
	TECHNICAL SPECIFICATION	Nº I-ET-3010.2D-1200-500-P4X-001	REV. B
	AREA:	ATAPU 2 AND SÉPIA 2	SHEET 2 of 26
	TITLE:	MATERIAL SPECIFICATION FOR PROCESS SYSTEMS PRESSURE VESSELS AND TANKS	INTERNAL ESUP

SUMMARY

1.	OBJECTIVE	3
2.	NORMATIVE REFERENCES	3
3.	DEFINITIONS AND ABBREVIATIONS.....	6
4.	GENERAL REQUIREMENTS.....	7
5.	QUICK OPENING /CLOSURE FOR PIG LAUNCHERS/RECEIVERS.....	9
6.	OIL COLLECTING AND SEPARATION MATERIAL SPECIFICATION (U-1223)	11
7.	VAPOR RECOVERY UNIT MATERIAL SPECIFICATION (U-1225).....	13
8.	MAIN GAS COMPRESSOR UNIT MATERIALS SPECIFICATION (U-1231001)	14
9.	GAS DEHYDRATION SYSTEM MATERIAL SPECIFICATION (U-1233)	15
10.	DEW POINT CONTROL UNIT MATERIAL SPECIFICATION (U-1238)	18
11.	CO ₂ COMPRESSION UNIT MATERIALS SELECTION (U-1254)	19
12.	INJECTION GAS COMPRESSION UNIT MATERIALS SELECTION (U-1252).....	20
13.	EXPORTATION GAS COMPRESSION UNIT MATERIALS SPECIFICATION (U-1231002)	21
14.	FUEL GAS UNIT MATERIALS SELECTION (U-5135)	22
15.	STRUCTURAL TANKS RECOVERY GAS UNIT MATERIALS SELECTION (U-1350)	23
16.	FLARE SYSTEM UNIT MATERIALS SELECTION (U-5412)	24
17.	PRODUCED WATER UNIT MATERIAL SPECIFICATION (U-5331)	25
18.	CHEMICAL INJECTION UNITS MATERIAL SPECIFICATION (U-1260)	26

	TECHNICAL SPECIFICATION	Nº I-ET-3010.2D-1200-500-P4X-001	REV. B
	AREA:	ATAPU 2 AND SÉPIA 2	SHEET 3 of 26
	TITLE:	MATERIAL SPECIFICATION FOR PROCESS SYSTEMS PRESSURE VESSELS AND TANKS	INTERNAL ESUP

1. OBJECTIVE

This document covers the material specification for pressure vessels, filters, tanks and pig launchers/receivers of TOPSIDE PROCESS SYSTEMS to be supplied to BUYER for ATAPU 2 AND SEPIA 2 FPSO units.

The requirements herein listed apply to all players which will perform any activity related to the scope of equipment furnish, including manufacturers, packagers, main contractor, subcontractors, suppliers, sub-suppliers, integrators, constructors, and all technical personnel involved. Within the scope of this document, they are all referred to as being a SELLER.

In addition to the requirements of this technical specification, SELLER shall follow all the requirements of the Exhibit I (SCOPE OF SUPPLY), as well as Exhibit III (DIRECTIVES FOR ENGINEERING EXECUTION), Exhibit IV (DIRECTIVES FOR CONSTRUCTION AND ASSEMBLY), Exhibit V (DIRECTIVES FOR PROCUREMENT), Exhibit VI (DIRECTIVES FOR PLANNING AND CONTROL), Exhibit VII (DIRECTIVES FOR QUALITY MANAGEMENT SYSTEM) and Exhibit VIII (DIRECTIVES FOR COMMISSIONING PROCESS).

All calculations and mechanical datasheets shall be submitted to BUYER approval by SELLER.

2. NORMATIVE REFERENCES

All equipment shall comply with the requirements of this technical specification and references stated below. All equipment parts and details not complying with any of these requirements shall be informed on a "Deviation List". Otherwise, they will be considered as "Agreed", and so required.

2.1. CLASSIFICATION SOCIETY

2.1.1. SELLER shall perform the work in accordance with the requirements of Classification Society.

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

2.1.3. Classification Society rules may only be waived upon the formal approval from the Classification Society itself and from BUYER.

2.2. CODES AND STANDARDS

The following codes and standards include provisions which, through reference herein, constitute provisions of this specification. The latest issue of the references shall be used unless otherwise agreed.

ASME BPCV Code SEC II	- Material Specifications
ASTM	- American Society for Testing and Materials
ISO 15156	- Petroleum and Natural Gas Industries – Materials for use in H ₂ S Containing Environments in Oil and Gas Production

2.3. GOVERNAMENTAL REGULATION

Regulatory Standard are mandatory and shall prevail, if more stringent, over the requirements of this specification and other references herein.

NR-13	Brazilian Regulatory Standard - Boilers, Pressure Vessels, Pipes and Metallic Storage Tanks
NR-26	Brazilian Regulatory Standard - Safety Signaling

	TECHNICAL SPECIFICATION	Nº I-ET-3010.2D-1200-500-P4X-001	REV. B
	AREA:	ATAPU 2 AND SÉPIA 2	SHEET 4 of 26
	TITLE:	MATERIAL SPECIFICATION FOR PROCESS SYSTEMS PRESSURE VESSELS AND TANKS	INTERNAL
			ESUP

NR-37Brazilian Regulatory Standard - Safety and Health in Petroleum Platforms

2.4. REFERENCE DOCUMENTS

DR-ENGP-M-I-1.3

DR-ENGP-I-1.15

I-ET-3010.00-1200-295-P4X-001

I-ET-3010.00-1200-251-P4X-001

I-ET-3010.00-1200-510-P4X-001

I-ET-3010.00-1200-540-P4X-001

I-ET-3010.00-1200-940-P4X-002

I-ET-3010.00-1200-500-P4X-001

I-ET-3010.00-1200-431-P4X-001

I-ET-3010.00-1200-955-P4X-001

I-ET-3010.00-1200-956-P4X-002

I-ET-3010.00-1200-956-P4X-003

I-ET-3010.00-1200-751-P4X-001

I-ET-3010.00-1200-900-P4X-001

I-ET-3010.2D-1200-200-P4X-001

I-ET-3010.2D-1200-940-P4X-001

I-FD-3010.2D-1210-296-P4X-001

I-FD-3010.2D-1244-296-P4X-001

I-FD-3010.2D-1231-296-P4X-001

I-FD-3010.2D-1223-540-P4X-001

I-FD-3010.2D-1223-540-P4X-002

I-FD-3010.2D-1223-562-P4X-001

I-FD-3010.2D-1223-562-P4X-002

I-FD-3010.2D-1223-562-P4X-003

I-FD-3010.2D-1223-562-P4X-004

I-FD-3010.2D-1225-540-P4X-001

I-FD-3010.2D-1225-540-P4X-002

I-FD-3010.2D-1231-540-P4X-001

I-FD-3010.2D-1231-540-P4X-002

I-FD-3010.2D-1231-540-P4X-003

I-FD-3010.2D-1231-561-P4X-001

I-FD-3010.2D-1233-540-P4X-001

I-FD-3010.2D-1233-540-P4X-002

I-FD-3010.2D-1233-561-P4X-001

I-FD-3010.2D-1233-561-P4X-002

I-FD-3010.2D-1233-561-P4X-003

I-FD-3010.2D-1238-540-P4X-001

I-FD-3010.2D-1238-561-P4X-001

I-FD-3010.2D-1254-540-P4X-001

I-FD-3010.2D-1254-561-P4X-001

I-FD-3010.2D-1252-540-P4X-001

SAFETY ENGINEERING GUIDELINE

COLOR CODING

REQUIREMENTS FOR PIG LAUNCHER AND RECEIVER DESIGN

REQUIREMENTS FOR BOLTING MATERIALS

METALLIC TANKS DESIGN FOR TOPSIDE

REQUIREMENTS FOR PRESSURE VESSELS DESIGN AND FABRICATION

GENERAL TECHNICAL TERMS

NON METALLIC TANKS AND PRESSURE VESSELS DESIGN

THERMAL INSULATION FOR MARITIME INSTALLATIONS

WELDING

GENERAL PAINTING

THERMAL SPRAY COATING APPLICATION OF ALUMINUM

ANODES SPECIFICATION FOR MECHANICAL EQUIPMENT

ADDITIONAL REQUIREMENTS FOR SOUR SERVICE 3.5% NICKEL STEEL

PIPING SPECIFICATION FOR TOPSIDE

MATERIAL SELECTION PHILOSOPHY FOR DETAILED DESIGN

PIG RECEIVERS

PIG LAUNCHERS

PIG LAUNCHER/RECEIVER

PRE-OIL DEHYDRATOR DEGASSER (V-TO-1223001A/B)

OIL DEHYDRATOR DEGASSER (V-TO-1223002A/B)

FREE WATER SEPARATOR (SG-1223001A/B)

PRE-OIL DEHYDRATOR (TO-1223001A/B)

OIL DEHYDRATOR (TO-1223002A/B)

TEST SEPARATOR (SG-1223002)

VRU K.O. DRUM (V-1225001)

VRU SCRUBBERS (V-UC-1225001 A/B-01/02)

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

MAIN GAS COMPRESSION UNIT SCRUBBERS (V-UC-1231001-A/C-01/02)

EXPORTATION GAS COMPRESSION UNIT SCRUBBERS (V-UC-1231002A/D-01/02)

EXPORTATION GAS COMPRESSION UNIT COOLERS CW FILTERS (FT-P-UC-1231002A/D-01/02)

MOLECULAR SIEVE INLET GAS K.O. DRUM (V-1233001)

REGENERATION GAS SEPARATOR (V-1233002)

MOLECULAR SIEVE GAS COALESCER FILTER(FT-1233001A/B)

MOLECULAR SIEVE PARTICULATE FILTER (FT-1233002A/B)

MOLECULAR SIEVE REGENERATION PARTICULATE FILTER (FT-1233003A/B)


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


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


CO2 COMPRESSION UNIT VESSELS (V-UC-1254001A/C-01/02)

CO2 COMPRESSION UNIT COOLERS CW FILTERS (FT-P-UC-1254001A/C-01/02)

INJECTION GAS COMPRESSION UNIT VESSELS (V-UC-1252001A/B)

	TECHNICAL SPECIFICATION	Nº I-ET-3010.2D-1200-500-P4X-001	REV. B
	AREA:	ATAPU 2 AND SÉPIA 2	SHEET 5 of 26
	TITLE:	MATERIAL SPECIFICATION FOR PROCESS SYSTEMS PRESSURE VESSELS AND TANKS	INTERNAL
			ESUP
I-FD-3010.2D-1252-561-P4X-001	INJECTION GAS COMPRESSION DISCHARGE COOLER CW FILTERS (FT-P-UC-1252001A/B)		
I-FD-3010.2D-5135-540-P4X-001	FUEL GAS K.O DRUM (V-5135001)		
I-FD-3010.2D-5135-561-P4X-001	MAIN GENERATOR FUEL GAS FILTER (FT-5135001A/F)		
I-FD-3010.2D-1350-540-P4X-001	STRUCTURAL TANKS RECOVERY GAS K.O DRUM (V-1350001)		
I-FD-3010.2D-5412-540-P4X-001	FLARE SYSTEM VESSELS (V-5412001, V-5412002)		
I-FD-3010.2D-5331-540-P4X-001	PRODUCED WATER FLASH DRUM (V-5331001)		
I-FD-3010.2D-5331-561-P4X-001	PRODUCED WATER FILTER (FT-5331001A/C)		
I-DE-3010.2D-1210-944-P4X-022	PIG RECEIVERS (SATELLITE WELLS "A" TO "J");		
I-DE-3010.2D-1210-944-P4X-023	PIG RECEIVER (PWAG WELLS "K" TO "P");		
I-DE-3010.2D-1210-944-P4X-024	PIG RECEIVERS (WAG INJECTION WELLS "Q" TO "X").		
I-DE-3010.2D-1244-944-P4X-001	WELL PIG LAUNCHERS (LP-1244001A/B);		
I-DE-3010.2D-1244-944-P4X-002	WELL PIG LAUNCHERS (LP-1244001C/D);		
I-DE-3010.2D-1244-944-P4X-003	WELL PIG LAUNCHERS (LP-1244001E/F);		
I-DE-3010.2D-1244-944-P4X-004	WELL PIG LAUNCHERS (LP-1244001G/H);		
I-DE-3010.2D-1244-944-P4X-005	WELL PIG LAUNCHER (LP-1244001J);		
I-DE-3010.2D-1244-944-P4X-006	WELL PIG LAUNCHERS (LP-1244002A/B);		
I-DE-3010.2D-1244-944-P4X-007	WELL PIG LAUNCHERS (LP-1244002C/D);		
I-DE-3010.2D-1244-944-P4X-008	WELL PIG LAUNCHERS (LP-1244002E);		
I-DE-3010.2D-1244-944-P4X-009	WELL PIG LAUNCHERS (LP-1244003A/B);		
I-DE-3010.2D-1244-944-P4X-010	WELL PIG LAUNCHERS (LP-1244003C/D);		
I-DE-3010.2D-1244-944-P4X-011	WELL PIG LAUNCHERS (LP-1244003E/F);		
I-DE-3010.2D-1244-944-P4X-012	WELL PIG LAUNCHER (LP-1244003G);		
I-DE-3010.2D-1231-944-P4X-014	LIFT GAS AND EXPORTATION HEADERS – PIG LAUNCHER/RECEIVER		
I-DE-3010.2D-1223-944-P4X-003	FREE WATER SEPARATOR A		
I-DE-3010.2D-1223-944-P4X-004	FREE WATER SEPARATOR B		
I-DE-3010.2D-1223-944-P4X-009	PRE OIL DEHYDRATOR A		
I-DE-3010.2D-1223-944-P4X-010	PRE OIL DEHYDRATOR B		
I-DE-3010.2D-1223-944-P4X-011	OIL DEHYDRATOR A		
I-DE-3010.2D-1223-944-P4X-012	OIL DEHYDRATOR B		
I-DE-3010.2D-1223-944-P4X-017	TEST HEATER/TEST SEPARATOR		
I-DE-3010.2D-1225-944-P4X-001	VRU K. O. DRUM		
I-DE-3010.2D-1225-944-P4X-002	VAPOR RECOVERY UNIT - TRAIN A - 1ST STAGE		
I-DE-3010.2D-1225-944-P4X-003	VAPOR RECOVERY UNIT - TRAIN B - 1ST STAGE		
I-DE-3010.2D-1225-944-P4X-004	VAPOR RECOVERY UNIT - TRAIN A - 2ND STAGE		
I-DE-3010.2D-1225-944-P4X-005	VAPOR RECOVERY UNIT - TRAIN B - 2ND STAGE		
I-DE-3010.2D-1231-944-P4X-001	SAFETY GAS K.O. DRUM		
I-DE-3010.2D-1231-944-P4X-002	MAIN COMPRESSION UNIT - TRAIN A		
I-DE-3010.2D-1231-944-P4X-003	MAIN COMPRESSION UNIT - TRAIN B		
I-DE-3010.2D-1231-944-P4X-004	MAIN COMPRESSION UNIT - TRAIN C		
I-DE-3010.2D-1231-944-P4X-006	EXPORTATION GAS COMPRESSION UNIT- TRAIN A – 1ST STAGE		
I-DE-3010.2D-1231-944-P4X-007	EXPORTATION GAS COMPRESSION UNIT- TRAIN B – 1ST STAGE		
I-DE-3010.2D-1231-944-P4X-008	EXPORTATION GAS COMPRESSION UNIT- TRAIN C – 1ST STAGE		
I-DE-3010.2D-1231-944-P4X-009	EXPORTATION GAS COMPRESSION UNIT- TRAIN D – 1ST STAGE		
I-DE-3010.2D-1231-944-P4X-010	EXPORTATION GAS COMPRESSION UNIT- TRAIN A – 2ND STAGE		
I-DE-3010.2D-1231-944-P4X-011	EXPORTATION GAS COMPRESSION UNIT- TRAIN B – 2ND STAGE		
I-DE-3010.2D-1231-944-P4X-012	EXPORTATION GAS COMPRESSION UNIT- TRAIN C – 2 ND STAGE		
I-DE-3010.2D-1231-944-P4X-013	EXPORTATION GAS COMPRESSION UNIT- TRAIN D – 2 ND STAGE		
I-DE-3010.2D-1233-944-P4X-001	GAS DEHYDRATION K.O. DRUM		
I-DE-3010.2D-1233-944-P4X-002	GAS DEHYDRATION COALESCER FILTER		
I-DE-3010.2D-1233-944-P4X-003	GAS DEHYDRATION SYSTEM		
I-DE-3010.2D-1233-944-P4X-004	REGENERATION PRE TREATMENT		
I-DE-3010.2D-1233-944-P4X-005	REGENERATION COOLING		
I-DE-3010.2D-1238-944-P4X-001	HYDROCARBON DEW POINT CONTROL SYSTEM		

 PETROBRAS	TECHNICAL SPECIFICATION	Nº I-ET-3010.2D-1200-500-P4X-001	REV. B																																		
	AREA:	ATAPU 2 AND SÉPIA 2	SHEET 6 of 26																																		
	TITLE:	MATERIAL SPECIFICATION FOR PROCESS SYSTEMS PRESSURE VESSELS AND TANKS	INTERNAL																																		
			ESUP																																		
<table><tr><td>I-DE-3010.2D-1254-944-P4X-001</td><td>CO2 COMPRESSION UNIT - TRAIN A - 1ST STAGE</td></tr><tr><td>I-DE-3010.2D-1254-944-P4X-002</td><td>CO2 COMPRESSION UNIT - TRAIN B - 1ST STAGE</td></tr><tr><td>I-DE-3010.2D-1254-944-P4X-003</td><td>CO2 COMPRESSION UNIT - TRAIN C - 1ST STAGE</td></tr><tr><td>I-DE-3010.2D-1254-944-P4X-004</td><td>CO2 COMPRESSION UNIT - TRAIN A - 2ND STAGE</td></tr><tr><td>I-DE-3010.2D-1254-944-P4X-005</td><td>CO2 COMPRESSION UNIT - TRAIN B - 2ND STAGE</td></tr><tr><td>I-DE-3010.2D-1254-944-P4X-006</td><td>CO2 COMPRESSION UNIT - TRAIN C - 2ND STAGE</td></tr><tr><td>I-DE-3010.2D-1252-944-P4X-001</td><td>INJECTION GAS COMPRESSION UNIT - TRAIN A</td></tr><tr><td>I-DE-3010.2D-1252-944-P4X-002</td><td>INJECTION GAS COMPRESSION UNIT - TRAIN B</td></tr><tr><td>I-DE-3010.2D-1350-944-P4X-001</td><td>STRUCTURAL TANKS GAS RECOVERY SYSTEM</td></tr><tr><td>I-DE-3010.2D-5135-944-P4X-002</td><td>FUEL GAS TREATMENT</td></tr><tr><td>I-DE-3010.2D-5147-944-P4X-001</td><td>TURBOGENERATOR INTERCONNECTION A/B</td></tr><tr><td>I-DE-3010.2D-5147-944-P4X-002</td><td>TURBOGENERATOR INTERCONNECTION C/D</td></tr><tr><td>I-DE-3010.2D-5147-944-P4X-003</td><td>TURBOGENERATOR INTERCONNECTION E/F</td></tr><tr><td>I-DE-3010.2D-5412-944-P4X-001</td><td>HIGH PRESSURE FLARE K.O. DRUM</td></tr><tr><td>I-DE-3010.2D-5412-944-P4X-002</td><td>LOW PRESSURE FLARE K.O. DRUM</td></tr><tr><td>I-DE-3010.2D-5331-944-P4X-001</td><td>PRODUCED WATER COOLER AND FLASH DRUM</td></tr><tr><td>I-DE-3010.2D-5331-944-P4X-007</td><td>PRODUCED WATER BOOSTER PUMP AND FILTER</td></tr></table>				I-DE-3010.2D-1254-944-P4X-001	CO2 COMPRESSION UNIT - TRAIN A - 1ST STAGE	I-DE-3010.2D-1254-944-P4X-002	CO2 COMPRESSION UNIT - TRAIN B - 1ST STAGE	I-DE-3010.2D-1254-944-P4X-003	CO2 COMPRESSION UNIT - TRAIN C - 1ST STAGE	I-DE-3010.2D-1254-944-P4X-004	CO2 COMPRESSION UNIT - TRAIN A - 2ND STAGE	I-DE-3010.2D-1254-944-P4X-005	CO2 COMPRESSION UNIT - TRAIN B - 2ND STAGE	I-DE-3010.2D-1254-944-P4X-006	CO2 COMPRESSION UNIT - TRAIN C - 2ND STAGE	I-DE-3010.2D-1252-944-P4X-001	INJECTION GAS COMPRESSION UNIT - TRAIN A	I-DE-3010.2D-1252-944-P4X-002	INJECTION GAS COMPRESSION UNIT - TRAIN B	I-DE-3010.2D-1350-944-P4X-001	STRUCTURAL TANKS GAS RECOVERY SYSTEM	I-DE-3010.2D-5135-944-P4X-002	FUEL GAS TREATMENT	I-DE-3010.2D-5147-944-P4X-001	TURBOGENERATOR INTERCONNECTION A/B	I-DE-3010.2D-5147-944-P4X-002	TURBOGENERATOR INTERCONNECTION C/D	I-DE-3010.2D-5147-944-P4X-003	TURBOGENERATOR INTERCONNECTION E/F	I-DE-3010.2D-5412-944-P4X-001	HIGH PRESSURE FLARE K.O. DRUM	I-DE-3010.2D-5412-944-P4X-002	LOW PRESSURE FLARE K.O. DRUM	I-DE-3010.2D-5331-944-P4X-001	PRODUCED WATER COOLER AND FLASH DRUM	I-DE-3010.2D-5331-944-P4X-007	PRODUCED WATER BOOSTER PUMP AND FILTER
I-DE-3010.2D-1254-944-P4X-001	CO2 COMPRESSION UNIT - TRAIN A - 1ST STAGE																																				
I-DE-3010.2D-1254-944-P4X-002	CO2 COMPRESSION UNIT - TRAIN B - 1ST STAGE																																				
I-DE-3010.2D-1254-944-P4X-003	CO2 COMPRESSION UNIT - TRAIN C - 1ST STAGE																																				
I-DE-3010.2D-1254-944-P4X-004	CO2 COMPRESSION UNIT - TRAIN A - 2ND STAGE																																				
I-DE-3010.2D-1254-944-P4X-005	CO2 COMPRESSION UNIT - TRAIN B - 2ND STAGE																																				
I-DE-3010.2D-1254-944-P4X-006	CO2 COMPRESSION UNIT - TRAIN C - 2ND STAGE																																				
I-DE-3010.2D-1252-944-P4X-001	INJECTION GAS COMPRESSION UNIT - TRAIN A																																				
I-DE-3010.2D-1252-944-P4X-002	INJECTION GAS COMPRESSION UNIT - TRAIN B																																				
I-DE-3010.2D-1350-944-P4X-001	STRUCTURAL TANKS GAS RECOVERY SYSTEM																																				
I-DE-3010.2D-5135-944-P4X-002	FUEL GAS TREATMENT																																				
I-DE-3010.2D-5147-944-P4X-001	TURBOGENERATOR INTERCONNECTION A/B																																				
I-DE-3010.2D-5147-944-P4X-002	TURBOGENERATOR INTERCONNECTION C/D																																				
I-DE-3010.2D-5147-944-P4X-003	TURBOGENERATOR INTERCONNECTION E/F																																				
I-DE-3010.2D-5412-944-P4X-001	HIGH PRESSURE FLARE K.O. DRUM																																				
I-DE-3010.2D-5412-944-P4X-002	LOW PRESSURE FLARE K.O. DRUM																																				
I-DE-3010.2D-5331-944-P4X-001	PRODUCED WATER COOLER AND FLASH DRUM																																				
I-DE-3010.2D-5331-944-P4X-007	PRODUCED WATER BOOSTER PUMP AND FILTER																																				
<h3>2.5. CONFLICTING REQUIREMENTS</h3> <p>In case of conflicting requirements between this technical specification and other cited references, the most stringent shall prevail. If necessary, the SELLER may revert to BUYER for clarification.</p>																																					
<h2>3. DEFINITIONS AND ABBREVIATIONS</h2>																																					
<h3>3.1. DEFINITIONS</h3> <p>All Terms and definitions are established in the latest revision I-ET-3010.00-1200-940-P4X-002 - GENERAL TECHNICAL TERMS.</p> <p>3.1.1. 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.</p> <p>3.1.2. 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).</p> <p>3.1.3. 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.</p> <p>3.1.4. 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:</p> <ul style="list-style-type: none">a) design temperature lower than or equal to 15 °C;b) design temperature over 340 °C;c) service with hydrogen;d) vessels made of alloy steel, stainless steels and nonferrous materials.																																					

	TECHNICAL SPECIFICATION	Nº I-ET-3010.2D-1200-500-P4X-001	REV. B
	AREA:	ATAPU 2 AND SÉPIA 2	SHEET 7 of 26
	TITLE:	MATERIAL SPECIFICATION FOR PROCESS SYSTEMS PRESSURE VESSELS AND TANKS	INTERNAL ESUP

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

3.1.6. 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.

3.1.7. 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

CRA	Corrosion Resistant Alloy
GRP	Glass – Reinforced plastic
P&ID:	Piping & Instrumentation Diagram

4. GENERAL REQUIREMENTS

4.1. DESIGN

4.1.1. SELLER shall design and fabricate the equipment for a minimum lifetime of 30 years.

4.1.2. The design of the vessels, filter and tanks shall be in accordance with I-ET-3010.00-1200-540-P4X-001 – REQUIREMENTS FOR PRESSURE VESSELS DESIGN AND FABRICATION; I-ET-3010.00-1200-510-P4X-001 – METALLIC TANKS DESIGN FOR TOPSIDE and I-ET-3010.00-1200-500-P4X-001 – NON-METALLIC TANKS AND PRESSURE VESSELS DESIGN.

4.1.3. The SELLER is responsible detailing the materials selection in accordance with this specification. In all cases, SELLER shall submit the detailed material list, including all equipment and their components, for BUYER approval prior manufacture activities.

4.1.4. In case of any equipment not specified in this document, the material selection shall be based on I-ET-3010.2D-1200-940-P4X-001 - MATERIAL SELECTION PHILOSOPHY FOR DETAILED DESIGN.

4.2. MATERIAL

4.2.1. All valves, pipes and components specified for hydrogen sulfide service shall be in accordance with ISO 15156 requirements. For carbon and low alloy steels, in case of sour service, the environmental severity shall be Region 3 as default, per NACE MR0175/ISO 15156-2.


4.2.2. The 316/316L dual graded stainless steel materials may be acceptable in place of SS316L. These materials require dual certification and stamp (i.e., 316/316LSS material shall be dual certified and stamped); i.e., material shall comply with the mechanical property requirements of 316 SS and chemical requirements of 316L SS per applicable material manufacturing specifications. In this case, the equipment shall only have dual certificate 316 material.

4.3. FLANGES AND GASKETS

4.3.1. Flanges materials shall be compatible with the shell and heads materials (Class I Parts), except where explicit mentioned in this document.

4.3.2. When flange materials are specified for the low temperature requirement (-80°C). At this case, the use of clad or weld overlaid is only possible if base material has the required impact properties.

4.3.3. 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-3010.2D-1200-200-P4X-001 – PIPING SPECIFICATION FOR TOPSIDE). Different types of flanges and gaskets might be acceptable, under BUYER

	TECHNICAL SPECIFICATION	Nº I-ET-3010.2D-1200-500-P4X-001	REV. B
	AREA:	ATAPU 2 AND SÉPIA 2	SHEET 8 of 26
	TITLE:	MATERIAL SPECIFICATION FOR PROCESS SYSTEMS PRESSURE VESSELS AND TANKS	INTERNAL ESUP

approval, in the following cases:

4.3.4. If the pressure rating of the nozzle flange is higher than the pressure rating of the pipe flange;

4.3.5. For CLADED/COATED piping specification.

4.3.6. If flange manufacture is unfeasible;

4.3.7. In all cases of conflict, the SELLER shall inform BUYER of the conflict and seek clarification.

4.4. BOLTS AND NUTS

4.4.1. All Fasteners (studs, bolts, tightening bolts and nuts) shall be according to I-ET-3010.00-1200-251-P4X-001 – REQUIREMENTS FOR BOLTING MATERIALS

4.4.2. When the flange connection is specified for a low temperature special service, the bolt material shall be compatible with this condition.

4.4.3. The material for internal bolts shall have the same corrosion resistance of Class IV Parts (removable internals).

4.4.4. When the pressure vessel is specified for sour service, the internal bolts shall meet the requirements of ISO 15156.

4.5. COATING AND INSULATION REQUIREMENTS

4.5.1. Equipment subjected to temperature of 60°C and above shall receive a personal protection system, by means of 316SS wire mesh / perforated plates. Equipment in which heat conservation is necessary shall be thermal insulated. The thermal insulation shall be according to latest revision of I-ET-3010.00-1200-431-P4X-001 – THERMAL INSULATION FOR MARITIME INSTALLATIONS

4.5.2. Painting requirements shall be according to I-ET-3010.00-1200-956-P4X-002 -GENERAL PAINTING

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

5. QUICK OPENING /CLOSURE FOR PIG LAUNCHERS/RECEIVERS

5.1. PIG RECEIVERS

5.1.1. SATELLITE PRODUCTION WELL PIG RECEIVER (RP-1210001A/B)

RP-1210001A/B- MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS32750/32760
Internal Coating/ Cladding	Not applicable
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS32750/32760
Welded attachments (Class III Parts):	- externals: UNS32750/32760
	- internals: UNS32750/32760
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	UNS32750/32760
Special Service	ISO15156 H ₂ S Service
Reference Documents	I-FD-3010.2D-1210-296-P4X-001 I-ET-3010.00-1200-295-P4X-001 I-DE-3010.2D-1210-944-P4X-022

5.1.2. PWAGFLEX WELL PIG RECEIVER (RP-1210002)

RP-1210002 - MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS32750/32760
Internal Coating/ Cladding	Not applicable
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS32750/32760
Welded attachments (Class III Parts):	- externals: UNS32750/32760
	- internals: UNS32750/32760
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	UNS32750/32760
Special Service	ISO15156 H ₂ S Service
Reference Documents	I-FD-3010.2D-1210-296-P4X-001 I-ET-3010.00-1200-295-P4X-001 I-DE-3010.2D-1210-944-P4X-023

5.1.3. WAG-LOOP WELL PIG RECEIVER (RP-1210003 A/B)

RP-1210003 A/B- MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS32750/32760
Internal Coating/ Cladding	Not applicable
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS32750/32760
Welded attachments (Class III Parts):	- externals: UNS32750/32760
	- internals: UNS32750/32760
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	UNS32750/32760
Special Service	ISO15156 H ₂ S Service
Reference Documents	I-FD-3010.2D-1210-296-P4X-001 I-ET-3010.00-1200-295-P4X-001 I-DE-3010.2D-1210-944-P4X-024

5.2. PIG LAUNCHER

5.2.1. SATELLITE PRODUCTION WELL PIG LAUNCHER (LP-1244001 A/J)

LP-1244001 A/J - MATERIAL DATA	
Shell and Heads (Class I Parts):	ASTM 516 GR70N / ASTM A333 GR6
Internal Coating/ Cladding	Not applicable
Corrosion allowance:	1,6mm
Nozzles reinforcements (Class II Parts):	ASTM 350 LF2
Welded attachments (Class III Parts):	- externals: ASTM 516 GR70N
	- internals: ASTM 516 GR70N
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	ASTM 516 GR70N
Special Service	ISO15156 H ₂ S Service Low Temperature (-50°C)
Reference Documents	I-FD-3010.2D-1244-296-P4X-001 I-ET-3010.00-1200-295-P4X-001 I-DE-3010.2D-1244-944-P4X-001/ 002/ 003/ 004/ 005

5.2.2. PWAGFLEX WELLS PIG LAUNCHER (LP-1244002 A/E)

LP-1244002 A/E - MATERIAL DATA	
Shell and Heads (Class I Parts):	ASTM 516 GR70N / ASTM A333 GR6
Internal Coating/ Cladding	Not applicable
Corrosion allowance:	1,6mm
Nozzles reinforcements (Class II Parts):	ASTM 516 GR70N / ASTM A333 GR6
Welded attachments (Class III Parts):	- externals: ASTM 516 GR70N
	- internals: ASTM 516 GR70N
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	ASTM 516 GR70N
Special Service	ISO15156 H ₂ S Service Low Temperature (-50°C)
Reference Documents	I-FD-3010.2D-1244-296-P4X-001 I-ET-3010.00-1200-295-P4X-001 I-DE-3010.2D-1244-944-P4X-006/007/008

5.2.3. WAG-LOOP WELLS PIG LAUNCHER (LP-1244003 A/G)

LP-1244003 A/G - MATERIAL DATA	
Shell and Heads (Class I Parts):	ASTM 516 GR70N / ASTM A333 GR6
Internal Coating/ Cladding	Not applicable
Corrosion allowance:	1,6mm
Nozzles reinforcements (Class II Parts):	ASTM 350 LF2
Welded attachments (Class III Parts):	- externals: ASTM 516 GR70N
	- internals: ASTM 516 GR70N
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	ASTM 516 GR70N
Special Service	ISO15156 H ₂ S Service Low Temperature (-50°C)
Reference Documents	I-FD-3010.2D-1244-296-P4X-001 I-ET-3010.00-1200-295-P4X-001 I-DE-3010.2D-1244-944-P4X-009/010/011/012

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):	UNS32750/32760
Internal Coating/ Cladding	Not applicable
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS32750/32760
Welded attachments (Class III Parts):	- externals: UNS32750/32760
	- internals: UNS32750/32760
Removable internals (Class IV Parts):	Not applicable
Support (Class V Parts):	UNS32750/32760
Special Service	ISO15156 H ₂ S Service Low Temperature (-50°C)
Reference Documents	I-FD-3010.2D-1231-296-P4X-001 I-ET-3010.00-1200-295-P4X-001 I-DE-3010.2D-1231-944-P4X-014

6. OIL COLLECTING AND SEPARATION MATERIAL SPECIFICATION (U-1223)

6.1. PRESSURE VESSELS

6.1.1. FREE WATER SEPARATOR (SG-1223001 A/B)

SG-1223001 A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS 31803
Internal Coating/ Cladding	N/A
Nozzles reinforcements (Class II Parts):	UNS 31803
Welded attachments (Class III Parts):	- externals: UNS 31803
	- internals: UNS 31803
Removable internals (Class IV Parts):	UNS 31803
Support (Class V Parts):	UNS 31803
Special Service	ISO15156 H ₂ S Service
Reference Documents	I-FD-3010.2D-1223-562-P4X-001 I-DE-3010.2D-1223-944-P4X-003 I-DE-3010.2D-1223-944-P4X-004

6.1.2. TEST SEPARATOR (SG-1223002)

SG-1223002 - MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS 31803
Internal Coating/ Cladding	N/A
Nozzles reinforcements (Class II Parts):	UNS 31803
Welded attachments (Class III Parts):	- externals: UNS 31803
	- internals: UNS 31803
Removable internals (Class IV Parts):	UNS 31803
Supportt (Class V Parts):	UNS 31803
Special Service	ISO15156 H ₂ S Service
Reference Documents	I-FD-3010.2D-1223-562-P4X-002 I-DE-3010.2D-1223-944-P4X-017

6.1.3. PRE-OIL DEHYDRATOR (TO-1223001 A/B)

TO-1223001 A/B- MATERIAL DATA	
Shell and Heads (Class I Parts):	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: SA 516 Gr. 70
	- internals: SA 516 Gr. 70 + Organic Coating ¹
Removable internals (Class IV Parts):	SS 316.
Supportt (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	ISO15156 H ₂ S Service.
Reference Documents	I-FD-3010.2D-1223-562-P4X-002 I-DE-3010.2D-1223-944-P4X-009 I-DE-3010.2D-1223-944-P4X-010
Note (1): Internal Coating with paint system 14 according to I-ET-3010.00-1200-956-P4X-002.	

6.1.4. OIL DEHYDRATOR (TO-1223002 A/B)

TO-1223002 A/B- MATERIAL DATA	
Shell and Heads (Class I Parts):	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: SA 516 Gr. 70
	- internals: SA 516 Gr. 70 + Organic Coating ¹
Removable internals (Class IV Parts):	SS 316.
Supportt (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	ISO15156 H ₂ S Service.
Reference Documents	I-FD-3010.2D-1223-562-P4X-003 I-DE-3010.2D-1223-944-P4X-011 I-DE-3010.2D-1223-944-P4X-012
Note (1): Internal Coating with paint system 14 according to I-ET-3010.00-1200-956-P4X-002.	

6.1.5. PRE-OIL DEHYDRATOR DEGASSER (V-TO-1223001 A/B)

V-TO-1223001 A/B - 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
Supportt (Class V Parts):	SA-36 or SA 516 Gr. 70
Special Service	ISO15156 H ₂ S Service.
Reference Documents	I-FD-3010.2D-1223-540-P4X-001 I-DE-3010.2D-1223-944-P4X-009 I-DE-3010.2D-1223-944-P4X-010

6.1.6. OIL DEHYDRATOR DEGASSER (V-TO-1223002 A/B)

V-TO-1223002 A/B - 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
Supportt (Class V Parts):	SA-36 or SA 516 Gr. 70
Special Service	ISO15156 H ₂ S Service.
Reference Documents	I-FD-3010.2D-1223-540-P4X-002 I-DE-3010.2D-1223-944-P4X-011 I-DE-3010.2D-1223-944-P4X-012

7. VAPOR RECOVERY UNIT MATERIAL SPECIFICATION (U-1225)

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 (3mm)
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
Supportt (Class V Parts):	SA-36 or SA-516 Gr70
Special Service	ISO15156 H ₂ S Service
Reference Documents	I-FD-3010.2D-1225-540-P4X-001 I-DE-3010.2D-1225-944-P4X-001

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

V-UC-1225001A/B-01- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA-516 Gr70
Internal Coating/ Cladding	UNS N06625 (3mm)
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
Supportt (Class V Parts):	SA-36 or SA-516 Gr70
Special Service	ISO15156 H ₂ S Service
Reference Documents	I-FD-3010.2D-1225-540-P4X-002 I-DE-3010.2D-1225-944-P4X-002/ 003

7.1.3.VRU 2ND STAGE SUCTION SCRUBBER (V-UC-1225001A/B-02)

V-UC-1225001A/B-02- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA-516 Gr70
Internal Coating/ Cladding	UNS N06625 (3mm)
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
Supportt (Class V Parts):	SA-36 or SA-516 Gr70
Special Service	ISO15156 H ₂ S Service
Reference Documents	I-FD-3010.2D-1225-540-P4X-002 I-DE-3010.2D-1225-944-P4X-004/ 005

8. MAIN GAS COMPRESSOR UNIT MATERIALS SPECIFICATION (U-1231001)

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 Gr70N
Internal Coating/ Cladding	UNS N06625 (3mm)
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
Supportt (Class V Parts):	SA-36 or SA-516 Gr70
Special Service	ISO15156 H ₂ S Service.
Reference Document	I-FD-3010.2D-1231-540-P4X-001 I-DE-3010.2D-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):	SA-516 Gr70N
Internal Coating/ Cladding	UNS N06625 (3mm)
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
Supportt (Class V Parts):	SA-36 or SA-516 Gr70
Special Service	ISO15156 H ₂ S Service.
Reference Document	I-FD-3010.2D-1231-540-P4X-002 I-DE-3010.2D-1231-944-P4X-002/003/004

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):	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 316
Support (Class V Parts):	UNS S31803
Special Service	ISO15156 H ₂ S Service.
Reference Document	I-FD-3010.2D-1231-540-P4X-002 I-DE-3010.2D-1231-944-P4X-002/003/004

9. GAS DEHYDRATION SYSTEM MATERIAL SPECIFICATION (U-1233)

9.1. PRESSURE VESSELS

9.1.1.MOLECULAR SIEVE INLET GAS K.O. DRUM (V-1233001)

V-1233001- MATERIAL DATA		
	Option 1	Option 2
Shell and Heads (Class I Parts):	A 203 Gr D or SA 765 gr III'	SS 316L (UNS S31603)
Internal Coating/ Cladding	SS 316L (UNS S31603) (3mm)	Not applicable
Corrosion allowance:	Not applicable	Not applicable
Nozzles reinforcements (Class II Parts):	A 203 Gr D or SA 765 gr III'	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: A 203 Gr D or SA 765 gr III'	- externals: SS 316L (UNS S31603)
	- internals: SS 316L (UNS S31603)	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316 (UNS S31603)	SS 316 (UNS S31603)
Support (Class V Parts):	A 203 Gr D or SA 765 gr III	SS 316L (UNS S31603)
Special Service	ISO15156 H2S Service Low temperature (-80°C)	
Reference Documents	I-FD-3010.2D-1233-540-P4X-001 I-DE-3010.2D-1233-944-P4X-001	
Note: (1): For 3,5Ni requirements in sour service, see I-ET-3010.00-1200-900-P4X-001.		

9.1.2. REGENERATION GAS SEPARATOR (V-1233002)

V-1233002- MATERIAL DATA	
Shell and Heads (Class I Parts):	A 203 Gr D or SA 765 gr III'
Internal Coating/ Cladding	UNS N06625 (3mm)
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	A 203 Gr D or SA 765 gr III'
Welded attachments (Class III Parts):	- externals: A 203 Gr D or SA 765 gr III'
	- internals: UNS N06625
Removable internals (Class IV Parts):	UNS N06625
Support (Class V Parts):	SA-36 or SA-516 Gr70
Special Service	ISO15156 H ₂ S Service Low temperature (-80°C)
Reference Documents	I-FD-3010.2D-1233-540-P4X-002 I-DE-3010.2D-1233-944-P4X-005
Note: (1): For 3,5Ni requirements in sour service, see I-ET-3010.00-1200-900-P4X-001.	

9.2. FILTERS

9.2.1. MOLECULAR SIEVE GAS COALESCER FILTER (FT-1233001 A/B)

FT-1233001 A/B - MATERIAL DATA		
	Option 1	Option 2
Shell and Heads (Class I Parts):	A 203 Gr D or SA 765 gr III'	SS 316L (UNS S31603)
Internal Coating/ Cladding	SS 316L (UNS S31603) (3mm)	Not applicable
Corrosion allowance:	Not applicable	Not applicable
Nozzles reinforcements (Class II Parts):	A 203 Gr D or SA 765 gr III'	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: A 203 Gr D or SA 765 gr III'	- externals: SS 316L (UNS S31603)
	- internals: SS 316L (UNS S31603)	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316 (UNS S31603)	SS 316 (UNS S31603)
Support (Class V Parts):	A 203 Gr D or SA 765 gr III	SS 316L (UNS S31603)
Special Service	ISO15156 H2S Service Low temperature (-80°C)	
Reference Documents	I-FD-3010.2D-1233-561-P4X-001 I-DE-3010.2D-1233-944-P4X-002	
Note: (1): For 3,5Ni requirements in sour service, see I-ET-3010.00-1200-900-P4X-001.		

9.2.2. MOLECULAR SIEVE PARTICULATE FILTER (FT-1233002 A/B)

FT-1233002 A/B - MATERIAL DATA		
	Option 1	Option 2
Shell and Heads (Class I Parts):	A 203 Gr D or SA 765 gr III'	SS 316L (UNS S31603)
Internal Coating/ Cladding	SS 316L (UNS S31603) (3mm)	Not applicable
Corrosion allowance:	Not applicable	Not applicable
Nozzles reinforcements (Class II Parts):	A 203 Gr D or SA 765 gr III'	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: A 203 Gr D or SA 765 gr III'	- externals: SS 316L (UNS S31603)
	- internals: SS 316L (UNS S31603)	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316 (UNS S31603)	SS 316 (UNS S31603)
Support (Class V Parts):	A 203 Gr D or SA 765 gr III	SS 316L (UNS S31603)
Special Service	ISO15156 H ₂ S Service Low temperature (-80°C)	
Reference Documents	I-FD-3010.2D-1233-561-P4X-002 I-DE-3010.2D-1233-944-P4X-004	
Note: (1): For 3,5Ni requirements in sour service, see I-ET-3010.00-1200-900-P4X-001.		

9.2.3. MOLECULAR SIEVE REGENERATION PARTICULATE FILTER (FT-1233003 A/B)

FT-1233003 A/B - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr. 70N
Internal Coating/ Cladding	UNS N06625 (3mm)
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70N
Welded attachments (Class III Parts):	- externals: SA 516 Gr. 70N
	- internals: UNS N06625
Removable internals (Class IV Parts):	UNS N06625
Support (Class V Parts):	SA-36 or SA-516 Gr70
Special Service	ISO15156 H ₂ S Service Low temperature (-46°C)
Reference Documents	I-FD-3010.2D-1233-561-P4X-003 I-DE-3010.2D-1233-944-P4X-005

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

10.1. PRESSURE VESSELS

10.1.1. COLD SEPARATOR (V-1238001)

V-1238001- MATERIAL DATA		
	Option 1	Option 2
Shell and Heads (Class I Parts):	A 203 Gr D or SA 765 gr III ¹	SS 316L (UNS S31603)
Internal Coating/ Cladding	SS 316L (UNS S31603) (3mm)	Not applicable
Corrosion allowance:	Not applicable	Not applicable
Nozzles reinforcements (Class II Parts):	A 203 Gr D or SA 765 gr III ¹	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: A 203 Gr D or SA 765 gr III	- externals: SS 316L (UNS S31603)
	- internals: SS 316L (UNS S31603)	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316 (UNS S31603)	SS 316 (UNS S31603)
Support (Class V Parts):	A 203 Gr D or SA 765 gr III	SS 316L (UNS S31603)
Special Service	ISO15156 H ₂ S Service Low temperature (-80°C)	
Reference Documents	I-FD-3010.2D-1238-540-P4X-001 I-DE-3010.2D-1238-944-P4X-001	
Note: (1): For 3,5Ni requirements in sour service, see I-ET-3010.00-1200-900-P4X-001.		

10.2. FILTERS

10.2.1. COALESCER FILTER (FT-1238001A/B)

FT-1238001A/B MATERIAL DATA		
	Option 1	Option 2
Shell and Heads (Class I Parts):	A 203 Gr D or SA 765 gr III ¹	SS 316L (UNS S31603)
Internal Coating/ Cladding	SS 316L (UNS S31603) (3mm)	Not applicable
Corrosion allowance:	Not applicable	Not applicable
Nozzles reinforcements (Class II Parts):	A 203 Gr D or SA 765 gr III ¹	SS 316L (UNS S31603)
Welded attachments (Class III Parts):	- externals: A 203 Gr D or SA 765 gr III	- externals: SS 316L (UNS S31603)
	- internals: SS 316L (UNS S31603)	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316 (UNS S31603)	SS 316 (UNS S31603)
Support (Class V Parts):	A 203 Gr D or SA 765 gr III	SS 316L (UNS S31603)
Special Service	ISO15156 H ₂ S Service Low temperature (-80°C)	
Reference Documents	I-FD-3010.2D-1238-561-P4X-001 I-DE-3010.2D-1238-944-P4X-001	
Note: (1): For 3,5Ni requirements in sour service, see I-ET-3010.00-1200-900-P4X-001.		

11. CO₂ COMPRESSION UNIT MATERIALS SELECTION (U-1254)

11.1. PRESSURE VESSELS

11.1.1. CO₂ COMPRESSION -1ST STAGE SUCTION SCRUBBER (V-UC-1254001 A/C-01)

V-UC-1254001 A/C-01 - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr.70
Internal Coating/ Cladding	not applicable
Corrosion allowance:	3mm
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	N/A
Reference Documents	I-FD-3010.2D-1254-540-P4X-001 I-DE-3010.2D-1254-944-P4X-001/ 002/003

11.1.2. CO₂ COMPRESSION -2ND STAGE SUCTION SCRUBBER (V-UC-1254001 A/C-02)

V-UC-1254001 A/C-02 - MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr.70
Internal Coating/ Cladding	not applicable
Corrosion allowance:	3mm
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	ISO15156 H ₂ S Service
Reference Documents	I-FD-3010.2D-1254-540-P4X-001 I-DE-3010.2D-1254-944-P4X-004/005/006

11.2. FILTERS

11.2.1. CO₂ COMPRESSION UNIT COOLERS CW FILTERS (FT-P-UC-1254001A/C-01/02)

FT-P-UC-1254001A/C-01/02 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 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	Not applicable
Reference Documents	I-FD-3010.2D-1254-561-P4X-001 I-DE-3010.2D-1254-944-P4X-001/002/003/004/005/006

12. INJECTION GAS COMPRESSION UNIT MATERIALS SELECTION (U-1252)

12.1. PRESSURE VESSELS

12.1.1. GAS INJECTION COMPRESSION SCRUBBER (V-UC-1252001A/B)

V-UC-1252001A/B- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 765 gr III ¹
Internal Coating/ Cladding	SS 316L (UNS S31603) (3mm)
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	SA 765 gr III ¹
Welded attachments (Class III Parts):	- externals: A 203 Gr D or SA 765 gr III
	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316L (UNS S31603)
Support (Class V Parts):	SA 765 gr III
Special Service	ISO15156 H ₂ S Service. Low temperature (-100°C)
Reference Documents	I-FD-3010.2D-1252-540-P4X-001 I-DE-3010.2D-1252-944-P4X-001/ 002
Note: (1): For 3,5Ni requirements in sour service, see I-ET-3010.00-1200-900-P4X-001.	

12.2. FILTERS

12.2.1. INJECTION GAS COMPRESSION DISCHARGE COOLER CW FILTER (FT-P-UC-1252001A/B)

FT-P-UC-1252001A/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	Not applicable
Reference Documents	I-FD-3010.2D-1252-561-P4X-001 I-DE-3010.2D-1252-944-P4X-001/ 002

13.EXPORTATION GAS COMPRESSION UNIT MATERIALS SPECIFICATION (U-1231002)

13.1. PRESSURE VESSELS

13.1.1. EXPORTATION GAS COMPRESSION 1ST STAGE SUCTION SCRUBBER (V-UC-1231002A/D-01)

V-UC-1231002A/D-01- MATERIAL DATA	
Shell and Heads (Class I Parts):	A 203 Gr D or SA 765 gr III1
Internal Coating/ Cladding	SS 316L (UNS S31603) (3mm)
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	A 203 Gr D or SA 765 gr III1
Welded attachments (Class III Parts):	- externals: A 203 Gr D or SA 765 gr III
	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316L (UNS S31603)
Support (Class V Parts):	A 203 Gr D or SA 765 gr III
Special Service	ISO15156 H ₂ S Service. Low temperature (-80°C)
Reference Documents	I-FD-3010.2D-1231-540-P4X-003
	I-DE-3010.2D-1231-944-P4X-006/007/008/009
Note: (1): For 3,5Ni requirements in sour service, see I-ET-3010.00-1200-900-P4X-001.	

13.1.2. EXPORTATION GAS COMPRESSION 2ND STAGE SUCTION SCRUBBER (V-UC-1231002A/D-02)

V-UC-1231002A/D-02- MATERIAL DATA	
Shell and Heads (Class I Parts):	A 203 Gr D or SA 765 gr III1
Internal Coating/ Cladding	SS 316L (UNS S31603) (3mm)
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	A 203 Gr D or SA 765 gr III1
Welded attachments (Class III Parts):	- externals: A 203 Gr D or SA 765 gr III
	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS 316L (UNS S31603)
Support (Class V Parts):	A 203 Gr D or SA 765 gr III
Special Service	ISO15156 H ₂ S Service. Low temperature (-80°C)
Reference Documents	I-FD-3010.2D-1231-540-P4X-003
	I-DE-3010.2D-1231-944-P4X-010/011/012/013
Note: (1): For 3,5Ni requirements in sour service, see I-ET-3010.00-1200-900-P4X-001.	

13.2. FILTERS

13.2.1. EXPORTATION GAS COMPRESSION UNIT COOLERS CW FILTERS (FT-P-UC-1231002A/D-01/02)

FT-P-UC-1231002A/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	Not applicable
Reference Documents	I-FD-3010.2D-1231-561-P4X-001 I-DE-3010.2D-1231-944-P4X-006/007/008/009/010/011/012/013

14. FUEL GAS UNIT MATERIALS SELECTION (U-5135)

14.1. PRESSURE VESSELS

14.1.1. FUEL GAS K.O. DRUM (V-5135001)

V-5135001- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr. 70N
Internal Coating/ Cladding	not applicable
Corrosion allowance:	3.00 mm
Nozzles reinforcements (Class II Parts):	SA 516 Gr. 70N
Welded attachments (Class III Parts):	- externals: SA 516 Gr. 70N
	- internals: SS 316
Removable internals (Class IV Parts):	SS 316
Support (Class V Parts):	SA-36 or SA-516 Gr. 70
Special Service	Low temperature (-46°C)
Reference Documents	I-FD-3010.2D-5135-540-P4X-001 I-DE-3010.2D-5135-944-P4X-002

14.2. FILTERS

14.2.1. MAIN GENERATOR FUEL GAS FILTER (FT-5135001A/F)

FT-5135001A/F - MATERIAL DATA	
Shell and Heads (Class I Parts):	SS 316L (UNS S31603)
Internal Coating/ Cladding	Not applicable
Corrosion allowance:	3 mm
Nozzles reinforcements (Class II Parts):	SS 316/316L
Welded attachments (Class III Parts):	- externals: SS 316L (UNS S31603)
	- internals: SS 316L (UNS S31603)
Removable internals (Class IV Parts):	SS316
Support (Class V Parts):	SS 316/316L
Special Service	Low temperature (-46°C)
Reference Documents	I-FD-3010.2D-5135-561-P4X-001 I-DE-3010.2D-5147-944-P4X-001/ 002/003

15. STRUCTURAL TANKS RECOVERY GAS UNIT MATERIALS SELECTION (U-1350)

15.1. PRESSURE VESSELS

15.1.1. STRUCTURAL TANKS RECOVERY GAS K.O. DRUM (V-1350001)

V-1350001- 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. 70N
Welded attachments (Class III Parts):	- externals: SA 516 Gr. 70N
	- internals: SS 316
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-3010.2D-1350-540-P4X-001 I-DE-3010.2D-1350-944-P4X-001

TECHNICAL SPECIFICATION	Nº I-ET-3010.2D-1200-500-P4X-001	REV. B
AREA:	ATAPU 2 AND SÉPIA 2	SHEET 24 of 26
TITLE:	MATERIAL SPECIFICATION FOR PROCESS SYSTEMS PRESSURE VESSELS AND TANKS	INTERNAL
		ESUP

16. FLARE SYSTEM UNIT MATERIALS SELECTION (U-5412)

16.1. PRESSURE VESSELS

16.1.1. HIGH PRESSURE FLARE K.O. DRUM (V-5412001)

V-5412001- 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	ISO15156 H ₂ S Service. Low temperature (-100°C)
Reference Documents	I-FD-3010.2D-5412-540-P4X-001 I-DE-3010.2D-5412-944-P4X-001

16.1.2. LOW PRESSURE FLARE K.O. DRUM (V-5412002)

V-5412002- 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	ISO15156 H ₂ S Service.
Reference Documents	I-FD-3010.2D-5412-540-P4X-001 I-DE-3010.2D-5412-944-P4X-002

17. PRODUCED WATER UNIT MATERIAL SPECIFICATION (U-5331)

17.1. PRESSURE VESSELS

17.1.1. PRODUCED WATER FLASH DRUM (V-5331001)

V-5331001- MATERIAL DATA	
Shell and Heads (Class I Parts):	SA 516 Gr.70
Internal Coating/ Cladding	UNS N06625(3mm)
Corrosion allowance:	SA 516 Gr. 70
Nozzles reinforcements (Class II Parts):	- externals: SA 516 Gr. 70
Welded attachments (Class III Parts):	- internals: UNS N06625
	UNS N06625
Removable internals (Class IV Parts):	SA-36 or SA 516 Gr. 70
Support (Class V Parts):	SA 516 Gr.70
Special Service	Not applicable
Reference Documents	I-FD-3010.2D-5331-540-P4X-001 I-DE-3010.2D-5331-944-P4X-001

17.2. FILTERS

17.2.1. PRODUCED WATER FILTER (FT-5331001A/C)

FT-5331001A/C - MATERIAL DATA	
Shell and Heads (Class I Parts):	UNS 31803
Internal Coating/ Cladding	Not applicable
Corrosion allowance:	Not applicable
Nozzles reinforcements (Class II Parts):	UNS S32750
Welded attachments (Class III Parts):	externals: UNS 31803
	- internals: UNS 31803
Removable internals (Class IV Parts):	UNS 31803
Support (Class V Parts):	UNS 31803
Special Service	Not applicable
Reference Documents	I-FD-3010.2D-5331-561-P4X-001 I-DE-3010.2D-5331-944-P4X-007

18. CHEMICAL INJECTION UNITS MATERIAL SPECIFICATION (U-1260)

18.1. TANKS

TAG	DESCRIPTION	MATERIAL SPECIFICATION
TQ-UQ-1261001-01 A/B	Defoamer	GRP
TQ-UQ-1261001-02 A/B	Demulsifier	GRP
TQ-UQ-1261001-03	H ₂ S scavenger tank - offloading	GRP
TQ-UQ-1261001-04	Acetic Acid (75%)	SS 316L
TQ-UQ-1261001-05	Sodium hydroxide (50%)	GRP
TQ-UQ-1261001-06 A/B	Scale inhibitor- topsides	GRP
TQ-UQ-1261001-07 A/B	Scale inhibitor - subsea	GRP
TQ-UQ-1261001-08	Wax inhibitor- subsea	SS 316L
TQ-UQ-1261001-09	Asphalten inhibitor – subsea	GRP
TQ-UQ-1261001-10 A/B	H ₂ S scavenger - subsea	GRP
TQ-UQ-1261001-11 A/B	Hydrate inhibitor	GRP
TQ-UQ-1261001-12	Gas corrosion inhibitor	GRP
TQ-UQ-1261001-13	Hydrate inhibitor (subsea)	GRP
TQ-UQ-1262001-01 A/B	Polyelectrolyte	GRP
TQ-UQ-1262001-02	Scale inhibitor	GRP
TQ-UQ-1262001-03 A/B	Biocide	GRP
TQ-UQ-1262001-04	O ₂ Scavenger	GRP
TQ-UQ-1262001-05	Biocoagulant	GRP
TQ-UQ-1263001-01	O ₂ Scavenger	GRP
TQ-UQ-1263001-02	Biodispersant	GRP
TQ-UQ-1263001-03 A/B	Biocide	GRP
TQ-UQ-1263001-04	Scale Inhibitor	GRP