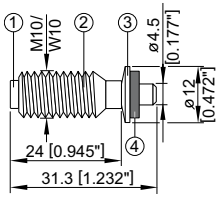
X-BT stainless steel threaded studs

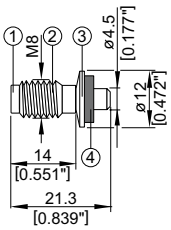
Product data

Dimensions

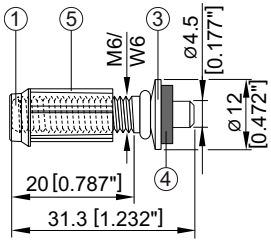
X-BT W10-24-6 SN12-R
X-BT M10-24-6 SN12-R



X-BT M8-15-6 SN12-R



X-BT W6-24-6 SN12-R
X-BT M6-24-6 SN12-R



General information

Material specifications

① Shank:	
CR 500 (CrNiMo alloy)	equivalent to A4 /
S31803 (1.4462)	AISI grade 316 material
N 08926 (1.4529) [1]	Available on request
② Threaded sleeve:	X5CrNiMo 17-12-2+2H, 1.4401
③ SN12-R washers:	S 31635 (X2CrNiMo 17-12-2, 1.4404)
④ Sealing washers:	Elastomer, black *
⑤ Guide sleeve:	Plastic

* Resistant to UV, salt water, water, ozone, oils, etc.

[1]) For High Corrosion Resistance HCR material inquire at Hilti

Designation according to Unified Numbering System (UNS)

Recommended fastening tools

DX 351-BT / BTG

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

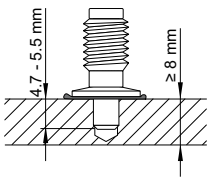
Approvals

ICC ESR-2347 (USA), ABS, LR, UL, DNV, BV 23498/A1, GL 12272-10HH, Russian Maritime Register

Applications

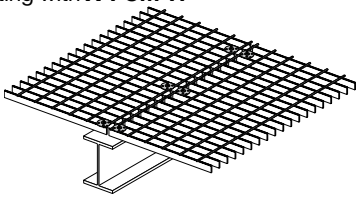
Examples

Threaded stud applications especially for:



- High strength steel
- Coated steel structures
- Through penetration of base steel is not allowed

Grating with **X-FCM-R**



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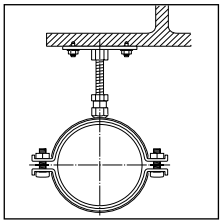
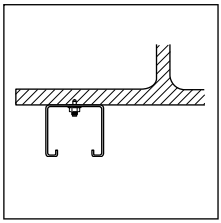
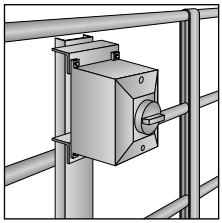


Base plates



Installation rails

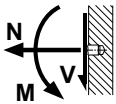


Junction box, etc.

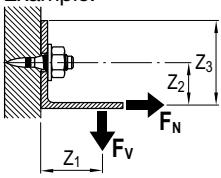
Load data

Recommended loads – steel

Steel grade: Europe, USA		S235, A36	S355, Grade 50 and stronger steel
Tension,	$\mathbf{N_{rec}}$ [kN/lb]	1.8 / 405	2.3 / 517
Shear,	$\mathbf{V_{rec}}$ [kN/lb]	2.6 / 584	3.4 / 764
Moment,	$\mathbf{M_{rec}}$ [Nm/lbft]	8.2 / 6	8.2 / 6
Torque,	$\mathbf{T_{rec}}$ [Nm/lbft]	8 / 5.9	8 / 5.9



Example:



Recommended loads – cast iron *

Tension,	$\mathbf{N_{rec}}$ [kN/lb]	0.5 / 115
Shear,	$\mathbf{V_{rec}}$ [kN/lb]	0.75 / 170
Moment,	$\mathbf{M_{rec}}$ [Nm/lbft]	8.2 / 6

Conditions for recommended loads:

- Global factor of safety for static pull-out > 3 (based on 5% fractile value)
- Minimum edge distance = 6 mm [1/4"].
- Effect of base metal vibration and stress considered.
- Redundancy (multiple fastening) must be provided.
- The recommended loads in the table refer to the resistance of the individual fastening and may not be the same as the loads F_N and F_V acting on the fastened part.
  Note: If relevant, prying forces need to be considered in design, see example. Moment acting on fastener shank only in case of a gap between base and fastened material.

*Requirements of spheroidal graphite cast iron base material

Subject	Requirements
Cast iron	Spheroidal graphite cast iron according to EN 1563
Strength class	EN-GJS-400 to EN-GJS-600 acording to EN 1563
Chemical analysis and amount of carbon	3.3–4.0 mass percentage
Mictrostructure	Form IV to VI (spherical) according to EN ISO 945-1:2010 Minimum size 7 according to Figure 4 of EN ISO 945-1:2010
Material thickness	$t_{II} \geq 20$ mm

Design resistance – steel

Steel grade: Europe		S235	S355
Tension	N_{Rd} [kN]	2.9	3.7
Shear	V_{Rd} [kN]	4.2	5.4
Moment	M_{Rd} [Nm]	18.4	18.4

Design resistance – cast iron *

Tension	N_{RD} [kN]	0.8
Shear	V_{RD} [kN]	1.2
Moment	M_{RD} [Nm]	13.1

Recommended interaction formula for combined loading - steel and cast iron base material

Combined loading situation	Interaction formula
V–N (shear and tension)	$\frac{V}{V_{rec}} + \frac{N}{N_{rec}} \le 1.2$ with $\frac{V}{V_{rec}} \le 1.0$ and $\frac{N}{N_{rec}} \le 1.0$
V–M (shear and bending)	$\frac{V}{V_{rec}} + \frac{M}{M_{rec}} \le 1.2$ with $\frac{V}{V_{rec}} \le 1.0$ and $\frac{M}{M_{rec}} \le 1.0$
N–M (tension and bending)	$\frac{N}{N_{rec}} + \frac{M}{M_{rec}} \le 1.0$
V–N–M (shear, tension and bending)	$\frac{V}{V_{rec}} + \frac{N}{N_{rec}} + \frac{M}{M_{rec}} \le 1.0$

Cyclic loading:
- Anchorage of **X-BT-R** threaded stud in steel base material is not affected by cyclic loading.
- Fatigue strength is governed by fracture of the shank. Inquire at Hilti for test data if high cycle loading has to be considered in the design.

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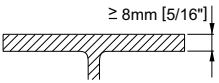
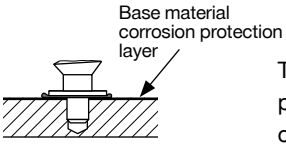
Application requirements

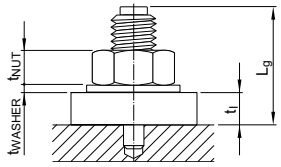
Thickness of base material





Thickness of base material corrosion protection layer ≤ 0.4mm. For thicker coatings, please contact Hilti.

Thickness of fastened material

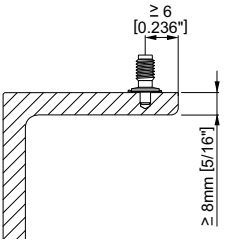


X-BT M8: **$2.0 \le t_I \le 7.0$ mm**
X-BT M10 / X-BT W10: **$2.0 \le t_I \le 15.0$ mm**
X-BT M6 / X-BT W6: **$1.0 \le t_I \le 14.0$ mm**

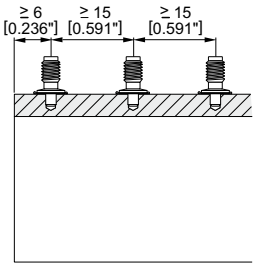
Note:
For X-BT with SN 12R sealing washer $t_I \ge 2.0$ mm
For X-BT M6 / W6 with SN 12R sealing washer $t_I \ge 1.0$ mm

Spacing and edge distances

Edge distance: ≥ 6 mm



Spacing: ≥ 15 mm



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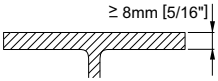
Corrosion information

The corrosion resistance of Hilti CR500 and S31803 stainless steel material is equivalent to AISI 316 (A4) steel grade.
Studs made of N 08926 (HCR) material with higher corrosion resistance, e.g. for use in road tunnels or swimming pools, are available on special order.

Application limit



- $t_{II} \geq 8$ mm [$^{5}/_{16}$"] → No through penetration
- No limits with regards to steel strength

Fastener selection and system recommendation

Fastener program

Designation	Item no.	**Tool** Designation
X-BT M8-15-6 SN12-R	**377074**	DX 351-BTG
X-BT M10-24-6 SN12-R	**377078**	DX 351-BT
X-BT W10-24-6 SN12-R	**377076**	DX 351-BT
X-BT W10 without washer	**377075**	DX 351-BT
X-BT M6-24-6 SN12-R	**432266**	DX 351-BT
X-BT W6-24-6 SN12-R	**432267**	DX 351-BT

Note: For High Corrosion Resistance HCR material inquire at Hilti

Cartridge selection and tool energy setting

6.8/11 M high precision brown cartridge
Fine adjustment by installation tests on site

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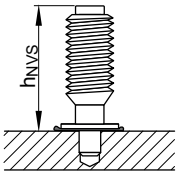
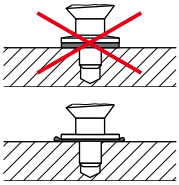
Fastening quality assurance

Fastening inspection



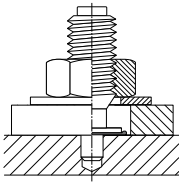


X-BT M8
h_{NVS} = 15.7–16.8 mm

X-BT M10 / X-BT W10 and
X-BT M6 / X-BT W6
h_{NVS} = 25.7–26.8 mm

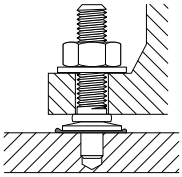
Installation

X-BT with washer

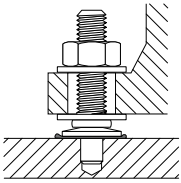


Fastened material hole ∅
≥ 13 mm

X-BT M6 / X-BT W6



Fastened material with pre-drilled hole diameter < 7 mm



Fastened material with pre-drilled hole diameter ≥ 7 mm

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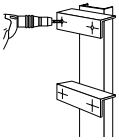
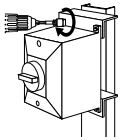
Pre-drill with **TX-BT 4/7** step shank drill bit



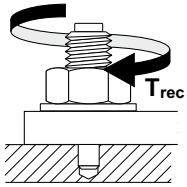
Pre-drill until the shoulder grinds a shiny ring (to ensure proper drilling depth)

Before fastener installation:
the drilled hole must be clear of liquids and debris. The area around the drilled hole must be free from liquids and debris.

Tighten using a screwdriver with torque clutch



Tightening torque:
$T_{rec} \leq 8$ Nm (5.9 ft-lb)!



Hilti screwdriver:	Torque setting:
SF 121-A	11
SF 150-A	9
SF 180-A	8
SF 144-A	9
SF 22A	9

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These are abbreviated instructions which may vary by application.
ALWAYS review/follow the instructions accompanying the product.