INDEX OF REVISONS

REV.	DESCRIPTION AND/OR REVISED SHEETS
0	ORIGINAL ISSUE

SUMMARY

1 SCOPE

1.1. This Specification defines the minimum requirements and recommended practices for design, fabrication and assembly of pipe supporting of production and utility piping systems for HULL, TOPSIDE and modules of offshore projects.

1.2. In case of conflicting requirements between this technical specification and other references or requirements on project, the most stringent shall prevail and must be brought to BUYER attention. If necessary, the CONTRACTOR may revert to BUYER for clarification.

2 ABBREVIATIONS

In addition to general definitions set in reference \1\, the following abbreviations are applicable in this specification.

2.1 API - American Petroleum Institute.

2.2 ASME - American Society of Mechanical Engineers.

2.3 CS - Classification Society.

2.4 ISO - International Organization for Standardization.

2.5 MESG - Maximum Experimental Safe Gap.

2.6 NPS - Nominal Pipe Size.

2.7 P&ID – Piping and instrumentation diagram.

3 DEFINITIONS AND TERMS

In addition to definitions and terms set in reference API 2000, the following definitions and terms are applicable in this specification.

3.1 *Full Lift Valve:* A valve that in maximum 10% overpressure is in the fully open position.

3.2 *Pure weight type valve:* A valve that has pressure plug without springs or magnetic forces to control opening. The opening is only controlled by the weight of the plug (pallet).

3.3 *Emergency Relief Valve:* An additional valve used exclusively for fire conditions.

4 NORMATIVE REFERENCES

The following standards and documents include provisions, which, through reference in this text or not, constitute requirements of this technical specification. 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.

4.1 CLASSIFICATION RULES

Refer to Project General Conditions and Data Specification for nominated Classification Society. Relevant Class Rules shall apply.

SELLER's responsibilities include documents submission to the certifying authority as described in the latest edition of their rules for equipment on offshore facilities.

4.2 CODES, STANDARDS AND REGULATIONS

In addition to rules and regulations set forth in reference \2\, the following codes and standards are applicable to piping supports.

API 2000 – Venting Atmospheric and Low-Pressure Storage Tanks

ASME B16.5 - Pipe Flanges and Flanged Fittings

ISO 16852 - Flame arresters — Performance requirements, test methods and limits for use

ISO 27509 - Petroleum and natural gas Industries — Compact flanged connections with IX seal ring

4.3 REFERENCE DOCUMENTS

The following documents are cited or not within this technical specification and therefore constitute requirements for the piping supports.

Ref. #	Doc. No.	Doc. Title
\1\	I-ET-3010.00-1200-940-P4X-002	General Technical Terms
\2\	I-MD-3010.2E-1200-940-P4X-027	Descriptive Memorandum – Hull Systems
\3\	DR-ENGP-I-1.15	Color Coding
\4\	I-ET-3010.00-1200-956-P4X-002	General Painting
\5\	I-ET-3010.00-1200-251-P4X-001	Requirements for Bolting Materials

5 DESIGN CRITERIA FOR VALVE

5.1 Accumulation: Vendor shall consider accumulation zero, that is, valve will not pass the MAWP or design pressure.

5.2 Overpressure: for the purpose of sizing, the valve overpressure shall be maximum 10%.

5.3 The valve shall be full lift type for pressure (discharge condition), except for magnetic valves with negative overpressure.

5.4 The valve shall have soft seal.

5.5 The valve shall be sized according to the flowrate required for pressure and vacuum in the datasheet. It shall be avoided to install valves with certified capacity more than 100% required capacity to avoid chattering.

5.6 The P&ID shall be sent to manufacturer for sizing.

5.7 It shall be followed the recommendations from API 2000 for valves weight type. Above 65 mbar set pressure pure weight type valves may be too heavy and shall be used only if approved by BUYER.

6 DESIGN CERTIFICATION FOR VALVE

6.1 Valve shall have flowrate curves certified by independent laboratory (except emergency relief valve).

6.2 The manufacture shall issue certificates for set pressure and vacuum tests and calibrations. The test bench shall record the pressure and vacuum tests that shall be attached to the certificates. It shall be included photos of the pressure and vacuum tests. The certificate shall be witnessed and assigned and included in valve Databook.

6.3 The manufacture shall issue certificates for tightness (leakage) tests for pressure and vacuum. The test bench shall record the pressure and vacuum tests that shall be attached to the certificates. It shall be included photos of the pressure and vacuum tests. The certificate shall be witnessed and assigned and included in valve Databook.

6.4 Material certificates for body, bolts, studs, seat, spring and other traceable parts.

7 ADDITIONAL REQUIREMENTS FOR VALVES

7.1 The valves shall be tested for inclination before the tightness test. The valve shall be fully assembled with the plugs and placed on the horizontal position, rotate to 90 degrees to vertical position and then rotate to 180 degrees to horizontal position (other side). After that, the valve shall be assembled on the test bench to be leakage tested.

7.2 The allowable leakage is maximum 70% of the values stablished in API 2000.

7.3 If any repair is needed the valve need to be tested again according to the items above.

8 DESIGN CRITERIA FOR FLAME ARRESTER

8.1 The fluid composition shall be informed in datasheet and the manufacturer is responsible to confirm the MESG of the flame arrester.

8.2 The pressure drop shall be informed in datasheet. For flame arrester protecting tanks the maximum pressure drop shall be less than MAWP of the tank. If the flame arrester is assembled on vent equipped with valves, the sizing of the flame arrester shall be done together with the pressure vacuum valve to protect the tank. The pressure loss of piping, including headers, bends shall be considered in the sizing.

8.3 The P&ID shall be sent to the manufacturer for sizing.

8.4 The flame arrester shall be select for detonation or deflagration according to the maximum distances from the source of ignition according to flame arrester model.

8.5 The line between the flame arrester and the source of ignition (generally atmosphere) shall have constant inside diameter.

8.6 In case of continuous burning inside inline flame arrester, it shall be equipped with temperature sensors connected to safety systems.

8.7 Shall comply ISO 16852.

8.8 Flame arresters are not recommended for liquid lines. Also not recommended for gas temperature above 60°C and pressure above 0.5 bar. For conditions above these limits the manufacturer shall confirm if the model select can comply with it, including certifications for these conditions.

9 DESIGN CERTIFICATION FOR FLAME ARRESTER

9.1 Flame arrester shall be certified by independent laboratory by test for flame propagation (detonation, deflagration, continuous burning) according to the requirements of ISO 16852, for the fluid class specified, the temperature and pressure according to the datasheet.

9.2 Material certificates for body, bolts, studs, flame arrester element, flame arrester cage and any other traceable parts.

9.3 For flame arrester equipped with instruments, explosion proof certificate and INMETRO certificates are required.

10 ADDITIONAL REQUIREMENTS FOR FLAME ARRESTER

10.1 Flame arrester for horizontal installations shall be eccentric type. No pocket inside flame arrester body is permitted.

10.2 Flame arrester for vertical lines may be concentric type.

10.3 Welds shall be 100 % radiography. In alternative US maybe accept if approved by BUYER.

10.4 Performance tests are only hydrostatic test and leakage test for body gaskets. Certificates to be included in datasheet.

10.5 Burning tests do not need to be performed for each equipment, but only to be certified by an international laboratory (FM, TUV, etc.) through prototype.

11 PAINTING

11.1 Valves and flame arrester shall be painted according to project technical specification set in reference \4\.

12 FASTENERS

12.1 Bolts and nuts shall be sour service resistant and chlorine resistant. SS 304 are not acceptable for any parts. Bolts and nuts shall be Zn Ni plus PTFE coated according to project specification \5\ or equivalent coating.

13 TAG FOR VALVE AND FLAME ARRESTER

13.1 Tag name plate shall be in 316 ss. It shall contain TAG number, maximum operating temperature, pressure, connection, body material, order number, manufacturer name.

14 DOCUMENTATION ISSUED BY VENDOR VALVES AND FLAME ARRESTER

The vendor shall issue and present for BUYER approval at least the following documents:

14.1 Certified dimensional drawings with scale.

14.2 Exploded 3D view with parts identified.

14.3 Gaskets commercial identification.

14.4 Datasheets.

14.5 IPT according to contract.

14.6 Data-book according to contract.

14.7 Flow rate and Sizing Calculation.

14.8 Spare parts list with commercial identification.

14.9 Tests Reports.

All documentation shall be issued at least in readable and searchable pdf format.