



# X-BT-MF DATA SHEET

Composite threaded stud

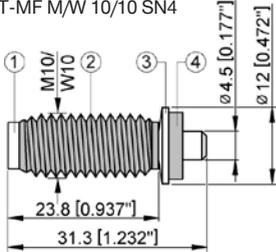


# X-BT-MF Composite threaded stud

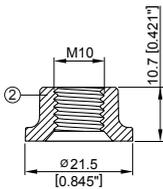
## Product data

### Dimensions

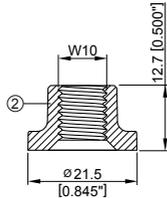
X-BT-MF M/W 10/10 SN4



M10 nut



W10 nut



W10 = 3/8" UNC 2 thread

### Material specifications

- ① Shank: 1.4362 according to EN 10088-2
- ② Threaded sleeve and nut: ASTM A240 UNS S32304  
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

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

## Approvals and certificates

ICC ESR-2347

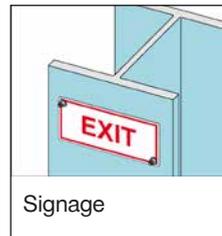
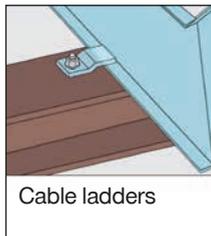
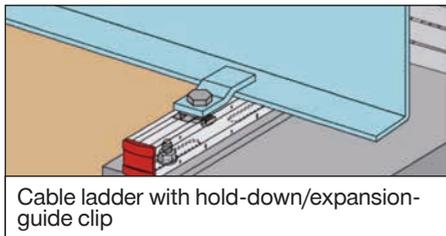
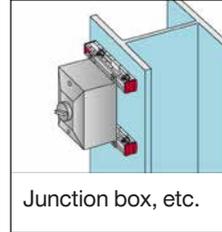
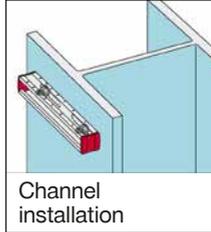
- Not all information presented in this product data sheet might be subject to approval/certificate content. Please refer to approval/certificate for further information.

## Applications

### Examples

Threaded stud applications especially for:

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

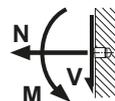


## Performance data

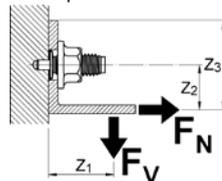
### Recommended loads

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

Service temperature		-40°C to +60°C / -40°F to +140°F	+60°C to +100°C / +140°F to 212°F
Tension	$N_{rec}$	1.5 kN / 340 lb	1.0 kN / 225 lb
Shear	$V_{rec}$	2.2 kN / 500 lb	1.4 kN / 315 lb
Moment	$M_{rec}$	8.2 Nm / 6 lbft	8.2 Nm / 6 lbft
Torque	$T_{rec}$	$\leq 8$ Nm / $\leq 5.9$ lbft	$\leq 8$ Nm / $\leq 5.9$ lbft
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 [<sup>1</sup>/<sub>4</sub>"].
- 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  $R_m \geq 350$  MPa)

Service temperature		-40°C to +60°C / -40°F to +140°F	+60°C to +100°C / +140°F to 212°F
Tension	$N_{Rd}$	2.0 kN / 450 lb	1.35 kN / 300 lb
Shear	$V_{Rd}$	3.0 kN / 675 lb	1.9 kN / 425 lb
Moment	$M_{Rd}$	18.4 Nm / 13.6 lbft	18.4 Nm / 13.6 lbft
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	

### Recommended interaction formula for combined loading

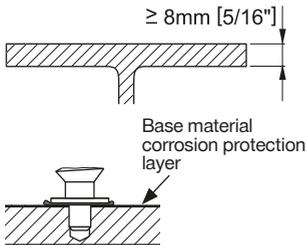
Combined loading situation	Interaction formula
V-N (shear and tension)	$\frac{V}{V_{rec}} + \frac{N}{N_{rec}} \leq 1.2$ with $\frac{V}{V_{rec}} \leq 1.0$ and $\frac{N}{N_{rec}} \leq 1.0$
V-M (shear and bending)	$\frac{V}{V_{rec}} + \frac{M}{M_{rec}} \leq 1.2$ with $\frac{V}{V_{rec}} \leq 1.0$ and $\frac{M}{M_{rec}}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

### Thickness of base material

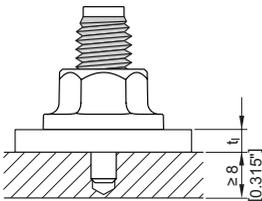


Where through penetration is not allowed\*  
 Thickness of base material corrosion protection layer  $\leq 0.4\text{ mm}$ . For thicker coatings, please contact Hilti.

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

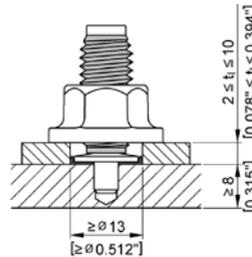
Please contact Hilti for load recommendations if base material thickness is less than 8mm and through penetration allowed.

### Thickness of fastened material



$$2.0 \leq t_f \leq 10.0 \text{ mm}$$

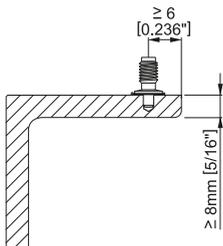
$$0.08'' \leq t_f \leq 0.39''$$



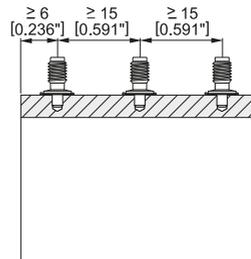
Fastened material hole  $\varnothing \geq 13\text{ mm}$  ( $0.51''$ )

### Spacing and edge distances

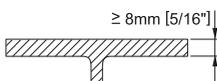
#### Edge distance: $\geq 6\text{ mm}$



#### Spacing: $\geq 15\text{ mm}$



### Application limit



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

### 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”.

### Fastener program 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

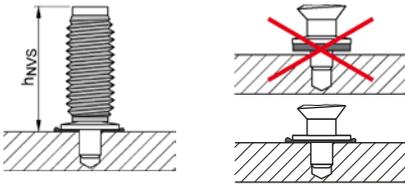
#### Accessories

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

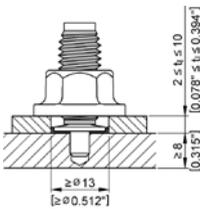
6.8/11 M high precision brown cartridge

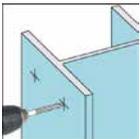
-  • Tool power level adjustment by setting tests on site.
- Start tool energy selection with lowest recommended tool power level.
- Correct according requirement from chapter quality assurance.

**Quality assurance**
**Fastening inspection**

**X-BT-MF**

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

$$= 1.012''-1.055''$$

**Installation recommendation**

**Fastened material hole**  
 $\text{Ø} \geq 13 \text{ mm (0.51")}$ 
**Remark:** for group fastenings subjected to shear loading the fastened material hole diameter should not exceed 14mm

**Pre-drill**


- 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.

These are abbreviated instructions which may vary by application.

**ALWAYS** review/follow the instructions accompanying the product.

### Tightening torque

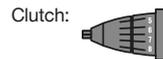
	Fastener: X-BT-MF
Element: nut	8 Nm

### Tightening tool recommendation for tightening with cordless screwdriver

Cordless screwdriver	Clutch type (stop detection)	Gear	Clutch
SF 4-A22	TRC	1	8
SF 6-A22	ESC (HJ)	1	3
SF 6H-A22	ESC (HJ)	1	3
SFC 14-A	TRC	1	6
SFC 18-A	TRC	1	3
SFC 22-A	TRC	1	5
SBT 4-A22	TRC	1	7



- Tool power level adjustment:



- The setting of the torque via the Hilti screwdriver with torque release coupling (TRC) can change as the clutch wears over time. The specified torque setting is only a rough guide value and applies to a new Hilti screwdriver. To ensure recommended torque is applied, Hilti recommends the use of a calibrated torque wrench or the Hilti torque tool.
- The specified torque setting for the Hilti screw drivers with electronic slip clutch (ESC) is only a rough guide value as the ESC has 2 stop detections; Soft Joint (SJ) detection and Hard Joint (HJ) detection. The hard joint detection is activated due to drop in speed (fast stop) and can lead to a torque spike. The installation torque may vary depending on the user and the application. To ensure recommended torque is applied, Hilti recommends the use of a calibrated torque wrench or the Hilti torque tool.

### Tightening tool recommendation for tightening with Hilti torque tool

Hilti torque tool

Torque tool X-BT 1/4" – 8 Nm