SLOVENSKI STANDARD
SIST EN 1093-3:2007

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Nadomeġļa:
SIST EN 1093-3:1998

Varnost strojev ï Vrednotenje emisije nevarnih snovi, ki jih prenaġa zrak ï 3. del: Metoda s preskusno mizo za merjenje stopnje emisije doloļ ene onesnaġevalne snovi

Safety of machinery - Evaluation of the emission of airborne hazardous substances - Part 3: Test bench method for the measurement of the emission rate of a given pollutant

Sicherheit von Maschinen - Bewertung der Emission von luftgetragenen Gefahrstoffen - Teil 3: Prüfstandverfahren zur Messung der Emissionsrate eines bestimmten luftverunreinigenden Stoffes

Sécurité des machines - Evaluation de l'émission de substances dangereuses véhiculées par l'air - Partie 3: Méthode sur banc d'essai pour le mesurage du débit d'émission d'un polluant donné

Ta slovenski standard je istoveten z: **EN 1093-3:2006**

ICS:

13.040.40	Emisije nepremiļ nih virov	Stationary source emissions
13.110	Varnost strojev	Safety of machinery

SIST EN 1093-3:2007 **en**

EUROPEAN STANDARD

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English Version

Safety of machinery - Evaluation of the emission of airborne hazardous substances - Part 3: Test bench method for the measurement of the emission rate of a given pollutant

Sécurité des machines - Evaluation de l'émission de substances dangereuses véhiculées par l'air - Partie 3: Méthode sur banc d'essai pour le mesurage du débit d'émission d'un polluant donné

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This European Standard was approved by CEN on 4 November 2006.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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Contents

Page

Foreword

This document (EN 1093-3:2006) has been prepared by Technical Committee CEN/TC 114 “Safety of machinery”, 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 June 2007, and conflicting national standards shall be withdrawn at the latest by June 2007.

This document supersedes EN 1093-3:1996.

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.

This part 3 of EN 1093 *Safety of machinery — Evaluation of the emission of airborne hazardous substances* belongs to a series of documents, the other parts of which are the following:

— Part 1: Selection of test methods;

— Part 2: Tracer gas method for the measurement of the emission rate of a given pollutant;

— Part 4: Capture efficiency of an exhaust system — Tracer method;

— Part 6: Separation efficiency by mass, unducted outlet;

— Part 7: Separation efficiency by mass, ducted outlet;

— Part 8: Pollutant concentration parameter, test bench method;

— Part 9: Pollutant concentration parameter, room method;

— Part 11: Decontamination index.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This European Standard is a type B standard as stated in EN ISO 12100-1.

The provisions of this European Standard can be supplemented or modified by a type C standard.

NOTE For machines which are covered by the scope of a type C standard and which have been designed and built according to the provisions of that standard, the provisions of that type C standard take precedence over the provisions of this type B standard.

1 Scope

This European Standard specifies a test bench method for the measurement of the emission rate of a given airborne hazardous substance from machines using a test bench under specified operating conditions of the machine.

The measurement of the emission rates of a given pollutant emitted from machines can serve for:

a) the evaluation of the performance of a machine;

b) the evaluation of the reduction of pollutant emissions of the machine;

c) the comparison of machines within groups of machines with the same intended use (groups are defined by the function and materials processed);

d) the ranking of machines from the same group according to their emission rates;

e) the determination of the state of the art of machines with respect to their emission rates.

This European Standard is not applicable to machinery which is manufactured before the date of its publication as an EN.

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 ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003 and the following apply.

3.1
uncontrolled emission rate of a given pollutant
uncontrolled emission rate of a specified pollutant (deprecated)
$\dot{m}_u$

mass of pollutant emitted from the machine into the space around the machine per unit of time

NOTE 1 Any measures to reduce the air pollution around the machine (e.g. capture devices, containment equipment, wetting process) are not in use or are de-activated.

NOTE 2 In previous language use the term "uncontrolled emission rate of a specified pollutant" was used. This term has been identified as ambiguous in view of its possible translation and should therefore not be used any longer.

[EN 1093-1:1998, 3.2.1]

3.2
controlled emission rate of a given pollutant
controlled emission rate of a specified pollutant (deprecated)
$\dot{m}_k$

mass of pollutant emitted from the machine into the space around the machine per unit of time, taking into account the effects of measures to reduce the air pollution

NOTE In previous language use the term "controlled emission rate of a specified pollutant" was used. This term has been identified as ambiguous in view of its possible translation and should therefore not be used any longer.

[EN 1093-1:1998, 3.2.2]

4 Principle

The principle of the measurement method is to operate machines under controlled conditions under a uniform air flow in a test bench and to collect a representative part of the airborne emissions in that air flow.

5 Description of the test bench

The test bench consists generally of a cabin with a funnel and a duct, of rectangular or circular cross section followed by a fan (see Figure 1). It is the responsibility of the type C standard committees to select parameters within the ranges given in Figure 1.

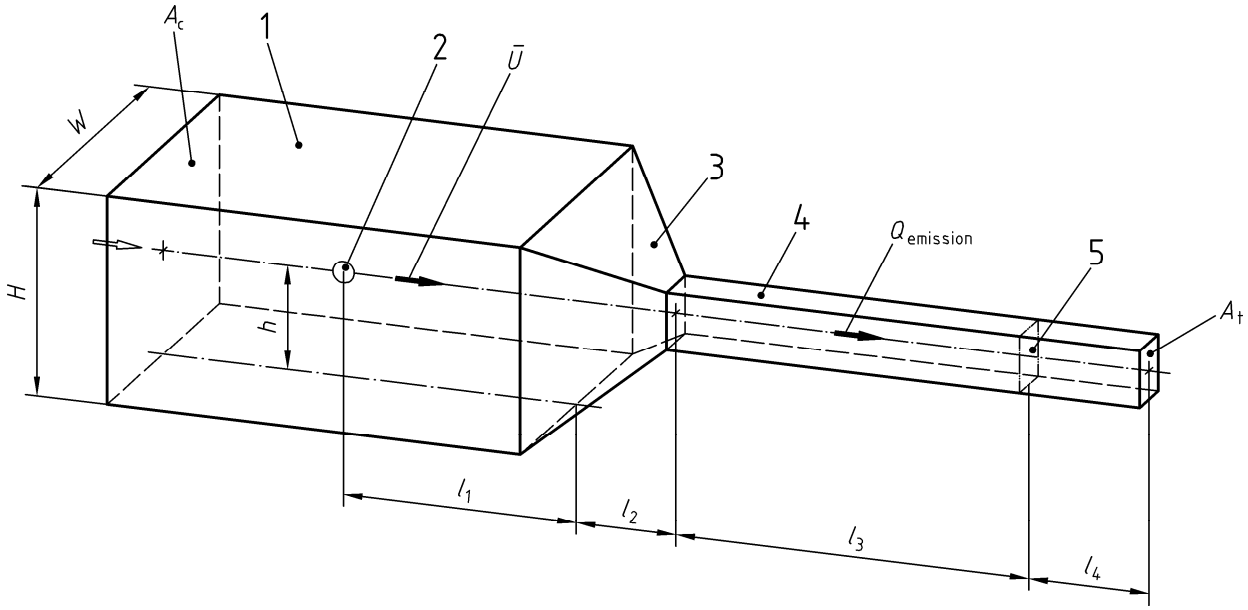
The fan produces an air flow in the test cabin from the inlet towards the funnel. The cabin should be equipped with an inlet that ensures that the air entering the cabin has a uniform velocity profile across the cabin cross section. This can be achieved in a number of ways (e.g. macroporous filter material, perforated plastic foil or plate, profiled inlet associated with undisturbed air flow pattern in the test hall).

The selected average air velocity, $\bar{U}$, in the cabin between the source and the funnel (see Figure 1) is determined by the air volume flow rate, Q, in the duct. The system requires controls to ensure that a constant flow rate is maintained during a test. This air flow rate does not include the air flow rate caused by the operation of the capture device (where used) of the machine under test.

The cross section of the cabin (form and dimensions) is chosen according to the size of the test object. The maximum cross-sectional area of the test object shall not exceed a fifth of the cross-sectional area of the cabin, A_c.

A small axial fan is positioned in the funnel to mix the pollutant emitted from the machine to ensure more accurate sampling of the pollutant in the measuring duct. Other mixing devices, e.g. compressed air nozzles, can be used providing they give a similar degree of uniformity of the concentration profile at the sampling plane.

The test cabin shall be long enough to accommodate the machine and the operator with the emission sources as close as practicable to the location specified in Figure 1.



Key

A_c	cross sectional area of the test cabin (inlet)	1	test cabin
A_t	cross sectional area of the measurement duct	2	emission source[1]
H	height of the test cabin	3	funnel
h	height of the emission source	4	measurement duct
$\bar{U}$	average air velocity in the test cabin	5	sampling plane
W	width of the test cabin		

$W/H \geq 0{,}66$	$l_3 \geq 5\sqrt{A_t}$
$\leq 1{,}5$	$\leq 10\sqrt{A_t}$
$h \leq 0{,}66H$	$l_4 \geq 3\sqrt{A_t}$
$l_1 \leq 2{,}0$ m	$A_t \leq 0{,}1\,A_c$
$\leq 2H$	$\geq 5\,A_{mi}$ (mi = measuring instrument)
$l_2 \geq 0{,}5\sqrt{A_c}$	$\bar{U} = 0{,}1$ m s^{-1} for gases and respirable fraction particles according to EN 481
$\leq \sqrt{A_c}$	$\bar{U} = 0{,}5$ m s^{-1} for inhalable fraction particles according to EN 481

The value of the average air velocity Ū shall be chosen to enable the emitted pollutants to be transported from the machine to the sampling plane. For gases and small particles (e.g. respirable particles, welding fume) an average air velocity of 0,1 m s^{-1} is sufficient, whilst for the larger particles within the inhalable fraction an average air velocity of 0,5 m s^{-1} is required (see [1]). Lower velocities may be used providing reliable surface deposition measurements are also carried out.

[1] Generally the emission source cannot be considered as a point, but as a zone including several sources.

Figure 1 — Test bench (schematic layout)

6 Test method

6.1 Position of the machine

To ensure that all the pollutant will be carried to the sampling plane, as far as possible, the machine should be positioned in the test cabin in such a way, that:

- the source of the hazardous substance emitted from the machine is in the area of the transverse plane to the longitudinal axis of the cabin at a distance of l_1 from the beginning of the funnel;