LIST		
WEIGHT							
EXPANDER / GEAR / DRIVEN	KG						
EXP. / COMP. LOADED / COMPACT DESIGN	KG						
MAX WEIGHT FOR MAINTENANCE	KG						
SPACE L / W / H	M						
EVALUATION RANKING	SA LC	DB LD					
PRICE TOTAL	USD						

**IRANIAN PETROLEUM STANDARDS
A12-QUOTATION ANALYSIS REPORT FOR
MIXERS**

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OPERATION DATA				QUOTATION ANALYSIS REPORT MIXERS				SKETCH	
WORKING PRESS _____				BARA _____				<div style="display: flex; justify-content: space-between;"> <div> PROJECT _____ CLIENT _____ LOCATION _____ UNIT NO. _____ ITEM NO. _____ SERVICE _____ </div> <div> </div> </div>	
WORKING TEMP _____ °C									
DENSITY OF SLURRY AT W.T. _____ KG/M ³									
DENSITY OF LIQUID AT W.T. _____ KG/M ³									
DENSITY OF SOLIDS AT W.T. _____ KG/M ³									
VISCOSITY OF SLURRY AT W.T. _____ CP									
VISCOSITY OF LIQUID AT W.T. _____ CP									
PARTICLE SIZE OF SOLIDS _____									
CLASS OF AGITATION: (1) BLEND (2) DISPERSE GAS (3) DISSOLVE (4) SUSPEND SOLIDS (5) HEAT EXCHANGE (6) MIXING (YES) (NO) (OTHER) _____									
DEGREE OF AGITATION: (1) FULL (2) PARTIAL (3) TENDENT									
BATCH OPERATION (QTY, UNIT, AND TIME) _____ KG _____ H									
CONT. OPERATION (FLOW RATE) _____ KG/S									
REQUIRED POWER IN LIQUID _____ KW									
VENDOR _____									
LOCATION _____									
DRIVER TYPE: (1) MOTOR/STEAM (2) HAND _____ YES _____ NO									
DRIVE DIRECT/GEAR/BE/FLY W/ARK _____									
ESTIMATED INST. POWER _____ KW _____ LI									
LIVES/TEAM/PRESS./TEMP _____ KG/CM ² °C									
EXHAUST STEAM/PRESS./TEMP _____ KG/CM ² °C									
GEAR TYPE/MER _____									
RATIO/GEAR/RATING/OUT PUT SPEED _____ RPM									
SHAFT COUPLING TYPE/MER _____									
SHAFT DIA. (FROM MOUNTING) _____ MM _____ MM									
IMPELLER TYPE/OD _____ MM									
NO. IMP./NO. BLADES PER IMP. _____									
SPEED OF ROTATION _____ RPM									
CRITICAL SPEED BEYOND/BELOW _____									
MECHANICAL SEAL TYPE/MER _____ YES _____ NO									
COUPLING OF SEAL _____ YES _____ NO									
MESH SEAL SHAFT SEAL _____ YES _____ NO									
PUMPING ACTION DIRECTION _____ TOWARDS DRIVE _____ AWAY FROM DRIVE									
ESTIMATED POWER IN LIQUID _____ KW									
TYPE OF BEARINGS: (1) BALL (2) ROLL _____ YES _____ NO									
LUBRICATION OF BEARINGS _____ GREASE _____ OIL _____ OIL RING									
GLAND PACKING _____ YES _____ NO									
SPACER TYPE COUPLING _____ YES _____ NO									
COOLING REQUIRED ON STUFFING BOX/ON BEARING _____ YES _____ NO									
COOLING WATER: FRESH/BRAKISH/SALT _____									
MIXING TANK V/SSET: DIA _____ MM									
LENGTH (W, TANG, L) _____ MM									
TOTAL VOL. /WORKING VOL. _____ M ³ _____ M ³									
INTERNATIONAL COILS _____ YES _____ NO									
JACKET _____ YES _____ NO									
MATERIAL SPEC (ASTM No) _____									
IMPELLER TYPE/DIA/MAT. _____ MM _____ MM									
SHAFT DIA/MAT. _____ MM _____ MM									
STUFFING BOX BUSHINGS/GLANDS _____									
GASKETS/O-RINGS _____									
COMMISSIONING/TWO YEARS SPARE _____ YES _____ NO									
TOTAL SHIPPING WEIGHT _____ KG									
SPACE L-W-H _____									