



X-BT-MF DATA SHEET

Composite threaded stud

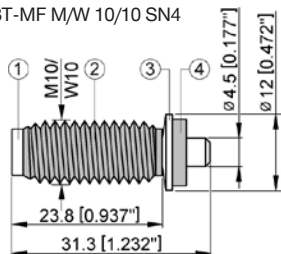


X-BT-MF Composite threaded stud

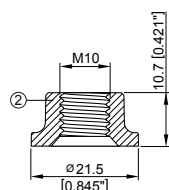
Product data

Dimensions

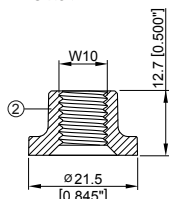
X-BT-MF M/W 10/10 SN4



M10 nut



W10 nut



W10 = 3/8" UNC 2 thread

General information

Material specifications

- ① Shank: 1.4362 according to EN 10088-2
ASTM A240 UNS S32304
- ② Threaded sleeve and nut: Glass-fiber reinforced polyamide material - ISO 1874: PA6T/6I, MH, 12-190, GF50 (glass-fiber content: 50%), Flammability rating: UL94 HB
- ③ SN12 washer: S 31635
(X2CrNiMo 17-12-2, 1.4404)
- ④ Sealing washer: Chloroprene rubber CR 3.1107, black

Recommended fastening tools

DX 351-BT

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

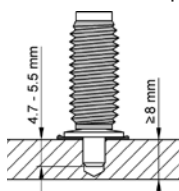
Approvals

ICC ESR-2347

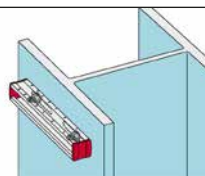
Applications

Examples

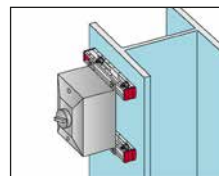
Threaded stud applications especially for:



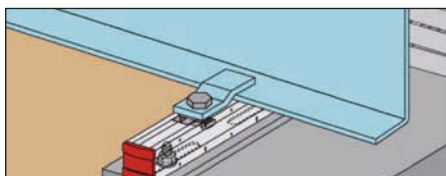
- High strength steel
- Coated steel structures
- Through penetration of base steel is not allowed



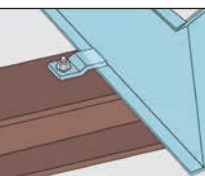
Channel installation



Junction box, etc.



Cable ladder with hold-down/expansion-guide clip



Cable ladders



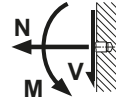
Signage

Load data

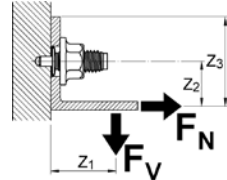
Recommended loads

For structural steel (ultimate strength of base material $R_m \geq 350 \text{ MPa}$)

Service temperature	-40°C to +60°C -40°F to +140°F	+60°C to +100°C +140°F to 212°F
Tension, N_{rec} [kN/lb]	1.5 / 340	1.0 / 225
Shear, V_{rec} [kN/lb]	2.2 / 500	1.4 / 315
Moment, M_{rec} [Nm/lbft]	8.2 / 6	8.2 / 6
Torque, T_{rec} [Nm/lbft]	≤ 8 / ≤ 5.9	
During installation		
In service temp. range	-40°C to +100°C / -40°F to +212°F	
Installation temperature	-10°C to +60°C / 14°F to 140°F	



Example:



Conditions for recommended loads:

- Use with Hilti glass-fiber reinforced polyamide material nuts, M10 and W10 (② according to General Information - Material specifications)
- Not to be used with any additional washer which provide an axial force when deformed, e.g. spring or lock washer, etc.
- Global factor of safety > 3 (based on 5% fractile value)
- Minimum edge distance = 6 mm [$\frac{1}{4}$ "]
- 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.

- **Minimum temperature for installation and adjustments = -10°C**

Design loads

For structural steel (ultimate strength of base material $R_m \geq 350 \text{ MPa}$)

Service temperature	-40°C to +60°C -40°F to +140°F	+60°C to +100°C +140°F to 212°F
Tension, N_{Rd} [kN/lb]	2.0 / 450	1.35 / 300
Shear, V_{Rd} [kN/lb]	3.0 / 675	1.9 / 425
Moment, M_{Rd} [Nm/lbft]	18.4 / 13.6	18.4 / 13.6
In service temp. range	-40°C to +100°C / -40°F to +212°F	
Installation temperature	-10°C to +60°C / 14°F to 140°F	

Recommended interaction formula for combined loading

Combined loading situation

Interaction formula

V-N (shear and tension) $\frac{V}{V_{rec}} + \frac{N}{N_{rec}} \leq 1.2$ with $\frac{V}{V_{rec}} \leq 1.0$ and $\frac{N}{N_{rec}} \leq 1.0$

V-M (shear and bending) $\frac{V}{V_{rec}} + \frac{M}{M_{rec}} \leq 1.2$ with $\frac{V}{V_{rec}} \leq 1.0$ and $\frac{M}{M_{rec}} \leq 1.0$

N-M (tension and bending) $\frac{N}{N_{rec}} + \frac{M}{M_{rec}} \leq 1.0$

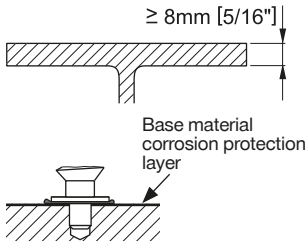
V-N-M (shear, tension and bending) $\frac{V}{V_{rec}} + \frac{N}{N_{rec}} + \frac{M}{M_{rec}} \leq 1.0$

Cyclic loading:

- Anchorage of **X-BT-MF** 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.

Application requirements

Thickness of base material



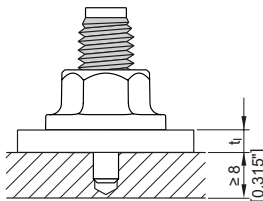
Where through penetration is not allowed*

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

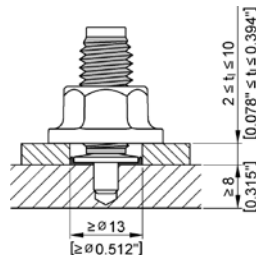
*Note: Corrosion protection may be compromised if base material thickness is less than 8 mm.

Please contact Hilti for load recommendations if base material thickness is less than 8 mm and through penetration allowed.

Thickness of fastened material



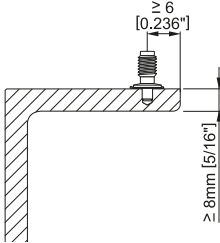
$2.0 \leq t_1 \leq 10.0$ mm
 $0.08'' \leq t_1 \leq 0.39''$



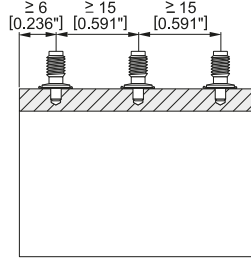
Fastened material hole \varnothing
 ≥ 13 mm (0.51")

Spacing and edge distances

Edge distance: ≥ 6 mm



Spacing: ≥ 15 mm



Durability

From a durability point of view, it can be assumed that the Hilti X-BT-MF system will have a lifetime over 20 years even in mildly corrosive environment (C3 environment according to EN-ISO 12944-2).

Corrosion information

For fastenings exposed to outdoor environments in mildly corrosive conditions where HDG coated parts are commonly specified or used.

Not for use in atmospheres with chlorides (marine atmospheres) or in heavily polluted environments (e.g. sulphur dioxide).

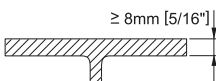
Vibration (Transportation, handling and base material vibration)

When installed according to instruction for use and fastening quality assurance, the X-BT-MF system (stud and Hilti glass-fiber reinforced polyamide material nuts) is resistant to transportation, handling and base material vibration.

The use of additional lock washer is not required. Lock washer will affect the integrity and functionality of the Hilti glass-fiber reinforced polyamide material nuts. Therefore additional lock or spring washers must not be used in combination with the X-BT-MF system.

For more information regarding vibration, please refer to “X-BT-MF Additional Technical Information”.

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-MF M10/10 SN4	2083549	DX 351-BT
X-BT-MF W10/10 SN4	2083620	DX 351-BT

Accessories

Designation	Item no.	For use with
Socket X-NSD 1/4" – 16mm	2097397	X-BT-MF M10/10 SN4 and T-handle or Torque tool
Socket X-NSD 1/4" – 9/16"	2107229	X-BT-MF W10/10 SN4 and T-handle or Torque tool
T-handle X-NSD 1/4"	2115130	X-NSD sockets
Torque tool X-BT 1/4"	2119272	X-NSD sockets

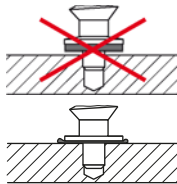
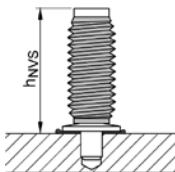
Cartridge selection and tool energy setting

6.8/11 M high precision brown cartridge

Fine adjustment by installation tests on site

Fastening quality assurance

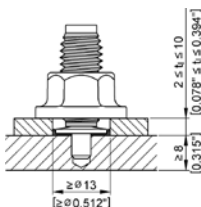
Fastening inspection



X-BT-MF

$h_{NVS} = 25.7 - 26.8 \text{ mm}$
 $= 1.012" - 1.055"$

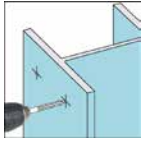
Installation



Fastened material hole
 $\varnothing \geq 13 \text{ mm (0.51")}$

Remark: for group fastenings subjected to shear loading the fastened material hole diameter should not exceed 14mm

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



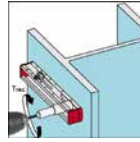
Pre-drill until the shoulder grinds a shiny ring (to ensure proper drilling depth)



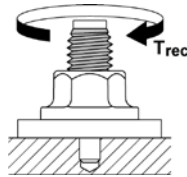
Before fastener installation:

The drilled hole and the area around the drilled hole must be clear of liquids and debris.

Tighten using a screwdriver with torque clutch



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



Hilti Torque tool X-BT 1/4"

Hilti screwdriver:	Torque setting:
SFC 14-A	6
SFC 18-A	3
SFC 22-A	3

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