

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Structural Connecting Elements**

with type designation(s)

HILTI Grating Fasteners X-FCM-R, X-FCM-R HL, X-FCM-M, X-FCS-R

Issued to

Hilti AG
Schaan, Liechtenstein

is found to comply with

**EN 1993-1-4:2006 Eurocode 3: Design of steel structures – Part 1-4: General rules –
Supplementary rules for stainless steels****EN 10088-2:2014 Stainless steels – Part 2: Technical delivery conditions for sheet/plate and
strip of corrosion resisting steels for general purposes****Application :****Refer to section Application in the certificate.**Issued at **Hamburg** on **2019-07-16**This Certificate is valid until **2024-07-15**.DNV GL local station: **Augsburg**Approval Engineer: **Guido Friederich**for **DNV GL**

Olaf Drews
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



PRODUCT DESCRIPTION

The Hilti X-FCM-R, X-FCM-R HL, X-FCM-M and X-FCS-R grating fastener belonging (in connection with threaded fastener X-BT, X-BT-GR and S-BT) to the Hilti fastening system, designed for attaching metal and fiberglass gratings (rectangular and square) to coated steel and/or high-strength steel for upstream and high corrosion environment (valid for -R products).

The grating fasteners are from carbon steel, duplex coated (X-FCM-M) or austenitic stainless steel (X-FCM-R, X-FCM-R HL, X-FCS-R) and will be assembled on the pre-installed threaded fastener.

- The X-FCM fastener consists from 3 parts: Cup washer (disc), Threaded stem (screw), Absorber

Abbreviation description:

- M: Cold rolled carbon steel – duplex coated (zinc coating plus reactive sealer)
- R: Austenitic stainless steel
- HL: "High Load"

- The X-FCS-R fastener consists from 2 parts: Clamping element (3 or 4 ears), Flange nut

These fasteners are designed such, that higher shear loads acting on the grating can be transferred into the base material without significant slip. The shear load transfer does not rely on friction but contact pressure (form-locking) between the X-FCS-R walls and the grating ribs/members.

Detailed information to be found in the Installation Instruction of manufacturer.

X-FCM-R (to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GR)

Designation	Item Description	Application
X-FCM-R 25/30	Stainless steel fastener. Assembly range $H_G = 25$ to 30 mm	Grating fastening
X-FCM-R 35/40	Stainless steel fastener Assembly range $H_G = 35$ to 40 mm	Grating fastening
X-FCM-R 45/50	Stainless steel fastener. Assembly range $H_G = 45$ to 50 mm	Grating fastening
X-FCM-R 1" -1.1¼"	Stainless steel fastener Assembly range $H_G = 29$ to 34 mm	Grating fastening

X-FCM-R HL (to be used in connection with Threaded Fasteners X-BT-GR)

Designation	Item Description	Application
X-FCM-R HL 25/30	Stainless steel fastener. Assembly range $H_G = 28$ to 33 mm	Grating fastening
X-FCM-R HL 35/40	Stainless steel fastener Assembly range $H_G = 38$ to 43 mm	Grating fastening
X-FCM-R HL 45/50	Stainless steel fastener. Assembly range $H_G = 48$ to 53 mm	Grating fastening
X-FCM-R HL 1" -1.1¼"	Stainless steel fastener Assembly range $H_G = 32$ to 37 mm	Grating fastening

X-FCM-M (to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GR, S-BT-GF)

Designation	Item Description	Application
X-FCM-M 25/30	Carbon steel fastener, duplex coated with an assembly range $H_G = 25$ to 30 mm	Grating fastening
X-FCM-M 35/40	Carbon steel fastener, duplex coated with an assembly range $H_G = 35$ to 40 mm	Grating fastening
X-FCM-M 45/50	Carbon steel fastener, duplex coated with an assembly range $H_G = 45$ to 50 mm	Grating fastening
X-FCM-M 1" -1.1¼"	Carbon steel fastener, duplex coated with an assembly range $H_G = 29$ to 34 mm	Grating fastening

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Certificate No: **TAS00001UJ**

X-FCS-R (to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GR)

Designation	Item Description	Application
X-FCS-R-3-25 31/35	Stainless steel fastener (3 ears) for gratings with an inner rib spacing of 25 mm. Assembly range $H_G = 31$ to 35 mm	Grating fastening
X-FCS-R-3-25 37/41	Stainless steel fastener (3 Ears) for gratings with an inner rib spacing of 25 mm. Assembly range $H_G = 37$ to 41 mm	Grating fastening
X-FCS-R-4-25 31/35	Stainless steel fastener (4 ears) for gratings with an inner rib spacing of 25 mm. Assembly range $H_G = 31$ to 35 mm	Grating fastening
X-FCS-R-4-25 37/41	Stainless steel fastener (4 ears) to fix grating with an inner rib spacing of 25 mm. Assembly range $H_G = 37$ to 41 mm	Grating fastening

Material specification grating fasteners:

X-FCM-M:

Cup washer (disc):

Material: Cold rolled carbon steel DC04 according to EN 10130
Dimensions: thickness t: 1.25 mm
outer \varnothing : 50 mm

Threaded stem (screw):

Material: 11SMNPB30+C according to EN 10277-3
Dimensions: outer \varnothing : 10.3 mm
stem length: 27, 31, 37, 47 mm

Absorber:

Material: Thermoplastic polyurethane
Properties: color: black; resistant to UV, water, salt water, ozone, oils, grease etc.

X-FCM-R:

Cup washer (disc):

Material: X2CrNiMo17-12-2, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: thickness t: 1.25 mm
outer \varnothing : 50 mm

Threaded stem (screw):

Material: X2CrNiMo17-12-2, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: outer \varnothing : 10.3 mm
stem length: 27, 31, 37, 47 mm

Absorber:

Material: Thermoplastic polyurethane
Properties: color: black; resistant to UV, water, salt water, ozone, oils, grease etc.

X-FCM-R HL*:

Cup washer (disc):

Material: X2CrNiMo17-12-2, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: thickness t: **1.5 mm**
outer Ø: 50 mm

Threaded stem (screw):

Material: X2CrNiMo17-12-2, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: outer Ø: 10.3 mm
stem length: 27, 31, 37, 47 mm

Absorber:

Material: Thermoplastic polyurethane
Properties: color: **red**; resistant to UV, water, salt water, ozone, oils, grease etc.

* suffix "HL" abbreviating "High Load":

- Grating fastener with higher tension resistance (e.g. relevant, if the fastener is used in wave-zone areas).
- The color of the absorber is **red**.

X-FCS-R:

Clamping element:

Material: X2CrNiMo17-12-2, AISI 316L
(equivalent to grade 1.4404 according to EN 10088-2)
Dimensions: thickness t: 2 mm
applicable for an inner rib spacing of 25 mm and a bar thickness of 5 mm

Flange nut:

Material: X5CrNiMo17-12-2, AISI 316
(equivalent to grade 1.4401 according to EN 10088-2)
Dimensions: high 12 mm, thread M8, wrench size 12 mm

Tightening Tools:

Tightening Tools according user manual/ Installation Instruction of manufacturer.

RESPONSIBILITY

Hilti AG, Schaan, Liechtenstein takes the responsibility that the design and production of the Grating Fasteners are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

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APPLICATION

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-R, X-FCM-R HL, X-FCM-M and X-FCS-R grating fastener are to be used only in connection with threaded fastener X-BT, X-BT-GR and S-BT (see DNV GL Type Approval Certificates 12272-10 HH, TAS00001SV and TAS00000N6)

The fasteners are designed and to be used for attaching metal and fiberglass gratings to coated steel and/or high-strength steel for upstream and high corrosion environment (valid for -R products).

The stainless-steel Hilti Grating Fastener system (suffix -R) possesses very good resistance to corrosion for a 10-year period of exposure to marine atmospheres and in the splash zone of sea water. From a corrosion-specific point of view it can be assumed that the Hilti X-BT system will have a life of more than 40 years, even under atmospheric conditions (corrosion categories C4 respectively C5-M) of use where chloride is present (marine atmospheres and in the splash zone).

LIMITATION

The grating fasteners are not to be used for the following locations:

On the shell plating, sea chests and collision bulkheads.

TYPE APPROVAL DOCUMENTATION

TESTS CARRIED OUT

Documentation of tests performed and referenced in the list above are the basis for this type approval.

MARKING OF PRODUCT

For traceability of products, marking shall be legible and indelible.

Products are to be marked at least as follows:

- Manufacturers name or trade mark
- Type designation

PERIODICAL ASSESSMENT

A condition for retention of the type approval certificate in its validity period is that periodical assessments are successfully carried out.

The objective of the periodical assessment is to verify that the conditions for the type approval have not been altered.

Regulations for the periodical assessment of the type approval certificate are to be found in the DNVGL Class Programme CP-0338.

It is further to be noted that the Society shall be informed of:

- any modifications to the product which are liable to affect its characteristics and functions, as originally specified and tested.
- any shifting of the production site and any additional production site.

If such notifications are not made, the validity of the type approval certificate terminates.

END OF CERTIFICATE