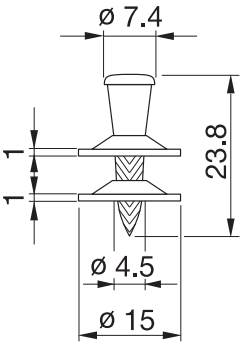
X-ENP Siding and Decking Nail

Product data

Dimensions



General information

Material specifications

Carbon steel shank:	HRC 58
Zinc coating:	8–16 µm

Recommended fastening tools

	Single nail:
DX 76 F15, DX 76 PTR with X-76-F15-PTR fastener guide	X-ENP-19 L15
DX 76 MX, DX 76 PTR	Collated nails: X-ENP-19 L15 MX, white magazine strip
DX 860-ENP	X-ENP-19 L15 MXR, grey magazine strip

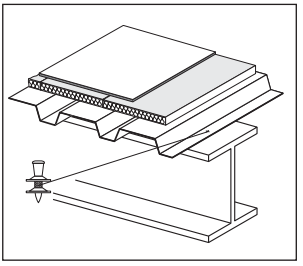
See **Tools and equipment** for more details.

Approvals

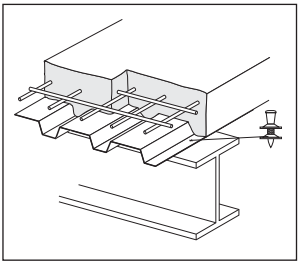
ETA-04/0101 (Hilti-DX-DoP001), UL R13203, FM 3021719, ICC ESR-2197, ESR-2776 (USA), MLIT (Japan), ABS, LR 97/00077

Applications

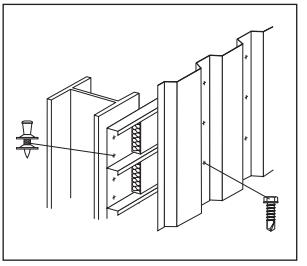
Examples



Roof decking



Floor decking



Wall liners

The intended use only comprises fastenings which are not directly exposed to external weather conditions or moist atmospheres. For out-door applications, that can be ensured by using SDK 2 sealing caps. During construction exposure to external atmosphere must not exceed 6 months. Fastening of aluminum sheeting is generally recommended only for indoor conditions.

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Load data

Characteristic loads – steel sheeting

Sheeting thickness t_t [mm]	Trapezoidal profile (symmetric loading) Char. resistance according to ETA-04/0101		Liner trays [1] (asymmetric loading) Char. resistance keeping to ETA-04/0101	
nominal	**Shear** V_{Rk} [kN]	**Tension** N_{Rk} [kN]	**Shear** V_{Rk} [kN]	**Tension** N_{Rk} [kN]
0.75	4.70	6.30	3.30	4.40
0.88	5.40	7.20	3.80	5.00
1.00	6.00	8.00	4.20	5.60
1.13	7.00	8.40	4.90	5.90
1.25	8.00	8.80	5.60	6.20
1.50	8.60	8.80	6.00	6.20
1.75	8.60	8.80	6.00	6.20
2.00	8.60	8.80	6.00	6.20
2.50	8.60	8.80	6.00	6.20

- N_{Rk} and V_{Rk} are valid for steel sheet with minimum tensile strength ≥ 360 N/mm² (≥ S280 EN 10346).
- For intermediate sheet thicknesses, use recommended load for next smaller thickness or linear interpolation.

1) Required load reduction is taken into account in accordance with EN 1993-1-3: 2006, section 8.3 (7) and fig. 8.2. See also construction rules under spacings and edge distances.

Recommended loads – steel sheeting

Sheeting thickness t_t [mm]	Trapezoidal profile (symmetric loading) **Recommended loads**		Liner trays [1] (asymmetric loading) **Recommended loads**	
nominal	Shear V_{rec} [kN]	Tension N_{rec} [kN]	Shear V_{rec} [kN]	Tension N_{rec} [kN]
0.75	2.50	3.35	1.75	2.35
0.88	2.90	3.85	2.00	2,70
1.00	3.20	4.25	2.25	3.00
1.13	3.75	4.50	2.65	3.15
1.25	4.25	4.70	3.00	3.30
1.50	4.60	4.70	3.20	3.30
1.75	4.60	4.70	3.20	3.30
2.00	4.60	4.70	3.20	3.30
2.50	4.60	4.70	3.20	3.30

- N_{rec} and V_{rec} are valid for steel sheet with minimum tensile strength ≥ 360 N/mm² (≥ S280 EN 10346).
- For intermediate sheet thicknesses, use recommended load for next smaller thickness or linear interpolation.
- Recommended loads N_{rec} and V_{rec} are appropriate for Eurocode 1 wind loading design with a partial safety factor γ_F =1.5 for wind load and a partial resistance factor γ_M = 1.25 for the fastening.

1) Required load reduction is taken into account in accordance with EN 1993-1-3: 2006, section 8.3 (7) and fig. 8.2. See also construction rules under spacings and edge distances.

Recommended loads – aluminum sheeting[1] with $f_u \geq 210$ N/mm²

Trapezoidal profile (symmetric loading)

Thickness t_I [mm]	Shear V_{rec} [kN]	Tension N_{rec} [kN]
0.60	0.75	0.35
0.70	0.90	0.50
0.80	1.00	0.65
0.90	1.20	0.80
1.00	1.30	0.95
1.20	1.55	1.30
1.50	1.85	1.45
2.00	2.55	1.90

1) Only recommended for indoor applications. Constraint forces and corrosion aspects have to be considered.

- For intermediate sheet thicknesses, use recommended load for next smaller thickness.
- Recommended loads N_{rec} and V_{rec} are appropriate for Eurocode 1 wind loading design with a partial safety factor of γ_F =1.5 for wind load and a partial resistance factor γ_M = 1.25 for the fastening.

Recommended loads – other applications

V_{rec} [kN]	N_{rec} [kN]
4.6	2.4

- Fastened parts: clips, brackets, etc.; thick steel parts ($t_{I,max}$ = 2.5 mm).
- Redundancy (multiple fastening) must be provided.
- The possibility of prying effects has to be considered
- Failure of the fastened part is not considered in these values of N_{rec}, V_{rec}.
- Valid for predominantly static loading
- Global factor of safety is ≥ 2 based on 5% fractile value

Design

Depending on the verification concept, the corresponding design criteria are given as following.

Working load concept		Partial safety concept
Tensile loads	$N_{Sk} \leq N_{rec}$	$N_{Sd} \leq N_{Rd}$
Shear loads	$V_{Sk} \leq V_{rec}$	$V_{Sd} \leq V_{Rd}$

N-V Interaction

For combined tensile and shear forces on the fastener, a linear function has to be used.

$$\left(\frac{V_{Sk}}{V_{rec}}\right) + \left(\frac{N_{Sk}}{N_{rec}}\right) \leq 1$$

with:

V_{Sk}, N_{Sk} unfactored characteristic load acting on the fastening (= working load)

V_{rec}, N_{rec} recommended (allowable) load with γ_{GLOB} = 1.875

$$\left(\frac{V_{Sd}}{V_{Rd}}\right) + \left(\frac{N_{Sd}}{N_{Rd}}\right) \leq 1$$

with:

V_{Sd}, N_{Sd} Design load with γ_F = 1.5

V_{Rd}, N_{Rd} Design resistance of the fastening with γ_M = 1.25

V_{Rd} = V_{Rk} / 1.25

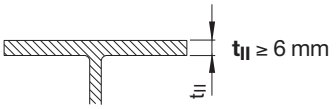
N_{Rd} = α_{cycl} N_{Rk} / 1.25

α_{cycl} = 1.0 according to ETA-04/0101

Application requirements

Thickness of base material

Steel thickness t_{II}



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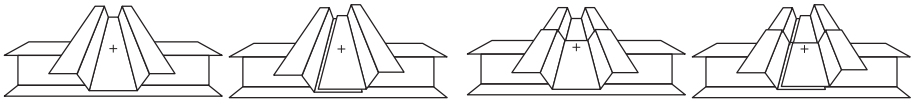
Thickness of fastened material

$\Sigma t_{I,\,tot} \leq 4.0$ mm

Sheet thicknesses and overlap types



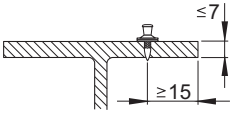
(a) single	(b) side lap	(c) end overlap	(d) side lap and end overlap

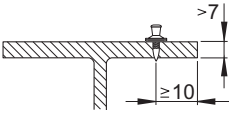
Nominal sheeting thickness t_I [mm]	Allowable overlap types
0.63–1.00	a, b, c, d
> 1.00–1.25	a, c
> 1.25–2.50	a

With the above recommended sheet thickness and overlap types, it is not necessary to take into account the effect of constraints due to temperature for steel grades up to S320 (EN 10346). For steel grade S350 (EN 10346) it shall be considered for design. Sheets of grade S350 on base material $t_{II} \geq 8$ mm have been verified by Hilti, forces of constraint can be neglected.

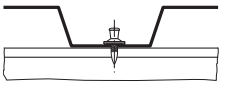
Spacing and edge distances (mm)

Steel base material

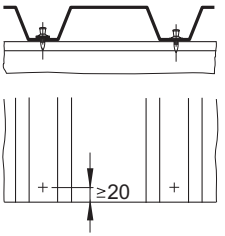




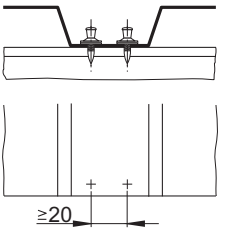
Trapezoidal profiles

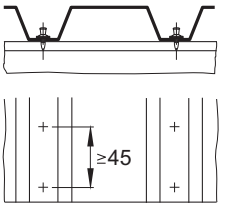


Centre fastenings in ribs



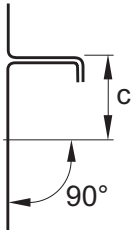
Clearance to end of sheet



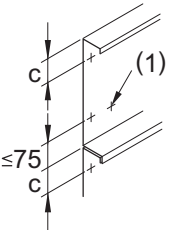


Double fastenings (asymmetric)
Note:
Reduce tensile resistance per fastener to 0.7 N_{Rk} or 0.7 N_{rec}.

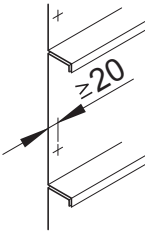
Liner trays



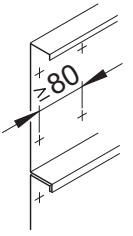
Clearance to side of sheet



Clearance to side of sheet



Clearance to end of sheet



Fastener spacing along sheet

When driving the fastener, the fastening tool needs to be positioned perpendicular to the surface.
If c > 75 mm, it is recommended to drive an additional fastener at the other side of the tray. This additional fastener is indicated with (1) in the graph above.

Corrosion information

The intended use only comprises fastenings which are not directly exposed to external weather conditions or moist atmospheres. For outdoor applications that can be ensured by using **SDK 2** sealing caps. During construction exposure to external atmosphere must not exceed 6 Month. Fastening of Aluminum sheeting is generally recommended only for indoor conditions.

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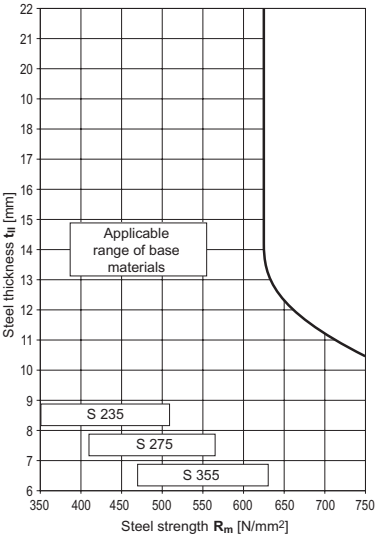
Application limit

X-ENP-19 with DX 76, DX 76 PTR and DX 860-ENP

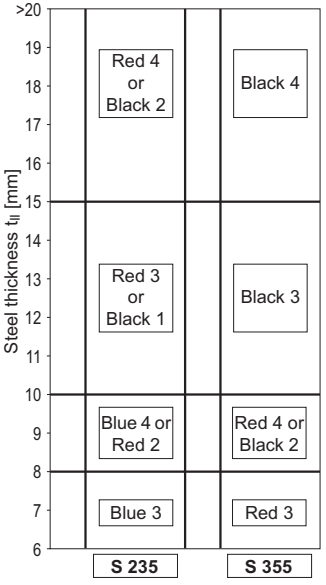


Fastener selection and system recommendation

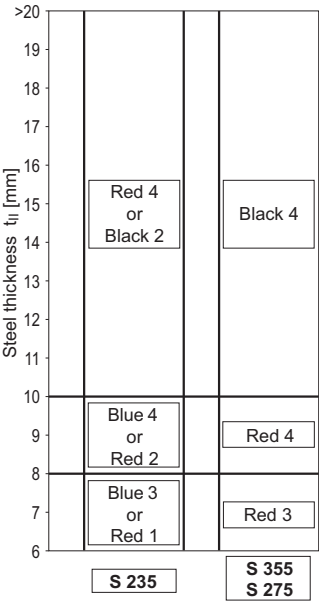
Fasteners			Tools	Fastener guide
	Designation	Item no.	Designation	Designation
Single nail:	X-ENP-19 L15	283506	DX 76 PTR DX 76 F15	X-76-F15-PTR
Collated nails:	X-ENP-19 L15 MX, white magazine strip	283507	DX 76 PTR DX 76 MX	
	X-ENP-19 L15 MXR, grey magazine strip	283508	DX 860-ENP	
Piston:	X-76-P-ENP-PTR X-76-P-ENP		DX 76 PTR DX 76 DX 860-ENP	

Cartridge selection and tool energy setting

DX 76, DX 860-ENP



DX 76 PTR



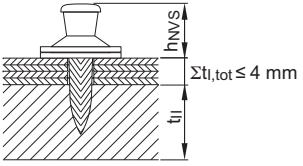
Fine adjustment by installation tests on site.

Note for S275:

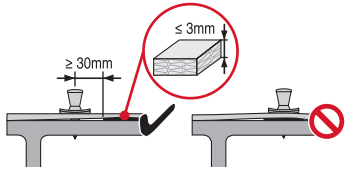
Start with recommendation for S355. In case of too much energy: reduction of tool energy setting or change of cartridge colour till correct nail head stand-offs h_{NVS} are achieved.

Fastening quality assurance

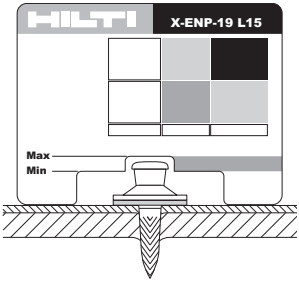
Fastening inspection



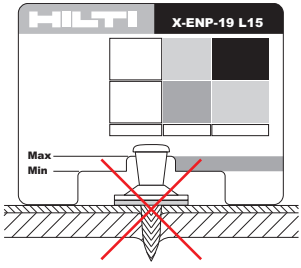
h_{NVS} = 8.2–9.8 mm for $t_{I,tot} \leq 4$ mm



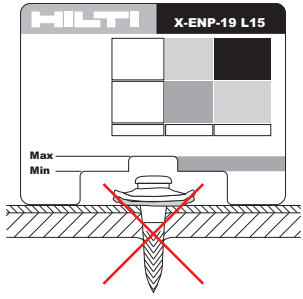
In order to allow the steel sheeting to be in direct contact with the steel supporting structure in the area of connections the X-ENP-19 fastener should be installed ≥ 30mm away from the edges of insulation / isolation tapes that are ≤ 3 mm thick.



h_{NVS} = 8.2–9.8 mm



h_{NVS} > 9.8 mm
(washers are not compressed)



h_{NVS} < 8.2 mm
(washers are strongly damaged by the tool piston)

Visible inspection:
Properly driven fastener.
Piston mark clearly visible on the washer.