



X-FCM-R HL DATA SHEET

Grating fastening system

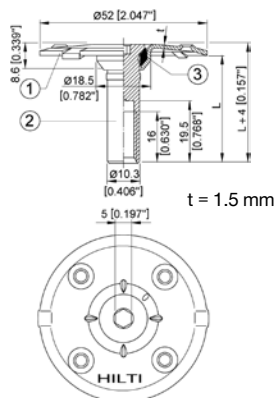


X-FCM-R HL Grating fastening system

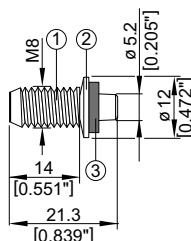
Product data

Dimensions

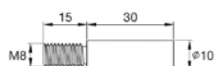
X-FCM-R HL



X-BT-GR M8/7 SN 8



X-SEA-R30 M8



Features and benefits

The X-FCM-R HL together with the X-BT-GR M8 threaded fasteners forms a high resistance and robust fastening system to fix grating in marine C5 corrosive environment:

- High tension resistance for use in wave zones
- Robust shear behavior
- No rework of backside of coated base material with thickness ≥ 8 mm
- Base material coating up to 500 μm
- No application limits in terms of base material strength and thickness
- Vibration resistant

General information

Material specifications

Disk (1) and	A4 / 316
threaded stem (2):	1.4404, X2CrNiMo17-12-2
Absorber (3) ¹⁾ :	TPU – thermoplastic polyurethane, red

¹⁾ resistant to: UV, saltwater, ozone, oil, grease

X-SEA-R 30 M8:	A4 / 316
	1.4401 or 1.4571

Recommended fastening tools

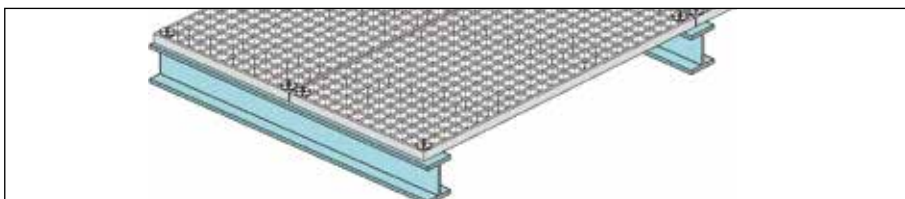
See **X-FCM-R HL fastener program** in the next pages and **Tools and equipment** chapter for more details.

Approvals

ABS, BV
DNV GL, LR



Application



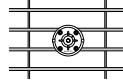
Position and fix steel or fibre-reinforced grating to steel

Load data

Recommended tensile loads N_{rec} [kN]

Grating opening type

Rectangular



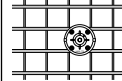
Clear bar spacing [mm] ¹⁾

18 to 24 | >24 to 30 | >30 to 35 | >35 to 44

X-FCM-R HL	2.8	2.1	1.4	0.7
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Grating opening type

Square



Clear mesh width [mm]

18 to 38²⁾ | > 38 to 44¹⁾

X-FCM-R HL	3.6	1.2
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¹⁾ Loading is limited by elastic limit of the X-FCM-R HL grating fastener.

²⁾ Loading is limited by recommended load of threaded stud X-BT-GR M8/7 SN 8. Exceeding recommended loads might reduce the pre-tensioning of the connection.

Remark: Full utilization of X-FCM-R HL load data requires the use of the X-BT-GR M8/7 SN 8 threaded stud with $T = 16 - 20 \text{ Nm}$

Characteristic tensile loads N_{Rk} can be conservatively calculated by multiplying the recommended load values N_{rec} with the factor 2.8, $N_{Rk} = 2.8 * N_{rec}$

Recommended shear loads V_{rec} [kN]

Without extension adapter X-SEA-R

For grating with clear rectangular mesh width from 18 to 44 mm: $V_{rec} = 0.4 \text{ kN}$

For grating with clear square mesh width from 18 to 44 mm: $V_{rec} = 0.6 \text{ kN}$

With extension adapter X-SEA-R

For grating with clear rectangular or square mesh width from 18 to 44 mm: $V_{rec} = 0.4 \text{ kN}$

Notes:

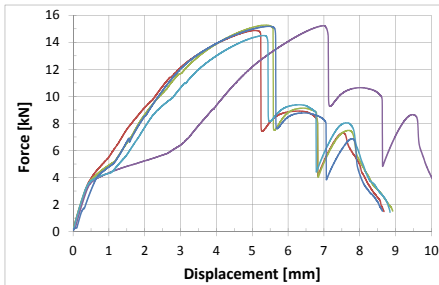
Those recommended loads V_{rec} are based on friction under standard conditions without the presence of lubricants (e.g. oil, grease) and require the application of an installation torque $T = 16 - 20 \text{ Nm}$. The respective slips are in the range of 0.2 mm.

Those values allow robust positioning e.g. in case of transportation of preassembled units. Structural applications – e.g. stabilizing the compression flange of a supporting beam, if the grating is used as a diaphragm – are out of scope of the X-FCM-R HL grating fastener.

Load displacement behavior – examples:

Tensile load

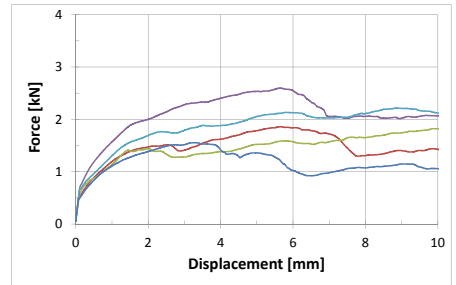
Example with square grating and a clear mesh width of 30 x 30 mm



Failure mode: Pull-over of disk (1) over the threaded stem (2)

Shear load

Example with rectangular grating and a clear bar spacing of 44 mm



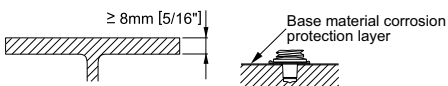
Notes:

Graph shows slipping behavior due to friction. The actual ultimate resistance will be significantly higher, as the grating itself will get into contact with the X-FCM-R HL fastener. However, those resistances are not used for design purpose due to the high deformation at those states.

Application requirements

Thickness of base material

X-BT-GR M8/7 SN8



To prevent damage of back side coating: base material thickness ≥ 8 mm. Thickness of base material corrosion protection considered up to 500 μm .

Thickness of fastened material

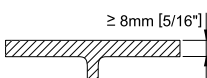
Grating height: 28–43 mm, 48–53 mm

Grating height: 58–73 mm, 78–83 mm with the extension adapter X-SEA-R30 M8.

Corrosion information

X-FCM-R HL and X-BT-GR grating fastening system is intended for use in coastal and offshore applications

Application limit

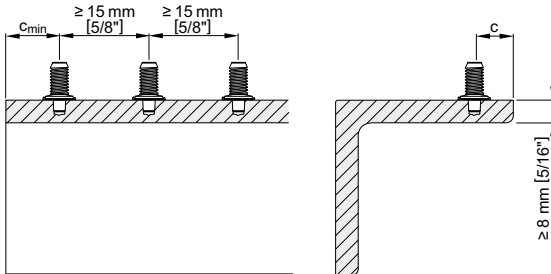


$t_{II} \geq 8$ mm [5/16"] \rightarrow No through penetration
No limits with regards to steel strength

Spacing and edge distance

Edge distance: $c \geq 10 \text{ mm}$

Spacing: $\geq 15 \text{ mm}$

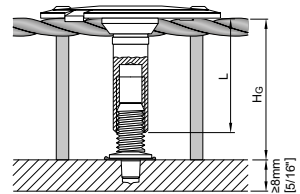


Fastener selection and system recommendation

Fastener program

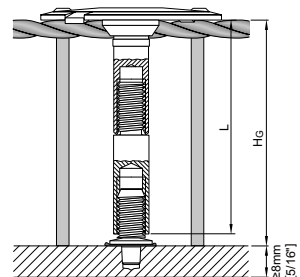
X-FCM-R HL

Designation	Item no.	Dimensions	
		L [mm]	Grating height H_G [mm]
X-FCM-R HL 25/30	2194345	23	28 – 33
X-FCM-R HL 1" - 1¼"	2194346	27	32 – 37
X-FCM-R HL 35/40	2194347	33	38 – 43
X-FCM-R HL 45/50	2194348	43	48 – 53



X-FCM-R HL in combination with X-SEA-R30 M8 (Item no. 432274)

Designation	Item no.	Dimensions	
		L [mm]	Grating height H_G [mm]
X-FCM-R HL 25/30	2194345	53	58 – 63
X-FCM-R HL 1" - 1¼"	2194346	57	62 – 67
X-FCM-R HL 35/40	2194347	63	68 – 73
X-FCM-R HL 45/50	2194348	73	78 – 83



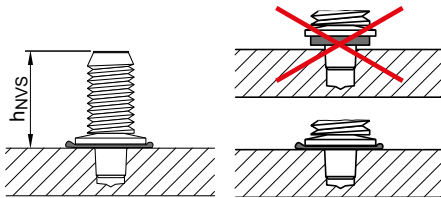
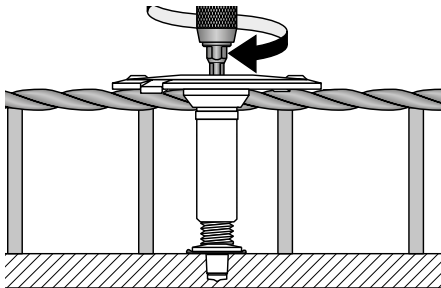
X-BT-GR stainless steel stud

Designation	Item no.	Tool
		Designation
X-BT-GR M8/7 SN 8	2194344	DX 351-BTG

Cartridge selection and tool energy setting

6.8/11 M10 high precision brown cartridge

The recommended tool energy setting = 1 (if required, increase of energy setting based on job site tests)

Fastening quality assurance
Fastening inspection

X-BT-GR M8/7 SN 8
 $h_{NVS} = 15.7-16.8 \text{ mm}$
Installation

Tightening torque $T = 16-20 \text{ Nm}$
Tightening tool:

- Screwdriver (SF6, speed 1, clutch 11)
- with torque release coupling (TRC)
- 5 mm Allen-type bit
- Hilti torque tool X-BT ¼" 20 Nm

Details on installation are given in the instructions for use which are supplied together with the product.

