



EN

## DECLARATION OF PERFORMANCE

according to Annex III of the Regulation (EU) Nr. 305/2011 (Construction Products Regulation)

Hilti blunt-tip threaded studs X-BT-MR and X-BT-GR  
No. Hilti-DX-DoP-008

**1. Unique identification code of the product-type:** Hilti blunt-tip threaded studs X-BT-MR and X-BT-GR in combination with Hilti powder-actuated fastening tool DX 351-BT(G) or battery-actuated fastening tool BX 3-BT(G)

**2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):** Type and lot number are displayed on the packaging

**3. Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:**

Intended use	Redundant multiple fastening and group fastening of non-structural components.
Fixed material (component I)	Non-alloy structural steel covered by EN 1993-1-1 and the material codes given there, and EN 10346. Corrosion resistant steel according to EN 10088-2.
Base material (component II)	Non-alloy structural steel covered by EN 1993-1-1 and the material codes given there. Non-alloy structural steel covered by EN 1993-1-12 and EN 10025-6. The base material with a thickness $\geq 8$ mm may be paint coated, hot-dipped galvanized or duplex coated (duplex = paint applied over zinc coating) up to a maximum coating thickness of 0.5 mm.
Environmental condition	Use in dry internal conditions and in corrosive environments. The threaded studs are allocated to the corrosion resistance class CRC IV according to EN 1993-1-4. Use in the temperature range from $-40$ °C to $+100$ °C.
Loading	Static and quasi-static loads

**4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5):**

Hilti Aktiengesellschaft, Business Unit Direct Fastening, 9494 Schaan, Fürstentum Liechtenstein

**5. Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in Article 12(2):** n.a.

**6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V:** System 2+

**7. In case of the declaration of performance concerning a construction product covered by a harmonized standard:**  
n.a.

**8. In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued:**

DIBt, Deutsches Institut für Bautechnik issued ETA-20/1042 on the basis of EAD 333037-00-0602, April 2020. The notified body MPA-Stuttgart 0672 performed third party tasks under system 2+.



## 9. Declared performance:

Essential characteristics	Performance
Tension resistance	Annex C1 (Table C1) for base material thickness $\geq 8$ mm and Annex C2 (Table C2) for base material thickness $4 \text{ mm} \leq t_{II} < 8 \text{ mm}$ of ETA-20/1042 (details see below)
Shear resistance of individual threaded studs	
Shear Resistance of groups of threaded stud connections	
Bending moment resistance	
Application limits	
Resistance in case of combined loading (interaction)	Annex B3 of ETA-20/1042 (details see below)
Fatigue classification of base material	Detail category 100 with $m=5$ in compliance with EN 1993-1-9, Construction detail, description and requirements see Annex C4 of ETA-20/1042
Reaction to fire	Class A1 – EN 13501-1
Resistance to fire	Annex C3 (Table C3) of ETA-20/1042 (details see below)

**The following summary provides extracts from the referenced annexes of ETA-20/1042:**

## Performances for base material thickness $\geq 8$ mm

**Table C1: Hilti threaded studs X-BT-MR and X-BT-GR**  
Characteristic tension, shear and bending resistance, partial factors

Performances		S235, S275	S355 to S960 <sup>1)</sup>
Characteristic tension resistance	$N_{Rk,II}$ [kN]	10.0	13.0
Characteristic shear resistance	$V_{Rk,II}$ [kN]	12.0	15.0
Reduction factor considering group effect in shear	$\alpha$ (n=4) <sup>2)</sup> [-]	1.0	
Characteristic bending resistance	$M_{Rk}$ [Nm]	35.0	
Spacing	s [mm]	$\geq 15$	
Edge distance	c [mm]	$\geq 10$	
Coating thickness of steel base material	$t_c$ [mm]	$\leq 0.5$	
Partial factor <sup>3)</sup>	$\gamma_M$ [-]	1.25	
Partial factor to consider base material variations <sup>3)</sup>	$\gamma_{MII}$ [-]	1.60	

Application limit:

The performances apply within the entire strength range of the steel grades S235 to S960.

There is no upper maximum thickness limit for the construction steel base materials.

## Performances for base material thickness $4 \text{ mm} \leq t_{II} < 8 \text{ mm}$

**Table C2: Hilti threaded studs X-BT-MR and X-BT-GR**  
Characteristic tension, shear and bending resistance, partial factors

Performances		S235, S275	S355 to S960 <sup>1)</sup>
Characteristic tension resistance	$N_{Rk,II}$ [kN]	$\beta_{II} \cdot 10.0$	$\beta_{II} \cdot 13.0$
Characteristic shear resistance	$V_{Rk,II}$ [kN]	$\beta_{II} \cdot 12.0$	$\beta_{II} \cdot 15.0$
Reduction factor considering group effect in shear	$\alpha$ (n=4) <sup>2)</sup> [-]	1.0	
Characteristic bending resistance	$M_{Rk}$ [Nm]	$\beta_{II} \cdot 35.0$	
Reduction factor $\beta_{II}$ to consider base metal thickness	$\beta_{II}$ [-]	$\beta_{II} = \frac{t_{II} - 2}{6}$	
Spacing	s [mm]	$\geq 15$	
Edge distance	c [mm]	$\geq 10$	
Coating thickness of steel base material	$t_c$ [mm]	uncoated	
Partial factor <sup>3)</sup>	$\gamma_M$ [-]	1.25	
Partial factor to consider base material variations <sup>3)</sup>	$\gamma_{MII}$ [-]	1.60	

Application limit:

The performances apply within the entire strength range of the steel grades S235 to S960.

Footnotes for Table C1 and C2:

<sup>1)</sup> Remark: EN 1993 is currently valid only up to S700

<sup>2)</sup> Conditions:

- The maximum clearance hole  $d_c$  in the fixed material amounts to 14 mm
- The shear force is introduced via the sealing washer as shown in Annex B4 of ETA-20/1042.
- The value  $\alpha$  covers the group patterns "Row Setup" and "Rectangular Plate Setup" up to 4 stud (details see EAD 333037-00-0602)
- In case the hole clearance exceeds 14 mm, the following reduction factors  $\alpha$  apply:  
for "Row Setup":  $\alpha$  (n) = 1/n  
for "Rectangular Plate Setup":  $\alpha$  (n=4) = 0.5

<sup>3)</sup> In the absence of national regulations

## Resistances in case of combined loading (failure of base material and fastener)

Load combination	Interaction provision
Shear - Tension	$\frac{V_{Ed}}{V_{Rd}} + \frac{N_{Ed}}{N_{Rd}} \leq 1.2$
Shear – Bending moment	$\frac{V_{Ed}}{V_{Rd}} + \frac{M_{Ed}}{M_{Rd}} \leq 1.0$
Tension – Bending moment	$\frac{N_{Ed}}{N_{Rd}} + \frac{M_{Ed}}{M_{Rd}} \leq 1.0$
Shear – Tension – Bending moment	$\frac{V_{Ed}}{V_{Rd}} + \frac{N_{Ed}}{N_{Rd}} + \frac{M_{Ed}}{M_{Rd}} \leq 1.0$

$N_{Ed}$  = design value of the acting tensile force

$V_{Ed}$  = design value of the acting shear force

$M_{Ed}$  = design value of the acting bending moment

## Resistance to fire – resistance at elevated temperatures

**Table C3: Temperature dependent strength reduction factor**

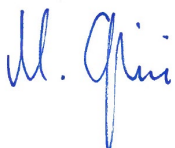
Temperature $\Theta$ of base material and X-BT	Temperature reduction factor $k_{u,\Theta,TS}$
$\leq 100^{\circ}\text{C}$	1.00
$100^{\circ}\text{C} < \Theta \leq 200^{\circ}\text{C}$	0.85
$200^{\circ}\text{C} < \Theta \leq 400^{\circ}\text{C}$	0.70
$400^{\circ}\text{C} < \Theta \leq 600^{\circ}\text{C}$	0.34

The temperature reduction factor  $k_{u,\Theta,TS}$  can be applied to the X-BT-MR and X-BT-GR threaded studs in case of fire design.

The reduction factor  $k_{u,\Theta,TS}$  is applicable to the characteristic tension, shear and bending resistance given in Annex C1 and Annex C2 of ETA-20/1042.

**10. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 9. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.**

Signed for and on behalf of the manufacturer by:



**Mario Grazioli**

Head of Quality Direct Fastening

Hilti Aktiengesellschaft, Schaan: June 1, 2021