SLOVENSKI STANDARD
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Kovinski dimniki - Zahteve za odpornost proti koroziji in preskusne metode

Metal chimneys - Corrosion resistance requirements and test methods

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Metal chimneys - Corrosion resistance requirements and test methods

This CEN REPORT has been prepared by Technical Committee CEN/TC 166 "Chimneys" and has been approved by CEN on 1996-12-06.

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CEN

European Committee for Standardization
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Foreword

This Technical Report has been prepared by CEN/TC166/SC2 "Metal Chimneys" to become an ENV after having finished the necessary prenormative research and to be implemented into EN 1856 and EN 1859 after approval.

This Technical Report includes the description of the quality of specific product requirements for metal liners for multi wall and single wall metal chimneys and metal flue liners for relining when tested according to the described test method. After having finished the prenormative research the quantitative expressions for the requirements shall be defined.

There exists no European Standard on this topic.

The generic word chimney, when used in this standard refers to all systems with metallic liner used to convey the products of combustion from any appliance to the outside atmosphere, and thus includes all other terms of common use in the trade, such as vents, flues, shafts, exhaust systems ducts, etc.

The standards in this series for metallic chimney products and systems are cited in normative reference.

This series of standards should be read in conjunction with prEN 1443 "General Requirements". Materials used in the manufacture of the chimney shall be identified and meet the requirements of the appropriate EC regulations for hygiene, health and the environment (as reflected in the Interpretative Document of the CPD for hygiene, health and the environment).

The content of this document is to be validated by prenormative research.

Introduction

This Technical Report is intended to cover the conditions burning gas and light oil. The conditions burning wood, coal and heavy oil have been excluded in this first phase because of the lack of sufficient test experience. Extended prenormative research would be necessary to cover these fuels.

The testing conditions are to be representative of normal use, yet severe enough to yield meaningful corrosion results in a relatively short period of time. Based on prior knowledge passing this test will minimise the risk of premature failure enabling so to achieve a reasonable lifetime if it is used in accordance with the corrosion load and temperature class and the manufacturers installation instructions.

The methodology for testing and evaluation presented here is based on the idea that the acceleration should be restricted to ensure that no change in the corrosion mechanism occurs. Acceleration of the corrosion therefore is realised only by cutting off time periods with low corrosion rate. The cycles which have to be validated by prenormative research shall represent the most critical corrosion conditions (formation and evaporation of flue gas condensate) occurring in normal service.

There is not enough research information available to validate the results of a test methodology based on a very high acceleration factor resulting in a total failure of the tested flue liner.

As the test period is not intended to exceed 6 weeks a more extensive evaluation of the results with the help of microscopic research on samples taken out of the flue liner is necessary.

1 Scope

This Technical Report specifies the requirements for corrosion resistance for the metal flue liners of single and multi wall metal chimneys and metal flue liners for relining conveying products of combustion from appliance to outside atmosphere when tested according to the described test method.

2 Normative references

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

prEN 1443: Chimneys - General Requirements

prEN 1856: Chimneys - Performance Requirements for Metal Chimneys
Part 1: System Chimneys Products
Part 2: Metal Liner an Connecting Flue Pipe Products

prEN 1859: Chimneys - Metal Chimneys Test Methods

prEN 10088-1: Stainless Steels. Part 1: List of Stainless Steels

EN 573-3: Aluminium and Aluminium Alloys. Chemical Composition and Form of Wrought Products.
Part 3: Chemical Composition

prEN 166/20: Chimneys - Metal Chimneys Execution Standard
Part 1: System Chimneys
Part 2: Relining
Part 3: Custom Built Chimneys with metallic liner and non metallic outer wall

prEN 166/21 Chimneys - Performance Requirements for Metal Chimneys, Metal Liner and Connecting Flue Pipe Products

ISO 8044 Corrosion of Metals and Alloys - Vocabulary

3 Definitions

Corrosion terms are defined in ISO 8044. For the purposes of this standard, for chimneys definitions of prEn 1856 and the following definitions apply.

3.1 Minimum declared wall thickness

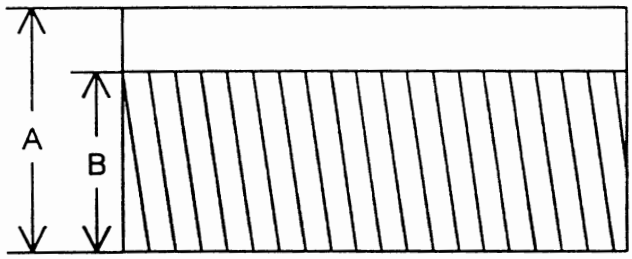
Minimum value of the wall thickness to be declared by the producers.

4 Requirements

When tested in accordance to the test method of clause 5, the flue liner shall meet the following requirements in relation to the different product types:

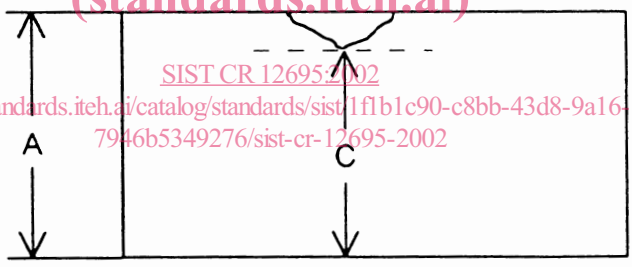
4.1 Uniform corrosion

The decrease of the wall thickness (Difference of the wall thickness before (A) and after the corrosion test (B)) shall not exceed $\alpha^{*)}$ % of the minimum declared wall thickness.



4.2 Pitting corrosion

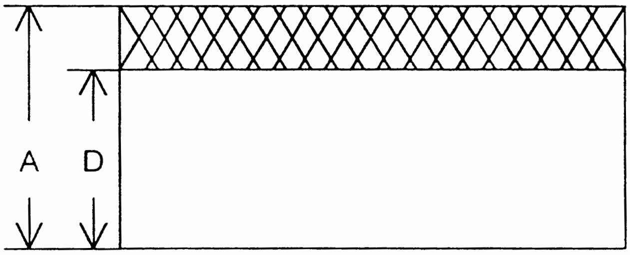
The maximum pitting depth (difference of the wall thickness before(A) and the wall thickness at the deepest pit after the corrosion test (C)) shall not exceed $\beta^{*)}$ % of the minimum declared wall thickness.



*) α, β, γ have to be validated by prenormative research

4.3 Intergranular corrosion

The maximum depths of zone attacked by intergranular corrosion (difference of the wall thickness before (A) and the thickness of the unaffected zone after the corrosion test))shall not exceed γ*) % of the minimum declared wall thickness.



4.4 Other Parameters

Other possible parameters to set up requirements may come into consideration as a result of prenormative research.

5 Test method

5.1 Principle

The liner of metallic chimneys is exposed in cycles under controlled conditions to the flue gas generated by an appliance and the air of the test room as cooling medium. By cooling below the water dew point during the cooling phase formation of flue gas condensate at the begin of the heating phase is induced. Due to increasing temperature during the heating phase enrichment of corrosive agents by evaporation of water takes place. Pass/fail criteria is the corrosion effect after the test period of 6 weeks.

*) α, β, γ have to be validated by prenormative research

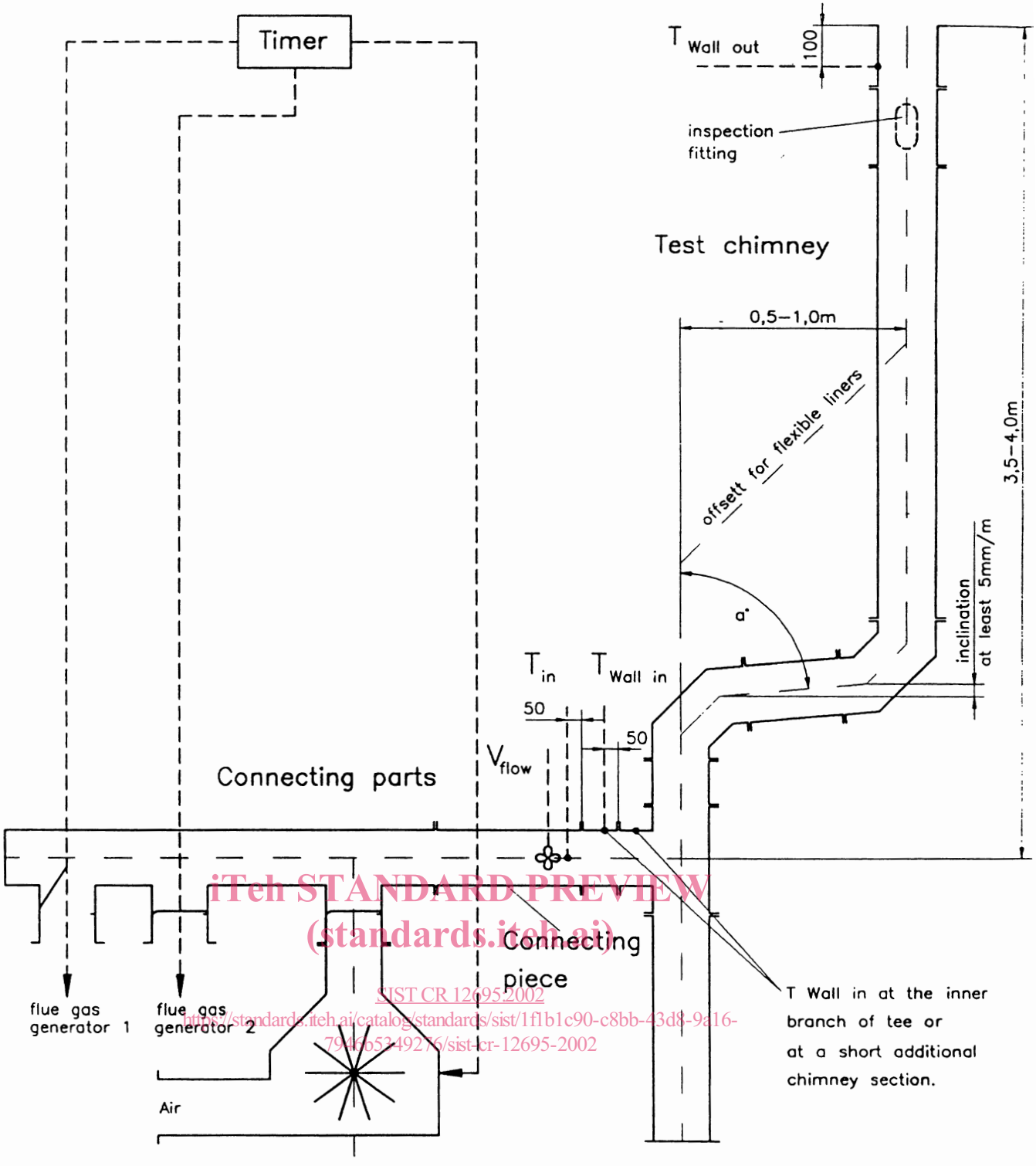


Figure 1: Test assembly