AS 4024.2801:2017
ISO 13855:2010

AS 4024.2801:2017

Australian STANDARD

Safety of machinery

Part 2801: Positioning of safeguards with respect to the approach speeds of parts of the human body

STANDARDS Australia

AS 4024.2801:2017

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Engineers Australia
Human Factors and Ergonomics Society of Australia
Institute of Instrumentation, Control and Automation Australia
National Safety Council of Australia
NSW Department of Industry
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Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee SF-041, Safety of Machinery, to supersede AS 4024.2801—2008, *Safety of machinery*, Part 2801: *Safety distances and safety gaps—Positioning of protective equipment with respect to the approach speed of parts of the human body*.

The objective of this Standard is to specify the positioning of safeguards with respect to the approach speeds of parts of the human body. This Standard specifies parameters based on values for approach speeds of parts of the human body and provides a methodology to determine the minimum distances to a hazard zone from the detection zone or from actuating devices of safeguards.

This Standard is identical with, and has been reproduced from, ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*.

As this document has been reproduced from an International Standard, the following applies:

(a) In the source text 'this International Standard' should read 'this Australian Standard'.

(b) A full point substitutes for a coma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific.

The terms 'normative' and 'informative' are used in Standards to define the application of the appendices or annexes to which they apply. A 'normative' appendix or annex is an integral part of a Standard, whereas an 'informative' appendix or annex is only for information and guidance.

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13855 was prepared by Technical Committee ISO/TC 199, *Safety of machinery*.

This second edition cancels and replaces the first edition (ISO 13855:2002), which has been technically revised.

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Introduction

The structure of safety standards in the field of machinery is as follows:

a) type-A standards (basic safety standards) giving basic concepts, principles for design, and general aspects that can be applied to all machinery;

b) type-B standards (generic safety standards) dealing with one safety aspect or one or more type(s) of safeguard that can be used across a wide range of machinery:

   — type-B1 standards on particular safety aspects (e.g. safety distances, surface temperature, noise);

   — type-B2 standards on safeguards (e.g. two-hand controls, interlocking devices, pressure-sensitive devices, guards);

c) type-C standards (machine safety standards) dealing with detailed safety requirements for a particular machine or group of machines.

This document is a type-B standard as stated in ISO 12100-1.

The requirements of this document can be supplemented or modified by a type-C standard.

For machines which are covered by the scope of a type-C standard and which have been designed and built according to the requirements of that type-C standard, the following applies: if the requirements of that type-C standard deviate from the requirements in type-B standards, the requirements of that type-C standard take precedence over the provisions of other standards.

The effectiveness of certain types of safeguard described in this International Standard to minimize risk relies, in part, on the relevant parts of that equipment being correctly positioned in relation to the hazard zone. In deciding on these positions, a number of aspects are taken into account, such as:

— the necessity of a risk assessment according to ISO 14121-1;

— the practical experience in the use of the machine;

— the overall system stopping performance;

— the time taken to ensure the safe condition of the machine following operation of the safeguard, for example to stop the machine;

— the bio-mechanical and anthropometric data;

— any intrusion by a part of the body towards the hazard zone until the protective device is actuated;

— the path taken by the body part when moving from the detection zone towards the hazard zone;

— the possible presence of a person between the safeguard and the hazard zone;

— the possibility of undetected access to the hazard zone.

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Safety of machinery

Part 2801: Positioning of safeguards with respect to the approach speeds of parts of the human body

1 Scope

This International Standard establishes the positioning of safeguards with respect to the approach speeds of parts of the human body.

It specifies parameters based on values for approach speeds of parts of the human body and provides a methodology to determine the minimum distances to a hazard zone from the detection zone or from actuating devices of safeguards.

The values for approach speeds (walking speed and upper limb movement) in this International Standard are time tested and proven in practical experience. This International Standard gives guidance for typical approaches. Other types of approach, for example running, jumping or falling, are not considered in this International Standard.

NOTE 1 Other types of approach can result in approach speeds that are higher or lower than those defined in this International Standard.

Safeguards considered in this International Standard include:

a) electro-sensitive protective equipment [see IEC 61496 (all parts)], including:

   — light curtains and light grids (AOPDs);

   — laser scanners (AOPDDRs) and two-dimensional vision systems;

b) pressure-sensitive protective equipment (see ISO 13856-1, ISO 13856-2 and ISO 13856-3), especially pressure-sensitive mats;

c) two-hand control devices (see ISO 13851);

d) interlocking guards without guard locking (see ISO 14119).

This International Standard specifies minimum distances from the detection zone, plane, line, point or interlocking guard access point to the hazard zone for hazards caused by the machine (e.g. crushing, shearing, drawing-in).

Protection against the risks from hazards arising from the ejection of solid or fluid materials, emissions, radiation and electricity are not covered by this International Standard.

NOTE 2 Anthropometric data from the 5th to the 95th percentile of persons of 14 years and older were used in the determination of the intrusion distance value "*C*" in the equations.

NOTE 3 The data in this International Standard are based on experience of industrial application; it is the responsibility of the designer to take this into account when using this International Standard for non-industrial applications.

NOTE 4 Data specifically for children have not been used in this International Standard. Until specific data are available for approach speeds for children, it is the responsibility of the designer to calculate the distances taking into account that children might be quicker and that a child might be detected later.

The International Standard is not applicable to safeguards (e.g. pendant two-hand control devices) that can be moved, without using tools, nearer to the hazard zone than the calculated minimum distance.

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