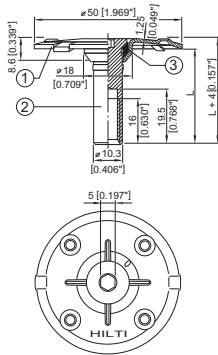


# X-FCM Grating Fastening System

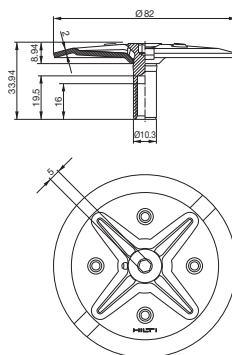
## Product data

### Dimensions

X-FCM



X-FCM-M\_L



### General information

#### Material specifications

See fastener selection for more details.

#### Recommended fastening tools

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

#### Approvals

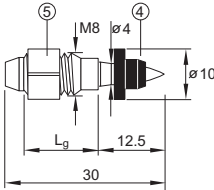
GL, BV, DNV: X-FCM-M, X-FCM-R

ABS, LR: all types

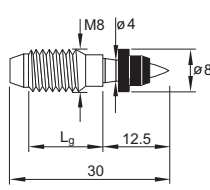
No approvals for X-FCM-M\_L



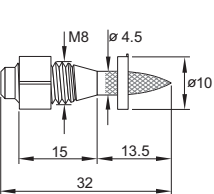
X-CRM8-15-12 FP10



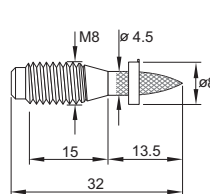
X-CRM8-15-12 P8



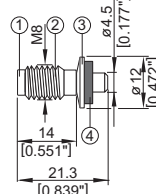
X-EM8H-15-12 FP10



X-EM8H-15-12 P8

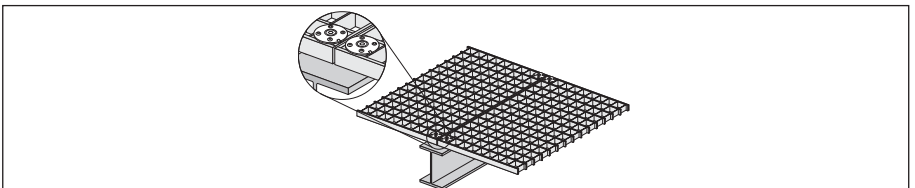


X-BT M8-15-6 SN12-R



## Applications

### Example



Grating (steel and fiberglass reinforced)

## Load data

### Recommended tensile loads $N_{rec}$ [kN]

	Grating opening type				Grating opening type				
	Rectangular		Square		Rectangular		Square		
	Bar spacing [mm]		Bar spacing [mm]		Bar spacing [mm]		Bar spacing [mm]		
	18	30	18	30	30	57	30	60	
<b>X-FCM</b>	0.8**	0.8**	2.4*	0.8**	<b>X-FCM-M_L</b>	0.8**	0.8**	1.8*	0.8**
<b>X-FCM-M</b>	0.8**	0.8**	1.8*	0.8**					
<b>X-FCM-R</b>	1.4**	1.0**	1.8*	1.0**					

\* Loading is limited by recommended load for threaded stud.

\*\* Loading is limited by elastic limit of the **X-FCM** disk. Exceeding recommended loads can result in plastic deformation of disk.

#### Notes:

**X-FCM**, **X-FCM-M**, **X-FCM-R**, **X-FCM-M\_L** resist shear by friction and are not suitable for explicit shear load designs, e.g. diaphragms. Depending on surface characteristics, shear loads of up to about 0.3 kN will not result in permanent deformation. Therefore small unexpected shear loads can generally be accommodated without damage.

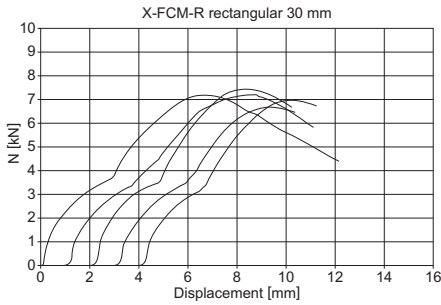
### Characteristic tensile loads $N_{Rk}$ :

Type	Grating – bar spacing	X-FCM-R with		X-CRM
		X-BT S235 / A36 steel	> S355 / Grade 50 steel	
	Rectangle 18 mm	4.2 kN / 945 lb*	4.2 kN / 945 lb*	4.2 kN / 945 lb*
	Rectangle 30 mm	3.0 kN / 675 lb*	3.0 kN / 675 lb*	3.0 kN / 675 lb*
	Square 18 mm	5.4 kN / 1215 lb	6.9 kN / 1550 lb	5.4 kN / 1215 lb
	Square 30 mm	3.0 kN / 675 lb*	3.0 kN / 675 lb*	3.0 kN / 675 lb*

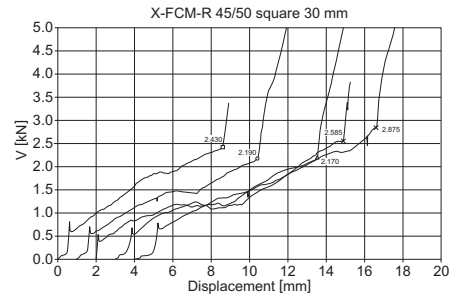
\* Loading is limited by elastic limit of the **X-FCM** disc.

**Load displacement behaviour – examples:**

**Tensile load**



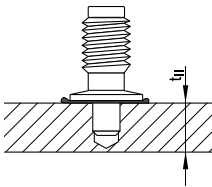
**Shear load**



**Application requirements**

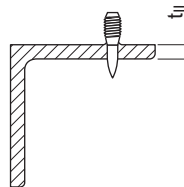
**Thickness of base material**

**X-BT**



$t_{II} \geq 8 \text{ mm}$

**X-CRM and X-EM8H**



$t_{II} \geq 6 \text{ mm}$

**Thickness of fastened material**

**Grating height: 25–50 mm** with standard X-FCM. For other dimensions special X-FCM are available on demand.

**Spacing and edge distances**

**X-CRM, X-EM8H**

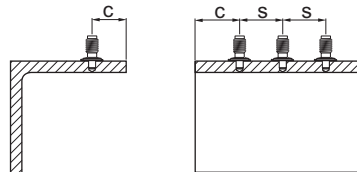
Edge distances:  $c \geq 15 \text{ mm}$

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

**X-BT**

Edge distance:  $c \geq 6 \text{ mm}$

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

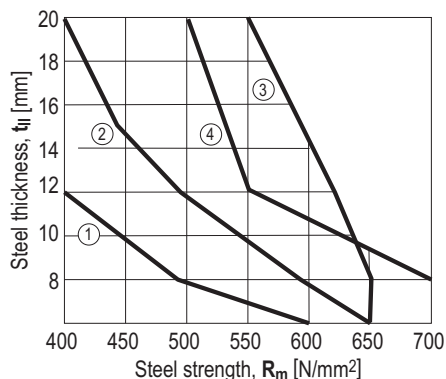


### Corrosion information

The intended use of the **X-EM8H** carbon steel fasteners only comprises fastenings which are not directly exposed to external weather conditions or moist atmospheres. For outdoor applications **X-BT** or **X-CRM** stainless steel fasteners have to be used, see fastener selection.

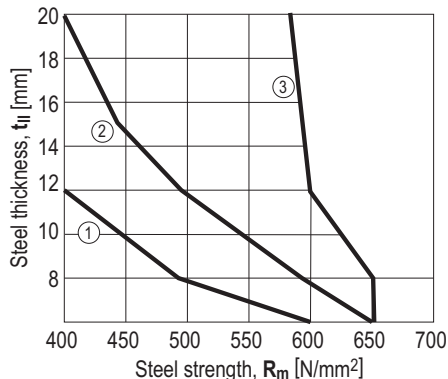
### Application limits

#### DX 76, DX 76 PTR



- ① **X-CRM8-15-12 FP10** /  
DX 76, DX 76 PTR (impact)
- ② **X-CRM8-15-12 FP10** /  
DX 76, DX 76 PTR (co-acting)
- ③ **X-EM8H-15-12 FP10** /  
DX 76, DX 76 PTR (impact)
- ④ **X-EM8H-15-12 P8** /  
DX 76, DX 76 PTR (impact)

#### DX 460



- ① **X-CRM8-15-12 P8** / DX 460 (impact)
- ② **X-CRM8-15-12 P8** / DX 460 (co-acting)
- ③ **X-EM8H-15-12 P8** / DX 460 (impact)

**X-BT:** No application limits → using in high strength steel  
 No through penetration →  $t_{II} \geq 8 \text{ mm} \left[ \frac{5}{16}'' \right]$

**Fastener selection and system recommendation**

**Fastener program**

**Application areas**

Indoors, dry and non corrosive environment

Indoors, mildly corrosive environment, or for limited lifetime use

Marine, offshore, petrochemical, caloric (coal, oil) power plants, etc.

**X-FCM system**

				Dimensions		Tools		
X-FCM Zinc plated	Item no.	X-FCM-M Duplex coated	Item no.	X-FCM-R Stainless steel	Item no.		L [mm]	Grating height [mm]
<b>X-FCM 25/30</b>	26582	<b>X-FCM-M 25/30</b>	378683	<b>X-FCM-R 25/30</b>	247181	<b>23</b>	<b>25-30</b>	1)
<b>X-FCM 1"-1 1/4"</b>	247175	<b>X-FCM-M 1"-1 1/4"</b>	378686	<b>X-FCM-R 1"-1 1/4"</b>	247184	<b>27</b>	<b>29-34</b>	1)
<b>X-FCM 35/40</b>	26583	<b>X-FCM-M 35/40</b>	378684	<b>X-FCM-R 35/40</b>	247182	<b>33</b>	<b>35-40</b>	1)
<b>X-FCM 45/50</b>	26584	<b>X-FCM-M 45/50</b>	378685	<b>X-FCM-R 45/50</b>	247183	<b>43</b>	<b>45-50</b>	1)
		<b>X-FCM-M 31/36 L</b>	2042852*			<b>25</b>	<b>31-36</b>	1)

\*For use only with X-BT M8-15-6 SN12-R

Note:  
Not for use in marine atmosphere or in heavily polluted environment.

Note:  
Not for use in automobile tunnels, swimming pools or similar environments

1) SF 100-A, SF 11-A, SF 150-A, SF 121-A, SF 14, SF 14-A, SF 18-A, SFC 18-A, SF 22-A

**Threaded studs**

	Item no.	Tools
<b>X-EM8H-15-12 P8</b>	271981	2)
<b>X-EM8H-15-12 FP10</b>	271982	2)
<b>X-BT M8-15-6 SN12-R</b>	377074	3)
<b>X-CR M8-15-12 P8</b>	372033	2)
<b>X-CR M8-15-12 FP10</b>	372034	2)

2) DX 76 PTR, DX 460

3) DX 351-BTG

**Cartridge selection and tool energy setting**

**X-BT**

**6.8/11M high precision brown** cartridges

**X-CRM**

**6.8/11M yellow or red** cartridges with DX 460

**6.8/18M blue** cartridges with DX 76 and DX 76 PTR

Tool energy adjustment by setting tests on site.

**X-EM8H**

**6.8/11M red or black** cartridges with DX 460

**6.8/18M blue, red or black** cartridges with DX 76 and DX 76 PTR

## Material specifications and coatings

### X-FCM system

	X-FCM-R		X-FCM-M+X-FCM-M_L		X-FCM		All systems ③ Absorber <sup>1)</sup>
	① Disk	② Threaded stem	① Disk	② Threaded stem	① Disk	② Threaded stem	
Material designation	X2CrNiMo17122	X2CrNiMo17122	DC 04	11SMNPB30+C	DC 04	11SMNPB30+C	Polyurethane Black
Coating	none	none	Duplex*	Duplex*	≥20µm Zn	10–20 µm Zn	–

<sup>1)</sup> resistant to: UV, saltwater ozone, oil, grease

<sup>\*</sup>) comparable to 45 µm HDG steel (480 h Salt spray test per DIN 50021)

### Threaded studs

	X-BT			X-CRM8		X-EM8H
	Shank ①	Threaded sleeve ② SN12-R washer ③	Sealing washer <sup>1)</sup> ④	Shank	Threaded sleeve	
Material designation	Stainless steel CR 500 (A4 / AISI316)	X2CrNiMo17132 X5CrNiMo17122+2H (A4 / AISI316)	Elastomer, black	Stainless steel CR 500 (A4 / AISI316)	X2CrNiMo17132 X5CrNiMo17122+2H (A4 / AISI316)	Carbon steel  Ck 67 MOD
Coating	none	none		none	none	5–13 µm Zn <sup>2)</sup>

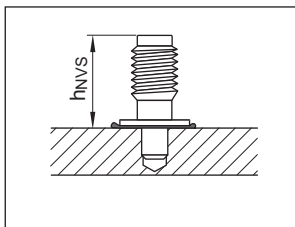
<sup>1)</sup> resistant to: UV, saltwater ozone, oil, grease

<sup>2)</sup> Zinc applied by electroplating. Intended for corrosion protection during shipment, storage, construction and service in protected environment. It is not adequate for protection against corrosion in outside or otherwise corrosive applications

## Fastening quality assurance

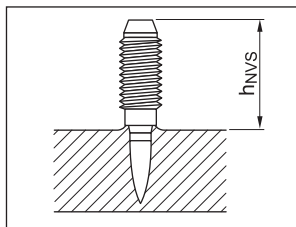
### Fastening inspection

X-BT M8-15-6 SN12-R



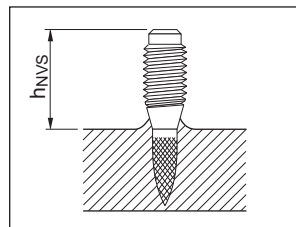
$h_{NVS} = 15.7\text{--}16.8 \text{ mm}$

X-CRM8-15-12



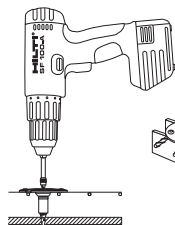
$h_{NVS} = 16\text{--}20 \text{ mm}$

X-EM8 H-15-12



$h_{NVS} = 15.5\text{--}19.5 \text{ mm}$

Tighten the disk



**Tightening torque**

$T_{rec} = \text{max. } 8 \text{ Nm}$

**Tightening tool:**

- Screwdriver with torque release coupling (TRC)
- 5 mm Allen-type bit

Hilti Screwdriver	Torque setting
<b>SF 121-A</b>	6–10
<b>SF 150-A</b>	5–8
<b>SF 14</b>	5–8
<b>SF 14-A</b>	6–10
<b>SF 18-A</b>	5–8
<b>SFC 18-A</b>	5–8
<b>SF 22-A</b>	5–8



