

AS/NZS 2161.8:2024
EN 421:2010



Australian/New Zealand Standard™

Occupational protective gloves

Part 8: Protection against ionizing radiation and radioactive contamination, (EN 421:2010, IDT)

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AS/NZS 2161.8:2024

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Australian/New Zealand Standard™

Occupational protective gloves

**Part 8: Protection against ionizing radiation and
radioactive contamination, (EN 421:2010, IDT)**

Originated as AS/NZS 2161.8:2002.
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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-053, Personal Protective Equipment and Clothing to supersede AS/NZS 2161.8:2002, *Occupational protective gloves, Part 8: Protection against ionizing radiation and radioactive contamination*.

The objective of this document is to specify requirements and test methods for gloves to protect against ionizing radiation and radioactive contamination. The standard is applicable to gloves offering protection to the hand and various parts of the arm and shoulder. It applies also to gloves to be mounted in permanent containment enclosures.

This document also applies to intermediary sleeves used between a glove and a permanent containment enclosure.

The requirements of this document do not apply to protective gloves against X-ray radiation.

This document is identical with, and has been reproduced from EN 421:2010, *Protective gloves against ionizing radiation and radioactive contamination*.

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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

This document (EN 421:2010) has been prepared by Technical Committee CEN/TC 162 “Protective clothing including hand and arm protection and lifejackets”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2010, and conflicting national standards shall be withdrawn at the latest by November 2010.

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

This document supersedes EN 421:1994.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

[Annex D](#) provides details of significant technical changes between this European Standard and the previous edition EN 421:1994.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Australian/New Zealand Standard

Occupational protective gloves

Part 8: Protection against ionizing radiation and radioactive contamination, (EN 421:2010, IDT)

1 Scope

This European Standard specifies requirements and test methods for gloves to protect against ionizing radiation and radioactive contamination. The standard is applicable to gloves offering protection to the hand and various parts of the arm and shoulder. It applies also to gloves to be mounted in permanent containment enclosures.

This European Standard also applies to intermediary sleeves used between a glove and a permanent containment enclosure (report to [4.7.2.3](#)).

The requirements of this European Standard do not apply to protective gloves against X-ray radiation.

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.

EN 374-1:2003, *Protective gloves against chemicals and micro-organisms — Part 1: Terminology and performance requirements*

EN 374-3, *Protective gloves against chemicals and micro-organisms — Part 3: Determination of resistance to permeation by chemicals*

EN 388:2003, *Protective gloves against mechanical risks*

EN 420:2003+A1:2009, *Protective gloves — General requirements and test methods*

EN 61331-1:2002, *Protective devices against diagnostic medical X-radiation — Part 1: Determination of attenuation properties of materials (IEC 61331-1:1994)*

ISO 1431-1, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*

ISO 7000:2004, *Graphical symbols for use on equipment — Index and synopsis*

ISO 11933-1, *Components for containment enclosures — Part 1: Glove/bag ports, bungs for glove/bag ports, enclosure rings and interchangeable units*

ISO 11933-2, *Components for containment enclosures — Part 2: Gloves, welded bags, gaiters for remote - handling tongs and for manipulators*

CISO/TR 11610: 2004, *Protective clothing — Vocabulary (ISO/TR 11610:2004)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CISO/TR 11610:2004 and the following apply.

3.1**radioactive contamination**

presence of radioactive substances in or on a material or in a place where they are undesirable or could be harmful

3.2**ionizing radiation**

radiation constituted by particles directly or indirectly ionizing (photons included) or by a mixture of both

3.3**irradiation**

exposure of a living being or matter to ionizing radiation by external sources (X, Alpha, Beta, Gamma or Neutron radiations)

3.4**water vapour permeability**

weight of water vapour in grams transmitted through a material per square metre per 24 h time, under specified conditions of temperature and humidity ($\text{gm}^{-2}\text{d}^{-1}$)

3.5**containment enclosure**

enclosure that prevent from the spreading of products contained in the inside medium towards the outside medium, or the penetration of outside atmosphere towards the inside medium or both

3.6**glove box**

containment enclosure in which material or products can be manipulated being isolated from the operator, which is realized thanks to gloves fixed in a tightness way to openings that are designed in walls of the enclosure (glove port or cell ring)

3.7**glove for glove box or for containment enclosure**

glove with a long cuff constituted in flexible elastomeric material, intended to enable a tight clamping on the circumference or the extremity of a glove port or on any other component and enabling at the same time a good mechanical resistance

3.8**glove port**

cylindrical collar fitted with a bead or a groove, fixed on the wall of a glove box or a containment enclosure in order to receive a glove or any other flexible accessory finished with a bead of same diameter

3.9**cell ring**

sectional ring in plastic or metal fixed on the enclosure, that receive interchangeable tightness accessories by pushing and which can be replaced without breaking the containment

3.10**support ring**

interchangeable tightness ring, in metallic alloy or plastic, fitted with grooves, fixed on a cell ring and equipped with a glove or other plastic component, finished by a bead, a toric joint or a lip joint of same diameter

3.11**protective glove material**

material or combination of materials used in a glove for the purpose of preventing the user from direct contact with radioactive contamination or of minimizing the radiation dose to the user from external radiation sources

4 Requirements

4.1 General

[Table 1](#) gives the requirements for gloves and gloves for containment enclosures for protection against radioactive contamination and protection against ionizing radiation.

Table 1 — Requirements for gloves and gloves for containment enclosures

		Gloves		Gloves for containment enclosures	
		Protection against radioactive contamination	Protection against radioactive contamination and protection against ionizing radiation	Protection against radioactive contamination	Protection against radioactive contamination and protection against ionizing radiation
Requirements	4.2.1	X	X	X	X
	4.2.2	X	X		
	4.3		X		X
	4.4	X	X		
	4.5	X	X	X	X
	4.6	*	*	*	*
	4.7.2			X	X
	4.7.3			X	X
	4.7.4			◆	◆
* : optional requirement ◆ : mandatory if the gloves are used in an atmosphere containing ozone					

4.2 Design principles

4.2.1 General principles

The glove shall comply with the relevant requirements defined in EN 420, with the following specific additions.

The glove may be constructed from a single or multiple material layers. The choice of material is defined by the end use requirements.

In the case of protection against external ionizing radiation the glove may contain lead (PbO, Pb₃O₄) or other heavy metallic elements to act as attenuation medium in one or more of the layers. Metallic element distribution may be uniform or designed.

4.2.2 Glove sizing and dimensions

Gloves shall be sized following prescriptions of EN 420:2003+A1:2009, 5.1.

NOTE In case where specific use identified, special tests can be identified according to [Annex B](#).

4.3 Attenuation efficiency and uniformity of distribution of protective material

The lead equivalent thickness shall be measured by one of the methods described in [5.1](#). The test methods give equivalent results.