International Association of Oil & Gas Producers

SPECIFICATION
S-722

August
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Supplementary Specification to API Standard 537 Flare Package

JIP33
JOINT INDUSTRY PROGRAMME

Revision history

VERSION	DATE	PURPOSE
1.0	August 2020	Issued for Use

Acknowledgements

This IOGP Specification was prepared by a Joint Industry Programme 33 Standardization of Equipment Specifications for Procurement organized by IOGP with support by the World Economic Forum (WEF).

Foreword

This specification was prepared under Joint Industry Programme 33 (JIP33) "Standardization of Equipment Specifications for Procurement" organized by the International Oil & Gas Producers Association (IOGP) with the support from the World Economic Forum (WEF). Companies from the IOGP membership participated in developing this specification to leverage and improve industry level standardization globally in the oil and gas sector. The work has developed a minimized set of supplementary requirements for procurement, with life cycle cost in mind, resulting in a common and jointly agreed specification, building on recognized industry and international standards.

Recent trends in oil and gas projects have demonstrated substantial budget and schedule overruns. The Oil and Gas Community within the World Economic Forum (WEF) has implemented a Capital Project Complexity (CPC) initiative which seeks to drive a structural reduction in upstream project costs with a focus on industry-wide, non-competitive collaboration and standardization. The CPC vision is to standardize specifications for global procurement for equipment and packages. JIP33 provides the oil and gas sector with the opportunity to move from internally to externally focused standardization initiatives and provide step change benefits in the sector's capital projects performance.

This specification has been developed in consultation with a broad user and supplier base to realize benefits from standardization and achieve significant project and schedule cost reductions.

The JIP33 work groups performed their activities in accordance with IOGP's Competition Law Guidelines (November 2014).

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Introduction

The purpose of this specification is to define a minimum common set of requirements for the procurement of flare packages in accordance with API Standard 537, Third Edition, March 2017 for application in the petroleum and natural gas industries.

This specification follows a common document structure comprising the four documents as shown below, which together with the purchase order define the overall technical specification for procurement.

JIP33 Specification for Procurement Documents
Supplementary Technical Specification

This specification is to be applied in conjunction with the supporting datasheet, quality requirements specification (QRS) and information requirements specification (IRS) as follows.

IOGP S-722: Supplementary Specification to API Standard 537 Flare Package

This specification defines the technical requirements for the supply of the equipment and is written as an overlay to API Standard 537, following the API Standard 537 clause structure. Clauses from API Standard 537 not amended by this specification apply as written to the extent applicable to the scope of supply.

Modifications to API Standard 537 defined in this specification are identified as *Add* (add to clause or add new clause), *Replace* (part of or entire clause) or *Delete*.

IOGP S-722D: Datasheet for Flare Package

The datasheet defines application specific requirements, attributes and options specified by the purchaser for the supply of equipment to the technical specification. The datasheet may also include fields for supplier provided information attributes subject to purchaser's technical evaluation. Additional purchaser supplied documents may also be incorporated or referenced in the datasheet to define scope and technical requirements for enquiry and purchase of the equipment.

IOGP S-722Q: Quality Requirements for Flare Package

The QRS defines quality management system requirements and the proposed extent of purchaser conformity assessment activities for the scope of supply. Purchaser conformity assessment activities are defined through the selection of one of four generic conformity assessment system (CAS) levels on the basis of evaluation of the associated service and supply chain risks. The applicable CAS level is specified by the purchaser in the datasheet or in the purchase order.

IOGP S-722L: Information Requirements for Flare Package

The IRS defines the information requirements, including contents, format, timing and purpose to be provided by the supplier. It may also define specific conditions which invoke information requirements.

The terminology used within this specification and the supporting datasheet, QRS and IRS follows that of API Standard 537 and is in accordance with ISO/IEC Directives, Part 2 as appropriate.

The datasheet and IRS are published as editable documents for the purchaser to specify application specific requirements. The supplementary specification and QRS are fixed documents.

The order of precedence (highest authority listed first) of the documents shall be:

a) regulatory requirements;

b) contract documentation (e.g. purchase order);

c) purchaser defined requirements (datasheet, QRS, IRS);

d) this specification;

e) API Standard 537.

1 Scope

Replace section with

This supplementary specification provides requirements and guidance for the selection, design, specification, operation, and maintenance of flares and related combustion and mechanical components used in pressure-relieving and vapour-depressurising systems for petroleum, petrochemical and natural gas industries. This specification is intended for onshore and offshore facilities.

The following types of flares are outside the scope of this specification:

— liquid burner flares;

— burn pits;

— flare burners with assist media other than steam and air (such as high-pressure gas or water);

— temporary, mobile, trailer mounted flares.

Annex A, Annex B, Annex C and Annex D provide further guidance and best practices for the selection specification and mechanical details for flares and on the design, operation and maintenance of flare combustion and related equipment.

It is intended that IOGP S-722D datasheet is used to communicate and record design information. Datasheets in Annex F and instructions in Annex E are retained for information.

2 Normative References

Delete from section

ASTM B633, *Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel*

Add to section

ASME B16.47, *Large Diameter Steel Flanges*

ASTM A193/193M, *Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications*

EN 1092-1, *Flanges and their joints – Circular flanges for pipes, valves, fittings and accessories, PN designated – Part 1: Steel flanges*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods*

ISO 10684, *Fasteners hot dip galvanized coatings*

IOGP S-705, *Supplementary Specification to API Recommended Practice 582 Welding Guidelines for the Chemical, Oil, and Gas Industries*

4 Design

4.2 System Design

Add to item a) after "release"

and including a minimum continuous case;

4.4 Types of Flares

Replace NOTE 1 with

NOTE 1 Refer to Figure A.1 for a general flare type selection guide. Within each general type of flare, various alternatives and proprietary design aspects can exist. An understanding of alternatives and/or proprietary design aspects can be obtained and evaluated using the IOGP S-722D datasheet and Annex E.

4.5 Flare Burners

Add to section a)

- the material of the flare burner shall be Type 310 stainless steel or other high-temperature alloy with mechanical and corrosion resistance properties at 900 °C (1650 °F) exceeding those of Type 310 stainless steel;

  NOTE 1 Properties affecting material selection are high temperature yield strength, creep rupture strength, thermal fatigue resistance, metallurgical stability, weldability and resistance to oxidation, sulphidation, chloridation, carburization and nitridation.

- attachments welded to the flare burner shall be of the same material as the flare burner;

- the minimum thickness of the flare burner barrel shall be 6 mm (0.25 in.) for burners with a barrel diameter less than 0.914 m (36 in.) and 9 mm (0.35 in.) for burners with barrel diameters of 0.914 m (36 in.) and above;

- internal or external refractory lining shall not be used for elevated flare burners;

- pipe or tube used for the fabrication of the burner parts shall be seamless type;

- the material of steam injection nozzles and steam piping exposed to flame shall be Type 316 stainless steel or other 300 series stainless steel with equal or higher corrosion resistance;

- the material of assist air distribution and injection parts exposed to the flame shall be Type 310 stainless steel or other high-temperature alloy with mechanical and corrosion resistance properties at 900 °C (1650 °F) exceeding those of Type 310 stainless steel;

  NOTE 2 Properties affecting material selection are high temperature yield strength, creep rupture strength, thermal fatigue resistance, metallurgical stability, weldability and resistance to oxidation, sulphidation, chloridation, carburization and nitridation.

- for Type 310 stainless steel flare burners in offshore or coastal locations, the bolting for all flanged connections and attachments to the flare burner shall be ASTM A193/193M Grade B8MLCuNA or high-nickel alloy material;

- for Type 310 stainless steel flare burners in onshore locations, excluding coastal, the bolting for all flanged connections and attachments to the flare burner shall be ASTM A193/193M Grade B8M;

- for high-nickel alloy flare burners, the bolting for high nickel alloy flanged connections and attachments to the flare burner shall be of the same material;

- the windshield and attachment of the windshield to the flare burner shall be designed for differential thermal expansion;

- the material of construction for the flare burner windshield and windshield supports shall be the same as the flare burner material;

- velocity and venturi-type purge seals shall have drain holes incorporated at the bases;

— the material of velocity and venturi-type purge seals shall be the same as the flare burner material.

Add to section b)

— where heat tracing is specified, drains on the flare stack shall be routed to grade, heat-traced and insulated;

— separate steam risers and controls shall be provided for each steam injection system.

Add new section d)

d) For flare burners with a single variable orifice:

— a full flow bypass around the flare burner shall be provided.

Add new section e)

e) For flares with multiple variable orifices:

— the capacity of flare burner shall be increased above the required design capacity by the maximum flow rate of a single variable orifice.

4.6 Mechanical Design

4.6.1

Replace second sentence of item b) with

Structural components shall comply with the specified structural design code, supplemental requirements in this standard and the site-specific structural design specification.

4.6.2

Delete NOTE after item o)

Add new section

p) thermal cycling, flame-lick and low flows;

Add new section

q) constraints of the available shipping, receiving and handling facilities.

4.7 Pilots

Add to section e)

The performance verification type-test shall be in accordance with A.6.

Add to section f)

For multi-burner staged flares, at least two pilots shall be provided for each stage or for each row of burners.

Table 1—Number of Pilots for Single-point Flares

Add footnote c to table

[c] For elevated flares with multi-point or complex geometry burners, the inlet diameter of flare burner shall be used in Table 1.

Replace section g) with

g) The pilot burner head shall be a single cast piece or machined from a single (monolithic) piece of wrought material.

Replace section i) with

i) A settling chamber or a strainer with openings no larger than 25 % of the fuel orifice diameter shall be installed upstream of the gas orifice at the pilot.

Replace section j) with

j) The pilot tip and pilot components between the pilot tip and the air mixer shall be Type 310 stainless steel or other high-temperature alloy with mechanical and corrosion resistance properties at 900 °C (1650 °F) exceeding those of Type 310 stainless steel.

NOTE Properties affecting material selection are high temperature yield strength, creep rupture strength, thermal fatigue resistance, metallurgical stability, weldability and resistance to oxidation, sulphidation, chloridation, carburization and nitridation.

Replace section p) with

p) For flares with continuously lit pilots, individual fuel gas supply lines shall be installed to each pilot from a location that is accessible while the flare is in service.

Add new section

q) Pilots shall be self-inspirating pre-mix type burners with fixed heat release.

Add new section

r) Strainers shall be installed upstream of the pilot fuel gas regulator.

Add new section

s) The strainers shall be accessible for online cleaning without interruption of the fuel gas supply to the pilots.

Add new section

t) The strainers shall have a screen or wire mesh with openings that are 25 % or less than the diameter of the fuel orifice at the pilot.

Add new section

u) The pressure regulator(s) shall be accessible for online maintenance without interruption of the fuel gas supply to the pilots.

Add new section

v) For offshore or coastal locations, the material for pilot fuel gas regulator strainers, regulators, valves, piping and fittings shall be Type 316 stainless steel or other material with higher corrosion resistance.

NOTE Valve and regulator material is for body material. Trim material may have greater corrosion or erosion resistant properties than those of the body material.

Add new section

w) For onshore locations, excluding coastal, the material for pilot fuel gas regulator strainers, regulators, valves, piping and fittings shall be Type 304 stainless steel or other material with higher corrosion resistance.

NOTE Valve and regulator material is for body material. Trim material may have greater corrosion or erosion resistant properties than those of the body material.

Add new section

x) If specified, the pilot performance test shall be carried out in accordance with A.6.

Add new section

y) Threaded connections at the pilot tip shall not be used.

4.8 Pilot Ignition Systems

Replace last sentence of section a) with

The performance verification test shall be in accordance with A.6.

Add new section

f) For flares that cannot be taken offline without impact on safety, two independent pilot ignition systems shall be provided.

Add new section

g) For flares that cannot be taken offline without impact on safety, at least one of the pilot ignition systems shall have all parts requiring maintenance installed at a location which is accessible while the flare is in service.

Add new section

h) The primary pilot ignition system shall have automatic pilot re-ignition upon detection of pilot flame failure.

Add new section

i) High-tension type ignition systems shall not be used for spark ignition at the pilot.

NOTE High-tension and high-voltage type ignition systems utilize sparking devices with dielectric insulator between the electrodes and an air gap between the electrodes' ends. High-tension type systems typically require voltages above 8 kV to produce a spark. Refer to A.4.3 for more information.

Add new section

j) Components of ignition systems shall be proven in successful operation for at least five years in two or more installations.

NOTE New technologies can be accepted on a case by case basis. Additional design verification and validation information such as prototype tests, functional, operational, performance, field test results and comparison to similar proven designs may be required from the supplier.

Add new section

k) The following functions shall be implemented in the local control panel:

- power on/off selection and indication;
- pilot lit/unlit status indication for each pilot;
- automatic/manual ignition mode selection for the primary ignition system;
- manual spark pushbuttons for the primary and secondary ignition systems;
- pilot selection for the FFG system if automated valves are provided on the pilot lines.

Add new section

l) The local control panel shall be installed at a location that is accessible while the flare is in service.

Add new section

m) A functional test of ignition and flame detection system shall be performed at the supplier's facility.

Add new section

4.8.1 High Energy Ignition

For a high energy ignition system, the following applies:

a) The sparking device shall ignite the fuel/air mixture prior to the pilot tip.

b) Ignition system electrical components shall be rated to withstand the highest temperature which they are exposed to during all flaring cases.

c) The ignition cable connecting the ignition probe with the first junction box shall be protected from the flare flame radiation.

d) The first junction box shall be installed in a sheltered location under the flare burner access platform or the other heat shield.

e) The junction boxes installed local to the pilots shall be constructed of stainless steel material with ceramic connectors.

f) The ignition system exciter shall be installed at a location that is accessible during flare service.

Add new section

4.8.2 Flame Front Generator

For an FFG ignition system, the following applies:

a) The FFG ignition system shall be compressed-air type.

b) The pilot shall have a dedicated flame front ignition line from the ignition control panel.

c) For offshore or coastal locations, the material for front generator lines between the FFG panel and pilots shall be Type 316 stainless steel or other material with higher corrosion resistance.

d) For onshore locations, excluding coastal, the material for front generator lines between the FFG panel and pilots shall be Type 304 stainless steel or other material with higher corrosion resistance.

e) The FFG line size shall be DN 25 (NPS 1).

f) The wall thickness for FFG lines shall be Schedule 40S.

g) If specified, the flame front generator lines shall be heat-traced and insulated.

h) The pressure regulators and pressure gauges that are downstream of the regulators shall be provided on the ignition fuel gas and the air supply lines to mixing chamber.

i) The pressure gauges installed in fuel and air supply lines shall be able to withstand or be protected from the pressure pulses occurring during ignition of the fuel-air mixture.

j) The pressure regulators installed in the ignition fuel line and the air supply line shall have shut-off valves.

k) The mixing chamber and view port shall be designed for the temperature and pressure experienced during ignition of the fuel/air mixture.

4.9 Pilot Flame Detection

Replace last sentence of section b) with

The performance verification test shall be in accordance with A.6.

Add new section

d) Thermocouples shall be provided for pilot flame detection.

Add new section

e) If specified, an independent backup flame detection system other than thermocouple shall be provided.

Add new section

f) Components of flame detection systems shall be proven in successful operation for at least five years in two or more installations.

NOTE New technologies can be accepted on case by case basis. Additional design verification and validation information such as prototype tests, functional, operational, performance, field test results and comparison to similar proven designs may be required from the supplier.

Add new section

g) The pilot flame failure alarm shall be provided in the local control panel and plant central control system for each pilot.

Add new section

4.9.1 Thermocouples

For the thermocouple type pilot flame detection system, the following applies:

a) Two single-circuit Type K thermocouples shall be provided for each pilot.

b) The thermocouple tip weld shall be an ungrounded type.

c) The thermocouple sheath shall be Hastelloy X (UNS N06002) or equal material packed with magnesium oxide insulation.

d) The thermocouple shall be installed in a separate thermowell incorporated into the pilot head.

e) The thermocouple sheath shall be protected from flame impingement for a distance of at least 1.8 m (6 ft) or 125 % of the actual burner diameter (whichever is greater) from top of the flare burner.

f) The thermocouples sheathing shall extend to a termination head or junction box installed in a location protected from flare radiation.

g) The thermocouple termination heads or junction boxes installed local to the flare burner shall be stainless steel material with ceramic terminals.

h) The thermocouple extension cable or wire shall be rated to withstand the highest temperature that it is exposed to during all flaring cases.

Add new section

4.9.2 Flame Ionization

For a flame ionization type pilot flame detection system, the following applies:

a) The ionization cable shall be protected from flame impingement and radiation to the first junction box.

b) The ionization cable shall be rated to withstand the highest exposure temperature at all flaring cases.

c) The first junction box shall be installed in a location protected from flare radiation.

d) The ionization system junction boxes nearest to pilots shall be stainless steel material with ceramic terminals.

e) The ionization system transformer and electronics shall be installed at a location that is accessible while the flare is in service.

Add new section

4.9.3 Optical Systems

For an optical type pilot flame detection system, the following applies:

a) The optical system shall be infrared (IR) type.

NOTE Refer to A.5.2.4 for optical systems use guidance.

b) The optical sensors shall be installed on a vibration-free platform accessible while the flare is in service.

Add new section

4.9.4 Acoustic Systems

For an acoustic type pilot flame detection system, the acoustic sensors shall be installed at a location accessible while the flare is in service.

4.10 Piping

4.10.1

Add new section

4.10.9

Steam piping termination points at the stack base shall be anchored.

Add new section

4.10.10

The flare header between the flare knockout drum and the riser shall slope back and drain into the flare knockout drum or liquid seal drum.

Add new section

4.10.11

Low point drains shall be provided on all auxiliary piping lines.

Add new section

4.10.12

Low point drain valves shall be accessible while the flare is in service.

Add new section

4.10.13

The bolting materials for piping flanges at locations other than flare burner shall comply with the piping design code and the piping and bolting specifications as specified.

Add new section

4.10.14

The flare gas piping diameter shall be equal or larger than flare header diameter.

4.11 Auxiliary Components

Add new section

4.11.4

Air assisted flare blowers and drivers shall be proven in successful operation for at least five years in two or more installations.

Add new section

4.11.5

The type of driver for blowers shall be an electric motor.

Add new section

4.11.6

Belt drives shall not be used for an air-assist blower.

Add new section

4.11.7

A mechanical run test of the air-assist blowers shall be performed at the supplier's facility.

Add new section

4.12 Noise

For steam-assisted and air-assisted flares, the noise generated by the assist media shall be included in the overall flare noise level calculations under normal and emergency operating conditions.

Add new section

4.13 Liquid Seal

4.13.1

For the liquid seal, the liquid seal configuration, sizing, internals and instrumentation shall be in accordance with API-521 and specified supplemental requirements.

4.13.2

Liquid seal mechanical design, materials, fabrication and testing shall comply with the design code and specification for pressure vessels.

5 Mechanical Details—Elevated Flares

5.1 Mechanical Design—Design Loads

Add to section i)

6) Lifting lugs or brackets provided on the flare burner for initial installation shall be removed prior to placing the flare burner in service.

7) Loads imposed by temporary lifting equipment or scaffolding during maintenance or replacement of the flare burner shall be included in the structural design calculations.

5.2 Design Details

Replace the first sentence of section a) with

The stack deflection due to wind load or earthquake shall be:

Add to section d)

5) For air-assist flare stacks with coaxial risers, the design shall consider the risk of corrosion of internal surfaces in contact with assist air.

Add new section

f) The heat radiation from the flare burners shall be considered for:

1) the material selection of the structure with respect to the allowable stresses and environmental corrosion;

2) the design of the structural steel joints under severe thermal cycling.

NOTE The design temperature for the structure can be established from radiation data and expected duration of flaring event.

Add new section

g) Double nuts and washers shall be provided for all bolted connections used in flare support structure.

5.3 Flanges

5.3.1

Replace first sentence with

The elevated flare burner and auxiliary connections at the flare burner (e.g. pilot fuel gas, FFG lines, steam, air) to the respective risers shall be flanged as follows:

Replace section a) with

a) for flanges for DN 600 (NPS 24) and smaller burners: ASME B16.5, Class 150 RFSO / RFWN or EN 1092-1, PN 25 Type 01 / Type 11 or fabricated plate flanges drilled in accordance with the specified code;

Replace section b) with

b) for flanges for burner sizes greater than DN 600 (NPS 24): forged flanges or fabricated plate flanges drilled to ASME B16.47 or dimensions specified in Table 3.

NOTE For flange sizes greater than those shown in Table 3, follow the flare manufacturer's standard.

Replace section c) with

c) for DN 600 (NPS 24) and smaller size auxiliary connection: ASME B16.5 RFWN type or EN 1092-1 Type 11.

5.3.3

Replace section with

The bolted connection of the flare burner to the stack and bolted attachments mounted on the flare burner (e.g. pilots, windshield, muffler) shall have double nuts.

Delete NOTE 1

Delete NOTE 2

Add new section

5.3.4

Bolt tightening torque values for the flare burner flange and auxiliary piping flanges at the burner shall be provided.

5.4 Materials of Construction

5.4.2

Replace section including NOTE with

The flare burner inlet flange material shall be the same as the flare burner.

5.5 Welding

5.5.1

Replace section with

The relief-gas-containing portions of the support structure shall be fabricated in accordance with the welding requirements of the pressure design code and IOGP S-705.

5.5.2

Replace section with

If the bottom portion of the stack is designed in accordance with the pressure design code, the fabrication of that portion shall be governed by the welding qualification requirements of the pressure design code and IOGP S-705.

5.5.3

Replace section with

Non-gas-containing portions of the support structure shall be fabricated in accordance with the welding requirements of the structural design code.

Add new section

5.5.4

Welding consumables with filler metal matching base material shall be used for flare burner welding.

Add new section

5.5.5

Attachment welds to the flare burner shall be full penetration.

Add new section

5.5.6

For welding at flare burner, the welding heat input shall be controlled at less than 1.5 kJ/mm (38.1 kJ/in.) without preheat.

Add new section

5.5.7

The FCAW process shall not be used for welding of attachments to the flare burner.

NOTE This is due to the risk of high heat input in relation to hot cracking and the criticality of attachments e.g. lifting lugs, pilots, windshield, etc.

5.6 Inspection

5.6.1

Replace section a) with

a) The pressure design code, pressure vessels and welding specifications shall be used for nondestructive testing and inspection procedures, inspection techniques, standards for acceptance, inspector qualifications, and inspections.

Add new section

5.6.3

Flare burner welds shall be visually inspected during the welding operation and again after the work is completed to determine satisfactory penetration of weld metal fusion and satisfactory operator performance.

Add new section

5.6.4

Butt welds in the flare burner shall be 100 % radiographed.

Add new section

5.6.5

Fillet welds in the flare burner shall be 100 % examined by dye penetrant testing.

Add new section

5.6.6

A positive material identification (PMI) shall be performed on all flare burner parts materials and welds.

Add new section

5.6.7

Parts of the structure intended for assembly at site shall be trial-assembled and match-marked before shipping.

5.7 Surface Preparation and Protection

Replace entire section with the following new sections

5.7.1

The corrosion protection for pressure containing parts and structural parts shall be in accordance with the coating specification as specified.

5.7.2

The flare support structure coating system shall be suitable for the expected exposure temperature due to flare flame radiation but not less than 200 °C (392 °F).

5.7.3

The carbon steel tubular members shall be protected against internal and external corrosion, closed and sealed.

5.7.4

Galvanizing shall be in accordance with ASTM A123/123M, ASTM A143/143M, ASTM A153/153M, ASTM A384/384M, ASTM A385/385M or ISO 1461.

5.7.5

The bolts joining galvanized sections shall be galvanized in accordance with ASTM A153/153M or ISO 10684.

5.10 Platforms and Ladders

5.10.4

Replace section with

The material of construction for platforms, ladders and safety gates shall be suitable for the expected exposure temperature due to flare flame radiation.

5.10.6

Delete section

Add new section

5.10.7

If specified, a 360° platform shall be provided below the flare burner mounting flange for inspections, maintenance, and replacement of the flare burner and auxiliaries.

Add new section

5.10.8

The flare burner maintenance platform shall have not less than 0.9 m (3 ft) clearance width from the flare burner and its appurtenances.

Add new section

5.10.9

For flares equipped with a buoyancy-type air seal, a platform shall be provided for access to the inspection and clean-out nozzles.

Add new section

5.10.10

Access platform(s) shall be provided for inspection and maintenance of fixed, non-retractable type aircraft warning lights.

Add new section

5.10.11

For flare systems equipped with a liquid seal, platforms shall be provided for access to instruments and valves.

Add new section

5.10.12

Ladder and platform attachments to the flare stack shall be by bolting to the welded support clips.

Add new section

5.10.13

If specified, a stairway with a minimum of 0.9 m (3 ft) width shall be provided from grade to riser mounting/ demounting working platforms.

Add new section

5.10.14

All ladders shall have a side exit to the arrival area.

Add new section

5.10.15

If specified, a 360° access platform shall be provided at each guy-wire fixing elevation.

6 Mechanical Details—Enclosed-flame Flares

6.1 Combustion Chamber

6.1.4

Replace section with

Personnel protection shall be provided adjacent to the combustion chamber in areas for personnel access during operation when surface temperatures exceed the specified value.

Add new section

6.1.5

The refractory design hot-face temperature shall be the calculated hot-face temperature plus 165 °C (300 °F) based on the maximum flaring case with the maximum ambient temperature and zero wind velocity.

Add new section

6.1.6

The refractory design cold-face temperature shall be calculated based on the maximum flaring case with the maximum ambient temperature and zero wind velocity.

Add new section

6.1.7

If refractory ceramic fibre (RCF) material is used, the supplier shall provide procedures to mitigate health hazards caused by ceramic fibres during installation, operation and maintenance activities.

NOTE RCF lining material is a potential health hazard classified in Europe as category 2 carcinogen. The purchaser may require the flare supplier and flare manufacturing shop to follow the purchaser's internal policy that outlines requirements for personnel working with and exposed to RCF materials.

Add new section

6.1.8

The combustion chamber design shall prevent water ingress between refractory and casing.

6.4 Pilots

6.4.1

Add to section

The first stage shall be equipped with at least two pilots.

6.5 Wind Fence

Add new section

6.5.7

The view port(s) shall allow observance of all pilots and burners while the flare is in service.

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