International Standard 6184/4

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Explosion protection systems — Part 4: Determination of efficacy of explosion suppression systems

Systèmes de protection contre les explosions — Partie 4: Détermination de l'efficacité des systèmes de suppression des explosions

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 6184/4 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting.*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Explosion protection systems — Part 4: Determination of efficacy of explosion suppression systems

0 Introduction

0.1 Explosion suppression is a technique by which a developing explosion in a confined, or essentially confined, volume is detected and arrested during its incipient stage, thus limiting pressure development to a safe or predetermined value and preventing or minimizing damage.

The performance of an explosion suppression system is a function of the following:

a) the nature and explosibility of the combustible material;

b) the environmental conditions of temperature, pressure, turbulence, product flow, etc.;

c) the size and geometry of the container;

d) the effectiveness of the explosion suppressant;

e) the performance characteristics of the explosion suppression hardware;

f) the deployment and choice of hardware for the system.

0.2 This part of ISO 6184 is one of a series dealing with explosion protection systems. The other parts are as follows:

Part 1: Determination of explosion indices of combustible dusts in air.

Part 2: Determination of explosion indices of combustible gases in air.

Part 3: Determination of explosion indices of fuel/air mixtures other than dust/air and gas/air mixtures.

0.3 It should be recognized that the results obtained from the use of the methods specified in the other parts of ISO 6184, either by measurement, interpolation or extrapolation, refer to defined test conditions representing a generalization of typical operational conditions.

The validation of the application of an explosion suppression system for a particular hazard may require further test work and/or theoretical evaluation. Such interpretation and application shall be undertaken by those who are experienced in this field of explosion protection.

The design of explosion suppression systems for hazards which have explosion parameters significantly different from those realised in the standard test procedures should be left to specialists in this field of explosion protection. Examples of such hazards are those characterized by one or more of the following parameters:

a) vessel aspect ratio greater than 2 : 1;

b) partially vented vessels;

c) container fitted with fixed or mobile apparatus which could impede the distribution of suppressant;

d) operating pressures and temperatures substantially higher or lower than normal atmospheric conditions;

e) high levels of turbulence and/or product throughput;

f) vessel volumes substantially greater or lower than those used in the efficacy test.

1 Scope

This part of ISO 6184 specifies a method for evaluating the effectiveness of explosion suppression systems against defined explosions in an enclosed volume. It gives the criteria for alternative test apparatus used to undertake explosion suppression efficacy tests and criteria to be applied in defining the safe operating regime of an explosion suppression system.

2 Field of application

This part of ISO 6184 is applicable only to explosion suppression systems intended for the protection of closed, or essentially closed, vessels in which an explosion may result as a consequence of ignition of an explosive mixture. It does not apply to:

a) systems which render explosive and pyrotechnic materials insensitive to ignition, explosion and/or detonation;

b) systems or devices designed to protect against overpressure of vessels containing steam, compressed gases, liquified gases or unstable reactants;

c) systems or devices designed to protect against exothermic dissociation or polymerization reactions;

d) explosion suppression systems for use in ducts or mine galleries;

e) systems or devices designed specifically for the purpose of prevention of ignition of explosive mixtures.

The deployment of fire protection measures, which are outside the scope of this part of ISO 6184, may be necessary after the suppression of the explosion to prevent reignition in the part of the plant concerned.