

## GENERAL SPECIFICATION

### SAFETY

#### GS EP SAF 331

#### Carbon dioxide fixed fire extinguishing systems

|      |         |                                                |
|------|---------|------------------------------------------------|
|      |         |                                                |
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| 03   | 01/2011 | General Revision                               |
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| 01   | 10/2003 | Change of Group name and logo                  |
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## 1. Scope

### 1.1 Purpose

The purpose of this specification is to define the requirements for the design and installation of carbon dioxide (or CO<sub>2</sub>) fixed fire extinguishing systems.

### 1.2 Applicability

This specification applies to all CO<sub>2</sub> fixed fire extinguishing systems, in onshore and offshore installations. This specification is not retroactive; it shall apply to new projects and any modifications of existing installations.

It does not apply to snuffing of vents. For more details refer to [GS EP SAF 262](#).

It does not apply to CO<sub>2</sub> portable extinguishers. For more details refer to [GS EP SAF 311](#).

## 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

## 3. Reference documents

The reference documents listed below form an integral part of this General Specification.

### External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

| Reference                   | Title                                                                                                         |
|-----------------------------|---------------------------------------------------------------------------------------------------------------|
| <a href="#">ISO 3500</a>    | Gas cylinders - Seamless steel CO <sub>2</sub> cylinders for fixed fire-fighting installations on ships.      |
| <a href="#">ISO 3500/A1</a> | Amendment 1 to standard ISO 3500:2005                                                                         |
| <a href="#">ISO 6183</a>    | Fire protection equipment - Carbon dioxide extinguishing systems for use on premises- Design and installation |
| <a href="#">NFPA 12</a>     | Standard on Carbon Dioxide Extinguishing Systems                                                              |

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**Total General Specifications**

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

| Reference     | Title                                                                                                   |
|---------------|---------------------------------------------------------------------------------------------------------|
| GS EP SAF 222 | Safety rules for turbines, Diesel engines, gas engines and process units in sheltered or enclosed areas |
| GS EP SAF 262 | Pressure protection relief and hydrocarbon disposal systems                                             |
| GS EP SAF 311 | Rules for the selection of fire-fighting systems                                                        |
| GS EP SAF 312 | Fire and Gas detection systems                                                                          |

**4. Terms and definitions**

There are three types of statements in this General Specification: “shall”, “should” and “may”. They shall be understood as follows:

**Shall** Is to be understood as mandatory. Any deviation from a “shall” statement requires a derogation approved by the Company.

**Should** Is to be understood as strongly recommended to comply with the requirements of the specification. Alternatives shall provide a similar level of protection and this shall be documented.

**May** Is used where alternatives are equally acceptable.

For the purpose of this specification, the following terms and definitions apply.

**Automatic operation** Operation that does not require any human action. The fire extinguishing system is based on automatic fire detection and CO<sub>2</sub> release (Company).

**CO<sub>2</sub> total flooding system** System arranged to discharge carbon dioxide into an enclosed space to achieve the appropriate design concentration (ISO 6183).

**Centralized system** Fire extinguishing system designed for several zones, with direction valves on the CO<sub>2</sub> network. A common CO<sub>2</sub> storage is used to protect several rooms (Company).

**Isolated (remote) room** Room where personnel are not normally present and where access time for intervention would take more than 5 minutes (Company).

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These definitions for rooms can be summarized as follows:

| <b>Personnel presence</b>                                                                 | <b>Time to access</b>  |                       |
|-------------------------------------------------------------------------------------------|------------------------|-----------------------|
|                                                                                           | <b>≤ 5 minutes</b>     | <b>&gt; 5 minutes</b> |
| No routine requirement                                                                    | Unmanned               | Isolated              |
| Routine checks<br>• once per day<br>or<br>• once per shift                                | Not permanently manned | Isolated              |
| Permanent occupancy<br>• 50 % of total time per day<br>or<br>• 25% of total time per week | Permanently manned     | NA                    |

**Manual operation**

Operation of the CO<sub>2</sub> system requiring human action (Company).

**Not permanently manned room**

Room which does not require the presence of personnel for normal operations, but where entrance for maintenance or control activities is frequent (e.g. switch-room, instrument room). The access is limited to qualified personnel and it is recognized that the intervention is quick (less than 5 minutes) in case of fire alarm (Company).

**Permanently manned room**

Room which is continuously manned or where personnel are present most of the time, e.g. control room, radio room (Company).

**Semi-modular system**

Fire extinguishing system designed only for a single zone, with CO<sub>2</sub> storage outside the protected space (Company).

**Unmanned room (or enclosure)**

Room (or enclosure) where personnel are not normally present and could not enter (except with difficulty) in case of fire, e.g. diesel engine or turbine enclosure (Company).

## 5. General principles

### 5.1 Extinguishing agent

CO<sub>2</sub> is a colorless, odorless, electrically non conductive inert gas agent used for extinguishing fire by reducing the concentration of oxygen in air to the point where combustion stops. CO<sub>2</sub> extinguishes fire by lowering the oxygen concentration down to approximately 15%, which leads to a minimum effective CO<sub>2</sub> concentration of around 34% in the atmosphere of the premise.

Concerning the quality of CO<sub>2</sub> gas, it shall have the properties, as defined in [NFPA 12](#).

### 5.2 Limitation

CO<sub>2</sub> cannot extinguish fires where the following materials are actively involved in the combustion process:

- Substances containing their own oxygen supply, such as cellulose nitrate