

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-15/0551
of 29 January 2016

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Trade name of the construction product

Product family
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment
contains

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

Deutsches Institut für Bautechnik

Anchor Heads for Ground anchors

Anchor Heads for Post-Tensioning Systems

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13 pages including 9 annexes which form an integral part
of this assessment

Guideline for European technical approval of "Post-
tensioning kits for prestressing of structures", ETAG 013,
used as European Assessment Document (EAD)
according to Article 66 Paragraph 3 of Regulation (EU)
No 305/2011.

European Technical Assessment
ETA-15/0551
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Page 2 of 13 | 29 January 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:

Anchor heads for temporary ground anchors according to EN 1537:2014, observing the standards and regulations in force at the place of use. The use of EN 1537:2014 requires the consideration of EN 1997-1 with National Annex.

The Anchor heads can be used with 2 to 9 strands with a nominal tensile strength 1770 N/mm² or 1860 N/mm² (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 stands shall be used in accordance with national provisions with the characteristics given in Table 1.

Table 1: Dimensions and properties of 7-wire strands

Property	Symbol	Unit	Value	
Tensile strength	R _m	MPa	1770 oder 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 bis 1,04 d	1,02 bis 1,04 d

Only prestressing strands with very low relaxation shall be used.

1.3 Wedges

The strands are fixed separately with wedges considering of 2 parts (see Annex A) 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 A)

1.4 Anchor blocks

The dimension of the anchor blocks shall be in accordance with Annex A. To control the force in the anchor the anchor blocks can be added with an external thread according to the technical documentation.

The anchor blocks are marked with the letter "M" and a productioncode.

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.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the Anchor Head of at least 100 years. Limitation of working life according to EN 1537:2014 have to be fulfilled. The working life of the System depends on the corrosion protection system according to EN 1537:2014 (observing the standards and regulations in force at the place of use). The corrosion protection is not part of this ETA. 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
Resistance to static load	The PT system as described in the ETA meets the acceptance criteria of ETAG 013, Clause 6.1.1-I
Resistance to fatigue	The PT system as described in the ETA meets the acceptance criteria of ETAG 013, Clause 6.1.2-I *
Load Transfer to structure	Not relevant
Friction coefficient	Not relevant
Deviation/deflection (limits)	Not relevant

* Annex B, section 2.1 has to be noticed

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, Juni 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/EG].

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 29 January 2016 by Deutsches Institut für Bautechnik

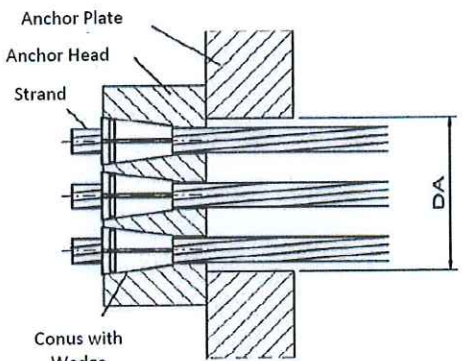
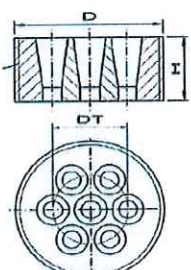
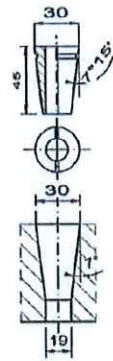
Uwe Bender
Head of Department

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Typ of Anchor Heads		M-3	M-4	M-5	M-7	M-9
Anchor Head Configuration						
Number of Strands (complete use)		3	4	5	7	9
Number of Strands (particular use)		3	2 With † marked conical bore-holes are not in use.	5	6 With † marked conical bore-holes are not in use. The conical bore-hole could be omitted.	8
Diameter D	mm	100	120	120	140	160
Thickness H	mm	55	60	65	65	70
Pitch Circle: Diameter DT	mm	40	54	60	70	92
external Thread ¹⁾		Tr100x6	Tr120x6	Tr120x6	Tr140x6	Tr160x6
Anchorplate:						
internal Diam. DA	mm	72	82	88	98	120

¹⁾ It's possible to use the anchor heads with an external thread, so a device for a technical verification can be fixed.

²⁾ The Evidence of the external Dimensions and Material, have to be calculated in every single case.

<p>Survey:</p> 	<p>Anchor heads:</p>  <p>The Anchor heads are marked with an "M" and a batchnumber on the front end.</p>	<p>Wedge ³⁾ and Conus:</p> 	<p>Strands:</p> <p>150 mm² (0,62") - St 1570/1770 - St 1660/1860</p> <p>for use with Wedge 0,62"</p> <hr/> <p>140 mm² (0,6") - St 1570/1770 - St 1660/1860</p> <p>for use with Wedge 0,6"</p>
<p>³⁾ The Ring Wedges are marked with an "M" and specification 0,6" e.g. 0,62" on the front end.</p>			

Anchor Heads for Ground anchors

Technical discription - Anchor heads and wedges

Annex A

1 Intended use Bewertung

1.1 General

Components correspond to the drawings and provisions given in this European Technical Assessment including the Annexes and in the technical documentation of this European Technical Assessment. The technical documentation of this European Technical Assessment is deposited with Deutsches Institut für Bautechnik.

Concerning to 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 block

The anchor block shall be in full contact to the anchor plate. The anchor block shall be located in the centre of the hole DA in the anchor plate. The static calculation of the anchor plate shall be in accordance with the technical regulations.

Tendons can be restressed by releasing and re-using the wedges. After restressing and anchoring, wedge marks on strands resulting from first stressing shall be 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 2×10^6 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 2×10^6 are not verified.

2.2 Slip at the anchorages

A slip at the anchorages of 6 mm shall be taken into account in the static calculation.

Anchor Heads for Ground anchors

Intended Use
Methods of verification

Annex B

1 Technical details of realization of the system of assessment and verification of constancy of performance and CE-marking

1.1 System of Verification and Assessment of Constancy of Performance

According to the decision 98/456/EC of the European Commission¹ System 1+ of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1+: declaration of conformity of the product by a notified body on the basis of:

- (a) Tasks for the manufacturer:
 - (1) Factory production control
 - (2) Further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan
- (b) Tasks for the notified body:
 - (3) Initial type-testing of the product
 - (4) Initial inspection of factory and of factory production control
 - (5) Continuous surveillance, assessment and assessment of factory production control
 - (6) Audit-testing of samples taken at the factory

1.2 Responsibilities

1.2.1 Tasks of the manufacturer

1.2.1.1 Factory production control

The kit manufacturer shall keep available an updated list of all components manufacturers. The list is provided to the notified body and to the Technical Assessment Body.

The kit manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the kit manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European Technical Assessment.

The kit manufacturer may only use initial materials stated in the technical documentation of this European Technical Assessment.

The factory production control shall be in accordance with the Control Plan of November 2015 relating to the European Technical Assessment ETA 15/0551 which is part of the technical documentation of this European Technical Assessment. The Control Plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.²

¹ Official Journal of the European Communities L 201/112 of 3 July 1998

² The "Control Plan" is a confidential part of the European Technical Assessment and only handed over to the notified notified bodies involved in the system of assessment and verification of constancy of performance. See section 1.2.2.

Anchor Heads for Ground anchors	Annex C1 Page 1/3
Technical details of realization of the system of assessment and verification of constancy of performance and CE-marking	

The basic elements of the Control Plan comply with ETAG 013, Annex E1.

The records shall contain at least the following information:

- Designation of the product or of the initial material and the components
- Kind of control or testing
- Date of manufacture and of testing of product or components and of initial material
- Results of controls and tests and, where specified, comparison with the requirements
- Name and signature of person responsible for the factory production control

The records shall be kept for at least ten years and on request they shall be presented to Deutsches Institut für Bautechnik.

If the test result is not satisfactory, the kit manufacturer shall take immediate measures to eliminate the deficiency. Construction products and components which do not comply with the requirements shall be handled such that they cannot be mistaken for products complying with the requirements. After elimination of the deficiency the relevant test shall be immediately repeated as far as is technically possible and necessary for verifying the deficiency elimination.

1.2.1.2 Declaration of performance and other tasks of manufacturer

The kit manufacturer shall, on the basis of a contract, involve a body which is notified for the tasks referred to in section 1.1 in the field of Post-Tensioning Kits for prestressing of Structures in order to undertake the actions laid down in section 1.2.2. For this purpose, the control plan referred to in sections 1.2.1.1 and 1.2.2 shall be handed over to the notified body involved by the manufacturer.

The kit manufacturer shall provide a certificate of constancy of performance by the notified body, stating that the construction product is in conformity with the provisions of the European Technical Assessment ETA-15/0551.

For the product a declaration of performance shall be drawn up. The producer can draw up a declaration of performance for the essential characteristics due to section 3 of this European Technical Assessment if the acceptance criteria due to ETAG 013 are fulfilled and the the certificate of constancy of performance of a notified body is available.

Specimens shall be taken from construction works currently in progress at least once a year on which one series of single tensile element test in accordance with ETAG 013, Annex E3 shall be performed. The results of these test series shall be made available to the notified body.

At least once a year, each components manufacturer shall be audited by the kit manufacturer (see ETAG 013, 8.2.1.1).

1.2.2 Tasks of the notified Body

1.2.2.1 General

The notified body shall perform the measures according to sections 1.2.2.2 to 1.2.2.5 and in accordance with the provisions laid down in the "Control Plan of 25 March 2010 relating to the European Technical Assessment ETA-15/0551".

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in written reports.

Anchor Heads for Ground anchors

Technical details of realization of the system of assessment and verification of constancy of performance and CE-marking

Annex C1
Page 2/3

The notified body involved by the kit manufacturer shall issue a certificate of constancy of performance of the product stating that all rules for the assessment and verification of constancy of performance and the performance named in the European Technical Assessment have to be due to System 1+ and stating compliance of the construction product with all applicable requirements.

In cases where the provisions of the European Technical Assessment and its "Control Plan" are no longer fulfilled the notified body shall withdraw the declaration of conformity and inform Deutsches Institut für Bautechnik without delay.

1.2.2.2 Initial type-testing

For initial type-testing the results of the tests performed as part of the assessment for the European Technical Assessment may be used unless there are changes in the production line or plant. In such cases the necessary initial type-testing has to be agreed between the Deutsches Institut für Bautechnik and the notified body involved.

1.2.2.3 Initial inspection of factory and of factory production control

The notified body shall ascertain that, in accordance with the "Control Plan", the factory, in particular the staff and equipment, and the factory production control are suitable to ensure a continuous and orderly manufacturing of the Post-Tensioning System with the specifications mentioned in section 1 of the Specific Part of the European Technical Assessment ETA-15/0551 as well as in the Annexes to the European Technical Assessment.

1.2.2.4 Continuous surveillance, assessment and assessment of factory production control

The notified body shall visit the factory at least once a year. Each factory of the components listed in Annex C2 shall be audited at least once in five years. It has to be verified that the system of factory production control and the specified manufacturing process are maintained taking account of the "Control Plan".

Continuous surveillance and assessment of factory production control have to be performed according to the control plan.

The results of product certification and continuous surveillance shall be made available on demand by the notified body to the Deutsches Institut für Bautechnik.

1.2.2.5 Audit-testing of samples taken at the kit manufacturer

During surveillance inspections the notified body shall take samples of components of the Post-Tensioning System for independent testing. For the most important components Annex C3 contains the minimum procedures which have to be performed by the notified body.

The basic elements of the Audit testing comply with ETAG 013, Annex E2 (see Annex C3).

1.3 CE marking

The CE marking shall be affixed on the delivery note. The letters "CE" shall be followed by the identification number of the notified body, if applicable, and be accompanied by the following additional information:

- The name or identifying mark of the kit manufacturer and of the production plant (legal entity responsible for the manufacture),
- The last two digits of the year in which the CE marking was affixed,

Anchor Heads for Ground anchors

Technical details of realization of the system of assessment and verification of constancy of performance and CE-marking

Annex C1
Page 3/3

- The number of the certificate of constancy of performance for the product,
- The number of the European Technical Assessment,
- The number of the Guideline for European Technical Approval,
- The identification of the product (trade name)
- The nominal cross sectional area and the characteristic value of tensile strength of the strands

CONTENT OF CONTROL PLAN

Component	Item	Test/Check	Traceability ⁴	Minimum frequency	Documentation
Anchor plate	material	check	bulk	100%	"2.2" ¹
	detailed dimensions ⁵	test		3% ≥2 specimen	yes
	visual inspection ³	check		100%	no
Anchor block	material	check	full	100%	"3.1" ²
	detailed dimensions ⁵	test		5% ≥2 specimen	yes
	visual inspection ³	check		100%	no
Wedge	material	check	full	100%	"3.1" ²
	treatment, hardness	test		0,5% ≥2 specimen	yes
	detailed dimensions ⁵	test		5% ≥2 specimen	yes
	visual inspection ³	check		100%	no
Tensile element strand ⁸	diameter	test	"CE"	each coil/bundle	no
	visual inspection ³	check		each coil/bundle	no

Continuation of Control Plan and footnotes see Annex C2 page 2/2

Anchor Heads for Ground anchors

Control Plan

Annex C2
Page 1/2

Component	Item	Test/Check	Traceability ⁴	Minimum frequency	Documentation
Constituents of filling material as per EN 447	cement	check	bulk	100%	yes
	admixtures, additions	check		100%	yes
Helix	material	check	full	100%	yes
	visual inspection ³	check		100%	no
Stirrups	material	check	full	100%	yes
	visual inspection ³	check		100%	no
Corrosion protection mass (grease)	material ⁷	check	full	100%	"CE"

All samples shall be randomly selected and clearly identified.

¹ "2.2": test report type "2.2" according to EN 10204

² "3.1": Inspection certificate type "3.1" according to EN 10204

³ Visual inspection means e.g.: Main dimensions, gauge testing, correct marking or labeling, surface, fins, kinks, smoothness, corrosion, coating etc. as given in the Control Plan

⁴ full: full traceability of each component to its raw material

bulk:: traceability of each delivery of components to a defined point

⁵ Detailed dimensions mean measuring of all dimensions and angles according to the specification as given in the Control Plan

⁶ Characteristic material properties see ETA, chapter 2.1.3

⁷ Grease according to an ETA based on ETAG 013, C.4.1 or according to national regulations valid at the place of use.

⁸ As long as the basis for CE marking for prestressing steel is not available, an approval or certificate according to the respective rules in force at the place of use shall accompany each delivery.

⁹ Certificate or confirmation given by supplier

Anchor Heads for Ground anchors

Control Plan

Annex C2
Page 2/2

AUDIT TESTING

Component	Item	Test/ Check	Sampling ³ – Number of components per audit
Anchor block, coupling block, anchor plate, multi surface anchor	material according to specification	check/ test	1
	detailed dimensions	test	1
	visual inspection ⁴	check	1
	treatment	test	
Wedge	material according to specification	check/ test	2
	treatment	test	2
	Detailed dimensions	test	1
	Main dimensions, surface hardness	test	5
	visual inspection ²	check	5
Single tensile element test	ETAG 013, Annex E.3	test	1 series

³ All samples shall be randomly selected and clearly identified.

⁴ Visual inspection means e.g.: Main dimensions, gauge testing, correct marking or labelling, appropriate performance, surface, fins, kinks, smoothness, corrosion, etc.as given in the Control Plan.

Anchor Heads for Ground anchors

Audit Testing

Annex C3

Codes and References

- EN 1537:2014-07 Execution of special geotechnical works – Ground anchors
- EN 10204:2005-01 Metallic products - Types of inspection documents
- ETAG 013:2002-06 Guideline for European Technical Approval of post-tensioning kits for prestressing of structures
- prEN 10138-3:2009 Prestressing steels - Part 3: Strand
- EN 1997-1 Geotechnical design – Part 1: General rules

Anchor Heads for Ground anchors	Annex D
Codes and References	