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Kmetijski traktorji in stroji z lastnim pogonom za zaščito rastlin - Zaščita upravljalca (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

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

Ta slovenski standard je istoveten z: EN 15695-2:2017

ICS:

65.060.10 Kmetijski traktorji in prikolice Agricultural tractors and
trailed vehicles

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EUROPEAN STANDARD

EN 15695-2

NORME EUROPÉENNE

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English Version

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
Pflanzenschutzgeräte - Schutz der Bedienungsperson
(Fahrer) vor gefährlichen Substanzen - Teil 2: Filter,
Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 3 July 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 15695-2:2017) 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 March 2018, and conflicting national standards shall be withdrawn at the latest by March 2018.

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 15695-2:2009.

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 Annex ZA, which is an integral part of this document.

The EN 15695 series, *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 organisations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 15695-2:2017 (E)**Introduction**

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

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate in the drafting process of this document.

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 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 PPP 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, Parts 1 and 2 of this European Standard specify cab categories, performance requirements, test procedures and the operator information to be provided, in particular with regard to installation, use and maintenance operations.

1 Scope

This European Standard is applicable to filters as part of cabs of categories 2, 3 and 4 of agricultural and forestry tractors and self-propelled sprayers as specified in EN 15695-1 in order to limit the exposure of the operator (driver) to hazardous substances, in agricultural and forestry operations. It specifies requirements, test procedures and the information to be provided by the filter manufacturer.

This standard does not cover:

- the exposure linked to fumigants;
- the category of cab and performance level to be used for any particular application;
- the actual cab performance in the field applications;
- field durability of filters or filtration systems.

This document is not applicable to filters which are manufactured before the date of its publication as EN.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 143:2000, *Respiratory protective devices - Particle filters - Requirements, testing, marking*

EN 1822-2:2009, *High efficiency air filters (EPA, HEPA and ULPA) - Part 2: Aerosol production, measuring equipment, particle counting statistics*

EN 1822-5:2009, *High efficiency air filters (EPA, HEPA and ULPA) - Part 5: Determining the efficiency of filter elements*

EN 12941:1998, *Respiratory protective devices - Powered filtering devices incorporating a helmet or a hood - Requirements, testing, marking*

EN 14387:2000, *Respiratory protective devices — Gas filter(s) and combined filter(s) — Requirements, testing, marking*

EN 15695-1:2017, *Agricultural tractors and self-propelled machinery — Protection of the operator (driver) against hazardous substances — Part 1: Cab classification, requirements and test procedures*

ISO 12103-1:2016, *Road vehicles — Test contaminants for filter evaluation — Part 1: Arizona test dust*

ISO 14269-4:1997, *Tractors and self-propelled machines for agriculture and forestry — Operator enclosure environment — Part 4: Air filter element test method*

3 Requirements and test procedures

3.1 Dust filter

3.1.1 Requirements

The air delivery system filter shall have a performance of ≥ 99 % gravimetric efficiency when tested as specified in 3.1.2.

EN 15695-2:2017 (E)**3.1.2 Test procedure**

The filter shall be tested in the horizontal position. 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, $+10\%$ to -0% . The temperature shall be (23 ± 2) °C. The relative humidity shall be (50 ± 3) %.

The filter media shall be tested for gravimetric efficiency in accordance with ISO 14269-4 (or any other equivalent standard) over 30 min with a fine dust (A2 given in ISO 12103-1:2016, or, as an alternative in accordance with fine grade dust defined in ISO 14269-4:1997, 4.2.2) concentration of 1 g/m³. The test report shall include all information to identify the filter, the test conditions and laboratory.

3.2 Aerosol filter**3.2.1 Requirements**

The filter shall meet the requirements of the type "P-R" filter as given in EN 143, so as to block off aerosols. The maximum aerosol penetration shall be $\leq 0,05$ % before and after storage when tested as specified in 3.2.2.

3.2.2 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 Diethylhexylsebacate (DEHS) or Dispersed Oil Particulate (DOP) in accordance with EN 1822-2 and EN 1822-5 and in accordance with EN 15695-1:2017, 5.2.3.

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 °C and 32 °C and (50 ± 30) % relative humidity.

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

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

3.3 Vapour filter**3.3.1 Pre-test vibration conditioning**

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

3.3.1.2 Drop conditioning shall subject the device to a single 5 ms pulse of 245 m·s⁻² (25 g). The orientation of the drop shall be a minimum of 20° off one axis of the device.

3.3.1.3 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 Hz·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 m·s⁻² RMS (3 g peak) from 32 Hz to 200 Hz.

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

3.3.2 Requirements

The filter shall meet the requirements of the type "A" filter as specified in EN 14387 intended for the vapours of organic products of which the boiling temperature exceeds 65 °C.

Downstream of the filter, the test vapour concentration shall not exceed the threshold of 10 ml/m³ throughout the entire test specified in 3.3.3.

3.3.3 Test procedure

The effectiveness of filters against vapours shall be checked according to the cyclohexane (C₆H₁₂) method specified EN 12941, during 70 min, with a test gas concentration of 1,8 mg/l upstream of the air delivery and filtration system. During the test the air delivery system shall be adjusted to the highest air flow rate operating condition specified by the air delivery system manufacturer.

4 Information for use

4.1 Information

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, replacement and disposal of the filter.

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4.2 Marking

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The following information shall be given on the filter:

- Filter for cab category X according to EN 15695-1:2017.