



Marine & Offshore

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This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

Hilti Aktiengesellschaft
SCHAAN - LIECHTENSTEIN

for the type of product

MECHANICAL FASTENING SYSTEM

HILTI X-BT-GR, X-BT-MR and X-BT-ER 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: 01 Aug 2023

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 01 Aug 2018,

Adama Diene



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 :

Hilti X-BT-GR, X-BT-MR and X-BT-ER mechanical fastening system, comprising Hilti fastening tool, power load, drill bit, stainless steel threaded studs and accessories, whereby fastenings are made by using powder-actuated tools to drive the fasteners into their final positions into a pre-drilled hole and without having to penetrate the base materials in a process of pressing and fusing.

Identification of components:

Component name	Designation
X-BT-MR M6/14 SN 8	X-BT-MR for multi-purpose fastenings
X-BT-MR W6/14 SN 8	X-BT-MR for multi-purpose fastenings
X-BT-MR M8/14 SN 8	X-BT-MR for multi-purpose fastenings
X-BT-MR M10/15 SN 8	X-BT-MR for multi-purpose fastenings
X-BT-MR W10/15 SN 8	X-BT-MR for multi-purpose fastenings
X-BT-GR M8/7 SN 8	X-BT-GR for fastening of grating
X-BT-ER M6/7 SN 8	X-BT-ER for electrical connections
X-BT-ER W6/7 SN 8	X-BT-ER for electrical connections
X-BT-ER M8/7 SN 8	X-BT-ER for electrical connections
X-BT-ER M10/7 SN 8	X-BT-ER for electrical connections
X-BT-ER W10/7 SN 8	X-BT-ER for electrical connections
X-FCS-R-3-25 31/35	X-FCS-R Gating fastening system
X-FCS-R-3-25 37/41	X-FCS-R Gating fastening system
X-FCS-R-4-25 31/35	X-FCS-R Gating fastening system
X-FCS-R-4-25 37/41	X-FCS-R Gating fastening system
X-FCM-R HL 25/30	X-FCM-R HL Gating fastening system
X-FCM-R HL 1" - 1 1/4"	X-FCM-R HL Gating fastening system
X-FCM-R HL 35/40	X-FCM-R HL Gating fastening system
X-FCM-R HL 45/50	X-FCM-R HL Gating fastening system
DX 351 BT	Fastening tool
X-351-BT FG M1024	Components for fastening tool
X-351-BT FG W1024	Components for fastening tool
X-351-BT P 1024	Components for fastening tool
DX 351 BTG	Fastening tool
X-351-BT FG G	Components for fastening tool
X-351-BT P G	Components for fastening tool
SF BT 22-A	Cordless drill
SF BT 18-A	Cordless drill
TX-BT 4.7/7-80	Drill bit
TX-BT 4.7/7-110	Drill bit
TX-BT 4.7/7-150	Drill bit
6.8/11M brown	Cartridge

2. DOCUMENTS AND DRAWINGS :

Designation	Revision / Date
New Generation Hilti X-BT-GR, X-BT-MR and X-BT-ER Threaded Fastener Specification	June 2018
X-FCS-R Grating Fastening System	2018-05-22
X-FCM-R HL Grating Fastening System	2018-05-22

3. TEST REPORTS :

According to the following tests:

- Evaluation report no: XE-18-12 at Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN dd. May 22, 2018
- Test report no. 254/17 at Bautechnische Versuchsanstalt HTL Rankweil / AUSTRIA dd. December 4th, 2017
- Expert assessment 9004742000G/Bf at MPA University of Stuttgart / GERMANY dd. 03.02.2014
- Investigation report 903 4407 000 at MPA University of Stuttgart / GERMANY dd. 08.01.2018
- Report no. 17-IK-0260.S01 at Electrosuisse, Fehraltorf / SWITZERLAND dd. 2017/11/22
- Test report no. FRM-1659 at DEHN+SÖHNE GmbH+Co.KG, Neumarkt / GERMANY dd. 17 March 2017
- Test report no. 5214017148/e at EMPA, Dübendorf / SWITZERLAND dd. January 16th, 2018
- Test report no. 5214017145/e at EMPA, Dübendorf / SWITZERLAND dd. January 15th, 2018
- Test report no. 5214015649/e at EMPA, Dübendorf / SWITZERLAND dd. June 28th, 2017
- Report no. 2018-13X at University of Stuttgart / GERMANY dd. May 19th, 2018
- Test report no. ID 04112018 at Hilti(Shanghai)Ltd / CHINA dd. 10th May 2018

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/or high strength steel and to structural steel according to EN 100025 (S235, S275, S355, S420, S460, S690, S960) or US steel grades A36 or Grade 50, to cast iron (EN-GJS-400 to EN-GJS-600) and to stainless steel (1.4401, 1.4462, 1.4529, 1.4539).

4.2 The minimum thickness of the base material is not to be less than 8 mm, if through penetration of base steel is not allowed. If through penetration is acceptable, the base material thickness can be reduced to minimum 4 mm (load reductions according to "New Generation X-BT-GR, X-BT-MR and X-BT-ER Threaded Fastener Specification")

4.3 The thickness of the fastened material:

X-BT-GR / X-BT-MR		X-BT-ER
X-BT-GR M8	$2 \text{ mm} \leq t \leq 7 \text{ mm}$	$t \leq 7 \text{ mm}$
X-BT-MR M10/W10	$2 \text{ mm} \leq t \leq 15 \text{ mm}$	
X-BT-MR M8	$2 \text{ mm} \leq t \leq 14 \text{ mm}$	
X-BT-MR M6/W6	$2 \text{ mm} \leq t \leq 14 \text{ mm}$	

4.4 The minimum distance to the edge of a flange or cutout is not to be less than 10 mm for full tension, shear and moment performance (for $6 \text{ mm} \leq 10 \text{ mm}$, application of load reduction factor is 0.65) and the minimum spacing between fasteners is not to be less than 15 mm.

4.5 The mechanical fastening system may be used in areas where drilling for bolting is permissible.

4.6 The X-BT-GR, X-BT-MR and X-BT-ER 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. In case of fatigue design, the minimum thickness of the base material is not to be less than 8 mm, and the minimum distance to the edge of a flange or cutout is not to be less than 15 mm.

4.7 The manufacturer's assembly instructions and recommendations are to be complied with.

5. PRODUCTION SURVEY REQUIREMENTS :

- 5.1 The mechanical fastening systems are to be supplied by the manufacturer 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.
- 5.3 Hilti Aktiengesellschaft has to make the necessary arrangements to have its works recognised by BUREAU VERITAS in compliance with the requirements of NR320 for HBV products :
X-BT-GR, X-BT-MR and X-BT-ER:
Hilti Plant 1, Schaan / LIECHTENSTEIN
- X-FCM-R HL:
WP-Wörgartner Produktions GmbH, Oberndorf / AUSTRIA
- X-FCS-R:
Daepac Industries SDN, Ulu Tiram, Johor / MALAYSIA

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 This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the units at any time and that **Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN** will accept full responsibility for informing shipbuilders, ship owners or their subcontractors of the proper methods of use and general maintenance of the units and the conditions of this approval.

***** END OF CERTIFICATE *****