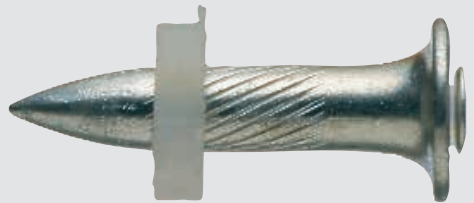




DS DATA SHEET

**Heavy-duty nail for fastening
to concrete and steel**

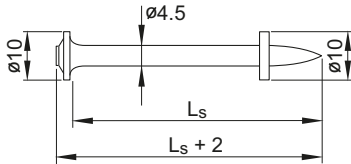


DS Heavy-duty nail for fastening to concrete and steel

Product data

Dimensions

DS __ P10



Material specifications

Carbon steel shank: HRC 54 (DS)
HRC 58 (DSH)

Zinc coating: 5–20 µm

Recommended fastening tools

DX 6 F10, DX 5 F10, DX 460 F10,
DX 76, DX 76 PTR

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

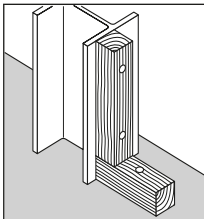
Approvals

ICC (USA) LR 97/00077

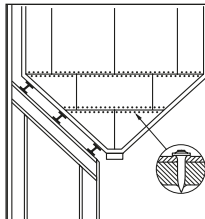
- Not all information presented in this product data sheet might be subject to approval / certificate content. Please refer to approval/certificate for further information.

Applications

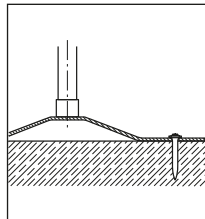
Examples



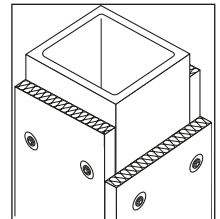
Wood to steel and concrete



Plastic and rubber to steel



Metal parts to concrete

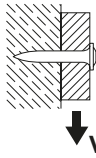
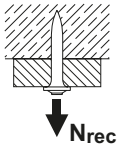


Soft material to steel and concrete

Performance data

Recommended resistance under tension and shear load

Fastening wood to concrete, sandlime masonry or steel



Fastening wood to concrete, sandlime masonry:

$$N_{rec} = V_{rec} = 0.4 \text{ kN}$$

Fastening wood to steel:

$$N_{rec} = V_{rec} = 0.6 \text{ kN}$$

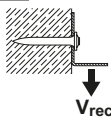
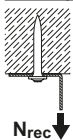
Conditions:

- For safety-relevant fastenings sufficient redundancy of the entire system is required: minimum 5 fastenings per fastened unit with normal weight concrete base material.
- All visible failures must be replaced.
- Valid for concrete and sandlime masonry with strength of $f_{cc} < 40 \text{ N/mm}^2$.
- Fastened material: wood, minimum thickness = 24 mm
plywood, minimum thickness = 16 mm

Soft material:

- Working loads depend on strength and thickness of material fastened. Do not use working loads in excess of those for wood.
- Depth of penetration and other conditions same as for fastening wood.
- Use R23 or R36 ($\varnothing 4.5 \text{ mm}$ hole) washer to control penetration and to increase pull-over strength. Separately available from Hilti.

Metal profiles to concrete:

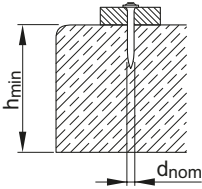


$$N_{rec} = V_{rec} = 0.4 \text{ kN}$$

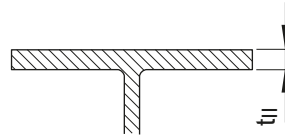
- Minimum 5 fastenings per fastened unit (normal weight concrete)
- Increase to 600 N possible if 8 or more fastenings in each fastened unit.
- All visible failures must be replaced
- $t_1 = 1\text{--}4 \text{ mm}$

Application recommendation

Base material thickness



Concrete
 $h_{\min} = 100 \text{ mm}$ ($d_{\text{nom}} \geq 4.5 \text{ mm}$)



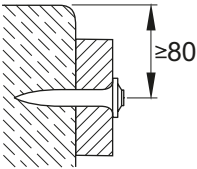
Steel
 $t_{II} \geq 6 \text{ mm}$

Fastened material thickness

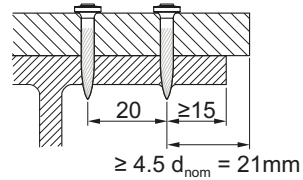
$t_I \leq 50.0 \text{ mm}$

Fastener positioning

Edge distance: concrete (mm)



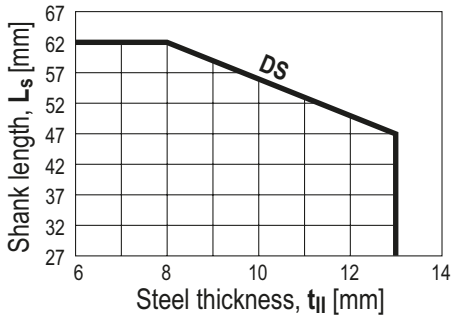
Edge distance: steel (mm)



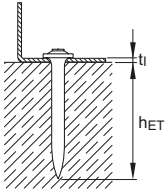
Spacing
 $a = 20 \text{ mm}$

Application limits

Steel



Fastener shanks length recommendation for fastening to concrete



Required nail shank length:

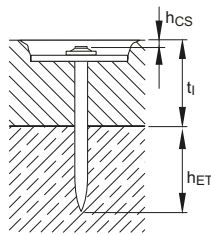
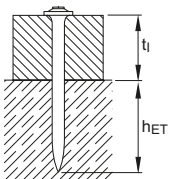
Wood or

metal profiles $L_S = h_{ET} + t_f$ [mm]

Soft material $L_S = h_{ET} + t_f - 2 \cdot h_{CS}$ [mm]

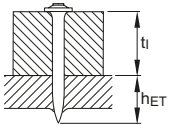
$h_{CS} \equiv 3$ mm if possible

Required depth of penetration h_{ET}



$h_{ET} \geq 27$ mm

Fastener shanks length recommendation for fastening to steel



$h_{ET} = 17-27$ mm

Corrosion information



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

Cartridge recommendation for fastening to concrete

Base material	Cartridge color (tool power level)		
	Tool type: DX 6 F10	Tool type: DX 5 F10, DX 460 F10	Tool type: DX 76, DX 76 PTR
	Cartridge type: 6.8/11 M	Cartridge type: 6.8/11 M	Cartridge type: 6.8/18 M
Sand lime masonry	titanium ■ (1-5)	green ■, yellow ■	
Soft/medium concrete	titanium ■ (2-8)	yellow ■, red ■	yellow ■, red ■
Tough concrete	titanium ■ (4-8), black ■ (7-8)	red ■, black ■	red ■

Cartridge recommendation for fastening to steel

Base material		Cartridge color (tool power level)		
		Tool type: DX 6 F10	Tool type: DX 5 F10, DX 460 F10	Tool type: DX 76, DX 76 PTR
		Cartridge type: 6.8/11 M	Cartridge type: 6.8/11 M	Cartridge type: 6.8/18 M
S235 to S355	$6 \leq t_{\parallel} < 13 \text{ mm}$	titanium ■ (4-8), black ■ (7-8)	red ■, black ■	red ■, black ■

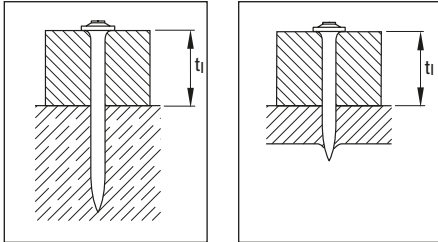


- Tool power level adjustment by setting tests on site.
- Start tool energy selection with lowest recommended tool power level.
- Correct according requirement from chapter quality assurance.

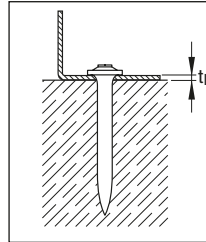
Quality assurance

Setting depth control

Fastening wood or soft material



Fastening metal profiles



Flush setting of the nails

Fastener program

Designation	Item no.	LS [mm]	d _{nom} [mm]
DS 27 P10	46157	27	4.5
DS 32 P10	46158	32	4.5
DS 37 P10	46159	37	4.5
DS 42 P10	46160	42	4.5
DS 47 P10	46161	47	4.5
DS 52 P10	46162	52	4.5
DSH 57 P10	40591	57	4.5
DS 62 P10	46164	62	4.5
DS 72 P10	46165	72	4.5

Nail length limits are for use without pre-driving into the wood. Hand-driving the nail into the wood and bringing the DX tool into position over the nail head extend the nail length range for the tools.