

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-14/0403
of 9 January 2015

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

Vorpa Midle duty Anchor VHS-C

Product family
to which the construction product belongs

Torque controlled expansion anchor for use in non-
cracked concrete

Manufacturer

VORPA srl
Via S. Leo 5
47838 Riccione (RN)
ITALIEN

Manufacturing plant

Vorpa srl.

This European Technical Assessment
contains

12 pages including 3 annexes

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

Guideline for European technical approval of "Metal
anchors for use in concrete", ETAG 001 Part 2: "Torque
controlled expansion anchors", April 2013,
used as European Assessment Document (EAD)
according to Article 66 Paragraph 3 of Regulation (EU)
No 305/2011.

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Specific Part

1 Technical description of the product

The Vorpa Middle duty anchor VHS-C is an anchor made of galvanised steel which is placed into a drilled hole and anchored by torque-controlled expansion.

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 resistance for static and quasi static action and displacement under tension load	See Annex C1
Characteristic resistance for static and quasi static action and displacement under shear load	See Annex C2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	No performance determined (NPD)

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances there may be requirements (e.g. transposed European legislation and national laws, regulations and administrative provisions) applicable to the products falling within the scope of this European Technical Assessment. In order to meet the provisions of Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

3.5 Protection against noise (BWR 5)

Not applicable.

3.6 Energy economy and heat retention (BWR 6)

Not applicable.

English translation prepared by DIBt

3.7 Sustainable use of natural resources (BWR 7)

The sustainable use of natural resources was not investigated.

3.8 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

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

According to Decision of the Commission of 24 June 1996 (96/582/EC) (OJ L 254 of 08.10.96 p. 62-65), the system of assessment and verification of constancy of performance (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	Level or class	System
Metal anchors for use in concrete (heavy-duty type)	For fixing and/or supporting concrete structural elements or heavy units such as cladding and suspended ceilings	—	1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

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

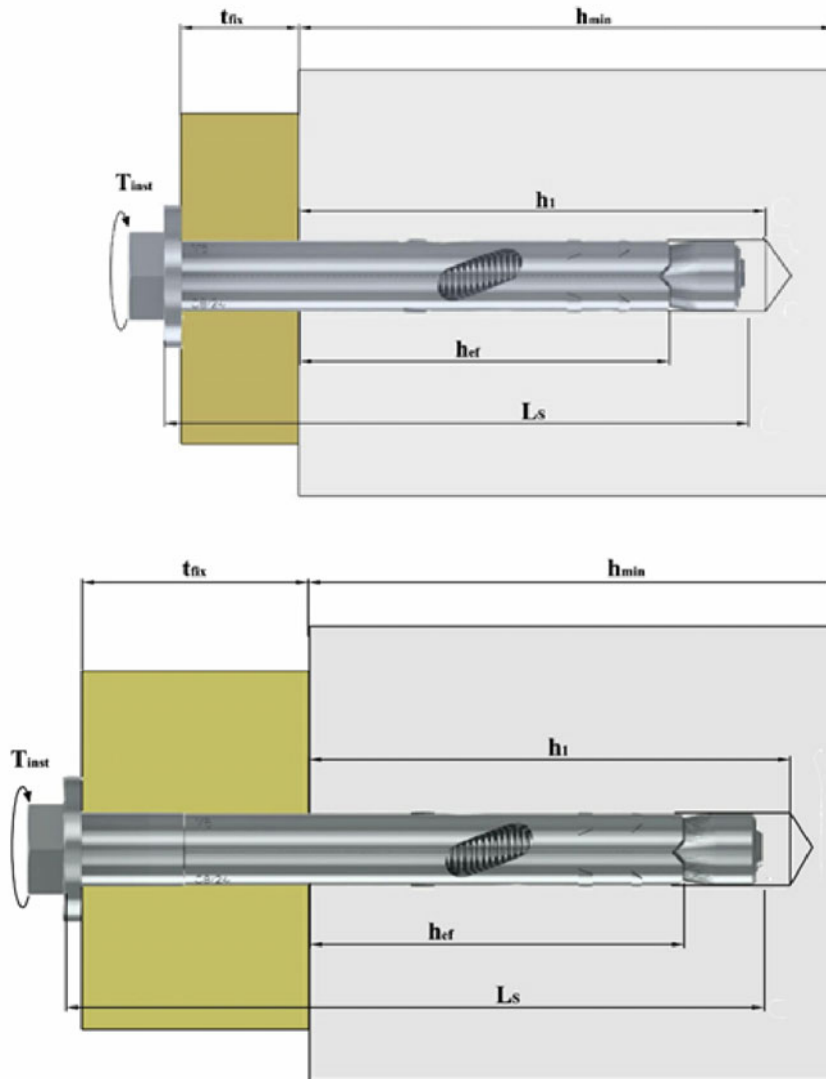
Issued in Berlin on 9 January 2015 by Deutsches Institut für Bautechnik

Uwe Bender
Head of Department

beglaubigt:
Lange

Installed condition

Through-setting Installation of the Vorpa Middle-duty anchor VHS-C:



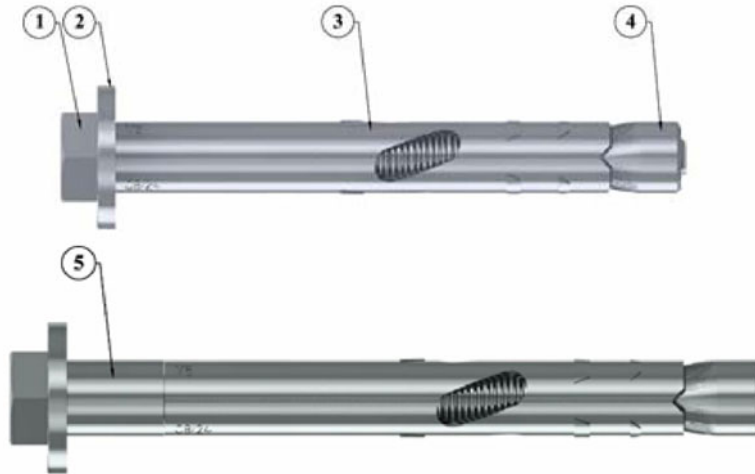
Vorpa Middle-duty anchor VHS-C

Product description

Installed condition

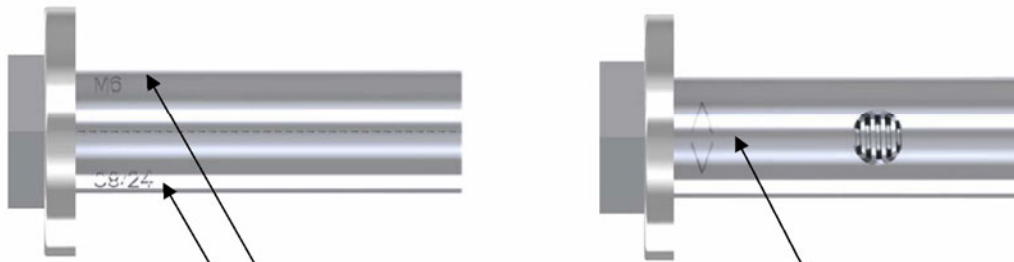
Annex A1

Denomination and Marking



COMPONENTS:

- 1 – Hexagonal head bolt
- 2 – Washer
- 3 – Expander
- 4 – Conical nut
- 5 – Extension (for some dimensions only)



READING:

- Manufacturer and product logo (<>)
- Thread of the bolt (ex. M6)
- Hole diameter/ t_{fix} (ex. Ø8/24)

Vorpa Middle-duty anchor VHS-C

Product description

Marking and denomination

Annex A2

Table A1: Materials and components

COMPONENT	DENOMINATION	FOR DIMENSIONS	MATERIAL
1	Hexagonal head bolt	All	Steel, property class 8.8 EN ISO 898-1 <i>Electrolytic zinc plated min. 5µm</i>
2	Washer	All	Steel, DD11 UNI EN 10111 (JIS G 3131 SPHC) <i>Electrolytic zinc plated min. 5µm</i>
3	Expander	All	Steel, DC01 EN 10139 – EN 10130 (SAE 1010) <i>Electrolytic zinc plated min. 5µm</i>
4	Conical nut	All	Steel, DC01-DC04 EN 10139 (SAE 1006 - SAE 1010) <i>Electrolytic zinc plated min. 5µm</i>
5	Extension	8/54-100 10/45-100 10/65-120 12/45-100 12/65-120 16/50-130	Steel, DC01 EN 10139 – EN 10130 (SAE 1010) <i>Electrolytic zinc plated min. 5µm</i>

Vorpa Middle-duty anchor VHS-C

Product description

Materials

Annex A3

Specifications of intended use

Anchorage subject to:

- Static and quasi-static loads.

Base materials:

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

Use conditions (Environmental conditions):

- Anchorages subject to dry internal conditions (zinc coated steel or stainless steel).

Design:

- Anchorages 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 is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages are designed in accordance with CEN/TS 1992-4, Method A.

Installation:

- Hole drilling by hammer drilling only.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.
- Anchor installation such that the effective anchorage depth is complied with. This compliance is ensured, if the leading edge of expander does not more exceed the concrete surface.

Vorpa Middle-duty anchor VHS-C

Intended use

Specifications

Annex B1

Table B1: Installation parameters

Anchor size			M6 / ϕ 8	M8 / ϕ 10	M10 / ϕ 12	M12 / ϕ 16
Effective anchorage depth	h_{ef}	[mm]	31	35	40	60
Nominal drill hole diameter	d_0	[mm]	8	10	12	16
Drill hole depth	$h_1 \geq$	[mm]	50	55	60	85
Clearance hole in the fixture	d_f	[mm]	10	12	14	18
Torque moment	T_{inst}	[Nm]	10	25	40	65
Minimum fixture thickness	$T_{fix,min}$	[mm]	1	1	1	1
Maximum fixture thickness	$T_{fix,max}$	[mm]	24/54	25/45/65	25/45/65	10/30/50
Hexagonal head bolt length	L_s	[mm]	70/100	75/100/120	80/100/120	90/110/130

Table B2: Minimum thickness of concrete member, minimum spacing and edge distance

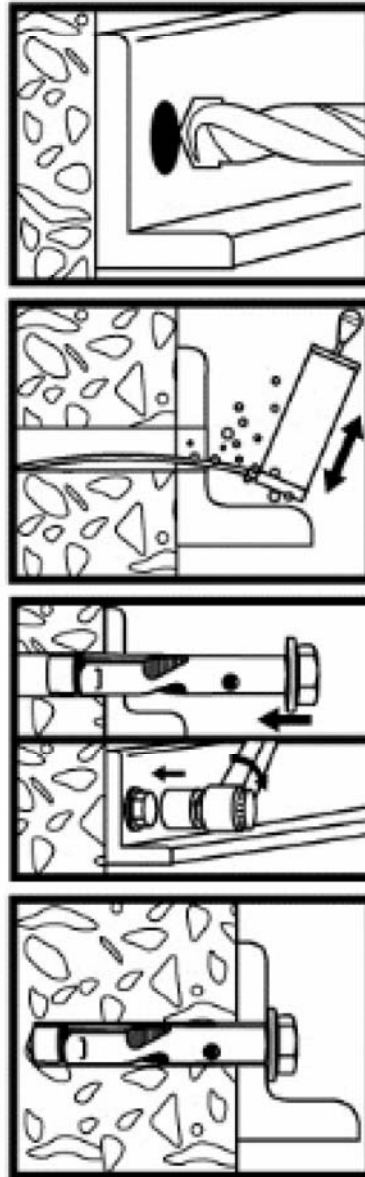
Anchor size			M6 / ϕ 8	M8 / ϕ 10	M10 / ϕ 12	M12 / ϕ 16
Minimum thickness of the member	h_{min}	[mm]	80	100	120	150
Minimum spacing	s_{min}	[mm]	95	120	145	175
Minimum edge distance	c_{min}	[mm]	50	60	75	90

Vorpa Middle-duty anchor VHS-C

Intended use
Installation parameters
Minimum thickness of concrete member, minimum spacing and edge distance

Annex B2

Installation instruction



1. Make a drill hole with a hammer drilling
2. Clean the drill hole
3. Place the anchor
4. Apply the required installation torque

Vorpa Middle-duty anchor VHS-C

Intended use

Installation instructions

Annex B3

**Table C1: Design method A acc. to CEN/TS 1992-4
Characteristic values for tension loads**

Anchor size			M6 / $\phi 8$	M8 / $\phi 10$	M10 / $\phi 12$	M12 / $\phi 16$
Installation safety factor	γ_{inst}	[-]	1,0			
Steel failure						
Characteristic resistance	$N_{Rk,s}$	[kN]	16,1	29,3	46,4	67,4
Partial safety factor	$\gamma_{MS}^{1)}$	[-]	1,5			
Pullout failure						
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,P}$	[kN]	6,0	7,5	12,0	20,0
Increasing factor for concrete	ψ_c	C30/37	1,0			
		C40/50				
		C50/60				
Concrete cone failure						
Effective anchoring depth	h_{ef}	[mm]	31	35	40	60
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}			
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}			
Factor in CEN/TS 1992-4-4, 6.2.1.4	k_{ucr}	[-]	10,1			
Splitting failure						
Spacing	$s_{cr,sp}$	[mm]	200	300	340	430
Edge distance	$c_{cr,sp}$	[mm]	100	150	170	215

¹⁾ In absence of other national regulations.

Table C2: Displacements under tension loads

Anchor size			M6 / $\phi 8$	M8 / $\phi 10$	M10 / $\phi 12$	M12 / $\phi 16$
Tension load	N	[kN]	3,4	5,2	5,3	11,6
Displacement	δ_{N0}	[mm]	0,10	0,19	0,39	0,51
	$\delta_{N\infty}$	[mm]	-	-	0,39	-

Vorpa Middle-duty anchor VHS-C

Performances

Design method A, Characteristic values of resistance under tension loads
Displacements under tension loads

Annex C1

**Table C3: Design method A acc. to CEN/TS 1992-4
Characteristic values for shear loads**

Anchor size			M6 / $\phi 8$	M8 / $\phi 10$	M10 / $\phi 12$	M12 / $\phi 16$
Steel failure without level arm						
Characteristic resistance	$V_{Rk,s}$	[kN]	7,5	12,0	20,0	30,0
Partial safety factor	$\gamma_{MS}^{1)}$	[-]	1,25			
Steel failure with level arm						
Characteristic bending moment	$M_{Rk,s}^0$	[kN]	12,2	30,0	59,8	104,8
Partial safety factor	$\gamma_{MS}^{1)}$		1,25			
Concrete pry out failure						
Factor in equation (16) of CEN/TS 1992-4-4, 6.2.2.3	k_3	[mm]	1,0			2,0
Installation safety factor	γ_{inst}	[mm]	1,0			
Concrete edge failure						
Effective length of anchor in shear loading	ℓ_f	[mm]	31	35	40	60
Effective external diameter of anchor	d_{nom}	[mm]	8	10	12	16
Installation safety factor	γ_{inst}	[-]	1,0			

1) In absence of other national regulations.

Table C4: Displacements under shear loads

Anchor size			M6 / $\phi 8$	M8 / $\phi 10$	M10 / $\phi 12$	M12 / $\phi 16$
Shear load	V	[kN]	3,8	7,0	11,0	16,1
Displacement	δ_{V0}	[mm]	1,1	1,4	2,6	2,7
	$\delta_{V\infty}$	[mm]	1,6	2,1	3,9	4,1

Vorpa Middle-duty anchor VHS-C

Performances

Design method A, Characteristic values of resistance under shear loads
Displacements under shear loads

Annex C2