



**Resalat Oil Field Development Project
Phase 1 (EPC-EPD)**



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Material Requisition For GTG package

						<i>FRM</i>	
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00	01/16/24	Issue for Comment	IOEC	R.K	A.M	H.M	
REV.	DATE	DESCRIPTION	ORIG.	PRPD	CHKD	APP'D	COMPANY



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1. INTRODUCTION

1.1 Development Overview

The Resalat Field previously known as Rakhsh Field, is located in the Persian Gulf, some 80 km to the South of Lavan Island, in water depth of 65-75 meters. The facilities which were originally developed in 1968 have sustained some damage due to the Iran/Iraq war and adverse climate conditions thereafter.

To increase oil production capacity from this field (adding 12,000 stock barrels per day to current production), Iranian Offshore Oil Company (IOOC) has defined new project which includes Engineering, Drilling, Procurement, Construction for following items:

- New satellite Wellhead Platform (WHP1) with totally nine (9) conductor slots.
- Development and renovation of Existing offshore complex consist of new power generation, control system, HVAC, Electrical /control room, electrical panels(LV &MV),process & utility piping, and all necessary activities which shall be done for connection to existing facilities(Tie in requirements)
- Drilling of two new production wells in R1 and two wells in WHP1 platform and Re-entry and work-over of two existing well in R1 platform.
- One 10" productions submarine pipeline from WHP1 to PP and a single submarine cable (power and data) from SP to WHP1
- Inspection, Strengthening, Modification and Repair of existing R1 complex Jackets and topsides and replacement of boatlanding and Barge Bumpers.

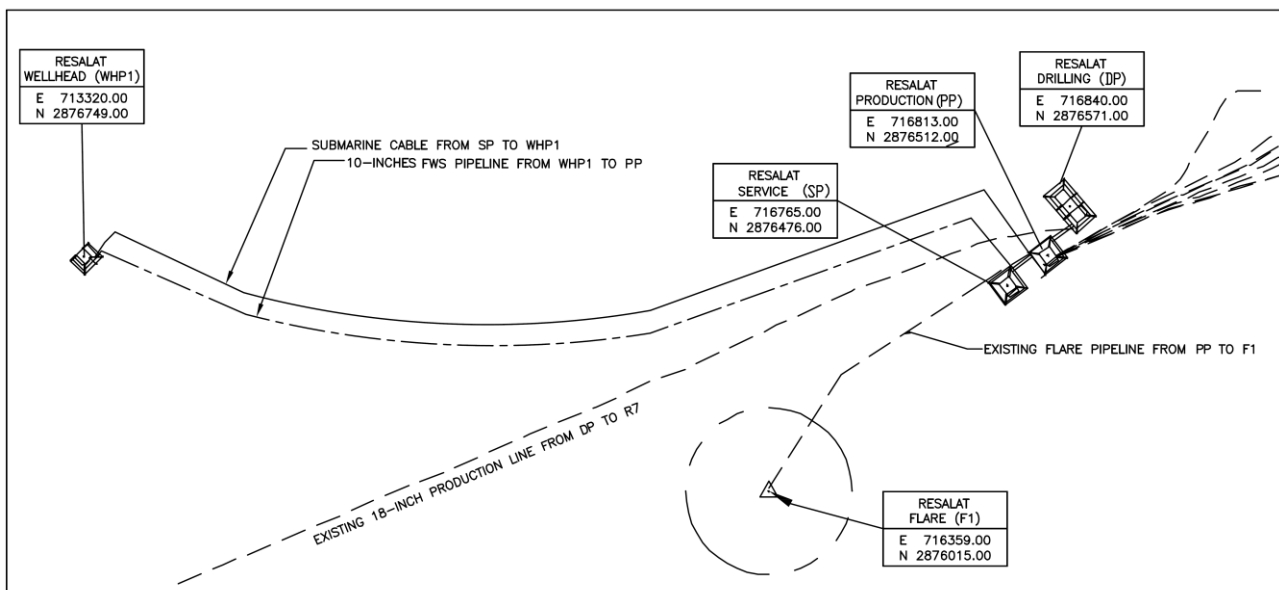


Figure 1: Resalat Development Field Layout (Datum WGS84, Zone 39, Cent. Meridian 51° East)



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1.2 CODES AND STANDARDS

The latest edition of codes and standards referenced in this requisition, shall form an integral part of this Requisition and shall be followed where applicable.

For codes and standards, latest revision up to date of order shall be followed. Purchaser reserve the right to request the vendor to use and follow an older revision of a code or standard due to his requirements.

Code/Standard Number	Code/Standard Title
ISO 2314	Gas Turbines - Acceptance Tests
API 616	Gas Turbines for the Petroleum, Chemical, and Gas Industry Services
ISO 1940	Mechanical Vibration - Balance Quality Requirements For Rotors In A Constant (Rigid) State
API 614	Lubrication, shaft-sealing and control oil systems for special-purpose applications
API 613	Special-purpose gear units for petroleum, chemical, and gas industry services
ISO 15156	Petroleum and natural gas industries — Materials for use in H2S-containing environments in oil and gas production
ISO 10474	Steel and steel products - inspection documents
NACE R0175	Petroleum and natural gas industries — Materials for use in H2 S-containing environments in oil and gas production
NACE R0103	Materials resistant to sulfide stress cracking in corrosive petroleum refining environments
MSS SP 55	Quality standard for steel castings for valves, flanges and fittings and other piping components - visual method
ASTM D 2880	Gas turbine fuel oils
ASTM A 770	Through-thickness tension testing of steel plates for special applications
ASTM A 193	Alloy steel and stainless steel bolting materials for high temperature service
BS 7244	Flame arresters for general use
ASME B1.20.1	Pipe threads, general purpose (inch)
ASME B31.3	Petroleum Refinery Piping
ASME B16.5	Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard
ASME B16.47	Large Diameter Steel Flanges NPS 26 Through NPS 60 Metric/Inch Standard
ASME Sec. VIII	Rules for Construction of Pressure Vessels



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IPS-G-SF-900	General Standard for Noise Control and Vibration
IPS-E-SF-860(1)	Engineering Standard for Air Pollution Control
IEC-60034	Rotating Electrical Machines
IEC 60072	Dimensions and Output Series for Rotating Electrical Machines
IEC 60079	Electrical apparatus for explosive gas atmospheres
IEC 60529	Degrees of protection provided by enclosures (IP Code)
IEC 60898	Electrical accessories – Circuit breakers for overcurrent protection for household and similar installations
IEC 60947	Low-voltage switchgear and control gear

2. REFERENCE DOCUMENTS

All documents referenced in this requisition, shall form an integral part of this Requisition and shall be followed where applicable.

For project documents, latest revision of the documents up to date of kickoff meeting shall be followed.

No.	Description	Doc. Number
1	Regulations and Instructions for Implementing HSE	NIOC-HSE-TR-RU-042
2	Document Numbering Procedure	LRSL-000-PM-PR-001
3	Coordination Procedure Between Contractor & Sub-Contractor	LRSL-000-PM-PR-700
4	List of Applicable Codes and Standards	LRSL-000-PM-LI-743
5	Data Sheet for Gas Turbine Generator	LRSL-R1X-RE-DS-210
6	Specification for Gas Turbine Generator	LRSL-000-RE-SP-256
7	Process Design Basis (Basic)	LRSL-000-PR-DB-706
8	Piping and Instrumentation Diagram Gas Turbine Generator	LRSL-SPX-PR-PI-202



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No.	Description	Doc. Number
9	Piping Material Specification (PMS)	LRSL-000-PI-SP-697
10	Electrical Design Criteria	LRSL-000-EL-DB-603
11	Specification for Electrical requirement for package equipment	LRSL-000-EL-SP-624
12	Specification for asynchronous Electrical Motors	LRSL-000-EL-SP-614
13	Specification for PMS	LRSL-000-EL-SP-622
14	Data Sheet for NER	LRSL-R1X-EL-DS-007
15	Generator sizing	LRSL-R1X-EL-CC-009
16	Data Sheet for Synchronous Generator	LRSL-R1X-EL-DS-008
17	I/O list for PMS	LRSL-R1X-EL-LI-003
18	Architectural block diagram for PMS	LRSL-R1X-EL-BD-001
19	ATS Logic Block Diagram	LRSL-R1X-EL-LD-001
20	Overall Single Line Diagram	LRSL-R1X-EL-SD-007
21	Schematic diagram for MV Switchgear	LRSL-R1X-EL-SM-001
22	Specification for Synchronous Generator	LRSL-000-EL-SP-619
23	Specification for the Design of Piping In Mechanical Packages	LRSL-000-PI-SP-696
24	Specification For Insulation	LRSL-000-PI-SP-690
25	Plot Plan for Service Platform	LRSL-SPX-PI-PP-001
26	Instrumentation Design Criteria	LRSL-000-IN-DB-632
27	Specification for Instrument & Control System For Package Units	LRSL-000-IN-SP-645



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No.	Description	Doc. Number
28	Specification for Painting	LRSL-000-MW-SP-673
29	Specification for 110VDC UPS System	LRSL-000-EL-SP-618
30	MV Single Line Diagram	LRSL-R1X-EL-SD-008
31	Generator sizing	LRSL-R1X-EL-CC-009
32	Electrical Signal Interface List	LRSL-R1X-EL-LI-005
33	Typical Data Sheet for MV & LV asynchronous Motor	LRSL-R1X-EL-DS-009

3. ABBREVIATIONS

Abbreviation	Meaning
NDT	Non Destructive Test
CV	Curriculum Vitae
QA	Quality assurance
CD	Compact Disc
QCP	Quality Control Plan
BOM	Bill of Material
MOM	Minutes of Meeting
GTG	Gas Turbine Generator

4. INQUIRED ITEMS

No.	Item Description	Item Tag Number	Number Required
1	Gas Turbine Generator Package, to meet the demand of output power (kw) at site condition that is stated in the GTG datasheet	LRSL26-PK-0301 A/B/C	3*



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Required equipment and/or materials in above items shall be considered as per "Data Sheet for Gas Turbine Generator".

*Any proposed array such as 2+1 or other shall be proposed by VENDOR and to be approved by the PURCHASER.

5. SCOPE OF WORK AND SUPPLY

The supply shall include, but not be limited to, all the items with all the appurtenances and accessories (internal and external) shown on the attached specifications, drawings, sketches, standards and requested in following tables and/or necessary for testing, shipment, operation and maintenance except items that have been explicitly excluded in this requisition.

The supply shall also include Design, Manufacturing, Testing, Inspection, Documentation, Spare Parts, Special Tools, Certification, Packing and Marking, Supply of goods, Services and Documentation for the equipment/bulk material fully in accordance with the specifications and other attachments to the requisition.

VENDOR shall specifically indicate whether any equipment, spare parts or consumables are likely to have a restricted "shelf life", or require special storage arrangements, which would impact on their ability to comply with the guarantee period outlined in section 16 of this material requisition.

VENDOR's proposal shall include, but not be limited to, equipment, materials and works listed in below tables as Scope of Supply and Work.

5.1 Scope of Supply

Row No.	Item / Tag	QTY	Description
1	LRSL26-PK-0301 A/B/C	3 No.	gas turbines set and auxiliary systems and equipment suitable for outdoor installation with combustion chamber, also including: Blow off and cooling air valves Variable inlet guide vanes and actuation system On board drainage system Intermediate shaft (between gas turbine and generator) Gas Turbine thermal skin insulation gas fuel (Dry Low NOx burners) Equipment supports



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2		3 No.	Motor Control Center (MCC Located in Electrical Emergency Room)
	Each package shall comprise of, but not be limited to:		
3		1x100%	Combustion Gas Turbine Driver capable of starting and continuously operating on sour natural gas and on diesel fuel
4		1 Lot Per Unit	Air inlet system including instrumentation, filters, silencer, drains, inspection covers, weather hood/louvres, bird screen, interconnecting ducting and fasteners etc. (constructed from Stainless steel 316L) The air filter shall be guaranteed to remove 99% of all particles 2 µm and larger, and 99.9% of all particles 10 µm and larger in the atmospheric air intake.
5		1 Lot Per Unit	Exhaust system with duct, two sample points, bellows and silencer (constructed from Stainless steel 316L).
6		1 Lot Per Unit	Common oil lubrication system for gas turbine, gearbox and generator with air cooled lube oil coolers, DC pumps, AC motors, batteries, battery charger, filters, flame arresters, vents and drains all in accordance with API 614
7		1 No. Per Unit	Gear Box built as per API 613
8		2 x 100% Per Unit	Air Cooled Lube Oil Cooler
9		1 No. Per Unit	Fuel gas supply and control system, including: Fuel gas skid with strainer, emergency stop valve, control valves, vent valve, Piping between fuel gas skid and gas turbine, boosting compressor (if needed) and all related accessories, unit Accessories such as metering equipment and etc. The Manufacturer shall confirm the ability of the



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			proposed gas turbine system to fully meet the design requirements with the fuel (sour gas) proposed by Purchaser/Owner.
10		1 No. Per Unit	Fuel oil system with all related accessories The Manufacturer shall confirm the ability of the proposed gas turbine system to fully meet the design requirements with the fuel proposed by Purchaser/Owner.
11		1 No. Per Unit	Ignition System
12			Compressor cleaning system including water tank, pump, hoses and nozzles
13			Hydraulic oil skid with tank, main pump, auxiliary pump, fan, accumulators, filters, valves, etc.
14		1 No. Per Unit	Enclosures: The ventilation system shall be designed to provide the ventilation and incorporate automatic fire/gas dampers at the air inlet and outlet, which shall be controlled from the fire and gas protection system. Enclosure for gas turbine and gear box including 2x100% ventilation fans certified for Zone 1, IIB T3, fire and gas detection and protection system and Co ₂ extinguishing systems. (Also fulfill the requirements of the GTG specification document)
15		1x100% Per Unit	Synchronous Ac Generator 6.6KV, 3PH, 3 Wire, 50HZ and Low Resistance Earthed
16			Generator Control Panel including Synchronizing Panel, AVR and required protections, metering & control facilities



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17			VFD Starter for Turbine Start Motor
18			Dedicated DC UPS (If Required)
19			Neutral Earthing Resistance (Outdoor Located)
20			Unit Control Panel (UCP)
21			Integration test with DCS/PMS
22		1 No. Per Unit	Starting System (Electric Motor, Battery pack & Battery Charger)
23		1 No. Per Unit	Gas Turbine Control Module
24			Over Speed Protection
25			Detectors and control system
26			Local Gauge Board With Terminal Box
27			Control Panel (PLC based) with HMI
28			Synchronizing panel with all required accessories
29			Protection panel with all protection functions
30			Mating Flanges and Reducers With Bolts, Nuts and Gaskets at Package Battery Limit (if it does not comply with purchaser PMS)
31			All piping items (include: pipe, fitting, valve, flange, gasket, bolt & nut) within battery limits
32			All Interconnecting piping supply with all required supports and all internals/interconnecting work required for each piece of equipment
33			Manifold single connection at the edge of skid Utility connections Vent and drain connections
34			All necessary controls, instrumentation and wiring within battery limits



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35				Electrical and Instrument equipment with all required accessories			
36				All required metering facilities			
37				Load sharing system			
38				All required safety devices			
39				Fire and Gas Detection and Alarm System			
40				Fire Fighting equipment			
41				All required electrical accessories in battery limit include cable, cable gland, terminal box			
42				Nameplates and its supports			
43				Earthing Boss, Bolt, Nut and Washer			
44				Special tools for erection and maintenance			
45				Spare Parts List for Installation, Pre-commissioning, Commissioning & Start-up, two year (s) operation			
46				Lifting lugs for installation and Maintenance and Any lifting appliance necessary to the installation of the package			
47				Equipment earthing by externally accessible earthing studs			
48				Neutral Grounding Resistor with contactor (NGR)			
49				GTG unit Power panel			
50				Base frame with associated accessories (Including embed materials)			
51				Supply and connection of all electrical and instrumentation cabling and wiring within battery limits			
52				Touch-up paint for site repair work and Protective Coating			



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53				Electrical trouble shooting diagrams			
54				All certificates requested in this specification			
55				Rust prevention for storage			
56				Export Packing for all items suitable for seaworthy and road transport			
57				First Fill lubricant and Consumable			
58				Setting bolts, nuts, Liners, Shims and washers for steel structure			
59				Coupling with Non-Sparking Coupling Guard			
60				Voltage Transformers and Current Transformers as required for protection, metering and voltage regulation control.			
61				Common heavy duty structural skid complete with welded attachments like earthing bosses and lifting lugs and anti-vibration mountings			
62				Complete earthing and bounding system			
63				Engineering services for all package design			
64				HAZOP participation or meeting when required by Purchaser			
65				Multi point supports complete with bolting as required for skid installation or welding installation by others			
66				All required inspection and tests as per approved ITP			
67				Certified lifting frames / beams, slings and shackles, etc. required for single point lifting			
68				Coordination and support of all Sub-Vendors			
69				SS316L name plate in English language			
70				Surface preparation and final painting of the equipment as per project painting specification			
71				Warranty and mechanical and performance guarantee (Design, material & workmanship)			
72				Workshop testing and Factory Acceptance Test (FAT) for complete unit and Site Performance Test			
73				Weight control data guarantee			



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74			Required documentation, certification & clarification dossier for engineering, installation, commissioning, operation, maintenance and trouble shooting for all items in Package
75			Other requirements specified in P&ID, Mechanical and Electrical Data Sheets, Specification, etc. Specified requirements in relevant P&ID are as minimum. Vendor shall add any other requirement inside package limit to achieve performance guarantee, control and safety of the equipment (subject to purchaser approval).
76			Other accessories required for safe and reliable operation (not referred in this document)

5.2 Scope of Work

No.	ITEM
1	Engineering/ Design and Documentation as per Vendor Document Index & Schedule
2	Manufacturing and Assembling
3	Engineering responsibility for all equipment covered by this requisition
4	Engineering and documentation
5	Inspection and Testing at Shop
6	*Painting (at Factory)
7	Mechanical and Performance guarantee
8	Electrical performance guarantee
9	Protection and Packing Marking
10	Calibration and Alignment (at Factory)
11	Training for Operation and Maintenance
12	Sub vendor coordination



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No.	ITEM
13	Packing (Export Packing & Rust Prevention)
14	Supervision for installation on Per diem and/or lump sum
15	Supervision for installation, commissioning, Pre-commissioning and start up on Per diem basis
16	Guarantee of the suitability of all used materials
17	Code Stamp and Certificates requested in this requisition
18	Certificates or declarations of conformance (as Required) of all Equipment
19	Procurement of Material & equipment
20	Marking, Packing, Transportation, Insurance, performing custom clearances and delivery of material and equipment to site and off lodging at site.
21	Insulation work
22	Hydrostatic test, NDT exam and performance test at shop
23	Interface coordination work with vendor for upstream-downstream switchgear and PDCS
24	Pre-inspection meeting
25	Any other work required for safe and correct performance of the items inquired

*Painting including finish coat in accordance with "Specification for Painting (Basic)". VENDOR shall get PURCHASER's approval for final coating color before painting.

6. EXCLUSIONS

All work and equipment required for a complete operating of the items inquired shall be included except as specifically excluded works by vendor and confirmed by client.

7. COORDINATION

Vendor shall follow requirements of "coordination procedure with vendors" in all stage of the job before and after order.



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8. DESIGN

8.1 General

Project site environmental condition shall be noted in all stages of job from early design to start-up and maintenance.

All of referenced and attached standards or project documents shall be used and followed strictly when applicable including all typical drawing or details.

All documents / drawings shall be written in English.

All changes and modifications on VENDOR documents shall be clearly clouded marked with revision mark. PURCHASER will take no action on any change without such marking.

No fabrication work is allowed without approved fabrication drawings / calculation books. However, when VENDOR print is marked with "approved as noted"; fabrication activities can be performed if PURCHASER's comments incorporated as indicated.

All fabrication drawings shall be drawn in specific scale.

The VENDOR shall grant free access to her organization to PURCHASER and OWNER representative for expediting, inspection and auditing activities.

Original file of calculation should be provided along with the result of calculation.

VENDOR shall submit the following VENDOR documents within 1 month after receiving the letter of intent from PURCHASER:

- Final Master Schedule showing design, procurement, fabrication, test, painting, packing & etc.
- VENDOR Print Index and Schedule (2 weeks after order)
- General arrangement drawing showing all of dimension and support location detail
- Setting information with loading data
- Complete unit weight dimensions' drawings with support location including nozzles

8.2 Technical Notes

Spare Parts shall be packed separately from the equipment.



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8.3 General Arrangement Drawings

General arrangement drawings (unit outline drawings) and component dimensional drawings shall include:

- Identification, size, rating and location of every terminal connection to which purchaser must connect. These connections include piping, instrumentation and electrical.
- Overall dimensions and centerline height(s).
- Dimensions of base frame complete with diameter, number, and location of bolt holes.
- Locating or tie-in dimensions of the equipment relative to the base frame or skid.
- Driver, gear (if applicable) and auxiliaries.
- Make, type, rated power and speed of driver(s).
- Direction of rotation for drivers and driven equipment.
- Magnitude and direction of thermal expansion movement of all equipment and piping.
- Location of all instrument panels, gage boards and junction boxes.
- Location of platforms, ladders, clips and pipe supports.
- Connection symbol.
- Size, rating, facing, and flange thickness.
- Location of center of gravity in three (3) directions of each major component.
- Approximate overall and handling weights.
- Each equipment and instrument item shall be identified with the purchaser's tag number.
- All horizontal and vertical clearances necessary for maintenance purposes, including lifting lug locations.
- Grounding lug location.
- Allowable nozzle loading data - allowable forces and moments for all equipment process connections (for customer connections only).
- General arrangement drawings shall also be provided for ancillary/auxiliary equipment. This covers equipment whether mounted on the main base frame or not.
- Automatic CO2 gas extinguishing system shall be considered for "Engine generator enclosure".



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Note: VENDOR shall consider PURCHASER's plot plan in his design. Dimension of package shall comply with PURCHASER's layout in Length, Width and Height. Also the stack height shall be designed based on PURCHASER requirement to avoid any health issues on upper deck.

8.4 Shop Detail Drawings/Catalogues

All fabrication details for process side components construction and attachment details, nondestructive examinations and testing requirement details, heat treatment procedures and all other applicable fabrication details.

8.5 Surface Preparation and Painting Procedures

Specified paint procedures shall be confirmed. If not specified, provide the proposed paint procedures including:

- Instructions for cleaning of surfaces and for blasting
- Materials used with names of paint manufacturers.
- Number of coats, color and dry film thickness of each coat.

8.6 Electrical & Instrument Wiring

Signal, power supply and grounding diagrams including instrument, junction box and cabinet terminations and wiring. Relay ladder diagrams are also included in this category.

8.7 Instrument / Electrical Installation Drawings

Typical hook ups showing supporting and electrical mounting of the instruments, junction boxes and accessories with associated identifying tags.

8.8 Performance Curves

The performance curves shall be in accordance with the applicable standards as specified (or as described in the general notes).

8.9 Bills of Material / Parts List

The parts list (bill of materials) requirements are:

All system components shall be listed and fully described.

Purchaser's tag numbers shall be used.

When component specification sheets or separate lists (instrumentation index) are provided a simple cross reference in lieu of a full description may be used.



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8.10 Spare Parts List and Special Tools List

Recommended spare parts list and special tools are required for each piece of equipment. Each list shall indicate the project name and location, equipment tag numbers, part manufacturer, part name and number and quantity (recommended by vendor and required by purchaser individually).

8.11 Sub items procurements

List of approved vendors is attached to this material requisition. Vendor shall select all of his sub vendors from this list. If not, vendor shall follow purchaser instruction for selection of qualified sub vendors. Vendor shall not use any sub item from sub vendors that does not listed in approved vendor list or does not approved by purchaser.

8.12 Emission/pollution control

VENDOR shall inform purchaser about all hazardous materials that is used in his product and their disposal requires special attention including:

- Highly ignitable or self ignitable materials such potassium etc.
- Corrosive materials including acids, Alkaline, caustics etc.
- Radioactive materials
- Toxic materials

Safe method of disposal shall be issued by VENDOR for PURCHASER approval and use.

Local limitations for emission rates in all forms to air, water bodies and soils shall be satisfied by supplied equipment and packages. IPS-E-SF-860 (1) shall be used as a base for Emission, pollution control and environmental protections as applicable.

8.13 Safety and health protection

Requirements of "Specification for Fire and Gas Detection; GDOC-ENG-IN-SP-005" shall be followed where applicable including safety signs and marks.

Requirements of "Regulations and Instructions for Implementing HSE; NIOC-HSE-TR-RU-042-00" shall be followed for shop and site activities where applicable.

9. DOCUMENTATION

9.1 General

Vendor shall provide the Copy of current certification of ISO 9001. When vendor does not hold ISO certification, vendor shall provide the following documents to purchaser for review During Equipment/ Material/ Service Procurement/ Subcontracting Stage and, in anyway, before Purchase Order:



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- Vendor Management commitment letter to Quality.
- Detailed Organization Chart of Vendor and Job Ticket scope of work and responsibilities of every position of that chart.
- Name and CV of Personnel for the position shown on the Chart with indication if on pay roll or from subsidiary or contracted personnel.
- List of working procedure to be issued for the Job at Order / Contractor Stage in order to be as close as possible to ISO 9001 and covering all item of the application Norm.
- Issue of Vendor Management Audit Program
- During Equipment / Material Service Purchase Order implementation stage:
 - Issue of the Job QA plan
 - Issue of working procedures for purchaser review within one month after order.
 - Implementation of the working procedure during order execution
 - Performance of vendor Management Audit Program
- VENDOR shall provide the Copy of vendor quality manual / quality plan. Quality Plan shall be subject to presentation, discuss and clarification with purchaser, and Company as necessary, prior to incorporation into contract.

9.2 Conflict in purchaser documents

In case of conflict between purchaser documents, VENDOR shall inform the PURCHASER about the conflict. For important conflicts, VENDOR shall wait for PURCHASER clarification before proceeding. For other events, documents priority order as specified hereinafter should be used. When conflict is not clarified between PURCHASER and VENDOR before order, the PURCHASER has the right to select the most stringent requirements without accepting any cost or time impact.

9.3 Order of priority of purchaser documents

The order of priority of PURCHASER documents (project documents) is as listed below:

- First priority : Purchase Order
- Second priority : Equipment Data Sheets
- Third priority : This requisition
- Fourth priority : Other Referenced Specifications



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Fifth priority : Code & Standard

Priority of valid clarification forms or minutes of meetings could be higher than all above when approved by purchaser.

9.4 Format and numbering of documentation

Vendor shall follow requirements of "Vendor Document Handling Procedure" and "Engineering Documents Numbering Procedure" in all stage of his job from proposal to end of vendor guarantee period.

9.5 Method of document submittal

Method of vendor document submittal is included in "Vendor document handling procedure" and shall be followed strictly. Template for transmittal is included in this document.

9.6 Language of documentation

All documents shall be written in the English. Persian may be used for local letters and minutes of meeting if approved by purchaser. All documents in other languages shall be translated to English before submittal.

9.7 Unit of measurement

SI units shall be used as far as possible except for followings:

- Pipe and flange nominal diameter should be represented in inch.
- Pressure : barg

10. DOCUMENTS THAT SHALL BE SUBMITTED BY VENDOR

LIST OF DOCUMENTS REQUIRED FROM VENDOR

No.	DESCRIPTION	AT THE TIME OF BID Q/TYP E	AFTER ORDERING				AT THE FINA L INSP. (Note 4)
			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
A	General Documents:						
1.	Manufacturing Schedule/Inspection Schedule (Note 5)	-	4/C+3/CD	2W	R	-	-



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LIST OF DOCUMENTS REQUIRED FROM VENDOR

No.	DESCRIPTION	AT THE TIME OF BID Q/TYP E	AFTER ORDERING				AT THE FINA L INSP. (Note 4)
			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
2.	Organization Chart	-	4/C+3/CD	2W	R	-	-
3.	VENDOR Print Index and Schedule (Note 5,7)	-	4/C+3/CD	2W	A	-	-
4.	SUB VENDOR List (Note 6)	4/C+3/CD	4/C+3/CD	2W	A	-	-
5.	Deviation List to Applicable Codes and Standards / PROJECT Specifications	4/C+3/CD	-	-	-	-	-
6.	Reference/Installation List	4/C+3/CD	-	-	-	-	-
7.	Quality Control Plan/Inspection and Test Plan	4/C+3/CD	4/C+3/CD	4W	A	5/C+4/CD	X
8.	Surface Preparation and Painting Procedures	-	4/C+3/CD	6W	R	5/C+4/CD	X
9.	Shop Detail Drawings/Catalogues	-	4/C+3/CD	4W	R	-	-
10.	Test / NDT Procedures	-	4/C+3/CD	18W	A	5/C+4/CD	X
11.	Mechanical Test Procedure	-	4/C+3/CD	18W	A	5/C+4/CD	X
12.	Performance Test Procedure	-	4/C+3/CD	18W	A	5/C+4/CD	X
13.	Recommended Spare Parts for Commissioning	4/C+3/CD	4/C+3/CD	18W	R	5/C+4/CD	X
14.	Recommended Spare Parts for 2 years of Operation	4/C+3/CD	4/C+3/CD	18W	R	5/C+4/CD	X
15.	Special Tools List	4/C+3/CD	4/C+3/CD	8W	R	5/C+4/CD	X
16.	Packing & storage and Transportation Procedure	-	4/C+3/CD	40W	R	5/C+4/CD	X



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			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
17.	Installation and erection manual	-	4/C+3/CD	4W Before Delivery	A	5/C+4/CD	X
18.	Operation & Maintenance Manuals	-	4/C+3/CD	4W Before Delivery	A	5/C+4/CD	X
19.	Inspection & Test Records and Certificates including but not limited to Material Test, NDT, etc.	-	4/C+3/CD	20W	R	5/C+4/CD	X
20.	Mechanical Test Certificates	-	4/C+3/CD	4W Before Delivery	R	5/C+4/CD	X
21.	Performance Test Certificates	-	4/C+3/CD	4W Before Delivery	R	5/C+4/CD	X
22.	Certified Test & Calibration Reports	-	4/C+3/CD	4W Before Delivery	R	5/C+4/CD	X
23.	Manufacturer's Data Books	-	4/C+3/CD	4W Before Delivery	R	5/C+4/CD	X
24.	List of Manufacturer's Data Book	-	4/C+3/CD	4W Before Delivery	R	5/C+4/CD	X
25.	Nonconformance Control and Corrective action Procedure	-	4/C+3/CD	4W	R	-	-
26.	Nonconformity Reports (NCR)	-	-	-	-	5/C+4/CD	X
27.	Packing List To Be Delivered At SITE	-	4/C+3/CD	4W Before Delivery	R	5/C+4/CD	X
28.	Progress Report (as per PROJECT format)	-	4/C+3/CD	Monthly	R	5/C+4/CD	-
29.	VENDOR's Procurement Status	-	4/C	Monthly	I	-	-
30.	Material Certificates / Certificate of Origin	-	4/C+3/CD	3W Before Fabricatio n Start	R	5/C+4/CD	X
31.	Copy of Unpriced SUB VENDOR Orders	-	4/C+3/CD	1W After Sub Order Placement	I	-	-



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			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
32.	Heat Treatment Procedures (If Applicable)	-	4/C+3/CD	6W Before Treat	R	5/C+4/CD	X
33.	Pickling and Passivation Procedure	-	4/C+3/CD	6W Before Pickling	R	5/C+4/CD	X
34.	NDT Map	-	4/C+3/CD	6W Before Test	R	5/C+4/CD	X
35.	Testing / NDT Records	-	4/C+3/CD	2W After Test	R	5/C+4/CD	X
36.	Internal Lining/Coating/Paintin g Procedures (If Applicable)	-	4/C+3/CD	6W Before Lining	R	5/C+4/CD	X
37.	PMI Procedure (If Applicable)	-	4/C+3/CD	6W Before Test	R	5/C+4/CD	X
38.	Material + Mill Certificates and Acceptance Certificates	-	4/C+3/CD	1W Before Delivery	R	5/C+4/CD	X
39.	Special Precautions for Handling & Storage Prior / During Erection (If Applicable)	-	4/C+3/CD	6W Before Shipping	R	5/C+4/CD	X
40.	As-Built Drawings	-	4/C+3/CD	2W Before Delivery	R	5/C+4/CD	X
B	Technical Documents:						
B.1	General Arrangement Drawing						
1.	Arrangement With Identification of Components	4/C+3/CD	4/C+3/CD	4W	A	-	X



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			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
2.	Plan, Front, Side View And Other Elevation Views of Components	4/C+3/CD	4/C+3/CD	4W	A	-	X
3.	Required Clearance for Opening Door and for Removing Breakers	-	4/C+3/CD	4W	A	-	X
4.	Location And Available Space For Cable(Gland) and/or Conduit Entrance on both Top and Bottom	-	4/C+3/CD	4W	A	-	X
5.	Location Of Terminal Blocks For Purchaser's Wring	-	4/C+3/CD	4W	A	-	X
6.	Location, Number & Size Of Setting Bolts	-	4/C+3/CD	4W	A	-	X
7.	Location, Number & Size of Earth Connections	-	4/C+3/CD	4W	A	-	X
8.	Weight of Equipment; Individual Weight of Stationary Unit and Breaker, If Shipped Separately	4/C+3/CD	4/C+3/CD	4W	A	-	X
9.	Degree of Protection (IP Rating)	-	4/C+3/CD	4W	A	-	X
10.	Noise Level	-	4/C+3/CD	4W	A	-	X
11.	Necessary Space and Fixing Details (Support Frame Details)	-	4/C+3/CD	4W	A	-	X
B.2	Electrical Technical Document						
1.	Single line diagram	4/C+3/CD	4/C+3/CD	4W	A	-	X
2.	Protection, metering and control wiring diagram		4/C+3/CD	4W	A	-	X



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			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
3.	Synchronizing panel IO list/ panel layout/ logic diagram/wiring diagram/termination diagram	-	4/C+3/CD	6W	A	-	X
4.	Load sharing system IO list/ panel layout/ logic diagram/wiring diagram/termination diagram	-	4/C+3/CD	6W	A	-	X
5.	NGR sizing	-	4/C+3/CD	4W	A	-	X
6.	Cable route layout (in battery limit)	-	4/C+3/CD	12W	A	-	X
7.	All Wiring Within Unit	-	4/C+3/CD	8W	A	-	X
8.	All Interconnecting Wiring Between Units	-	4/C+3/CD	8W	A	-	X
9.	Identification of all Terminals	-	4/C+3/CD	8W	A	-	X
10.	Identification of Terminal Blocks Including Those For Future Use	-	4/C+3/CD	8W	A	-	X
11.	All Wiring Which Should be Installed by Purchaser	-	4/C+3/CD	8W	A	-	X
12.	Completed Data Sheets (Electrical)	4/C+3/CD	4/C+3/CD	4W	A	-	X
13.	Characteristics Curves And Settings With Increments For All Protective Relays And Devices	-	4/C+3/CD	4W	A	-	X
14.	Detailed Data for and voltage transformer I.E. Type, Ratio, Burden & Excitation Characteristic Curve Etc. Including	-	4/C+3/CD	6W	A	-	X



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			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
	calculation for Suitability						
15.	Trouble Shooting Diagram	-	4/C+3/CD	8W	A	-	X
16.	Relay Co-ordination Drawings / Logic (Including Protection Relay Settings)	-	4/C+3/CD	8W	A	-	X
17.	Electrical Control System Loop Diagram	-	4/C+3/CD	4W	A	-	X
18.	Electrical Control System Logic Diagram	-	4/C+3/CD	4W	A	-	X
19.	Signal List	-	4/C+3/CD	8W	R	-	X
20.	Electrical Load list	4/C+3/ C D	4/C+3/CD	4W	A	-	X
21.	Type Test Report	4/C+3/ C D	4/C+3/CD	4W	A	5/C+4/ CD	X
22.	Termination Diagram	-	4/C+3/CD	4W	A	5/C+4/ CD	X
23.	Electrical Cable List	-	4/C+3/CD	4W	A	5/C+4/ CD	X
24.	Performance Test		4/C+3/CD	4W	A	5/C+4/ CD	X
25.	Characteristic Curve of Generator	4/C+3/ C D	4/C+3/CD	4W	A	5/C+4/ CD	X
26.	Complete Name Plate And Label Data	-	4/C+3/CD	2W	A	-	X
B.3	Mechanical Technical Document						
1	Completed Data Sheets (Mechanical)	4/C+3/ CD	4/C+3/CD	4W	A	-	X
2	Performance Curves	4/C+3/ CD	4/C+3/CD	4W	A	-	X
3	Cross Sectional	4/C+3/ CD	4/C+3/CD	10W	A	-	X



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			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
	Drawings of main equipment	CD					
4	P&ID's / PFD's (Machine, Lube Oil System, Cooling System, etc.)	4/C+3/ CD	4/C+3/CD	4W	A	-	X
5	Auxiliary Equipment Data Sheet including, L/O System, Coupling, Coolers, air intake, exhaust, fuel gas system, fuel oil system, etc.	-	4/C+3/CD	12W	A	-	-
6	Auxiliary Systems General Arrangement Drawing	4/C+3/ CD	4/C+3/CD	12W	A	-	-
7	Equipment component list	-	4/C+3/CD	20W	R	-	-
8	Utility Requirements	-	4/C+3/CD	20W	R	-	-
9	Coupling Drawing including Bill of Material	-	4/C+3/CD	20W	R	-	-
10	Completed Noise Data Sheet	-	4/C+3/CD	12W	A	-	-
11	Lubricant list		4/C+3/CD	12W	A		
12	Performance acceptance test procedure	4/C+3/ CD	4/C+3/CD	4W	A	-	X
13	Performance report test	4/C+3/ CD	4/C+3/CD	4W	A	-	X
B.4	Instrument Documents (Note 9):						
1	Completed Instrument Data Sheets (Note 10)	-	4/C+3/CD	10W	A	5/C+4/ CD	-
2	Instrument Wiring Diagram	-	4/C+3/CD	12W	A	5/C+4/ CD	X
3	Control and Instrument	-	4/C+3/CD	10W	A	5/C+4/ CD	-



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			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
	Schematics						
4	Instrument List	-	4/C+3/CD	10W	A	5/C+4/CD	-
5	I/O List (Note 11)	-	4/C+3/CD	12W	A	5/C+4/CD	-
6	Instrument Loop and Logic diagrams	-	4/C+3/CD	12W	A	5/C+4/CD	-
7	Cause and effect diagrams	-	4/C+3/CD	12W	A	5/C+4/CD	-
8	Instrument Cable list (for all cables in Unit, including length to battery limit) (Note 12)	-	4/C+3/CD	10W	A	5/C+4/CD	X
9	Alarm, Trip and Set point list	-	4/C+3/CD	12W	A	5/C+4/CD	X
10	Manufacturers documentation and drawings	-	4/C+3/CD	12W	A	5/C+4/CD	X
11	Instrument Installation drawings (hook-up, terminal, JB, Local panel, etc.)	-	4/C+3/CD	12W	A	5/C+4/CD	X
12	Unit Control Panel Dimensional drawing with component list	-	4/C+3/CD	12W	A	5/C+4/CD	X
13	Unit Control Panel terminal detail and wiring diagram	-	4/C+3/CD	12W	A	5/C+4/CD	X
14	Ignition Control Panel Layout	-	4/C+3/CD	12W	A	5/C+4/CD	X
15	Flow Element Calculations	-	4/C+3/CD	12W	A	5/C+4/CD	-
16	Control Philosophy	-	4/C+3/CD	8W	A	5/C+4/CD	X
B.5	Process and Safety Documents:						
1	Piping and instrument diagrams of all	4/C+3/CD	4/C+3/CD	8W	A	5/C+4/CD	X



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			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
	systems						
2	Certificate for CO2 Extinguishing System	4/C+3/ CD	4/C+3/CD	8W	A	5/C+4/ CD	X
3	P&ID for CO2 Extinguishing System	4/C+3/ CD	4/C+3/CD	8W	A	5/C+4/ CD	X
4	Distribution Piping Layout for CO2 Extinguishing System	-	4/C+3/CD	8W	A	5/C+4/ CD	X
5	CO2 calculation	4/C+3/ CD	4/C+3/CD	8W	A	5/C+4/ CD	X
6	Cause & Effect for CO2 Extinguishing System	4/C+3/ CD	4/C+3/CD	8W	A	5/C+4/ CD	X
7	Data sheet for CO2 Devices and Instruments	-	4/C+3/CD	8W	A	5/C+4/ CD	X
8	Technical Description for CO2 Extinguishing System	-	4/C+3/CD	8W	A	5/C+4/ CD	X
B.6	Other technical document						
1	Bill Of Materials Giving Manufacturer, Model No., Size Rating And Quantity Etc.	4/C+3/ CD	4/C+3/CD	8W	A	-	X
2	Specification And Catalogues.	4/C+3/ CD	4/C+3/CD	3W	A	-	X
3	Quality Assurance Manual, Quality Control Plan and Certificates Associated With Quality Control If any	-	4/C+3/CD	4W	A	-	X
4	Inspection And Test Plan Procedure	4/C+3/ CD	4/C+3/CD	4W	A	-	X
5	Inspection And Test Report Including	-	4/C+3/CD	3 Days After	R	-	X



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			DRAWINGS AND DOCUMENTS				
			Q/TYPE (Note 1)	DEL. TIME (Note 2)	PURPOSE (Note 3)	FINAL ISSUE (Note 1)	
	Type Test Certificates			Inspection			
6	Operating and Maintenance Manual With Instructions For Erection and Start-Up	-	4/C+3/CD	4W	R	-	X
7	Spare Parts For Insurance, Construction, Pre-commissioning, Commissioning and Start-Up	-	4/C+3/CD	4W	R	-	X
8	Special Tools for Installation, & Maintenance	-	4/C+3/CD	4W	R	-	X
9	Final book & Final book index	-	4/C+3/CD	At Delivery	A	5/C+4/CD	X
10	Vendor Data book	-	4/C+3/CD	At Delivery	A	5/C+4/CD	-
11	Packing List	-	4/C+3/CD	4w before Delivery	A	5/C+4/CD	X
12	Export Packing Specification and Procedure	-	4/C+3/CD	4w before Delivery	A	5/C+4/CD	X
13	Transport Authorization	-	4/C+3/CD	4w before Delivery	A	5/C+4/CD	X

• NOTES:

1. Q=Quantity, C=Copy, T=Transparent, P=Polyester, CD=Compact Disc, E=E-File.
2. W=Week After Order Placement, M=Month After Order Placement
3. R=For Review, I=For Information, A=For Approval
4. X=Documents To Be Submitted At The Final Inspection / Data Book
5. First payment of the job could not be released before submittal of document marked with Note 5.
6. PURCHASER has the right to reject SUB VENDORS if his capability is judged poor or not proven.



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7. No drawing/document could be reviewed before receiving VPIS.
8. All drawings should include weighted part list.
9. Title of all documents which will be issued by vendor shall strictly be as listed on this table.
10. All instrument data sheets shall be completed based on ISA format
11. List to include tag, short name, range, units, low/high scale, alarm levels, and signal levels, active or passive, etc.
12. For all cables in unit, including length to battery limit.
13. Document Native files shall be submitted.

11. VENDOR PROPOSAL

11.1 Deviation to PURCHASER documents/applicable codes and standards

VENDOR proposal shall be in strict conformity with PURCHASER requirements, codes and standard without exception. Any deviation or alternatives shall be clearly identified and separately listed in VENDOR proposal in vendor deviation form. No deviation list submittal in proposal means that VENDOR accepted all PURCHASER requirements. PURCHASER has no responsibility to discover any deviations or alternatives entered in VENDOR proposal and are not listed in deviation list. VENDOR deviation form template is represented in "Vendor document handling procedure".

Deviations, if any, shall be submitted during bid stage. No deviations will be accepted after order.

Exceptions, deviations and alternatives will be valid only if approved in writing by PURCHASER.

11.2 Information that shall be available in proposal

Each proposal shall include the following information:

- Requisition number
- Firm price(s) by item
- Earliest delivery date(s)
- Origin of material being quoted (country, place, and name of manufacturer)
- Approximate shipping weight and dimension

Un-priced proposals should be prepared to be able to meet technical evaluation only.



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If purchaser datasheets contain fields that marked by "by vendor", VENDOR shall fill this fields and shall include filled datasheet (s) to his proposal. PURCHASER reserve the right to reject or discard proposals that does not includes of completed datasheets.

11.3 Pricing

A template for pricing form will be submitted to VENDOR for use in his proposal. VENDOR shall submit his comments on this form in technical section of his proposal. Finalized price form will be forwarded to vendors for use in commercial proposal. PURCHASER reserve the right to reject proposals that does not follows pricing sequence and method.

11.4 After Order

All documents and drawings shall be submitted, in accordance with "Vendor Documentation Procedure" attached in this Requisition. The calculation must include an outline of the method used, input data, formula used and result all clearly set out which can be readily understood and reviewed by the PURCHASER. Computer results may also be presented.

11.5 General

VENDOR shall submit the following Vendor Documents within 1.5 months after receiving the Letter of Intent from PURCHASER:

- Master Schedule shown design, procurement, fabrication, test, painting, packing & etc.
- Vendor Print Index and Schedule (2 weeks after order)
- General arrangement drawing showing all of dimension and support location detail
- Setting information with loading data
- Complete unit weight dimensions' drawings with support location including nozzles

11.6 Coordination meetings

After the order is awarded, VENDOR shall, on receipt of PURCHASER notice, send sufficient number of qualified personnel to PURCHASER office at vendor cost to hold the coordination meeting(s).



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12. INSPECTION AND TESTS

12.1 General

Inspection and tests shall be made by VENDOR in accordance with requirements specified in this Requisition and/or any Engineering Specification, code or standard referenced in this requisition.

Shop witness test shall be carried out in accordance with the documents approved by PURCHASER. Any witness/testing/inspection without the approved document shall be invalid.

No protection, paint or other filling shall be applied to the contract works before they have been inspected, tested and approved.

Manufacturing Data Record for Equipment shall be prepared in accordance with applicable specification and shall be completed at the final stage of inspection/test for PURCHASER's inspector's review prior to shipment of items.

12.2 Quality Assurance Plan

VENDOR shall submit a quality assurance plan describing his quality system and its application to the scope of supply. This plan shall be in accordance with the applicable project specifications.

12.3 Traceability Levels

The following levels shall apply to the traceability of certification:

Level 1 – EN 10204-3.2 Critical items

Level 2 – EN 10204-3.1 Normal level of assurance

Level 3 – EN 10204-2.2 Non- critical items

12.4 NDE Qualification

All personnel performing NDE functions must be adequately qualified. The NDE operators qualifications shall form part of all Vendor quality plans and therefore be approved by the PURCHASER before manufacture works by the inspector. The foregoing shall also apply to all sub- vendors.

13. SPARE PARTS AND SPECIAL TOOLS

VENDOR shall submit list of recommended spare parts for Commissioning, pre Commissioning and startup and list of two years operation spare part. This list shall be priced item by item and forwarded to the PURCHASER in bid stage for review and approval. Price of spare parts shall be valid from date of proposal delivery by



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PURCHASER for 30 month or end of VENDOR guarantee period, each appears earlier. VENDOR is responsible to supply each of spare parts at PURCHASER request.

A template form for spare parts list is attached to this requisition. VENDOR shall use this template for pre-commissioning, commissioning and startup and also for two years spare parts.

14. DELIVERY

After PURCHASER's approval for tests and inspections and before dispatch, each part of the contract works shall be thoroughly cleaned and appropriately protected and packed in accordance with the requirements of carriers and shippers and suitably for prolonged storage. All packing cases and materials shall be included in the proposed price, and shall become the property of the PURCHASER.

At Preparation for Shipment, Equipment shall be emptied, dried, painted and, where necessary preserved for shipment and long term 18 months outdoor storage at project site.

Adequate temporary bracing for equipment and accessories shipped, shall be provided to avoid overstressing or damage during shipping, transportation and erection, as required. All equipment shall be packed and weather protected for export. Loose parts shall be boxed and shipped along with an itemized packing list with the main assembly.

VENDOR shall provide the following documents with delivery of equipment.

Three (3) hard copies plus six (6) electronic copies of following documents shall be provided inside the packing of the equipment, supplement from documents, which is specified in the Vendor Documents Requirements attached in this Requisition:

- Complete package of final drawings
- Copy of all certificates
- Inspection release certificate (IRC)
- Approved packing list (Including each spare list)

Calibrated loading data (the mentioned calibrated loading data should be required at lifting stage for heavy equipment. And then, this document shall have an endorsement by PURCHASER inspector or an appointed third party inspector)

"Instruction for Packing, Marking, Shipping and Delivery" shall be followed strictly by VENDOR where applicable.



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15. SUPERVISING AND TRAINING

15.1 General

The vendor supervisor(s), who is assigned to the project site for the installation, start-up, inspection, repair and maintenance of the equipment supplied by the VENDOR, shall perform his duty for all equipment including those supplied by the vendor subcontractors.

15.2 Supervisor(s) qualification

The vendor supervisor(s), who is assigned to the project site for the installation, start-up, inspection, repair and maintenance of the equipment supplied by the VENDOR, shall perform his duty for all equipment including those supplied by the vendor subcontractors.

15.3 Supervisor(s) Duty

The duty of the Supervisor shall be, but not limited to, as follows:

- Witness the inspection of undoing the packing
- Check the dimension of the setting
- Supervising and direction for the assembling and installation
- Supervising and direction for, and check the leveling and alignment
- Supervising and direction for, and check the connection of the cables
- Check the performance, and adjustment of the safety device and instruments
- Supervising the preparation of the startup
- Supervising and direction for the start-up operation
- Execution of and/or supervising and direction for the assembling, disassembling, inspection and repair
- Preparation of the inspection record and the miscellaneous report
- Advice of the control for the time schedule
- Technical supervising and direction for the maintenance

15.4 Supervisor(s) Responsibility

The VENDOR shall be responsible to indemnify for damages to property or for personal injuries which result from the gross negligence of the Supervisor(s) while performing his duty.



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16. GUARANTEE

VENDOR shall guarantee the operation of the equipment to the specified design conditions. VENDOR shall warrant the engineering, materials and workmanship of the equipment for a period of 12 months after successful start-up or 36 months after shipping whichever comes earlier. Under this warranty, all materials, parts, and assemblies found to be defective during the guarantee period shall be replaced by VENDOR.