

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-18/0245
of 6 September 2018

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Hilti brackets MQK-41/3/300, MQK-41/3/450,
MQK-41/3/600 and Hilti brackets MQK-41/300,
MQK-41/450, MQK-41/600

Product family
to which the construction product belongs

Products related to installation systems supporting
technical equipment for building services such as pipes,
conduits, ducts and cables

Manufacturer

Hilti AG
Feldkircherstraße 100
9494 Schaan
FÜRSTENTUM LIECHTENSTEIN

Manufacturing plant

L 1000511
L 1069983

This European Technical Assessment
contains

10 pages including 6 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 280016-00-0602

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Specific Part

1 Technical description of the product

Objects of this European Technical Assessment are the Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600 and Hilti brackets MQK-41/300, MQK-41/450, MQK-41/600. The brackets consist of a steel baseplate with three elongated holes and a welded-on, thin-walled steel channel profile with parallel flanges and a connecting web. The elongated holes in the steel plate are arranged centrally on their longitudinal axis. The edges of the channel flanges are folded over. The flange faces are grooved to enable matching channel fixtures to be firmly interlocked to the channel. The channel web is slotted at regular intervals.

Annex A describes the dimensions and materials of the Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600, MQK-41/300, MQK-41/450 and MQK-41/600.

2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

The performance given in Section 3 can only be assumed if the Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600, MQK-41/300, MQK-41/450 and MQK-41/600 are used in compliance with the specifications and under boundary conditions set out in Annex B. The test and assessment methods on which this European Technical Assessment is based lead to an assumption of a working life of the Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600, MQK-41/300, MQK-41/450 and MQK-41/600 of at least 50 years in final use under ambient temperatures in indoor areas. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

In accordance with the European Assessment Document EAD 280016-00-0602, the product is intended to be used in

- a) installations for the support of sprinkler kits;
- b) installations for the support of other building service elements such as pipes, conduits, ducts and cables.

3 Performance of the product and references to the methods used for its assessment

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

3.2 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Shape	see Annex A
Dimensions	see Annex A
Material	see Annex A
Characteristic resistance at ambient temperature	see Annex C

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document EAD 280016-00-0602, the following legal bases apply:

- In case of intended use a) specified in Section 2:
Decision of the commission N° 1996/577/EC:
System 1 applies for the assessment and verification of constancy of performance (AVCP).
- In case of intended use b) specified in Section 2:
Decision of the commission N° 1999/472/EC:
System 3 applies for the assessment and verification of constancy of performance (AVCP).

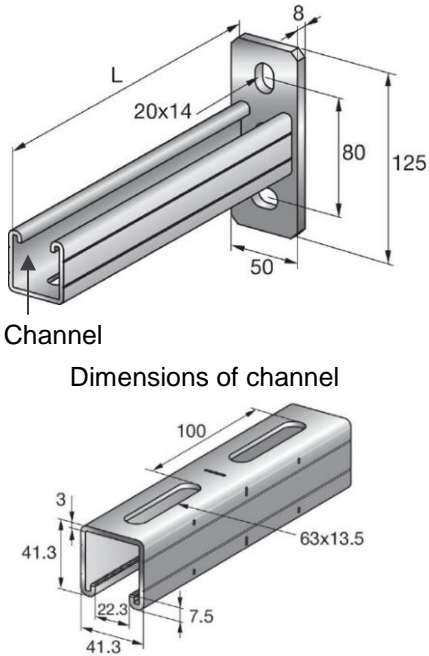
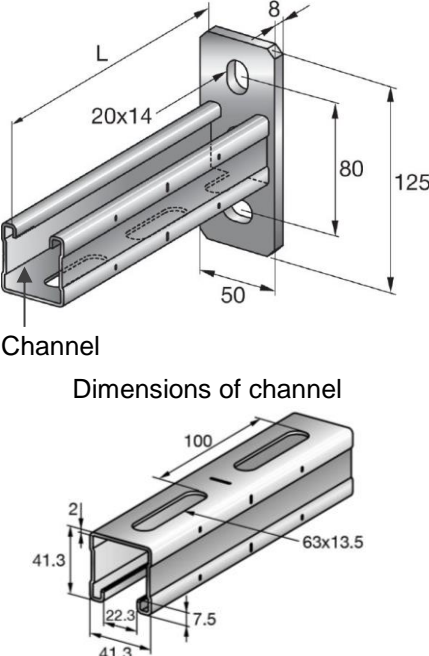
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

The technical details necessary for the implementation of the system for the assessment and verification of constancy of performance are laid down in the control plan (confidential part of this European Technical Assessment) deposited at Deutsches Institut für Bautechnik.

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Häßler

Table A1: Dimensions and materials of the brackets

Illustration of bracket and associated channel [Dimensions in mm]	Designation	Item number	L [mm]	Material channel	Material baseplate
	MQK-41/3/300	370595	300	S235JR in accordance with EN 10025-2, zinc coated	S235JR in accordance with EN 10025-2, zinc coated
	MQK-41/3/450	370596	450		
	MQK-41/3/600	370597	600		
	MQK-41/300	369609	300	S235JR in accordance with EN 10025-2, zinc coated	S235JR in accordance with EN 10025-2, zinc coated
	MQK-41/450	369610	450		
	MQK-41/600	369611	600		

Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600 and
Hilti brackets MQK-41/300, MQK-41/450, MQK-41/600

Product description
Shape, dimensions and materials

Annex A

English translation prepared by DIBt

- Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600, MQK-41/300, MQK-41/450 and MQK-41/600 are used to transfer building services component loads such as ducts and equipment for sprinklers, water, heating, cooling, ventilation, electrical and other systems. Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600, MQK-41/300, MQK-41/450 and MQK-41/600 are performing this loadbearing function at ambient temperature under the conditions described in Section 2 of this European Technical Assessment.
- The resistance at ambient temperature applies for static actions in the main axes X,Y,Z. The point of intersection of the axes X,Y,Z is located in the centroid position of the cross section of the channel and on the baseplate surface facing the channel according to Figure B1.1. The welded connection of the channel profile to the baseplate is presented in Figure B1.2.
- Prior to installation, it must be ensured that the component to be supported by the brackets, the anchoring of the bracket to the base material and the base material itself are suitable to withstand the resistance values of the installation system and that they have a fireproof certificate.
- Installation must be carried out by trained personnel and under the supervision of the site manager. The general installation instructions of the manufacturer are to be observed.

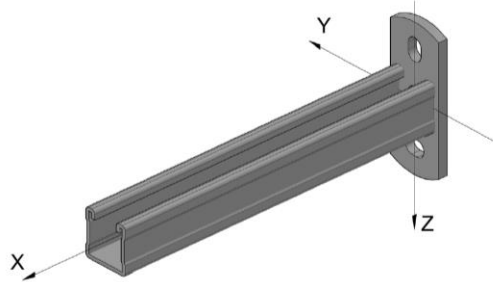
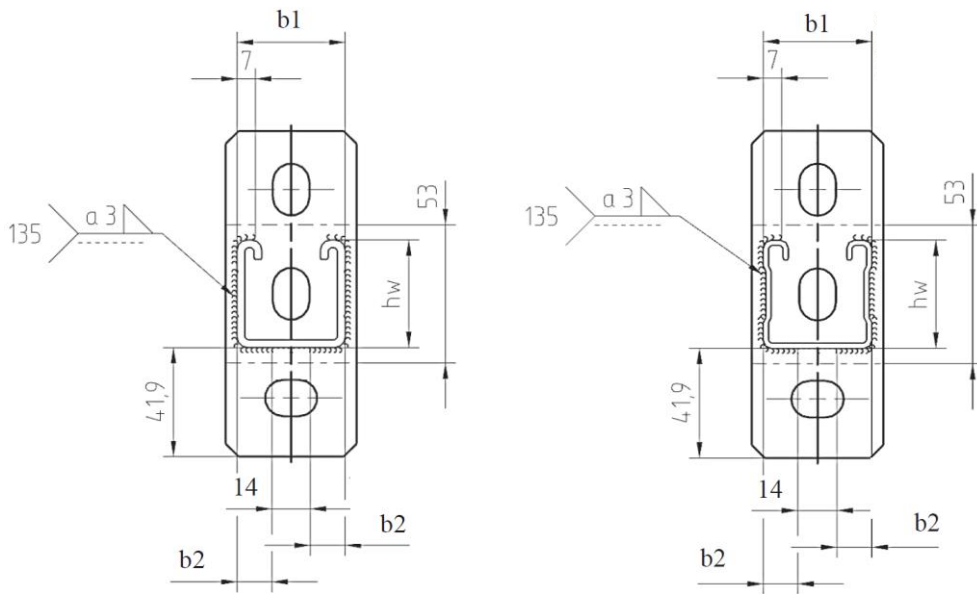


Figure B1.1: Coordinate system for the resistance



Weld lengths:

b1 = 40 mm
b2 = 13 mm
hw = 42 mm

Dimensions in mm

MQK-41/3/300, MQK-41/3/450, MQK-41/3/600

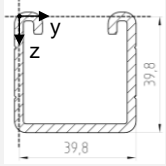
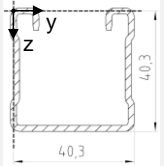
MQK-41/300, MQK-41/450, MQK-41/600

Figure B1.2: Welded connection

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Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600 and Hilti brackets MQK-41/300, MQK-41/450, MQK-41/600	Annex B1
Requirements for performance assessment	

Table B2: Section properties of channels as part of brackets

Description	Symbol	Channel section MQK-41/3/300, MQK-41/3/450, MQK-41/3/600	Channel section MQK-41/300, MQK-41/450, MQK-41/600	Unit
				
Classification cross section in accordance with EN 1993-1-1	-	3	3	-
Cross section areas	A	375.88	267.75	mm ²
	A _{tot}	375.88	267.75	mm ²
Shear areas	A _y	48.69	31.37	mm ²
	A _z	195.47	131.02	mm ²
Centroid position	y _{C,0}	19.15	19.65	mm
	z _{C,0}	20.57	20.69	mm
Moments of inertia	I _y	76963.50	58819.90	mm ⁴
	I _z	107949.00	76868.60	mm ⁴
Inclination of principal axes	α	90.00	90.00	°
Polar moments of inertia	I _p	184913.00	135689.00	mm ⁴
	I _{p,M}	778900.00	601167.00	mm ⁴
Radii of gyration	i _y	14.31	14.82	mm
	i _z	16.95	16.94	mm
Polar radii of gyration	i _p	22.18	22.51	mm
	i _{p,M}	45.52	47.38	mm
Warping radius of gyration	i _{w,M}	7.02	7.20	mm
Torsional constant	J	848.88	271.13	mm ⁴
Secondary torsional constant	J _s	105319.00	71833.80	mm ⁴
Location of the shear center	y _{M,0}	19.15	19.65	mm
	z _{M,0}	60.32	62.39	mm
	y _M	0.00	0.00	mm
	z _M	39.75	41.69	mm
Warping constants	I _{w,C}	2.09277E+08	1.64871E+08	mm ⁶
	I _{w,M}	38387600	31136900.00	mm ⁶
	r _{w,M}	0.00	0.00	-
Section moduli	S _{y,max}	4002.48	3000.15	mm ³
	S _{y,min}	-3487.10	-2711.29	mm ³
	S _{z,max}	5227.58	3722.45	mm ³
	S _{z,min}	-5277.58	-3722.45	mm ³
Torsional section modulus	S _t	282.96	135.57	mm ³
Max. plastic bending moment	M _{pl,y,k}	NPA ¹⁾	NPA	kNm
	M _{pl,z,k}	NPA	NPA	kNm
Max. plastic section moduli	Z _y	NPA	NPA	mm ³
	Z _z	NPA	NPA	mm ³
Plastic shear areas	A _{pl,y}	NPA	NPA	mm ²
	A _{pl,z}	NPA	NPA	mm ²
Area bisecting axis position	f _{y,0}	NPA	NPA	mm
	f _{z,0}	NPA	NPA	mm
Plastic shear forces	V _{pl,y,k}	NPA	NPA	kN
	V _{pl,z,k}	NPA	NPA	kN
Plastic axial force	N _{pl,k}	NPA	NPA	kN
Buckling curves	BC _y	c	c	-
	BC _z	c	c	-

¹⁾ NPA: No performance assessed

Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600 and
Hilti brackets MQK-41/300, MQK-41/450, MQK-41/600

Requirements for performance assessment

Annex B2

Table C1.1: Characteristic resistance: Steel baseplate and channel
according to the coordinate system in Figure B1.1

$+F_{X,Rk}$ [kN]	$-F_{X,Rk}$ [kN]	$+F_{Y,Rk}$ [kN]	$-F_{Y,Rk}$ [kN]	$+F_{Z,Rk}$ [kN]	$-F_{Z,Rk}$ [kN]
18.80	38.98	10.45	10.45	31.61	31.61
$M_{X,Rk}$ [kNcm]	$M_{Y,Rk}$ [kNcm]	$M_{Z,Rk}$ [kNcm]			
4.63	66.74	33.09			

Table C1.2: Characteristic resistance: Welded connection
according to the coordinate system in Figure B1.1

$+F_{X,Rk}$ [kN]	$-F_{X,Rk}$ [kN]	$+F_{Y,Rk}$ [kN]	$-F_{Y,Rk}$ [kN]	$+F_{Z,Rk}$ [kN]	$-F_{Z,Rk}$ [kN]
105.96	105.96	21.04	21.04	65.47	65.47
$M_{X,Rk}$ [kNcm]	$M_{Y,Rk}$ [kNcm]	$M_{Z,Rk}$ [kNcm]			
130.94	68.75	160.37			

Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600

Characteristic resistance at ambient temperature

Annex C1

Table C2.1: Characteristic resistance: Steel baseplate and channel
according to the coordinate system in Figure B1.1

$+F_{X,Rk}$ [kN]	$-F_{X,Rk}$ [kN]	$+F_{Y,Rk}$ [kN]	$-F_{Y,Rk}$ [kN]	$+F_{Z,Rk}$ [kN]	$-F_{Z,Rk}$ [kN]
18.80	38.98	7.19	7.19	21.71	21.71
$M_{X,Rk}$ [kNcm]	$M_{Y,Rk}$ [kNcm]	$M_{Z,Rk}$ [kNcm]			
2.20	57.03	33.09			

Table C2.2: Characteristic resistance: Welded connection
according to the coordinate system in Figure B1.1

$+F_{X,Rk}$ [kN]	$-F_{X,Rk}$ [kN]	$+F_{Y,Rk}$ [kN]	$-F_{Y,Rk}$ [kN]	$+F_{Z,Rk}$ [kN]	$-F_{Z,Rk}$ [kN]
105.96	105.96	21.04	21.04	65.47	65.47
$M_{X,Rk}$ [kNcm]	$M_{Y,Rk}$ [kNcm]	$M_{Z,Rk}$ [kNcm]			
130.94	68.75	160.37			

Hilti brackets MQK-41/300, MQK-41/450, MQK-41/600

Characteristic resistance at ambient temperature

Annex C2

- In case of more than one force acting simultaneous on the bracket, the following interaction formula can be used for the design of the brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600, MQK-41/300, MQK-41/450 und MQK-41/600 according to the coordinate system in Figure B1.1:

$$\frac{F_{X.Ed}}{F_{X.Rd}} + \frac{F_{Y.Ed}}{F_{Y.Rd}} + \frac{F_{Z.Ed}}{F_{Z.Rd}} + \frac{M_{X.Ed}}{M_{X.Rd}} + \frac{M_{Y.Ed}}{M_{Y.Rd}} + \frac{M_{Z.Ed}}{M_{Z.Rd}} \leq 1.0$$

Where the shear force is equal to or exceeds half the plastic shear resistance ($V_{Ed} \geq 0,50 V_{pl,Rd}$), the reduced moment resistance should be taken using a reduced yield strength in accordance with EN 1993-1-1, section 6.2.8.

The proof of stability is to be provided with the proof given above.

- Partial safety coefficients, provided that no other national regulations apply:

Steel: $\gamma_{M0} = 1.0$; $\gamma_{M1} = 1.1$; $\gamma_{M2} = 1.25$

Concrete: $\gamma_C = 1.5$; $\gamma_S = 1.15$

Hilti brackets MQK-41/3/300, MQK-41/3/450, MQK-41/3/600 and Hilti brackets MQK-41/300, MQK-41/450, MQK-41/600	Annex D (informative)
Interaction formula and partial safety coefficients	