



Exploration & Production

GENERAL SPECIFICATION

STRUCTURAL

GS EP STR 104

**Design and fabrication of technical cubicles for
offshore oil installations**

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1. Scope

To define rules governing the design of transportable prefabricated technical cubicles of less than 150 T for offshore oil installations. This specification applies to onshore technical cubicles only to the extent to which the requirements are relevant.

To define the specifications applicable to the studies, supply, construction, fitting out and installation of transportable, prefabricated technical cubicles for offshore oil installations.

These specifications may be applied in full or in part for premises incorporated in the structure of an offshore oil installation.

Special provisions, specific to each project (layout, climatic conditions, programme, function, equipment, etc.), shall be covered by appropriate job specifications.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

Where there are local regulations, their instructions and those of the standards or codes to which they refer shall always be applied, in addition to or in place of the instructions in this document.

Standards

Reference	Title
ISO 834	Fire-resistance tests - Elements of building construction
ISO 3008	Fire resistance tests – Door and shutter assemblies
ISO 3009	Fire-resistance tests Elements of building construction Glazed elements
ISO 1182	Reaction to fire tests for building products – Non-combustibility test
ISO 5657	Reaction to Fire Tests - Ignitability of Building Products Using a Radiant Heat Source
ISO R 1996	The curve of background noise
EN 287	Qualification test of welders – Fusion welding –
ISO 15614 Part 1	Specification and qualification of welding procedures for metallic materials – Welding procedure test – Part 1: arc and gas welding of steels and arc welding of nickel and nickel alloys
ISO 1184	Non-combustibility - Essai de réaction au feu des produits de construction - Essai d'incombustibilité
ISO/TR 3956	Principles of structural fire-engineering design with special regard to the connection between real fire exposure and the heating conditions of the standard fire-resistance test
ISO/TC92/SC2/WG6	Sealing of passageways through fire-break walls

IEC 60079-13	Electrical apparatus for explosive gas atmospheres. Part 13 : construction and use of rooms or buildings protected by pressurization
IEC 60034	Rotating electrical machines
EN 60079-14	Electrical apparatus for explosive gas atmospheres. Part 14 : electrical installations in hazardous areas

Professional Documents

Reference	Title
AISC	Specification for the design, fabrication and erection of structural steel for building, or equivalent
API RP 500	Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
Department Of the Energy – Health and Executive Safety (D.O.E. – H.S.E.)	Offshore installations – Guidance on design, construction and certification (4 th Ed., 1990): - Department of Energy, Hydrocarbon Fire Test standard and Procedure - First Action Level of 85 dBA - A guide to the Offshore Installation (Safety Case) SI 1992/2885, Regulation 4, Safety cases for fixed installations
D.O.E. Section 24	Materials other than steel and concrete
D.O.E. Section 52	Noise and vibration
Bureau VERITAS (BV)	BV Publications (12.93)
B.V. June 2000	Rules for the classification of Steel ships – Part F, chapter 6 Comfort on board COMF & 7 Refrigerating installation – Additional Class Notations
British Standards (BS)	Fire Safety
BS 476	Fire Tests on Building Materials and Structures
BS 2475	Octave and One Third Octave Band Pass Filters
BS 4727	Glossary of Electrotechnical, Power, Telecommunications, Electronics, Lighting and Colour Terms
Institute of Petroleum (I.P)	Model Code of Safe Practice for the Petroleum Industry
N.M.D	Norwegian Maritime Directorate (N.M.D) - Regulation for Mobile Offshore Units
N.P.D. Guidelines	Acts, regulations and provisions for the Petroleum Activities

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
IMO-MODU code	(Mobile Offshore Drilling Unit) Chapter 9
AWS D 1.1	Structural Welding Code - Steel
SOLAS Res. A653 (16)	Recommendation on improved fire test procedures for surface flammability of bulkhead, ceiling and deck finish materials (supersedes A.516(13) and A.564(14))
SOLAS Res. A517 (13)	Recommendation on fire test procedures for "A", "B" and "F" class divisions
SOLAS Res. A166 (ES.IV)	Guidelines on the evaluation of fire hazard properties of materials
SOLAS Res. A472 (XII)	Improved recommendation on test method for qualifying marine construction materials as non-combustible (supersedes A.270(VIII))
I.M.O – 844E	Fire Test Procedures (Ed. 1993) Regulation 3, 3(1) & 3(2) Chapter II-2 SOLAS 1982

Other documents

Reference	Title
Not applicable	

Total General Specifications

Reference	Title
GS EP COR 350	External protection of offshore and coastal structures and equipment by painting
GS EP COR 450	External protection of structures and equipment by painting. Maintenance works
GS EP ELE 001	Electrical design criteria
GS EP ELE 031	Design of earthing and bonding systems
GS EP ELE 079	Electrical apparatus for potentially explosive gas atmosphere
GS EP ELE 081	Lighting
GS EP ELE 161	Electrical cables
GS EP STR 001	Weight monitoring and weighing offshore units
GS EP STR 103	Design and fabrication of skids and equipment supporting structures

Reference	Title
GS EP STR 201	Materials for offshore steel structures
GS EP SAF 216	Area classification
GS EP SAF 253	Impact area, restricted area and fire zones
GS EP SAF 337	Passive fire protection

3. Functions

A technical cubicle is a closed and covered construction, with openings, cable entries and/or conduits, containing technical equipment, big enough to accommodate people needing to work or remain inside.

The transportable and entirely prefabricated cubicles are factory fitted, ready for installation or insertion on a fixed or floating offshore platform. They can also be built into the main framework of a structure.

The term technical cubicle covers the following spaces (non-exhaustive list):

- Electrical, instrumentation, communication and air conditioning plant rooms
- Offices, stores, workshops
- Kitchens, refectories, toilets, watch rooms
- Radio rooms, control rooms, modular accommodation premises, temporary shelters
- Laboratories (subject to studies specific to this type of activity).

These areas can be “inhabited” or “uninhabited” and provide “vital functions” or “secondary functions”, according to the definitions below.

- **Inhabited areas**

Accommodation - Shelter pending evacuation.

Areas regularly and continuously occupied: offices, workshops, laboratories, watch rooms and radio rooms, control rooms, kitchens, refectories, modular accommodation rooms.

- **Uninhabited areas**

Personnel are present in these areas only occasionally and for short periods.

- **Vital functions**

Safety: protection of personnel, shelter pending evacuation, process control and installation safety functions, communications, emergency power supply, fire-fighting.

Production: determined by the risks: pollution, aggravation of an accidental situation, loss of production (importance of the function to production and time/cost of replacement).

- **Secondary functions**

All others not included in the above.

The structure is defined by contractual documents. In the event of contradiction between documents, the following order of precedence shall apply:

- Job specification
- Basic drawings

- Specifications

If necessary, account must be taken of additional or planned future equipment in the job specification.

The life of a structure is normally 20 years.

4. Design methods

4.1 Fire resistance

The level of fire resistance for each segregated area should be defined in the **general safety design**. It is important to assess the level of risk and the consequences of damage caused by fire in the cubicle. The **decision flow diagrams** in the appendix are based on the "inhabited" or "uninhabited" nature of the areas and whether the functions provided are "vital" or "secondary".

In the absence of a general safety design or job specifications, passive fire protection shall be provided in accordance with Chapter 9, sections 9.1 and 9.2 of **MODU - (Rules governing the construction and equipment of mobile offshore drilling unit equipment)** and « **I.M.O 844-E Regulation 3, 3(1) & 3(2) Chapter II-2 SOLAS Fire Test Procedures** ». Fire protection system shall comply with **GS EP SAF 337**.

The required resistance values are as specified below. The tests establishing these values shall adhere to the specifications laid down in the following standards:

- **ISO 834**
- **ISO 3008**
- **SOLAS Chapter II-2 and MODU Code**
- **N.M.D Regulations Part VI p.358**
- **N.P.D acts-regulations and provisions for the Petroleum Activities Vol 2, 01/06/98**
- **I.M.O 844E Fire Test Procedures**

Active fire protection, if required, shall be the subject of a job specification.

4.1.1 Fire resistance of walls and floors

The fire resistance of the walls and elements of construction shall be established, if required, according to the following criteria:

- Load-bearing capacity
- Thermal insulation
- Imperviousness to smoke and flames.

The fire resistance tests on the elements of construction shall be performed in accordance with the conditions described in **ISO 834** and **SOLAS Resolutions A.653 and A.517**.

The design of the structure shall take into account technical report **ISO/TR 3956** will special regard to the connection between real fire exposure and the heating conditions of the standard fire resistance test (**ISO 834**).

The normalized temperature-time curve governs the "class A" tests.

The "hydrocarbon (HC) fire curve" temperature-time curve - "NPD" - governs the "class H" tests.

Doors and closures are tested in accordance with [ISO 3008](#).

Any glass elements (bulls-eye windows, port holes) shall be tested in accordance with [ISO 3009](#).

4.1.2 Reaction and resistance to fire of equipment and materials

All equipment and materials shall be compliant with the following standard tests:

- Non-combustibility: [ISO 1182](#) - criteria according to Appendix A of this standard
- Ignitability/Combustibility: [ISO 5657](#) - combustion time less than or equal to 5 seconds
- Toxic gases (pending the publication of an ISO standard, the following paragraph shall apply).

The materials used must not, in case of fire, release gases such as hydrocyanic acid or hydrochloric acid in quantities greater than those indicated below: the total mass of materials shall be such that for every m³ of volume in the room, the total quantity of nitrogen and chlorine contained and liable to be released in hydrocyanic acid or hydrochloric acid form cannot exceed 5 grams and 25 grams respectively.

Material performance shall be in accordance with [DOE-HSE Section 24](#)

Materials must be tested in accordance with the requirements of [Regulation 3 of Chapter II-2 of SOLAS, IMO-844E Fire Test Procedures](#).

A standard fire test may be the test in [Regulation 3\(b\) of Chapter II-2 of SOLAS, IMO-844E Fire Test Procedures](#) or in [BS 476: Part 20, 21 and 22](#).

Hydrocarbon fire test means a test conducted in accordance with the Department of Energy Hydrocarbon Fire Test Standard and Procedure.

4.1.3 Passages through classified walls

These passages or entries shall conform to the specifications and tests of resolution A 754 (18) of the International Maritime Organization (IMO) and the systems employed shall comply with the requirements of [ISO/TC92/SC2/WG6](#).

4.2 Dropped object and Fire & Blast resistance

For Dropped object and Fire & Blast resistance see [GS EP STR 102](#).

4.3 Installation conditions

4.3.1 Installation in classified areas

The area classification plan is given in the project-specific documentation.

The areas classification shall comply with [GS EP SAF 216](#) and [GS EP SAF 253](#).