Akustika. Soovituslikud juhised müravabade mehhanismide ja seadmete konstrueerimiseks. Osa 1: Kavandamine

Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 11688-1:2009 sisaldab Euroopa standardi EN ISO 11688-1:2009 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 11688-1:2009 consists of the English text of the European standard EN ISO 11688-1:2009.
Standard on kinnitatud Eesti Standardikeskuse 30.10.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 30.10.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 19.08.2009.	Date of Availability of the European standard text 19.08.2009.
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English Version

Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1:1995)

Acoustique - Pratique recommandée pour la conception de machines et d'équipements à bruit réduit - Partie 1: Planification (ISO/TR 11688-1:1995)

Akustik - Richtlinien für die Konstruktion lärmarmer Maschinen und Geräte - Teil 1: Planung (ISO/TR 11688-1:1995)

This European Standard was approved by CEN on 3 August 2009.

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 Management Centre or to any CEN member.

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Ref. No. EN ISO 11688-1:2009: E

Foreword

The text of ISO/TR 11688-1:1995 has been prepared by Technical Committee ISO/TC 43 “Acoustics” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 11688-1:2009 by Technical Committee CEN/TC 211 “Acoustics” the secretariat of which is held by DS.

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 January 2010, and conflicting national standards shall be withdrawn at the latest by January 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 supersedes EN ISO 11688-1:1995.

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 EC Directives.

For relationship with EC Directives, see informative Annexes ZA and ZB, which are integral parts of this document.

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.

Endorsement notice

The text of ISO/TR 11688-1:1995 has been approved by CEN as a EN ISO 11688-1:2009 without any modification.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 98/37/EC, amended by 98/79/EC on machinery.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING - Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Annex ZB
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC on machinery.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

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Introduction

This International Technical Report provides a guideline for the design of low-noise machinery. Most of the existing International Technical Reports prepared in ISO/TC 43/SC 1 specify methods for the measurement and/or evaluation of noise. The final objective of this International Technical Report, however, will be noise control in existing machinery and noise control at the design stage.

It is important that non-acoustic engineers are engaged in noise control practice. It is of great importance for these engineers to have a basic knowledge of noise generation and propagation characteristics and to understand the basic principles of noise control measures. Hence, this International Technical Report also serves as an introduction into acoustical terms, and as a basis to the acquisition of further knowledge in noise control.

It is strongly required to support the dissemination of the design rules given here through standardisation.

Such considerations have led to the preparation of International Technical Reports in the area of noise control.

Acoustics — Recommended practice for the design of low-noise machinery and equipment —

Part 1: Planning

1 Scope

This International Technical Report is an aid to understanding the basic concepts of noise control in machinery and equipment.

The recommended practice presented here is intended to assist the designer at any design stage to control the noise of the final product. Methodical development of products was chosen as a basis for the structure of this document (see Clause 4).

The list of design rules given in this International Technical Report is not exhaustive. Other technical measures for reducing noise at the design stage may be used if their efficacy is identical or higher.

To solve problems going beyond the scope of this International Technical Report, the designer can refer to the bibliography in Annex D, which presents the general state of acoustic handbooks at the time of publication. Furthermore, reference is made to the numerous technical publications dealing with acoustical problems.

2 References

ISO 3744:1994, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane.*

ISO 3746:—[1)], *Acoustics — Determination of sound power levels of noise sources — Survey method employing an enveloping measurement surface over a reflecting plane.*

ISO 4871:—[1)], *Acoustics — Declaration and verification of noise emission values of machinery and equipment.*

ISO 9611:—[1)], *Acoustics — Characterization of sources of structure-borne sound with respect to the airborne sound radiation of connected structures — Measurement of velocity at the contact points of machinery when resiliently mounted.*

ISO 9614-1:1994, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points.*

ISO 9614-2:—[1)], *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning.*

1) To be published.

ISO 11200:—[1)], *Acoustics — Noise emitted by machinery and equipment — Guidelines for the use of basic standards for the determination of emission sound pressure levels at the work station and at other specified positions.*

ISO 11689:—[1)], *Acoustics — Systematic collection and comparison of noise-emission data for machinery and equipment.*

3 Definitions

For the purpose of this International Technical Report the following definitions apply:

3.1 *Airborne, liquid-borne and structure-borne noise:* Sound propagating through air, a liquid or a solid structure, respectively.

3.2 *Active noise components:* Components of machinery, which generate noise. In many cases these are the power converting devices generating mechanical work from power resources, such as electrical, mechanical or magnetic energy, hydraulic pressure, internal forces, or friction. Other noise "components" may be regions with non-steady flow and contact surfaces between moving parts.

3.3 *Passive noise components:* Components which transmit noise generated by the active components; they do not contain noise sources but can be dominating radiators of noise. Typical passive components are structural parts and covering panels of machinery.

3.4 *Periodic noise:* A noise event which is periodically repeated. Typical sources of periodic noise are gear wheels and piston machines. It is characteristic for periodic noise that it exhibits a line spectrum.

3.5 *Tonal noise:* Noise which is dominated by one or several clearly distinguishable tone(s).

3.6 *Broad band noise:* Noise generated by either single shocks, i.e. short duration pressure pulses or impacts, or by turbulence in an air or fluid flow. The characteristics of broad band noise are that the frequency analysis shows a continuous spectrum over a large frequency range.

3.7 *Force excitation:* The excitation force is independent of the properties of the excited structure; an example of this is the effect of a light and flexible source on a relatively stiff and heavy structure.

3.8 *Velocity excitation:* The excitation velocity is independent of the properties of the excited structure; an example of this is a light and flexible structure excited by a relatively massive source.

3.9 *Quasi-static response:* Response of the machine at frequencies below the lowest resonant frequency.

3.10 *Resonant response:* Response in a frequency range of distinct resonances.

3.11 *Multi-resonant response:* Response in a frequency range with many resonances.