CEN/TC 162
Protective clothing including hand and arm protection and lifejackets
E-mail of Secretary: thomas.hoegen_von@din.de
Secretariat: DIN

# DRAFT Decision 274/2013 ¿ Activation of WI 00162330 Pesticide protective clothing and submission to CEN enquiry (CEN/TC 162/WG 3 N 821)

| | |
|---|---|
| Date of document | 2013-02-04 |
| Expected action | Vote |
| Due Date | 2013-03-04 |

## Background

Dear member,

With document N 3134, we circulated erroneously a WD on WI 00162330 ""Protective clothing against liquid chemicals – Performance requirements for protective clothing worn by operators applying liquid pesticides" **for information** in combination with a voting booth for voting. Unfortunately only few members realised that this was for voting. We therefore repeat the voting procedure herewith."

Please find enclosed the draft of WI 00162330. The CEN/TC 162 members are herewith asked by postal ballot to agree on the submission of the enclosed document to the CEN enquiry.

We propose the following draft decision C 274/2013.

**Subject: CEN/TC 162 -"Protective clothing against liquid chemicals -Performance requirements for protective clothing worn by operators applying liquid pesticides" -Activation of 00162330 and submission to CEN enquiry**

CEN/TC 162

- having considered the proposal for a new work item as documented in CEN/TC 162 N 3134;
- having considered the Guidance –Adoption of a new work item in a CEN Technical Committee, as documented in the BOSS;
- confirming that the new work item falls within its scope;
- confirming that the new work item corresponds to real market needs;
- confirming that the resources to complete the work as described below are available;
- decides to register the work item described below in its **active** programme of work;
- approves the work item for submission to the **CEN enquiry**

TITLE: Protective clothing against liquid chemicals - Performance requirements for protective clothing worn by operators applying liquid pesticides

SCOPE: This European Standard establishes minimum performance for protective clothing worn by operators applying field strength pesticide products, primarily liquid mixtures for three different levels of exposure; High (Level 3), Medium (Level 2) and Low (Level 1).

**Level 1** is intended for low exposure scenarios; for example, by drift particles of diluted pesticides during field application by boom sprayers of tractors or self- propelled machinery.

**Level 2** is intended for medium exposure scenarios; for example, by drift particles of diluted pesticides during intensive field and high culture application by tractors and handheld equipment.

**Level 3** is intended for high exposure scenarios; for example, from wetting by indoor/outdoor applications with handheld or motorised equipment and a potential direct contact with treated foliage.

The stringency in testing requirements increases for each level of exposure, defined as level 1, level 2, and level 3. Therefore, any garment approved for a Level 2 exposure is assumed to meet Level 1 requirements. Similarly, any garment approved for Level 3 exposure is assumed to meet the requirements for Level 1 and Level 2.

Garment materials and seams (exposed in use) intended for Level 3 exposures, may require, for a particular formulation, additional permeation testing to fully characterise the material as specifically resistant to permeation of a given formulation. The need to perform a permeation test shall be decided on the basis of a risk assessment which takes into account not only the level of exposure but the Accepted Operator Exposure Level (AOEL) of the active ingredient.

The whole garments shall pass a practical performance test, as described in Annex A, prior to being submitted to the low level spray test (Level 1 & Level 2) or high-level spray test (Level 3).

Protective clothing covered by this European Standard includes, but may not be limited to shirts, jackets, trousers and coveralls. This European Standard also addresses protection provided by protective accessories, with the exception of those used for the protection of the head, respiratory tract, hands, and feet for which the minimum performance requirements are detailed in other European Standards.

This European Standard does not address protection against biocides, fumigants, or highly volatile liquids and biological agents; nor does it address protection against undiluted pesticide products, which are often encountered during the preparation and mixing phase, for which the minimum performance requirements are detailed in other European Standards.

ENVIRONMENTAL ASPECTS to be considered: use of materials

DOCUMENT DEVELOPED in: CEN/TC 162/WG 3

TRACK: CEN enquiry and formal vote MANDATE: M/031 under directive 89/686/EEC, for publication in OJEU

We have prepared an electronic Voting Booth for all member bodies to vote.

Please observe the deadline for voting of 2013-03-04. For your voting, please enter the name of the member body in the field "Comment".

**Note: The document will be set in template before submission to CEN enquiry.**

Yours sincerely

DIN German Institute for Standardization
Personal Protective Equipment Standards Committee (NPS)

Thomas von Hoegen
Secretary of CEN/TC 162

CEN/TC 162/WG 3
Protective clothing against chemicals, infective agents and radioactive contamination
E-mail of Secretary: thomas.hoegen_von@din.de
Secretariat: DIN

# WD on Pesticides Protective Clothing presented by Dr Hinz

| | |
|---|---|
| Date of document | 2012-12-04 |
| Expected action | Info |

## Background

Dear expert of CEN/TC 162/WG 3,

Please find enclosed the WD on pesticides protective clothing presented by Dr Hinz for information.

The WD will be submitted and to CEN/TC 162 for activation of the work item and approval of the WD for submission to the public enquiry.

These are the lines by Dr Hinz regarding the WD:

*Dear All,*

*As agreed in Milan you will find in the attachment a new draft of the TC 162 WI:*
***Protective Clothing. Performance requirements for protective clothing worn by operators applying liquid pesticides.***

*This draft is a further development of the draft presented in London February 2012 and considers statements and comments given for the WG3 Meetings in Lübeck and Milan 2012 including the French remarks.*

*The following gives a survey of the numbers of revised clauses and pages:*

***Clause, page:***


Yours sincerely

DIN German Institute for Standardization
Personal Protective Equipment Standards Committee (NPS)

Thomas von Hoegen
Secretary of CEN/TC 162/WG 3

**CEN/TC 162**

Date: 2012-011

**TC 162 WI**

CEN/TC 162

Secretariat: DIN

# Protective Clothing. Performance requirements for protective clothing worn by operators applying liquid pesticides — —

ICS:

Descriptors:

Document type: European Standard
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## Contents

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## Foreword

This document prEN XXX 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 XXXXXX and conflicting national standards shall be withdrawn at the latest by XXXXX.

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

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

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

**This document is a working document**

# Introduction

This European Standard addresses the performance requirements for protective clothing worn by operators applying primarily field in-use diluted chemical product. These substances are also known as crop or plant protection products.

Registration of pesticide products, such as insecticides, herbicides and fungicides, involves the assessment of operator exposure and risk factors. Such assessments determine the need for sufficient exposure control measures to be taken and for protective clothing, amongst other items of PPE, to be worn to reduce the predicted dermal exposure to an acceptable level for the users' health.

This European Standard defines performance requirements for protective clothing intended to protect workers across three levels of exposure during crop treatment; High (Level 3), Medium (Level 2) and Low (Level 1).

When applying this European standard users should take into account the level of exposure as well as the hazard posed from the specific pesticide formulation. A low level of operator exposure, in terms of the volume of liquid, could in fact present a major risk to health depending on the health hazard class of the product, its concentration, or both.

This European Standard is intended for use by experts in Occupational Health and Safety or those with specific knowledge of the risks associated with the handling of pesticides. The three levels of exposure can be related to the type of equipment used and the exposure scenario i.e. indoor or outdoor application. As a general rule, indoor applications with manual equipment experience the highest exposure and outdoor applications with tractor mounted equipment experience the lowest exposure. A detailed risk assessment should always be performed before deciding upon the appropriate level of pesticide protective clothing to be worn.

# Protective clothing – Performance requirements for protective clothing worn by operators applying liquid pesticides

## 1 Scope

This European Standard establishes minimum performance for protective clothing worn by operators applying field strength pesticide products, primarily liquid mixtures for three different levels of exposure; High (Level 3), Medium (Level 2) and Low (Level 1).

**Level 1** is intended for low exposure scenarios; for example, by drift particles of diluted pesticides during field application by boom sprayers of tractors or self- propelled machinery.

**Level 2** is intended for medium exposure scenarios; for example, by drift particles of diluted pesticides during intensive field and high culture application by tractors and handheld equipment.

**Level 3** is intended for high exposure scenarios; for example, from wetting by indoor/outdoor applications with handheld or motorised equipment and a potential direct contact with treated foliage.

The stringency in testing requirements increases for each level of exposure, defined as level 1, level 2, and level 3. Therefore, any garment approved for a Level 2 exposure is assumed to meet Level 1 requirements. Similarly, any garment approved for Level 3 exposure is assumed to meet the requirements for Level 1 and Level 2.

Garment materials and seams (exposed in use) intended for Level 3 exposures, may require, for a particular formulation, additional permeation testing to fully characterise the material as specifically resistant to permeation of a given formulation. The need to perform a permeation test shall be decided on the basis of a risk assessment which takes into account not only the level of exposure but the Accepted Operator Exposure Level (AOEL) of the active ingredient.

The whole garments shall pass a practical performance test, as described in Annex A, prior to being submitted to the low level spray test (Level 1 & Level 2) or high-level spray test (Level 3).

Protective clothing covered by this European Standard includes, but may not be limited to shirts, jackets, trousers and coveralls. This European Standard also addresses protection provided by protective accessories, with the exception of those used for the protection of the head, respiratory tract, hands, and feet for which the minimum performance requirements are detailed in other European Standards.

This European Standard does not address protection against biocides, fumigants, or highly volatile liquids and biological agents; nor does it address protection against undiluted pesticide products, which are often encountered during the preparation and mixing phase, for which the minimum performance requirements are detailed in other European Standards.

## 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 340: 2003, *Protective clothing – General requirements*

EN 14325: 2004, *Protective clothing against chemicals – Test methods and performance classification of chemical protective clothing materials, seams, joins and assemblages*

ISO 6330:2000, *Textiles — Domestic washing and drying procedures for textile testing*

ISO 13994, *Clothing for protection against liquid chemicals — Determination of the resistance of protective clothing materials to penetration by liquids under pressure*

EN ISO 17491-4, *Protective clothing — Test methods for clothing providing protection against chemicals — Part 4: Determination of resistance to penetration by a spray of liquid (spray test)*

ISO 22608, *Protective clothing — Protection against liquid chemicals — Measurement of repellency, retention, and penetration of liquid pesticide formulations through protective clothing materials*

EN 14786, *Protective clothing — Determination of resistance to penetration by sprayed liquid chemicals, emulsions and dispersions — Atomizer test*

EN 31092, *Textiles – Determination of physiological properties – Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded – hot plate test) (ISO 11092: 1993)*

CEN ISO/TR 11610, *Protective clothing – Vocabulary (ISO/TR 11610)*

EN 23758, *Textiles – Care labelling code using symbols (ISO 3758: 1991)*

ISO 7000, *Graphical symbols for use on equipment – Index and synopsis*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. For general terms used in relation to protective clothing the definitions given in ISO/TR 11610 apply.

**3.1 Biocide**
Non-agricultural pesticide

**3.2 Drift**
Wind induced loss of sprayed pesticides during application

**3.3 Fumigant**
Pesticide in the form of gas with the ability to spread to all areas of a sealed structure

**3.4 Pesticide (I.e. plant protection product, PPP)**
Substance or mixture of substances intended for preventing, destroying, repelling, or reducing any pest

NOTE: the term pesticide applies to insecticides, herbicides, fungicides, and various other substances used to control pests.

**3.4 AOEL (Acceptable Operator Exposure Level)**
Level in mg/kg body weight/day

**3.5 Operators**
Persons who are involved in activities relating to the application of a plant protection product (PPP)

**3.6 Wetting**
Penetration of a garment due to a high load of liquid contamination

# 4 Performance Requirements

## 4.1 General

Pesticide protective clothing shall fulfil the relevant requirements of EN 340. The clothing shall be made so that the wearer has freedom of movement and is as comfortable as possible, consistent with the protection afforded by the garment, as can be verified by the "seven movements" test, described in Annex A

NOTE 1 Wearer comfort can be judged in wear trials of the suit with test persons experienced in the type of work and environments for which the suits are intended as protective clothing.

Materials shall be tested in accordance with 4.4

Seams, joins, assemblages and whole suits shall be tested in accordance with 4.5

Pesticide protective clothing Level 1, 2 and 3 shall fulfil the whole suit spray test requirements specified in Clause 4.2 Table 2, when combined with additional protective equipment, i.e. for protection of hands, feet, face, head and/or respiratory tract, according to the manufacturer's instructions and when tested as a complete suit. The requirements of this clause apply to the garment as a whole including component parts (e.g. gloves, boots, hoods or respirators) that are not integral to the garment. The joins and assemblages attaching these components are included within the scope of this document, whereas criteria for the components are given in other European Standards.

NOTE 2 Partial body protection covers only specific areas of the body, leaving others exposed to the hazard. Because of this only limited testing of this type of clothing is appropriate and this product standard is defined accordingly.

## 4.2 Pre-conditioning

Prior to testing, the pesticide protective clothing shall be cleaned, if the manufacturer's instructions indicate that cleaning is allowed. Manufacturer’s instructions with regard to number of cleaning cycles, cleaning procedures and possible reapplication of treatments shall be observed. If no maximum number of cleaning cycles is indicated, the clothing shall undergo five cleaning cycles.

## 4.3 Conditioning

All test specimens shall be conditioned in accordance with the requirements of the test standard prescribed. If no condition is specified by the test standard then test specimens shall be conditioned at (20 ± 2)ºC and (65 ± 5) % relative humidity for at least 24 hours

## 4.4 Materials

Protective clothing materials complying with this standard shall be tested according to the requirements of Table 1 and unless specified a performance level of at least 1 shall be obtained for all requirements.

Protective clothing materials shall not be known to cause skin irritation or have any adverse effect to health and shall fulfil the requirements of EN 340.

Prior to testing all protective clothing materials shall be cleaned, if the manufacturer's instructions indicate that cleaning is allowed. Manufacturer's instructions with regard to number of cleaning cycles, cleaning procedures and possible re-application of treatments shall be observed. If no maximum number of cleaning cycles is indicated, materials shall undergo five cycles.

**Table 1 – Test requirements for Level 1, 2 and 3 materials**

| Normative Reference | Clause | Specific Performance Test | Level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| EN 14325 | 4.10 | Abrasion Resistance | | | |
| EN 14325 | 4.10 | Tear Resistance | x | x | x |
| EN 14325 | 4.10 | Tensile Strength | x | x | x |
| EN 14325 | 4.10 | Puncture Resistance | | | |
| EN 14325 | 4.9 [a] | Resistance to permeation of liquids | o | o | x |
| EN 14786 | 4.6 | Resistance penetration by liquids (atomiser test) | x | | |
| ISO 22608 | 4.7 | Resistance to penetration by liquids (pipette test). Method B | | x | x |
| ISO 13994 | 4.8 | Resistance to penetration by liquids under pressure | | 0 | x |

[a] if, for a particular pesticide, additional testing is required to fully characterise the material the material shall also be tested for permeation resistance using the formulation in question. The need to perform a permeation test shall be decided on the basis of a risk assessment which takes into account not only the level of exposure but the Accepted Operator Exposure Level (AOEL) of the active ingredient.

o = optional requirement
x = mandatory requirement

NOTE 1 The substances against which the protective clothing material should be assessed for resistance to permeation and/or penetration should be derived from the intended use, as described in the information supplied by the manufacturer. An informative Annex (Annex D) is provided to assist in the selection of a suitable test battery for chemical protective clothing manufacturers.

NOTE 2 Materials should be as light and flexible as possible in order to ensure wearer comfort as well as providing effective protection. Consideration should be given to the test method (Clause 4.12/ Annex B) for the evaluation of materials water vapour resistance. Material properties are only one element for the determination of wearer comfort of protective clothing. Design features of the clothing may even have a more important influence on wearer comfort that material properties

NOTE 3 Protective clothing material for which a test method in Table 1 does not provide a clear measurement end-point should be marked "not applicable" in the test report and in the instructions for use. The reason why the test could not be completed should be indicated, e.g. where the elasticity of the specimen prevents to determine an end-point in the puncture resistance test.

### 4.5 Seams, joins, assemblages and whole suits

Seam, joins, assemblages and whole suits shall be tested according to the requirements of Table 2 and unless specified a performance level of at least 1 shall be obtained for all requirements.

**Table 2 – Test requirements for Level 1, 2 and 3 seams, joins, assemblages and whole suits**

| Normative Reference | Clause | Specific Performance Test | Level | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| EN 14325 | 4.9 [ab] | Resistance to permeation of liquids | o | o | x |
| EN 14325 | 4.8 [b] | Resistance to penetration by liquids under pressure | | | x |
| EN 14325 | 4.10 | Seam Strength | x | x | x |
| EN ISO 17491-4[c] | 4.5- | Low-level whole suit spray test (Method A) | x | x | |
| EN ISO 17491-4[c] | 4.5- | High-level whole suit spray test (Method B) | | | x |

[a] if, for a particular pesticide, additional testing is required to fully characterise the material the material shall also be tested for permeation resistance using the formulation in question. The need to perform a permeation test shall be decided on the basis of a risk assessment which takes into account not only the level of exposure but the Accepted Operator Exposure Level (AOEL) of the active ingredient.

[b] Applicable only to seams which are exposed in use. For partial body protection items only seams relevant to the construction shall be considered.

[c] Whole suit spray testing is not required for items designated as partial body protection, as described in the manufacturer's information for use (e.g. jackets, gowns, aprons, trousers)

o = optional requirement
x = mandatory requirement

NOTE 1 The substances against which the protective clothing material should be assessed for resistance to permeation and/or penetration should be derived from the intended use, as described in the information supplied by the manufacturer. An informative Annex (Annex D) is provided to assist in the selection of a suitable test battery for chemical protective clothing manufacturers.

Protective clothing Level 1, Level 2 and Level 3 shall fulfil the whole suit spray test requirements specified in 4.5 (Table 2), when combined with additional protective equipment, i.e. for protection of hands, feet, face, head and/or respiratory tract, according to the manufacturer's instructions and when tested as a complete suit. The requirements of this clause apply to the garment as a whole including component parts (e.g. gloves, boots, hoods or respirators) that are not integral to the garment. The joins and assemblages attaching these components are included within the scope of this document, whereas criteria for the components are given in other European Standards.

Partial body protection covers only specific areas of the body, leaving others exposed to the hazard. Because of this only limited testing of this type of clothing is appropriate and this product standard is defined accordingly.

### 4.6 Liquid penetration resistance, atomiser test

Protective clothing materials for Level 1 garments shall be tested in accordance with EN 14786 and the average of three readings of percentage penetration shall be used to classify the material. If the average of three readings is within 10 % of the minimum requirement, the test shall be repeated for an additional set of three readings and the average of six readings shall be used to classify the material.

If more than one type of material is used to construct the garment, three specimens of each material shall be tested separately and the penetration classification based on the lowest performing level..

If the garment consists of a combination of separate layers of materials, all layers shall be tested together with the outer fabric exposed to the test chemical. For single-layer garments constructed from different types of materials, each material shall be tested separately and the penetration classification based on the lowest performing level.

Materials shall have an average penetration value of 5 % or less

The results for all chemicals tested shall be reported in the information supplied by the manufacturer, as specified in Clause 6.

### 4.7 Liquid penetration resistance, pipette test

Protective clothing materials for Level 2 garments shall be conditioned and tested in accordance with ISO 22608, Method B.
The substances against which the protective clothing material should be assessed for resistance to permeation and/or penetration should be derived from the intended use, as described in the information supplied by the manufacturer. An informative Annex (Annex D) is provided to assist in the selection of a suitable test battery for chemical protective clothing manufacturers.
The average of three percentage penetration values shall be used to classify the material. If the average of three readings is within 10 % of the minimum requirement, the test shall be repeated for an additional set of three readings and the average of six readings shall be used to classify the material.

If the garment consists of a combination of separate layers of materials, all layers shall be tested together with the outer fabric exposed to the test chemical. For single-layer garments constructed from different types of materials, each material shall be tested separately and the penetration classification based on the lowest performing level.

Materials shall have an average penetration value of 5 % or less.

The results shall be reported in the information to be supplied by manufacturer's product, as specified in Clause 6.

### 4.8 Liquid penetration under pressure resistance

Level 2 and 3 garments shall show a minimum level of resistance to penetration by liquids under pressure to ensure tightness against water that means protection against wetting. The test shall be carried out optional for level 2 and mandatory for level 3 garments:

According to ISO 16602 a pressure >7kPa to be the minimum performance requirement for Level 2 fabrics & seams and > 14kPa for level 3 must be achieved.

According to ISO 16602 a pressure >14kPa to be the minimum performance requirement for Level 3 fabrics & seams must be achieved

### 4.9 Resistance to permeation

Level 2 and 3 garments shall show a minimum level of resistance to permeation.
The test shall be carried out according ISO 6529 optional for level 2 and mandatory for level 3 garments. The evaluation criteria shall base on the cumulative method.
Note: At the present time it is not

4.10 Mechanical Performance

Garments shall fulfil minimal requirements of the mechanical properties, Tear resistance, Tensile strength shall be tested according EN 14325, Table 1 and Table 2. Garment materials

shall be conditioned and tested in accordance with ISO 9073-4. The average of five readings shall be a minimum of 10 N for re-usable and limited-use garments.
For tensile strength garment materials shall be conditioned and tested in accordance with ISO 13934-1and the average of five readings shall be calculated in both the machine and cross directions. The tensile strength of re-usable materials shall a minimum of 180 N. Materials with an elongation of more than 50 % are exempted from this requirement. For limited-use garments the tensile strength shall be a minimum of 30 N.
Seam tensile strength garment seam constructions shall be conditioned and tested in accordance with ISO 13935-2. For re-usable constructions with elongation less than 50 % the seam strength shall be at least 150 N for limited- use materials 30 N.

### 4.11 Practical Performance

Prior to whole suit testing, as detailed in Clause 4.5, table 2, practical performance testing in accordance with Annex A shall be performed.

Protective clothing shall meet the following criteria:

Garments shall have no design feature (e.g. sleeve plackets) that would allow the pesticide products against which the garment is intended to offer protection to penetrate through the garment. Outside pockets are allowed only if it is ensured that the pesticide products cannot penetrate or adhere to the pockets.

NOTE Outside pockets with drain gutter, flap or perforation are possible designs that fulfil the requirement.

Garments shall not restrict the test subject from performing any task.

c) Garment closures shall be fully secured in accordance with the manufacturer's instructions. For the duration of the test, there shall be no gaps or openings observed between closures that might have the potential to allow liquid penetration.

If the test subject is not able to perform one or several movements due to the hindrance of the garment or if the movements result in substantial damage to the garment or if the garment closures do not remain secure for the duration of the test, the garment shall fail the practical performance test and no further testing shall be conducted.

Comments, including those regarding garment comfort, provided by the wearer during the practical performance testing shall be recorded. A negative comment does not constitute a failure of this test.

A negative comment regarding comfort shall be addressed by the manufacturer in accordance with 6 j) and other information from the test subject shall be collected for possible refinement of methodology in the future.

The practical performance procedure specified in Annex A also serves as a precondition for the high- and low-level spray tests in accordance with ISO 17491-4. Therefore, if applicable, the test subject shall proceed to spray testing upon successful completion of the practical performance test.

### 4.12 Ergonomic Performance

Thermal comfort is just like protection efficiency an important factor for the wearer of chemical protective suits. To protect wearer against heat stress using tight(level2 or3) suits wearing time limitations must be kept as given in Annex B.
If applicable, recommendations that are intended to prevent heat stress, such as maximum continuous wearing time, shall be given in the instructions for use [see 6 j)]. The information provided in accordance with Clause 6 j) shall also address any comments with respect to garment comfort provided by the wearer during the practical performance testing (4.11).

## 5 Marking

The chemical protective clothing shall be marked with at least the following information. The marking shall be clearly visible and as durable as adequate for the life of the clothing.
a) the name, trade mark or other means of identification of the manufacturer;

b) the manufacturer's type, identification or model number

c) a pictogram showing that the clothing is intended to protect against pesticides (ISO 7000) and a pictogram inviting to read the instructions for use and any other information supplied by the manufacturer (ISO 7000, see EN 340);

d) the number and date of publication of this document

e) the year of manufacture, and also the month of manufacture if the expected shelf-life of the clothing is less than 24 months. This information may be marked on every commercial packaging unit instead of being marked on every item of clothing

f) for clothing which is suitable to be cleaned for re-use; care pictograms according to EN ISO 3758; for limited or single use clothing, a warning sentence "Do not re-use"

g) a pictogram showing that the clothing is intended to protect against pesticides (ISO 7000) and a pictogram inviting to read the instructions for use and any other information supplied by the manufacturer (ISO 7000, see EN 340);

NOTE Consideration should be given to suitable additional marking

## 6 Information supplied by the manufacturer

This information shall accompany every item of chemical protective clothing or at least every commercial packaging unit. The purpose is to guarantee that the wearer is confronted with these instructions.

The information shall be at least in the official language(s) of the country or region of destination. They shall be clear, legible, unambiguous and, if helpful, illustrations, part numbers, marking etc. shall be added. If appropriate, warnings shall be given against problems likely to be encountered.

The instructions together with the information on the marking shall contain at least the following information:

a) the name, trademark of other means of identification of the manufacturer and/or his authorised representative established in the European Union or the country where the product is placed on the market;

b) the reference number of this document and the identification as Level 1, 2 or 3;

c) a statement to confirm whether the clothing article is intended to offer full-body or partial body protection. If partial body then the specific area for which protection is offered must be specified;

c) if applicable, a statement to specify additional personal protective equipment with which the clothing shall be worn, and how to attach or connect them, to achieve the claimed performance classification. This statement shall be precise enough to help the user to select the appropriate equipment, e.g. a hood model YY or equivalent, or respiratory protection including a full face mask, etc…;

d) the manufacturer's type, identification or model number;

e) the size range (as defined in EN 340);

f) a list of chemicals and chemical products (including the names and approximate concentrations of the components) to which the protective clothing has been tested and the performance levels obtained in permeation and/or penetration testing In principle the use of the clothing shall be restricted to the chemicals listed, but if the list represents only a selection of the available information, then this shall be clearly stated along with the reference to where additional information can be obtained shall be mentioned, e.g. a separate brochure, the manufacturer's telephone or fax number, a web site on the internet etc..;

g) all other test performance levels, preferably in a table; explanations on the meaning of these performance levels

h) if applicable, retirement criteria such as end-of-life indicators (e.g. measuring repellency by applying drops of a liquid supplied with the garment (is there such a product available??)

i) instructions to remove the garment immediately if contaminated by concentrate spill; (what if the manufacturer expects the product to be a barrier to the concentrate??)

j) warning of potential heat stress and information to assist the user in making decisions regarding selection and use of the garment, if applicable

k) information necessary for trained persons on:
- application, limitations of use (temperature range etc.),
- tests to be carried out by the wearer before use (if applicable),
- fitting,
- use,
- removal,
- maintenance and cleaning procedures (including guidance for decontamination and disinfection),
- storage,
- if applicable, disposal (contaminated chemical protective clothing may be harmful and should be disposed of as hazardous waste in accordance with national regulations),
- special attention to potential problems which may be caused by deterioration of special treatments and the correct way of regenerating these treatments;

l) a statement to advise that the wearing of chemical protective clothing may cause heat stress and, if applicable, information on comfort-related parameters, e.g. the Ret value according to EN 31092 (Annex B refers)

# **Annex A** (normative)

## Test subject exercises for practical performance evaluation

The following activities shall be performed as part of the practical performance evaluation and to evaluate the garment for gaping and design requirements.

A practical test shall be carried out by a human test subject. If more than one size of protective clothing is manufactured, the test subject will be asked to select the appropriate size according to the manufacturer's information leaflet.

The test shall comprise three repetitions, at moderate speed, of the sequence of seven movements described below.

Starting from a standing position in each case, carry out the following sequence of movements:

- movement 1: kneel on both knees, lean forward and place both hands on the floor (45 ± 5) cm in front of the knees; crawl forwards and backwards on hands and knees for a distance of 3 m in each direction;
- movement 2: climb a vertical ladder at least four steps, with rungs as encountered on a typical ladder;
- movement 3: position hands at chest level, palms out; reach directly overhead, interlock thumbs, extend arms fully upwards;
- movement 4: kneel on right knee, place left foot on floor with left knee bent (90 ± 10)° and touch thumb of right hand to toe of left shoe; repeat movement with alternative posture, i.e. by kneeling on left knee and placing right foot on the floor with knee bent at 90°;
- movement 5: extend arms fully in front of body, lock thumbs together, twist upper body (90 ± 10)° left and right;
- movement 6: stand with feet shoulder width apart, arms at side; raise arms until they are parallel to the floor in front of the body; squat down as far as possible;
- movement 7: kneel as in movement 4, with left arm hanging loosely at side, and raise arm fully overhead; repeat movement with alternative posture by alternating arms.

# **Annex B** (normative)
# **Material water-vapour resistance**

If tested in accordance with ISO 11092, the water-vapour resistance of all layers of a garment shall be classified in accordance with Table B.1. The results shall be reported in the manufacturer's product technical information, as specified in Clause 6.

**Table B.1 — Classification of water-vapour resistance**

| | 1 | 2 | 3 |
|---|---|---|---|
| **r-vapour resistance**, $R_{et}$ ($m^2$·Pa/W) | $R_{et}$ > 40 | 20 < $R_{et}$ ≤ 40 | $R_{et}$ ≤ 20 |

Table B.2 shows recommended wearing times for scenarios with minimum physiological strain and working environments with temperatures of 25 °C or less. The information is included as an example to illustrate the effect of water-vapour permeability on the recommended continuous wearing time of a garment. Comfort trials are recommended to evaluate the use of garments in hot climatic conditions.

**Table B.2 — Recommended maximum continuous wearing time for a complete suit consisting of jacket and trousers without thermal lining**

| **Temperature of working environment** °C | **Wearing time**[a] min | | |
|---|---|---|---|
| | **Class 1** $R_{et}$ > 40 $m^2$·Pa/W | **Class 2** 20 $m^2$·Pa/W < $R_{et}$ ≤ 40 $m^2$·Pa/W | **Class 3** $R_{et}$ ≤ 20 $m^2$·Pa/W |
| 25 | 60 | 105 | 205 |
| 20 | 75 | 250 | – |
| 15 | 100 | – | – |
| 10 | 240 | – | – |
| 5 | – | – | – |
| "–" indicates an absence of limit for wearing time. | | | |
| a The recommended wearing times given in this table are valid for a medium physiological strain, $M$, of 150 W/$m^2$, standard-man, at 50 % relative humidity, and wind speed, $v_a$, of 0,5 m/s. | | | |

Other test methods are available for the evaluation of water-vapour resistance. Procedures also exist for the evaluation of thermal stress and heat stress caused by a garment. These methods or wear trials may be used as a basis for recommendations for maximum continuous wearing time.

If, because of the protection required, the use of materials with low water-vapour resistance is not possible, then the garment should be designed in such a way as to reduce the physiological strain as much as possible (e.g. by ventilation).

# Annex C (informative)

Exposure Scenarios and levels of protection required, examples

| **Usual scenarios of exposure** | **Produce** | **Hazards by drift droplets(dp) or direct contact (dc)** | **exposure / risk estimation**<br><br>**+, ++ , +++** | **Proposed means of protection** | **Suit Level** | **comments** |
|---|---|---|---|---|---|---|
| Spray application tractor bound or self propelled | Field crops, viniculture,<br><br>vegetable gardening | dp | +/++ | Cab Cat.4<br><br>PPE | 1 | Depending on the cab category 1-3 |
| Air-assisted spray application, tractor bound or self-propelled | bush and tree cultures, field crops,<br><br>viniculture,<br><br>gardening,<br><br>orchard crops | dp | +/++ | Cab<br><br>PPE | 1 | Depending on the cab category 1-3 |
| Spray application hand-held with Knapsack lance | field crops,<br><br>vegetable gardening | dp,dc | ++ | Suits, PB | 3 | Wetting especially neck and back |
| Air-assisted spray application hand–held<br><br>motorised knapsack mistblowers | Bush, tree cultures, viniculture,<br><br>field crops,<br><br>gardening,<br><br>orchard crops | dp, dc | ++/+++ | Suits, PB | 2 | Wetting especially neck and back |

| | | | | | | |
|---|---|---|---|---|---|---|
| Application in greenhouses with hand-held hydraulic or CDA sprayer | low and tall plants,<br><br>vegetables,<br><br>orchard crops | dp, dc | +/+++ | Suits, PB | 2/3 | Vapour ? |
| Follow-up work with plant contact | | dc | +/++ | Suits, PB | 3 | |

# Annex D (informative)

## Selection of test chemical for penetration tests

The test chemical chosen for the penetration tests is the result of a multifaceted selection process. Pesticide formulation chemists were consulted to identify key factors that affect pesticide penetration through fabrics. Additional availability on the market must be considered. Pesticides must be authorized by national boards mainly for limited spaces of years only. If a authorization is cancelled or not prolonged for this pesticide a substitute must be found for testing purpose which show same results for penetration of a garment. This will be difficult and specifically if only one pesticide is used.

**Table 1 — Test chemicals**

| **Brand name ZA-Nr.** | **Type of preparation** | **Active substance** | **concentration of active substance** | **Concentration of active substance in the liquid pesticide** | **Preparation concentration of spray dilution** | **manufacturer** |
|---|---|---|---|---|---|---|
| U46-D-Fluid 0941-00 | SL | 2,4-D-DMA-Salz | 500 g/l | 2 400 mg/l | 5 ml/l | BASF |
| Pirimor Granulat 2470-00 | WG | Pirimicarb | 500 g/kg | 750 mg/l | 1.5 g/l | Syngenta |
| Amistar 5090-00 | SC | Azoxystrobin | 250 g/l | 1 250 mg/l | 5 ml/l | Syngenta |
| Betanal Expert 4991-00 | EC | Phenmedipham | 75 g/l | 560 mg/l | 7,5 ml/l | Bayer CropScience |
| Folicur 4028-00 | EW | Tebuconazole | 250 g/l | 1 250 mg/l | 5 ml/l | Bayer CropScience |

NOTE When choosing the test chemicals from table A.1, the establishing of the authorities shall be observed.

# Annex ZA
(informative)

## Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

This European Standard 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 89/686/EEC.

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

The following clauses of this standard are likely to support requirements of Directive 89/686/EEC, Annex II:

| EU-Directive 89/686/EEC, Annex II | Clauses of this standard |
|---|---|
| 1.1 Design principles | |
| 1.1.1 Ergonomics | 4, EN 340 and practical performance test |
| 1.1.2 levels and classes of protection | 4.4, 4.5, 4.6,4.7 |
| 1.2 Innocuousness of PPE | 4, 5, 6 |
| 1.2.1 Absence of risks and other 'inherent' nuisance factors<br>1.2.1.1 Suitable constituent materials<br>1.2.1.2 Satisfactory surface condition of all PPE parts in contact with the user<br>1.2.1.3 Maximum permissible user impediment | 4.1, 4.4,4. 5<br>EN 340<br>Practical performance test |
| 1.3 Comfort and efficiency | |
| 1.3.1 Adaptation of PPE to user morphology | EN 340, Practical performance test |
| 1.3.2 Lightness and design strength | 4.1,<br>Practical performance test |
| 1.4 Information supplied by the manufacturer | |
| 2.2 PPE 'enclosing' the parts of the body to be protected | 4.5<br>Practical performance test |
| 2.4 PPE subject to ageing | 4.1 |
| 2.12 PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety | Marking |
| 3.3 Protection against physical injury (abrasion, perforation, cuts, bites) | 4.4 |
| 3.10.2 Protection against dangerous substances and infective agents | 4.4,4.5<br>Instruction for use |

Compliance with the clauses of this standard provides one means of conforming to the specific essential requirements of the Directive concerned and associated EFTA regulations.

**ICS 13.340.10**

Price based on 18 pages