SLOVENSKI STANDARD
SIST EN 13384-3:2006

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Dimniki – Računske metode termodinamike in dinamike fluidov – 3. del: Metode za razvoj diagramov in tabel za dimnike za eno ogrevalno napravo

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

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

Conduits de fumée - Méthodes de calcul thermo-aéroaulique - Partie 3 : Méthodes d'élaboration de diagrammes et de tableaux pour les conduits de fumée desservant un seul appareil de chauffage

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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.

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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.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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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of an identical text or by endorsement, at the latest by April 2006, and conflicting national standards shall be withdrawn at the latest by April 2006.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.

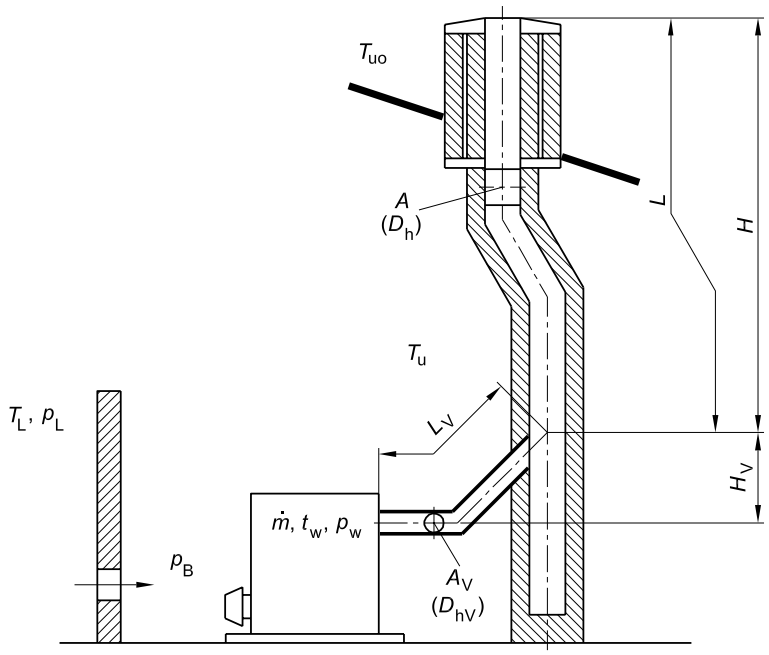

Figure 1 – Diagrammatic representation of some symbols

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	σ (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	σ (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: σ(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**	$(1/\Lambda)_V$	m²K/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)	Each highest value of $\Sigma\zeta_{V,n}$
	— kinds/angles	-	-			
	— 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	-	-			