BS EN 14195:2014

BSI Standards Publication

Metal framing components for gypsum board systems — Definitions, requirements and test methods

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National foreword

This British Standard is the UK implementation of EN 14195:2014. It supersedes BS EN 14195:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/544, Plastering, rendering, dry lining.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Metal framing components for gypsum board systems - Definitions, requirements and test methods

Éléments d'ossature métalliques pour systèmes en plaques de plâtre - Définitions, spécifications et méthodes d'essai

Metall-Unterkonstruktionsbauteile für Gipsplatten-Systeme - Begriffe, Anforderungen und Prüfverfahren

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 14195:2014) has been prepared by Technical Committee CEN/TC 241 “Gypsum and gypsum based products”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by June 2015, and conflicting national standards shall be withdrawn at the latest by September 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14195:2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of Regulation (EU) No. 305/2011.

For relationship with Regulation (EU) No. 305/2011, see informative Annex ZA, which is an integral part of this document.

The main technical changes that have been made in this new edition of EN 14195 are the following:

a) Normative references have been updated;

b) Clause 1, Scope, has been enlarged to include profiles, hangers and connectors and boards according to EN 520, EN 14190, EN 15283-1 and EN 15283-2;

c) Annex ZA and Clause 6 have been revised to be in line with the Construction Products Regulation (CPR);

d) document has been editorially revised.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the characteristics of metal framing components (e.g. profiles, hangers and connectors) intended to be used in building construction works in conjunction with gypsum boards manufactured according to EN 520, EN 15283-1 and EN 15283-2 and gypsum board products from reprocessing conforming to EN 14190 where the assembly is non-loadbearing. Such assemblies include, for example, partitions, wall and ceiling linings, ceilings with mechanically fixed boards and the cladding of beams, columns, ducts and shafts.

It covers the following performance characteristics: reaction to fire, flexural (yield) strength and loadbearing capacity of suspension components to be measured according to the relevant test methods as specified or cited in this European Standard.

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 10132 (all parts), *Cold-rolled narrow steel strip for heat-treatment*

EN 10244-2, *Steel wire and wire products - Non-ferrous metallic coatings on steel wire - Part 2: Zinc or zinc alloy coatings*

EN 10346, *Continuously hot-dip coated steel flat products - Technical delivery conditions*

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

EN 13964:2014, *Suspended ceilings - Requirements and test methods*

EN ISO 6892-1, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1)*

EN ISO 9227, *Corrosion tests in artificial atmospheres - Salt spray tests (ISO 9227)*

EN ISO 16120-2, *Non-alloy steel wire rod for conversion to wire - Part 2: Specific requirements for general-purpose wire rod (ISO 16120-2)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 General terms

3.1.1
non-loadbearing element
element which does not transfer vertical forces and whose contribution to the stability of the building is not taken into account

3.1.2
metal section
corrosion protected steel member, cold rolled to form profiles

Note 1 to entry: See examples in Annex C.

3.1.3
nominal thickness
thickness of steel stated by the manufacturer of the metal section including metallic surface coating

3.1.4
core thickness
thickness of steel excluding surface coating

3.1.5
flange
part of section to which gypsum board is usually attached, depending upon the position of the section

Note 1 to entry: See Figure 6.

3.1.6
web
central and connecting part of section between flanges of a stud and channel section

Note 1 to entry: See Table C.1.

Note 2 to entry: Some sections have no web, e.g. L.

3.1.7
nominal width/depth
width and depth of sections stated by the manufacturer

3.1.8
bend
curvature to impart shape and/or strength, for example, between flange and web

Note 1 to entry: See Figures 3, 4, and 5.

3.1.9
hanger
component connecting the metal sections to the loadbearing main structure

Note 1 to entry: See Annex D.

Note 2 to entry: Hangers are designated by H.

3.1.10
connector
components connecting metal section to metal section

Note 1 to entry: See Annex D.

Note 2 to entry: Connectors are designated by N.

3.2 Symbols and abbreviations

For the purpose of simplification in product marking and performance information characteristics may be identified through the symbols and abbreviations given in Table 1.

Table 1 — Symbols and abbreviations

Requirement	Sub-clause	Symbol or abbreviation
Reaction to fire	4.1	R2F
Yield strength	4.2	σ
Loadbearing capacity of suspension components	4.6.2	L
Dangerous substances	4.3	DS

4 Requirements

4.1 Reaction to fire

When the intended use of metal components is for situations in building construction works where there is a risk of exposure to fire, metal components shall be classified A1 according to Commission Decision 96/603/EC, as amended, without the need of testing if they contain less than 1 % organic material by weight or volume (whichever is the more onerous).

For the purpose of classification in classes other than class A1, the metal components shall be tested and classified in accordance with EN 13501-1 using mounting and fixing defined in Annex F.

4.2 Flexural tensile strength (expressed as yield strength)

The manufacturer shall declare the yield strength of the hot dip coated steel strip to EN 10346, tested in accordance with EN ISO 6892-1 or other equivalent method. The yield strength shall be at least 140 N/mm^2. If necessary, the design value of the section shall be calculated in accordance with 4.6.

4.3 Dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through: http://ec.europa.eu/enterprise/construction/cpd-ds/

The corrosion protection coating shall not contain hexavalent chromium [Cr (VI)].

4.4 Materials

Metal framing components shall be manufactured from mild steel strip having a protective coating conforming to EN 10346 or EN 10132. For suspension wires EN ISO 16120-2 and EN 10244-2 are relevant. For spring steel EN 10132 applies.

The protective coating shall conform or be equivalent to one of the classes given in Table 2. The equivalence shall be proved by salt spray test according to EN ISO 9227 until the first appearance of red rust.

Table 2 — Classes of protective coating

Class	Reference standard
Z275	EN 10346
Z140	
Z100	
ZA130	
ZA095	
AZ150	
AZ100	
NOTE 1 Z means zinc, ZA means zinc/aluminium, AZ means aluminium/zinc.	
NOTE 2 The figures give the total coating weight in g/m^2.	

4.5 Dimensions and tolerances

4.5.1 General

No individual measurement shall lie outside the stated tolerances.

4.5.2 Metal profiles

4.5.2.1 Thickness

The nominal thickness and tolerance shall be stated by the manufacturer of the section.

The thickness of metal shall be measured as described in 5.1.4.1 and compared with the nominal thickness.

4.5.2.2 Length of section

The nominal length of the section shall be stated by the manufacturer.

The length shall be measured as described in 5.1.4.2 and compared with the nominal length. The tolerances shall conform to Table 3.

Table 3 — Tolerance for length

Length in mm	Tolerance in mm
Up to 3 000	±3
Between 3 000 and 5 000	±4
Over 5 000	±5

4.5.2.3 Width of section

The nominal width of the section shall be stated by the manufacturer.

The width shall be measured as described in 5.1.4.5 and compared with the nominal width. The tolerance shall be ± 0,5 mm.

4.5.2.4 Cut-out/opening

In certain sections the size and the position of cut-outs/openings may be important and shall be declared by the manufacturer.

4.5.2.5 Widths of flange

The nominal width of the flange shall be stated by the manufacturer.

The widths of the flange shall be measured as described in 5.1.4.6 and compared with the nominal width of the flange. The tolerances shall conform to Table 4.

Table 4 — Flange width tolerance

Flange	Tolerance in mm
Flange between two bends	±0,5
Flanges between bend an cut edge	±1,0

4.5.2.6 Angular dimension

The design angle dimension between the web and the flange shall be stated by the manufacturer of the section. The angular dimensions shall be measured in accordance with 5.1.4.3 and compared with the nominal angle. The deviation shall not exceed ± 2° (see Figure 1).

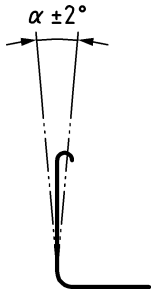


Figure 1 — Angular dimension

4.5.2.7 Straightness of the section

The straightness of the section shall be measured in accordance with 5.1.4.4 and shall not deviate from the flat surface by more than L/400 (where L is the nominal length in mm).

4.5.2.8 Twist of section

The maximum twist of the section shall be measured in accordance with 5.1.4.7. If h is the gap and W is the nominal width of the section (see Figure 7), the relation *h/W* shall not exceed 0,1.

4.5.3 Suspension components

When applicable, nominal dimensions and tolerances shall be stated by the manufacturer.

4.6 Mechanical properties

4.6.1 Calculation of section properties

Where users find it necessary or are required to predict the performance of the installed section, this can be undertaken by calculation using, as a basis, the mechanical properties of the metal framing component. In order to ensure that this can be done manufacturers shall provide the necessary material properties and, where required, the calculation shall be made in accordance with the methods/principles given in Annex B.

4.6.2 Loadbearing capacity of suspension components

When tested according to 5.2 suspension components shall comply with the following loadbearing capacity classes in Table 5.

Table 5 — Load bearing capacity classes

Class with safety factor v = 3	Class with safety factor v = 2,5	Admissible F (N)
L 150 a	L 150 b	≥ 150
L 250 a	L 250 b	≥ 250
L 400 a	L 400 b	≥ 400
L X00 a	L X00 b	≥ 500[a]
[a] X ≥ 5, admissible load to be declared by the producer.		

When the intended use of a suspension component (e.g. hanger, connector) is in a suspended ceiling exposed to wind load, the suspension component shall pass functional tests carried out according to Annex E.

4.6.3 Impact resistance

For impact resistance EN 13964:2014, 4.3.6 and Annex D, is relevant.

5 Test methods

5.1 Measurement of dimensions of metal profiles

5.1.1 Sampling

Three sections of each type, thickness and profile shall be tested.

5.1.2 Principle

Thickness, length, angular dimensions, straightness, twist, section width and flange width shall be measured.

5.1.3 Apparatus

a) A continuously flat surface capable of taking the longest section having a level of L/1000.

b) A micrometer permitting a reading to 0,01 mm.

c) A metal rule permitting a reading to 1 mm.

d) A metal tape measure permitting a reading to 1 mm.

e) A protractor with revolving arm permitting a reading to 1° (see Figure 2).

f) A slide calliper permitting a reading to 0,1 mm.

g) Hand vice or weight.

5.1.4 Procedure

5.1.4.1 Thickness

Measure the thickness with the micrometer in three separate positions on a representative surface area free from profile and any distortions from cutting. Record the results for thickness to the nearest 0,01 mm.

5.1.4.2 Length

Place the specimen on the flat surface and measure the length along the web using the metal tape measure. Record the results for length to the nearest 1 mm.

5.1.4.3 Angular dimension

Place the base of the protractor on one surface ensuring that it is in direct contact with the plane of the surface and registers it correctly. Move the protractor close to the angle and rotate the arm until it is in firm contact with the adjacent flange. Read off the angle shown on the protractor (see Figure 2).

Record the results for angular dimension to the nearest degree.

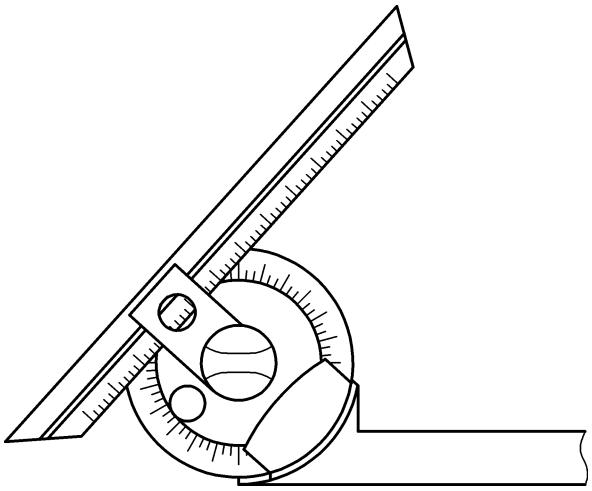


Figure 2 — Revolving arm protractor for accurate measurement of angles

5.1.4.4 Straightness

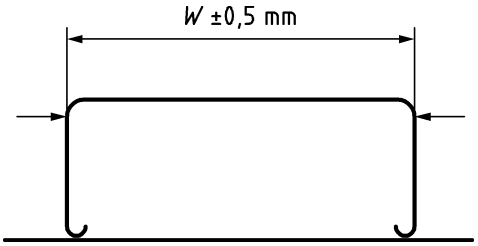
Place the specimen on the flat surface and use the metal rule to measure the maximum deviation from the plane of the flat surface.

Rotate the specimen through 90° about its longitudinal axis and repeat the measurement.

Record the results for straightness to the nearest 1,0 mm.

5.1.4.5 Web width of section

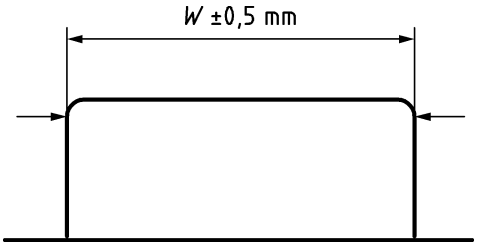
Place the specimen on the flat surface with the web uppermost. Select three positions not closer than 150 mm from the end of the section. Using the slide calliper measure the specimen on the outside in the position shown in the diagram (see Figures 3, 4 and 5). The measurements shall be taken as close to the bends as possible. Record the results for width to the nearest 0,1 mm.



Key

⟶ point where measurement is to be taken

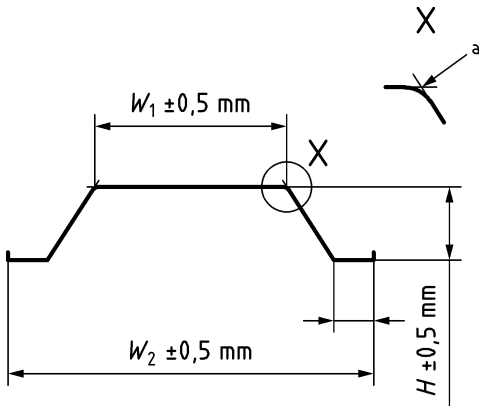
Figure 3 — C – Section



Key

⟶ point where measurement is to be taken

Figure 4 — U - Section



Key

a to eliminate the effect of the curve, measurements shall be taken at the point where the prolongations of the web and the edge meet

Figure 5 — Measurement with bends

5.1.4.6 Width of flange

Place the specimen on the flat surface, with the flange to be measured uppermost. Measure the flange using the slide calliper in three positions not closer than 150 mm from the ends of the section (see Figure 6). Record the results for width to the nearest 0,1 mm.

Key

a measuring width of flange between two bends

b measuring width of flange between bend and cut edge

Figure 6 — Width of flange

5.1.4.7 Measurement of twist of section

Place the specimen on the flat surface, web down. Press the end against the surface, using the hand vice or weight, in such a way that there is full contact between the web and the surface. At a distance 2 500 mm from the secured end of the specimen, measure the gap h using the metal rule (see Figure 7). When the length of the section is less than 2 500 mm the gap should be measured at the end of the section and calculated proportionately to an equivalent length of 2 500 mm.

Calculate the twist as h/W where h is the gap and W is the nominal width of the section.

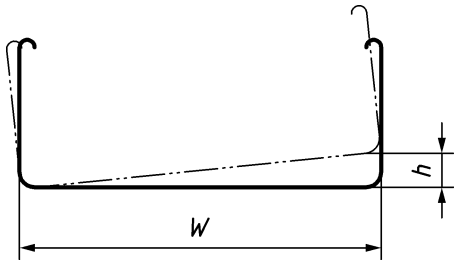


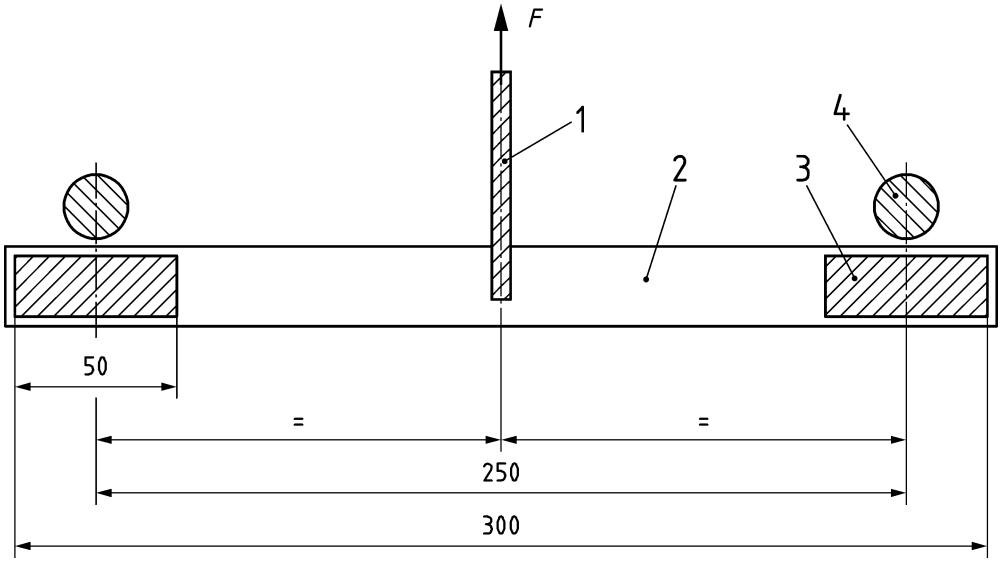
Figure 7 — Measurement of twist of section

5.2 Determination of mechanical strength of metal suspension components

5.2.1 General

The suspension test shall include both its connections to the top fixing and to the profile.

Dimensions in mm



Key

1 suspension (top fixing or substructure profile)

2 supporting member / Channel / Profile

3 short wood batten

4 round steel ø 20 mm

Figure 8 — Principle set-up of suspension test

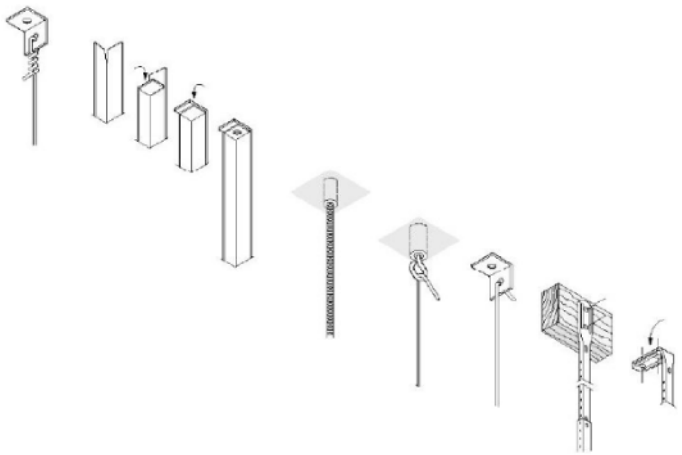


Figure 9 — Examples of different suspension components

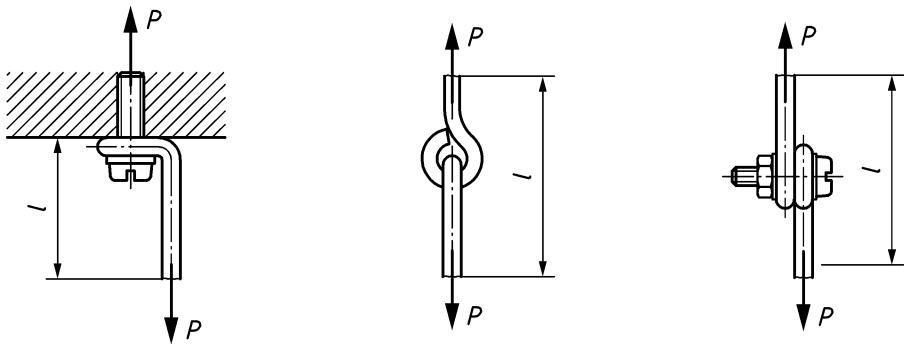


Figure 10 — Examples of different connections between top fixing and suspension

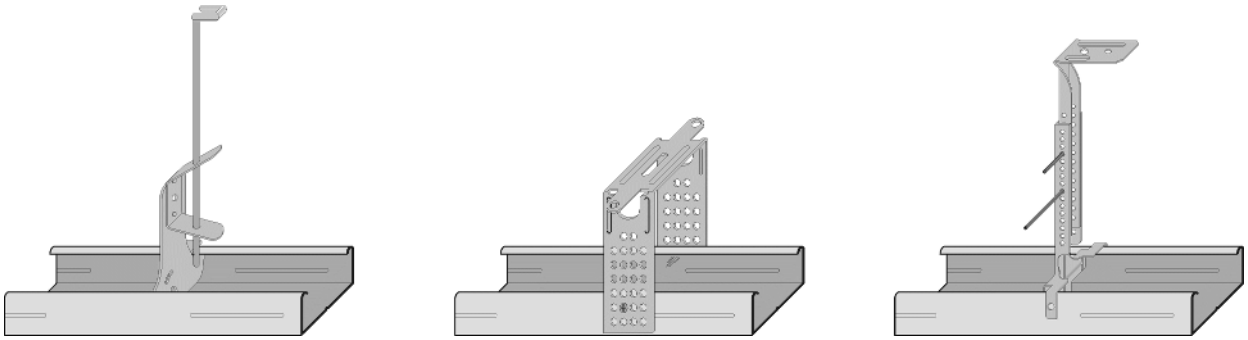
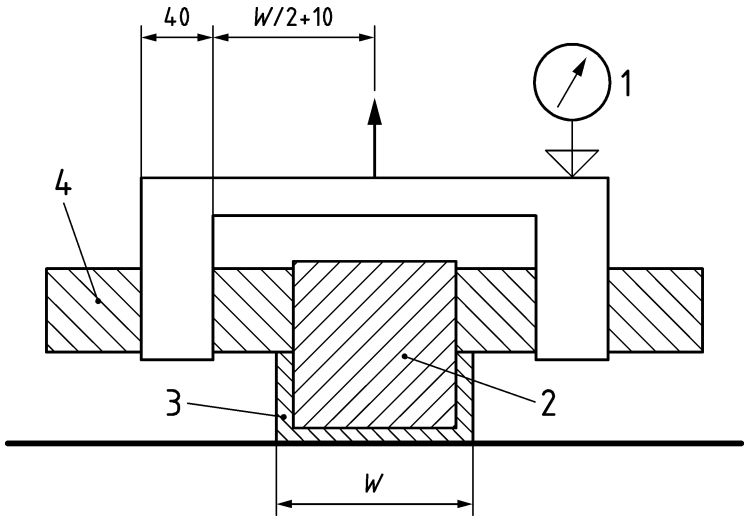


Figure 11 — Examples of different connections between suspension and channel / profile

Connecting components (e.g. wire clips, channel connectors, screws) shall be tested in a similar way using the components to be connected (e.g. primary and secondary profile, see Figure 12).

Dimensions in mm

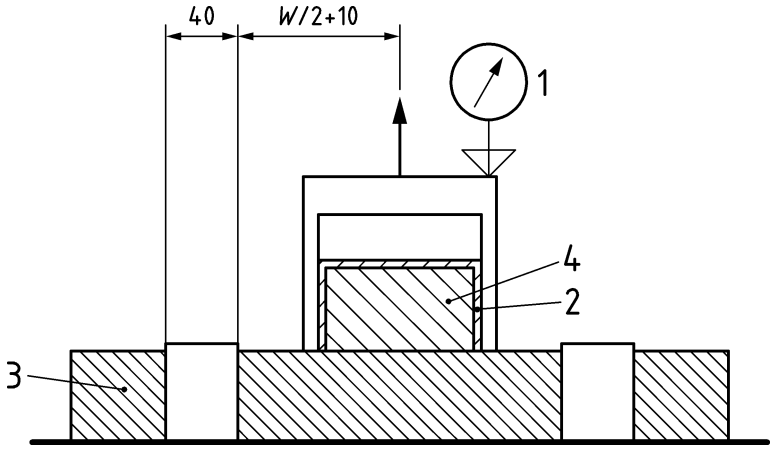


a) Front view

Key

1 displacement measurement
2 profile connecting component (e.g. cross connector)
3 supporting profile (lower channel/profile)
4 supporting profile (upper channel/profile)
W width of lower channel

Dimensions in mm



b) Lateral view

Key

1 displacement measurement
2 profile connecting component (e.g. cross connector)
3 supporting profile (lower channel/profile)
4 supporting profile (upper channel/profile)
W width of lower channel

Figure 12 — Principle set-up of connections component test

5.2.2 Static test

5.2.2.1 General

The test as mentioned in 5.2.1 shall be carried out on at least 3 individual samples (components) fitted in the same way as in practice in a ceiling structure, including the connection to the top fixing as well as to the supporting member.

The test configuration shall be selected such that the largest displacement of the loading point and the minimum load capacity is to be expected. Diagonal pull or bending may need to be taken into account.

For suspension components designed to be subjected to compression, the tests shall be carried out under compressive load in which the length of the suspension component shall be taken into account.

5.2.2.2 Test for suspension components

The test conditions shall express standard laboratory conditions.

Measurements taken and recorded shall be load, load rate and displacement.

Number of test samples subjected to testing shall be at least 3 per suspension component type.

5.2.2.3 Test for connecting components

The test conditions shall express standard laboratory conditions.

Measurements taken and recorded shall be load, load rate and displacement.

Number of test samples subjected to testing shall be at least 3 per connector type.

5.2.3 Assessment of test results (static test)

The admissible load (adm F) shall be determined from the results of not less than 3 individual tests using the formula:

$$F_{\text{adm}} = F_{\text{max},0,5} / \nu$$

$$F_{\text{max},0,5} = F_{\text{max,mean}} - k_{\sigma} \cdot s$$

where

$F_{\text{max, mean}}$ is average value of ultimate load F_{max} in N;

k_{σ} is statistical factor (acceptance factor see 5.2.4);

s is the standard deviation in N;

$F_{\text{max, 05}}$ is the 5 % fractile;

ν is safety factor = 2,5 or 3 (according to classes in Table 5).

The displacement of the loading point corresponding to adm F shall be stated as

$\overline{f}$ average value of displacement in mm;

f_{min} minimum value of displacement in mm;

f_{max} maximum value of displacement in mm.

5.2.4 Acceptance factor k_σ

The basis for the k_σ value is the assumption of a random test with an unknown standard deviation of the result. The acceptance factor k_σ shall be taken from Table 6. k_σ depends on the number n of test samples (common practice n = 10). The minimum number of n is 3. Consequently v = n – 1 starts with 2.

Table 6 — Acceptance factor k_σ − Values for k_σ depending on the number of test samples n, the probability (W) and the fractile value Φ (assumption: the standard deviation is unknown)

Fractile Φ	$v = n - 1$												
	2	3	4	5	6	7	8	9	10	11	12	13	14
W = 0,90 5 %	5,31	3,96	3,40	3,09	2,89	2,75	2,65	2,57	2,50	2,45	2,40	2,36	2,33
NOTE For this standard, the probability W and the fractile value Φ have been fixed at 0,90 % and 5 % respectively. For n = 10 test pieces, the prevailing k_σ value is 2,57.													

6 Assessment and verification of constancy of performance - AVCP

6.1 General

The compliance of metal framing components with the requirements of this standard and with the performances declared by the manufacturer in the DoP shall be demonstrated by:

— Determination of the product type;

— Factory Production Control by the manufacturer, including product assessment.

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performance(s).

For the purposes of testing, metal framing components may be grouped into families, where it is considered that the selected property is common to all metal framing components within that family.

The decision on those products or properties which fall within a family shall be made by the manufacturer.

6.2 Type testing

6.2.1 General

Sampling and testing shall be in accordance with Clause 5.

The results of all type tests shall be recorded and held by the manufacturer for at least 10 years.

6.2.2 Determination of the product type

Determination of the product type shall be performed to show conformity with this document.

Determination of the product type shall be performed at the beginning of the production of a new metal framing components type (unless it is a member of a family previously tested) or at the beginning of a new method of production (where this may significantly affect the stated properties).

Tests previously performed in accordance with the provisions of this standard (same product, same characteristic(s), test method, sampling procedure, system of attestation of conformity, etc.) may be taken into account.

All product characteristics in Clause 4 applicable to the intended uses shall be subject to determination of the product type, with the following exceptions:

— release of dangerous substances may be assessed indirectly by controlling the content of the substance concerned;

— when design values or declared values are used;

— when reaction to fire is class A.1 (no contribution to fire) without further testing as 4.1.

6.2.3 Further type testing

Whenever a change occurs in the metal framing components design, the raw material or supplier of the components, or the production process (subject to the definition of a family), which would change significantly one or more of the characteristics, the type tests shall be repeated for the appropriate characteristic(s).

Sampling shall be in accordance with 5.2.

The results of all type tests shall be recorded and held by the manufacturer for at least 10 years.

6.3 Factory production control (FPC)

6.3.1 General

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market conform with the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

A FPC system conforming with the requirements of EN ISO 9001, and made specific to the requirements of this European Standard, should be considered to satisfy the above requirements.

The results of inspections, tests or assessments requiring action shall be recorded, as shall any action taken. The action to be taken when control values or criteria are not met shall be recorded and retained for the period specified in the manufacturer's FPC procedures.

6.3.2 Personnel

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product conformity, shall be defined. This applies in particular to personnel that needs to initiate actions preventing product non-conformities from occurring, actions in case of non-conformities and to identify and register product conformity problems. Personnel performing work affecting product conformity shall be competent on the basis of appropriate education, training, skills and experience for which records shall be maintained.

6.3.3 Equipment

6.3.3.1 Testing

All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

6.3.3.2 Manufacturing

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use, wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records retained for the period defined in the manufacturer's FPC procedures.

6.3.4 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their conformity.

6.3.5 Product testing and evaluation

The manufacturer shall establish procedures to ensure that the stated values of all product characteristics are maintained.

Compliance with EN ISO 9001:2008, 7.5.1 and 7.5.2 should be deemed to satisfy the requirements of this clause.

6.3.6 Traceability and marking

Individual products, product batches or packages shall be identifiable and traceable with regard to their production origin. The manufacturer shall have written procedures ensuring that processes related to affixing traceability codes and/or markings are inspected regularly.

Compliance with EN ISO 9001:2008, 7.5.3 should be deemed to satisfy the requirements of this clause.

6.3.7 Non-complying products

The manufacturer shall have written procedures which specify how non-complying products shall be dealt with. Any such events shall be recorded as they occur and these records shall be kept for the period defined in the manufacturer's written procedures.

6.3.8 Corrective action

The manufacturer shall have documented procedures that instigate action to eliminate the cause of non-compliance in order to prevent recurrence.

Compliance with EN ISO 9001:2008, 8.5.2 should be deemed to satisfy the requirements of this clause.

6.3.9 Other test methods

For factory production control, test methods other than those specified for the determination of the product type may be used providing they provide sufficient confidence in the compliance of the product with this standard.

7 Designation

Metal framing components shall be designated as follows:

a) the wording “metal framing component”;

b) reference to this document;

c) the manufacturer's specific description;

d) class of protective coating (see Table 1);

e) prefix letter of profile followed by the nominal dimensions in millimetres in the order:

- dimensions of cross section (see Annex C);
- thickness;
- length.

f) class of load bearing capacity for suspension components.

EXAMPLES Example of designation of a profile = Metal framing component EN 14195 Brand name/Z 275/C/40/48/40/0,6/3000.

Example of designation of a hanger = Metal framing component EN 14195 H/Z 275/L150a

8 Marking, labelling and packaging

Metal framing components complying with this document shall be clearly marked on the product or accompanying label or on the packaging or on the accompanying commercial document (e.g. delivery note) with the following items:

a) reference to this document;

b) the name, trademark or other means of identification of the manufacturer;

c) the means of identifying the metal framing components and relating them to their designation, as defined in Clause 7.

NOTE For CE marking purposes, when relevant, only marking and labelling requirements of ZA.3 are of application.

Annex A
(informative)

Sampling procedure for testing

A.1 General

The required number of samples to determine the compliance with specification should be sampled from a delivery consignment of metal framing components.

The appropriate consignment size shall be agreed between representatives of any involved parties who should have the opportunity to be present at the time of sampling.

A.2 Sampling procedure

A.2.1 General

The choice of the method of sampling should be as defined in A.2.2 and A.2.3.

A.2.2 Random sampling[1)]

Whenever possible, the random sampling method should be used, in which every metal component in the consignment has an equal chance of being selected for the sample.

Three metal components of each type should be selected from positions throughout the consignment without any consideration given to their condition or quality.

A.2.3 Representative sampling

When random sampling is impracticable or not convenient, e.g. when the metal components form a large stack or stacks with ready access to only a limited number of components, a representative sampling procedure should be used.

A.2.4 Sampling from a stack

A.2.4.1 General

The consignment should be divided into at least three real or imaginary parts, each of a similar size. One component should be selected at random from within each part in order to give the required number of samples as indicated in 5.1.

NOTE It will be necessary to remove some parts of the stack or stacks in order to gain access to components within the body of such stacks when taking samples.

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1) In practice, random sampling is normally only convenient either when the components forming the consignment are being moved in a loose (unpacked) form from one place to another of when they have been split into a large number of small stacks awaiting installation.

A.2.4.2 Sampling from a consignment formed of banded packs

At least three packs should be selected at random from the consignment. The band around each of the selected packs should be removed and one part should be sampled at random from within each pack in order to give the required number of samples without any consideration given to the condition or quality of the selected components.

Annex B
(normative)

Calculation of section properties

B.1 Scope

This annex provides the rules for the calculation of section properties of metal framing components for use in situations where the stress in the metal is such that there is no need for reduction of effective section area (e.g. assessment of assembly stiffness at low load level). An alternative solution is to use EN 1993-1-3.

B.2 Principles

a) The thickness used in calculation is the minimum steel core thickness. This is calculated as nominal thickness (see 4.5.2) minus tolerance and thickness of the protective coating (The thickness of the coating shall be obtained from EN 10346, as appropriate);

b) the width of section and flange used in the calculation shall be nominal (see 4.5.2.3 and 4.5.2.5) provided that the tolerances to this standard are met;

c) the section area is not reduced for buckling;

d) the section area is not reduced for cut outs (for services) in the web;

e) the radius of bends is ignored (i.e. calculated as if the bending radius is zero);

f) sub-areas are not repeated;

g) smaller stiffeners etc. are ignored.

B.3 Example of calculation

B.3.1 Symbols

For calculation purposes the following symbols apply:

x-x along the section;

y-y the axis of symmetry of the cross-section;

z-z minor axis perpendicular to the flanges;

I_{yy} second moment of inertia around the y-y-axis;

t minimum core thickness.

B.3.2 Profile and calculation

$$I_{yy} = \frac{AB^3}{12} - \frac{(A-2t)(B-2t)^3}{12} - \frac{t(B-2C)^3}{12}$$

with

A = 35 mm;

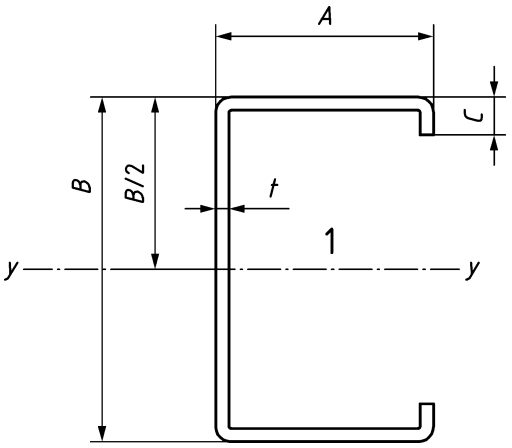
B = 70 mm;

C = 5 mm; and

t = 0,5 mm (minimum core thickness)

the calculation gives:

$$I_{yy} = 60{,}64 \times 10^3 \text{mm}^4$$



Key

1 centre of gravity

Figure B.1 — Dimensions of the section for calculation

Annex C
(informative)

Designation of cross section

The designation of metal framing components is addressed in Clause 7. Consideration has been given to the multiplicity of metal sections currently in use, without recourse to a means of rationalization of their shape, profile or dimensions, for the purpose of providing a method of interpretation of their profiles to enable them to be individually designated numerically.

The application and function of metal framing components used in conjunction with gypsum board has resulted in the majority of sections having a general commonality but with minor variations to satisfy manufacturing, national or local industry requirements. The remainder may have specific applications requiring more complex design profiles and these may need further consideration.

The following procedure should enable the manufacturer to provide a consistent characterization to satisfy Clause 7 e): Dimensions in millimetres and section.

a) Select the component and examine the section;

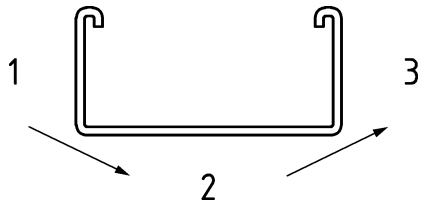
b) starting from an opening, working in an anti-clockwise direction, identify each major metal segment of the section numerically;

c) ignore small returns;

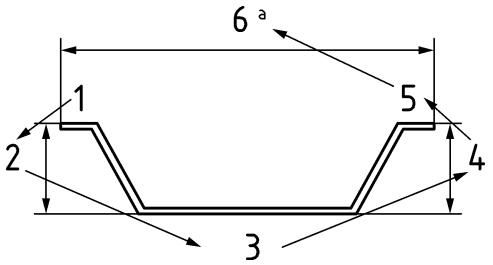
d) measure the dimensions of each segment (and extensions), previously identified, in millimetres and convert these into a numerical designation for each component, as shown below;

e) in those situations which require the overall width to be included in the designation, the dimensions of the metal and/or that of the opening can be combined, see example 2.

The following examples are intended to show the method of measuring the dimensions (including angularity) of a range of common sections used as studs, channels and furring channels and the method by which these characteristics can be computed into descriptive designations for the metal framing components, described in this document. Examples of designation of sections are given in Table C.1.



Example 1 – C/1/2/3

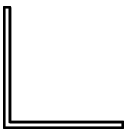
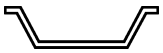


Example 2 – W/1/2/3/4/5/6

NOTE Start the measuring from an opening, work anti-clockwise as shown in examples 1 and 2.

*) When the overall width is included in the designation, place it at the end of an underline.

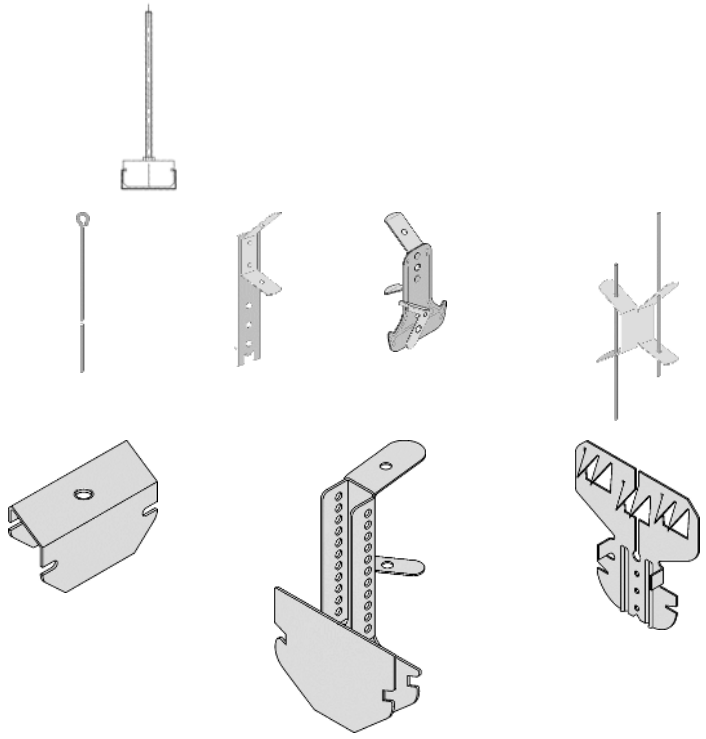
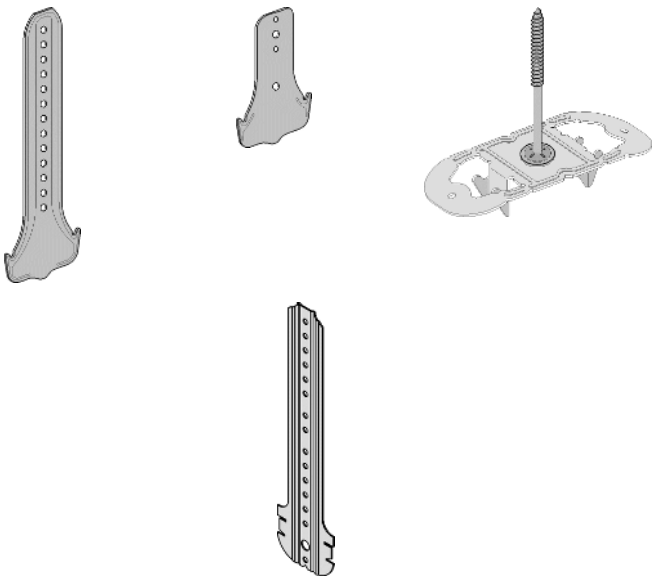
Table C.1 — Examples of designation of sections

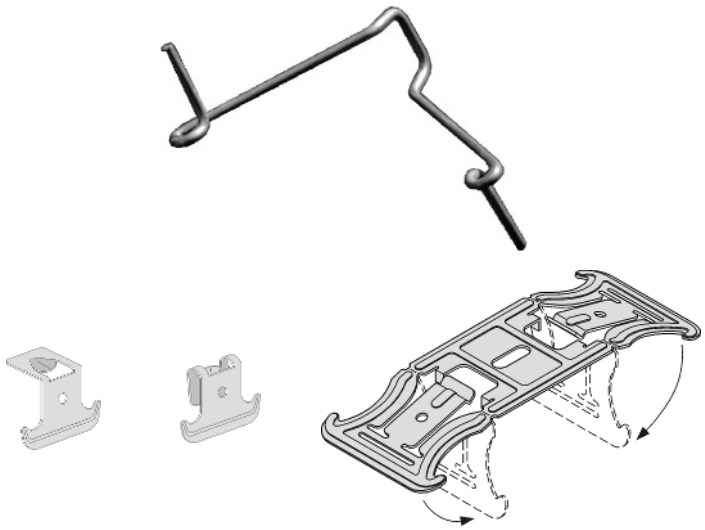
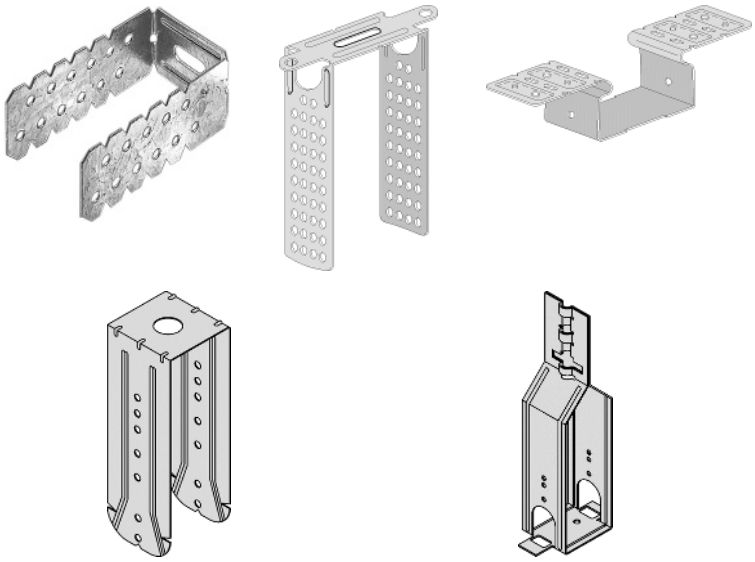
Common sections	Example of use	Method of measurement	Identification of segment	Computations of designation
C	Stud/ceiling	Ex. 1 or 2	 C/1/2/3	C/40/48/40
I	Stud	Ex. 1 or 2	 I/1/2/3	I/38/48/38
L	Corner	Ex. 1	 L/1/2	L/60/60
U	Channel	Ex. 1 or 2	 U/1/2/3	U/40/50/40
W	Ceiling	Ex. 1 or 2	 W/1/2/3/4/5	W/10/25/50/25/10
Z	Stud	Ex. 1	 Z/1/2/3	Z/40/48/40

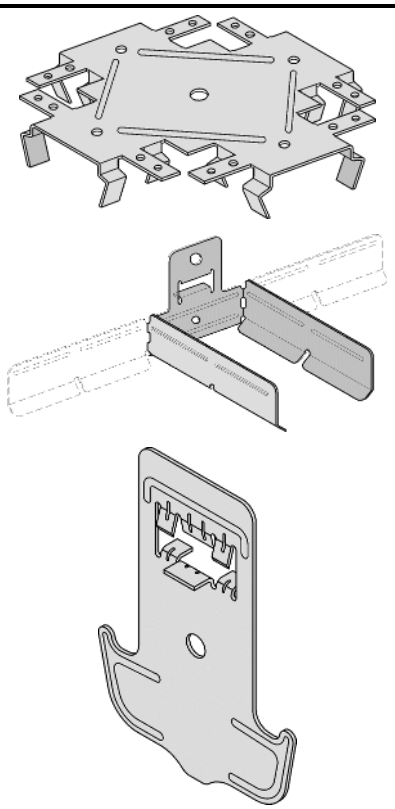
Annex D
(informative)

Examples of hangers and connectors

Table D.1 — Examples of hangers and connectors

Type	Example of use	Component	Designation
Hanger	Fixing profiles to loadbearing structure		**H**
Hanger	Fixing profiles to loadbearing timber structure		H

Type	Example of use	Component	Designation
Connector	Connect ceiling profiles to each other		**N**
Hanger (Bracket)	Fixing profiles to the structure		**H**
Connector	Fixing profiles to steel beams (I and H)		**N**
Connector	Joining profiles lengthwise		**N**
Connector	Fixing profiles in the same level		**N**

Type	Example of use	Component	Designation
			

Annex E
(normative)

Suspension component – Functional test

For the design purposes of the suspension component, it can be necessary to carry out a functional test. In principle the execution of the functional test shall be representative of the situation in which the suspension component is applied. If no information about the practical application is available, the functional test is carried out as follows:

The functional test shall be conducted with three individual samples (components) each with $n = 10^5$ load cycles. The load frequency shall be 2 Hz (load cycles per second).

Components that are loaded only by tensile force shall be tested under pulsating load with the admissible load (adm F) as the upper load and 0,4 adm F as the lower load (see Figure E.1).

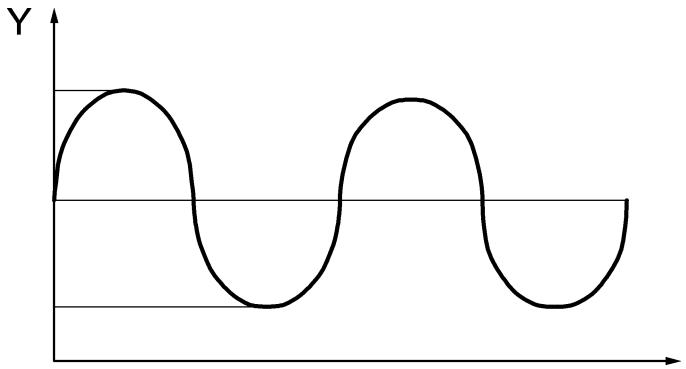


Figure E.1 — Tensile pulsating load

Components that are designed for both compressive and tensile load shall be tested under an appropriate alternating load, using compressive and tensile loads of 0,15 kN (see Figure E.2).

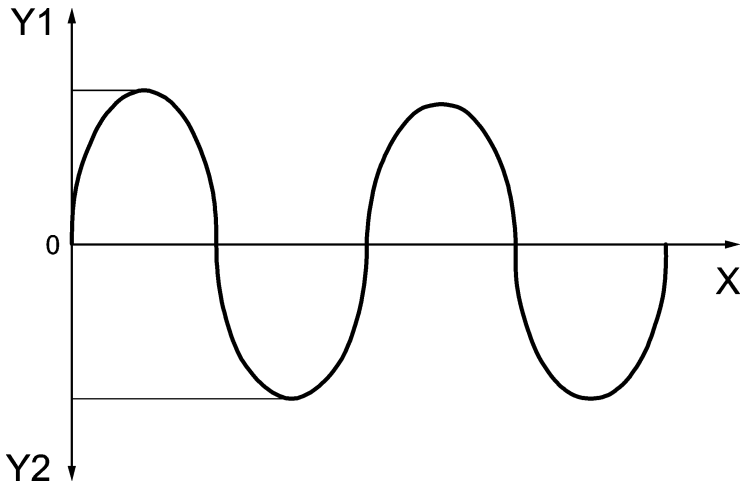


Figure E.2 — Alternating load (tension-compression)

The displacement of the loading point shall be measured during all tests and stated to the nearest 0,1 mm. A progressively increasing deformation during the pulsating load test shall not be permissible.

No defects shall be present in any of the samples after finishing the functional test.

If the suspension component fails the functional test, the load in the static test (5.2.2) shall be reduced appropriately (see also Figure E.3) and the functional test repeated.

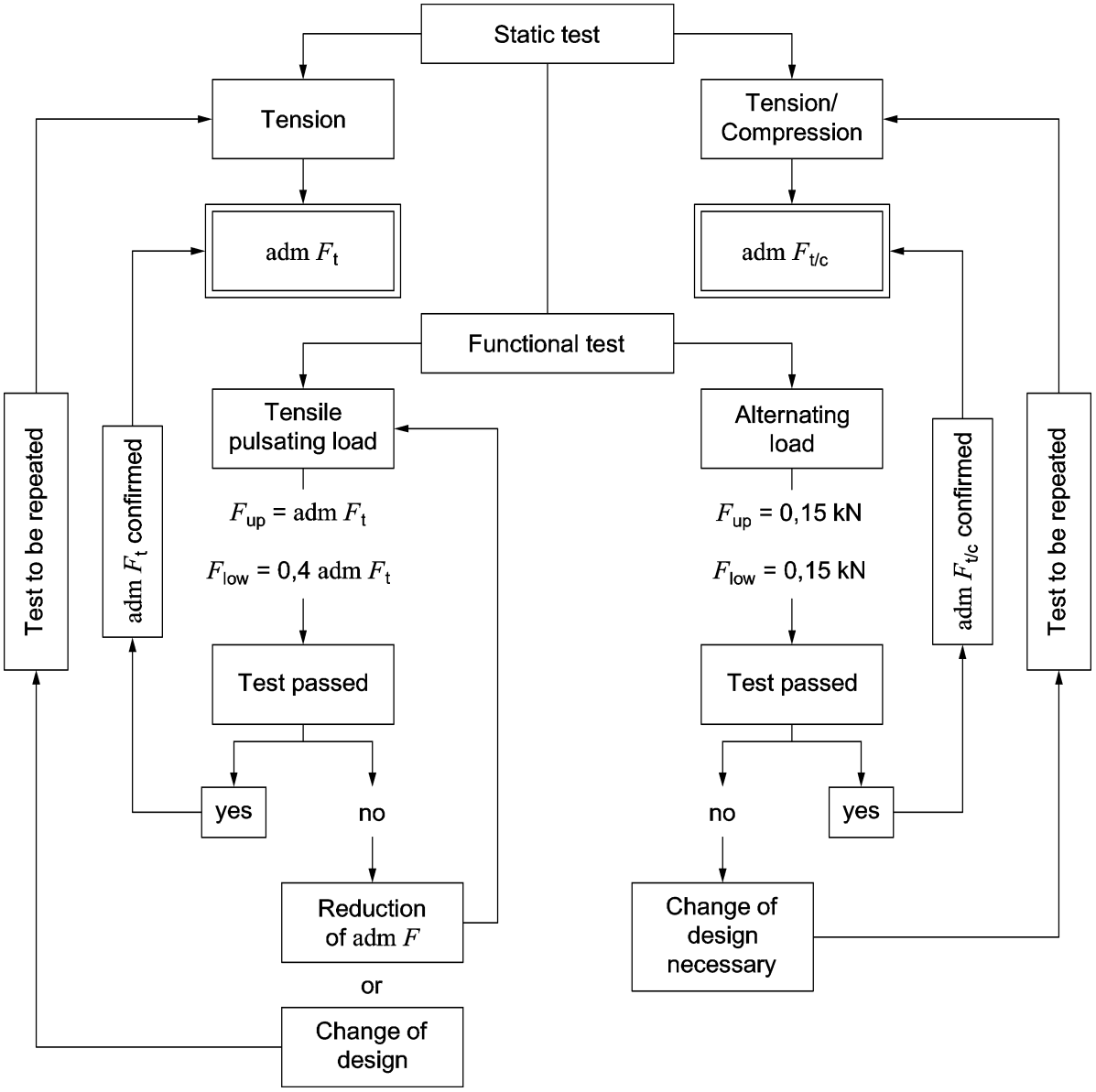


Figure E.3 — Test scheme for suspension components - static test and functional test

Annex F
(normative)

Mounting and fixing in the test according to EN 13823 (SBI test)

F.1 General applications

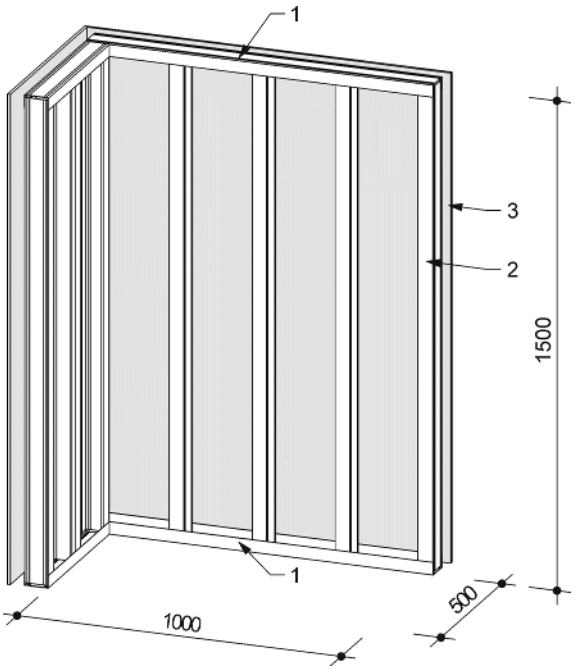
The metal framing components shall be mounted and fixed using the following method. This provides the most onerous conditions and the resultant classification shall be applied to all end use applications. Results obtained for a given thickness of component apply for all thicker components.

The components shall be mounted as shown in Figure F.1a, Figure F.1b, Figure F.1c and Figure F.1d.

The structure shall be vertical steel studs with a web width of 70 mm to 80 mm or channels with a web of 45 mm to 60 mm and a metal thickness of 0,5 mm to 0,6 mm positioned as shown in Figure F.1b.

A 40 mm air gap shall be left between the structure and the calcium silicate boards.

Dimensions in millimetres



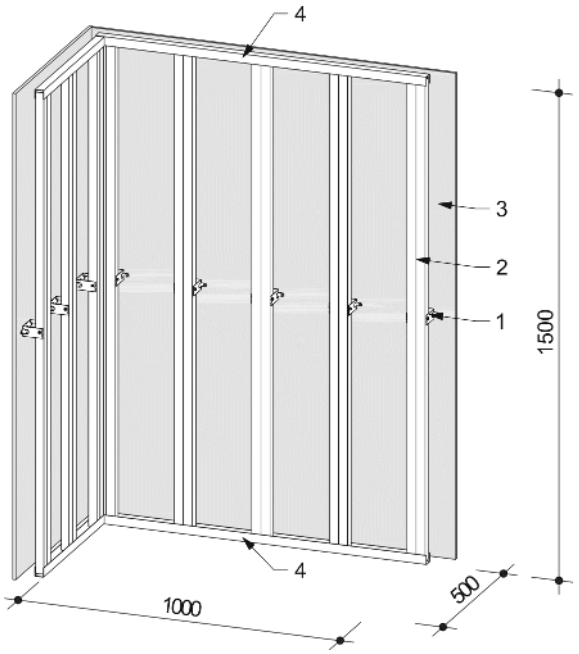
a) Free standing sub-structure

Key

1 U profile

2 C profile

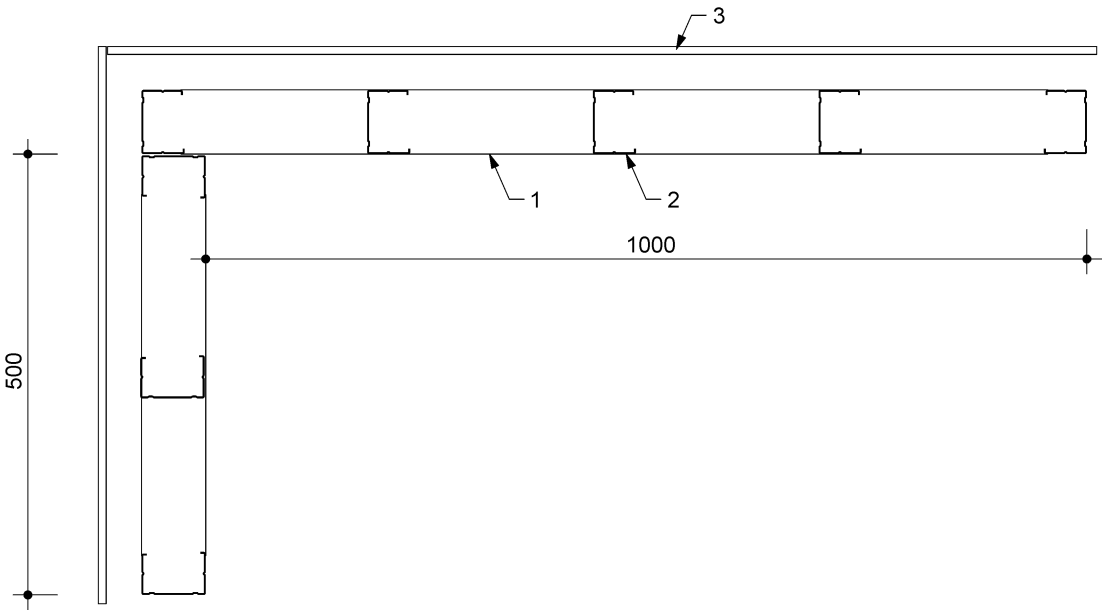
3 calcium silicate baseboard



b) sub-structure including suspension

Key

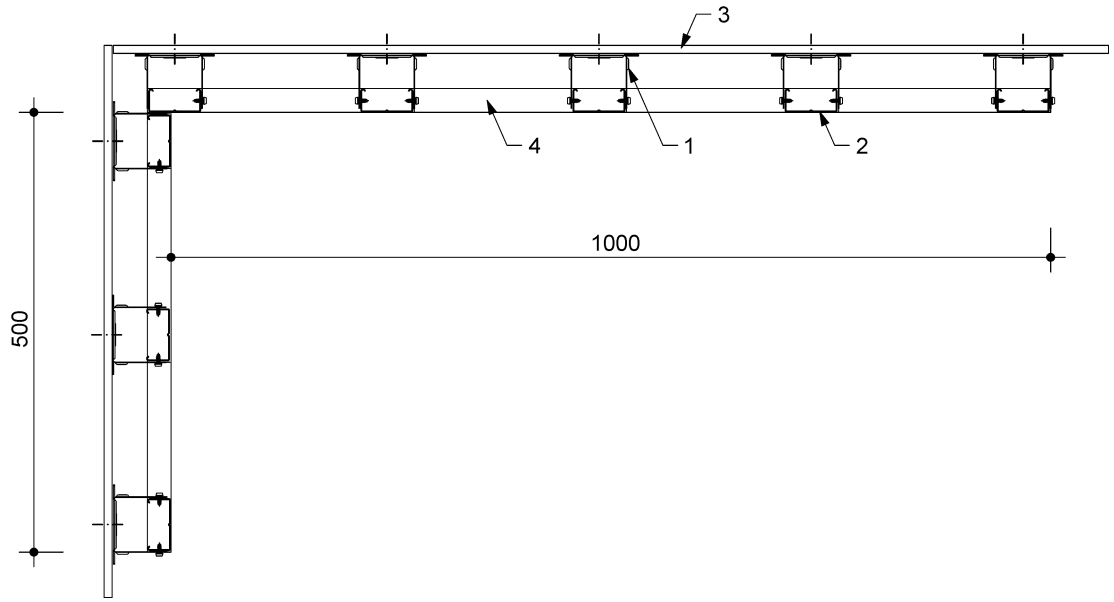
1 direct hanger
2 C channel
3 calcium silicate baseboard
4 U profile



c) Mechanical fixings for free standing sub-structure

Key

1 U profile
2 C profile
3 calcium silicate baseboard



d) Mechanical fixing of sub-structure including suspension

Key

1 direct hanger

2 C channel

3 calcium silicate baseboard

4 U profile

Figure F.1 — Mounting and fixing of a metal sub-structure

Annex ZA
(informative)

Clauses of this European Standard addressing provisions of the EU Construction Products Regulation

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under a Mandate M/106 “Gypsum products” as amended and given to CEN by the European Commission and the European Free Trade Association.

If this European standard is cited in the Official Journal of the European Union (OJEU), the clauses of this standard, shown in this annex, are considered to meet the provisions of the relevant mandate, under the Regulation (EU) No. 305/2011.

This annex deals with the CE marking of the metal framing components for gypsum board systems intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

This annex has the same scope as in Clause 1 of this standard related to the aspects covered by the mandate and is defined by Table ZA.1.

Table ZA.1 — Relevant clauses for metal framing components for gypsum board systems and intended use

Product:	Metal framing components for gypsum board systems		
Intended use(s):	In building construction works in conjunction with gypsum boards		
Essential characteristics	**Clauses in this and other European standard(s) related to essential characteristics**	**Regulatory classes**	**Notes**
Reaction to fire	4.1	A1 to F	Declared class
Flexural tensile strength	4.2	-	Expressed as yield strength in N/mm^2
Loadbearing capacity of the suspension components	4.6.2	-	Declared class
Dangerous substances	4.3	-	

The declaration of the product performance related to certain essential characteristics is not required in those Member States (MS) where there are no regulatory requirements on these essential characteristics for the intended use of the product.

In this case, manufacturers placing their products on the market of these MS are not obliged to determine nor declare the performance of their products with regard to these essential characteristics and the option “No performance determined” (NPD) in the information accompanying the CE marking and in the declaration of performance (see ZA.3) may be used for those essential characteristics.

ZA.2 Procedure for AVCP of metal framing components for gypsum board systems

ZA.2.1 Systems of AVCP

The AVCP systems of metal framing components for gypsum board systems indicated in Table ZA.1, established by EC Decisions 95/467/EC (OJ L 268, 10.11.1995, p.29) amended by 20001/596/EC of 8 January 2001 (L209 page 33, 2.8.2001) and 2002/592/EC of 15 July 2002(L192, page 57, 20.7.2002) is shown in Table ZA.2 for the indicated intended uses and relevant levels or classes of performance.

Table ZA.2 — Systems of AVCP

Products	Intended uses	Levels or classes of performance	AVCP systems
Boards and ceiling elements with thin laminations, fibrous gypsum boards, fibrous gypsum plaster casts and composite panels (laminates)in which the incorporated material is placed on a face susceptible to be exposed to fire, including relevant ancillary products	In walls, partitions or ceilings (or lining thereof) subject to reaction to fire requirements	A1[a], A2[a], B[a],C[a]	1
		A1[b], A2[b], B[b], C[b], D, E	3
		(A1 to E)[c], F	4
Boards, blocks, ceiling elements and plasters, fibrous gypsum plaster casts, including relevant ancillary products	In walls, partitions or ceilings, as relevant, for situations and uses not mentioned above	–	4
System 1: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.2 System 3: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.4 System 4: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.5 *[10]*			
[a] Products/materials for which a clearly identifiable stage in the production process results in any improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material) [b] Products/materials not covered by footnote [a] [c] Products Products/materials that do not require to be tested for reaction to fire (e.g. Products/materials of Classes A1 according to Commission Decision 96/603/EC).			

NOTE Table ZA.2 lists the relevant systems of AVCP as defined in the Commission Decisions. The metal framing components for gypsum board systems as defined in Table ZA.1 belong to the products defined in Table ZA.2. Experience has shown that the majority of the metal framing components for gypsum board systems are subject to system 3 for reaction to fire.

The AVCP of the metal framing components for gypsum board systems in Table ZA.1 shall be according to the AVCP procedures indicated in Table ZA.3.1, Table ZA.3.2 and Table ZA.3.3 resulting from application of the clauses of this or other European Standard indicated therein. The content of tasks of the notified body shall be limited to those essential characteristics as provided for, if any, in Annex III of the relevant mandate and to those that the manufacturer intends to declare.

Table ZA.3.1 — Assignment of AVCP tasks for metal framing components for gypsum board systems under system 1 (for reaction to fire classes A1[a], A2[a], B[a], C[a])

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	6.3
	Further testing of samples taken at factory according to the prescribed test plan	Essential characteristics of Table ZA.1 relevant for the intended use which are declared	6.2.3, 6.3
Tasks for the notified product certification body	determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product	Reaction to fire	6.2.2
	Initial inspection of manufacturing plant and of FPC	Reaction to fire. Documentation of the FPC.	6.3
	Continuous surveillance, assessment and evaluation of FPC	Reaction to fire. Documentation of FPC	6.3

Table ZA.3.2 —Assignment of AVCP tasks for metal framing components for gypsum board systems under system 3 (for reaction to fire classes A1[b], A2[b], B[b], C[b], D, E

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	6.3
	Determination of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product	Essential characteristics of Table ZA.1 relevant for the intended use which are declared except 'reaction to fire'	6.2
Tasks for a notified testing laboratory	Determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product	Reaction to fire	6.2

Table ZA.3.3 — Assignment of AVCP tasks for metal framing components for gypsum board systems under system 4 (for reaction to fire classes (A1 to E)[C], F)

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use	6.3
	Determination of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product	Essential characteristics of Table ZA.1 relevant for the intended use which are declared	6.2

ZA.2.2 Declaration of performance (DoP)

ZA.2.2.1 General

The manufacturer draws up the DoP and affixes the CE marking on the basis of the different AVCP systems set out in Annex V of the Regulation (EU) No 305/2011:

In case of products under system 1

— the factory production control and further testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and

— the certificate of constancy of performance issued by the notified product certification body on the basis of determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product; initial inspection of the manufacturing plant and of factory production control and continuous surveillance, assessment and evaluation of factory production control.

In case of products under system 3

— the factory production control carried out by the manufacturer; and

— the determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product, carried out by the notified testing laboratory.

In case of products under system 4

— the factory production control carried out by the manufacturer

— the determination by the manufacturer of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product.

ZA.2.2.2 Content

The model of the DoP is provided in Annex III of the Regulation (EU) No 305/2011.

According to this Regulation, the DoP shall contain, in particular, the following information:

— the reference of the product-type for which the declaration of performance has been drawn up;

— the AVCP system or systems of the construction product, as set out in Annex V of the CPR;

— the reference number and date of issue of the harmonized standard which has been used for the assessment of each essential characteristic;

— where applicable, the reference number of the Specific Technical Documentation used and the requirements with which the manufacturer claims the product complies.

The DoP shall in addition contain:

a) the intended use or uses for the construction product, in accordance with the applicable harmonized technical specification;

b) the list of essential characteristics, as determined in the harmonized technical specification for the declared intended use or uses;

c) the performance of at least one of the essential characteristics of the construction product, relevant for the declared intended use or uses;

d) where applicable, the performance of the construction product, by levels or classes, or in a description, if necessary based on a calculation in relation to its essential characteristics determined in accordance with the Commission determination regarding those essential characteristics for which the manufacturer shall declare the performance of the product when it is placed on the market or the Commission determination regarding threshold levels for the performance in relation to the essential characteristics to be declared;

e) the performance of those essential characteristics of the construction product which are related to the intended use or uses, taking into consideration the provisions in relation to the intended use or uses where the manufacturer intends the product to be made available on the market;

f) for the listed essential characteristics for which no performance is declared, the letters “NPD” (No Performance Determined);

Regarding the supply of the DoP, article 7 of the Regulation (EU) No 305/2011 applies.

The information referred to in Article 31 or, as the case may be, in Article 33 of Regulation (EC) No 1907/2006, (REACH) shall be provided together with the DoP.

ZA.2.2.3 Example of DoP

The following gives an example of a filled-in DoP for metal framing components for gypsum board systems

DECLARATION OF PERFORMANCE

No. 001DoP2014-07-14

1. Unique identification code of the product-type:

C/40/48/40

2 Type, batch or serial number or any other element allowing identification of the construction product as required under Article 11(4):

C/40/48/40 – brand name

3. Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:

in building construction works in conjunction with gypsum boards.

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required under Article 11(5):

AnyCo SA,

PO Box 21

B-1050 Brussels, Belgium

Tel. +32987654321

Fax: +32123456789

Email: anyco.sa@provider.be

5. Where applicable, name and contact address of the authorized representative whose mandate covers the tasks specified in Article 12(2):

not relevant

6. System or systems of assessment and verification of constancy of performance of the construction product as set out in CPR, Annex V:

System 3

7. In case of the declaration of performance concerning a construction product covered by a harmonized standard:

Notified testing laboratory No. 5678 performed the determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product under system 3 and issued the test/calculation reports.

8. Declared performance

Essential characteristics	Performance	Harmonized technical specification
Reaction to fire - R2F	**A1**	EN 14195:2014 EN 14195
Yield strength – σ	**140 N/mm^2**	
Dangerous substances - DS	**NPD**	

10. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 8. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4. Signed for and on behalf of the manufacturer by:

……

(name and function)

……..…… ……..……

(place and date of issue) (signature)

ZA.3 CE marking and labelling

The CE marking symbol shall be in accordance with the general principles set out in Article 30 of Regulation (EC) No 765/2008 and shall be affixed visibly, legibly and indelibly:

— to a label attached to it.

Where this is not possible or not warranted on account of the nature of the product, it shall be affixed:

— to the packaging

or

— to the accompanying documents.

The CE marking shall be followed by:

— the last two digits of the year in which it was first affixed;

— the name and the registered address of the manufacturer, or the identifying mark allowing identification of the name and address of the manufacturer easily and without any ambiguity;

— the unique identification code of the product-type;

— the reference number of the declaration of performance;

— the level or class of the performance declared;

— the dated reference to the harmonized technical specification applied;

— the identification number of the notified body, *[only for products under systems 1 and 3]*;

— the intended use as laid down in the harmonized technical specification applied.

The CE marking shall be affixed before the construction product is placed on the market. It may be followed by a pictogram or any other mark notably indicating a special risk or use.

Figure ZA.1 gives an example of the information related to products subject to AVCP under the system 3 to be given on the accompanying label, or on the packaging or on the accompanying commercial documents.

CE 5678	*CE marking, consisting of the "CE"-symbol* *Identification number of the notified test laboratory*
AnyCo Ltd, PO Box 21, B-1050 Brussels, Belgium **14** 001DoP2014–07–14	*name and the registered address of the manufacturer, or identifying mark* *Last two digits of the year in which the marking was first affixed* *Reference number of the DoP*
EN 14195:2014 C/40/48/40 In building construction works in conjunction with gypsum boards **Reaction to fire – R2F:** A1 **Yield strength - σ:** 140 N/mm^2 **Dangerous substances - DS:** NPD	*No. of European standard applied, as referenced in OJEU* *Unique identification code of the product-type* *Intended use of the product as laid down in the European standard applied* *Level or class of the performance declared*

Figure ZA.1 — Example CE marking information of products under AVCP system 3 on the label, or on the packaging or on the accompanying commercial documents

Figure ZA.2 gives an example of the information related to products subject to AVCP under the system 4 to be given on the accompanying label, or on the packaging or on the accompanying commercial documents.

CE	*CE marking, consisting of the "CE"-symbol*
AnyCo Ltd, PO Box 21, B-1050 Brussels, Belgium **14** 001DoP2014/07/14	*name and the registered address of the manufacturer, or identifying mark* *Last two digits of the year in which the marking was first affixed* *Reference number of the DoP*
EN 14195:2014 Hanger (H) In building construction works in conjunction with gypsum boards **Reaction to fire – R2F:** A1 **Loadbearing capacity – L:** L 250 a **Dangerous substances – DS:** NPD	*No. of European standard applied, as referenced in OJEU* *Unique identification code of the product-type* *Intended use of the product as laid down in the European standard applied* *Level or class of the performance declared*

Figure ZA.2 — Example CE marking information of products under AVCP system 4 on the label, or on the packaging or on the accompanying commercial documents

Figure ZA.3 gives an example of the information related to products subject to AVCP under the system 3 to be given on the product.

CE _5678_AnyCo_13_001DoP2014–07–14_EN 14195:2014_C/40/48/40_BC_A1_140_NPD
*CE marking, consisting of the "CE"-symbol_ Identification number of the notified test laboratory (5678)_Name and the registered address of the manufacturer, or identifying mark (AnyCo)_Last two digits of the year in which the marking was first affixed (13)_Reference number of the DoP.(001-DoP-2013/07/14)_No. of European standard applied, as referenced in OJEU (*EN 14195:2014*)_Unique identification code of the product type (C/40/48/409)_Intended use of the product as laid down in the European standard applied (in building construction works in conjunction with gypsum boards)_Reaction to fire (A1)_Yield strength (140 N/mm^2)_ Dangerous substances (NPD)*

Figure ZA.3 — Example CE marking information of products under AVCP system 3 on the product

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