



Confirmation of Product Type Approval

Company Name: HILTI AKTIENGESELLSCHAFT

Address: FELDKIRCHERSTR. 100 9494 SCHAAN Liechtenstein

Product: Fastening System

Model(s): F-BT welded threaded studs: Metric: Without Sealing Washer -F-BT-MR M6 x L (6) -F-BT-MR M8 x L (8) -F-BT-MR M10 x L (10) -F-BT-MR M12 x L (10) With Sealing Washer -F-BT-MR M6 x L SN (4) -F-BT-MR M6 x L SN (6) -F-BT-MR M8 x L SN (4) -F-BT-MR M8 x L SN (8) -F-BT-MR M10 x L SN (10) -F-BT-MR M12 x L SN (10) Imperial: Without Sealing Washer -F-BT-MR 3/8 x L (3/8) -F-BT-MR 1/2 x L (3/8) With Sealing Washer -F-BT-MR 3/8 x L SN (5/32) -F-BT-MR 3/8 x L SN (3/8)

Endorsements:

Certificate Type	Certificate Number	Issue Date	Expiry Date
Product Design Assessment (PDA)	23-2398165-PDA	23-JUN-2023	22-JUN-2028
Manufacturing Assessment (MA)	21-4879051	29-JUL-2021	30-AUG-2026
Product Quality Assurance (PQA)	NA	NA	NA

Tier

3 - Type Approved, unit certification not required

Intended Service

For fastening of fastened materials to parent materials of carbon steel in the Ship and Shipbuilding environment and in Offshore Structures.

Description

1. Material: Corrosion resistant steel studs made from A5 or 316Ti stainless wire. The material specifications are:

- Material number 1.4571 (X6CrNiMoTi17-12-2) per EN 10088-3 or
- AISI/SAE 316Ti per ASTM A240 or A276

2. Threaded section: The threaded section allows the connection of fixed components through nuts and washers. For fastenings made with F-BT-MR SN studs with sealing washer, a stainless collar lock nut is to be used. The nut will be supplied together with the stud.

3. Reduced weld base diameter: Depending on the thread size, several reduced weld base diameters $d_2 = 5, 6$ or 7.2 mm are used. The weld diameter d_2 determines the minimum thickness of the coated parent material t_{ll} .

$d_2 = 5$ mm # $t_{ll, min} = 4$ or 6 mm depending on stud model

$d_2 = 6 \text{ mm}$ # tll,min = 8 mm

$d_2 = 7.2 \text{ mm}$ # tll,min = 10 mm

The different reduced weld diameters are necessary in order to avoid damage of the coating of the parent material.

Note: The minimum parent material thickness reduces to 2 mm if uncoated black steel is used as parent material.

4. Necked section: As the weld diameter d_2 is smaller than the thread diameter d_1 , the studs feature a necked section with a diameter d_n in order to consistently develop stud fracture when the stud is loaded in tension: $d_n \leq d_2$

Ratings

1. Refer to the Data Sheets in the attachment "HILTI CORDLESS STUD FUSION (Technical Manual) May 2023", for the recommended maximum loading in tension, shear, moment and torque, in association with the recommended loads specified therein. (recommended loads listed below).

Tension Compression Shear Moment

Thread M10, M12, 3/8, 1/2 with Sealing washers 8.0kN -8.0kN 3.6kN 20Nm

Thread M10, M12, 3/8, 1/2 without Sealing washers 8.0kN N/A 4.5kN 20Nm

Thread M8 with Sealing washers 4.5kN -8.0kN 2.0kN N/A

Thread M8 without Sealing washers 4.5kN N/A 2.6kN N/A

Thread M6 with Sealing washers 3.1kN -8.0kN 1.4kN N/A

Thread M6 without Sealing washers 3.1kN N/A 1.8kN N/A

Thread M6, M8, 3/8 with Sealing washers (thin base) 1.8kN -8.0kN 1.0kN N/A

2. Weld Code - Refer to "HILTI CORDLESS STUD FUSION (Technical Manual) May 2023" appendix 1 stud welding parameters

Thread M6 with sealing washer and coated parent material: H2

Thread M8 with sealing washer and coated parent material: H3

Thread M10, M12, 3/8 with sealing washer and coated parent material: H10

Thread M6, M8, 3/8 with sealing washer and coated thin parent material: H1

Thread M6 without sealing washer coated and uncoated parent material: H2

Thread M8 without sealing washer coated and uncoated parent material: H3

Thread M10, M12, 3/8, 1/2 without sealing washer coated and uncoated parent material: H10

3. Refer to the Data Sheets for the application requirements to the followings:

a) Parent material thickness;

b) Thickness of fastened material;

c) Edge distance;

d) Corrosion information;

4. Service Temperature: -40 to +60 degree (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 parent material, refer to the CSF_Technical Manual 5.2.3 & 6.2.3 Parent Material, which includes Shipbuilding steels A, B, D, E, AH 32, DH 32, AH 36, DH 36, EH 36 provided ultimate tensile strength are greater than 380 N/mm²

b) Maximum ultimate tensile strength of steel: 630 N/mm²

c) Minimum thickness of parent material tII: refer to the Data Sheet;

d) Maximum thickness of parent material tII: 30 mm

2) In general, type approved F-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) Fire rated boundaries;

d) Structural members which require fatigue design;

e) Members with thermal stresses;

f) Highly stressed structural members

3) Hilti fasteners often may be used for the listed applications ("Appendix - Service Restrictions" attached to the ABS approval letter in Task # T2398165) 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;

4) Hilti fasteners may be used for additional applications other than those listed in the "Appendix - Service Restrictions" attached to the ABS approval letter in Task # T2398165 provided that its been ABS reviewed and Approved

For more Service Restrictions please see the "Appendix - Service Restrictions" attached to the ABS approval letter in Task # T2398165

Comments

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

Notes, Drawings and Documentation

Drawing No. -, (01) Hilti Cordless Stud Fusion_Technical Manual_Nov 2022, Revision: -, Pages: -

Drawing No. L22/0862_01, (12) GBD_F-BT_Tension_L22_0862_01, Revision: -, Pages: -

Drawing No. L22/0862_02, (13) GBD_F-BT_Tension_L22_0862_02, Revision: -, Pages: -
Drawing No. L22/0862_03a, (14) GBD_F-BT_Shear_L22_0862_03a, Revision: -, Pages: -
Drawing No. PW-2022-0082, (28) SPIEZ PW-2022-0082 Test Report Sealing, Revision: -, Pages: -
Drawing No. PW-2022-0115, (27) SPIEZ PW-2022-0115 Test Report_Lifetime, Revision: -, Pages: -
Drawing No. XE-23-08, (17) XE-23-08_F-BT interaction tests, Revision: -, Pages: -
Drawing No. XE-23-10, (00) XE-23-10 F-BT Evaluation Report with Appendices, Revision: -, Pages: -
Drawing No. XE_22_17, (16) XE-22-17_F-BT sealing washer_Compression load, Revision: -, Pages: -
Drawing No. XE_23_04, (26) XE-23-04_F-BT fasteningpoint durability, Revision: -, Pages: -
Drawing No. XE_23_18, (15) XE-23-12_F-BT base material thickness influence, Revision: -, Pages: -
Drawing No. -, CSF_Technical Manual_05-2023, Revision:-, Pages:-

Term of Validity

This Product Design Assessment (PDA) Certificate remains valid until 22/Jun/2028 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

ABS Rules

2023 ABS Rules for Conditions of Classification, 1-1-4/7.7, 1-1-A3, 1-1-A4

2023 ABS Rules for Conditions of Classification – Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following

2023 ABS Rules for Building and Classing Mobile Offshore Units 3-2-2/9, 4-3-3/5.9

International Standards

EN ISO 13918:2018+A1:2021: Welding - Studs and ceramic ferrules for arc stud welding

EN ISO 14555:2017: Welding - Arc stud welding of metallic materials

EU-MED Standards

NA

National Standards

NA

Government Standards

NA

Other Standards

Manufacturer's Standards



A handwritten signature in blue ink, appearing to read "Joseph W. White".

Corporate ABS Programs
American Bureau of Shipping
Print Date and Time: 26-Jun-2023 2:06

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 is printed.

If the Rules and/or standards used in the PDA evaluation are revised or if there is a design modification (whichever occurs first), a PDA revalidation may be necessary.

The continued validity of the MA is dependent on completion of satisfactory audits as required by the ABS Rules. The validity of both PDA and MA entitles the product to receive a **Confirmation of Product Type Approval**.

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or prior to the effective date of the ABS Rules and standards applied at the time of PDA issuance. 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.

Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. The manufacturer is responsible to maintain compliance with all specifications applicable to the product design assessment. Unless specifically indicated in the description of the product, certification under type approval does not waive requirements for witnessed inspection or additional survey for product use on a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS.

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.

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.

Appendix

Comments:

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

In general, the Hilti F-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 38 mm [1.5"] from the edge of a flange or cutout and no closer than 35 mm [1.38"] between fasteners. The following additional guidance is provided for applications on ship structures:

1) Acceptable applications:

- a) The securing of modular supports
- b) The securing of electrical cable trays
- c) The securing of electrical cable clips
- d) The securing of joiner bulkhead tracks to plating in deck modules (with Fire test procedure approval)
- e) The securing of light duty fixtures and light hangers
- f) The securing of wall panel struts
- g) The securing of exterior and interior outfitting
- h) The securing of safety 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) Water tight and Non-tight bulkheads
- iii) Lower decks
- iv) Transverse side frames
- v) Superstructure & Deckhouse bulkheads and decks with a minimum thickness 6.4 mm (1/4" inch)
- vi) Topside Deck members and plating
- vii) Deck modules
- viii) Longitudinal and Transverse Frames of hulls

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 and outdoor applications 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