



Attached are page(s) from the 2008 Hilti North American Product Technical Guide. For complete details on this product, including data development, product specifications, general suitability, installation, corrosion, and spacing & edge distance guidelines, please refer to the Technical Guide, or contact Hilti.

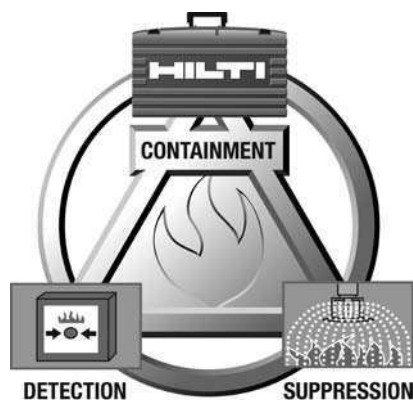


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- Design Centers
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- Online Ordering
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MI - Industrial Pipe Support Technical Guide

A guide to specifying the Hilti modular pipe support system for medium to heavy loads without welding.

- MI System is the ideal solution for pipes up to 24 in. diameter
- Reliable fastenings without welds
- Easily installed

Grating & Checkerplate Fastener Selection 3.3.1

The following sections describe grating and checkerplate fastening solutions for marine (Oil and Gas Upstream) and non-marine environments. These solutions consist of powder-actuated and mechanical fasteners which provide the installer with highly productive, high quality solutions which are designed to fit the needs of the particular application.

The primary concern when determining which solution to choose will be the level of corrosion resistance required. For marine environments, Hilti offers a stainless steel grating or checkerplate disk and powder-actuated stud. Stainless steel studs are attached directly using Hilti powder-actuated tools, while the disk is then attached using a screw fastening tool. If through penetration of the base material is not desired, or if the base material onto which the grating panels are installed is very thick, an option for stud attachment is the Hilti X-BT system. The Hilti X-BT system consists of a specialized

tool set which enables the installer to pre-drill a small pilot hole into the base steel. A blunt tip stud, the diameter of which is slightly larger than that of the pre-drilled hole is then fastened down with a Hilti powder-actuated tool directly into the pilot hole. Finally, the disk is installed with a screw fastening tool.

For non-marine environments, Hilti offers a portfolio of powder-actuated fasteners which feature stainless steel fasteners and duplex coated (similar to hot dip galvanized) pre-mounted fasteners. These fasteners offer high productivity and corrosion resistance at a level which is typically needed in non-marine, semi-corrosive exposed environments. For those cases where powder-actuated solutions are not desired, or where base materials are very thick (over 1/2" structural steel), Hilti also offers a mechanical clamp, the X-MGR. This fastener features a hot dip galvanized coating, and will fit most standard open bar grating panels.

X-FCM Grating Disk System

X-GR Grating Fastening System

X-GR RU Grating Fastening System

X-MGR Grating Fastening System



Hilti Grating and Checkerplate Product Selection Guide¹

Hilti System	Corrosion Resistance			Grating/ Checkerplate Height in. (mm)	Base Steel Thickness in. (mm)	Connection Type	
	Zinc Electroplated	Hot-Dipped Galvanized	Stainless Steel			Powder-Actuated/ Mechanical	Permanent/ Removable
X-FCM Grating Disk System	X-FCM	X-FCM-M Duplex Coated ²	X-FCM-R	Steel or FRP Grating 1 to 2 (25 to 50)	≥ 1/4 ³ (≥ 6)	Powder-Actuated	Removable ⁵
X-FCP Checkerplate Disk System	-	X-FCP-M Duplex Coated ²	X-FCP-R	Checkerplate 1/4 to 1/2 (6 to 12)		Powder-Actuated	Removable ⁵
X-GR Grating Fastening System	-	Duplex Coated ²	-	Steel Grating 1 to 1-1/2 (25 to 38)	1/4 to 1/2 (6 to 12)	Powder-Actuated	Permanent
X-GR RU Grating Fastening System	-	Duplex Coated ²	-	Steel Grating 1 to 1-1/2 (25 to 38)	1/4 to 1/2⁴ (6 to 12)	Powder-Actuated	Removable ⁵
X-MGR Grating Fastening System	-	Minimum 45 µm	-	Steel Grating 1 to 1-1/2 (25 to 38)	1/8 to 1 (3 to 25)	Mechanical	Removable

- Reference entire section for specific details on load values, selection and installation. More information on X-FCM Grating and X-FCP Checkerplate Disk Systems can be found in Section 3.3.2. More information on X-GR, X-GR RU and X-MGR Grating Systems can be found in Section 3.3.3.
- Duplex coating tested to 480 hours salt spray test per DIN 50021 and 10 cycles Kesternich test per DIN 50018/2.0 (Comparable to 45 microns HDG coating).
- X-BT M8 threaded studs require a minimum steel thickness of 5/16" (8 mm) to ensure no through point penetration. X-CRM8 threaded studs have an application limit of 1/2" (12 mm).
- Fastening X-GR RU fasteners into base material thicknesses greater than 1/2" (12 mm) may be possible. Site testing is required.
- Disk or saddle may be removed easily. Threaded stud or base will remain in base steel unless removed by overloading fastener.

3.3.2 X-FCM & X-FCP Grating & Checkerplate

3.3.2.1 Product Description

3.3.2.2 Material Specifications

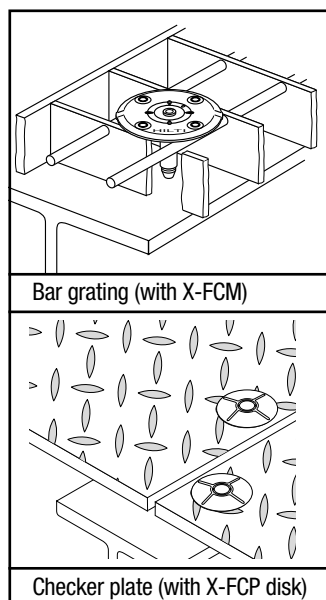
3.3.2.3 Technical Data

3.3.2.4 Installation Instructions

3.3.2.5 Ordering Information

X-FCM

X-FCP



Listings/Approvals

ABS (American Bureau of Shipping)
for X-FCM-R and X-FCP-R

Lloyds Register
for all X-FCM types

3.3.2.1 Product Description

The Hilti Grating Fastening System consists of the X-FCM Grating Disk, an 8 mm powder-actuated threaded stud, and a powder-actuated tool equipped with a special grating adapter that fits through the bar grating and contacts the base steel. The X-FCM Grating Disk is available in three lengths to accommodate grating thickness of 1" to 2".

Carbon steel disks are available zinc plated or with duplex coating. The stainless steel disks offer the highest corrosion resistance. The 8 mm threaded studs are available in zinc plated hardened steel or stainless steel.

The X-FCP Fastening System is used to fasten flat floorplates with thicknesses of 1/4" to 1/2" to supporting steel structures. The Hilti X-FCP Fastening System includes the X-FCP Disk, an 8 mm powder-actuated threaded stud and a powder-actuated tool with specialized adapter. The adapter is designed to fit through a 3/4" diameter pre-drilled hole in the checkerplate or other similar solid flooring material, and contact the base steel. The X-FCP Disk is available in duplex coated carbon steel or stainless steel. The 8 mm threaded studs are available in zinc plated hardened steel or stainless steel.

Product Features

- Grating or checkerplate are fastened in place
- Topside only access needed
- Removable* and reusable*
- Corrosion resistance of stainless disks and X-CRM8 Threaded Studs
- Non-trip profile
- Non-slip surfaces
- No electrical or pneumatic power required

* Only disk part of fastener can be removed and reused. Threaded stud remains in place unless removed by overloading the fastener.

Guide Specification

05500 Metal Fabrications 05540 Grating

Disk: X-FCM Disk shall be electroplated or duplex coated carbon steel or stainless steel, which consists of an assembly of a disk and an 8 mm internally threaded screw manufactured by Hilti.

Stud: Powder-actuated threaded stud for attaching the X-FCM Disk shall be X-CRM8-15-12, X-BT M8-15-6 SN12-R stainless steel or X-EM8H-15-12 electroplated carbon steel studs manufactured by Hilti.

Installation: Contact a manufacturer's representative from Hilti to provide training to the operators at the project site.

0553X Floor Plates

Disk : X-FCP Disk shall be duplex coated carbon steel or stainless steel, which consists of an assembly of a disk and an 8 mm internally threaded screw manufactured by Hilti.

Stud : Powder-actuated threaded stud for attaching the X-FCP Disk shall be X-CRM8-9-12 or X-CRM8-15-12 stainless steel studs manufactured by Hilti.

Installation : Contact a manufacturer's representative from Hilti to provide training to the operators at the project site.

Note: For exterior or potentially corrosive environments, the stainless steel stud is generally recommended due to potential for HASCC with carbon steel studs. Refer to Section 2.3.2.3.

X-FCM & X-FCP Grating & Checkerplate 3.3.2

3.3.2.2 Material Specifications

Component	X-FCM		X-FCM-M and X-FCP-M		X-FCM-R and X-FCP-R	
	Material	Coating	Material	Coating	Material	Coating
Disk	Carbon Steel	ASTM B 633 SC 1, Type III	Carbon Steel	65 µm Zinc	SAE 316	None
Threaded Extension	Carbon Steel	ASTM B 633 SC 1, Type III	Carbon Steel	Duplex ¹	SAE 316	None
Threaded Stud	Carbon Steel	ASTM B 633 SC 1, Type III	SAE 316 equivalent	None	SAE 316 equivalent	None

¹ 480 hour salt spray test per DIN 500 21 and 10 cycles Kesternich test per DIN 50018/2.0 (Comparable to 45 microns HDG coating).

3.3.2.3 Technical Data

Allowable Tension Loads for X-FCM, X-FCM-M or X-FCM-R with Grating, lb (kN)^{1,2,4}

Fastener Description	Rectangular Grid Barspacing in. (mm)		Square Grid Barspacing in. (mm)	
	3/4 (19)	1-3/16 (30)	3/4 (19)	1-3/16 (30)
X-FCM	180 (0.8)	180 (0.8)	540 (2.4) ³	180 (0.8)
X-FCM-M	180 (0.8)	180 (0.8)	405 (1.8) ³	180 (0.8)
X-FCM-R	315 (1.4)	225 (1.0)	405 (1.8) ³	225 (1.0)

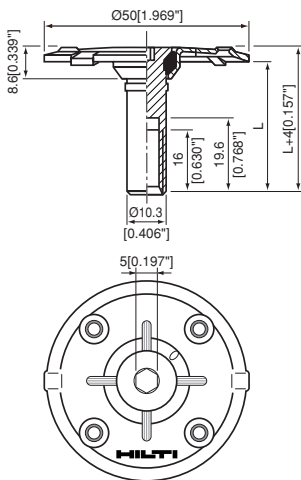
1. Allowable loads represent the capacity of the Hilti Grating System only. The capacity of the grid must be investigated in accordance with accepted design criteria.
2. Unless otherwise noted, load values are limited by plastic deformation of the X-FCM disk.
3. Load value is limited by recommended load for threaded stud.
4. X-FCM, X-FCM-M, X-FCM-R Fastening Systems 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 65 lb (0.3 kN) will not result in permanent deformation. Therefore, small unexpected shear loads can generally be accommodated without damage.

Allowable Tension Load for X-FCP-M and X-FCP-R with Checkerplate^{1,3}

Fastener Description	Allowable Tension Loads ² lb (kN)
X-FCP-M X-FCP-R	405 (1.8)

Note: For exterior or potentially corrosive environments, the stainless steel stud is generally recommended due to potential for HASSC with carbon steel studs. Refer to Section 2.3.2.3.

- 1 Allowable loads represent capacity of X-FCP disk or threaded stud. The capacity of checkerplate must be investigated in accordance with accepted design criteria.
- 2 Limited by the strength of the X-CRM8 threaded stud.
- 3 X-FCP-M and X-FCP-R are not intended for shear loading.



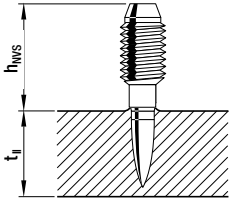
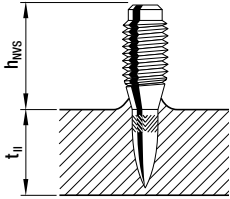
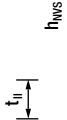
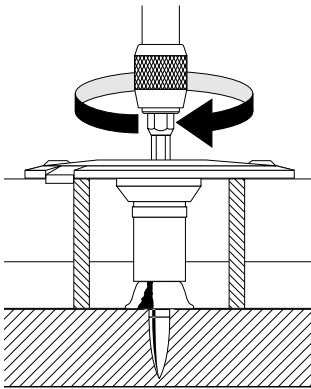
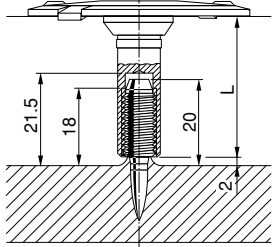
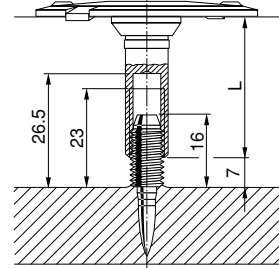
Product Selection Guide for Grating

	Electroplated	Duplex Coated ¹	Stainless Steel	L in. (mm)	Grating Height in. (mm)
Grating Disk	X-FCM 25/30	X-FCM-M 25/30	X-FCM-R 25/30	0.906 (23)	1 to 1-3/16 (25-30)
	X-FCM 1-1/4 to 1-1/2	X-FCM-M 1-1/4 to 1-1/2	X-FCM-R 1-1/4 to 1-1/2	1.181 (30)	1-1/4 to 1-1/2 (32-38)
	X-FCM 35/40	X-FCM-M 35/40	X-FCM-R 35/40	1.299 (33)	1-3/8 to 1-9/16 (35-40)
	X-FCM 45/50	X-FCM-M 45/50	X-FCM-R 45/50	1.693 (43)	1-3/4 to 2 (45-50)
Threaded Stud	X-EM8H-15-12 FP10	-	-	-	-
	-	X-CRM8-15-12 FP10	-	-	-
	X-EM8H-15-12 P8	-	-	-	-
	-	X-BT M8-15-6 SN12-R	-	-	-

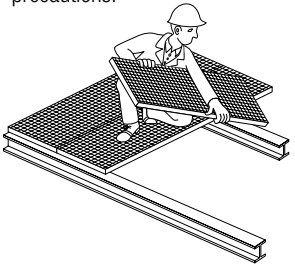
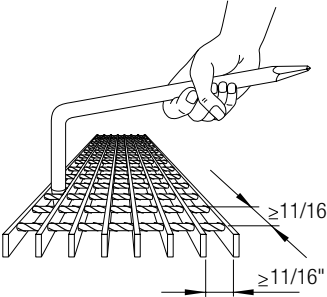
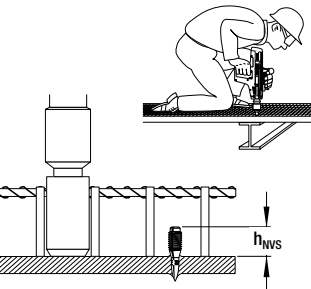
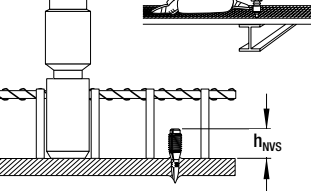
¹ 480 hour salt spray test per DIN 500 21 and 10 cycles Kesternich test per DIN 50018/2.0 (Comparable to 45 microns HDG coating).

3.3.2 X-FCM & X-FCP Grating & Checkerplate

3.3.2.4 Installation Instructions

Threaded stud placing	Tightening torque	Fitting tolerances/height of grating (dimensions in mm)	
<p>X-CRM8-15-12 $h_{NVS} = 5/8"$ to $25/32"$ (16.0 to 20.0 mm) $t_{II} \geq 1/4"$ (6 mm)</p>  <p>X-EM8H-15-12 $h_{NVS} = 5/8"$ to $3/4"$ (15.5 to 19.5 mm) $t_{II} \geq 1/4"$ (6 mm)</p>  <p>X-BT M8-15-6 SNR12¹ $h_{NVS} = 5/8"$ to $11/16"$ (15.7 to 16.8 mm) $t_{II} \geq 5/16"$ (8 mm)</p> 	<p>$T_{max} = 6.0$ ft-lb (8.0 N-m) for X-CRM8 and studs. $T_{max} = 8.0$ ft-lb (11.0 N-m) for X-EM8H studs. $T_{max} = 6.0$ ft-lb (8.0 N-m) for X-BT M8 studs.¹</p> <p>Tightening tool: Hilti screwdriver SF 121-A SF 150-A or SF 180-A with 5 mm Torx Bit (Item no. 00087904)</p> <p>Set clutch to appropriate setting to obtain desired torque.</p> 	<p>Min. grating height = $L + 2$</p>  <p>Governing requirement:</p> <ul style="list-style-type: none"> Minimum 2 mm clearance between X-FCM and surface of base steel to allow for deflections <p>Example: X-FCM 25/30 Min. grating ht. = $23 + 2 = 25$ mm Max. grating ht. = $23 + 7 = 30$ mm</p> <p>Grating height of 32 can be accommodated if $h_{NVS} \geq 18$ mm</p>	<p>Max. grating height = $L + 7$</p>  <p>Governing requirement:</p> <ul style="list-style-type: none"> Minimum 5 mm thread engagement at the minimum allowable stand-off, h_{NVS}. <p>Note:</p> <ul style="list-style-type: none"> The maximum grating height for an X-FCM type can be extended if h_{NVS} is tightly controlled, e.g. at 18 mm instead of 16 mm.

¹ Reference Section 3.2.10 for more details on proper installation of X-BT fasteners.

Installation procedure for bar grating			
<p>1. Place the grating sections following recognized safety precautions.</p> 	<p>2. Widen opening at fastening</p> 	<p>3. Place the threaded stud</p> 	<p>4. Tighten the disk, without exceeding maximum tightening torque</p> 

X-FCM & X-FCP Grating & Checkerplate 3.3.2

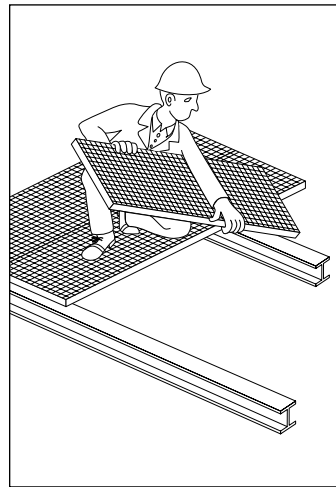
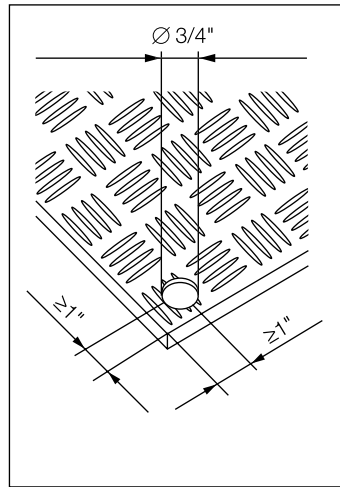
Product Selection Guide for Checkerplate

Fastening Height in. (mm)	X-FCP Disk ¹	DX 76 ² / DX 460 F10 Grating Stud	DX 460-GR Stud
1/4 to 21/64 (6.4 to 8.3)	X-FCP-M5/10 X-FCP-R5/10	X-CRM8-9-12P10 Stud Stand-off 31/64 – 37/64	X-CRM8-9-12P8 X-CRM8-9-12P8
11/32 to 1/2 (8.7 to 12.7)	X-FCP-M5/10 X-FCP-R5/10	X-CRM8-15-12P10 Stud Stand-off 41/64" – 25/32"	X-CRM8-15-12P8 Stud Stand-off 41/64" – 25/32"
1/4 to 1/2 (6.4 to 12.7)	X-FCP sealing ring	Optional	Optional

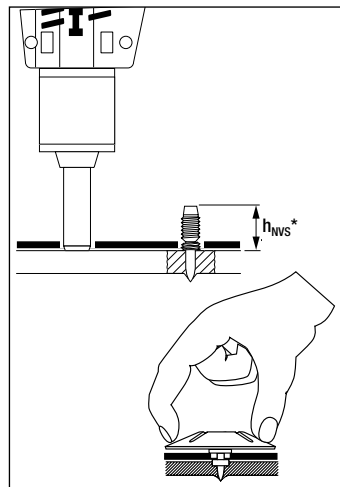
1 X-FCP-M = Galvanized, X-FCP-R = Stainless

2 Additional equipment required

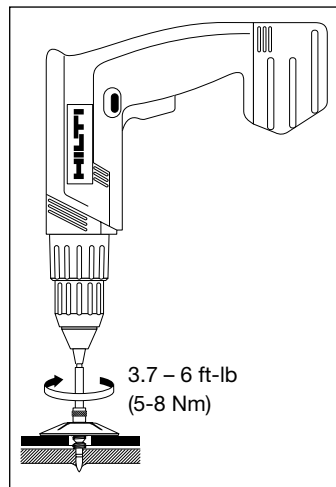
Installation procedure for checkerplate



1. Place and align the plate section following recognized safety precautions.



2. Place the 8 mm stainless threaded stud through the pre-drilled hole.
3. Start the X-FCP on the stud by hand.



4. Tighten the disk, without exceeding maximum tightening torque.

*h_{NVS} = Stud Stand-off Length

3.3.2 X-FCM & X-FCP Grating & Checkerplate

3.3.2.5 Ordering Information

Grating Disks

Description	Coating/Material	Box Qty
X-FCM 25/30	Electro Galvanized	100
X-FCM 35/40	Electro Galvanized	100
X-FCM 1-1/4 - 1-1/2	Electro Galvanized	100
X-FCM 45/50	Electro Galvanized	100
X-FCM-M 25/30	Duplex Coated	100
X-FCM-M 35/40	Duplex Coated	100
X-FCM-M 1-1/4 - 1-1/2	Duplex Coated	100
X-FCM-M-45/50	Duplex Coated	100
X-FCM-R 25/30	Stainless Steel	100
X-FCM-R 35/40	Stainless Steel	100
X-FCM-R 1-1/4 - 1-1/2	Stainless Steel	100
X-FCM-R 45/50	Stainless Steel	100

Threaded Studs

Description	Coating/Material	Box Qty
X-EM8H-15-12 FP10	Electro Galvanized	100
X-EM8H-15-12 P8	Electro Galvanized	100
X-CRM8-15-12 FP10	Stainless Steel	100
X-CRM8-15-12 P8	Stainless Steel	100
X-CRM8-9-12 FP10	Stainless Steel	100
X-CRM8-9-12 P8	Stainless Steel	100
X-BT M8-15-6 SN12-R	Stainless Steel	100

Checkerplate Disks

Description	Coating/Material	Box Qty
X-FCP-M5/10	Duplex Coated	200
X-FCP-R5/10	Stainless Steel	200
X-FCP Sealing Ring	Polyurethane	200

X-GR, X-GR RU, X-MGR Grating Fastening Systems 3.3.3

3.3.3.1 Product Description

Hilti provides a wide range of solutions for the attachment of grating. These solutions allow attachment of different grating heights, have HDG* equivalent corrosion resistance and provide removable or permanent grating attachment.

Product Features

- Grating or checkerplate fastened in place
- Topside only access needed
- Removable and reusable**
- Corrosion resistance of HDG*
- Non-trip profile
- No electrical or pneumatic power required

3.3.3.1	Product Description
3.3.3.2	Material Specifications
3.3.3.3	Technical Data
3.3.3.4	Installation Instructions
3.3.3.5	Ordering Information



* Refer to material specifications below for more details on coatings.

** Only disk/saddle and screw parts of powder-actuated fasteners can be removed and reused.

3.3.3.2 Material Specifications

X-GR, X-GR RU, and X-MGR Grating Fastening Systems

System Component	X-GR		X-GR RU		X-MGR	
	Material	Coating	Material	Coating	Material	Coating
Hook/Saddle	Carbon Steel	Duplex ¹	Carbon Steel	Duplex ¹	Carbon Steel	65 µm Zinc
Powder-Actuated Fastener	Stainless Steel	8 µm Zinc ²	Stainless Steel	8 µm Zinc ²	-	-
Screw	-	-	Carbon Steel	Duplex ¹	Carbon Steel	60 µm Zinc
Nut	-	-	-	-	Carbon Steel	45 µm Zinc
Nut Holder	-	-	-	-	Stainless Steel	-

X-GR Grating Fastening System



¹ Duplex coating tested to 480 hours salt spray test per DIN 50021 and 10 cycles Kesternich test per DIN 50018/2.0 (Comparable to 45 microns HDG coating).

² Coating on X-GR and X-GR RU powder-actuated fasteners for improved driving.

3.3.3.3 Technical Data

Allowable Static Tension Loads for Hilti Grating Systems with Grating^{1,2,3}

Fastener Description	Bearing Bar Spacing ⁴ in. (mm)	Base Steel Thickness in. (mm)	Allowable Tension Load lb (mm)
X-GR	≥ 3/4 (≥ 20)	1/4 to 1/2 (6 to 12)	135 (0.6)
X-GR RU	1 to 1-1/4 (25 to 32)	1/4 to 1/2 (6 to 12) ⁵	180 (0.8)
X-MGR	≥ 1-3/16 (≥ 30)	1/8 to 1 (3 to 25)	135 (0.6)

X-GR RU Grating Fastening System



¹ Allowable loads represent the static capacity of the Hilti Grating System only. The capacity of the grid must be investigated in accordance with accepted design criteria.

² Load values are limited by plastic deformation of the X-GR hook, X-GR RU saddle clip, or the X-MGR saddle clip.

³ X-GR, X-GR RU, and X-MGR Grating Fastening Systems 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 65 lb (0.3 kN) will not result in permanent deformation. Therefore, small unexpected shear loads can generally be accommodated without damage.

⁴ Reference installation instructions for more details regarding bearing and cross bar dimensions.

⁵ Fastening X-GR RU fasteners into base material thicknesses greater than 1/2" (12 mm) may be possible. Site testing is required.

X-MGR Grating Fastening System

3.3.3 X-GR, X-GR RU, X-MGR Grating Fastening Systems

3.3.3.4 Installation Instructions (including selection guides)

General Spacing Edge Distance & Base Steel Thickness Guidelines

X-GR and X-GR RU

Edge Distance: $c \geq 1/2"$ (12 mm)

Spacing: $s \geq 5/8"$ (15mm)

Base Steel Thickness: $t_b = 1/4"$ to $1/2"$ (6 mm to 12 mm)*

* Fastening X-GR RU fasteners into base steel thicknesses greater than $1/2"$ (12 mm) may be possible. Site testing is required.

X-MGR

Edge Distance: No general restriction for end of beam condition (reference X-MGR Installation Procedures for more detail).

Spacing: No general restriction.

Base Steel (Flange) Thickness: $1/8"$ to $1"$ (3 mm to 25 mm)

X-GR Selection Guide for Grating

Fastener Description	Powder-Actuated Fastener ¹	Nominal Grating Height in. (mm)	Minimum Bar Spacing ² in. (mm)	Base Steel Thickness in. (mm)	DX Tool
X-GR 25 / 1"	X-CR 16-4.5R Zn P8 SN12-R	1 (25)	3/4 (20)	1/4 to 1/2 (6 to 12)	DX 460 with 6.8/11M black cartridges
X-GR 1-1/4"		1-1/4 (32)			
X-GR 1-1/2"		1-1/2 (38)			

1. Comes pre-assembled as part of X-GR fastener.

2. Reference step 2 of the X-GR Installation Procedures below for more details on bar spacing requirements.

X-GR Installation Procedures for Grating

<p>1. Place the grating sections following recognized safety precautions.</p>	<p>2. Place the X-GR Fastener (Continued)</p> <p>Bearing bar spacing (a): $a \geq 3/4"$ (20 mm)</p> <p>Cross bar spacing (b): $b \geq 3/4"$ (20 mm)</p>	<p>3. Check Installed Fastener</p> <p>$h_{WS} = 0.20" - 0.30"$ (5 mm – 7.6 mm)</p> <p>Check nail stand-off (h_{WS}).</p>
<p>2. Place the X-GR Fastener</p> <p>Note: position the flat side of the fastener guide to the hook!</p>		

X-GR, X-GR RU, X-MGR Grating Fastening Systems 3.3.3

X-GR RU Selection Guide for Grating

Fastener Description	Powder-Actuated Fastener ¹	Nominal Grating Height in. (mm)	Minimum Cross Bar Spacing ² in. (mm)	Bearing Bar Spacing ² in. (mm)	Base Steel Thickness ³ in. (mm)	DX Tool
X-GR RU 1"	X-CR 20-4.5R Zn P8	1 (25)	1-3/16 (30)	1 to 1-1/4 (25 to 32)	1/4 to 1/2 (6 to 12)	DX 460 with 6.8/11M black cartridges
X-GR RU 1-1/4"		1-1/4 (32)				
X-GR RU 1-1/2"		1-1/2 (38)				

1. Comes pre-assembled as part of X-GR RU fastener.
2. Reference step 2 of the X-GR RU Installation Procedures below for more details on bar spacing requirements.
3. Fastening X-GR RU fasteners into base material thicknesses greater than 1/2" (12 mm) may be possible. Site testing is required.

X-GR RU Installation Procedures for Grating

<p>1. Place the grating sections following recognized safety precautions.</p>	<p>2. Place X-GR RU Fastener</p> <p>Note: position the flat side of the fastener guide to the saddle!</p> <p>Bearing bar spacing (a): a = 1" to 1-1/4" (25 to 32 mm)</p> <p>Cross bar spacing (b): b ≥ 1-3/16" (30 mm)</p>	<p>3. Tighten the screw T_{rec} = 2.2 – 3.7 ft-lb (3 - 5 Nm)</p> <p>Tightening tool:</p> <ul style="list-style-type: none"> • Screw driver with torque release coupling (TRC) • 6 mm Allen-type bit T_{rec} = 2.2 - 3.7 ft-lb (3 - 5 Nm) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Hilti Screw Driver</th> <th>Torque Setting</th> </tr> </thead> <tbody> <tr> <td>SF 121-A</td> <td>TRC 5 – 7</td> </tr> <tr> <td>SF 150-A</td> <td>TRC 3 – 5</td> </tr> </tbody> </table> <p>Do not over tighten: The saddle of the fastener should not be bent.</p>	Hilti Screw Driver	Torque Setting	SF 121-A	TRC 5 – 7	SF 150-A	TRC 3 – 5
Hilti Screw Driver	Torque Setting							
SF 121-A	TRC 5 – 7							
SF 150-A	TRC 3 – 5							
<p>4. Check Installed Fastener</p> <p>h_{WS} = 0.28" – 0.41" (7.0 mm – 10.5 mm)</p> <p>4a. Check nail stand-off (h_{WS}).</p> <p>4b. Check that screw has not been over tightened as shown in step 3.</p>								

3.3.3 X-GR, X-GR RU, X-MGR Grating Fastening Systems

X-MGR Selection Guide for Grating

Fastener Description	Powder-Actuated Fastener	Grating Height in. (mm)	Minimum Cross Bar Spacing ¹ in. (mm)	Bearing Bar Spacing ¹ in. (mm)	Maximum Bearing Bar Thickness ¹ in. (mm)	Base Steel Thickness in. (mm)	Fastening Tool
X-MGR-W60	None	1 to 1-1/2 (25 to 38)	1-3/16 (30)	1 (25)	3/16 (4.8)	1/8 to 1 (3 to 25)	SF 121-A, SF 150-A

¹ Reference step 2 of the X-MGR Installation Procedures below for more details on bar spacing and thickness requirements.

X-MGR Installation Procedures for Grating

<p>1. Place the grating sections following recognized safety precautions.</p>	<p>2. Place the X-MGR Fastener</p>	<p>3. Tighten the screw $T_{rec} = 3.7 - 6.0 \text{ ft-lb}$ $(5 - 8 \text{ Nm})$</p> <p>Tightening tool:</p> <ul style="list-style-type: none"> Screw driver with torque release coupling (TRC) 1/4" Allen-type bit <p style="text-align: center;">$T_{rec} = 3.7 - 6.0 \text{ ft-lb} (5 - 8 \text{ Nm})$</p> <table border="1" style="width: 100%;"> <thead> <tr> <th>Hilti Screw Driver</th> <th>Torque Setting</th> </tr> </thead> <tbody> <tr> <td>SF 121-A</td> <td>TRC 7 – 11</td> </tr> <tr> <td>SF 150-A</td> <td>TRC 5 – 9</td> </tr> </tbody> </table> <p>Do not over tighten: The saddle of the fastener should not be bent.</p>	Hilti Screw Driver	Torque Setting	SF 121-A	TRC 7 – 11	SF 150-A	TRC 5 – 9		
Hilti Screw Driver	Torque Setting									
SF 121-A	TRC 7 – 11									
SF 150-A	TRC 5 – 9									
<p>4. Check</p> <p>4a. Check that the indentation line on the clip is positioned under the steel flange as shown below.</p> <p style="text-align: center;">indentation line ↓</p>	<table border="1" style="width: 100%;"> <thead> <tr> <th></th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>X-MGR W60</td> <td>1" (25 mm)</td> <td>$\geq 1-3/16"$ (30 mm)</td> <td>$\leq 3/16"$ (4.8 mm)</td> </tr> </tbody> </table>		a	b	c	X-MGR W60	1" (25 mm)	$\geq 1-3/16"$ (30 mm)	$\leq 3/16"$ (4.8 mm)	<p>4b. Check that screw has not been over tightened as shown in step 3.</p>
	a	b	c							
X-MGR W60	1" (25 mm)	$\geq 1-3/16"$ (30 mm)	$\leq 3/16"$ (4.8 mm)							

X-GR, X-GR RU, X-MGR Grating Fastening Systems 3.3.3

3.3.3.5 Ordering Information

DX 460-GR

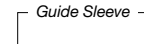
Description

DX 460-GR Deluxe Grating Tool
Includes tool, ramrod, cleaning brushes, cleaning cloth, spray lubricant and operating instructions in an impact-resistant plastic tool box

Replacement Parts

Description

X-460-F8GR Fastener Guide Assembly
X-460-TGR Fastener Guide Sleeve
X-460-PGR Piston



X-GR Fastener

Fastener Only Packs

Non-Combo

Description	Qty
X-GR 1" 25 CR 16 P8	100 pcs
X-GR 1-1/4" CR 16 P8	100 pcs

Combo Packs (includes equal quantities of fasteners and cartridges)

Description	Qty
X-GR 1" Grating Fastener Cartridge Combo	100 pcs
X-GR 1-1/4" Grating Fastener Cartridge Combo	100 pcs
X-GR 1-1/2" Grating Fastener Cartridge Combo	100 pcs
X-GR 1" Grating Fastener Partial Pallet Combo	3200 pcs
X-GR 1-1/4" Grating Fastener Partial Pallet Combo	3200 pcs
X-GR 1-1/2" Grating Fastener Partial Pallet Combo	3200 pcs

X-GR RU Fastener

Fastener Only Packs

Non-Combo

Description	Qty
X-GR RU 1" 25/30 CR 20 P8	100 pcs
X-GR RU 1-1/4" CR 20 P8	100 pcs
X-GR RU 1-1/2" CR 20 P8	100 pcs

Combo packs (includes equal quantities of fasteners and cartridges)

Description	Qty
X-GR RU 1" Grating Fastener Cartridge Combo	100 pcs
X-GR RU 1-1/4" Grating Fastener Cartridge Combo	100 pcs
X-GR RU 1-1/2" Grating Fastener Cartridge Combo	100 pcs
X-GR RU 1" Grating Fastener Partial Pallet Combo	2400 pcs
X-GR RU 1-1/4" Grating Fastener Partial Pallet Combo	2400 pcs
X-GR RU 1-1/2" Grating Fastener Partial Pallet Combo	2400 pcs

X-MGR Fastener

Fastener Only Packs

Description	Qty
X-MGR W 60	20 pcs
X-MGR Mechanical Grating Fastener Pallet	2560 pcs

.27 Caliber Cartridge — Short (strips of 10 each)

Description	Qty
6.8/18 M Black — Extra Heavy (Power Level 6)	100 pcs

In The United States

PAYMENT TERMS:	Net 30 days from date of invoice. Customer agrees to pay all costs incurred by Hilti in collecting any delinquent amounts, including attorney's fees.
FREIGHT:	All sales are F.O.B. Destination with transportation allowed via Hilti designated mode. Delivery dates are estimates only. Additional charges for expedited shipments, special handling requirements, and orders below certain dollar amounts shall be the responsibility of Customer. Fuel surcharges may apply depending on market conditions.
CREDIT:	All orders sold on credit are subject to Credit Department approval.
RETURN POLICY:	Products must be in saleable condition to qualify for return. Saleable condition is defined as unused items in original undamaged packaging and unbroken quantities and in as-new condition. All returns are subject to Hilti inspection and acceptance, and a \$125 restocking charge if returned more than 90 days after invoice date. Proof of purchase is required for all returned materials. Special orders products and discontinued items are not eligible for return credit. Dated materials are only returnable in case quantity, and within 30 days after invoice date.
WARRANTY:	<p>Hilti warrants that for a period of 12 months from the date it sells a product it will, at its sole option and discretion, refund the purchase price, repair, or replace such product if it contains a defect in material or workmanship. Absence of Hilti's receipt of notification of any such defect within this 12-month period shall constitute a waiver of all claims with regard to such product.</p> <p>THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Hilti shall in no event be liable for, and Customer hereby agrees to indemnify Hilti against all claims related to special, direct, indirect, incidental, consequential, or any other damages arising out of or related to the sale, use, or inability to use the product.</p>
ACCEPTANCE OF ORDER:	Acceptance is limited to the express terms contained herein, and terms are subject to change by Hilti without notice. Additional or different terms proposed by Customer are deemed material and are objected to and rejected, but such rejection shall not operate as a rejection of the offer unless it contains variances in the terms of the description, quantity, price or delivery schedule of the goods. Orders are not deemed "accepted" by Hilti unless and until it ships the associated items.
DOMESTIC ORIGIN:	Any non-domestic Hilti product will be so identified on shipping documents and invoices for customers who properly identify themselves as a federal government entity. All other customers may obtain such information by written request to Hilti, Inc., Contract Compliance, P.O. Box 21148, Tulsa, Oklahoma 74121. Hilti's Quality Department personnel are the only individuals authorized to warrant the country of origin of Hilti products.
BUSINESS SIZE:	Hilti is a large business.
PRICES:	Prices are those stated on the order, and unless otherwise noted are based on purchasing all items on the order — pricing for individual products may vary for purchases of different quantities or item combinations. Hilti does not maintain most favored customer records, makes no representation with respect to same, and rejects any price warranty terms proposed by Customer. Hilti's published net price list is subject to change without notice.
CONSENT TO JURISDICTION:	All transactions made pursuant hereto shall be deemed to have been made and entered into in Tulsa, Oklahoma. Any and all disputes arising directly or indirectly from such transactions shall be resolved in the courts of the County of Tulsa, State of Oklahoma, to the exclusion of any other court, and any resulting judgment may be enforced by any court having jurisdiction of such an action. All transactions shall be governed by and construed in accordance with the laws of the State of Oklahoma.
INDEMNIFICATION:	Customer hereby agrees to indemnify Hilti for any costs, including attorney's fees, incurred by Hilti as a result, in whole or in part, of any violation by Customer of any Federal, State or Local statute or regulation, or of any nationally accepted standard. It shall be Customer's sole responsibility to comply with all applicable laws and regulations regarding the handling, use, transportation, or disposal of products upon taking possession of same.
AUTHORIZATION:	HILTI LEGAL DEPARTMENT PERSONNEL ARE THE ONLY INDIVIDUALS AUTHORIZED TO MODIFY THESE TERMS AND CONDITIONS, WARRANT PRODUCT SUITABILITY FOR SPECIFIC APPLICATIONS, OR EXECUTE CUSTOMER DOCUMENTS, AND ANY SUCH ACTION IS NULL AND VOID UNLESS IN WRITTEN FORM SIGNED BY SUCH INDIVIDUAL.

In Canada

PAYMENT TERMS:	Net 30 days from date of invoice. Customer agrees to pay all costs incurred by Hilti in collecting delinquent amounts, if any, including reasonable attorney's fees.
FREIGHT:	Sales are F.O.B. Destination Point with transportation allowed via Hilti designated mode. Additional charges may apply for expedited delivery, special handling requirements, and order under certain limits. A fuel surcharge may apply depending on market conditions.
CREDIT:	All orders sold on credit are subject to Credit Department approval.
RETURN POLICY:	Product may be returned prepaid (unless otherwise authorized) to Hilti provided: <ul style="list-style-type: none"> i) it is returned by the original purchaser ii) it is not dated product returned more than 30 days after the original delivery date iii) it is not discontinued, clearance or special order product iv) it is unused, in original packaging and in unbroken quantities. <p>Hilti will inspect product and, if the above requirements are satisfied, will credit to customer the original purchase price. A 15% restocking fee may apply.</p>
WARRANTY:	Other than the manufacturer's published warranty, no warranties or conditions, express or implied, written or oral, statutory or otherwise are implied. Any and all conditions and warranties implied by law or by the Sale of Goods Act or any similar statutes of any Province are hereby expressly waived.
TITLE TO PRODUCT:	Title to product remains with Hilti until the total purchase price of product is paid.
PRICES:	Customer agrees to pay Hilti prices set out on invoice. Customer agrees to pay taxes as indicated on invoice unless Hilti receives acceptable exemption certificates.
INDEMNIFICATION:	Customer agrees to use product at own risk and to indemnify Hilti against all liabilities, including legal fees, to third parties arising out of the use or possession thereof. Hilti shall in no event be liable for special, incidental or consequential damages.
CHANGES:	Hilti sales personnel are not authorized to modify these Terms and Conditions or modify Customer's credit terms. Terms are subject to change by Hilti with reasonable notice to Customer.
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