

# TECHNICAL SPECIFICATION

# SPÉCIFICATION TECHNIQUE

**Safety of machinery – Application of protective equipment to detect the presence of persons**

**Sécurité des machines – Application des équipements de protection à la détection de la présence de personnes**

IEC/TS 62046:2008

<https://standards.iteh.ai/standards/iec/1/1caaccd-f421-413d-b3e0-a3a99d5de1cd/iec-ts-62046-2008>



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF MACHINERY –  
APPLICATION OF PROTECTIVE EQUIPMENT  
TO DETECT THE PRESENCE OF PERSONS**

## FOREWORD

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62046, which is a technical specification, has been prepared by IEC technical committee 44: Safety of machinery – Electrotechnical aspects.

This second edition cancels and replaces the first edition issued in 2004. This second edition constitutes a general technical revision of the first edition, and includes further examples of interfacing and muting techniques.



The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
44/534/DTS	44/552B/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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WITHDRAWN

## INTRODUCTION

This Technical Specification provides information on the application of protective equipment, which employs a sensing device(s) to detect person(s) in or approaching an area, in order to reduce or minimize a risk from hazardous parts of machinery, without providing a physical barrier.

The objective of this specification is to assist: standards writing committees responsible for developing machine standards ("C" Standards), machine designers, manufacturers and refurbishers, machine safety certification organizations, workplace authorities and others on the proper application of protective equipment to machinery.

Figures 1 and 2 show the general context and the intended use of this specification.

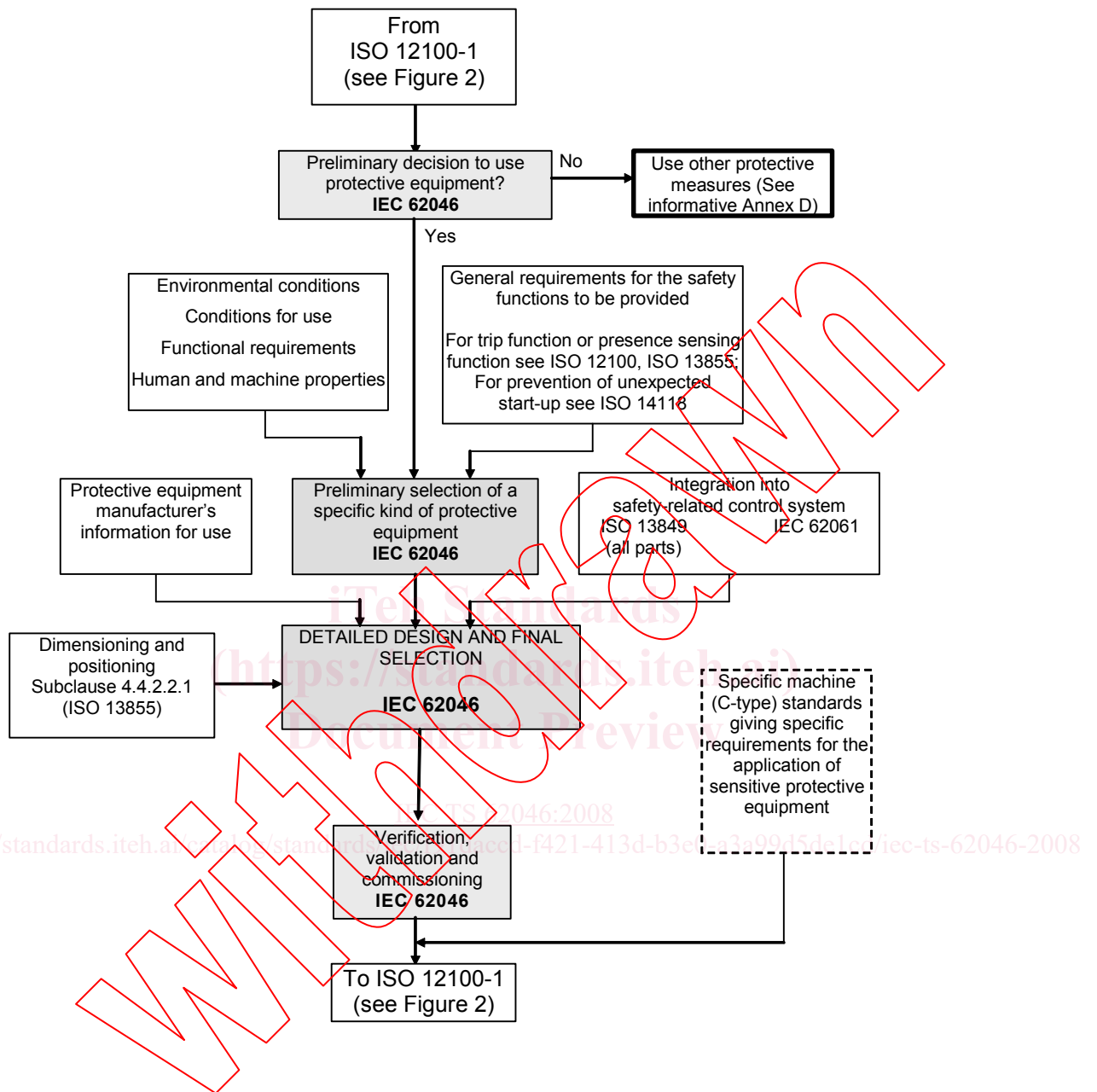
Clauses 1 to 5, 7 and 8 of this specification apply to all protective equipment included in the scope, Clause 6 contains guidance for the application of specific kinds of protective equipment.

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**Figure 1 – Relationship of this Technical Specification to other standards**

(see also Figure 2)

# SAFETY OF MACHINERY – APPLICATION OF PROTECTIVE EQUIPMENT TO DETECT THE PRESENCE OF PERSONS

## 1 Scope

This Technical Specification specifies requirements for the selection, positioning, configuration and commissioning of protective equipment to detect the presence of persons in order to protect those persons from dangerous part(s) of machinery in industrial applications. This standard covers the application of electro-sensitive protective equipment (ESPE) specified in IEC 61496 (all parts) and pressure sensitive mats and floors specified in ISO 13856-1.

It takes into account the characteristics of the machinery, the protective equipment, the environment and human interaction by persons of 14 years and older.

## 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 (including any amendments) applies.

IEC 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 61496-1:2004, *Safety of Machinery – Electro-sensitive protective equipment – General requirements and tests*

IEC 61496-2:1997, *Safety of machinery – Electro-sensitive protective equipment – Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)*

IEC 61496-3:2001, *Safety of machinery – Electro-sensitive protective equipment – Particular requirements for equipment for Active Opto-Electronic Protective Devices responsive to Diffuse Reflection (AOPDDR)*

IEC 62061, *Safety of machinery – Functional safety of safety related electrical, electronic and programmable control systems*

ISO 12100-1: 2003, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology*

ISO 12100-2: 2003, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles*

ISO 13849 (all parts), *Safety of Machinery – Safety-related parts of control systems*

ISO 13855:2002, *Safety of machinery – Positioning of protective equipment with respect to the approach speeds of parts of the human body*

ISO 13856-1:2001, *Safety of machinery – Pressure-sensitive protective devices – Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors*

ISO 14121 (all parts), *Safety of machinery – Risk assessment*

### 3 Terms, definitions and abbreviations

#### 3.1 Terms and definitions

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

##### 3.1.1

##### **active opto-electronic protective device**

##### **AOPD**

device whose sensing function is performed by opto-electronic emitting and receiving elements detecting the interruption of optical radiations generated, within the device, by an opaque object present in the specified detection zone (or for a light beam device, on the axis of the light beam)

[IEC 61496-2, 3.201, modified]

##### 3.1.2

##### **active opto-electronic protective device responsive to diffuse reflection**

##### **AOPDDR**

device, whose sensing function is performed by opto-electronic emitting and receiving elements, that detects the diffuse reflection of optical radiations generated within the device by an object present in a detection zone specified in two dimensions

[IEC 61496-3, 3.301]

##### 3.1.3

##### **blanking**

optional function that permits an object of a size greater than the detection capability of the ESPE to be located within the detection zone without causing an OFF-state of the OSSD(s)

[IEC 61496-1, 3.1]

##### 3.1.4

##### **detection capability**

sensing function parameter limit specified by the supplier that will cause actuation of the protective equipment

[IEC 61496-1, 3.3, modified]

##### 3.1.5

##### **detection zone**

zone within which a specified test piece will be detected by the electro-sensitive protective equipment (ESPE)

[IEC 61496-1, 3.4]

NOTE ISO 13856-1 uses the term “effective sensing area” when describing pressure-sensitive mats and floors. In this document the terms “detection zone” and “effective sensing area” are used synonymously.

##### 3.1.6

##### **electro-sensitive protective equipment**

##### **ESPE**

assembly of devices and/or components working together for protective tripping or presence-sensing purposes and comprising as a minimum

- a sensing device;
- controlling/monitoring devices;
- output signal switching devices

[IEC 61496-1, 3.5]

### 3.1.7

#### **effective sensing area**

part of the top surface area of the sensor or a combination of the pressure-sensitive mat or pressure-sensitive floor within which a response to an actuating force will take place

NOTE IEC 61496-1 uses the term “detection zone” when describing electro-sensitive protective equipment. In this document the terms “detection zone” and “effective sensing area” are used synonymously.

[ISO 13856-1, modified]

### 3.1.8

#### **external device monitoring**

##### **EDM**

means by which the electro-sensitive protective equipment (ESPE) monitors the state of control devices which are external to the ESPE

[IEC 61496-1, 3.6]

### 3.1.9

#### **failure (of equipment)**

termination of the ability of an item to perform a required function

NOTE 1 After failure the item has a fault.

NOTE 2 “Failure” is an event, as distinguished from “fault”, which is a state.

NOTE 3 This concept as defined does not apply to items consisting of software only.

[IEV-191-04-01]

### 3.1.10

#### **failure to danger**

failure which prevents or delays all output signal switching devices going to, and/or remaining in the OFF-state in response to a condition which, in normal operation, would result in their so doing

[IEC 61496-1, 3.8]

### 3.1.11

#### **fault**

state of an item characterized by its inability to perform a required function, excluding the inability during preventive maintenance or other planned actions, or due to lack of external resources

[IEV 191-05-01]

NOTE 1 A fault is often the result of a failure of the item itself, but may exist without prior failure.

NOTE 2 In the field of machinery, the English term ‘fault’ is commonly used in accordance with the definition in IEV 191-05-01, whereas the French term “défaut” and the German term “fehler” are used rather than the term “panne” and “fehlzustand” that appear with this definition.

NOTE 3 In practice, the terms “fault” and “failure” (see 3.1.9) are often used synonymously.

### 3.1.12

#### **Final Switching Device**

##### **FSD**

component of the machine’s safety-related control system that interrupts the circuit to the machine primary control element (MPCE) when the output signal switching device (OSSD) goes to the OFF-state

[IEC 61496-1, 3.10]