

# TYPE APPROVAL CERTIFICATE

## This is to certify:

That the **Structural Connecting Elements**

with type designation(s)  
**HILTI S-BT HL FASTENING SYSTEM SCREW-IN THREADED STUDS**

Issued to  
**Hilti AG**  
**Schaan, Liechtenstein**

is found to comply with  
**IMO Resolution MSC.307(88) International code for application of fire test procedures, 2010 (2010 FTP Code)**  
**EN 1993-1-4:2006 Eurocode 3: Design of steel structures – Part 1-4: General rules – Supplementary rules for stainless steels**  
**EN 1993-1-9:2005 Eurocode 3: Design of steel structures – Part 1-9: Fatigue**  
**ISO/TR 14345:2012 Fatigue – Fatigue testing of welded components – Guidance**  
**ISO 16701:2015 Corrosion of metals and alloys – Corrosion in artificial atmosphere – Accelerated corrosion test involving exposure under controlled conditions of humidity cycling and intermittent spraying of a salt solution**  
**ISO 9227:2017 Corrosion tests in artificial atmospheres – Salt spray tests**  
**IEC 62561-1:2017 Lightning protection system components (LPSC) – Part 1: Requirements for connection components**  
**IEC 60947-7-1:2009 Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors**  
**IEC 60947-7-2:2009 Low-voltage switchgear and controlgear – Part 7-2: Ancillary equipment – Protective conductor terminal blocks for copper conductors**  
**EAD 333037-00-0602:2020 Threaded studs for connection of materials to structural steel and aluminium members**

## Application :

Refer to **APPLICATION/LIMITATION** in the certificate.

Issued at **Hamburg** on **2023-04-18**

This Certificate is valid until **2028-04-17**.

DNV local unit: **Augsburg**

for **DNV**

Approval Engineer: **Christian Kaemmer**

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**Sven Klinger**  
**Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



## PRODUCT DESCRIPTION

The S-BT HL fasteners are threaded studs manufactured from hardened carbon steel and austenitic-ferritic stainless steel 1.4462 acc. DIN-EN 10088-1 (AISI 316 SS equivalent). The S-BT HL threaded studs are fasteners with male threads (metric or inch) for attachment on one end and a threaded tip on the other end. All studs are supplied with a sealing washer. They will be screwed in a pre-drilled hole. The screw is tapping its own internal mating threads when installed into steel or aluminium material. For drilling the hole into the base material, a special stepped drill bit is needed to ensure an accurately defined hole in terms of borehole depth and diameter. The metallic sealing washer with a sealing ring made of chloroprene rubber CR offers weather resistant fastenings against moisture or condensation. The washer seals the hole to prevent moisture from dripping into the fastener threads and prevents the base material from corrosion.

### Abbreviation description:

- MR: Multipurpose, stainless steel
- MF: Multipurpose, carbon steel – duplex coated
- GR: Grating, stainless steel
- GF: Grating, carbon steel – duplex coated
- ER: Electrical connection, stainless steel
- EF: Electrical connection, carbon steel – duplex coated
- MT: Mechanical Trade

### Scope / Technical data

Designation	Item Description	Application
S-BT-GR M8/7 SN 6 HL	Stainless steel threaded stud M8 with sealing washer	Grating
S-BT-GR M8/7 SN 6 HL AL	Stainless steel threaded stud M8 with sealing washer, for base material aluminum	Grating
S-BT-MR M8/7 SN 6 HL	Stainless steel threaded stud M8 with sealing washer	Multipurpose
S-BT-MR M8/15 SN 6 HL	Stainless steel threaded stud M8 with sealing washer	Multipurpose
S-BT-MR M10/15 SN 6 HL	Stainless steel threaded stud M10 with sealing washer	Multipurpose
S-BT-MR W10/15 SN 6 HL	Stainless steel threaded stud W10 with sealing washer	Multipurpose
S-BT-MR M8/7 SN 6 HL AL	Stainless steel threaded stud M8 with sealing washer, for base material aluminium	Multipurpose
S-BT-MR M8/15 SN 6 HL AL	Stainless steel threaded stud M8 with sealing washer, for base material aluminium	Multipurpose
S-BT-MR M10/15 SN 6 HL AL	Stainless steel threaded stud M10 with sealing washer, for base material aluminum	Multipurpose
S-BT-MR W10/15 SN 6 HL AL	Stainless steel threaded stud M10 with sealing washer, for base material aluminum	Multipurpose
S-BT-GF M8/7 AN 6 HL	Carbon steel threaded stud M8 with sealing washer	Grating
S-BT-MF M8/7 AN 6 HL	Carbon steel threaded stud M8 with sealing washer	Multipurpose
S-BT-MF M8/15 AN 6 HL	Carbon steel threaded stud M8 with sealing washer	Multipurpose
S-BT-MF M10/15 AN 6 HL	Carbon steel threaded stud M10 with sealing washer	Multipurpose
S-BT-MF W10/15 AN 6 HL	Carbon steel threaded stud W10 with sealing washer	Multipurpose
S-BT-MF MT M10/15 AN 6 HL	Carbon steel threaded stud M10 with sealing washer	Multipurpose
S-BT-MF MT W10/15 AN 6 HL	Carbon steel threaded stud W10 with sealing washer	Multipurpose

<b>Designation</b>	<b>Item Description</b>	<b>Application</b>
S-BT-ER M8/15 SN 6 HL	Stainless steel threaded stud M8 with sealing washer and grounding equipment kit	Electrical Connection
S-BT-ER M10/15 SN 6 HL	Stainless steel threaded stud M10 with sealing washer and grounding equipment kit	Electrical Connection
S-BT-ER W10/15 SN 6 HL	Stainless steel threaded stud W10 with sealing washer and grounding equipment kit	Electrical Connection
S-BT-EF M8/15 AN 6 HL	Carbon steel threaded stud M8 with sealing washer and grounding equipment kit	Electrical Connection
S-BT-EF M10/15 AN 6 HL	Carbon steel threaded stud M10 with sealing washer and grounding equipment kit	Electrical Connection
S-BT-EF W10/15 AN 6 HL	Carbon steel threaded stud W10 with sealing washer and grounding equipment kit	Electrical Connection
S-BT-ER M10 HC 120 HL	Stainless steel threaded stud M10 suitable for High Current with sealing washer and grounding equipment kit including conductivity disc for higher contact surface.	Electrical Connection (High Current)
S-BT-ER W10 HC 4/0 HL	Stainless steel threaded stud W10 suitable for High Current with sealing washer and grounding equipment kit including conductivity disc for higher contact surface.	Electrical Connection (High Current)
S-BT-EF M10 HC 120 HL	Carbon steel threaded stud M10 suitable for High Current with sealing washer and grounding equipment kit including conductivity disc for higher contact surface.	Electrical Connection (High Current)
S-BT-EF W10 HC 4/0 HL	Carbon steel threaded stud W10 suitable for High Current with sealing washer and grounding equipment kit including conductivity disc for higher contact surface.	Electrical Connection (High Current)

**Material specification S-BT HL fasteners:**

**Material specification Shank:**

Upper part: Metric or inch thread with a HEX head 6.35 (1/4") for M10 / W10 and HEX 5.3 (0.21") for M8  
 Lower part: Tapping screw thread  
 Material: S-BT stainless steel: Stainless steel S31803 (1.4462) acc. EN 10088-1:2014 (AISI 316 SS equivalent), zinc-coated  
 S-BT carbon steel: Carbon steel 1038, duplex-coating ZN-alloy & top coat

**Material specification washer:**

S-BT stainless steel: Stainless steel S31635 (1.4404) sealing washer Ø 12mm (0.47") with a sealing ring.  
 S-BT carbon steel: Aluminum sealing washer Ø 10mm (0.39") or Ø 12mm (0.47") with a sealing ring.  
 Sealing ring: Chloroprene rubber CR 3.1107, black

**Material specification disc:**

Conductivity disc: Ø 32 mm (1.260")  
 from copper alloy CuSn8 (tin-coated) with  
 FKM sealing. Applicable for studs with annex HC - High Current.

## APPLICATION/LIMITATION

The HILTI S-BT HL Fastening System is type approved for fastening to base metals of carbon steel and aluminum on board ships and other structures classed by DNV as follows:

Application Examples:

- Gratings to steel and aluminum
- Cable, conduit and tubing connectors to steel and aluminum
- Trays, channels and struts to steel and aluminum for cable, conduit and tubing runs
- Instrumentation, junction boxes, lighting
- Pipe hangers
- Signage
- Door frames
- Mounting cabinets, securing furniture, utensils, etc.
- Grounding and bonding equipment (e.g. for equipment, pipe flanges, storage tanks, junction boxes etc.)

In general, the installation of the fasteners may be carried out in areas where drilling for bolting is permissible.

The base material is limited to steel grade with a maximum ultimate tensile strength  $f_u = 760$  MPa (110 ksi). The minimum ultimate tensile strength of steel is  $f_u \geq 360$  MPa (52 ksi). The minimum ultimate tensile strength of aluminum is  $f_u \geq 270$  MPa (39 ksi).

Fasteners are not being installed closer than 6 mm (0.236") from the edge of a flange or cutout and closer than 18 mm (0.709") between fasteners.

## FATIGUE DESIGN to CARBON STEEL BASE MATERIAL

The S-BT fasteners are type approved 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 in compliance with DNVGL RP-C203.

For fatigue verification, 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  $\geq 3$  mm, edge distance  $\geq 15$  mm. This is applicable for structural steel grades with nominal yield strength ranging from 235 MPa to 355 MPa. Other constructions which require fatigue verification 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 ( $m=5$ ) acc. 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.

## Requirement / Limitation

The nominal stress range  $[\text{N}/\text{mm}^2]$  is to be calculated by the gross cross-section fulfilling the requirements of the nominal stress approach.

Plate thickness:	$t \geq 3$	[mm]
Minimum edge distance:	15	[mm]

Structural steel grades: S235 up to S355 grades acc. to EN 10025-2, EN 10025-3 and EN 10225.

## COMPONENTS OF S-BT FASTENING SYSTEM

Designation	Description	Application
SBT 6-22; SBT 4-A22; SF 6-(A)22	Drilling tool	Drilling, setting, nut fastening

Designation	Description	Application
TS-BT 5.3-65 S; TS-BT 5.3-95 S	Stepped drill bit	Drilling in steel
TS-BT 5.5-74 AL	Stepped drill bit	Drilling in aluminium
TS-BT 5.3 HC	Coating removal drill bit	Removal of the coating from the base material

Designation	Description	Application
S-DG BT M8/7 Short 6	Depth gauge	Setting of S-BT HL
S-DG BT M8/15 Long 6	Depth gauge	Setting of S-BT HL, S-BT-ER HL /-EF HL
S-DG BT M10-W10/15 Long 6	Depth gauge	Setting of S-BT HL, S-BT-ER HL /-EF HL
S-DG BT M10-W10/15 HC 6	Depth gauge	Setting of S-BT ER ... HC HL / -EF ... HC HL

Designation	Description	Application
S-SH BT M8	Stud holder	for S-BT studs M8
S-SH BT M10/W10	Stud holder	for S-BT studs M10 and W10

### The S-BT HL-fasteners are not approved for:

- For attachment of structural fire protection insulation
- On bulkheads and decks with a thickness less than 6 mm (0.24"), if through penetration of the base material is not accepted. If through penetration is accepted, the base material thickness can be reduced to minimum 3 mm (load reductions according to "Hilti S-BT HL screw-in threaded studs – Product data sheet")
- On the shell plating, sea chests and collision bulkheads, tanks and pressure vessels.

The selection of the Hilti S-BT HL Fastening System for the corresponding application and the proper assembly are to be in accordance with the instructions of the manufacturer.

## TYPE APPROVAL DOCUMENTATION

### Manufacturing plant:

Hilti AG, Plant 1, Schaan, Liechtenstein


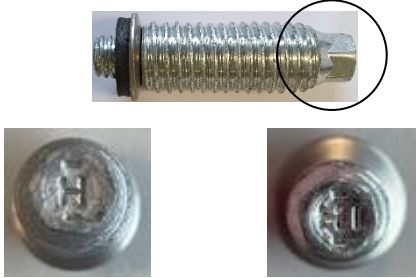
### TESTS CARRIED OUT

Documentation of tests forming the basis for this type approval are referenced in:

- DNV GL Ref.-No. 262.1-023658-2, 15-073637, 15-067232, 15-056411, 12-004312, 11-069328; 262.1-038919-1

### MARKING OF PRODUCT

For traceability, the products are to be marked as follows:

<ul style="list-style-type: none"> <li>- Manufacturers name or trademark</li> <li>- Type / Designation</li> <li>- Lot-number</li> </ul>	<p>Marking sample:</p> 
<p>Hexagon head with embossing (head mark)</p> <ul style="list-style-type: none"> <li>- Coated carbon steel S-BT-MF HL, S-BT-MF MT HL, S-BT-GF HL and S-BT-EF (HC) HL: <u>H</u></li> <li>- Stainless steel S-BT-MR HL, S-BT-GR HL and S-BT-ER (HC) HL: <u>HI</u></li> </ul>	

### PERIODICAL ASSESSMENT

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNV-CP-0338, Sec.4.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>