

Safety Criteria for Design of Fire and Gas Detection and Alarm System in Onshore Facilities

Procedure

This Standard replaces and cancels its previous revision.

The CONTEC - Authoring Subcommittee provides guidance on the interpretation of this Standard when questions arise regarding its contents. The Department of PETROBRAS that uses this Standard is responsible for adopting and applying the sections, subsections and enumerates thereof.

Technical Requirement: A provision established as the most adequate and which shall be used strictly in accordance with this Standard. If a decision is taken not to follow the requirement ("non-conformity" to this Standard) it shall be based on well-founded economic and management reasons, and be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by imperative nature.

Recommended Practice: A provision that may be adopted under the conditions of this Standard, but which admits (and draws attention to) the possibility of there being a more adequate alternative (not written in this Standard) to the particular application. The alternative adopted shall be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by verbs of a nonmandatory nature. It is indicated by the expression: **[Recommended Practice]**.

Copies of the registered "non-conformities" to this Standard that may contribute to the improvement thereof shall be submitted to the CONTEC - Authoring Subcommittee.

Proposed revisions to this Standard shall be submitted to the CONTEC - Authoring Subcommittee, indicating the alphanumeric identification and revision of the Standard, the section, subsection and enumerate to be revised, the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

"This Standard is exclusive property of Petróleo Brasileiro S. A. - PETROBRAS, internal application and PETROBRAS Subsidiaries and shall be used by its suppliers of goods and services under contracts or similar under the conditions established in Bidding, Contract, Agreement or similar.

The use of this Standard by other companies / organizations / government agencies and individuals is the sole responsibility of the users.."

CONTEC

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Industrial Safety

Introduction

PETROBRAS Technical Standards are prepared by Working Groups - WG (consisting specialized of Technical Collaborators from Company and its Subsidiaries), are commented by Company Units and its Subsidiaries, are approved by the Authoring Subcommittees - SCs (consisting of technicians from the same specialty, representing the various Company Units and its Subsidiaries), and ratified by the Executive Nucleus (consisting of representatives of the Company Units and its Subsidiaries). A PETROBRAS Technical Standard is subject to revision at any time by its Authoring Subcommittee and shall be reviewed every 5 years to be revalidated, revised or cancelled. PETROBRAS Technical Standards are prepared in accordance with PETROBRAS Technical Standard [N-1](#). For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.

Foreword

This Standard is the English version (issued in 12/2013) of PETROBRAS N-2914 REV. A 08/2013. In case of doubt, the Portuguese version, which is the valid document for all intents and purposes, shall be used.

1 Scope

1.1 This Standard establishes the safety criteria for the design of detection and alarm systems for fire, flammable and toxic gases and vapors in onshore operating facilities

1.2 This Standard applies to designs started as of its date of issuance.

1.3 The application of this Standard in the case of companies of the PETROBRAS System headquartered abroad shall be based on respect for local legislation, as well as for the other applicable requirements. It shall be understood that all existing Brazilian legislations or references pointed out in this Standard may serve as input to its adaptation process.

1.4 This Standard contains Technical Requirements and Recommended Practices.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies.

PETROBRAS [N-1645](#) - Safety Criteria to Project of Liquefied Petroleum Gas Storage Fixed Facilities;

PETROBRAS [N-1997](#) - Electrical Networks in Cable Tray Systems - Design, Installation, and Inspection;

PETROBRAS [N-2549](#) - Safety Criteria Laboratories;

PETROBRAS [N-2595](#) - Criteria for Design, Operation and Maintenance of Safety Instrumented Systems in Industrial Units;

ABNT [NBR 11836](#) - Detectores Automáticos de Fumaça para Proteção Contra Incêndio;

ABNT [NBR 13231](#) - Proteção Contra Incêndio em Subestações Elétricas de Geração, Transmissão e Distribuição;

ABNT [NBR 13295](#) - Cloro Líquido - Distribuição, Manuseio e Transporte a Granel e em Cilindros;

ABNT [NBR 17240](#) - Sistemas de Detecção e Alarme de Incêndio - Projeto, Instalação, Comissionamento e Manutenção de Sistemas de Detecção e Alarme de Incêndio - Requisitos;

NFPA [45](#) - Standard on Fire Protection for Laboratories Using Chemicals;

NFPA [72H](#) - National Fire Alarm and Signaling Code Handbook;

API [RP 55](#) - Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide;

API [RP 751](#) - Safe Operation of Hydrofluoric Acid Alkylation Units;

API [PUBL 2510A](#) - Fire-Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities.

NOTE For documents referred in this Standard and for which only the Portuguese version is available, the PETROBRAS department that uses this Standard should be consulted for any information required for the specific application.

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1

Class A detection circuit

according to ABNT [NBR 17240](#), every circuit in which there is wiring returning to the center, so that an occasional interruption at any point of this circuit does not result in partial or total suspension of its operation

NOTE The path of the circuit returning to the center should be different from the one coming from the center. **[Recommended Practice]**

3.2

Addressable detector

a detector that allows remote identification of the point or space where detection occurs

3.3

Safety Instrumented System (SIS)

according to standard PETROBRAS [N-2595](#), an instrumented protection layer comprised of one or more safety loops intended to place the process in a safe state when certain preset conditions are reached

4 General Conditions

4.1 This Standard assumes that detection and alarm systems shall not generate automatic actions and operational processes block, except for the items which are permitted in this Standard or based on specific risk conditions of the unit, according to analyses performed in design.

4.2 Systems shall be installed so as to allow detection and alarm, in a reasonable time, the occurrence of fires and accumulation of flammable and toxic gases and vapors in dangerous concentrations, in order to allow actions aimed at protecting the integrity of people, environment and property. In cases where there is no need to install the detection system, they shall have a technical reason evidenced by risk analysis, using the criteria adopted by PETROBRAS.

4.3 The occurrence of fire or accumulation of gases or vapors shall be identified through sound and visual signals in the Integrated Control Center (CIC, with its abbreviation in Portuguese). An abnormal condition in the detection and alarm system shall also be identified in CIC.

4.4 The electrical circuits of devices for activation, alarm and signaling of the safety systems described as following shall have continuous monitoring, indicating the opening of the circuit, short circuit, detector defects, power outage etc. on the operator's console of the area involved: