BRITISH STANDARD

BS EN
13384-3:2005

Chimneys — Thermal and fluid dynamic calculation methods —

Part 3: Methods for the development of diagrams and tables for chimneys serving one heating appliance

The European Standard EN 13384-3:2005 has the status of a British Standard

ICS 91.060.40

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 13384-3:2005.

The UK participation in its preparation was entrusted by Technical Committee B/506, Chimneys, to Subcommittee B/506/1, Chimneys general requirements, 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 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

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 32, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 18 November 2005

ISBN 0 580 46287 0

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13384-3

October 2005

ICS 91.060.40

English Version

Chimneys - Thermal and fluid dynamic calculation methods - Part 3: Methods for the development of diagrams and tables for chimneys serving one heating appliance

Conduits de fumée - Méthode de calcul thermo-aéraulique - Partie 3 : Méthodes d'élaboration de diagrammes et de tableaux pour les conduits de fumée desservant un seul générateur de chaleur

Abgasanlagen - Wärme- und strömungstechnische Berechnungsverfahren - Teil 3: Verfahren für die Entwicklung von Diagrammen und Tabellen für Abgasanlagen mit einer Feuerstätte

This European Standard was approved by CEN on 12 September 2005.

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, 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.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 13384-3:2005: E

Contents

Page

Foreword

This European Standard (EN 13384-3:2005) has been prepared by Technical Committee CEN/TC 166 “Chimneys”, the secretariat of which is held by UNI.

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 April 2006, and conflicting national standards shall be withdrawn at the latest by April 2006.

This European Standard is one of a series of standards prepared by CEN/TC 166 comprising product standards and execution standards for chimneys.

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.

1 Scope

This European Standard gives guidance for the development of diagrams and tables which can be used to simplify the determination of the performance of chimneys serving one heating appliance in accordance with EN 13384-1. The diagrams and tables can be developed in order to assist in the design of a chimney configuration which is suitable for the desired application without undertaking the full calculation of EN 13384-1.

This European Standard does not itself provide the diagrams and/or tables for use in the design of a chimney; it provides only the method to create these diagrams and tables.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1443:2003, *Chimneys — General requirements*

EN 13384-1:2002, *Chimneys — Thermal and fluid dynamic calculation methods — Part 1: Chimneys serving one appliance*

EN 13384-2:2003, *Chimneys — Thermal and fluid dynamic calculation methods — Part 2: Chimneys serving more than one heating appliance*

EN 12391-1:2003, *Chimneys — Execution standard for metal chimneys — Part 1: Chimneys for non-roomsealed heating appliances*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1443:2003, EN 13384-1:2002, EN 13384-2:2003 and EN 12391-1:2003 apply.

4 Principle of the method

The purpose of the method is to simplify the determination of the performance of chimneys using the procedures of EN 13384-1, by the production of tables or diagrams giving the result of predetermined conditions.

The basis of the calculation is EN 13384-1. Normative Annex A gives a list of all the characteristics for which a value shall be given and how the values should be specified. Figure 1 is a diagrammatic representation of some of the symbols used in the calculation method.

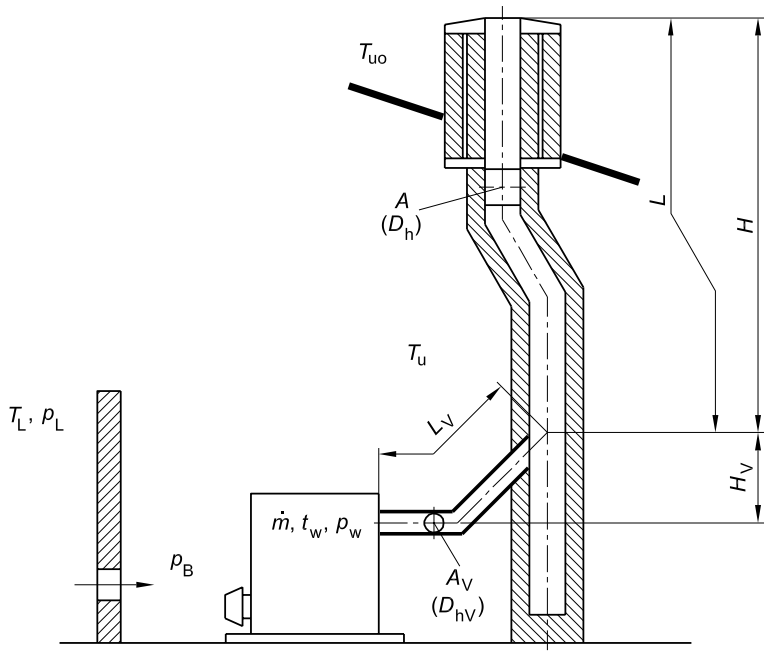


Figure 1 – Diagrammatic representation of some symbols

The method for producing a table is to undertake the calculation for a single condition and repeat the calculation for the range of parameters.

Where a diagram or table covers a range of parameters it is necessary to specify the limiting conditions e.g. for a connecting flue pipe the minimum diameter allowed and/or the maximum length, and/or number and type of bends.

A typical diagram would cover the determination of the chimney diameter for a range of chimney heights or appliance outputs for a specified construction and appliance type.

5 Procedure

Determine the range/scope for the diagram or table e.g. based on fuel type, appliance type and chimney construction.

NOTE All diagrams/tables eventually give either a chimney size for a particular application i.e. a diameter for a chimney serving a particular appliance of x kW or which appliance can be fitted to a particular chimney configuration.

Collect the data and fill in the table of the normative Annex A. For each characteristic it is necessary to specify where the value is to be identified (information source), the value or range for which the diagram or table is valid, and the values which are used for the calculation.

Annex B gives an example of the data used, and the resulting diagram for determining which appliance can be used with an existing chimney.

Annex C gives an example for producing diagrams for new built chimneys.

Annex D gives an example for producing a table for determining the maximum heat output of an appliance possible for a particular existing chimney construction, or for a new chimney the size needed for a particular appliance type and heat output.

Undertake a single calculation according to EN 13384-1 for one value on the diagram in the table. Change the parameters and undertake as many calculations as necessary for the range/scope of the diagram or table.

6 Results

Use the results of the calculations to produce a diagram or table and give the limiting conditions for the diagram or table in any documentation accompanying the diagram or table.

Annex A
(normative)

Table A.1 - Characteristics used to produce a diagram or table based on the full calculation method

	Characteristic	Symbol	Unit	Information source	Specified values/ranges	Calculation values
A.1	**Heating appliance data**					
A.1.1	**Type/kind**			Information source	To specify: — with or without a draught diverter / regulator — non-roomsealed/ roomsealed — natural draught or forced draught combustion — positive pressure or negative pressure (natural draught) — open fire or closed fire	
A.1.2	**Kind of fuel**			Information source	To specify (see EN 13384-1:2002, Table B.1)	
A.1.3	**Flue gas mass flow or**	$\dot{m}$	kg/s	Information source	To specify a range or values	Minimum, maximum, steps
	• nominal heat input and	Q_F	kW	Information source	a range or values	Minimum, maximum, steps
	— kind of fuel	-	-	See A.1.2		
	— CO_2-content or	$\sigma(CO_2)$	%	See A.1.6		
	• nominal heat output and	Q_N	kW	Spec. point if applicable	a range or values	Minimum, maximum, steps
	— boiler efficiency	η_w	%	Spec. point if applicable	To specify a value/values or correlation (formula, see EN 13384-1:2002, Table B.2)	
	— kind of fuel			See A.1.2		
	— CO_2-content or	$\sigma(CO_2)$	%	See A.1.6		
	• fireplace opening size and	A_F	m²	Spec. point if applicable	a range or values	Minimum, maximum, steps

	— relation height/width	-	-	Spec. point if applicable	To specify height ≤ or > width	
A.1.4	**Flue gas temperature**	t_W	°C	Information source	To specify a value/values (temperature group) or range	Each lowest value of minimum, maximum, steps (For open fire places: 80 °C)
A.1.5	**Minimum draught or**	P_W	Pa	Information source	To specify a value/values or see EN 13384-1:2002, Table B.2	Each highest value (For open fire places: EN 13384-1:2002, 5.5.3)
	Maximum differential pressure	P_{WO}	Pa	Information source	To specify a value/values or correlation (equation)	Each lowest value
A.1.6	**CO_2-content**	σ (CO_2)	%	Information source	To specify a value/values or see EN 13384-1:202, Tables B.2 and B.3 (For open fire places: $\sigma(CO_2)$ = 1 %)	
A.1.7	**Cross section/hydraulic diameter of flue gas outlet**	A_W/ D_{hW}	m^2/m	Information source	To specify a value/values or correlation (equation)	Each highest value.
A.2	**Connecting flue pipe**					
A.2.1	**Shape**	-	-	Information source	To specify: — round — square — rectangular	
A.2.2	**Internal size (cross-section)**	A_V / D_{hV}	m^2/m	Information source	To specify minimum value or correlation (equation)	Each lowest value
A.2.3	**External size (cross-section)**	D_{haV}	m	Information source	To specify maximum values (wall thickness) or correlation (equation)	Each highest value
A.2.4	**Total length**	L_{totV}	m	Information source	To specify maximum values or correlation (equation)	Each highest value
A.2.5	**Effective height**	H_V	m	Information source	To specify minimum values or correlation (equation)	Each lowest value
A.2.6	**Thermal resistance**	$(1/\Lambda)_V$	m^2K/W	Information source	To specify minimum values or correlation (equation)	Each lowest value
A.2.7	**Roughness of material**	r_V	m	Information source	To specify maximum values or correlation (equation) or material (see EN 13384-1:2002, Table B.4)	Each highest value

A.2.8	**Bends**			Information source	To specify kinds or a maximum $\Sigma\zeta_{V,n}$ and give possible combinations for this value or correlation (equation)	
	— kinds/angles	-	-			Each highest value of $\Sigma\zeta_{V,n}$
	— numbers	-	-			
	— Shape/angle of enlargement or reduction at the inlet from the heating appliance (adapter)	-	-			
A.2.9	**Inlet to the chimney**			Information source		
	— angle of inlet	γ	°	Information source	To specify a maximum value	Each highest value
	— shape/angle of enlargement or reduction (adapter)	γ	°	Information source	To specify according to EN 13384-1:2002, Table B.8	Each highest value
A.3	**Chimney**					
A.3.1	**Condensate resistance class**	-	-	Information source	To specify: — wet — dry	
A.3.2	**Ventilated air gaps**	-	-	Information source	To specify: — without — ventilated in the same direction as the flue gas — ventilated in the opposite direction as the flue gas	
A.3.3	**Shape**	-	-	Information source	To specify: — round — square — rectangular	
A.3.4	**Internal size (cross-section)**	A / D_h	m	Information source	To specify a value/values or range	For pressure requirement each lowest value and for temperature requirement each highest value of minimum, maximum, steps

A.3.5	**External size (cross-section)**	D_{ha}	m	Information source	To specify maximum values (wall thickness) or correlation (equation)	Each highest value
A.3.6	**Total length**	L_{tot}	m	Information source	To specify maximum values or correlation (equation) e.g. depending on the effective height	Each highest value
A.3.7	**Effective height**	H	m	Information source	To specify a range or value/ values.	Each lowest value of minimum, maximum, steps
A.3.8	**Areas in the boiler room**	A_{ub}/L_{ub}	m^2/m	Information source	To specify minimum values or correlation (equation) e.g. depending on the total length	Each lowest value
A.3.9	**Length in heated areas**	L_h	m	Information source	To specify minimum values or correlation (formula) e.g. depending on the total length	Each lowest value
A.3.10	**Length in unheated areas**	L_u	m	Information source	To specify maximum values or correlation (formula) e.g. depending on the total length	Each highest value
A.3.11	**Length external**	L_o	m	Information source	To specify maximum values or correlation (equation) e.g. depending on the total length	Each highest value
A.3.12	**Thermal resistance**	$(1/\Lambda)$	m^2K/W	Information source	To specify minimum values or correlation (equation)	Each lowest value
A.3.13	**Roughness of material**	r	m	Information source	To specify maximum values or correlation (equation) or material (see EN 13384-1:2002, Table B.4)	Each highest value
A.3.14	**Bends**			Information source	To specify kinds or a maximum $\Sigma\zeta_{,n}$ and give possible combinations for this value or Correlation (equation)	Each highest value of $\Sigma\zeta_{,n}$
	- kinds/angles	-	-			
	- numbers	-	-			

A.3.15	**Chimney terminal zeta value**	ζ	-	Information source	To specify a maximum value	Each highest value
A.3.16	**Wind velocity pressure or location of chimney outlet**	P_L	Pa	Information source	To specify: — 0 Pa — 25 Pa — 40 Pa or text according to EN 13384-1:2002, 5.10.4	Each highest value
A.3.17	**Additional thermal insulation above the roof**	$(1/\Lambda)_o$	m²K/W	Information source	To specify a minimum value or correlation (equation)	Each lowest value
A.4	**Ambient values**					
A.4.1	**External air pressure or height above sea level**	pL/z	Pa/m	Information source	To specify a minimum value maximum value	Value
A.4.2	**External air temperatures**	T_L	K	Information source	See EN 13384-1:2002, 5.7.1.2: e.g. T_L = 288,15 K or national data	Value
A.4.3	**Ambient air temperature at the chimney outlet**	T_{uo}	K	Information source	See EN 13384-1:2002, 5.7.1.3: e.g. T_{uo} = 258,15 K or 273,15 or national data	Value
A.4.4	**Other ambient air temperatures relevant to the chimney route and appliance position**	T_u	K	Information source	See EN 13384-1:2002, 5.7.1.3	Value
A.5	**Combustion air supply**					
A.5.1	**Pressure resistance according to the configuration** **or**	PB	Pa	Information source	To specify: — with ventilation opening — without ventilation opening → a value according to EN 13384-1:2002 5.11.3 (PB = 3 Pa or 4 Pa)	Each highest value
A.5.2	**Pressure resistance for combustion air pipes:**			Spec. point if applicable		
A.5.2.1	**Shape**	-	-	Spec. point if applicable	To specify: — round — square rectangular	

A.5.2.2	**Internal size (cross-section)**	D_{hB}	m	Spec. point if applicable	To specify a minimum value or correlation (equation)	Each lowest value
A.5.2.3	**Length**	L_B	m	Spec. point if applicable	To specify a maximum value or equation	Each highest value
A.5.2.4	**Roughness of material**	r	m	Spec. point if applicable	To specify maximum values or correlation (equation) or material (see EN 13384-1:2002, Table B.4)	Each highest value
A.5.2.5	**Bends**			Spec. point if applicable	To specify kinds or a maximum $\Sigma\zeta_{,B}$ and give possible combinations for this value or Correlation (equation)	Each highest value of $\Sigma\zeta_{,B}$
	- kinds/angles	-	-			
	- numbers	-	-			
	- Grill	-	-			
A.6	**Secondary air device**					
A.6.1	**Group**	-	-	Spec. point if applicable	To specify a minimum group depending on chimney/ connecting flue pipe size according to EN 13384-1:2002, Table B.7	
A.6.2	**Location**			Spec. point if applicable	To specify: — in connecting flue pipe — in chimney	
A.6.3		L_{v2}	m	Spec. point if applicable	To specify a maximum value or correlation (equation)	Each highest value

Annex B
(informative)

Example for producing diagrams for existing chimneys

The scope of this example is exclusively for brick built chimneys or other single wall chimneys with a minimum wall thickness of 11,5 cm, serving oil fired appliances with forced draught burner.

Table B.1 - Characteristics used to produce the diagram for existing chimneys using the full calculation method:

	Characteristic	Symbol	Unit	Information source	Specified values/ranges	Calculation values
B.1	**Heating appliance data**					
B.1.1	**Type/Kind**			Headline of diagram	— without a draught diverter — non-roomsealed — forced draught combustion — negative pressure (natural draught)	
B.1.2	**Kind of fuel**			Headline of diagram	Domestic heating oil	
B.1.3	**Flue gas mass flow or**	$\dot{m}$	kg/s	-		
	• nominal heat input and	Q_F	kW	-		
	— kind of fuel	-	-	-		
	— CO_2-content or	σ (CO_2)	%	-		
	• nominal heat output and	Q_N	kW	Abscise of diagrams	0 to 100 kW	5 to 100 kW in steps of 0,5 kW
	— boiler efficiency	η_w	%	Brochure (see Table B.2)	Calculated with EN 13384-1:2002, Table B.2	
	— kind of fuel			See B.1.2		

	— CO_2-content or	$\sigma(CO_2)$	%	See B.1.6		
	• fireplace opening size and	A_F	m²	-		
	— relation height/width	-	-	-		
B.1.4	**Flue gas temperature**	t_W	°C	Parameter in the diagram as heat loss q_A according to the flue gas temperature	q_A = 6 % to 8 %, $q_A \geq$ 8 % to 10 %, $q_A \geq$ 10 % to 12 %, $q_A \geq$ 12 %	= 6 % = 8 % = 10 % = 12 %
B.1.5	**Minimum draught or**	P_W	Pa	Headline of diagram	≤ 7 Pa	= 7 Pa
	Maximum differential pressure	P_{WO}	Pa	-		
B.1.6	**CO_2-content**	$\sigma(CO_2)$	%	Brochure (see Table B.2)	Calculated with EN 13384-1:2002, Tables B.2 and B.3	
B.1.7	**Cross section / hydraulic diameter of flue gas outlet**	A_W / D_{hW}	m	Brochure (see Table B.2)	At least the value in diagram 1 depending on Q_N	The value in diagram 1 depending on Q_N
B.2	**Connecting flue pipe**					
B.2.1	**Shape**	-	-	Brochure (see Table B.2)	Round	
B.2.2	**Internal size (cross-section)**	D_{hV}	m	Brochure (see Table B.2)	≥ D_{hW}	= D_{hW}
B.2.3	**External size (cross-section)**	D_{haV}	m	Brochure (see Table B.2)	Without insulation →	= D_{hv} + 0,004 m
B.2.4	**Total length**	L_{totV}	m	Brochure (see Table B.2)	≤ 1,5 m	= 1,5 m
B.2.5	**Effective height**	H_V	m	Brochure (see Table B.2)	≥ 0 m	= 0 m
B.2.6	**Thermal resistance**	$(1/\Lambda)_V$	m²K/W	Brochure (see Table B.2)	Without insulation →	= 0 m²K/W
B.2.7	**Roughness of material**	r_V	m	Brochure (see Table B.2)	≤ 0,001 m	= 0,001 m
B.2.8	**Bends**			Brochure (see Table B.2)	$\Sigma\zeta_{V,n} \leq$ 1,8 (including change in direction at the inlet to the chimney)	$\Sigma\zeta_{V,n}$ = 1,8 – ζ for change in direction at the inlet to the chimney
	- types/angles	-	-			
	- numbers	-	-			
	-Shape/angle of enlargement or reduction at the inlet from the heating appliance (adapter)	-	-			
B.2.9	**Inlet to the chimney**					
	— angle of inlet	γ	°	See B.2.8	See B.2.8	See B.2.8
	— shape/angle of enlargement or reduction (adapter)	γ	°	Not specified → Maximum	≤ 180°	step enlargement (EN 13384-1:2002, Table B.8, No. 7)

B.3	**Chimney**					
B.3.1	**Condensate resistance class**	-	-	Headline of diagram	Dry	
B.3.2	**Ventilated air gaps**	-	-	Headline of diagram	Without	
B.3.3	**Shape**	-	-	Headline of diagram	Square	
B.3.4	**Internal size (cross-section)**	A / D_h	m	Headline of diagram	= 20 cm	= 0,2 m
B.3.5	**External size (cross-section)**	D_{ha}	m	Brochure (see Table B.2) depending on D_h	≤ 1,25 · D_h + 0,16 m	= 1,25 · D_h + 0,16 m
B.3.6	**Total length**	L_{tot}	m	Indirect with 3.13	$\Sigma\zeta_{,n}$ = 0 → no offsets →	L_{tot} = H
B.3.7	**Effective height**	H	m	Ordinate of diagram	0 to 20 m	1 m to 20 m with steps of 0,2 m
B.3.8	**Areas in the boiler room**	A_{ub}/L_{ub}	m^2/m	Information source	To specify minimum values or correlation (formula) e. g. depending on the total length	Each lowest value
B.3.9	**heated areas**	L_{uh}	m		$L_{tot} - L_o - L_u > ¾ L_{tot}$	= ¾ L_{tot}
B.3.10	**unheated areas in the building**	L_{uh}	m		≤ ¼ L_{tot} - L_o	= ¼ L_{tot} - L_o
B.3.11	**areas external in the building**	L_{ul}	m		≤ 13 % of L_{tot}	= 0,13 * H
B.3.12	**Thermal resistance**	(1/Λ)	m²K/W	Brochure (see Table B.2)	≥ 0,12 m²K/W	= 0,12 m²K/W
B.3.13	**Roughness of material**	r	m	Brochure (see Table B.2)	≤ 0,005 m	= 0,005
B.3.14	**Bends**			Brochure (see Table B.2)	$\Sigma\zeta_{,n}$ = 0	$\Sigma\zeta_{,n}$ = 0
	— kinds/angles	-	-			
	— numbers	-	-			

B.3.15	**Chimney terminal zeta value**	ζ	-	Indirect with 3.13	= 0	= 0
B.3.16	**Wind velocity pressure or location of chimney outlet**	P_L	Pa	Brochure (see Table B.2)	= 0 Pa	= 0 Pa
B.3.17	**Additional thermal insulation above the roof**	$(1/\Lambda)_o$	m²K/W	Indirect headline in accordance with brochure (see Table B.2)	≥ 0 or m²K/W ≥ 0,1 m²K/W	= 0 m²K/W = 0,1 m²K/W
B.4	**Ambient values**					
B.4.1	**External air pressure or height above sea level**	p_L	Pa	Brochure (see Table B.2)	≈ 93 200 Pa	= 93 200 Pa
B.4.2	**External air temperatures**	T_L	K	Brochure (see Table B.2)	= 288,15 K	= 288,15 K
B.4.3	**Ambient air temperature at the chimney outlet**	T_{uo}	K	Brochure (see Table B.2)	= 273,15 K	= 273,15 K
B.4 4	**Other ambient air temperatures relevant to the chimney route and appliance position**	T_u	K	See B.3.10	$L_u \leq ¼\ L_{tot} - L_o$ →	T_u = 288,15 K
B.5	**Combustion air supply**					
B.5.1	**Pressure resistance according to the configuration or**	P_B	Pa	Indirect in brochure (see Table B.2)	With ventilation opening → ≤ 3 Pa	= 3 Pa
B.5.2	**Pressure resistance for combustion air pipes**			-		
B.5.2.1	**Shape**	-	-			
B.5.2.2	**Internal size (cross-section)**	A_B / D_{hB}	m	-		
B.5.2.3	**Length**	L_B	m	-		
B.5.2.4	**Roughness of material**	r	m	-		
B.5.2.5	**Bends**					
	- types/angles	-	-			
	- numbers	-	-			
	- Grill	-	-			
B.6	**Secondary air device**					
B.6.1	**Group**	-	-	Headline of diagram	Depending on D_h	
B.6.2	**Location**			Brochure (see Table B.2)	In the chimney	
B.6.3	**Distance from chimney inlet**		m	Brochure (see Table B.2)	≤ 30 cm	= 30 cm

Table B.2 – Content of the brochure

Diagrams for determining which appliance can be used with an existing chimney

1 Structure of the diagrams

These diagrams are exclusively for brick built chimneys or other single wall chimneys with a minimum wall thickness of 11,5 cm, serving oil fired appliances with forced draught burner. They are divided into:

- chimney with and without additional thermal insulation at the chimney top (surrounding layer of minimum 11,5 cm brick wall or a minimum of 3 cm additional insulation on all sides (coefficient of thermal conductivity $\lambda \leq 0{,}1$ W/(m·K)) or covering the chimney top with an air gap (surrounding distance between covering and chimney wall 1 cm to 5 cm) and
- a minimum draught for the heating appliances (maximum 0 Pa and 7 Pa).

The diagrams show the effective height of the chimney and the heat output of the heating appliance following the necessary flue gas temperature (150 °C to 200 °C). The lower continuous curves give the minimum height of chimneys with and without draught regulator. The upper dotted curves give the maximum possible height of chimneys without a draught regulator. The upper continuous curves give the maximum possible height of chimneys with draught regulators.
In the place which is enclosed by the curves the conditions of EN 13384-1 are fulfilled. That means that the point of intersection of heat output and effective height leads to the minimum flue gas temperature (necessary flue gas temperature) which ensures the proper working of the installation. If the actual flue gas temperature is lower than this minimum flue gas temperature, one or more conditions for the correct operation of the installation are not fulfilled.

2 Basic conditions

The diagrams are based on acceptations, algorithms, functional relations and conditions of EN 13384-1. The places which are enclosed by the curves fulfil the pressure requirements ($P_Z > P_{Ze}$ and $P_Z > P_B$) and the temperature requirement ($T_{iob} > T_p$).

3 Further conditions

The following conditions are the base of the diagrams:

General:

– flow safety coefficient	S_E	=	1,5
– correction value for temperature instability	S_H	=	0,5
– external air temperature	T_L	=	288,15 K = 15 °C
– ambient air temperature	T_u	=	288,15 K = 15 °C
– ambient air temperature for outside areas	T_{uo}	=	273,15 K = 0 °C
– external air pressure (equal to a mean height above sea level	p_L z	=	93 200 Pa = 325 m)
– wind velocity pressure (chimney terminal not in an adverse pressure zone)	P_L	=	0 Pa
– pressure resistance of the air supply	P_B	≤	3 Pa

Heating appliance:

- oil-fired heating appliances with forced draught
- CO_2-volume-concentration following EN 13384-1:2002, Table B.2
- round outlet at the heating appliance with hydraulic diameter (with the nominal heat output Q_N in kW) $D_{hW} \leq (0{,}1 + 0{,}000\,8 \cdot Q_N)$ m
- efficiency of the heating appliance η_W following EN 13384-1:2002, Table B.2

Connecting flue pipe:

– a connecting flue pipe from steel without thermal insulation			
– mean value of roughness of the inner wall	r_V	≤	0,001m
– length	L_V	=	1,5 m
– effective height (The effective height of the connecting flue pipe H_V can be added to the effective height of the chimney if needed)	H_V	≥	0 m
– minimum round hydraulic diameter according to the outlet of the heating appliance	D_{hV}	≥	D_{hW}
– total amount of the coefficients of local resistance according to chart 1 (widenings or narrowings at the inlet into the chimney are considered)	$\sum\zeta_V$	≤	1,8

Chimney:

– thermal resistance	$(1/\Lambda)$	≥	0,12 m²·K/W
– mean value of roughness of the inner wall	r	≤	0,005 m
– total amount of the coefficients of local resistance (the resistance of the draught diverter is considered by the diagrams)	$\Sigma\zeta$	=	0
– hydraulic diameter of the outer wall (with the hydraulic diameter of the inner wall D_h)	$D_{ha} \leq 1{,}25 \cdot D_h + 0{,}16$ m		
– coefficient of heat transfer of the outer wall (maximum 13 % of the chimney outside)	α_a	≤	10 W/(m²·K)

Thermal insulation of the chimney top:

– additional thermal resistance (e.g. with surrounding layer of bricks with a thickness of 11,5 cm or a thermal insulation for example of mineral fibre with a thickness of 3 cm thickness or an air conditioned covering of the chimney top with a distance between the covering and the chimney wall of 1 cm to 5 cm)	$(1/\Lambda)_o$	≥	0,1 m²·K/W
– hydraulic diameter of the outer wall at the chimney top (with hydraulic diameter of the outer wall D_{ha})	$D_{hao} \leq D_{ha} + 2 \cdot 0{,}115$ m		

Draught regulator:

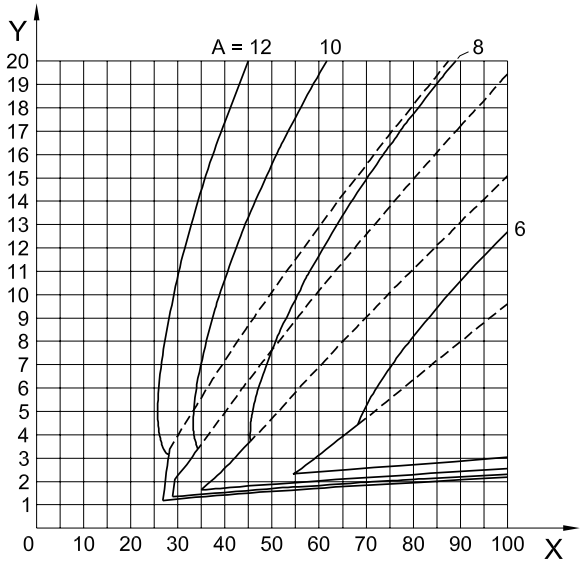
– draught regulator according to the named class which fulfil the conditions of the diagram in EN 13384-1:2002, Annex D.

– location: at the chimney 30 cm above the inlet into the chimney. The diagrams are approximately valid for draught diverters in connecting flue pipes if the connecting flue pipe has a thermal insulation and the cross-section is equal to that of the chimney after the draught diverter.

– temperature of secondary air $T_{NL} \geq 288{,}15$ K = 15 °C

4 Diagrams

Diagram a: graph for oil-fired heating appliances with forced draught and chimneys with quadratic or rectangular cross-section and diameter 20 cm × 20 cm, without thermal insulation or covering of the chimney top and with minimum draught of the heating appliance of 0 Pa.



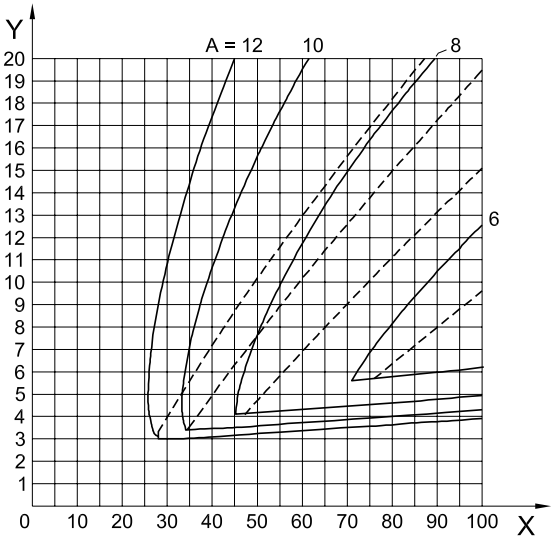
Key

Y = effective height in m

X = nominal heat output in kW

A = heat loss in percentage

Diagram b: graph for oil-fired heating appliances with forced draught and chimneys with quadratic or rectangular cross-section and diameter 20 cm × 20 cm, without thermal insulation or covering of the chimney top and with minimum draught of the heating appliance of max. 7 Pa.



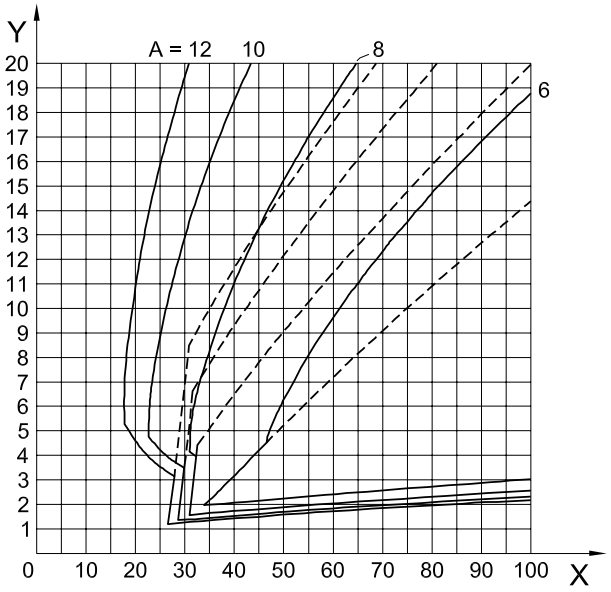
Key

Y = effective height in m

X = nominal heat output in kW

A = heat loss in percentage

Diagram c: graph for oil-fired heating appliances with forced draught and chimneys with quadratic or rectangular cross-section and diameter 20 cm × 20 cm, with thermal insulation or covering of the chimney top and with minimum draught of the heating appliance of 0 Pa.



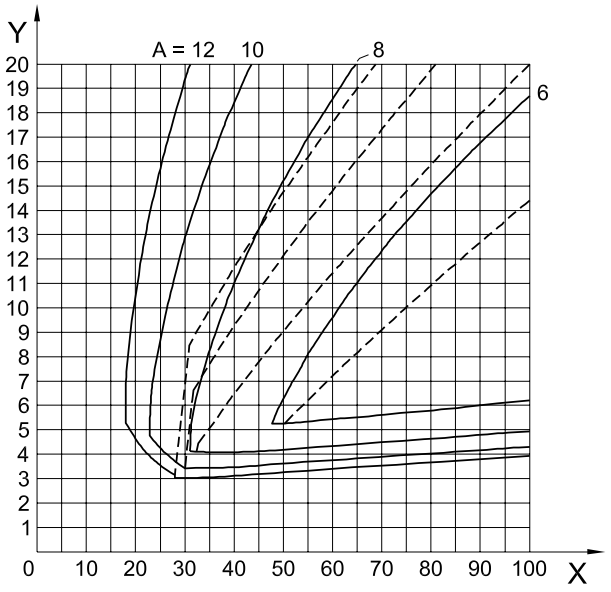
Key

Y = effective height in m

X = nominal heat output in kW

A = heat loss in percentage

Diagram d: graph for oil-fired heating appliances with forced draught and chimneys with quadratic or rectangular cross-section and diameter 20 cm x 20 cm, with thermal insulation or covering of the chimney top and with minimum draught of the heating appliance of max. 7 Pa



Key

Y = effective height in m

X = nominal heat output in kW

A = heat loss in percentage

Annex C
(informative)
Example for producing diagrams for new built chimney

Table C.1 - Characteristics used to produce the diagram for a new built chimney

	Characteristic	Symbol	Unit	Information source	Specified values/ranges	Calculation values
C.1	**Heating appliance data**					
C.1.1	Type/kind			Headline of diagram	— without a draught diverter — non-roomsealed — forced draught combustion — negative pressure (natural draught)	
C.1.2	Kind of fuel			Headline of diagram	Natural gas	
C.1.3	Flue gas mass flow or	$\dot{m}$	kg/s	-		
	• nominal heat input and	Q_F	kW	-		
	— kind of fuel	-	-			
	— CO_2-content or	$\sigma(CO_2)$	%			
	• nominal heat output and	Q_N	kW	Ordinate of diagram	5 kW to 250 kW	5 kW to 250 kW in steps enough to produce a curve
	— boiler efficiency	ηW	%	Brochure (see Table B.2)	Calculated with EN 13384-1:2002, Table B.2	
	— kind of fuel			See C.1.2		
	— CO_2-content or	$\sigma(CO_2)$	%	See C.1.6		
	• fireplace opening size and	A_F	m²	-		
	— relation height/width	-	-	-		
C.1.4	Flue gas temperature	t_W	°C	Headline of diagram	≥ 140 °C to 190 °C	= 140 °C
C.1.5	Minimum draught or	P_W	Pa	Brochure (see Table B.2)	= 0 Pa	= 0 Pa
	Maximum differential pressure	P_{WO}	Pa	-		
C.1.6	CO_2-content	$\sigma(CO_2)$	%	Brochure (see Table B.2)	Calculated with EN 13384-1:2002, Tables B.2 and B.3	
C.1.7	Size of flue gas outlet	D_{hW}	m	Brochure (see Table B.2)	≤ D_{hV}	=DhV

C.2	**Connecting flue pipe**					
C.2.1	Shape	-	-	Brochure (see Table B.2)	Round	
C.2.2	Internal size (cross-section)	D_{hV}	m	Brochure (see Table B.2)	$\leq D_h$	$=D_h$
C.2.3	External size (cross-section)	D_{haV}	m	Brochure (see Table B.2)	With insulation →	$D_{haV} = D_{hV} + 0{,}062$ m
C.2.4	Total length	L_{totV}	m	Brochure (see Table B.2)	≤ 2 m	= 2 m
C.2.5	Effective height	H_V	m	Brochure (see Table B.2)	≥ 0,5 m	= 0,5 m
C.2.6	Thermal resistance	$(1/\Lambda)_V$	m²K/W	Brochure (see Table B.2)	≥ 0,65 m²K/W	= 0,65 m²K/W
C.2.7	Roughness of material	r_V	m	Brochure (see Table B.2)	≤ 0,001 m	= 0,001 m
C.2.8	Bends			Brochure (see Table B.2)	$\Sigma\zeta_{V,n} \leq 1{,}8$ (inclusive change in direction at the inlet to the chimney)	$\Sigma\zeta_{V,n} = 1{,}8$ (inclusive change in direction at the inlet to the chimney)
	— kinds/angles	-	-			
	— numbers	-	-			
	Shape/angle of enlargement or reduction at the inlet from the heating appliance (adapter)	-	-			
C.2.9	Inlet to the chimney					
	— angle of inlet	γ	°	Not specified	See C.2.8	See C.2.8
	— shape/angle of enlargement or reduction (adapter)	γ	°	Not specified → Maximum	≤ 180°	= 180° (EN 13384-1:2002, Table. B.8, No. 7)

C.3	**Chimney**					
C.3.1	Condensate resistance class	-	-	Brochure (see Table B.2)	Wet	
C.3.2	Ventilated air gaps	-	-	Brochure (see Table B.2)	Without	
C.3.3	Shape	-	-	Brochure (see Table B.2)	Round	
C.3.4	Internal size (cross-section)	D_h	m	Parameter of diagram	= 12 cm	= 0,12 m
C.3.5	External size (cross-section)	D_{ha}	m	Product Information depending on	= D_h + 0,24 m	= D_h + 0,24 m
C.3.6	Total length	L_{tot}	m	Indirect with C 3.14	$\Sigma\zeta_{,n}$ = 0 → no offsets →	L_{tot} = H
C.3.7	Effective height	H	m	Abscise of diagram	4 m to 30 m	4 m to 30 m in steps of 0,2 m
C.3.8	Length in the boiler room	L_{ub}	m	Indirect with C.3.9 to C.3.11	≥ L_{tot} – 3 m	= L_{tot} – 3 m
C.3.9	Length in heated areas	L_{uh}	m	Not specified → Minimum	= 0	= 0
C.3.10	Length in unheated areas	L_{uu}	m	Brochure (see Table B.2)	≤ 2 m	= 2 m
C.3.11	Length external	L_{ul}	m	Brochure (see Table B.2)	≤ 1 m	= 1 m
C.3.12	Thermal resistance	$(1/\Lambda)$	m²K/W	Brochure (see Table B.2)	≥ 0,40 m²K/W	= 0,40 m²K/W
C.3.13	Roughness of material	r	m	Brochure (see Table B.2)	≤ 0,001 5 m	= 0,001 5 m
C.3.14	Bends			Brochure (see Table B.2)	$\Sigma\zeta_{,n}$ = 0	$\Sigma\zeta_{,n}$ = 0
	— kinds/angles	-	-			
	— numbers	-	-			
C.3.15	Chimney terminal zeta value	ζ	-	Indirect with C.3.13	= 0	= 0
C.3.16	Wind velocity pressure or location of chimney outlet	P_L	Pa	Brochure (see Table B.2)	= 0 Pa	= 0 Pa
C.3.17	Additional thermal insulation above the roof	$(1/\Lambda)_o$	m²K/W	Not specified → Minimum	≥ 0 m²K/W	= 0 m²K/W

C.4	Ambient values					
C.4.1	External air pressure or height above sea level	p_L z	Pa	Brochure (see Table B.2)	≤ 400 m	400 m
C.4.2	External air temperatures	T_L	K	EN 13384-1:2002, 5.7.1.2	= 288,15 K	= 288,15 K
C.4.3	Ambient air temperature at the chimney outlet	T_{uo}	K	EN 13384-1:2002, 5.7.1.3	= 258,15 K	= 258,15 K
C.4.4	Other ambient air temperatures relevant to the chimney route and appliance position	T_u	K	EN 13384-1:2002, 5.7.1.3	Calculated with EN 13384-1:2002 Equation (11)	

C.5	Combustion air supply					
C.5.1	Pressure resistance according to the configuration or	P_B	Pa	Brochure (see Table B.2)	≤ 3 Pa	= 3 Pa
C.5.2	Pressure resistance for combustion air pipes:			-		
C.5.3	**Shape**	-	-	-		
C.5.4	Internal size (cross-section)	D_{hB}	m	-		
C.5.5	Length	L_B	m	-		
C.5.6	Roughness of material	r	m	-		
C.5.7	Bends			-		
	— kinds/angles	-	-			
	— numbers	-	-			
	Grill/ducts	-	-			

C.6	**Secondary air device**					
C.6.1	Group	-	-	-	-	
C.6.2	Location			-	-	
C.6.3	Distance from chimney inlet	L_{V2}	m	-	-	

Table C.2 - **Content of the brochure for determining which appliance can be used with a new chimney**

1 Structure of the table

This diagram is for a round, wet multi-wall chimney without offsets and without back ventilation for forced draught gas heating appliances. The diagram shows the diameter of the chimney related to the effective height of the chimney and the nominal heat output of the gas-heating appliance.

2 Basic conditions

The diagram is based on the assumptions, algorithms, functional relations and conditions of EN 13384-1.

3 Further conditions

The following conditions are the base of the table:

General:

- mean height above sea level	z	=	400 m
– wind velocity pressure (chimney termination not in an adverse pressure zone)	P_L	=	0 Pa
– pressure resistance of the air supply	P_B	≤	3 Pa

Heating appliance:

– efficiency of the heating appliance and CO_2 content calculated with EN 13384-1:2002, Table B.2			
– minimum draught of the heating appliance	P_w = 0 Pa		
– Size of flue gas outlet	D_{hW}	≤	D_{hV}

Connecting flue pipe:

– a connecting flue pipe from steel with 3 cm thermal insulation	$(1/\Lambda)_V$	≥	0,65 m^2K/W
– mean value of roughness of the inner wall	r_V	≤	0,001m
– length	L_V	=	2 m
– effective height	H_V	≥	0,5 m
– minimum round hydraulic diameter according to the outlet of the heating appliance	D_{hV}	≤	D_h
– coefficient of flow resistance due to a directional and/or cross sectional change in the flue (inclusive chimney inlet)	$\Sigma\zeta_{V,n}$	≤	1,8

Chimney:

– Length in unheated areas	L_u	≤	2 m
– Length external	L_o	≤	1 m
– thermal resistance	$(1/\Lambda)$	≥	0,4 $m^2 \cdot K/W$
– mean value of roughness of the inner wall	r	≤	0,0015 m
– no offsets			
– no terminal			

Natural gas

Heating appliance with forced draught combustion $t_W \geq$ **140 °C to 190 °C**	**140 °C**

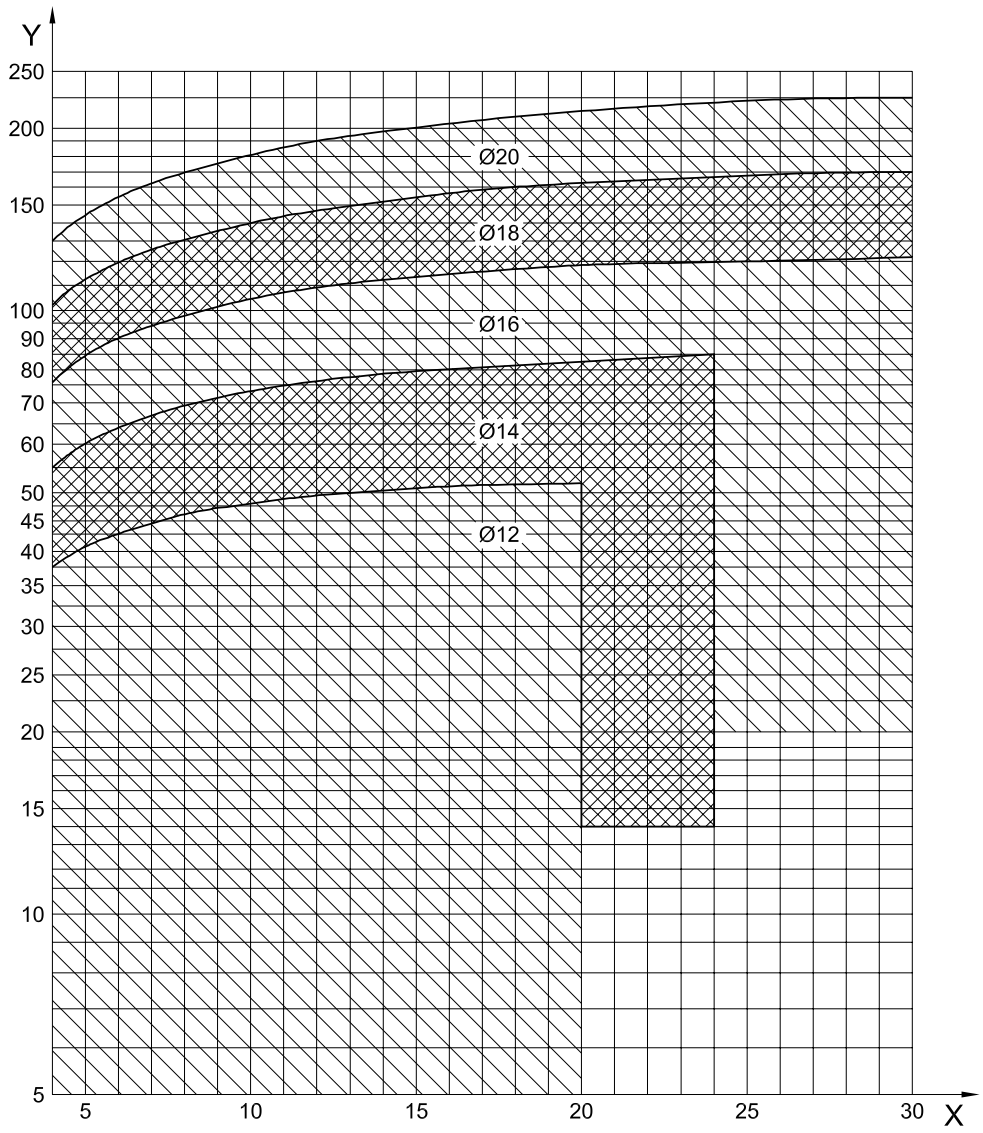


Figure C.1 - Calculation of cross-section

Key

X = effective height in m

Y = normal heat output in kW

Annex D
(informative)
Example for producing tables for both new and existing chimney

Table D.1 - Characteristics used to produce the table for both new and existing chimneys

D.1	**Heating appliance data**					
D.1.1	**Type/Kind**			Text of brochure	— with a draught diverter — non-roomsealed — natural draught combustion — negative pressure (natural draught)	
D.1.2	**Kind of fuel**			Text of brochure	Natural or liquid gas	
D.1.3	**Flue gas mass flow or**	$\dot{m}$	kg/s	-		
	• nominal heat input and	Q_F	kW	-		
	— kind of fuel	-	-	-		
	— CO_2-content or	$\sigma(CO_2)$	%	-		
	• nominal heat output and	Q_N	kW	Text of brochure	0 to 70 kW	
	— boiler efficiency	η_W	%	Text of brochure	≤ 83 % (efficiency directive 92-42)	
	— kind of fuel			See D.1.2		
	— CO_2-content or	$\sigma(CO_2)$	%	See D.1.6		
	• fireplace opening size and	A_F	m²	-		
	— relation height/width	-	-	-		
D.1.4	**Flue gas temperature**	t_W	°C	Text of brochure	≥ 160 °C	160 °C
D.1.5	**Minimum draught or**	P_W	Pa	Text of brochure	≥ 3 Pa	3 Pa
	Maximum differential pressure	P_{WO}	Pa	-		
D.1.6	**CO_2-content**	$\sigma(CO_2)$	%	Text of brochure (indirect)	Calculated with EN 13384-1:2002, Tables B.2 and B.3	
D.1.7	**Cross section / hydraulic diameter of flue gas outlet**	D_{hW}	m	Text of brochure	≤ D_{hV}	= D_{hV}

D.2	**Connecting flue pipe**					
D.2.1	**Shape**	-	-	Text of brochure	Round	
D.2.2	**Internal size (cross-section)**	D_{hV}	m	Row of table	83 mm to 200 mm	0,083 m to 0,200 m in steps
D.2.3	**External size (cross-section)**	D_{haV}	m	Text of brochure	Without insulation →	= D_{hv} + 0,004 m
D.2.4	**Total length**	L_{totV}	m	Text of brochure	≤ 3 m	= 3 m
D.2.5	**Effective height**	H_V	m	Text of brochure	≥ 0,5 m	= 0,5 m
D.2.6	**Thermal resistance**	$(1/\Lambda)_V$	m²K/W	Text of brochure	Without insulation →	= 0 m²K/W
D.2.7	**Roughness of material**	r_V	m	Text of brochure	≤ 0,001 m	= 0,001 m
D.2.8	**Bends**			Text of brochure	1 bend (90°) or 2 bends (45°)	ζ = 1,6
	types/angles	-	-			
	numbers	-	-			
	Shape/angle of enlargement or reduction at the inlet from the heating appliance (adapter)	-	-			
D.2.9	**Inlet to the chimney**					
	angle of inlet	γ	°	Not specified - maximum	≤ 90°	= 90°
	shape/angle of enlargement or reduction (adapter)	γ	°	Not specified - maximum	≤ 180°	Step enlargement (EN 13384-1:2002, Table B.8, number 7)
D.3	**Chimney**					
D.3.1	**Condensate resistance class**	-	-	Text of brochure	Dry	
D.3.2	**Ventilated air gaps**	-	-	Text of brochure (indirect)	Without	
D.3.3	**Shape**	-	-	Text of brochure	Round	
D.3.4	**Internal size (cross-section)**	D_h	m	Column of table	D_h = 111 mm to 250 mm	= 0,111 m to 0,250 m in steps
D.3.5	**External size (cross-section)**	D_{ha}	m	Text of brochure	Single wall →	=D_h + 0,004 m
D.3.6	**Total length**	L_{tot}	m	Indirect with D.3.13	$\Sigma\zeta_{,h}$ = 0 → no offsets →	L_{tot} = H
D.3.7	**Effective height**	H	m	Column of table	4 m to 10 m	= 4 m for pressure requirement = 10 m for temperature requirement

D.3.8	**Length in boiler room**	L_{ub}	m			
D.3.9	**Length in heated areas**	L_{uh}	m		$L_{tot} - L_o - L_u$	1,5 m for pressure requirement
D.3.10	**Length in unheated areas**	L_{uu}	m		≤1,5 m	=1,5 m
D.3.11	**Length external**	L_{ul}	m	Text of brochure	≤ 1 m	1 m
D.3.12	**Thermal resistance**	$(1/\Lambda)$	m²K/W	Text of brochure	≥ 0 m²K/W	= 0 m²K/W
D.3.13	**Roughness of material**	r	m	Text of brochure	≤ 0,005 m	= 0,005
D.3.14	**Bends**			Text of brochure	$\Sigma\zeta_{,n} = 0$	$\Sigma\zeta_{,n} = 0$
	kinds/angles	-	-			
	numbers	-	-			
D.3.15	**Chimney terminal zeta value**	ζ	-	Text of brochure	= 0	= 0
D.3.16	**Wind velocity pressure or location of chimney outlet**	P_L	Pa	Text of brochure	= 0 Pa	= 0 Pa
D.3.17	**Additional thermal insulation above the roof**	$(1/\Lambda)_o$	m²K/W	Text of brochure (indirect)	≥ 0 m²K/W	= 0 m²K/W

D.4	**Ambient values**					
D.4.1	**External air pressure or height above sea level**	z	m	Text of brochure	≤ 400 m	= 400 m
D.4.2	**External air temperatures**	T_L	K	Text of brochure	= 289,15 K (16 °C)	= 289,15 K
D.4.3	**Ambient air temperature at the chimney outlet**	T_{uo}	K	Text of brochure	= 273,15 K	=273,15 K
D.4.4	**Other ambient air temperatures relevant to the chimney route and appliance position**	T_u	K	Text of brochure	$L_u + L_{ul} \leq ¼ L_{tot}$ →	289,15 K

D.5	**Combustion air supply**					
D.5.1	**Pressure resistance according to the configuration or**	P_B	Pa	Text of brochure	≤ 3 Pa	= 3 Pa
D.5.2	**Pressure resistance for combustion air pipes:**			-		
D.5.2.1	**Shape**	-	-	-		
D.5.2.2	**Internal size (cross-section)**	A_B / D_{hB}	m^2/m	-		
D.5.2.3	**Length**	L_B	m	-		
D.5.2.4	**Roughness of material**	r	m	-		
D.5.2.5	**Bends**			-		
	- types/angles	-	-			
	- numbers	-	-			
	- grill	-	-			
D.6	**Secondary air device**					
D.6.1	**Group**	-	-			
D.6.2	**Location**					
D.6.3	**Distance from chimney inlet**		m			

Table D.2 – Content of the brochure for determining which appliance can be used with a new or existing chimney

1 Structure

The following table is exclusively for round dry single wall chimneys without offsets serving gas heating appliances with draught diverter (type B11BS).

The table shows the maximum nominal heat output depending on the diameter of the chimney and the diameter of the connecting flue pipe.

2 Basic conditions

The table is based on the assumptions, algorithms, functional relations and conditions of EN 13384-1 except air temperature.

3 Further conditions

The following conditions are the base of the table:

General:	
– external air temperature	T_L = 289,15 K = 16 °C
– ambient air temperature	T_u = 289,15 K = 16 °C
– ambient air temperature for outside areas	T_{uo} = 273,15 K = 0 °C
- mean height above sea level	z = 400 m
– wind velocity pressure (chimney termination not in an adverse pressure zone)	P_L = 0 Pa
– pressure resistance of the air supply	$P_B \leq$ 3 Pa
Heating appliance:	
– gas heating appliances with natural draught combustion (type B11BS)	
– natural or liquid gas	
– Maximum nominal heating appliance output	$Q_N \leq$ 70 kW
– efficiency of the heating appliance	$\eta_W \leq$ 83 %
– flue gas temperature	$t_w \geq$ 160 °C
– minimum draught	$P_w \geq$ 3 Pa
Connecting flue pipe:	
– diameter range	83 mm $\leq D_{hV} \leq$ 200 mm
– a connecting flue pipe from steel without thermal insulation	
– mean value of roughness of the inner wall	$r_V \leq$ 0,001 m
– length	L_V = 5 m
– effective height	$H_V \geq$ 0,5 m
– minimum round hydraulic diameter according to the outlet of the heating appliance	$D_{hV} \geq D_{hW}$
– maximum of bends (local resistance)	1 bend (90°) or 2 bends (45°)
Chimney:	
– Height range	4 m $\leq H \leq$ 10 m
– Diameter range	111 mm $\leq D_h \leq$ 250 mm
– thermal resistance	$(1/\Lambda) \geq$ 0 m²·K/W
– mean value of roughness of the inner wall	$r \leq$ 0,005 m
– unheated areas in the building	≤ 1,5 m
– areas external to the building	≤ 1,0 m
– no terminal	

Table D.1 – (*concluded*)

- Maximum of nominal heating output in kW

		Diameter of chimney in mm							
		111	**125**	**139**	**153**	**167**	**180**	**200**	**250**
Diameter of connecting flue pipe in mm	**83**	10,4	11,6	12,7	12,7	12,7	12,7	12,7	12,7
	97	15,1	16,2	17,4	17,4	18,5	18,5	18,5	19,7
	111	18,5	20,9	22	23,2	24,4	25,5	25,5	26,7
	125	19,7	25,5	27,8	30,2	31,3	32,5	33,6	34,8
	139	20,9	26,7	32,5	36	38,3	39,5	41,8	42,9
	153	-	29	34,8	41,8	45,3	47,6	51,1	53,4
	167	-	-	37,1	44,1	51,1	54,6	61,5	63,9
	180	-	-	-	46,4	53,4	61,5	69,7	69,7
	200	-	-	-	-	58,1	66,2	69,7	69,7

NOTE The values indicated in the table come from French experience.
Intermediate values may be interpolated.

Procedure

Existing chimney:

You know	Height of the chimney in m Diameter of the chimney in mm Diameter of connecting flue pipe in mm
You determine	Maximum of nominal heating output in kW

New chimney:

You know	Maximum of nominal heating output in kW Height of the chimney in m (height of the building) Diameter of the connecting flue pipe (equal to size of flue gas outlet)
You determine	Diameter of the chimney in mm

blank

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL