

EPAQ European Quality Assurance Association for Panels and Profiles

The European Association for Panels and Profiles

**Revision 1 of EN 14509
Changes and news**

**Klaus Berner
25. Oct. 2013**

EN 14509 valid version

EPAQ European Quality Assurance Association for Panels and Profiles

EUROPEAN STANDARD	EN 14509
NORME EUROPÉENNE	
EUROPÄISCHE NORM	November 2006
ICS 91.100.60	
English Version	
Self-supporting double skin metal faced insulating panels - Factory made products - Specifications	
Panneaux sandwichs autoportants, isolants, double peau à parements métalliques - Produits manufacturés - Spécifications	Selbsttragende Sandwich-Elemente mit beidseitigen Metaldeckschichten - Werkmäßig hergestellte Produkte - Spezifikationen

EN 14509:2006: valid version
Date of applicability of the standard as harmonised
European Standard: 2009.01.01

Slide 2

Revision 1 of EN 14509: Basic principles SUPPORT QUALITY ENHANCING COMPETITION BY PROMOTING INNOVATION

- For European Standards it is generally required to make a revision after five years validation. Therefore a revision 1 is conducted for EN 14509 on the base of the following resolution of 2011.10.05:
- „Resolution No. 16, CEN/TC 128 SC 11 Plenary Meeting: Acceptance of Draft First Revision of EN 14509 for UAP“.



Slide 3

Revision 1 of EN 14509: Time schedule SUPPORT QUALITY ENHANCING COMPETITION BY PROMOTING INNOVATION

- Editing of the revision until 2013.06.17 (finished)
- Voting of the national members until 2013.07.20.
The voting was positive with 15:1 votes
- Up to 2013.08.20 text available of the complete revision.
Final version for translation
- Translation finished in Sept. 2013
- Final version of revision 1 in Oct. 2013
- Announcement in the official journal of the EU in Nov./Dec. 2013 (planned)
- Introduction until 2014.02.02 (planned)
- Request for the period of coexistence: 12 months



Slide 4

Revision 1 of EN 14509: Final version

EUROPEAN STANDARD **EN 14509**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2013

ICS 91.100.60 Supersedes EN 14509:2006

English Version

**Self-supporting double skin metal faced insulating panels -
Factory made products - Specifications**

Panneaux sandwichs autoportants, isolants, double peau
à parements métalliques - Produits manufacturés -
Spécifications Selbsttragende Sandwich-Elemente mit beidseitigen
Metalldeckschichten - Werkmäßig hergestellte Produkte -
Spezifikationen

This European Standard was approved by CEN on 16 July 2013.

Slide 5

Example of one page of Rev.1 version

EN 14509:2013 (E)

Steel load spreading plates are required below the load points and over the supports. When testing samples with profiled faces and the loads are used the load shall be applied through timber or steel transverse loading beams together with timber loading pistons (see Figure A.12).

The width L_s of the load spreading plates shall not be less than 60 mm. This width may be increased as necessary in order to avoid local crushing of the core. The clear distance between the load plates and the support plates shall not be less than 1.2 d_c . The thickness of the load spreading plates shall be between 8 mm and 12 mm.

The support conditions shall be such as to apply no restraint to the rotation of the panel about the lines of support.

A.4.3 Test specimens

Sampling and conditioning of the test specimens shall comply with 6.2.2 and 6.2.3.

The span L shall be chosen so that a shear failure is obtained.

For panels with discontinuous core material, tests shall be carried out on the full cover width of the panel with joints in the core material in the worst arrangement that may arise in practice but not at a distance from the support less than half the panel thickness.

The span should be chosen to be close to but less than the largest span that gives rise to a reliable shear failure recognised by the failure mode shown in Figure A.5. The recommended span for general use is 1 000 mm but for deep panels ($d_c > 100$ mm) a larger span may be more appropriate. If the recommended chosen span does not result in a shear failure similar to that illustrated in Figure A.5, the span should be reduced in increments of 100 mm until a shear failure is obtained. Subsequent tests should then be carried out at the reduced span.

NOTE Joints in the core material near the support are more critical than joints near mid span.

At the discretion of the manufacturer, visible compressive deflection of the core material at the supports may be taken into account in the calculation of the shear modulus. If this is the case, visible deflections w_1 and w_2 over the supports shall be measured during the tests. The deflection w at mid span shall then be modified by subtracting

$$\left(\frac{w_1 + w_2}{2} \right)$$

from the measured deflection w

where


w_1 and w_2 are the measured deflections of the top face of the specimen over the left and right hand supports respectively.

In EN 14509:2006, the deduction for visible compression at the supports was mandatory. However, subsequent detailed finite element analyses have suggested that making this deduction may not always result in the most accurate value of the shear modulus. For this reason, pending further research, ~~making this deduction~~ is now to be regarded as optional. There is no 'safe' procedure because introducing a low value of the shear modulus into the design calculations will generally result in more critical deflections together with less critical stresses in the faces, and vice versa. The manufacturer's decision should reflect which of these is considered to be the most critical factor in the design.

The net metal thickness, excluding all protective coatings, of both faces of each test specimen (t_n , t_b) shall be measured and recorded. The joint arrangement used in the tests shall be described in the test report.

Slide 6

Annex F of Rev. 1 version



EN 14509:2013 (E)

Annex F
(informative)


Significant technical changes between this European Standard and the previous edition

Annex F provides details of significant technical changes between this European Standard and the previous edition.


NOTE The technical changes referred to include the significant technical changes from the EN revised but is not an exhaustive list of all modifications from the previous edition.

Table F.1 – Technical changes in this European Standard

Section	Clause/Table/Figure	Type of change	Note
Annex A	A.1.3	Modified	Reference to incompletely bonded panels included
	A.1.4: A.2.4	Modified	Test procedure modified
	A.3.1: A.3.2	Modified	Clarification of procedures. Revised Figure A.4
	A.3.3	Modified	Clarification – thicker panels
	A.3.3 Figure A.5	New	Figure corrected
	A.3.4	Modified	Test procedure modified
	A.3.5.1: A.3.5.2	Modified	Clarification of definitions
	A.3.5.3 Figure A.6 and	New	Clause covering incompletely bonded panels
	A.3.6.1	Modified	Calculation procedure modified
	A.4.1: A.4.2: A.4.3: A.4.4	Modified	Major revision covering apparatus, specimens and procedure
	A.4.5	New	Calculation procedures revised to cover different types of facings and loading methods
	A.5.1: A.5.2: A.5.3	Modified	Clarification of loading, support and procedures
	A.5.4	Modified	Test procedure modified
	A.5.5.3: A.5.5.4	Modified	Major revisions
	A.5.6	Deleted	
A.6.2: A.6.3	Modified	Clarification	
A.6.4	Modified	Revised test procedure	

 Slide 7

Example of one page Rev. 1, Visible changes



EN 14509:2012 (E)

Steel load spreading plates are required below the load points and over the supports **When testing samples with profiled faces and line loads are used the load shall be applied through timber or steel transverse loading beams together with timber loading plates (see Figure A.3).**

The width l_1 of the load spreading plates shall not be less than 60 mm. **The width may be increased as necessary in order to avoid local crushing of the core. The clear distance between the load plates and the support plates shall not be less than 1.2 l_0 . The thickness of the load spreading plates shall be between 8 mm and 12 mm.**

The support conditions shall be such as to apply no restraint to the rotation of the panel about the lines of support.

A.4.3 Test specimens

Sampling and conditioning of the test specimens shall comply with 6.2.2 and 6.2.3.

The span l shall be chosen so that a shear failure is obtained.

For panels with discontinuous core material, tests shall be carried out on the full cover width of the panel with joints in the core material in the worst arrangement that may arise in practice, but not at a distance from the support less than half the panel thickness.

NOTE 1 The span should be chosen to be close to but less than the largest span that gives rise to a visible shear failure recognized by the failure mode shown in Figure A.5. The recommended span for concrete is 1 100 mm (but for deep panels up to 200 mm) a larger span may be more appropriate. If the recommended criterion does not result in a shear failure similar to that illustrated in Figure A.5, the span should be reduced in increments of 100 mm until a shear failure is obtained. Subsequent tests should then be carried out at the reduced span.

NOTE 2 Joints in the core material near the support are more critical than joints near mid span.

All the deflections of the main structure, visible compressive deflection of the core material at the supports, may be taken into account in the calculation of the shear modulus. If this is the case, visible deflections w_1 and w_2 over the supports shall be measured during the tests. The deflection w at mid span shall then be modified by subtracting

$$\frac{w_1 + w_2}{2}$$

from the measured deflection w .

where w_1 and w_2 are the measured deflections of the top face of the specimen over the left and right hand supports respectively.

NOTE 3 In EN 14509 (2006) the deduction for visible compression at the supports was mandatory. However, independent evidence from element analysis has suggested that making this deduction may not always result in the most accurate value for the shear modulus. For the reason, pending further research, making the deduction is now to be regarded as optional. There is no 'safe' procedure because introducing a low value of the shear modulus into the design calculations will generally result in more critical deflections together with more critical stresses in the design, and vice versa. The manufacturer's decision should reflect which of these is considered to be the most critical factor in the design.


The net metal thickness, excluding all protective coatings, of both faces of each test specimen ($t_{n,1}$) shall be measured and recorded. The joint arrangement used in the tests shall be described in the test report.

A.4.4 Procedure

The test shall be carried out by subjecting a simply supported panel of full cover width to either two equally spaced line loads, or to an uniformly distributed load.

NOTE 1 A uniformly distributed load may be applied using air pressure caused by either a partial vacuum chamber test apparatus or air beam (A.5).

NOTE 2 Other load positions may be used and the capacities calculated accordingly.

 Slide 8

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Seite 1

Ae General Changes					
Pt	Topic	Chapter	Changes in Rev 1	Kind of changes	Comments
1	List of changes in Rev.1 compared to the previous edition.	Foreword	Annex F provides details of significant technical changes between this European Standard and the previous edition.	new	In this appendix practical all changes are listed, however only with very short remarks (keywords) regarding the single changes
2	Use of Data obtained from earlier tests	Foreword	Data obtained from earlier tests in accordance to EN 14509:2006 may be used without the need for further testing to the revised procedures (6.2.2) providing the declared data does not change significantly.	new	important remark Comments s.6.2.2
3	Evaluation of conformity, testing, assessment and sampling methods General	6.1	The principle of grouping products into families may be used ...	new	Procedure is suitable to obtain more uniform characteristic values and material safety factors as the parameters within a range of similar products are varied, or to reduce testing costs. More information s. para 6.4
4	...				

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List of tables for important changes


The changes are **selected** in the following tables to **relevant issues**:

- Table Nr. Ae: General Changes
- Table Nr. Be: Mechanics
- Table Nr. Ce: Fire
- Table Nr. De: Insulating
- Table Nr. Ee: steel faces
- Table Nr. Fe: Durability
- Table Nr. Ge: Tightness
- Table Nr. He: Tolerances
- Table Nr. Ie: FPC-Control

all together ca 30 pages

See Internet Address:
www.is-eng.de/downloads.html


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Rev.1 EN 14509 : General Changes 

- Use of Data obtained from earlier tests, chapt.6.2.2
- Table Ae, Pt. 2 and 4

In general, it is not required to repeat ITT tests previously performed in accordance with the provisions of EN 14509:2006. There are two exceptions as follows:

- a) **Reaction to fire test** EN ISO 11925-2. In cases where the **edge was protected** in the original test and is unprotected in the new test (See C.1.2) the product shall be **retested**.
- b) Where the **thermal transmittance was calculated** using the tabulated values in **A.10**, the thermal transmittance shall be **recalculated**.

 Slide 11


Rev.1 EN 14509 : General Changes 


- Shortening testing programme, chapt. 6.2.5.
- Table Ae, Pt. 6, 7, 8

If there is only a **change of the core material or the adhesive** for a panel family, a shortened test programme (not the whole range of ITT) – see Table 6 may be used to compare the values of shear strength and modulus; tensile strength and modulus; compression strength and modulus of the core; and creep against the values from the original ITT.

Provided that all of these characteristic **material values for the new core material are better than or equal** to the values declared as a result of the original ITT test, the **existing declared value** for the mechanical properties of the panel may be retained without further ITT.

If there is only a change in the grade of the facing material a shortened test programme to compare the bending moment capacity values shall be used (see Table 6).


 Slide 12


Rev.1 EN 14509 : General Changes 

- Shortening testing programme , chapt. 6.2.5.3
- Table Ae, Pt. 6, 7, 8

Where there is a change of the core material or the adhesive for a panel family, there is **no shortened test programme** for the remaining characteristics listed in Table 5 – **density, thermal transmittance, durability, fire, permeability and sound**. New ITT tests shall be carried out where applicable.

In the case of the **fire characteristics** any requirement for a **retest** shall be in accordance with the direct application rules, **C.1.3** – reaction to fire and **C.2.4** – fire resistance.

 Slide 13


Rev.1 EN 14509 : General Changes 

- Characteristic values from families of tests, chapt. 6.1
- Table Ae, Pt. 3

The principle of grouping products into families may be used in order to obtain

more uniform characteristic values and material safety factors as the parameters within a range of similar products are varied,

or to **reduce testing costs**.

 Slide 14

Rev.1 EN 14509 : General Changes



- Characteristic values from families of tests, chapt. 6.4
- Table Ae, Pt 9

The evaluation of families of test results shall follow the **principles** given in **EN 1990:2002, Annex D**. The procedure that follows is a simplified version of the more general procedure given in EN 1990, which is deemed to be adequate for the purposes of this European Standard.

The characteristic resistances of the members of the family shall be determined on the basis of a suitable **design expression 'x_{des}'** that relates the test results to all of the relevant parameters. This design expression may either be based on the appropriate formulae of structural mechanics or determined on an empirical basis.

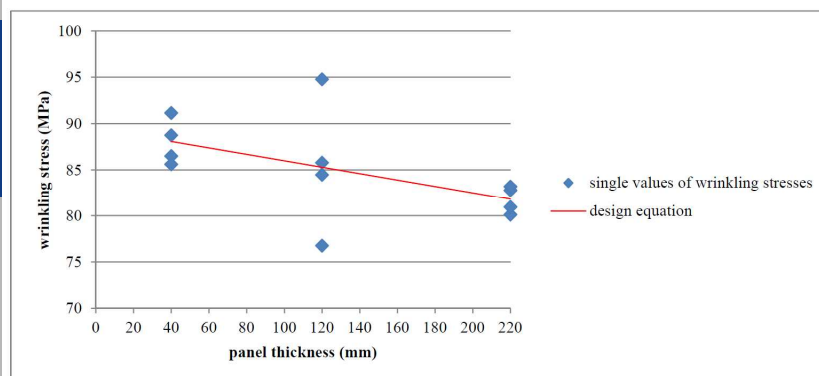


Slide 15

Rev.1 EN 14509 : General Changes



- Single values of the wrinkling stresses and the used design equation.



Slide 16

Rev.1 EN 14509 : General Changes



➤ Example of an evaluation separately for the panel thicknesses and as a family

1	2	3	4	5	6	7	8	9
Panel thickness	x_i test results	5%-fractile value x_p separate evaluation	belonging materialsafety-factor γ_{MULS}	x_{des}	x_u	$y_u = \ln(x_u)$	$(\ln(x_u) - \bar{y})^2$	5%-fractile value x_p evaluation as a family
(mm)	(MPa)	(MPa)	(/)	(MPa)	(/)	(/)	(/)	(MPa)
40	86,51	81,62	1,11	88,00	0,983068	-0,017077	0,000256141	78,21
	88,74				1,008409	0,008374	8,92331E-05	
	85,61				0,972841	-0,027535	0,000700254	
	91,14				1,035682	0,035060	0,001305548	
120	94,78	67,59	1,26	85,45	1,109221	0,103658	0,010968473	75,95
	76,75				0,898140	-0,107429	0,011311829	
	85,79				1,003979	0,003971	2,5436E-05	
	84,48				0,988660	-0,011405	0,000106756	
220	82,79	77,89	1,09	81,75	1,012691	0,012611	0,000187232	72,66
	83,18				1,017461	0,017311	0,000337932	
	80,11				0,979909	-0,020296	0,000369535	
	80,93				0,989939	-0,010112	8,1711E-05	
Mean value:					1	-0,001072		

$n = 12$
 $n - 1 = 11 \Rightarrow k = 2,06$
 $\sigma_{20} = 0,0567 \Rightarrow \gamma_{MULS} = 1,19$



Slide 17

Rev.1 EN 14509 : General Changes



➤ Classification and designation, chapt. 7, Table 10, Footnote c
➤ Table Ae, Pt. 10

A sandwich panel shall be classified and designated in accordance with Table 10!

New:


Either the wrinkling strength **or** bending resistance shall be declared.

Thermal transmittance **and** thermal conductivity:
W/m²·K and W/m·k

Air permeability : **C** and **n** values




Slide 18


Rev.1 EN 14509 : General Changes  SUPPORT QUALITY
SUPPORTING INNOVATION
SUPPORTING PROGRESS

- Marking, labelling and packaging, chapt. 8.1, 1.paragraph
- Table Ae, Pt. 11

The following information shall be supplied by the manufacturer with or attached to every pack, or bundle of sandwich panels or supplied with the **commercial documentation**:


New:
remark f) **including grade of metal**, and coatings where applicable;

 Slide 19

Rev.1 EN 14509 : General Changes  SUPPORT QUALITY
SUPPORTING INNOVATION
SUPPORTING PROGRESS

- Interpolation and extrapolation of test results, chapt. A.16.4
- Table Ae, Pt.12

In the case of panels of the same type the minimum requirement is that the greatest and least thickness shall be tested together with a panel from the middle of the range. If only three thicknesses are tested, **the values for products of intermediate thickness and of greater thickness up to 20 % but not more than 30 mm higher may be interpolated or extrapolated linearly.**

 Slide 20

Rev.1 EN 14509 : General Changes

- Serviceability limit state, chapt. E.5.4
- Table Ae, Pt. 14

The serviceability limit state shall be characterized.... :

- The attainment of specified amounts of **axial movement in the panel due to thermal expansion and contraction in the faces.**
- ... This effect is likely to be a potential problem only in **special cases with long panels e.g. 20 m** with aluminium facings, particularly at end laps.

Slide 21

Rev.1 EN 14509 : General Changes

- Thermal expansion and contraction, chapt. E.7.2.8
- Table Ae, Pt. 16

A safe approximation to the net thermal movement over the length L of a long panel may be determined.....

New formulas:

$$\text{Elongation of face 1} = L \alpha_1 T_1 + \rho \frac{M_s L}{e A_{F1} E_{F1}}$$

$$\text{Elongation of face 2} = L \alpha_2 T_2 - \rho \frac{M_s L}{e A_{F2} E_{F2}}$$

Sandwich component of bending moment, $M_s = e \left(\frac{E_{F1} A_{F1} E_{F2} A_{F2}}{E_{F1} A_{F1} + E_{F2} A_{F2}} \right) (T_2 \alpha_2 - T_1 \alpha_1)$

Slide 22

Rev.1 EN 14509 : General Changes

- Static system, geometry and thickness, design thickness, chapt. E.7.3
- Table A, Pt. 17

The design thickness of a steel facing sheet shall be taken as $t_d = t_{nom} - t_{zinc} - 0,5 t_{tol}$, where

t_{nom} is the nominal thickness of the steel sheet,

t_{zinc} the total thickness of the zinc layers (or similar protective coating) and

t_{tol} the normal or special tolerance according to EN 10143.

If the special tolerance according to EN 10143 is fixed, the design thickness shall be taken as $t_d = t_{nom} - t_{zinc}$ (without any reduction).

Slide 23

Rev.1 EN 14509 : General Changes

- Static system, geometry and thickness, design thickness, chapt. E.7.3
- Table A, Pt. 17

Example:

Panel: PU-core, D = 100 mm, $t_{nom1} = 0,60$ mm, $t_{nom2} = 0,40$ mm
special tolerance according to EN 10143

acc. EN 14509:2006:

Design thickness: $t_d = t_{nom} - t_{zinc} - 0,5 t_{tol}$

Outer face: $t_{d1} = 0,60 - 0,040 - 0,5 \cdot 0,040 = 0,540$ mm

inner face: $t_{d2} = 0,40 - 0,040 - 0,5 \cdot 0,035 = 0,343$ mm

acc. EN 14509 (Rev1):

Design thickness: $t_d = t_{nom} - t_{zinc}$

Outer face: $t_{d1} = 0,60 - 0,040 = 0,560$ mm


inner face: $t_{d2} = 0,40 - 0,040 = 0,360$ mm

Allowable span: 2-span, Color Group III, wind +0,36 kN/m² / -0,60 kN/m²

acc. EN 14509:2006 (valid Standard): zul. L = 6,19 m

acc. EN 14509 (Rev1): zul. L = 6,34 m

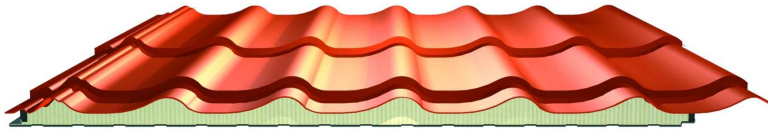
Slide 24

Rev.1 EN 14509 : General Changes 


- Panels with special profiles, chapt. E.8, E.8.1
- Table Ae, Pt 18


Panels with special profiles:
A typical example of a special profile is an outer metal face which is formed in 3-dimensions to simulate a tiled profile.

Sandwich panel with outer tile shaped face



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 Slide 25

Rev.1 EN 14509 : General Changes 


- Information accompanying CE Marking symbol —Roof, chapt. ZA.3.4
- Table Ae, Pt 19

Changed:

description of the product: generic name, grade and thickness of facing materials, metallic coating mass and coating type and thickness, core material and thickness, mass, density and intended use;

resistance to point loads – roofs – where required. The maximum achieved load and tested span shall be declared;

resistance to access loads. (for occasional foot traffic without additional protection) – roofs – where required.
Pass required before affixing CE Marking

 Slide 26

Rev.1 EN 14509 : General Changes


- Example of CE Marking (roofs): accompanying information, Figure ZA.2
- Table Ae, Pt. 20

Mass: 12 kg/m².

For **non-standard steels** properties of yield stress, ultimate strength and elongation are to be declared from tests.

Reaction to fire: B-s2,d0 (**with steel flashing details**)

Air permeability: **n = 0.9: C = 0.001**


 Slide 27


Rev.1 EN 14509 : Mechanical issues

- Shear strength (f_{Cv}) and shear modulus (G_c), 5.2.1.2 whole chapter
- Table Be, Pt.1

The declared values of the shear strength and shear modulus of the core shall be determined using the appropriate test procedures from **A.3 or A.4**.

In principle, each test method is suitable for panels with flat, lightly profiled or profiled facings.

 Slide 28


Rev.1 EN 14509 : Mechanical issues 


- Bending moment capacity (M_u) and wrinkling stress (σ_w), chapt, 5.2.1.7 whole chapter
- Table Be, Pt. 2

Wrinkling stress is related to bending moment by a simple mathematical relationship **so that it is not necessary to declare both the bending resistance and the wrinkling strength.**

If it is intended that design shall be carried out on the basis of calculations in accordance with Annex E, it is **preferable to declare the wrinkling strength** wherever possible.

The **bending resistance** shall be **declared together with the span** of the test specimen.

 Slide 29


Rev.1 EN 14509 : Mechanical issues 

- Test speed, chapt. A1.4, A2.4, A3.4, A5
- Table Be, Pt. 3

Test for Cross panel tensile and Compressive strength:
The deflection rate shall have a minimum value of 1 % of d_c per minute and shall not exceed 3 % of d_c per minute.

Shear test:
The loading rate shall be uniform and such as to result in failure between 1 min and 5 min after the commencement of the test.

bending moment capacity:
The loading rate shall be such as to result in failure between 5 min and 15 min after the commencement of the test.

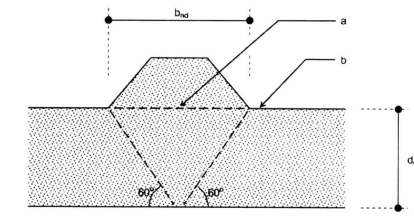
 Slide 30

Rev.1 EN 14509 : Mechanical issues



- Shear strength of Incompletely bonded panels, chapt. A.3.5.3
- Table Be, Pt.4

If the core is not completely bonded with the faces the declared values shall be calculated using the following procedures based on the dimensions illustrated in Figure A.6.



- Key**
- a unbonded area (b_{nd} = unbonded width)
 - b bonded area
 - d_c continuous depth of core

Figure A.6 Incompletely bonded panel



Slide 31

Rev.1 EN 14509 : Mechanical issues



- Shear strength of Incompletely bonded panels, chapt., A.3.5.3
- Table Be, Pt.4

Where $b_{nd} \leq 2 \cdot d_c \cdot 0,58$ the unbonded area has only a small influence on the recorded values.

The declared value of the shear strength f_{Cv} shall be determined using normal Formulas.


Where $b_{nd} > 2 \cdot d_c \cdot 0,58$ the declared values shall be reduced in accordance with Formulae (A.8) and (A.9).

$$f_{Cv,red} = f_{Cv} \left(1 - \frac{b_{nd} - 1.16 d_c}{p} \right) \quad (A.8)$$

$$G_{C,red} = G_C \left(1 - \frac{b_{nd} - 1.16 d_c}{p} \right) \quad (A.9)$$



Slide 32

Rev.1 EN 14509 : Mechanical issues 

- Test to determine the shear properties of a complete panel, chapt. A.4
- Table Be, Pt 6 to 8




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 Slide 33

Rev.1 EN 14509 : Mechanical issues 

- Test to determine the shear properties of a complete panel, chapt. A.4
- Table Be, Pt 6 to 8

The chapter A.4 is completely revised with precisely described test procedure and complete description of all formulas which are needed for elements with profiled faces the evaluation is only iterative possible. The expressions to determine the shear properties of panels with profiled faces (see A.4.5.3 and A.4.5.5) become relatively complicated and require the use of design charts or computer software.


 Slide 34


Rev.1 EN 14509 : Mechanical issues  SUPPORT QUALITY
Engineering description
of Panels and Profiles

- Test to determine the shear properties of a complete panel, chapt. A.4
- Table Be, Pt 6 to 8

Advantage of the procedure:
No short beam specimens must be cut.


Disadvantage:
Test arrangements must be available for complete (short) panels with full width.
The evaluation of tests for elements with profiled faces is rather complicated.

 Slide 35

Rev.1 EN 14509 : Mechanical issues  SUPPORT QUALITY
Engineering description
of Panels and Profiles

- wrinkling stress (σ_w) of a flat or lightly profiled face, chapt. A.5.5.3
- Table Be, Pt. 10

For panels of nominally identical inner and outer faces, the wrinkling stress for design purposes shall be based on the least favourable wrinkling stress.


 Slide 36

Rev.1 EN 14509 : Mechanical issues

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- Determination of the creep coefficient (ϕ_t), chapt. A.6
- Table Be, Pt. 11 and 12

New:
Detailed comments regarding the test procedure.
Very useful for the laboratories
Some new statements, e.g.:
Where the range of thickness is up to 200 mm the thickest panel shall be tested. If the thickest panel exceeds 200 mm, it is sufficient to test a panel of 200 mm thickness.


 Slide 37

Rev.1 EN 14509 : Fire behavior

EPAQ SUPPORT QUALITY
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- Fire performance tests – additional instructions and direct field of Application, chapt. C
- Table Ce, Pt. 1-13


The used standards and decisions of the Commission are **updated**. But **no new essential change** (except one) for testing and assessment of the fire behavior are resultant.
In summary it can be said that regarding the fire behavior the standard is updated and a lot of details for the test procedures for reaction to fire and fire resistance are more exact and understandable.

 Slide 38

Rev.1 EN 14509 : Fire behavior

- Fire performance tests – additional instructions and direct field of Application, chapt. C.1.2
- Table Ce, Pt. 6

An essential change is introduced in the new **chapter C.1.2** regarding the testing of reaction to fire:
It is now for the tests according to EN ISO 11025-2 strictly required that **the flame shall be applied directly to the insulating core of the sandwich panel without any facing, flashing or covering and shall be carried out on the middle of the thickness of the insulating core (specimen turned 90°)**. With this it is ensured that for elements which are placed in the fire class E or better also **the insulating core itself fulfill at least the class E**.


 Slide 39


Rev.1 EN 14509 : Thermal transmittance

- Thermal Transmittance, chapt. 5.2.2, A.10
- Table D, Pt. 1-3

The thermal transmittance value for the panel (U), incorporating the declared thermal conductivity for the core material (λ Declared) and the joints and any profiled facings, shall be determined in accordance with A.10.
Both λ Declared and the $U_{d,s}$ -value shall be declared.

**For thermal transmittance a lot of changes are stated.
Special comments are given in a separate EPAQ document.**

 Slide 40


Rev.1 EN 14509 : Durability testing 


- Durability testing, chapt B2 – B6
- Table Fe, Pt. 1

For the test procedure and evaluation of tests there are stated several small changes e.g:

Cutting and storage of the test specimens.
or
DUR1 Temperature test:Set 3: Condition for 84 days (instead of 24 weeks) at T °C followed by tensile test;

If new tests are provided, the changes should be taken in account.


 Slide 41

Rev.1 EN 14509 : Durability testing 

- Thermal shock test, chpt. B.7
- Table Fe, Pt. 2

Comprehensive **new information** about test arrangement, test specimens, optional measurements and assessment of the results.

Important new chapter, special if new tests are planned.

 Slide 42

Rev.1 EN 14509 : Air permeability



- Air permeability, Procedure, Calculations and results, chapt. 5.2.7 and A.12
- Table Ge, Pt 1 and 2

The air permeability (air loss) shall be determined in accordance with EN 12114.

The air permeability test should begin with a pressure difference Δp max of at least 200 Pa between the inside and outside of the test assembly.

The values n and C shall be declared

on the basis of the test results (according to EN 12114, app. B, Formula (B.8). The air loss V can be calculated using $C = \exp(\alpha)$ and $V = C \cdot \Delta p^n$

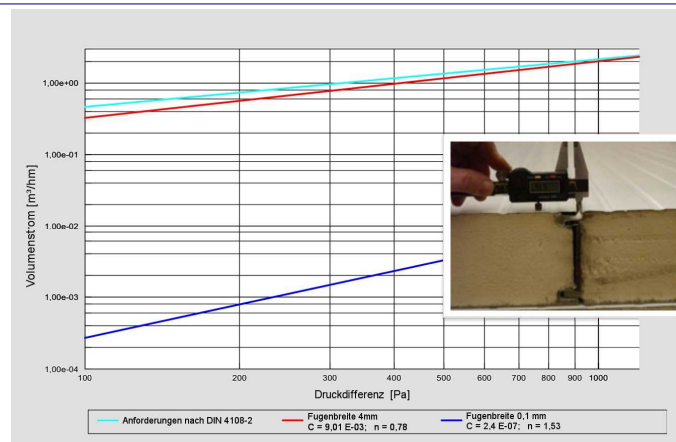


Slide 43


Rev.1 EN 14509 : Air permeability



- Air permeability, Procedure, Calculations and results, chapt. 5.2.7 and A.12
- Example





Slide 44

Rev.1 EN 14509 : Sound 

- Airborne sound and Sound Absorption, test specimens, chapt. A.13, A.14
- Table Ge, Pt. 3 and 4


The specimen shall be mounted in accordance with EN ISO 140-3, Clause 5.2.1, Partitions and EN ISO 354:2003, Annex B Type A.

 Slide 45

Rev.1 EN 14509 : Tolerances 

- Dimensional tolerances, chapt. 5.2.5 and D
- Table H, Pt. 1 and 2

There are some smaller changes, e.g.
Deviation of straightness:
Tolerance: 2,0 mm for each metre length but not greater than 20 mm
(instead of 10 mm)

 Slide 46

Rev.1 EN 14509 : Factory Production Control SUPPORT QUALITY SUPPORTS DESCRIPTION OF PRODUCTS AND PROCESSES

- Factory Production Control (FPC), General, chapt. 6.3.1
- Table Ie, Pt.1

Where this European Standard **permits alternative test procedures** to be used, all **FPC tests** shall be carried out using the test procedure that was used for the **corresponding ITT tests**.
Where CE marking is based on the use of **existing ITT test data** in accordance with 6.2.2., it is permissible to **use the same test speed for FPC tests** that was used for the original ITT tests.



Slide 47

Rev.1 EN 14509 : Factory Production Control SUPPORT QUALITY SUPPORTS DESCRIPTION OF PRODUCTS AND PROCESSES

- Factory Production Control (FPC), Results of FPC tests, chapt. 6.3.2
- Table Ie, Pt.2

Where values shall be reduced, any related characteristics that are not subject to FPC shall be adjusted



Slide 48

Rev.1 EN 14509 : Factory Production Control  SUPPORT QUALITY
SUPPORTS DESCRIPTION
OF PRODUCTS AND PROCESSES

- Factory Production Control (FPC), Results of FPC tests, chapt. 6.3.2
- Example

If a shear modulus of 5,0 MPa must be reduced to 4,0 MPa the relevant wrinkling stresses shall be also reduced, e.g. with the factor

$$\sqrt[3]{\frac{G_{\text{reduced}}}{G_{\text{existing}}}} = \sqrt[3]{\frac{4,0}{5,0}} = 0,928$$

in dependence on EN 14509, A.5.5.3 [2]



Slide 49

Rev.1 EN 14509 : Factory Production Control  SUPPORT QUALITY
SUPPORTS DESCRIPTION
OF PRODUCTS AND PROCESSES

- FPC controls for fire characteristics
- Minimum testing frequencies for components for reaction to fire characteristics,
- Chapt. 6.3.5.3
- Table 1e, Pt.4

Core material:

Check of raw material or chemical formulation and density (A.8)
1 per shift/ 6 or 8h (instead of 1 per day)



Slide 50

Thank you for your attention!

Keep in mind for the tables with changes:
www.is-eng.de/downloads.html

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Slide 51