

**2.9 X-EDNI, ENK, EDS General Purpose Nails for Steel**

Carbon steel shank :    **EDNI 12 - 22**    HRC 55.5 ± 1  
                                   **EDS19/22,**    HRC 54.5 ± 1  
                                   **ENK22, EDS27,** HRC 53.5 ± 1  
                                   **EDNIH 16**     HRC 58.0 ± 1

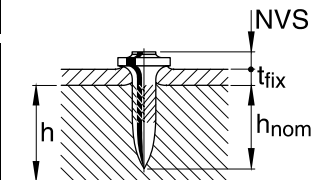
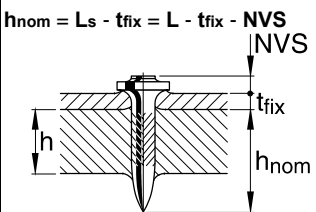
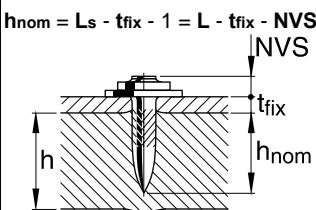
Coating :                    Zinc, 5 - 13 µm  
 Steel washers :            Mild carbon steel, Zn 10 - 20 µm  
 Plastic washers :         Polyethylene

**Application Approvals and Governing Design Guidelines**
**ICBO, Lloyd's, ABS**

Technical data (design loads, application restrictions, etc.) presented in these approvals and design guidelines reflect specific local conditions and may differ from those published in this handbook. If the project is in a jurisdiction where the fastening is subject to the approval process or where a design guideline must be used, technical data in the approval or design guideline has precedence over data presented here. Approval copies are available from your Hilti technical advisory service.

**Fastener Program (dimensions in mm)**

Designation	L <sub>s</sub>	Guidelines for application				DX tools
		Min. h	h <sub>nom</sub>	NVS	Max. t <sub>fix</sub>	
① X-EDNI 12 P8	12	4	10 - 14	3.5 - 4.5	1	DX 460, DX-A 40/41 DX 450/451, DX 36M, DX 600N
X-EDNI 16 P8	16				3	
X-EDNI 19 P8	19				6	
X-EDNI 22 P8	22				9	
② X-EDNI __ MX	16, 19, 22				L <sub>s</sub> - 13	DX-A 40/41, DX 36M
③ X-EDNI __ S12	16, 19, 22			4.0 - 5.5	L <sub>s</sub> - 14	DX 460, DX-A 40, DX 450
X-EDNIH 16 S12	16					
④ ENK __ S12	16, 19, 22			3.5 - 4.5		DX 450
⑤ EDS __ P10	19, 22, 27	6	12 - 17	3 - 4		DX 750 I, DX 600N

**Application Dimensions**
**X-EDNI \_\_ P8/MX, EDS \_\_ P10**

**X-EDNI \_\_ S12, ENK \_\_ S12**

**Recommended Loads for Steel Sheet Fastenings (in kN)**

t <sub>fix</sub> (mm)	X-EDNI __ P8/MX, ENK __ S12		X-EDNI __ S12		EDS __ P10	
	N <sub>rec</sub>	V <sub>rec</sub>	N <sub>rec</sub>	V <sub>rec</sub>	N <sub>rec</sub>	V <sub>rec</sub>
0.75	1.0	1.2	1.4	1.2	1.1	1.5
1.00	1.2	1.8	1.8	1.8	1.3	2.3
1.25	1.5	2.6	2.2	2.6	1.7	3.2
2.00	2.2	2.6	2.2	2.6	2.4	4.0

- 1) Recommended working loads valid for steel sheet with minimum tensile strength  $\geq 360 \text{ N/mm}^2$ .
- 2) For intermediate sheet thicknesses, use recommended load for next smaller thickness.
- 3) **N<sub>rec</sub>** & **V<sub>rec</sub>** include an overall safety factor of 3.0 applied to the characteristic strength.  
Static test             $F_{rec} = FR_k / 3.0$
- 4) For X-EDNIH16 S12:  $h_{min} = 8 \text{ mm}$  for  $t_{fix} \geq 1.5 \text{ mm}$  and  $h_{min} = 6 \text{ mm}$  for  $t_{fix} \leq 1.25 \text{ mm}$

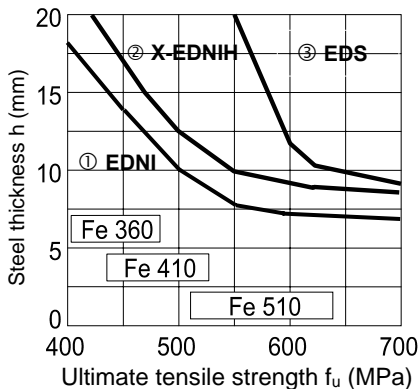
**Recommended Loads for other fastenings**

X-EDNI __ P8/MX, X-EDNI __ S12, ENK __ S12			EDS __ P10		
N <sub>rec</sub>	V <sub>rec</sub>	M <sub>rec</sub>	N <sub>rec</sub>	V <sub>rec</sub>	M <sub>rec</sub>
1.6	2.6	4.9	2.4	4.0	8.8

- 1) Fastened parts: Clips, brackets, etc. with 1 to 2 fastenings; thick steel parts
- 2) Failure of the fastened part is not considered in these values of **N<sub>rec</sub>**, **V<sub>rec</sub>**, **M<sub>rec</sub>**.
- 3) Valid for predominantly static loading.

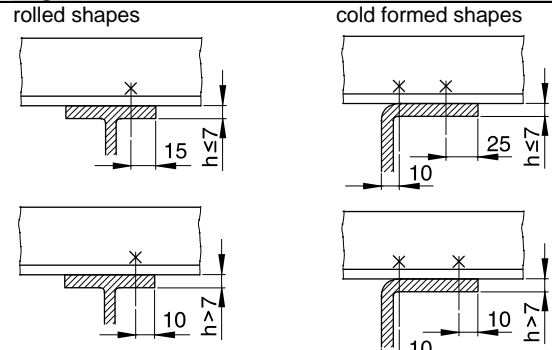
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Application Limits

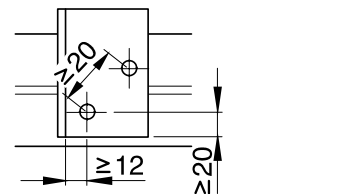


- ① X-EDNI & DX 460, DX-A tools
- ② X-EDNIH & DX 462 tool
- ③ EDS & DX 750 I, DX 600N tools
- Limit lines valid for steel,  $t_{fix} \leq 3$  mm
- For steel  $t_{fix} > 3$  mm and without pre-drilling, either make trial fastenings or adjust h to  $h + t_{fix}$  before using the chart above.

Edge distances - base material



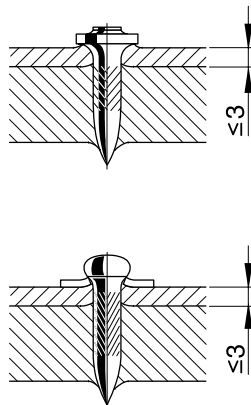
Edge Distance/Fastening Spacing - Fastened Material



Special Measures - for Steel Fastened Material >3 mm

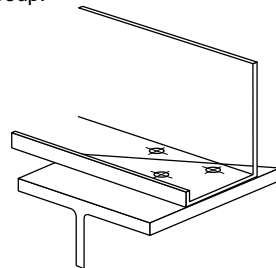
**$t_{fix} \leq 3$  mm**  
 Steel fastened material  $\leq 3$  mm thick, usually deforms with the displaced base material to allow a tight fit between fastened steel and base material without pre-drilling.

Because conditions may vary, trial fastenings are recommended.

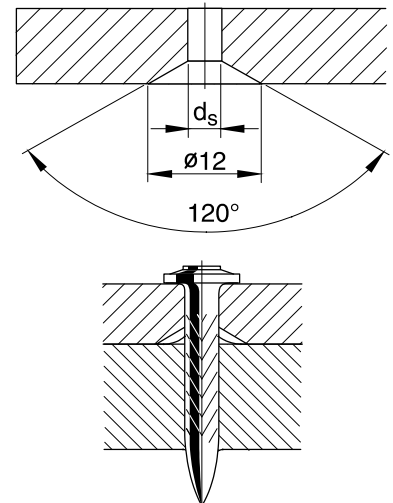


**Without pre-drilling:**  
 Steel fastened material  $> 3$  mm thick is too stiff to fully deform with the displaced base material. The gap, which increases with increasing  $M_{Pa}$ , can result in bending moments being applied to the nail shank.

To prevent imposition of a moment on the shank of the fastener, use three fasteners in a group.

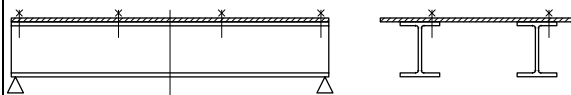


**With pre-drilling:**  
 If a gap between the fastened part and the base material is unacceptable, the fastened part can be prepared with drilled holes.

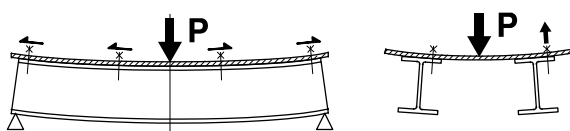


Forces of constraint

When fastening large pieces of steel, the possibility of shear loading from forces of constraint should be considered. Avoid exceeding  $V_{rec}$  for the fastener shank!



Deflection due to primary loading



Temperature effect

