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| **طرح نگهداشت و افزایش تولید 27 مخزن** | | | | | | |
| **PMR FOR GAS COMPRESSORS**  **نگهداشت و افزایش تولید میدان نفتی بینک** | | | | | | |
|  | |  |  |  |  |  |  |
| D03 | | MAY. 2022 | IFI | H. Adineh | M.Fakharian | M. Mehrshad |  |
| D02 | | FEB. 2022 | IFI | H. Adineh | M.Fakharian | M. Mehrshad |  |
| D01 | | JAN. 2022 | IFI | H. Adineh | M.Fakharian | M. Mehrshad |  |
| D00 | | NOV. 2021 | IFC | H. Adineh | M.Fakharian | M. Mehrshad |  |
| **Rev.** | | **Date** | **Purpose of Issue/Status** | **Prepared by:** | **Checked by:** | **Approved by:** | **CLIENT Approval** |
| **Class: 4** | | | **CLIENT Doc. Number:F0Z-709217** | | | | |
| **Status:** | | **IDC: Inter-Discipline Check**  **IFC: Issued For Comment**  **IFA: Issued For Approval**  **AFD: Approved For Design**  **AFC: Approved For Construction**  **AFP: Approved For Purchase**  **AFQ:** Approved For Quotation  **IFI: Issued For Information**  **AB-R: As-Built for CLIENT Review**  **AB-A: As-Built –Approved** | | | | | |

**REVISION RECORD SHEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |  | **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |
| **1** | X | X | X | X |  | **66** |  |  |  |  |  |
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| **43** | X | X |  |  |  | **108** |  |  |  |  |  |
| **44** | X | X |  |  |  | **109** |  |  |  |  |  |
| **45** | X | X | X |  |  | **110** |  |  |  |  |  |
| **46** | X | X | X |  |  | **111** |  |  |  |  |  |
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| **48** |  | X |  |  |  | **113** |  |  |  |  |  |
| **49** |  | X |  | X |  | **114** |  |  |  |  |  |
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# INTRODUCTION

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.

With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO). Also PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.

As a part of the Project, a New Gas Compressor Station (adjacent to existing Binak GCS) shall be constructed to gather of 15 MMSCFD (approx.) associated gases and compress & transfer them to Siahmakan GIS.

**GENERAL DEFINITION**

The following defines the meaning of specific words used in this specification:

|  |  |
| --- | --- |
| CLIENT: | National Iranian South Oilfields Company (NISOC) |
| PROJECT: | Binak Oilfield Development – Surface Facilities; New Gas Compressor Station |
| GENERAL CONTRACTOR (GC): | Petro Iran Development Company (PEDCO) |
| EPC CONTRACTOR: | Joint Venture of : Hirgan Energy – Design & Inspection(D&I) Companies |
| VENDOR: | The firm or person who will fabricate the equipment or material. |
| EXECUTOR: | Executor is the party which carries out all or part of construction and/or commissioning for the project. |
| THIRD PARTY INSPECTOR (TPI): | The firm appointed by EPD/EPC CONTRACTOR (GC) and approved by CLIENT (in writing) for the inspection of goods. |
| SHALL: | Is used where a provision is mandatory. |
| SHOULD: | Is used where a provision is advisory only. |
| WILL: | Is normally used in connection with the action by CLIENT rather than by an EPC/EPD CONTRACTOR, supplier or VENDOR. |
| MAY: | Is used where a provision is completely discretionary. |

# GENERAL

* This document presents the item material requisitions for Contractor’s use as appropriate.
* This material requisition covers the requirements for the design, manufacturing, testing and supply of Gas Compressor Package as listed below. All equipment/devices/items shall conform to this requisition and all specifications which have been mentioned in attachment 1 of this material requisition.
* The vendor's supply shall include:

|  |  |  |
| --- | --- | --- |
| **Tag No.** | **Description** | **Qty.** |
| C-2101 & 2102 A/B/C | Gas Compressor Package | 3 Set |
|  | Main Electrical Motor Driver | 3 Set |
|  | All accessories and auxiliary systems |  |

# 

# REFERENCE / ATTACHED DOCUMENTS

1. Specified documents in attachment 1 shall be considered as a part of this material Requisition.
2. All codes and standards which have been referenced in above mentioned specs shall be considered.
3. In case of any conflict between the contents of this document or any discrepancy between this document and other project documents or reference standards, this issue must be reported to the CLIENT. The final decision in this situation will be made by CLIENT.
4. Deviations

Any exceptions/clarifications to codes/standards and specifications listed in attachment 1 must be clearly stated in a separate dedicated section of the proposal in the format submitted in attachment 4.

The proposed deviations/comments list shall include as minimum:

* Reference for the involved specification, chapter and paragraph.
* Technical justification for the non-compliance.
* Detailed description of the proposed alternative.

If no exceptions or clarifications exist, either for the complete referenced document or an individual paragraph, the supplier shall be considered to be in full compliance with the relevant document.

The supplier may propose materials of equivalent or better quality compared to those indicated in the equipment data sheet. Even these cases shall be duly included/technically supported in the deviations/clarifications list.

# SUBJECT OF THE SUPPLY

The supplier shall supply Gas Compressor Package that completely assembled and tested. The scope of supply is detailed at para. 5. The supplier shall include in the supply, all other equipment/devices/items not listed in the following, but necessary for a good design and a safe operation, taking into account process data and installation conditions such as area classification and climatic conditions.

The grade of shop assembly of the equipment/devices/items supplied shall be at maximum extent to facilitate site erection and pre-commissioning activities.

# LIMITS OF SUPPLY

5.1 SCOPE OF SUPPLY

VENDOR’S scope of work and supply shall include but not limited to items in below tables under requirements stated in this requisition and all of its attachments. The scope of supply must include all necessary components and materials of Gas Compressors Package in full compliance to this MR and its attachments, required for all modes of operation and safe and smooth operation of the plant.

As a note all required items by purchaser which shall be in the vendor’s base offer are specified with and all items which shall be quoted as option are specified by O.

Vendor shall fill out below tables and mark all his proposed items with 

| **No.** | **Description** | **Required by Purchaser** | **Proposed by vendor** | **Remark** |
| --- | --- | --- | --- | --- |
|  | Reciprocating Compressor proper |  |  |  |
|  | Electric motor driver with terminal box and accessories |  |  |  |
|  | Coupling, flywheel & non-spark guard |  |  |  |
|  | Spill back recycle control valve |  |  |  |
|  | Permanent and temporary Inlet strainers |  |  |  |
|  | Suction and discharge pulsation suppressor (volume bottle) for each stage and supports |  |  |  |
|  | All on skid interconnecting piping and tubing c/w all valves, fitting, instruments and etc. on them  Note: All on skid piping and tubing shall be fully assembled at shop |  |  |  |
|  | All between skids (Compressor skid, oil skid, cooling water skid and etc.) interconnecting piping and tubing c/w all valves, fitting, instruments and etc. on them  Note: All between skids piping and tubing shall be prefabricated and match marked at shop  Note2: A detailed isometric DWG for them shall be provided by vendor. |  |  |  |
|  | UPS (If required) |  |  |  |
| D03 | One cooling water system per each compression train including but not limited to:   * + Water Reservoir c/w thermostatically electrical heater and relevant instruments   + Motor driven main water pump   + Motor driven standby water pump   + Twin filter with switch over valve   + Air cooled water cooler   + PCV, TCV with relevant instruments   + Piping and tubing c/w all valves, instruments and etc. on them   + Local Gauge Board   + Baseplate |  |  |  |
| D03 | One lube oil system per each compression train including but not limited to:   * + Oil reservoir c/w thermostatically electrical heater and relevant instruments   + Shaft driven main oil pump   + Air cooled oil cooler   + PCV, TCV with relevant instruments   + Oil filter (Twin with switch over valve)   + Local temp. Gauge and pressure gauge   + Oil piping and valve, sight glass, etc.   + Baseplate   D03 |  |  |  |
|  | Cylinder lubricator |  |  |  |
|  | Buffer gas system including purging system and all related auxiliary equipment (as per figure I-2 of API618) |  |  |  |
|  | Barring device with electrical motor |  |  |  |
|  | Baseplate for compressor, motor, aux. systems with anchor bolts and foundation bolts |  |  |  |
|  | Jackscrews for all equipment |  |  |  |
|  | Shim packs with jackscrews for baseplates |  |  |  |
|  | Name plate for main equipment as well as all auxiliary equipment as per purchaser specification |  |  |  |
|  | Capacity control system |  |  |  |
|  | PSVs on process lines, oil lines, cooling water lines and etc. |  |  |  |
|  | Heat tracing, Insulation and jacketing for on skid equipment and piping  Note: All required heat tracing and insulation within the skids shall be assembled at shop |  |  |  |
|  | Heat tracing, Insulation and jacketing for between skids piping  Note: Design and providing relevant MTO for all required heat tracing and insulation for between the skids piping shall be in the vendor’s scope of work and shall be considered in his base offer | O |  |  |
|  | Clips and supports required for equipment fire proofing |  |  |  |
|  | Any required ladder, platforms, handrails for the package | O |  |  |
|  | Coupling hydraulic mount/ removal equipment |  |  |  |
|  | Hold down supports |  |  |  |
|  | All terminal points terminating in flanged and valved connections (as shown in P&ID).  For flange connection others than ASME type, mating flanges to be supplied by vendor |  |  |  |
|  | All manifolds for pressure instruments |  |  |  |
|  | All necessary accessories for utility distribution  **Note:**  Each utility will be supply in one tie-in and any required accessories for distribution of these utilities is in the vendor’s scope. |  |  |  |
|  | All on-skid wiring and cabling terminating to skid edge junction boxes and all relevant material (metallic conduit and cable tray with cover) |  |  |  |
|  | Cabling, wiring & tubing between skids and local panel |  |  |  |
|  | Unit control and shutdown panel, load sharing panel,… as per project specification/ data sheet |  |  |  |
|  | Instrumentation / control valves / block valves / PSV required for safe and reliable operation of compressor including but not limited to the items specified in purchaser data sheet and P&ID's, field instruments, hook-up material, Cable glands and junction boxes in compliance with the project specifications |  |  |  |
|  | Cable glands for all instruments and junction boxes |  |  |  |
|  | Local gauge boards (LGBs) |  |  |  |
|  | Work station, lap top, licensed software,.. |  |  |  |
|  | PLC based Remote control panels (UCP with redundant CPU and power) common for all trains with dedicated SIL rated loop for protection/ESD signals.  ( Spill back control loop, load sharing if required,... to be included ) with redundant Modbus serial communication links to plant DCS system with modbus RTU protocol and RS-485 as per Project Specifications. |  |  |  |
|  | Local control panels |  |  |  |
|  | Machine monitoring sensors as per API 670 , connected directly to UCP or to related system such as VMS.  field instruments, hook-up material, Cable glands and  junction boxes in compliance with the project  specification  - Key-phasor probe and proximitor  - Vibration probes and proximitors  - Rod drop detector  - Packing temperature indicator  - Bearing Temperature Sensors |  |  |  |
|  | Earthing material as per Technical Specification |  |  |  |
|  | Installation, Pre-Commissioning, Commissioning and Start up Spare Parts as per attachment #1 |  |  |  |
|  | Capital Spare Parts as per attachment #1 | O |  |  |
|  | Spare parts for 2 years operation (with separate price and as per attachment#1) | O |  |  |
|  | Special tools for installation and maintenance for all equipment in train |  |  |  |
|  | All necessary lifting lugs and beams |  |  |  |
|  | All necessary device for noise attenuation such as hood and etc. |  |  |  |
|  | Documentation as per "RFD"( fixed during Pre-Order Meeting) |  |  |  |
|  | First fill of grease |  |  |  |
|  | First fill of oil | O |  |  |

### 5.1.1 Exclusion

* Electrical cabling between junction boxes on skids and CONTRACTOR’s electrical cabin.
* Instrumentation cables between FIELD (Local Control Panel, Junction Box) and Rack Room
* Main cable and cable glands on battery limit (between package junction boxes and remote mounted package control panels)

5.2 SCOPE OF WORK

| **NO.** | **Description** | **Required by Purchaser** | **Proposed by vendor** | **Remark** |
| --- | --- | --- | --- | --- |
| 1 | Planning, coordination and project control (covering all sub Vendors) |  |  |  |
| 2 | Engineering, Design and Procurement of all material |  |  |  |
| 3 | Document control and submissions to Purchaser for review/ comments / final filling and updating them progressively |  |  |  |
| 4 | Pulsation analysis (Acoustical simulation, and piping restraint analysis plus mechanical response analysis - approach 3) till damping all vibrations |  |  |  |
| 5 | Manufacturing and Assembling |  |  |  |
| 6 | Mounting of Main Equipment, Driver and Auxiliary Systems on their skids |  |  |  |
| 7 | Units Assembly at Factory and unit responsibility for the entire unit, including compatibility with entire unit |  |  |  |
| 8 | Lateral and critical speed analysis for compressor and driver |  |  |  |
| 9 | Torsional analysis for the complete train |  |  |  |
| 10 | Design of heat tracing (steam/electrical), insulation and personnel protection and MTO (if required) |  |  |  |
| 11 | Heat tracing including panels, heating cables and relevant connectors, electrical cables, junction boxes and thermostats (if required) |  |  |  |
| 12 | Surface preparation and Painting at shop including primer, intermediate & finish coats conform to the specification for painting |  |  |  |
| 13 | Design of All inter/after coolers and separators | O |  |  |
| 14 | Design of all instruments and control panels for proper work of package including all field instruments in pipe works out of piping scope (loose instruments) |  |  |  |
| 15 | All on skid wiring terminating at skid edge junction boxes |  |  |  |
| 16 | All between skids wiring and cabling |  |  |  |
| 17 | All on skid pipe work |  |  |  |
| 18 | Design and providing relevant MTO and isometric DWG for all interconnecting piping including on skid piping, between skids piping |  |  |  |
| 19 | Design and providing relevant MTO and isometric DWG for main process piping between compressor, KO drums, coolers and etc. | O |  |  |
| 20 | Verify purchaser piping and supporting design |  |  |  |
| 21 | P&ID mark-up and checking for specifying requirements of acid washing and oil flushing |  |  |  |
| 22 | PDMS 3D model |  |  |  |
| 23 | Hold down supports complete design and detailed drawings |  |  |  |
| 24 | Anchor/Setting bolt design |  |  |  |
| 25 | Foundation loading diagram and information, anchor/setting bolts arrangement and details |  |  |  |
| 26 | Specify any requirement for walkways, platforms, ladders and handrails on related drawings |  |  |  |
| 27 | Design and providing relevant MTO for walkways, platforms, ladders and handrails required for whole the compressor packages |  |  |  |
| 28 | Inspection and tests at shop and providing reports |  |  |  |
| 29 | MRT for compressor at shop |  |  |  |
| 30 | Complete Unit Test at site (Compressor + Driver+ Auxiliary Systems) | O |  |  |
| 31 | Performance Test at site | O |  |  |
| 32 | Instrumentation and control system FAT (at vendor shop) |  |  |  |
| 33 | IFAT (at plant DCS vendor shop) | O |  |  |
| 34 | HAZOP & SIL study |  |  |  |
| 35 | Performance guarantee |  |  |  |
| 36 | Mechanical guarantee |  |  |  |
| 37 | Material guarantee |  |  |  |
| 38 | UCP and Instruments Guarantee |  |  |  |
| 39 | As built drawings and documents |  |  |  |
| 40 | Packing including export and rust prevention for long term storage (such as N2 purge) |  |  |  |
| 41 | Shipping and transportation according to delivery condition |  |  |  |
| 42 | Supervision for Installation, Pre-Commissioning, Commissioning and Start-Up including time schedule & supervision stages | O |  |  |
| 43 | Training (Syllabus, number of man days and duration to be specified in the quotation) | O |  |  |

### 

### **5.2.1 Exclusion**

In addition to exclusion items of engineering data sheets, the following shall be considered as exclusion:

* Foundations design (But foundation loading diagram and information shall be provided by vendor)
* Civil works
* Installation of equipment

5.3 BATTERY LIMITS

Refer to “P&ID for Gas Compressor Package with Doc.No:BK-GCS-PEDCO-120-PR-PI-0007 & 0010”. All items in battery limits to be provided by Vendor.

# INSPECTION AND TESTS

The equipment shall be inspected and tested in accordance with the quality control plan issued by the supplier and approved by the PURCHASER before the award of the order. The QC plan shall at least be according to the Commodity Procurement and Manufacturing Inspection Instruction; Doc. No. ICE-EID-MI-SP01-Rev.01) and Instructions for selecting the level of inspection of goods and equipment; Doc No. ICE-EID-MI-SP02-Rev.01 and data sheets (if any).

The supplier shall in any case conduct all the tests required by contractual documents, specifications, codes and standards, manufacturer standard quality system and keep the relevant documentation.

# VENDOR DOCUMENTATION REQUIREMENTS & SCHEDULE

* Vendor document shall be according to attachment 2 of this document.
* All documents, preliminary or final, are to be stamped and signed by the supplier.
* Failure in dispatch of the required documents shall cause the supply to be considered as unfulfilled.
* PURCHASER’s approval does not relieve vendor, in any way, from his obligation to fulfill the requirements of the purchase order documents.
* All vendor drawings and documents shall be in English language.
* VENDOR shall provide list of drawings and documents by one week after order award.
* VENDOR of Equipment/material shall provide all documents and drawings listed in RFD and submit required number of copies.
* All Vendor documents shall be categorized either “FOR INFORMATION”, or “FOR REVIEW/COMMENTS” according to Vendor Documents Min. Requirement.
* Purchaser will reply according to each categories and return to Vendor documents and Vendor shall take necessary actions on them.
* All vendor’s documents and drawings shall be submitted in both Native and PDF format upon each issue.
* Native file of PDMS and all software applicable for control system shall be submitted by vendor as well.

All drawings and documents are to be identified as per clause 1 **“GENERAL DEFINITION”**

# UNIT RESPONSIBILITY

VENDOR shall be responsible for the design, engineering, co-ordination, supply, delivery, testing, final check-out and satisfactory operation of the equipment/devices/items. The engineering coordination also includes responsibility for handing and expediting drawings.

Also VENDOR shall be responsible for ensuring that all relevant information and documentation is passed on the sub-suppliers.

# GUARANTEE AND WARRANTY

All material and Equipment/Devices/Items in VENDOR’s scope of work/supply shall be guaranteed by VENDOR.

The guarantee period shall be eighteen (18) months from the date of delivery and/or twelve (12) months from the installation date of each equipment/packages at site.

VENDOR shall guarantee the performance of supplied items (if any).

VENDOR shall guarantee that the Equipment/Device/Item is suitable for the operating conditions herein specified, and that all materials and components are free from any defects; verifications of all calculations are in VENDOR’s responsibility.

VENDOR shall unconditionally guarantee the materials and workmanship of all material and/or services. If, within the guarantee period, any defects occur which are due to faulty material and/or services included in his scope (design, manufacturing, inspection, testing, supply & etc.), VENDOR shall, at his own expense, repair or adjust the condition, or replace the material and/or services to the complete satisfaction of CLIENT’s representative. These repairs, replacement or adjustments shall be made only at such time as will be least detrimental to the operation of the CLIENT’s business.

VENDOR warrants promptly repairing or replacing the defective parts in the warranty period.

Vendor shall ensure a correct and safe operation of the unit, providing all safety protection Devices.

Vendor shall be responsible for the safe, reliable, continuous functioning of the Equipment/Devices/Items.

VENDOR is fully responsible for the design of package for correct and safe operation based on project requirement during package life time; therefore, VENDOR shall specify any documents/specifications which may be required for design, manufacture and finalizing of Equipment/Devices/Items to avoid any problems during the package operation at site before P.O; otherwise, VENDOR shall be hold responsible for any corresponding deviation from expectations from the Equipment/Devices/Items.

# DEVIATION

VENDOR’s proposal shall be prepared in strict compliance with the requirements set forth in the relevant specifications of tender documents.

VENDOR shall include in his proposal the statement of compliance with the tender documents should VENDOR wish to submit exception to the requirements of tender documents. They shall be submitted for PURCHASER’s approval.

# PRICE BREAKDOWN

Breakdown price of following items shall be included in the proposal, as well as total price.

1) Material and Fabrication for each Section Separately

2) Pre-commissioning & commissioning spare parts (E&D-QC-SP-1)

3) 2 years operational spare parts (E&D-QC-SP-1)

4) Packing & transportation

5) Other fee (if any)

# SPECIAL NOTES

Unless otherwise stated in the specification, data sheet and/or the under mentioned shall be followed:

12.1 Vendor's quotation for equipment and/or materials shall be in strict accordance with conditions and specifications stated in this requisition and all attached documents. Vendor shall clearly state any exceptions, deviations and alternatives in the Deviation List and will be valid only if approved by the purchaser.

12.2 Process Flow Diagrams and Piping and Instrumentation Diagrams are required for equipment, packaged process plants, and pressure lubrication and seal support systems.

12.3 P&ID shall included but not limited to:

* + 1. Each piece of equipment, including spare equipment, along with equipment numbers
    2. Each instrument used shall be shown on P&ID drawing e.g. gauges, indicators, control valves, solenoids, position switches as well as tag numbers.
    3. All customer connections with connection reference symbol/number
    4. An indication of all components and accessories that are to be shipped loose
    5. All pipelines and inline piping devices
    6. All valves and the type of valve
    7. All vent, drain, and purge connections
    8. The purpose of all connections e.g., startup vent, sample point
    9. The size, schedule and material of all lines or piping class
    10. Flow direction
    11. Changes in rating class or pipe specification
    12. The type of nozzle connection to equipment, e.g., flange, weld end, threaded
    13. Manholes and hand holes, including size
    14. Location of vessel connections relative to essential internals
    15. Critical elevation notes
    16. All pressure relief devices, including the set pressure, inlet flange size, and outlet flange size
    17. Special requirements, e.g., heights of seal loops, slope of lines, no pockets, sensor in liquid phase only.
    18. The failure position of control valves
    19. Hand wheels when supplied on control valves
    20. Requirement for tight shutoff valves
    21. Push buttons and switches associated with interlock systems and sequential control systems
    22. Insulation requirements including thickness, type and reason for insulation
    23. Extent and type of heat tracing
    24. All Vendor/Purchaser scope breaks
    25. Symbology Legend (If other than ISA or Purchaser).
    26. Specific/Special requirements via notes
    27. Instrumentation, Control Loop including interlocks, sequences and emergency shut down
    28. Sample connection
    29. Size and set pressure of safety valves
    30. Measuring and control signal transmission of signals
    31. Kind of signaling lines representation

12.4 Implementation of HAZOP and SIL study in related documents and supply of any added equipment/instrumentation shall be done by vendor without any cost impact.

12.5 Instrument calibration loose items shall be checked at site before installation. In case of any inaccuracy or drift faced during guarantee period instrument shall be re- calibrated in calibration shop at site and extra charges to be borne by vendor.

* 1. Isometric drawing shall include, but not limited to:

1. Length
2. Bill of Material
3. Piping data including pressure, temperature
4. Hydrostatic test medium as well as required pressure and time
5. Material information
6. NDT
   1. Dimensional Outline Drawing” shall be included and not limited to:
7. Compressor/driver/train baseplate leveling diagram
8. Anticipated thermal movement on major connection Nozzle Allowable
9. Thermal Growth
10. Lifting lugs detail
11. Allowable piping forces and moments
    1. “Foundation Layout Drawing” shall be included and not limited to:
12. Anchor Bolt/Erection Bolt list & Arrangement with appropriate drawing
13. Grouting requirements
14. Static & Dynamic loads for foundation design

12.9 Auxiliary equipment includes and not limited to: “Sealing System”, “Lubrication System”, “Buffer Gas System”

12.10 Oil Flushing, Acid Washing, Warm-up and Steam Blow out procedure and Steam blow out acceptance criteria shall be specified in IOM manual.

12.11 "Equipment list" document shall be included (at least but not limited to) tag number, service description, quantity, fluid name, density, driver type, power, design and operation data including capacity/inlet/outlet pressure/temperature, material).

12.12 Type and characteristics of lubricants, volume, first fill volume and interval changes shall be specified in "Lubricant list" as well as equivalent brands.

12.13 All materials shall be as per ASTM standard. Also all materials shall be new and first quality.

12.14 Anchor supports (fix point) shall be considered at this Tie-in point. It means that Tie- in point has zero displacement/rotation; otherwise displacements shall be specified by vendor at this tie-in point.

12.15 The static equipment, supplied as a part of the package unit shall comply with the requirements of Technical Specification for Pressure Vessels and Shell & Tube Heat Exchangers.

12.16 Spare parts shall be packed separately from the equipment.

12.17 All instruments & valves to be installed in proper height for easy access.

12.18 Head room height shall be at least 2200 mm.

12.19 Foundation bolts delivery time will be finalized during Pre-Order meeting.

12.20 Tagging and Numbering of the I&C and relevant cables and wires to be in compliance with package numbering procedure.

12.21 Vendor shall consider all the mentioned seismic parameters and confirm that all of them have been considered in its calculation.

12.22 The vendor shall submit performance curves or tables of power and capacity versus suction pressure with parameters of discharge pressure, showing the effects of unloading devices and showing any operating limitation and with calculation input and output data identified, all as mutually agreed between the vendor and the purchaser.

* 1. Torsional analysis report shall be included but not limited to the following:
     1. Complete description of method used.
     2. Graphic display of mass elastic system.
     3. Tabulation identifying the mass moment and torsional stiffness for each component identified in the mass elastic system.

1. Graphic display of exciting forces versus speed and frequency.
2. Graphic display of torsional critical speeds and deflections (mode shape diagram).
3. Effects of proposed changes on analysis.
4. Current pulsation analysis.
   1. Acoustic and mechanical analysis report, including but not limited to:
5. Design approach and method used (complete description), including description of design techniques used.
6. Findings and comparison with permitted values.
7. Effects of required modifications; and marked up drawings showing changes.
   1. As-built dimensions and data shall be included, but not limited to:
8. Fits, clearances and run outs measured during final assembly.
9. Nameplate data for each cylinder.
10. Cylinder minimum and design clearances for each end of each cylinder.
11. Volume of all clearance pockets, plugs or bottles installed on each cylinder.
12. Crank angle phasing

12.26 Anticipated Maintenance area, maximum maintenance weight and minimum required hook elevation shall be specified in proposal and exact values shall be shown in "General Arrangement Drawing" as much as possible.

12.27 Vendor to fill in native SPIR form mentioned in PURCHASER’s documents including description of each part, manufacturing part number, manufacturing drawing number, price, showing interchangeability and etc.

12.28 Flanges for nozzles shall be as per ANSI/ASME B16.5.

12.29 Single inlet/outlet to be provided by vendor for all identical mediums.

12.30 Pulsation bottles shall be rigidly mounted such that the piping interface with the bottle is limited to the loads and moments same as vessels.

12.31 For reciprocating compressor, Pulsation and vibration study shall be performed by vendor. Vendor shall locate Tie-in points in positions where pulsation and vibration do not affect purchaser side's piping. Tie-in point has zero displacement and rotation, otherwise displacements shall be specified by vendor at this tie-in point (clause: 6.14). In the event that pulsation study result has impact on purchaser piping routes and/or pipe supports, all vendor requirements shall be informed to purchaser by marking-up pipe route clearly. Since space management and piping static stress analysis are in purchaser scope of work, vendor to obtain purchaser approval on marked-up isometric drawings.

12.32 Vendor shall provide allowable piping loads at the tie-in points. Allowable nozzle loads shall be in accordance with "Appendix N in Specification For Pressure Vessels". In case of unavoidable over loaded, then the loads should be submitted to the vendor for consideration and approval.

12.33 All external surfaces of equipment shall be painted (3 layers primary, inter & finish) according to manufacturer‘s painting procedure with considering project’s painting specification.

12.34 Material Safety Data Sheets in accordance with ISO 11014 or OSHA 1910-1200 are required for catalysts, chemicals, absorbents, desiccants, resins, molecular sieves, purging/cleaning and passivating fluids, lubricants, hydraulic fluid oils, coolants and refrigerants supplied or recommended by the Vendor for use with the equipment.

# PRESERVATION AND PROTECTION

Vendor shall advise any requirement for preservation of material that requires long-term storage after delivery at site. Vendor shall provide all preservation and protection required for shipment and storage at site prior to installation.

# COORDINATION MEETING

VENDOR shall, upon receipt of PURCHASE NOTICE, send a sufficient number of qualified personnel to HIRGAN Energy office (in Tehran) at VENDOR’s cost to hold the coordination meeting(s) according to following schedule:

|  |  |
| --- | --- |
| Pre-Order Meeting: | for **4** days after **2** weeks after Purchase Notice |
| PIM Meeting: | for **2** days as per schedule |
| Design Clarification Meeting: | will be defined in Pre-Order Meeting (If Required) |

# CONFORMITY

VENDOR'S proposal shall be in strict conformity with PURCHASER'S requirements as stated in this Requisition and all of its attachments. Any deviation or exception to Purchaser’s requirements shall be raised to Purchaser to obtain prior Approval. Without such Approval any claims will be rejected and Vendor shall correct the non-conformities at her own cost.

Purchaser Approval on Vendor documents shall in no way to relieve Vendor of any of his obligation, responsibility or liability under the condition of this requisition.

# ATTACHMENT #1

D03

**LIST OF REFERENCE / APPLICABLE DOCUMENTS**

| No. | Document Title | Document No. | Rev. |
| --- | --- | --- | --- |
| **Process** | | | |
| 1 | Process Basis of design | BK-GNRAL-PEDCO-000-PR-DB-0001 | D05 |
| 2 | Process Design criteria | BK-GNRAL-PEDCO-000-PR-DC-0001 | D02 |
| 3 | Process Data Sheets for Gas Compressors Packages | BK-GCS-PEDCO-120-PR-DT-0030 | D02 |
| **Mechanical** | | | |
| 3 | Mechanical Design Criteria | BK-GNRAL-PEDCO-000-ME-DC-0001 | D00 |
| 4 | Specification for reciprocating compressor (API 618) | BK-GCS-PEDCO-120-ME-SP-0002 | D05 |
| 5 | Specification for centrifugal pump (API 610) | BK-GCS-PEDCO-120-ME-SP-0003 | D04 |
| 6 | Specification for air cooled heat exchangers | BK-GCS-PEDCO-120-ME-SP-0001 | D00 |
| 7 | Specification for pressure vessels | BK-GNRAL-PEDCO-000-ME-SP-0001 | D00 |
| 8 | Mechanical datasheet for gas compressor packages (C-2101 A/B/C & C-2102 A/B/C) | BK-GCS-PEDCO-120-ME-DT-0031 | D06 |
| **General** | | | |
| 9 | Specification For Welding Procedure | BK-GNRAL-PEDCO-000-QC-PR-0015 | D00 |
| 10 | Packing, Marking, Transportation Procedure | BK-GNRAL-PEDCO-000-QC-PR-0045 | D00 |
| 11 | ICE-EID-MI-SP01-Rev01 | دستورالعمل بازرسی، خرید و ساخت کالا | D01 |
| 12 | E&C-QC-SP-1 | دستورالعمل تامین قطعات یدکی راه اندازی وراهبری دو سالانه | D00 |
| 13 | ICE-EID-MI-SP02-REV-01 | دستورالعمل انتخاب سطح بازرسي كالا و تجهيزات | D01 |
| 14 | Document numbering procedure | BK-GNRAL-PEDCO-000-PM-PR-0003 | D00 |
| 15 | SIL study procedure | BK-GNRAL-PEDCO-000-GE-PR-0003 | D01 |
| 16 | HAZOP study procedure | BK-GNRAL-PEDCO-000-GE-PR-0001 | D02 |
| **Piping** | | | |
| 17 | Data sheets for manual valves | BK-GCS-PEDCO-120-PI-DT-0002 | D00 |
| 18 | Specification for the design of piping in mechanical packages | BK-GNRAL-PEDCO-000-PI-SP-0003 | D00 |
| 19 | Specification for material requirements in sour service | BK-GNRAL-PEDCO-000-PI-SP-0008 | D00 |
| 20 | Piping material specification | BK-GCS-PEDCO-120-PI-SP-0001 | D01 |
| 21 | Specification for painting | BK-GNRAL-PEDCO-000-PI-SP-0006 | D04 |
| 22 | Specification for insulation | BK-GNRAL-PEDCO-000-PI-SP-0019 | D02 |
| 23 | Specification for metallic pipes | BK-GNRAL-PEDCO-000-PI-SP-0004 | D05 |
| 24 | Specification for fitting & flange & gasket & bolts | BK-GNRAL-PEDCO-000-PI-SP-0005 | D02 |
| 25 | Specification for manual valves | BK-GNRAL-PEDCO-000-PI-SP-0009 | D00 |
| 26 | Piping design criteria | BK-GNRAL-PEDCO-000-PI-DC-0001 | D03 |
| **Electrical** | | | |
| 27 | Data sheets for MV induction motors | BK-GCS-PEDCO-120-EL-DT-0009 | D02 |
| 28 | Data sheets for LV induction motors | BK-GCS-PEDCO-120-EL-DT-0008 | D02 |
| 29 | Specification for lv induction motors | BK-GNRAL-PEDCO-000-EL-SP-0010 | D03 |
| 30 | Specification for mv induction motors | BK-GNRAL-PEDCO-000-EL-SP-0017 | D03 |
| 31 | Specification for Earthing & lightning system | BK-GNRAL-PEDCO-000-EL-SP-0006 | D03 |
| 32 | Electrical system design criteria | BK-GNRAL-PEDCO-000-EL-DC-0001 | D02 |
| 33 | Specification for power & control cable | BK-GNRAL-PEDCO-000-EL-SP-0014 | D03 |
| 34 | Data Sheets for Local Control Stations(LCS) | BK-GCS-PEDCO-120-EL-DT-0006 | D01 |
| **I & C** | | | |
| 35 | Specification for instrumentation | BK-GNRAL-PEDCO-000-IN-SP-0001 | D03 |
| 36 | Specification for instrument and control of package unit system (PU) | BK-GNRAL-PEDCO-000-IN-SP-0004 | D01 |
| 37 | Specification for control valves | BK-GNRAL-PEDCO-000-IN-SP-0005 | D02 |
| 38 | Specification for instrument and F&G cables | BK-GNRAL-PEDCO-000-IN-SP-0010 | D00 |
| 39 | Specification for pressure safety valves (PSV) | BK-GNRAL-PEDCO-000-IN-SP-0007 | D03 |
| **Drawing** | | | |
| 40 | Symbol & legend for PFD and P&ID | BK-GCS-PEDCO-120-PR-PI-0001 | D02 |
| 41 | Standard drawing for pressure vessel and Heat Exchangers | BK-GNRAL-PEDCO-000-ME-DW-0001 | D00 |
| 42 | Standard Drawing For Anchor Bolts | BK-GNRAL-PEDCO-000-ST-DW-0002 | D02 |
| 43 | P&ID - 1st Stage Gas Compression Compressors | BK-GCS-PEDCO-120-PR-PI-0007 | D02 |
| 44 | P&ID - 2nd Stage Gas Compression Compressors | BK-GCS-PEDCO-120-PR-PI-0010 | D02 |
| 45 | Process Flow Diagram (PFD) | BK-GCS-PEDCO-120-PR-PF-0001 | D04 |

# ATTACHMENT #2

**VENDOR DOCUMENTS MIN. REQUIREMENT**

| **Item No.** | **Document** | **With Bid** | **TIME SCHEDULE** | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **For Review** | | **Final Issue** | |
| **Copies**  **No./Type**  **(7)** | **Copies**  **No./Type (1)** | **Solar**  **days**  **(2)** | **Copies**  **No./Type (1)** | **Calendar days**  **(3)** |
| **MANAGEMENT** | | | | | | |
| 001 | Work Load Chart | 4N | 6C+E |  | 6C+E |  |
| 002 | Vendor Document List & Schedule (VDLS) | 3N | 6C+E |  |  |  |
| 003 | Organization Chart | 4N | 6C+E |  | 6C+E |  |
| 004 | Monthly /Weekly Progress Report |  | 6C+E |  |  |  |
| 005 | Engineering, Procurement, Fabrication, Testing and Delivery Schedule | 3N | 6C+E |  |  |  |
| 006 | Deviation & Clarification List | 3N |  |  |  |  |
| 007 | Experience List( For Similar jobs) | 3N |  |  |  |  |
| 008 | Vendor Catalogue | 4N | 6C+E |  | 6C+E |  |
| **QUALITY** | | | | | | |
| 001 | Project Quality Assurance Plan | 4N |  |  | 6C+E |  |
| 002 | Vendor Quality Control Records | 4N |  |  | 6C+E |  |
| 003 | Welders & NDE operator qualification records | 4N |  |  | 6C+E |  |
| 004 | Final Book Index | 4N | 6C+E |  | 6C+E |  |
| 005 | Welding procedure for fabrication of pulsation suppression devices |  | 6C+E |  | 6C+E |  |
| 006 | Weld procedures (PQR/WPS) |  | 6C+E |  | 6C+E |  |
| 007 | FAT/SAT procedures |  | 6C+E |  | 6C+E |  |
| 008 | Final Data Book | 4N | 6C+E |  | 6C+E |  |
| **HSE** | | | | | | |
| 001 | HSE Procedures/Policy |  | 6C+E |  | 6C+E |  |
| 002 | Material safety data sheets |  | 6C+E |  | 6C+E |  |
| 003 | Safety instructions |  | 6C+E |  | 6C+E |  |
| **INTERFACE** | | | | | | |
| 001 | Electrical & Instrumentation Cable Schedule (for all systems) |  | 6C+E |  | 6C+E |  |
| 002 | Electrical & Instrumentation Wiring Drawings (for all systems) |  | 6C+E |  | 6C+E |  |
| 003 | Package Data Sheets | 4N | 6C+E |  | 6C+E |  |
| 004 | Reliability, Availability, Maintainability Calculations/Reports | 4N | 6C+E |  | 6C+E |  |
| 005 | Performance Curves |  | 6C+E |  | 6C+E |  |
| 006 | PFD's | 4N | 6C+E |  | 6C+E |  |
| 007 | Functional Description |  | 6C+E |  | 6C+E |  |
| 008 | General Arrangements Drawings | 4N | 6C+E |  | 6C+E |  |
| 009 | Mechanical Equipment List | 3N | 6C+E |  | 6C+E |  |
| 010 | Electrical Equipment List | 3N | 6C+E |  | 6C+E |  |
| 011 | Control, Instrument & Cable List |  | 6C+E |  | 6C+E |  |
| 012 | Interface Block Diagrams | 3N | 6C+E |  | 6C+E |  |
| 013 | Junction Box, Local Panels & Cabinets: wiring diagrams & termination drawings |  | 6C+E |  | 6C+E |  |
| 014 | Functional Logic Diagram |  | 6C+E |  | 6C+E |  |
| 015 | P & ID's | 3N | 6C+E |  | 6C+E |  |
| 016 | Utility Consumption List | 3N | 6C+E |  | 6C+E |  |
| 017 | Power Supply Requirements | 3N | 6C+E |  | 6C+E |  |
| 018 | Single Line Diagram | 3N | 6C+E |  | 6C+E |  |
| 019 | Earthing Details | 3N | 6C+E |  | 6C+E |  |
| 020 | Weight / Centre of Gravity Drawings & Data's |  | 6C+E |  | 6C+E |  |
| 021 | External Static and Dynamic Forces & Moments (present during test, start-up, normal/maximum operation, shutdown, and other conditions of service) |  | 6C+E |  | 6C+E |  |
| 022 | Wind and Seismic Loads including shear and moment forces on supports and foundation. |  | 6C+E |  | 6C+E |  |
| 023 | Anchor Bolt Details Drawings (incl. size, type, locations relative to the equipment center-lines in three planes). |  | 6C+E |  | 6C+E |  |
| 024 | Ladder & Platform Detail Drawing |  | 6C+E |  | 6C+E |  |
| 025 | Steel Structure Detail Drawing |  | 6C+E |  | 6C+E |  |
| **ENGINEERING** | | | | | | |
| 001 | Deviation list to Standards / Codes / Technical Specifications of Mechanical / I&C / Electrical |  | 6C+E |  | 6C+E |  |
| 002 | List of components requiring PURCHASER’s approval [any components that can be construe as being of alternative design, requiring purchaser's acceptance] |  | 6C+E |  | 6C+E |  |
| 003 | P&ID and Schematic Diagrams for compressor and Auxiliaries |  | 6C+E |  | 6C+E |  |
| 004 | Minimum length of straight pipe required at machine inlet or side inlets |  | 6C+E |  | 6C+E |  |
| 005 | Metallurgy of major components |  | 6C+E |  | 6C+E |  |
| 006 | Tabulation of all utilities |  | 6C+E |  | 6C+E |  |
| 007 | Lubricant List |  | 6C+E |  | 6C+E |  |
| 008 | Painting SPEC |  | 6C+E |  | 6C+E |  |
| 009 | Piping Material SPEC |  | 6C+E |  | 6C+E |  |
| 010 | Insulation SPEC |  | 6C+E |  | 6C+E |  |
| 011 | Terminal Points list |  | 6C+E |  | 6C+E |  |
| 012 | PDMS 3D Model data base |  | 6C+E |  | 6C+E |  |
| 013 | Isometric drawing for between skids piping |  | 6C+E |  | 6C+E |  |
| 014 | Data sheets applicable to proposals, purchase and as-built |  | 6C+E |  | 6C+E |  |
| 015 | Noise data sheets |  | 6C+E |  | 6C+E |  |
| 016 | Gas load, rod load, and crosshead load reversal and duration charts. |  | 6C+E |  | 6C+E |  |
| 017 | Starting torque versus speed curves for compressor |  | 6C+E |  | 6C+E |  |
| 018 | Loading sequence |  | 6C+E |  | 6C+E |  |
| 019 | Predicted Performance curves for each section as well as overall curve for train [with surge points] |  | 6C+E |  | 6C+E |  |
| 020 | Performance curves and data after test |  | 6C+E |  | 6C+E |  |
| 021 | Maximum and minimum allowable seal pressure for each compressor |  | 6C+E |  | 6C+E |  |
| 022 | Capacity control schematics and bill of material |  | 6C+E |  | 6C+E |  |
| 023 | Pulsation suppression device arrangement drawing and bill of material |  | 6C+E |  | 6C+E |  |
| 024 | Pulsation suppression device detail drawings and final pressure code calculations |  | 6C+E |  | 6C+E |  |
| 025 | Auxiliary equipment Data Sheet |  | 6C+E |  | 6C+E |  |
| 026 | Auxiliary equipment outline drawing |  | 6C+E |  | 6C+E |  |
| 027 |  |  |  |  |  |  |
| 028 | Thermal rating and Mechanical Design for Heat Exchangers | 4N |  |  |  |  |
| 029 | Vessel general arrangement & detail drawings and data |  | 6C+E |  | 6C+E |  |
| 030 | pulsation suppressors general arrangement and bill of material |  | 6C+E |  | 6C+E |  |
| 031 | Strength Calculation for Casings |  | 6C+E |  | 6C+E |  |
| 032 | Strength Calculation for Pressure Vessels |  | 6C+E |  | 6C+E |  |
| 033 | Coupling selection and rating |  | 6C+E |  | 6C+E |  |
| 034 | Shaft coupling assembly drawing and bill of materials | 4N | 6C+E |  | 6C+E |  |
| 035 | Coupling & shaft alignment diagram | 4N | 6C+E |  | 6C+E |  |
| 036 | Inter stage/After stage/Kick Back cooler system data [Drawing showing cooling system details/Data for purchasers heat and material balances/Details of provisions for separating and withdrawing condensate/vendor's recommendations regarding provisions for support and piping expansion] |  | 6C+E |  | 6C+E |  |
| 037 | Shaft end gap and tolerance |  | 6C+E |  | 6C+E |  |
| 038 | Coupling guards drawing and bill of material | 3N | 6C+E |  | 6C+E |  |
| 038 | Dimensional outline drawing including maximum maintenance weight & minimum required hook elevation, Flywheel data, driver and transmission mass, Moments on inertia, Stator shift, Air gap |  | 6C+E |  | 6C+E |  |
| 039 | Foundation Layout Drawing |  | 6C+E |  | 6C+E |  |
| 040 | Allowable flange loading (either cylinder or pulsation suppression device) and coordinates Allowable flange loading(s) for all cylinder (or pulsation bottle) connections, including anticipated thermal movements referenced to a defined point, and x, y, z-coordinate system. |  | 6C+E |  | 6C+E |  |
| 041 | Lifting lugs detail |  | 6C+E |  | 6C+E |  |
| 042 | Dismantling clearances |  | 6C+E |  | 6C+E |  |
| 043 | Field assembly procedures, including frame and cylinder alignment requirements |  | 6C+E |  | 6C+E |  |
| 044 | Calculation sheets for lifting attachments, wind loading and hydrotest support |  | 6C+E |  | 6C+E |  |
| 045 | Anticipated thermal movement on major connection Nozzle Allowable Thermal Growth |  | 6C+E |  | 6C+E |  |
| 046 | Anchor Bolt/Erection Bolt list |  | 6C+E |  | 6C+E |  |
| 047 | Grouting requirements |  | 6C+E |  | 6C+E |  |
| 048 | Static & Dynamic loads for foundation design |  | 6C+E |  | 6C+E |  |
| 049 | Hold down supports detail drawing and data |  | 6C+E |  | 6C+E |  |
| 050 | Cross sectional drawings and bill of materials |  | 6C+E |  | 6C+E |  |
| 051 | Piston, Rider rings Piston rod Crankcase assembly drawings and bill of materials |  | 6C+E |  | 6C+E |  |
| 052 | Crosshead to rod assembly drawing |  | 6C+E |  | 6C+E |  |
| 053 | Pressure packing drawings |  | 6C+E |  | 6C+E |  |
| 054 | Distance Piece (including vents, drains & buffer) schematic and bills of materials |  | 6C+E |  | 6C+E |  |
| 055 | Distance Piece (including vents, drains & buffer) arrangement drawing and list of connections |  | 6C+E |  | 6C+E |  |
| 056 | Distance Piece (including vents, drains & buffer) components drawings and data |  | 6C+E |  | 6C+E |  |
| 057 | Distance Piece (including vents, drains & buffer) drawing and part number |  | 6C+E |  | 6C+E |  |
| 058 | Seal leakage rates |  | 6C+E |  | 6C+E |  |
| 059 | Oil wiper unit sectional drawing with bill of material |  | 6C+E |  | 6C+E |  |
| 060 | Oil wiper unit schematic and arrangement drawing with part numbers |  | 6C+E |  | 6C+E |  |
| 061 | Lubricating oil system schematic and bill of materials |  | 6C+E |  | 6C+E |  |
| 062 | Lubricating oil system arrangement drawing & list of connect |  | 6C+E |  | 6C+E |  |
| 063 | Lubricating oil system component drawing and data |  | 6C+E |  | 6C+E |  |
| 064 | Cooling or Heating system (including packing cooling) schematic and bill of materials |  | 6C+E |  | 6C+E |  |
| 065 | Cooling or Heating system (including packing cooling) arrangement drawing & list of connections |  | 6C+E |  | 6C+E |  |
| 066 | Cooling or Heating system (including packing cooling) component drawing and data |  | 6C+E |  | 6C+E |  |
| 067 | Silencer(s), intake cap(s) or hood(s), trash screen(s), and transition piece(s) drawing |  | 6C+E |  | 6C+E |  |
| 068 | Oil wiper unit schematic and arrangement drawing with part numbers |  | 6C+E |  | 6C+E |  |
| 069 | Lubricating oil system schematic and bill of materials |  | 6C+E |  | 6C+E |  |
| 070 | Lubricating oil system arrangement drawing & list of connect |  | 6C+E |  | 6C+E |  |
| 071 | Lubricating oil system component drawing and data |  | 6C+E |  | 6C+E |  |
| 072 | Cooling or Heating system (including packing cooling) schematic and bill of materials |  | 6C+E |  | 6C+E |  |
| 073 | Lateral critical speed analysis |  | 6C+E |  | 6C+E |  |
| 074 | Train Torsional analysis report |  | 6C+E |  | 6C+E |  |
| 075 | Data for an independent torsional analysis |  | 6C+E |  | 6C+E |  |
| 076 | Acoustic and mechanical analysis report |  | 6C+E |  | 6C+E |  |
| 077 | Engineering analysis for fabricated cylinders |  | 6C+E |  | 6C+E |  |
| 078 | Balancing data tabulation. Listing of mass balance data for each throw, including piston, rod, crosshead, nuts, bushings, bearings and balance masses and including both design target masses and actual assembly masses. The allowable mass tolerance per throw shall be stated. |  | 6C+E |  | 6C+E |  |
| 079 | Valve dynamics report |  | 6C+E |  | 6C+E |  |
| 080 | Data for an independent valve dynamic analysis. |  | 6C+E |  | 6C+E |  |
| 081 | Vibration analysis data |  | 6C+E |  | 6C+E |  |
| 082 | Damped unbalanced response analysis |  | 6C+E |  | 6C+E |  |
| 083 | Vibration monitoring system details |  | 6C+E |  | 6C+E |  |
| 084 | Mechanical Equipment List |  | 6C+E |  | 6C+E |  |
| 085 | Nameplate details (for main and auxiliary equipment) |  | 6C+E |  | 6C+E |  |
| 086 | Mechanical Final MTO |  | 6C+E |  | 6C+E |  |
| 087 | Insulation & Tracing Final MTO |  | 6C+E |  | 6C+E |  |
| 088 | As-built drawing and clearances |  | 6C+E |  | 6C+E |  |
| 089 | HAZOP & SIL study report |  | 6C+E |  | 6C+E |  |
| 090 | General layout drawing including compressor and auxiliary equipments |  | 6C+E |  | 6C+E |  |
| 091 | Motor speed-torque/current curve |  | 6C+E |  | 6C+E |  |
| 092 | Thermal limit curve |  | 6C+E |  | 6C+E |  |
| 093 | List of electrical consumers |  | 6C+E |  | 6C+E |  |
| 094 | Electrical Final MTO |  | 6C+E |  | 6C+E |  |
| 095 | Electrical I/O List between package and MCC |  | 6C+E |  | 6C+E |  |
| 096 | Electrical Cable Lists |  | 6C+E |  | 6C+E |  |
| 097 | Cross sectional drawing and bill of material of Motor |  | 6C+E |  | 6C+E |  |
| 098 | Data sheets applicable to proposal, purchaser and as built for Motors |  | 6C+E |  | 6C+E |  |
| 099 | Predicted noise sound level |  | 6C+E |  | 6C+E |  |
| 100 | Predicted temperature rise |  | 6C+E |  | 6C+E |  |
| 101 | Predicted vibration level |  | 6C+E |  | 6C+E |  |
| 102 | Dimensional outline drawings, bill of materials and connection list for Motor and auxiliaries |  | 6C+E |  | 6C+E |  |
| 103 | Termination / Connection diagrams |  | 6C+E |  | 6C+E |  |
| 104 | Power & control wiring diagrams |  | 6C+E |  | 6C+E |  |
| 105 | Catalogue for auxiliary equipment such as heater, transformer, PTC or PT100, … (if applicable) |  | 6C+E |  | 6C+E |  |
| 106 | Motor terminal box drawing including terminal box for main power cable, space heaters, protection devices and current transformer |  | 6C+E |  | 6C+E |  |
| 107 | Hazard source list / layout |  | 6C+E |  | 6C+E |  |
| 108 | Instrument list of the package |  | 6C+E |  | 6C+E |  |
| 109 | Instrument data sheets & sizing calculation |  | 6C+E |  | 6C+E |  |
| 110 | Loop diagrams, logic diagrams, alarm & trip set points list, I/O list |  | 6C+E |  | 6C+E |  |
| 111 | Cause and Effect |  | 6C+E |  | 6C+E |  |
| 112 | Control narrative / Interlocks & sequences description |  | 6C+E |  | 6C+E |  |
| 113 | Trend group & control group schedule |  | 6C+E |  | 6C+E |  |
| 114 | Interposing diagram & philosophy with electrical systems |  | 6C+E |  | 6C+E |  |
| 115 | Air & pressure hook-up drawings |  | 6C+E |  | 6C+E |  |
| 116 | Mounting hook-up drawing |  | 6C+E |  | 6C+E |  |
| 117 | Location layouts, cable routings & sections |  | 6C+E |  | 6C+E |  |
| 118 | Instrument cable list |  | 6C+E |  | 6C+E |  |
| 119 | Panels & junction boxes termination diagrams |  | 6C+E |  | 6C+E |  |
| 120 | Instrumentation bulk material MTO |  | 6C+E |  | 6C+E |  |
| 121 | Catalogues & Brochures for all systems and devices |  | 6C+E |  | 6C+E |  |
| 122 | Hardware, software, HMI & communication FDS |  | 6C+E |  | 6C+E |  |
| 123 | UCP systems block diagram |  | 6C+E |  | 6C+E |  |
| 124 | System I/O Assignment List |  | 6C+E |  | 6C+E |  |
| 125 | Mod bus serial link I/O list and address mapping |  | 6C+E |  | 6C+E |  |
| 126 | Safety validation plan |  | 6C+E |  | 6C+E |  |
| 127 | System loading calculations, Reliability & Availability calculations |  | 6C+E |  | 6C+E |  |
| 128 | System cabinets & consoles outline drawings |  | 6C+E |  | 6C+E |  |
| 129 | Power distribution plan, consumption and heat load calculations |  | 6C+E |  | 6C+E |  |
| 130 | Cabinets front, back and internal layout drawings & internal wiring details (System, marshaling, PDB, AUX & HMI consoles) |  | 6C+E |  | 6C+E |  |
| 131 | Termination diagrams (Marshaling cabinets, consoles, …) |  | 6C+E |  | 6C+E |  |
| 132 | Instrumentation general assembly drawings, section drawings, weights & dimensions |  | 6C+E |  | 6C+E |  |
| 133 | Instrument earthing drawing |  | 6C+E |  | 6C+E |  |
| 134 | Local Gauge Board drawing |  | 6C+E |  | 6C+E |  |
| 135 | Machine monitoring system details |  | 6C+E |  | 6C+E |  |
| 136 | Control & application software of control, safety and monitoring system |  | 6C+E |  | 6C+E |  |
| 137 | Graphic displays |  | 6C+E |  | 6C+E |  |
| 138 | System Cables Schedule |  | 6C+E |  | 6C+E |  |
| 139 | As-Built Drawings |  | 6C+E |  | 6C+E |  |
| **PROCUREMENT** | | | | | | |
| 001 | Sub-Vendor List | 4N |  |  | 6C+E |  |
| 002 | Sub-Contractor List | 4N |  |  | 6C+E |  |
| 003 | Un-priced Copy of Sub Orders | 4N |  |  | 6C+E |  |
| 004 | Packing List | 4N |  |  | 6C+E |  |
| 005 | Master Packing List | 4N |  |  | 6C+E |  |
| **TRANSPORTATION, INSPECTION, OPERATION AND MAINTENANCE MANUALS** | | | | | | |
| 001 | Shipping volume information that is best estimation (Net weight, gross weight for all packings) |  | 6C+E |  | 6C+E |  |
| 002 | Shipping list (Net weight, gross weight for all packings) |  | 6C+E |  | 6C+E |  |
| 003 | Transportation Drawing |  | 6C+E |  | 6C+E |  |
| 004 | Installation Instruction |  | 6C+E |  | 6C+E |  |
| 005 | Operation & Maintenance Instruction |  | 6C+E |  | 6C+E |  |
| 006 | Software Manual (Including Trouble Shooting) |  | 6C+E |  | 6C+E |  |
| 007 | Commissioning & Start-Up Manual |  | 6C+E |  | 6C+E |  |
| 008 | Operating / Maintenance / Configuration Manuals of PLC |  | 6C+E |  | 6C+E |  |
| 009 | IOM manuals for all systems and devices |  | 6C+E |  | 6C+E |  |
| 010 | Trouble shooting diagram | 3N | 6C+E |  | 6C+E |  |
| 011 | Steam blow out acceptance criteria |  | 6C+E |  | 6C+E |  |
| 012 | Oil Flushing procedure |  | 6C+E |  | 6C+E |  |
| 013 | Spare Parts List (Installation, Pre- commissioning, Commissioning & Start-Up) |  | 6C+E |  | 6C+E |  |
| 014 | Spare Parts List (Capital), If Required |  | 6C+E |  | 6C+E |  |
| 015 | Spare Parts Lists (Two Years & Operation) |  | 6C+E |  | 6C+E |  |
| 016 | Special Tools for installation and maintenance for all equipment in package |  | 6C+E |  | 6C+E |  |
| 017 | (Packing, Knockdown and transportation procedure) Handling and Transport Protective Measures at Site |  | 6C+E |  | 6C+E |  |
| 018 | Preservation procedures [Long term storage procedure/ Preparation for storage at job site before installation/ Weather protection at job site] |  | 6C+E |  | 6C+E |  |
| **TESTING** | | | | | | |
| 001 | QC Inspection & Test Plan |  | 6C+E |  | 6C+E |  |
| 002 | Shop Test Procedure |  | 6C+E |  | 6C+E |  |
| 003 | Statement of manufacturer’s testing capabilities |  | 6C+E |  | 6C+E |  |
| 004 | Rotor mechanical and electrical run out for compressor (and gearbox, if applicable) |  | 6C+E |  | 6C+E |  |
| 005 | Coupling balance log |  | 6C+E |  | 6C+E |  |
| 006 | Hydrotest Procedure |  | 6C+E |  | 6C+E |  |
| 007 | MRT Procedure |  | 6C+E |  | 6C+E |  |
| 008 | Performance Test Procedure |  | 6C+E |  | 6C+E |  |
| 009 | Rotor Test Procedure |  | 6C+E |  | 6C+E |  |
| 010 | Balance Test Procedure |  | 6C+E |  | 6C+E |  |
| 011 | Surface Preparation & Painting Procedure |  | 6C+E |  | 6C+E |  |
| 012 | NDT Procedure |  | 6C+E |  | 6C+E |  |
| 013 | PWHT Procedure |  | 6C+E |  | 6C+E |  |
| **RECORDS, REPORTS & CERTIFICATES** | | | | | | |
| 001 | Certification Dossier |  | 6C+E |  | 6C+E |  |
| 002 | Certificates of electrical classification (including instrument devices) |  | 6C+E |  | 6C+E |  |
| 003 | Certificates of materials (including instrument devices) |  | 6C+E |  | 6C+E |  |
| 004 | Crankshaft ultrasonic test certificate |  | 6C+E |  | 6C+E |  |
| 005 | Valve leak test certificate |  | 6C+E |  | 6C+E |  |
| 006 | Certificates of calibrations |  | 6C+E |  | 6C+E |  |
| 007 | Certification for motors |  | 6C+E |  | 6C+E |  |
| 008 | Material Certification (for pressure parts) |  | 6C+E |  | 6C+E |  |
| 009 | Material Certification (for Non pressure parts) |  | 6C+E |  | 6C+E |  |
| 010 | Hazardous Area certification for electrical items |  | 6C+E |  | 6C+E |  |
| 011 | Mill test reports |  | 6C+E |  | 6C+E |  |
| 012 | Test reports (fully) for motors |  | 6C+E |  | 6C+E |  |
| 013 | Hydrostatic test report |  | 6C+E |  | 6C+E |  |
| 014 | Rotor balancing logs including residual unbalance report |  | 6C+E |  | 6C+E |  |
| 015 | Performance Test Report |  | 6C+E |  | 6C+E |  |
| 016 | Rotor clearance report |  | 6C+E |  | 6C+E |  |
| 017 | FAT test report |  | 6C+E |  | 6C+E |  |
| 018 | IFAT test report |  | 6C+E |  | 6C+E |  |
| 019 | Inspection & Test Records |  | 6C+E |  | 6C+E |  |
| **INSTALLATION** | | | | | | |
| 001 | Sub-Assembly Documentation |  | 6C+E |  | 6C+E |  |
| 002 | Sub-Assembly Drawings |  | 6C+E |  | 6C+E |  |
| 003 | Erection/Installation Manual (if required) |  | 6C+E |  | 6C+E |  |
| 004 | Name Plate Documents |  | 6C+E |  | 6C+E |  |
| 005 | Handling, Transportation & Storage Instructions |  | 6C+E |  | 6C+E |  |
| 006 | Unpacking & Inspection Instructions |  | 6C+E |  |  |  |
| 007 | Preliminary Packing List | 4N |  |  |  |  |
| 008 | Packing List |  | 6C+E |  | 6C+E |  |
| **OPERATION & MAINTENANCE** | | | | | | |
| 001 | Operating Instructions |  | 6C+E |  | 6C+E |  |
| 002 | Maintenance Instructions (if required) |  | 6C+E |  | 6C+E |  |
| 003 | Commissioning & Start-up Manual |  | 6C+E |  | 6C+E |  |
| 004 | List of Spare Parts Commissioning & Start-up | 4N | 6C+E |  | 6C+E |  |
| 005 | List of Spare Parts 2 Years Operation | 4N | 6C+E |  | 6C+E |  |
| 006 | List of Special Tools | 4N | 6C+E |  | 6C+E |  |
| 007 | Lube Oil Schedule |  | 6C+E |  | 6C+E |  |
| 008 | Software Manual (incl. Troubleshooting) |  | 6C+E |  | 6C+E |  |
| 009 | Consumables List |  | 6C+E |  | 6C+E |  |
| 010 | Function Test Procedure |  | 6C+E |  | 6C+E |  |
| 011 | Safety Instructions |  | 6C+E |  | 6C+E |  |
| **OTHERS** | | | | | | |
| 001 | All others documents (if required) will be listed in the order |  | 6C+E |  |  |  |
| NOTES:  (1) N= Number of document, C=Copy, E=Electronic Copy  (2) Starting from date of order placement  (3) Starting from reception of documentation without comments  (4) First issue of the document is subjected to the release of payment milestone as per purchase order  (5) Calendar days after reception of drive data  (6) Prior to testing  (7) One copy each bid copy  (8) List of Documents will be Finalized in VDLS | | | | | | |

# ATTACHMENT #3

**SPARE PART LIST**

The Spare Parts list provided here is the 'minimum' required ones. Vendor offer for Spare Parts shall comply the minimum required Spare Parts listed here in MR.

**Erection/Pre-commissioning/Commissioning/Start-up as follows but not limited (vendor to check and confirm):**

As per Project Document (E&D-QC-SP-1)

**Two years spare parts as follows but not limited (vendor to check and confirm):**

As per Project Document (E&D-QC-SP-1)

**Capital spare part**

(As per Vendor Recommendation)

# ATTACHMENT #4

**DEVIATIONS / EXCEPTIONS / ALTERNATIVES TO REQUISITION**

Requisition No.:

Description:

Vendor Name:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item No.** | **Description**  **of proposed exception** | **Recommended revision to job specification** | **Reason for proposed exception** | **Effect on base**  **proposal if CONTRACTOR rejects exception** |
|  |  |  |  |  |