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**Protective clothing — Performance
requirements for protective clothing
worn by operators applying pesticides
and for re-entry workers**

AMENDMENT 1: Surrogate test chemical

*Habillement de protection — Exigences de performance pour les
vêtements de protection portés par les opérateurs appliquant des
pesticides et pour les travailleurs de rentrée*

AMENDEMENT 1: Produit chimique de substitution pour essai

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This document was prepared by Technical Committee ISO/TC 94, *Personal safety — Personal protective equipment*, Subcommittee SC 13, *Protective clothing*.

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Protective clothing — Performance requirements for protective clothing worn by operators applying pesticides and for re-entry workers

AMENDMENT 1: Surrogate test chemical

Introduction, seventh paragraph, fourth sentence

Replace

"The test chemical selected for testing is an emulsifiable concentrate that is representative of a worst case scenario for penetration and repellency."

with

"The test chemical selected for testing is a pesticide surrogate that is representative of a worst case scenario for penetration."

6.2

Delete footnote 1, and replace the text in the main paragraphs with the following:

"Materials for Level C1 and Level C2 protective clothing shall be tested in accordance with ISO 22608, Method A, using 0,2 ml of test chemical. Three specimens shall be tested for each material. The test chemical shall be diluted pesticide surrogate EC-DY, an emulsion of Disperse Yellow 26 in water. Water grade 3 (according to ISO 3696) or deionized water shall be used to prepare the diluted solution with 2,5 % EC-DY. See Annex C concerning selection of test chemical and Annex G for composition of the test chemical.

For materials for protective clothing classified as Level C1, the upper limit for percent penetration shall be 40 %. For materials classified as Level C2, the upper limit for percent penetration shall be 5 %.

In addition, materials for protective clothing shall be tested for resistance to penetration according to ISO 22608 Method B if one or more of the following requirements are met:

- a) the test results for materials for protective clothing classified as Level C1 are greater than 40 % but less than 48 % (i.e. at least one specimen shows its result greater than 40 % and the three test specimens show their result lower than 48 %).
- b) the test results for materials for protective clothing classified as Level C2 are greater than 5 % but less than 6 % (i.e. at least one specimen shows its result greater than 5 % and the three test specimens show their result lower than 6 %). If the specimens are tested with both methods A and B, the results obtained by Method B shall be used for determining penetration classification and reporting requirements.

NOTE 1 For Method A, a gravimetric method, the difference in the mass of the collector layer before and after testing is used to calculate the % penetration. Method A is used in the first instance because this is the simpler and less-expensive of the two test methods. However, in some cases the increase in mass of the collector layer is due to water and/or water vapour penetration. Therefore, for validation Method B is required as the chemical analysis required for Method B confirms the amount of the actual dye/active ingredient that has penetrated.

For materials for protective clothing classified as Level C1, the three specimens tested shall have maximum penetration of 40 %.

For materials for protective clothing classified as Level C2, the three specimens tested shall have maximum penetration of 5 %.

NOTE 2 ISO 22608 is an accelerated laboratory test that differentiates the penetration performance of materials and seams. The maximum allowable penetration of 40 % is derived from the data analysis of cotton and cotton/polyester protective clothing used for operator exposure studies. The 40 % penetration limit for Level C1 protective clothing is based on analysis of lab data as well as operator exposure study data. Studies conducted with the reference fabric for Level C1 had less than 5 % penetration through the garment in operator exposure studies. Therefore, it is not possible to substitute laboratory penetration data for field penetration data. For this reason, the laboratory test data are used only to classify materials and seams. It cannot be used as default protection factors for risk assessment. References [4] and [5] provide additional information on the analysis to establish the 40 % limit value for Level C1 and the 5 % limit value for Level C2."

6.4

Replace paragraphs prior to NOTE 1 with the following.

"For Level C3 protective clothing, three specimens shall be tested for cumulative permeation in accordance with ISO 19918. Use(s) claimed by the manufacturer and stated in accordance with Clause 10 c) shall be used as the basis for conducting the permeation test. See Annex C concerning selection of test chemical and Annex G for composition of the test chemical.

- For protection against diluted formulations, the test shall be conducted for 1 h using pesticide surrogate EC-DY (an emulsion of Disperse Yellow 26), diluted with water grade 3 (according to ISO 3696) or deionized water to 2,5 % EC-DY.
- For protection against concentrates for short duration, the test shall be conducted for 15 min using pesticide surrogate EC-DY (without dilution).

Additional testing may be required to determine cumulative permeation through material for specific pesticides. For additional testing, the procedure, test methods, and pass criteria shall be the same as that for EC-DY stated above. The test chemical shall be the specific pesticide formulation, either concentrated or diluted with water, in accordance with the pesticide product labelling.

Materials for protective clothing classified as Level C3 shall have a maximum cumulative permeation of 1 µg/cm² for all three specimens tested with pesticide surrogate EC-DY."

7.2, first and second paragraph

Replace with the following:

"Specimens with seams used in Level C1 protective clothing shall be tested in accordance with ISO 22608, Method A, using 0,2 ml of test chemical. Three specimens shall be tested for each type of seam. The test chemical shall be diluted pesticide surrogate EC-DY, an emulsion of Disperse Yellow 26 in water. Water grade 3 (according to ISO 3696) or deionized water shall be used to prepare the diluted solution with 2,5 % EC-DY. The seam shall be tested by placing the specimen such that the seam is centred along the length so that the test chemical falls directly on it. The test shall be repeated if the test chemical does not fall directly onto the seam during application. The specimen shall be discarded, and the test repeated with a new specimen. All types of seams used in the construction shall be tested if more than one type of seam is used.

For seams for protective clothing classified as Level C1, the upper limit for percent penetration shall be 40 %.