



Marine & Offshore

Certificate number: 74271/A0 BV

File number: ACM 139/1905/5

Product code: 0226H

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

Hilti Corporation
SCHAAN - LIECHTENSTEIN

for the type of product

MECHANICAL FASTENING SYSTEM
HILTI S-BT HL 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: 27 Feb 2028

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 27 Feb 2023,

Heiko Lange

This certificate was created electronically and is valid without signature



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. 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 4 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

The Hilti S-BT HL fasteners are threaded studs manufactured from hardened carbon steel 1038 and austenitic-ferritic (Duplex) stainless steel 1.4462. The S-BT HL 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 or Ø 12 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 HL stud in a predrilled blind pilot hole (without penetration of the base material) or a drill through hole. The Hilti S-BT HL mechanical fastening system comprises the Hilti drilling tool, Hilti stepped drill bit, setting tool, depth gauge, screw-in stainless steel and carbon steel threaded studs S-BT HL and accessories.

Identification of components:

Component name	Designation
S-BT-MR M10/15 SN 6 HL	Stainless steel threaded stud M10 with sealing washer
S-BT-MR M10/15 SN 6 HL AL	Stainless steel threaded stud M10 with sealing washer
S-BT-MR W10/15 SN 6 HL	Stainless steel threaded stud W10 with sealing washer
S-BT-MR W10/15 SN 6 HL AL	Stainless steel threaded stud W10 with sealing washer
S-BT-MF M10/15 AN 6 HL	Carbon steel threaded stud M10 with sealing washer
S-BT-MF MT M10/15 AN 6 HL	Carbon steel threaded stud M10 with sealing washer
S-BT-MF W10/15 AN 6 HL	Carbon steel threaded stud W10 with sealing washer
S-BT-MF MT W10/15 AN 6 HL	Carbon steel threaded stud W10 with sealing washer
S-BT-MR M8/15 SN 6 HL	Stainless steel threaded stud M8 with sealing washer
S-BT-MR M8/15 SN 6 HL AL	Stainless steel threaded stud M8 with sealing washer
S-BT-MR M8/7 SN 6 HL	Stainless steel threaded stud M8 with sealing washer
S-BT-MR M8/7 SN 6 HL AL	Stainless steel threaded stud M8 with sealing washer
S-BT-GR M8/7 SN 6 HL	Stainless steel threaded stud M8 with sealing washer
S-BT-GR M8/7 SN 6 HL AL	Stainless steel threaded stud M8 with sealing washer
S-BT-MF M8/15 AN 6 HL	Carbon steel threaded stud M8 with sealing washer
S-BT-MF M8/7 AN 6 HL	Carbon steel threaded stud M8 with sealing washer
S-BT-GF M8/7 AN 6 HL	Carbon steel threaded stud M8 with sealing washer
S-BT-ER M10/15 SN 6 HL	Stainless steel threaded stud M10 with sealing washer for electrical connections
S-BT-ER W10/15 SN 6 HL	Stainless steel threaded stud W10 with sealing washer for electrical connections
S-BT-EF M10/15 AN 6 HL	Carbon steel threaded stud M10 with sealing washer for electrical connections
S-BT-EF W10/15 AN 6 HL	Carbon steel threaded stud W10 with sealing washer for electrical connections
S-BT-ER M8/15 SN 6 HL	Stainless steel threaded stud M8 with sealing washer for electrical connections
S-BT-EF M8/15 AN 6 HL	Carbon steel threaded stud M8 with sealing washer for electrical connections
S-BT-ER M10 HC 120 HL	Stainless steel threaded stud M10 with sealing washer and grounding equipment kit for electrical connections (High Current)
S-BT-ER W10 HC 4/0 HL	Stainless steel threaded stud W10 with sealing washer and grounding equipment kit for electrical connections (High Current)
S-BT-EF M10 HC 120 HL	Carbon steel threaded stud M10 with sealing washer and grounding equipment kit for electrical connections (High Current)
S-BT-EF W10 HC 4/0 HL	Carbon steel threaded stud W10 with sealing washer and grounding equipment kit for electrical connections (High Current)

2. DOCUMENTS AND DRAWINGS:

Designation	Revision / Date
Hilti Product Data Sheet – S-BT HL screw-in stainless- and carbon steel threaded studs	12/2022
Hilti Product Data Sheet – S-BT-ER (HC) HL /-EF (HC) HL screw-in threaded studs for electrical connections	12/2022
Hilti AG, Manufacturing Drawing 5651499 / 03, S-BT-xF HL (sheet 1 – 3)	25/07/2022
Hilti AG, Manufacturing Drawing 5651457 / 05, S-BT-xR HL (sheet 1 – 2)	25/07/2022
Hilti AG, Manufacturing Drawing 5651472 / 03, S-BT HL	20/01/2022

3. TEST REPORTS:

According to the following tests:

- Test report no. 084/22 at HTL Rankweil, Bautechnische Versuchsanstalt /AUSTRIA dd. October 28th, 2022
- Test report no. 5214'029'374/e at Empa Dübendorf, Swiss Federal Laboratories for Materials Testing and Research / SWITZERLAND dd. November 07th, 2022
- Test report no. 2276_FRM at DEHN SE, Neumarkt / GERMANY dd. December 16th, 2022
- Evaluation Report no. 2022-55X at Universität Stuttgart / GERMANY dd. November 10th, 2022
- European Technical Assessment (ETA-23/0001), ETA Danmark / DENMARK dd. February 16th, 2023

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, S500).
- 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 HL studs $\leq 7 \text{ mm}$ and $\leq 15 \text{ mm}$ respectively and for the S-BT M10 HL / S-BT W10 HL $\leq 15 \text{ mm}$.
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 HL and 22 mm for all S-BT M10 HL / S-BT W10 HL.
- 4.5 The minimum tensile strength of the steel base material is not to be less than 360 N/mm² and not to be less than 270 N/mm² for aluminium base material. The maximum tensile strength of the steel base material is not to be more than 760 N/mm².
- 4.6 No limits with regards to the thickness of the base material.
- 4.7 The S-BT HL 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 8 Nm (steel base material thickness $3 \text{ mm} \leq t < 5 \text{ mm}$ and aluminium) and not to be more than 16 Nm for steel base material thickness $t \geq 5 \text{ mm}$.
- 4.9 The S-BT HL 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 threaded studs S-BT-MR HL, S-BT-MF HL, S-BT-MF MT HL, S-BT-GR HL and S-BT-GF HL with pre-drilled hole in structural steel base material.
The nominal stress range [N/mm²] is to be calculated by the gross cross-section fulfilling the requirements of the nominal stress approach. Plate thickness: $t \geq 3 \text{ mm}$; 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 HL”, as described in the “Hilti S-BT HL screw-in threaded studs – Specification binder”, shall be used. This curve applies for base material thickness $\geq 3 \text{ mm}$, edge distance $\geq 15 \text{ mm}$. 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 system are to be supplied by **Hilti Corporation** 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 and as such does not require a BUREAU VERITAS product certificate.
- 5.3 **Hilti Corporation** has to make the necessary arrangements to have its works recognised by BUREAU VERITAS in compliance with the requirements of NR320 for HBV products.
- 5.4 For information, **Hilti Corporation** has declared to BUREAU VERITAS the following production sites:
S-BT-MR HL, S-BT-MF HL, S-BT-MF MT HL, S-BT-GR HL, S-BT-GF HL, S-BT-ER (HC) HL and S-BT-EF (HC) HL:
Hilti Plant 1, Schaan / LIECHTENSTEIN

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 It is **Hilti Corporation**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

*** END OF CERTIFICATE ***