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Refuse collection vehicles and their associated lifting devices - General requirements and safety requirements - Part 4: Noise test code for refuse collection vehicles

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Refuse collection vehicles and their associated lifting devices - Part 4: Noise test code for refuse collection vehicles

Bennes de collecte des déchets et leurs lève-conteneurs associés - Partie 4 : Code d'essai de mesurage du bruit des bennes de collecte des déchets

Abfallsammelfahrzeuge und die dazugehörigen Schüttungen - Teil 4: Geräuschprüfverfahren für Abfallsammelfahrzeuge

This draft European Standard is submitted to CEN members for second enquiry. It has been drawn up by the Technical Committee CEN/TC 183.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (prEN 1501-4:2006) has been prepared by Technical Committee CEN/TC 183 “Waste management”, the secretariat of which is held by DIN.

This document is currently submitted to the second CEN Enquiry.

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 European Standard is one part of the series of co-ordinated standards of EN 1501 about “Refuse collection vehicles and their associated lifting devices” comprising the other following parts:

— *Part 1: Rear loaded refuse collection vehicles, as amended by A1: Footboards (under revision)*

— *Part 2: Side loaded refuse collection vehicles*

— *Part 3: Front loaded refuse collection vehicles (under preparation)*

— *Part 5: Lifting devices for refuse collection vehicles (under preparation)*

— *Part 6: Electromagnetic compatibility of refuse collection vehicles (under preparation).*

It augments the “C”-type safety standards prepared by CEN/TC183.

Its purpose is to provide a means of determination, declaration and verification of noise emission for the equipment within the scope of this standard. The determination of noise emission values is a prerequisite for a manufacturer to assess the noise reduction obtained at the design stage.

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 98/37/EC.

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

The Annexes A and B are normative. The Annexes C and ZA are informative.

Introduction

This European Standard deals with the measurement of noise emitted by refuse collection vehicles (RCVs) in view of the declaration and marking of the sound power level to fulfil the requirements of EU Directive 2000/14/EC on the approximation of the laws of the Member states relating to the noise emission in the environment by equipment for use outdoors. It also covers the noise information requirements of EU Directive 98/37/EC on the approximation of the laws of the Member states relating to machinery.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

This document is a type C standard as stated in EN 1070.

1 Scope

This European Standard defines the measurement of noise emitted by refuse collection vehicles (RCVs).

Its goal is to obtain, on one hand, the sound pressure level at the operative's position(s) and, on the other hand, the sound power level of the RCV during waste collection. It specifies a standardized procedure for measurement and later comparison of RCVs noise emission, consisting of four operating conditions: chassis operation, compaction operation, lifting operation and specified waste falling into the RCV.

Together with information concerning other parameters, the test results obtained in accordance with this standard are also applicable to the evaluation of the hazards generated by noise from RCVs.

This standard addresses the uncertainties due to measurement procedures.

This standard deals with the noise measurement conditions for the types of RCVs defined and described in the standards of the series EN 1501.

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 12100-2:2004, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles*

EN 840-1:2004, *Mobile waste containers — Part 1: Containers with 2 wheels with a capacity up to 400 l for comb lifting devices — Dimensions and design*

EN 1070:1998, Safety of machinery - Terminology

EN 1452-2:1999, *Plastics piping systems for water supply — Unplasticized poly (vinyl chloride) (PVC-U) — Part 2: Pipes*

EN 1501-1:1998, *Refuse collection vehicles and their associated lifting devices — General requirements and safety requirements — Part 1: Rear loaded refuse collection vehicles*

EN 1501-2:2005, *Refuse collection vehicles and their associated lifting devices — General requirements and safety requirements — Part 2: Side loaded refuse collection vehicles*

prEN 1501-3, *Refuse collection vehicles and their associated lifting devices — General requirements and safety requirements — Part 3: Front loaded refuse collection vehicles (under preparation)*

EN ISO 3744:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane*

EN ISO 4871:1997, *Acoustics — Declaration and verification of noise emission values of machinery and equipment*

EN ISO 11201:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specific positions — Engineering method in an essentially free field over a reflecting plane*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 3744:1995, EN ISO 4871:1995, EN ISO 11201:1995 and in the series of standards EN 1501 apply, together with the following:

3.1
collection mode
RCV with all the functions of the bodywork operating or ready to operate

NOTE This mode excludes the travel movement

3.2
shaking mode
part of the lifting cycle where the waste container, in its tilted position, is moved back and forth and/or hits a mechanical stop device, either by a specific command or automatically, in order to get all the waste out of it

4 Preparation of the RCV for measurements

4.1 Test environment

For the test site, test environment and measurement conditions, the requirements of EN ISO 11201:1995 and EN ISO 3744:1995 shall be fulfilled.

4.2 Choice of the RCV

Measurements shall be carried out on a sample RCV that has the noise emission characteristics of a series of produced RCVs or of a specific RCV class or group (see note in sub-clause 9 and Annex C).

4.3 Position of the RCV during measurement

The RCV shall be tested in a stationary position.

The RCV shall be positioned with its longitudinal axis along the x-axis of the co-ordinate system used to fix the microphone positions and with its mid-length L/2 over the origin “O” (see Figure B.1).

5 Operating conditions (before and) during measurement

5.1 RCV conditions

The engine and hydraulic system shall be warmed up in accordance. The instructions and safety requirements, as specified in the information for use manual, shall be observed

No signalling device such as warning horn or reverse auditory signal (buzzer) shall be operated during the test.

If the RCV is fitted with several engines, they shall work simultaneously during the tests. If this is not possible, each possible combination of engines shall be tested.

For measurements inside the cab, the doors and windows shall be closed and any noisy in-cab equipment (fan, radio, air conditioner, etc) off.

5.2 Fan speed

If the engine of the RCV or its hydraulic system is fitted with one (a) fan(s), it (they) must operate during the test. The fan speed to be used shall be in accordance with one of the following conditions, depending on the conditions set by the manufacturer of the equipment, and must appear in the test report, this speed being used in further measurements.

a) Fan drive directly connected to the engine:

If the fan drive is directly connected to the engine and/or hydraulic equipment (e.g. by belt drive) it must operate during the test.

b) Fan drive with several distinct speeds:

If the fan can work at several distinct speeds, the test shall be carried out

— either at its maximum speed,

— or in a first test with the fan set at zero speed and in a second test with the fan set at maximum speed.

c) Fan drive with continuous variable speed:

If the fan can work at continuous variable speed, the test shall be carried out either according to 5.1b) or with the fan speed set by the manufacturer at no less than 70 % of the maximum speed.

Note: If the fan speed is automatically regulated by the engine temperature and if preliminary noise measurement investigations have shown that the influence of the fan speed measured at microphone positions is less than 1 dB (A), then only one fan speed condition can be used.

5.3 Selection of operations

The noise emission of the RCV is determined considering four operating conditions:

— chassis operation (in the collection mode),

— compaction operation,

— lifting, tilting and lowering operation of an empty waste container,

— specified waste falling into the RCV.

This standard does not address the discharge operation as this operation is short in time (1 % of the working period) and the noise emission is of the same order of quantity as the noise emission of the main operation (compaction).

5.4 Chassis operation

The noise measurements shall be carried out without operating the compaction and lifting mechanisms. For the purpose of the test, the engine shall be set up by the cab accelerator pedal at the maximum speed provided by the manufacturer for the collection mode as defined in 3.1.

5.5 Compaction system operation

For noise measurements with the compaction system operating, the body and the hopper shall be empty.

The engine shall be set up to its maximum working speed when the compaction system is running. This speed shall be measured.

If the measured speed is lower than the speed provided by the chassis manufacturer by more than 5 % the test shall be carried out with the engine accelerated by the cab accelerator, to ensure the maximum working speed provided by the manufacturer.

If the engine speed for the compaction system is not provided by the chassis manufacturer or if the vehicle is not provided with an automatic accelerator, then the engine working speed, issued by the cab accelerator, shall be 1200 rpm.

5.6 Lifting of empty waste container(s)

For noise measurements during the lifting operation, the following procedures shall be carried out:

a) Comb lifting device:

The lifting device shall run up and down, with an empty waste container on. The container shall be two-wheeled, with a 240 l capacity, made of plastic and shall comply with EN 840-1. If such a container is not available, one with a capacity of 240 l ± 10 % shall be used for this operation.

The engine speed shall be determined and controlled as for the compaction system running (5.5);

b) Other lifting devices:

The lifting device shall run up and down, with an empty waste container on. The smallest container with a capacity as near as possible to 240 l shall be used for this operation.

The engine speed shall be determined and controlled as for the compaction system running (5.5).

5.7 Waste falling into the RCV

5.7.1 Materials to be used

For noise measurements during the waste falling operation, the materials to be used shall comprise 30 tubes of PVC-U, each with a 0,4 kg approximate mass and with the following dimensions, according to EN 1452-2.

— length: 150 mm ± 0,5 mm;

— nominal external diameter: 90 mm;

— nominal thickness: 6,7 mm;

— volumic weight: minimum: 1 350 kg/m^3, maximum: 1 460 kg/m^3;

— minimum resistance (MRS) 25 MPa.

5.7.2 RCVs fitted with a lifting device

The materials specified in 5.7.1 shall be emptied in bulk into the hopper (initially empty) from a waste container, as specified in 5.6, emptied by the lifting device.