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Autorisé et notifié conformément à l'article 10 de la directive 89/106/EEC du Conseil, du 21 décembre 1988, relative au rapprochement des dispositions législatives, réglementaires et administratives des Etats membres concernant les produits de construction.

CSTB le futur en construction

MEMBRE DE L'EOTA

European Technical Approval ETA-99/0009

(English language translation, the original version is in French language)

Nom commercial : **Trade name:**	**Hilti HDA and HDA-R**
Titulaire : **Holder of approval:**	**Hilti AG, Business Unit Anchors** **FL-9494 SCHAAN** **Principality of Liechtenstein**
Type générique et utilisation prévue du produit de construction : **Generic type and use of construction product:**	Cheville métallique à verrouillage de forme par auto ancrage dans le béton, en acier galvanisé diamètres M10, M12, M16 et M20 et en acier inoxydable diamètres M10, M12 et M16. **Self-cutting undercut anchor, made of galvanised steel for use in concrete: sizes M10, M12, M16 and M20 and made of stainless steel for use in concrete: sizes M10, M12 and M16**
Validité du : au : **Validity from / to:**	**25/03/2013** **25/03/2018**
Usine de fabrication : **Manufacturing plant:**	**Hilti plants**
Le présent Agrément technique européen contient : **This European Technical Approval contains:**	26 pages incluant 18 annexes faisant partie intégrante du document. **26 pages including 18 annexes which form an integral part of the document.**

Cet Agrément Technique Européen remplace les ETA-99/0009 valide du 17.12.2010 au 25.03.2013

This European Technical Approval replaces ETA-99/0009 with validity from 17.12.2010 to 25.03.2013

I LEGAL BASES AND GENERAL CONDITIONS

1. This European Technical Approval is issued by the Centre Scientifique et Technique du Bâtiment in accordance with:

   - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by the Council Directive 93/68/EEC of 22 July 1993[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council [3];
   - Décret n° 92-647 du 8 juillet 1992[4] concernant l'aptitude à l'usage des produits de construction;
   - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC[5];
   - Guideline for European Technical Approval of « Metal Anchors for use in Concrete » ETAG 001, edition 1997, Part 1 « Anchors in general » and Part 3 « Undercut anchors ».

2. The Centre Scientifique et Technique du Bâtiment is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant (for example concerning the fulfilment of assumptions made in this European Technical Approval with regard to manufacturing). Nevertheless, the responsibility for the conformity of the products with the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.

3. This European Technical Approval is not to be transferred to manufacturers or agents of manufacturer other than those indicated on page 1; or manufacturing plants other than those indicated on page 1 of this European Technical Approval.

4. This European Technical Approval may be withdrawn by the Centre Scientifique et Technique du Bâtiment pursuant to Article 5 (1) of the Council Directive 89/106/EEC.

5. Reproduction of this European Technical Approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of the Centre Scientifique et Technique du Bâtiment. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.

6. The European Technical Approval is issued by the approval body in its official language. This version corresponds to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities n° L 40, 11.2.1989, p. 12
2 Official Journal of the European Communities n° L 220, 30.8.1993, p. 1
3 Official Journal of the European Union n° L 284, 31.10.2003, p. 25
4 Journal officiel de la République française du 14 juillet 1992
5 Official Journal of the European Communities n° L 17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of product

The HILTI HDA anchor in the range of M10 to M20 is a self-cutting undercut anchor made of galvanised steel. The HILTI HDA-R anchor in the range of M10 to M16 is a self-cutting undercut anchor made of stainless steel. Both are available as pre-setting (HDA-P and HDA-PR version) and as through-fastening anchor (HDA-T and HDA-TR version). They are placed into a hole drilled with a special stop drill bit and self-cutting undercut using a special setting tool. The nut is torque tightened to complete the fastening of the fixture.
For the installed anchor see Figures given in Annexes 1 and 2.

1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106/EEC shall be fulfilled and failure of anchorages made with these products would compromise the stability of the works, cause risk to human life and/or lead to considerable economic consequences. The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C 20/25 minimum to C50/60 maximum according to ENV 206-1: 2000-12. It may be anchored in cracked and non-cracked concrete.

The HDA-P and HDA-T anchors may only be used in concrete subject to dry internal conditions.

The HDA-PR and HDA-TR anchors may be used in concrete subject to dry internal conditions and also in concrete subject to external atmospheric exposure (including industrial and marine environment), or exposure in permanently damp internal conditions, if no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere or indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

The provisions made in this European Technical Approval are based on an assumed intended working life of the anchor of 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.

2 Characteristics of product and methods of verification

2.1 Characteristics of product

The anchor in the range of M10 to M20 corresponds to the drawings and provisions given in Annexes 1 to 5. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annexes 3 to 5 shall correspond to the respective values laid down in the technical documentation [6] of this European Technical Approval. The characteristic anchor values for the design of anchorages are given in Annexes 9 to 14. The special tools required to use this anchor are described in Annexes 15 to 16.

Each anchor is marked (stamped or printed) with the manufacturer's name, the commercial name, the version, the special stepped drill bit nominal diameter, the nominal diameter of the thread, the effective embedment depth and the maximum thickness of the fixture according to Annex 3.
On the threaded part of the bolt, a small non-threaded coloured ring marking identifies the complete expansion of the sleeve. A letter code corresponding to the total length of the bolt is punched on the head of the bolt.

The anchor shall only be packaged and supplied as a complete unit.

2.2 Methods of verification

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 has been made in accordance with the « Guideline for European Technical Approval of Metal Anchors for use in Concrete », Part 1 « Anchors in general » and Part 3 « Undercut anchors », on the basis of Option 1.

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3 Evaluation of Conformity and CE marking

3.1 Attestation of conformity system

The system of attestation of conformity 2 (i) (referred to as system 1) according to Council Directive 89/106/EEC Annex III laid down by the European Commission provides:

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 approved body:
   3. initial type-testing of the product,
   4. initial inspection of factory and of factory production control,
   5. continuous surveillance, assessment and approval of factory production control.

[6] The technical documentation of this European Technical Approval is deposited at the Centre Scientifique et Technique du Bâtiment and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

The manufacturer shall have a factory production control system in the plant and shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the product is in conformity with the European Technical Approval.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the prescribed test plan[7]. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Check of incoming materials such as nuts, washers, wire for bolts and sleeves shall include control of the inspection documents presented by suppliers (comparison with nominal values) by verifying dimension and determining material properties.

The manufactured components of the anchor shall be subjected to the following tests:

- Dimensions of component parts:
  bolt (diameters, lengths, thread and ring marking, geometry of the cone);
  sleeve (lengths, internal and external diameters, geometry of the expansion part, cutting edge);
  plastic ring (diameters, thickness);
  hexagonal nut (proper running, wrench size across flats);
  washer (diameters, thickness).
- Material properties:
  bolt (ultimate tensile strength),
  sleeve (ultimate tensile strength),
  plastic ring (material composition),
  hexagonal nut (proof load), washer (hardness).
- Thickness of the galvanised treatment of the elements.
- Visual control of correct assembly and of completeness of the anchor.

The frequency of controls and tests conducted during production and on the assembled anchor is laid down in the prescribed test plan taking account of the automated manufacturing process of the anchor.

The results of factory production control are recorded and evaluated.

The records shall be presented to the inspection body during the continuous surveillance. On request, they shall be presented to the Centre Scientifique et Technique du Bâtiment.

Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the prescribed test plan which is part of the technical documentation of this European Technical Approval.

3.2.1. 2 Other tasks of the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved. The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

[7] The prescribed test plan has been deposited at the Centre Scientifique et Technique du Bâtiment and is only made available to the approved bodies involved in the conformity attestation procedure.

3.2.2 Tasks of approved bodies

3.2.2.1 Initial type-testing of the product

For initial type-testing the results of the tests performed as part of the assessment for the European Technical Approval shall 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 Centre Scientifique et Technique du Bâtiment and the approved bodies involved.

3.2.2.2 Initial inspection of factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed test plan, the factory and the factory production control are suitable to ensure continuous and orderly manufacturing of the anchor according to the specifications mentioned in 2.1. as well as to the Annexes to the European Technical Approval.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.

3.2.2.3 Continuous surveillance

The approved certification body involved by the manufacturer shall visit the factory at least once a year for regular inspection. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking account of the prescribed test plan.

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

The results of product certification and continuous surveillance shall be made available on demand by the certification body or inspection body, respectively, to the Centre Scientifique et Technique du Bâtiment. In cases where the provisions of the European Technical Approval and the prescribed test plan are no longer fulfilled the conformity certificate shall be withdrawn and CSTB informed without delay.

3.3 CE-Marking

The CE marking shall be affixed on each packaging of anchors. The symbol « CE » shall be accompanied by the following information:

- Commercial name;
- Name or identifying mark of the producer and manufacturing plant;
- Name of approval body and ETA number;
- Identification number of the certification body;
- Number of the EC certificate of conformity;
- Use category (ETAG 001-1 Option 1);
- The last two digits of the year in which the CE-marking was affixed;
- Size.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The anchor is manufactured in accordance with the provisions of the European Technical Approval using the automated manufacturing process as identified during inspection of the plant by the Centre Scientifique et Technique du Bâtiment and the approved body and laid down in the technical documentation. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to the Centre Scientifique et Technique du Bâtiment before the changes are introduced. The Centre Scientifique et Technique du Bâtiment will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

4.2 Installation

4.2.1 Design of anchorages

The fitness of the anchors for the intended use is given under the following conditions:

- The anchorages are designed in accordance with the « Guideline for European Technical Approval of Metal Anchors for Use in Concrete », Annex C, Method A, for undercut anchors under the responsibility of an engineer experienced in anchorages and concrete work.
- For concrete cone failure, the initial value of the characteristic resistance of an HDA anchor placed in cracked concrete is obtained by: $N^{0}_{Rk,c} = 8{,}3 . \sqrt{f_{ck,\,cube}} . h_{ef}{}^{1,5}$ instead of equation (5.2a) in Annex C, §5.2.2.4.
- 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 support, etc.).

4.2.2 Installation of anchors

The fitness for use of the anchor can only be assumed if the anchor is installed as follows:

1) anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on the site;
2) use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor;
3) anchor installation in accordance with the manufacturer's specifications and drawings prepared for that purpose and using the appropriate special tools (hammer drill, setting tool, stop drill bit, centering washer if needed);
4) thickness of the fixture corresponding to the range of required thickness values for the type of anchor;.
5) checks before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply;
6) check of concrete being well compacted, e.g. without significant voids;
7) cleaning the hole of drilling dust;
8) anchor installation ensuring the specified embedment depth using the special required stop drill bit;
9) anchor installation ensuring complete expansion of the sleeve with checking that the non-threaded coloured ring marking on the bolt is visible above the top edge of the anchor sleeve; therefore it is required using the special setting tool, that is the appropriate depth ring marking of the setting tool at least flush with the concrete surface (pre-setting) respecting with the fixture surface (through-fastening).

10) anchor installation ensuring complete shear load capacity, the recess of the top edge of the sleeve respecting with the concrete surface (pre-setting) or with surface of the fixture (through-fastening) has to be in the specified range according to Annex 8; the use of a centering washer (see Annex 3) ensures the shear load capacity for HDA-T anchors with the minimum fixture thickness according Annex 12 and/or Annex 13;
11) keeping of the edge distance and spacing to the specified values without minus tolerances;
12) positioning of the drill holes and the undercut without damaging the reinforcement;
13) 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 to the anchor in the direction of load application;
14) application of the torque moment given in using a calibrated torque wrench.

4.2.3 Responsibility of the manufacturer

It is the manufacturer's responsibility to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to as well as in sections 4.2.1. and 4.2.2. is given to those who are concerned. This information may be made by reproduction of the respective parts of the European Technical Approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

The minimum data required are:

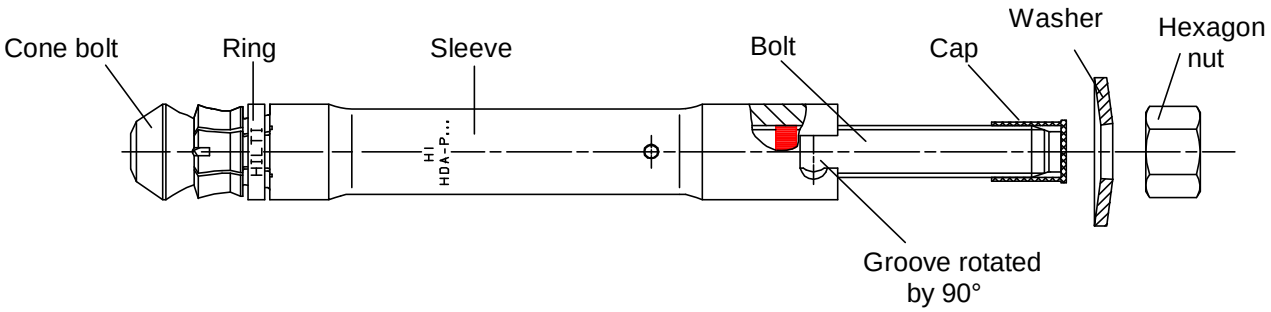
- drill bit diameter,
- thread diameter,
- maximum thickness of the fixture,
- required installation and hole depth,
- required torque moment,
- information on the installation procedure, including cleaning of the hole, preferably by means of an illustration,
- reference to any special installation equipment needed,
- identification of the manufacturing batch.

All data shall be presented in a clear and explicit form.

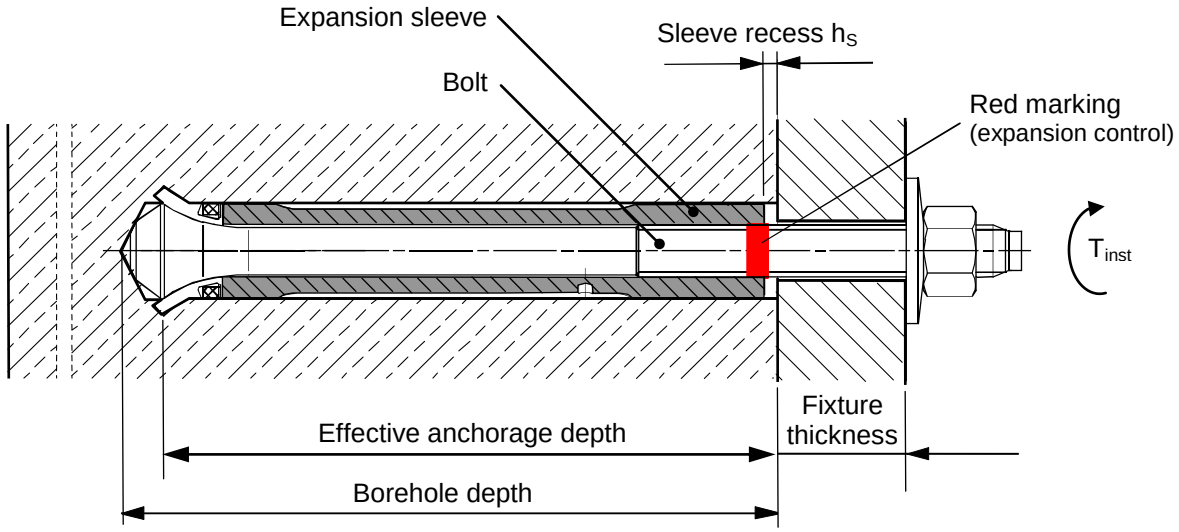
The original French version is signed by

Le Directeur Technique
C. BALOCHE

Pre-setting anchor HDA-P and HDA-PR (Prepositioning)



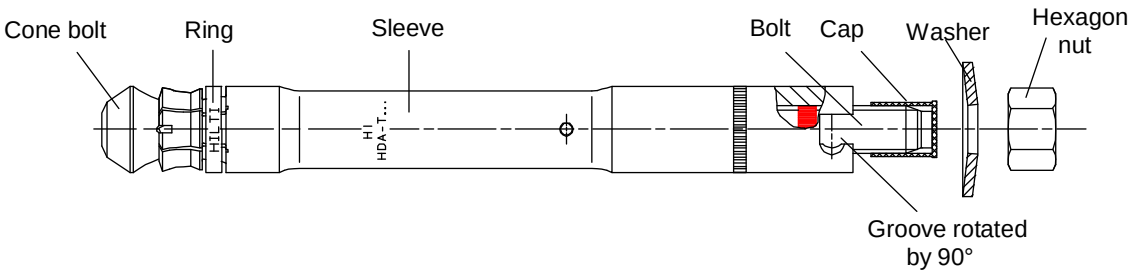
Pre-setting anchor HDA-P and HDA-PR (Prepositioning)



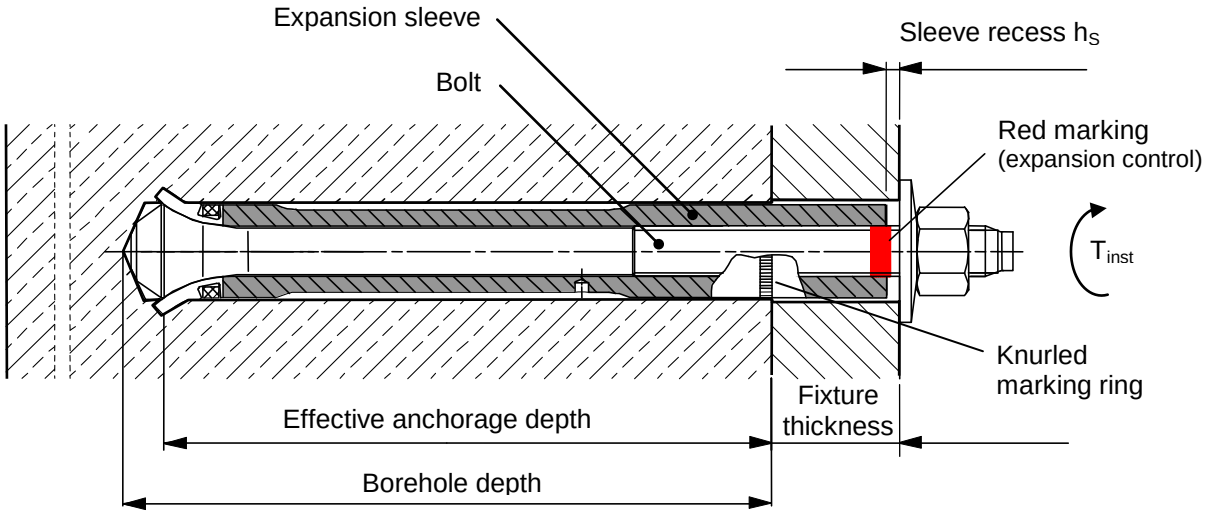
Intended use:
HDA-P for use in cracked or non-cracked concrete in dry internal conditions only
HDA-PR for use in cracked or non-cracked concrete (any conditions but very aggressive)

Hilti Design Anchor HDA	**Annex 1**
HDA-P and HDA-PR **Product and intended use**	of European Technical Approval **ETA-99/0009**

Through-fastening anchor HDA-T and HDA-TR (Postpositioning)



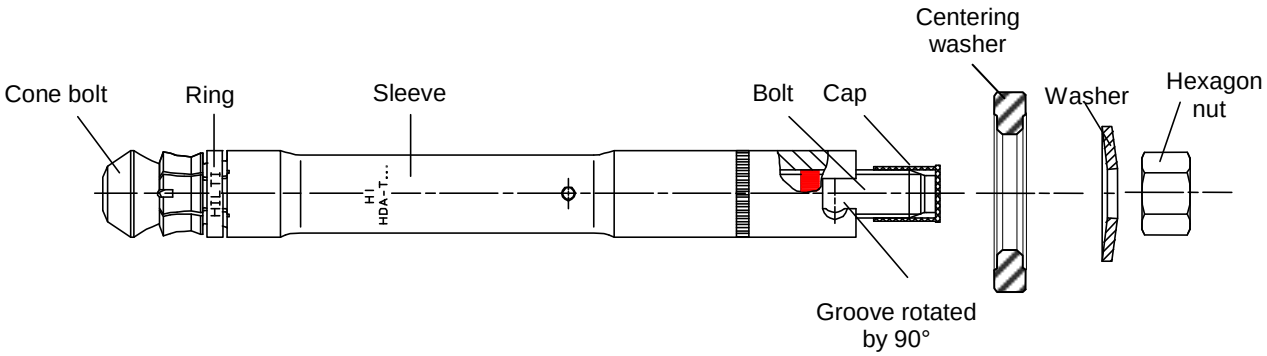
Through-fastening anchor HDA-T and HDA-TR (Postpositioning)



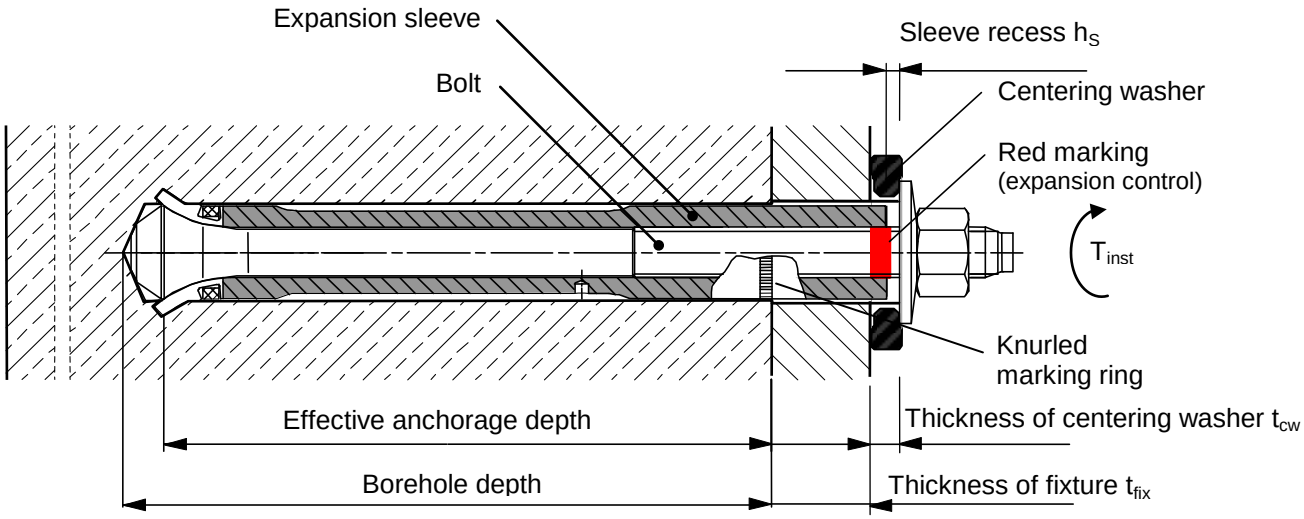
Intended use:
HDA-T for use in cracked or non-cracked concrete in dry internal conditions only
HDA-TR for use in cracked or non-cracked concrete (any conditions but very aggressive, see 1.2)

Hilti Design Anchor HDA	**Annex 2**
HDA-T and HDA-TR **Product and intended use**	of European Technical Approval **ETA-99/0009**

Through-fastening anchor HDA-T and HDA-TR with centering washer (Postpositioning)



Through-fastening anchor HDA-T and HDA-TR with centering washer (Postpositioning)



The maximum fastenable thickness $t_{fix,max}$ (see Table 2, Annex 6) is kept if following equation is fulfilled:

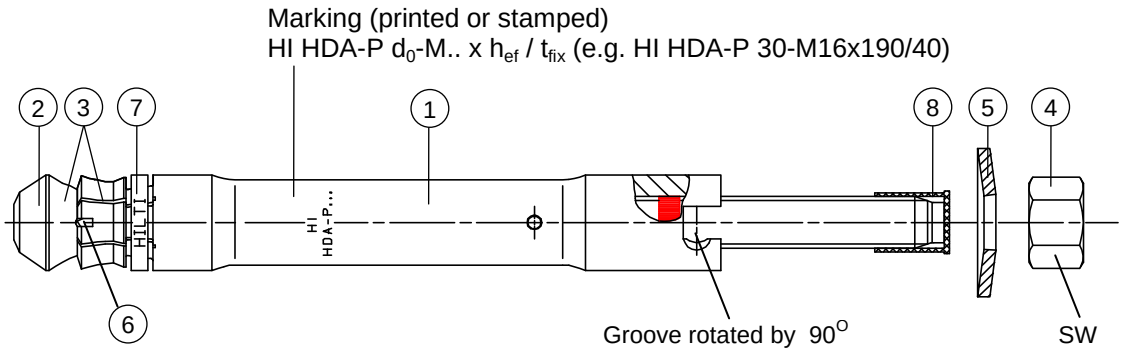
$$t_{fix,max} \geq t_{fix} + t_{cw}$$

with:
t_{fix} … thickness of the fixture
t_{cw} … thickness of the centering washer (5mm for all sizes)

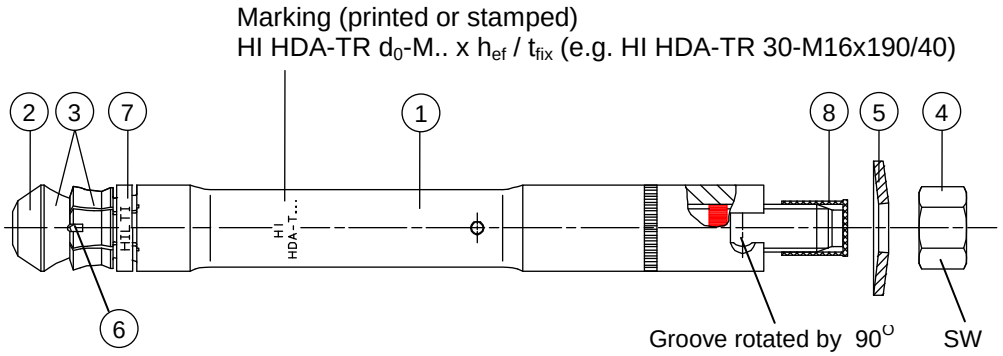
Nota: The centering washer must be used for the drilling of the hole to ensure the proper embedment depth.

Hilti Design Anchor HDA	**Annex 3**
HDA-T and HDA-TR with centering washer **Product and intended use**	of European Technical Approval **ETA-99/0009**

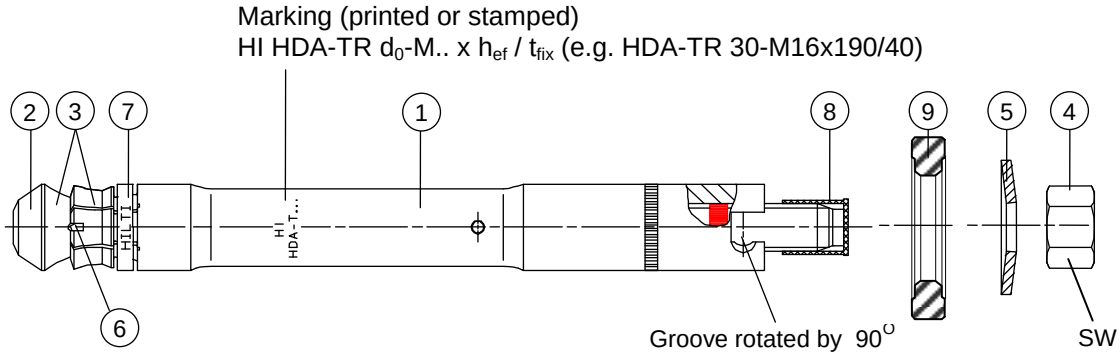
Pre-setting anchor HDA-P and HDA-PR (Prepositioning)



Through-fastening anchor HDA-T and HDA-TR (Postpositioning)



Through-fastening anchor HDA-T and HDA-TR with centering washer (Postpositioning)



Hilti Design Anchor HDA	**Annex 4**
Material of anchor	of European Technical Approval **ETA-99/0009**

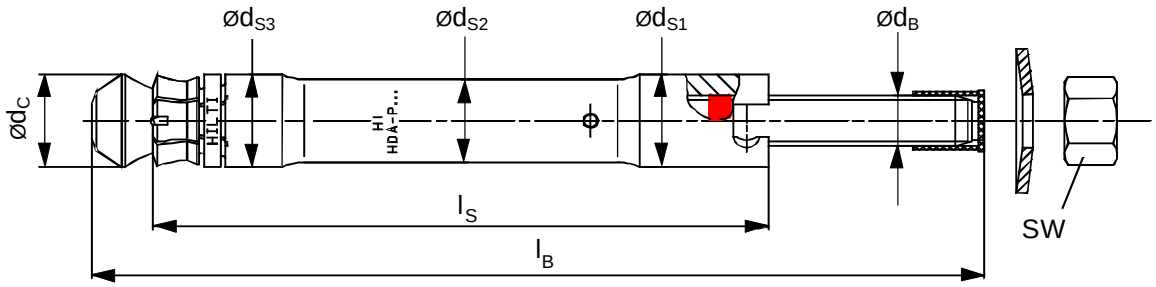
Table 1a: Materials HDA-P and HDA-T

Part	Designation	HDA-P / HDA-T (galvanized ≥5μm)
1	Sleeve	Machined carbon steel with brazed tungsten carbide tips
2	Bolt	M10 - M16: Cold formed steel, steel strength 8.8 M20: Cone machined, rod steel strength 8.8
3	Coating of bolt and sleeve	Galvanized 5-25μm
4	Hexagon nut	M10 - M16: Class 8, h=1*d, galvanized M20: Class 8, galvanized
5	Washer	M10 - M16: Spring washer, galvanized or coated M20: washer, galvanized
6	Cutting edges	Tungsten carbide
7	Ring	Plastic ring
8	Cap	Plastic cap
9	Centering washer	Machined steel

Table 1b: Materials HDA-PR and HDA-TR

Part	Designation	HDA-PR / HDA-TR
1	Sleeve	Machined stainless steel 1.4401, 1.4404, or 1.4571 with brazed tungsten carbide tips
2	Bolt	Rod: machined stainless steel 1.4401, 1.4404 or 1.4571 Cone: machined stainless steel 1.4401, 1.4404 or 1.4571
3	Coating of cone	Hardchrome > 10 μm
4	Hexagon nut	Grade A4-80, h=1*d
5	Washer	Spring washer stainless steel
6	Cutting edges	Tungsten carbide
7	Ring	Plastic ring
8	Cap	Plastic cap
9	Centering washer	Machined stainless steel, 1.4401

Pre-setting anchor HDA-P and HDA-PR (Prepositioning)



Through-fastening anchor HDA-T and HDA-TR (Postpositioning)

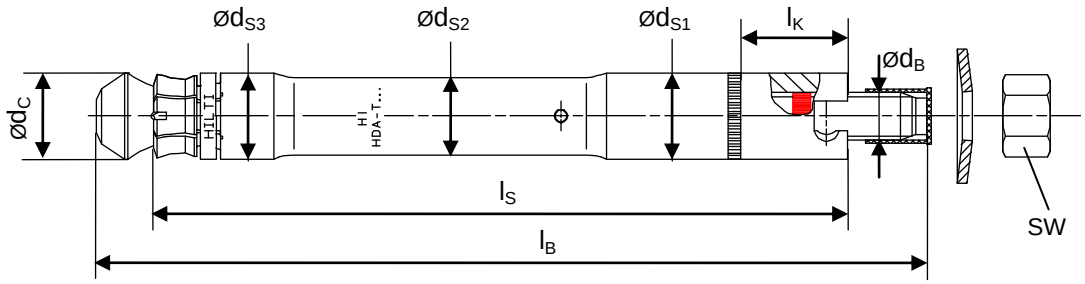


Table 2: Anchor Dimensions

Anchor type	t_{fix} [1)] min-max [mm]	l_B [mm]	**Length code letter**	l_S [mm]	l_k [mm]	**SW**	d_{S1} [mm]	d_{S2} [mm]	d_{S3} [mm]	d_C [mm]	d_B [mm]
HDA-P(R) 20-M10x100/20	0 - 20	150	I	100	-	17	19	16,8	18,5	19,5	10
HDA-T(R) 20-M10x100/20	10 - 20	150	I	120	17	17	19	16,8	18,5	19,5	10
HDA-P(R) 22-M12x125/30	0 - 30	190	L	125	-	19	21	18,8	20,5	21,4	12
HDA-P(R) 22-M12x125/50	0 - 50	210	N	125	-	19	21	18,8	20,5	21,4	12
HDA-T(R) 22-M12x125/30	10 - 30	190	L	155	27	19	21	18,8	20,5	21,4	12
HDA-T(R) 22-M12x125/50	10 - 50	210	N	175	47	19	21	18,8	20,5	21,4	12
HDA-P(R) 30-M16x190/40	0 - 40	275	R	190	-	24	29	26	29	29	16
HDA-P(R) 30-M16x190/60	0 - 60	295	S	190	-	24	29	26	29	29	16
HDA-T(R) 30-M16x190/40	15 - 40	275	R	230	35,5	24	29	26	29	29	16
HDA-T(R) 30-M16x190/60	15 - 60	295	S	250	55,5	24	29	26	29	29	16
HDA-P 37-M20x250/50	0 - 50	360	V	250	-	30	35	32	35	36	20
HDA-P 37-M20x250/100	0 - 100	410	X	250	-	30	35	32	35	36	20
HDA-T 37-M20x250/50	20 - 50	360	V	300	45	30	35	32	35	36	20
HDA-T 37-M20x250/100	50 - 100	410	X	350	95	30	35	32	35	36	20

[1)] first value: $t_{fix,min}$ minimum fastenable thickness for pure tension load (shear load see Table 9a and Table 9b)
second value: $t_{fix,max}$ maximum fastenable thickness

Hilti Design Anchor HDA	**Annex 6**
HDA-P, HDA-PR, HDA-T and HDA-TR **Dimensions of anchor**	of European Technical Approval **ETA-99/0009**

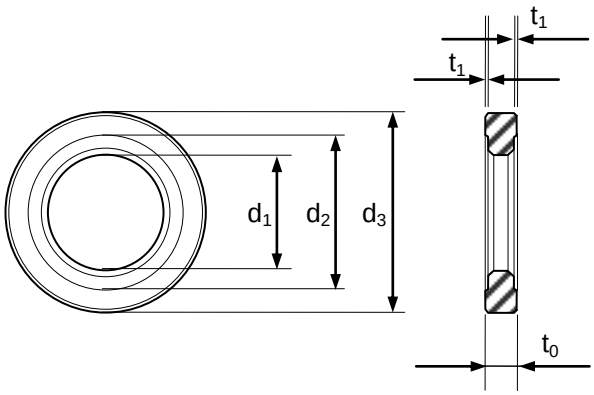
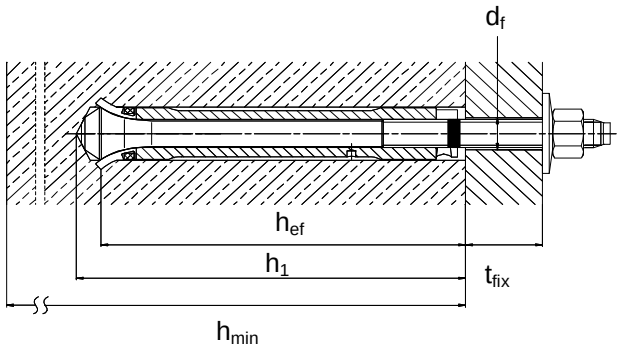


Table 3: Dimensions of centering washer

Centering washer	t_{CW} [1)] [mm]	t_0 [mm]	t_1 [mm]	d_1 [mm]	d_2 [mm]	d_3 [mm]	Anchor type
HDA-F-CW 5-M10	5	5,5	0,5	21	28	36	HDA-T 20-M10x100/20
HDA-F-CW 5-M12	5	5,5	0,5	23	33	42	HDA-T 22-M12x125/30 HDA-T 22-M12x125/50
HDA-F-CW 5-M16	5	5,5	0,5	32	46	56	HDA-T 30-M16x190/40 HDA-T 30-M16x190/60
HDA-F-CW 5-M20	5	5,5	0,5	40	50	62	HDA-T 37-M20x250/50
HDA-R-CW 5-M10	5	5,5	0,5	21	28	36	HDA-TR 20-M10x100/20
HDA-R-CW 5-M12	5	5,5	0,5	23	33	42	HDA-TR 22-M12x125/30 HDA-TR 22-M12x125/50
HDA-R-CW 5-M16	5	5,5	0,5	32	46	56	HDA-TR 30-M16x190/40 HDA-TR 30-M16x190/60

[1)] effective thickness of centering washer

Pre-setting anchor
HDA-P (Prepositioning)



Through-fastening anchor
HDA-T (Postpositioning)

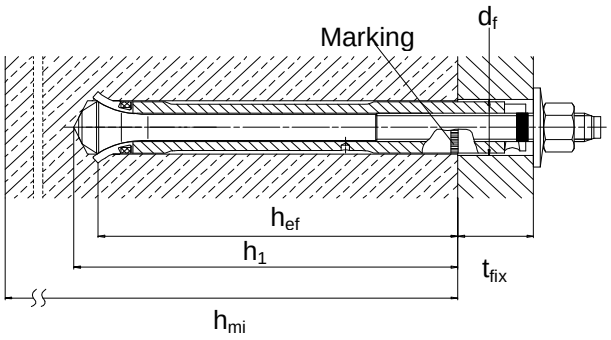


Table 4: Characteristic values of anchors and installation

Anchor type		**HDA M10**		**HDA M12**		**HDA M16**		**HDA M20**	
Pre-setting/Through-setting		**P(R)**	**T(R)**	**P(R)**	**T(R)**	**P(R)**	**T(R)**	**P**	**T**
Nominal diameter of drill bit	d_0 [mm]	20		22		30		37	
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	20,55		22,55		30,55		37,70	
Depth of drill hole	h_1 [mm]	107	≥107	133	≥133	203	≥203	266	≥266
Diameter of clearance hole in the fixture	d_f [mm]	12	21	14	23	18	32	22	40
Minimum fixture thickness	$t_{fix,min}$ [mm]	0	10	0	10	0	15	0	20
Sleeve recess[1)]	h_S [mm]	$2 \leq h_S \leq 6$		$2 \leq h_S \leq 7$		$2 \leq h_S \leq 8$		$2 \leq h_S \leq 8$	
Installation torque	T_{inst} [Nm]	50		80		120		300	

[1)] sleeve recess after setting of the anchor
a) Pre-setting anchor HDA-P(R):
distance from surface of the concrete member to top edge of the anchor sleeve, see Annex 1
b) Through-fastening anchor HDA-T(R):
distance from top edge of the fixture to top edge of the anchor sleeve, see Annex 2 and Annex 3

Hilti Design Anchor HDA	**Annex 8**
Installation data	of European Technical Approval **ETA-99/0009**

Table 5a: Minimum thickness of concrete member, HDA-P and HDA-PR

Anchor type			**HDA-P M10 HDA-PR M10**	**HDA-P M12 HDA-PR M12**	**HDA-P M16 HDA-PR M16**	**HDA-P M20 HDA-PR M20**
Minimum thickness of concrete member	h_{min}	[mm]	180	200	270	350

Table 5b: Minimum thickness of concrete member, HDA-T and HDA-TR

Anchor type			**HDA-T M10 HDA-TR M10**	**HDA-T M12 HDA-TR M12**		**HDA-T M16 HDA-TR M16**		**HDA-T M20**	
Maximum fastenable thickness	$t_{fix,max}$ [1]	[mm]	20	30	50	40	60	50	100
Minimum thickness of concrete member	h_{min} [2]	[mm]	200-t_{fix}	230-t_{fix}	250-t_{fix}	310-t_{fix}	330-t_{fix}	400-t_{fix}	450-t_{fix}

[1] $t_{fix,max}$ maximum fastenable thickness, see Table 2,

[2] h_{min} is dependent on the actual fixture thickness t_{fix} (use of a stop drill bit)
e.g. HDA-T 22-M12x125/50 : t_{fix} = 20mm → h_{min} = 250-20 = 230mm
t_{fix} = 50mm → h_{min} = 250-50 = 200mm

Table 6: Minimum spacing and minimum edge distances of anchors

HDA-P(R) / HDA-T(R)			**M10**	**M12**	**M16**	**M20**
Cracked concrete						
Minimum spacing[1]	s_{min}	[mm]	100	125	190	250
Minimum edge distance[2]	c_{min}	[mm]	80	100	150	200
Non-cracked concrete						
Minimum spacing[1]	s_{min}	[mm]	100	125	190	250
Minimum edge distance[2]	c_{min}	[mm]	80	100	150	200

[1] ratio s_{min} / h_{ef} = 1,0

[2] ratio c_{min} / h_{ef} = 0,8

Table 7a: Characteristic values of resistance to tension loads of design method A, HDA-P and HDA-T

HDA-P / HDA-T			**M10**	**M12**	**M16**	**M20**
Steel failure						
Characteristic resistance	$N_{Rk,s}$	[kN]	**46**	**67**	**126**	**192**
Partial safety factor	γ_{Ms} [1)]		1,5			
Pull-out failure [2)]						
Characteristic resistance in cracked concrete only C20/25	$N_{Rk,p}$	[kN]	**25**	**35**	**75**	**95**
Partial safety factor in cracked concrete only	γ_{Mp} [1)]		1,5 [3)]			
Increasing factors for $N_{Rk,p}$ for cracked concrete only	ψ_c	C30/37	1,22			
		C40/50	1,41			
		C50/60	1,55			
Concrete cone failure and splitting failure [4)]						
Effective anchorage depth	h_{ef}	[mm]	100	125	190	250
Partial safety factor in cracked and non cracked concrete	γ_{Mc} [1)]		1,5 [3)]			
Spacing	$s_{cr,N}$	[mm]	300	375	570	750
Edge distance	$c_{cr,N}$	[mm]	150	190	285	375
Spacing	$s_{cr,sp}$	[mm]	300	375	570	750
Edge distance	$c_{cr,sp}$	[mm]	150	190	285	375

[1)] In absence of national regulations.

[2)] The pull-out failure mode is not decisive in non-cracked concrete; it does not have to be calculated by the designer.

[3)] Partial safety factor γ_2 = 1,0 is included.

[4)] For concrete cone failure, the initial value of the characteristic resistance of an HDA anchor placed in cracked concrete is obtained by: $N^0_{Rk,c} = 8{,}3 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1,5}$ instead of equation (5.2a) in ETAG 001 Annex C, § 5.2.2.4.

Table 8a: Displacements under tension loads, HDA-P and HDA-T

HDA-P / HDA-T			**M10**	**M12**	**M16**	**M20**
Tension load in C20/25 to C50/60 cracked concrete		[kN]	**11,9**	**16,7**	**35,7**	**45,2**
Displacement	δ_{N0}	[mm]	0,1	0,8	2,1	2,1
	$\delta_{N\infty}$	[mm]	1,3	1,3	2,1	2,1
Tension load in C20/25 to C50/60 non-cracked concrete		[kN]	**21,9**	**31,9**	**60,0**	**91,4**
Displacement	δ_{N0}	[mm]	0,4	0,8	1,7	2,4
	$\delta_{N\infty}$	[mm]	1,3	1,3	1,7	2,4

Table 7b: Characteristic values of resistance to tension loads of design method A: HDA-PR and HDA-TR

HDA-PR / HDA-TR			M10	M12	M16
Steel failure					
Characteristic resistance	$N_{Rk,s}$	[kN]	**46**	**67**	**126**
Partial safety factor	γ_{Ms} [1)]		1,60		
Pull-out failure [2)]					
Characteristic resistance in cracked concrete only C20/25	$N_{Rk,p}$	[kN]	**25**	**35**	**75**
Partial safety factor in cracked concrete only	γ_{Mp} [1)]		1,5 [3)]		
Increasing factors for $N_{Rk,p}$ for cracked concrete only	ψ_c	C30/37	1,22		
		C40/50	1,41		
		C50/60	1,55		
Concrete cone failure and splitting failure [4)]					
Effective anchorage depth	h_{ef}	[mm]	100	125	190
Partial safety factor in cracked and non cracked concrete	γ_{Mc} [1)]		1,5 [3)]		
Spacing	$s_{cr,N}$	[mm]	300	375	570
Edge distance	$c_{cr,N}$	[mm]	150	190	285
Spacing	$s_{cr,sp}$	[mm]	300	375	570
Edge distance	$c_{cr,sp}$	[mm]	150	190	285

[1)] In absence of national regulations.

[2)] The pull-out failure mode is not decisive in non-cracked concrete; it does not have to be calculated by the designer.

[3)] Partial safety factor γ_2 = 1,0 is included.

[4)] For concrete cone failure, the initial value of the characteristic resistance of an HDA anchor placed in cracked concrete is obtained by: $N^0_{Rk,c} = 8{,}3 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1,5}$ instead of equation (5.2a) in ETAG 001 Annex C, § 5.2.2.4.

Table 8b: Displacements under tension loads, HDA-PR and HDA-TR

HDA-PR / HDA-TR			M10	M12	M16
Tension load in C20/25 to C50/60 cracked concrete		[kN]	**11,9**	**16,7**	**35,7**
Displacement	δ_{N0}	[mm]	0,8	0,9	1,6
	$\delta_{N\infty}$	[mm]	1,3	1,3	2,1
Tension load in C20/25 to C50/60 non-cracked concrete		[kN]	**20,5**	**29,9**	**56,3**
Displacement	δ_{N0}	[mm]	1,4	1,1	1,7
	$\delta_{N\infty}$	[mm]	1,4	1,1	1,7

Table 9a: Characteristic values of resistance to shear loads of design method A: HDA-P and HDA-T

HDA-P		**M10**	**M12**	**M16**	**M20**
Steel failure without lever arm					
Characteristic resistance	$V_{Rk,s}$ [kN]	**22**	**30**	**62**	**92**
Partial safety factor	γ_{Ms} [1)]	1,25	1,25	1,25	1,25
Steel failure with lever arm					
Distance according ETAG 001, Annex C, § 4.2.2.3	a_3 [mm]	8	10	13	15
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	**60**	**105**	**266**	**519**
Partial safety factor	γ_{Ms} [1)]	1,25	1,25	1,25	1,25

HDA-T		**M10**		**M12**			**M16**					**M20**			
Steel failure without lever arm															
Characteristic resistance	for t_{fix} [mm]	10 ≤ < 15	15 ≤ ≤ 20	10 ≤ < 15	15 ≤ < 20	20 ≤ ≤ 50	15 ≤ < 20	20 ≤ < 25	20 ≤ < 30	30 ≤ < 35	35 ≤ ≤ 60	20 ≤ < 25	25 ≤ < 40	40 ≤ < 55	55 ≤ ≤100
	$V_{Rk,s}$ [kN]	**65**[2)]	**70**	**80**[2)]	**80**	**100**	**140**[2)]	**140**	**155**	**170**	**190**	**205**[2)]	**205**	**235**	**250**
Partial safety factor	γ_{Ms} [1)]	1,5		1,5			1,5					1,5			
Steel failure with lever arm															
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	**60**		**105**			**266**					**519**			
Partial safety factor	γ_{Ms} [1)]	1,25		1,25			1,25					1,25			

HDA-P / HDA-T		**M10**	**M12**	**M16**	**M20**
Concrete pryout failure					
Factor in equation (5.6) according ETAG 001, Annex C, § 5.2.3.3.	k	2,0	2,0	2,0	2,0
Partial safety factor	γ_{Mc} [1)]	1,5[3)]	1,5[3)]	1,5[3)]	1,5[3)]
Concrete edge failure					
Effective length of anchor in shear loading	l_f [mm]	70	88	90	120
External diameter of anchor	d_{nom} [mm]	19	21	29	35
Partial safety factor	γ_{Mc} [1)]	1,5[3)]	1,5[3)]	1,5[3)]	1,5[3)]

[1)] In absence of national regulations.

[2)] only with use of centering washer, t_{fix} = thickness of the base plate without thickness of the centering washer, see Annex 3

[3)] Partial safety factor γ_2 = 1,0 is included.

Table 9b: Characteristic values of resistance to shear loads of design method A: HDA-PR and HDA-TR

HDA-PR		**M10**	**M12**	**M16**
Steel failure without lever arm				
Characteristic resistance	$V_{Rk,s}$ [kN]	**23**	**34**	**63**
Partial safety factor	γ_{Ms} [1)]	1,33	1,33	1,33
Steel failure with lever arm				
Distance according ETAG 001 (Annex C, § 4.2.2.3)	a_3 [mm]	8	10	13
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	**60**	**105**	**266**
Partial safety factor	γ_{Ms} [1)]	1,33	1,33	1,33

HDA-TR		**M10**		**M12**				**M16**			
Steel failure without lever arm											
Characteristic resistance	for t_{fix} [mm]	10 ≤ < 15	15 ≤ ≤ 20	10 ≤ < 15	15 ≤ < 20	20 ≤ < 30	30 ≤ ≤ 50	15 ≤ < 20	20 ≤ < 25	20 ≤ < 35	35≤ ≤ 60
	$V_{Rk,s}$ [kN]	**71**[2)]	**71**	**87**[2)]	**87**	**94**	**109**	**152**[2)]	**152**	**158**	**170**
Partial safety factor	γ_{Ms} [1)]	1,33		1,33				1,33			
Steel failure with lever arm											
Characteristic resistance	$M^0_{Rk,s}$ [Nm]	**60**		**105**				**266**			
Partial safety factor	γ_{Ms} [1)]	1,33		1,33				1,33			

HDA-PR / HDA-TR		**M10**	**M12**	**M16**
Concrete pryout failure				
Factor in equation (5.6) according ETAG 001 (Annex C, § 5.2.3.3.)	k	2,0	2,0	2,0
Partial safety factor	γ_{Mc} [1)]	1,5[3)]	1,5[3)]	1,5[3)]
Concrete edge failure				
Effective length of anchor in shear loading	l_f [mm]	70	88	90
External diameter of anchor	d_{nom} [mm]	19	21	29
Partial safety factor	γ_{Mc} [1)]	1,5[3)]	1,5[3)]	1,5[3)]

[1)] In absence of national regulations.

[2)] only with use of centering washer, t_{fix} = thickness of the base plate without thickness of the centering washer, see Annex 3.

[3)] Partial safety factor γ_2 = 1,0 is included.

Table 10a: Displacements under shear loads, HDA-P and HDA-T

HDA-P		**M10**	**M12**	**M16**	**M20**
Shear load in C20/25 to C50/60 cracked and non-cracked concrete	[kN]	11,4	17,1	35,9	51
Displacement	δ_{V0} [mm]	2,8	2,5	4,1	5,0
	$\delta_{V\infty}$ [mm]	4,1	3,8	6,2	7,5
HDA-T		**M10**	**M12**	**M16**	**M20**
Shear load in C20/25 to C50/60 cracked and non-cracked concrete	[kN]	33,3	42,8	95,2	119
Displacement	δ_{V0} [mm]	6,2	6,9	10,1	12,0
	$\delta_{V\infty}$ [mm]	9,3	10,3	15,1	18,0

Table 10b: Displacements under shear loads, HDA-PR and HDA-TR

HDA-PR		**M10**	**M12**	**M16**
Shear load in C20/25 to C50/60 cracked and non-cracked concrete	[kN]	13,3	19,3	35,9
Displacement	δ_{V0} [mm]	4,2	3,0	6,9
	$\delta_{V\infty}$ [mm]	6,3	4,5	10,4
HDA-TR		**M10**	**M12**	**M16**
Shear load in C20/25 to C50/60 cracked and non-cracked concrete	[kN]	41,7	46,9	73,7
Displacement	δ_{V0} [mm]	4,2	3,0	6,9
	$\delta_{V\infty}$ [mm]	6,3	4,5	10,4

Stop drill bit HDA

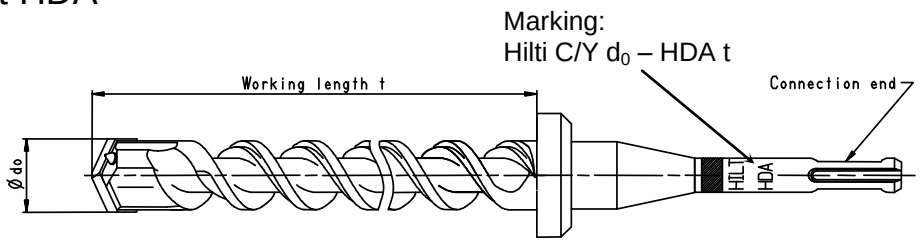
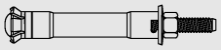
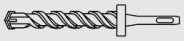


Table 11: Required stop drill bits for HDA and HDA-R

Anchor 	**Stop drill bit with**		**Nominal Working length**	**Drill bit diameter**
	TE-C connection end 	**TE-Y** connection end 	**t** [mm]	**d_0** [mm]
HDA-P(R) 20-M10x100/20	TE-C-HDA-B 20x100	TE-Y-HDA-B 20x100	107	20
HDA-T(R) 20-M10x100/20	TE-C-HDA-B 20x120	TE-Y-HDA-B 20x120	127	20
HDA-P(R) 22-M12x125/30 HDA-P(R) 22-M12x125/50	TE-C HDA-B 22x125	TE-Y HDA-B 22x125	133	22
HDA-T(R) 22-M12x125/30	TE-C HDA-B 22x155	TE-Y HDA-B 22x155	163	22
HDA-T(R) 22-M12x125/50	TE-C HDA-B 22x175	TE-Y HDA-B 22x175	183	22
HDA-P(R) 30-M16x190/40 HDA-P(R) 30-M16x190/60	-	TE-Y HDA-B 30x190	203	30
HDA-T(R) 30-M16x190/40	-	TE-Y HDA-B 30x230	243	30
HDA-T(R) 30-M16x190/60	-	TE-Y HDA-B 30x250	263	30
HDA-P 37-M20x250/50 HDA-P 37-M20x250/100	-	TE-Y HDA-B 37x250	266	37
HDA-T 37-M20x250/50	-	TE-Y HDA-B 37x300	316	37
HDA-T 37-M20x250/100	-	TE-Y HDA-B 37x350	366	37

Setting tool HDA

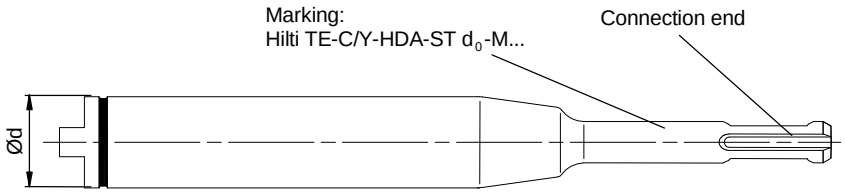


Table 12a: Required setting tools and hammer drills for HDA

Anchor	**Setting tool**			**Hammer drill**										
		Ød [mm]	**Connection end**	**TE 24**	**TE 25**[1]	**TE 35**	**TE 40 TE 40 AVR**	**TE 56**[2] **TE 56-ATC**[2]	**TE 60 TE 60-ATC**	**TE 70**[2] **TE 70-ATC**[2]	**TE 75**[2]	**TE 76**[2] **TE 76-ATC**[2]	**TE 80 -ATC TE 80-ATC AVR**
HDA-P/T 20-M10x100/20	**TE-C-HDA-ST 20-M10**	20	TE-C	■	■		■						
	TE-Y-HDA-ST 20-M10	20	TE-Y					■	■				
HDA-P/T 22-M12x125/30 **HDA-P/T 22-M12x125/50**	**TE-C-HDA-ST 22-M12**	22	TE-C	■	■		■						
	TE-Y-HDA-ST 22-M12	22	TE-Y					■	■				
HDA-P/T 30-M16x190/40 **HDA-P/T 30-M16x190/60**	**TE-Y-HDA-ST 30-M16**	30	TE-Y							■	■	■	■
HDA-P/T 37-M20x250/50 **HDA-P/T 37-M20x250/100**	**TE-Y-HDA-ST 37-M20**	37	TE-Y							■		■	■

[1] TE25: first gear only.

[2] TE56 / TE56-ATC, TE76 /TE76-ATC: use with max. impact energy.

Table 12b: Required setting tools and hammer drills for HDA-R

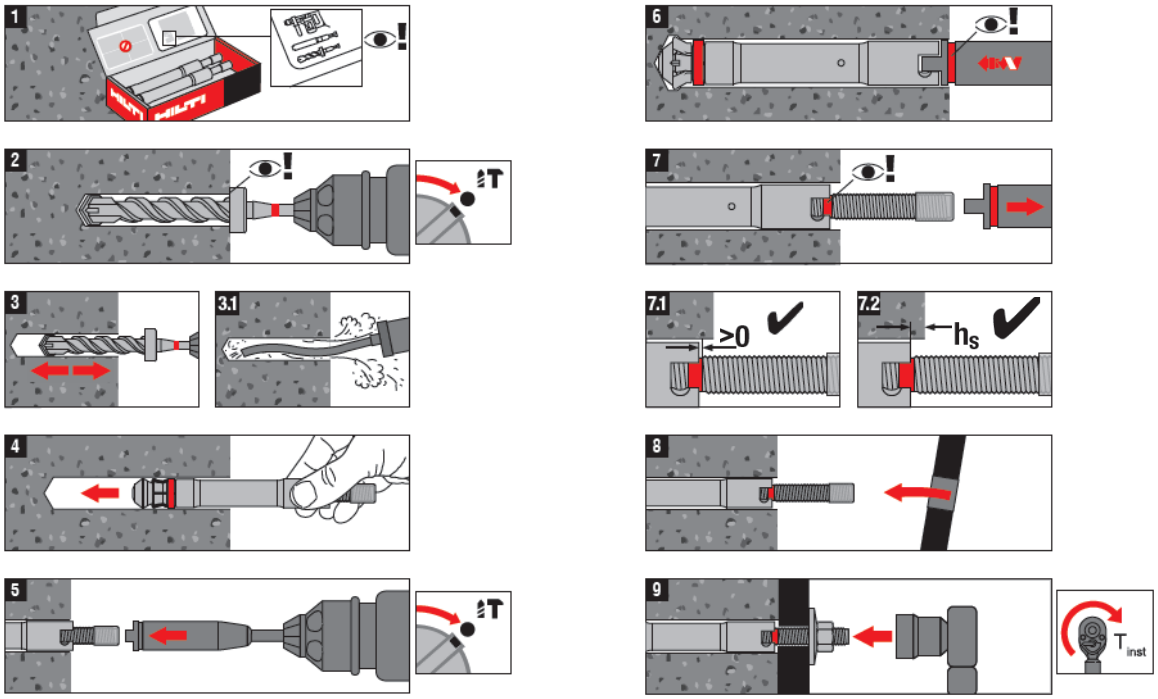
Anchor	**Setting tool**			**Hammer drill**										
		Ød [mm]	**Connection end**	**TE 24**	**TE 25**[1]	**TE 35**	**TE 40 TE 40 AVR**	**TE 56-ATC** Erreur ! Signet non défini.)	**TE 60 TE 60-ATC**	**TE 70-ATC** Erreur ! défini.)	**TE 75**	**TE 76-ATC** Erreur ! défini.)	**TE 80 -ATC TE 80-ATC AVR**
HDA-PR/TR 20-M10x100/20	**TE-C-HDA-ST 20-M10**	20	TE-C	■	■	■	■						
	TE-Y-HDA-ST 20-M10	20	TE-Y					■	■				
HDA-PR/TR 22-M12x125/30 **HDA-PR/TR 22-M12x125/50**	**TE-C-HDA-ST 22-M12**	22	TE-C	■	■	■	■						
	TE-Y-HDA-ST 22-M12	22	TE-Y					■	■				
HDA-PR/TR 30-M16x190/40 **HDA-PR/TR 30-M16x190/60**	**TE-Y-HDA-ST 30-M16**	30	TE-Y							■	■	■	■

[1] TE25: first gear only.

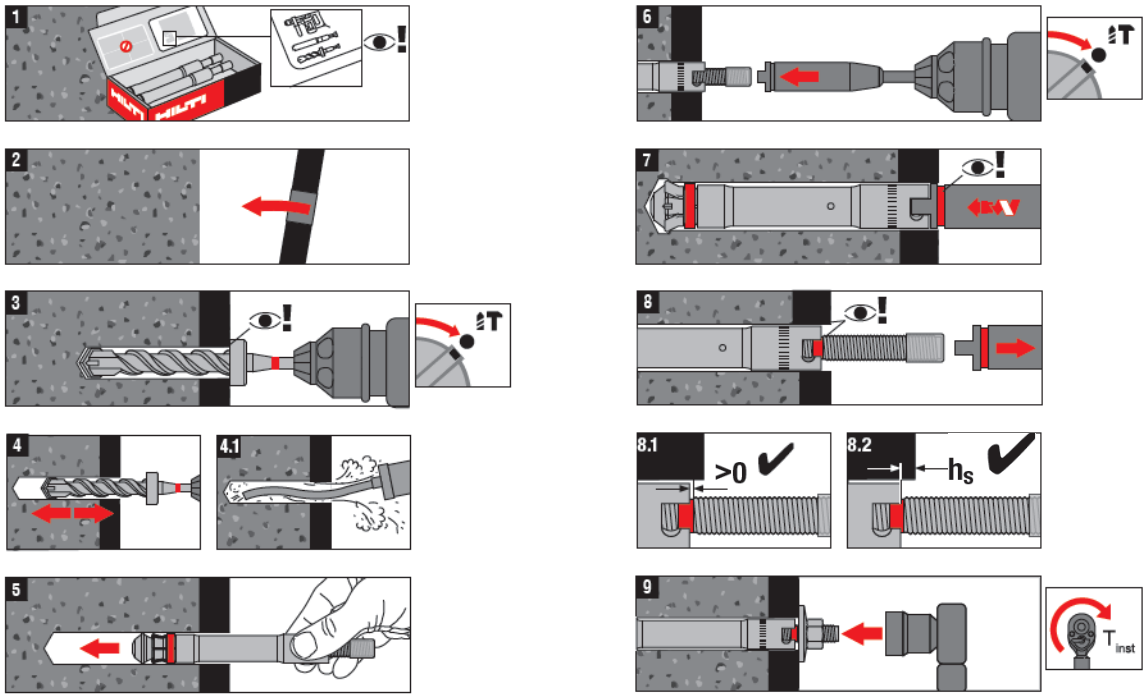
[2] TE56 / TE56-ATC, TE76 /TE76-ATC: use with max. impact energy.

Hilti Design Anchor HDA	**Annex 16**
HDA setting tools	of European Technical Approval **ETA-99/0009**

Instruction for Use: HDA-P and HDA-PR

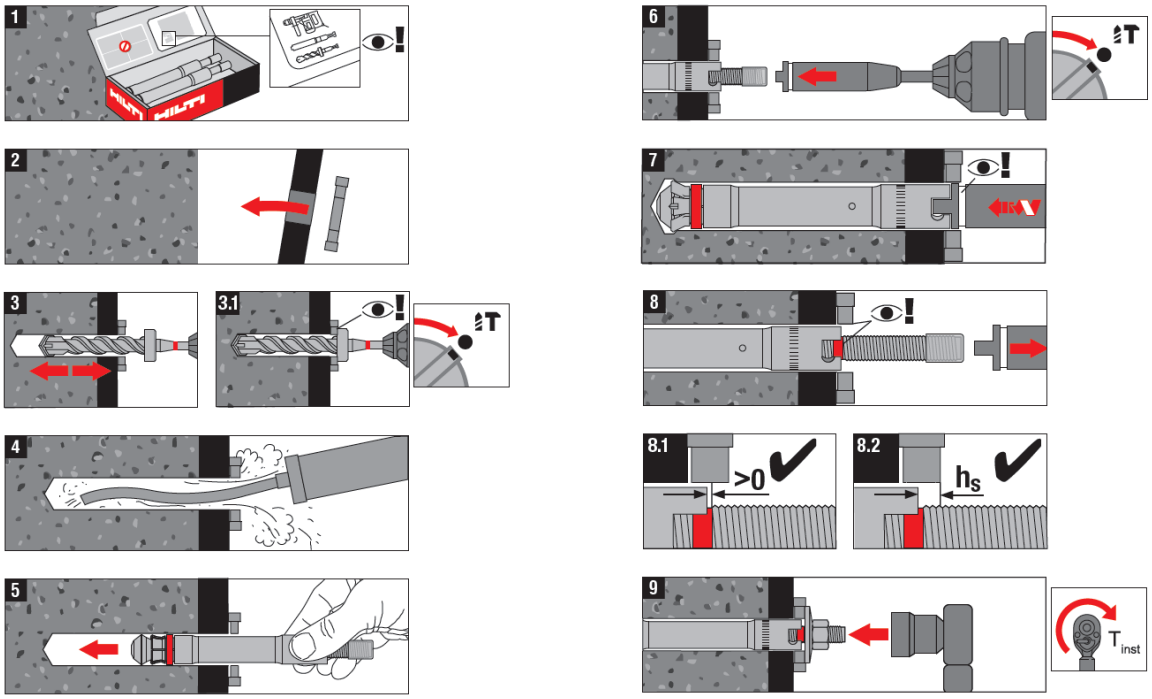


Instruction for Use: HDA-T and HDA-TR



Hilti Design Anchor HDA	**Annex 17**
HDA-P, HDA-PR , HDA-T and HDA-TR **Instruction for use**	of European Technical Approval **ETA-99/0009**

Instruction for Use: HDA-T and HDA-TR with centering washer



Hilti Design Anchor HDA	**Annex 18**
HDA-T and HDA-TR with centering washer **Instruction for use**	of European Technical Approval **ETA-99/0009**