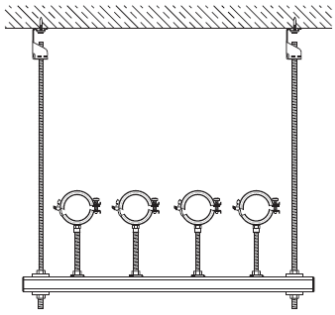
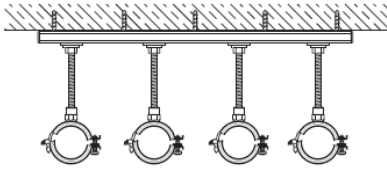
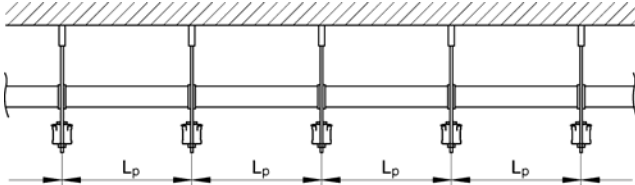
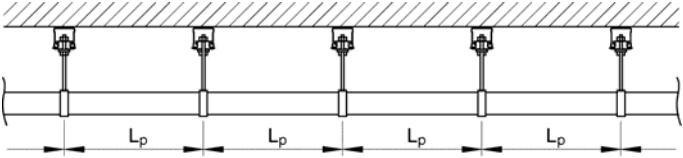
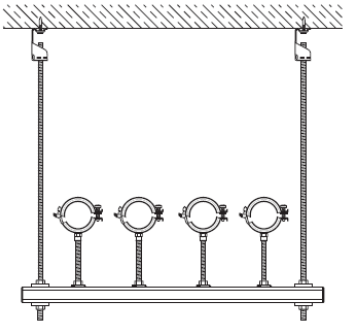
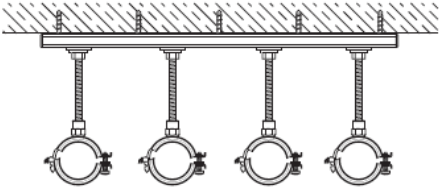
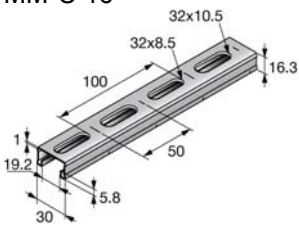
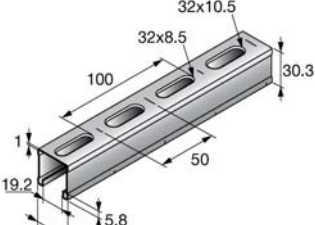
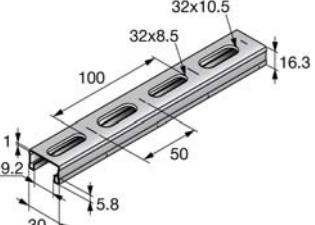
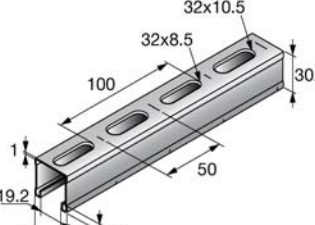
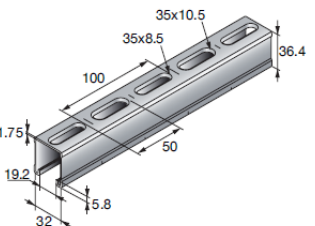


Fastening of MM channels for connection of water-filled pipes with power-actuated fasteners

Application and fastener selection

Types of construction and allocation of recommended power-actuated fastener

Trapeze construction	Channel directly fastened to the substrate
	
<p data-bbox="331 887 587 920">Static model for pipes</p>  <p data-bbox="140 1167 624 1227">Channel spacing: $L_p \leq 3.0$ m Continuous pipe with at least 5 supports.</p>	<p data-bbox="1018 887 1273 920">Static model for pipes</p>  <p data-bbox="807 1137 1291 1198">Channel spacing: $L_p \leq 3.0$ m Continuous pipe with at least 5 supports.</p>
<p data-bbox="140 1261 440 1294">Base material Concrete</p> <p data-bbox="140 1301 751 1361">Powder-actuated fasteners without pre-drilling (DX-Standard):</p> <ul data-bbox="188 1368 517 1429" style="list-style-type: none"> • X-HS M8 U32 P8 S15 • X-HS M10 U32 P8 S15 <p data-bbox="140 1442 715 1503">Powder-actuated fasteners with pre-drilling (DX-Kwik):</p> <ul data-bbox="188 1509 560 1570" style="list-style-type: none"> • X-HS M8 DKH 48 P8 S15 • X-HS M10 DKH 48 P8 S15 	<p data-bbox="807 1261 1107 1294">Base material Concrete</p> <p data-bbox="807 1301 1417 1361">Powder-actuated fasteners without pre-drilling (DX-Standard):</p> <ul data-bbox="855 1368 1390 1429" style="list-style-type: none"> • X-GHP 20 MX (maximum grade C30/37) • X-U 27 P8 (maximum grade C50/60)
<p data-bbox="140 1606 379 1639">Base material Steel</p> <ul data-bbox="188 1646 517 1706" style="list-style-type: none"> • X-HS M8 U19 P8 S15 • X-HS M10 U19 P8 S15 	<p data-bbox="807 1606 1046 1639">Base material Steel</p> <ul data-bbox="855 1646 1066 1706" style="list-style-type: none"> • X-U 16 P8 • X-U 15 P8TH

Trapeze construction		Channel directly fastende to the substrate	
			
Channel and fastener selection for the base material concrete		Channel and fastener selection for the base material concrete	
<p>MM-C 16</p>  <ul style="list-style-type: none"> • for DX-Standard and DX-Kwik 	<p>MM-C 30</p>  <ul style="list-style-type: none"> • for DX-Kwik 	<p>MM-C 16</p>  <ul style="list-style-type: none"> • for X-GHP 20 MX and X-U 27 P8 	<p>MM-C 30</p>  <ul style="list-style-type: none"> • for X-U 27 P8
<p>MM-C 36</p>  <ul style="list-style-type: none"> • for DX-Kwik 			
<p>Pipes filled with water and with 100 % insulation:</p> <ul style="list-style-type: none"> • Medium heavy steel pipes according to DIN 2440 and medium type M according to DIN EN 10255, respectively • Stainless steel pipes according to DIN 17455 • Copper pipes according to DIN 1786, DIN 1754 and EN 1057, respectively • Geberit Mepla metal composite pipes <p>Recommended diameter and number of pipes depend on the span of the pipes (= channel spacing) and the selected power-actuated fastener (see the application tables).</p>			

Power-actuated fastening systems

Power-actuated fasteners „DX-Standard“ without pre-drilling for fastenings to concrete

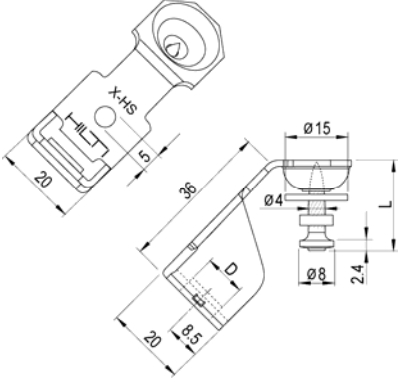
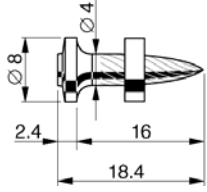
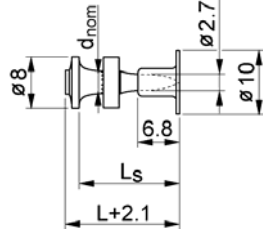
Fastener / Concrete grade		Fastening tool
X-HS M8 U32 P8 S15 Item number: 361789 X-HS M10 U32 P8 S15 Item number: 361790 Maximum concrete grade: C 30/37 ¹	<p>L = 34 mm</p>	DX 460 F8 Fastener guide: X-460-F8 Piston: X-460-P8 Cartridge: 6.8/11M, Yellow, Red or Black DX 351 F8 Fastener guide: X-FG8 ME-351 Piston: X-P 8S-351 Cartridge: 6.8/11M, Yellow or Red
X-U 27 P8 Item number: 237333 Maximum concrete grade: C 50/60		DX 460 F8 Fastener guide: X-460-F8 Piston: X-460-P8 Cartridge: 6.8/11M, Yellow, Red or Black DX 351 F8 Fastener guide: X-FG8 ME-351 Piston: X-P 8S-351 Cartridge: 6.8/11M, Yellow or Red
X-GHP 20 MX Item number: see national product catalogue Maximum concrete grade: C 30/37		GX 100-E GX 120-ME

Powder-actuated fasteners „DX-Kwik“ with pre-drilling for fastenings to concrete

Fastener		Fastening tool
X-HS M8 DKH P8 S15 Item number: 299697 X-HS M10 DKH P8 S15 Item number: 299698 Maximum concrete grade: C 50/60	<p>L = 50,4 mm</p>	DX 460 F8 Fastener guide: X-460-F8 Piston: X-460-P8 Cartridge: 6.8/11M, Yellow, Red or Black

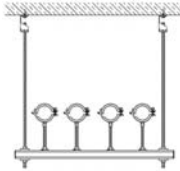
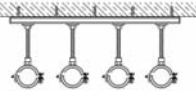
¹ The method DX-Standard with X-HS M_ U32 P8 S15 is recommended for concrete strength $f_{cc} \leq 45 \text{ N/mm}^2$. With the method DX-Standard, fasteners might fail during the driving process. In case of failure rates exceeding about 10 %, it is recommended to switch to the DX-Kwik method with the X-HS M_ DKH48 P8 S15.

Powder-actuated fasteners for fastenings to steel

Fastener		Fastening tool
<p>X-HS M8 U19 P8 S15 Item number: 386214</p> <p>X-HS M10 U19 P8 S15 Item number: 386215</p>	 <p>L = 21,4 mm</p>	<p>DX 460 F8 Fastener guide: X-460-F8 Piston: X-460-P8 Cartridge: 6.8/11M, Yellow, Red or Black</p> <p>DX 351 F8 Fastener guide: X-FG8 ME-351 Piston: X-P 8S-351 Cartridge: 6.8/11M, Yellow or Red</p>
<p>X-U 16 P8 Item number: 237330</p>		<p>DX 460 F8 Fastener guide: X-460-F8 Piston: X-460-P8 Cartridge: 6.8/11M, Yellow, Red or Black</p>
<p>X-U 15 P8TH Item number: 237328</p>	 <p>L_s = 16 mm</p>	<p>DX 460 F8 Fastener guide: X-460-F8 Piston: X-460-P8 Cartridge: 6.8/11M, Yellow, Red or Black</p>

Application tables for fastenings to concrete

Medium steel pipes according to DIN 2440 filled with water and with 100 % insulation and steel pipes of medium type M according to DIN EN 10255 filled with water and with 100 % insulation

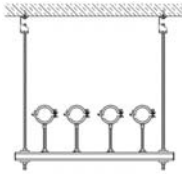
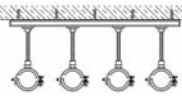
Pipe			Channel selection and channel spacing L _P [m]						Trapeze construction		Channel directly fastened to the substrate	
DN	D _a [mm]	n	L [mm]	1.0	1.5	2.0	2.5	3.0				
									DX-Standard	DX-Kwik	GX/DX-Standard ^{x)}	
									X-HS M_U32	X-HS M_DKH48	X-GHP20	X-U27P8
15	21.3	4	500	MM-C16	MM-C16	MM-C16	MM-C16	-	yes	yes	yes	yes
		6	500	MM-C16	MM-C16	MM-C16	MM-C16	-	yes	yes	yes	yes
		8	600	MM-C16	MM-C16	MM-C16	MM-C16	-	yes	yes	yes	yes
		10	700	MM-C16	MM-C16	MM-C16	MM-C30	-	no	yes	yes	yes
20	26.9	4	600	MM-C16	MM-C16	MM-C16	MM-C16	MM-C16	no	yes	yes	yes
		6	600	MM-C16	MM-C16	MM-C16	MM-C16	MM-C16	no	yes	yes	yes
		8	700	MM-C16	MM-C16	MM-C30	MM-C30	MM-C30	no	yes	no	yes
		10	800	MM-C16	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	yes
25	33.7	4	600	MM-C16	MM-C16	MM-C16	MM-C16	MM-C16	no	yes	no	yes
		6	600	MM-C16	MM-C16	MM-C16	MM-C30	MM-C30	no	yes	no	yes
		8	700	MM-C16	MM-C16	MM-C30	MM-C30	MM-C30	no	yes	no	yes
		10	800	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	no
32	42.4	4	600	MM-C16	MM-C16	MM-C30	MM-C30	MM-C30	no	yes	no	yes
		6	700	MM-C16	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	yes
		8	800	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	no
		10	1000	MM-C30	MM-C30	MM-C36	MM-C36	MM-C36	no	yes	no	no
40	48.3	4	600	MM-C16	MM-C16	MM-C30	MM-C30	MM-C30	no	yes	no	no
		6	700	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	no
		8	800	MM-C30	MM-C30	MM-C30	MM-C30	MM-C36	no	yes	no	no
50	60.3	2	600	MM-C16	MM-C16	MM-C16	MM-C30	MM-C30	no	yes	no	no
		4	700	MM-C16	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	no
		6	800	MM-C30	MM-C30	MM-C30	MM-C36	MM-C36	no	yes	no	no
65	76.1	2	600	MM-C16	MM-C16	MM-C30	MM-C30	MM-C30	no	yes	no	no
		4	800	MM-C30	MM-C30	MM-C30	MM-C36	MM-C36	no	yes	no	no

DN ... Nominal diameter
D_a ... Outer diameter [mm]
n Number of pipes per channel
L Length of channel [mm]

^{x)} At least 5 fastening points per channel.
Driving sequence: 1. Drive one fastener at each end of the channel. Control of the proper fastening of these 2 end fasteners.
2. Drive 3 more fasteners between the end fasteners.

Stainless pipes according to DIN 17455 filled with water and with 100 % insulation

Wall thickness: For all pipes ≤ 2 mm

Pipe			Channel selection and channel spacing L_P [m]						Trapeze construction		Channel directly fastened to the substrate	
DN	D_a [mm]	n	L [mm]	1.0	1.5	2.0	2.5	3.0				
									DX-Standard	DX-Kwik	GX/DX-Standard ^{x)}	
									X-HS M_U32	X-HS M_DKH48	X-GHP20	X-U27P8
15	21.3	4	500	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		6	500	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		8	600	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		10	700	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
20	26.9	4	600	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		6	600	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		8	700	MM-C16	MM-C16	MM-C16	-	-	no	yes	yes	yes
		10	800	MM-C16	MM-C30	MM-C30	-	-	no	yes	no	yes
25	33.7	4	600	MM-C16	MM-C16	MM-C16	-	-	no	yes	no	yes
		6	600	MM-C16	MM-C16	MM-C16	-	-	no	yes	no	yes
		8	700	MM-C16	MM-C30	MM-C30	-	-	no	yes	no	yes
		10	800	MM-C30	MM-C30	MM-C30	-	-	no	yes	no	yes
32	42.4	4	600	MM-C16	MM-C16	MM-C16	MM-C16	-	no	yes	no	yes
		6	700	MM-C16	MM-C30	MM-C30	MM-C30	-	no	yes	no	yes
		8	800	MM-C16	MM-C30	MM-C30	MM-C30	-	no	yes	no	no
		10	1000	MM-C30	MM-C30	MM-C30	MM-C36	-	no	yes	no	no
40	48.3	4	600	MM-C16	MM-C16	MM-C16	MM-C16	MM-C30	no	yes	no	yes
		6	700	MM-C16	MM-C16	MM-C30	MM-C30	MM-C30	no	yes	no	yes
		8	800	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	no
50	60.3	2	600	MM-C16	MM-C16	MM-C16	MM-C16	MM-C16	no	yes	no	yes
		4	700	MM-C16	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	yes
		6	800	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	no
65	76.1	2	600	MM-C16	MM-C16	MM-C16	MM-C30	MM-C30	no	yes	no	no
		4	800	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	no
80	88.9	2	600	MM-C16	MM-C16	MM-C30	MM-C30	MM-C30	no	yes	no	no
		4	1000	MM-C30	MM-C30	MM-C36	MM-C36	MM-C36	no	yes	no	no

DN ... Nominal diameter
 D_a ... Outer diameter [mm]
 n Number of pipes per channel
 L Length of channel [mm]

^{x)} At least 5 fastening points per channel.

Driving sequence: 1. Drive one fastener at each end of the channel. Control of the proper fastening of these 2 end fasteners.
 2. Drive 3 more fasteners between the end fasteners.

Copper pipes according to DIN 1786, DIN 1754 or DIN EN 1057 filled with water and with 100 % insulation

Wall thickness: from DN 15 to 20: ≤ 1.0 mm
 from DN 25 to 40: ≤ 1.5 mm
 from DN 50 to 80: ≤ 2.0 mm

Pipe			Channel selection and channel spacing L _P [m]						Trapeze construction		Channel directly fastened to the substrate	
DN	D _a [mm]	n	L [mm]	1.0	1.5	2.0	2.5	3.0				
				DX-Standard	DX-Kwik	GX/DX-Standard ^{x)}						
				X-HS M_U32	X-HS M_DKH48	X-GHP20	X-U27P8					
15	18.0	4	500	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		6	500	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		8	600	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		10	700	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
20	22.0	4	600	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		6	600	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		8	700	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		10	800	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
25	22.0	4	600	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		6	600	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		8	700	MM-C16	MM-C16	MM-C16	-	-	no	yes	no	yes
		10	800	MM-C16	MM-C30	MM-C30	-	-	no	yes	no	yes
32	35.0	4	600	MM-C16	MM-C16	MM-C16	MM-C16	-	no	yes	no	yes
		6	700	MM-C16	MM-C16	MM-C16	MM-C30	-	no	yes	no	yes
		8	800	MM-C16	MM-C30	MM-C30	MM-C30	-	no	yes	no	yes
		10	1000	MM-C30	MM-C30	MM-C30	MM-C30	-	no	yes	no	yes
40	42.0	4	600	MM-C16	MM-C16	MM-C16	MM-C16	MM-C16	no	yes	no	yes
		6	700	MM-C16	MM-C16	MM-C30	MM-C30	MM-C30	no	yes	no	yes
		8	800	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	yes
50	54.0	2	600	MM-C16	MM-C16	MM-C16	MM-C16	MM-C16	no	yes	no	yes
		4	700	MM-C16	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	yes
		6	800	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	no
65	76.1	2	600	MM-C16	MM-C16	MM-C16	MM-C30	MM-C30	no	yes	no	no
		4	800	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	no
80	88.9	2	600	MM-C16	MM-C16	MM-C30	MM-C30	MM-C30	no	yes	no	no
		4	1000	MM-C30	MM-C30	MM-C36	MM-C36	MM-C36	no	yes	no	no

DN ... Nominal diameter
 D_a ... Outer diameter [mm]
 n Number of pipes per channel
 L Length of channel [mm]

^{x)} At least 5 fastening points per channel.
 Driving sequence: 1. Drive one fastener at each end of the channel. Control of the proper fastening of these 2 end fasteners.
 2. Drive 3 more fasteners between the end fasteners.

Geberit Mepla metal composite pipe filled with water

Pipe			Channel selection and channel spacing L _P [m]						Trapeze construction		Channel directly fastened to the substrate	
DN	D _a x s [mm]	n	L [mm]	1.0	1.5	2.0	2.5	3.0				
				DX-Standard	DX-Kwik	GX/DX-Standard						
				X-HS M_U32	X-HS M_DKH48	X-GHP20	X-U27P8					
15	20x2.5	4	500	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		6	500	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		8	600	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		10	700	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
20	26x3.0	4	600	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		6	600	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		8	700	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
		10	800	MM-C16	MM-C16	-	-	-	yes	yes	yes	yes
25	32x3.0	4	600	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		6	600	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		8	700	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		10	800	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
32	40x3.5	4	600	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		6	700	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
		8	800	MM-C16	MM-C16	MM-C16	-	-	yes	yes	yes	yes
40	50x4.0	2	600	MM-C16	MM-C16	MM-C16	MM-C16	-	yes	yes	yes	yes
		4	600	MM-C16	MM-C16	MM-C16	MM-C16	-	yes	yes	yes	yes
		6	700	MM-C16	MM-C16	MM-C16	MM-C16	-	yes	yes	yes	yes
50	63x4.5	2	600	MM-C16	MM-C16	MM-C16	MM-C16	-	no	yes	yes	yes
		4	1000	MM-C30	MM-C30	MM-C30	MM-C30	-	no	yes	yes	yes
		6	1200	MM-C30	MM-C30	MM-C30	MM-C30	-	no	yes	no	yes
65	75x4.7	2	600	MM-C16	MM-C16	MM-C16	MM-C16	MM-C16	no	yes	no	yes
		4	1000	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	yes
		6	1200	MM-C30	MM-C30	MM-C30	MM-C30	MM-C30	no	yes	no	yes

DN ... Nominal diameter
D_a ... Outer diameter [mm]
n Number of pipes per channel
L Length of channel [mm]

^{x)} At least 5 fastening points per channel.

Driving sequence: 1. Drive one fastener at each end of the channel. Control of the proper fastening of these 2 end fasteners.
2. Drive 3 more fasteners between the end fasteners.

Application range for fastenings to steel

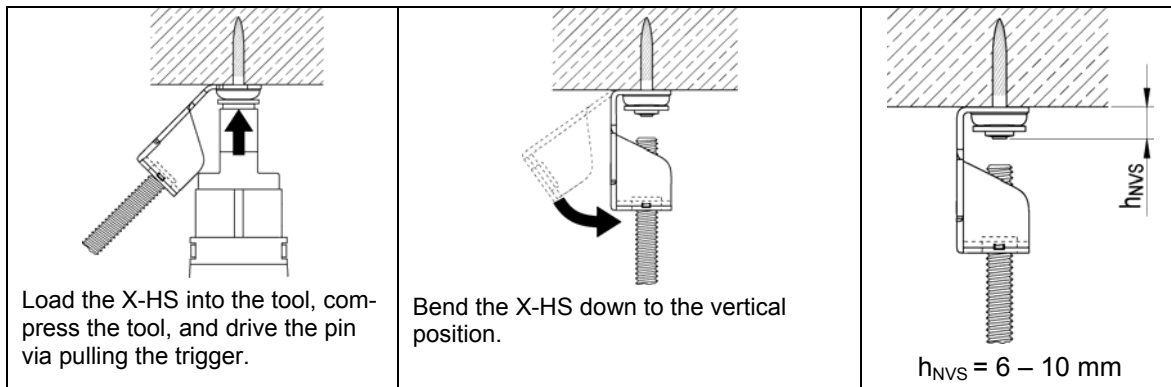
- The application scope from the tables above for concrete is completely covered for the base material steel, when using the powder-actuated fasteners X-HS M8 U19 P8 S15, X-HS M10 U19 P8 S15, X-U 16 P8 or X-U 15 P8TH.
- If the channel is directly fixed to the steel substrate, the number of fasteners per channel may be additionally reduced from 5 to 2. One fastener shall be driven at both ends of the channel. The inner 3 fasteners may be omitted. The application limit of the used fastening system needs to be observed.

Execution and fastening quality: Fastening to concrete

Trapeze construction

DX-Standard: X-HS M8 U32 P8 S15 and X-HS M10 U32 P8 S15

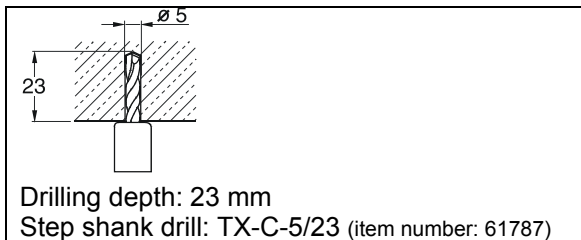
- Cartridge and tool energy setting are to be selected, that the fasteners will be driven flush. It is recommended to start with high energy setting (Red 4 with the DX 460 F8, Red 3 with the DX 351 F8). If the required nail stand-off provisions are met, a reduction of the driving energy is possible. Detailed settings according to trial fastenings on the job-site.
The power of the cartridge is indicated with the colour code: Yellow (low/medium power load) → Red (medium high power load) → Black (extra high power load).
- The correct nail stand-off h_{NVS} needs to be observed. h_{NVS} corresponds with the distance between the top of the nail head and the concrete surface.



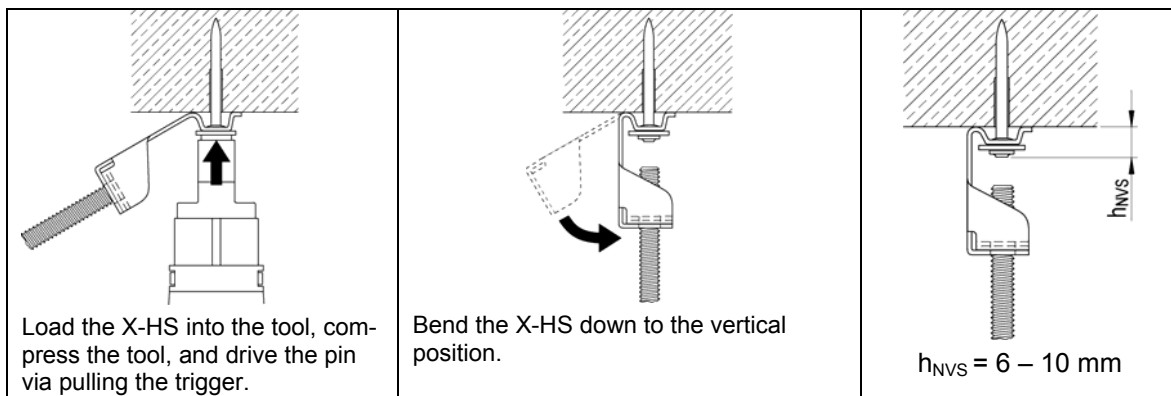
- Proper attachment of each hanger needs to be checked by manual pulling of the threaded rod.
- Fasteners with no holds need to be replaced.

DX-Kwik: X-HS M8 DKH48 P8 S15 and X-HS M10 DKH48 P8 S15

- Pre-drilling of hole using a step shank drill before driving the fastener.



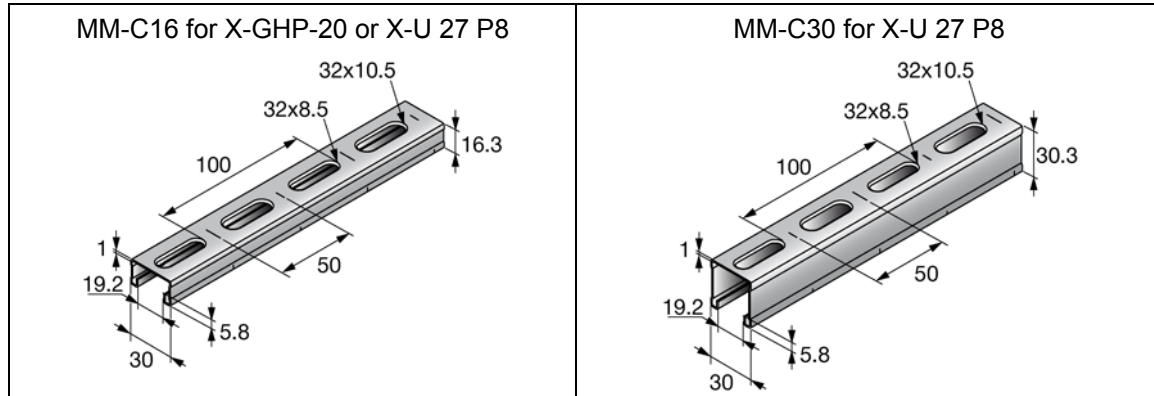
- Cartridge and tool energy setting are to be selected, that the fasteners will be driven flush. The yellow cartridge is recommended for lower strength concrete and the red cartridge is recommended for higher strength concrete. Detailed settings according to trial fastenings on the job-site.
- The correct nail stand-off h_{NVS} needs to be observed. h_{NVS} corresponds with the distance between the top of the nail head and the concrete surface.



Channels directly fastened to the concrete with GX/DX-Standard X-GHP-20 or X-U27 P8

Fastening locations

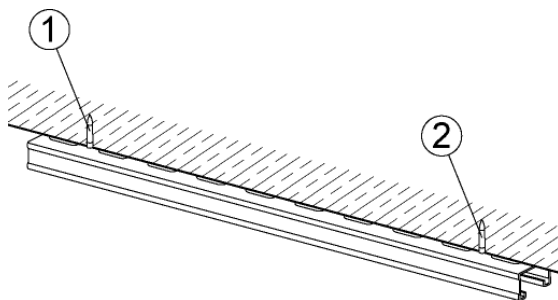
- Fastening of the channel has to be made directly through the wall of the channel. As the back side of the channels MM-C16 and MM-C30 has slotted holes, possible fastening locations are given between these slotted holes with a distance of 50 mm.



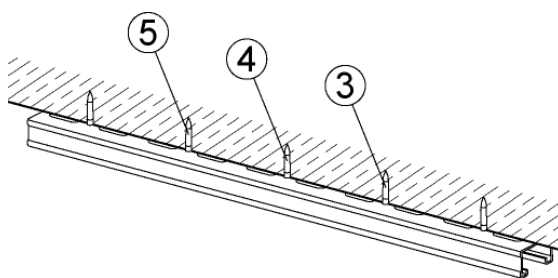
Fastening sequence

When fastening the channels directly to the concrete the following sequence has to be observed.

- Fasteners #1 and #2 have to be driven first at each end of the channel at the outermost possible fastening location.

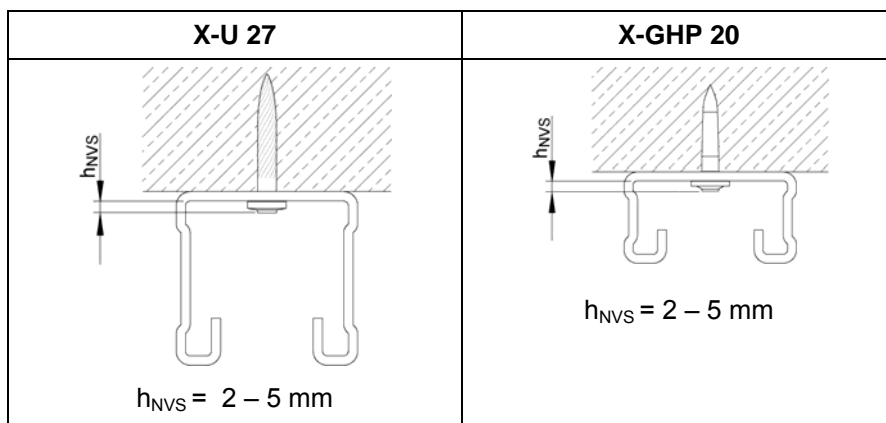


- Proper attachment of the channel needs to be checked. Loose fasteners must be replaced.
- Then 3 more inner fasteners (# 3, 4 and 5) are to be driven.



Tool energy setting and nail head stand-off

- Cartridge and tool energy setting are to be selected, that the fasteners will be driven flush.
- In case of the X-U27 P8 the yellow cartridge is recommended for lower strength concrete and the red cartridge is recommended for higher strength concrete. Detailed settings according to trial fastenings on the job-site.
- In case of X-GHP20 MX the nose position of the GX-100 and the GX-120 has to be set to position „+“.
- The correct nail stand-off h_{NVS} needs to be observed. h_{NVS} corresponds with the distance between the top of the nail head and the top side of the channel wall.



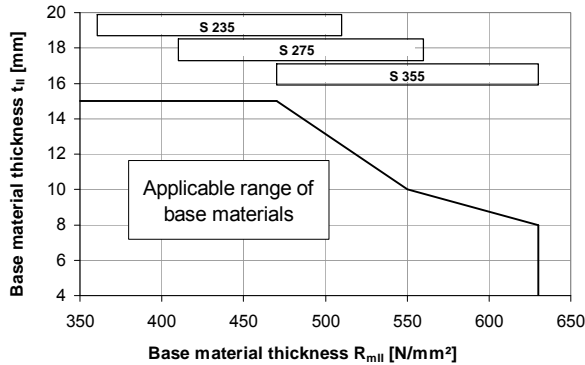
Execution and fastening quality: Fastening to steel

Trapeze construction

- The application limit of the fastening system has to be observed. For the thickness given in the table below the complete strength tolerance range is covered for the listed steel grades.

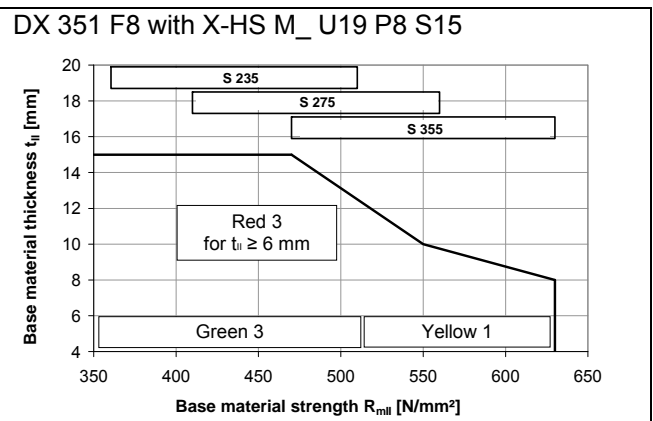
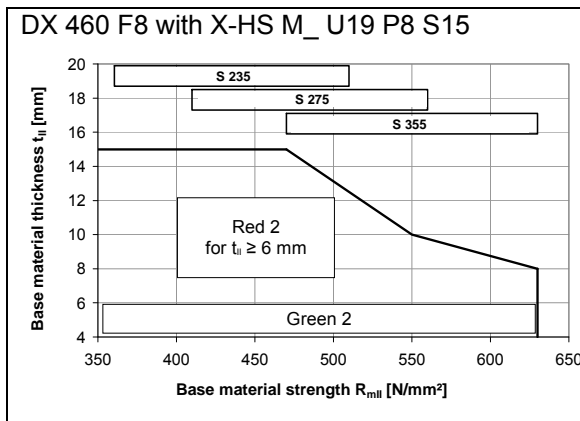
Fastener	Steel grade	Base metal thickness t_{II}
X-HS M_ U19 P8 S15	S 235	4 to 13 mm
	S 355	4 to 8 mm

For greater thickness the following application limit has to be observed:



Base material:
Structural steel S235, S275 und S355 in the qualities JR, J0, J2 and K2 according to EN 10025-2:2005

- Procedure for determination of optimum driving energy:
 - Cartridge selection and tool energy setting according to the diagrams for the respective fastening tool DX 460 F8 or DX 351 F8.



- Trial fastenings in order to check the nail head standoff $h_{NVS} = 6$ to 10 mm. h_{NVS} corresponds with the distance between the top of the nail head and the steel surface.
- If necessary adjustment of the energy setting or change of cartridge. The power of the cartridge is indicated with the colour code: Green (low power load) → Yellow (low/medium power load) → Red (medium high power load) → Black (extra high power load).
- The correct standoff h_{NVS} has to be observed.

Hanger X-HS M_ U19 P8 S15

In case of correct standoff, the washer of the X-HS is bent downwards.

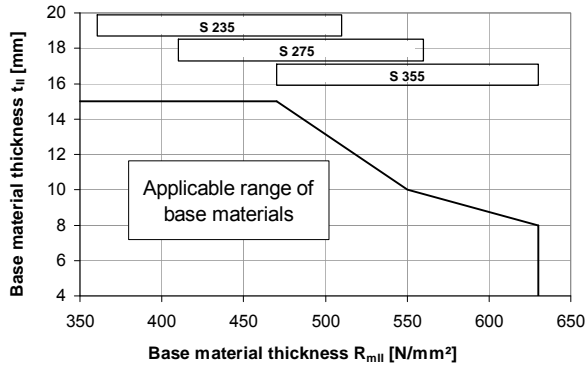
$h_{NVS} = 6 - 10$ mm

Channels directly fastened to steel with X-U 16 P8 or X-U 15 P8TH

- The application limit of the fastening system has to be observed. For the thickness given in the table below the complete strength tolerance range is covered for the listed steel grades.

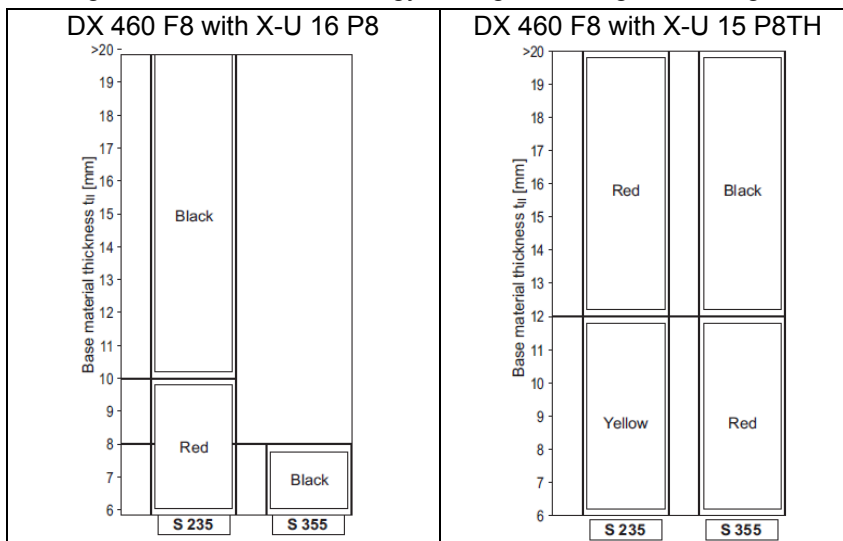
Fastener	Steel grade	Base material thickness t_{II}
X-U 16 P8	S 235	6 to 12 mm
	S 355	6 to 8 mm
X-U 15 P8TH	S 235 bis S 355	≥ 6 mm

In case of the X-U 16 P8 the following application limit has to be observed for greater thickness:



Base material:
Structural steel S235, S275 und S355 in the qualities JR, J0, J2 and K2 according to EN 10025-2:2005

- Procedure for determination of optimum driving energy:
 - Cartridge selection and tool energy setting according to the diagrams for the fastening tool DX 460 F8.



- Trial fastenings in order to check the nail head standoff h_{NVS} . h_{NVS} corresponds with the distance between the top of the nail head and the steel surface.
 - If necessary adjustment of the energy setting or change of cartridge. The power of the cartridge is indicated with the colour code: Yellow (low/medium power load) → Red (medium high power load) → Black (extra high power load).
- The correct standoff h_{NVS} has to be observed.

