BRITISH STANDARD

BS EN
14239:2004

Ventilation for buildings — Ductwork — Measurement of ductwork surface area

The European Standard EN 14239:2004 has the status of a British Standard

ICS 91.140.30

BSI
British Standards

National foreword

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 11 and a back cover.

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English version

Ventilation for buildings - Ductwork - Measurement of ductwork surface area

Ventilation des bâtiments - Réseau de conduits - Mesurage de l'aire superficielle des conduits

Lüftung von Gebäuden - Luftleitungen - Messung von Luftleitungsoberflächen

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Contents

Foreword

This document (EN 14239:2004) has been prepared by Technical Committee CEN/TC 156 "Ventilation for buildings", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by July 2004, and conflicting national standards shall be withdrawn at the latest by July 2004.

The standard is one of a series of standards for ductwork used for ventilation and air conditioning of buildings for human occupancy.

The position of this standard in the field of mechanical building services is shown in Figure 1.

Annex A is informative.

This document includes a bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

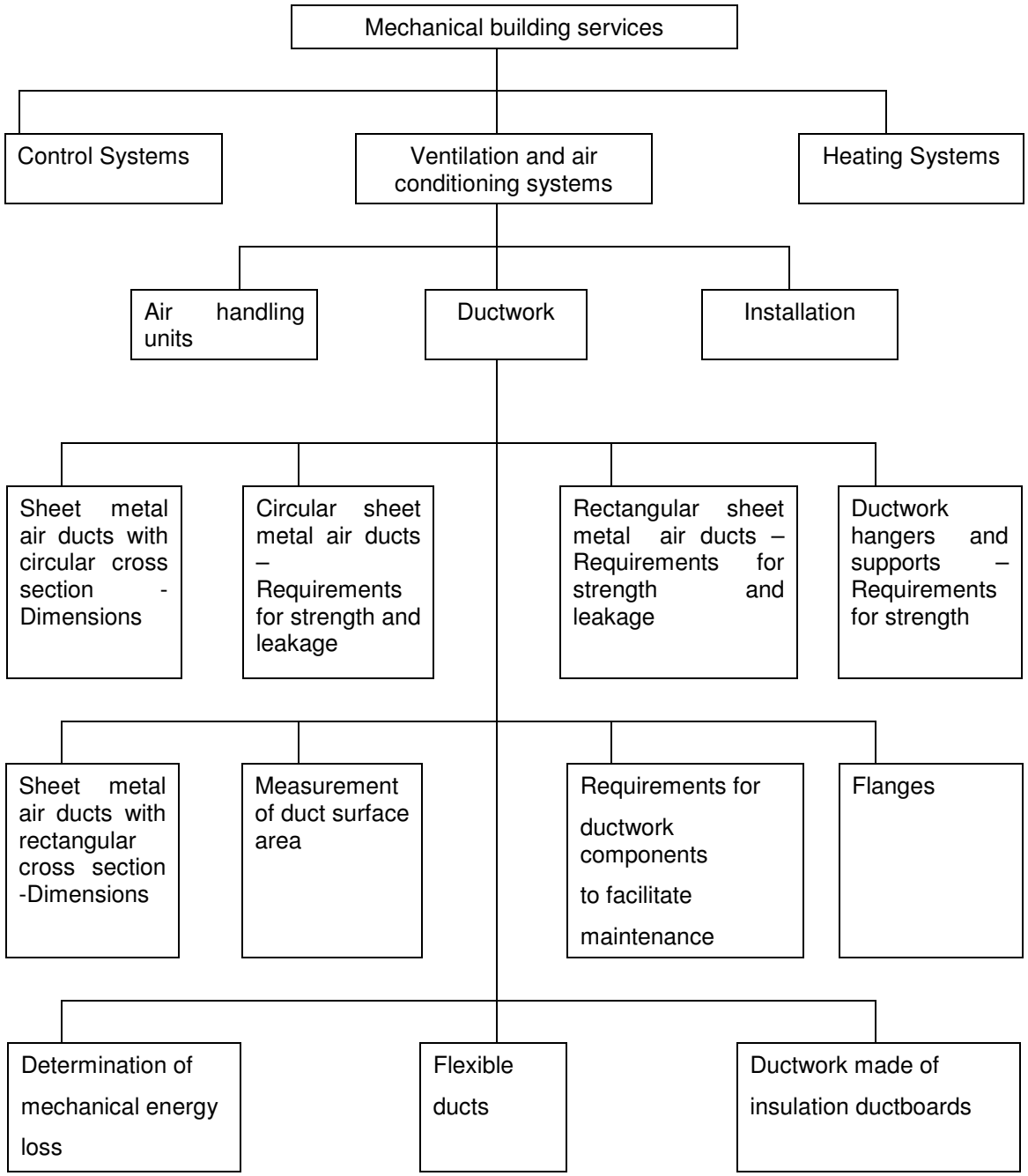

Figure 1 Position of EN 14239 in the field of mechanical building services

Introduction

This European Standard provides a method of measurement to establish the surface area for use in further calculations for ductwork in ventilation and air conditioning systems.

1 Scope

This European Standard specifies the requirements for the measurement of the surface area of a duct for use in the determination of air leakage flow rate per unit surface area (leakage factor).

The standard is applicable to circular and rectangular ducts and components used in air conditioning and ventilation systems in buildings.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references the subsequent amendments to the revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 12792, *Ventilation for buildings – Symbols and terminology and graphical symbols.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 12792 apply.

4 Measurement of circular ductwork

Measurement of circular ductwork shall be carried out in accordance with the following, where references in the text are as indicated in Figure 2 which shows a typical installation, and an example of calculation for this installation is shown in Table 1 using data given in annex A.

The length of each straight duct with the same diameter shall be measured between two points on perpendiculars to the axis of the duct. The lengths of separate components situated between the perpendiculars such as dampers (A) and transformation pieces (B) are thereby included. The accuracy of measurement shall be 10 mm. Openings, e.g. branch and inspection panels, shall not be deducted from the surface area. The surface area of end plates shall also be included. However, internal duct walls or guide vanes shall not be taken into account. Transformation pieces shall be calculated based on the largest dimension. In the case where the branch tap is located on a transformation piece, the main duct axis corresponds to the duct of the largest size.

The additional length of a bend (C) shall be calculated to the intersection of the straight centerlines, and the length of a branch shall be calculated from the axis of the principal duct (D).

Dimensions in millimetres

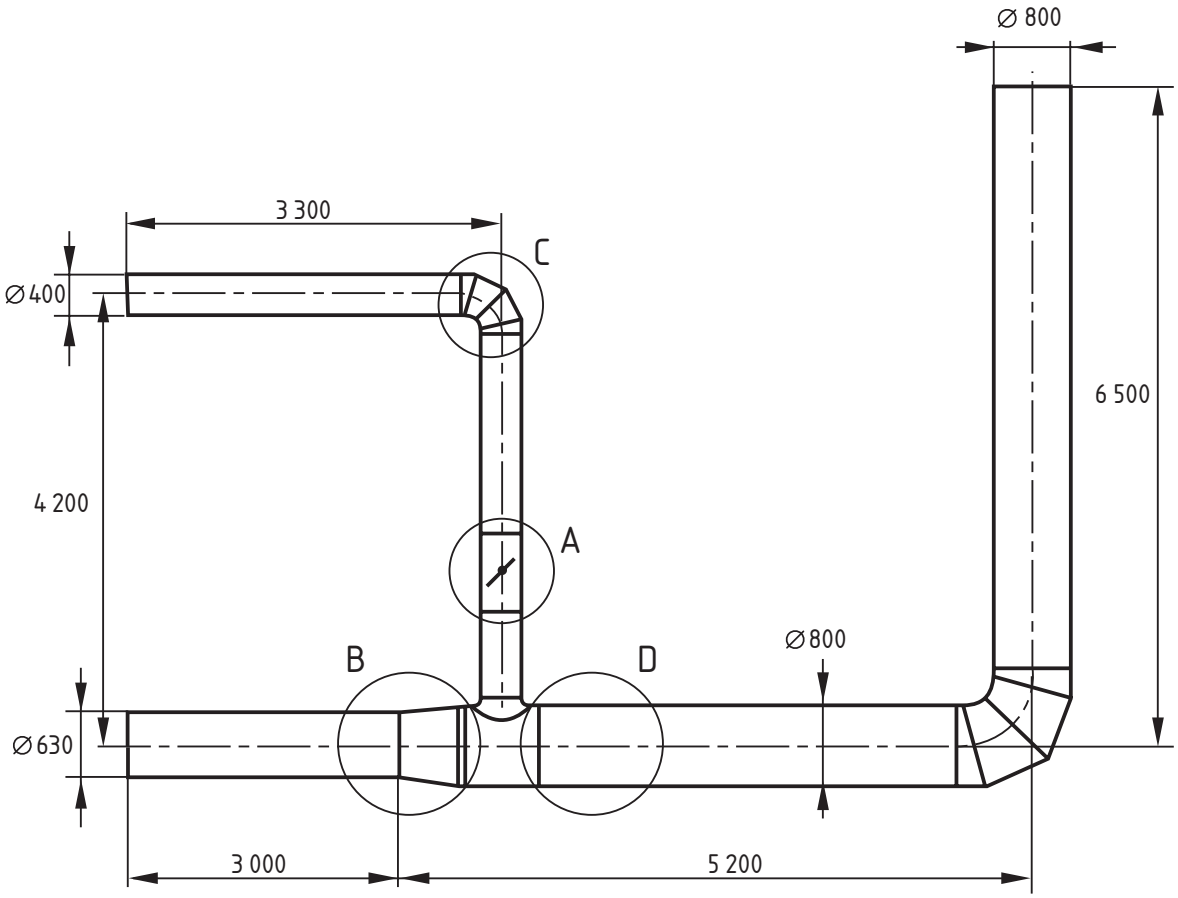

Figure 2 Example of typical installation of ductwork with circular cross section

Table 1 Example of calculation of duct surface area for circular ducts

Diameter mm	Duct surface area [a] per unit length m^2/m	Length m	Total duct surface area m^2
800	2,51	6,5 + 5,2	2,51 11,7 = 29,4
630	1,98	3,0	1,98 3,0 = 5,9
400	1,26	4,2 + 3,3	1,26 7,5 = 9,5
Total for installation shown in Figure 2			44,8

[a] From Table A.1

5 Measurement of rectangular ductwork

Measurement of rectangular ductwork shall be carried out according to the following where references in the text are as indicated in Figure 3, which shows a typical installation, and an example of calculation for this installation is given in Table 2 using data given in annex A.

The length of each straight duct of the same dimensions shall be measured between two points on perpendiculars to the axis of the duct. The accuracy of measurement shall be 10 mm. Openings, e.g. branch and inspection panels, shall not be deducted from the surface area. The surface area of end plates shall also be included. However, internal duct walls or guide vanes shall not be taken into account. The surface area of transformation pieces shall be calculated in the same manner as a straight duct based on the biggest dimension (A). In the case where the branch tap is located on a transformation piece, the main duct axis corresponds to the duct of the largest size.

The additional length of a bend shall be calculated to the intersection of the straight centerlines, and the length of a branch shall be calculated from the axis of the principal duct (B).

Dimensions in millimetres

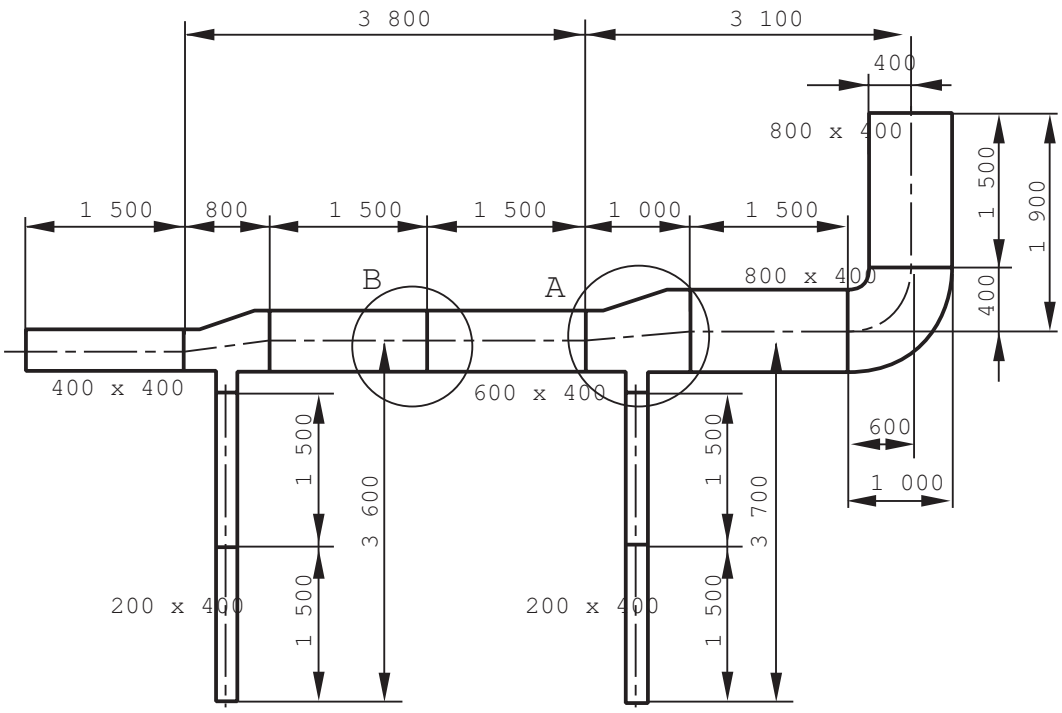

Figure 3 Example of typical installation of ductwork with rectangular cross section

Table 2 Example of calculation of duct surface area for rectangular ducts

Dimensions mm	Duct surface area [a] per unit length m^2/m	Length m	Total duct surface area m^2
800 400	2,4	1,9 + 3,1	2,4 5,0 = 12,0
600 400	2,0	3,8	2,0 3,8 = 7,6
400 400	1, 6	1,5	1,6 1,5 = 2,4
200 400	1,2	3,6 + 3,7	1,2 7,3 = 8,8
Total for installation shown in Figure 3			30,8

[a] From Table A.2

Annex A
(informative)

Duct surface areas for use in calculations

A.1 Duct surface area per unit length for circular ducts

The duct surface area per unit length for circular ducts in accordance with EN 1506 is given in Table A.1.

Table A.1 Duct surface area per unit length for circular ducts

Nominal diameter mm	Duct surface area per unit length m^2/m
63	0,197
80	0,251
100	0,314
125	0,393
150	0,471
160	0,502
200	0,628
250	0,785
300	0,943
315	0,990
355	1,11
400	1,26
450	1,41
500	1,57
560	1,76
630	1,98
710	2,23
800	2,51
900	2,83
1 000	3,14
1 120	3,52
1 250	3,93

A.2 Duct surface area per unit length for rectangular ducts

The duct surface area per unit length for rectangular ducts in accordance with EN 1505 is given in Table A.2.

Table A.2 Duct surface area per unit length for rectangular ducts in m²/m

Side lengths mm	100	150	200	250	300	400	500	600	800	1 000	1 200
200	0,60	0,70	0,80								
250	0,70	0,80	0,90	1,00							
300	0,80	0,90	1,00	1,10	1,20						
400	1,00	1,10	1,20	1,30	1,40	1,60					
500		1,30	1,40	1,50	1,60	1,80	2,00				
600		1,50	1,60	1,70	1,80	2,00	2,20	2,40			
800			2,00	2,10	2,20	2,40	2,60	2,80	3,20		
1 000				2,50	2,60	2,80	3,00	3,20	3,60	4,00	
1 200					3,00	3,20	3,40	3,60	4,00	4,40	4,80
1 400						3,60	3,80	4,00	4,40	4,80	5,20
1 600						4,00	4,20	4,40	4,80	5,20	5,60
1 800							4,60	4,80	5,20	5,60	6,00
2 000							5,00	5,20	5,60	6,00	6,40

Bibliography

EN 1505, *Ventilation for buildings – Sheet metal air ducts and fittings with rectangular cross section – Dimensions.*

EN 1506, *Ventilation for buildings – Sheet metal air ducts and fittings with circular cross section – Dimensions.*

prEN 1507, *Ventilation for buildings – Sheet metal air ducts with rectangular section – Requirements for strength and leakage.*

EN 12237, *Ventilation for buildings – Ductwork – Strength and leakage of circular sheet metal ducts.*

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