

Kõrgnähtavusega märguriietus. Katsemeetodid ja nõuded

**High visibility clothing - Test methods and requirements
(ISO 20471:2013)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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EUROPEAN STANDARD

EN ISO 20471

NORME EUROPÉENNE

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English Version

**High visibility clothing - Test methods and requirements (ISO
20471:2013)**

Vêtements à haute visibilité - Méthodes d'essai et
exigences (ISO 20471:2013)

Warnkleidung - Prüfverfahren und Anforderungen (ISO
20471:2013)

This European Standard was approved by CEN on 1 March 2013.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 20471:2013) has been prepared by Technical Committee ISO/TC 94 "Personal safety - Protective clothing and equipment" in collaboration with 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of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.

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 471:2003+A1:2007.

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.

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

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 20471:2013 has been approved by CEN as EN ISO 20471:2013 without any modification.

Annex ZA
(informative)
Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive 89/686/EEC on the approximation of the laws of the Member States relating to personal protective equipment.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 89/686/EEC

Clause(s)/subclause(s) of this EN	Essential Requirements (ERs) of Directive 89/686/EEC	Qualifying remarks/notes
4.1	1.1.2.2 Classes of protection appropriate to different levels of risk	
4.1; 4.2; 5.4	1.2.1 Absence of risks and other 'inherent' nuisance factors	
5.2; 5.3; 5.5; 6.2	1.3.2 Lightness and design strength	
6.2	1.4 Information supplied by the manufacturer	
5.6	2.2 PPE "enclosing" the parts of the body to be protected	
7.5.1	2.4 PPE subject to ageing	
8	2.12 PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety	
5.1, 6.1	2.13 PPE capable of signalling the user's presence visually	

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

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Introduction

The performance of the conspicuity-enhancing materials to be used for high risk-related visibility clothing is specified photometrically together with minimum areas and placement (design) requirements.

Conspicuity is the property that makes an object readily attract visual attention. This is a particularly important feature in complex environments which have visually competing objects. Conspicuity is determined by an object's luminance contrast, colour contrast, pattern and design, and motion characteristics relative to the ambient background against which it is seen.

Three classes of garment are defined based on three different minimum areas of retroreflective, fluorescent and/or combined performance materials. Each of these classes will provide a different level of conspicuity, class 3 being the class that provides the highest degree of conspicuity against most backgrounds found in urban and rural situations in daylight and in night time. Users should select the required class of performance based on a risk assessment of the location/situation in which the protection afforded by clothing to this International Standard is required.

This International Standard contains requirements relating to risk assessment and risk analysis of high visibility garments. Possible designs illustrating the placement of retroreflective materials are included within the standard. Ergonomic factors such as fit/sizing, comfort, and range of motion of the wearer should be considered when selecting the most appropriate configuration of retroreflective and fluorescent materials within the garment.

Selection and use of high visibility clothing can vary among user countries and may be subject to local regulations. This International Standard contains requirements relating to risk assessment of the condition in which the high visibility clothing is to be used. This will involve consideration of the factors which may affect an observer's ability to detect that a person is present. The observer needs both to perceive and to recognize the wearer and then needs to be able to take appropriate avoidance action. The wearing of a conspicuity-enhancing high visibility garment does not guarantee that the wearer will be visible under all conditions.

The minimum requirements given within this International Standard are determined by the specific test methods and their assigned measuring values. The tests are partly performed on new materials and partly on preconditioned materials. By preconditioning (e.g. folding of retroreflective material) a load of the materials is simulated. However, it should be noted that laboratory testing may not represent real life conditions. The conspicuity performance of a garment will depend on usage (e.g. dirt, solar irradiation), care (e.g. cleaning agent, repair), storage (e.g. dust-free, lightproof), etc.

High visibility clothing — Test methods and requirements

1 Scope

This International Standard specifies requirements for high visibility clothing which is capable of visually signalling the user's presence. The high visibility clothing is intended to provide conspicuity of the wearer in any light condition when viewed by operators of vehicles or other mechanized equipment during daylight conditions and under illumination of headlights in the dark. For further information concerning risk situations, see [Annex A](#).

This International Standard is not applicable to medium-risk and low-risk situations.

Performance requirements are included for colour and retroreflection as well as for the minimum areas and for the placement of the materials in protective clothing.

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.

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

ISO 105-A03, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining*

ISO 105-B02:1994, *Textiles — Tests for colour fastness — Part B02: Colour fastness to artificial light: Xenon arc fading lamp test*

ISO 105-C06, *Textiles — Tests for colour fastness — Part C06: Colour fastness to domestic and commercial laundering*

ISO 105-D01, *Textiles — Tests for colour fastness — Part D01: Colour fastness to drycleaning using perchloroethylene solvent*

ISO 105-E04, *Textiles — Tests for colour fastness — Part E04: Colour fastness to perspiration — Part E04: Colour fastness to perspiration*

ISO 105-N01, *Textiles — Tests for colour fastness — Part N01: Colour fastness to bleaching: Hypochlorite — Tests for colour fastness — Part N01: Colour fastness to bleaching: Hypochlorite*

ISO 105-X11, *Textiles — Tests for colour fastness — Part X11: Colour fastness to hot pressing — Tests for colour fastness — Part X11: Colour fastness to hot pressing*

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

ISO 1421:1998, *Rubber- or plastics-coated fabrics — Determination of tensile strength and elongation at break*

ISO 4674-1:2003, *Rubber- or plastics-coated fabrics — Determination of tear resistance — Part 1: Constant rate of tear methods*

ISO 4675, *Rubber- or plastics-coated fabrics — Low-temperature bend test*

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

ISO 11092, *Textiles — Physiological effects — Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test)*