



Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

Manufacturer	Hilti Corporation
Address	Feldkircherstrasse 100, 9494 Schaan, Liechtenstein
Place of Production	Jiaxing Chuangyuan Machinery Manufacturing Co., Ltd. No. 588 Yedao Road, Binhai south Road Daqiao new District, Haiyan County Development District, Jiaxing, Zhejiang, China
Type	Building Construction Elements
Description	Hilti F-BT studs are stainless steel studs which are welded, to coated, or uncoated, carbon steel by means of the Hilti CSF – Cordless Stud Fusion – system. The welding process is drawn arc stud welding (process number 783) according to EN ISO 14555. Though the welding process is covered by a standard, the load performances (tension, shear, compression, bending) of the welded F-BT studs are established by tests considering the geometric specifics of the studs.
Trade Name	Hilti F-BT-MR-SN studs with sealing washer & Stainless Hilti F-BT-MR studs without sealing washer
Application	Welded fastening of studs in the marine, offshore and industrial environments used in the following application groups, using the Cordless Stud Fusion (CSF) technology: <ul style="list-style-type: none">• Multi-disciplinary support• Welded support for cable trays• Modular support for cable trays• Individual support

Jenny Wilson

Engineering - Machinery Principal Specialist
to Lloyd's Register EMEA
A member of the Lloyd's Register group

71 Fenchurch Street, London, EC3M 4BS, United Kingdom

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Type Approval Certificate

- Welded support for pipe trays
- Modular support for pipes
- Suspended ceiling
- Equipment fastening
- Shipbuilding fastening

Specified Standard Lloyd's Register Rules and Regulations for the Classification of Ships, July 2024, Eurocode 3 and EN 1993-1-9

Ratings See Appendix

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document LR2536337TA and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. LR2536337TA

Appendix

Rating:

Design resistances of F-BT-MR SN with sealing washer:

<u>Designation</u>	Parent material thickness (t in mm)	Tension Load (in kN)	Compression Load (in kN)	Shear Load (in kN)	Bending Moment (in Nm)
F-BT-MR M6x25 SN (4)	$4 \leq t < 30$	2.5	11.2	1.4	n.a
F-BT-MR M8x25 SN (4)	$4 \leq t < 30$	2.5	11.2	1.4	
F-BT-MR M6x25 SN (6)	$6 \leq t < 30$	4.3	11.2	1.9	
F-BT-MR M8x25 SN (8)	$8 \leq t < 30$	6.3	11.2	2.8	
F-BT-MR M10x25 SN (10)	$10 \leq t < 30$	11.2	11.2	5	28
F-BT-MR M10x50 SN (10)					
F-BT-MR M12x25 SN (10)	$10 \leq t < 30$	11.2	11.2	5	28
F-BT-MR M12x50 SN (10)					
F-BT-MR 3/8x1 SN (5/32)	$4 \leq t < 30$ (5/32" $\leq t < 1 \frac{1}{8}$ ")	2.5 (560 lb)	11.2 (2520 lb)	1.4 (315 lb)	n.a
F-BT-MR 3/8x1 SN (3/8)	$10 \leq t < 30$ (3/8" $\leq t < 1 \frac{1}{8}$ ")	11.2 (2520 lb)	11.2 (2520 lb)	5 (1125 lb)	28 (20.6 lb-ft)
F-BT-MR 3/8x1 1/2 SN (3/8)					
F-BT-MR 3/8x2 SN (3/8)					
F-BT-MR 3/8x4 SN (3/8)					

Design resistances of F-BT-MR without sealing washer:

<u>Designation</u>	Parent material thickness (t in mm)	Tension Load (in kN)	Shear Load (in kN)	Bending Moment (in Nm)
F-BT-MR M6x25 (6)	$6 \leq t < 30$	4.3	2.5	n.a
F-BT-MR M8x25 (8)	$8 \leq t < 30$	6.3	3.6	
F-BT-MR M10x25 (10)	$10 \leq t < 30$	11.2	6.3	28



ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. LR2536337TA

F-BT-MR M10x50 (10)				
F-BT-MR M12x25 (10)	10 ≤ t < 30	11.2	6.3	28
F-BT-MR M12x50 (10)				
F-BT-MR 3/8x1 (3/8)	10 ≤ t < 30 (3/8" ≤ t < 1 1/8")	11.2 (2520 lb)	6.3 (1415 lb)	28 (20.6 lb-ft)
F-BT-MR 3/8x1 1/2 (3/8)				
F-BT-MR 3/8x2 (3/8)				
F-BT-MR 3/8x4 (3/8)				
F-BT-MR 1/2x1 1/2 (3/8)	10 ≤ t < 30 (3/8" ≤ t < 1 1/8")	11.2 (2520 lb)	6.3 (1415 lb)	28 (20.6 lb-ft)
F-BT-MR 1/2x2 (3/8)				

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LLOYD'S REGISTER TYPE APPROVAL – DESIGN APPRAISAL DOCUMENT

Issue by: Global Technical Support Office

Issued to: Hilti Corporation

The undernoted documents have been reviewed for compliance with the requirements of the Lloyd's Register's 'Type Approval Schemes Procedures', 1st January 2025, and this Design Appraisal Document forms part of the Certificate.

APPROVAL DOCUMENTATION

Doc. No.	Document	Expiry Date
TSO-23-001092-M	Machinery General Design Appraisal	27 th Mar 2030

TEST REPORTS

Doc. No.	Document	Date
PRJ11100438045	Production Quality Assessment	04 th Dec 2024
HAM2303359/2	LR-Welding Procedure Qualification Record (PQR)	22 nd Dec 2023
L22/0862_02	Tension test	19 th Oct 2022
L22/0862_03a	Shear tests	13 th Dec 2022
XE_23_18	Base material thickness influence on F-BT tensile performance	03 rd Mar 2023
XE_22_17	F-BT sealing washer: Maximum compression load capacity	02 nd May 2022
XE-23-08	Interaction tests with F-BT-MR threaded fasteners	15 th Feb 2023
XE_23_04	F-BT fastening point durability	08 th Mar 2023
PW-2022-0115	Testing Laboratory for Polymers and Rubber (Batch-QN2)	08 th Nov 2022
PW-2022-0082	Testing Laboratory for Polymers and Rubber (Batch-QN1)	13 th July 2022
L22/1281_01	Inspection report Hilti F-BT-MR M12x50 SN (10)	19 th Oct 2022
L22/1282_01	Inspection report Hilti F-BT-MR M10x50 SN (10)	19 th Oct 2022
L22/0867_01	Inspection report Hilti F-BT-MR M8x25 SN (8)	03 rd Oct 2022
L22/0868_01	Inspection report Hilti F-BT-MR M6x25 SN (6)	03 rd Oct 2022
L22/0869_01	Inspection report Hilti F-BT-MR M6x25 SN (4)	03 rd Oct 2022
L22/1283_01	Inspection report Hilti F-BT-MR M12x50 (10)	19 th Oct 2022
L22/1284_01	Inspection report Hilti F-BT-MR M10x50 (10)	19 th Oct 2022
L22/0872_01	Inspection report Hilti F-BT-MR M8x25 (8)	03 rd Oct 2022
L22/0873_01	Inspection report Hilti F-BT-MR M6x25 (6)	03 rd Oct 2022
CSF-WPS F-BT-MR (EU)	Welding Procedure Specification (WPS)	14 th Nov 2022
OTR/5724148/02	Hilti F-BT visual examination catalogue	14 th Nov 2022
L22/0867_02	Macroscopic examination F-BT-MR M8x25 SN (8)	10 th Aug 2022
L22/0868_02	Macroscopic examination F-BT-MR M6x25 SN (6)	01 st Aug 2022
L22/0869_02	Macroscopic examination F-BT-MR M6x25 SN (4)	10 th Aug 2022
L22/1281_02	Macroscopic examination F-BT-MR M12x50 SN (10)	24 th Aug 2022
L22/1282_02	Macroscopic examination F-BT-MR M10x50 SN (10)	24 th Aug 2022
L22/1283_02a	Macroscopic examination F-BT-MR M12x50 (10)	25 th Oct 2022



Doc. No.	Document	Date
L22/1284_02a	Macroscopic examination F-BT-MR M12x50 SN (10)	25 th Oct 2022
L22/0867_03	Hardness test F-BT-MR M8x25 SN (8)	10 th Aug 2022
L22/0868_03	Hardness test F-BT-MR M6x25 SN (6)	10 th Aug 2022
L22/0869_03	Hardness test F-BT-MR M6x25 SN (4)	10 th Aug 2022
L22/0869_04	Macroscopic examination F-BT-MR M6x25 SN (4)	10 th Aug 2022

Jenny Wilson
Principal Specialist, Specialised Projects
Global Technical Support Office
Lloyd's Register EMEA
Direct Tel No.: +44 (0) 3304140339

Supplementary Type Approval Terms and Conditions

Type Approval certifies that a representative sample of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein. It does not mean or imply approval for any other use, nor approval of any product(s) designed or manufactured otherwise than in strict conformity with the said representative sample.

Type Approval is based on the understanding that the manufacturer's recommendations and instructions and any relevant requirements of the Rules and Regulations are complied with.

Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations. Lloyd's Register EMEA reserves the right to cancel or withdraw this Type Approval Certificate in accordance with the Lloyd's Register Type Approval System Procedure.





Design Appraisal Document

Lloyd's Register Marine and Offshore India LLP
M&O_TSO_Mumbai TSO(IN712063)
Aurum Q Parc, Gen 4/1 TT
Thane Belapur Road, Mumbai
400710, India

Date
28 March 2025

Please quote this reference number on all future communications
GTSO/GED/GDC/AN/TSO/23-001902

MACHINERY GENERAL DESIGN APPRAISAL Hiliti F-BT Welded Studs

VALID UNTIL 27th MARCH 2030

1. The Document(s) listed in paragraph 1 of the appendix have been examined for compliance with Rules and Regulations for the Classification of Ships, July 2024, Eurocode 3 and EN 1993-1-9, and will be approved, as indicated, in accordance with the following conditions:

2. Product

Manufacturer	Hilti Corporation
Type Designation- Cordless Stud Fusion	Stainless Hilti F-BT-MR-SN studs with sealing washer M6, M8, M10, M12 and 3/8" Stainless Hilti F-BT-MR studs without sealing washer M6, M8, M10, M12, 3/8" and 1/2"
Purpose	Welded Support for non-pressure parts-Cable Trays, Pipe Trays, Suspended Sealing, Equipment Fastening
Service Temperature (in °C)	-40/ +60
Material of Stud	EN 10088-3 (1.4571 (A5)) ASTM A240/A276 (316Ti)
Material of Sealing ring- Metal cap	EN 10088-2 (1.4404 (A4))/ ASTM A240(316L)
Material of Sealing ring- Sealing elastomer	Chloroprene Rubber (CR)
Material of Support plate	PA66-GF50
Material of Parent/Base	-S235JR +N (or +AR) to S355K2 +N (or +AR), -S275N/NL to S355N/NL, -ASTM A36/ ASTM 572 Grade 50, -Shipbuilding steel- A, B, D, E, AH 32, DH 32, AH 36, DH 36, EH 36, -CEV=C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

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Lloyd's Register Marine and Offshore India LLP
M&O_TSO_Mumbai TSO(IN712063)
Aurum Q Parc, Gen 4/1 TT
Thane Belapur Road, Mumba
400710, India

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3. Details

3.1 Design resistances of F-BT-MR SN with sealing washer:

<u>Designation</u>	Parent material thickness (t in mm)	Tension Load (in kN)	Compression Load (in kN)	Shear Load (in kN)	Bending Moment (in Nm)
F-BT-MR M6x25 SN (4)	$4 \leq t < 30$	2.5	11.2	1.4	n.a
F-BT-MR M8x25 SN (4)	$4 \leq t < 30$	2.5	11.2	1.4	
F-BT-MR M6x25 SN (6)	$6 \leq t < 30$	4.3	11.2	1.9	
F-BT-MR M8x25 SN (8)	$8 \leq t < 30$	6.3	11.2	2.8	
F-BT-MR M10x25 SN (10)	$10 \leq t < 30$	11.2	11.2	5	28
F-BT-MR M10x50 SN (10)					
F-BT-MR M12x25 SN (10)	$10 \leq t < 30$	11.2	11.2	5	28
F-BT-MR M12x50 SN (10)					
F-BT-MR 3/8x1 SN (5/32)	$4 \leq t < 30$ (5/32" $\leq t < 1 \frac{1}{8}$ ")	2.5 (560 lb)	11.2 (2520 lb)	1.4 (315 lb)	n.a
F-BT-MR 3/8x1 SN (3/8)	$10 \leq t < 30$ (3/8" $\leq t < 1 \frac{1}{8}$ ")	11.2 (2520 lb)	11.2 (2520 lb)	5 (1125 lb)	28 (20.6 lb-ft)
F-BT-MR 3/8x1 1/2 SN (3/8)					
F-BT-MR 3/8x2 SN (3/8)					
F-BT-MR 3/8x4 SN (3/8)					



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3.2 Design resistances of F-BT-MR without sealing washer:

<u>Designation</u>	Parent material thickness (t in mm)	Tension Load (in kN)	Shear Load (in kN)	Bending Moment (in Nm)
F-BT-MR M6x25 (6)	$6 \leq t < 30$	4.3	2.5	n.a
F-BT-MR M8x25 (8)	$8 \leq t < 30$	6.3	3.6	
F-BT-MR M10x25 (10)	$10 \leq t < 30$	11.2	6.3	28
F-BT-MR M10x50 (10)				
F-BT-MR M12x25 (10)	$10 \leq t < 30$	11.2	6.3	28
F-BT-MR M12x50 (10)				
F-BT-MR 3/8x1 (3/8)	$10 \leq t < 30$ (3/8" $\leq t < 1$ 1/8")	11.2 (2520 lb)	6.3 (1415 lb)	28 (20.6 lb-ft)
F-BT-MR 3/8x1 1/2 (3/8)				
F-BT-MR 3/8x2 (3/8)				
F-BT-MR 3/8x4 (3/8)				
F-BT-MR 1/2x1 1/2 (3/8)	$10 \leq t < 30$ (3/8" $\leq t < 1$ 1/8")	11.2 (2520 lb)	6.3 (1415 lb)	28 (20.6 lb-ft)
F-BT-MR 1/2x2 (3/8)				

4. Conditions of Approval

4.1 None

5. General Comments

5.1 Installation and application of this product is to be in accordance with the Manufacturer's Manual, 'Hilti Cordless Stud Fusion Technical Manual'.

5.2 The Water Tightness for F-BT-MR SN with sealing washer should be as per EN ISO 9227.

5.3 The Corrosion resistance class CRC III for F-BT-MR SN with sealing washer & F-BT-MR without sealing washer should be as per EN 1993-1-4.

5.4 The Welding for F-BT-MR SN with sealing washer & F-BT-MR without sealing washer should be as per welding code / standard such as EN ISO 14555 or AWS D1.6/D1.6M.

Nomaan Akhter

Nomaan Akhter
Specialist, MEC
Mumbai Technical Support Office
Lloyd's Register Marine & Offshore India LLP
Email: nomaan.akhter@lr.org

Jenny Wilson

Jenny Wilson
Principal Specialist, Specialised Projects
Global Technical Support Office
Lloyd's Register EMEA
Direct Tel No.: +44 (0) 3304140339

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Appendix

1. The documents listed below have been examined

Document No.	Rev.	Title	Status	Date
OTR / 5724148 / 000 / 02	A7	Engineering BOM	SI	28 Mar 2025
5502004/13/703018	-	Threaded Stud (F-BT-MR M/W12xXX-7.2), 20.12.2022	A	28 Mar 2025
5502007/12/703018	-	Threaded Stud (F-BT-MR M/W10xXX-7.2), 20.12.2022	A	28 Mar 2025
5502006/11/703018	-	Threaded Stud (F-BT-MR M/W8xXX-6), 20.12.2022	A	28 Mar 2025
5502005/09/703018	-	Threaded Stud (F-BT-MR M/W6xXX-5), 20.12.2022	A	28 Mar 2025
5501751/10/703018	-	Threaded Stud (F-BT-MR M/W12xXX-S7.2), 20.12.2022	A	28 Mar 2025
5501761/11/703018	-	Threaded Stud (F-BT-MR M/W10xXX-S7.2), 20.12.2022	A	28 Mar 2025
5501759/08/703018	-	Threaded Stud (F-BT-MR M/W8xXX--S6), 20.12.2022	A	28 Mar 2025
5501752/07/703018	-	Threaded Stud (F-BT-MR M/W6xXX-S5), 20.12.2022	A	28 Mar 2025
5502027/08/703018	-	Threaded Stud (F-BT-MR M/W10xXX-S5-T), 20.12.2022	A	28 Mar 2025
5516046/08/703018	-	Threaded Stud (F-BT-MR M8x25-S5-T), 20.12.2022	A	28 Mar 2025
5516064/07/703018	-	Threaded Stud (F-BT-MR M6x25-S5-T), 20.12.2022	A	28 Mar 2025
5500884/03/700752	-	Washer (F-BT M/W6) assy, 30.09.2022	A	28 Mar 2025
5500881/06/700752	-	Washer (F-BT M/W6), 03.10.2022	A	28 Mar 2025
5452497/06/705419	-	Sealing ring (F-BT M/W6), 14.02.2023	A	28 Mar 2025
5500877/02/691368	-	Washer (F-BT M8) assy, 22.06.2022	A	28 Mar 2025
5500874/05/700752	-	Washer (F-BT M/W8), 30.09.2022	A	28 Mar 2025
5496357/04/705419	-	Sealing ring (F-BT M8), 14.02.2023	A	28 Mar 2025
5504617/02/691368	-	Washer (F-BT M/W10) assy, 22.06.2022	A	28 Mar 2025
5452218/05/700752	-	Washer (F-BT M/W10), 30.09.2022	A	28 Mar 2025
5504625/03/705419	-	Sealing ring (F-BT M/W10), 14.02.2023	A	28 Mar 2025

2. The documents listed below have been considered together with the submitted documents in the appraisal

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Appendix

Document No.	Rev.	Title
F-BT	-	Hilti cordless stud fusion (Technical Manual)
XE-23-10	-	Evaluation report on Hilti F-BT welded studs (TTM Stud Welding (516000376)), 09.03.2023

Appraisal Status Key

A	Approved – provided the arrangements are to the surveyor's satisfaction
SI	Retained as supporting documentation for information only



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