DIN EN ISO 3740:2019-08 (E)

Acoustics - Determination of sound power levels of noise sources - Guidelines for the use of basic standards (ISO 3740:2019)

Contents

Page

European foreword 4

Foreword 5

Introduction 6

1 Scope 8

2 Normative references 8

3 Terms and definitions 8

4 Sound power level 14
4.1 Basic information 14
4.2 Reasons for the determination of sound power levels 14
4.3 Basic procedures for determining sound power levels 14
4.4 Quality of determined sound power levels 15
4.5 Noise emission declaration 15

5 Selection of the most appropriate method in the set of standards 16
5.1 Methods and quantities to be measured and determined 16
5.2 Considerations affecting the selection of a measurement method 16
5.3 Test environment 24
5.4 Selection of basic standards appropriate for measurements in laboratory rooms and special test rooms 24
5.4.1 General 24
5.4.2 Acoustical requirements on the sound field in laboratories and special test rooms 24
5.4.3 Background noise limitation 24
5.5 Selection of basic standards appropriate for in-situ measurements 25
5.5.1 General 25
5.5.2 Hemi-anechoic sound field check 26
5.6 Determination of high-frequency sound power levels 27

Annex A (informative) Basic International Standards specifying methods for determining sound power levels of machines, equipment and products -- Main facts and requirements 28

Annex B (informative) Acoustical test environments 30

B.1 Environments provided by acoustic test laboratories 30
B.1.1 General 30
B.1.2 Reverberation test rooms 30
B.1.3 Special reverberation test rooms 30
B.1.4 Anechoic and hemi-anechoic test rooms 30
B.2 Environments in situ 31
B.2.1 Precision method (accuracy grade 1) 31
B.2.2 Engineering methods (accuracy grade 2) 31
B.2.3 Survey methods (accuracy grade 3) 31

Annex C (informative) Measurement uncertainty 32

C.1 General aspects 32

C.2 Determination of the expanded measurement uncertainty 34

Annex D (informative) Case studies 35

D.1 General 35
D.2 Case study 1 -- Application of ISO 3744 under free-field (outdoors) conditions -- Measurement setup and source 35
D.3 Case study 2 -- Application of ISO 3744 under in situ conditions -- Measurement setup and sound source 37
D.4 Case study 3 -- Application of ISO 3746 under in situ conditions -- Measurement setup and sound source 39

Bibliography 41

Figures Figure 1 -- Flowchart guiding the selection of appropriate International Standards for the determination of sound power levels 17

Figure 2 -- Flowchart guiding the selection of International Standards for the determination ofs ound power levels appropriate for in situ measurements 26

Figure C.1 -- Flowchart to assist determining omc, together with a guideline for the selection of the appropriate grade of accuracy 33

Figure D.1 -- Top view on the hemispherical measurement surface surrounding the reference box and showing the measurement positions 35

Figure D.2 -- Top view on the parallelepiped used as measurement surface surrounding the reference box and showing the measurement positions 37

Figure D.3 -- Top view on the parallelepiped used as measurement surface surrounding the reference box and showing the measurement positions 39

Tables Table 1 -- Overview of International Standards for the determination of sound power levels of machines, equipment and products using sound pressure 19

Table 2 -- Overview of International Standards for the determination of sound power levels of machines, equipment and products applying sound intensity measurements 21

Table 3 -- Overview of International Standards for the determination of sound power levels of machines, equipment and products using vibration measurement 23

Table 4 -- Applicability of different methods taking into account the background noise level 26

Table A.1 -- Basic International Standards specifying various methods for determining sound power levels of machines, equipment and products 28

Table C.1 -- Coverage factor for different confidence levels during one-sided and two-sided tests .. 34

Table D.1 -- Case study 1 -- Application of ISO 3744 under free field conditions 36

Table D.2 -- Application of ISO 3744 under in situ conditions 37

Table D.3 -- Application of ISO 3746 under in situ conditions 39