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European Technical Assessment Body
for construction products



European Technical Assessment

ETA-16/0262
of 18 December 2025

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

BBV Anchor Heads for Ground anchors with 2 to 31 strands

Product family to which the construction product belongs

BBV Anchor Heads for Ground Anchors with 2 to 31 Strands, 140 mm² und 150 mm², Y1770S7 and Y1860S7

Manufacturer

BBV Systems GmbH
Industriestraße 98
67240 Bobenheim-Roxheim
DEUTSCHLAND

Manufacturing plant

BBV Systems GmbH
Industriestraße 98
67240 Bobenheim-Roxheim
DEUTSCHLAND

This European Technical Assessment contains

6 pages 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 160004-00-0301

This version replaces

ETA-16/0262 issued on 14 October 2016

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Specific Part

1 Technical description of the product

1.1 Definition of the construction product

The present European Technical Assessment applies to the kit:

BBV Anchor Heads for Ground anchors with 2 to 31 strands

according to EN 1537, observing the standards and regulations in force at the place of use. The use of EN 1537 requires the consideration of EN 1997-1 with National Annex. Ducts and filling material are executed in accordance with EN 1537 and the standards and regulations in force at the place of use.

The Anchor heads can be used with 2 to 31 strands with a nominal tensile strength 1770 MPa or 1860 MPa (Y1770S7 or Y1860S7), nominal diameter 15.3 mm (0.6" - 140 mm²) or nominal diameter 15.7 mm (0.62" - 150 mm²) which are used in normal-weight concrete.

Tensile elements consist in strands made of prestressing steel, complying with the specifications of prEN 10138-3:2009; table 4 in terms of geometry and characteristic force or complying with the regulations in place of use.

The anchorage of the strands in anchor blocks is done by means of wedges.

The components and the system setup of the product are given in Annex A.

1.2 Strands

Only 7-wire strands shall be used in accordance with national provisions and the characteristics given in Table 1:

Table 1: Dimensions and properties of 7-wire strands

Designation	Symbol	Unit	Value	
Tensile strength	R_m	MPa	1770 or 1860	
Strand				
Nominal diameter	D	mm	15.3	15.7
Nominal cross section	A_p	mm ²	140	150
Nominal mass	M	g/m	1093	1172
Individual wires				
External wire diameter	D	mm	5.0 ± 0.04	5.2 ± 0.04
Core wire diameter	d'	mm	1.02 to 1.04 d	1.02 to 1.04 d

Only prestressing strands with very low relaxation shall be used.

The maximum deflection angle of the tension member towards the normal to the anchor head is 2.6° for tension number L3 to L22 and L31 strands. For tension number L27 strands the maximum deflection angle is 2.1°.

1.3 Wedges

The strands shall be fixed separately with wedges considering of 3 parts (see Annex A1) in the anchor blocks.

In dependence of the nominal diameter of the strand, two types of wedges are used. One type for 0.6" – strand (nominal cross section 140 mm²) and another type for 0.62" – strand (nominal cross section 150 mm²). The wedges have to be marked according to the used strand (see Annex A1)

1.4 Anchor head

The dimension of the anchor heads shall be in accordance with Annex A1. To control the force in the anchor, the anchor heads can be provided with an external thread according to the deposited technical documentation.

1.5 Bearing plates

The anchorage using patched, round bearing plates according to Annex A2 applies to tendons of 3 to 22 strands.

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

The performances given in Clause 3 are valid only if the PT-System is used in accordance with the specifications and conditions given in Annex B.

2.1 Specification

Specific information on installation and use is provided in Annex B.

2.2 Working Life

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the assessed Anchor Head of at least 100 years. Limitation of working life according to EN 1537 have to be fulfilled. The working life of the entire System depends on the corrosion protection system according to EN 1537 (observing the standards and regulations in force at the place of use). The corrosion protection system is not part of this ETA. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, 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)

No.	Essential characteristic	Performance
1	Resistance to static load	The acceptance criterion to EAD 160004-00-03-01 clause 2.2.1 is fulfilled, see Annex B1
2	Resistance to fatigue	The acceptance criterion to EAD 160004-00-03-01 clause 2.2.2 is fulfilled, see Annex B1, At the tendon deviations, a stress range of 35 N/mm ² at 2×10 ⁶ load cycles can be assumed as verified
3	Load transfer to structure	The acceptance criterion to EAD 160004-00-03-01 clause 2.2.3 is fulfilled, see Annex B1
4	Friction coefficient	No performance assessed
5	Deviation/ deflection (limits) for internal bonded and internal unbonded tendon	No performance assessed
6	Deviation/ deflection (limits) for external tendon	No performance assessed
7	Assessment of assembly	No performance assessed
8	Resistance to static load under cryogenic conditions for applications with anchorage/coupling outside the possible cryogenic zone	No performance assessed

9	Resistance to static load under cryogenic conditions for applications with anchorage/coupling inside the possible cryogenic zone	No performance assessed
10	Material properties, component performance, system performance of plastic duct	No performance assessed
11	Material properties, component performance, system performance of plastic duct to provide an encapsulated tendon	No performance assessed
12	Material properties, component performance, system performance of plastic duct to provide an electrically isolated tendon	No performance assessed
13	Corrosion protection	No performance assessed
Monostrand, sheathing base material		
14	Melt index	No performance assessed
15	Density	No performance assessed
16	Carbon black	No performance assessed
17	Tensile strenght	No performance assessed
18	Elongation	No performance assessed
19	Thermal stability	No performance assessed
Monostrand, manufactured sheathing		
20	Tensile strenght	No performance assessed
21	Elongation	No performance assessed
22	Surface of sheathing	No performance assessed
23	Environtal stress cracking	No performance assessed
24	Temperatur resistance	No performance assessed
25	Resistance to externally applied agents (mineral oil, acid, base, solvents and salt water)	No performance assessed
26	Sheathing minimum thickness	No performance assessed
Monostrand, manufactured monostrand		
27	External diameter of sheathing	No performance assessed
28	Mass of sheathing per metre	No performance assessed
29	Mass of filling material per metre	No performance assessed
30	Alteration of dropping point caused by monostrand manufacturing	No performance assessed
31	Alteration of oil separation caused by monostrand facturing	No performance assessed
32	Impact resistance	No performance assessed
33	Friction between shealting and strand	No performance assessed
34	Leak tightness	No performance assessed

3.2 Safety in case of fire (BWR 2)

No.	Essential characteristic	Performance
35	Reaction to fire	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

No.	Essential characteristic	Performance
36	Content, emission and/or release of dangerous substances	No performance assessed

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

In accordance with guideline for European technical approval ETAG 013, June 2002, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011, the applicable European legal act is: [98/456/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 18 December 2025 by Deutsches Institut für Bautechnik

Dr.-Ing. Lars Eckfeldt
Head of Section

beglaubigt:
Knischewski

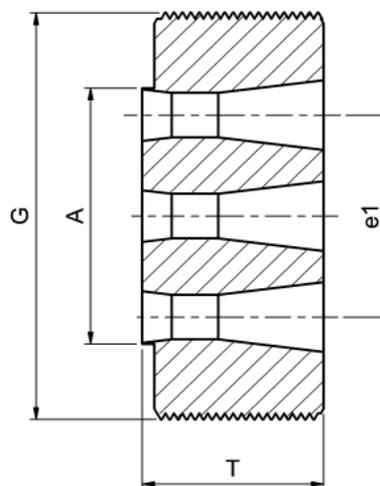
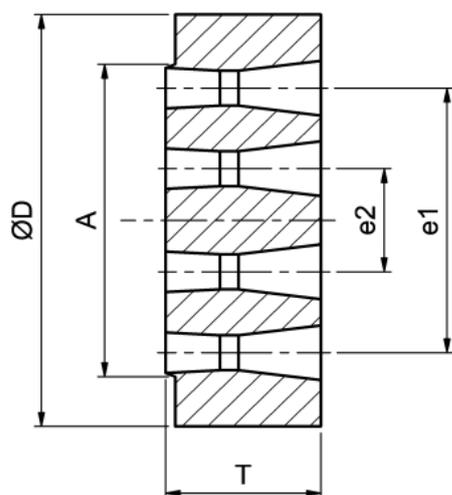
Technical Details

Anchor head*	Unit	L3	L4	L5	L7	L9	L12	L15	L19	L22	L27	L31
Number of strands *	-	3	4	5	7	9	12	15	19	22	27	31
Diameter, D	mm	104	104	115	132	160	180	200	220	245	265	280
External thread, G	mm	M110x4	M110x4	M121x4	M138x4	M168x4	M188x4	M208x4	M228x4	M255x4	M275x4	M290x4
Thickness, T	mm	65	65	70	75	75	80	82	92	105	120	125
Diameter, A	mm	68	77	79	89	109	127	146	159	179	195	204
Diameter circle e1	mm	45	54	56	66	86	Grid	120	Grid	Grid	Grid	Grid
Diameter circle e2	mm							56				
Hole Diameter, Di	mm	72	81	83	93	113	131	150	163	183	199	208

* The number of strands in a tendon can be reduced by leaving out strands lying radial symmetrically in the anchor head (max. 4 strands). The provisions for tendons with completely filled anchors (basic types) also apply to tendons with only partly filled anchor heads. Into the free boreholes in the anchor head, short pieces of strands with wedges have to be pressed in.

Anchor head

Anchor head with external thread



BBV Anchor Heads for Ground anchors with 2 to 31 strands

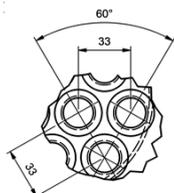
Product Description
Technical Details
Anchor Head, Wedges and Thread Sleeve

Annex A1
Page 1 of 2

Technical Details - Continued

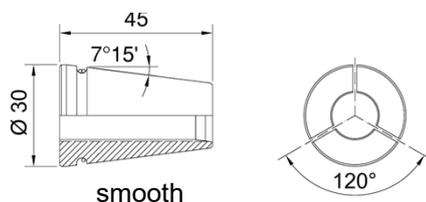
Strand Pattern BBV L12; L19; L22; L27; L31

Conical borings are in line,
lines result in a grid.



Wedges Type 30

Wedges for different strand sizes have to be distinguishable. Wedges for 150 mm² strands are marked with "0.62" on the front face.

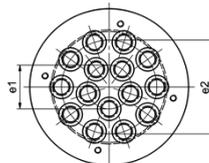


smooth

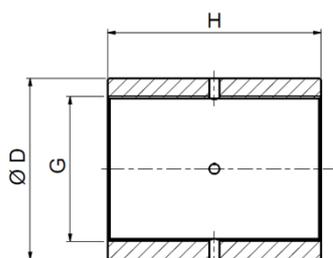
Strand Pattern BBV L3; L4; L5; L7; L9; L15

All conical borings are aligned
on one or two circles (e1 and e2), s. table above.

Example: BBV L15:



Threaded sleeve



Threaded sleeve	Unit	L3	L4	L5	L7	L9	L12	L15	L19	L22	L27	L31
Number of strands	-	3	4	5	7	9	12	15	19	22	27	31
External Diameter, D	mm	140	140	155	180	210	240	265	300	325	355	380
Thread, G	mm	M111x4	M111x4	M122x4	M139x4	M169x4	M189x4	M209x4	M229x4	M256x4	M276x4	M291x4
Length, H ≥	mm	190	190	200	210	210	220	224	244	270	300	310

BBV Anchor Heads for Ground anchors with 2 to 31 strands

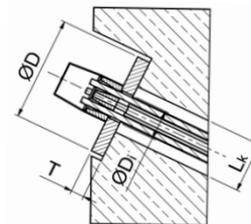
Product Description
Technical Details
Anchor Head, Wedges and Thread Sleeve

Annex A1
Page 2 of 2

Anchorage on Concrete with Bearing Plates

Designations:

- D: Diameter of the bearing plate
 D_i: Hole diameter in the bearing plate (see Annex A1)
 T: Thickness of the bearing plate
 L_k: Hole diameter in the concrete bedding



Steel grade Y 1770, Cross Section 140 mm²

D x T mm	max. Hole diameter concrete bedding L _k in mm												
	250	230	225	220	210	200	190	180	170	160	150	140	
Number of strands L2 to L22	2	-	-	-	-	-	-	-	-	205x45	200x40	190x40	
	3	-	-	-	-	-	-	-	-	225x45	220x45	210x40	
	4	-	-	-	-	-	-	-	-	245x50	235x45	230x45	
	5	-	-	-	-	-	-	-	275x55	265x50	260x50	255x45	250x45
	6	-	-	-	-	-	-	-	285x55	280x50	275x50	270x50	-
	7	-	-	-	-	-	-	-	300x55	295x55	290x50	285x50	-
	8	-	-	-	-	-	-	320x60	315x55	310x55	305x50	300x50	-
	9	-	-	-	-	-	-	335x60	330x55	320x55	315x50	310x50	-
	10	-	-	-	-	-	350x60	345x60	340x55	335x55	330x50	325x50	-
	11	-	-	-	-	-	360x60	355x60	350x55	345x55	340x50	335x50	-
	12	-	-	-	-	-	375x65	370x60	365x60	360x55	355x55	350x50	-
	13	-	-	400x65	395x65	390x65	385x60	380x60	375x55	370x55	365x50	-	-
	14	-	-	410x70	405x65	400x65	395x65	390x60	385x60	380x55	375x55	-	-
	15	-	-	420x70	415x70	410x65	405x65	400x60	395x60	390x60	385x55	-	-
	19	-	460x75	-	455x70	-	445x65	440x65	435x60	-	-	-	-
	22	495x80	-	-	480x70	-	470x65	465x65	465x60	-	-	-	-

Minimal centre distance $a \times a$, $f_{cmj,cube} = 38 \text{ N/mm}^2$:

Tendon Type	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L19	L22
Min. Centre-/ Edge Distance* mm	235	270	300	335	360	385	410	430	455	470	490	515	535	555	620	675

* Edge distance: Centre distance/2 + 20mm (rounding up at 5mm intervals)

The Centre-/ Edge distances can be converted to the similar area from square to rectangular; the shorter side has to be min. 85% of the square side length. The anchorage distances in one direction can be reduced to 85% of the table values, if the distances correspondingly increased in the other direction.

Note:

In the anchorage zone, an uniformly distributed steel reinforcement orthogonal to the force direction at all sides with a minimum reinforcement ratio of $\rho_{w,min} = 0.005$ is assumed.

BBV Anchor Heads for Ground anchors with 2 to 31 strands

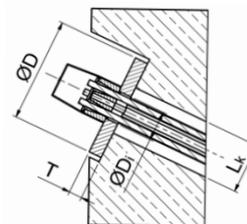
Product Description
 Anchorages on Concrete
 Steel Grade Y1770S7, Cross Section 140 mm²

Annex A2
 Page 1 of 2

Anchorage on Concrete with Bearing Plates

Designations:

- D: Diameter of the bearing plate
D_i: Hole diameter in the bearing plate (see Annex A1)
T: Thickness of the bearing plate
L_k: Hole diameter in the concrete bedding



Steel grade Y 1860, Cross Section 150 mm²

D x T mm	Max. Hole Diameter concrete bedding L _k in mm												
	250	230	225	220	210	200	190	180	170	160	150	140	
Number of strands L2 to L22	2	-	-	-	-	-	-	-	-	-	210x45	205x40	195x40
	3	-	-	-	-	-	-	-	-	-	235x45	225x45	220x40
	4	-	-	-	-	-	-	-	-	-	250x50	245x45	240x45
	5	-	-	-	-	-	-	-	-	280x55	275x55	270x50	265x50
	6	-	-	-	-	-	-	-	-	300x55	290x55	285x50	280x50
	7	-	-	-	-	-	-	-	-	315x60	310x55	300x55	295x50
	8	-	-	-	-	-	-	-	335x60	330x55	320x55	315x50	310x50
	9	-	-	-	-	-	-	-	345x60	340x60	335x55	330x55	325x50
	10	-	-	-	-	-	-	365x60	360x60	355x60	350x55	345x55	340x50
	11	-	-	-	-	-	-	380x65	375x60	370x60	365x55	360x55	355x50
	12	-	-	-	-	-	-	390x65	385x65	380x60	375x60	370x55	365x55
	13	-	-	415x70	410x70	405x65	400x65	395x60	390x60	385x55	385x55	-	-
	14	-	-	425x70	425x70	420x65	415x65	410x60	405x60	400x60	395x55	-	-
	15	-	-	435x70	435x70	430x70	425x65	420x65	415x60	410x60	405x60	-	-
	19	-	480x75	-	475x75	-	465x70	460x70	455x65	-	-	-	-
22	515x80	-	-	505x75	-	495x70	490x70	485x65	-	-	-	-	

Minimal centre distance a x a, f_{cmj,cube} = 38 N/mm²:

Tendon Type	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L19	L22
Min. Centre-/ Edge Distance* mm	245	280	315	350	380	405	430	450	475	500	520	545	565	580	660	720

- * Edge distance: Centre distance/2 + 20mm (rounding up at 5mm intervals)
The Centre-/ Edge distances can be converted to the similar area from square to rectangular; the shorter side has to be min. 85% of the square side length. The anchorage distances in one direction can be reduced to 85% of the table values, if the distances correspondingly increased in the other direction.

Note:

In the anchorage zone, an uniformly distributed steel reinforcement orthogonal to the force direction at all sides with a minimum reinforcement ratio of $\rho_{w,min} = 0.005$ is assumed.

BBV Anchor Heads for Ground anchors with 2 to 31 strands

Product Description
Anchorage on Concrete
Steel Grade Y1770S7, Cross Section 150 mm²

Annex A2
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Dimensions and Properties of 7-wire Strands

Designation	Symbol	Unit	Value	
Tensile strength	R_m/F_{pk}	MPa	1770 or 1860	
Strand				
Nominal diameter	D	mm	15.3	15.7
Nominal cross section	A_p	mm ²	140	150
Nominal mass	M	g/m	1093	1172
Surface configuration	-	-	plain	
Strength at 0,1%	$f_{p0.1k}$	MPa	1520 or 1600*	
Strength at 0,2%	$f_{p0.2}$	MPa	1570 or 1660	
Modulus of elasticity	E	MPa	≈ 195,000	
Individual wires				
External wire diameter	d	mm	5.0 ± 0.04	5.2 ± 0.04
Core wire diameter	d'	mm	1.02 to 1.04 d	1.02 to 1.04 d

* If admissible in the place of use, strands with higher characteristic yield stresses might be used, but not more than $f_{p0.1k} = 1560$ MPa (Y1770S7) or 1640 MPa (Y1860S7).

As long as prEN 10138-3:2009-08 has not been adopted 7-wire strands in accordance with national provisions and with the characteristics given in the table above shall be used.

BBV Anchor Heads for Ground anchors with 2 to 31 strands

Product Description
Dimensions and Properties of 7-wire Strands

Annex A3

1 Intended use

1.1 General

Components corresponding to the annex A and the technical documentation of this European Technical Assessment, in which dimensions, material and material properties of the components with the allowed tolerances are indicated, shall be used. The technical documentation of this European Technical Assessment is deposited with Deutsches Institut für Bautechnik.

Concerning corrosion protection the requirements given in EN 1537:2014 have to be fulfilled, observing the standards and regulations in force at the place of use.

1.2 Anchor head

The anchor head must lie in full contact on a steel bearing plate. The anchor head shall be fixed by inserting the offset with the diameter A according to Annex A1 in the opening of the bearing plate with the hole diameter Di according to Annex A1. The static calculation of the steel bearing plate shall be in accordance with the technical regulations. The anchor head may be provided with holes for fixing an anchor cap and if applicable for filling the anchor head with corrosion protection mass, whose diameter and location is detailed on the deposited design drawings.

For restressing or releasing the anchor force, a threaded sleeve is used according to Annex A1, which is screwed onto the threaded anchor head and lifts the anchor head without loosening of the wedges. For this purpose, the screwed sleeve is raised with the stressing jack, which is supported on the abutment by a pressing chair. Resulting strain differences are balanced with the threaded sleeve. In this case, it can be adjusted via the blind holes, which are located at the sides of the threaded sleeve. The threaded anchor head can be extended to ensure sufficient screwing.

Between threaded sleeve and steel bearing plate, spacer plates (flat washers or pipe sections, divided into two parts, according to the documents deposited with the Deutsches Institut für Bautechnik), whose height corresponds to the displacement resulted from restressing or releasing, may also be inserted.

For this, the threaded anchor head is raised via a screwed threaded sleeve using a stressing jack, which is supported on the abutment by a stressing chair and, if necessary, spacer plates are removed or added.

Tendons can be restressed by releasing and re-using the wedges, if after restressing and anchoring, the wedge marks on strands resulting from first stressing are moved to the outside by at least 15 mm.

2 Methods of verification

2.1 Resistance to fatigue

With the fatigue test for the anchors carried out in accordance with ETAG 013, the stress range of 80 N/mm² of the strands at the maximum stress of 0,65 f_{pk} at 2×10⁶ load cycles was verified.

It has to be verified that the stress range at air side of the anchorage is lower than 0,7 of this value. Load cycles higher than 2×10⁶ are not verified.

2.2 Slip at the anchorages

The slip to be taken into account is 3 mm in the case of pre-wedging with 0.1 P_{m0}(x) and 6 mm without pre-wedging (the wedges shall be secured by securing caps).

BBV Anchor Heads for Ground anchors with 2 to 31 strands

Intended Use
Intended Use and Methods of Verification

Annex B
Page 1of 2

2.3 Load transfer in the structural concrete

The anchorages (including reinforcement) are verified by means of tests for the transfer of the prestressing forces to the structural concrete.

For the anchors which are subsequently patched on concrete according to Annex A2, if no uniformly distributed steel reinforcement orthogonal to the force direction at all sides with a minimum reinforcement ratio of $\rho_{w,\min} = 0.005$ can be assumed in the anchorage zone, the load transfer to the structure has to be verified separately. For adjacent bearing plates, the unfavourable influence of the superposition of concrete stresses due to the load transfer has to be taken into account. The bearing plates have constantly to rest even on the entire surface (outside of the core bore holes). The strength of the existing concrete has to be verified by material testing if necessary.

BBV Anchor Heads for Ground anchors with 2 to 31 strands

Intended Use
Intended Use and Methods of Verification

Annex B
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Material of Components

Designation	Material	Number	Standard
Anchorage			
Bearing Plate	deposited at DIBt		EN 10025-2:2005-04
Wedges	deposited at DIBt		
Anchor Head	deposited at DIBt		EN 10083-2:2006-10
Additional Reinforcement	ripped reinforcing steel $R_e \geq 500$ MPa		valid provisions at the place of use
Corrosion Protection Mass			
Vaseline FC 284 *)	deposited at DIBt		
Unigel 128F-1 *)	deposited at DIBt		
Nontribos MP-2	deposited at DIBt		

further details (e.g. minimum strength) of the components in deposited delivery conditions

*) according to the supplier's material composition deposited at the Deutsches Institut für Bautechnik, characteristic material properties shall comply with ETAG 013, Annex C.4.1 or C.4.2

BBV Anchor Heads for Ground anchors with 2 to 31 strands

Materials and References
Material of Components

Annex C1

Codes and References

- EN 1537:2014-07 Execution of special geotechnical works – Ground anchors
- prEN 10138-3:2009-08 Prestressing steels - Part 3: Strand
- EAD 160004-00-0301 Post-tensioning kits for prestressing of structures
- EN 10204:2005-01 Metallic products - Types of inspection documents
- EN 1997-1:2009-09 Geotechnical design – Part 1: General rules

BBV Anchor Heads for Ground anchors with 2 to 31 strands

Materials and References
Codes and References

Annex C2