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SUMMARY

SECTION I – GENERAL INFORMATION

1 OBJECTIVE

1.1 This technical specification provides an overview of the technical requirements and practices of the FPSO project. It aims to contextualize the requirements defined by the International Association of Oil & Gas Producers at IOGP S-617 and its amendments (IOGP S-617L, IOGP S-617Q and IOGP S-617D) to the interfaces and needs of the FPSO project.

1.2 Basically, this technical specification covers the minimum technical requirements for the design, materials, fabrication, assembly, inspection, testing, certification, preparation for shipment, installation, onboard integration, pre-commissioning, commissioning and final acceptance tests of the Offshore Cranes.

1.3 These requirements shall be complied with, in conjunction with other applicable MANUFACTURER's documents and standards.

2 DEFINITIONS AND ABBREVIATIONS

2.1 Definitions

2.1.1 All terms and definitions are established in the latest revision of **I-ET-3010.00-1200-940-P4X-002 - GENERAL TECHNICAL TERMS**. For instance:

- INTEGRATOR is the Company that will execute all the interconnections amongst Modules.
- MANUFACTURER is defined as the responsible by fabrication of equipment or components internal to the Package.
- OWNER is defined as PETROBRAS.
- PACKAGER is defined as the responsible for project, assembly, construction, fabrication, test and furnishing of the Package.
- SUPPLIER is defined as the responsible for the detailed design, purchase all instrument, equipment, system, unit, material, assembly and construction, commissioning, the lift, hook up, installation and integration of all Modules on the Unit Hull.
- UNIT is defined as the FPSO (Floating Production Storage and Offloading), FSO (Floating Storage and Offloading), SS (Semi-Submersible) or Fixed Offshore Unit.
- Document supplied by OWNER: Project's document to be furnished by OWNER to PACKAGER/MANUFACTURER, this document contains information to be used during equipment design and fabrication. It is indicated by the expression: [document supplied by OWNER].

2.2 Abbreviations

- AFT Afterward
- BS The Bristish Standards Institution
- CS Classification Society
- EN European Standard
- FPSO Floating, Production, Storage and Offloading Production Unit
- FWD Forward
- HAZOP Hazard and Operability Analysis
- HPU Hydraulic Power Unit
- IOGP International Association of Oil & Gas Producers
- MBL Minimum Breaking Load
- SWL Safe Working Load

3 SCOPE OF SUPPLY

3.1 PACKAGER/MANUFACTURER scope of supply shall include the following:

- Two Offshore Cranes (EN 13852-1 L1 lattice boom crane type or EN 13852-1 L2 centre-post type with lattice boom, and electric-driven cranes).
- A complete engineering package including design, fabrication, inspection, factory and site testing, commissioning, certification, documentation and data required on this technical specification and by Classification Society.
- A full 3D model of the equipment in format STEP.
- Electrical and instrumentation installation, including cables, junction boxes, grounding and all necessary instruments, ancillaries and supports.
- Nameplates manufactured in SS 316 in Portuguese & English for all equipment and instruments.
- Spare parts recommended for installation, commissioning, start-up and by Classification Society.
- All consumables and special tools for installation, commissioning, start-up and maintenance.
- Technical assistance during assembly, installation, pre-commissioning, commissioning and start-up phases.
- Engineering, maintenance and operators training program.
- Warranty.
- Preparation for shipment and preservation, including equipment handling conditioning and storage at job site.

4 RULES, CODES, STANDARDS AND REFERENCE DOCUMENTS

4.1 Normative References

4.1.1 PACKAGER/MANUFACTURER shall comply with the requirements of this technical specification, data sheet, documents as stated below and with those referred to herein.

4.1.2 As a general guideline, in case of conflicting requirements between this technical specification and other cited references, the most stringent shall prevail. If necessary the PACKAGER/MANUFACTURER may revert to OWNER for clarification.

4.2 Brazilian Governmental Regulation Rules

4.2.1 Brazilian Government Regulations Rules are mandatory and shall prevail, if more stringent, over the requirements of this specification and other references herein.

- NR 10 Segurança em Instalações e Serviços em Eletricidade (Safety in Electrical Facilities and Services)
- NR 12 Segurança no trabalho em máquinas e equipamentos (Safety in services in machines and equipment)
- NR 13 Caldeiras e Vasos de Pressão (Boilers and Pressure Vessels)
- NR 17 Ergonomia (Ergonomics)
- NR 26 Sinalização de Segurança (Safety Signs)
- NR 37 Segurança e Saúde em Plataformas de Petróleo (Safety and Health at Oil Platforms)

- NR10, NR-12, NR-13, NR-17, NR-26 and NR-37 establish electrical panels on-off standard, nameplate information, safety signaling and emergency warnings and requirements on operation & maintenance manuals. They also establish construction design criteria for ladder, guard rail for walkways, footer, access fitting ~~and personnel lifting requirements.~~ Furthermore, there are specific documentation and test requirements for pressure vessels.

- INMETRO Resolution 115, March 21st 2022.

– ANATEL Resolutions about telecommunication equipment homologation and licenses requirement.

4.3 Classification Society Certification

4.3.1 SUPPLIER shall guarantee the suitable third party certification, including design verification, manufacturing, FAT and SAT surveys according to this technical specification and the stated standards.

4.3.2 Classification Society, as third party, shall perform the design verification towards the requirements of BS EN 13852-1 and IOGP S-617.

4.3.3 PACKAGER/MANUFACTURER is responsible for submitting to the Classification Society all documentation and reports required for certification.

4.4 Applicable Codes and Standards

4.4.1 The latest editions of the following codes and standards shall be fully complied with:

– BS EN 13852-1: 2013 Cranes – Offshore Cranes Part 1: General Purpose Offshore Cranes
– IOGP S-617: 2018 Supplementary Specification to EN 13852-1 General Purpose Offshore Cranes
– IOGP S-617L: 2018 Information Requirements for General Purpose Offshore Cranes (EN 13852-1)
– IOGP S-617Q: 2018 Quality Requirements for General Purpose Offshore Cranes (EN 13852-1)
– IOGP S-617D: 2018 Data Sheet for General Purpose Offshore Cranes (EN 13852-1)

4.5 Applicable and Reference Documents

4.5.1 The following documents shall be used as reference or followed wherever they are mentioned throughout this specification:

General

– DR-ENGP-M-I-1.3 - SAFETY ENGINEERING GUIDELINE
– DR-ENGP-I-1.15 - COLOR CODING
– I-ET-3000.00-1200-940-P4X-001 - TAGGING PROCEDURE FOR PRODUCTION UNITS DESIGN
– I-ET-3010.00-1200-940-P4X-002 - GENERAL TECHNICAL TERMS
– I-ET-3010.00-1350-940-P4X-001 - SYSTEMS OPERATION PHILOSOPHY
– I-ET-METOCEAN DATA
– I-LI-EQUIPMENT LIST

Safety

– I-DE-AREA CLASSIFICATION - GENERAL
– I-FD-SAFETY DATA SHEET

Process

– I-RL-GENERAL SPECIFICATION FOR AVAILABLE UTILITIES

Arrangement

– I-DE-GENERAL ARRANGEMENT

Naval

– I-ET-DESIGN REQUIREMENTS - NAVAL ARCHITECTURE
– I-RL-MOTION ANALYSIS

Mechanical

– I-ET-3010.00-1200-431-P4X-001 - THERMAL INSULATION FOR MARITIME INSTALLATIONS
– I-ET-3010.00-1200-956-P4X-002 - GENERAL PAINTING
– I-FD-GD-5266501 (AFT) / GD-5266502 (FWD) GENERAL PURPOSE OFFSHORE CRANES (EN 13852-1 ELECTRIC-DRIVEN CRANES) DATASHEET

Electrical

– I-ET-3010.00-5140-700-P4X-001 - SPECIFICATION FOR ELECTRICAL DESIGN FOR OFFSHORE UNITS
– I-ET-3010.00-5140-700-P4X-002 - SPECIFICATION FOR ELECTRICAL MATERIAL FOR OFFSHORE UNITS

- I-ET-3010.00-5140-700-P4X-003 - ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS
- I-ET-3010.00-5140-700-P4X-005 - REQUIREMENTS FOR HUMAN ENGINEERING DESIGN FOR ELECTRICAL SYSTEM OF OFFSHORE UNITS
- I-ET-3010.00-5140-700-P4X-007 - SPECIFICATION FOR GENERIC ELECTRICAL EQUIPMENT FOR OFFSHORE UNITS
- I-ET-3010.00-5140-700-P4X-008 - SPECIFICATION FOR LIGHTING AND ELECTRICAL SIGNALLING FOR OFFSHORE UNITS
- I-ET-3010.00-5140-700-P4X-009 - GENERAL REQUIREMENTS FOR ELECTRICAL MATERIAL AND EQUIPMENT FOR OFFSHORE UNITS
- I-ET-3010.00-5140-712-P4X-001 - LOW-VOLTAGE INDUCTION MOTORS FOR OFFSHORE UNITS
- I-ET-3010.00-5140-741-P4X-004 - SPECIFICATION FOR LOW-VOLTAGE GENERIC ELECTRICAL PANEL FOR OFFSHORE UNITS
- I-ET-3010.00-5140-797-P4X-001 - ELECTRICAL SYSTEM AUTOMATION ARCHITECTURE UNITS
- I-DE-3010.00-5140-700-P4X-003 - GROUNDING INSTALLATION TYPICAL DETAILS
- I-DE-3010.00-5140-797-P4X-001 - ELECTRICAL SYSTEM AUTOMATION ARCHITECTURE DIAGRAM

Automation

- I-ET-3010.00-1200-800-P4X-002 - AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGE UNITS
- I-ET-3010.00-5520-888-P4X-001 - AUTOMATION PANELS
- I-ET-INSTRUMENTATION ADDITIONAL TECHNICAL REQUIREMENTS
- I-ET-FIELD INSTRUMENTATION
- I-ET-AUTOMATION INTERFACE OF PACKAGE UNITS

Telecommunications

- I-MD-3010.00-5510-760-PPT-001 - GENERAL CRITERIA FOR TELECOMMUNICATIONS DESIGN
- I-ET-3010.00-5512-762-PPT-002 - LTE TRANSMISSION SYSTEM
- I-ET-3010.00-5514-76A-PPT-002 - TOPSIDES CCTV SYSTEM
- I-ET-3010.00-5264-769-PPT-002 - HULL SHUTDOWN TELECOMMUNICATION SYSTEM
- I-DE-3010.00-5515-762-PPT-001 - GMDSS AND RADIO OPERATIONAL ONE LINE DIAGRAM
- I-DE- TOPSIDES STRUCTURED CABLING ONE LINE DIAGRAM
- I-DE- TOPSIDES WLAN SYSTEM ONE LINE DIAGRAM
- I-DE- HULL TELECOMMUNICATIONS ENERGY SYSTEM ONE LINE DIAGRAM
- I-DE- HULL INDUSTRIAL TELEPHONY ONE LINE DIAGRAM
- I-DE- HULL WLAN SYSTEM ARRANGEMENT
- I-DE- HULL PUBLIC ADDRESS ONE LINE DIAGRAM

Structure

- I-DE-3010.00-1400-140-P4X-003 - STANDARD-STEEL GUARDRAIL - TYPICAL DETAILS
- I-DE-3010.00-1400-140-P4X-004 - GENERAL NOTES FOR TOPSIDES STRUCTURES
- I-DE-3010.00-1400-140-P4X-011 - STANDARD-PULTRUDED GUARDRAIL - TYPICAL DETAILS

- SUPPLIER shall consult 3D model in case documents with HOLD status were not supplied during bidding phase.
- SUPPLIER shall issue updated General Purpose Offshore Cranes data sheet and material requisition for purchase purpose. It is not desirable add more reference documents, if necessary, SUPPLIER shall include only applicable requirements for this package.

4.5.2 The document identification number may vary according to the project. The document title may also vary slightly from one project to another. Project's DOCUMENT LIST shall be consulted in order to verify the correct document number and title.

4.6 Packager/Manufacturer Responsibilities

4.6.1 Any conflict between the requirements of this specification and related codes and standards shall be presented in writing for OWNER's resolution prior to manufacturing.

4.6.2 PACKAGER/MANUFACTURER shall assume sole contractual and total engineering responsibility for the items supplied.

4.6.3 PACKAGER/MANUFACTURER's responsibility shall also include but not be limited to:

- Technical responsibility for the entire scope of supply.
- Resolving all engineering questions and/or problems relating to design manufacturing and commissioning.
- Providing details as requested, for the main and auxiliary equipment, relating to design manufacturing and commissioning.
- Submitting to the certifying/classification authority the documentation.
- If necessary, attending HAZOP meetings arranged by OWNER.
- Pre-Commissioning, Commissioning and Training.
- NOTE: Installation at site by others (however, presence of supervision will be required).

4.6.4 Compliance by the PACKAGER/MANUFACTURER with the provisions of this specification does not relieve the PACKAGER/MANUFACTURER of his responsibility to furnish equipment and accessories of a proper mechanical design suited to meet the specified service conditions.

4.6.5 PACKAGER is responsible for all coordination with MANUFACTURERS and collections of all details, drawings and data to achieve optimum design and full submission of all documents requested in the specification.

5 ARRANGEMENT REQUIREMENTS

5.1 General Arrangement

5.1.1 The UNIT General Arrangement is presented at **I-DE-GENERAL ARRANGEMENT.** Arrangement and structural modifications may occur at detailed design and all updates shall be provided by SUPPLIER and informed to PACKAGER/MANUFACTURER.

5.1.2 The Offshore Cranes are located on the starboard of the vessel and it shall be installed on the top of the pedestal.

5.1.3 PACKAGER/MANUFACTURER shall define the final arrangement of the Offshore Cranes but shall consider the maintenance area necessary for slew/swing bearing removal.

5.1.4 PACKAGER/MANUFACTURER shall confirm pedestal and rest boom location at drawings and 3D model. The rest boom and the pedestal details shall be provided by SUPPLIER and informed to PACKAGER/MANUFACTURER.

5.1.5 The crane will be used for operations of transfer of load ~~and personnel~~ between the offshore installation and supply boats, lifting and moving loads on the deck and lifting flexible intake pipes/hoses immersed at the sea throughout vessel caissons. For more details, SUPPLIER shall check **I-ET-TOPSIDE'S MECHANICAL HANDLING PROCEDURES**.

5.1.6 The crane shall be able to lift flexible intake pipes (hoses) inside vessel caisson. Pipe dimension and weight shall be detailed by SUPPLIER and informed to PACKAGER/MANUFACTURER.

6 DESIGN REQUIREMENTS

6.1 PACKAGER/MANUFACTURER shall comply with the requirements of Section II – IOGP S-617 Supplementary Specification to EN 13852-1 General Purpose Offshore Cranes, Section III - IOGP S-617L Information Requirements for General Purpose Offshore Cranes (EN 13852-1), Section IV – IOGP S-617Q Quality Requirements for General Purpose Offshore Cranes (EN 13852-1) and the **I-FD-GD-5266501 (AFT) / GD-5266502 (FWD) GENERAL PURPOSE OFFSHORE CRANES (EN 13852-1 ELECTRIC-DRIVEN CRANES) DATASHEET** issued according with IOGP S-618D Data Sheet for General Purpose Offshore Cranes (EN 13852-1).

6.2 PACKAGER/MANUFACTURER shall also consider the design requirements defined in this section.

6.3 Operation Environment

6.3.1 The equipment supplied shall be suitable for the marine environment and range of ambient condition including, atmospheric pressure, relative humidity, rainfall, air temperature (dry bulb), characteristic monthly values and wind motions defined in **I-ET-METOCEAN DATA**.

6.3.2 The Offshore Cranes shall be designed considering that the full load test will be performed at integration site where temperature can be lower than the absolute minimum temperature established at metocean data.

6.3.3 If temperature during the tests may be expected to be lower than the temperature mentioned in the project documentation, the lower value shall be considered as the reference of minimum ambient temperature, for steel selection and qualification of welders and welding procedures.

6.3.4 The maximum ambient temperature considers radiation during flaring continuous operation.

6.4 Motion Requirements

6.4.1 The Offshore Cranes shall be designed for induced hull motion factors. The necessary design data and information on motion requirements are given by **I-ET-DESIGN REQUIREMENTS - NAVAL ARCHITECTURE** and **I-RL-MOTION ANALYSIS.**

6.4.2 All equipment shall be able to withstand when the UNIT is subjected to 100-year return period environmental conditions and to operate when the UNIT is subjected to 1-year return period environmental conditions, at any draft from fully loaded to 20% loaded/ballasted condition, and under inclination (static and dynamic) as per Classification Society Rules.

6.4.3 SUPPLIER shall inform PACKAGER/MANUFACTURER any data from the model tests, which contradicts the specified data. Any action on the revised data will be subject to agreement with the SUPPLIER.

6.5 Design Life

6.5.1 The Offshore Cranes shall be designed and constructed for a design life of 30 years without the need for change of any major component due to wear, fatigue, corrosion or material failure.

6.6 Safety Requirements

6.6.1 All equipment, devices, electrical components and instrumentation of the Offshore Cranes shall be designed and constructed to be used in an area classified in accordance with international codes,

statutory regulations, **DR-ENGP-M-I-1.3 - SAFETY ENGINEERING GUIDELINE** and **I-DE-AREA CLASSIFICATION - GENERAL**.

6.6.2 All outdoors equipment and components shall be at least IP56 and certified for installation and operation in a hazardous area Zone 2, Gas Group II A and Temperature Class T3

6.6.3 According to NR-37, effective since February 1st, 2022, item 37.24.8, mechanical equipment installed in classified areas shall be evaluated according to the requirements in technical standard ABNT NBR ISO 80079-36 or ABNT NBR ISO 80079-37.

6.6.4 Thermal insulation for personnel protection according to **I-ET-3010.00-1200-431-P4X-001 - THERMAL INSULATION FOR MARITIME INSTALLATIONS** and Safety signaling in Portuguese & English language.

6.7 Materials

6.7.1 The required materials for structural design, construction, machinery and components of the Offshore Cranes shall be in accordance with this technical specification. When not specified, PACKAGER/MANUFACTURER is responsible for materials selection**.**

6.8 Painting and Color

6.8.1 PACKAGER/MANUFACTURER paint system shall be according to **I-ET-3010.00-1200-956-P4X-002 - GENERAL PAINTING**.

6.8.2 Color code adopted shall be in accordance with **DR-ENGP-I-1.15 - COLOR CODING**.

6.9 Noise Control

6.9.1 Noise control analysis is a mandatory item to be carried out as established at IOGP S-617 Supplementary Specification to EN 13852-1 General Purpose Offshore Cranes Specifications.

6.10 Electrical and Lighting System

6.10.1 **The electrical equipment and the lighting system shall comply with requirements of I-ET-3010.00-5140-700-P4X-001 - SPECIFICATION FOR ELECTRICAL DESIGN FOR OFFSHORE UNITS, I-ET-3010.00-5140-700-P4X-002 - SPECIFICATION FOR ELECTRICAL MATERIAL FOR OFFSHORE UNITS, I-ET-3010.00-5140-700-P4X-007 - SPECIFICATION FOR GENERIC ELECTRICAL EQUIPMENT FOR OFFSHORE UNITS, I-ET-3010.00-5140-700-P4X-008 - SPECIFICATION FOR LIGHTING AND ELECTRICAL SIGNALLING FOR OFFSHORE UNITS, I-ET-3010.00-5140-700-P4X-009 - GENERAL REQUIREMENTS FOR ELECTRICAL MATERIAL AND EQUIPMENT FOR OFFSHORE UNITS, I-ET-3010.00-5140-741-P4X-004 - SPECIFICATION FOR LOW-VOLTAGE GENERIC ELECTRICAL PANEL FOR OFFSHORE UNITS and I-ET-3010.00-5140-700-P4X-005 - REQUIREMENTS FOR HUMAN ENGINEERING DESIGN FOR ELECTRICAL SYSTEM OF OFFSHORE UNITS.**

6.10.2 Electrical induction motors shall comply with requirements of **I-ET-3010.00-5140-712-P4X-001 - LOW-VOLTAGE INDUCTION MOTORS FOR OFFSHORE UNITS**.

6.10.3 Concerning electrical system voltages and quantity of feeders for motors, panels and auxiliaries shall be according to definitions of **I-ET-3010.00-5140-700-P4X-003 - ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS**.

6.10.4 All electrical equipment, instruments and telecommunications equipment shall be manufactured and tested in compliance with Classification Society and IEC requirements.

6.10.5 All electrical equipment, instruments and telecommunications equipment installed in hazardous areas shall be certified according to area classification. All electrical equipment, instruments and telecommunication equipment installed outdoors and kept energized during emergency shutdown ESD-3P or/and ESD-3T shall be certified for installation in hazardous areas Zone 2, Group IIA temperature T3, complying with requirements of IEC 61892 and Classification Society. They shall

be of type approved and certified according to certified by international recognized laboratory and also in accordance with INMETRO Resolution 115, March 21st 2022.

6.11 Automation, Control and Instrumentation

6.11.1 The package automation, control and instrumentation shall fully comply with **I-ET-3010.00-1350-940-P4X-001 - SYSTEMS OPERATION PHILOSOPHY** and **I-ET-3010.00-1200-800-P4X-002 - AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGE UNITS**.

6.11.2 PACKAGER/MANUFACTURER shall ensure that the equipment is properly certified for the specified classification. For further information see **I-ET-FIELD INSTRUMENTATION**.

6.11.3 PACKAGE automation type classification shall be according to **I-ET-AUTOMATION INTERFACE OF PACKAGE UNITS**.

6.11.4 All sensors shall be suitable for prevailing temperatures. When applicable, field amplifiers, transducers, etc., shall be installed as per PACKAGER/MANUFACTURER practices, according to the area classification and to protect them against mechanical damage.

6.11.5 All wiring within the limits of the enclosure shall be clearly marked on the wire and at the terminal.

6.12 Monitoring Requirements, Alarms and Shutdown Signals

6.12.1 The Offshore Cranes shall be monitored and the monitoring requirements, minimum alarms and shutdown signals & functions shall be according to **I-FD-GENERAL PURPOSE OFFSHORE CRANES DATA SHEET (EN 13852-1 ELECTRIC-DRIVEN CRANES)**, **I-FD-SAFETY DATA SHEET** and according to FPSO matrix of cause and effect to be approved by OWNER.

6.12.2 All machine monitoring sensors shall be interconnected to the local control console at operator cabin. Gas detection and shutdown signals shall be linked to UNIT´s Control Safety System and visible at UNIT´s Center Control Room.

6.13 Telecommunication Requirements

6.13.1 Electrical communication slip ring interfaces, VHF/SMM base station radio, PAGA System, Telephony System and Crane CCTV System shall be according to **I-FD-GENERAL PURPOSE OFFSHORE CRANES DATA SHEET (EN 13852-1 ELECTRIC-DRIVEN CRANES).**

6.13.2 It shall comply with Brazilian Telecom Regulatory Agency (ANATEL), with operational characteristics according to International Legislation (ITU-T).

7 NAMEPLATES AND TAG NUMBERING

7.1 Nameplates

7.1.1 MANUFACTURER shall attach corrosion resistant SS 316 nameplates on main equipment and its ancillaries in an accessible location, fastened with corrosion resistant pins.

7.1.2 The nameplate information shall include, as a minimum, the following items in the Portuguese and English language:

- Purchase order
- Manufacturer and year of built
- TAG number
- Equipment model and serial number
- Load capacity
- Dry weight
- Driver power rating and speed
- Design code
- Design temperature and pressure
- NOTE: The nameplate data for equipment, which handle hydrocarbons, shall have information that allows the lost emission calculation, according to established Standards from AP-42 – Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, of the USA Environment Protection Agency (EPA).

7.2 TAG Numbering

7.2.1 Tagging of all items including valves shall be carried out in accordance with **I-ET-3000.00-1200-940-P4X-001 - TAGGING PROCEDURE FOR PRODUCTION UNITS DESIGN.**
7.2.2 Tags shall be supplied with number and description in Portuguese language.
7.2.3 All tag plates shall be made from SS 316 stainless steel material.
7.2.4 Valves shall be tagged with the applicable number only.
7.2.5 Tag numbers for remaining auxiliary equipment shall be defined in detailed design after approval of OWNER.

8 SPARE PARTS AND SPECIAL TOOLS

8.1 Spare Parts

8.1.1 PACKAGER/MANUFACTURER shall include in the supply of equipment all spares required for installation, commissioning and startup with spare part inventory. For instance: tightening bolts and nuts; electrical components; relays.
8.1.2 Spare parts recommended by the Classification Society, if applicable, shall also be provided. Spare parts list recommended for 2 (two) years operation, including price and delivery time of each part shall be provided.
8.1.3 All spares shall be packed separately with clear identification and delivered with the main equipment in packing suitable for long-term storage.
8.1.4 All spare parts shall be detailed in the packing list, and shall be consistent with the list of spare parts issued for the engineering documentation. These items shall have an item number in the packing list, which shall match the item number fixed on the packing.

8.2 Special Tools

8.2.1 MANUFACTURER shall provide any special tools necessary for installation, commissioning, start-up and maintenance of the equipment as alignment templates, spreader bars, lifting beams and specific handling devices.
8.2.2 All special tools shall be supplied with the delivery of the equipment. Special tools and SUPPLIER personnel required for installation and/or commissioning shall be specified as a separate cost.
8.2.3 All special tools shall be detailed in the packing list, and shall be consistent with the list of special tools issued for the engineering documentation. These items shall have an item number in the packing list, which shall match the item number fixed on the packing.

9 INSPECTION, TESTING AND COMMISSIONING

9.1 Classification Society Certification

9.1.1 The Classification Society Certificate of compliance with BS EN 13852-1 and IOGP S-617 shall be supplied for Offshore Cranes.
9.1.2 PACKAGER/MANUFACTURER shall be responsible for obtaining all necessary certification of the equipment. PACKAGER/MANUFACTURER through the independent certifying authority shall supply all certificates related to the materials, qualification activities, inspections and tests detailed in the approved Quality Plan.
9.1.3 All materials and equipment shall be according to this technical specification and applicable standards.
9.1.4 For qualification activities, inspection and testing, Classification Society shall be consulted to define the requirements applicable to the Offshore Cranes.

9.2 Inspection and Testing

9.2.1 PACKAGER/MANUFACTURER shall prepare the Inspection and Test Plan (ITP) and submit it for OWNER approval. It shall be carried out in be in accordance with Section IV – IOGP S-617Q Quality Requirements for General Purpose Offshore Cranes (EN 13852-1) and its Annex A

Purchase Conformity Assessment Requirements and Annex B Material Traceability and Certification Requirements. The conformity assessment system (CAS) is letter B.

9.2.2 PACKAGER/MANUFACTURER shall ensure that all the witnessed inspection requirements by the Classification Society are fully accommodated and the due notice requirements are satisfied. OWNER shall witness hydrostatic test of vessels classified as NR-13.

9.3 Factory Acceptance Test (FAT)

9.3.1 PACKAGER/MANUFACTURER shall prepare the FAT procedure and submit it for OWNER approval. It shall be carried out in accordance with Section IV – IOGP S-617Q Quality Requirements for General Purpose Offshore Cranes (EN 13852-1) and its Annex C FAT Requirements.

9.3.2 PACKAGER/MANUFACTURER shall advise OWNER of the test schedule before the planned test dates. When required, PACKAGER/MANUFACTURER shall arrange with the appointed Classification Society surveyor to witness FAT.

9.3.3 Acceptance of FAT will not be considered as the final acceptance of the equipment and shall not relieve the PACKAGER/MANUFACTURER of his responsibilities in any way whatsoever.

9.4 Commissioning

9.4.1 PACKAGER/MANUFACTURER shall be required to provide any necessary installation support like assembly, pre-commissioning and commissioning supervision of the equipment and of the components delivered loose either at a shore based fabrication yard and/or on the UNIT.

9.4.2 SUPPLIER shall inform PACKAGER/MANUFACTURER regarding specific commissioning conditions for the equipment, i.e., conditions in which the equipment will have to operate temporarily, which are different from the conditions defined in this technical specification.

9.5 Site Acceptance Test (SAT)

9.5.1 SUPPLIER shall prepare the SAT procedure and submit it for OWNER approval. It shall be carried out in accordance with Section IV – IOGP S-617Q Quality Requirements for General Purpose Offshore Cranes (EN 13852-1) and its Annex D SAT Requirements which include system checks, functional and performance verifications such as monitoring measurements, alarms and safety checks, brake and full load tests, for instance.

9.5.2 SUPPLIER shall advise PACKAGER/MANUFACTURER of the test schedule before the planned test dates. When required, SUPPLIER shall arrange with the appointed Classification Society surveyor to witness SAT.

10 TECHNICAL ASSISTANCE, TRAINING AND WARRANT

10.1 PACKAGER/MANUFACTURER shall provide technical assistance during assembly, installation, pre-commissioning, commissioning and start-up phases and a complete training program for OWNER engineering, operation and maintenance team.

10.2 Technical assistance, training and warranty requirements shall follow the Exhibit V (DIRECTIVES FOR PROCUREMENT) and Exhibit VIII (DIRECTIVES FOR COMMISSIONING PROCESS). The applicable services shall be considered by SUPPLIER.

11 PREPARATION FOR SHIPMENT

11.1 Marking

11.1.1 All items supplied to this specification shall be adequately marked for identification against a certificate or relevant test documentation. Marking shall be such that it shall not damage or impair the component. Marking may be done on the item itself or on its packing or nameplate.

11.1.2 Items that cannot be identified shall be rejected. Rejected items may be recertified by carrying out all relevant testing, with prior approval of the SUPPLIER.

11.1.3 As a minimum, the following identification shall be provided:

- Project number;
- Manufacturer's name;
- Purchase order number;
- Shipping weight;
- Item number;
- Classification Society surveyor's stamp.

11.2 Shipment Packing

11.2.1 The equipment shall be supplied tested, flushed and preserved and, if practical, already charged up with coolant and lubricants.

11.2.2 The preparation shall make the equipment suitable for 12 months outdoor storage from the time of shipment. The package shall be protected from corrosion.

11.2.3 PACKAGER/MANUFACTURER shall submit the packing specification to the SUPPLIER for approval. Packing shall be in accordance with the requirements of the country to which the equipment is being shipped.

11.2.4 PACKAGER/MANUFACTURER shall provide the procedures for unpacking, handling and installation, as well as repacking, and long-term storage requirements. PACKAGER/MANUFACTURER shall specify any limitations applicable to the transport and installation phase.

11.2.5 Unless otherwise advised, each item of equipment shall be checked for its suitability to resist horizontal and vertical acceleration of 0.8g in any direction during sea transportation.

12 DOCUMENTATION REQUIREMENTS

12.1 The following documents shall be provided during technical proposal by PACKAGER/MANUFACTURER in their preliminary version:

- General Arrangement Drawing;
- Equipment Data Sheet.

12.2 After PACKAGER/MANUFACTURER has been chosen, during detail engineering design, PACKAGER/MANUFACTURER shall issue before any other documents the document list.

12.3 Document list shall be approved before issuance of any other document from PACKAGER/ MANUFACTURER. The reason for this requirement is to avoid issuance of documents with wrong document number, which will require document cancellation procedure to be followed.

12.4 Title of all documents to be issued by PACKAGER/MANUFACTURER shall have the following format:

- First part – tag number;
- Second part – service description;
- Third part – document description;
- EXAMPLE: GD-5266501/GD-5266502 – AFT/FWD Offshore Cranes – datasheet.

12.5 PACKAGER/MANUFACTURER shall provide original documents in PDF format for all required documents. Extracted figures from catalogue or manual, especially for the outline drawings are not acceptable.

12.6 After document list is approved, the technical documents required at Section III - IOGP S-617L Information Requirements for General Purpose Offshore Cranes (EN 13852-1) shall be issued by PACKAGER/MANUFACTURER.

12.7 PACKAGER/MANUFACTURER shall provide a full 3D model of the equipment in format STEP (ISO10303 Standard for Exchange of Product model data or equivalent) as established at IOGP S-617L Information Requirements for General Purpose Offshore Cranes (EN 13852-1).

12.8 The electrical diagram shall contain the description of the electrical circuits, explaining the function of the main components, including actuation and equipment protection.

12.9 Installation manual shall contain instructions to assemble and disassemble each major piece of the equipment and all recommendations for preservation during storage on erection stage.

12.10 Installation manual shall also contain all consumables to be used for erection, commissioning and start up, preferably in a summarized list.

12.11 Operation manual shall contain, among other information, the load chart, safety alerts and local control console description.

12.12 Maintenance manual shall contain the specification of lubricant fluids with periodicity of replacement.

12.13 Ancillary equipment, such as gearboxes, electrical motors, brakes and others electrical major components, catalogues shall be word searchable (not image doc).

12.14 Each material certificate and NDT report provided by third parties shall be preceded by a PACKAGER/MANUFACTURER sheet, informing to which part of the equipment the document refers.

SECTION II – IOGP S-617 SUPPLEMENTARY SPECIFICATION TO EN-13852-1 GENERAL-PURPOSE OFFSHORE CRANES

S-617v18-12.pdf

SECTION III – IOGP S-617L INFORMATION REQUIREMENTS FOR GENERAL-PURPOSE OFFSHORE CRANES (EN-13852-1)

S-617Lv18-12.xlsx

SECTION IV – IOGP S-617Q QUALITY REQUIREMENTS FOR GENERAL-PURPOSE OFFSHORE CRANES (EN-13852-1)

S-617Qv18-12.pdf