International Standard

ISO 3941

Classification of fires

Classes de feux

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Foreword

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ISO 3941 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 2, *Manually transportable fire extinguishers*.

This third edition cancels and replaces the second edition (ISO 3941:2007), which has been technically revised.

The main changes are as follows:

— addition of a classification for lithium-ion battery fires;

— addition of Clause 4 which provides information on the hazards related to the fire classes.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document defines classes of fires according to the nature of the material undergoing combustion. In consequence, it does not define a particular class of fire involving an electrical risk.

Classification of fires

1 Scope

This document classifies, into categories, the different kinds of fires each defined by the nature of the fuel. Such a classification is particularly useful in the context of equipment for fire protection and firefighting.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Definitions and designation of classes of fire

The following designations are for the purpose of classifying fires of different natures and of simplifying spoken and written reference to them:

— **Class A** Fires involving solid materials such as, but not limited to, wood, cloth, paper, rubber, and many plastics, usually of an organic nature, in which combustion normally takes place with the formation of glowing embers;

— **Class B** Fires involving liquids or liquefiable solids;

— **Class C** Fires involving gases;

— **Class D** Fires involving metals;

— **Class F** Fires involving cooking media (vegetable or animal oils and fats) in cooking appliances;

— **Class L** Fires involving lithium-ion cells and batteries, where no lithium metal is present.
Note: Class L fires are electrochemical fires that, by comparison to most class A, B, C, D, and F fires, have a greater energy density that can result in a faster growth rate when released.

5 Additional information related to the fire classes

5.1 For all classes

In addition to the hazards described below, the toxicity of the combustion products shall be considered for all classes of fire.

5.2 Related to class A

Class A fires can be either surface, where the fire is on the surface of the material or deep seated, where the fire is within the material.

5.3 Related to class B

For Class B fires, fuel containment and characteristics (e.g., polar or non-polar) shall be considered, as these can impact the method of firefighting.

5.4 Related to class C

It is generally considered dangerous to extinguish a gas fire if the gas source cannot be stopped, creating an explosion risk. Gas under pressure can accumulate and further increase the risk of explosion.

5.5 Related to class D

A metal fire presents a situation so specific (in terms of the metal itself, its form, the configuration of the fire etc.) that it is not possible to define a representative standard fire for the purposes of testing and each situation shall be considered separately.

5.6 Related to class F

When water is projected directly into hot cooking media in depth, there is a risk of explosion and/or splashing of the oil.

5.7 Related to class L

In addition to the fire hazard, there are several additional potential safety hazards, including venting of hot and explosive gases, toxicity of the gases, presence of physical obstruction(s) that hinder the agent from reaching the seat of the fire source, cascading thermal runaway which is uncontrollable heat transfer from cell to cell, projectile expulsion of hot and/or burning cell(s) from the fire source and/or exposure to leaking electrolyte. Stranded energy, which remains in damaged cells after initial firefighting efforts, can cause reignition and pose an electric shock hazard. Damaged rechargeable lithium-ion batteries connected to a power source can pose an electric shock hazard.

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