X-GR
DATA SHEET

Grating fastening system

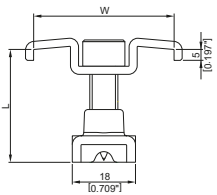
May 2023

X-GR Grating fastening system

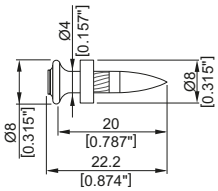
Product data

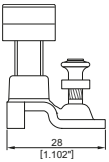
Dimensions

X-GR an X-GR-L

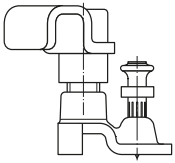


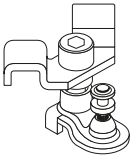
X-R 20-4.0 Zn P8





X-GR C





See Fastener selection for detailed dimensions

Material specifications

Screw:	
Carbon steel	
Zinc coating:	Duplex* coated
Nail:	
Stainless steel:	CrMnMo Alloy and zinc coated
Upper part:	
Carbon steel:	DD11 or DC01
Zinc coating:	Duplex* coated
Bottom part:	
Carbon steel:	S315MC or DC04
Zinc coating:	Duplex* coated

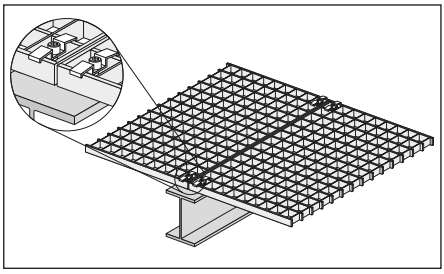
*) 480 h salt spray test per DIN 50021 and 10 cycles Kesternich test per DIN 50018/2.0 (comparable to 45 µm HDG steel)

Recommended fastening tools

DX 6 GR, DX 5 GR and DX 460 GR

- See system recommendation in the next pages.

Application



Fastening of grating

- For fastenings exposed to weather and mildly corrosive conditions.
- Not for use in marine atmospheres (upstream)!

Performance data

Recommended resistance under tension load

N_{rec} = 0.8 kN (180 lb)

- Tensile loading is limited by plastic deformation of the saddle clip.
- X-GR resists shear by friction and is not suitable for explicit shear load designs.
- For X-GR C: In case of dynamic load N_{rec} = 0.6 kN (135 lb).

Application recommendation

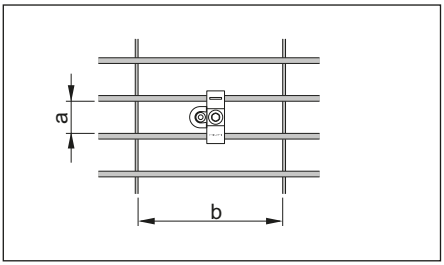
Base material thickness

t_{II} ≥ 4 mm (0.157“)

Fastened material thickness

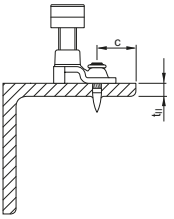
Grating height: H_G = 23-52 mm (0.91"–2.05")
Standard X-GR (X-GR 25/30, X-GR 1 $^1/_4$", X-GR 35/40):
See Fastener selection for detailed dimensions
Specials X-GR (X-GR 33/37, X-GR 43/47, X-GR 48/52, X-GR _/_ L and X-GR _/_ C):
Other dimensions special X-GR are available on demand

Grating opening types



a : see Fastener selection
b ≥ 30 mm (1.18")

Fastener positioning in base material

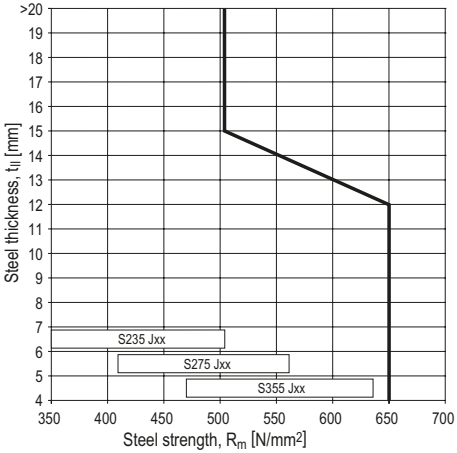


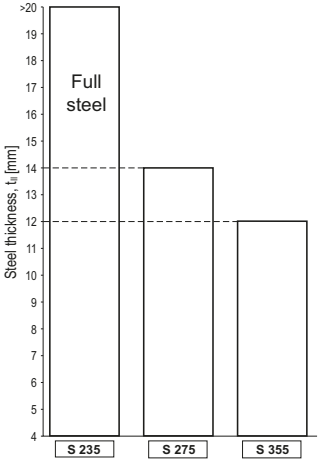
Edge distance: c ≥ 15 mm (0.59")

Application limits

Fastener: X-GR

Tool type: DX 460, DX 5, DX 6





- S235: No application limit
- S275: Full coverage of grade up to 14mm base material thickness
- S355: Full coverage of grade up to 12mm base material thickness

Corrosion information

- For fastenings exposed to weather and mildly corrosive conditions.
- Not for use in marine atmospheres (upstream) or in heavily polluted environments.
- For more details, please refer to following technical document: Hilti Corrosion Handbook.

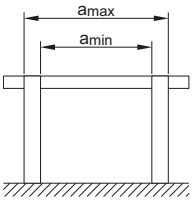
System recommendation

- For more details, please refer to the chapter **Accessories and consumables compatibility** in the Direct Fastening Technology Manual (DFTM).

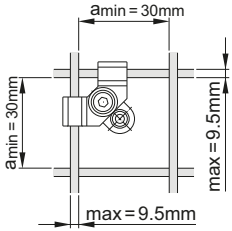
Fastener selection

Fastener	Item no.	W mm (inch)	L mm (inch)	Grating width a mm (inch)	Grating height H_G mm (inch)
X-GR 25/30	2106415 or 2154241	40 (1.58”)	32 (1.26”)	23-38 (0.91”-1.50”)	25-30 (0.98”-1.18”)
X-GR 1¼”	2106416 or 2154243	40 (1.58”)	34 (1.34”)	23-38 (0.91”-1.50”)	27-32 (1.06”-1.26”)
X-GR 35/40	2106417 or 2154242	40 (1.58”)	42 (1.65”)	23-38 (0.91”-1.50”)	35-40 (1.38”-1.57”)
X-GR 33/37	2222597	40 (1.58”)	32 (1.26”)	23-38 (0.91”-1.50”)	33-37 (1.30”-1.46”)
X-GR 43/47	2222598	40 (1.58”)	42 (1.65”)	23-38 (0.91”-1.50”)	43-47 (1.69”-1.85”)
X-GR 48/52	2222599	40 (1.58”)	47 (1.85”)	23-38 (0.91”-1.50”)	48-52 (1.89”-2.05”)
X-GR 23/27 L	2222640	65 (2.56”)	32 (1.26”)	35-65 (1.38”-2.56”)	23-27 (0.91”-1.06”)
X-GR 28/32 L	2222641	65 (2.56”)	37 (1.46”)	35-65 (1.38”-2.56”)	28-32 (1.10”-1.26”)
X-GR 33/37 L	2222642	65 (2.56”)	42 (1.65”)	35-65 (1.38”-2.56”)	33-37 (1.30”-1.46”)
X-GR 38/42 L	2222643	65 (2.56”)	47 (1.85”)	35-65 (1.38”-2.56”)	38-42 (1.50”-1.65”)
X-GR 43/47 L	2222644	65 (2.56”)	52 (2.05”)	35-65 (1.38”-2.56”)	43-47 (1.69”-1.85”)
X-GR 48/52 L	2222645	65 (2.56”)	57 (2.24”)	35-65 (1.38”-2.56”)	48-52 (1.89”-2.05”)
X-GR 23/27 C	2222646	32 (1.26”)	32 (1.26”)	30 + (1.18” +)	23-27 (0.91”-1.06”)
X-GR 28/32 C	2222647	32 (1.26”)	37 (1.46”)	30 + (1.18” +)	28-32 (1.10”-1.26”)
X-GR 33/37 C	2222648	32 (1.26”)	42 (1.65”)	30 + (1.18” +)	33-37 (1.30”-1.46”)
X-GR 38/42 C	2222649	32 (1.26”)	47 (1.85”)	30 + (1.18” +)	38-42 (1.50”-1.65”)
X-GR 43/47 C	2222650	32 (1.26”)	52 (2.05”)	30 + (1.18” +)	43-47 (1.69”-1.85”)
X-GR 48/52 C	2222651	32 (1.26”)	57 (2.24”)	30 + (1.18” +)	48-52 (1.89”-2.05”)

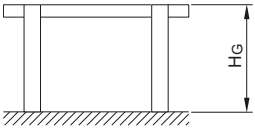
Grating width of X-GR _/_ and X-GR _/_ L



Grating width of X-GR _/_ C



Grating height



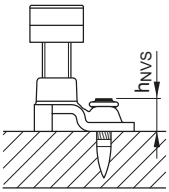
Cartridge recommendation

Base material		Cartridge color (tool power level)	
		Tool type: DX 6 GR	Tool type: DX 5 GR, DX 460 GR
		Cartridge type: 6.8/11 M	Cartridge type: 6.8/11 M
S235	$4 \le t_{II} \le 6$ mm	titanium ■ (4)	red ■ (1)
	$6 < t_{II} \le 12$ mm	titanium ■ (5-8), black ■ (6–7)	black ■ (1–3)
	$12 < t_{II} \le 20$ mm	black ■ (6–8)	black ■ (3–4)
S275	$4 \le t_{II} \le 6$ mm	titanium ■ (4-6)	red ■ (1-2)
	$6 < t_{II} \le 12$ mm	titanium ■ (6-8), black ■ (6–7)	black ■ (2–3)
	$12 < t_{II} \le 20$ mm	black ■ (8)	black ■ (4)
S355	$4 \le t_{II} \le 6$ mm	titanium ■ (4-7)	red ■ (1-3)
	$6 < t_{II} \le 10$ mm	titanium ■ (6-8), black ■ (6–8)	black ■ (2–4)
	$10 < t_{II} \le 14$ mm	black ■ (8)	black ■ (4)

- Tool power level adjustment by setting tests on site.
- Start tool energy selection with lowest recommended tool power level.
- Correct according requirement from chapter quality assurance.

Quality assurance

Fastening inspection



h_{NVS} = 7–10.5 mm (0.28"–0.41")

- Observing the cartridge selection and tool energy setting typically leads to a stand-off between 9 and 10 mm.

Installation recommendation

Tightening torque for X-GR 25/30, X-GR 1 1/4", X-GR 35/40

	Fastener: Pre-mounted X-R 20
Element: X-GR 25/30, X-GR 1 1/4", X-GR 35/40	3–5 Nm

Tightening tool recommendation for tightening with cordless screwdriver

Cordless screwdriver	Clutch type (stop detection)	Gear	Clutch
SF 2-A12	TRC	1	15
SF 2H-A12	TRC	1	15
SF 4-A22	TRC	1	4
SF 6-A22	ESC (SJ)	1	5
SF 6H-A22	ESC (SJ)	1	5
SFC 14-A	TRC	2	6-7
SF 8M-A22	TRC	4	3-5
SF 10W-A22	TRC	4	3-5

- Tool power level adjustment: Gear:  Clutch: 
- The setting of the torque via the Hilti screwdriver with torque release coupling (TRC) can change as the clutch wears over time. The specified torque setting is only a rough guide value and applies to a new Hilti screwdriver. To ensure recommended torque is applied, Hilti recommends the use of a calibrated torque wrench or the Hilti torque tool.
- The specified torque setting for the Hilti screw drivers with electronic slip clutch (ESC) is only a rough guide value as the ESC has 2 stop detections; Soft Joint (SJ) detection and Hard Joint (HJ) detection. The hard joint detection is activated due to drop in speed (fast stop) and can lead to a torque spike. The installation torque may vary depending on the user and the application. To ensure recommended torque is applied, Hilti recommends the use of a calibrated torque wrench or the Hilti torque tool.

Tightening tool recommendation for tightening with Hilti torque tool

Hilti torque tool
Torque tool S-BT 1/4" – 5 Nm

Tightening torque for Installation recommendation for X-GR 33/37, X-GR 43/47, X-GR 48/52, X-GR _/_ L

	Fastener: Pre-mounted X-R 20
Element: X-GR 33/37, X-GR 43/47, X-GR 48/52, X-GR _/_ L	5–8 Nm

Tightening tool recommendation for tightening with cordless screwdriver

Cordless screwdriver	Clutch type (stop detection)	Gear	Clutch
SF 2-A12	TRC	1	15
SF 2H-A12	TRC	1	15
SF 4-A22	TRC	1	9
SF 6-A22	ESC (SJ)	1	8
SF 6H-A22	ESC (SJ)	1	8
SF 8M-A22	TRC	4	3-5
SF 10W-A22	TRC	4	3-5

- Tool power level adjustment: Gear:  Clutch: 
  - The setting of the torque via the Hilti screwdriver with torque release coupling (TRC) can change as the clutch wears over time. The specified torque setting is only a rough guide value and applies to a new Hilti screwdriver. To ensure recommended torque is applied, Hilti recommends the use of a calibrated torque wrench or the Hilti torque tool.
  - The specified torque setting for the Hilti screw drivers with electronic slip clutch (ESC) is only a rough guide value as the ESC has 2 stop detections; Soft Joint (SJ) detection and Hard Joint (HJ) detection. The hard joint detection is activated due to drop in speed (fast stop) and can lead to a torque spike. The installation torque may vary depending on the user and the application. To ensure recommended torque is applied, Hilti recommends the use of a calibrated torque wrench or the Hilti torque tool.

Tightening tool recommendation for tightening with Hilti torque tool

Hilti torque tool
Torque tool S-BT 1/4" – 5 Nm
Torque tool X-BT 1/4" – 8 Nm

Tightening torque for Installation recommendation for X-GR_/_C

	Fastener: Pre-mounted X-R 20
Element: X-GR _/_ C	5–8 Nm

Tightening tool recommendation for tightening with cordless screwdriver

Cordless screwdriver	Clutch type (stop detection)	Gear	Clutch
SF 2-A12	TRC	1	15
SF 2H-A12	TRC	1	15
SF 4-A22	TRC	1	9
SF 6-A22	ESC (SJ)	1	8
SF 6H-A22	ESC (SJ)	1	8
SF 8M-A22	TRC	4	3-5
SF 10W-A22	TRC	4	3-5

- Tool power level adjustment: Gear:  Clutch: 
  - The setting of the torque via the Hilti screwdriver with torque release coupling (TRC) can change as the clutch wears over time. The specified torque setting is only a rough guide value and applies to a new Hilti screwdriver.
    To ensure recommended torque is applied, Hilti recommends the use of a calibrated torque wrench or the Hilti torque tool.
  - The specified torque setting for the Hilti screw drivers with electronic slip clutch (ESC) is only a rough guide value as the ESC has 2 stop detections; Soft Joint (SJ) detection and Hard Joint (HJ) detection. The hard joint detection is activated due to drop in speed (fast stop) and can lead to a torque spike. The installation torque may vary depending on the user and the application. To ensure recommended torque is applied, Hilti recommends the use of a calibrated torque wrench or the Hilti torque tool.

Tightening tool recommendation for tightening with Hilti torque tool

Hilti torque tool
Torque tool S-BT 1/4" – 5 Nm
Torque tool X-BT 1/4" – 8 Nm