

Acoustics — Stationary audible warning devices used outdoors —

Part 1: Field measurements for determination of sound emission quantities

ICS 13.320

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to iv, pages 1 to 19 and a back cover.

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**Acoustics — Stationary audible warning
devices used outdoors —**

Part 1:

Field measurements for determination
of sound emission quantities

Acoustique — Dispositifs d'alarme sonore fixes utilisés à l'extérieur

Partie 1: Mesurages sur le terrain des grandeurs d'émission acoustique



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 13475-1 was prepared by ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

ISO 13475 consists of the following parts, under the general title *Acoustics — Stationary audible warning devices used outdoors*:

$\frac{3}{4}$ *Part 1: Field measurements for determination of sound emission quantities*

$\frac{3}{4}$ *Part 2: Test room measurements*

$\frac{3}{4}$ *Part 3: Outdoor propagation of warning signals over built-up areas*

Annexes A and B form a normative part of this part of ISO 13475.

Introduction

ISO 13475-1 describes field measurements. The test methods are intended to produce field test values of the sound emission level of a siren as it is installed in an outdoor situation. These field test values may, together with the stated measurement uncertainties, be used to check the specifications of delivered sirens or to compare the performance of different sirens under the same conditions, emitting the same signals.

ISO 13475-2 describes precision measurements. This method is intended to produce a generally valid specification of sirens for type tests, acceptance tests, or for use in the design of outdoor warning systems, etc.

In part 1 of ISO 13475, two types of field measurements are discussed. They are:

- a) **Flat-plate measurements:** this method uses a microphone placed on a flat plate which is located on the ground. During the measurement, the intended main sound radiation pattern of the warning devices is tilted toward the microphone and plate assembly.
- b) **Horizontal measurements:** this method is performed with the microphone placed at the same elevation as the centre of the audible warning device (at a preferred height of 10 m).

Measurements made under optimal conditions in conformity with this part of ISO 13475 should result in standard uncertainties equal to or less than the values given in Table 1. The standard uncertainty for actual measurement conditions taking into account the cumulative effect of all causes of measurement uncertainty are treated in parts 1 and 2 of ISO 13475.

Table 1 — Uncertainty in determining immission-relevant C-weighted sound power levels for stationary audible warning devices

Reference	Measurement method	Expected expanded uncertainty
Part 1: Field measurements	Flat plate	2 dB
	Horizontal	4 dB
Part 2: Precision measurements	—	1 dB

Acoustics — Stationary audible warning devices used outdoors —

Part 1:

Field measurements for determination of sound emission quantities

1 Scope

This part of ISO 13475 specifies the test conditions by which the sound emission level of stationary audible warning devices can be obtained. The methods are applicable to sirens for use in public outdoor warning systems and sound signalling devices for use outdoors.

The purpose of this test code is to be able to produce reliable sound emission level measurements for stationary sirens used for warning outdoors.

This part of ISO 13475 does not cover spoken messages and contains no recommendations for specific warning signals.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 13475. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 13475 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

IEC 60651¹⁾, *Sound level meters*.

IEC 60804¹⁾, *Integrating-averaging sound level meters*.

IEC 60942, *Sound calibrators*.

IEC 61260, *Octave-band and fractional-octave-band filters*.

3 Terms and definitions

For the purposes of this part of ISO 13475, the following terms and definitions apply.

3.1

siren

audible warning device for use outdoors

¹⁾ These will be revised and combined as IEC 61672.

3.2

electronic siren

siren that produces tonal sounds by amplifying the output of an electronic signal generator and broadcasting the amplified signal from one or more electrodynamic loudspeakers

NOTE Such sirens may also be used for giving voice messages.

3.3

electromechanical siren

siren that produces tonal sounds by flow interruptions generated in a rotating wheel

NOTE Electromechanical sirens are mechanical sirens driven by an electric motor.

3.4

pneumatic siren

siren that produces sound by periodically interrupting or modulating a flow of compressed air

NOTE The air compressor may be integral with or separate from the flow interrupter.

3.5

horizontally omnidirectional siren

siren that radiates sound approximately uniformly (within a specified tolerance) in all horizontal directions from the siren at the specified frequency of the sound

3.6

directional siren

siren that radiates most of its sound in one or more specific directions

3.7

rotating or oscillating siren

directional siren that contains a mechanism which slowly rotates its beam of sound about a vertical axis

3.8

immission-relevant sound power level

$L_{W,imm}$

sound power level from a monopole source that would give the same sound pressure level in the far field as the actual source

NOTE It is expressed in decibels (dB).

Table 2 — Symbols

Symbol	Definition	Unit
L_p	Sound pressure level, ref. 20 μ Pa	dB
L_{pC}	C-Weighted sound pressure level, ref. 20 μ Pa	dB
$L_{pCmax,F}$	Maximum C-weighted sound pressure level, measured with time weighting F according to 4.5.3	dB
$L_{pCeq,T}$	Equivalent C-weighted sound pressure level over a time period T	dB
$L_{W,imm}$	Immission-relevant sound power level, ref. 1 pW	dB
$L_{WC,imm}$	C-Weighted immission-relevant sound power level, ref. 1 pW	dB