International Standard

ISO 15027-1

Immersion suits —

Part 1: Safety and performance requirements for constant wear suits

Combinaisons d'immersion —

Partie 1: Exigences de sécurité et de performance pour les combinaisons de port permanent

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 188, *Small craft*, Subcommittee SC 1, *Personal safety equipment*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 162, *Protective clothing including hand and arm protection and lifejackets*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 15027-1:2012), which has been technically revised.

The main changes are as follows:

— the terms and definitions have been revised;

— in 4.3, requirements for other optional accessories have been added;

— in Table 3, a new thermal performance level E, equivalent to SOLAS uninsulated immersion suit has been added;

— in Table 3, minimum immersed clo values to suit performance levels have been added;

— in 4.12, the performance requirements have been re-ordered to improve the order of testing;

— in 4.12.5, the missing donning time for hand protection has been added;

— in Clause 5, the warnings have been revised;

— in Clause 7, the consumer information has been revised;

— Annex A has been revised.

A list of all parts in the ISO 15027 series can be found on the ISO website.

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.

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Introduction

This document has been prepared to meet the needs of persons engaged in certain activities on or near water.

Constant wear suits are used to provide protection in the event of accidental immersion, to prolong life and to aid rescue. An individual's estimated thermal protection time when wearing this type of equipment depends upon the water temperature, weather conditions, clothing, the cold tolerance of the person and the person's behaviour. This document specifies the minimum levels of insulation provided by the different ranges of suit in particular water temperatures.

This document allows for thermal protection to be provided by a variety of methods and materials, some of which can require action when the suit enters the water (e.g. inflation of chambers by gas from a cylinder). The conformity of a constant wear suit with this document does not imply that it is suitable for all circumstances. This document cannot make detailed provision for all the special uses to which a constant wear suit can be put, such as special working conditions, i.e. slip resistance or fire resistance or special leisure applications.

This document is intended to serve as a minimum performance requirement for manufacturers, purchasers and users of constant wear suits by ensuring that they provide an effective standard of performance in use. Designers should encourage the wearing of this equipment by making it comfortable and functional for continuous wear on or near water.

The primary aims in wearing a constant wear suit are:

a) to reduce the risk of cold shock and to delay the onset of hypothermia;

b) to enable users to propel themselves in the water and extricate themselves from the water without it becoming an encumbrance;

c) to make users sufficiently conspicuous in the water so as to aid their recovery.

The performance of the suit can be altered by a number of factors, including wave action or the wearing of additional equipment. Users, owners and employers should ensure that equipment is correctly maintained according to the manufacturer's instructions.

A suit system may comprise one or more pieces provided that in all cases it meets the requirements of this document as a complete system.

A constant wear suit may often be worn with a lifejacket as it will provide extra flotation and can help to bring a person to a face-up position.

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Immersion suits —

Part 1:
Safety and performance requirements for constant wear suits

1 Scope

This document specifies performance and safety requirements for constant wear suits and suit systems for professional and leisure activities to protect the user against the effects of cold-water immersion, by reducing cold shock and delaying the onset of hypothermia.

If a suit system includes a personal flotation device (PFD), it provides protection against drowning.

This document is applicable to dry and wet constant wear suits and suit systems.

This document does not apply to abandonment suits. Requirements for abandonment suits are given in ISO 15027-2:2026.

Test methods for immersion suits are given in ISO 15027-3:2026.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 105-A02:1993, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

ISO 105-A02:1993/Cor 2:2005, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour — Technical Corrigendum 2*

ISO 105-B04:2024, *Textiles — Tests for colour fastness — Part B04: Colour fastness to artificial weathering: Xenon arc fading lamp test*

ISO 105-E02:2013, *Textiles — Tests for colour fastness — Part E02: Colour fastness to sea water*

ISO 105-X12:2016, *Textiles — Tests for colour fastness — Part X12: Colour fastness to rubbing*

ISO 1421:2016, *Rubber- or plastics-coated fabrics — Determination of tensile strength and elongation at break*

ISO 2411:2017, *Rubber- or plastics-coated fabrics — Determination of coating adhesion*

ISO 3801:1977, *Textiles — Woven fabrics — Determination of mass per unit length and mass per unit area*

ISO 4674-1:2016, *Rubber- or plastics-coated fabrics — Determination of tear resistance — Part 1: Constant rate of tear methods*

ISO 7854:1995, *Rubber- or plastics-coated fabrics — Determination of resistance to damage by flexing*

ISO 9227:2022, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 9227:2022/Amd 1:2024, *Corrosion tests in artificial atmospheres — Salt spray tests — Amendment 1: Footnote of Warning*

ISO 12402-2:2020, *Personal flotation devices — Part 2: Lifejackets, performance level 275 — Safety requirements*

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ISO 12402-3:2020, *Personal flotation devices — Part 3: Lifejackets, performance level 150 — Safety requirements*

ISO 12402-4:2020, *Personal flotation devices — Part 4: Lifejackets, performance level 100 — Safety requirements*

ISO 12402-5:2020, *Personal flotation devices — Part 5: Buoyancy aids (level 50) — Safety requirements*

ISO 12402-7:2020, *Personal flotation devices — Part 7: Materials and components — Safety requirements and test methods*

ISO 12402-8:2020, *Personal flotation devices — Part 8: Accessories — Safety requirements and test methods*

ISO 12402-9:2020, *Personal flotation devices — Part 9: Evaluation*

ISO 13688:2013, *Protective clothing — General requirements*

ISO 13688:2013/Amd 1:2021, *Protective clothing — General requirements — Amendment 1*

ISO 13934-1:2013, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method*

ISO 13935-2:2014, *Textiles — Seam tensile properties of fabrics and made-up textile articles — Part 2: Determination of maximum force to seam rupture using the grab method*

ISO 13937-4:2000, *Textiles — Tear properties of fabrics — Part 4: Determination of tear force of tongue-shaped test specimens (Double tear test)*

ISO 15027-3:2026, *Immersion suits — Part 3: Test methods*

CIE 015:2018, *Colorimetry*

Resolution MSC. 481(102) adopted by the IMO[1)] Assembly to amend the International Convention for the Safety of Life at Sea (SOLAS), 1974, *Revised recommendation on the use and fitting of retro-reflective materials on life-saving appliances*

3 Terms and definitions

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

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/

3.1
immersion suit
suit designed to protect the user's body from the cooling effects of immersion in water

Note 1 to entry: Cooling effects include *cold shock* (3.17) and *hypothermia* (3.11).

3.2
constant wear suit
immersion suit (3.1) designed to be routinely worn for activities on or near water in anticipation of immersion in water, but permitting physical activity to such an extent that actions can be undertaken without undue encumbrance and, thus, the head, hands and feet do not need to be covered

3.3
abandonment suit
immersion suit (3.1) including head, hand and feet protection designed to permit rapid donning in the event of an imminent immersion in water

1) IMO is the abbreviation for International Maritime Organization, based in London, UK. IMO issues regulations which are then published as laws by the member states.

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