SLOVENSKI STANDARD
oSIST prEN 16758:2014

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Obešene fasade - Ugotavljanje trdnosti strižnih spojev - Preskusna metoda in zahteve

Curtain walling - Determination of the strength of sheared connections - Test method and requirements

Vorhang-Fassade - Festlegung der beanspruchbarkeit von auf Abscheren beanspruchten Verbindungen - Testmetode und Anforderungen

Façades rideaux - Détermination de la résistance des assemblages - Méthode d'essai et exigences

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ICS:

91.060.10	Stene. Predelne stene. Fasade	Walls. Partitions. Facades

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English Version

Curtain walling - Determination of the strength of sheared connections - Test method and requirements

Façades rideaux - Détermination de la résistance des assemblages - Méthode d'essai et exigences

Vorhang-Fassade - Festlegung der beanspruchbarkeit von auf Abscheren beanspruchten Verbindungen - Testmetode und Anforderungen

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Foreword

This document (prEN 16758:2014) has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

Annex A is informative; Annex B is normative.

This document includes a Bibliography.

1 Scope

This European Standard specifies the test method and the requirements to determine the bearing capacity of connections between curtain walling framing members for which it cannot be calculated in accordance with current codes or conventional calculations based upon the strength of the materials.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13119, *Curtain walling – Terminology*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13119 and the following apply.

3.1
connection
set of components designed to transfer loads between structural framing members (e.g. cleat)

4 Symbols

For the purposes of this European Standard, the following symbols apply.

$F_{h,des}$	design horizontal load
$F_{v,des}$	design vertical load
F_{u5}	the characteristic force giving 75% confidence that 95% of the test results will be higher than this value
s	the standard deviation of the series under consideration
γ_u	partial factor for the connection applicable to rupture
$\tau_{\alpha\beta}$	statistical eccentricity of 5% with 75% confidence

5 Method of evaluation

5.1 General

Connections are subjected to permanent loads as well as to variable loads. The measurement of the deformation is recorded at the application of the force. The support must restraint vertical and horizontal movements.

5.2 Samples

The samples shall be representative of the connection between the framing members and comprise, as minimum, the connection and the framing members that meet at the node.

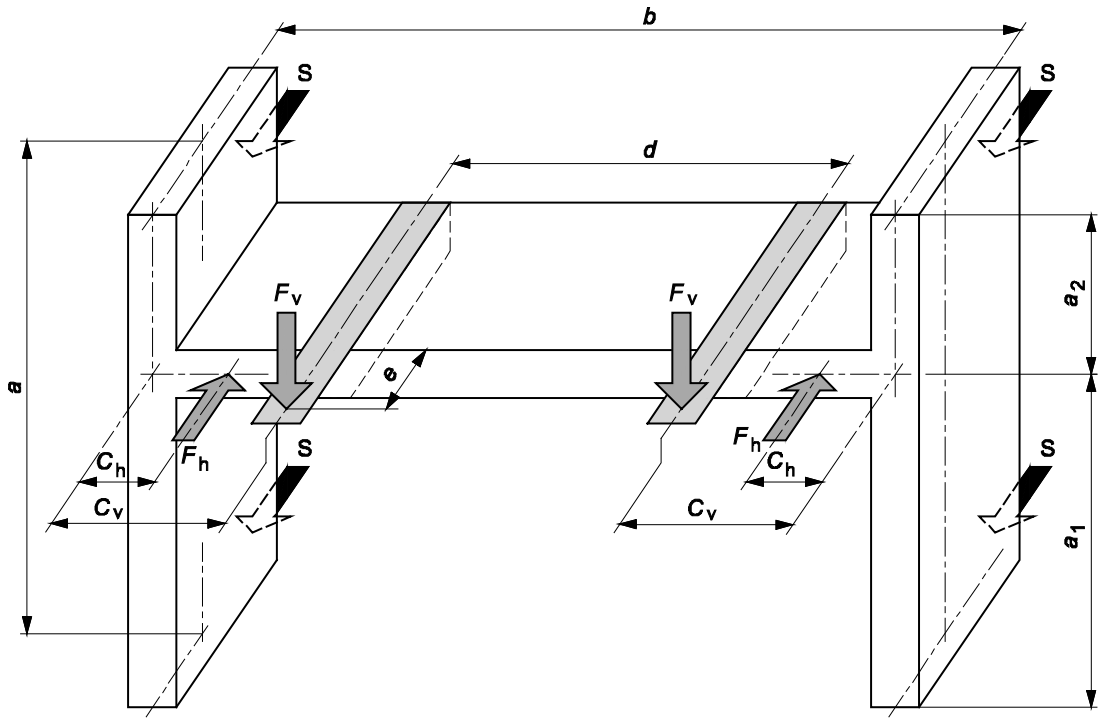

Figure 1.a — Schematic T- connection and loading points (any connection method can be chosen)

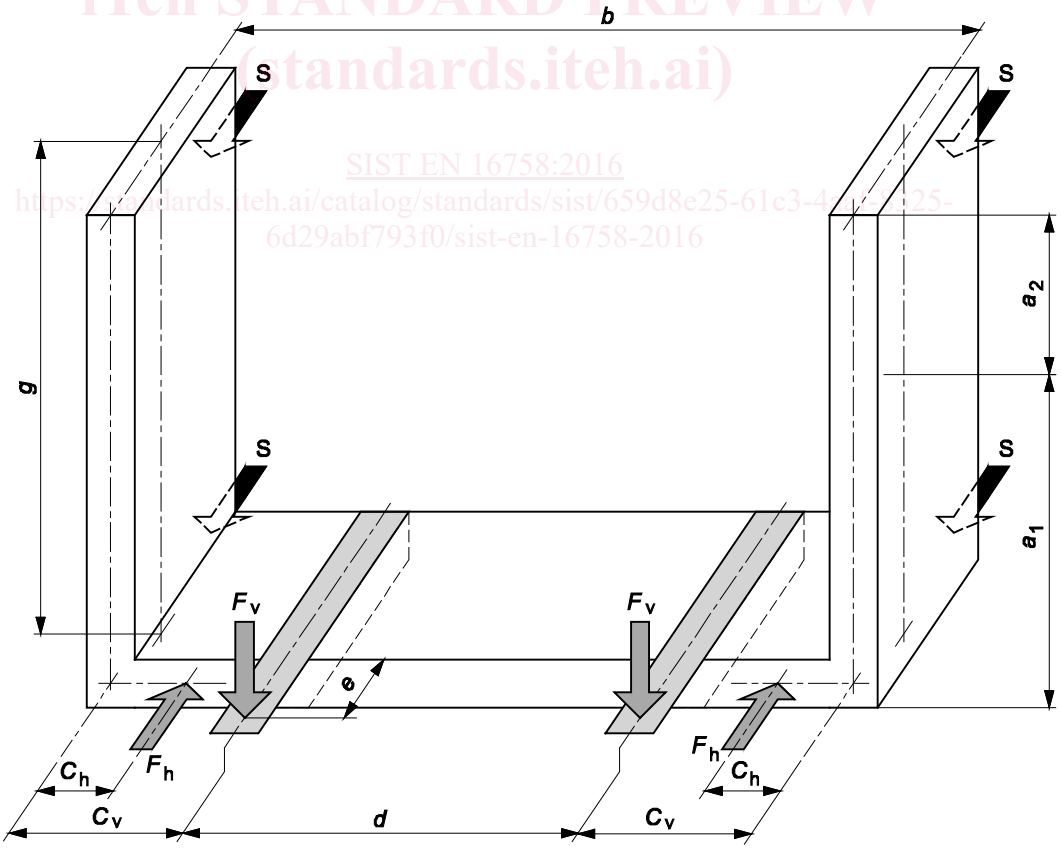

Figure 1.b — Schematic L- connection and loading points (any connection method can be chosen)

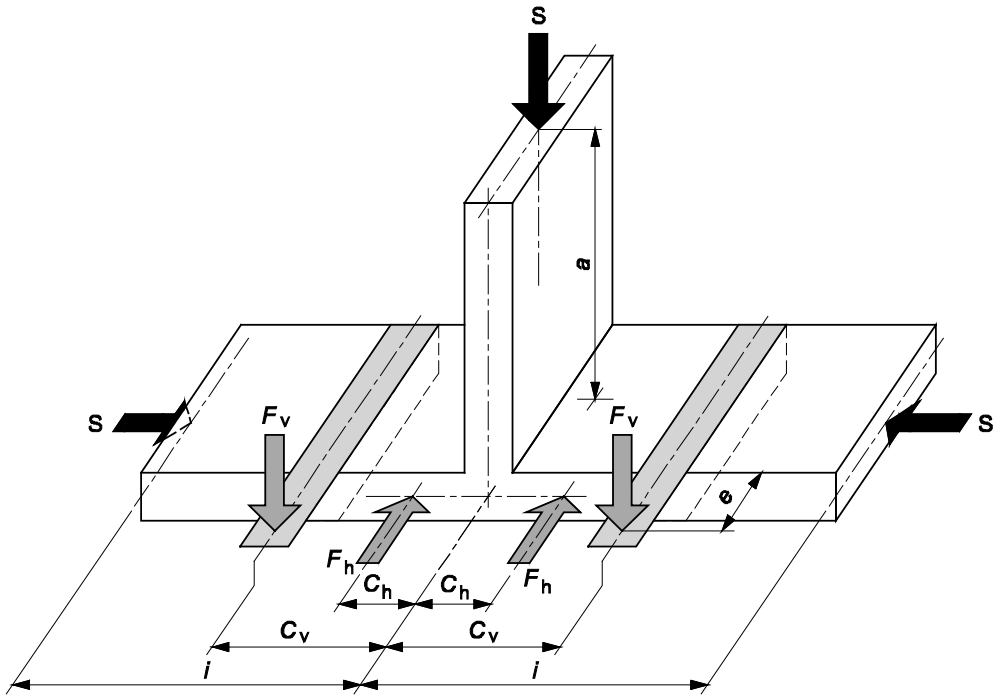

Figure 1.c — Axial resistance (any connection method can be chosen)

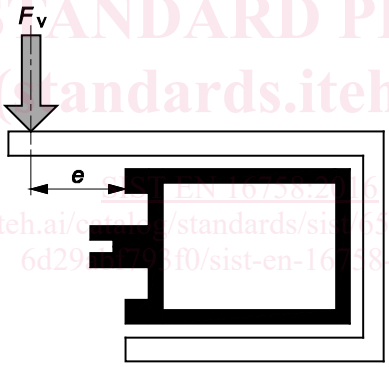

Figure 1.d — Dead load (*Fv*)

The samples are built according to Figure 1:

— a = 300 mm (recommending [1] a_1=200 mm and a_2=100 mm)

— b>= 500 mm (recommending [2] b=750 mm)

— c_v, c_h [3] d, e: dimensions of the actual loadings points and typical of the construction tested

— e: the distance from the position of (a) the contact area of the internal glazing gasket and the transom, AND (b) the centre of gravity of the infill the manufacturer is willing to use on his/her curtain walling.

— g = 250 mm

1) Due to a specific reason (project specifications or product's details) the sizes could differ.

2) Due to a specific reason (project specifications or product's details) the sizes could differ.

3) Depending of the actual geometry of the connection, F_h must be located on the transom as closed as possible of mullion with a recommended maximum of $c_h \leq 50$mm.

— i = 250 mm

— S: fixing of the samples on the test bank

5.3 Loadings

5.3.1 Vertical loading

The design static loading is defined as follow:

Minimum n=5 connections are submitted to vertical loading until break, using a deformation speed of 5 mm/min, the force/deformation cured is recorded.

The design vertical load $F_{v,des}$ is determined according the procedure described in Annex A.

5.3.2 Horizontal loading

5.3.2.1 Positive (pressure) loading is defined as follow:

Minimum n=5 connections are submitted to horizontal positive loading until break, using a deformation speed of 5 mm/min, the force/deformation curves are recorded.

The design positive horizontal load $F_{h,des,+}$ is determined according the procedure described in Annex A.

5.3.2.2 Negative (suction) loading is defined as follow:

Minimum n=5 connections are submitted to horizontal negative loading until break, using a deformation speed of 5 mm/min, the force /deformation cured is recorded.

The design negative horizontal load $F_{h,des,-}$ is determined according the procedure described in Annex A.

5.4 Combination of horizontal and vertical load

5.4.1 Method A

The samples which were used to calculate the $F_{v,des}$, $F_{h,des,-}$ and $F_{v,des,+}$ (see 5.3) are enough.

For each series of n samples, the vertical ($F_{v,des,x\%}$) and the positive and negative design horizontal ($F_{h+,des,x\%}$, $F_{h-,des,x\%}$) forces are determined according the procedure described in Annex B. When specifically required, for serviceability limit state the methodology is described in Annex A.

$$F_{h,des} = \min\left(F_{h,des,+}; F_{h,des,-}\right) \quad (1)$$

All the combinations included in the area A(0, $F_{v,des}$, $F_{h,des}$) are acceptable.

The points "m" of maximum combinations of vertical and horizontal design loads belong to the straight line of equation:

$$F_{v,m} = F_{v,des} - F_{h,m} \times \frac{F_{v,des}}{F_{h,des}} \quad (2)$$

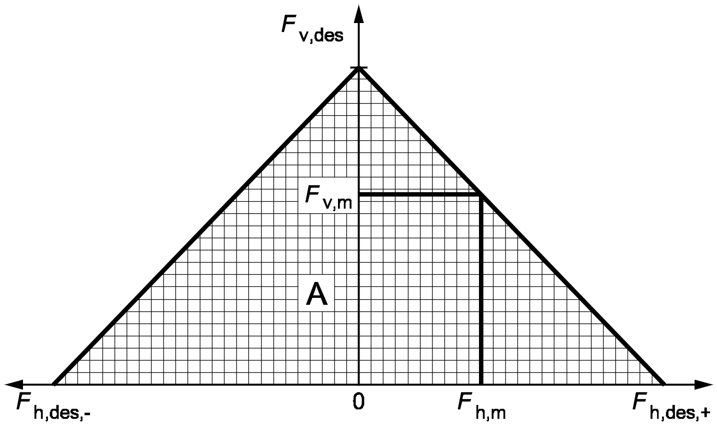

Figure 2 — Area of acceptable combination of vertical and horizontal loadings

5.4.2 Method B (detailed, optional)

Series of 5 connections are loaded simultaneously with vertical and horizontal loadings as follow:

Table 1 — Series of combined loadings

Series of minimum samples number n =	Vertical loadings	Positive and negative horizontal loadings
5	$F_{v,des,20\%}$ = 20% x $F_{v,des}$	From $0N$ to $F_{h,des,-}$
5	$F_{v,des,40\%}$ = 40% x $F_{v,des}$	From $0N$ to $F_{h,des,-}$
5	$F_{v,des,60\%}$ = 60% x $F_{v,des}$	From $0N$ to $F_{h,des,-}$
5	$F_{v,des,80\%}$ = 80% x $F_{v,des}$	From $0N$ to $F_{h,des,-}$
5	$F_{v,des,100\%}$ = 100% x $F_{v,des}$	From $0N$ to $F_{h,des,-}$
5	$F_{v,des,20\%}$ = 20% x $F_{v,des}$	From $0N$ to $F_{h,des,+}$
5	$F_{v,des,40\%}$ = 40% x $F_{v,des}$	From $0N$ to $F_{h,des,+}$
5	$F_{v,des,60\%}$ = 60% x $F_{v,des}$	From $0N$ to $F_{h,des,+}$
5	$F_{v,des,80\%}$ = 80% x $F_{v,des}$	From $0N$ to $F_{h,des,+}$
5	$F_{v,des,100\%}$ = 100% x $F_{v,des}$	From $0N$ to $F_{h,des,+}$

The deformation speed is 5 mm/min and the force/deformation curve are recorded.

For each series of n samples, the vertical $(F_{v,des,x\%})$ and the positive and negative design horizontal ($F_{h+,des,x\%}$, $F_{h-,des,x\%}$) forces are determined according the procedure described in Annex B. When specifically required, for serviceability limit state the methodology is described in Annex A.

The pairs of values ($F_{h+,des,x\%}$, $F_{v+,des,x\%}$) are graphically represented as follows for positive and negative horizontal values. The area A is representing the possible combinations of horizontal and vertical loadings.