

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
AI-QUOTATION ANALYSIS REPORT
FOR CENTRIFUGAL PUMPS**

ISSUE
PREP

OPERATING CONDITION		QUOTATION ANALYSIS REPORT FOR CENTRIFUGAL PUMP			
PUMPING LIQUID:		PROJECT: _____ CLIENT: _____ LOCATION: _____ UNIT NO.: _____ ITEM NO.: _____ SERVICE: _____			
PT (PUMPING TEMP):	°C/°F				
SPECIFIC GRAVITY AT PUMPING TEMP:					
VAPOR PRESSURE AT PT:	KG/CM ² /PSIA				
VISCOSITY AT PT:	CP, CEN				
CORROSION/EROSION CAUSED BY:					
CAPACITY-NORMAL:	M ³ /HR, GPM				
RAISED:	M ³ /HR, GPM				
DIFFERENTIAL HEAD:	MET				
DISCHARGE PRESS:	KG/CM ² /PSIG				
SUCTION PRESS:	KG/CM ² /PSIG				
DIFFERENTIAL PRESS:	KG/CM ² /PSIG				
HYDRAULIC POWER:	KW, HP				
MAX SUCTION PRESS:	KG/CM ² /PSIG				
NPSH AVAILABLE:	MET				
DESCRIPTION:	VENDOR'S NAME		LOCATION		
MODEL NO. OF STAGE:	<input type="radio"/> HORIZ. <input type="radio"/> VERT.				
TYPE OF DRIVE/ROTATION:	<input type="radio"/> MOTOR <input type="radio"/> TORR	EW/CLW	<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
PUMP SPEED:		R.P.M.			
CASE STYLE:	<input type="radio"/> RADIAL <input type="radio"/> AXIAL		<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
STAGE TYPE:	<input type="radio"/> SINGLE OR DOUBLE		<input type="radio"/> SINGLE <input type="radio"/> DOUBLE	<input type="radio"/> SINGLE <input type="radio"/> DOUBLE	
CASE SUPPORT:	CENTERLINE		<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
SHAFT SUPPORT:	<input type="radio"/> OVERRUNG <input type="radio"/> BETWEEN BRG		<input type="radio"/> OVERRUNG <input type="radio"/> BETWEEN BRG	<input type="radio"/> OVERRUNG <input type="radio"/> BETWEEN BRG	
NOZZLE, NUC, MFE, RATING, FACE & LOG. DIM., SIZE RATING, FACE & LOG. EFF. AT RATED CAPACITY AT R.E.P.		%	M ³ /HR, GPM		
B.H.P. AT RATED/MAX.		KW, HP			
DRIVER POWER:		KW, HP			
NPSH REQUIRED (IN WATER 3% IC DROP):		M, FT			
SUCTION SPECIFIC SPEED @ R.E.P.	(WITH MAX IMPELLER)	M ³ /MIN, M, RPM			
HEAD RESERV./HEAD RISE TO MIN. OFF:	MIN. 8%	%			
MIN. FLOW RATE, THERMAL/STABLE:		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="radio"/> OPEN <input type="radio"/> CLOSE		<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
IMPELLER DIA. MIN./MAX. RATED:	S. SUCTION DW D SECTION	MM, INCH	<input type="radio"/> SINGLE <input type="radio"/> DOUBLE	<input type="radio"/> SINGLE <input type="radio"/> DOUBLE	
CUL. WATER DIA. MECHANICAL SEAL - API CODE / NBR:		MM, INCH			
API AX. PIPE PLAN. SEAL FLUSH/QUENCH:					
TERMIN. WATER CASING DRAIN CONN.:	PROVIDE W/VALVE & FLANGE		<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
CASING VENT CONN.:	PROVIDE W/VALVE & FLANGE		<input type="radio"/> YES <input type="radio"/> NOT REQ'D	<input type="radio"/> YES <input type="radio"/> NOT REQ'D	
BEARING TYPE OR NO. RADIAL / THRUST:	<input type="radio"/> BALL <input type="radio"/> SLEEVE <input type="radio"/> TILT. PAD	<input type="radio"/> BALL <input type="radio"/> OIL RING	<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
LUBRICATION SYSTEM:	<input type="radio"/> FLOOD <input type="radio"/> FORCED FEED <input type="radio"/> OIL RING <input type="radio"/> FLINGER		<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
COUPLING WITH GUARD MFR / MODEL NO.:	NON-LUBE FLEX. W/NON-SPARK GUARD		<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
BASEPLATE TYPE:	<input type="radio"/> COMMON <input type="radio"/> STEEL FABR.		<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
W/DR VENT HOLES DRAIN CONNECTION:	<input type="radio"/> REQ'D <input type="radio"/> REQ'D		<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
SHAFT LEAVE:	MAX #RGS		<input type="radio"/> YES <input type="radio"/> YES	<input type="radio"/> YES <input type="radio"/> YES	
MATERIALS - API SPECIFICATION:					
CASING/IMPELLER IMPELLER WEARING/CASE WEARING SHAFT/SHAFT SLEEVE INNER PARTS/THRUST BUSH THRUSTLE BUSH:					
DEVIATIONS FROM IPS STD. TEST AND INSPECTIONS:					
DEVIATIONS RANKING:	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D				
TOTAL PRICE (DELIVERY EX FACTORY):		IN USD \$			

IRANIAN PETROLEUM STANDARDS
A3-QUOTATION ANALYSIS REPORT
FOR RECIPROCATING COMPRESSOR

ISSUE
PKRPM

OPERATION CONDITIONS				QUOTATION ANALYSIS REPORT				SKETCH
ITEM NO. (OVERALL) _____ STAGE _____ GAS COMPRESSED _____ CORROSIVE DUE TO _____ RELATIVE HUMIDITY _____ MOI. WGT. AT INTAKE _____ UP TO VALVE / SECTION/DISCHARGE _____				RECIPROCATING COMPRESSOR (DE)				
INLET TEMP. °C / °F _____ INLET PRESS. KG/CM ² A, PSIG _____ MIP. AT. BETWEEN STGS. KG/CM ² A, PSIG _____ ACTUAL DISCH. TEMP. °C / °F _____ DISCHARGE PRESS. KG/CM ² A, PSIG _____ PRESSURE RATIO _____ Z: SECTION DISCHARGE _____				PROJECT _____ CLIENT _____ LOCATION _____ UNIT NO. _____ ITEM NO. _____ SERVICE _____				
RATED PER API (CAPACITY TOLERANCE ±0%; BRP TOLERANCE ±0%) KG. HR. / LB. HR. MET _____ INLET M ³ /HR. FT ³ /MIN. (CORRECTED) _____ NM ³ /HR. MMSCFD OR SCFM _____								
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. (EACH STAGE) / RPM		RPM						
CAPACITY CONTROL, SEC. VALVE UNLOADER		<input type="checkbox"/> PNEUM. / <input type="checkbox"/> MAN. / <input type="checkbox"/> AUTO				<input type="checkbox"/> YES		
ENTIRE UNLOADER / CLEARANCE SYSTEM BY _____ / POCKET		<input type="checkbox"/> VENDOR PROVIDE				<input type="checkbox"/> YES <input type="checkbox"/> YES		
BORE / STROKE		MM / IN						
CLEARANCE % / VOL. EFF.		%						
PISTON SPEED		M/S / FT/M						
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 (SU/DIN)								
ANSI RATING / FACING								
VALVE TYPE / RFR								
NO. PER STAGE / SU/DIN								
GAS VELOCITY / FT/PT		M/S / FT/M		MM / IN				
MATERIALS		IN ASTM / INTL NO.						
CYLINDER / LINER								
PISTON / PISTON RING / RIDER RING								
PISTON ROD / PACKING								
VALVE SEAT / PACKING								
GASKET / VALVE / GASKET VALVE								
CRANK CASE / CRANK SHAFT / CRANK HEAD								
MAIN BEARING TYPE / NO.								
AT / KW		KW / HP		%				
RIP / RATED / DISCH. / EFF.		M ³ / KW		%		MT		
DRIVER POWER / SPEED								
COUPLING TYPE / PWR								
RUNNING COST PER YEAR		USD / KW / Y						
TORSIONAL ANALYSIS		<input type="checkbox"/> REQUIRED				<input type="checkbox"/> YES <input type="checkbox"/>		
ROD PACKING / SU / INT								
LUBRICATION / OIL / LSC		<input type="checkbox"/> FORCE LUBE <input type="checkbox"/> NON LUBE		<input type="checkbox"/> COP <input type="checkbox"/> JACK		<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/>		
DISTANCE / PIECE		<input type="checkbox"/> EXTRA LONG <input type="checkbox"/> TWO COMPARTMENT				<input type="checkbox"/> YES <input type="checkbox"/>		
COVER		<input type="checkbox"/> NO HD COVER <input type="checkbox"/> WITH HD / DRAIN				<input type="checkbox"/> YES		
FRAME / TUBE / TYPE		<input type="checkbox"/> SPLASH <input type="checkbox"/> PRESSURE SYSTEM				<input type="checkbox"/> YES		
OIL PUMP DRIVER MAIN / AUXILIARY				<input type="checkbox"/> CRANK <input type="checkbox"/> MOTOR		<input type="checkbox"/> MOTOR <input type="checkbox"/> ISLAND P <input type="checkbox"/> AUX P		
DRIVER POWER MAIN / AUX		KW / HP						
OIL COOLER EXP. / OIL / SEAL / CODE		<input type="checkbox"/> FINED IN <input type="checkbox"/> FIN <input type="checkbox"/> C / D / K		T/MA				
VALVE								
RELIEF VALVE / SETTING		VENDOR SUPPLY		VENDOR SUPPLY		<input type="checkbox"/> YES <input type="checkbox"/> YES		
LUBRICATOR DRIVER / TASK CAPACITY		KW / HP		L / GAL				
DAMPER - ANSI / DR / DESIGN CODE		API APPROACH		I / J		<input type="checkbox"/> YES <input type="checkbox"/> YES		

Q.A.R FOR RECIPROCATING COMPRESSOR

DESCRIPTION	VENDOR MODEL			
	VENDOR SUPPLY			
SCOPE OF SUPPLY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DRIVERS MAIN & AUX	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SPEED CHANGE/BASEPLATE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEMPLATE/ASM FOR BOLTS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COUPLING/GAURDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FLY WHEEL & GAURDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SIDE JACK SCREWS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INTER COOLER MW/APPLY CODE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AFTER COOLER MW/APPLY CODE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SUC/DIS. SNUBBER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INTERSTAGE PIPING/RELIEF VALVE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SEPARATE MOISTURE W/TRAPS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INTER CONNECTING AUX. PIPING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LUBE OIL SYSTEM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AIR RECEIVER TYPE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AIR DRYER TYPE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AIR FILTER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PACKING VENT SEPARATOR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
W/VALVE, LG, RN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GIT FLOW INDICATOR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VIBRATION ACCELEROMETER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INSTRUMENT PANEL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INSTRUMENTS & WIRING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TURNING DEVICE/SPECIAL/TOOLS/WIRES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CONSTRUCTION SPARE PARTS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAINTENANCE SPARE PARTS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER MAINTENANCE REQUENT IN US SPEC/REQ.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INSTRUMENT INDICATION	AS PER IPS SPEC.			<input type="checkbox"/>
ALARM	AS PER IPS SPEC.			<input type="checkbox"/>
TRIP & INTERLOCK	AS PER IPS SPEC.			<input type="checkbox"/>
UTILITY CONSUMPTION: WATER	M ³ /H			<input type="checkbox"/>
STEAM	TON/H			<input type="checkbox"/>
N ₂	NM ³ /H			<input type="checkbox"/>
AIR	NM ³ /H			<input type="checkbox"/>
NOISE LEVEL	DB(A)			<input type="checkbox"/>
TEST & INSPECTION				AS PER IPS SPEC. SEE BELOW
DELIVERY (EX-FACTORY)				
OTHERS				
EXCEPTION TO SPEC.				
TEST & INSPECTION				
INSTRUMENTATION				
SCOPE OF SUPPLY				
TECHNICAL EVALUATION RANKING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PRICE COMPRESSOR W/CONS.	USD \$			
SPARE	USD \$			
GEAR	USD \$			
DRIVER	USD \$			
TOTAL	USD \$			
MAINTENANCE S; PARTS	USD \$			
GLAND TOTAL	USD \$			

FANS AND BLOWERS

**I:
P**

OPERATION CONDITIONS (EACH UNIT)		CASE 1		QUOTATION ANALYSIS REPORT FAN & BLOWER	
CAPACITY	NAME, MINCFM			PROJECT	_____
WEIGHT FLOW	K/GM/HR, L/HR/HR			CLIENT	_____
SUCT. PRESS. (STATIC)	MMHG, IN.HG			LOCATION	_____
SUCT. PRESS. (TOTAL)	MMHG, IN.HG			UNIT NO.	_____
SUCT. TEMP.	°C			ITEM NO.	_____
DISCH. PRESS. (STATIC)	MMHG, IN.HG			SERVICE	_____
DISCH. PRESS. (TOTAL)	MMHG, IN.HG				
DISCH. TEMP.	°C				
DIFF. PRESS. (STATIC)	MMHG, IN.HG				
DIFF. PRESS. (TOTAL)	MMHG, IN.HG				
PREFERABLE					
LEGEND: NOT PREFERABLE					
DESCRIPTION	SPEC		VENDOR LOCATION		
TYPE OF FAN					
MODEL NO. OF STAGE					
BHP/EFFICIENCY	KW HP		%		
BLOWER SPEED/CRITICATED SPEED/END CRIT TO RATED SPEED	%		%		
DRIVER/SPEED/POWER	M.I	KW HP	M.I		
IMPELLER TYPE/CONSTRUCTION	<input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED	<input type="checkbox"/> WELDED <input type="checkbox"/> M/S FEM	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
IMP. SPEED/DIA	MM IN	MM IN			
SHAFT SEAL	<input type="checkbox"/> GLAND PACKING <input type="checkbox"/> BALL	<input type="checkbox"/> BALL <input type="checkbox"/> OIL BAT	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
BEARING TYPE RADI/DIRT					
LUBRICATION	<input type="checkbox"/> GREASE <input type="checkbox"/> OILED				
NOZZLE SIZE/DIS. SIZE RATING					
EXCISE DUTY/LOCATION					
COPPING TYPE/SER					
MATERIAL					
CASING IMPELLER					
SHAFT SHAFT STAVE					
CORR ALLOW/THICKNESS OF CASING			MM IN		
WEIGHT FAN & BASE/MOTOR/TOTAL			TON LB		
DIMENSION W X L X H			M FT		
SCOPE OF SUPPLY	VENDOR SUPPLY				
DRIVER/BASEPLATE			<input type="checkbox"/> YES	<input type="checkbox"/> YES	
SPEED CHANGER/SER			<input type="checkbox"/> YES	<input type="checkbox"/> YES	
COUPLING/GUARD			<input type="checkbox"/> YES	<input type="checkbox"/> YES	
ANCHOR BOLTS/SHD JACK SCREWS			<input type="checkbox"/> YES	<input type="checkbox"/> YES	
SILENCER			<input type="checkbox"/> YES	<input type="checkbox"/> YES	
DUCT & STACK	<input type="checkbox"/> LIST C.	<input type="checkbox"/> DIS.	<input type="checkbox"/> YES	<input type="checkbox"/> YES	
DAMPEN & CONTROLLER	<input type="checkbox"/> SEC. <input type="checkbox"/> DIS.	<input type="checkbox"/> MANUAL <input type="checkbox"/> AUTO	<input type="checkbox"/> YES	<input type="checkbox"/> YES	
NO. FINS FILTER/EX. PIPING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES	
TURB. OIL SYSTEM	<input type="checkbox"/>		<input type="checkbox"/> YES	<input type="checkbox"/> YES	
INSTRUMENT PANEL	<input type="checkbox"/>		<input type="checkbox"/> YES	<input type="checkbox"/> YES	
BEARING TEMP.	<input type="checkbox"/>		<input type="checkbox"/> YES	<input type="checkbox"/> YES	
PRESS. GAGE SPT/DIS.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES	
TURNING DEVICE/SPECIAL HOLES/WIRON	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES	
CONSTRUCTION SPARE PARTS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> YES	<input type="checkbox"/> YES	
MAINTENANCE SPARE PARTS	<input type="checkbox"/>		<input type="checkbox"/> YES	<input type="checkbox"/> YES	
OTHER AUXILIARIES IN D/S SPEC/REQ.	<input type="checkbox"/>		<input type="checkbox"/> YES	<input type="checkbox"/> YES	
OTHERS					
UTILITY COOLING WATER			GPM M ³ /H		
BUFFER GAS	<input type="checkbox"/> N ₂ <input type="checkbox"/>			NM ³ /H SCFM	
OTHERS					
NOISE LEVEL			DB(A)		
TEST AND INSPECTION			<input type="checkbox"/> AS PER IPS SPEC. <input type="checkbox"/> NO SEE BELOW		
EXCEPTIONS TO SPEC					
TEST AND INSPECTION					
SCOPE OF SUPPLY					
DELIVERY (EX-FACTORY)					
PRICE - BLOWER					
DRIVER					
TOTAL					
MAINTENANCE SPARE PARTS					
GLAND TOTAL					
EVALUATION RANKING	0A 0C	0B 0D			

IRANIAN PETROLEUM STANDARDS
AS-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"/> API 614 <input type="checkbox"/>				<input type="checkbox"/> LUBE OIL SYSTEM <input type="checkbox"/> SEAL OIL SYSTEM	
TYPE	<input type="checkbox"/> SEPARATED <input type="checkbox"/> COMBINED				<input type="checkbox"/> YES <input type="checkbox"/>	
SYSTEM API 614 FIG. NO.	<input type="checkbox"/> A <input type="checkbox"/> A <input type="checkbox"/> OPTION -		<input type="checkbox"/> A-		<input type="checkbox"/> YES <input type="checkbox"/>	
SEAL SEALS/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"/> A-		<input type="checkbox"/> YES <input type="checkbox"/>	
CAPACITY/RETEN. TIME	L GAL		MIN.		<input type="checkbox"/> YES <input type="checkbox"/> MIN.	
MATERIAL / INTERIOR CODE	<input type="checkbox"/> PER SPEC. <input type="checkbox"/>				<input type="checkbox"/> YES <input type="checkbox"/>	
PUMP & DRIVER QUANTITY	<input type="checkbox"/> CENTRI. <input type="checkbox"/> POSI. DIS.		STEEL		<input type="checkbox"/> YES <input type="checkbox"/>	
PUMP TYPE / CASE MATERIAL						
MFR / MODEL NO.						
CAPACITY / DISM. PRESS.	M ³ /HR GPM		KG/CM ² PSIG			
SPEED / RHP / DHP	RPM		KW HP			
R.V. SET PRESS. - R.V. SET	KG/CM ² PSIG		KW HP			
COUPLING TYPE / MFR	<input type="checkbox"/> FLEX. DISK <input type="checkbox"/>				<input type="checkbox"/> YES <input type="checkbox"/>	
SEAL SEALS CODE / MFR	<input type="checkbox"/> METAL <input type="checkbox"/>				<input type="checkbox"/> YES <input type="checkbox"/>	
DRIVER TYPE - MAIN / STAND BY	T M		T M		<input type="checkbox"/> YES <input type="checkbox"/>	
MFR - MAIN / STAND BY						
OIL COOLER - CODE	<input type="checkbox"/> TEMA-C <input type="checkbox"/> A- <input type="checkbox"/> OPTION -				<input type="checkbox"/> YES <input type="checkbox"/>	
ARRANGEMENT API 614 FIG. NO.	<input type="checkbox"/> TEMA-AET <input type="checkbox"/>		KG/CM ² PSIG		<input type="checkbox"/> YES <input type="checkbox"/>	
TYPE / DESIGN PRESS.	KCAL / MIN. BTU / HR		M ² FT ²			
DUTY / SURFACE AREA	MIN IN					
TUBE - O.D. / RWG						
MATERIAL - SHELL / MANNEU						
TYPE / DR. SHEET						
FILTER - CODE	<input type="checkbox"/> ASME <input type="checkbox"/>				<input type="checkbox"/> YES <input type="checkbox"/>	
ARRANGEMENT API 614 FIG. NO.	<input type="checkbox"/> A-11 <input type="checkbox"/> OPTION -		<input type="checkbox"/> A-11		<input type="checkbox"/> YES <input type="checkbox"/>	
FILTRATION ELEMENT MATERIAL	P					
A.P. CLEAN / COLUMN	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"/>	
ARRANGEMENT API 614 FIG. NO.						
QUANTITY / MFR	L GAL		MIN.		<input type="checkbox"/> YES <input type="checkbox"/>	
EFFECTIVE CAPA. TOTAL / REN. DOWN						
MATERIAL - SHELL / BLADDER	<input type="checkbox"/> VALVE, REGULATION <input type="checkbox"/> NOT RED'D. AND PG. <input type="checkbox"/> ASME <input type="checkbox"/>				<input type="checkbox"/> YES <input type="checkbox"/>	
CHARGING ASSEMBLY	<input type="checkbox"/> A-17 <input type="checkbox"/> OPTION -		<input type="checkbox"/> A-18		<input type="checkbox"/> YES <input type="checkbox"/>	
OVERHEAD TANK - CODE						
ARRANGEMENT API 614 FIG. NO.						
NO. OF BARRIER / DESIGN PRESS.			KG/CM ² PSIG			
MATERIAL - LSNK / BLADDER					<input type="checkbox"/> YES <input type="checkbox"/>	
TOTAL BARRIER CAPACITY - EFFECTIVE	15 MIN. <input type="checkbox"/> NOT RED'D. <input type="checkbox"/>		14 MIN. <input type="checkbox"/> NOT RED'D. <input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	
RENDOWN TANK						
RETENTION TIME / MATERIAL	MIN.					
DRAIN TRAP - QU'TY / MATERIAL	<input type="checkbox"/> A-19 <input type="checkbox"/> OPT.		<input type="checkbox"/> A-20 <input type="checkbox"/> MANUAL <input type="checkbox"/> ASME <input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	
ARRANGEMENT API 614 FIG. NO.						
RETENTION TIME / CAPA. / CODE	L GAL				<input type="checkbox"/> YES <input type="checkbox"/>	

A9- QUOTATION ANALYSIS REPORT FOR CENTRIFUGAL COMPRESSORS

OPERATION CONDITION		QUOTATION ANALYSIS REPORT CENTRIFUGAL COMPRESSOR (U2)				SKETCH:
ITEM NO. (SERVICE)	_____	PROJECT _____				
STAGE	_____	CLIENT _____				
GAS COMPRESSED	_____	LOCATION _____				
CORROSIVE DUE TO	_____	UNIT No. _____				
RELATIVE HUMIDITY	_____	ITEM NO. _____				
MOLE WT. AT INLET	_____	SERVICE _____				
C.F. (CYCLES) / SEC. (DISCHARGE)	_____					
INLET TEMP. (C. / F)	_____					
INLET PRESS. (KPA / G. / PSIA)	_____					
MIN. FLOW (TYPICAL) (KGS. / KVA. / PSI)	_____					
AT INLET (DISCH. TEMP. / F)	_____					
DISCHARGE PRESS. (KPA / G. / PSIA)	_____					
PRESSURE RATIO	_____					
DISCHARGE DISCHARGE	_____					
RATED PER. (CAPACITY TOLERANCE -0% / EFF. TOLERANCE -0%)	_____					
KG. HR. LB. HR. WET	_____					
INLET SMOKE (MIN. / CORRECTED)	_____					
N. SMOKE (MIN. / CORRECTED)	_____					
DESCRIPTION	VENDOR _____					
	LOCATION _____					
MANUFACTURER'S MODEL						
NO. OF STAGE						
SPEEDS: RATED (MIN. / MAX)						
PROCESS CONTROL	MAN. THRO. / DISCH. THRO.					
	UNFEED / THROTTLED					
	VAR. BYPASS					
ESTIMATED MERGE AT RATED SPEED (INLET CAP. / DISCH. PRESS. (A))	M ³ /HR. (MPSI) (KG / CM ²)					
ANALYZER BYPASS	ONLINE / OFFLINE					
INLET PRESSURE	KG / CM ² (PSI)					
INLET TEMP.	C. (F)					
DISCHARGE PRESSURE	KG / CM ² (PSI)					
DISCH. TEMP. / MAX. ALLOW. DISCH. TEMP.	C. (F)					
HELP REQUIRED (GATE LINES INCLUDE)						
POLY. HEAD / POLY. EFF. (AT RATED)	MFT					
GUARANTEE POINT						
INLET CAPACITY / HEAD	M ³ / (CM) / (MFT)					
NOZZLE AT NOZZLE						
SIZE	IN					
ASSTRATING / FINING						
LATERAL CRITICAL SPEED						
FIRST TO MAX. CONT. SPEED						
FIRST TO MIN. CONT. SPEED						
SECOND TO MAX. CONT. SPEED						
FORMANAL VIB. ANALYSIS	UNREQUIRED					
LATERAL VIB. ANALYSIS	UNREQUIRED					
VIB. DETECTIONAL POS. DETC.	UNREQUIRED					
BEARING TEMP. DEVICES	<input type="checkbox"/> THERMOCOUPLE / <input type="checkbox"/> THERMISTOR		<input type="checkbox"/> YES / <input type="checkbox"/> NO			
NO. PER. BRO. (RADIAL / TANGENTIAL)						
DRIVER POWER / SPEED	MT	KW / HP	%	MT		
COUPLING TYPE / MFR						
RUNNING COST PER YEAR	USD / KW / HR		> 8000 / < 8000			
REDIAL BEARING						
TYPE / LOAD (ACTUAL / ALLOW)	DEAD / IMPL. EFF.	KG / CM ²	KG / CM ²	YES / NO		
THRUST BEARING						
TYPE / LOAD (ACTUAL / ALLOW)	ONINGS / BURY	KG / CM ²	KG / CM ²	YES / NO		
THRUST COUPLER	INTEGRAL / REPLACEABLE		YES / NO			
BEARING HOUS. CONST. TYPE / PLIT	SEPARATE / INTEGRAL		YES / NO			
SHAFT SEAL TYPE / MFR						
INNER OIL LEAKAGE	M ³ / DAY / SEAL					
CASING SPLIT / MAX. / MAX. W. / KG / CM ²						
DRIP TYPE / DIA. / NOM. / MAT.	OPEN / CLOSED					
LABYRINTH TYPE / MATERIAL	STATIONARY / ROTATING			YES / NO		

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

DESCRIPTION	VENDOR		LOCATION		
	LOCATION		CRANK	MOTOR	MOTOR
OIL PUMP DRIVER MAIN/AUX (START)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DRIVER POWER MAIN/AUX (START)		KW			
OIL COOLER TYPE	<input type="checkbox"/> SHE	<input type="checkbox"/> COE	<input type="checkbox"/> YES	<input type="checkbox"/> YES	
GEAR TYPE/RATING/SPEED RATIO		KW			
NOISE LEVEL		(DBA)			
TEST & INSPECTION	DAN PER IPS SPEC (SEE BELOW)				
UTILITY CONSUMPTION:	WATER	M ³ /H			
	STEAM	TON/H			
	AIR	NM ³			
	ELECTRICITY	KW			
SCOPE OF SUPPLY:					
DRIVER MOD/LINER	<input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>		
BASIS/PLATE/TEMPLATE/ANCHOR BOLT	<input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/>
COUPLING/GAUBIN	<input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/>	
INTER/AFter COOLER	<input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/>	
LUB/SEAL OIL SYSTEM	<input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/>	
INTER STAGE PIPING/RELIEF VALVE	<input type="checkbox"/>		<input type="checkbox"/> YES <input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/>	
INST PANEL, MOD/LINER	<input type="checkbox"/> YES		<input type="checkbox"/> YES <input type="checkbox"/>		
INSTRUMENTS & WIRING	<input type="checkbox"/> YES		<input type="checkbox"/> YES <input type="checkbox"/>	<input type="checkbox"/> YES <input type="checkbox"/>	
COMMISSIONING SPARE PART	<input type="checkbox"/>		<input type="checkbox"/> YES		
TWO YEARS SPARE PART	<input type="checkbox"/>		<input type="checkbox"/> YES		
OTHER AUX REQ. IS IPS SPEC.	<input type="checkbox"/>		<input type="checkbox"/> YES	<input type="checkbox"/> SEE BELOW	
WEIGHTS: COMP/GEAR/DRIVER		KG			
MAX. WEIGHT FOR MAINTENANCE		KG			
TOTAL SHIPPING WEIGHT		KG			
SPACE LxWxH		M			
DELIVERY (EX-FACTORY)					
EXCEPTIONS TO SPEC					
1. TEST & INSPECTION					
2. INSTRUMENTATION					
3. SCOPE OF SUPPLY					
EVALUATION RANKING	<input type="checkbox"/> A <input type="checkbox"/> C		<input type="checkbox"/> B <input type="checkbox"/> D		
PRICE: COMPRESSOR W/					
COMMISSIONING SPARE/GEAR/DRIVER					
ALL ACCESSORIES/REQ. TOTAL		USD			
TWO YEARS SPARE PARTS		USD			
G.C. AND TOTAL		USD			

QUALITY CONTROL REQUIREMENTS (QCR)

DESCRIPTION	VENDOR			LOCATION		
TURBINATION SH/DOWN/DRY				YES	YES	YES
LUB OIL SYSTEM						
1-USE PARALLEL SHIMMS WITH DRIVES	YES	YES		YES	YES	
2-ALIGNING ARRANGEMENT	CONSOLE	BASE PLATE		YES	YES	
3-MAIN/STANDBY/EMER OIL PUMP	YES	YES	YES	YES	YES	YES
4-STAINLESS STEEL PIPING	DOWN STREAM FILTER	COMPLETE SYSTEM		YES	YES	
LUB OIL SYSTEM IN ACC WITH IPS-M-PM-209	YES			YES	YES	YES
GAS TURBINE CHARACTERISTICS						
ISO RATING	KW					
FULL RATED SPEED	RPM	RPM				
TURBINE INLET/EXHAUST TEMPERATURE	°C	°C				
MAX. CONT. P. SPEED	RPM					
MIN. ALLOWABLE SPEED	RPM					
PUMP/GENERATOR CRITICAL SPEED	RPM	RPM	RPM			
CRITICAL/INTERCRITICAL SPEED	RPM	RPM	RPM			
MAIN GEAR BOX LOSSES	KW					
INLET/EXHAUST LOSSES	KW					
SHAFT	SINGLE	TWO		SINGLE	TWO	
COMPRESSOR STAGE NOS						
COMPRESSOR CASING SPLIT	HOR	VER		HOR	VER	
COMPRESSOR ROTOR	SOLID	BUILT UP		SOLID	BUILT UP	
MAX. ALLOW. TEMP./PRESS OF COMP	°C	BAR				
MAX. TIP SPEED OF COMPRESSOR	M/S					
TURBINE STAGE NOS						
TURBINE CASING SPLIT	HOR	VER		HOR	VER	
TURBINE ROTOR	SOLID	BUILT UP		SOLID	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 BLAD 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	
GOVERNER TYPE	ELECTR	HYD		MECH	HYD	
GOVERNOR SPEED RANGE (MAX/MIN) FOR VARIANCE SPEED	RPM/RPM					
CONTROL PANEL MOUNTING	INSTR. CAB	FREE STANDING	MANUAL STAB	YES	YES	YES
COMMISSIONING / TWO YEARS STABS	YES	YES		YES	YES	
TOTAL SHIPPING MASS	KG					
MAX ERECTION MASS	KG					
MAX MAINTENANCE MASS	KG					
INSTALLED LENGTH/DIA/HEIGHT	M					
PROPOSAL IS IN ACC. IPS-M-PM-209				YES	YES	YES
DELIVERY (S/F/FORM)						
INSPECTION AND TESTS						
EXCEPTIONS TO SPEC						

**IRANIAN PETROLEUM STANDARDS
A11- QUOTATION ANALYSIS REPORT FOR
EXPANSION TURBINES**

**ISSUED D.
PREP'D**

OPERATING CONDITIONS				PROJECT				QUOTATION ANALYSIS REPORT				(1/2)				SKETCH			
				CLIENT				EXPANSION TURBINE											
				LOCATION															
				UNIT No.															
				ITEM No.															
				SERVICE															
RATED				VENDOR															
NORMAL				LOCATION															
DESCRIPTION				RPM															
RATE FLOW				RPM															
WEIGHT FLOW WGT/DAY				RPM															
DISCHARGE PRESS./TEMP.				BAR				°C											
POWER/ SPEED				KW				RPM											
HEAD/ EFFICIENCY (EXPANDER)																			
HEAD/ EFFICIENCY (COMPRESSOR)																			
MAX. CONST. 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-SECT				YES			
EXP./COMP. IMPELLER SEAL																			
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 SLEEVES MATERIAL SEALS																			
SETTING OF PRESSURE SEALS				BARG															
BUFFER GAS SYS. 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				VERTICAL				YES				YES			
BEARING HOUS. SPLIT				HORIZONTAL				VERTICAL				YES				YES			
RADIAL BEARING TYPE				DANTE				DISC				FLY				YES			
				FRICTION				SHEAVE				SHEAVE				YES			

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

DESCRIPTION	VENDOR			LOCATION		
	THRST STOR	THRST COUPLE	THRST ATTI- CHD	YES	YES	YES
BEARING / SUMP DEVICES						
THRST BEARING MAX/TEU LOAD	BAR	BAR				
AREA / NO PADS	MM²					
THRST COLLAR	INTEGRAT	REPLACEABLE		YES	YES	
VIBRATION DETECTOR						
MFR / MODEL / TYPE						
NO. AT EACH SHAFT BEARING						
AXIAL POSITION DETECTOR						
MFR / TYPE / MODEL						
NO. AT EACH SHAFT BEARING						
TURB & SEAL OIL CONFIRM TO IPS-M-PM-270				YES	YES	INFO ATTACHED DEVIATION LIST
APPC. CONFIRM TO IPS-M-PM-270				YES	YES	INFO ATTACHED DEVIATION LIST
INSPECTION & TEST CONFIRM TO ATTACHED DATA SHEET						INFO ATTACHED DEVIATION LIST
WEIGHTS						
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**

ISS

OPERATION DATA		MARA		QUOTATION ANALYSIS REPORT MIXERS		SKETCH	
WORKING PRESS				PROJECT _____			
WORKING TEMP				CLIENT _____			
DENSITY OF MURRY AT W.I				LOCATION _____			
DENSITY OF LIQUID AT W.I				UNIT No. _____			
DENSITY OF SOLIDS AT W.I				ITEM NO. _____			
VISCOSITY OF MURRY AT W.I				SERVICE _____			
VISCOSITY OF LIQUID AT W.I							
PARTICLE SIZE OF SOLIDS							
CLASS OF AGITATION:	(B)END	(D)ISSOLVE					
(U)SPPND SOLIDS	(U)NPERSE GAS	(U)NPERSE LIQ					
(U)HEAT EXCHANGE	(U)MULTRY	(U)NDR					
(U)ASHING (YES) (NO)							
DEGREE OF AGITATION	(U)NDR	(U)NDR					
BATCH OPERATION (QTY, AND TIME)	KG	(U)NDR					
CONT. OPERATION (FLOW RATE)	KG/S	(U)NDR					
REQUIRED POWER IN LIQUID	KW	(U)NDR					
	VENDOR						
DESCRIPTION	LOCATION						
DRIVER TYPE: ELEC MOTOR/STEAM TURBINE	YES	YES					
DRIVE DIRECT/OPPOSITE/AX							
ESTIMATED INST. POWER	KW	YES	LI				
LIVE STEAM PRESS./TEMP	KG/CM ²	°C					
EXHAUST STEAM PRESS./TEMP	KG/CM ²	°C					
GEAR TYPE/NER							
RATIO/GEAR RATING/OUTPUT SPEED		RPM					
SHAFT COUPLING TO PUMP							
SHAFT DIA. (FROM MOUNTING)	MM	MM					
IMPELLER TYPE/OD							
NO. IMP./NO. BLADES PER IMP.							
SPEED OF ROTATION	RPM						
CRITICAL SPEED BEYOND/BELOW							
MECHANICAL SEAL TYPE/NER	YES	YES					
COUPLING OF SEAL	YES	YES					
MESH SEAL SHAFT SEAL	YES	YES					
PUMPING ACTION DIRECTION			TOWARDS DRIVE	AWAY FROM DRIVE			
ESTIMATED POWER IN LIQUID	KW						
TYPE OF BEARINGS	(U)NDR	(U)NDR	YES	YES			
LUBRICATION OF BEARINGS			GREASE	FORCED	LIQ RING		
GLAND PACKING	YES		YES				
SPACER TYPE COUPLING	YES		YES				
COOLING REQUIRED ON STUFFING BOX/ON BEARING	YES		YES				
COOLING WATER, FRESH/BRACKISH/SALT							
MIXING TANK/VESSEL DIA	MM						
LENGTH DIA. TANG. LINE	MM						
TOTAL VOL./WORKING VOL.	M ³	M ³					
INTERNATIONAL COILS	YES		YES				
JACKET	YES		YES				
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	YES	YES	YES			
TOTAL SHIPPING WEIGHT	KG						
SPACE L*W*H							