	TECHNICAL SPECIFICATION		N°: I-ET-3010.00-1200-972-P4X-006	
	CLIENT: SRGE		SHEET: 1 of 16	
	PROGRAM: ALL		-	
	AREA: ALL		-	
SRGE	TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION			INTERNAL
				ESUP

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INDEX OF REVISIONS

REV.	DESCRIPTION AND/OR REVISED SHEETS
------	-----------------------------------

0	ORIGINAL ISSUE
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	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATE	05/10/2022								
DESIGN	ESUP								
EXECUTION	CSM5								
CHECK	UQ00								
APPROVAL	BEX1								


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TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
UNIT:	ALL	SHEET 2 of 16
TITLE:	REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	INTERNAL
		ESUP

SUMMARY

1 OBJECTIVE	3
2 REFERENCE DOCUMENTS	3
3 DEFINITIONS AND ABBREVIATURES.....	3
4 RESPONSIBILITY FOR THE SURVEY INSPECTION	4
5 GENERAL REQUIREMENTS	4
6 PRE-INSPECTION MEETING.....	4
7 INSPECTION AND TEST PLAN	5
8 SURVEY INSPECTION BY SELLER	6
9 NOTIFICATION OF INSPECTION	7
10 INSPECTION BY BUYER	8
11 SURVEY INSPECTION REPORT	8
12 FACTORY ACCEPTANCE TEST (FAT)	9
13 INSPECTION RELEASE CERTIFICATE (IRC).....	9
14 TECHNICAL DOCUMENTATION AND CERTIFICATION	10
15 INSPECTION PERFORMANCE	12
16 AUDIT BY BUYER AT VENDOR AND SURVEY INSPECTION	12
17 APPENDIX I – LEVEL OF INSPECTION X EQUIPMENT	13

	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
	UNIT: ALL	SHEET 3 of 16	
	TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	INTERNAL ESUP	

1 OBJECTIVE

This technical specification establishes the general requirements for manufacturing survey inspection to be fulfilled by SELLER.

NOTE: the goal of manufacturing survey inspection is to assure the conformance of material or equipment with its technical specifications at manufacturer facilities. It shall not be misunderstood with, nor substituted by inspection performed by CS.

Specific conditions for each material, equipment or package are determined in one or more of the following BUYER contractual documents, in a decreasing hierarchic order:

- I. Exhibit
- II. Material Requisition ("RM"), Technical Specification ("ET") and Data Sheet ("FD")
- III. Technical Standards.


2 REFERENCE DOCUMENTS

- I-ET-3010.00-1200-940-P4X-002 General Technical Terms
- I-ET-3010.00-1200-916-1AL-001 Requirements for Quality Audits in the FPSO Supply Chain
- I-ET-3010.00-1200-970-P4X-003 Requirements Personnel Qualification and Certification
- DR-ENGP-I-1.1

3 DEFINITIONS AND ABBREVIATURES

In addition to I-ET-3010.00-1200-940-P4X-002, the following terms are adopted:

CS	Classification Society
FAT	Factory Acceptance Test
IRC	Inspection Release Certificate
ITP	Inspection and Test Plan
NCR	Non-Conformance Report
NDT	Non-Destructive Testing
NR	Regulatory Norm (Government Rule)
PIM	Pre-Inspection Meeting
RM	Material Requisition
WPS	Welding Procedure Specification

	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
	UNIT: ALL	SHEET 4 of 16	
	TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	INTERNAL ESUP	

4 RESPONSIBILITY FOR THE SURVEY INSPECTION

The responsibility for the manufacturing survey inspection is always assigned to the SELLER through the whole supply chain. SELLER shall observe the minimum requirements applicable to each type of equipment established in this document.

BUYER, at its sole discretion, can follow and witness all procurement phases of the materials under SELLER's Scope of Supply. In this way, SELLER shall notify the BUYER about any technical meeting and/or inspection with Suppliers and Sub-suppliers according to the rules herein established.

For the expediting, factory inspections and factory acceptance tests of materials under SELLER's scope of Supply, only qualified inspectors and/or technical professionals will be accepted to execute such activities, in accordance with the I-ET-3010.00-1200-970-P4X-003.

SELLER's survey inspector shall issue a report concerned to each inspection performed.

5 GENERAL REQUIREMENTS

SELLER shall approve the fabrication procedures and inspect materials and equipment supplied by its suppliers and sub-suppliers, as a minimum herein stated, checking the compliance with SELLER's Purchase Orders and/or Contract specifications and requirements.

SELLER shall make available an inspection team for in-house and field inspection upon issuance of the first Purchase Order and make sure that all contractual specifications applicable to the equipment / system are submitted to the team.


6 PRE-INSPECTION MEETING

Pre-Inspection Meeting (PIM) shall be held at the factory where the equipment, material or system will be manufactured. It may be carried out through videoconference as an option for participation of BUYER's representatives. SELLER shall always invite BUYER, who reserves the right to take part or attend it or not.

Notification for PIM shall be provided according to inspection notification statements.

Minimum agenda of PIM shall be as follows:

- Organization of Supplier
- Scope of Supply
- Review of reference document in Material Requisition (RM)
- Review of Supplier document submission/approval status
- Review of accepted deviations and Technical Query Form (TQF)
- Fabrication Schedule
- Review of sub-supplier list and sub-order status

	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
	UNIT: ALL	SHEET 5 of 16	
	TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	INTERNAL ESUP	

- Review of ITP
- Scope of inspection, procedures approval, control of inspection activities and inspection requirement (including WPS, NDT, Dimension, Painting, Calculation Sheet, FAT, final inspection, packing & preservation etc.) according to RM, approved ITP and project specification
- Requirement for Class, NR and other standards & design codes
- Requirement for certificate
- Personnel Qualification based on project requirements
- Inspection notification and communication matrix
- Punch & NCR control
- Manage quality record
- IRC
- List of documents required during PIM
- Site survey.

7 INSPECTION AND TEST PLAN


SELLER shall review and approve the ITP issued by manufacturer, concerning to all equipment to be supplied, containing hold points, witness points, schedule of inspection and test, test procedures, tests and events to be witnessed by SELLER´ s inspection team.

ITP shall comprise, at least, the following requirements:

- a) Ensure the compatibility of the design, procedures and applicable documents to the equipment or material which constitutes the object of supply.
- b) Description of the inspections on each fabrication stages throughout the manufacturing process, including those carried out in the sub-suppliers, indicating traceability requirements, the type and extent of examinations, tests and verifications to be performed.
- c) Identify type of participation, such as review document, hold point, witness point, monitoring point and spot witness, of the Manufacturer and other parties (Vendor, SELLER, BUYER, CS etc.).
- d) Indicate the personnel qualification and certification performing inspection and checking activities.
- e) Indicate the execution procedures, standards, technical specifications and acceptance criteria for all quality features and requirements.

NOTE: Procedures shall indicate devices and equipment to be used to check critical dimensions, examinations, functional tests, pressure testes among others, required to achieve quality required.

- f) Indicate the reference quality level (e.g. API/PSL and VSL), when so determined in the project.

	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
	UNIT: ALL	SHEET 6 of 16	
	TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	INTERNAL	
			ESUP

- g) Identify quality records concerned to each activity, mentioning the type of record: report, certificate, graph, etc. Such records shall allow the identification and traceability of critical components along the entire manufacturing process.

NOTE: Special attention shall be taken to all equipment / skids / material that are subject to coating application, metallizing, lining and / or material specification, as to ensure that these points are considered in the Inspection and Test Plan.

SELLER shall indicate in the Inspection and Test Plans the extension of its own participation, or by an inspection company which it may have contracted, in the performance of manufacturing inspection, pointing out the document review, the mandatory hold points and the witness points.

BUYER shall indicate any equipment and materials for which SELLER shall submit the ITP for BUYER approval, within the time schedule previously agreed upon by the parties.

BUYER shall also point out the inspection events that shall be witnessed by BUYER itself or by its representative.

8 SURVEY INSPECTION BY SELLER

Survey inspection is assigned as **level I, II or III**. Level II and III focus on the finished product. Level I, beyond take part on final events, also assesses Vendor's manufacturing process, setting up mandatory hold and witness points throughout the fabrication process.

The definition of survey inspection events to be followed up by SELLER, as determined in the respective ITP (document review, monitoring, witness points and hold points) shall consider the level of inspection determined in APPENDIX I.

For equipment not subjected to survey inspection by SELLER, the suppliers shall also follow the requirements of Section 14.

SELLER shall submit to BUYER approval any change in the level of survey inspection for a specific supply. SELLER shall accomplish the necessary arrangement of approved ITP to maintain the coherence between the newly established level of inspection and the manufacturing process.

Table 1 determines the minimum activities for each level of survey inspection, to be performed by SELLER or contracted inspection organization.


	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
	UNIT: ALL	SHEET 7 of 16	
	TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	INTERNAL	
		ESUP	

Table 1: Minimum activities for each level of survey inspection.

MINIMUM ACTIVITIES	LEVEL OF INSPECTION		
	I	II	III
	Survey follow-up	Final inspection with tests	Final inspection without tests
Review and approval of ITP before beginning of manufacturing	X (1)	X (1)	X (1)
Review of raw material certification, quality records, personnel certification and traceability	X	X	X
Review and approval of procedures for fabrication, inspection and test (such as welding, non-destructive testing, pressure test, leak test, painting, factory acceptance test)	X	X	X
Checking during manufacturing (methods of manufacturing and assembly, processes control, such as welding parameters, PMI, hardness, ferrite check, painting and other intermediate inspections)	X		
Review quality records according to accomplishment of ITP	X	X	X
Witness of hydrostatic tests and/or pneumatic tests and/or Factory Acceptance Tests, when applicable	X	X	
Final visual inspection and dimensional check, including painting	X	X	X
Review of data book and technical documents	X	X	X
Identification and packing	(2)	(2)	(2)

REMARKS:

X Mandatory activity


(1) The Inspection and Test Plan shall be submitted to SELLER approval before manufacturing starts

(2) To be checked when required in the Contract or defined in the Quality Plan.

9 NOTIFICATION OF INSPECTION

The notification for all inspections to be witnessed by BUYER, as well as PIM, shall be submitted to BUYER with antecedence established in contractual requirements, considering premises for Vendors located in Brazil and abroad.

SELLER shall notify BUYER in writing whenever SELLER plans to conduct hydrostatic, mechanical, performance or other tests subject to be witnessed, observing the communication deadlines stated above.

	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
	UNIT: ALL	SHEET 8 of 16	
	TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	INTERNAL ESUP	

10 INSPECTION BY BUYER

At its discretion, BUYER may conduct detailed inspections in addition to those mentioned in the approved Inspection and Test Plan.

For supplying of equipment or materials, even when not subject to survey inspection, BUYER may perform a technical supply audit according to its criterion, to verify the procurement management of SELLER and the supplier.

In addition to the above, BUYER can send inspectors to witness all performance tests and any of the subsequent activities including test apparatus removal, final inspection, preservation and preparation for shipment.


For all inspections that BUYER intends to participate, the SELLER must also send a representative.

List of equipment in APPENDIX I are also the preliminary list of items which BUYER intends to inspect and witness the tests. SELLER and BUYER shall agree on a definitive list.

11 SURVEY INSPECTION REPORT

SELLER shall provide an inspection report to BUYER after each inspection or test within 3 working days. The Inspection Report shall be in english language and minimum content must be as follows:

- a) Report number
- b) Number of purchase order
- c) Item of purchase order
- d) Quantity inspected
- e) Level of Inspection
- f) Date or period of inspection
- g) Location of inspection
- h) Identification of supplier and manufacturer, in case of sub-supplier
- i) Notification of Inspection reference, including the date of receipt thereof
- j) Purpose
- k) Description and identification of inspected material (tag, serial number etc.);
- l) Reference documents
- m) List of annexes
- n) ITP number and respective stage(s) attended
- o) Description of activities developed and parameters assessed
- p) Manufacturing stage (before, during or after manufacturing)

	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
	UNIT: ALL	SHEET 9 of 16	
	TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	INTERNAL ESUP	

- q) Quality records
- r) Result of inspection
- s) Photographic records
- t) Area of concern, including any punch and NCR
- u) Conclusion: Satisfactory or Non-Satisfactory
- v) Inspector identification and qualification/certification
- w) Report distribution list
- x) Contact person at Supplier's including Department.

12 FACTORY ACCEPTANCE TEST

Where applicable, FAT procedure, including performance test, shall be developed by SELLER's Vendors or Sub-Vendors and submitted to BUYER for approval, at least three (3) months prior to a FAT planned. FAT of equipment and packages shall be a part of the SELLER's Vendors or Sub-Vendors scope of supply and shall be witnessed by the BUYER's representative and Classification Society surveyor, as applicable.

13 INSPECTION RELEASE CERTIFICATE

After getting a satisfactory result at the final inspection at Vendors or Sub-Vendors, SELLER's representative shall issue the Inspection Release Certificate (IRC), before shipment, complying with all Purchase Order requirements.

The IRC shall be in english language and signed off by supplier, SELLER and BUYER (if required).

All IRCs shall also be part of project records. The minimum content of the IRC shall be according to the survey inspection report.

Minimum condition, which shall be confirmed by SELLER' survey inspector, to issue IRC shall be as follows:

- a) ITP fully accomplished
- b) Traceability and material specification was confirmed
- c) All NDE and FAT performed successfully
- d) None NCR open
- e) All punch list closed

Exemptions regarding issuance of IRC with an open punch list, Vendors and Sub-Vendors shall present to SELLER and BUYER's an corrective action plan for approval, containing a deadline to clear the issues. This Punch List and its action plan shall be attached to the IRC and incorporated in the Project Punch



TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
UNIT: ALL	SHEET 10 of 16	
TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	INTERNAL	
	ESUP	

List, controlled by SELLER, as part of the Integrated Management System as specified in CONTRACT and its Exhibits.

NOTE: SELLER shall guarantee access to the Project Punch List to BUYER

SELLER's Vendors shall issue a photographic report, demonstrating all items of the packing list, before packing and transportation.

SELLER shall inform BUYER when the equipment/skid/package is ready for transportation. BUYER at its discretion will attend the release inspection, before transportation. The inspection notice shall be forwarded to BUYER, according to stated in this specification.

14 TECHNICAL DOCUMENTATION AND CERTIFICATION

Suppliers shall keep available for SELLER's inspection and BUYER's auditing at least the quality records indicated below, reinforcing or complementing those required by the technical documents, which shall be inserted in the Data Book accompanying equipment or material items.

The documents required by project shall complement this list, in accordance with the specifications of each equipment or material presented in table 2.

Table 2: Minimum quality records per group of materials/equipments.

Quality Record	Machine & Rotating	Static & Piping	Valves	Electrical	Instrumentation & Automation	Telecom	Safety
Certificates of metallic and non-metallic materials, including mechanical, physical and chemical tests of raw materials and components	X	X	X	X	X	X	X
Records of heat treatment for stress relief, including graphics	X	X	X				
Records of heat treatment, including dehydrogenation for coated screws and nuts in case of tensile strength above 100 Ksi	X	X	X				
Hardness test record	X	X	X				
Inspection record	X	X	X	X	X	X	X
Non-conformities records or reports brought up in the process of manufacturing, assembling, tests and expedition, including respective manufacturer's judgment aimed at corrective action	X	X	X	X	X	X	X
Repair procedures and repair records (defects, repaired during manufacture), when applicable	X	X	X				
Reports concerning visual and dimensional tests	X	X	X	X	X	X	X



TECHNICAL SPECIFICATION

Nº: I-ET-3010.00-1200-972-P4X-006

REV. 0

UNIT: ALL

SHEET 11 of 16

TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION

INTERNAL

ESUP

Quality Record	Machine & Rotating	Static & Piping	Valves	Electrical	Instrumentation & Automation	Telecom	Safety
Qualification records of welding procedures, welders and welding operators, issued by inspectors qualified and certified by a nationally acknowledged entity in the country where manufacturing occurs	X	X	X				
Welding reports, including instructions for welding execution and inspection	X	X	X				
Certificate of welding consumables	X	X	X				
Records of personnel qualification for non-destructive tests	X	X	X				
Qualification records of non-destructive test procedures, performed by a certified inspector	X	X	X				
Non-destructive and destructive tests reports	X	X	X				
Hydrostatic and pneumatic tests records	X	X	X				
Certificates of calibration for all instruments used at final factory tests	X	X	X	X	X	X	X
Gauging records for peripheral instruments	X	X	X	X	X	X	X
Static and dynamic balancing records of the of the revolving set for rotating equipment	X						
Mechanical running tests, including noise level test for rotating or dynamic equipment	X						
Performance test records, including vibration measurements for rotating or dynamic equipment	X						
Assembly clearance records, as well as records concerning any non-conformity found during disassembling after the tests for rotating or dynamic equipment	X						
Electrical/electronic equipment conformity certificates for protection types applied in potentially explosive atmosphere and protection grades	X			X	X	X	
Functional tests of electric panels, such as: switchboard, control and protection boards, and their respective components				X	X	X	
Routine tests certificates for electrical equipment and special test certificates and for the respective prototypes				X	X	X	
Gauging and functional tests records for instruments and automation systems					X		
Painting scheme applied and record of painting application quality control	X	X	X	X	X	X	X
Preservation, packing, transportation and storage procedures	X	X	X	X	X	X	X



TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
UNIT: ALL	SHEET 12 of 16	
TITLE: REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION		INTERNAL
		ESUP

Quality Record	Machine & Rotating	Static & Piping	Valves	Electrical	Instrumentation & Automation	Telecom	Safety
Record of the follow-up inspections concerning painting, detailing surface preparation, each coating applied, as well as the results regarding thickness and adherence	X	X	X	X	X	X	X
Installation, operation and maintenance manuals.	X	X	X	X	X	X	X

15 PERFORMING THE INSPECTION

SELLER or an independent inspection company contracted by SELLER, shall perform the inspection events indicated in approved ITP and issue the corresponding inspection reports and material release or rejection notes.

Manufacturing Survey Inspectors shall be qualified according to I-ET-3010.00-1200-970-P4X-003.

SELLER or an independent inspection company contracted by SELLER, shall provide enough inspection resources, preferably close to the regions where foreign suppliers are located. These inspections teams shall be qualified to analyse, discuss and approve the ITP, NDT, welding, FAT, painting, metallizing and internal lining procedures, at the suppliers' locations, avoiding delays.

16 AUDIT BY BUYER AT VENDOR AND SURVEY INSPECTION


BUYER, at its own discretion, may audit any Vendor that take part in supply chain of SELLER. This audit shall be performed based on Quality Management System and technical requirements stated in contractual documentation.


The conduction of this quality audit shall be performed according to I-ET-3010.00-1200-916-1AL-001, which generate a quality index of Vendor.

17 APPENDIX I – LEVEL OF INSPECTION x EQUIPMENT

Table 3: Level of Survey Inspection per Equipment/Material.

Item	Group of Equipment/Material	Level
Machine/Rotating Equipment		
I.1	Centrifugal Pumps	II
I.2	Vertical Submerged Pumps	II
I.3	Diaphragm Pumps	III
I.4	Reciprocating Pumps	III
I.5	Liquid Ring Pumps	III
I.6	Progressive Cavity Pumps	III
I.7	Rotary Pumps	III
I.8	Metering Pumps	III
I.9	Centrifugal Pumps API 610	I
I.10	Cranes	II
I.11	Reciprocating Pumps API 674	I
I.12	Diesel Hydraulic Fire Water Pumping Unit NFPA20	I
I.13	Reciprocating Compressors	III
I.14	Reciprocating Compressor API 618	I
I.15	Centrifugal and Axial Compressors API 617	I
I.16	Screw Compressors API 619	I
I.17	Screw Compressors	III
I.18	Winches	III
I.19	Gas Engines above 650 HP	II
I.20	Diesel Engines above 650 HP	II
I.21	Gear Box API 613	II
I.22	Hydraulic Speed Variator	II
I.23	Speed Reductors	III
I.24	Gas Turbines API 616	II
I.25	Air conditioning units	III
I.26	Liquid Ring Compressor API 681	II
I.27	Hydraulic Power Units	II
I.28	Pull-in System	II
I.29	Fans and Blowers	III
I.30	Turbogenerator Start-up Hydraulic Power Unit	III
I.31	Hydraulic Units	II
I.32	Centrifuges	III
I.33	Tank Cleaning Machines	III
Static Equipments		
I.34	Filling Station Hose Reels	II
I.35	Tanks	II
I.36	Shell & Tube Heat Exchangers (MDMT below -29 °C, H2S service, clad/overlaid, duplex/superduplex, pressure rating #900 and above)	I
I.37	Shell & Tube Heat Exchangers other than above	II

	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
	UNIT:	ALL	
	TITLE:	REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	
		SHEET	14 of 16
		INTERNAL	
		ESUP	
I.38	Printed Circuit Heat Exchangers	I	
I.39	Plate Heat Exchangers	II	
I.40	Pressure Vessels (internal coating, MDMT below -29 °C, H2S service, cladded/overlaid, duplex/superduplex, pressure rating #900 and above)	I	
I.41	Pressure Vessels other than above	II	
I.42	Air Coolers	I	
I.43	Flare	I	
I.44	Pig Launcher & Receiver	I	
I.45	Electrostatic Precipitator	I	
I.46	Conical Receptacle for Rigid Riser	I	
I.47	Diverless Bellmouth	I	
I.48	Riser Modular Support Tube	I	
I.49	Hard Pipe	I	
I.50	Waste Heat Recovery Stack (if constructed in CRA pipes)	I	
I.51	Cladded Pipe and Fitting	III	
Electrical Equipments			
I.52	Flexible cables with PVC extruded solid insulation for voltage below 750 V	III	
I.53	Control cables for voltage below 1 kV	III	
I.54	Power cables for voltage equal or above 1 kV	II	
I.55	Power cables for voltage below 1 kV	III	
I.56	Synchronous Machines below 300 HP	III	
I.57	Synchronous Machines equal or above 300 HP	I	
I.58	Continuous Current Machines below 300 HP	III	
I.59	Continuous Current Machines equal or above 300 HP	I	
I.60	Electrical Motors below 300 HP	III	
I.61	Electrical Motors equal or above 300 HP	I	
I.62	Electrical Panels below 480 V	III	
I.63	Electrical Panels equal or above 480 V	II	
I.64	Grounding Resistors	III	
I.65	Rectifiers / Battery Charges / UPS	II	
I.66	Power Transformers equal or above 450kVA	II	
I.67	Power Transformers below 450kVA	III	
I.68	Battery Banks	II	
I.69	Electrical Battery Charger	II	
I.70	Electrical Frequency Converter	II	
I.71	Electric Heaters	II	
Instrumentation and Automation			
I.72	Instrument / Service Air Compression Unit Power Panel	II	
I.73	Electrical Workstation	II	
I.74	Transmitters, switches and local indicators	III	
I.75	PLC	II	
I.76	Instrumentation Panels	II	
I.77	Automation Control Panel	II	
I.78	Automation Workstation	II	
I.79	Automation Remote IO Panel	II	

	TECHNICAL SPECIFICATION	Nº: I-ET-3010.00-1200-972-P4X-006	REV. 0
	UNIT:	ALL	
	TITLE:	REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION	
		SHEET	15 of 16
		INTERNAL	
		ESUP	
I.80	Automation Computer Panel		II
I.81	Environment monitoring systems		II
I.82	Metering Skids		II
I.83	Orifice Plates for metering systems		III
Valves			II
I.84	Manual Block Valves		III
I.85	Control Valves		II
I.86	Foot Valves		II
I.87	Check Valves		II
I.88	Pressure and Safety Valves		II
I.89	Valves Classified as VSL-4 (as per Appendix A of DR-ENGP-I-1.1)		I
Telecom			
I.90	GMDSS Consoles and Radio Operational Console		II
I.91	Active Repeater Panel		II
I.92	Public Address Central Station (CIT-5518501A/B)		II
I.93	Rack for CCTV System		II
Safety			
I.94	Fire Fighting Hoses		II
I.95	Rescue Boats		II
I.96	Life Boats		II
I.97	Life Boat Davits		II
I.98	Hoist Cargo Handling		II
I.99	Fixed Foam Equipment		II
Packages			
I.100	Nitrogen Generator Units		II*
I.101	CO2 Compressor Hydraulic Start-up Unit		II*
I.102	Waste Heat Recovery Unit		II*
I.103	Slop Treatment Unit		II*
I.104	Inert Gas Generator Package		II*
I.105	Oily Water Separator Package		II*
I.106	Diesel Oil Purifier Package		I*
I.107	Potable Water Maker Package		I*
I.108	Offloading System (AFT & FWD) Package		I*
I.109	Fresh Water Hydrophore Unit Package		I*
I.110	Ultraviolet Sterilizer Unit Package		I*
I.111	Calorifier Unit Package		I*
I.112	Mooring System Package		I*
I.113	Marine Growing Protection System Package		I*
I.114	Sanitary Treatment and Vacuum Unit Package		I*
I.115	Main Turbogenerator Unit Package		I*
I.116	Emergency Generator Package		I*
I.117	Auxiliary Generator Package		I*
I.118	Hull Generator Package		I*
I.119	Oil Circulation Unit Main Sea Water Lift Pump Package		I*
I.120	Oil Circulation Unit Startup Sea Water Lift Pump Package		I*



TECHNICAL SPECIFICATION

Nº: **I-ET-3010.00-1200-972-P4X-006**

REV. **0**

UNIT: **ALL**

SHEET **16** of **16**

TITLE: **REQUIREMENTS FOR MANUFACTURING SURVEY INSPECTION**

INTERNAL

ESUP

I.121	Water Mist System for Main Turbogenerator Package	I*
I.122	Water Mist System for CO ₂ Turbocompressor Package	I*
I.123	Air Drying Unit Package	I*
I.124	Compressor Skid Package	I*
I.125	Teg Vent Recovery Unit Package	I*
I.126	Vapor Recovery Unit Package	I*
I.127	Main Gas Compression Unit Package	I*
I.128	Injection Gas Compression Unit Package	I*
I.129	CO ₂ Compression Unit Package	I*
I.130	Instrument / Service Air Compression Unit Package	I*
I.131	Slop Gas Recovery Unit Package	I*
I.132	Flare Gas Recovery Compression Unit (Uc-5412001) Package	I*
I.133	Fresh Water Maker Package	I*
I.134	Fresh Water Maker for Oil Dilution Package	I*
I.135	Sea Water Electrochlorination Unit Package	I*
I.136	Ufu Chemical Dosing System Package	I*
I.137	Oil And Gas Chemical Injection Unit Package	I*
I.138	Produced Water Chemical Injection Unit Package	I*
I.139	Injection Water Chemical Injection Unit Package	I*
I.140	CO ₂ Removal Unit Package	I*
I.141	Gas Refrigeration Unit Package	I*
I.142	Ultrafiltration Unit Package	I*
I.143	Sulphate Removal Unit Package	I*
I.144	Vacuum Deaerator Unit Package	I*
I.145	Dilution Blending Unit Package	I*
I.146	Hydrocarbon Dew Point Control System	I*
I.147	Vacuum System	I*
I.148	TEG Regeneration Package	I*
I.149	Fresh Water Chlorination Unit Package	I*
I.150	Diesel Hydraulic Fire Water Pumping Package Unit	I*

* Level of inspection applicable to the Main Vendor of Package Unit. For the equipment that belongs to the package, supplied by the Main Vendor's subcontractors or Sub-Vendors, SELLER shall consider those specific survey inspection level.