



Zentrum für Konstruktionswerkstoffe
Staatliche Materialprüfungsanstalt Darmstadt
Fachgebiet und Institut für Werkstoffkunde
Prof. Dr.-Ing. Matthias Oechsner



TECHNISCHE
UNIVERSITÄT
DARMSTADT

National Test Certificate

P – S 15 1702

Client: Hilti Aktiengesellschaft
Feldkircherstraße 100
9494 Schaan
Fürstentum Liechtenstein

Object: Drilling screws
Hilti S-AD 01 LHS 4,8 x17 (A2) and
Hilti S-AD 01 LHSS 4,8 x17 (A4)

Range of use: Helical compounds for ventilated exterior wall cladding according to DIN 18516-1:2010-06, Building Regulations List A Part 2, consecutive no. 2.17 (edition 2015/2)

Provisions clause: German is the official language of MPA Darmstadt statements. In case of doubt or dispute due to textual, grammatical, semantical, hermeneutical or linguistic provisions to this English national test certificate – in particular in the course of legal procedures – MPA Darmstadt reserves the right of explanation in the German language.

Date of issue: 07.13.2016

Validity until: 07.12.2021

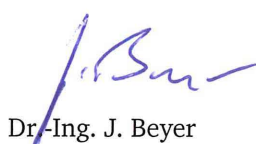
Number of pages: This national test certificate comprises 6 pages (incl. appendix)

Based on this test certificate the named object can be used in the specified range in accordance to the building regulations of the relevant federal state

Staatliche Materialprüfungsanstalt Darmstadt
(State Materials Testing Institute)
Bauteilfestigkeit / Werkstoff- und Bauteilprüfung
Grafenstraße 2, 64283 Darmstadt, Germany

Darmstadt, 07.13.2016

Deputy Head of the test body according to LBO


Dr.-Ing. J. Beyer



Official in charge


Dipl.-Ing. (FH) F. Persichella

Anerkennungen:
PÜZ-Stelle nach LBO: HES02
Notified Body 1343

Die in diesem Prüfzeugnis mitgeteilten Ergebnisse und Ausführungen beziehen sich ausschließlich auf den angegebenen Gegenstand. Die auszugswise Wiedergabe dieses Berichtes oder seine Verwendung für Werbezwecke bedarf der schriftlichen Genehmigung durch die Staatliche Materialprüfungsanstalt Darmstadt.

A General provisions

- (1) The National Test Certificate does not replace prescribed statutory authorizations, agreements or certificates for the execution of construction projects.
- (2) The National Test Certificate is issued without prejudice to the rights of third parties, in particular to private patent rights.
- (3) Manufacturers and distributors of the construction product, notwithstanding more extensive regulations in the “Special Provisions” are obliged to provide the user of the construction products with copies of the National Test Certificate and to point out that the National Test Certificate must be on hand at the site of usage. Copies of the National Test Certificate shall be made available on demand to the relevant authorities.
- (4) The National Test Certificate may be reproduced only in its entirety. Publication of excerpts requires the consent of the *Staatliche Materialprüfungsanstalt Darmstadt* (State Materials Testing Institute Darmstadt). Texts and drawings of advertising material may not contradict the National Test Certificate. Translations of the National Test Certificate must include the notice “translation of the German original version is unaudited by the *Staatliche Materialprüfungsanstalt Darmstadt*”.
- (5) The National Test Certificate may be revoked after issue. Its provisions may be supplemented and amended, in particular when this is required by new funding.

B Special provisions

1 Object and range of use

1.1 Object

Object of the National Test Certificate are drilling screws Hilti S-AD 01 LHS 4,8x17 and Hilti S-AD 01 LHSS 4,8x17 manufactured and marketed by the company Hilti AG.

1.2 Range of use

The above-mentioned object is meant for use exclusively in transverse-force loaded fasteners of aluminium composite panels (plate thickness 4 mm) on aluminium profiles with a minimum thickness of 2 mm for ventilated exterior wall cladding according to DIN 18516-1:2010-06, Building Regulations List A Part 2, consecutive no. 2.17 (edition 2015/2).

2 Requirements for the construction product

2.1 Properties and composition

Dimensions, materials and specifications for corrosion protection are provided in Appendix 1 and in Test Report S 15 1702.1 of the *Staatliche Materialprüfungsanstalt Darmstadt* (State Materials Testing Institute Darmstadt).

2.2 Provisions for design and dimensioning

2.2.1 Preliminary remark

The component on which the screw head abuts is designated as Component I (composite aluminium panel), the thread-side component as Component II.



2.2.2 Load-bearing capacity

For the design, the verification concept provided in DIN 18516:2010-06 applies, wherein for restricted usage applications, forces in the direction of pull (parallel to the longitudinal screw axis) shall be excluded by design, and only the transverse force-bearing capacity (load direction orthogonal to longitudinal axis of screw) must be verified. The design values of the transverse force-bearing capacity $F_{Q,Rd}$ result from the characteristic values of the transverse force-bearing capacity $F_{Q,Rk}$ with a partial safety factor γ_M of 2,0.

For the certification of load-bearing capacity, the design value of the transverse forces $F_{Q,Ed}$ may not exceed the design value of the transverse force-bearing capacity $F_{Q,Rd}$.

$F_{Q,R}$ characteristic value of the transverse force-bearing capacity in accordance with Appendix 1

$F_{Q,Rd}$ Design value of the transverse force-bearing capacity

$F_{Q,Ed}$ Design value of the impacting transverse forces

The definition of the characteristic values of the load-bearing capacity specified in **Appendix 1** bases on experimental results which are shown in Test Report S 15 1702.1 of the *Staatliche Materialprüfungsanstalt Darmstadt* (State Material Testing Institute).

The defined characteristic values of the load-bearing capacity apply to Components II from the aluminium alloys listed in DIN 18516-1:2010-06 in accordance with DIN EN 755-2:2013-12 or DIN EN 485-2:2013-12 with a minimum tensile strength R_m of 245 MPa and a minimum thickness of 2,0_{-0,15} mm and a maximum thickness of 3,0^{+0,2} mm.

For Component I, standardized aluminium composite panels in accordance with DIN 18516-1:2010-06 with a thickness of 4 mm may be used.

The minimum tensile strength R_m of the aluminium cover sheets is 130 MPa, the minimum thickness 0,5_{-0,04} mm. The surfaces of the aluminium composite panels may be bare, anodized or coated.

The sum of the sheet thicknesses $t_I + t_{II}$ may not exceed the clamping length of the screw.

The aluminium composite panels (Component I) may be pre-drilled at a diameter of 4,0 mm.

The permissible minimum edge distances of the fasteners are 15 mm, both for Component I and for Component II. The minimum distance between two fasteners is 30 mm.

2.2.3 Thermally-induced restraint stress

The use of the fasteners for connections which are not unrestrained is only permissible with a confirmation of the thermally-induced restraint stress (transverse stress); compare DIN 18516-1:2010-06, Section 5.2.2.

2.3 Provisions for the implementation

Connections in accordance with Section 1 may only be realized by companies which have the necessary experience for this, unless a briefing of the assembly staff is provided for by experts from companies which have the requisite experience in this field.

In scheduled transverse loading, the components to be connected must lie directly upon one another, and the shear plane must be located at the contact point of component I to Component II so that the fastener is not subjected to additional bending.



The fasteners are to be placed orthogonally to the component surface. The cylindrical threaded portions of the fasteners are to be fully screwed in, and the head of the screw must bear upon Component I. The data on drilling performance and clamping thickness as well as the type of screw anchor in the appendices must be observed. The use of impact drivers is not permitted.

3 Compliance certificate

3.1 General

Confirmation of the conformity of construction products with the provisions of this National Test Certificate must be performed for each production facility with a declaration of conformance from the manufacturer based on an factory production control conducted in accordance with the following provisions.

3.2 Factory production control

In each production facility an factory production control system shall be initiated and conducted in accordance with the tenets of the *Deutsches Institut für Bautechnik* (DiBt) for the „Übereinstimmungsnachweis für Verbindungselemente im Metallbau“ / verification of conformity for fasteners in metal construction (see DiBt-Mitteilungen, Heft 6/1999). Factory production control is defined as the establishment of continuous monitoring of production by the manufacturer, with which the latter ensures that the construction products manufactured by him comply with the provisions of this National Test Certificate.

Factory production control shall include the monitoring of the following

- The shape and dimensions of the fasteners,
- Their mechanical characteristics, and
- The source materials used

The results of the factory production control shall be recorded and assessed. The records must include the following information as a minimum:

- Identification of the construction products, of the source materials and the components
- Type of monitoring or testing
- Production date and date of monitoring / testing of the construction products, and of source materials or components
- Results of monitoring and testing, and comparison with the requirements
- Signature of the person responsible for the factory production control

The records shall be maintained for at least five years. Upon request, they shall be submitted to the *Deutsches Institut für Bautechnik* (German institute for building technology) (DiBt), the responsible supreme building authority and the issuing inspection point.

For test results that do not meet the requirements of the relevant technical specifications, the manufacturer must immediately take the necessary measures to remedy the defect. After the defect has been removed, the relevant test must be repeated to prove the elimination of the defect. Non-compliant products shall be separated and marked accordingly. The measures adopted shall be documented.



4 Compliance mark

The construction product shall be labelled with the compliance mark (compliance mark, Ü-mark) by the manufacturer in accordance with the Compliance Mark Regulation (ÜZVO) of the federal states.

The compliance mark shall be affixed in accordance with *Landesbauordnung* (building regulations of the relevant federal state) with the prescribed information regarding the construction product, in a leaflet, or on its packaging, or, if this should cause difficulty, on the delivery receipt or attachments to the delivery receipt.

The labelling with the compliance mark under consideration of the number of this National Test Certificate may be done only if the conditions set out in Section 3 are fulfilled.

5 Legal basis

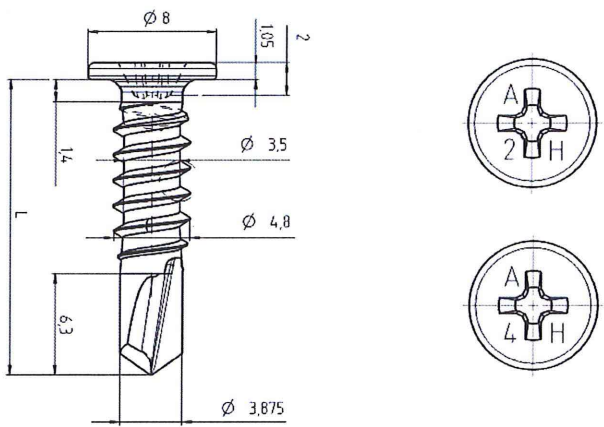

This National Test Certificate is issued in accordance with §18 and §21 of the *Hessische Bauordnung* (HBO) (Building Code of the State of Hessen), issue dated 03.12.2010, in conjunction with Construction Code List A, Part 2, Nr.2.17, Edition 2015/2.

In accordance with §19, Art. 2, in conjunction with §18, Art. 7, of the *Musterbauordnung* (Model Building Code) (MBO) and the corresponding provisions of the respective state building codes of the other federal states, a National Test Certificate which has been issued in one state is valid in all federal states of the Federal Republic of Germany.

6 Instruction on right to appeal

An appeal against this decision is permissible. The appeal must be filed within one month after the receipt of this decision, either in writing or directly at the *Staatliche Materialprüfungsanstalt Darmstadt*, (State Material Testing Institute) Grafenstraße 2, 64283 Darmstadt. The date of receipt of the appeal at the *Staatliche Materialprüfungsanstalt Darmstadt* (State Materials Testing Institute) shall determine its timeliness.



Fastener: Drilling screw Hilti S-AD 01 LHS 4,8x17 Drilling screw Hilti S-AD 01 LHSS 4,8x17		Component I: Composite aluminium panel Panel thickness 4 mm		Component II: Aluminium support profile Tensile strength $R_m \geq 245$ MPa		
Material: Rust-resistant steel in accordance with DIN EN 10088 Material no. 1.4567 (Hilti S-AD 01 LHS 4,8x17) Material no. 1.4578 (Hilti S-AD 01 LHSS 4,8 x17)						
Type of screw anchor: Pre-defined adjoining screw anchor ¹⁾						
Max drilling performance: 4 mm ²⁾						
Characteristic values of the transverse force-bearing capacity $F_{Q,RK}$ in kN						
Component I Composite aluminium panels		Component II				
		2,0 mm	2,5 mm	3,0 mm		
4,0 mm		2,07	2,07	2,07		
Further definitions: <ul style="list-style-type: none"> • Pre-defined anchors loaded via longitudinal tensile forces are not permissible. • The cover sheets of the aluminium composite panels (Component I) feature a thickness of 0,5 mm and a minimum tensile strength of 130 MPa. • Edge distance of the fastener element: $\geq 15,0$ mm (for Component I and Component II) • Distance of the fastener elements between one another: min. 30,0 mm <p>¹⁾ During placement, the screw must not overwind (strip). The head of the screw must abut on Component I. Component I and Component II must lie flat upon one another. The proper adjustment is carried out via the depth stop or the slip clutch of the drills.</p> <p>²⁾ The sum of the thickness of the lower cover sheet of the aluminium composite panels and the thickness of Component II may not exceed the maximum drilling performance of the screw.</p>						

