

Revision 1 of EN 14509

Changes and News

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Table Be: Mechanics

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Pt.	Topic	Chapter	Changes in Rev 1	Kind of changes	Comments
1	Shear strength (f_{cV}) and shear modulus (G_c)	5.2.1.2 whole chapter	<p>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 accordance with Table 2. The same test procedure shall be used to determine both the shear strength and shear modulus of a panel. In principle, each test method is suitable for panels with flat, lightly profiled or profiled facings. The declared value of the shear strength shall be less than or equal to the characteristic value and shall be declared by the manufacturer in megapascals (MPa).</p> <p>Only the mean value of the shear modulus obtained from the available test results shall be declared. The 5 %-fractile value shall be recorded for FPC purposes in accordance with A.3 or A.4.</p>	changed	<p>Particularly test and evaluation of the test are new defined in chapter A.4. More information see comments to chapter A.4.</p>

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2	Bending moment capacity (M_U) and wrinkling stress (σ_w)	5.2.1.7 whole chapter	<p>The bending moment capacity shall be obtained by testing according to A.5.</p> <p>For panels with flat, lightly profiled or profiled faces, the wrinkling stress shall be calculated in accordance with A.5.5 and the wrinkling strength shall be declared by the manufacturer in megapascals (MPa).</p> <p>The declared wrinkling stress should generally be determined on the basis of the results of bending tests. However, A.5.5.3 also allows a conservative value of the wrinkling stress to be calculated according to Formula (A.20) and declared.</p> <p>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.</p> <p>For a panel with a profiled face in compression, the bending resistance shall be declared together with the span of the test specimen. Optionally the wrinkling stress can be declared.</p> <p>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.</p> <p>NOTE Declaration of the bending moment is essential for design on the basis of testing.</p>	new	Important statement regarding the declaration of the bending moment (M_u) und and the wrinkling stress (σ_w).

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3	Test speed	A1.4, A2.4, 1. clause A3.4 1. clause	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. 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.	changed	instead of: 10 mm \pm 10 % in previous edition. instead of: maximum deflection equivalent to 10 % of thickness \pm 25 %, per minute Different test speed can lead to different results.
4	Shear strength of Incompletely bonded panels	A.3.5.3	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. 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 Formula (A.5) and the shear modulus G_C using Formula (A.7). 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).	new	This paragraph is especially important for mineralwool elements, which are normally not bonded in the trapezoidal shaped area.
5	long term loading	A.3.6.1	Where required for design purposes for roof and ceiling applications, and if no tests are available, the long term shear strength at 2 000 h and 100 000 h shall be calculated as: - 40 % of the short term value, if the φ_t is less or equal than 2,4 at 2 000 h - 30 % of the short term value, if the φ_t is higher than 2,4 at 2 000 h	changed	Values for long term shear strength are slightly changed: Instead of 50 % of the short term value, if the φ_t is less or equal than 2,4 at 2 000 h

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6	Test to determine the shear properties of a complete panel	A.4 A.4.1 Principle	NOTE 2 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 to find numerical solutions. Additional information on the formulae for sandwich panels of all types is given in 'Light-weight sandwich construction' [3].	new	Advantage of the procedure: No short beam specimens have to be cut. Disadvantage of the procedure: Test arrangements must be available for complete (short) panels with full width The evaluation of tests for elements with profiled faces is rather complicated and requires an iteration.
7	Test to determine the shear properties of a complete panel	A.4.2, A.4.3, A.4.4	Test specimens, test arrangement , procedure	changed/new	Precisely described test procedure
8	Test to determine the shear properties of a complete panel	A.4.5	Calculations and results	changed/new	Complete description of all formulas which are needed. For elements with profiled faces the evaluation is possible only iteratively.
9	Test to determine the bending moment capacity of a simply supported panel	A.5.4 4. app.	The panel shall be loaded steadily in at least 10 increments until failure occurs. The loading rate shall be such as to result in failure between 5 min and 15 min after the commencement of the test. Both the load and the central deflection shall be recorded. Displacement transducers shall have an accuracy of 0,1 mm.	changed	Instead of: The deflection speed shall not exceed 1/50 span per minute at any time in the previous edition This old requirement made no sense.
10	Determination of the wrinkling stress (σ_w) of a flat or lightly profiled face or the local buckling stress of a profiled face	A.5.5.3	For panels of nominally identical inner and outer faces, the wrinkling stress for design purposes shall be based on the least favourable wrinkling stress. Note 1: This requirement recognises that it may not be possible to identify which face was uppermost during manufacture once the product has left the factory.	changed	Only a clarification and better explanations

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11	Determination of the creep coefficient (φ) <i>Test specimen</i>	A.6 A.6.3	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. However, it is permissible to test greater thicknesses	new	This new statement is very senseful as panel thicknesses are becoming higher.
12	Determination of the creep coefficient (φ)	A.6.4	Whole chapter: Procedure of testing	new	Detailed comments regarding the test procedure are added. They are very useful for the laboratories.