



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 Corporation
SCHAAN - LIECHTENSTEIN

for the type of product

MECHANICAL FASTENING SYSTEM
HILTI X-FCM and X-FCS-R GRATING FASTENER

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: 19 Apr 2027

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 07 Jun 2023,

Heiko Lange

This certificate was created electronically and is valid without signature



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 5 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

The Hilti X-FCM and X-FCS-R grating fasteners are designed for attaching metal and fiberglass gratings (rectangular and square) to coated steel, aluminum and/or high strength steel in the marine and offshore environment.

The grating fasteners shall be used in combination with Hilti powder-actuated threaded studs X-BT or screw-in threaded studs S-BT or S-BT HL, see BUREAU VERITAS Type Approval Certificate N° 54054 and N° 45116 and N° 74271.

The grating fasteners are made from zinc plated carbon steel (X-FCM), duplex coated carbon steel, (X-FCM-F, X-FCM-F L, X-FCM-F HL, X-FCM-F NG) or austenitic stainless steel (X-FCM-R, X-FCM-R L, X-FCM-R HL, X-FCM-R NG, X-FCS-R) and will be assembled on the pre-installed Hilti powder-actuated threaded studs X-BT or screw-in threaded studs S-BT or S-BT HL.

The X-FCM fastener consists of 3 parts: cup washer (disc), threaded stem M8 (screw), absorber.

The X-FCS-R fastener consists of 2 parts: clamping element (3 or 4 ears), flange nut M8.

Identification of components:

Component name	Designation	Combination with threaded studs
X-FCM 23/28 X-FCM 28/33 X-FCM 32/37 X-FCM 38/43 X-FCM 48/53	Grating fastener with standard disc, carbon steel, zinc plated	S-BT-GF M8/7 AN 6 S-BT-GF NG M8/7 AN 6 S-BT-MF M8/15 AN 6 according to BV Type Approval Certificate 45116 S-BT-GF M8/7 AN 6 HL S-BT-MF M8/15 AN 6 HL according to BV Type Approval Certificate 74271
X-FCM-F 23/28 X-FCM-F 28/33 X-FCM-F 32/37 X-FCM-F 38/43 X-FCM-F 48/53	Grating fastener with standard disc, carbon steel, duplex coated	S-BT-GF M8/7 AN 6 S-BT-GF NG M8/7 AN 6 S-BT-MF M8/15 AN 6 according to BV Type Approval Certificate 45116 S-BT-GF M8/7 AN 6 HL S-BT-MF M8/15 AN 6 HL according to BV Type Approval Certificate 74271
X-FCM-F L 28/33 X-FCM-F L 32/37 X-FCM-F L 38/43 X-FCM-F L 48/53	Grating fastener with large disc, carbon steel, duplex coated	S-BT-GF M8/7 AN 6 S-BT-GF NG M8/7 AN 6 S-BT-MF M8/15 AN 6 according to BV Type Approval Certificate 45116 S-BT-GF M8/7 AN 6 HL S-BT-MF M8/15 AN 6 HL according to BV Type Approval Certificate 74271
X-FCM-F HL 23/28 X-FCM-F HL 28/33 X-FCM-F HL 32/37 X-FCM-F HL 38/43 X-FCM-F HL 48/53	Grating fastener for high loads, carbon steel, duplex coated	S-BT-GF M8/7 AN 6 S-BT-GF NG M8/7 AN 6 S-BT-MF M8/15 AN 6 according to BV Type Approval Certificate 45116 S-BT-GF M8/7 AN 6 HL S-BT-MF M8/15 AN 6 HL according to BV Type Approval Certificate 74271
X-FCM-F NG 23/28 X-FCM-F NG 28/33 X-FCM-F NG 32/37 X-FCM-F NG 38/43 X-FCM-F NG 48/53	Grating fastener for gratings with small openings (narrow grating), carbon steel, duplex coated	S-BT-GF NG M8/7 AN 6 according to BV Type Approval Certificate 45116 S-BT-GF M8/7 AN 6 HL S-BT-MF M8/15 AN 6 HL according to BV Type Approval Certificate 74271

The grating fasteners from zinc plated carbon steel (X-FCM) and duplex coated carbon steel, (X-FCM-F, X-FCM-F L, X-FCM-F HL, X-FCM-F NG) can also be used in combination with Hilti powder-actuated threaded studs X-BT made from austenitic stainless steel.

Component name	Designation	Combination with threaded studs
X-FCM-R 23/28 X-FCM-R 28/33 X-FCM-R 32/37 X-FCM-R 38/43 X-FCM-R 48/53	Grating fastener with standard disc, stainless steel	S-BT-GR M8/7 SN 6 S-BT-GR NG M8/7 SN 6 S-BT-GR M8/7 SN 6 AL according to BV Type Approval Certificate 45116 S-BT-GR M8/7 SN 6 HL S-BT-GR M8/7 SN 6 HL AL according to BV Type Approval Certificate 74271 X-BT-GR M8/7 SN 8 according to BV Type Approval Certificate 54054
X-FCM-R L 28/33 X-FCM-R L 32/37 X-FCM-R L 38/43 X-FCM-R L 48/53	Grating fastener with large disc, stainless steel	S-BT-GR M8/7 SN 6 S-BT-GR NG M8/7 SN 6 S-BT-GR M8/7 SN 6 AL according to BV Type Approval Certificate 45116 S-BT-GR M8/7 SN 6 HL S-BT-GR M8/7 SN 6 HL AL according to BV Type Approval Certificate 74271 X-BT-GR M8/7 SN 8 according to BV Type Approval Certificate 54054
X-FCM-R HL 23/28 X-FCM-R HL 28/33 X-FCM-R HL 32/37 X-FCM-R HL 38/43 X-FCM-R HL 48/53	Grating fastener for high loads, stainless steel	S-BT-GR M8/7 SN 6 HL according to BV Type Approval Certificate 74271 X-BT-GR M8/7 SN 8 according to BV Type Approval Certificate 54054
X-FCM-R NG 23/28 X-FCM-R NG 28/33 X-FCM-R NG 32/37 X-FCM-R NG 38/43 X-FCM-R NG 48/53	Grating fastener for gratings with small openings (narrow grating), stainless steel	S-BT-GR NG M8/7 SN 6 according to BV Type Approval Certificate 45116 S-BT-GR M8/7 SN 6 HL S-BT-GR M8/7 SN 6 HL AL according to BV Type Approval Certificate 74271
X-FCS-R-3-25 31/35 X-FCS-R-3-25 37/41 X-FCS-R-4-25 31/35 X-FCS-R-4-25 37/41	Grating fastener for tension and shear load transfer, stainless steel	S-BT-GR M8/7 SN 6 S-BT-GR M8/7 SN 6 AL according to BV Type Approval Certificate 45116 S-BT-GR M8/7 SN 6 HL S-BT-GR M8/7 SN 6 HL AL according to BV Type Approval Certificate 74271 X-BT-GR M8/7 SN 8 X-BT M8-15-6 SN 12 R according to BV Type Approval Certificate 54054

2. DOCUMENTS AND DRAWINGS:

Designation	Revision / Date
Hilti Product Data Sheet – X-FCM Grating Fastening System	03/2022
Hilti Product Data Sheet – X-FCM Grating Fastening System, including X-FCM-F HL, S-BT HL	04/2023
Hilti Product Data Sheet – X-FCS-R Grating Fastening System	10/2020

3. TEST REPORTS:

According to the following tests:

- Test Report no. 269/95 at HTL Rankweil, AUSTRIA, dd. January 20th 1997
- DX-Development Report no: XE-07-34 at Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN dd. June, 15th 2007
- Evaluation Report no: XE-10-90 at Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN dd. May, 11th 2011
- Evaluation Report no: XE-18-12 at Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN dd. May, 22nd 2018
- Test Report no. ID 04112018 at Hilti (Shanghai) Ltd / CHINA dd. May, 10th 2018

- Evaluation Report no: XSMSse-02/2020 at Hilti Aktiengesellschaft, Schaan / LIECHTENSTEIN dd. November 27th 2020
- Hilti Development Report XSEje_05-20, QE report Narrow Grating System X-FCM NG / LIECHTENSTEIN dd. May 29th 2020
- Hilti Development Report XSEje_09.2-21, QE report Grating System X-FCM-F HL / LIECHTENSTEIN dd. October 13th 2021

4. APPLICATION / LIMITATION:

- 4.1 Conditions of applications, installation instructions and load data are to be observed according to the actual documentation and data sheets of the manufacturer.
The Hilti X-FCM and X-FCS-R grating fasteners are designed for attaching metal and fiberglass gratings (rectangular and square) to coated steel, aluminum and/or high strength steel in the marine and offshore environment.
The grating fasteners shall to be used in combination with Hilti powder-actuated threaded studs X-BT or screw-in threaded studs S-BT or S-BT HL, see BUREAU VERITAS Type Approval Certificate N° 54054 and N° 45116 and N° 74271.
The stainless-steel Hilti grating fasteners X-FCM-R, X-FCM-R L, X-FCM-R HL, X-FCM-R NG and X-FCS-R in combination with stainless-steel Hilti threaded studs X-BT-GR and S-BT-GR or S-BT-GR HL possesses very good resistance to corrosion in marine atmospheres and in the splash zone of sea water.
- 4.2 The Hilti X-FCM and X-FCS-R grating fastening system may be used in areas where drilling into the base material is permissible.
- 4.3 Dimensions and material specifications of the Hilti X-FCM and X-FCS-R grating fasteners:
Refer to Hilti Product Data Sheets for X-FCM Grating Fastening System and X-FCS-R Grating Fastening System as defined in section 2.
- 4.4 Type, grade and thickness of the base material:
Refer to Hilti Product Data Sheets for X-FCM Grating Fastening System and X-FCS-R Grating Fastening System as defined in section 2.
- 4.5 Grating material, grating properties and grating recommendation:
Refer to Hilti Product Data Sheets for X-FCM Grating Fastening System and X-FCS-R Grating Fastening System as defined in section 2.
- 4.6 Performance data (resistance values):
Refer to Hilti Product Data Sheets for X-FCM Grating Fastening System and X-FCS-R Grating Fastening System as defined in section 2.
- 4.7 Environmental conditions:
Refer to Hilti Product Data Sheets for X-FCM Grating Fastening System and X-FCS-R Grating Fastening System as defined in section 2.
- 4.8 The manufacturer's assembly instructions and recommendations are to be complied with.
Refer to Hilti Product Data Sheets for X-FCM Grating Fastening System and X-FCS-R Grating Fastening System as defined in section 2.
- 4.9 The Hilti X-FCM and X-FCS-R grating fastening systems 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 (for X-BT threaded studs) resp. 3 mm (for S-BT and S-BT HL threaded studs), and the minimum distance to the edge of a flange or cutout is not to be less than 15 mm.

5. PRODUCTION SURVEY REQUIREMENTS:

- 5.1 The mechanical fastening system are to be supplied by **Hilti Corporation** 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 and as such does not require a BUREAU VERITAS product certificate.
- 5.3 **Hilti Corporation** has to make the necessary arrangements to have its works recognised by BUREAU VERITAS in compliance with the requirements of NR320 for HBV products.
- 5.4 For information, **Hilti Corporation** has declared to BUREAU VERITAS the following production sites:
X-FCM, X-FCM-F, X-FCM-F L, X-FCM-F HL, X-FCM-R, X-FCM-R L, X-FCM-R HL:
WP-Wörgartner Produktions GmbH, Oberndorf / AUSTRIA
Ningbo World Broad Hardware & Electrical Co., Ltd., Yuyao / CHINA
- X-FCM-F NG and X-FCM-R NG:
Ningbo World Broad Hardware & Electrical Co., Ltd., Yuyao / CHINA
- X-FCS-R:
Daepac Industries Sdn. Bhd., 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 It is **Hilti Corporation**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.
- 7.3 This certificate supersedes the Type Approval Certificate N° 71291/A0 BV issued on 19 Apr 2022 by the Society.

*** END OF CERTIFICATE ***