**Draft for Public Comment**

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Responsible committee: B/506/5 Chimneys and their components having inner linings of metal

Interested committees:

Title: Draft BS EN 1856-2 Chimneys - Requirements for metal chimneys. Part 2: Metal flue liners and connecting flue pipes.

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**Introduction**

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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| Date: xx/xx/20xx | Document: ISO/DIS xxxx |
|---|---|

| 1 | 2 | (3) | 4 | 5 | (6) | 7 |
|---|---|---|---|---|---|---|
| **MB** | Clause No./ Subclause No./Annex **(e.g. 3.1)** | Paragraph/Figure/ Table/Note | **Type of comment** | **Commend (justification for change) by the MB** | **Proposed change by the MB** | **Secretariat observations on each comment submitted** |
| | 3.1 | Definition 1 | ed | Definition is ambiguous and needs clarifying. | Amend to read '...so that the mains connector to which no connection...' | |
| | 6.4 | Paragraph 2 | te | The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK. | Delete reference to UV photometer. | |

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# DRAFT
# prEN 1856-2

May 2021

ICS 91.060.40

Will supersede EN 1856-2:2009

English Version

# Chimneys - Requirements for metal chimneys - Part 2: Metal flue liners and connecting flue pipes

Conduits de fumée - Prescriptions pour les conduits de fumée métalliques - Partie 2 : Tubages et éléments de raccordements métalliques

Abgasanlagen - Anforderungen an Metall-Abgasanlagen - Teil 2: Innenrohre und Verbindungsstücke aus Metall

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 166.

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## European foreword

This document (prEN 1856-2:2021) has been prepared by Technical Committee CEN/TC 166 “Chimneys”, the secretariat of which is held by ASI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1856-2:2009.

The main changes in comparison to EN 1856-2:2009 are:

— adoption of the template for harmonized standards under the EU Construction Products Regulation (305/2011/EU) meaning a clearer definition of the Scope, rewording in Clause 4 “Product characteristics”, Clause 5 “Testing, assessment and sampling methods” and Clause 7 “Product classification and designation”, and adoption of the template for Clause 6 “Assessment and verification of constancy of performance”;

— adoption of prEN 1856-1:2021, new revised Annex A “Corrosion tests”. The material table with minimum material specification of the former edition has been taken over.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Regulation(s).

For relationship with EU Regulation(s), see informative Annex ZA, which is an integral part of this document.



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# 1 Scope

This document specifies the characteristics of performance for rigid or flexible metal flue liners, rigid metal connecting flue pipes and their fittings used to convey the products of combustion from appliances to the outside atmosphere (including their supports) or the chimney.

This document specifies sootfire resistant flue liners, connecting flue pipes and fittings for combustion appliances burning solid, liquid and gaseous fuels and non-sootfire resistant flue liners, connecting flue pipes and fittings for combustion appliances burning liquid and gaseous fuels only.

NOTE This means that flue liners, connecting flue pipes and fittings designated "O" are not suitable for combustion appliances burning solid fuel.

Vitreous enamelled connecting flue pipes are also covered by this document.

Rigid flue liners can be used as flue liners for renovation or adaptation of existing chimneys and as flue liners of custom built chimneys.

Flexible metal flue liners described in this document are exclusively for renovation or adaptation of existing chimneys. Flexible connecting flue pipes and extensible flexible products designed to be compressed or extended along their length are excluded from the scope of this document.

Single-wall and multi-wall system chimney products (chimney sections, chimney fittings and terminals, including supports) are covered by prEN 1856-1:2021, even if used as liners for existing chimneys or connecting flue pipes.

# 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 573-3:2013, *Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition and form of products*

EN 1443:2019, *Chimneys - General requirements*

prEN 1856-1:2021, *Chimneys - Requirements for metal chimneys - Part 1: System chimney products*

EN 10025-2:2019, *Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10088-1:2014, *Stainless steels - Part 1: List of stainless steels*

EN 10131:2006, *Cold rolled uncoated and zinc or zinc-nickel electrolytically coated low carbon and high yield strength steel flat products for cold forming - Tolerances on dimensions and shape*

EN 10209:2013, *Cold rolled low carbon steel flat products for vitreous enamelling - Technical delivery conditions*

EN 10346:2015, *Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions*

EN 13216-1:2019, *Chimneys - Test methods for system chimneys - Part 1: General test methods*

EN 13384-1:2015+A1:2019, *Chimneys - Thermal and fluid dynamic calculation methods - Part 1: Chimneys serving one combustion appliance*

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EN 13501-1:2018, *Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests*

EN 14241-1:2013, *Chimneys - Elastomeric seals and elastomeric sealants - Material requirements and test methods - Part 1: Seals in flue liners*

EN 15287-1:2007+A1:2010, *Chimneys - Design, installation and commissioning of chimneys - Part 1: Chimneys for non-roomsealed heating appliances*

# 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1443:2019 and prEN 1856-1:2021 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

**3.1**
**bending radius**
minimum radius measured on the inner side of a flexible flue liner when bent

**3.2**
**double skin flexible flue liner**
flexible flue liner consisting of two layers of metal, where the inner layer forming the flue is flat and covers the corrugations

**3.3**
**flue liner kit**
flue liner that is installed using a combination of compatible flue liner components, obtained or specified as a kit from one manufacturing source with product responsibility for the whole flue liner including all its components

Note 1 to entry: A flue liner kit is not considered a system chimney.

# 4 Product characteristics

## 4.1 Mechanical resistance and stability

### 4.1.1 Rigid flue liners and their fittings

#### 4.1.1.1 Compressive strength

##### 4.1.1.1.1 Sections and fittings

The compressive strength of sections and their fittings shall be tested according to the test method described in prEN 1856-1:2021, 5.2.1, and shall be expressed in kg of chimney or preferably equivalent meters of sections length.

##### 4.1.1.1.2 Liner supports

The compressive strength of liner supports shall be tested according to the test method described in prEN 1856-1:2021, 5.2.2, and shall be expressed in kg of liner or preferably equivalent meters of sections length.



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#### 4.1.1.2 Tensile strength

The tensile strength of liners and their fittings shall be tested according to the test method described in prEN 1856-1:2021, 5.3, and shall be expressed in kg of liner or preferably equivalent meters of sections length.

#### 4.1.1.3 Non-vertical installation

The non-vertical installation shall be tested according to the test method described in prEN 1856-1:2021, 5.4.1, and expressed as maximum length between the supports.

### 4.1.2 Flexible flue liners and their fittings

#### 4.1.2.1 General

Flexible flue liners and their fittings shall comply with the characteristics of 4.1.2.2 to 4.1.2.4.

#### 4.1.2.2 Compressive strength of fittings and supports

The compressive strength of fittings and supports shall be tested according to the test method described in prEN 1856-1:2021, 5.2.1 and 5.2.2, and shall be expressed in kg of liner or preferably equivalent meters of sections length.

#### 4.1.2.3 Compressive strength of flexible flue liners

The compressive strength of flexible flue liners is tested as crushing resistance and shall be tested in accordance with 5.3.3; the outside diameter of the flexible flue liner shall not have been reduced to less than 75 % of its original nominal diameter and shall fulfil the gas tightness requirement of 4.4.

#### 4.1.2.4 Tensile strength

##### 4.1.2.4.1 General

The tensile strength of the flexible flue liner and fittings and shall be tested according to the test method described in 5.3.2 and shall be expressed in kg of liner and preferably equivalent meters of length.

After the test, the flexible flue liner shall meet the gas tightness requirement described in 4.4.

In addition, tensile strength in relation to flexibility and torsion shall fulfil 4.1.2.4.2 and 4.1.2.4.3.

##### 4.1.2.4.2 Flexibility

The flexibility of the flexible flue liner shall be tested according to the test method described in 5.3.4 and expressed as minimum declared bending radius.

After the test, the flexible flue liner shall fulfil the gas tightness requirement of 4.4 and the inner layer of the double skin flexible flue liner shall remain overlapped.

Oval flexible liners shall be subjected to the test method of 5.3.4 in both axes of the oval shape.

##### 4.1.2.4.3 Torsion strength

The torsion strength of flexible liners shall be tested according to the test method described in 5.3.5.

After the test, the flexible flue liner shall meet the gas tightness requirement described in 4.4.

### 4.1.3 Connecting flue pipes and their fittings

#### 4.1.3.1 General

Connecting flue pipes and their fittings shall comply with the characteristics of 4.1.3.2 to 4.1.3.4.

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#### 4.1.3.2 Compressive strength

##### 4.1.3.2.1 Sections and fittings

The compressive strength of sections and their fittings shall be tested according to the test method described in prEN 1856-1:2021, 5.2.1, and shall be expressed in kg of connecting flue pipe or preferably equivalent meters of sections length.

##### 4.1.3.2.2 Connecting flue pipe supports

The compressive strength of connecting flue pipe supports shall be tested according to the test method described in prEN 1856-1:2021, 5.2.2, and shall be expressed in kg of connecting flue pipe or preferably equivalent meters of sections length.

#### 4.1.3.3 Tensile strength

The tensile strength of connecting flue pipes and their fittings shall be tested according to the test method described in prEN 1856-1:2021, 5.3, and shall be expressed in kg of connecting flue pipe or preferably equivalent meters of sections length.

#### 4.1.3.4 Non-vertical installation

The non-vertical installation of connecting flue pipes and their fittings shall be tested according to the test method described in prEN 1856-1:2021, 5.4.1, and expressed as maximum length between the supports.

## 4.2 Reaction to fire

The reaction to fire shall be declared. Classification may be carried out via testing according to the relevant product standard and in accordance with EN 13501-1:2018.

Metal flue liners and connecting flue pipes shall be classified A1 without testing.

NOTE More information is available in Commission Decision [96/603/EC (2)].

Classification of other materials, i.e. thermal insulation, plastic air supply duct, shall be assessed via testing according to the relevant product standard and in accordance with EN 13501-1:2018.

## 4.3 Resistance to fire

### 4.3.1 Sootfire resistance classes

The sootfire resistance class of the flue liner or connecting flue pipe shall be declared.

Sootfire resistance classes are:

— O for chimneys, flue liners, connecting flue pipes, components and accessories without sootfire resistance;

— G for chimneys, flue liners, connecting flue pipes, components and accessories with sootfire resistance.

The sootfire resistance class shall be expressed as G or O as described above.

Additionally, for connecting flue pipes, the letter G or O shall be followed by the distance to combustible materials (xx) expressed in mm, followed by (M) or (NM).



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### 4.3.2 Sootfire resistance

#### 4.3.2.1 Rigid flue liners and their fittings

The sootfire resistance of rigid flue liners and their fittings shall be tested according to the test method described in 5.4, with the test structure defined in 5.4.5.1 and the test sample in 5.4.6.2, and shall be expressed as described in 4.3.1.

The gas tightness according to 4.4 shall be met before and after the sootfire resistance test.

#### 4.3.2.2 Flexible flue liners and their fittings

The sootfire resistance of flexible flue liners and their fittings shall be tested according to the test method described in 5.4, with the test structure defined in 5.4.5.1 and the test sample in 5.4.6.1, and shall be expressed as described in 4.3.1.

The gas tightness according to 4.4 shall be met before and after the sootfire resistance test.

The test sample shall allow the test ball defined in 5.4.6.1.2 to move freely down.

#### 4.3.2.3 Connecting flue pipes and their fittings

The sootfire resistance of connecting flue pipes and their fittings shall be tested according to the test method described in 5.4, with the test structure defined in 5.4.5.2 and the test sample in 5.4.6.3, and shall be expressed as described in 4.3.1.

The gas tightness according to 4.5 shall be met before and after the sootfire resistance test.

The minimum distance to combustible material shall be declared, either measured (M) according to 5.4 – the preferred method - or calculated (NM) as at least three times their nominal diameter but not less than 375 mm (as specified in EN 15287-1:2007+A1:2010, 4.3.9.3, 3rd paragraph, first sentence for connecting flue pipes naturally ventilated) and the characteristics of 4.3.3 shall be met.

### 4.3.3 Thermal performance under normal working conditions

#### 4.3.3.1 General

The thermal performance under normal working conditions, performed for G and O designated flue liners and connecting flue pipes, shall be tested according to the test method described in 5.4 and shall be expressed as described in 4.3.1, with the addition of the temperature class according to Table 1.



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**Table 1 — Temperature classes and test temperatures**

| Temperature class | Nominal working temperature (t) °C | Flue gas test temperature °C |
|---|---|---|
| T 080 | t ≤ 80 | 100 |
| T 100 | t ≤ 100 | 120 |
| T 120 | t ≤ 120 | 150 |
| T 140 | t ≤ 140 | 170 |
| T 160 | t ≤ 160 | 190 |
| T 200 | t ≤ 200 | 250 |
| T 250 | t ≤ 250 | 300 |
| T 300 | t ≤ 300 | 350 |
| T 400 | t ≤ 400 | 500 |
| T 450 | t ≤ 450 | 550 |
| T 600 | t ≤ 600 | 700 |

#### 4.3.3.2 Rigid flue liners and their fittings

The thermal performance under normal working conditions of rigid flue liners and their fittings shall be tested according to the test method described in 5.4, with the test structure defined in 5.4.5.1 and the test sample in 5.4.6.2.

The gas tightness according to 4.4 shall be met.

#### 4.3.3.3 Flexible flue liners and their fittings

The thermal performance under normal working conditions of flexible flue liners and their fittings shall be tested according to the test method described in 5.4, with the test structure defined in 5.4.5.1 and the test sample in 5.4.6.1.

The gas tightness according to 4.4 shall be met.

The test sample shall allow the test ball of 5.4.6.1.2 to move freely down.

#### 4.3.3.4 Connecting flue pipes and their fittings

The thermal performance under normal working conditions of connecting flue pipes and their fittings shall be tested according to the test method described in 5.4, with the test structure defined in 5.4.5.2 and the test sample in 5.4.6.3.

The gas tightness according to 4.4 shall be met.

### 4.4 Hygiene, health and environment, gas tightness

The gas tightness of flue liners, connecting flue pipes and their fittings shall be tested according to 5.2 and shall be expressed as a pressure class according to Table 2.



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**Table 2 — Leakage rate**

| Pressure Class | Pressure[a] Pa | Type of use | Test pressure Pa | Leakage rate $l \cdot s^{-1} \cdot m^{-2}$ |
|---|---|---|---|---|
| N 1 | ≤ 0 | for negative pressure chimneys | 40 | ≤ 2,0 |
| N 2 | ≤ 0 | for negative pressure chimneys | 20 | ≤ 3,0 |
| P 1 | ≤ 200 | for low positive pressure chimneys | 200 | ≤ 0,006 |
| P 2 | ≤ 200 | for low positive pressure chimneys | 200 | ≤ 0,120 |
| M 1 | ≤ 1 500 | for medium positive pressure chimneys | 1 500 | ≤ 0,006 |
| M 2 | ≤ 1 500 | for medium positive pressure chimneys | 1 500 | ≤ 0,120 |
| H 1 | ≤ 5 000 | for high positive pressure chimneys | 5 000 | ≤ 0,006 |
| H 2 | ≤ 5 000 | for high positive pressure chimneys | 5 000 | ≤ 0,120 |

[a] Pressure at steady-state condition under normal working conditions.

## 4.5 Safety in use

### 4.5.1 Thermal resistance

The thermal resistance value of insulated connecting flue pipes shall be either tested, according to the test method of EN 13216-1:2019, 5.8 (being the reference value) or calculated, using the simplified calculation method specified in EN 13384-1:2015+A1:2019, Annex A, and expressed in square metres kelvin per watt.

The density of insulation in a fitting or a section shall be within $^{+30}_{0}$ % of the declared value.

### 4.5.2 Condensate resistance

Condensate resistance classes are:

— Dry: for flue liners, connecting flue pipes and theirs fittings operating under dry conditions;

— Wet: for flue liners, connecting flue pipes and theirs fittings operating under wet conditions.

The condensate resistance shall be tested according to the test method described in 5.5 and shall be expressed as D or W.

### 4.5.3 Flow resistance of flue liners and connecting flue pipes

#### 4.5.3.1 General

The declared internal diameter of the flue liners and connecting flue pipes and fittings shall not vary by more than ± 5 mm from the nominal size.

The measured internal diameter of the fitting or section shall not be less than the diameter declared.

For flexible flue liners, the internal diameter shall be measured in accordance with 5.1 and shall not be less than the declared diameter.

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Oval flexible liners shall only be factory made and the ovalization ratio shall not exceed 1,5 maximum.

#### 4.5.3.2 Flue liners and connecting flue pipes

The flow resistance of flue liners and connecting flue pipes, expressed as the mean value of roughness in meters, shall be determined according to the test method given in EN 13216-1:2019, 5.11 (the method of reference) or alternatively obtained from data given in EN 13384-1:2015+A1:2019.

#### 4.5.3.3 Fittings

The flow resistance of fittings for flue liners and connecting flue pipes, expressed as a coefficient due to a directional and/or cross-sectional and/or mass flow change in the flue, shall be determined according to the test method given in EN 13216-1:2019, 5.11 (the method of reference) or alternatively obtained from data given in EN 13384-1:2015+A1:2019.

## 4.6 Durability

### 4.6.1 Durability against corrosion

#### 4.6.1.1 General

The durability against corrosion shall be determined according to prEN 1856-1:2021, 5.8 and expressed as follows:

— corrosion class 1, 2 or 3 as given in EN 1443:2019, Table 4

or

— “nt” (not tested)

a) according to Table 3 on the basis of material type according to Table 4 for connecting flue pipes

b) according to Table 5 on the basis of material type according to Table 6 for flue liners

followed, in both cases, by the material type and nominal thickness as described in the footnote of Table 4 and Table 6.

The thickness of the material from which the components are made shall be not less than the minimum declared wall thickness.

The tolerance for material thickness shall not be more than ± 10 % of the nominal thickness.

NOTE 1 The characteristics of durability against corrosion are covered by the wording “corrosion resistance”.

NOTE 2 The relation between the corrosion classes and the loads for the tests as well as the test overview are given in prEN 1856-1:2021, Table A.3 and Table A.4.

In addition, the material specification of the outer skin of the double skin flue liners and connecting flue pipes shall be declared.

When tested in accordance with EN 10209:2013, the adherence level of the coating of vitreous enamelled connecting flue pipes shall not exceed level 3. This test shall be performed after thermal performance test defined in 5.4 and Figure 7.

#### 4.6.1.2 Durability against corrosion of connecting flue pipes

Durability against corrosion shall be declared as follows:

— corrosion class 1, 2 or 3 as given in EN 1443:2019, Table 4, on the basis of the results of the test method described in prEN 1856-1:2021, Annex A, or



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— "nt" (not tested) on the basis of material type (according to Table 4) and thickness of the connecting flue pipe. This is only possible for dry operating conditions (D) and wet operating conditions (W) class 1 with temperature classes ≤ T120 (see Table 3).

NOTE The allowed corrosion resistance class for products which have a declaration on the basis of material type and thickness is dependent on individual member states regulations where they exist.

Corrosion designation shall be as described in Table 3.

**Table 3 — Designation of corrosion resistance of connecting flue pipes**

| Products designated to ... | Corrosion resistance class 1 according to EN 1443:2019 | Corrosion resistance class 2 according to EN 1443:2019 | Corrosion resistance class 3 according to EN 1443:2019 |
|---|---|---|---|
| **Dry operating conditions (D)** | 1 [a] or nt [b] | 2 [a] or nt [b] | 3 [a] or nt [b] |
| **Wet operating conditions (W)** | 1 [a] or nt [b, c] | 2 [a] nt not possible | 3 [a] nt not possible |
| [a] 1, 2, 3 means "corrosion tested". For additional information, see prEN 1856-1:2021, Table A.3 and Table A.4.<br>[b] nt means "not tested" (previously named Vm).<br>[c] Only for temperature classes ≤ T120. | | | |
| NOTE Table 3 is given to clarify the possible designations of corrosion resistance classes depending on operating conditions (D) an (W). | | | |



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