Certificate Number: 16-HS1550085-2-PDA
07/NOV/2018

Confirmation of Product Type Approval

Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this product.

This certificate reflects the information on the product in the ABS Records as of the date and time the certificate is printed.

Pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed product held a valid Manufacturing Assessment (MA) with expiration date of 18-SEP-2021. The continued validity of the Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS Rules.

And; a Product Design Assessment (PDA) valid until subject to continued compliance with the Rules or standards used in the evaluation of the product.

The above entitle the product to be called Product Type Approved.

The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

Product Name: Fastening System

Model Name(s): S-BT screw-in stainless steel multi-purpose threaded fasteners: S-BT-MR M10, S-BT-MR W10, S-BT-MR M8 S-BT screw-in carbon steel multi-purpose threaded fasteners: S-BT-MF M10, S-BT-MF W10, S-BT-MF M8 S-BT screw-in stainless steel threaded fasteners for electrical purposes: S-BT-ER M10, S-BT-ER W10, S-BT-ER M8, S-BT-ER M10 HC, S-BT-ER W10 HC S-BT screw-in carbon steel threaded fasteners for electrical purposes: S-BT-EF M10, S-BT-EF W10, S-BT-EF M8, S-BT-EF M10 HC, S-BT-EF W10 HC S-BT screw-in stainless steel threaded fasteners for gratings: S-BT-GR M8 (in association with Composite Fasteners X-FCM-R, X-FCM-M) S-BT screw-in carbon steel threaded fasteners for gratings: S-BT-GF M8 (in association with Composite Fasteners X-FCM-R, X-FCM-M)

Presented to:
HILTI AKTIENGESELLSCHAFT
FELDKIRCHERSTR. 100
Liechtenstein

Intended Service:	For fastening of fastened materials to base materials of carbon steel or aluminum in the Ship and Shipbuilding environment and in Offshore Structures.
Description:	1. In the S-BT fasteners, the threaded stud is set into a small pre-drilled pilot hole and the drill entry point is then completely sealed by the stud washer during setting. This doesn't require any rework of the protective surface coating because there is no through penetration of the base material. 2. For the S-BT System there is also the possibility to set the stud into a drill through hole in thin base material. In

	this case a rework of the protective surface on the backside is potentially needed. 3. Dimensions and material specifications of S-BT fasteners: refer to the Data Sheets("S-BT screw-in stainless steel and carbon steel threaded studs Product Data", "S-BT-ER and S-BT-EF screw-in stainless steel and carbon steel threaded studs for electrical connections Product Data" & "Hilti S-BT Screw-in threaded studs"). 4. The fasteners are to be installed and inspected using installation procedures and tools recommended by the manufacturer as in the Data Sheet: a) Drilling tool: SF BT 18-A, SF BT 22-A or SBT 4-A22; b) Drill bits: TS-BT 4.3-74 S, TS-BT 5.5-74 S, TS-BT 5.5-74 AL. 5. Base material thickness tII and type of bore hole: a) Pilot hole, base material steel: tII >= 6 mm [0.24”]; b) Pilot hole, base material aluminum: tII >= 6 mm [0.24”]; c) Drill through hole, base material steel: 6 mm [0.24”] > tII >= 3mm [0.12”]; d) Drill through hole, base material aluminum: 6 mm [0.24”] > tII >= 5mm [0.20”]. 6. Composite fasteners are either made from stainless steel (X-FCM-R) or from duplex coated steel (X-FCM-M).
Tier:	3
Ratings:	1. Refer to the Data Sheets ("S-BT screw-in stainless steel and carbon steel threaded studs Product Data", "S-BT-ER and S-BT-EF screw-in stainless steel and carbon steel threaded studs for electrical connections Product Data" & "Hilti S-BT Screw-in threaded studs") for the recommended maximum loading in tension, shear, moment and torque, in association with the recommended loads specified therein. 2. Refer to the Data Sheets for the application requirements to the followings: a) Base material thickness and type of bore hole; b) Thickness of fastened material; c) Edge distance >= 6 mm [0.24”]; Spacing >= 18 mm [0.71”]; d) Corrosion information. 3. Service Temperature: - 40 to 100 Celsius.
Service Restrictions:	Unit Certification is not required for this product. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined. 1) The base material is limited to steel grade with the following properties: a) For Steel as base material, Maximum ultimate tensile strength of steel fu = 630 MPa [91 ksi] & Minimum ultimate tensile strength of steel fu >= 340 MPa [49 ksi]; b) For Aluminum as base material, Minimum ultimate tensile strength of aluminum fu >= 270 MPa [39 ksi]; c) Minimum thickness of base material tII: refer to the Data Sheet; d) Maximum thickness of base material tII: no limits. 2) In general, type approved S-BT fasteners are NOT to be used for the following: a) Shell plating (i.e. bottom plating, side plating, main deck plating); b) Tank Boundaries c) Weathertight boundaries where through penetration of the base materials is required; d) Fire rated boundaries other than A0; e) Structural members which require fatigue design; f) Members with significant thermal stresses; g) Highly stressed structural members 3) On Watertight bulkheads or decks (decks other than main deck or strength deck), the installation shall be to a doubler plate, with no through penetration, welded onto the bulkhead/deck plating. 4) Hilti fasteners often may be used for the listed applications by following the Manufacturer's recommendations and guidance. The attending Surveyor and Owner are to be consulted and agree with the use of the fasteners; 5) Hilti fasteners may also be used for additional applications other than those listed above. Some applications may require an engineering review in advance. 6) Structural members that are sensitive to stress patterns or variations and in areas where notch toughness is of paramount importance, the curve class S-BT (as per specification binder) applies for fatigue design for base materials of thickness >= 4mm and yield strength ranging from 235 MPa to 355 MPa at an edge distance >= 15 mm. 7) Only the S-BT-ER & S-BT-EF models are to be used for grounding and bonding equipment. 8) Models X-FCM-R and X-FCM-M are to be used in association with S-BT-GR & S-BT-GF models only.
Comments:	The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product. In general, the Hilti S-BT fasteners may be used to fasten materials in areas where welding or drilling for bolting is permissible e. g. gratings, installation channels, installation rails, junction boxes and lighting, control panels, cable trays, cable channels. It is recommended that fasteners be installed no closer than 6 mm [0.24”] from the edge of a flange or cutout and no closer than 15 mm [0.71”] between fasteners. The following additional guidance is provided for applications on ship structures: 1) Acceptable applications: a) The securing of grating panels for S-BT-GF & S-BT-GR models along with X-FCM-R or X-CFM-M; b) The securing of checker plate; c) The securing of electrical cable trays; d) The

	securing of electrical cable clips; e) The securing of joiner bulkhead tracks to plating in deck modules; f) The securing of light duty fixtures and light hangers; g) Securing of items (a-f) above in A0 fire rated divisions; h) The securing of wall panel struts; i) The securing of exterior and interior outfitting; j) The security of safety equipment; k) Use of S-BT-EF, S-BT-ER, S-BT-EF HC & S-BT-ER HC models as grounding and bonding equipment. 2) Acceptable locations: a) Locations other than those listed in "Service Restrictions". Some example of acceptable locations are as follows, provided they do not have "Service Restriction" applicability: i) Platform decks & flats ii) Non-tight bulkheads iii) Lower decks iv) Transverse side frames v) Superstructure & Deckhouse bulkheads vi) Topside Deck members and plating vii) Deck modules viii) Longitudinal and Transverse Frames of hulls ix) A-0 Fire rated boundaries 3) The fasteners may also be used for applications other than those listed above, where special care is recommended by following the manufacturer's recommendation, such as hangers for pipe systems with high thermal stresses and sprinkler systems. Such applications must be to the satisfaction of the attending surveyor. 4) The intended use comprises connections for indoor (mainly the carbon steel fasteners) and outdoor applications (mainly the stainless steel fasteners) with predominantly static loads (e.g. dead loads). 5) ABS approvals are general based on the product test reports furnished by recognized institutions and laboratories which may reflect specific local conditions. If any application is in a jurisdiction where the fasteners are subject to the approval process or specific guidelines are to be followed, the approved technical data or design guidelines take precedence over technical data presented herein. The arrangement and details of each vessel-specific installation are to be reviewed to ABS Rules as applicable.
Notes / Documentation:	S-BT screw-in stainless steel and carbon steel threaded studs Product Data, Revision:-, Pages: 8 S-BT-ER and S-BT-EF screw-in stainless steel and carbon steel threaded studs for electrical connections Product Data, Revision:-, Pages:7 Hilti S-BT Screw-in threaded studs, Revision:-, Pages: 72 Drawing No. 5179696/06/603918, Threaded stud S-BT R, Revision:-, Pages: 3 Drawing No. 5181496/05/603918, Threaded stud S-BT F, Revision:-, Pages: 3 Test Report No. 279/15, HTL RANKWEIL, 12 February 2016 Report No. 9030160000/Bf, MPA Stuttgart, 14 September 2015 Document No. TM-414/14_2, Untersuchung auf Galvanische Korrosion, Revision:-, Pages: 7 Test Report No. MA Audit Report MF3365826 CHK SHT A 2017, Audit Report, Revision: -, Pages: 1 Test Report No. MA Audit Report MF3365826 CHK SHT A 2017, Audit Report, Revision: --, Pages: 1 Test Report No. 5214011585/e, EMPA, 26 April 2016 Test Report No. 5214011585/e_corr, EMPA, 29 June 2017 Test Report No. 5214014601/e, EMPA, 11 April 2017 Report No. 2017/38X Universitat Stuttgart, Institut fur Konstruktion und Entwurf, 30 June 2017 Test Report No. 20170384, MPA Dresden GmbH, 20 July 2017 Test Report No. 20161614, MPA Dresden GmbH, 21 July 2017 Test Report No. 20161614/01, MPA Dresden GmbH, 03 August 2017 Test Report No. 1648, DEHN, 21 March 2017 Test Report No. 1649, DEHN, 21 March 2017 Test Report No. 1650, DEHN, 21 March 2017 Test Notes No. 1651, DEHN, 21 March 2017 Test Notes No. 1652, DEHN, 21 March 2017 Test Report No. 1689, DEHN, 30 June 2017 Report No. 17-IK-0093.S02, Eurofins Electrosuisse Product Testing AG, 14 July 2017 Report No. 16-IK-0021.S.02, Electrosuisse, 30 June 2017 Test Report No. 1834, DEHN, 27-07-2018 Test Report No. 1798, DEHN, 24-05-2018 Test Report No. 1795, DEHN, 07-06-2018 Test Report No. 17-IK-0021.S04, Eurofins Electrosuisse, 09-08-2018 Test Report No. 17-IK-0021.S04 Annex, Eurofins Electrosuisse, 02-02-2018 Test Report No. XSMSse-02-18, Evaluation Report on Electrical Connections, 10-08-2018 Drawing No. 08-2018, S-BT-ER and S-BT-EF, Revision:-, Pages: 14 Hilti S-BT Specification, Hilti S-BT Specification Version 08-2018 Drawing No. 5179696, Threaded stud S-BT R, Revision:-, Pages: 7
Term of Validity:	This Product Design Assessment (PDA) Certificate 16-HS1550085-2-PDA, dated 01/Oct/2018 remains valid until 18/Sep/2021 or until the Rules or specifications used in the assessment are revised (whichever occurs first). This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product. Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA. Use of the Product for non ABS classed vessels, MODUs or facilities is to be

to an agreement between the manufacturer and intended client.

ABS Rules: Rules for Conditions of Classification, Part 1 – 2018 Steel Vessel Rules 1-1-4/7.7, 1-1-A3, 1-1-A4; ABS Rules for Conditions of Classification, Part 1 – 2018 Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following: Mobile Offshore Drilling Units (2018): 3-2-2/11; 4-3-3/5.9; ABS Guide for Fatigue Assessment of Offshore Structures - 2018

National Standards:

International Standards: IMO Resolution MSC.307(88), Fire Test Procedure Code - 2010 BS EN 10025-2:2004, Hot Rolled Products of Structural Steel: Technical Delivery Conditions for Non-Alloy Structural Steels; BS EN 10025-3:2004, Hot Rolled Products of Structural Steel: Technical Delivery Conditions for Normalized/Normalized Rolled Weldable Fine Grain Structural Steels; BS EN 10225:2009, Weldable Structural Steels for Fixed Offshore Structures: Technical Delivery Conditions; BS EN 1993-1-9:2005, Eurocode 3 Design of Steel Structures: Fatigue; 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 Block for Copper Conductors; IEC 62561-1:2017, Lightning Protection System Components (LPSC) - Part 1: Requirements for Connection Components

Government Authority:

EUMED:

Others: Manufacturer's Standards

Model Certificate	Model Certificate No	Issue Date	Expiry Date
PDA	16-HS1550085-2-PDA	03-OCT-2018	18-SEP-2021

ABS Programs

ABS has used due diligence in the preparation of this certificate and it represents the information on the product in the ABS Records as of the date and time the certificate was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rule, to which they were assessed, remains valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product; Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS. Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.