EN

DECLARATION OF PERFORMANCE

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

Hilti threaded studs S-BT-MR, S-BT-GR
No. Hilti-SF-DoP-029

1. Unique identification code of the product-type: Hilti threaded studs S-BT-MR, S-BT-GR

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 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:

Generic type and use	Threaded studs for connection of materials to structural steel and aluminium members
Product size covered	M8, M10
Base material	Non-alloy steel, acc. to EN 1993-1-1, EN 10025, EN 10346 Aluminium acc. to EN 1999-1-1
Fastened material	Non-alloy steel, acc. to EN 1993-1-1, EN 10346 Corrosion resistant steel acc. to EN 10088-2 Aluminium, e.g. acc. to EN 755-2 or EN 485-2
Fastener material	Stainless steel 1.4462 acc. to EN 10088-2, zinc-coated
Loading	Static & quasi static

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5): Hilti AG, 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: On the basis of EAD 333037-00-0602 issued ETA-20/0530. The notified body MPA-Stuttgart 0672 performed third party tasks under system 2+.

9. Declared performance:

Essential characteristic	**Performance**	**Harmonized technical specification**
Characteristic tension resistance $N_{Rk,II}$	see Table 1	EAD 333037-00-0602
Characteristic shear resistance of individual threaded studs $V_{Rk,II}$	see Table 2 und 3	
Characteristic shear resistance of groups of threaded stud connections $V_{Rk,II,g}$	see Table 2 und 3	
Characteristic bending moment resistance M_{Rk}	see Table 4	
Resistance in case of combined loading (interaction)	see Table 7	
Application limits	see Table 6	
Fatigue classification of base material	see Table 5	
Reaction to fire	Class A1 - EN 13501-1	
Resistance to fire	no performances assessed	

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:

Lars Taenzer
Head of Business Unit Direct Fastening

Pierre Hohmeier
Head of Quality Screw Fastening

Hilti AG, Schaan, 01.10.2020

Table 1: Characteristic tension resistance for Hilti threaded studs S-BT-MR, S-BT-GR

			S-BT-MR, S-BT-GR
Steel failure threaded studs and pull-out			
Steel S235 to S355 - EN 10025, S280GD to S420GD - EN 10346 Thickness 3,0 mm ≤ t_{II} < 5,0 mm			
Characteristic tension resistance	$N_{Rk,II}$ [1]	[kN]	5,00
Steel S235 to S355 - EN 10025, S280GD to S420GD - EN 10346 Thickness t_{II} ≥ 5,0 mm			
Characteristic tension resistance	$N_{Rk,II}$ [1]	[kN]	5,30
Aluminium [2] - EN 1999-1-1 Thickness t_{II} ≥ 5,0 mm			
Characteristic tension resistance	$N_{Rk,II}$	[kN]	5,30
Spacing	s	[mm]	≥ 18,0 for M8 ≥ 22,0 for M10
Edge distance	c	[mm]	≥ 6,0
Coating thickness of steel base material	t_c	[mm]	≤ 0,8
Partial factor	γ_M	[-]	1,25
Partial factor	γ_{MII}	[-]	1,60

[1] The characteristic tension resistance $N_{Rk,II}$ may be increased by 20% when using steel base material S355 - EN 10025, S390GD and S420GD - EN 10346.

[2] Tensile strength R_m ≥ 270 N/mm²

Table 2: Characteristic shear resistance for Hilti threaded studs S-BT-MR at an edge distance 6,0 mm ≤ c < 15,0 mm

			S-BT-MR
Steel failure threaded studs and pull-out			
Steel S235, S275 - EN 10025, S280GD to S350GD - EN 10346 Thickness 3,0 mm ≤ t_{II} < 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	6,70
Reduction factor considering group effect	α [3]	[-]	0,78
Steel S235, S275 - EN 10025, S280GD to S350GD - EN 10346 Thickness t_{II} ≥ 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	7,00
Reduction factor considering group effect	α [3]	[-]	0,67
Steel S355 - EN 10025, S390GD, S420GD - EN 10346 Thickness 3,0 mm ≤ t_{II} < 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	6,90
Reduction factor considering group effect	α [3]	[-]	0,67
Steel S355 - EN 10025, S390GD, S420GD - EN 10346 Thickness t_{II} ≥ 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	7,70
Reduction factor considering group effect	α [3]	[-]	0,67
Aluminium [2] - EN 1999-1-1 Thickness t_{II} ≥ 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	8,00
Reduction factor considering group effect	α [3]	[-]	0,90
Spacing	s	[mm]	≥ 18,0 for M8 ≥ 22,0 for M10
Edge distance	c	[mm]	≥ 6,0
Coating thickness of steel base material	t_c	[mm]	≤ 0,8
Partial factor	γ_M	[-]	1,25
Partial factor	γ_{MII}	[-]	1,60

[1] The characteristic shear resistance $V_{Rk,II}$ is related to a shear load introduction via the sealing washer according to Table B3 of ETA-20/0530. In case of a shear load introduction via the fastening thread, the additional bending moment due to the resulting eccentricity has to be considered in design.

[2] Tensile strength R_m ≥ 270 N/mm²

[3] The performance reduction factor α covers group effects with a row-setup of maximum 4 studs or a rectangular plate setup of 2 rows with maximum 4 studs per row and symmetrical load introduction with uniform load distribution on all rows.

Table 3: Characteristic shear resistance for Hilti threaded studs S-BT-MR at an edge distance c ≥ 15,0 mm

			S-BT-MR
Steel failure threaded studs and pull-out			
Steel S235, S275 - EN 10025, S280GD to S350GD - EN 10346 Thickness 3,0 mm ≤ t_{II} < 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	10,50
Reduction factor considering group effect	α [3]	[-]	0,78
Steel S235, S275 - EN 10025, S280GD to S350GD - EN 10346 Thickness t_{II} ≥ 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	11,20
Reduction factor considering group effect	α [3]	[-]	0,67
Steel S355 - EN 10025, S390GD, S420GD - EN 10346 Thickness 3,0 mm ≤ t_{II} < 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	10,50
Reduction factor considering group effect	α [3]	[-]	0,67
Steel S355 - EN 10025, S390GD, S420GD - EN 10346 Thickness t_{II} ≥ 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	11,20
Reduction factor considering group effect	α [3]	[-]	0,67
Aluminium [2] - EN 1999-1-1 Thickness t_{II} ≥ 5,0 mm			
Characteristic shear resistance	$V_{Rk,II}$ [1]	[kN]	9,90
Reduction factor considering group effect	α [3]	[-]	0,90
Spacing	s	[mm]	≥ 18,0 for M8 ≥ 22,0 for M10
Edge distance	c	[mm]	≥ 15,0
Coating thickness of steel base material	t_c	[mm]	≤ 0,8
Partial factor	γ_M	[-]	1,25
Partial factor	γ_{MII}	[-]	1,60

[1] The characteristic shear resistance $V_{Rk,II}$ is related to a shear load introduction via the sealing washer according to Table B3 of ETA-20/0530. In case of a shear load introduction via the fastening thread, the additional bending moment due to the resulting eccentricity has to be considered in design.

[2] Tensile strength R_m ≥ 270 N/mm²

[3] The performance reduction factor α covers group effects with a row-setup of maximum 4 studs or a rectangular plate setup of 2 rows with maximum 4 studs per row and symmetrical load introduction with uniform load distribution on all rows.

Table 4: Characteristic bending resistance for Hilti threaded studs S-BT-MR

				S-BT-MR
Steel failure with lever arm				
Steel S235 to S355 - EN 10025, S280GD to S420GD - EN 10346 Thickness ≥ 3,0 mm				
Characteristic bending resistance	M_{Rk}	[Nm]		19,50
Aluminium [1] - EN 1999-1-1 Thickness t_{II} ≥ 5,0 mm				
Characteristic bending resistance	M_{Rk}	[Nm]		19,50
Spacing	s	[mm]		≥ 18,0 for M8 ≥ 22,0 for M10
Edge distance	c	[mm]		≥ 6,0
Coating thickness of steel base material	t_c	[mm]		≤ 0,8
Partial factor	γ_M	[-]		1,25
Partial factor	γ_{MII}	[-]		1,00

[1] Tensile strength R_m ≥ 270 N/mm²

Table 5: Construction detail „Steel base material with Hilti S-BT threaded studs“ in compliance with EN 1993-1-9:2005

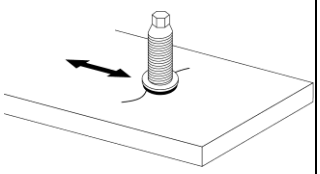
Detail category	Construction detail	Description	Requirements
100 m = 5		Hilti threaded studs S-BT-MR, S-BT-GR with pre-drilled hole in structural steel base material. Imperfect fastener installations as e.g. overwound or pulled-out fasteners are covered.	$\Delta\sigma$ to be calculated on the gross cross section. Base material thickness t_{II} ≥ 3 mm. Steel base material S235 to S355 according to EN 10025.

Table 6: Application limits

Threaded studs	$t_{I,min}$ [mm]	$t_{I,max}$ [mm]	$d_{c,max}$ [mm]	$t_{II,min}$ [mm]	$t_{c,max}$ [mm]	T_{max} [Nm]
S-BT-MR M8/7	2,5	7	14	3,0 5,0 [1)]	0,8	8 5 [2)]
S-BT-MR M8/15		15				
S-BT-MR M10/15						
S-BT-GR M8/7	-	-	-			

[1)] For base material made of aluminium

[2)] For base material made of steel with thickness 3,0 mm ≤ t_{II} < 5,0 mm and base material made of aluminium

t_I = thickness of fixed material (component I)
t_{II} = thickness of base material (component II)
t_c = coating thickness of base material (component II)
d_c = diameter of the clearance hole in the fixed material (component I)
T = installation torque of the flange nut, grating fastener or checker plate fastener

Material of the base material (component II):

- non-alloy structural steel, according to EN 1993-1-1 and the material codes given there, EN 10025, EN 10346 with tensile strength 360 ≤ R_m ≤ 630 N/mm²
- Aluminium according to EN 1999-1-1 and the material codes given there with tensile strength R_m ≥ 270 N/mm²

Table 7: Resistance in case of combined loading (interaction)

Load combination	Interaction provision
Shear - Tension	$\frac{V_{Ed}}{V_{Rd}} + \frac{N_{Ed}}{N_{Rd}} \leq 1{,}0$
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	$\frac{V_{Ed}}{V_{Rd}} + \frac{N_{Ed}}{N_{Rd}} + \frac{M_{Ed}}{M_{Rd}} \leq 1{,}0$