

TYPE APPROVAL CERTIFICATE

Certificate No:
TAS00001UJ
Revision No:
4

This is to certify:

That the **Structural Connecting Elements**

with type designation(s)

HILTI GRATING FASTENER: X-FCM-R, X-FCM-R L, X-FCM-R HL, X-FCM-R NG, X-FCM, X-FCM-F, X-FCM-F L, X-FCM-F HL, X-FCM-F NG, 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/LIMITATION** in the certificate.

Issued at **Hamburg** on **2023-08-22**

This Certificate is valid until **2028-08-21** .

DNV local unit: **Augsburg**

for **DNV**

Approval Engineer: **Thilo Pabst**

Sven Klingner
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



PRODUCT DESCRIPTION

The Hilti X-FCM-R, X-FCM-R L, X-FCM-R HL, X-FCM-R NG, X-FCM, X-FCM-F, X-FCM-F L, X-FCM-F HL, X-FCM-F NG and X-FCS-R grating fastener belonging (in connection with threaded fastener X-BT, X-BT-GR, S-BT-GR, S-BT-GR NG, S-BT-GF, S-BT-GF NG, , S-BT-MF, S-BT-GR HL, S-BT-GF HL, S-BT MF HL according to DNV Type Approval Certificates: TAS00001SV, TAS00000N6, TAS00003NW) to the Hilti fastening system, designed for attaching metal and fiberglass gratings (rectangular and square) to coated steel, aluminum (S-BT-GR, S-BT-GR NG, S-BT-GR HL only) and/or high strength steel for upstream and high corrosion environment (valid for -R products).

The grating fasteners are from carbon steel, zinc plated (X-FCM), duplex coated (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 threaded fastener.

The X-FCM fastener consists of three parts: Cup washer (disc), Threaded stem (screw), Absorber.

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

These X-FCS-R 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.

Abbreviation description:

no suffix:	Carbon steel – zinc coated
-F:	Carbon steel – duplex coated (zinc coating plus reactive sealer)
-R:	Stainless steel
-HL:	“High Load” - Grating fastener with higher tension resistance (e.g. relevant, if the fastener is used in wave-zone areas).
-NG:	“Narrow Grating” - Grating fastener for gratings with small openings (mesh width 13 mm to 22 mm).

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

Scope / Technical data

X-FCM-R - to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GR, S-BT-GR NG, S-BT-GR HL, S-BT-GR HL AL

Designation	Item Description	Application
X-FCM-R 23/28	Stainless steel fastener. Assembly range $h_G = 23$ to 28 mm	Grating fastening
X-FCM-R 28/33	Stainless steel fastener. Assembly range $h_G = 28$ to 33 mm	
X-FCM-R 32/37	Stainless steel fastener. Assembly range $h_G = 32$ to 37 mm	
X-FCM-R 38/43	Stainless steel fastener. Assembly range $h_G = 38$ to 43 mm	
X-FCM-R 48/53	Stainless steel fastener. Assembly range $h_G = 48$ to 53 mm	

X-FCM-R L - to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GR, S-BT-GR NG, S-BT-GR HL, S-BT-GR HL AL

Designation	Item Description	Application
X-FCM-R L 28/33	Stainless steel fastener. Assembly range $h_G = 28$ to 33 mm	Grating fastening
X-FCM-R L 32/37	Stainless steel fastener. Assembly range $h_G = 32$ to 37 mm	
X-FCM-R L 38/43	Stainless steel fastener. Assembly range $h_G = 38$ to 43 mm	
X-FCM-R L 48/53	Stainless steel fastener. Assembly range $h_G = 48$ to 53 mm	

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

Designation	Item Description	Application
X-FCM-R HL 23/28	Stainless steel fastener. Assembly range $h_G = 23$ to 28 mm	Grating fastening
X-FCM-R HL 28/33	Stainless steel fastener. Assembly range $h_G = 28$ to 33 mm	
X-FCM-R HL 32/37	Stainless steel fastener. Assembly range $h_G = 32$ to 37 mm	
X-FCM-R HL 38/43	Stainless steel fastener. Assembly range $h_G = 38$ to 43 mm	
X-FCM-R HL 48/53	Stainless steel fastener. Assembly range $h_G = 48$ to 53 mm	

X-FCM-R NG - to be used in connection with Threaded Fasteners S-BT-GR NG, S-BT-GR HL, S-BT-GR HL AL

Designation	Item Description	Application
X-FCM-R NG 23/28	Stainless steel fastener. Assembly range $h_G = 23$ to 28 mm	Grating fastening
X-FCM-R NG 28/33	Stainless steel fastener. Assembly range $h_G = 28$ to 33 mm	
X-FCM-R NG 32/37	Stainless steel fastener. Assembly range $h_G = 32$ to 37 mm	
X-FCM-R NG 38/43	Stainless steel fastener. Assembly range $h_G = 38$ to 43 mm	
X-FCM-R NG 48/53	Stainless steel fastener. Assembly range $h_G = 48$ to 53 mm	

X-FCM - to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GF, S-BT-MF, S-BT-GF NG, S-BT-GF HL, S-BT-MF HL

Designation	Item Description	Application
X-FCM 23/28	Carbon steel fastener, zinc plated. Assembly Range $h_G = 23$ to 28 mm	Grating fastening
X-FCM 28/33	Carbon steel fastener, zinc plated. Assembly range $h_G = 28$ to 33 mm	
X-FCM 32/37	Carbon steel fastener, zinc plated. Assembly range $h_G = 32$ to 37 mm	
X-FCM 38/43	Carbon steel fastener, zinc plated. Assembly range $h_G = 38$ to 43 mm	
X-FCM 48/53	Carbon steel fastener, zinc plated. Assembly range $h_G = 48$ to 53 mm	

X-FCM-F - to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GF, S-BT-MF, S-BT-GF NG, S-BT-GF HL, S-BT-MF HL

Designation	Item Description	Application
X-FCM-F 23/28	Carbon steel fastener, duplex coated. Assembly range $h_G = 23$ to 28 mm	Grating fastening
X-FCM-F 28/33	Carbon steel fastener, duplex coated. Assembly range $h_G = 28$ to 33 mm	
X-FCM-F 32/37	Carbon steel fastener, duplex coated. Assembly range $h_G = 32$ to 37 mm	
X-FCM-F 38/43	Carbon steel fastener, duplex coated. Assembly range $h_G = 38$ to 43 mm	
X-FCM-F 48/53	Carbon steel fastener, duplex coated. Assembly range $h_G = 48$ to 53 mm	

X-FCM-F L - to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GF, S-BT-MF, S-BT-GF NG, S-BT-GF HL, S-BT-MF HL

Designation	Item Description	Application
X-FCM-F L 28/33	Carbon steel fastener, duplex coated. Assembly range $h_G = 28$ to 33 mm	Grating fastening
X-FCM-F L 32/37	Carbon steel fastener, duplex coated. Assembly range $h_G = 32$ to 37 mm	
X-FCM-F L 38/43	Carbon steel fastener, duplex coated. Assembly range $h_G = 38$ to 43 mm	
X-FCM-F L 48/53	Carbon steel fastener, duplex coated. Assembly range $h_G = 48$ to 53 mm	

X-FCM-F HL - to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GF HL, S-BT-MF HL

Designation	Item Description	Application
X-FCM-F HL 23/28	Carbon steel fastener, duplex coated. Assembly range $h_G = 23$ to 28 mm	Grating fastening
X-FCM-F HL 28/33	Carbon steel fastener, duplex coated. Assembly range $h_G = 28$ to 33 mm	
X-FCM-F HL 32/37	Carbon steel fastener, duplex coated. Assembly range $h_G = 32$ to 37 mm	
X-FCM-F HL 38/43	Carbon steel fastener, duplex coated. Assembly range $h_G = 38$ to 43 mm	
X-FCM-F HL 48/53	Carbon steel fastener, duplex coated. Assembly range $h_G = 48$ to 53 mm	

X-FCM-F NG - to be used in connection with Threaded Fasteners X-BT, X-BT-GR, S-BT-GF NG, S-BT-GF HL, S-BT-MF HL

X-FCM-F NG 23/28	Carbon steel fastener, duplex coated. Assembly range $h_G = 23$ to 28 mm	Grating fastening
X-FCM-F NG 28/33	Carbon steel fastener, duplex coated. Assembly range $h_G = 28$ to 33 mm	
X-FCM-F NG 32/37	Carbon steel fastener, duplex coated. Assembly range $h_G = 32$ to 37 mm	
X-FCM-F NG 38/43	Carbon steel fastener, duplex coated. Assembly range $h_G = 38$ to 43 mm	
X-FCM-F NG 48/53	Carbon steel fastener, duplex coated. Assembly range $h_G = 48$ to 53 mm	

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

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	
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	
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	

Material specification grating fasteners:

X-FCM:

Cup washer (disc):

Material: Carbon steel zinc coated
Dimensions: Outer Ø = 50 mm

Threaded stem (screw):

Material: Carbon steel zinc coated
Dimensions: Outer Ø = 10.3 mm

Absorber:

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

X-FCM-F:

Cup washer (disc):

Material: Carbon steel duplex coated
Dimensions: Outer Ø = 50 mm

Threaded stem (screw):

Material: Carbon steel duplex coated
Dimensions: Outer Ø = 10.3 mm

Absorber:

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

X-FCM-F L:

Cup washer (disc):

Material: Carbon steel duplex coated
Dimensions: Outer Ø = 82 mm

Threaded stem (screw):

Material: Carbon steel duplex coated
Dimensions: Outer Ø = 10.3 mm

Absorber:

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

X-FCM-F HL:

Cup washer (disc):

Material: Carbon steel duplex coated
Dimensions: Outer Ø = 50 mm

Threaded stem (screw):

Material: Carbon steel duplex coated
Dimensions: Outer Ø = 10.3 mm

Absorber:

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

X-FCM-F NG:

Cup washer (disc):

Material: Carbon steel duplex coated
Dimensions: Outer Ø = 44 mm

Threaded stem (screw):

Material: Carbon steel duplex coated
Dimensions: Outer Ø = 10.3 mm

O-Ring:

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

X-FCM-R:

Cup washer (disc):

Material: Stainless steel, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: Outer Ø = 50 mm

Threaded stem (screw):

Material: Stainless steel, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: Outer Ø = 10.3 mm

Absorber:

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

X-FCM-R L:

Cup washer (disc):

Material: Stainless steel, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: Outer Ø = 82 mm

Threaded stem (screw):

Material: Stainless steel, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: Outer Ø = 10.3 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: Stainless steel, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: Outer Ø = 50 mm

Threaded stem (screw):

Material: Stainless steel, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: Outer Ø = 10.3 mm

Absorber:

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

X-FCM-R NG:

Cup washer (disc):

Material: Stainless steel, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: Outer Ø = 44 mm

Threaded stem (screw):

Material: Stainless steel, 1.4404 according to EN 10088-2
(equivalent to grade AISI 316L or A4)
Dimensions: Outer Ø = 10.3 mm

O-Ring:

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

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.

APPLICATION/LIMITATION

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 L, X-FCM-R NG, X-FCM-R HL, X-FCM, X-FCM-F, X-FCM-F L, X-FCM-F NG, X-FCM-F HL and X-FCS-R grating fastener are to be used only in connection with threaded fastener X-BT, X-BT-GR, S-BT-GR, S-BT-GR NG, S-BT-GF and S-BT-GF NG and S-BT-MF, S-BT-GR HL, S-BT-GF HL, S-BT MF HL according to DNV Type Approval Certificates: TAS00001SV, TAS00000N6 and TAS00003NW. The fasteners are designed and to be used for attaching metal and fiberglass gratings to coated steel, aluminum (S-BT-GR, S-BT-GR NG, S-BT-GR HL only) 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, S-BT and S-BT HL systems (stainless steel) 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, collision bulkheads, tanks.

TYPE APPROVAL DOCUMENTATION



TESTS CARRIED OUT

INVESTIGATION OF THE CORROSION RESISTANCE OF HILTI X-BT FASTENERS IN MARINE ATMOSPHERES AND IN SEA

TENSION AND SHEAR TESTS WITH THE GRATING FASTENER X-FCS-R COMBINED WITH X-BT-GR

MARKING OF PRODUCT

For traceability of products, marking shall be legible and indelible. Products are to be marked at least as follows:

Scope	Example
<ul style="list-style-type: none"> - Manufacturer's name or trademark - Type / Designation 	<p>Marking sample:</p>  

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 DNV Class Programme CP-0338.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

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.
- Shifting of the production site and additional production site.

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

END OF CERTIFICATE