



Marine &amp; Offshore

Certificate number: 45116/A2 BV

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Product code: 0226H

*This certificate is not valid when presented without the full attached schedule composed of 7 sections*

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## TYPE APPROVAL CERTIFICATE

*This certificate is issued to*

**Hilti Aktiengesellschaft**  
SCHAAN - LIECHTENSTEIN

*for the type of product*

**MECHANICAL FASTENING SYSTEM**  
HILTI S-BT MECHANICAL FASTENING SYSTEM

### Requirements:

BUREAU VERITAS Rules for the Classification of Steel Ships  
BUREAU VERITAS Rules for the Classification of Offshore Units  
BUREAU VERITAS Rules for the Classification of Naval Ships  
BUREAU VERITAS Rules for the Classification of Yachts

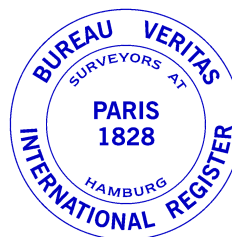
*This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.*

**This certificate will expire on: 20 Apr 2021**

**For Bureau Veritas Marine & Offshore,**

At BV HAMBURG, on 24 Sep 2018,

Adama Diene



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site [www.veristar.com](http://www.veristar.com). Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 5 page(s)

## THE SCHEDULE OF APPROVAL

### 1. PRODUCT DESCRIPTION :

The Hilti S-BT fasteners are threaded studs manufactured from hardened carbon steel 1038 and austenitic-ferritic (Duplex) stainless steel 1.4462. The S-BT threaded studs are fasteners with male threads (metric M8 and M10 or inch W10) for attachment on one end and a threaded tip on the other end for embedment into the structural steel or aluminium. Carbon steel studs are supplied with an aluminium sealing washer Ø 10 mm, stainless steel studs are supplied with a stainless steel sealing washer Ø 12 mm, both with an chloroprene rubber sealing ring. Fastenings are made by screwing in the S-BT stud in a predrilled pilot hole (without penetration of the base material) or a drill through hole. The Hilti S-BT mechanical fastening system comprises the Hilti drilling tool, Hilti step drill bit, setting tool, depth gauge, screw-in stainless steel and carbon steel threaded studs S-BT and accessories.

Identification of components:

<b>Component name</b>	<b>Designation</b>
S-BT-MR M10/15 SN 6	Stainless steel threaded stud M10 with sealing washer
S-BT-MR M10/15 SN 6 AL	Stainless steel threaded stud M10 with sealing washer
S-BT-MR W10/15 SN 6	Stainless steel threaded stud W10 with sealing washer
S-BT-MR W10/15 SN 6 AL	Stainless steel threaded stud W10 with sealing washer
S-BT-MF M10/15 AN 6	Carbon steel threaded stud M10 with sealing washer
S-BT-MF W10/15 AN 6	Carbon steel threaded stud W10 with sealing washer
S-BT-MR M10/15 SN 5	Stainless steel threaded stud M10 with sealing washer
S-BT-MR W10/15 SN 5	Stainless steel threaded stud W10 with sealing washer
S-BT-MR M8/15 SN 6	Stainless steel threaded stud M8 with sealing washer
S-BT-MR M8/15 SN 6 AL	Stainless steel threaded stud M8 with sealing washer
S-BT-MR M8/7 SN 6	Stainless steel threaded stud M8 with sealing washer
S-BT-MR M8/7 SN 6 AL	Stainless steel threaded stud M8 with sealing washer
S-BT-GR M8/7 SN 6	Stainless steel threaded stud M8 with sealing washer
S-BT-GR M8/7 SN 6 AL	Stainless steel threaded stud M8 with sealing washer
S-BT-MF M8/15 AN 6	Carbon steel threaded stud M8 with sealing washer
S-BT-MF M8/7 AN 6	Carbon steel threaded stud M8 with sealing washer
S-BT-GF M8/7 AN 6	Carbon steel threaded stud M8 with sealing washer
S-BT-MR M8/15 SN 5	Stainless steel threaded stud M8 with sealing washer
S-BT-MR M8/7 SN 5	Stainless steel threaded stud M8 with sealing washer
S-BT-GR M8/7 SN 5	Stainless steel threaded stud M8 with sealing washer
S-BT-ER M10/15 SN 6	Stainless steel threaded stud M10 with sealing washer for electrical connections
S-BT-ER W10/15 SN 6	Stainless steel threaded stud W10 with sealing washer for electrical connections
S-BT-EF M10/15 AN 6	Carbon steel threaded stud M10 with sealing washer for electrical connections
S-BT-EF W10/15 AN 6	Carbon steel threaded stud W10 with sealing washer for electrical connections
S-BT-ER M8/15 SN 6	Stainless steel threaded stud M8 with sealing washer for electrical connections
S-BT-EF M8/15 AN 6	Carbon steel threaded stud M8 with sealing washer for electrical connections
S-BT-ER M10 HC 35	Stainless steel threaded stud M10 with sealing washer and grounding equipment kit for electrical connections
S-BT-ER W10 HC AWG2	Stainless steel threaded stud W10 with sealing washer and grounding equipment kit for electrical connections
S-BT-ER M10 HC 120	Stainless steel threaded stud M10 with sealing washer and grounding equipment kit for electrical connections
S-BT-ER W10 HC AWG4/0	Stainless steel threaded stud W10 with sealing washer and grounding equipment kit for electrical connections
S-BT-EF M10 HC 35	Carbon steel threaded stud M10 with sealing washer and grounding equipment kit for electrical connections
S-BT-EF W10 HC AWG2	Carbon steel threaded stud W10 with sealing washer and grounding equipment kit for electrical connections
S-BT-EF M10 HC 120	Carbon steel threaded stud M10 with sealing washer and grounding equipment kit for electrical connections
S-BT-EF W10 HC AWG4/0	Carbon steel threaded stud W10 with sealing washer and grounding equipment kit for electrical connections
X-FCM	Grating fastener, carbon steel, zinc plated
X-FCM-M	Grating fastener, carbon steel, duplex coated
X-FCM-R	Grating fastener, stainless steel
X-FCS-R	Grating fastener, stainless steel

**2. DOCUMENTS AND DRAWINGS :**

Designation	Revision / Date
Hilti Direct Fastening Technology Manual – S-BT product pages	06/2018
Hilti S-BT screw-in threaded studs – Hilti S-BT Specifications	August 2018
Direct Fastening Technology Manual – S-BT-ER and S-BT-EF screw-in threaded studs for electrical connections	08/2018

**3. TEST REPORTS :**

According to the following tests:

- Test report no. 279/15 at HTL Rankweil, Bautechnische Versuchsanstalt /AUSTRIA dd. February 12th, 2016
- Report no. TM-414/14\_2 at Hilti AG / Liechtenstein dd. 01.07.2015
- Investigation report 903 0160 000/Bf at MPA University of Stuttgart / GERMANY dd. 14.09.2015
- Test report no. 5214011585/e at Empa Dübendorf / SWITZERLAND dd. April 26th, 2016
- Test report no. 5214013022/e\_corr at Empa Dübendorf / SWITZERLAND dd. June 29th, 2017
- Test report no. 5214014601/e at Empa Dübendorf / SWITZERLAND dd. April 11th, 2017
- Report no. 2017-38X at Universität Stuttgart / GERMANY dd. June 30th, 2017
- Test report no. 20170384 at MPA Dresden / GERMANY dd.2017-07-20
- Test report no. 20161614 at MPA Dresden / GERMANY dd. 2017-07-21
- Test report no. 20161614/01 at MPA Dresden / GERMANY dd. 2017-08-03
- Test report no. FRM-1648 at DEHN + SÖHNE GmbH + Co.KG, Neumarkt / GERMANY dd. 21 March 2017
- Test report no. FRM-1649 at DEHN + SÖHNE GmbH + Co.KG, Neumarkt / GERMANY dd. 21 March 2017
- Test report no. FRM-1650 at DEHN + SÖHNE GmbH + Co.KG, Neumarkt / GERMANY dd. 21 March 2017
- Test notes no. FRM-1651 at DEHN + SÖHNE GmbH + Co.KG, Neumarkt / GERMANY dd. 21 March 2017
- Test notes no. FRM-1652 at DEHN + SÖHNE GmbH + Co.KG, Neumarkt / GERMANY dd. 21 March 2017
- Test report no. FRM-1689 at DEHN + SÖHNE GmbH + Co.KG, Neumarkt / GERMANY dd. 30 June 2017
- Report no. 17-IK-0093.S02 at Electrosuisse, Fehraltorf / SWITZERLAND dd. 14/07/2017
- Report no. 16-IK-0021.S02 Annex at Electrosuisse, Fehraltorf / SWITZERLAND dd. 30/06/2017
- Report no. XSMSse-01-17 at Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN dd. September 18, 2017
- Test report no. 1795\_FRM\_02 at DEHN + SÖHNE GmbH + Co.KG, Neumarkt / GERMANY dd. 07 June 2018
- Test report no. 1798\_FRM\_00 at DEHN + SÖHNE GmbH + Co.KG, Neumarkt / GERMANY dd. 24 May 2018
- Test report no. 1834\_PAM at DEHN + SÖHNE GmbH + Co.KG, Neumarkt / GERMANY dd. 27 July 2018
- Report no. 17-IK-0021.S04: at Eurofins Electrosuisse Product Testing AG, Fehraltorf / SWITZERLAND dd. 09/08/2018
- Report no. 17-IK-0021.S04 Annex: at Eurofins Electrosuisse Product Testing AG, Fehraltorf / SWITZERLAND dd. 02/02/2018
- Report no. XSMSse-02-18 at Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN dd. August 10th, 2018
- Report no. XE-18-12 at Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN dd. 22.05.2018

**4. APPLICATION / LIMITATION :**

- 4.1 The mechanical fastening system is intended for fastening applications in shipbuilding, offshore and crane structures as far as the BUREAU VERITAS Rules are complied with:
- Metal and fiberglass grating
  - Cable, conduit and tubing connectors
  - Trays, channels and struts for cable, conduit and tubing runs
  - Instrumentation, junction boxes, lighting
  - Pipe hangers
  - Signage
  - Door frames
  - Mounting cabinets, securing furniture, utensils, etc.
  - Earthing (Grounding), bonding (e.g. for equipment, pipe flanges, storage tanks, junction boxes etc.) to coated steel and to structural steel according to EN 100025 (S235, S275, S355).
- 4.2 The thickness of the base material is  $3 \text{ mm} \leq t < 6 \text{ mm}$  (steel) and  $5 \text{ mm} \leq t < 6 \text{ mm}$  (aluminium) for pre-drilled through holes and  $t \geq 6 \text{ mm}$  (steel and aluminium) for fasteners intended to be set in pre-drilled pilot holes.
- 4.3 The thickness of the fastened material is for the S-BT M8 studs  $\leq 7 \text{ mm}$  and  $\leq 15 \text{ mm}$  respectively and for the S-BT M10 / S-BT W10  $\leq 15 \text{ mm}$ .  
The minimum thickness of the fastened material is 1.6 mm.

- 4.4 The minimum distance to the edge of a flange or cutout is not to be less than 6 mm and the minimum spacing between fasteners is not to be less than 18 mm for all S-BT M8 and 22 mm for all S-BT M10 / S-BT W10.
- 4.5 The minimum tensile strength of the steel base material is not to be less than 340 N/mm<sup>2</sup> and not to be less than 270 N/mm<sup>2</sup> for aluminium base material. The maximum tensile strength of the steel base material is not to be more than 630 N/mm<sup>2</sup>.
- 4.6 No limits with regards to the thickness of the base material.
- 4.7 The S-BT fastening system may be used in areas where drilling into the base material is permissible.
- 4.8 The maximum tightening torque of grating disc or nut fitted to the threaded fastener is not to be more than 5 Nm (steel base material thickness 3 mm ≤ t < 6 mm and aluminium) and not to be more than 8 Nm for steel base material thickness t ≥ 6 mm.
- 4.9 The S-BT fasteners are allowed to be used on structural members made from carbon steel that require fatigue verification. Fatigue verification of structural members in ship structures has to be made with the corresponding BUREAU VERITAS Rules and is subject to special consideration of BUREAU VERITAS. Fatigue verification of crane-structures are to be made in compliance with Eurocode 3 (EN 1993-1-9: Eurocode 3: Design of Steel structures – Part 1.9: Fatigue). For fatigue verification of normal stresses the detail category 100 (m=5) according to EN 1993-1-9 applies.  
Description of constructional detail:  
Hilti S-BT screw-in stainless and carbon steel threaded studs with pre-drilled hole in structural steel base material. Imperfect fastener installations as e.g. overwound or pulled-out fasteners are covered.  
The nominal stress range [N/mm<sup>2</sup>] is to be calculated by the gross cross-section fulfilling the requirements of the nominal stress approach.  
Plate thickness: t ≥ 3 mm; minimum edge distance: 15 mm; minimum spacing of fasteners: 18 mm; structural steel grades: S235 up to S355 grades according to EN 10025-2, EN 10025-3 and EN 10225.  
For fatigue verification in compliance with BUREAU VERITAS, the fatigue S-N curve “S-BT”, as described in the “Hilti S-BT screw-in threaded studs – Specification binder”, shall be used. This curve applies for base material thickness ≥ 3 mm, edge distance ≥ 15 mm. This is applicable for structural steel grades with nominal yield strength ranging from 235 MPa to 355 MPa.
- 4.10 The manufacturer’s assembly instructions and recommendations are to be complied with.

## **5. PRODUCTION SURVEY REQUIREMENTS :**

- 5.1 The mechanical fastening systems are to be supplied by the manufacturer in compliance with the type described in this certificate.
- 5.2 This type of product is within the category HBV of BUREAU VERITAS Rule Note NR320.
- 5.3 Hilti Aktiengesellschaft has to make the necessary arrangements to have its works recognised by BUREAU VERITAS in compliance with the requirements of NR320 for HBV products :  
S-BT-MR, S-BT-MF, S-BT-GR, S-BT-GF, S-BT-ER and S-BT-EF:  
**Hilti Plant 1, Schaan / LIECHTENSTEIN**  
and  
**Precistec s.r.o., Koprivnice / CZECH REPUBLIC**
- X-FCM, X-FCM-M and X-FCM-R:  
**WP-Wörgartner Produktions GmbH, Oberndorf / AUSTRIA**
- X-FCS-R:  
**Daepac Industries Sdn. Bhd., Ulu Tiram, Johor / MALAYSIA**

## **6. MARKING OF PRODUCT :**

The mechanical fastening system should be clearly identified with:

- Manufacturer’s name or logo
- Type designation

**7. OTHERS :**

- 7.1 The mechanical fastening systems will be delivered with the relevant documentation / user's guide.
- 7.2 This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the units at any time and that **Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN** will accept full responsibility for informing shipbuilders, ship owners or their subcontractors of the proper methods of use and general maintenance of the units and the conditions of this approval.
- 7.3 This certificate supersedes the Type Approval Certificate N° 45116/A1 BV issued on 13 Nov 2017 by the Society.

**\*\*\* END OF CERTIFICATE \*\*\***