HILTI

X-U
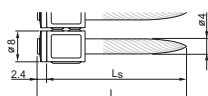# DATA SHEET

Nail for fastening to concrete and steel

X-U Nail for fastening to concrete and steel
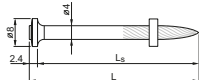
Product data

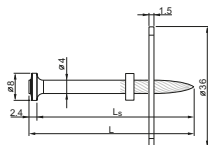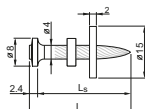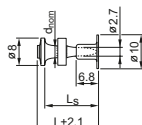### Dimensions

X-U__MX

X-U __ P8

X-U __ P8 S36

X-U __ P8 S15
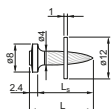
X-U 15 P8TH

X-U __ S12

General information

Material specifications

Carbon steel shank:	HRC 58
	HRC 59 (X-U 15)
Zinc coating:	5–20 µm

#### Recommended fastening tools

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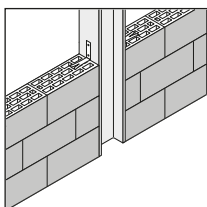
Approvals

ICC ESR-2269 (USA)
DIBt Z-14.4-517 (Germany), DNV-GL
ABS, LR 97/00077, IBMB 2006/2011

Note: technical data presented in these approvals and design guidelines reflect specific local conditions and may differ from those published in this handbook.

Applications
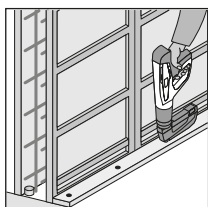
System formwork

Wall-tie to steel and concrete
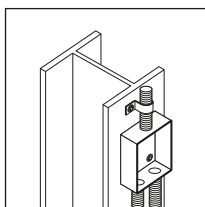
Mechanical and electrical fixtures
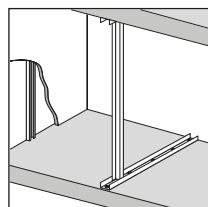
Drywall track to concrete and steel
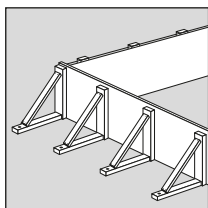
Conventional formwork

Tagging labels
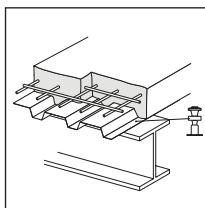
Tacking of metal decks
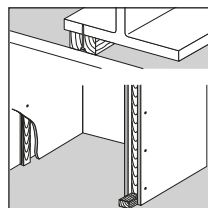
Sill plates / 2x4 wood to concrete and steel

The intended use for safety relevant and permanent applications only comprises fastenings which are not directly exposed to external weather conditions or moist atmospheres.

Fastening to Concrete

Recommended loads
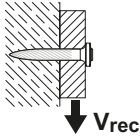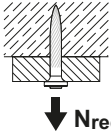
N_{rec} [kN]	V_{rec} [kN]	h_{ET} [mm]
0.4	0.4	≥ 27
0.3	0.3	≥ 22
0.2	0.2	≥ 18
0.1	0.1	≥ 14

N_{rec}　　　**V_{rec}**

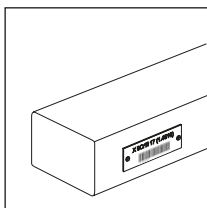**Design conditions:**
• For safety relevant fastenings sufficient redundancy of the entire system is required: Minimum 5 fastenings per fastened unit.
• All visible failures must be replaced.
• Valid for concrete with strength of **f_{cc}** ≤ 45 N/mm².
• Valid for predominantly static loading.
• Failure of the fastened material is not considered in recommended loads
• To limit penetration of nail and to increase pull-over load, use nails with washers.

Fastening to Concrete

Application requirements

Thickness of base material	Thickness of fastened material
Concrete:	Wood:
h_{min} = 80 mm	t_I = 15–57 mm

Edge distance and fastener spacing
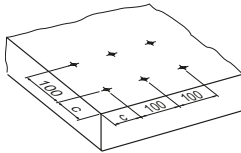
Edge distance: **c ≥ 70 mm**
Spacing: **s ≥ 100 mm**

Fastener selection and system recommendation

Fastening to concrete

Required nail shank length: $L_S = h_{ET} + t_I$ [mm]
Recommendation: h_{ET} = 22 mm
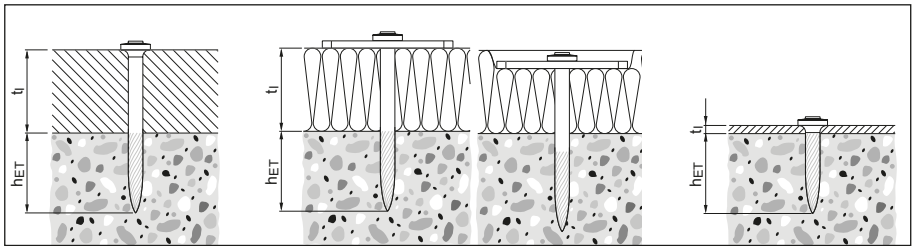
In case flush fastenings are required:
$L_S = h_{ET} + t_I - 5$ [mm]

Cartridge recommendation

Tool energy adjustment by setting tests on site

Fastening to concrete:	**6.8/11M yellow cartridge**	on soft and tough concrete
	6.8/11M red cartridge	on very tough concrete

Fastening to Steel

Recommended loads

Fastening of steel sheets and other steel parts with X-U 16 and X-U 19

Recommended loads t_I [mm]	X-U _ P8/MX N_{rec} [kN]	X-U _ S12 N_{rec} [kN]	V_{rec} [kN]
0.75	1.0	1.4	1.2
1.00	1.2	1.8	1.8
1.25	1.5	2.2	2.6
≥ 2.00	2.0	2.2	2.6

Tacking of steel sheets with X-U 15

according to ECCS-recommendation N73, „Good Construction Practice for Composite Slabs "

Recommended loads t_I [mm]	N_{rec} [kN]	V_{rec} [kN]
0.75–1.25	0.6	0.8

Design conditions:

- Recommended working loads valid for steel sheet with minimum tensile strength ≥ 360 N/mm².
- For intermediate sheet thicknesses, use recommended load for next smaller thickness.
- In case of a design based on the characteristic resistance, recommended values have to be multiplied by two: => N_{Rk} = N_{rec} · 2.0 V_{Rk} = V_{rec} · 2.0
- For X-U 16 S12: base material thickness $t_{II,min}$ = 8 mm for t_I ≥ 1.5 mm and $t_{II,min}$ = 6 mm for t_I ≤ 1.25 mm
- Other fastened parts: clips, brackets, etc.
- Redundancy (multiple fastening) must be provided.
- Valid for predominantly static loading

Forces of constraint

When fastening large pieces of steel, the possibility of shear loadings from forces of constraint should be considered. Avoid exceeding V_{rec} for the fastener shank!
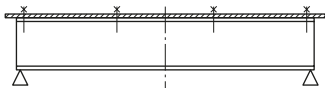
Deflection due to primary loading   Temperature effect
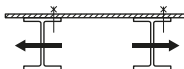
Fastening to Steel

Fastenings of wood to steel

N_{rec} **= 0.3 kN**

V_{rec} **= 0.6 kN**

Design conditions:
- For safety-relevant fastenings sufficient redundancy of the entire system is required.
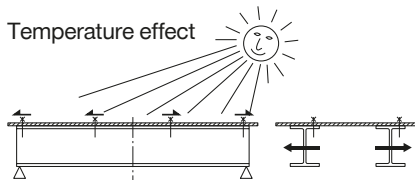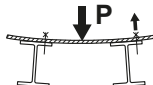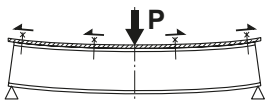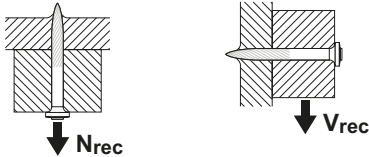- In case soft material is fastened, its strength determines the loads.
- To limit penetration of nail and to increase pull-over load, use nails with washers.
- Observance of edge distance and fastener spacing in compliance with recognized standards EN 1995 (see approval).
- With respect to details of fastening wood, chipboard or OSB members to steel base material, it is refered to the German approval DIBt Z-14.4-517.

Application requirements

Thickness of base material

Steel:

$t_{II} \geq$ **6.0 mm** (fastening steel to steel)

$t_{II} \geq$ **4.0 mm** (fastening wood to steel)

Thickness of fastened material

Steel:

$t_l \leq$ **3 mm** (fastened material not pre-drilled)

3 mm < $t_l \leq$ 6 mm (fastened material pre-drilled)

Wood:

t_l = **15–57 mm**

Condition for thick fastened steel parts (3 mm < $t_l \leq$ 6 mm)

If a gap between the fastened part and the base material is unacceptable, the fastened part needs to be prepared with drilled holes.

$\geq 4.5\ d_{nom}$ = 18mm

d_s

Ø12

120°
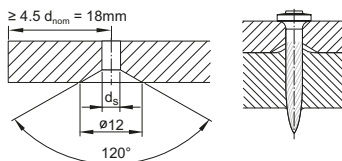
Edge distance and spacing

Rolled shapes:

20 ≥15

$\geq 4.5\ d_{nom}$ = 18mm
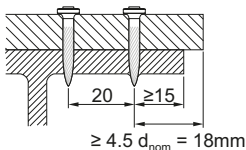
Edge distance: c ≥ 15 mm

Spacing: a = 20 mm

Fastening to Steel

Application limits

Fastening of steel sheets and steel parts to steel
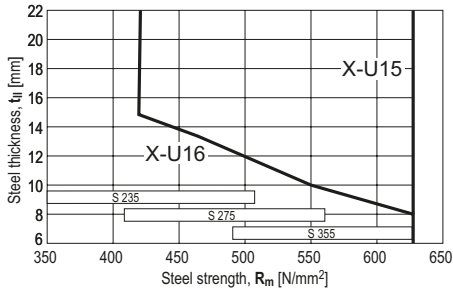
Fastening of wood and soft material to steel
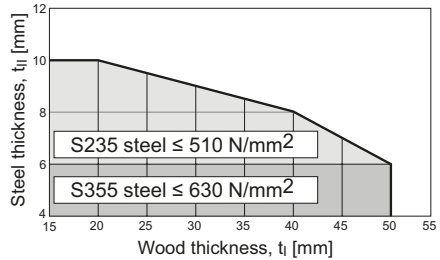
X-U 16 P8, X-U 15 P8TH: For steel sheeting with 0.75 mm ≤ t_I ≤ 1.25 mm sheets

For X-U 22 P8 to X-U 62 P8

On higher steel grades, fastening with single nails (P8 or P8TH) may yield better results (e.g. less shear brakes) than fastening with collated nails (MX or MXSP) due to better nail guidance.

Fastener selection and system recommendation

Required nail shank length: $L_S = h_{ET} + t_I$ [mm]

Fastening steel to steel
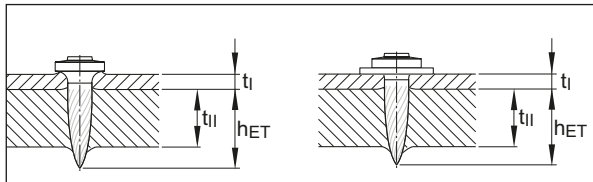
Recommendation: h_{ET} = 12 ± 2 mm

Fastening wood to steel
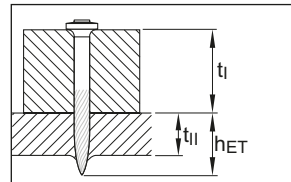
h_{ET} ≥ 8 mm
h_{ET} ≥ 5 mm for flush installation

Cartridge recommendation

Tool energy adjustment by setting tests on site

Fastening wood to steel:	**6.8/11M green or yellow cartridge** on steel thickness t_{II} < 6 mm
	6.8/11M yellow, red or black cartridge on steel thickness t_{II} ≥ 6 mm
Fastening steel to steel:	**6.8/11M yellow, red or black cartridge**

Fastening to Steel

X-U 16

Base material thickness t_{II} [mm]

	S 235	S 355
Black (10–>20)	Black	Black
Red (8–10)	Red	
Black (6–8)		Black

X-U 15 P8TH

Base material thickness t_{II} [mm]

	S 235	S 355
(12–>20)	Red	Black
(6–12)	Yellow	Red
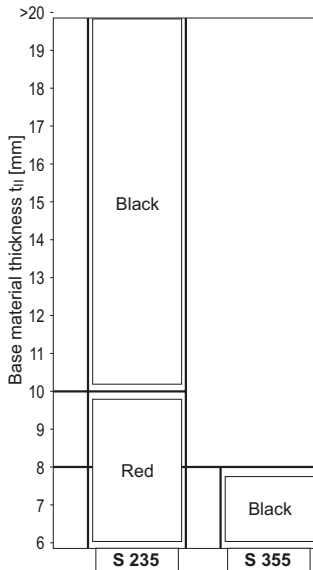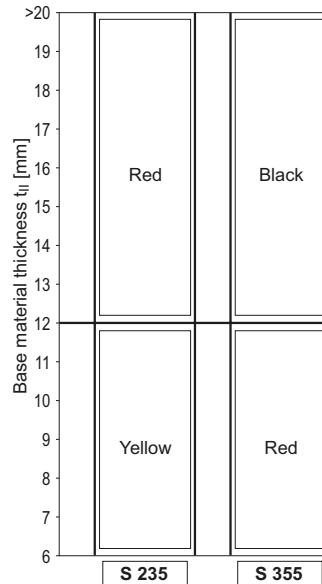
Fastening quality assurance

Fastening inspection

X-U __ P8/MX

h_{NVS} = 2.5–4.5 mm

X-U __ S12

h_{NVS} = 4.0–5.5 mm

X-U _ P8TH / MXSP
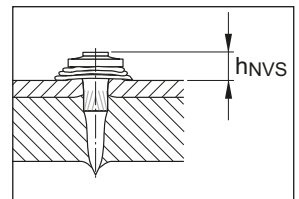
h_{NVS} = 4.0–6.0 mm

Fastener program

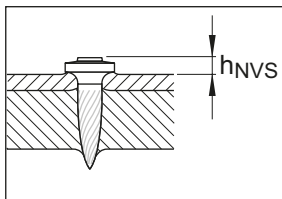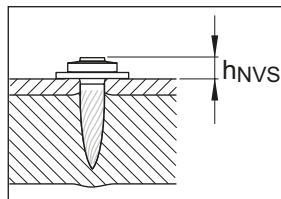| Fastener	Item no.	L_S [mm]	DX 460 MX, DX 5 MX	DX 460 F8, DX 5 F8	DX 36, DX 2	DX E72	DX 351 MX	DX 351 F8	DX 35	DX 462 F8	DX 460 F8S12 / DX 5 F8S12 / DX 462 F8S12	Key applications
			Standard tools						Special tools			
X-U 16 MX	237344	16	■				■					Sheet metal on steel
X-U 19 MX	237345	19	■				■					Sheet metal on steel
X-U 22 MX	237346	22	■				■					Wood on concrete/steel
X-U 27 MX	237347	27	■				■					Wood on concrete/steel
X-U 32 MX	237348	32	■									Wood on concrete/steel
X-U 37 MX	237349	37	■									Wood on concrete/steel
X-U 42 MX	237350	42	■									Wood on concrete/steel
X-U 47 MX	237351	47	■									Wood on concrete/steel
X-U 52 MX	237352	52	■									Wood on concrete/steel
X-U 57 MX	237353	57	■									Wood on concrete/steel
X-U 62 MX	237354	62	■									Wood on concrete/steel
X-U 72 MX	237356	72	■									Wood on concrete/steel
X-U 16 P8	237330	16		■	■	■		■	■	■		Sheet metal on steel
X-U 19 P8	237331	19		■	■	■		■	■	■		Sheet metal on steel
X-U 22 P8	237332	22		■	■	■		■	■	■		Wood on concrete/steel
X-U 27 P8	237333	27		■	■	■		▨	▨	■		Wood on concrete/steel
X-U 32 P8	237334	32		■	■	■		▨	▨	■		Wood on concrete/steel
X-U 37 P8	237335	37		■	■	■		▨	▨	■		Wood on concrete/steel
X-U 42 P8	237336	42		■	■	■		▨		■		Wood on concrete/steel
X-U 47 P8	237337	47		■	■	■		▨		■		Wood on concrete/steel
X-U 52 P8	237338	52		■	■	■				■		Wood on concrete/steel
X-U 57 P8	237339	57		■	■	■				■		Wood on concrete/steel
X-U 62 P8	237340	62		■	■	■						Wood on concrete/steel
X-U 72 P8	237342	72		■	■	■						Wood on concrete/steel
X-U 16 P8TH	237329	16		■	■	■		■	■	■		Sheet metal on steel, *)
X-U 19 P8TH	385781	19		■	■	■		■	■	■		Sheet metal on steel, *)
X-U 27 P8TH	385782	27		■	■	■		▨	▨	■		Sheet metal on concrete, *)
X-U 15 MXSP	383466	16	■				▨					Sheet metal on steel
X-U 15 P8TH	237328	16		■	▨	▨		▨	■	■		Sheet metal on steel

*) firm hold down

Fastener	Item no.	L_S [mm]	Standard tools						Special tools			Key applications
			DX 460 MX, DX 5 MX	DX 460 F8, DX 5 F8	DX 36, DX 2	DX E72	DX 351 MX	DX 351 F8	DX 35	DX 462 F8	DX 460 F8S12 / DX 5 F8S12 / DX 462 F8S12	
X-U 27 P8S15	237371	27		■	■	■		▨	▨	■		High pull-over strength
X-U 32 P8S15	237372	32		■	■	■		▨	▨	■		High pull-over strength
X-U 32 P8S36	237374	32		■	■	■		▨	▨	■		Soft material on concr./steel
X-U 52 P8S36	237376	52		■	■	■		▨		■		Soft material on concr./steel
X-U 72 P8S36	237379	72		■	■	■						Soft material on concr./steel
X-U 16 S12	237357	16									■	High pull-over strength
X-U 19 S12	237358	19									■	High pull-over strength
X-U 22 S12	237359	22									■	High pull-over strength
X-U 27 S12	237360	27									■	High pull-over strength
X-U 32 S12	237361	32									■	High pull-over strength

■ = Recommended

▨ = Feasible