

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-02/0006**  
**of 13 November 2017**

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

PEIKKO HPM-L anchor bolt

Product family  
to which the construction product belongs

Cast-in anchor bolt of ribbed reinforcing steel

Manufacturer

PEIKKO GROUP CORPORATION  
Voimakatu 3  
15101 Lahti  
FINNLAND

Manufacturing plant

Peikko Herstellwerke

This European Technical Assessment  
contains

12 pages including 3 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 330924-00-0601

This version replaces

ETA-02/0006 issued on 13 November 2012

**European Technical Assessment  
ETA-02/0006**

English translation prepared by DIBt

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## Specific Part

### 1 Technical description of the product

The PEIKKO HPM-L anchor bolt consists of ribbed reinforcing steel B500B of the diameters 16, 20, 25, 32 and 40 mm, two hexagon nuts and two washers. One of the ends of the bolt is provided with an anchor head and the other end with a thread of the sizes M16, M20, M24, M30, and M39.

The anchor bolt is imbedded in concrete up to the threaded length.

The product description is given in Annex A.

### 2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. 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.

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

#### 3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistances under static and quasi-static loads and displacements	See Annex C1 to C2

#### 3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1

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

In accordance with EAD No. 330924-00-0601, the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

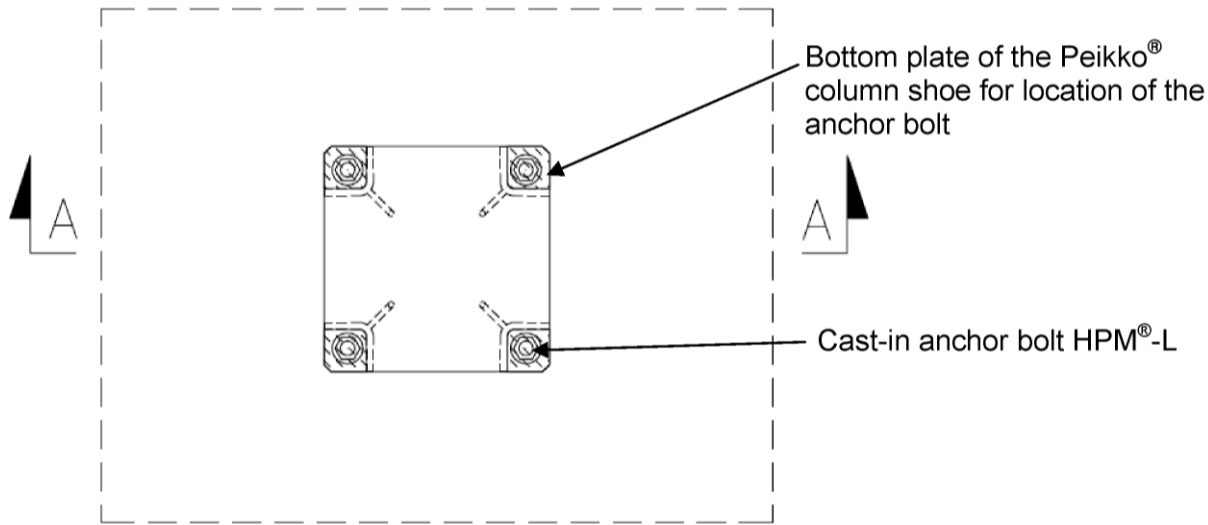
**5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

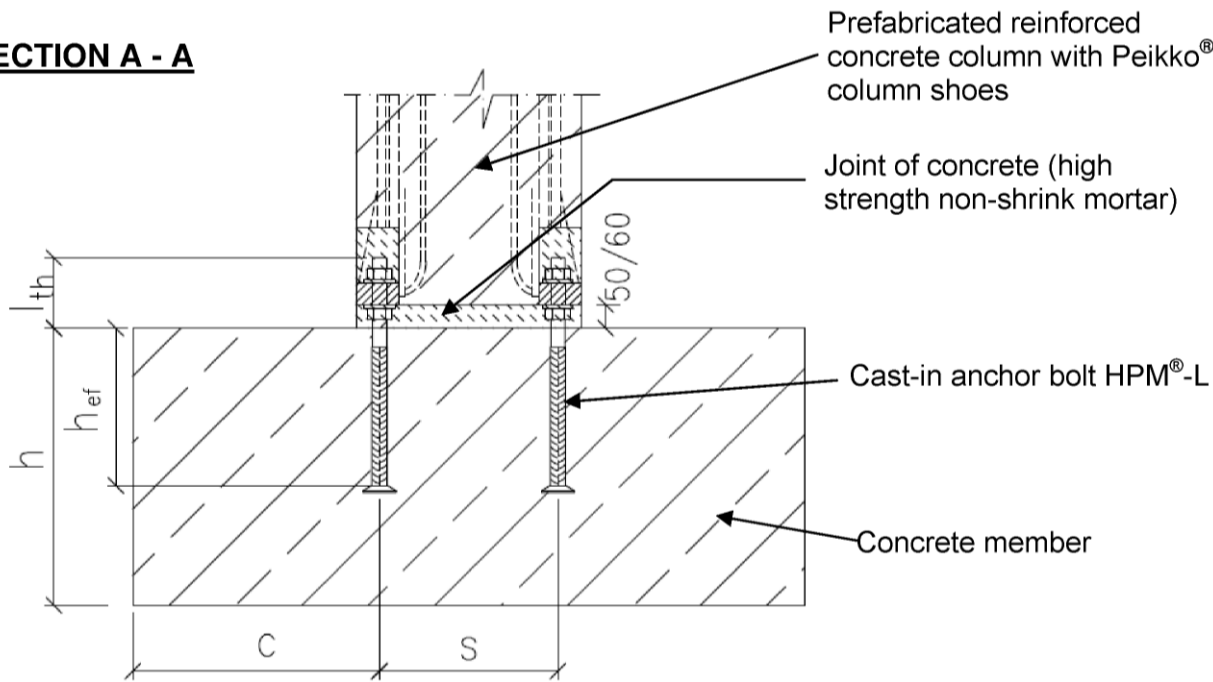
Issued in Berlin on 13 November 2017 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Müller



**SECTION A - A**



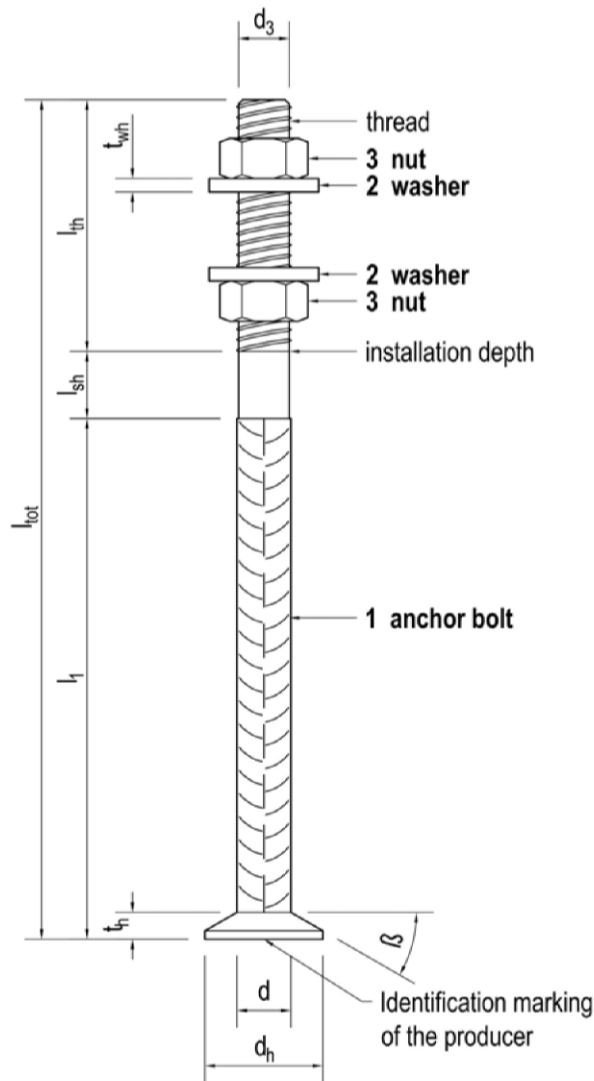
- h** = thickness of concrete member
- h<sub>ef</sub>** = effective embedment depth
- c** = edge distance
- s** = spacing
- l<sub>th</sub>** = threaded length of anchor bolt

dimensions in [mm]

**HPM®-L anchor bolt**

Product description  
Installed conditions

**Annex A1**



Identification marking /  
Alternatives:

Alternative A



Alternative B



Alternative C



Table 1: Dimensions [mm]

Type	1 anchor bolt									2 washer			3 hexagonal nut <sup>1)</sup>
	d	dh	d3	ltot	l1	lth	lsh	t1	β	d1	d2	twh	
HPM <sup>®</sup> 16-L	16	38	16	280	140	105	35	10	30°	18	38	5	M16
HPM <sup>®</sup> 20-L	20	46	20	350	210	115	25	12		22	46	6	M20
HPM <sup>®</sup> 24-L	25	55	24	430	260	130	40	13		25	55	6	M24
HPM <sup>®</sup> 30-L	32	70	30	500	310	150	40	15		31	65	8	M30
HPM <sup>®</sup> 39-L	40	90	39	700	500	185	15	18		41	90	8	M39

1) Dimensions according to EN ISO 4032:2012

HPM<sup>®</sup>-L anchor bolt

Product description  
Dimensions and product marking

Annex A2

**Table 2: Material**

Components		Material
1	anchor bolt	Ø16-40 Reinforcing steel B 500B or B500C according to EN 1992-1-1:2004 + AC:2010, Annex C
2	washer	Steel S355J2 according to EN 10025: 2004
3	hexagonal nut	According to EN ISO 4032:2012 and strength class 8 and 10 according to EN 898-2:2012

**HPM®-L anchor bolt**

Product description  
Material

**Annex A3**

## Specifications of intended use

### Loading of anchor bolts subject to:

- Static and quasi-static loads in tension and shear.

### Base materials:

- Reinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C20/25 to C50/60 according to EN 206-1:2000.
- Cracked or non-cracked concrete.

### Intended use and environmental conditions:

- Structures subject to dry internal conditions  
=> Anchor bolts acc. Annex A3, Table 2.
- Structures subject to external atmospheric exposure or damp internal conditions if no particular aggressive conditions (such as permanent or alternate immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulfurization plants or road tunnels, where de-icing materials are used)) exist.  
=> Anchor bolts acc. Annex A3, Table 2 with appropriate concrete cover acc. EN 1992-1-1: 2004

### Design:

- Anchor bolts are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor bars are indicated on the design drawings (e.g. position of the anchor bars relative to the reinforcement or to supports).
- For static and quasi-static loading the anchor bolts are designed in accordance with CEN/TS 1992-4-2:2009.
- It is generally assumed that the concrete is cracked and that the occurring splitting forces are resisted by the reinforcement. The required cross section of the minimum reinforcement is determined according CEN/TS 1992-4-2:2009, section 6.2.6.2 b).

### Installation:

#### Placing anchor bolts into concrete

- The installation of anchor bolts is carried out by appropriately qualified personnel under the supervision of the person responsible for the technical matters on site.
- Use of the product only as supplied by the manufacturer.
- Installation in accordance with the manufacturers product installation instructions given in Annex B3.
- The anchor bolts are fixed to the formwork, reinforcement or auxiliary construction such that no movement of the product will occur during the time of laying the reinforcement and of placing and compacting the concrete.
- The concrete under the head of the anchors are properly compacted.
- The installation torque according Annex B2 must not be exceeded.

## HPM®-L anchor bolt

Specifications  
Intended use

## Annex B1



**Table 3: Installation parameters**

Anchor bolt HPM <sup>®</sup> -L, thread diameter			M 16	M 20	M 24	M 30	M 39
effective embedment depth	$h_{ef}$	[mm]	165	223	287	335	502
minimum spacing	$s_{min}$	[mm]	80	100	100	130	150
minimum edge distance	$c_{min}$	[mm]	50	70	70	100	130
length of anchor bolt above concrete member / length of thread	$l_{th}$	[mm]	105	115	130	150	180
min. thickness of concrete member	$h_{min}$	[mm]	$h_{ef} + t_h + c_{nom}^{1)}$				
maximum installation torque	$T_{inst}$	[Nm]	90	180	230	640	1400

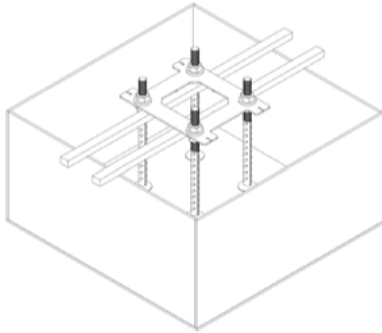
1) Required concrete cover according to EN 1992-1-1:2004 + AC:2010 and national rules

**HPM<sup>®</sup>-L anchor bolt**

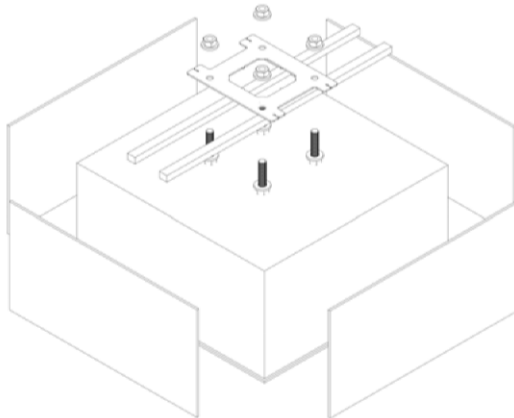
Intended use  
Installation parameters

**Annex B2**

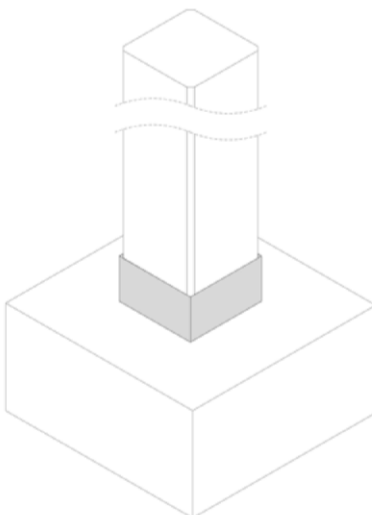
### Installation instruction:



- Install HPM®-L anchor bolts to the formwork by using a Peikko® installation template according to design drawings to ensure the correct position, size and length ( $l_{th}$ ) of the anchor bolts.
- Pay attention strong fixing to avoid moving during pouring.
- Compact concrete properly around and under the anchor bolt.



- After hardening of the concrete the installation template can be removed.



- For the installation of the precast concrete column with Peikko® HPKM® column shoes the lower levelling nuts are adjusted to the correct level.
- The connection is fixed by tightening the upper nuts.
- The installation torque  $T_{inst}$  acc. to Annex B2, Table 3 may not be exceeded.
- For the correct function of the connection the application of the installation torque is not required.
- The joint between the base structure and the column as well as the recesses of the column shoes have to be filled properly with non-shrinking mortar.

### HPM®-L anchor bolt

Intended use  
Manufacturers product installation instructions (MPII)

### Annex B3

**Table 4: Characteristic resistances under tension loads**

Anchor bolt HPM®-L			M16	M20	M24	M30	M39
Steel failure							
Characteristic resistance		N <sub>RK,s</sub> [kN]	86	134	194	308	537
Partial safety factor		γ <sub>Ms</sub>	1,4				
Pull-out failure for cracked concrete							
Characteristic resistance		N <sub>RK,p</sub> [kN]	140	200	250	450	750
Partial safety factor		γ <sub>Mp</sub> <sup>1)</sup>	1,5				
Concrete cone failure							
Effective embedment depth		h <sub>ef</sub> [mm]	165	223	287	335	502
Spacing		s <sub>cr,N</sub> [mm]= s <sub>cr,sp</sub> <sup>2)</sup>	3h <sub>ef</sub>				
Edge distance		c <sub>cr,N</sub> [mm] = c <sub>cr,sp</sub> <sup>2)</sup>	1,5h <sub>ef</sub>				
Partial safety factor		γ <sub>Mc</sub> <sup>1)</sup>	1,5				
Factor to take into account the influence of load transfer mechanisms	cracked concrete	k <sub>cr</sub>	8,5				
	non-cracked concrete	k <sub>ucr</sub>	11,9				
Local concrete blow out failure							
Partial safety factor		γ <sub>Mcb</sub> <sup>1)</sup>	1,5				

1) In the absence of other national regulations

2) Reinforcement resists the splitting forces and limits the crack width to  $w_k \leq 0,3$  mm according to CEN/TS 1992-4-2:2009, section 6.2.6.2

**Table 5: Displacements under tension loads**

Anchor bolt HPM®-L	M16	M20	M24	M30	M39
Displacements <sup>1)</sup> up to 0,9 mm under following loads [kN]	41	64	92	147	256

1) The indicated displacements are valid for short term loading, the displacements can be increased under long term loading to 1,8 mm.

## HPM®-L anchor bolt

Performance data  
Characteristic resistances and displacements under tension load

## Annex C1

**Table 6: Characteristic resistances under shear loads**

Anchor bolt HPM®-L		M16	M20	M24	M30	M39
Steel failure without lever arm						
Characteristic resistance	V <sub>Rk,s</sub> [kN]	39	60	87	138	241
Partial safety factor	γ <sub>Ms</sub>	1,5				
Steel failure with lever arm						
Characteristic bending resistance	M° <sub>Rk,s</sub> [Nm]	183	357	618	1237	2778
Partial safety factor	γ <sub>Ms</sub>	1,5				
Concrete pry-out failure						
Factor in equation (32) CEN/TS 1992-4-2:2009, section 6.3.4	k <sub>3</sub> <sup>1)</sup>	2,0				
Partial safety factor	γ <sub>Mcp</sub> <sup>2)</sup>	1,5				
Concrete edge failure						
Effective length of anchor bolt in shear loading	l <sub>f</sub> =h <sub>ef</sub> [mm]	165	223	287	335	502
Effective outside diameter	d <sub>nom</sub> =d <sub>3</sub> [mm]	16	20	24	30	39
Partial safety factor	γ <sub>Mc</sub> <sup>2)</sup>	1,5				

1) In case of supplementary reinforcement the factor  $k_3$  should be multiplied with 0,75

2) In the absence of other national regulations

**Table 7: Displacements under shear loads**

Anchor bolt HPM®-L	M16	M20	M24	M30	M39
Displacements <sup>3)</sup> to 1,5 mm under following loads in [kN]	18	25	41	66	115

3) The indicated displacements are valid for short term loading, the displacements can be increased under long term loading to 2,0 mm.

### Combined tension and shear load

The factor CEN/TS 1992-4-2:2009, section 6.4.1.3:  $k_7 = 2/3$

### HPM®-L anchor bolt

Performance data  
Characteristic resistances and displacements under shear load, combined tension and shear load

### Annex C2