

TENDER NO. PROC-FC/CB/PE&FD/MR-4591/2019

**(GAS ENGINEER DRIVEN RECIPROCATING COMPRESSOR PACKAGE FOR MARU RETI
FIELD)**

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OGDCL MASTER SET OF TENDER DOCUMENTS
UPLOADED ON OGDCL WEBSITE – SINGLE STAGE TWO ENVELOP BIDDING
PROCEDURE.

<https://ogdcl.com/sites/default/files/tender%20download/MasterSetofTenderDocumentsForeign-28Oct19.pdf>

(Note: In case of any conflict between Section I & Section II, Section I shall prevail)

SCHEDULE OF REQUIREMENT

(ANNEXURE-A)

TENDER NO. PROC-FC/CB/PE&FD/MR-4591/2019

GAS ENGINEER DRIVEN RECIPROCATING COMPRESSOR PACKAGE FOR MARU RETI FIELD

Line	Item Description	UOM	Quantity	Unit FOB Price USD	TOTAL FOB PRICE USD	Unit CFR Price USD	TOTAL CFR PRICE USD
	SUPPLY PART						
1	GAS ENGINE DRIVEN RECIPROCATING COMPRESSOR PACKAGE AS PER SPECIFICATIONS ATTACHED	QTY	1				
2	START-UP & COMMISSIONING SPARES	QTY	1				
	<i>(Please provide Item wise Price list)</i>						
3	DIAGNOSTIC TOOLS & CALIBRATION EQUIPMENT/ SPECIAL TOOLS	QTY	1				
	<i>(Please provide Item wise Price list)</i>						
4	OPERATION AND MAINTENANCE & CONSUMABLE SPARES FOR 02 YEARS FOR COMPRESSOR, ENGINE AND CONTROL SYSTEM	QTY	1				
	<i>(Please provide Item wise Price list)</i>						
	SERVICES PART						
5	INSTALLATION SUPERVISION, COMMISSIONING & STARTUP CHARGES	LUMPSUM	1				
	TOTAL				XXXXXXXXXXXX		XXXXXXXXXXXX

Other Terms

1	Bid shall remain Valid for a period of 180 Days from the date of Technical Bid Opening.
2	Bid Bond for an amount of USD 30,000 or Equivalent PKR is required upfront alongwith technical bid which shall remain valid for a period of 210 days from the date of technical bid opening.
3	The case will be processed on Single Stage - Two Envelop Bidding Procedure as per PPRA rules.
4	Supply LC Payment: 80% Payment will be made on shipment, balance 20% after successful commissioning and performance testing upon submission of beneficiary's Invoice duly verified by OGDCL.
5	Services LC Payment: Payment will be made after successful commissioning and performance testing
6	10% Performance Bond in case of award shall remain valid upto 24 Months from the date of Shipment or 12 Months from the date of commissioning, whichever comes first.
7	For the preparation of the Bid. Bidders are advised to carefully read all the terms and conditions of the tender document available at OGDCL website in the master tender document. (Single Stage Two Envelope Basis) https://ogdcl.com/sites/default/files/tender%20download/MasterSetofTenderDocumentsForeign-28Oct19.pdf
8	Bidder shall provide a certificate that the equipment shall be brand new along with the bid and along with shipment (in case of award of contract).
9	Item Sr. No. 4 , OPERATION AND MAINTENANCE & CONSUMABLE SPARES FOR 02 YEARS FOR COMPRESSOR, ENGINE AND CONTROL SYSTEM will not be made part of commercial evaluation. However the cost of these spares shall not exceed ten (10) percent of Main Equipment cost mentioned at Sr. No. 1.
10	Following Annexures to be attached with bids as per attached format
	ANNEXURE – “A” SCHEDULE OF REQUIREMENT or the Principal’s/manufacturer’s Proforma Invoice both duly signed and stamped by Principal/Manufacturer) (Un-prices with technical bid and Priced with Financial Bid)
	ANNEXURE – “B” FORM OF TENDER OR BIDDING FORM (Un-prices with technical bid and Priced with Financial Bid)
	ANNEXURE – “C” BID BOND
	ANNEXURE – “D” PERFORMANCE BANK GUARANTEE
	ANNEXURE – “E” DATA SUMMARY SHEET (Un-prices with technical bid and Priced with Financial Bid)
	ANNEXURE - “F” DECLARATION
	ANNEXURE - “G” DECLARATION
	ANNEXURE - “H” Integrity and Ethics Undertaking
	ANNEXURE - “I” Integrity and Ethics Undertaking



OIL & GAS DEVELOPMENT COMPANY LTD.

**TENDER DOCUMENTS FOR DESIGN,
MANUFACTURING/ FABRICATION, ASSEMBLING
& SUPPLYING OF PACKAGED RECIPROCATING
COMPRESSORS WITH INSTALLATION
SUPERVISION, PRE-COMMISSIONING,
COMMISSIONING & START-UP SERVICES AT
MARU-RETI GAS FIELD**

0504196-PRO-TD-001



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REV	DESCRIPTION	ORIG	REVIEW	PEC APPROVAL	DATE	CLIENT APPROVAL	DATE
0	Issued for review	<u> </u> Sheraz	<u> </u> Burhan	<u> </u> Adeel	August 17, 2019		
1	Issued for review	<u> </u> Sheraz	<u> </u> Burhan	<u> </u> Adeel	Oct. 02, 2019		

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1 **GENERAL**

1.1 Introduction

Maru-Reti gas field is located in the Ghotki district at a distance of approximately 150 kms from Sukkur. A total of seven wellheads have been drilled in the area including RETI-1A, RETI-2, MARU-1, MARU-2, MARU SOUTH, MARU EAST and KHAMISO. Raw gas from the above mentioned wellheads commingles at MARU-1 gas gathering facility and is being sold to ENGRO FERTILIZERS.



Keeping in view the declining trend in wellhead flowing pressures, OGDCL intends to install a reciprocating compressor package suitable to operate in remote locality of MARU-1 gas gathering facility.

1.2 Definitions

Terms used in this scope and specification have the following meanings

“Company” shall mean OGDCL (Oil & Gas Development Company Limited) installing the Packaged Reciprocating Compressor.



“Vendor/ Supplier” shall mean the entity with which OGDCL shall place order for the Packaged Reciprocating Compressor covered in this scope and specification on outright purchase.

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1.3 Codes, Standards & Company's Specifications Requirements

Supplier shall ensure compliance with Company supplied specification(s) and relevant industry accepted codes and standards listed below with the requirements for the items.

API 11P	Packaged Reciprocating Compressors for Oil and Gas Production Services.
API 615	Sound Control of Mechanical Equipment for Refinery Services
ASME VIII	Pressure Vessels
ASME B16.5	Pipe Flanges and Flanged Fittings
ANSI B31.3	Process Piping
API 618	Reciprocating Compressors for Petroleum, chemical and Gas industry services
RP 500B	Recommended Practice for Classification of Locations for Electrical Installations at Drilling Rigs and Production Facilities on Land and Marine Fixed and Mobile Platforms.
RP 520	Recommended Practices for the Design and Installation of Pressure Relieving Systems in Refineries, Part I–Design and Part II–Installation.
RP 521	Pressure Relieving & De-Pressuring Systems
RP 551	Process Measurement Instrumentation
RP 552	Transmission Systems

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RP 554 Process Instrumentation & Control

ASME Sec-II Boiler and Pressure Vessel Code, Material Specifications.

ASME Sec-VIII Boiler and Pressure Vessel Code. Rules for Construction of Pressure Vessels

Section IX Boiler and Pressure Vessel Code, Welding and Brazing Qualifications

NFPA70 National Electrical Code

MG-1 Motors and Generators



NEMA 250 Enclosures for Electrical Equipment

All applicable codes and standards of ASTM, GPSA, IEC, ISA, NACE, NFPA, OSHA, SSPC, TEMA.

1.4 Errors or Omissions

The review and comments by Company on Supplier's or its Manufacturer's drawings procedures or documents shall only indicate acceptance of general requirements and shall not relieve Supplier of its obligations to comply with the requirements of this scope and specification and other related parts of the Contract Documents.

Any errors or omissions noted by Supplier in this scope and specification shall be immediately brought to the attention of the Company. All deviations to this scope and specification, other related specifications or annexure and relevant codes & standards shall be brought to the knowledge of the Company in the bid. All deviations made during the procurement, design, manufacturing, testing and inspection shall be with written approval of the Company prior to execution of work. Such deviations shall be shown in the documentation prepared by Supplier.

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1.5 Conflicting Requirements

In the event of any conflict, inconsistency or ambiguity between the contract scope of work, this scope and specification, codes & standards referenced in this specification or any other contract documents. Supplier shall refer to the Company whose decision shall prevail.

1.6 Company's Intention



Company intends to directly purchase the compressor package based on specifications / Data sheet referred in this document. The supplier shall be responsible for design, manufacturing / fabrication, assembling, installation supervision, pre-commissioning, commissioning, start-up & testing of the compressor package. Company after the successful handover, shall be responsible for the operation and maintenance of the compressor package.

The Supplier shall be responsible to size the Packaged Reciprocating Compressor, in view of the requirements as detailed in relevant specifications, procure material, perform mechanical design (Supplier shall submit the package general arrangement drawings for Company's approval prior to finalization of design), fabricate, paint, test and prepare for shipment.

Supplier is advised to select from its standard range, compressor that will operate at given operating conditions. It should be noted that any equipment, instrument, etc. required for making package operational throughout the operating life as indicated shall be considered in Supplier's scope.

Supplier shall also be responsible for all Sub-suppliers coordination, data and other documents, provision of guarantees, provision of equipment and personnel for the trial assembly, mechanical run and functional testing of complete packages at Supplier's works and packaging and delivery as specified in the tender document. Supplier shall arrange each package according to good industry and well recognized practices, which facilitates operation and maintenance.

Supplier shall ensure that all components of the Reciprocating Compressor Packages are new.



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2 SCOPE OF SUPPLY & SERVICES

Supplier shall be responsible for the design, engineering, supply of all materials, manufacturing / fabrication, assembling, testing, painting, preservation, shipment transportation, installation supervision, pre-commissioning and commissioning required for the Compressor package in accordance with this scope and specification. Supplier shall submit all design details, general arrangement, and detailed drawings (03 sets of each) for Company's approval prior to finalization of design.

Supplier's scope shall include the following as a minimum:

- Supply of reciprocating compressor package complete with gas engine including lube oil system, fuel gas, PLC system, field instrumentation, F&G detectors & control devices, machine monitoring sensors as outlined in this document.
- Designing, engineering, manufacturing, fabrication, assembling, painting, configuration, programming, preservation, supplying, installation supervision, inspection, testing, start up and commissioning.
- Supply of Catalytic Bead Gas Detector and UV/IR flame detectors along with all mounting accessories, cables from Detectors to Control panel, termination and and calibration testing equipment.
- Provision of all necessary documentation including equipment dossiers, etc. (03 sets).
- Indication of all technical deviations/exceptions to this scope and specification and notifying Company about such deviations/exceptions.
- Preparation of shipping arrangement for delivery.
- Provision of required material certification.
- Protective coating/painting including preparation for shipment.
- Supply of two (02) years spare parts list with price (containing OEM / vendor part no. for traceability and ordering purposes to ensure 02 years smooth operation after commissioning.
- Supply of commissioning spares. Separate price list of commissioning spares is also required with OEM / vendor part number.



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- Provision of set of special tools & lifting arrangements.
- Development and provision of manufacturing schedule.
- Access for inspection, witnessed by Company / Company's Representative of skids during and after assembly.
- Arrange guarantee & warranty certificates from the original manufacturer of the equipment.
- Supply of operating consumables, and first fill of lubricants, chemicals, etc.
- Arrange undertakings from the original equipment manufacturers to the supply of spare parts and other after sales services obligations.
- Supervision of installation of hook-up.
- Startup, pre-commissioning & commissioning services.
- Performance Testing (Factory and at Site).
- Complete civil foundation design of the package. In this respect, Supplier shall provide detailed civil foundation drawings along with all calculations and design consideration details. Supplier shall also be responsible to supply foot-print anchor bolts templates of major equipment skids for an early error free construction of foundations at site.
- 3-D model of the whole package along with all interconnecting piping for Company's review / approval.

2.1 Commissioning Spares

A complete set of spare parts required for commissioning and start-up shall also be supplied and shipped with the package. These parts shall be tagged to show the part number for cross-referencing against a materials list. Packager shall provide list of spares at respective OEM letter head.

Supplier shall also specify and supply the first fill of lubricants and consumables for commissioning and start-up. This shall include the necessary quantity required for flushing the various systems.

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Supplier shall provide following commissioning spares in addition to the parts recommended for compressor package and by Original Equipment Manufacturer (OEM) of pumps, motors, instrumentation, etc.

- Lube oil for first charge of oil + 20% extra
- Other chemicals, consumables, etc. initial fill + 20% extra .
- Oil filters elements (2 times of the installed quantities).
- Suction strainer elements (3 times of the installed quantities).

2.2 Operation Spare Parts & consumables for 02 years

Supplier shall recommend and provide list of spare parts needed for two (02) years of operation with C&F Karachi price. The spares should be in accordance with recommendation by OEM of all supplied components at OEM letter head. Recommended spares should take into account related factors of item's reliability, effect to equipment downtime upon production or safety, costs of parts, and availability of equipment service facilities. The Company shall separately order these spares once supply of the package is finalized.

All spare parts furnished by Supplier shall be wrapped and packaged so that they can be preserved in original as-new conditions of storage and shall be properly tagged and coded so that later identification for intended equipment usage would be facilitated. They shall be packaged separately, clearly marked as "Spare Parts", and shipped along with the packages. Packing lists shall be furnished so that the parts can be handled without uncrating if desired.



Supplier shall also provide complete parts list with OEM / vendor part numbers for traceability of ordering purposes. Cost of recommended Operational & consumable spares for 02 years will not be included in financial evaluation. Prices of spares should be quoted on C&F basis.

2.3 Capital Spares

Parts or complete sub-assemblies with long delivery, generally of high cost and whose unavailability leads to prolonged shutdown of the equipment and curtailing production. They comprise such items as spare rotating parts, heat exchanger parts, and instruments, complete spare pumps, equipment without a standby etc. Supplier shall develop fully detailed list of these spares along with prices and submit with the bid.

2.3.1 Diagnostic Tools

- Bidder shall supply following diagnostics/ calibration/ maintenance tools
- One portable configurator or laptop computer having calibration/ diagnostic/ programming software for PLC, transmitter
 - Timing Light
 - Heat Gun & Vibration Pen
 - Laser Alignment Tool
 - Fluke Multimeter
 - Druke pneumatic pressure calibrator with pump

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2.4 Special Tools

The Supplier shall list in the quotation and supply all special tools, gauges, appliances and fixtures necessary for installation, maintenance and repair of all equipment in his supply including any special lifting/spreader beams, handling appliances, rotating element supports, calibration kits including sample gas cylinders etc. Each item shall be indelibly marked with its size and purpose. These special tools shall include any non-metallic standard tools, torque wrenches and the hydraulic tools for coupling, fitting and removal.

2.5 Third Party Pre-Shipment Inspection

Final inspection and testing of equipment prior to dispatch shall be carried out by Third Party Inspector, will be arranged by OGDCL. Preliminary inspections, e.g. to examine package instruments and junction boxes during or on completion of fabrication, will be performed as necessary and recorded separately.



A report and a completed test dossier shall be produced by the inspector on completion of all inspection and testing, or at intervals as testing proceeds. A release certificate will be issued by the inspector when all testing has been completed to his satisfaction and equipment may then be dispatched to site.

2.6 Installation Supervision, Pre- Commissioning / Commissioning & Startup Services

2.6.1 Installation Supervision

Supplier shall provide Installation Supervision of the complete package. Supervision services shall be continued till the mechanical completion of the package.

Before commencing installation, Supplier shall participate in overall package inspection at site for verification of completeness of the package. For installation supervision services, supplier shall submit a detailed schedule of construction / installation with HOLD points where check / inspection by supplier representative / supervision are mandatory. Supplier will indicate the category of field personnel to be deputed and their estimated man-days involved.

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2.6.2 Pre- Commissioning / Commissioning & Startup Services

Supplier shall provide Pre- Commissioning / Commissioning & Startup services after the completion of installation works and when the package is accepted as mechanically complete. Supplier will indicate the category of field personnel to be deputed and their estimated man-days involved.

2.7 Performance Test

After successful startup, the package will be subjected to performance testing as per section 5.5 of this document. It shall be the responsibility of the supplier to conduct performance test to demonstrate the package's suitability for the intended operating parameters as referred in section 4.1.1 of this document.

2.8 Meetings / Design Reviews



Company shall review all the basic and detailed engineering documents. Standardization of equipment, instruments and materials is also desirable as far as practicable. To achieve these objectives, follow up meeting and reviews are anticipated to take place at supplier's design office during the project implementation period. In this meeting, representatives of Company will participate. Upon award of contract, a kick-off meeting for detailed discussions on the design basis, supplier's design standards and criteria, operation philosophy of equipment will be held. This meeting may be conducted on tele-conferencing.

During detail engineering, one (01) design review meeting would be performed with supplier at his design office to discuss/finalize the design information such as control concept, plot plan, equipment specifications, and HAZOP study of the package; which would be provided / performed by the Supplier for civil, structural, piping, mechanical, electrical, instrumentation and other detailed engineering works for the Project and its tie-ins/interconnections with other units.

Two OGDCL Engineers will attend the design review meeting for 05 days (excluding travelling time). All expenses (Air Tickets, Visa, hotelling & transport) for 05 days will be borne by the bidder.

2.9 HAZOP & Safety Screening of Complete Package

HAZOP study during the design of package shall be carried out by a team of professional with expertise in different areas such as process, systems & instrument etc. The team will proceed with a well-structured brainstorming, which guides the examination of each

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probable deviations from normal conditions at specified process nodes and referring to a set of guidewords.

The outcome of HAZOP will be shared with the Company in form of close-out report. The outcomes of the report shall be implemented at design and manufacturing / assembling stages of the Compressor package. Any addition / installation of item or design change if identified during HAZOP then supplier is responsible for the implementation of the same on his own cost. HAZOP to be arrange in Supplier's office.

3 PACKAGE OVERVIEW

Gas engine driven reciprocating compressor is required for compression service for continuous operation.

The package shall be complete with lubrication, sealing, cooling, ignition, exhaust, instrument gas, fuel gas and start gas system for compressor & driver as required.



Process vessels i.e. suction scrubber(s), suction and discharge pulsation bottles, oil storage tanks etc. shall be the part of the package, all necessary interconnection piping shall also be included, including vent and drain header, as required.

The design life of the package shall be minimum twenty (20) years.

The minimum general piping and instrumentation requirements are shown on P&ID no. 0504196-01-PID-001 & 0504196-01-PID-002 attached with the specification. However, Supplier is responsible for provision of any other instrumentation, piping equipment etc. which are required to fulfill the safe and reliable operation of the package.

All platforms, ladders and other access facilities required for the proper operation and maintenance of the compressors and associated auxiliaries shall also be included.

Special lifting equipment required for maintenance, loading, unloading and delivery at site including any required lifting beams or frames shall be included.

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Microprocessor based instrumentation, controls and local PLC control panel are required to provide necessary protection for the equipment and desired control of the package operation.

PLC based local Control panel shall be powered up by Battery package during compressor shutdown, Supplier shall provide battery charger along with battery backup.

No Power source will be provided, so package shall drive power from Alternator supplied with compressor package. Compressor package lighting will also be powered up by compressor package itself.

The package shall be suitable for use in Class-I Division-2 and Group C&D area.

Supplier shall be responsible for carrying out Pulsation and Torsional studies of each type of compressor package.

The package shall have its own instrument gas / fuel gas conditioning and supply system for on- skid instrumentation and control system only.

The package shall be supplied with its own fuel gas conditioning system. Fuel gas take off shall be within the package limit. Startup gas shall also be supplied from the same conditioning system.



Inspection and testing of the complete package shall be performed in accordance with the industry standards and codes, to ensure the quality and functioning of the packages.

Painting or/and coating of the packages shall be adequate to prevent them from rust, corrosion and any other sediment during shipment and after installation on site.

All the above components shall be mounted on a structural steel skid. Proper packaging of the complete package before shipment is required to avoid damage to any of the component /equipment during the shipment.

Supplier shall be responsible for the provision of necessary foundation design data including but not limited to verification of size and location of all anchor bolts, static and dynamic loading conditions for foundation design.

After installation, Supplier shall be responsible for all checks prior to commissioning. These checks include alignment of the packages, operability of lube oil system, and all

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instrumentation field tests. Supplier will depute its Engineer/Technician or a technical team at the time of commissioning.

4 PACKAGE REQUIREMENTS

Details on the requirements of the package are provided in the following sections.

4.1 Compressor & Engine Sizing Requirement

The compressors and their drivers shall be sized in view of the following conditions:

4.1.1 Operating Conditions (Battery Limit of the Package)

Start and End of Operation the operating conditions shall be as the scenarios mentioned in the Data Sheet 0504196-01-DS-001.

4.1.2 Environmental Conditions

The environmental conditions are as follows;

Site Environmental Conditions		
Ambient Temperature	Min./Max.	0 / 49 °C
Wind Speed	Min./Max.	1.7/8.7 m/sec.
Relative humidity	Min./Max.	20 / 60 %
Elevation	m	73



4.2 Compressor

Compressors shall be reciprocating type, meeting the requirements of API 11P and this Scope & Specification for Packaged Reciprocating Compressor.

Supplier shall clearly indicate any deviation(s) or exception(s) to the standard(s) and/or specification in its bid. The compressors shall contain the following components/systems as a minimum:

4.2.1 Basic Components

- i) Compressor frame
- ii) Distance piece

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- iii) Crankshaft
- iv) Bearings
- v) Connecting rod
- vi) Cylinder
- vii) Valves
- viii) Piston, crosshead, piston rod, piston rings, wear bands,
- ix) Rod packing
- x) Manually operated variable clearance pockets to change the capacity of the compressor.



The package shall be equipped with automatic capacity control through engine rpm control together with the auto – recycling valve.

4.2.2 Lubrication System

Compressor shall include Integrated Lubricating Oil Systems for Compressor, Driver, and Gearbox etc. inclusive of Lube Oil Coolers etc. Flexible non-lube, multi element, spacer type couplings along with non- sparking coupling guards shall also be included.

Compressor lubrication system is required with following as minimum;

- Frame Lubrication System
 - i) Suction strainer
 - ii) Oil pump
 - iii) Oil cooler
 - iv) Oil filter
 - v) Crankcase oil breather
 - vi) Oil level sight glass
- Force Feed Lubrication System

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- i) Lube oil supply tank with sight glass, breather and isolation valves
- ii) Force feed lubricator pump
- iii) Distribution pump
- iv) Lubricator oil no flow sensor

4.3 Driver

Gas engine is required as driver of the compressors. Supplier must indicate the type of engine whether two or four stroke and indicate the engine rated rpm. The engine can be turbo charged or natural aspirated, however Supplier shall give full justification of the type selected for the packages. The gas engine shall be of RPM suitable for continuous operation. The organ shall contain the following components/systems as a minimum.

- **Basic Components/Systems**

- i) Crankcase breather
- ii) Carburetor
- iii) Governor
- iv) Ignition system including igniter
- v) Exhaust system including expansion joint, residential spark arresting grade exhaust muffler, silencer, detonation sensors, etc.
- vi) Cooling system including jacket and auxiliary coolant pump, intercooler (for turbocharged engine), air cooler for engine jacket water etc.
- vii) Lubrication system including oil strainer, pump, filter, oil cooler etc.
- viii) Oil bath air filter
- ix) Control system.
- x) Separate lube oil day tank with stand.
- xi) Shielded ignition system, alternator power with battery pack.
- xii) Crankcase oil level control.

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- xiii) Able to operate at variable speed to enable Compressor operation at various capacities/varying demand in terms of flow and suction / discharge pressures.

4.4 Fuel Gas System

Process gas at suction will be used as fuel gas for the engines. The fuel gas must be considered at saturated condition at the inlet of the fuel gas system. Please refer to gas composition mentioned in Datasheet no 0504196-01-DS-001.

Supplier to provide the following as a minimum in the fuel gas system.



- i) Fuel gas connection from process suction (at suctionscrubber);
- ii) Manual block valve for fuel gas supply.
- iii) Fuel gas strainer
- iv) Fuel gas supply regulator(s) as required.
- v) Pressure relief valve
- vi) Fuel gas pressure transmitter.
- vii) Fuel gas filter/separator complete with level gauge high level switch and drain valve.
- viii) Low pressure regulator.
- ix) Flexible connecting lines
- x) Differential pressure transmitter for fuel gas filter.

4.5 Start Gas System

Process gas shall be used as starting medium of the package. The gas starter should be of appropriate type and compatible for use on respective gas composition with moisture contents. The size should be based on minimum gas pressure available during life of the field at suction sides of the packages.

Supplier to provide the following as a minimum in the start gas system:

- i) Start gas connection from process suction or fuel gas scrubber.

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- ii) Manual block valve for start gas supply.
- iii) Start gas strainer.
- iv) Start gas regulator and relief valve.
- v) Start gas in-line coalescing filter with manual drain valve.
- vi) Gas powered engine starter.
- vii) Start gas relay valve complete with solenoid.
- viii) Flexible connectors as required.
- ix) Start gas pressure indicator
- x) Starter vent line (directed to the skid edge above the package at suitable height).

4.6 Instrument Gas System



Supplier to provide the following as a minimum in the instrument gas system:

- i) Instrument gas connection from process suction (at suction scrubber) or fuel gas scrubber
- ii) Manual block valve for instrument gas supply.
- iii) Instrument gas strainer.
- iv) Instrument gas and relief valve.
- v) Instrument gas in-line coalescing filter with manual drain valve.
- vi) Flexible connectors as required.
- vii) Instrument gas pressure transmitter

4.7 Cooling System for Compressor / Driver and Process Gas

Process gas air cooled heat exchanger shall be sized in view of the maximum ambient temperature 47°C and maximum gas temperature at air cooler suction 165 °C. Cooling system shall be complete with following as a minimum:

- i) Air cooled heat exchanger (after / interstage cooling of process gas, engine jacket water, etc.)

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- ii) Manually operated louvers
- iii) Cooling fan
- iv) Coolant pump
- v) Bug screen
- vi) Tank for coolant

4.8 Scrubbers and Pulsation Bottles

Following process vessels including all local instruments are required as a minimum:

- i) First stage suction scrubber with Demister Pads (API 11P class C)
- ii) Interstage scrubber with Demister Pads (API 11P class B).
- iii) Suction and discharge pulsation bottles.
- iv) Pressure Vessels

All pressure vessels shall be designed, fabricated and tested in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Division I. All vessels shall be U- stamped. All vessels shall have a minimum corrosion allowance of 3mm.



4.9 Safety and Relief Valves

Supplier shall be responsible for adequate arrangement of protection to the package against over pressure by means of suitable pressure safety valves. Full flow safety valve must be supplied at package inlet as per applicable code API-520 and 521.

4.10 Piping & Valves

All interconnecting piping between package components shall be included in the scope of supply. All flanges terminating at the skid edge shall be provided along with its companion flange, gasket and stud bolts.

All the pipe work shall be designed, tested and fabricated according to ANSI B31.3. The design should facilitate ease of operation and maintenance. Suitable break flanges and/or couplings should be provided for easy removal/re-installation of pipe work for maintenance purposes. Supplier shall ensure that all the pipe work (on-skid and interconnecting) is free from any stress by carrying out Piping Flexibility Analysis.

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Piping shall be well supported on skid and on foundations for interconnecting piping. Pipe supports shall be designed considering dead loads, live loads, dynamic loads due to flow induced vibration, pulsation, wind, shipping, etc. Pipe supports shall be so designed to accommodate pipe movement due to thermal and pressure stresses and shall be sufficiently supported to prevent differential settlement and undue forces and stresses in the piping or connected equipment.



Also, Relief valve vent header, starting bypass line and recycle line shall be provided. Compressor recycle line shall be with recycle valve. Compressor bypass line shall be equipped with a double Block & Bleed Valve with Non-Return Valves (NRV). Pneumatic automatic isolating valves for emergency shutdown (ESDs) required at suction and discharge linked with compressor tripping. Valves loading / unloading devices and capacity control arrangement such as automatic kickback, speed control with variable pockets and a bypass loop for operation during compressor outage. Common header for all Blow down, Relief Vent and Packing Vent.

Valves only from a renowned top quality manufacturer shall be acceptable. Automatic actuated Shutdown valves together with manual isolation valves shall be required at the process gas inlet and outlet of the package.

Check valve is also required at the process gas outlet of the package. Available line sizes at battery limit of the package are as per following Supplier is required to provide skid connections at battery limit with RF flanges (upto 600#) and for 900#, RTJ flanges are required.

4.11 Instrumentation and Controls

Supplier shall be responsible for complete supply of associated instrumentation, machine monitoring sensors and control system as a part of compressor package. The packages will be complete with built-in controls and all instrumentation requiring no additional equipment. Complete instrumentation, controls, alarms and shutdowns for the compressor & driver shall be provided. Control panel to be skid mounted with its power source to be engine mounted alternator / battery charging systems. Minimum desired Instruments and controls requirement to be followed are mentioned on project P&IDs and compressor data sheet. Separate instruments shall be used for control and shutdown service. Supplier shall provide terminal strips to wire required signals to respective wellhead control panel. All instruments should be provided in all weatherproof and explosion proof enclosures. Sunshades shall also be provided for all local instrumentations. All Instruments shall have local indication. All instruments shall

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have respective root valves / manifolds in addition to piping isolation valves. All transmitter and gauges shall be logically arranged and mounted on instrument racks.

Compressor skid shall be supplied with following UV/IR Fire and Catalytic Bead Gas Detectors. Fire Detectors will be installed on Compressor Shed to focus Engine and Compressor. While 03 Catalytic Bead Gas Detectors near Engine and Compressor.

Fire Detector: 03 numbers SIL-2 UV/IR along with all accessories

Gas Detector: 03 SIL-2 Catalytic Bead Type along with stand and all mounting accessories.

The package shall have its own microprocessor based PLC control unit. A local display shall be provided for monitoring and control of the unit. Annunciation of Alarms and Shutdown conditions shall be skid mounted.



There should be no unnecessary sharp bends / pockets / slopes in connections of Tubing and Instruments to minimize risk of Instrument failure due to chocking. Bridles will be installed on all vessels.

All electrical equipment and instruments shall be suitable for use in Class-I, Division- 2, Group C&D classified area. The method of protection shall be Ex'd' certification. OEM/Vendor supplied Hazardous Area Certification for all electronic instrument/equipment shall be provided.

Suitable no. of earthing bosses shall be provided.

Following are equipment wise instruments and controls required as a minimum and shall be read in conjunction with requirement mentioned on P&ID and compressor data sheet:

- **Compressor**
 - i) Crankcase oil level controller , transmitter with low level alarm and trip.
 - ii) Lubricator no flow sensor
 - iii) Oil pressure transmitter
 - iv) Oil pressure indicating transmitter (in and out of oil filter)

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v) Oil temperature indicating transmitter (in and out of oil cooler)

vi) Vibration Transmitters

- **Gas Engine**

i) Crankcase oil level controller , transmitter with low level alarm

ii) Oil pressure transmitter

iii) Oil pressure gauges

iv) Jacket water temperature transmitter with high temperature alarm and trip Jacket water cooler temperature indicating transmitter (in and out of cooler)

v) Auxiliary water cooler temperature indicating transmitter (in and out of cooler)

vi) Jacket water coolant level transmitter with alarm and trip

vii) Auxiliary water coolant level transmitter with alarm and trip.

viii) Oil cooler temperature indicating transmitter (in and out of cooler)

ix) Governor actuator for automatic speed control

x) Mechanical vibration transmitter

- **Scrubbers**

i) Electronic level controller , transmitter with High / Low alarms

ii) Electronic level transmitter with High-High / Low-Low alarms

ii) Temperature Transmitter with High/High-High alarms.



ii) Pressure Transmitter with High/Low alarms.

iii) 1st/2nd stage discharge PSV

- **Air Cooler**

i) Mechanical vibration switch

ii) Temperature indicating transmitter (in and out of air cooler/service)

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- **Local Process**

- i) Process temperature indicating transmitter for suction and discharge.
- ii) Process pressure transmitters for sensing;
 - Each stage suction pressure
 - Each stage discharge pressure
- iii) Final stage flow through orifice meter

- **Requirements for Compressor skid Control System**

The basic requirements mentioned below for supply of a Microprocessor based system to control the wellhead compressor packages should be considered as a minimum.

- Standard microprocessor based PLC control system shall be provided mounted on skid for complete control and monitoring of the compressor, driver and other skid equipment.
- Skid PLC shall be powered from 24 Volt DC supply from compressor engine alternator, battery set.
- All type of software involved in PLC programming, configuration, simulation, HMI development shall have un-limited time license in favour of Company and shall be able to install and function on atleast 01 workstation/laptops. Set of software/dongle/passwords along with licenses shall be handover to Company.
- The system shall be suitable to operate in the environmental conditions specified for the compressor package.
- The enclosure of the Microprocessor Based system shall be Explosion proof type suitable for Class-1, Div-2, and Group C&D area. "Ex" P type is not acceptable.
- 01 Nos. Laptop computer shall be provided for program loading, modification, set-point changes etc.with project required 01 numbers compressors.
- Vendor shall provide separate instrument for control and shutdown requirements.

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- Panel of Compressor skid PLC system and HMI shall be provided with adequate sunshade to protect panel from direct sunlight.
- PLC along with all of its components such as I/O modules, power supply, communication modules, programming suite, HMI software shall be of latest type / model being offered at time of bid by selected Vendor/OEM. Any equipment which is going to obsolete in nearby future and is under notice period by OEM in term of spare or services support shall not be provided.

HMI of the Skid

- The HMI (minimum 15” screen size) shall also be installed integrated with microprocessor on the same skid in the hazardous area and shall therefore be suitable for use in Class-1, Division-2, Group C&D area.
- The enclosure of the HMI shall be Explosion proof type suitable for Class-1, Div- 2, and Group C&D area.
- The HMI software shall be user friendly and shall require minimum skill to operate, configure, download program or modify settings etc.

4.12 Skid



Supplier shall be responsible for supply and design of the skid structure suitable for oil field applications. All calculations to prove compliance with the specific requirements and standards shall be held by Supplier and available for audit by Company. The subject structure shall be designed to include all dead loads, live loads, equipment vibration, bundle-pull, pipe load, pipe expansion thermal and friction, wind load, seismic load, impact and erection loads and forces and any other loads.

The skid frame shall be suitable for oil field applications and handling with mobile crane using a single point lift at the construction site. Where it is necessary to use special lifting beams, slings, shackles, etc. these shall be provided by Supplier.

4.13 Vibrations and Emission Requirement

Vibration

- As per API 11P.
- Maximum noise level shall be less than 85 dBa.

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Emission Requirement

The emission shall be within limits as per NEQS otherwise Catalytic converter shall be provided.

4.14 Painting & Corrosion Protection

Supplier must ensure that equipments, piping, structures, etc. shall be adequately protected from the prevailing atmosphere by means of correct material selection.

SSPC (Steel Structures Painting Council) manuals shall be followed for preparation of surfaces before painting and application of appropriate paint and number of coats.

Color coding for equipment & piping etc. shall be finalized after approval by Company.

4.15 Equipment Tagging, Labeling & Nameplates

All items need to be identified for operation and maintenance purposes shall be allocated with tag numbers to be mutually agreed afterwards. Supplier must indicate these numbers on all design documents. Supplier shall provide list of all equipment, instrumentation, etc to the Company.



All tagged items shall have corrosion resistant nameplates or labels permanently attached, which shall include Supplier's standard identification together with the Company's tag number. All other controls and indication devices that operators will need to access/maintain shall have corrosion resistant identification/duty labels permanently attached.

4.16 Packing, Preservation and Transportation of Material & Equipment

Packing and Preservation shall be suitable for transportation of material and equipment during their handling, inland transportation, shipment through sea and storage at site for up to 06 months in an uncovered and unheated location. Packing shall account for fragility and physico-chemical/mechanical damages of items. Company shall consider seaworthy packing of all the equipment and packages. Loose piping material, valves, instruments, etc. shall be properly tagged to allow easy identification/site assembling.

Nozzle openings shall be protected with steel cover with rubber gaskets. Nitrogen blanketing shall not be required.

Chemicals/consumables shall be delivered in non-returnable steel drums or pallets.

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4.17 Package Cleaning

Prior to shipment and after hydro testing, the package shall be subject to thorough cleaning by Supplier. Supplier shall give recommendation for the package cleaning. The package-cleaning program shall be agreed with the Company. As a general rule Supplier shall clean the package internals in the workshop prior to preparation for shipping. Supplier shall ensure that the package are free from any foreign material, dirt, etc.

5 INSPECTION AND TESTING

5.1 Fabrication & Welding

Supplier shall submit WPS, PQR and WQT for approval by Company. The approval shall be sought in a manner not disturbing the overall delivery schedule of the packages. Supplier shall notify Company at least fifteen working days prior to the start of fabrication.

5.2 Hydrostatic Tests

All equipment including pressure vessels and piping shall be hydro tested in accordance with the appropriate code requirements. Water for hydro testing shall be of suitable quality not to harm any component of the packages in any manner.



Process piping or tubing shall be tested with water after shop fabrication into sub-assemblies.

5.3 NDE Inspection

The NDE and Inspection procedures shall be submitted by Supplier and agreed upon by Company prior to its finalization.

5.4 Shop Witness Testing

The complete package, together with the associated equipment shall be witness tested in the presence of Company/ Company Representative at the Manufacturer's assembly workshop as an integrated system to verify that the supply conforms to the specifications in the order from the stand point of mechanics, safety devices, accessories controls at guaranteed performance parameters, etc. In this respect, shop testing will be required only for compressor package.

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The Supplier shall perform the Factory Test as per API-618 “Mechanical Running Test” requirements. The unit including integral auxiliary system packages shall receive a 4-hours mechanical running test before shipment. Further, Auxiliary equipment not integral with the unit such as oil pumps, oil coolers, filters, inter-coolers and after-coolers shall receive both an operational test and a 4-hours mechanical running test before shipment.

The Supplier shall perform the full load test of Compressor Unit at Manufacturer’s Facility.

The Supplier shall ensure that all workshop tests and inspections of main components shall be conducted (during and/or on completion of manufacture) in accordance with the recommended standards & practice.

Manufacturer shall inform Company/ Company Representative about the date of test 60 days in advance. No testing shall commence without written approval of Company/ Company representative. Company reserves the right to witness any aspects of the assembling process. The Supplier shall submit an inspection and testing procedure for review and approval by Company/ Company Representative prior to start assembling.



The manufacturer shall submit for Company’s review and approval a complete plan for the factory and site acceptance testing. This plan must be complete and provide sufficient detail to indicate the exact nature of each test, time required, expected results and systematic procedure. The plan shall be submitted at least 60 days in advance to the FAT.

The objective of the FAT is to verify that the purchased systems, as configured for delivery to site, meets or exceeds the specified designed functional requirements. The FAT shall be a 100% complete system functional test and shall be witnessed by Company/ Company Representative.

The Supplier shall submit an inspection and testing procedure for review and approval by Company prior to start assembling for testing at shop.

All examination methods shall be as per API 11P 2nd edition, ASME VIII and other applicable codes to the relevant equipment, piping, etc.

All inspection methods to be employed shall be subject to the approval by the Company. Two OGDCL Engineers will visit for 05 days (Excluding Travel Time) to witness the shop testing. All expenses (Air Tickets, Visa, Hotelling & Transport) for 05 days will be borne by the bidder.

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5.5 Performance Test at Site



The Performance test shall be carried out in accordance with the approved procedures for a minimum period of seventy-two (72) continuous hours. The Supplier shall submit such procedure for approval at least twenty (20) days before commencing the test. Test shall be carried out only if prior to the test the continuous operation of the compressors has been attributable to the supplier, the continuous test shall be started from the beginning (day 1) again.

If the Performance Test is interrupted for reasons attributable to the Supplier. The Supplier shall, at promptly re-engineer and/or carryout such modifications as are required to rectify the causes of the interruption. Company will thereafter give notice in writing to the Supplier specifying the date on which Performance Test may be recommended.

If the Compressor fails to meet the Performance Guarantee herein specified for reasons attributable to the Supplier; Tests of the Compressors or the said portion shall be repeated within a reasonable time upon the same terms and conditions.

Conditions of Compressor Site Performance Test:

- Details of Site Performance Test to be mutually agreed upon prior to site test.
- Elaboration of test procedure is included in Supplier scope of supply.
- Evaluation of site performance test and preparation of test report is included in Supplier scope of supply.
- Any special equipment / instrumentation required during Site Performance Test shall be arranged by Supplier.
- Site Performance Test will be conducted by Supplier commissioning engineer after commissioning. The price for Supplier on site preparation and conduction of the site performance test will be included in the commissioning services being offered on lump sum basis.
- During the performance test all equipment should perform without any indication of being overloaded under normal operating conditions.

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6 QUALITY ASSURANCE/CONTROL AND CERTIFICATION

6.1 Quality Assurance & Control

6.1.1 Quality Management System

Supplier shall operate an independently verified Quality Management System that satisfies the applicable provisions of BS-EN-ISO 9000 (series), or agreed equivalent standard, commensurate with the goods and services to be provided. Current details of registration, approval of other demonstration of the status and efficient operation of the Quality System shall be provided with the bid submission. Further information may be requested at the PO stage.

Company reserves the right to require Supplier to implement additional controls, where a satisfactory level of competence cannot be demonstrated in this regard, and/or exercise additional controls not detailed in this scope and specification.



Company reserves the right to visit the premises of Supplier for the purpose of undertaking Quality Audits relating to the unit and services covered by this scope and specification, the extent of which will be discussed with Supplier before, PO award. Prior notice of five working days will be given to Supplier of any such audits. A copy of the audit report will be forwarded to Supplier on completion. Any findings resulting from such audits shall necessitate the implementation of appropriate corrective actions based on a time scale to be agreed with Company.

6.1.2 Quality Control

It is the intention of Company to determine its involvement in the inspection of materials and activities at Supplier's work dependent on the unit complexity/criticality and the effectiveness of Supplier's QA/QC procedures. Supplier shall provide its standard format Quality Control Plan, relating to the scope of work for review at the time of bid submission. This should include those activities, which have been sub-contracted, and provision made for Company design review/inspection.

Regular visits by Company for the purpose of surveillance and documentation review will not be carried out as a matter of course. However, should it become apparent that

Supplier's agreed Manufacturing Quality Control Plan is either inadequate or not being implemented, Company reserves the right to increase the level or frequency of its

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Quality Control activities or request Supplier to revise its working practices, as necessary.

To assist Supplier in evaluating the expected level of Company involvement applicable to this scope and specification, the following activities in Quality Control Level by Company have been identified:

- QC Plan review/markup
- Surveillance of major Sub-suppliers
- Certification and manufacturing data review

6.1.3 Material Traceability & Certification

Supplier shall advise its proposed material traceability system by which material is assured to be fit-for-purpose and identified throughout the manufacturing process, as part of the bid submission. Supplier should note that material certification is to be provided for all pressure containing and load bearing components.

6.1.4 Inspection & Testing

The unit and structural items shall be tested and inspected as per API Standard 11P, 2nd Edition. Certification & Manufacturing Records



6.1.5 Inspection and Certification Records

Supplier shall ensure that all inspection, test and certification records for unit and materials procured by Supplier, and test and inspection records for Supplier's assemblies and fabrications required by legislation, codes, standards and specifications or otherwise required are provided, safely stored and available on request.

6.1.6 Certification and Manufacturing Data Requirements

Certification and manufacturing data requirements consist of a collection of original and type test certification, inspection and test records and final release documentation generated during the approval, manufacture and testing of the unit or material.

All Certification and Manufacturing Data (08 sets) is to be issued to Company.

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7 SHIPPING

Complete package shall be properly conditioned for shipping against all possible damages. The Supplier shall be responsible for shipment of package equipment to the Company's site in Pakistan and for the adequacy of the preparations for shipment ensuring that materials and equipment arrive at their destination in undamaged condition. The Supplier shall provide the Company shipment details, date of equipment departure and arrival at site and a list of weights and sizes of shipment packages prior to dispatch, to ensure that there are adequate facilities available at the site for safely unloading and placing the equipment in its designated location.



8 GUARANTEE / WARRANTY

If the supplied equipment fails to meet the guarantee/warranty conditions, Company shall promptly notify the Supplier in writing about the defects and claims under the warranty. Upon receipt of such notice the Supplier shall within the time mutually agreed between Company and Supplier shall repair / replace the defective material and of portion of works within the mutually agreed timeframe, with no cost or expense to Company. Travelling, including all expenses, of the personnel required for the repair / replacement in good running condition of the equipment shall be borne by Supplier. The repaired or replaced material or works shall be warranted by Supplier for twelve (12) months from the date of repair / replacement.

The supplier should submit statement of Guarantee / Warranty for the equipment and packages. The duration of warranty shall be 12 months from the date of initial start up or 24 months from the date of shipment.

9 AFTER SALES SERVICE

Packager should confirm and provide undertaking in their bid, their ability to provide after sale service i.e. to provide spare parts and overhauling/ servicing of quoted gas engine/ compressor at site in Pakistan as and when required by OGDCL in future.

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10 DOCUMENTATION REQUIREMENT

10.1 Transmittals



All documents submitted to the Company shall be accompanied by a transmittal completed by Supplier. All transmittals will be sequentially numbered.

10.2 Use of English Language

All documents shall be written in English Language.

10.3 Documents to be Submitted

- Completely filled API standard 11P, 2nd edition data sheet.
- Material test certificates
- Compressor operating manual including characteristic curves.
- Mechanical design calculations
- Detail fabrication drawings
- Sectional details/drawings
- List of spare parts along with OEM / vendor part number with C&F Karachi prices.
- List of sub vendors with complete address and references.
- Welding procedure specifications
- Welding qualification record
- Hydro testing certificates
- Performance test certificates/Performance curves.
- NDT/Painting inspection certificates
- Manufacturing Data Records (MDR)
- Motors performance curve including torque vs. speed curve.

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- Electrical equipment certification with reference to hazardous area classification.
- SIL Certification (where applicable)
- Instrumentation Calibration / Verification reports.
- Repair and overhauling manuals.
- Any other documents not specified above, but essential to make the unit operational and maintainable.
- Undertaking from the original equipment manufacturer to entertain warranties and other after sales service obligations.
- Pulsation and Torsional Study reports
- HAZOP Close-out Report

All above documents eight (08) sets shall be submitted in clearly labeled 4 ring white hard cover binders. All documents smaller than A4 shall be inserted into A4 pre-punched, top-opening plastic wallets (if original certification, etc.) or attached to A4 sheets. Documents larger than A4 shall be folded to A4 size and inserted into A4 pre-punched, top-opening plastic wallets with the project document number/title block clearly visible to the front.

10.4 Drawing Sizes

Sizes A1, A2, A3, and A4 shall be used. NB. A0 size drawings are NOT acceptable.



10.5 Scale Ratios

Except where stated, all drawings will be supplied in metric units using one of the following scales 1:1, 1:2, 1:5, 1:10, 1:20, 1:25, 1:50, 1:100, 1:250, 1:500, 1:1000.

10.6 Electronic Data

Supplier shall also submit electronic/soft copies of all design data, documents, drawings, etc. This also includes design details by Supplier's Sub-suppliers.

All drawings shall be provided in AutoCAD 2000 format. All documentation shall be prepared in MS Office 2000.

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10.7 REFERENCE DOCUMENTATION

10.7.1 Order of Precedence for Documents

In case of conflict among this Specification, the International Codes and Standards, the Supplier shall bring the matter to the Company's attention for resolution and approval in writing.



The order of precedence shall be as follows:

1. Compressor Data Sheet (0504196-01-DS-001)
2. Suction Pressure Control Valve Data Sheet (0504196-01-DS-002)
3. This specification.
4. Piping & Instrumentation Diagram(0504196-01-PID-001 & 0504196-01-PID-002)
5. Referenced International Codes and Standards

In the event of any conflict of data or requirements in any of above documents, it is the Supplier's responsibility to resolve these conflicts and obtain Company's approval before proceeding with design, manufacture or purchase. In any case the most stringent requirement shall prevail. However, Company's interpretation shall be final.

10.7.2 API

- Specification for Packaged Reciprocating Compressors for Oil and Gas Production, Services, API Standard 11P – Second Edition, November 1, 1989.
- Specification for oil field V – belting, API Standard 1B.
- Recommended Practice for Design and Installation of Electrical Systems and Offshore Production Platforms, API RP 14F.
- Recommended Practice for Classification of Locations for Electrical Installations at Drilling Rigs and Production Facilities on Land and Marine Fixed Mobile Platforms, API RP 500B.
- Recommended Practice for the Design and Installation of Pressure Relieving Systems in Refineries, Part I – Design and Part – II Installation, API RP 520 (Latest Edition).

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10.7.3 ANSI / ASME


- Unified Screw Threads, ANSI B1.1
- Pipe Threads, General Purpose (inch), ANSI B1.20.1
- Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800, ANSI B16.1
- Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys, ANSI B16.5
- Ductile Iron Pipe Flanges and Flanged Fittings Class 150 and 300, ANSI B16.42
- Chemical Plant and Petroleum Refinery Piping, ASME B31.3
- Boiler and Pressure Vessel Code, Material Specifications, ASME section II.
- Boiler and Pressure Vessel Code, Rules for Construction of Pressure Vessels, ASME section VIII.
- Boiler and Pressure Vessel Code, Welding and Brazing Qualifications, ASME IX.

ANNEXURE-A

DATASHEET FOR RECIPROCATING COMPRESSOR (1X100%)



OIL & GAS DEVELOPMENT COMPANY LIMITED

Rev	Date	Description	Initial	Initial	Initial	Signature
			Prepared by	Checked by	Approved By	
1	02-10-19	Client's Comments Incorporated	BA	AJ	AJ	
0	04-09-19	Issued For Review	BA	AJ	AJ	
			PETROCHEMICAL ENGINEERING CONSULTANT C-2, BLOCK NO. 17, GULSHAN-E-IQBAL NEAR NATIONAL STADIUM KARACHI-75300, PAKISTAN TEL: +92 21 34961088 & 34827780, FAX : +92 21 34961089 E-MAIL: contact@pcec.com.pk WEBSITE : www.pcec.com.pk			
MARU - RETI COMPRESSION						
TITLE		DATASHEET FOR RECIPROCATING COMPRESSOR (1X100%)				
PREPARED BA	CHECKED AJ	APPROVED AJ	REV 1			

GAS ANALYSIS

Note - 7

SERVICE		RAW GAS	RAW GAS	RAW GAS	
		1	2	Fuel gas	
		MOLE%	MOLE%	MOLE%	MOLE%
METHANE	- CH ₄	72.6624	83.3808	Note - 6	
ETHANE	- C ₂ H ₆	0.0799	0.1867		
PROPANE	- C ₃ H ₈				
ISO-BUTANE	- C ₄ H ₁₀				
NORMAL BUTANE	- C ₄ H ₁₀	0.0006			
ISO-PENTANE	- C ₅ H ₁₂				
NORMAL PENTANE	- C ₅ H ₁₂	0.0006			
HEXANE	- C ₆ H ₁₄	0.0059	0.0261		
HEPTANE+	- C ₇ H ₁₆				
HEPTANE+MW/SG	-				
AMMONIA	- NH ₃				
AIR	-				
WATER VAPOR	- H ₂ O	0.7052	0.4510		
OXYGEN	- O ₂				
NITROGEN	- N ₂	24.3383	14.9188		
HYDROGEN	- H ₂				
HYDROGEN SULFIDE	- H ₂ S				
CARBON MONOXIDE	- CO				
CARBON DIOXIDE	- CO ₂	2.2069	1.0366		
TOTAL	- 100%	100.00	100.00		
MIXTURE MW	-	19.600	18.890		
C _p /C _v	-	1.324	1.322		
RELATIVE HUMIDITY, %	-				
COMPRESSIBILITY FACTOR	-	0.9936	0.9934		
			NORMAL OPERATING POINT		
		OPERATING CONDITION 1	OPERATING CONDITION 2	OPERATING CONDITION 3	RATED CONDITION
SERVICE		RAW GAS	RAW GAS	RAW GAS	RAW GAS
NUMBER OF STAGES		VTS	VTS	VTS	VTS
SUCTION TEMPERATURE	- °C	41.1	41.1	41.1	VTS
SUCTION PRESSURE (Note - 2)	- BARG (PSIG)	3.44738 (50)	3.44738 (50)	6.89476 (100)	VTS
DISCHARGE PRESSURE (Note - 2)	- BARG (PSIG)	13.7895 (200)	17.2369 (250)	17.2369 (250)	VTS
UNIT GAS REQUIRED CAPACITY	- MMSCFD	12.00	12.00	12.00	VTS
		OPERATING CONDITION			
SERVICE		RAW GAS			
NUMBER OF STAGES					
SUCTION TEMPERATURE	- °C		Max		
SUCTION PRESSURE (Note - 2)	- BARG(PSIG)		Normal		
DISCHARGE PRESSURE (Note - 2)	- BARG(PSIG)		Max		
UNIT REQUIRED CAPACITY	- MMSCFD		Normal		

Notes:

- 1 VTS = VENDOR TO SPECIFY
- 2 PRESSURES MEASURED AT INLET AND OUTLET FLANGES OF PACKAGE
- 3 PACKAGE HAZOP REPORT SHALL BE SUBMITTED TO COMPANY FOR REVIEW.
- 4 VENDOR/PACKAGER SHALL SUBMIT ALL RELEVANT DESIGN DOCUMENTS INCLUDING BASIS OF DESIGN, VESSEL SIZING SHEETS, PCV SIZING SHEETS, PSV SIZING SHEETS, VENT & BLOWDOWN STUDY AND REPORTS ETC.
- 5 VENDOR SHALL PROVIDE PFD, H&MB, P&ID, DETAIL OPERATION MANUAL, CONTROL AND SAFEGUARDING MANUAL, MAINTENANCE MANUAL, START-UP & SHUTDOWN MANUAL, CAUSE & EFFECT SHEETS, HAZOP, SIL REPORTS. VENDOR SHALL PROVIDE SEPARATE DELIVERABLES.
- 6 PROCESS GAS WILL BE USED AS START GAS / FUEL GAS FOR PROPOSED COMPRESSOR PACKAGE.
- 7 TWO DIFFERENT GAS ANALYSIS ARE PROVIDED. VENDOR TO CONSIDER BOTH FOR EACH OPERATING CASE.
- 8 DUE TO THE PRESENCE OF HIGH NITROGEN CONTENT IN FUEL GAS, VENDOR TO SUGGEST ENGINE DE-RATING DUE TO FUEL GAS CONTENT. VENDOR TO PROVIDE DE-RATING CALCULATION SHEET FROM ENGINE MANUFACTURER.

GAS ANALYSIS (cont)

2.1.1 - 2.1.2

	OPERATING	RATED		
	CONDITION	CONDITION		
CASE 3	RAW GAS			
SERVICE				
NUMBER OF STAGES				
SUCTION TEMPERATURE - °C				
SUCTION PRESSURE* - BARG(PSIG)				
DISCHARGE PRESSURE* - BARG(PSIG)				
UNIT REQUIRED CAPACITY - MMSCFD				

	OPERATING	RATED		
	CONDITION	CONDITION		
CASE 4	RAW GAS			
SERVICE				
NUMBER OF STAGES				
SUCTION TEMPERATURE - °C				
SUCTION PRESSURE* - BARG(PSIG)				
DISCHARGE PRESSURE* - BARG(PSIG)				
UNIT REQUIRED CAPACITY - MMSCFD				

	OPERATING	RATED		
	CONDITION	CONDITION		
SIDESTREAM	NA			
SERVICE				
NUMBER OF STAGES				
SUCTION TEMPERATURE - °C				
SUCTION PRESSURE* - BARG(PSIG)				
DISCHARGE PRESSURE* - BARG(PSIG)				
UNIT REQUIRED CAPACITY - MMSCFD				
MAXIMUM ALLOWABLE CYLINDER DISCHARGE TEMPERATURE:		less than 148.9	°C	
MAXIMUM ALLOWABLE AFTERCOOLER DISCHARGE TEMPERATURE:		60	°C	
UNIT CAPACITY - MMSCFD - MEASURED AT:		VTD	BARA AND 15.6°C	

Notes:

* VTD = VENDOR TO DEFINE

PART 1 - MATERIAL REQUIREMENTS

COMPRESSOR

- MANUFACTURER: _____ **Vendor to advise** MODEL: _____ **Vendor to advise**
- 2.1.3 PRIME MOVER LOADING? YES NO
- 2.1.4 FURNISH VALUES OF FORCES AND COUPLES? YES NO
- 2.2 PURCHASER'S MAXIMUM ALLOWABLE COMPRESSOR PISTON SPEED: _____ **Vendor To Advise** FPM
 PURCHASER'S MAXIMUM ALLOWABLE PRIME MOVER SPEED: _____ **Vendor To Advise** RPM
- 2.3 FURNISH ESTIMATE ACTUAL AND/OR _____ CALCULATED ADIABATIC
- 2.4.1 COMPRESSOR CYLINDER DISCHARGE TEMPERATURES
 MAXIMUM ALLOWABLE OPERATING ROD LOAD? COMPRESSOR MANUFACTURE'S OR _____ PURCHASER'S
 IF PURCHASER'S, EXPLAIN: _____
 OTHER THAN OPERATING ROD LOAD CALCULATIONS? YES NO
 IF YES, PROVIDE PARAMETERS: _____
- 2.5.3.2 FURNISH PLUGGED 1/2" INDICATOR CONNECTIONS? YES NO
- 2.7.3 FURNISH NON-METALLIC PISTON WEAR BANDS? YES NO
- 2.7.6 FURNISH COATED PISTON RODS? YES NO
- BASE MATERIALS: _____ **Vendor To Advise** COATING MATERIALS: _____ **Vendor To Advise**
- 2.9.1 FURNISH _____ TYPE 1 OR TYPE 2 OR _____ TYPE 3 DISTANCE PIECES? YES NO
- 2.9.3 FURNISH EXPLOSION RELIEF DOORS? _____ VTA
- 2.11.6 FURNISH **100** GALLON FRAME OIL STORAGE TANK? YES NO
- 2.11.7 FURNISH FRAME OIL HEATER? (**NOTE - 1**) _____ VTA
- 2.12.1 IF A BLOCK CYLINDER LUBRICATION IS FURNISHED, THE PURCHASER MAY SPECIFY:
 LINE FILTERS (VTA) _____ VTA
 LUBE METER (VTA) _____ VTA
 FAULT INDICATORS YES NO
- 2.12.2.1 FURNISH **100** GALLON LUBRICATOR OIL STORAGE TANK? YES NO
- 2.13.1.3 FURNISH STANDARD COMPRESSOR CYLINDER MATERIAL? YES NO
 OR PURCHASER'S SPECIFIED CYLINDER MATERIAL: _____
- 2.13.4.2 FURNISH MATERIAL INSPECTION AS SPECIFIED? YES NO
 COMPONENT: _____ TYPE INSPECTION: _____
 COMPONENT: _____ TYPE INSPECTION: _____
 COMPONENT: _____ TYPE INSPECTION: _____
 COMPONENT: _____ TYPE INSPECTION: _____
- 2.14.2 WHEN A DISC TYPE COUPLING IS FURNISHED, THE DISC PACK SHALL BE: _____ STEEL OR STAINLESS STEEL
- 2.15 FURNISH ENGINE DERATING CALCULATION SHEET? YES NO

CAPACITY CONTROL

- 3.1 FURNISH CAPACITY CONTROL? YES NO
- 3.2 CAPACITY CONTROL OPERATION WILL BE: AUTOMATIC WITH: MANUAL OVERRIDE OR _____ MANUAL
- 3.2.1 FURNISH PRIME MOVER SPEED VARIATION? YES NO
- 3.2.2.1 FURNISH CLEARANCE POCKETS? YES NO
 IF YES, FURNISH: _____ CLEARANCE POCKETS OR VARIABLE CLEARANCE POCKETS
- 3.2.2.2 FURNISH VALVE SPACERS, IF REQUIRED TO MEET AN OPERATING CONDITION? YES NO
- 3.2.2.3 FURNISH CLEARANCE BOTTLES, IF REQUIRED? YES NO
 IF YES: _____ ANSI B31.3 PIPE CODE OR ASME VESSEL CODE
- 3.2.3.1 FURNISH START-UP BYPASS? YES NO
- 3.2.3.2 FURNISH CAPACITY CONTROL BYPASS? YES NO
 IF YES: _____ MANUAL AUTOMATIC
- 3.2.4.3 FURNISH AUTOMATIC VALVE UNLOADING? YES NO
- 3.2.5 FURNISH SUCTION PRESSURE REDUCING VALVE? (NOTE-2) YES NO
 IF YES BY: _____ PURCHASER OR PACKAGER FOR A MAXIMUM UPSTREAM PRESSURE OF _____ PSIG

Note:-

- VTA = Vendor to advise
- 1 VENDOR TO SUGGEST KEEPING IN VIEW THE MINIMUM AMBIENT TEMPERATURE PROVIDED IN THE DATASHEET.
 - 2 DATASHEET OF SUCTION PRESSURE REDUCING VALVE PCV-001 IS ATTACHED AS ANNEXURE-B.

PRIME MOVER

MANUFACTURER: _____ **Vendor To Define** MODEL: _____ **Vendor To Define**

4.1 THE PRIME MOVER WILL BE: GAS ENGINE OR ELECTRIC MOTOR

4.2.3 THE GAS ENGINE SHALL BE PROVIDED WITH: AN ELECTRIC AN AIR OR A GAS STARTING SYSTEM

4.2.3.1.2 WHEN AN AIR OR GAS STARTING SYSTEM IS FURNISHED, THE AIR OR GAS WILL BE FURNISHED FROM (SOURCE):
 _____ VTA _____ AT _____ BARG MAXIMUM OR _____ BARG MINIMUM

4.2.3.2.2 A _____ AMPERE-HOUR BATTERY SET WILL BE FURNISHED WHEN AN ELECTRIC STARTING SYSTEM IS SPECIFIED? YES NO

4.2.3.2.3 A CHARGING ALTERNATOR WILL BE PROVIDED WHEN A BATTERY SET IS FURNISHED? YES NO

4.2.4.1 FURNISH AN ENGINE AIR FILTER OTHER THAN THE MANUFACTURER'S STANDARD DRY TYPE? YES NO
 IF YES, EXPLAIN: _____

4.2.4.2.6 FURNISH AIR FILTER PRESSURE DROP INDICATOR? YES NO

4.2.5.1 FURNISH AN EXHAUST MUFFLER/SILENCER OTHER THAN THE MANUFACTURER'S STANDARD INDUSTRIAL TYPE?
 IF YES: SPARK ARRESTING OR NON SPARK-ARRESTING YES NO
 SOUND ATTENUATION TYPE: _____ VTA _____ PERSONNEL PROTECTION TYPE: _____ VTA

4.2.8 FURNISH ENGINE EMISSION LEVEL (Refer NEQS) YES NO
 BY MANUFACTURER'S _____ PERFORMANCE DATA OR _____ ACTUAL STACK TEST

4.2.8.1 KNOWN SITE EMISSION LEVEL LIMITS: (Refer NEQS)
 NITROUS OXIDE: _____ GM/BHP/HR CARBON MONOXIDE: _____ GM/BHP/HR
 SULFUR DIOXIDE: _____ GM/BHP/HR NON-METHANE HYDROCARBONS: _____ GM/BHP/HR

4.2.8.1.1 THE BASIS FOR THE MANUFACTURER'S EMISSION DATA WILL BE THE RATED BHP SHOWN ON:
 THE QUOTATION OR THE MANUFACTURER'S NAMEPLATE RATING OF THE ENGINE.

4.2.10 FURNISH _____ 100 _____ GALLON CRANKCASE OIL STORAGE TANK? YES NO

4.2.11.5 FURNISH A FUEL FILTER/SEPARATOR? YES NO

4.2.12 FUEL GAS SUPPLY SHALL BE FURNISH FROM SOURCE AT _____ PSIG

4.2.13 FURNISH CRANKCASE EXPLOSION RELIEF DOORS? YES NO

4.3.1 FURNISH PRIME MOVER ELECTRIC MOTORS AS FOLLOWS: TYPE: _____ SYNCHRONOUS _____ INDUCTION
 ELECTRICAL: VOLTS / PHASE / HERTZ: _____ / _____ / _____ SERVICE FACTOR: _____ ENCLOSURE TYPE: _____
 INSULATION TYPE: _____ STARTING CONDITIONS _____
 AREA CLASSIFICATION: CLASS: _____ GROUP: _____ DIVISION: _____ REDUCED VOLTAGE OR _____ FULL VOLTAGE
 MOTOR STARTER FURNISHED BY: _____ PACKAGER OR _____ PURCHASER
 SPACE HEATER FURNISHED BY PACKAGER? YES NO

COOLING SYSTEM

5.3.1.2 FURNISH _____ SIGHT FLOW INDICATORS AND/OR TEMPERATURE INDICATORS
 IN THE COMPRESSOR CYLINDER JACKET WATER SYSTEM? YES NO

5.3.5 FURNISH MAXIMUM GAS AFTERCOOLING TO _____ 60 _____ °C? YES NO

5.6.6 CONTROL OF COOLER AIR CIRCULATION?
 IF YES, BY: LOUVERS (MANUAL) _____ VARIABLE PITCH FAN _____ RE-CIRCULATION _____ OTHER: _____
 YES NO

5.6.7 COOLER BUG SCREENS AND/OR HAIL GUARDS YES NO

PRESSURE VESSELS

6.1.3 FURNISH PRESSURE VESSEL CORROSION ALLOWANCE? IF YES, 3 mm (Min.) YES NO

6.2.5 FURNISH STANDARD ANCILLARIES WITH EACH SCRUBBER YES NO

6.2.6 FURNISH SUCTION SCRUBBER WITH DIAMETER BASED UPON SERVICE CLASS: _____ A _____ B _____ C
 FURNISH INTERSTAGE SCRUBBER WITH DIAMETER BASED UPON SERVICE CLASS: _____ A _____ B _____ C
 FURNISH DISCHARGE SCRUBBER? YES NO
 IF YES, DIAMETER BASED UPON SERVICE CLASS: _____ A _____ B _____ C

6.3.1 FURNISH PULSATION CONTROL AND PULSATION STUDIES? YES NO
 IF YES, SPECIFY TYPE: _____ API 618 _____ AND SCOPE: _____ M2-M5

6.3.2 FURNISH SUCTION AND DISCHARGE VOLUME BOTTLES? YES NO

6.3.5 IF VOLUME BOTTLES ARE SPECIFIED BY THE PURCHASER, AND THEY ARE 12.75 INCHES IN DIAMETER OR LESS, THEY SHALL BE CONSTRUCTED AS: _____ ANSI B31.3 PIPE CODE OR AS ASME PRESSURE VESSEL CODE

6.3.7 FURNISH MECHANICAL RE-INFORCEMENT (WELD PADS OR SADDLES) OF FLANGED CONNECTIONS? YES NO

Notes:-

- 1- VTD = Vendor to define
- 2- VTA = Vendor to Advise.
- 3- Vendor to provide auto regulating crankcase pressure valve.
- 4- All pressure vessels shall be U-Stamped.
- 5- All pressure vessels scrubbers shall be CS.
- 6- Vendor to provide PSVs for all pressure vessels within the compressor package.

PIPING AND APPURTENANCES

- 7.1.4 THE EXTENT OF THE GAS PIPING SUPPLIED BY PACKAGER SHALL BEGIN AT THE PACKAGE SUCTION FLANGE AND BE CONTINUOUS THROUGH THE SYSTEM TO THE PACKAGE DISCHARGE FLANGE? YES NO
 OR THE GAS PIPING SHALL BEGIN AS FOLLOWS:
 SUCTION: FLANGE AT SUCTION SCRUBBER FLANGE AT SUCTION BOTTLE
 FLANGE AT COMPRESSOR NOZZLE OTHER (EXPLAIN): _____
 INTERSTAGE: FLANGE AT INTERSTAGE SCRUBBER FLANGE AT SUCTION BOTTLE
 FLANGE AT COMPRESSOR NOZZLE SIDESTREAM CONNECTION
 COMPLETE INTERSTAGE PIPING SYSTEM OTHER (EXPLAIN): _____
 DISCHARGE: FLANGE AT COOLER DISCHARGE FLANGE AT DISCHARGE BOTTLE
 SPOOL PIECE FROM FINAL DISCHARGE COOLER TO DISCHARGE SCRUBBER
 OTHER (EXPLAIN): _____
 FURNISH PIPING, BOTTLES, IF ANY, VESSELS AND THERMOWELDS DESIGNED AND ARRANGED FOR TRACING AND/OR INSULATION? YES NO
 7.1.5 REVIEW ARRANGEMENT DRAWING PRIOR TO FABRICATION? YES NO
 7.8 FURNISH SEAL WELDED, THREADED PIPING JOINTS IN ALL FLAMMABLE OR TOXIC SERVICE? YES NO
 7.10 SCREWED, FLANGED OR WELDED PIPING FOR ERW STEEL: YES NO
 7.11 TUBING FITTINGS MAY BE: STEEL OR 300 SERIES STAINLESS STEEL
 7.12 WHEN VALVES ARE FURNISHED IN FLAMMABLE OR TOXIC SERVICE, THEY SHOULD BE FITTED OUT WITH:
 BOLTED OR WELDED BONNETS BOLTED GLANDS BE 'FIRE SAFE' & FIRE TESTED (METAL TO METAL SEATED)
 FURNISH MOUNTED IN PIPING: SUCTION BLOCK VALVE CHECK VALVE
 DISCHARGE BLOCK VALVE BLOWDOWN VALVE
 7.15 FURNISH TEMPORARY START-UP STARINERS? YES NO
 IF YES, THE SCREEN SHALL BE LOCATED: AT EACH PURCHASER INLET CONNECTION
 AT SUCTION BOTTLE OF EACH SEPARATE GAS STREAM INSTALLED IN A REMOVABLE SPOOL PIECE
 7.16.2 FURNISH: STEEL OR 300 SERIES STAINLESS STEEL OIL LINE DOWNSTREAM OF THE OIL FILTER? YES NO
 7.17.1 FURNISH A COMPLETE ON-SKID COOLANT PIPING SYSTEM WHEN LIQUID COMPRESSOR CYLINDERS ARE UTILIZED? YES NO
 7.19.2 FURNISH A COMMON DISTANCE PIECE VENT HEADER TERMINATING AT THE EDGE OF THE SKID? YES NO
 7.19.3 FURNISH A COMMON DISTANCE PIECE DRAIN HEADER TERMINATING AT THE EDGE OF THE SKID? YES NO
 7.19.4 FURNISH A COMMON PACKING HP VENT HEADER TERMINATING AT THE EDGE OF THE SKID? NOTE-1 YES NO
 7.19.5 FURNISH A COMMON PACKING LP VENT HEADER TERMINATING AT THE EDGE OF THE SKID? NOTE-2 YES NO
 7.20.1 FURNISH RELIEF VALVE FOR INSTALLATION IN PURCHASER PIPING OR AT SUCTION SCRUBBER?
 IF YES, ADVISE ADDITIONAL SUCTION RELIEF VALVE CAPACITY REQUIRED TO PROTECT THE PACKAGE FOR UPSET CONDITIONS OTHER THAN RATED CAPACITY: EXPLAIN: _____ **VTA** _____
 7.20.2 FURNISH RELIEF VALVE VENT PIPES WHICH DISCHARGE VENT GAS? YES NO
 UPWARD TO ATMOSPHERE OR X INTO A COMMON HEADER TERMINATING AT SKID EDGE
 7.21 PACKAGE BLOWDOWN VALVE SHALL BE FURNISHED AS PER API STD, THE RELEASED GAS SHALL BE VENTED:
 UPWARD TO ATMOSPHERE X INTO A COMMON HEADER TERMINATING AT SKID EDGE OR
 ELSEWHERE - EXPLAIN: _____
 7.22 VENDOR TO MATCH THE MOC OF PIPING W.R.T DESIGN CONDITION & SERVICE COMPOSITION.
 7.23 ALL CRITICAL VALVES & INSTRUMENT MOUNTING ON PIPING SHALL BE ACCESSIBLE .
 7.24 ALL PRESSURE INSTRUMENTS MOUNTED ON PROCESS AND UTILITY STREAMS SHALL BE EQUIPPED WITH INTEGRAL DOUBLE BLOCK AND BLEED ASSEMBLY.
 ALL VALVES SHALL BE HAVING FLANGED CLOSURE FACE
 POCKETS TO BE AVOIDED IN PIPING NETWORK TO MAXIMUM POSSIBLE EXTENT, WHERE IT IS UNAVOIDABLE, PROVISION OF LOW POINT DRAIN TO BE CONSIDERED.
 7.25 INTERNAL PIPING SHALL BE ARRANGED IN PACKAGE TO FACILITATE ROUTINE MAINTENANCE & INSPECTION WORK.
 7.26 DELETED
 7.27 ALLOWABLE LOADS ON NOZZLE INLET OF SUCTION & DISCHARGE SHALL BE AS PER DESIGN CODE.
 7.28 VENDOR TO CONFIRM PROVISION OF TORSIONAL STUDY AND PULSATION STUDY AS PER API 618
 7.29 VENDOR TO PROVIDE APPURTENANCES WALKWAYS, LADDERS, INSPECTION HOLES, MANWAYS FOR MAINTENANCE & INSPECTION OF COOLERS, VESSELS WHERE AS APPLICABLE.
 7.30 ALL BALL VALVES LESS THAN 1-1/2 NPS SHALL BE FULL BORE.
 7.31 ALL THE FLANGES FROM CL600# SHALL BE RTJ WITH SURFACE FINISH RA 1.6 µM AS PER ASME B16.48. ALL RING TYPE GASKETS SHALL HAVE OCTAGONAL SECTION AS PER ASME B16.20
 7.32 SUPPLIER TO PROVIDE ALL THE INTERCONNECTING PIPING BETWEEN SKIDS IN THE PACKAGE AND BATTERY LIMIT TERMINAL SHALL BE FLANGED.
 7.33 VENDOR TO ENSURE THAT ALL CRITICAL DEVICES, VALVES ETC MOUNTED ON PIPING NETWORK SHALL BE IN NATURE FIRE SAFE DESIGN.
 7.34 ALL THE BALL VALVES WITH CLASS 600 # AND ABOVE HAVING SIZE EQUAL OR GREATER THAN 2 INCH NPS SHALL BE TRUNNION MOUNTED.
 7.35 PRESSURE CONTAINING PARTS AND CONTROLLING PARTS SHALL BE CERTIFIED TO TYPE 3.1 AND NON PRESSURE CONTAINING PARTS TO TYPE 2.2 AS PER EN 10204.

ELECTRICAL SYSTEMS

	AC VOLTS	AC PHASE	AC HERTZ	DC VOLTS
8.2 ELECTRICAL POWER	400 Volts	3 Phase	50 Hz	24 V
MAIN PRIME MOVER				
AUXILIARY MOTORS	400 Volts	3 Phase	50 Hz	24 V
HEATERS	400 Volts	3 Phase	50 Hz	
INSTRUMENTATION				24 V
ALARMS AND SHUTDOWNS				24 V

NOTES

- 1 INCLUDES VENT FROM SUCTION, DISCHARGE AND INTERSTAGE RELIEF VALVES ALONG WITH PACKAGE BLOWDOWN VALVE.
- 2 POWER SOURCE FROM ANY OUTSIDE WILL NOT BE PROVIDE. COMPRESSOR CONTROL PANEL SHALL HAVE BATTERY ALONG WITH CHARGER SHALL BE PROVIDED WITH COMPRESSOR.
- 3 ALL ELECTRICAL SUPPLY MENTIONED IN SEC. 8.2 SHALL BE MANAGED FROM INSIDE COMPRESSOR. NO OUTSIDE POWER SOURCE IS AVAILABLE. COMPRESSOR SKID LIGHTING SHALL ALSO BE POWERED BY COMPRESSOR BATTERY PANEL AND ALTERNATOR.
- 4 INCLUDES VENT FROM RELIEF VALVES INTEGRATED IN FUEL SYSTEM.

INSTRUMENTS AND CONTROLS

- 9.1 IN ADDITION TO THE INSTRUMENT AND CONTROL PANEL (SEE PARAGRAPH 9.2), AND TO ANY CAPACITY CONTROL (SEE SECTION 3), THE FOLLOWING CONTROL SYSTEMS ARE REQUIRED:
- | PURPOSE OR FUNCTION | CONTROL SIGNAL SOURCE | CONTROL SIGNAL RANGE | MANUAL OR AUTOMATIC | SENSITIVITY |
|---------------------|-----------------------|----------------------|---------------------|-------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
- 9.2.1 FURNISH PANELS WITH ENCLOSED BACKS **Hazardous Area Certified, Eexd & IP-65(min)** YES NO
- 9.2.2 PANELS SHALL BE: FREE-STANDING SKID-MOUNTED OFF-SKID MOUNTED
- 9.2.3 WIRING TO REMOTE PANELS SHALL BE INSTALLED IN:
 CONDUITS ENCLOSURES ARMORED CABLE
- 9.3.1 FURNISH TACHOMETER IN PANEL: YES NO
 IF YES, SPECIFY TYPE DIGITAL RANGE: _____ TO _____ RPM
- 9.3.2 FURNISH LIQUID FILLED, DIAL TEMPERATURE GAGES? YES NO
- 9.3.2.4 FURNISH: GROUNDED OR UNGROUNDED THERMOCOUPLE TEMPERATURE INDICATORS?
 IF YES, SPECIFY LOCATION: _____ YES NO
- 9.3.3 FURNISH LIQUID FILLED PRESSURE GAGES? YES NO

EMI/RFI INTERFERENCE (RADIATED SUSCEPTIBILITY):

THE PACKAGE ELECTRONIC EQUIPMENT SHALL PERFORM WITHIN THE NORMAL LIMITS WITHOUT LOSS OF FUNCTION OR DEGRADATION OF PERFORMANCE WHEN SUBJECTED TO RADIATED ELECTROMAGNETIC FIELDS IN ACCORDANCE WITH IEC 61000-4-3, LEVEL 3, (AT A 10 V/m POWER LEVEL), WITH ANY CABINET/PANEL DOORS OPEN.

IF CERTIFICATES ARE NOT AVAILABLE, THE EQUIPMENT IN THE CABINET SHALL FUNCTION WITHIN THE NORMAL LIMIT WHEN TESTED WITH A 5 WATT RADIO TRANSCEIVERS OPERATING AT 5 WATTS WITHIN THE FREQUENCY RANGES, 50-174 MHz, 406-470 MHz, AND 800-870 MHz AND HELD AT A DISTANCE OF 1 METER FROM THE CABINET/PANEL/CABLE, WITH ANY CABINET/PANEL DOORS OPEN.

IF A CERTIFICATE OF COMPLIANCE TO THE RFI REQUIREMENTS OF IEC-61000-4-3, LEVEL-3 SHALL BE PROVIDED THEN THE CERTIFICATE(S) SHALL BE FOR EITHER THE ENTIRE PACKAGE OR FOR ALL THE ELECTRONIC EQUIPMENT INSTALLED WITHIN THE PACKAGE INCLUDING INTERCONNECTING CABLING.

SHUTDOWNS, ALARMS, AND ANNUNCIATORS

- 10.1 SHUTDOWNS, ALARMS, AND ANNUNCIATORS SHALL BE: PNEUMATIC ELECTRIC
- 9.3.2 - 9.3.3 - 10.2.1

DESIRED ACTIONS	TYPE LOCATION ANNUNCIATION			SENSING DEVICE LOCATION
	S	H	U	T
I				
N				
D		A		
I		V	U	R
A		I	D	P
C		S	I	A
		U	B	N
		A	L	E
		L	E	L

NOTE:
 INDICATES THE DESIRED ACTION, TYPE AND LOCATION OF ANNUNCIATION AND LOCATION OF THE SENSING DEVICE.
 MARK EACH BOX FOR MULTIPLE REQUIREMENTS.

COMPRESSOR

TEMPERATURE OF INLET GAS TO PACKAGE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
HIGH	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TEMPERATURE OF OUTLET GAS FROM PACKAGE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
HIGH	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SUCTION GAS PRESSURE - FIRST STAGE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
HIGH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SUCTION GAS PRESSURE - INTERSTAGE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
HIGH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DISCHARGE GAS PRESSURE - INTERSTAGE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
HIGH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DISCHARGE GAS PRESSURE - FINAL STAGE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
HIGH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
LUBE OIL PRESSURE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
IN - FILTER	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
OUT - FILTER	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
LOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- Note:**
- Compressor discharge pressure indication to be provided via pressure transmitter, which should be available at compressor panel.
 - Compressor tripping shall be provided for outlet gas temperature at 330 °F
 - F&G detectors for compressor skid to be provided by vendor and control through compressor control system.

PAINT AND PAINTING

12.1 THE UNIT ENVIRONMENT IS: NORMAL OR SEVERELY CORROSIVE
COMPRESSOR: PACKAGER'S/MANUFACTURER'S STANDARD SPECIAL (EXPLAIN)
MANUFACTURE SHALL SEEK COMPANY APPROVAL FOR EXTERNAL & INTERNAL PAINT APPLICATIONS.

TIE COAT

PRIME MOVER: PACKAGER'S/MANUFACTURER'S STANDARD SPECIAL (EXPLAIN)
PROVIDE SPECIFICATIONS FOR THE COAT

TIE COAT

PACKAGE: PACKAGER'S/MANUFACTURER'S STANDARD SPECIAL (EXPLAIN)

VENDOR SHALL SUBMIT DETAILS OF PAINTING SYSTEM FOR COMPANY REVIEW AND APPROVAL.

12.5 AIR EXCHANGER:
SIDING/STRUCTURAL: PACKAGER'S/MANUFACTURER'S STANDARD HOT-DIPPED GALVANIZED
 SPECIAL (EXPLAIN)
VENDOR TO SHARE THE SPECIFIC STANDARD FOR HD SG STEEL USED FOR EXCHANGER SIDING.

HEADERS: PACKAGER'S/MANUFACTURER'S STANDARD HOT-DIPPED GALVANIZED
 SPECIAL (EXPLAIN)
**GENERALLY ENGINE EXHAUST PIPE IS CONSIDERED.
ZINC METALIZED**

INSPECTION, TESTING AND PREPARATION FOR SHIPMENT

13.1.2 PURCHASER PARTICIPATION IN INSPECTION AND TESTS? YES NO
IF YES, EXPLAIN: **FAT SHALL BE CARRIED OUT IN COMPANY'S REPRESENTATIVE PRESENCE ON MUTUALLY AGREED CONDITIONS.**

13.1.2.1 OTHER TESTS? YES NO
IF YES, EXPLAIN: **PANEL FUNCTION TEST DURING FAT
SAT OF COMPRESSION PACKAGE SHALL BE CARRIED OUT FOR 72 HOURS.**

13.2.2 PURCHASER'S INSPECTION? YES NO
IF YES, EXPLAIN: **WITNESS FAT TEST IN PACKAGERS SHOP
PURCHASER SHALL WITNESS ALL POINT OF CONCERNS AS PER APPROVED ITP OF SKIDS & VESSEL FABRICATION.**

13.2.3 PURCHASER REVIEW OF QUALITY CONTROL PROGRAM? YES NO
ALL QUALITY DOCUMENTATION WILL BE REVIEWED AT THE TIME OF FAT, HOWEVER COMPAN' SHALL DEPUTE LEVEL-III INSPECTION AT PACKAGE FOR THE SAKE OF MONITORING.

INSPECTION, TESTING AND PREPARATION FOR SHIPMENT

13.5.1 FURNISH SPECIAL PREPARATION FOR SHIPMENT? YES NO
 IF YES, EXPLAIN: EXPORT WORTHY PACKING

13.1.2.1 FURNISH SPECIAL PREPARATION FOR STORAGE? YES NO
 IF YES, EXPLAIN: 6 MONTHS PRSERVATION

13.2.2 FURNISH EXPORT BOXING? YES NO
 IF YES, FURNISH SPECIAL LIFTING DEVICES? YES NO

CORROSIVE GASES

COMPLETE THIS SECTION ONLY IF THE COMPRESSED GAS STREAM CONTAINS THE CORROSIVE COMPONENTS H₂S AND/OR CO₂

15.1 CORROSIVE GAS? YES NO
 IF YES, THE PERCENTAGES OF EACH COMPONENT SHOULD BE LISTED ON PAGE 2 OF PART 1 - 'API PACKAGED COMPRESSOR DATA SHEETS'
 WILL A CORROSION INHIBITOR BE UTILIZED? YES NO (NOTE-1)
 IF YES, SPECIFY TYPE: _____

15.3.2.3 H₂S
 FURNISH:
 ___ PRECIPITATION HARDENED STAINLESS STEEL PISTON ROD 4140 STEEL PISTON ROD ANNEALED TO C22 WITH HARDENING IN THE PACKING AREA EITHER BY: ___ CHROME PLATING TUNGSTEN CARBIDE COATIN
 NACE MATERIAL EQUIVALENT PISTON ROD

15.3.3.7 H₂S
 PACKING CASES WILL BE PURGED WITH : ___ SWEET NATURAL GAS INERT GAS
 TYPE: _____
 THE DISTANCE PIECE WILL BE: TYPE 2 ___ TYPE 3
 AND SHALL BE: ___ EVACUATED WITH A VACUUM PUMP
 ___ PURGED WITH SWEET NATURAL GAS PURGED WITH INERT GAS
 TYPE: _____

15.3.4 H₂S
 FURNISH: AUSTENITIC OR ___ 12CR STAINLESS STEEL ON ALL PARTS THAT COME IN CONTACT WITH THE PROCESS GAS STREAM.

PROCESS GAS PIPING	CARBON STEEL	STAINLESS STEEL	OTHER
COLD SIDE PIPING	—	—	—
HOT SIDE PIPING	—	—	—
BYPASS PIPING	—	—	—
VENT LINES	—	—	—
DRAIN LINES	—	—	—
PULSATION BOTTLES			
SUCTION	—	—	—
DISCHARGE	—	—	—
SCRUBBERS			
SUCTION	—	—	—
INTERSTAGE	—	—	—
DISCHARGE	—	—	—
GAS COOLER			
HEADER	—	—	—
TUBES	—	—	—

Notes:
 1 No corrosion inhibitor injection shall be carried out throughout the equipment life. Compressor vendor to confirm metallurgy of inter skid piping according to the process service/condition without Cl injection.

CORROSIVE GASES (Cont)

PROCESS GAS PIPING	CARBON STEEL	STAINLESS STEEL	OTHER	
VALVES				
SUCTION BLOCK	—	—	—	Vendor to Define
DISCHARGE BLOCK	—	—	—	Vendor to Define
BYPASS VALVES	—	—	—	Vendor to Define
BLOWDOWN VALVE	—	—	—	Vendor to Define
CHECK VALVE	—	—	—	Vendor to Define
UTILITY PROCESS VALVES	—	—	—	Vendor to Define
RELIEF VALVES	—	—	—	Vendor to Define
INSTRUMENTATION				
SCRUBBER CONTROLS	—	—	—	Vendor to Define
PRESSURE SWITCHES	—	—	—	Vendor to Define
TEMPERATURE SWITCHES	—	—	—	Vendor to Define
TUBING	—	—	—	Vendor to Define
FITTINGS	—	—	—	Vendor to Define

15.4.3.5 CO₂
 FURNISH PRECIPITATION HARDENED STAINLESS STEEL PISTON ROD OF 4140 STEEL PISTON ROD ANNEALED TO C22 WITH HARDENING IN THE PACKING AREA EITHER BY CHROME PLATING OR TUNGSTON CARBIDE COATING

15.4.4 CO₂
 FURNISH AUSTENITIC OR 12 CR STAINLESS STEEL ON ALL PARTS THAT COME IN CONTACT WITH THE PROCESS GAS STREAM:

PROCESS GAS PIPING	CARBON STEEL	STAINLESS STEEL	OTHER	
COLD SIDE PIPING				
HOT SIDE PIPING	—	—	—	Vendor to Define
BYPASS PIPING	—	—	—	Vendor to Define
VENT LINES	—	—	—	Vendor to Define
DRAIN LINES	—	—	—	Vendor to Define
PULSATION BOTTLES				
SUCTION	—	—	—	Vendor to Define
DISCHARGE	—	—	—	Vendor to Define
SCRUBBERS				
SUCTION	—	—	—	Vendor to Define
INTERSTAGE	—	—	—	Vendor to Define
DISCHARGE	—	—	—	Vendor to Define
GAS COOLERS				
HEADER	—	—	—	Vendor to Define
TUBES	—	—	—	Vendor to Define
VALVES				
SUCTION BLOCK	—	—	—	Vendor to Define
DISCHARGE BLOCK	—	—	—	Vendor to Define
BYPASS VALVES	—	—	—	Vendor to Define
BLOWDOWN VALVE	—	—	—	Vendor to Define
CHECK VALVE	—	—	—	Vendor to Define
UTILITY PROCESS VALVES	—	—	—	Vendor to Define
RELIEF VALVES	—	—	—	Vendor to Define
INSTRUMENTATION				
SCRUBBER CONTROLS	—	—	—	Vendor to Define
PRESSURE SWITCHES	—	—	—	Vendor to Define
TEMPERATURE SWITCHES	—	—	—	Vendor to Define
TUBING	—	—	—	Vendor to Define
FITTINGS	—	—	—	Vendor to Define

15.4.5 DELETED

Notes:- Vendor to Define if applicable

- 1- Minimum material requirement for compression package is as follow:
 - a- Process stream shall be Carbon Steel (CS) with 3 mm C.A.
 - b- All pressure vessel shall be CS .
 - c- Cooler header and tube shall be CS.

OFFSHORE AND/OR MARINE ENVIRONMENT

COMPLETE THIS SECTION ONLY IF THE PACKAGED COMPRESSOR IS TO BE INSTALLED IN AN OFFSHORE AND/OR MARINE ENVIRONMENT.

16.1.3 CORROSIVE ENVIRONMENT? YES NO
IF YES, EXPLAIN: _____

16.2.1 FURNISH ___ SHIELDED OR ___ NON-SHIELDED LOW TENSION MAGNETO IGNITION SYSTEM.

16.4.1.1 COOLER HEADERS: ___ PACKAGER'S/MANUFACTURER'S STANDARD PAINT ___ HOT-DIPPED GALVANIZING
___ SPECIAL PAINT (EXPLAIN)

16.8.4 FURNISH INSULATION ON ___ ALL DISCHARGE PIPING AND/OR ___ ALL DISCHARGE VOLUME BOTTLES WHEN
THEIR PREDICTED STABILIZED TEMPERATURE IS OVER 200°F? YES NO

16.10.3 FURNISH ___ MANUAL OR ___ PILOT OPERATED ___ SUCTION AND/OR ___ DISCHARGE BLOCK VALVES? YES NO

16.10.4 FURNISH PISTON TYPE DISCHARGE CHECK VALVE? YES NO

NOTES: Vendor to Define

FOLLOWING DOCUMENTATION SHALL NECESSARILY BE AVAILABLE FOR COMPANY REVIEW & APPROVAL:

- FABRICATION DRAWINGS OF VESSEL & PIPING ISOMETRICS.
- DATASHEETS OF CORROSION MONITORING SYSTEM INSTALLED AT COMPRESSOR SKID.
- MTCs OF ALL MATERIALS.
- APPLICABLE WPS & PQRs.
- ITP FOR PRESSURE VESSEL FABRICATION.
- ITP FOR SKID FRAME, STEEL STRUCTURE & ON SKID PIPING FABRICATION.
- INTERNAL & EXTERNAL PAINTING SYSTEM SPECIFICATIONS.

PART 1 - ACCEPTABLE VENDOR LIST



NOTE: COMPANY'S APPROVED VENDOR LIST SHALL BE FOLLOWED

NATURAL GAS ENGINE	-	_____
AIR/GAS STARTER	-	_____
ENGINE EXHAUST SILENCER	-	_____
ELECTRIC MOTOR	-	_____
COMPRESSOR	-	_____
EXPLOSION RELIEF DOORS	-	_____
LUBE OIL HEATER	-	_____
COUPLING	-	_____
AIR EXCHANGE COOLER	-	_____
TEMPERATURE CONTROL:		
COOLER LOUVERS	-	Refer Annexure-D
V-BELTS	-	_____
PRESSURE GAGES	-	_____
DIAL THERMOMETERS	-	_____
GAGE GLASSES	-	_____
LIQUID LEVEL CONTROL:		
SCRUBBERS	-	_____
ENGINE/COMPRESSOR OIL	-	_____
PRESSURE REGULATORS	-	_____
PRESSURE RELIEF VALVES	-	_____
SHUTDOWN/SWITCH VALVE:		
GAS PRESSURE	-	_____
WATER PRESSURE	-	_____
OIL PRESSURE	-	_____
COOLANT TEMPERATURE	-	_____
GAS TEMPERATURE	-	_____
LIQUID LEVEL:		
SCRUBBERS	-	_____
COOLANT SURGE TANK	-	_____
ENGINE/COMPRESSOR OIL	-	_____
LUBRICATOR NO-FLOW	-	_____
VIBRATION	-	_____
OVERSPEED	-	_____
SHUTDOWN ANNUCIATORS	-	_____
VALVES:		
GATE	-	_____
PLUG	-	_____
GLOBE	-	_____
NEEDLE	-	_____
BALL	-	_____
BUTTERFLY	-	_____
PAINT:		
WASH PRIMER	-	_____
METAL PRIMER	-	_____
FIRST COAT	-	_____
FINAL COAT	-	_____
HIGH TEMPERATURE	-	_____
PULSATION STUDY	-	REQUIRED
ENGINE MOUNTING	-	_____
PANEL/PLC	-	_____
SKID	-	WIDE FOUR RUNNER DESIGN
Transmitters	-	_____
HMI	-	Panel View
Communication (SCADA)	-	NO



ANNEXURE-B

**DATASHEET FOR PRESSURE CONTROL
VALVE (PCV-001)**

		MARU-RETI COMPRESSION									
		DOCUMENT TITLE		PROCESS / MECHANICAL DATASHEET FOR PRESSURE CONTROL VALVE (PCV-001)							
OIL & GAS DEVELOPMENT COMPANY LIMITED		DOCUMENT NO.		0504196-01-DS-002			Revision-0		Petrochemical Engineering Consultants		
CLIENT									CONSULTANT		
GENERAL	1	Tag Number		PCV-001							
	2	Service / Location		Compressor suction pressure control							
	3	Line Size		8-inch (300#)							
	4	Area Classification		Zone 2B							
	5	Ambient Temperature	Min.	Max.	32	°F		120	°F		
	6	Allowable Sound Pressure Level		dBA	85 @ 1 m from the Valve						
	7	Tightness Requirements		ANSI IV with metal seat							
	8	Available gas supply press.	Min.	Max.	30	psi-g		150	psi-g		
	9	Fail Safe Position		Close							
	10	P&ID Drawing Number		0504196-01-PID-0002 (Sheet 1 of 2)							
PIPE LINE	11	Line Size and Schedule	Inlet	Outlet	8-inch / VTS		8-inch / VTS				
	12	Pipe Material		VTS							
	13	Pipe Insulation		VTS							
PROCESS CONDITION	14	Process Fluid		Saturated Gas							
	15	Upstream Condition		Saturated Gas							
	16	Differential Pressure for Actuator Sizing		VTS		psi					
	17	Units		CASE - 1	CASE - 2	CASE - 3	CASE - 4	CASE - 5			
	18	Flow	MMScfd	12	12	12	12	12			
	19	Inlet Pressure	psig	600	300	100	240	70			
	20	Outlet Pressure	psig	250	250	50	50	50			
	21	Inlet Temperature	°F	105	105	105	105	105			
	22	Molecular Mass	MW	19.61	19.61	19.60	19.61	19.60			
	23	Inlet gas Compressibility factor	-	0.946	0.971	0.988	0.976	0.992			
	24	Inlet Viscosity	cP	0.014000	0.01353	0.01326	0.01345	0.01323			
	25	Inlet gas Specific heat ratio	-	1.421	1.367	1.333	1.357	1.328			
	26	Inlet vapor pressure	psia	-	-	-	-	-			
CALCULATED RESULTS	27	Flow Co-efficient Cv	-	21.269	62.21	125.26	53.67	211.34			
	28	Valve Opening	%	32	54	70	51	92			
	29	Sound Pressure Level	dBA	100	87	97	102	90			
BODY AND TRIM	30	MFR	Model	VTS	VTS						
	31	Body Type	VTS								
	32	Body Size	Trim Size	4-inch	4.375-inch						
	33	Rated Cv	Characteristic	224.01	Equal %						
	34	End Connection & Rating		RF 300#							
	35	Body Material		VTS							
	36	Bonnet Type	Material	VTS	VTS						
	37	Flow Direction		VTS							
	38	Lubricator	Isolat. Valve	No	Yes						
	39	Guiding	No. of Ports	VTS	VTS						
	40	Trim Type		VTS							
	41	Rate Travel		VTS							
	42	Plug/Ball/Disk Material		VTS							
	43	Seat Material		VTS							
	44	Cage	Stem Mater.	VTS	VTS						
	45	Gasket Material		VTS							
	46	NACE MR01-75		VTS							
	47										
48											
PNEUMATIC POSITIONER	56	MFR	Model	-	VTS						
	57	Signal : Inlet	Outlet	3-15 Psig	-						
	58	Increase Signal Valve		VTS							
	59	Cam Characteristic		VTS							
	60	Bypass	Gauges	N/R	YES						
	61	Smart E/P Type		N/R							
	62	Certification / IP Rating		N/R							
	63	MFR	Model	-	-						
	64	Type		N/R							
	65	When De-energizes		N/R							
	66	Certification / IP Rating / Voltage		N/R							
	67	MFR	Model	-	-						
68	Type		N/R								
69	Tag Open		N/R								
70	Tag Close		N/R								
71	Certification / IP Rating / Voltage		N/R								
72	MFR	Model	-	-							
73	Set Pressure		VTS								
74	Filter	Gauges	Required	Required							
75	HydroPressure		VTS								
76	Leakage		VTS								
77	Manufacturer		VTS								
78	Model										
79	Purchase Order Number										
80	Price	Item Number									
81	Serial Number										
SOLENOID VALVE	63	MFR	Model	-	-						
	64	Type		N/R							
	65	When De-energizes		N/R							
	66	Certification / IP Rating / Voltage		N/R							
	67	MFR	Model	-	-						
	68	Type		N/R							
69	Tag Open		N/R								
70	Tag Close		N/R								
71	Certification / IP Rating / Voltage		N/R								
SWITCHES	67	MFR	Model	-	-						
	68	Type		N/R							
	69	Tag Open		N/R							
70	Tag Close		N/R								
71	Certification / IP Rating / Voltage		N/R								
INSTRUMENT GAS SET	72	MFR	Model	-	-						
	73	Set Pressure		VTS							
	74	Filter	Gauges	Required	Required						
TESTS	75	HydroPressure		VTS							
	76	Leakage		VTS							
	77	Manufacturer		VTS							
PURCHASE	78	Model									
	79	Purchase Order Number									
	80	Price	Item Number								
	81	Serial Number									
	81	Serial Number									

NOTES :

- VTS: Vendor to Specify
- Control valve to be supplied with stainless steel wire and tag with stamping of tag no. (PCV-001) in 5mm lettering.
- Instrument air is not available, offered system shall be suitable for saturated instrument gas available at site. Process gas shall be used as instrument gas for subject PCV. Any gas conditioning requirement (including pressure regulator) shall be included in vendor's scope. Vendor to specify instrument gas consumption.
- Vendor to select best suitable and Guarantee compatibility of proposed/ selected material of construction for subject service.
- Material Testing certificate shall be part of scope of supply.
- At full opening, PCV shall have minimum possible pressure drop.
- PCV will be installed at Suction of compressor for controlling Compressors inlet pressure. Accordingly, offered system shall be suitable for variable set/ outlet pressure ranging from maximum pressure for 300# CS till 50 psig.
- Corrosion proof painting to be considered.
- Complete Control system as per attached P&ID to be offered complete in all respect including Control valve, pneumatic controller, interconnecting tubing etc.
- Minimum size for PCV is mentioned in the datasheet, vendor to confirm the size as per provided cases. In case the resultant size is larger than the minimum size, vendor to share the calculation details.



MARU-RETI COMPRESSION



OIL & GAS DEVELOPMENT
COMPANY LIMITED

DOCUMENT TITLE

PROCESS / MECHANICAL DATASHEET FOR PRESSURE CONTROL VALVE
(PCV-001)

DOCUMENT NO.

0504196-01-DS-002

Revision-0

Petrochemical
Engineering Consultants

CLIENT

CONSULTANT

1 COMPONENTS

mol%

2 Methane

72.9000

3 Ethane

0.0800

4 Propane

0.0000

5 i-Butane

0.0000

6 n-Butane

0.0006

7 i-Pentane

0.0000

8 n-Pentane

0.0006

9 n-Hexane

0.0059

10 n-Heptane +

0.0000

11 Nitrogen

24.4000

12 Carbon dioxide

2.2100

13 Water

Saturated

14 Hydrogen Sulfide, ppm

0.0000

15

16

17

18

19

20

21

22

23

24

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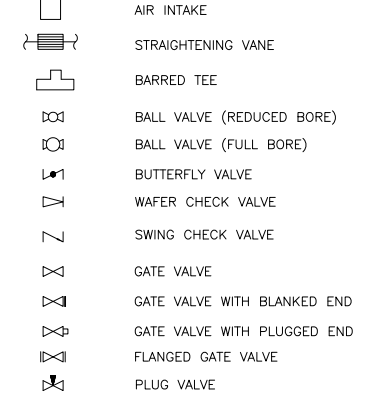
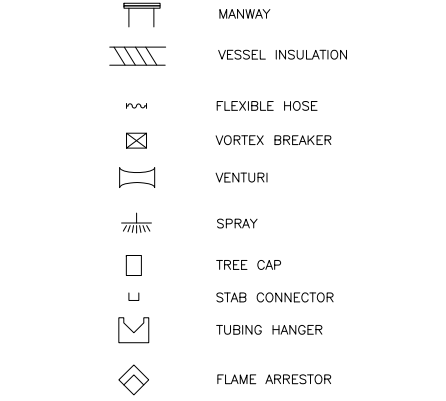
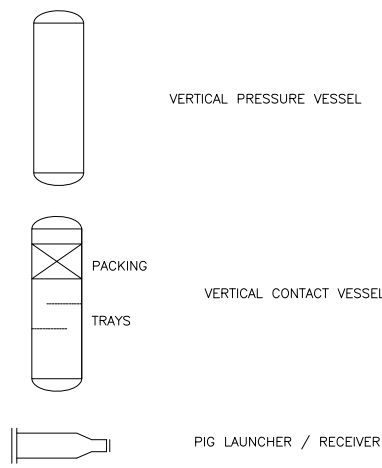
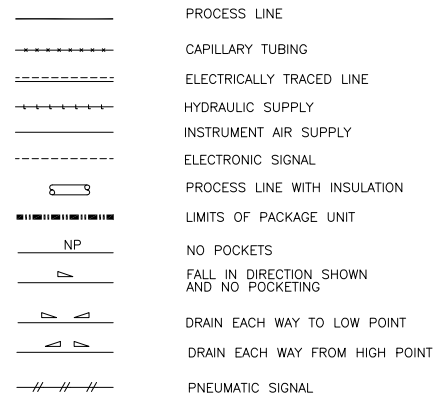
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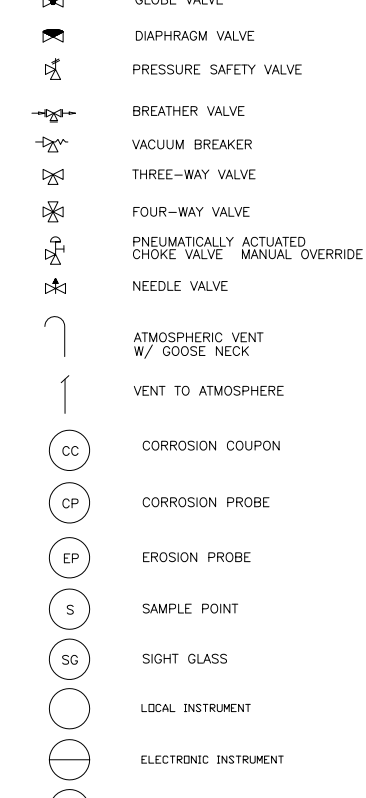
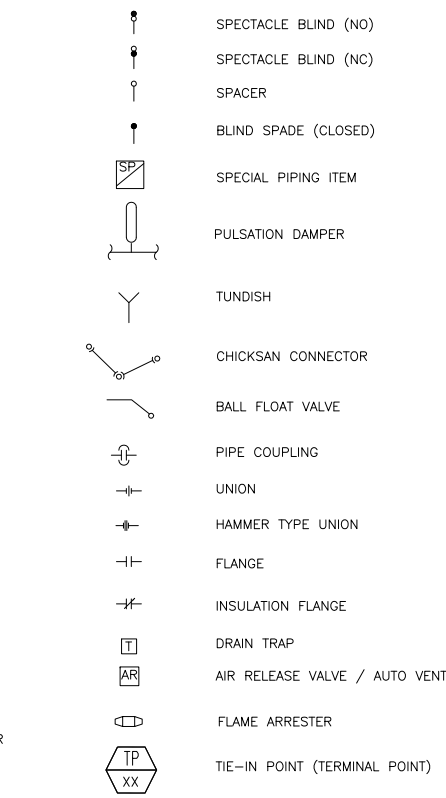
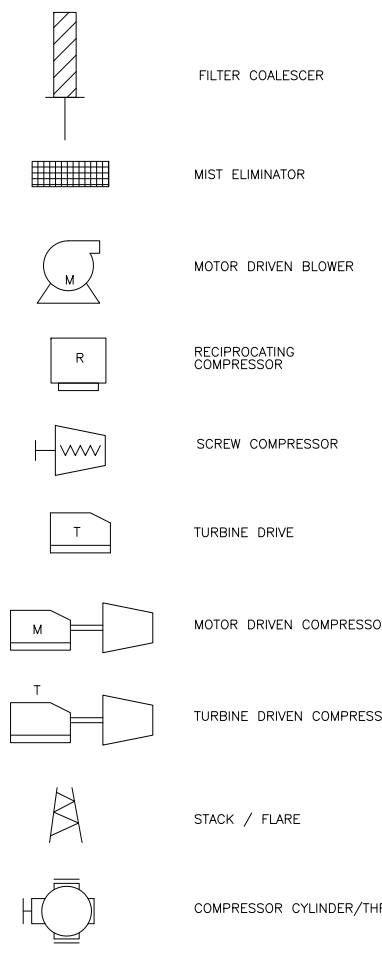
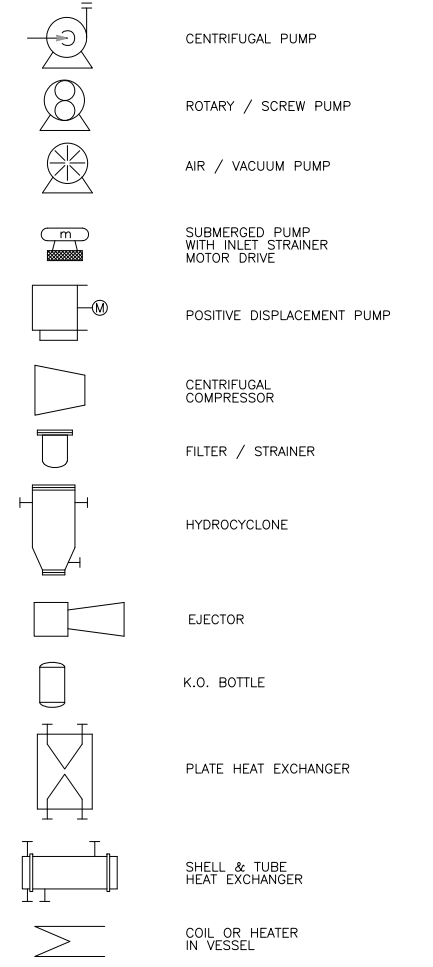
ANNEXURE-C

P&IDs FOR COMPRESSOR PACKAGE

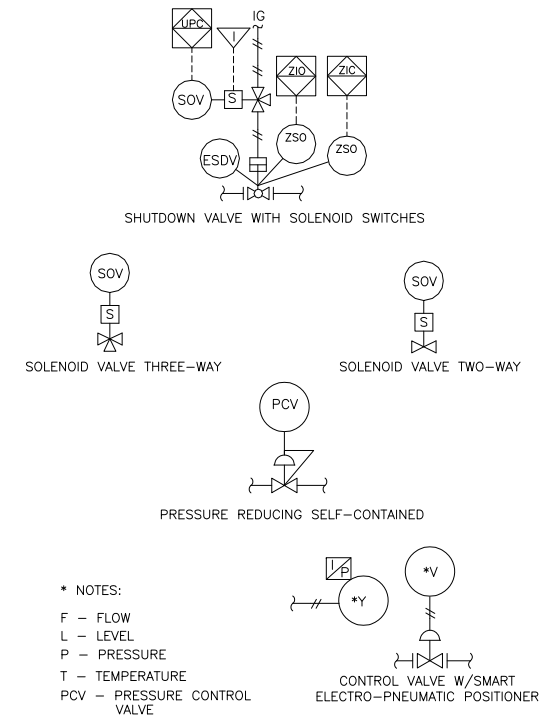
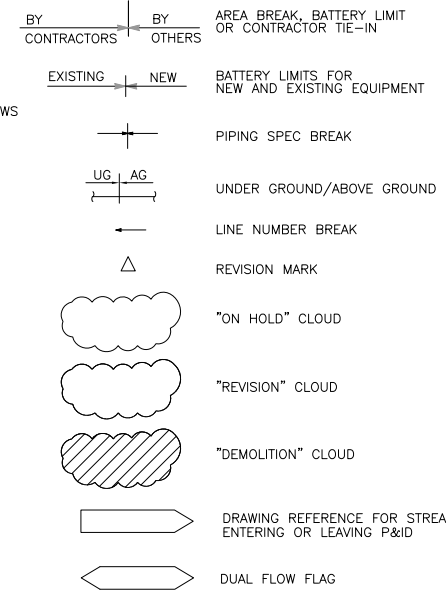
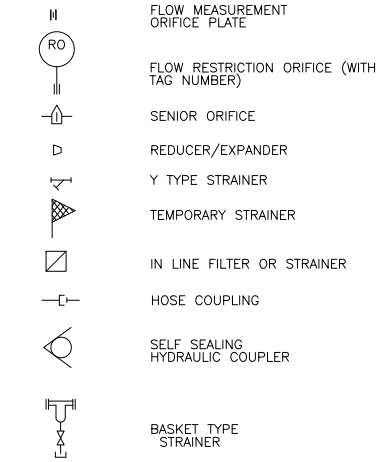
PIPING SYMBOLS



EQUIPMENT SYMBOLS



GENERAL SYMBOLS



0	23/08/19	ISSUED FOR REVIEW	KS	SHR		
REV.	DATE	DESCRIPTION	DRAWN	CHK'D	APP'VD	APP'VD
					CONSULTANT	CLIENT

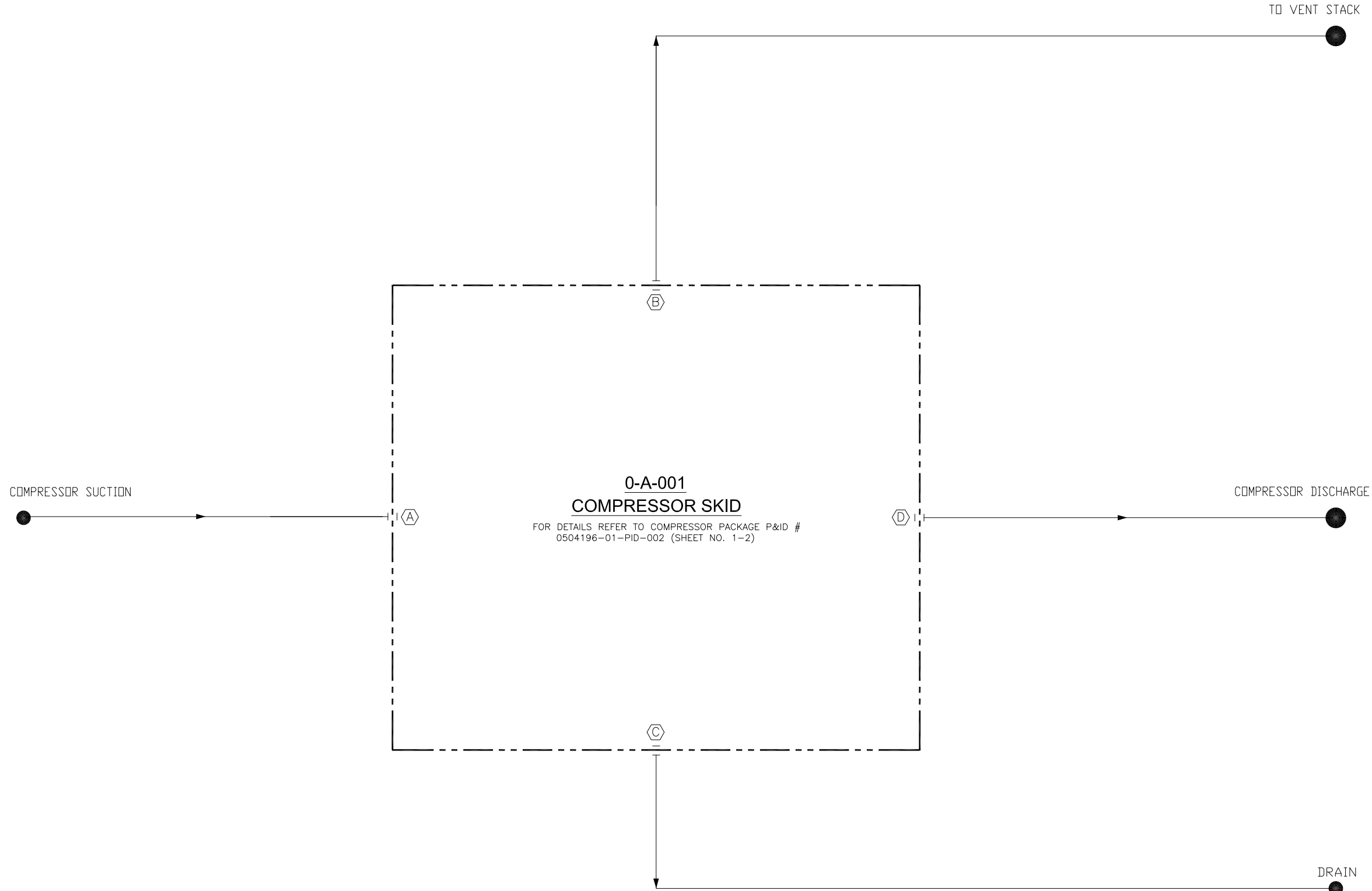
PC PETROCHEMICAL ENGINEERING CONSULTANTS
 C-2, BLOCK NO. 17, GULSHAN-E-IGBAL, NEAR NATIONAL STADIUM, KARACHI-75300. PAKISTAN.
 TEL: +92 (21) 34827780, 34961088, FAX: +92 21 34961089, E-Mail: contact@pcec.com.pk web site: www.pcec.com.pk

CLIENT
OIL & GAS DEVELOPMENT COMPANY LTD.

PROJECT
MARU-RETI COMPRESSION

TITLE
PIPING & INSTRUMENTATION DIAGRAM FOR LEGEND SHEET

DRAWING NO.		SHEET	SCALE	REV.
0504196-01-PID-000		1	A3	0



NOTES

1. THE COMPRESSOR PACKAGE SHALL BE SELF-CONTAINED, FULLY FUNCTIONAL COMPRISING OF ALL THE REQUIRED ISOLATION, SAFETY, CONTROL, RELIEF, EMERGENCY SHUTDOWN VALVES ETC.
2. COMPRESSOR PACKAGE SHOULD INCLUDE ISOLATION VALVE AT THE TIE-IN POINTS /BATTERY LIMITS OF THE SKID FOR ALL THE INTERCONNECTING SERVICES/PIPING INCLUDING PROCESS, UTILITIES, VENTS AND DRAINS ETC.
3. GAS COMPRESSOR WILL BE A VENDOR PACKAGE, VENDOR HAVE TO SUPPLY ALL INSTRUMENTS COMPLETE WITH PIPING, ACCESSORIES ETC.
4. CONTRACTOR SHALL FINALIZED ALL DESIGN INFORMATION AFTER VALIDATION OF DOCUMENTS.
5. CONTRACTOR SHALL ENSURE PROVISION OF VENTS & DRAINS LOCATION FOR PROPER PURGING & DRANING OPERATION DURING COMMISSIONING AND START-UP.
6. THE INSTRUMENTS SHOWN ON COMPRESSOR PACKAGE AS MINIMUM VENDOR TO SUPPLY ALL INSTRUMENTS REQUIRED FOR SAFE AND SMOOTH OPERATION OF THE COMPRESSOR PACKAGE WITH PIPING AND ACCESSORIES.

CONNECTION SCHEDULE		
MARK	SIZE/RATING	DESCRIPTION
A	8-inch/300#	COMPRESSOR SUCTION
B	VTA	HP VENT
C	VTA	PACKAGE DRAIN
D	6-inch/150#	COMPRESSOR DISCHARGE

REV.	DATE	DESCRIPTION	DRAWN	CHK'D	APP'VD	APP'VD
			CONSULTANT			CLIENT
0	23/08/19	ISSUED FOR REVIEW	KS	SHR		

PC PETROCHEMICAL ENGINEERING CONSULTANTS
 C-2, BLOCK NO. 17, GULSHAN-E-IBRAHIM, NEAR NATIONAL STADIUM, KARACHI-75300. PAKISTAN.
 TEL: +92 (21) 34827780, 34961088, FAX: +92 21 34961089, E-Mail: contact@pcec.com.pk web site: www.pcec.com.pk

CLIENT
OIL & GAS DEVELOPMENT COMPANY LTD.

PROJECT
MARU-RETI COMPRESSION

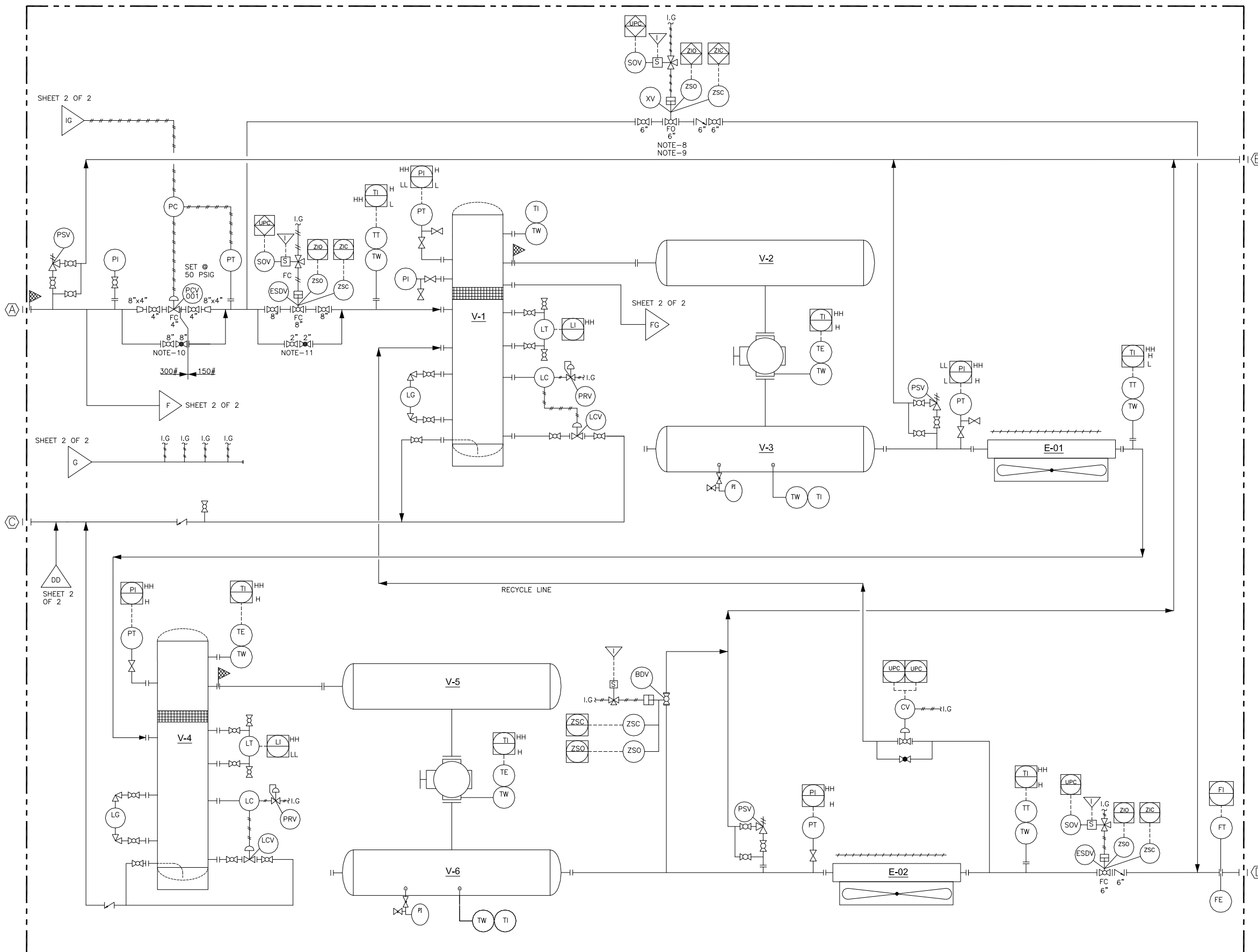
TITLE
PIPING & INSTRUMENTATION DIAGRAM FOR COMPRESSOR PACKAGE

DRAWING NO.		SHEET	SCALE	REV.
NO.	OF			
0504196-01-PID-001	1	1	A3	0

V-1 1st STG. SUCTION SCRUBBER V-2 1st STG. SUCTION BOTTLE V-3 1st STG. DISCHARGE BOTTLE V-4 2nd STG. SUCTION SCRUBBER V-5 2nd STG. SUCTION BOTTLE V-6 2nd STG. DISCHARGE BOTTLE E-01 INTER-STAGE COOLER E-02 AFTER COOLER

NOTES

1. THE COMPRESSOR PACKAGE SHALL BE SELF-CONTAINED, FULLY FUNCTIONAL COMPRISING OF ALL THE REQUIRED ISOLATION, SAFETY, CONTROL, RELIEF, EMERGENCY SHUTDOWN VALVES ETC.
2. COMPRESSOR PACKAGE SHOULD INCLUDE ISOLATION VALVE AT THE TIE-IN POINTS /BATTERY LIMITS OF THE SKID FOR ALL THE INTERCONNECTING SERVICES/PIPING INCLUDING PROCESS, UTILITIES, VENTS AND DRAINS ETC.
3. GAS COMPRESSOR WILL BE A VENDOR PACKAGE, VENDOR HAVE TO SUPPLY ALL INSTRUMENTS COMPLETE WITH PIPING, ACCESSORIES ETC.
4. CONTRACTOR SHALL FINALIZE ALL DESIGN INFORMATION AFTER VALIDATION OF DOCUMENTS.
5. CONTRACTOR SHALL ENSURE PROVISION OF VENTS & DRAINS LOCATION FOR PROPER PURGING & DRAINING OPERATION DURING COMMISSIONING AND START-UP.
6. THE INSTRUMENTS SHOWN ON COMPRESSOR PACKAGE AS MINIMUM VENDOR TO SUPPLY ALL INSTRUMENTS REQUIRED FOR SAFE AND SMOOTH OPERATION OF THE COMPRESSOR PACKAGE WITH PIPING AND ACCESSORIES.
7. P&ID DEPICTS TWO STAGE COMPRESSOR WITH ONE NUMBER CYLINDER EACH STAGE FOR INDICATIVE PURPOSE, HOWEVER, VENDOR TO SELECT NUMBER OF STAGES BASED ON OPERATING ENVELOPE.
8. CONTRACTOR TO PROVIDE AUTO BY-PASS VALVE INTEGRATED WITH THE COMPRESSOR PACKAGE.
9. THE VALVE SHALL BE CAPABLE TO BY-PASS COMPRESSOR PACKAGE IN THE EVENT OF COMPRESSOR TRIP.
10. PCV-001 BYPASS LINE SIZE SHALL BE OF SAME SIZE AS THAT OF COMPRESSOR SUCTION LINE.
11. PROVISION TO ALLOW FUEL/START GAS DURING START-UP OF COMPRESSOR PACKAGE.



CONNECTION SCHEDULE		
MARK	SIZE/RATING	DESCRIPTION
A	8-inch/300#	COMPRESSOR SUCTION
B	VTA	HP VENT
C	VTA	SCRUBBERS DRAIN
D	6-inch/150#	COMPRESSOR DISCHARGE
E	VTA	LP VENT
F	VTA	INSTRUMENT GAS TAKE-OFF FOR INLET PCV
G	VTA	INTER-SKID INSTRUMENT GAS SUPPLY
DD	VTA	FUEL SCRUBBER DRAIN
IG	VTA	INSTRUMENT GAS FOR INLET PCV
FG	VTA	FUEL GAS

0	23/08/19	ISSUED FOR REVIEW	KS	SHR		
REV.	DATE	DESCRIPTION	DRAWN	CHK'D	APP'VD	APP'VD
					CONSULTANT	CLIENT

PC PETROCHEMICAL ENGINEERING CONSULTANTS
 C-2, BLOCK NO. 17, GULSHAN-E-IBRAHIM, NEAR NATIONAL STADIUM, KARACHI-75300. PAKISTAN.
 TEL: +92 (21) 34827780, 34961088, FAX: +92 21 34961089, E-Mail: contact@pcec.com.pk web site: www.pcec.com.pk

CLIENT **OIL & GAS DEVELOPMENT COMPANY LTD.**

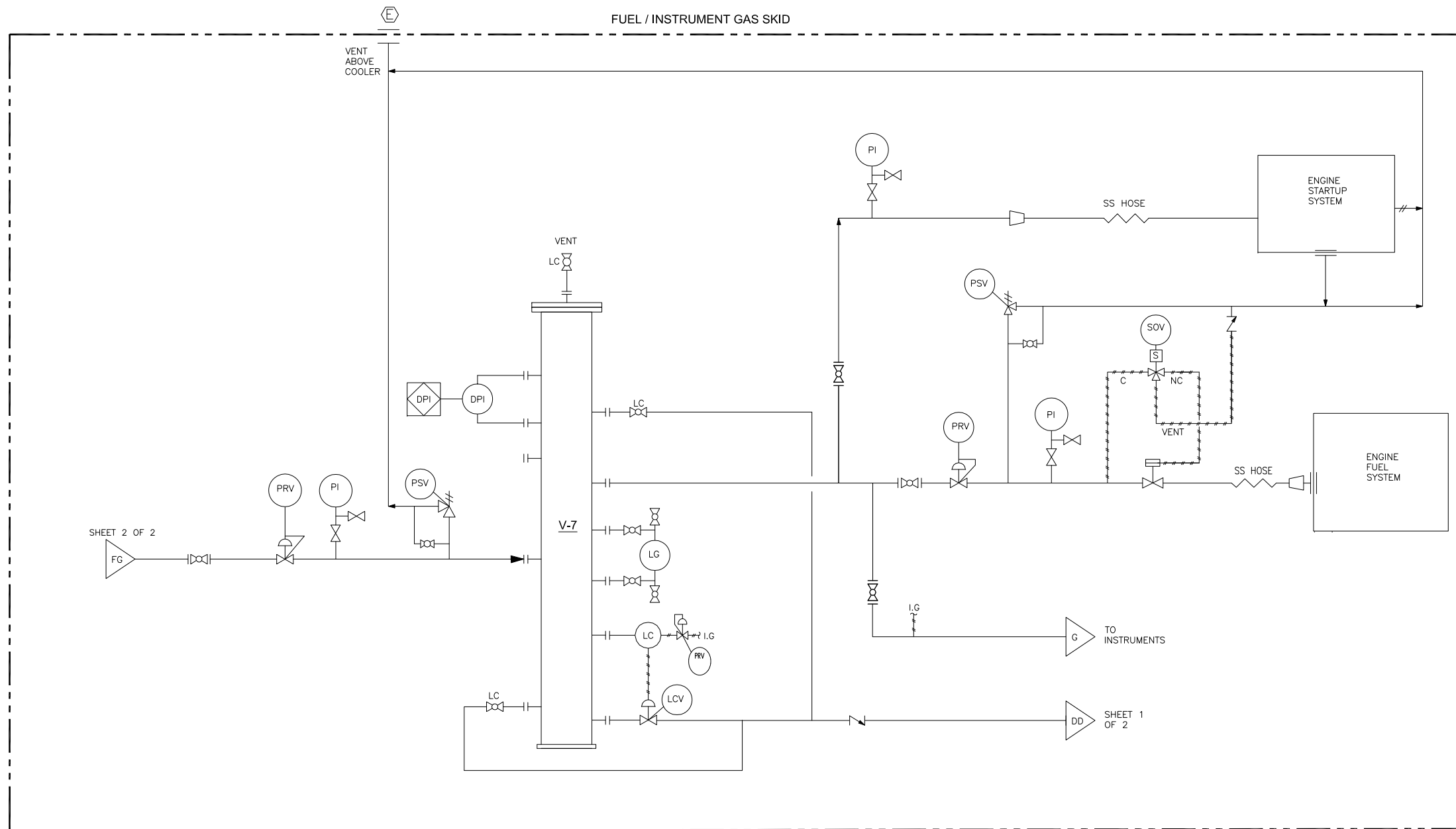
PROJECT **MARU-RETI COMPRESSION**

TITLE **PIPING & INSTRUMENTATION DIAGRAM FOR COMPRESSOR PACKAGE**

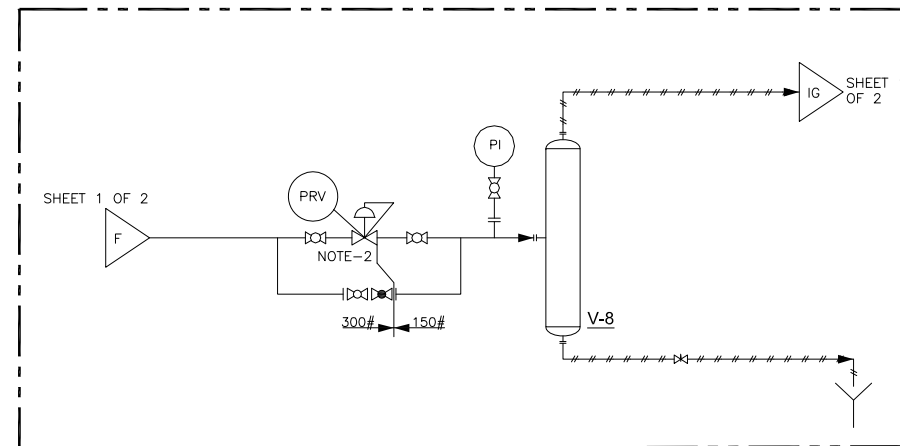
DRAWING NO.	SHEET	SCALE	REV.
0504196-01-PID-002	1	A3	0

V-7
FUEL GAS SCRUBBER

V-8
K.O BOTTLE



INSTRUMENT GAS SKID DURING COMPRESSOR TRIP



NOTES

1. THE INSTRUMENTS SHOWN ON PACKAGE ARE MINIMUM. VENDOR TO SUPPLY ALL INSTRUMENTS REQUIRED FOR SAFE AND SMOOTH OPERATION OF THE COMPRESSOR PACKAGE WITH PIPING AND ACCESSORIES.
2. THE SET PRESSURE OF PRESSURE REGULATING VALVE SHALL BE ACCORDING TO THE REQUIREMENT OF PRESSURE CONTROLLER FOR INLET PCV.

CONNECTION SCHEDULE		
MARK	SIZE/RATING	DESCRIPTION
A	8-inch/300#	COMPRESSOR SUCTION
B	VTA	HP VENT
C	VTA	SCRUBBERS DRAIN
D	6-inch/150#	COMPRESSOR DISCHARGE
E	VTA	LP VENT
F	VTA	INSTRUMENT GAS TAKE-OFF FOR INLET PCV
G	VTA	INTER-SKID INSTRUMENT GAS SUPPLY
DD	VTA	FUEL SCRUBBER DRAIN
IG	VTA	INSTRUMENT GAS FOR INLET PCV
FG	VTA	FUEL GAS

0	23/08/19	ISSUED FOR REVIEW	KS	SHR		
REV.	DATE	DESCRIPTION	DRAWN	CHK'D	APP'VD	APP'VD
			CONSULTANT			CLIENT

PC PETROCHEMICAL ENGINEERING CONSULTANTS
 C-2, BLOCK NO. 17, GULSHAN-E-IOBAL, NEAR NATIONAL STADIUM, KARACHI-75300, PAKISTAN.
 TEL: +92 (21) 34827780, 34961088, FAX: +92 21 34961089, E-Mail: contact@pcec.com.pk web site: www.pcec.com.pk

CLIENT
 **OIL & GAS DEVELOPMENT COMPANY LTD.**

PROJECT
MARU-RETI COMPRESSION

TITLE
PIPING & INSTRUMENTATION DIAGRAM FOR FUEL / INSTRUMENT GAS PACKAGE

DRAWING NO.		SHEET	SCALE	REV.
0504196-01-PID-002		NO. OF	-	0
		2	A3	

ANNEXURE-D
APPROVED VENDOR LIST

Appendix -D**RECOMMENDED VENDORS / MANUFACTURERS LIST****Article I. VENDOR LIST AS PER EQUIPMENT CATEGORY****1.01 VIBRATION MONITORING EQUIPMENT**

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Bentley Nevada (GE)	International
(ii)	Metrix Instrument Co.	International
(iii)	KrautKramer	International
(iv)	Entek	International
(v)	ProvibTech	International

1.02 AIR COOLED HEAT EXCHANGERS (PROCESS GAS SERVICE)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Batignolles Technologies Thermiques	International
(ii)	Hudson Products Corporation	International
(iii)	Descon Engineering	International / Pakistan
(iv)	Airfin, Marley Cooling Technologies (Acquired by SPX)	International
(v)	Smithco	International
(vi)	Deutsche Babcock	International
(vii)	GEA Rainey	International
(viii)	Jiangsu Sunpower Technology Co. Ltd.	International
(ix)	Sasakura	International
(x)	D'Hondt	International
(xi)	Jord International	International
(xii)	Aztech Heat Exchangers Pte Ltd	International
(xiii)	Alfa Laval / ACE	International
(xiv)	Air-X-Changers	International

1.03 SHELL & TUBE HEAT EXCHANGER

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Exell Inc.	International
(ii)	Fabsco	International
(iii)	Hudson Product Corporation	International
(iv)	Descon Engineering	International / Pakistan
(v)	Johnson Hunt	International
(vi)	Kawasaki Heavy Industires	International
(vii)	Calhex Industries	International
(viii)	Jiangsu Sunpower Technology Co., Ltd.	International
(ix)	Newpoint Gas	International
(x)	Exterran	International
(xi)	QB Johnson Manufacturing Inc.	International
(xii)	Aztech Heat Exchangers Pte Ltd.	International
(xiii)	GEA	International
(xiv)	Alfa Laval / ACE	International
(xv)	Steeltek	International
(xvi)	Huffman	International
(xvii)	Shell & Tube LLC	International

1.04 PRESSURE VESSELS

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Heavy Mechanical Complex Ltd. (HMC)	Pakistan
(ii)	DDFC	Pakistan
(iii)	HMC-3	Pakistan
(iv)	Descon Engineering	International / Pakistan
(v)	Deustche Babcock	International
(vi)	ADOS	International
(vii)	FMB Hudson	International
(viii)	GMMOS	International
(ix)	JFE (NKK)	International

Recommended Vendors / Manufacturers List

(x)	Exterren	International
(xi)	Process Group International	International
(xii)	Tianjin Hanyang Metal Equipment Co. Ltd.	International
(xiii)	QB Johnson Manufacturing Inc.	International
(xiv)	Gastec Engineering Corporation	International
(xv)	Natco Group Inc.	International
(xvi)	Newpoint Gas	International
(xvii)	GLP	International
(xviii)	AMC Sdn Bhd	International
(xix)	Modern Fabrication (MEFAB)	International
(xx)	SPEC DMCC	International
(xxi)	V-Gas LLC	International
(xxii)	S-Con Engineering	International
(xxiii)	Pennum	International
(xxiv)	Premium Welding	International
(xxv)	Modern Custom Fab	International

1.05 PROCESS RECIPROCATING COMPRESSORS

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Dresser Rand	International
(ii)	Nuovo Pignone	International
(iii)	Ariel	International
(iv)	Cooper Industries	International
(v)	BHGE (Baker Hughes, a GE Company)	International
(vi)	Siemens	International
(vii)	Atlas Capco	International

1.06 GAS ENGINES

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	BHGE (Baker Hughes, a GE Company)	International
(ii)	Siemens	International
(iii)	Caterpillar	International
(iv)	Waukesha	International
(v)	Deutz (MWM)	International
(vi)	Cummins	International
(vii)	Jan Bacher	International

1.07 AIR COMPRESSORS

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Atlas Capco	International
(ii)	Ingersoll Rand Air Compressor	International
(iii)	ANKARA HAMAK SAN. TIC. A.S.	International
(iv)	Airpack	International

1.08 PULSATION STUDY

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Beta Machinery	International
(ii)	PDI USA	International
(iii)	Compressor Dynamics USA	International
(iv)	Systems & Advanced Technologies Engineering (S.A.T.E) srl	International

1.09 FLEXIBLE COUPLING

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Rexroth	International
(ii)	TB Woods	International
(iii)	Vulkan	International

1.10 PROTECTIVE COATINGS

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Jotun	International / Pakistan
(ii)	International	International / Pakistan

(iii)	Sigma	International / Pakistan
(iv)	Ackzo Nobel	Pakistan
(v)	Cor-Pro	International
(vi)	Sutton	International
(vii)	Lonestar	International
(viii)	Seal For Life	International

Article II. PIPING COMPONENTS

2.01 STAINLESS STEEL PIPE, FITTINGS & FLANGES

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Schoeller Bleckmann	International
(ii)	Sandvik	International
(iii)	B.S.L	International
(iv)	Erndtebrucker	International
(v)	H. Buffing GmbH & Co.	International
(vi)	Mardale	International
(vii)	Raccordtubi	International
(viii)	Spromak	International
(ix)	Trouvay and Cauvin	International
(x)	Erne	International
(xi)	Zhejiang Jiuli Hi-Tech Metals Co., Ltd.	International
(xii)	Melesi	International
(xiii)	Metalfar	International
(xiv)	ULMA	International
(xv)	MGI	International
(xvi)	W Maass	International
(xvii)	Corinth	International
(xviii)	US Steel	International
(xix)	NKK	International
(xx)	Mannessmann	International

(xxi)	Bao Steel	International
(xxii)	Sumitomo	International
(xxiii)	Gerab National	International
(xxiv)	Inter Equipment	International
(xxv)	Phoccene	International

2.02 CARBON STEEL PIPE, FITTINGS & FLANGES

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Trouvay and Cauvin	International
(ii)	Sandvik	International
(iii)	Nippon Steel Corp.	International
(iv)	Kawasaki	International
(v)	Benteler	International
(vi)	Technoforge	International
(vii)	Erne	International
(viii)	Interfit	International
(ix)	Huffaz Engineering (for seamless pipe up to 10 inch diameter)	Pakistan
(x)	JFE	International
(xi)	Corinth	International
(xii)	US Steel	International
(xiii)	NKK	International
(xiv)	Mannesmann	International
(xv)	Crescent Steel	Pakistan
(xvi)	Data Steel	Pakistan
(xvii)	Hebei Cangzhou Hengtong Pipe fittings Manufacturing Co.,Ltd	International
(xviii)	Sumitomo	International
(xix)	Hengyang Valin Steel	International
(xx)	Melesi	International
(xxi)	Metalfar	International
(xxii)	ULMA	International

(xxiii)	MGI	International
(xxiv)	Gerab National	International
(xxv)	Inter Equipment	International

2.03 GASKETS

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Klinger	International / Pakistan
(ii)	James Walker	International / Pakistan
(iii)	Novus Sealing Technology (Shanghai) Co. Ltd.	International
(iv)	Garlock	International / Pakistan
(v)	Flexitallic	International / Pakistan
(vi)	Smith	International

2.04 VALVES

Manual Valves

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Shipham	International
(ii)	Grove	International
(iii)	Velan	International
(iv)	Cooper Cameron	International
(v)	Dresser	International
(vi)	Newman's / Newco	International
(vii)	OMB Valves	International
(viii)	Tyco	International
(ix)	KF	International
(x)	Brookbank Valves (For Bronze Valves)	International
(xi)	Crane Co (For Bronze Valves)	International
(xii)	Della Foglia	International
(xiii)	LVF	International

Recommended Vendors / Manufacturers List

(xiv)	Valveitalia	International
(xv)	JC Valvulas (for manual valves)	International
(xvi)	KVC (for manual valves)	International

Globe Valves

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	AES	International
(ii)	Crane	International
(iii)	Newco	International
(iv)	Walworth	International
(v)	Kitz	International
(vi)	LVF	International
(vii)	Valveitalia	International
(viii)	JC Valvulas	International
(ix)	KVC	International
(x)	Velan	International
(xi)	Ecoline -KSB	International

Gate Valves (API 6D)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Cameron	International
(ii)	Kvaerner Oiltool	International
(iii)	Control Flow Inc.	International
(iv)	Newco	International
(v)	FMC	International
(vi)	LVF	International
(vii)	Valveitalia	International
(viii)	JC Valvulas	International
(ix)	KVC	International
(x)	KF	International

(xi)	Velan	International
(xii)	Ecoline -KSB	International

Ball Valves

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Cameron	International
(ii)	Control Flow	International
(iii)	Neles Jamesbury	International
(iv)	Orbit	International
(v)	Valvitalia	International
(vi)	LVF	International
(vii)	JC Valvulas	International
(viii)	KVC	International
(ix)	KF	International
(x)	Ecoline -KSB	International
(xi)	Force	International
(xii)	Quadrant	International
(xiii)	Flow-Tek / Bray	International
(xiv)	PBV	International

Check Valves

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Anvil	International
(ii)	Butler	International
(iii)	Crane	International
(iv)	Newco	International
(v)	Tom Wheatley - Cameron	International
(vi)	JC Valvulas	International
(vii)	KVC	International
(viii)	Goodwin	International

(ix)	KF	International
(x)	Velan	International
(xi)	Ecoline -KSB	International

Needle Valves

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Anderson Greenwood	International
(ii)	Kenmac	International
(iii)	KF	International
(iv)	Oliver	International
(v)	Parker	International
(vi)	Precision Valves	International
(vii)	Swagelok	International

2.05 STEEL STRUCTURE

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Pakistan Steel	Pakistan
(ii)	Izhar Steel (Pvt.) Limited	Pakistan
(iii)	Others may be proposed for OGDCL's Approval	-

2.06 FIRE FIGHTING EQUIPMENT

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	ANGUS	UK
(ii)	SILVANI ANTINCENDI	ITALY
(iii)	FUKADA	JAPAN
(iv)	GUARD FIRE	SINGAPORE
(v)	DOLLEY TACKABERRY	USA
(vi)	HASEEN HABIB	PAKISTAN
(vii)	MIXEL	FRANCE
(viii)	FENSEN MIXERS	USA

(ix)	PERRY EQUIPMENT	USA
(x)	PALL TRINITY MICRO	USA
(xi)	WINSTON MANUFACTURING	USA
(xii)	FACET	USA

Article III. ELECTRICAL COMPONENTS

3.1 CIRCUIT BREAKERS

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	ABB	International / Pakistan
(ii)	Nilsen Electric	International
(iii)	Schneider	International / Pakistan
(iv)	Siemens	International / Pakistan
(v)	Terasaki	International / Pakistan
(vi)	G.E	International

3.2 400 / 230V DISTRIBUTION BOARDS

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Cutler Hammer (Eastan Electric)	International
(ii)	Heinemann	International
(iii)	NHP	International
(iv)	Siemens	International / Pakistan
(v)	Schneider	International / Pakistan
(vi)	BAKAT	International
(vii)	ABB	International / Pakistan
(viii)	G.E	International

3.3 LIGHT FITTINGS- NON HAZARDOUS AREA

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	CLIPSAL	International / Pakistan
(ii)	Crouse Hinds	International

(iii)	Perlite	International
(iv)	Philips	Pakistan
(v)	Victor Products	International
(vi)	Govan	International

3.4 LIGHT FITTINGS- HAZARDOUS AREA

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	CLIPSAL	International
(ii)	Crouse Hinds	International
(iii)	Perlite	International
(iv)	Victor Products	International
(v)	Govan	International
(vi)	Chalmit	International
(vii)	Philips	International / Pakistan
(viii)	Killark	International

3.5 LOCAL CONTROL STATION (NON HAZARDOUS AREA)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	CLIPSAL	International
(ii)	Cutler Hammer (Eastan Electric)	International
(iii)	NHP	International
(iv)	Allen Bradley	International
(v)	Killark	International

3.6 LOCAL CONTROL STATION (HAZARDOUS AREA)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	CLIPSAL	International
(ii)	Legrand	International
(iii)	NHP	International
(iv)	Killark	International

(v)	Crouse Hinds	International
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3.7 POWER CABLES

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Olex	International
(ii)	Prysman Cables	International
(iii)	MM Electrical	International
(iv)	Pakistan Cables	Pakistan
(v)	Pioneer Cables	Pakistan
(vi)	New Age Cables	Pakistan
(vii)	Cleveland	International
(viii)	Northsea Cables	International
(ix)	Riyad Cables	International
(x)	Saudi Cables	International
(xi)	Nexan	International
(xii)	Okonite	International
(xiii)	Amercable	International
(xiv)	Fast Cables	Pakistan
(xv)	General Cables	International

3.8 ELECTRIC MOTORS

Sr. #	Vendor / Manufacturer	Country of Origin
(i)	AEG	International
(ii)	Lawrence	International
(iii)	Reliance	International
(iv)	Siemens / Loher	International
(v)	Westinghouse	International
(vi)	WEG	International
(vii)	ABB	International
(viii)	Toshiba	International

3.9 CATHODIC PROTECTION (CP SYSTEM)

Sr. #	Vendor / Manufacturer	Country of Origin
(i)	Nakabohtec-Corrosion Pro	International
(ii)	Grobel	International
(iii)	Mapel	International
(iv)	Nippon Corrosion Engineering	International
(v)	Hockway	International
(vi)	Nuricon	Pakistan

3.10 CABLE GLANDS / JUNCTION BOXES

Sr. #	Vendor / Manufacturer	Country of Origin
(i)	BICC	International
(ii)	Hawke International	International
(iii)	Appleton	International
(iv)	CLIPSAL	International
(v)	CMP	International
(vi)	Peppers	International
(vii)	R.STAHL	International
(viii)	Crouse-Hinds	International

3.11 UPS WITH BATTERIES

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	APC Power Protection	International
(ii)	Powerware Solar	International
(iii)	Eaton	International
(iv)	Gutor	International
(v)	Chloride Power	International
(vi)	ABB	International

3.12 SOLAR POWER SYSTEMS

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Kyocera	International
(ii)	Solapak Ltd.	International
(iii)	Solar World	International
(iv)	SunWize Technologies Inc.	International
(v)	Tenesol (Sun Power)	International
(vi)	Tss4U	International

3.13 FIELD MARSHALLING BOXES

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	CLIPSAL	International
(ii)	Rittal	International
(iii)	NHP	International
(iv)	Hoffman	International

Article IV. INSTRUMENT COMPONENTS**4.1 FLOW INSTRUMENTS*****Transmitters (Electronic)***

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Emerson	International
(ii)	ABB	International
(iii)	Yokogawa	International
(iv)	Honeywell	International
(v)	Foxboro	International
(vi)	Endress+Hauser	International
(vii)	Rosemount	International

DP Indicator

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Emerson	International
(ii)	Yokogawa	International
(iii)	ABB	International
(iv)	Aschroft	International
(v)	Nouva fima	International
(vi)	Wika	International
(vii)	Precision	International
(viii)	Orange Research	International

Rotameters

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	ABB	International
(ii)	Brooks	International
(iii)	KDG	International
(iv)	Khrone	International
(v)	Fisher – Porter	International

(vi)	New Flow	International
(vii)	Parker / Porter	International

Flow Indicators

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Wallace & Tiernan	International
(ii)	Aschroft	International
(iii)	Nouva Fima	International
(iv)	Wika	International
(v)	Budenberg	International
(vi)	Tel-Tru	International
(vii)	British Rototherm	International
(viii)	Rueger	International
(ix)	Bourdon	International
(x)	Endress + Hauser	International
(xi)	New Flow	International
(xii)	John. C. Ernst	International
(xiii)	Parker/Porter	International

Orifice Plates & Flanges

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Emerson / Daniel	International
(ii)	ISA	International
(iii)	Superior	International
(iv)	Invensys	International
(v)	Yokogawa	International
(vi)	ABB	International
(vii)	Precision Flow Inc.	International

4.2 LEVEL INSTRUMENTS

DP Transmitters (Electronic)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Emerson	International
(ii)	ABB	International
(iii)	Yokogawa	International
(iv)	Honeywell	International
(v)	Foxboro	International
(vi)	KTek	International
(vii)	Endress+Hauser	International
(viii)	Magnetrol	International
(ix)	VEGA	International

Transmitters

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Yokogawa	International
(ii)	Honeywell	International
(iii)	Foxboro	International
(iv)	Magnetrol	International
(v)	Emerson	International

Switches

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Mobrey	International
(ii)	SOR	International
(iii)	Magnetrol	International
(iv)	Fisher (Emerson)	International
(v)	Dresser Masoneilan	International
(vi)	Orion	International
(vii)	Wellmark	International

Gauge Glass

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Penberthy	International
(ii)	Jerguson	International
(iii)	Simco	International
(iv)	Klinger	International
(v)	Jogler	International
(vi)	Inferno	International

Level Indicator (Float)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Magnetrol	International
(ii)	Honeywell	International
(iii)	Emerson	International
(iv)	Rosemount	International
(v)	VAREC	International
(vi)	Orion	International

4.3 PRESSURE INSTRUMENTS

Transmitters (Electronic)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Emerson	International
(ii)	ABB	International
(iii)	Yokogawa	International
(iv)	Honeywell	International
(v)	Foxboro	International
(vi)	Endress+Hauser	International

Self-Contained Regulators

Sr. #	Vendor / Supplier Name	Country of Origin
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Recommended Vendors / Manufacturers List

(i)	Emerson	International
(ii)	Norgen	International
(iii)	Masoneilan	International
(iv)	ABB	International
(v)	Fisher	International

Switches

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Ashcroft	International
(ii)	SOR	International
(iii)	DRUCK	International
(iv)	DELTA	International
(v)	HNL	International
(vi)	Neodyne	International
(vii)	UE	International
(viii)	ITT Snyder	International
(ix)	Honeywell	International
(x)	Ruelco	International
(xi)	Dwyer	International

Gauges

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Ashcroft	International
(ii)	Wika	International
(iii)	Dobbie	International
(iv)	Bourdon	International
(v)	Budenberg	International
(vi)	Nouva Fima	International
(vii)	Tel-Tru	International
(viii)	British Rototherm	International
(ix)	Dwyer	International

Recommended Vendors / Manufacturers List

(x)	Prevision Valves	International
(xi)	Winters	International

DP Gauges

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Ashcroft	International
(ii)	Wika	International
(iii)	Bourdon	International
(iv)	Budenberg	International
(v)	Nouva Fima	International
(vi)	Tel-Tru	International
(vii)	British Rototherm	International
(viii)	Precision Valves	International
(ix)	Winters	International

Safety Relief Valves

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Consolidated	International
(ii)	Farris	International
(iii)	Crosby	International
(iv)	Tyco	International
(v)	AGCO	International
(vi)	Bailey Birkett	International
(vii)	Dresser	International
(viii)	Metso	International
(ix)	Bopp & Reuther	International
(x)	Lesser	International
(xi)	ARI-Armaturen / Reyco	International

Pressure Reducing Valves

Sr. #	Vendor / Supplier Name	Country of Origin
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(i)	Emerson	International
(ii)	Dresser Masoneilan	International
(iii)	Broady Valves	International
(iv)	BelGas	International
(v)	Cashco	International
(vi)	Wellmark	International
(vii)	Samson	International

4.4 TEMPERATURE INSTRUMENTS

Transmitters (Electronic)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Emerson	International
(ii)	Yokogawa	International
(iii)	Honeywell	International
(iv)	Foxboro / Invensys	International

Indicator (Line Mounted)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Ashcroft	International
(ii)	Wika	International
(iii)	Bourden	International
(iv)	Teletherm	International
(v)	Reugar	International
(vi)	Thermodevices	International
(vii)	Teltru	International
(viii)	Weksler	International
(ix)	Emerson	International

4.5 CONTROL VALVES AND ACCESSORIES**Globe**

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Fisher	International
(ii)	Valtek	International
(iii)	Introl	International
(iv)	Samson	International
(v)	Dresser	International
(vi)	Flowserve	International
(vii)	Severn Glocon	International
(viii)	Norriseal	International
(ix)	Masoneilan	International
(x)	CVS Controls	International
(xi)	ARI - Armaturen	International
(xii)	DYNA-FLO	International

Electric Solenoid Valves

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Versa	International
(ii)	ASCO	International
(iii)	Maxseal	International
(iv)	RGS	International

Shutdown Valves

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Emerson	International
(ii)	Orbit	International
(iii)	Dresser	International
(iv)	Cameron	International

(v)	Neles Jamesbury	International
(vi)	Metso	International
(vii)	Deutche Audio	International
(viii)	Meridian	International
(ix)	Kitz	International
(x)	JC Valvulas	International
(xi)	Valvitalia	International
(xii)	Force	International
(xiii)	Quadrant	International
(xiv)	Flow-Tek / Bray	International
(xv)	PBV	International
(xvi)	Samson	International

4.6 CONTROL SYSTEM

Programmable Logic Controller (PLC)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Allen Bradley (Rockwell Automation)	International
(ii)	ABB	International
(iii)	Siemens	International
(iv)	Yokogawa	International
(v)	Honeywell	International
(vi)	General Electric / FANUC	International
(vii)	Wonder Ware	International
(viii)	Intech Process Automation	International
(ix)	Avanceon	International
(x)	TRC Advanced Technologies	International
(xi)	Schneider Process Automation	International
(xii)	Murphy Controls	International

4.7 FIRE AND GAS DETECTORS

Flammable Gas Detector / Toxic Gas Detectors / Flame Detectors / Smoke Detectors - Multi Element / Smoke detectors - VESDA / Manual Alarm Call point / Siren / Beacons / Fire Indication Panel (FIP)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Det-tronics	International
(ii)	Draeger	International
(iii)	Honeywell	International
(iv)	Tyco	International
(v)	Esser by Honeywell	International
(vi)	General Monitors / MSA	International
(vii)	MEDC	International
(viii)	Autronica	International
(ix)	Simrad	International

CO₂ and H₂S Detectors

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Simrad	International
(ii)	Det-tronics	International
(iii)	Draeger	International
(iv)	Zellweqer	International
(v)	Applied analytical Inc	International
(vi)	General Monitors / MSA	International
(vii)	Autronica	International

4.8 MISCELLANEOUS**Manifold Valves**

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	AGCO	International
(ii)	Oliver	International

(iii)	Parker - Hannifin	International
(iv)	Precision Valves	International

Enclosure

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Hoffman Engineering	International
(ii)	Rittal	International
(iii)	Siemens	International

Junction Boxes

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Klippon	International
(ii)	Stahl	International
(iii)	ABB	International
(iv)	Crouse Hind	International
(v)	Hoffman	International
(vi)	Govan	International
(vii)	Hawke	International
(viii)	AB Tech	International

Air Regulator / Filter Sets

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Fisher	International
(ii)	Norgon	International
(iii)	Dresser	International

Moisture Analyzer

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Ametek	USA / Singapore
(ii)	General Electric (G.E)	International
(iii)	Michel Instruments	International

I / P Converters

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Emerson	International
(ii)	Honeywell	International
(iii)	ABB	International
(iv)	Yokogawa	International
(v)	Foxboro	International
(vi)	CVS Controls	International
(vii)	Flowserve	International
(viii)	Siemens	International

Instrument Tubing & Fittings (stainless steel)

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Swagelok	International
(ii)	Gyrolok	International
(iii)	Parker - Hannifin	International

Instrument & Control Cables

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Leoni Kerpen	International
(ii)	BICC	International
(iii)	Belden	International
(iv)	Fuji Kura	International
(v)	Teck	International
(vi)	Anixter	International
(vii)	Pirelli Cables Ltd	International
(viii)	Prysman Cables	International
(ix)	Eupen	International
(x)	North Sea Cable	International
(xi)	Erse Kablo	International

(xii)	ADC	International
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Cable Glands

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	CCG	International
(ii)	ALCO	International
(iii)	CLIPSAL	International
(iv)	Weidmuller	International
(v)	Hawke	International
(vi)	CMP	International
(vii)	Peppers	International
(viii)	Crouse Hind	International
(ix)	ABB	International
(x)	Hoffman	International
(xi)	BICC	International
(xii)	Thomas & Betts	International

Earthing & Lighting Protection System

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Furse	International
(ii)	LPI	International
(iii)	Erico	International
(iv)	Kumwell	International
(v)	Burndy	International
(vi)	Wallis	International

Modular Buildings

Sr. #	Vendor / Supplier Name	Country of Origin
(i)	Kirby	International
(ii)	Portakabin	International

Recommended Vendors / Manufacturers List

(iii)	Yorkon	International
(iv)	Losberger	International
(v)	Alsim	International



ANNEXURE-E

**CORPORATE & FINANCIAL
INFORMATION**

ANNEXURE-E

FORMAT OF CORPORATE & FINANCIAL INFORMATION

PART - I

GENERAL INFORMATION

1. Name (Full Company Name):
 - Postal Address:
 - Contact Person Name:
 - Contact Person Mobile No:
 - Company Telephone:
 - Facsimile:
 - Valid e-mail for correspondence:
 - Website Address:
 - 1.1 Has the Company operated under any other name? If yes please give name, date of change and reason for change.
2. Type of Entity/Firm:
 - Corporation/Stock Company
 - Public Limited
 - Private Limited
 - Partnership
 - Proprietorship
3. Shareholders information/pattern with names and addresses of majority shareholders.
4. Place of Incorporation/Registration:
5. Year of Incorporation/Registration:
(Please provide copies of Incorporation/Registration Certificates and Memorandum & Articles of Association)
6. Company's National Tax No.
7. Company's Core Business Areas and their annual sales revenue/earnings during last five (5) years.
8. Name & Address of Owners/Directors
9. Registration with Pakistan Engineering Council (PEC) as Contractor. Please provide copy of membership certificate issued by PEC.

PART - II**FINANCIAL STRENGTH**

1. Provide details with regard to the financial standing of the applicant including copies of last three (3) years annual audited profit & loss account and balance sheet. Complete postal address, email address and contact numbers of the audited firm should be provided along with the bid. Also, please fill the financial summary as per below table;

S. No.	Description	Years		
		2018	2017	2016
1	Sales Revenue			
2	Paid Up Capital			
3	Profit Before Tax			
4	Profit After Tax			
5	Current Assets			
6	T. Asset			
7	Owner Equity			
8	Long Term Debt			
9	Current Liability			
10	Total Liabilities			

2. Bank(s) credit worthiness certificates (Latest Period) of applicant organization and available credit ceiling/limits with Account Number/Title.
3. Detail record with regard to litigation/arbitration proceedings or any other dispute related to project undertaken/being undertaken by the Bidder their Sub-Contractors and Suppliers (Specially with OGDCL it Joint Venture Partners or other public and private organizations working in the Oil & Gas sector of Pakistan) during past five (05) years.
4. Any information including brochures, references and other documentary evidence of technical qualification, capability and experience of the Applicant to execute the Project.

The undersigned on behalf of _____ hereby declare that the statements made and the information provided official herewith is complete, true and correct in every detail

Signature

Official Seal of the Company



ANNEXURE-F

HSE DETAILS

ANNEXURE - F

HSE DETAILS

1-	Do you have a formal written Safety Policy?	YES	NO
	If yes, please attach a copy(s)		
	Is safety policy distributed to all employees and posted at the offices?	YES	NO
2-	Do you have a safety program manual?	YES	NO
	If yes, please state scope		
<hr/>			
<hr/>			
3-	Do documented procedures exist to support the safety manual?	YES	NO
	If no, how is your safety program implemented?		
<hr/>			
<hr/>			
4-	Do you operate a formal review/audit of the safety program?	YES	NO
	How are review/audit results identified, documented and implemented?		
<hr/>			
<hr/>			
5-	Do you hold regular safety meetings for all employees	YES	NO
	If yes, how frequently do you hold these meetings?		
	Weekly	_____	
	Fortnightly	_____	
	Monthly	_____	
	Others	_____	When? _____

6-	Do you hold regular safety inspection ?	YES	NO
	If yes, please provide details.		
<hr/>			
<hr/>			
<hr/>			
7-	What Type of employee training programs is in place?		
<hr/>			
<hr/>			
<hr/>			

Is training delivered to subcontractors / vendors?	YES	NO
Is training delivered to clients?	YES	NO

8- How are accidents investigated and reports circulated to management? Give a copy of any report if available.



ANNEXURE-G
LAST 05 YEARS RECORD

ANNEXURE-G**DETAILS OF GAS ENGINE DRIVEN RECIPROCATING COMPRESSOR PACKAGE
SUPPLIED & COMMISSIONED DURING LAST FIVE (05) YEARS**

Sr. No.	Name & Address (Including Phone, Fax, email) of Buyer	Country	Details & Description of Supplied Equipment						Details & Description of Scope of Supply & Responsibilities***	Details of Operation & Maintenance or Technical Back-up Support Provided
			Qty	Year Of Supply	Gas Capacity (MMSCFD)	Prime Mover	Compressor Power	Commissioning YES / NO		

(* Please list country of origin (home country) orders first followed by Pakistan and other countries.

NOTE:

Please also provide a list of current orders for Supply & Commissioning of Gas Engine Driven Reciprocating Compressor Package on the above pattern.

ANNEXURE-H
ELIGIBILITY CRITERIA

Prior to the detailed technical and financial evaluation, pursuant to below mentioned criteria, the OGDCL will determine the eligibility requirements of bidder and goods.

Eligibility of Goods & Bidders

1. The Gas Engine Driven Reciprocating Compressor Package to be supplied under the Contract must be brand new (Certificate to be provided by supplier) and produced in and supplied from the countries maintaining bilateral trade relation with the Islamic Republic of Pakistan.
2. For purpose of this Clause, "origin" means the place where the Goods are mined, grown or produced or from where the ancillary services are supplied. Goods are produced through manufacturing, processing or substantial and major assembling of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components. The origin of Goods and Services is distinct from the nationality of the Bidder.
3. The JV Agreement is not acceptable, only OEM or OEM approved packagers shall submit the bid for supply of whole package. OEM approved packager must supply authorization letter from packager.
4. The bidders shall be the Manufacturer/Packager of Gas Engine Driven Reciprocating Compressor Package.
5. The Manufacturer must have at least consecutive TEN (10) years' experience in designing and manufacturing of Gas Engine and Reciprocating Compressor. The bidder shall submit documentary evidence in this regard.
6. The PACKAGER must have at least consecutive five (05) years' experience in supplying & commissioning of Gas Engine Driven Reciprocating Compressor with same manufacturer and in this connection PACKAGER must submit the authorization letter from the Manufacturer. The bidder shall submit documentary evidence in form of both the purchase order and completion certificate of the same to this effect.
7. The PACKAGER must have supplied at least 05 compressor/engine packages of similar capacity and similar configuration to the worldwide E&P sector (oil & natural gas industry) outside the country of origin during last 05 years. Clients Certificate of satisfactory performance from at least 03 clients, on letter head, must be provided from the clients.
8. The packager or vendor must have authorized representative in Pakistan for after sales service and the authorized representative must be working in Pakistan for last 03 years. Packager or Vendor shall provide complete details of the Authorized representative for after sales services.
9. Bidder to confirm acceptance to following delivery schedule. The Bidders are required to adhere to the maximum Delivery Period of Eight (8) months on CFR Karachi Sea/Air Port basis (excluding commissioning time) from the date the letter of credit (L/C) is established. Commissioning of Gas Engine Driven Reciprocating Compressor Package shall be undertaken by the Manufacturer/Packager. A notice shall be given by OGDCL after preparation of site for commissioning services of the package which shall be done within sixty (60) days after establishment of services letter of credit. The bidder/packager shall provide firm mobilization schedule within ten (10) days of issuance of notice by OGDCL which shall ensure mobilization of bidder/packager experts not later than 15 days.
10. Applicant must not be black listed with any agency or organization. An affidavit confirming this shall be provided with the technical proposal.
11. Documentary evidence where required are mandatory and without such documents completion / delivery shall not be considered.
12. Submission of duly signed and initialed copy of Tender Document along with Appendices, Annexures & Attachments referred therewith. Signing and stamping shall mean validation and compliance to all details included in Tender document.

ANNEXURE- I

TECHNICAL EVALUATION CRITERIA

ANNEXURE-I

Technical Evaluation Criteria

Technical Evaluation will be carried out in the light of following criteria:

- a) Compliance to Technical Specification. Bidder to submit signed / stamped copy of the specification.
- b) Corporate & Financial Information of Bidder.
- c) Curriculum Vitae (CVs) of commissioning & testing personnel and Installation Expert (As per format given in Annexure-I).
- d) Description of Quality Assurance and Quality Control procedures and HSE, QA/QC organization which the Bidder intends to adopt/follow.
- e) The components to be sub-contracted (if applicable) with names, address, capabilities and other details of Sub- Contractors and their written consent for entering into an agreement with the bidder for the specified work of the Project.
- f) Copies of valid ISO / API / ASME and other certification/accreditations.
- g) Audited Financial Statements of last 3 years.
- h) Bidder to provide performance/ design guarantee of the package that quoted design of compressor package will perform the duties as per design conditions stated in the tender specifications.
- i) Bidder to provide manufacturer's warranty/ guarantee of the quoted compressor unit and gas engine.
- j) Bidder should be responsible for complete detailed designing of compressor unit and supply of complete packages equipment. Therefore, bidder should provide in their bid, description of the process, process flow diagram (PFDs), ISID layout plan of the complete unit, civil drawings of the foundations, list of quoted equipment, skid sizes, weight and list of equipment on each skid, specification/ drawings/ data sheets of compressor, engine scrubbers, cooler exchangers, pulsation bottles, control panel, piping and all other equipment in the unit.
- k) Bidder should confirm their ability to provide supervision service engineer during installation commissioning, startup of the compressor package at site in Pakistan.
- l) Bidders must submit technical literature and brochures of the quoted equipment.
- m) All above required information should be provided along with the bid, failing which the bid will not be considered for the evaluation.

ANNEXURE – J

GAS ENGINE DRIVEN RECIPROCATING COMPRESSOR PACKAGE

**Format of Curriculum Vitae (CV) of Nominated Commissioning Personnel
and Installation Experts**

Proposed Position: _____

Name of Firm: _____

Name of Staff: _____

Profession: _____

Date of Birth: _____

Years with Firm: _____ Nationality: _____

Membership in Professional Societies: _____

Nominated Position & Tasks Assigned: _____

Key Qualifications:

[Give an outline of staff member's experience and training most pertinent to supply & commissioning of Gas Engine Driven Reciprocating Compressor Package. Also describe *degree of responsibility held* by staff member.]

Education:

[Summarize college/university and other specialized education of staff member, giving names of schools, dates attended and degrees obtained. Use up to a quarter page.]

Employment Record:

[Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organization, title of positions held and location of assignments. For experience in *last ten years*, also give types of activities performed and client references, where appropriate. Use up to three-quarters of a page.]

Languages:

[Indicate proficiency in speaking, reading and writing of each language: excellent, good, fair, or poor.]

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these bio-data correctly describe myself, my qualifications and my experience.

Signature of Staff Member or authorized official of Manufacturer

Date: _____
Day/Month/Year

TENDER NO. PROC-FC/CB/PE&FD/MR-4591/2019
(GAS ENGINEER DRIVEN RECIPROCATING COMPRESSOR PACKAGE
FOR MARU RETI FIELD)

PAYMENT TERMS

The payment shall be made as follow:-

A) Supply of Equipment/Material

For Supply Part Purchase Order Foreign Purchase Order for imported equipment and Local Purchase Order for local component (if any) will be issued and irrevocable Letter of Credit/Inland Letter of Credit will be established by OGDCL.

Supply LC payment terms are as follow:-

- a. Eighty (80) percent of Material LC/Purchase Order Price shall be paid by OGDCL on shipment of the complete material. The payment under the L/C shall be effected upon submission of following documents upon each shipment of material component:
 - I. Master Bills of Lading on Freight Pre-Paid Basis signed by the carrier or their authorized agent showing clean shipped on board. Freight forwarders, Third party, Short form, blank back and House Bills of Lading is not acceptable
 - II. Delivery Challan & Truck Receipt (For local Material).
 - III. Original detailed invoice showing material description, quantity unit price and total price strictly in line with the Contract.
 - IV. Packing list
 - V. Certificate and list of measurements and weight gross/net.
 - VI. Mill Inspection/Quality Certificate.
 - VII. Certificate of Brand New Equipment
 - VIII. Insurance declaration.
 - IX. Warranty Certificate
 - X. Certificate of origin.
 - XI. Third Party Inspection report/certificate issued by any one of the following:
 1. M/s TUV Rheinland.
 2. M/s SGS
 3. M/s TUV Austria (Formerly Moody Intl)

4. M/s Velosi

5. M/s Bureau Veritas

- b. Twenty (20) percent of the Material LC/Purchase Order Price shall be released under the L/C after successful commissioning, performance testing etc and issuance of Provisional Acceptance Certificate (PAC) / SAT Certificate by OGDCL upon submission of Invoice(s) duly verified by OGDCL.

B) Services

For Services Portion, **Installation, commissioning, start-up & Performance testing etc**, second Letter of Credit (L/C) shall be established.

The charges for **Installation, commissioning, start-up & Performance testing, etc** shall be paid by OGDCL after successful commissioning & Performance testing, etc on issuance of Provisional Acceptance Certificate/SAT Certificate against Supplier's invoice(s) duly verified by OGDCL.

Supplier's request(s) for payment shall be made to OGDCL in writing accompanied by an invoice describing, as appropriate, the equipment delivered or services performed, and by shipping documents, submitted pursuant to relevant clauses and upon fulfillment of all obligations stipulated in the Contract.

FORM OF TENDER OR BIDDING FORM

Dated: _____

Tender Enquiry No.._____

To,
Oil & Gas Development Company Limited
OGDCL House, Jinnah Avenue, Blue Area,
Islamabad, Pakistan.

Gentlemen,

1. Having Examined the Conditions of Contract and specifications, the receipt of which is here acknowledged, we the undersigned, offer to supply & deliver _____ in conformity with drawings, conditions of contract and specifications for the sum of _____ or such other sums as may be ascertained in accordance with the said conditions.
2. If our Bid is accepted we shall commence delivery within _____ days and Completed delivery of all the items specified in the Contract within _____ days from the date of receipt of your Letter of Credit.
3. If our tender is accepted we shall obtain the Guarantee of a scheduled Bank or other sureties (to approved by you) to be jointly and severally bound with us in a sum not exceeding ten percent (10%) of the Contract sum for due performance of the Contract as per format at Annexure “D”.
4. We agree to abide by this Tender for the period of one hundred and eighty (180) days from the date fixed for opening the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
5. Until a formal Agreement is prepared and executed, this Bid, together with your acceptance thereof, shall constitute a binding Contract between us.
6. We understand that you are not bound to accept the lowest or any tender you may receive.
7. We accept the other terms & conditions of L/C enclosed as Appendix – I.

Dated this _____ day of _____

Signature _____ in the

Capacity of _____ Duly
authorized to sign Tenders for and on behalf of

(Name of the firm in block capitals)

Address _____

Fax _____ Telephone _____

Witness: -

1. _____

2. _____

Signature

BID BOND

Oil & Gas Development Company Limited,
OGDCL House, Jinnah Avenue, Blue
Area, Islamabad.

Dear Sir,

In consideration of M/S _____ herein after called "THE BIDDER" having submitted the accompanying Bid and in consideration of value received form (the Bidder above), we hereby agree to under take as follows:-

1. To make unconditional, immediate and forthwith payment of the sum of US\$ (United States Dollars only) upon your FIRST and SIMPLE written demand without further recourse, question, query, deferment, contestation or reference to the bidder, account party or any other person in the event of the withdrawal of the aforesaid bid by the BIDDER before the end of the period specified in the Bid after the opening of the same for the validity thereof or if no such period be specified, within **180 days** after the said opening or if the Bidder, having been notified of the acceptance of his bid by the Company during the period of bid validity:
 - a) Fails, refuses or delays to execute the Contract in accordance with the instruction to Bidders, or
 - b) Fails, refuses or delays to furnish Performance Bond in accordance with the instruction to Bidders.
2. To accept written intimation(s) from you as conclusive, sufficient and final evidence of the existence of a default of non-compliance, breach or default as aforesaid on the part of the BIDDER and to make payment immediately and forthwith upon receipt of your FIRST and SIMPLE written intimation.
3. No grant of time or other indulgence to, or composition or arrangement with the BIDDER in respect of the aforesaid Bid with or without notice to us shall affect this Guarantee and our liabilities and commitments hereunder.
4. This is an **independent** and **direct** obligations guarantee and shall be binding on us and our successor in-interest and shall be irrevocable.
5. The Guarantor Bank warrants and represents that it is fully authorized, empowered and competent to issue this guarantee.

Yours faithfully,

(BANKERS)

Note: Guarantee from RBS/NIB/SUMMIT BANK is not acceptable.

PERFORMANCE BANK GUARANTEE

Oil & Gas Development Company
Limited OGDCL House, Jinnah
Avenue, Blue Area, Islamabad,
(Pakistan)

Dear Sir,

Ref; our Bank Guarantee No. _____ in the sum of _____
Account _____ in consideration of you having entered into Contract
No. _____ Dated _____ with _____ Called Contractor and in
consideration for value received from CONTRACTOR. We hereby agree and undertake as followings:

- 1 To make unconditional payment to you as called upon of (10%) ten percent of the Contract value of the contract price mentioned in the said contract, on your written FIRST and SIMPLE demand without further recourse, question or reference to CONTRACTOR or any other person in the event of default, non-performance or non-fulfillment by CONTRACTOR of his obligations, liabilities, responsibilities under the said contract of which you shall be the sole judge.
- 2 The accept written intimation from you as conclusive and sufficient evidence of the existence of the default or breach as aforesaid on the part of CONTRACTOR and to make payment immediately and forthwith upon receipt of your FIRST and SIMPLE written demand.
- 3 This Performance Bond shall remain valid and in full force and effect upto _____ or issue of statement of discharge by your authorized representative or return of original guarantee whichever is earlier.
- 4 DEMURRAGE DUE TO DELAY IN RECEIPT / NEGOTIATION OF ORIGINAL SHIPPING DOCUMENTS.

If clean documents are not negotiated within Negotiation Period allowed in Letter of Credit or documents are with held by Bank on account of any discrepancy:

- If the Demurrage, if any incurred due to late negotiation of the Clean Documents and paid by OGDCL will be realized from the beneficiary of L/C, by encashing this Performance Bond to the extent of demurrage amount. In case demurrage amount exceeds the total value of this Performance Bond the balance amount will be payable by the beneficiary.

- 1 That no grant of time or other indulgence to, amendment in the terms of the Contract by Agreement between the parties, or imposition or Agreement with CONTRACTOR in respect of the performance of his obligations under the said Agreement, with or without notice to us, shall in any manner discharge or otherwise affect this Guarantee and our liabilities and commitments there under.
- 2 This is an independent and direct obligation guarantee and shall be binding on us and our successors interest and shall be Irrevocable.
- 3 This guarantee shall not be affected by any change in the constitution of the Guarantor Bank or the constitution of the Contractor.
- 4 The Guarantor Bank Warrants and represents that it is fully authorized, empowered and competent to issue this guarantee.

(B A N K E R S)

DECLARATION

**(To be filled / signed / stamped by the prospective bidder
i.e. principal and by the Local Agent on their Letter Head)**

The Prospective Bidder will have to certify that;

- Their Firm / Company /Local Agent with current or any other title & style have not been involved in any manner or kind of litigation with OGDCL.
- Wrong declaration to above fact will be liable to legal proceedings including but not limited to confiscation of Bid Bond / Performance Bond & Blacklisting of Firm (the Principal) and also Local Agent

Sign/Name: _____

Principal's Name / Address: _____

Designation: _____

Date: _____

Stamp: _____

Sign/Name:

Local Agent's Name / Address: _____

Designation:

Date: _____

Stamp: _____

DECLARATIONS:

CONTRACT NO. PROC-FC/ _____

- i. Contractor/Seller declares and affirms that the contractor/Seller itself and its sub contractors, directors, officers, employees and agents have not paid, nor have undertaken to pay, any direct or indirect payment by way of any type of gratification, bribe, pay-off, kick-back, or unlawful commission, valuable thing or any offer, or any authorization or promise to pay money or any things of value, in any way or manner whether in rupees or in foreign currency and whether in Pakistan or abroad, no have given or offered to give any gifts and presents in Pakistan or abroad, to any official or employee of the purchaser or any other person while knowing that the payment or promise to pay will be passed on to an official or employee of the purchaser corruptly to an official or employee of the purchaser corruptly to influence purchaser, official act or decision or to secure an improper advantage in order to procure this contract or retain business. The Contractor further undertake not to engage in any of these or similar acts during the terms of this contract.
- ii. The Contractors, Sub-Contractor/Seller hereby further declares and affirms that no association of the Contractor, Sub-Contractors/Seller, Agent directors, officers exists with any party abroad and any agent in Pakistan, who may have a direct or indirect conflict of interest with the purchaser, and fully understands that the contract will become null and void and un enforceable in the event it is discovered that such; a relationship was in existence at the time of entering into contract. The Contractors, Sub-Contractors/Seller further under takes to immediately inform the purchaser if such a relationship is established after signing of the contract and it will be up to the purchaser to terminate the contract if so desired without any recourse or compensation or continue with it.
- iii. Any such disclosure contrary to the above declaration and affirmations shall be material breach resulting in termination of the contract forth with and the Contractor/Seller Agent shall be fully liable under the governing laws of Pakistan, and shall also be responsible to make good any loss or damage caused to the purchaser by such breach.

ON THE BEHALF OF SELLER
SIGNATURE & OFFICIAL SEAL

(On official letter-head of the bidder)
To be signed by the Chief
Executive of the bidding
company or a
Representative duly
authorized by board
resolution.

Annexure- "H"

Integrity and Ethics Undertaking

We hereby commit and undertake to observe the following principles during our participation in the tender process and during the contract execution:-

- a) That we will not directly or through any other person or firm offer promise or give to any of the employees of OGDCL involve in the tender process or execution of the contract any gain, pecuniary benefit or facilitation payment in order to obtain in exchange any advantage of any kind whatsoever during the execution of contract.
- b) That we have not and will not enter with other bidders into any undisclosed agreement or understanding either formal or informal to restrict competitiveness or to cartelise in the bidding process.
- c) That we will ensure that the remuneration of agents (if engaged) is appropriate and is for legitimate services only.
- d) That we will not use subcontracts, purchase orders or consulting agreements, as a mean of channeling payments to employees of OGDCL.
- e) That we will not commit any offence under the Pakistan Penal code, Prevention of corruption Act or National Accountability Ordinance to Achieve any advantage, gain or benefit during the tender process or execution of contract

We further understand and acknowledge that any violation or transgression of the above mentioned principles will attract disqualification from the tender process and may also result in permanent exclusion from future contact award processes.

We also accept and undertake to respect and uphold OGDCL's absolute right to resort to and impose such disqualification, debarment or exclusion.

For and on behalf of _____

Tender No. _____

(On official letter-head of the contractor)
To be signed by the Chief
Executive of the bidding
company or a
representative duly
authorized by board
resolution.

Annexure- "I"

Integrity and Ethics Undertaking

We hereby commit and undertake to observe the following principle during our participation in the contract execution:-

- a) That we will not directly or through any other person or firm offer promise or give to any of the employees of OGDCL involve in or relevant to the execution of the contract any gain, pecuniary benefit or facilitation payment in order to obtain in exchange any advantage of any kind whatsoever during the execution of contract at any stage thereafter
- b) That we did not enter with other bidders into any undisclosed agreement or understanding either formal or informal to restrict competitiveness or to cartelize in the bidding process.
- c) That we will ensure that the remuneration of agents (if engaged) is appropriate and is for legitimate services only.
- d) That we will not use subcontracts, purchase orders or consulting agreements as a mean of channeling payments to employees of OGDCL.
- e) That we will not commit any offence under the Pakistan Penal Code, Prevention of Corruption Act or National Accountability Ordinance to Achieve any advantage, gain or benefit during the tender process or execution of contract

We further understand and acknowledge that any violation or transgression of the above mentioned principles will attract disqualification from the tender process and may also result in permanent exclusion from future contact award processes.

We also accept and undertake to respect and uphold OGDCL's absolute right to resort to and impose such disqualification, debarment or exclusion.

For and on behalf of _____

Tender No. _____

Contract No. _____