

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

## Part 1: Planning

The European Standard EN ISO 11688-1:1998 has the status of a British Standard

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# National foreword

This British Standard is the English language version of EN ISO 11688-1:1998. It is identical with ISO/TR 11688-1:1995. The UK participation in its preparation was entrusted by Technical Committee EH/1, Acoustics, to Subcommittee EH/1/4, Machinery noise, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

### Cross-references

Attention is drawn to the fact that CEN and CENELEC standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement these international or European publications may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN ISO title page, page 2, the ISO TR title page, pages ii to iv, pages 1 to 24, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

### Amendments issued since publication

| Amd. No. | Date | Comments |
|----------|------|----------|
|          |      |          |
|          |      |          |
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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 lärmarmen Maschinen und Geräte — Teil 1: Planung  
(ISO/TR 11688-1:1995)

This European Standard was approved by CEN on 23 November 1997.

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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## CEN

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**

## Foreword

This European Standard has been prepared by ISO/TC 43 “Acoustics” and has been taken over by CEN/TC 211 “Acoustics”, the secretariat of which is held by DS.

This European Standard 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 Directives.

This European Standard has to be implemented at national level, either by publication of an identical text or by endorsement, at the latest by December 1998, and conflicting national standards shall be withdrawn at the latest by December 1998.

For relationship with EU Directives, see informative Annex ZB which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

**WARNING** This document was published as a European Standard to provide a harmonized base for national standards.

It is a guidance document and is not intended to be exhaustive, but to highlight important aspects to which attention should be given.

## Endorsement notice

The text of the International Standard ISO/TR 11688-1:1995 was approved by CEN as a European Standard with the following addition to clause 1 “Scope”:

*ISO/TR 11688-1 does not deal directly with the reduction of noise emission of the work piece itself. Nevertheless, the present theory from excitation through transmission to radiation, can be generally applied to estimating the noise generation of work pieces and hence its reduction.*

Normative references to International Standards which have been published as European Standards are given in normative Annex ZA.

TECHNICAL  
REPORT

ISO  
TR 11688-1

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

**Part 1:**  
Planning

*Acoustique — Pratique recommandée pour la conception de machines et  
d'équipements à bruit réduit —*

*Partie 1: Planification*



Reference number  
ISO/TR 11688-1:1995(E)

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**Descriptors:** Acoustics, machinery, equipment, noise (sound), engine noise, design, planning.

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard (“state of the art”, for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/TR 11688-1, which is a Technical Report of type 3, was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

ISO 11688 consists of the following parts, under the general title *Acoustics — Recommended practice for the design of low-noise machinery and equipment*.

- *Part 1: Planning* [Technical Report];
- *Part 2: Introduction into physics of low-noise design*.



## 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 standardization.

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

## 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:—, *Acoustics — Determination of sound power levels of noise sources — Survey method employing an enveloping measurement surface over a reflecting plane*<sup>1)</sup>.

ISO 4871:—, *Acoustics — Declaration and verification of noise emission values of machinery and equipment*<sup>1)</sup>.

ISO 9611:—, *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*<sup>1)</sup>.

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:—, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning*<sup>1)</sup>.

ISO 11200:—, *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*<sup>1)</sup>.

ISO 11689:—, *Acoustics — Systematic collection and comparison of noise-emission data for machinery and equipments*<sup>1)</sup>.

## 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

<sup>1)</sup> To be published.