
Kmetijski traktorji in stroji z lastnim pogonom za zaščito rastlin - Zaščita upravljavca (voznika) pred nevarnimi snovmi - 2. del: Filtri, zahteve in postopki preskušanja

Agricultural tractors and self-propelled sprayers - Protection of the operator (driver) against hazardous substances - Part 2: Filters, requirements and test procedures

Landwirtschaftliche Traktoren und selbstfahrende Pflanzenschutzgeräte - Schutz vor gefährlichen Stoffen - Teil 2: Filter, Anforderungen und Prüfverfahren

Tracteurs agricoles et pulvérisateurs automoteurs - Protection de l'opérateur (conducteur) contre les substances dangereuses - Partie 2: Filtres, exigences et méthodes d'essai

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**Agricultural tractors and self-propelled sprayers - Protection of
the operator (driver) against hazardous substances - Part 2:
Filters, requirements and test procedures**

Tracteurs agricoles et pulvérisateurs automoteurs -
Protection de l'opérateur (conducteur) contre les
substances dangereuses - Partie 2: Filtres, exigences et
méthodes d'essai

Landwirtschaftliche Traktoren und selbstfahrende
Arbeitsmaschinen - Schutz vor gefährlichen Stoffen - Teil 2:
Luftreinigungseinrichtungen

This European Standard was approved by CEN on 24 October 2009.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 15695-2:2009) has been prepared by Technical Committee CEN/TC 144 "Tractors and machinery for agriculture and forestry", the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by May 2010.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 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 Annexes ZA and ZB, which are integral parts of this document.

EN 15695, *Agricultural tractors and self-propelled sprayers – Protection of the operator (driver) against hazardous substances*, consists of the following parts:

- *Part 1: Cab classification, requirements and test procedures*
- *Part 2: Filters, requirements and test procedures*

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, 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.

Introduction

This document is a type C standard as stated in EN ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this European Standard. When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

When operating self-propelled sprayers and tractors the operator can be exposed to hazardous substances such as dust, aerosols or vapours (for example during the application of plant protection products or fertilisers). Cabs of agricultural tractors and self-propelled sprayers providing protection against these substances may respectively be used to reduce operator exposure to air-borne contaminants generated during farming operations.

With regard to the application of plant protection products (PPP) the operator can be exposed to risks:

- before the actual spraying operation (e.g. handling of PPP cans/packages, spray tank filling, sprayer adjustment);
- during the spraying operation (e.g. on the tractor or self-propelled sprayer with/without cab, when working at the sprayer when adjusting the sprayer in the field; removing nozzle blockages, etc.);
- after the spraying operation (e.g. when removing residues, sprayer cleaning, service and maintenance operations).

Protective measures (personal protective equipment (PPE)) are specified on labels today, for example:

- dermal exposure: gloves, overall, apron, headdress (with face protection), protective goggles;
- respiratory exposure: filtering half masks.

The objective of this European Standard is to improve the operator protection by using the protective function of the cab of self-propelled sprayers and tractors in case of mounted or trailed sprayers. For this purpose, this European Standard specifies cab categories, performance requirements, test procedures and the operator information to be provided, in particular with regard to installation, use and maintenance operations.

EN 15695-2:2009 (E)**3 Requirements and test procedures****3.1 Pre-test vibration conditioning**

3.1.1 Before the filter test is conducted, the air delivery and filtration system shall be subjected to drop and vibration pre-conditioning.

3.1.2 Drop conditioning shall subject the device to a single 5 ms pulse of $245 \text{ m}\cdot\text{s}^{-2}$ (25 g). The orientation of the drop shall be a minimum of 20° off one axis of the device.

3.1.3 During the vibration pre-conditioning the filter shall be mounted in the end use orientation. The pre-conditioning shall be performed with a logarithmic sweep of 10 Hz to 200 Hz and back to 10 Hz at a rate of $1,5 \text{ Hz}\cdot\text{s}^{-1}$.

The vibration levels shall be:

- a displacement of 1,5 mm from 10 Hz to 32 Hz;
- a constant acceleration of $20,8 \text{ m}\cdot\text{s}^{-2}$ RMS (3 g peak) from 32 Hz to 200 Hz.

Each of three axis shall be excited for a period of 0,5 h. All natural frequencies shall be recorded and reported.

3.2 Dust filter**3.2.1 Requirements**

The air delivery system filter shall have a performance of $\geq 99\%$ gravimetric efficiency when tested as specified in 3.2.2.

3.2.2 Test procedure

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The filter shall be tested in the orientation of that in the cab. The airflow shall be that as measured in the cab, at the air delivery and filtration system inlet, in the highest flow rate operating condition, $\begin{matrix} +10\% \\ -0\% \end{matrix}$. The temperature shall be $(23 \pm 2)^\circ\text{C}$. The relative humidity shall be $(80 \pm 3)\%$.

The filter media shall be tested for fractional efficiency in accordance with ISO 14269-4 over 30 min with a fine dust concentration of $1 \text{ g}/\text{m}^3$. The test report shall include all information to identify the filter, the test conditions and laboratory.

NOTE Other test standards than ISO 14269-4 may be used, if equivalence is shown.

3.3 Aerosol filter**3.3.1 Requirements**

The filter shall meet the requirements of the type "P-R" filter as given in EN 143:2000, so as to block off aerosols.

The maximum aerosol penetration shall be $\leq 0,05\%$ before and after storage when tested according to 3.3.2.

3.3.2 Test procedure

The effectiveness against aerosols of filters shall be checked during a period of 20 min at the maximum flow rate when tested with paraffin oil or DEHS or DOP in accordance with EN 1822-2 and EN 1822-5 and in accordance with 5.2.3 of EN 15695-1:2009.

The penetration shall be measured throughout the test at measurement intervals not exceeding 5 min.

Record the maximum penetration obtained during exposure to the aerosol.

Remove the filter from the test rig and store it for a period of (24 ± 1) h under temperature conditions between $16\text{ }^{\circ}\text{C}$ et $32\text{ }^{\circ}\text{C}$ and (50 ± 30) % relative humidity.

Resume testing with the filtration device and reinstall latter in the test rig.

Pass through the same test aerosol as before storage, at the nominal flow rate, and measure the penetration 3 min after commencing the test.

3.4 Vapour filter

3.4.1 Requirements

The filter shall meet the requirements of the type "A" filter as specified in EN 14387:2004, intended for the vapours of organic products of which the boiling temperature exceeds $65\text{ }^{\circ}\text{C}$.

Downstream of the filter, the test vapour concentration shall not exceed the threshold of $10\text{ }\mu\text{g/g}$ throughout the entire test specified in 3.4.2.

3.4.2 Test procedure

The effectiveness against vapours of filters shall be checked according to the cyclohexane (C_6H_{12}) method specified EN 12941:1998, during 70 min, with a test gas concentration of $500\text{ }\mu\text{g/g}$ upstream of the air delivery and filtration system.

4 Information for use

The following information shall be provided:

- intended use of the filter and against which substances protection it is provided;
- installation of the filter;
- service, maintenance and replacement of the filter.