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	JOB:	REFERENCE BASIC DESIGN	1001056398 0010
	AREA:	BÚZIOS	
DP&T-SRGE	TITLE: MATERIAL SPECIFICATION FOR PRESSURE VESSELS AND TANKS		NP-1 ESUP

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DATE	AUG/02/19								
DESIGN	ESUP								
EXECUTION	MMARROIG								
CHECK	PONTE								
APPROVAL	TMCAMPOS								

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1 SCOPE

This document covers the material specification for pressure vessels, filters, tanks and pig launchers/receivers to be supplied to **PETROBRAS** for **REFERENCE BASIC DESIGN** FPSO topside.

All calculations and mechanical datasheets shall be submitted to **PETROBRAS** approval by MANUFACTURER/PACKAGER.

2 NORMATIVE REFERENCES

Equipment design and fabrication shall comply with the requirements of this specification, data sheets, the rules, codes, standards and the project specifications as stated below and with those referred to herein.

2.1 CLASSIFICATION

2.1.1 PACKAGER/ MANUFACTURER shall perform the work in accordance with the requirements of Classification Society.

2.1.2 PACKAGER/ MANUFACTURER is responsible for submitting to the Classification Society all documentation in compliance with stated Rules.

2.2 CODES AND STANDARDS

2.2.1 The following codes and standards include provisions which, through reference in this text, constitute provisions of this specification. The latest issue of the references shall be used unless otherwise agreed. Other recognized standards may be used, provided it can be shown that they meet or exceed the requirements of the standards referenced below:

API Specification 12F	- Specification for Shop Welded Tanks for Storage of Production Liquids
API STD 2000	- Venting Atmospheric and Low-Pressure Storage Tanks
API STD 650	- Welded Steel Tanks for Oil Storage
API 6A	- Specification for Welhead and Tree Equipment
API RP 945	- Avoiding Environmental Cracking in Amine Units
ASME BPCV Code SEC II	- Material Specifications
ASME BPCV Code SEC V	- Non-Destructive Examination
ASME BPCV Code SEC VIII	- Rules for Construction of Pressure Vessels
ASME BPCV Code SEC IX	- Welding Brazing and Fusing Qualifications
ASME BPCV Code SEC X	- Fiber-Reinforced Plastic Pressure Vessels
ASME B16.11	- Forged Steel Fittings, Socket-Welding and Threaded
ASME B16.47	- Large Diameter Steel Flanges: NPS 26 Through NPS 60
ASME B16.5	- Pipe Flanges and Flanged Fittings
ASME B31.3	- Process Piping

ASME B31.4	- Pipeline Transportation System for Liquid and Slurries
ASME B31.8	- Gas Transmission and Distribution Piping
ASTM	- American Society for Testing and Materials
AWS D1.1	- Structural Welding Code
ISO 27509	- Petroleum and Natural Gas Industries – Compact Flanged with IX Seal Ring
ISO 15156	- Petroleum and Natural Gas Industries – Materials for use in H2S Containing Environments in Oil and Gas Production

2.3 GOVERNAMENTAL REGULATION

NR 13	- Caldeiras, Vasos de Pressão e Tubulações
NR 26	- Sinalização de Segurança (Safety Signaling - Brazilian Labor Ministry Rules)
NR 37	- Segurança e Saúde em Plataformas de Petróleo

*Note: Government codes, regulations, ordinances or rules applicable to the equipment in Brazil shall prevail over the requirements of this specification, including reference codes and standards, only if more stringent.

2.4 REFERENCE DOCUMENTS

DR-ENGP-M-I-1.3	- SAFETY GUIDELINE
DR-ENGP-I-1.15	- COLOR CODING
I-DE-3010.1M-XXXX-944-P4X-XXX	- *DESIGN P&IDs
I-DE-3010.1M-1200-942-P4X-002	- GENERAL ARRANGEMENT
I-ET-3000.00-1200-940-P4X-001	- TAGGING PROCEDURE FOR PRODUCTION UNITS DESIGN.
I-ET-3010.00-1200-251-P4X-001	- BOLT MATERIALS
I-ET-3010.00-1200-431-P4X-001	- THERMAL INSULATION FOR MARITIME INSTALLATIONS
I-ET-3010.00-1200-540-P4X-001	- REQUIREMENTS FOR PRESSURE VESSELS DESIGN
I-ET-3010.00-1200-540-P4X-002	- REQUIREMENTS FOR PRESSURE VESSELS FABRICATION
I-ET-3010.00-1200-955-P4X-001	- WELDING
I-ET-3010.00-1200-955-P4X-002	- REQUIREMENTS FOR WELDING INSPECTION
I-ET-3010.00-1200-956-P4X-002	- GENERAL PAINTING
I-ET-3010.00-1200-956-P4X-003	- THERMAL SPRAY COATING APPLICATION OF ALUMINUM
I-ET-3010.00-5267-750-P4X-002	- TECHNICAL SPECIFICATION FOR GALVANIC ANODES
I-ET-3010.1M-1200-200-P4X-001	- PIPING SPECIFICATION FOR TOPSIDE
I-FD-3010.1M-XXXX-XXX-XXX	- *DESIGN DATASHEET

*The specific document (Design P&IDs and Datasheets) are detailed in each equipment table.


2.5 CONFLICTING REQUIREMENTS

- 2.5.1 In case of conflicting information between this technical Specification (ET) and the referred applicable standards, this ET shall prevail.
- 2.5.2 In case of conflicting information between this Specification (ET) and other specific **PETROBRAS'** document (data sheet) the specific **PETROBRAS'** document shall prevail.
- 2.5.3 In all cases of conflict between this specification and applicable documents listed herein, the more stringent requirements shall prevail. In such cases, PACKAGER/MANUFACTURER shall inform **PETROBRAS** of the conflict and seek clarification.

3 DEFINITIONS AND ABBREVIATIONS

3.1 DEFINITIONS

- 3.1.1 **MAY:** May indicates a course of action that is permissible within the limits of the standard (a permission).
- 3.1.2 **SHALL:** Shall is an absolute requirement which must be followed strictly in order to conform with the standard.
- 3.1.3 **SHOULD:** Should is a recommendation. Alternative solutions having the same functionality and quality are acceptable.
- 3.1.4 **PACKAGER:** Company responsible for the project, assembly, construction, fabrication, test and furnishing of the Package.
- 3.1.5 **MANUFACTURER:** The supplier, vendor or Contractor. Company responsible for the fabrication of equipment or components internal to the Package.
- 3.1.6 **PURCHASER:** The Company designated as such in the contract or in the purchase order.
- 3.1.7 **PACKAGE UNIT or PACKAGE:** An assembly of equipment supplied interconnected, tested and operating, requiring only the available utilities from the FPSO for full operation.
- 3.1.8 **CLASS I PARTS:** Parts of the pressure wall of the vessel in contact with the process fluid (e.g.: shells, heads, nozzle necks, flanges, blind flanges and others) and other pressure parts in contact with the process fluid (e.g.: tubesheets). This class also includes internal parts welded to vessels and subject to primary stress (e.g.: rings, plates and other elements for supporting trays, gratings, internal heads and others). This class also includes reinforcements (any type) of openings on the vessel pressure wall.
- 3.1.9 **CLASS II PARTS:** Parts of the vessel pressure wall not in contact with the process fluid such as external reinforcements, vacuum reinforcements and others, except reinforcements of openings (included in Class I).
- 3.1.10 **CLASS III PARTS:** Internal parts welded to the vessel but not subject to primary stress (e.g.: baffles, vortex breakers, weir plates and others). External parts welded to the vessel subject to stress during operation, such as any type of support (e.g.: skirts, columns, saddles etc.), supporting elements for ladders, platforms, external piping and others. For supports, this class only includes the parts of supports directly welded to the vessel or very close to it.

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Note: The supports shall have a section 1000 mm long from the attachment to the vessel, with the same shell material in the following cases:

- design temperature lower than or equal to 15 °C;
- design temperature over 340 °C;
- service with hydrogen;
- vessels made of alloy steel, stainless steels and nonferrous materials.

3.1.11 CLASS IV PARTS: Internal removable parts (not welded to the vessel), such as trays, bubble caps, gratings, supporting beams, distributors, tube bundles and others.

3.1.12 CLASS V PARTS: Parts of supports of any type not included in Classes III and IV. For all parts of this class, the design temperature is always the ambient temperature.

3.1.13 CLASS VI PARTS: External parts welded directly to the vessel but subject to loads only during assembly, maintenance, disassembly and others, such as lifting eyes, davits and others. For all parts of this class, the design temperature is always the ambient temperature.

3.2 ABBREVIATIONS

API - American Petroleum Institute

ASME - American Society of Mechanical Engineers

ASTM - American Society for Testing and Materials

AWS - American Welding Society

CRA - Corrosion Resistant Alloy

FPSO - Floating Production Storage and Offloading

GRP - Glass – Reinforced plastic

NDE: - Non-Destructive Examination

P&ID: - Piping & Instrumentation Diagram

TSA - Thermal Spray Aluminum

4 GENERAL REQUIREMENTS

4.1 DESIGN

4.1.1 PACKAGER/ MANUFACTURER shall design and fabricate the equipment for a minimum lifetime of 25 years.

4.1.1.1 The PACKAGER is responsible detailing the materials selection in accordance with this specification. In all cases, PACKAGER/MANUFACTURER shall submit the detailed material list, including all equipment and their components, for **PETROBRAS** approval prior manufacture activities.

4.2 FLANGES AND GASKETS

- 4.2.1 Flanges materials shall be compatible with the shell and heads materials (Class I Parts), except where explicit mentioned in this document.
- 4.2.1.1 Flange materials is specified due to low temperature requirement at flange (-80°C). At this case, the use of clad or weld overlaid is only possible if base material have the required impact proprieties.

4.2.2 The type of nozzles flanges and flanges gaskets shall be compatible with the connected piping flange (shown in P&ID and defined in I-ET-3010.1M-1200-200-P4X-001 – PIPING SPECIFICATION FOR TOPSIDE). Different types of flanges and gaskets might be acceptable in the following cases:

- a) If the pressure rating of the nozzle flange is higher than the pressure rating of the pipe flange.
- b) For CLADED/COATED piping specification.
- c) If flange manufacture is unfeasible;

In all cases of conflict the PACKAGER/ MANUFACTURER shall inform **PETROBRAS** of the conflict and seek clarification.

4.3 BOLTS AND NUTS

- 4.3.1 Studs, bolts, tightening bolts and nuts shall be according I-ET-3010.00-1200-251-P4X-001 – BOLT MATERIALS
- 4.3.2 The material for internal bolts shall have the same corrosion resistance of Class IV Parts (removable internals).

4.4 COATING AND INSULATION REQUIREMENTS

- 4.4.1 Equipment subjected to temperature of 60°C and above shall receive a personal protection system, by means of 316SS wire mesh / perforated plates. Alternatively, a thermally insulated may be applied. Equipment in which heat conservation is necessary shall be thermal insulated. The thermal insulation shall be according latest revision of I-ET-3010.00-1200-431-P4X-001 – THERMAL INSULATION FOR MARITIME INSTALLATIONS
- 4.4.2 Painting requirements shall be according I-ET-3010.00-1200-956-P4X-002 -GENERAL PAINTING
- 4.4.3 Color code adopted shall be in accordance with DR-ENGP-I-1.15 – COLOR CODING.

4.5 NON-METALIC TANKS

- 4.5.1 GRP tanks shall be filament wound or contact molded conforming ASTM D-3299 specifications.

5 PIG LAUNCHERS/RECEIVERS

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

5.1 PIG RECEIVERS

5.1.1 WAG INJECTION AND PRODUCTION PIG RECEIVER SATELLITE WELL PIG RECEIVER (RP-1210001)

RP-1210001 - MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS32750
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS32750
Welded attachments (Class III Parts):	- externals: UNS32750
	- internals: UNS32750
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	UNS32750
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-DE-3010.1M-1210-944-P4X-016

5.1.2 WAG INJECTION WELL PIG RECEIVER (RP-1210002)

RP-1210002 - MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS32750
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS32750
Welded attachments (Class III Parts):	- externals: UNS32750
	- internals: UNS32750
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	UNS32750
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-DE-3010.1M-1210-944-P4X-016

5.1.3 SATELLITE PRODUCTION WELL PIG RECEIVER (RP-1210003 A/B)

RP-1210003 A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS32750
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS32750
Welded attachments (Class III Parts):	- externals: UNS32750
	- internals: UNS32750
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	SSDS
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-DE-3010.1M-1210-944-P4X-017

5.2 PIG LAUNCHERS

5.2.1 LIFT GAS PIG LAUNCHER (LP-1244001 A/S)

LP-1244001 A/S - MATERIAL DATA		
	OPTION 1	OPTION 2
Shell and Heads (Class I Parts):	Low Alloy Carbon Steel	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable	
corrosion allowance:	5.00 mm	Not applicable
Nozzles reinforcements (Class II Parts):	Low Alloy Carbon Steel	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: Low Alloy Carbon Steel	SS 316L (UNS S31603)
	- internals: Low Alloy Carbon Steel	SS 316L (UNS S31603)
Removable internals (Class IV Parts):	Not applicable	
Support (Class V Parts):	Low Alloy Carbon Steel	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service Low Temperature (-80°C)	
Reference Documents	I-DE-3010.1M-1244-944-P4X-001/009	

5.2.2 LIFT GAS PIG LAUNCHER (LP-1244002)

LP-1244002 - MATERIAL DATA		
	OPTION 1	OPTION 2
Shell and Heads (Class I Parts):	Low Alloy Carbon Steel	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable	
corrosion allowance:	5.00 mm	Not applicable
Nozzles reinforcements (Class II Parts):	Low Alloy Carbon Steel	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: Low Alloy Carbon Steel	SS 316L (UNS S31603)
	- internals: Low Alloy Carbon Steel	SS 316L (UNS S31603)
Removable internals (Class IV Parts):	Not applicable	
Support (Class V Parts):	Low Alloy Carbon Steel	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service Low Temperature (-80°C)	
Reference Documents	I-DE-3010.1M-1244-944-P4X-010	

5.3 PIG LAUNCHER&RECEIVER

5.3.1 GAS PIPELINE PIG LAUNCHER/RECEIVER (LR-1231001)

LR-1231001- MATERIAL DATA	
Shell and Heads (Class I Parts):	Low Temperature Carbon Steel
Internal Coating/ Cladding	Not applicable
corrosion allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	Low Temperature Carbon Steel
Welded attachments (Class III Parts):	- externals: Low Temperature Carbon Steel
	- internals: Low Temperature Carbon Steel
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	Low Temperature Carbon Steel
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-DE-3010.1M-1231-944-P4X-011

5.3.2 Gas Pipeline Pig Launcher/Receiver LR-1231002

LR-1231002 - MATERIAL DATA	
Shell and Heads (Class I Parts):	Low Temperature Carbon Steel
Internal Coating/ Cladding	Not applicable
corrosion allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	Low Temperature Carbon Steel
Welded attachments (Class III Parts):	- externals: Low Temperature Carbon Steel
	- internals: Low Temperature Carbon Steel
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	Low Temperature Carbon Steel
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-DE-3010.1M-1231-944-P4X-011

6 OIL COLLECTIONG AND SEPARATING MATERIAL SPECIFICATION (U-1223)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

6.1 PRESSURE VESSELS

6.1.1 FREE WATER SEPARATOR (SG-1223001)

SG-1223001 - MATERIAL DATA		
	OPTION 1	OPTION 2
Shell and Heads (Class I Parts):	UNS32750	SA 516 Gr.70
Internal Coating/ Cladding	Not applicable	3mm clad UNS N06625
corrosion allowance:	Not applicable	
Nozzles reinforcements (Class II Parts):	UNS32750	SA 516 Gr. 70
Welded attachments (Class III Parts):	- externals: UNS32750	- externals: SA 516 Gr. 70
	- internals: UNS32750	- internals: UNS N06625
Removable internals (Class IV Parts):	UNS S32750	UNS N06625
Support (Class V Parts):	UNS32750	SA-36 or SA 516 Gr. 70
Special Service	ISO151565 H ₂ S Service	
Reference Documents	I-FD-3010.1M-1223-562-P4X-001 I-DE-3010.1M-1223-944-P4X-002	

6.1.2 TEST SEPARATOR (SG-1223002)

SG-1223002 - MATERIAL DATA		
	OPTION 1	OPTION 2
Shell and Heads (Class I Parts):	UNS32750	SA 516 Gr. 70
Internal Coating/ Cladding	Not applicable	3mm clad UNS N06625
corrosion allowance:	Not applicable	
Nozzles reinforcements (Class II Parts):	UNS32750	SA 516 Gr. 70
Welded attachments (Class III Parts):	- externals: UNS32750	- externals: SA 516 Gr. 70
	- internals: UNS32750	- internals: UNS N06625
Removable internals (Class IV Parts):	UNS S32750	UNS N06625
Support (Class V Parts):	UNS32750	SA 516 Gr. 70
Special Service	ISO151565 H ₂ S Service	
Reference Documents	I-FD-3010.1M-1223-562-P4X-004 I-DE-3010.1M-1223-944-P4X-009	

6.1.3 Pre-Oil Dehydrator TO-1223001

TO-1223001- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr. 70
Internal Coating/ Cladding	UNS N06625 (3mm)
Corrosion Allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: SA 516 Gr. 70
	- internals: UNS N06625
Removable internals (Class IV Parts):	UNS N06625
Support(Class V Parts):	SA-36 or SA 516 Gr. 70
Special Service	ISO151565 H ₂ S Service.
Reference Documents	I-FD-3010.1M-1223-562-P4X-002 I-DE-3010.1M-1223-944-P4X-005

6.1.4 Oil Dehydrator TO-1223002

TO-1223002- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: SA 516 Gr. 70
	- internals: SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals (Class IV Parts):	SS 316.
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-1223-562-P4X-003 I-DE-3010.1M-1223-944-P4X-006

Note

(1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002.

(2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (5% of internal coating damage)

6.1.5 Pre-Oil Dehydrator Degasser V-TO-1223001

V-TO-1223001 - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr. 70
Internal Coating/ Cladding	UNS N06625
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments (Class III Parts):	- externals: SA 516 Gr. 70
	- internals: UNS N06625
Removable internals (Class IV Parts):	UNS N06625
Support (Class V Parts):	SA-36 or SA 516 Gr. 70
Special Service	ISO151565 H ₂ S Service.
Reference Documents	I-FD-3010.1M-1223-540-P4X-001
	I-DE-3010.1M-1223-944-P4X-005

6.1.6 Oil Dehydrator Degasser V-TO-1223002

V-TO-1223002 - MATERIAL DATA		
	OPTION 1	OPTION 2
Shell and Heads (Class I Parts):	UNS32750	SA 516 Gr. 70
Internal Coating/ Cladding	Not applicable	3mm clad UNS N06625
corrosion allowance:	Not applicable	
Nozzles reinforcements (Class II Parts):	UNS32750	SA 516 Gr. 70
Welded attachments (Class III Parts):	- externals: UNS32750	- externals: SA 516 Gr. 70
	- internals: UNS32750	- internals: UNS N06625
Removable internals (Class IV Parts):	UNS S32750	UNS N06625
Support (Class V Parts):	UNS32750	SA-36 or SA 516 Gr. 70
Special Service	ISO151565 H ₂ S Service	
Reference Documents	I-FD-3010.1M-1223-540-P4X-002	
	I-DE-3010.1M-1223-944-P4X-006	

7 VAPOR RECOVERY UNIT MATERIAL SPECIFICATION (U-1225)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

7.1 PRESSURE VESSELS

7.1.1 VRU K.O. DRUM (V-1225001)

V-1225001 - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA-516 Gr70
Internal Coating/ Cladding	UNS N06625
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SA-516 Gr70
Welded attachments (Class III Parts):	- externals: SA-516 Gr70
	- internals: UNS N06625
Removable internals (Class IV Parts):	UNS N06625
Support (Class V Parts):	SA-36 or SA-516 Gr 70
Special Service	ISO151565 H ₂ S Service. Low temperature (-80°C)
Reference Documents	I-FD-3010.1M-1225-540-P4X-001
	I-DE-3010.1M-1225-944-P4X-001

7.1.2 VRU 1ST STAGE SCRUBBER (V-UC-1225001A/B-01)

V-UC-1225001A/B-01- MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603),
	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service.
Reference Documents	I-FD-3010.1M-1225-540-P4X-002
	I-DE-3010.1M-1225-944-P4X-002/ I-DE-3010.1M-1225-944-P4X-003

7.1.3 VRU 2ST STAGE SCRUBBER (V-UC-1225001A/B-02)

V-UC-1225001A/B-02- MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SS SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603),
	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service.
Reference Documents	I-FD-3010.1M-1225-540-P4X-002
	I-DE-3010.1M-1225-944-P4X-004/ I-DE-3010.1M-1225-944-P4X-005

8 MAIN GAS COMPRESSOR UNIT MATERIALS SPECIFICATION (U-1231)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

8.1 PRESSURE VESSELS

8.1.1 SAFETY GAS K.O. DRUM (V-1231001)

V-1231001- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA-516 Gr 70
Internal Coating/ Cladding	UNS N06625
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SA-516 Gr 70N
Welded attachments (Class III Parts):	- externals: SA-516 Gr70
	- internals: UNS N06625
Removable internals (Class IV Parts):	UNS N06625
Support (Class V Parts):	SA-36 or SA-516 Gr70
Special Service	ISO151565 H ₂ S Service.
Reference Document	I-FD-3010.1M-1231-540-P4X-001
	I-DE-3010.1M-1231-944-P4X-001

8.1.2 MAIN GAS COMPRESSION - SUCTION SCRUBBER (V-UC-1231001A/C-01)

V-UC-1231001A/C-01 MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603),
	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service.
Reference Documents	I-FD-3010.1M-1231-540-P4X-002
	I-DE-3010.1M-1231-944-P4X-002
	I-DE-3010.1M-1231-944-P4X-003
	I-DE-3010.1M-1231-944-P4X-004

8.1.3 MAIN GAS COMPRESSION - DISCHARGE SCRUBBER (V-UC-1231001A/C-02)

V-UC-1231001A/C-02- MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	<i>ISO151565 H₂S Service. Low temperature requirement at flange (-80°C)</i>
Reference Documents	I-FD-3010.1M-1231-540-P4X-002 I-DE-3010.1M-1231-944-P4X-002 I-DE-3010.1M-1231-944-P4X-003 I-DE-3010.1M-1231-944-P4X-004
(1) Not acceptable cladded / weld overlaid flanges.	

9 GAS DEHYDRATION SYSTEM MATERIAL SPECIFICATION (U-1233)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

9.1 PRESSURE VESSELS
9.1.1 TEG INLET GAS COOLER (V-1233001)

V-1233001- MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	<i>ISO151565 H₂S Service. Low temperature requirement at flange (-80°C)</i>
Reference Documents	I-FD-3010.1M-1233-540-P4X-001 I-DE-3010.1M-1233-944-P4X-001
(1) Not acceptable cladded / weld overlaid flanges.	

9.1.2 GAS DEHYDRATION UNIT (T-1233001 & V-T-1233001)

T-1233001 e V-T-1233001- MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	<i>ISO151565 H₂S Service. Low temperature requirement at flange (-80°C)</i>
Reference Documents	I-FD-3010.1M-1233-550-P4X-001 I-DE-3010.1M-1233-944-P4X-003
(1) Not acceptable cladded / weld overlaid flanges.	

9.2 FILTERS

9.2.1 TEG INLET COALESCER FILTER (FT-1233001 A/B)

FT-1233001 A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	<i>ISO151565 H₂S Service. Low temperature requirement at flange (-80°C)</i>
Reference Documents	I-FD-3010.1M-1233-561-P4X-001 I-DE-3010.1M-1233-944-P4X-002
(1) Not acceptable cladded / weld overlaid flanges.	

9.2.2 TEG OUTLET COALESCER FILTER (FT-1233002 A/B)

FT-1233002 A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	<i>ISO151565 H₂S Service.</i> <i>Low temperature requirement at flange (-80°C)</i>
Reference Documents	I-FD-3010.1M-1233-561-P4X-002 I-DE-3010.1M-1233-944-P4X-004
(1) Not acceptable cladded / weld overlaid flanges.	

10 DEW POINT CONTROL UNIT MATERIAL SPECIFICATION (U-1238)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

10.1 PRESSURE VESSELS

10.1.1 HYDROCARBON DEW POINT CONTROL SYSTEM COLD SEPARATOR (V-1238001)

FT-1233002 A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	<i>ISO151565 H₂S Service.</i> <i>Low temperature requirement at flange (-80°C)</i>
Reference Documents	I-FD-3010.1M-1233-561-P4X-002 I-DE-3010.1M-1238-944-P4X-001
(1) Not acceptable cladded / weld overlaid flanges.	

10.2 FILTERS

10.2.1 HYDROCARBON DEW POINT CONTROL SYSTEM COALESCER FILTER (FT-1238001A/B)

FT-1233002 A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603),
	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service. Low temperature requirement at flange (-80°C)
Reference Documents	I-FD-3010.1M-1233-561-P4X-002 I-DE-3010.1M-1238-944-P4X-001
(1) Not acceptable cladded / weld overlaid flanges.	

11 AMINE UNIT MATERIAL SPECIFICATION (U-1234)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

11.1 PRESSURE VESSELS

11.1.1 AMINE INLET GAS K.O. DRUM (V-1234001)

V-1234001- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr70
Internal Coating/ Cladding	Not applicable
corrosion allowance:	3mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr70
Welded attachments (Class III Parts):	- externals: SA 516 Gr70
	- internals SA 516 Gr70
Removable internals (Class IV Parts):	SA 516 Gr70
Support (Class V Parts):	SA-36 or SA 516 Gr70
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-FD-3010.1M-1234-540-P4X-001 I-DE-3010.1M-1234-944-P4X-001

11.1.2 AMINE CONTRACTOR (T-1234001 A/B)

T-1234001 A/B- MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS S31803
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS S31803
Welded attachments (Class III Parts):	- externals: UNS S31803
	- internals: UNS S31803
Removable internals (Class IV Parts):	SS 316L (UNS S31603)
Support (Class V Parts):	UNS S31803
Special Service	ISO151565 H ₂ S Service Amine API RP 945
Reference Documents	I-FD-3010.1M-1234-550-P4X-001 I-DE-3010.1M-1234-944-P4X-002 / I-DE-3010.1M-1234-944-P4X-003

11.2 FILTERS

11.2.1 SOUR GAS COALESCER FILTER (FT-1234001A/B)

SOUR GAS COALESCER FILTER - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr70
Internal Coating/ Cladding	Not applicable
corrosion allowance:	3mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr70
Welded attachments (Class III Parts):	- externals: SA 516 Gr70
	- internals: SA 516 Gr70
Removable internals (Class IV Parts):	SS 316L (UNS S31603)
Support (Class V Parts):	SA-36 or SA 516 Gr70
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-FD-3010.1M-1234-561-P4X-001 I-DE-3010.1M-1234-944-P4X-001

12 EXPORTATION GAS DEHYDRATION SYSTEM MATERIAL SPECIFICATION (U-1233)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

12.1 PRESSURE VESSELS

12.1.1 MOLECULAR SIEVE INLET GAS K.O. DRUM (V-1233002)

V-1233002- MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-FD-3010.1M-1233-540-P4X-002 I-DE-3010.1M-1233-944-P4X-005

12.1.2 REGENERATION GAS SEPARATOR (V-1233003)

V-1233003- MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-FD-3010.1M-1233-540-P4X-003 I-DE-3010.1M-1233-944-P4X-007

12.2 FILTERS

12.2.1 MOLECULAR SIEVE GAS COALESCER FILTER (FT-1233003 A/B)

FT-1233003 A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603) - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316.
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-FD-3010.1M-1233-561-P4X-003 I-DE-3010.1M-1233-944-P4X-005

12.2.2 MOLECULAR SIEVE PARTICULATE FILTER (FT-1233004 A/B)

FT-1233004 A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr 70
Internal Coating/ Cladding	Not applicable
corrosion allowance:	5.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr 70
Welded attachments (Class III Parts):	- externals: SA 516 Gr 70 - internals: SA 516 Gr 70
Removable internals (Class IV Parts):	SS 316.
Support (Class V Parts):	SA-36 or SA 516 Gr 70
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-FD-3010.1M-1233-561-P4X-004 I-DE-3010.1M-1233-944-P4X-006

13 GAS EXPORTATION COMPRESSOR UNIT MATERIAL SPECIFICATION (U-1231)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

13.1.1 E.G. COMPRESSION STAGE SUCTION SCRUBBER (V-UC-1231002A/C-01 & V-UC-1231002A/C-02)

V-UC-1231002A/C-01 e V-UC-1231002A/C-02-- MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	<i>ISO151565 H₂S Service. Low temperature requirement at flange (-80°C)</i>
Reference Documents	I-FD-3010.1M-1231-540-P4X-003 I-DE-3010.1M-1231-944-P4X-005 /010
(1) Dual certificate 316/316L material may be accepted. (2) Not acceptable cladded / weld overlaid flanges.	

14 CO₂ COMPRESSION UNIT MATERIALS SELECTION (U-1254)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

14.1 PRESSURE VESSELS

14.1.1 CO₂ COMPRESSION -1ST STAGE SUCTION SCRUBBER (V-UC-1254001 A/B-01)

V-UC-1254001 A/B-01 - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr. 70
Internal Coating/ Cladding	not applicable
corrosion allowance:	5mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments (Class III Parts):	- externals: SA 516 Gr. 70 - internals: SA 516 Gr. 70
Removable internals (Class IV Parts):	SS316
Support (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	ISO151565 H ₂ S Service
Reference Documents	I-FD-3010.1M-1254-540-P4X-001 I-DE-3010.1M-1254-944-P4X-001 I-DE-3010.1M-1254-944-P4X-002

TECHNICAL SPECIFICATION	Nº. I-ET-3010.1M-1200-500-P4X-001	REV: 0
AREA:	BÚZIOS	SHEET: 23 of 36
TITLE:	MATERIAL SPECIFICATION FOR PRESSURE VESSELS AND TANKS	NP-1
		ESUP

14.1.2 CO₂ COMPRESSION -2ND STAGE SUCTION SCRUBBER (V-UC-1254001 A/B-02)

V-UC-1254001 A/B-02 - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr. 70
Internal Coating/ Cladding	not applicable
corrosion allowance:	5mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments (Class III Parts):	- externals: SA 516 Gr. 70 - internals: SA 516 Gr. 70
Removable internals (Class IV Parts):	SS316
Support (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	ISO151565 H2S Service
Reference Documents	I-FD-3010.1M-1254-540-P4X-001 I-DE-3010.1M-1254-944-P4X-003 I-DE-3010.1M-1254-944-P4X-004

14.1.3 CO₂ COMPRESSION -3RD STAGE SUCTION SCRUBBER (V-UC-1254001 A/B-03)

V-UC-1254001 A/B-03-- MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603) ¹
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	ISO151565 H ₂ S Service. Low temperature requirement at flange (-80°C)
Reference Documents	I-FD-3010.1M-1254-540-P4X-001 I-DE-3010.1M-1254-944-P4X-005 I-DE-3010.1M-1254-944-P4X-006
(1) Dual certificate 316/316L material may be accepted.	
(2) Not acceptable clad / weld overlaid flanges.	

14.1.4 CO₂ COMPRESSION -4TH STAGE SUCTION SCRUBBER (V-UC-1254001 A/B-04)
V-UC-1254001 A/B-04-- MATERIAL DATA

Shell and Heads (Class I Parts):	SS 316L (UNS S31603) ¹
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Flanges	SS 316L (UNS S31603)
Nozzles reinforcements (Class II Parts):	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603), - internals: SS S316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SS 316L (UNS S31603)
Special Service	<i>ISO151565 H₂S Service. Low temperature requirement at flange (-80°C)²</i>
Reference Documents	I-FD-3010.1M-1254-540-P4X-001 I-DE-3010.1M-1254-944-P4X-007 I-DE-3010.1M-1254-944-P4X-008

(1) Dual certificate 316/316L material may be accepted.

(2) Not acceptable cladded / weld overlaid flanges. In case of flange type: API 6A BX or ISO 27509 compact flanges, the requirement of Low temperature requirement at flange (-80°C), may be waived, being acceptable the used of weld overlay/clad.

15 INJECTION GAS COMPRESSION UNIT MATERIALS SELECTION (U-1252)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

15.1 PRESSURE VESSELS
15.1.1 INJECTION GAS COMPRESSION UNIT VESSELS (V-UC-1252001A/B)
V-UC-1252001 A/B-01 - MATERIAL DATA

Shell and Heads (Class I Parts):	Low Alloy Carbon Steel (3,5Ni)
Internal Coating/ Cladding	3.00 mm clad SS 316L (UNS S31603)
Corrosion Allowance:	Not applicable
Flanges	Flange type according spec J12 of I-ET-3010.1M-1200-200-P4X-001 Flange Material Low Alloy Carbon Steel (3,5Ni) cladded (316L)
Nozzles reinforcements (Class II Parts):	Low Alloy Carbon Steel (3,5Ni)
Welded attachments (Class III Parts):	- externals: Low Alloy Carbon Steel (3,5Ni) - internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316L (UNS S31603)
Support (Class V Parts):	Low Alloy Carbon Steel (3,5Ni)
Special Service	ISO151565 H ₂ S Service.
Reference Documents	I-FD-3010.1M-1252-540-P4X-001 I-DE-3010.1M-1252-944-P4X-001 I-DE-3010.1M-1252-944-P4X-002

16 FUEL GAS UNIT MATERIALS SELECTION (U-5135)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

16.1 PRESSURE VESSELS

16.1.1 FUEL GAS K.O. DRUM (V-5315001)

V-5315001- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr. 70
Internal Coating/ Cladding	not applicable
corrosion allowance:	3.00 mm
Nozzles reinforcements(Class II Parts):	SA 516 Gr. 70
Welded attachments (Class III Parts):	- externals: SA 516 Gr. 70
	- internals: SS 316
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	N/A
Reference Documents	I-FD-3010.1M-5135-540-P4X-001
	I-DE-3010.1M-5135-944-P4X-002

16.2 FILTERS

16.2.1 MAIN GENERATOR FUEL GAS FILTER (FT-5135001A/D)

FT-5135001A/D - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr. 70
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	3 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: SA 516 Gr. 70
	- internals: SA 516 Gr. 70
Removable internals(Class IV Parts):	SS316
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-5135-561-P4X-001
	I-DE-3010.1M-5147-944-P4X-001
	I-DE-3010.1M-5147-944-P4X-002

17 PRODUCED WATER UNIT MATERIAL SPECIFICATION (U-5331)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

17.1 PRESSURE VESSELS

17.1.1 PRODUCED WATER FLASH DRUM (V-5331001)

V-5331001- MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS S32750
Internal Coating/ Cladding	Not applicable
Corrosion Allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS S32750
Welded attachments(Class III Parts):	externals: UNS S32750
	- internals: UNS S32750
Removable internals(Class IV Parts):	UNS S32750
Support(Class V Parts):	UNS S32750
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-5331-540-P4X-001
	I-DE-3010.1M-5331-944-P4X-001

18 SEA WATER LIFT UNIT MATERIAL SPECIFICATION (U-5111)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

18.1 FILTERS

18.1.1 SEA WATER FILTERS (FT-5111001A/C)

FT-5111001A/C- MATERIAL DATA	
Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70
	- internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	Superduplex UNS S32760/32750
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-5111-561-P4X-001
	I-DE-3010.1M-5111-944-P4X-002
Note (1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002. (2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)	

18.1.2 START-UP SEA SEAWATER LIFT PUMP FILTER (FT-511102)

FT-511102- MATERIAL DATA	
Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70
	- internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	Superduplex UNS S32760/32750
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-5111-561-P4X-002 I-DE-3010.1M-5111-944-P4X-002

Note

(1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002.

(2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)

18.1.3 INJECTION SEA WATER FILTER (FT-511103 A/B)

FT-511103 A/B- MATERIAL DATA	
Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70
	- internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	Superduplex UNS S32760/32750
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-5111-561-P4X-002 I-DE-3010.1M-5111-944-P4X-002

Note

(1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002.

(2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)

19 INJECTION WATER UNIT MATERIAL SPECIFICATION (U-1251)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

19.1 FILTERS

19.1.1 INJECTION WATER COARSE FILTER (FT-1251001A/C)

FT-1251001A/C - MATERIAL DATA	
Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70
	- internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	Superduplex UNS S32760/32750
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-1251-561-P4X-001
	I-DE-3010.1M-1251-944-P4X-001
Note (1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002. (2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)	

20 COOLING WATER SYSTEM MATERIAL SPECIFICATION (U-5124)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

20.1 PRESSURE VESSELS

20.1.1 COOLING WATER EXPANSION VESSEL - CLASSIFIED AREA (V-5124001)

V-5124001- MATERIAL DATA	
Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70
	- internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	SS 316L
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-5124-540-P4X-003
	I-DE-3010.1M-5124-944-P4X-001
Note (1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002. (2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)	

20.1.2 COOLING WATER CHEMICAL INJECTION - CLASSIFIED AREA (V-5124002)

V-5124002- MATERIAL DATA	
Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70 - internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	SS 316L
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-5124-540-P4X-001 I-DE-3010.1M-5124-944-P4X-001
Note (1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002. (2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)	

20.1.3 COOLING WATER CHEMICAL INJECTION – NON-CLASSIFIED AREA (V-5124003)

V-5124003- MATERIAL DATA	
Shell and Heads (Class I Parts):	GRP
Internal Coating/ Cladding	Liner Bisphenol ¹
Corrosion Allowance:	Not aplicable
Nozzles reinforcements (Class II Parts):	GRP
Welded attachments(Class III Parts):	- externals: GRP - internals: GRP
Removable internals(Class IV Parts):	GRP
Support(Class V Parts):	GRP
Special Service	Not aplicable
Reference Documents	I-FD-3010.1M-5124-540-P4X-002 I-DE-3010.1M-5124-944-P4X-002
¹ Reference. PACKAGER/MANUFACTURER is responsible for the selection of suitable material for fluid and operational conditions	

20.2 TANKS
20.2.1 COOLING WATER EXPANSION TANK (TQ-5124001)

TQ-5124001- MATERIAL DATA	
Materials:	GRP
Flanges:	GRP
Internal Coating	Liner Bisphenol ¹
corrosion allowance:	not applicable
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-5124-511-P4X-001 I-DE-3010.1M-5124-944-P4X-002
¹ Reference. PACKAGER/MANUFACTURER is responsible for the selection of suitable material for fluid and operational conditions	

20.3 FILTERS

20.3.1 COOLING WATER FILTER (FT-5124001)

FT-5124001- MATERIAL DATA	
Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70
	- internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	SS 316L
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not applicable
Reference Documents	I-FD-3010.1M-5124-561-P4X-001 I-DE-3010.1M-5124-944-P4X-001
Note (1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002. (2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)	

21 HOT WATER UNIT MATERIAL SPECIFICATION (U-5125)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

21.1 PRESSURE VESSELS

21.1.1 HOT WATER EXPANSION VESSEL (V-5125001)

V-5125001- MATERIAL DATA	
Shell and Heads ⁽¹⁾ (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	TSA ¹
corrosion allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70N
Welded attachments (Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70
	- internals: Carbon Steel, SA 516 Gr. 70
Removable internals (Class IV Parts):	SS 316L
Support (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5125-540-P4X-001 I-DE-3010.1M-5125-944-P4X-001
Note: (1): Internal TSA Coating according I-ET-3010.00-1200-956-P4X-003	

21.1.2 HOT WATER CHEMICAL INJECTION VESSEL (V-5125002)

V-5125002- MATERIAL DATA	
Shell and Heads ⁽¹⁾ (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	TSA ¹
corrosion allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70N
Welded attachments (Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70 - internals: Carbon Steel, SA 516 Gr. 70
Removable internals (Class IV Parts):	SS 316L
Support (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5125-540-P4X-002 I-DE-3010.1M-5125-944-P4X-001
Note: (1): Internal TSA Coating according I-ET-3010.00-1200-956-P4X-003	

21.1.3 UTILITY HEATING CHEMICAL INJECTION VESSEL (V-5125003)

V-5125003- MATERIAL DATA	
Shell and Heads ⁽¹⁾ (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ¹
corrosion allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments (Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70 - internals: Carbon Steel, SA 516 Gr. 70
Removable internals (Class IV Parts):	Carbon Steel, SA 516 Gr. 70
Support (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5125-540-P4X-003 I-DE-3010.1M-5125-944-P4X-006
Note: (1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002.	

21.2 TANKS
21.2.1 UTILITY HEATING WATER EXPANSION TANK (TQ-5125001)

TQ-5125001- MATERIAL DATA	
Materials:	GRP
Flanges:	GRP
Internal Coating	Liner Derakane 411-350 ¹
corrosion allowance:	Not Applicable
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5125-511-P4X-001 I-DE-3010.1M-5125-944-P4X-006
¹ Reference. PACKAGER/MANUFACTURER is responsible for the selection of suitable material for fluid and operational conditions	

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22 FRESH WATER UNIT MATERIAL SPECIFICATION (U-5115)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

22.1 TANKS

22.1.1 DILUTION WATER STORAGE TANK (TQ-5115001)

TQ-5115001- MATERIAL DATA	
Materials:	GRP
Flanges:	GRP
Internal Coating	Liner: Derakane 411-350 or Isophthalic Ester ¹
corrosion allowance:	Not Applicable
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5115-511-P4X-001 I-DE-3010.1M-5115-944-P4X-001
¹ Reference. PACKAGER/MANUFACTURER is responsible for the selection of suitable material for fluid and operational conditions	

22.1.2 FRESH WATER MAKE-UP TANK (TQ-5115002)

TQ-5115002- MATERIAL DATA	
Materials:	GRP
Flanges:	GRP
Internal Coating	Liner Isophthalic Ester ¹
corrosion allowance:	Not Applicable
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5115-511-P4X-002 I-DE-3010.1M-5115-944-P4X-001
¹ Reference. PACKAGER/MANUFACTURER is responsible for the selection of suitable material for fluid and operational conditions	

23 DIESEL UNIT MATERIAL SPECIFICATION (U-5133)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

23.1 TANKS

23.1.1 WELL SERVICE DIESEL OIL BUFFER TANK (TQ-5133002)

TQ-5133002- MATERIAL DATA	
Materials:	SA 516 Gr 70
Flanges:	Carbon Steel
Internal Coating	Organic Coating ^{1,2}
corrosion allowance:	3.00 mm
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5133-510-P4X-001 I-DE-3010.1M-5133-944-P4X-001
(1) Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002.	
(2) Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)	

24 INSTRUMENT AND SERVICE AIR UNIT MATERIAL SPECIFICATION (U-5134)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

24.1 PRESSURE VESSELS

24.1.1 INSTRUMENT AND SERVICE AIR RECEIVERS (V-5134001 A/C)

V-5134001 A/C - MATERIAL DATA	
Shell and Heads ⁽¹⁾ (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Not Applicable
corrosion allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments (Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70 - internals: Carbon Steel, SA 516 Gr. 70
Removable internals (Class IV Parts):	Carbon Steel, SA 516 Gr. 70
Support (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5134-540-P4X-001 I-DE-3010.1M-5134-944-P4X-001
(1) Note:	Regarding arrangement concern: The geometry of pressure vessel heads shall be ellipsoidal/torispherical considering the semi-axis of ratio of 2:1 (torispherical heads known as false ellipse).

25 DRAINAGEM AND SLOPE UNIT MATERIAL SPECIFICATION (U-5336)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

25.1 PRESSURE VESSELS

25.1.1 SLOPE VESSEL (V-5336001)

V-5336001 - MATERIAL DATA	
Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70 - internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	SS 316L
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5336-540-P4X-001 I-DE-3010.1M-5336-944-P4X-001
Note	(1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002. (2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)

25.2 TANKS

25.2.1 OPEN DRAIN TANK - NON CLASSIFIED AREA (TQ-5336001)

TQ-5336001 - MATERIAL DATA	
Material	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70 - internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	SS 316L
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5336-511-P4X-001 I-DE-3010.1M-5336-944-P4X-002
Note (1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002. (2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)	

25.3 FILTERS

25.3.1 NON CLASSIFIED AREA - OPEN DRAIN FILTER (FT-5336001A/B)

FT-5336001A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70 - internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	SS 316L
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5336-561-P4X-001 I-DE-3010.1M-5336-944-P4X-002
Note (1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002. (2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)	

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25.3.2 CLASSIFIED AREA - OPEN DRAIN FILTER (FT-5336002A/B)**FT-5336002A/B - MATERIAL DATA**

Shell and Heads (Class I Parts):	Carbon Steel, SA 516 Gr. 70
Internal Coating/ Cladding	Organic Coating ^{1,2}
Corrosion Allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70
Welded attachments(Class III Parts):	- externals: Carbon Steel, SA 516 Gr. 70
	- internals: Carbon Steel, SA 516 Gr. 70 + Organic Coating ^{1,2}
Removable internals(Class IV Parts):	SS 316L
Support(Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Not Applicable
Reference Documents	I-FD-3010.1M-5336-561-P4X-002
	I-DE-3010.1M-5336-944-P4X-003

Note

(1): Internal Organic Coating according I-ET-3010.00-1200-956-P4X-002.

(2): Sacrifice anodes according to I-ET-3010.00-5267-750-P4X-002 (10% of internal coating damage)

PRELIMINARY

26 CHEMICAL INJECTION UNITS MATERIAL SPECIFICATION (U-1261, U-1262 & U-1263)

PACKAGER/MANUFACTURER shall be responsible for supplying the equipment in accordance with the requirements of this specification, codes and standards referenced therein.

PACKAGER/MANUFACTURER may specify the GRP material as alternative to SS 316L for chemical injection tanks that are located at non-classified area. The GRP material and respective liner shall be compatible with the process fluid and operational conditions. (In these cases PACKAGER/MANUFACTURER shall submit the detailed material list for **PETROBRAS** approval prior manufacture activities.

TAG	DESCRIPTION	REFERENCE DOCUMENTS	MATERIAL SPECIFICATION
TQ-UQ-1261001-01	Defoamer Tank	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-011	SS 316L
TQ-UQ-1261001-02	Demulsifier Tank	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-006	SS 316L
TQ-UQ-1261001-03	Scale Inhibitor Tank - Topsides	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-004	SS 316L
TQ-UQ-1261001-04A/B	Paraffin Inhibitor Tank	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-007	SS 316L
TQ-UQ-1261001-05A/B	Hydrate Inhibitor Tank	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-001	SS 316L
TQ-UQ-1261001-06A/B	Asphaltene Inhibitor Tank	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-009	SS 316L
TQ-UQ-1261001-07	Corrosion Inhibitor Tank	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-010	SS 316L
TQ-UQ-1261001-08A/C	H ₂ S Scavenger Tank	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-008	SS 316L
TQ-UQ-1261001-09	H ₂ S Scavenger /Scale Inhibitor Tank - Subsea	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-004	SS 316L
TQ-UQ-1261001-10	Acid Storage Tank	I-FD-3010.1M-1261-510-P4X-001 I-DE-3010.1M-1261-944-P4X-012	SS 316L
TQ-UQ-1262001-01	Inverted Emulsion Inhibitor Tank	I-FD-3010.1M-1262-510-P4X-001 I-DE-3010.1M-1262-944-P4X-001	SS 316L
TQ-UQ-1262001-02	Scale Inhibitor (Topsides) Tank	I-FD-3010.1M-1262-510-P4X-001 I-DE-3010.1M-1262-944-P4X-002	SS 316L
TQ-UQ-1262001-03	Produced Water biocide Tank	I-FD-3010.1M-1262-510-P4X-001 I-DE-3010.1M-1262-944-P4X-003	SS 316L
TQ-UQ-1262001-04	Produced water Biostatic Tank	I-FD-3010.1M-1262-510-P4X-001 I-DE-3010.1M-1262-944-P4X-003	SS 316L
TQ-UQ-1263001-01	Injection Water Oxigen Scavenger Tank	I-FD-3010.1M-1263-510-P4X-001 I-DE-3010.1M-1263-944-P4X-001	SS 316L
TQ-UQ-1263001-02	Injection Water Biodispersant Tank	I-FD-3010.1M-1263-510-P4X-001 I-DE-3010.1M-1263-944-P4X-002	SS 316L
TQ-UQ-1263001-03	Injection Water Biocide Tank	I-FD-3010.1M-1263-510-P4X-001 I-DE-3010.1M-1263-944-P4X-002	SS 316L
TQ-UQ-1263001-04	Injection Water Scale Inhibitor Tank	I-FD-3010.1M-1263-510-P4X-001 I-DE-3010.1M-1263-944-P4X-003	SS 316L