	TECHNICAL SPECIFICATION		Nr: I-ET-3010.2E-5125-540-P4X-001
	CLIENT:	SRGE	SHEET: 1 of 14
	JOB :	REFERENCE HULL 01	
	AREA:	-	
SRGE	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
			ESUP

File No.: MICROSOFT WORD 2016 – I-ET-3010.2E-5125-540-P4X-001_A.docx

INDEX OF REVISIONS

REV.	DESCRIPTION AND/OR REVISED SHEETS
0	ORIGINAL ISSUE
A	REVISED WHERE INDICATED AND ACCORDING TO THE CONSISTENCY ANALYSIS

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATE	SEP/05/22	DEC/05/22							
PROJECT	ESUP	ESUP							
EXECUTION	PMX4	CXZ0							
CHECK	U4WK	PMX4							
APPROVAL	UPDM	BYA6							

THE INFORMATION CONTAINED IN THIS DOCUMENT IS PETROBRAS PROPERTY AND MAY NOT BE USED FOR PURPOSES OTHER THAN SPECIFICALLY INDICATED HEREIN.

THIS FORM IS PART OF PETROBRAS N-381 REV.M ANNEX A – FIGURE A.1.




	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 2 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
			ESUP

TABLE OF CONTENTS	PAGE
1. INTRODUCTION	4
1.1. OBJECTIVE	4
1.2. DEFINITIONS	4
1.3. ABBREVIATIONS	4
2. NORMATIVE REFERENCES	4
2.1. INTERNATIONAL CODES, RECOMMENDED PRACTICES AND STANDARDS	4
2.2. BRAZILIAN CODES AND STANDARDS	5
2.3. CLASS APPROVAL AND CERTIFICATION	5
3. REFERENCE DOCUMENTS	5
3.1. REFERENCE HULL 01 FPSO DESIGN	5
3.2. TYPICAL DOCUMENTS	6
3.3. SPECIFIC PROJECT DOCUMENTS	7
4. DESIGN REQUIREMENTS	8
4.1. DESIGN CONDITIONS	8
4.2. SAFETY REQUIREMENTS	8
4.3. NOISE AND VIBRATIONS	9
4.4. MOTIONS AND ACCELERATION	9
5. SCOPE OF SUPPLY	9
5.1. PACKAGE EQUIPMENT	9
5.2. EQUIPMENT LOCATION	10
6. PACKAGE SPECIFICATION	10
6.1. CALORIFIER WATER VESSEL (V-Z-5125501A/B)	10
6.2. CALORIFIER ELECTRIC HEATERS (AQ-V-Z-5125501A/B)	10
6.3. ACCOMMODATION HOT FRESH WATER CIRCULATION PUMPS (B-Z-5125501A/B)	11
6.4. CALORIFIER WATER CONTROL PANEL (PN-Z-5125501-A/B)	11
7. GENERAL REQUIREMENTS	11
7.1. ELECTRICAL REQUIREMENTS	11
7.2. INSTRUMENTATION AND AUTOMATION REQUIREMENTS	12
7.3. PAINTING REQUIREMENTS	12
7.4. SKIDS LAYOUT AND FOUNDATION REQUIREMENTS	12
7.5. NAMEPLATES AND TAG NUMBERING	13
8. PACKAGE MANUFACTURING AND DELIVERY REQUIREMENTS	13

 PETROBRAS	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 3 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL

8.1. GENERAL.....	13
8.2. WELDING.....	14
8.3. DOCUMENTATION	14
8.4. SPARE PARTS.....	14
8.5. INSPECTION AND TESTS	14
8.6. PRESERVATION, PACKING AND TRANSPORTATION.....	14

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 4 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
		ESUP	

1. INTRODUCTION

1.1. OBJECTIVE

The purpose of this technical specification is to describe the minimum requirements for the design, manufacturing, assembly, supply, installation, commissioning, and tests of Calorifier Unit (Z-5125501) in conformance with relevant regulations and REFERENCE HULL 01 FPSO design documentation.

The purpose of Calorifier Unit (Z-5125501) is to heat the potable water for accommodation hot water distribution and consumption. For this purpose, PACKAGE shall be composed by heaters, vessel, circulation pumps and control panel to ensure the required design and operational performance.

1.2. DEFINITIONS

PACKAGE: It is defined as an assembly of equipment supplied interconnected, tested and ready to operate, requiring only the available utilities from the Unit for the Package operation.

PACKAGER: It is defined as the responsible for project, assembly, construction, fabrication, testing and furnishing of the Package.

CALORIFIER UNIT (Z-5125501): the package name.

OWNER: Petrobras.

All definitions are found on I-ET-3010.00-1200-940-P4X-002 – GENERAL TECHNICAL TERMS.

1.3. ABBREVIATIONS

CS Classification Society

FAT Factory Acceptance Tests

FPSO Floating Production Storage and Offloading Unit

SOS Supervisory and Operation System


SOS-HMI..... Human Machine Interface of SOS

2. NORMATIVE REFERENCES

2.1. INTERNATIONAL CODES, RECOMMENDED PRACTICES AND STANDARDS

The equipment will be designed and manufactured in accordance with the following codes and standards, if not mentioned otherwise.

- ANSI American National Standards Institute

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 5 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL

- API American Petroleum Institute
- ASME American Society Of Mechanical Engineers
- DIN German National Standard Code
- EN European Standards
- ISO International Standard Organization
- IMO – International Maritime Organization
- IEC – International Electric Codes
- AISC ASD
- AWS D1.1
- Classification Society defined for the Hull scope.

2.2. BRAZILIAN CODES AND STANDARDS


- NR – Brazilian Federal Government Regulatory Norms (Normas Regulamentadoras NRs)
- NORMAM-01 – Normas da Autoridade Marítima para Embarcações Empregadas na Navegação em Mar Aberto.


2.3. CLASS APPROVAL AND CERTIFICATION


The PACKAGE shall be designed, manufactured and tested according to the design reference documents, normative requirements and in accordance with the latest editions of Classification Society Rules, Regulations and Standards.

3. REFERENCE DOCUMENTS

3.1. REFERENCE HULL 01 FPSO DESIGN	
REF DOC NUMBER	REF DOC NAME
HULL SYSTEMS	
I-DE-3010.2E-5115-944-P4X-002	FRESH, HOT AND POTABLE WATER SYSTEM
I-DE-3010.2E-5115-944-P4X-003	FRESH, HOT AND POTABLE WATER SYSTEM DISTRIBUTION
I-MD-3010.2E-1200-940-P4X-027	DESCRIPTIVE MEMORANDUM - HULL SYSTEMS
OUTFITTING	

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 6 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
I-DE-3010.2E-1351-140-P4X-001	HULL GENERAL NOTES AND TYPICAL DETAILS		
3.2. TYPICAL DOCUMENTS			
REF DOC NUMBER	REF DOC NAME		
GENERAL			
I-ET-3000.00-0000-940-P4X-002	SYMBOLS FOR PRODUCTION UNITS DESIGN		
I-ET-3010.00-1200-940-P4X-002	GENERAL TECHNICAL TERMS		
I-ET-3010.00-1352-130-P4X-001	FLOOR GRATINGS, TRAY SYSTEMS AND GUARDRAILS MADE OF COMPOSITE MATERIALS.		
I-ET-3000.00-1200-940-P4X-001	TAGGING PROCEDURE FOR PRODUCTION UNITS DESIGN		
CONSTRUCTION			
I-ET-3010.00-1200-955-P4X-001	WELDING		
I-ET-3010.00-1000-970-P4X-002	REQUIREMENTS FOR NDT		
I-ET-3010.00-1200-955-P4X-002	REQUIREMENTS FOR WELDING INSPECTION		
I-ET-3010.00-0000-970-P4X-001	REQUIREMENTS FOR PROCEDURES AND PERSONNEL QUALIFICATION AND CERTIFICATION		
MECHANICAL			
I-ET-3010.00-1200-300-P4X-001	NOISE AND VIBRATION CONTROL REQUIREMENTS		
PAINTING			
I-ET-3010.00-1200-956-P4X-002	GENERAL PAINTING		
DR-ENGP-I-1.15	COLOR CODING		
SAFETY			
I-ET-3010.00-5400-947-P4X-002	SAFETY SIGNALING		
DR-ENGP-M-I-1.3	SAFETY ENGINEERING		

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 7 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
PIPING			
I-ET-3010.00-1200-251-P4X-001		REQUIREMENTS FOR BOLTING MATERIALS	
ELECTRICAL			
I-DE-3010.00-5140-700-P4X-003		GROUNDING INSTALLATION TYPICAL DETAILS	
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 AND EQUIPMENT FOR OFFSHORE UNITS	
I-ET-3010.00-5140-700-P4X-003		ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS	
I-ET-3010.00-5140-712-P4X-001		LOW-VOLTAGE INDUCTION MOTORS FOR OFFSHORE UNITS	
INSTRUMENTATION AND AUTOMATION			
I-ET-3010.00-1200-800-P4X-002		AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGE UNITS	
I-ET-3010.00-1200-800-P4X-013		GENERAL CRITERIA FOR INSTRUMENTATION PROJECTS	
I-ET-3010.00-5520-888-P4X-001		AUTOMATION PANELS	
I-ET-3010.00-1200-800-P4X-015		REQUIREMENTS FOR TUBING AND FITTING (ALIGNED TO IOGP-JIP33 S-716)	
3.3. SPECIFIC PROJECT DOCUMENTS			
REF DOC NUMBER		REF DOC NAME	
GENERAL			
I-DE-GENERAL ARRANGEMENT		GENERAL ARRANGEMENT	

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 8 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
			ESUP

I-DE-AREA CLASSIFICATION – GENERAL	AREA CLASSIFICATION – GENERAL
I-ET-AUTOMATION INTERFACE OF PACKAGE UNITS	AUTOMATION INTERFACE OF PACKAGE UNITS
I-ET-METOCEAN DATA	METOCEAN DATA
I-RL-MOTION ANALYSIS	MOTION ANALYSIS

Table 1 – Reference Documents

- Note: these above item 3.3 documents title and number may 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. DESIGN REQUIREMENTS

4.1. DESIGN CONDITIONS

- 4.1.1. PACKAGE Equipment shall be designed for a 30-year life in a corrosive offshore environment without the need for replacement of any major component due to wear, corrosion, fatigue, or material failure.
- 4.1.2. PACKAGER shall design the equipment for the full range of operational conditions as specified in this technical specification.
- 4.1.3. PACKAGE Equipment shall be designed with the compliance of the normative and design requirements as stated in this specification and complying with the technical parameters stated on the above item 3 with the REFERENCE HULL 01 FPSO basic design reference documents.

4.2. SAFETY REQUIREMENTS

- 4.2.1. Personnel safety protection shall be provided according to Brazilian Regulatory Norms (NR) issued by Brazilian Government.
- 4.2.2. Warning signs in Brazilian Portuguese language shall be provided where risk of personnel injury exist.
- 4.2.3. Rotating equipment outer parts, such as pulleys, couplings, belts and flywheels, shall have rigid protection, manufactured with aluminum ASTM B211 and shall be capable of being easily removed.
- 4.2.4. In accordance with the requirements of SOLAS II-1, Regulation 3-5, and MSC.1/Circ. 1379, all equipment and material to be supplied by PACKAGER must be "asbestos free".
- 4.2.5. Safety signaling shall be in full compliance with I-ET-3010.00-5400-947-P4X-002 – SAFETY SIGNALING.

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 9 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
			ESUP

4.2.6. Double block & bleed arrangements are required for isolation of equipment in piping classes of 300# and above.

4.3. NOISE AND VIBRATIONS

4.3.1. Noise and vibrations limits shall be in conformance with I-ET-3010.00-1200-300-P4X-001 – NOISE AND VIBRATION CONTROL REQUIREMENTS.

4.4. MOTIONS AND ACCELERATION

4.4.1. All equipment shall be able to withstand with the UNIT subjected to 100-year return period environmental conditions.

4.4.2. All equipment shall be able to operate with the UNIT subjected to 1-year return period environmental conditions.

4.4.3. All environmental conditions are defined in I-ET-METOCEAN DATA.

4.4.4. For the Hull loading conditions details and the maximum designed operational trim and heel inclinations refer to I-ET-3010.00-1350-960-P4X-003 – DESIGN REQUIREMENTS - NAVAL ARCHITECTURE.

4.4.5. For the design data and information regarding motion requirements refer to I-RL-MOTION ANALYSIS.

4.4.6. PACKAGE is also to withstand inertial forces during transportation from construction site to the final offshore location.


5. SCOPE OF SUPPLY

5.1. PACKAGE EQUIPMENT

5.1.1. CALORIFIER UNIT PACKAGE is composed by the following items:

	TAG	Description	Qty
1	AQ-V-Z-5125501A/B	CALORIFIER ELECTRIC HEATER	2 x 100%
2	V-Z-5125501A/B	CALORIFIER WATER VESSEL	2 x 100%
3	B-Z-5125501A/B	ACCOMMODATION HOT FRESH WATER CIRCULATION PUMP	2 x 100%
4	PN-Z-5125501-A/B	CALORIFIER WATER VESSEL CONTROL PANEL	2 x 100%

Table 2 – Scope of Supply

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 10 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
		ESUP	

5.1.2. All skid control valves shall also be included on the scope.

5.1.3. PACKAGE logic for control and automation shall be designed and supplied by PACKAGER.

5.1.4. Additionally, PACKAGE scope of supply shall include any other item inside the limits of the skid as valves, instruments, interconnection piping, accessories, and any other device to ensure the PACKAGE safe operation and under the design and operational limits defined by this Technical Specification.

5.2. EQUIPMENT LOCATION

5.2.1. CALORIFIER UNIT (Z-5125501) PACKAGE shall be installed in Engine Room downstream the mineralization and sterilization units, both part of POTABLE WATER MAKER package.

5.2.2. Engine Room is a closed and non-classified compartment as defined on I-DE-AREA CLASSIFICATION – GENERAL, and I-DE-GENERAL ARRANGEMENT and shall be used as reference for equipment location.

6. PACKAGE SPECIFICATION

6.1. CALORIFIER WATER VESSEL (V-Z-5125501A/B)

6.1.1. The two (2) Calorifier Water Vessel (V-Z-5125501A/B) shall be of vertical type each one with capacity of at least 6.3 m³.

6.1.2. Calorifier Water Vessel (V-Z-5125501A/B) shall be designed, manufactured, and tested in compliance with the requirements of the NR-13 – Brazilian Government Regulatory Standard.

6.1.3. Calorifier Water Vessel (V-Z-5125501A/B) shall have the following devices installed for equipment protection against overpressure and high temperature:

a) A pressure relief system with at least one pressure safety valve. with a pressure set to be defined during detailed engineering phase, taking into account the hot water piping design pressure.


b) A Temperature indicator / transmitter for the protection against overheating of heating coils of the electric heaters AQ-V-Z-5125501A/B installed on Calorifier Water Vessels V-Z-5125501A/B.


6.1.4. For maintenance purpose, a manhole shall be located on an adequate accessible location for safe inspection.

6.2. CALORIFIER ELECTRIC HEATERS (AQ-V-Z-5125501A/B)

6.2.1. Calorifier Electric Heaters (AQ-V-Z-5125501A/B) shall be supplied each one installed inside the Calorifer Water Vessels (V-Z-5125501A/B) for potable water heating and further distribution to Accommodation for consumption.

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 11 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
ESUP			
<p>6.2.2. The two (2) Calorifier Electric Heaters (AQ-V-Z-5125501A/B) shall have a temperature transmitter / indicator for control and protection of the heating resistance.</p> <p>6.2.3. The two (2) Calorifier Electric Heaters (AQ-V-Z-5125501A/B) material shall be INCOLOY 825.</p> <p>6.2.4. For material, coating and other details and specifications of V-Z-5125501A/B and AQ-V-Z-5125501A/B, see I-ET-3010.2E-1200-500-P4X-001 – MATERIAL SPECIFICATION FOR HULL SYSTEMS: PRESSURE VESSELS AND TANKS.</p> <p>6.2.5. The two (2) Calorifier Electric Heater (AQ-V-Z-5125501A/B) shall have a heating power of at least 180 kW each. The heating power is the effective heat transferred to the water. For the definition of the nominal electric power for the two (2) Calorifier Electric Heater (AQ-V-Z-5125501A/B), it shall be considered the equipment efficiency and additional margins as per PACKAGER design.</p> <p>6.3. ACCOMMODATION HOT FRESH WATER CIRCULATION PUMPS (B-Z-5125501A/B)</p> <p>6.3.1. Accommodation Hot Fresh Water Circulation pumps (B-Z-5125501A/B) (2x100%) shall be supplied to circulate the hot water to the Accommodation module.</p> <p>6.3.2. Each Accommodation Hot Fresh Water Circulation pumps (B-Z-5125501A/B) shall be of centrifugal type electrical driven with a capacity of at least 6.3 m³/h.</p> <p>6.3.3. Each Accommodation Hot Fresh Water Circulation pumps (B-Z-5125501A/B) shall be able to work with both Calorifier Water Vessel.</p> <p>6.4. CALORIFIER WATER CONTROL PANEL (PN-Z-5125501-A/B)</p> <p>6.4.1. Calorifier water control panel (PN-Z-5125501-A/B) shall be supplied to control the PACKAGE and shall be installed according to requirements of I-ET-3010.00-5140-700-P4X-003 – ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS.</p> <p>6.4.2. Each of two (02) control panels PLCs shall be able to control both Calorifer skids A and B.</p> <p>7. GENERAL REQUIREMENTS</p> <p>7.1. ELECTRICAL REQUIREMENTS</p> <p>7.1.1. Electrical equipment and material shall comply with requirements of the following references:</p> <p>a) I-ET-3010.00-5140-700-P4X-001 – SPECIFICATION FOR ELECTRICAL DESIGN FOR OFFSHORE UNITS</p> <p>b) I-ET-3010.00-5140-700-P4X-002 – SPECIFICATION FOR ELECTRICAL MATERIAL AND EQUIPMENT FOR OFFSHORE UNITS.</p>			

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 12 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
<p>c) I-ET-3010.00-5140-700-P4X-003 – ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS.</p> <p>d) I-ET-3010.00-5140-712-P4X-001 – LOW-VOLTAGE INDUCTION MOTORS FOR OFFSHORE UNITS.</p> <p>e) I-DE-3010.00-5140-700-P4X-003 – GROUNDING INSTALLATION TYPICAL DETAILS.</p>			
<p>7.2. INSTRUMENTATION AND AUTOMATION REQUIREMENTS</p> <p>7.2.1. PACKAGE instrumentation and control design shall fulfill the requirements of the following technical specifications:</p> <p>a) I-ET-3010.00-1200-800-P4X-002 – AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGE UNITS.</p> <p>b) I-ET-3010.00-1200-800-P4X-013 – GENERAL CRITERIA FOR INSTRUMENTATION PROJECTS.</p> <p>c) I-ET-AUTOMATION INTERFACE OF PACKAGE UNITS.</p> <p>d) I-ET-3010.00-5520-888-P4X-001 – AUTOMATION PANELS.</p>			
<p>7.3. PAINTING REQUIREMENTS</p> <p>7.3.1. Painting and coating in accordance with I-ET-3010.00-1200-956-P4X-002 – GENERAL PAINTING and DR-ENGP-I-1.15 COLOR CODING.</p> <p>7.3.2. All components shall be delivered fully painted/coated, unless otherwise indicated on this specification.</p> <p>7.3.3. The performed pre-treatment and complete coating shall be in accordance with the paint manufacturer's data sheets.</p>			
<p>7.4. SKIDS LAYOUT AND FOUNDATION REQUIREMENTS</p> <p>7.4.1. PACKAGE skid structure shall be designed to withstand the design conditions mentioned on item 4.4 and to ensure the lifting conditions on manufacturing site and shipyard. Lifting lugs shall be provided according to PACKAGER lifting procedure.</p> <p>7.4.2. Skid foundation structural steel components shall be designed and fabricated in accordance with AISC ASD.</p> <p>7.4.3. The Skid main frame shall be all welded construction. Structural skid welds, including lifting facilities shall be continuous and shall comply with AWS D1.1 (structural welding code) and CS Rules.</p> <p>7.4.4. Skid structure shall be designed to be welded to the supporting structure unless otherwise specified.</p>			

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 13 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL
			ESUP

7.4.5. Access ladders, platforms, gratings and any other access device shall comply with I-ET-3010.00-1352-130-P4X-001 - FLOOR GRATINGS, TRAY SYSTEMS AND GUARDRAILS MADE OF COMPOSITE MATERIALS. Metallic material is also acceptable and I-DE-3010.2E-1351-140-P4X-001 – HULL GENERAL NOTES AND TYPICAL DETAILS, item 3.23, shall be followed for metallic grating requirements.

7.4.6. PACKAGE skid layout and arrangement shall be designed to provide sufficient access to pumps, instruments, equipment, and control panels to ease the operability and maintenance with safe conditions. Instruments and valves shall be installed on a suitable height to allow safe access for monitoring, operation, and maintenance.

7.4.7. All necessary maintenance davits, monorails, padeyes or trolleys shall be provided to ensure the safe and easy maintenance conditions.

7.4.8. Drip trays with drain connections shall be provided underneath the PACKAGE Skid.

7.4.9. PACKAGE Equipment and components shall be located entirely within the skids / equipment base perimeter, including all equipment, piping, valves, electrical, instrumentation and controls.

7.5. NAMEPLATES AND TAG NUMBERING

7.5.1. PACKAGER / MANUFACTURER Equipment shall have nameplates in Brazilian Portuguese language, made of stainless steel AISI 316L, with 3 mm minimum thickness and fixed by stainless steel (AISI 316L) bolts or fasteners on visible and accessible location.

7.5.2. Tagging of all instruments, electrical, mechanical and piping items, including valves, shall be carried out as detailed on I-ET-3000.00-1200-940-P4X-001 – TAGGING PROCEDURE FOR PRODUCTION UNITS DESIGN


8. PACKAGE MANUFACTURING AND DELIVERY REQUIREMENTS

8.1. GENERAL

8.1.1. All materials and equipment supplied by PACKAGER / MANUFACTURER shall be brand new (not overhauled), field proven, free from defects and accepted by Owner and the Classification Society.

8.1.2. Materials and equipment shall be manufactured according to internationally recognized standards for the offshore oil drilling and production industries and shall be in conformance with the Basic Design and Agreement specifications and requirements.

8.1.3. Field proven definition: Systems and equipment shall demonstrate satisfactory operation at least in 3 floating offshore installation units, operating under process conditions (pressure, flow, capacity and similar fluids) for a minimum of 24,000

	TECHNICAL SPECIFICATION	Nr: I-ET-3010.2E-5125-540-P4X-001	REV. A
	-		SHEET: 14 of 14
	TITLE: CALORIFIER UNIT (Z-5125501)		INTERNAL

hours. For rotating equipment, they must demonstrate operation with fluid, flow and discharge pressure similar to the design. Unproven designs or prototypes (including components) without offshore service will not be accepted.

8.2. WELDING

8.2.1. PACKAGE equipment, structures and piping welding, welding inspection, non-destructive testing (NDT), bolted joints assembly and piping fabrication and commissioning activities shall be performed in compliance with the following technical specifications:

- a) I-ET-3010.00-1000-970-P4X-002 – Requirements for NDT.
- b) I-ET-3010.00-1000-955-P4X-002 – Requirements for Welding Inspection.
- c) I-ET-3010.00-1000-955-P4X-001 – Welding.
- d) I-ET-3010.00-1200-200-P4X-001 – Requirements for Bolted Joints Assembly and Management.
- e) I-ET-3010.00-1200-200-P4X-115 – Requirements for Piping Fabrication and Commissioning.

8.3. DOCUMENTATION

8.3.1. For the PACKAGE documentation and data-book requirements refer to EXHIBIT III – DIRECTIVES FOR ENGINEERING.

8.3.2. Additionally, for the PACKAGE documentation, data-book requirements refer to EXHIBIT V – DIRECTIVES FOR PROCUREMENT.

8.4. SPARE PARTS

8.4.1. For the PACKAGE, spare parts, special tools, CS required spare parts and spare parts list recommended for two (2) years of operation refer to EXHIBIT V – DIRECTIVES FOR PROCUREMENT.

8.5. INSPECTION AND TESTS

8.5.1. For PACKAGE inspection, tests, factory acceptance test (FAT) and inspection release certificate (IRC), refer to EXHIBIT V – DIRECTIVES FOR PROCUREMENT.

8.5.2. For PACKAGE inspection and test plan (ITP) requirements refer to EXHIBIT VII – DIRECTIVES FOR QUALITY ASSURANCE SYSTEM.

8.6. PRESERVATION, PACKING AND TRANSPORTATION

8.6.1. For PACKAGE preservation, packing and transportation requirements refer to EXHIBIT V – DIRECTIVES FOR PROCUREMENT.