

European Technical Assessment

**ETA-15/0747
of 30/11/2015**

English translation prepared by CSTB - Original version in French language

General Part

Nom commercial
Trade name

Topmaker ARROW

Famille de produit
Product family

**Cheville métallique à expansion par déformation contrôlée,
pour usage multiple et pour applications non structurales
dans le béton**

***Deformation-controlled expansion anchor made of
galvanized steel for multiple use and for non-structural
applications in concrete***

Partenaire commercial officiel
Exclusive trade partner

Iron Trade Havellant Kft.
2800 Tatabánya, Búzavirág u. 9.

Usine de fabrication
Manufacturing plants

Plant 2

Cette évaluation contient:
This assessment contains

10 pages incluant 7 annexes qui font partie intégrante de
cette évaluation
***10 pages including 7 annexes which form an integral part of
this assessment***

Base de l'ETE
Basis of ETA

ETAG 001, Version Avril 2013, utilisé en tant que EAD
ETAG 001, Edition April 2013 used as EAD

Cette évaluation remplace:
This assessment replaces

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Specific Part

1 Technical description of the product

The Topmaker ARROW anchor is a drop-in anchor made of galvanised steel which is placed into a drilled hole and anchored by deformation-controlled expansion.

The anchor consists of an expansion sleeve and an internal plug.

The illustration and the description of the product are given in Annexes A.

2 Specification of the intended use

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

The provisions made in this European technical assessment are based on an assumed 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.

3 Performance of the product

3.1 Mechanical resistance and stability (BWR 1)

Not relevant.

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfies requirements for Class A1
Resistance under fire acc. ETAG001, Annex C	See Annex C2

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances contained in this European technical approval, there may be 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.

3.4 Safety in use (BWR 4)

Essential characteristic	Performance
Design resistance acc. ETAG001, Annex C	See Annex C1
Displacements	See Annex C1

3.5 Protection against noise (BWR 5)

Not relevant.

3.6 Energy economy and heat retention (BWR 6)

Not relevant.

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was determined for this product.

3.8 General aspects relating to fitness for use

Durability and Serviceability are only ensured if the specifications of intended use according to Annex B1 are kept.

4 Assessment and verification of constancy of performance (AVCP)

According to the Decision 97/161/EC of the European Commission¹, as amended, the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

Product	Intended use	Level or class	System
Metal anchors for use in concrete (light-duty type)	Anchors for use in redundant systems for fixing and/or supporting to concrete of elements such as lightweight suspended ceilings as well as installations.	—	2+

5 Technical details necessary for the implementation of the AVCP system

Technical details necessary for the implementation of the Assessment and verification of constancy of performance (AVCP) system are laid down in the control plan deposited at Centre Scientifique et Technique du Bâtiment.

The manufacturer shall, on the basis of a contract, involve a notified body approved in the field of anchors for issuing the certificate of conformity CE based on the control plan.

The original French version is signed by

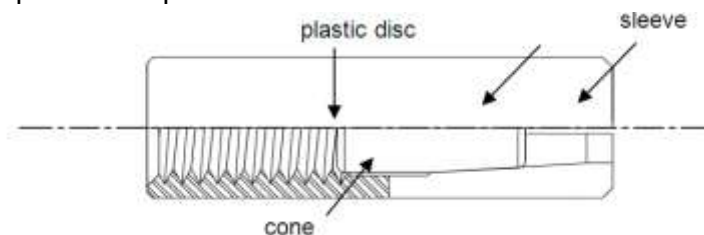
Charles Baloché
Technical Director

¹

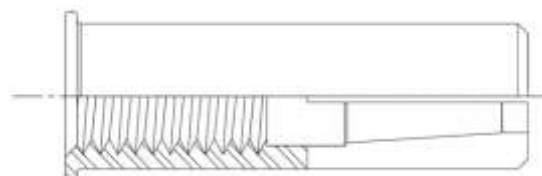
Official Journal of the European Communities L 254 of 08.10.1996

Topmaker ARROW Drop-in anchor :

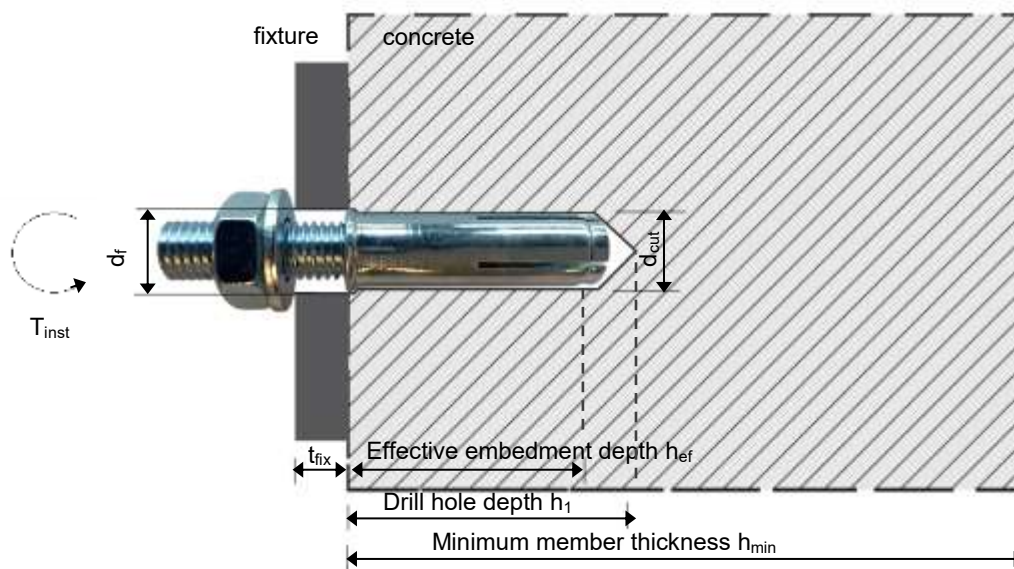
General working principle of a drop in anchor



Marking of the sleeve: e.g. "ARROW M8"



Anchor in use:



Intended use:

- Only for multiple use for non-structural applications
- Anchorages with requirements related to resistance to fire
- Use for dry internal conditions
- For use in cracked or non-cracked concrete

Topmaker ARROW Drop-in anchor

Product description
Installation condition

Annex A1

Different anchor versions and different parts of the anchor:

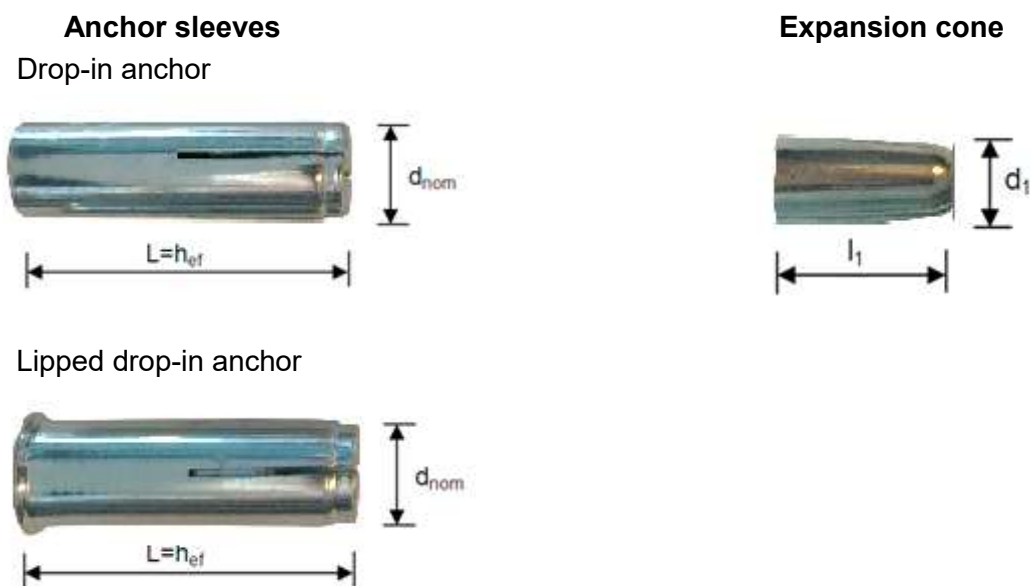


Table 1: Materials

Part	Designation	Product	Material	Protection
1	Anchor sleeves	ARROW	Cold formed steel, grade SWRCH8A	Zinc plated > 5 μm
		ARROW-LIP		
2	Expansion cones	ARROW	Cold formed steel, grade SWRCH8A	Zinc plated > 5 μm
		ARROW-LIP		
3	Screw of threaded rod for fastening	ARROW	Steel strength class 4.6, 5.6, 5.8 or 8.8 according to ISO898-1	Zinc plated > 5 μm
		ARROW-LIP		

Table 2: Anchor dimensions

				M8	M10	M12
Length sleeve	ARROW	$L = h_{ef}$	[mm]	30	40	50
	ARROW-LIP		[mm]	30	40	50
Nom. diameter	ARROW	d_{nom}	[mm]	9,9	11,9	15,9
	ARROW-LIP		[mm]	9,9	11,8	15,9
Cone diameter		d_1	[mm]	5,6	7,4	9,6
Cone length		l_1	[mm]	11,8	15,3	20,8

The length of the fastening screw shall be determined depending on thickness of fixture t_{fix} , admissible tolerance and available tread length l_{smax} as well as minimum screwing length l_{smin} .

Topmaker ARROW Drop-in anchor

Product description
Dimensions, materials

Annex A2

Drop-in anchor setting tool:

Basic version without marking function ARROW-BASIC



Version with marking function and safety grip ARROW-GRIP



The setting tool with marking function produces with correct installation a mark on the collar of the drop in anchor. This mark enables to check after installation the correct expansion of the product.

Table 3: Dimensions setting tool

			M8	M10	M12
Diameter setting tool	d _{st}	[mm]	5,7	7,1	9,8
Length setting pin	l _{st}	[mm]	19,7	23,8	24,9

Topmaker ARROW Drop-in anchor

Product description
Setting tools, marking

Annex A3

Specifications of intended use

Anchorage subject to:

- Static, quasi-static and fire.

Base materials:

- Cracked concrete and non-cracked concrete (multiple use)
- Reinforced or unreinforced normal weight concrete of strength classes C 20/25 at least to C50/60 at most according to EN 206: 2000-12.

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions.

Design:

- The anchorages are designed in accordance with the method C of ETAG001 Annex C "Design Method for Anchorages" under the responsibility of an engineer experienced in anchorages and concrete work.
- For application with resistance under fire exposure the anchorages are designed in accordance with method given in TR020 "Evaluation of Anchorage in Concrete concerning Resistance to Fire".
- 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.
- The anchor may only be used if in the design and installation specifications for the fixture the excessive slip or failure of one anchor will not result in a significantly violation of the requirements on the fixture in the serviceability and ultimate state
- The anchor is to be used only for multiple use for non-structural applications, the definition of multiple use according to the Member States is given in the informative [Annex 1 of ETAG 001, Part 6](#).

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools.
- Effective anchorage depth, edge distances and spacing not less than the specified values without minus tolerances.
- Hole drilling by hammer drill.
- Cleaning of the hole of drilling dust.
- Anchor expansion :
 - putting the setting tool properly aligned with the anchor shaft, in contact with the plastic disc ;
 - hammer the setting tool in order to push the cone down the anchor sleeve ;
 - this operation is completed when the setting tool shoulder is stopped by the anchor.
- In case of aborted hole, drilling of new hole at a minimum distance of twice the depth of the aborted hole, or smaller distance provided the aborted drill hole is filled with high strength mortar and no shear or oblique tension loads in the direction of aborted hole.

Topmaker ARROW Drop-in anchor

Intended Use
Specifications

Annex B1

Table 4: Installation data

				M8	M10	M12
Drill hole diameter		d_{cut}	[mm]	$\leq 10,45$	$\leq 12,5$	$\leq 16,5$
Drill hole depth	ARROW	h_1	[mm]	32	42	53
	ARROW-LIP			32	42	53
Embedment depth	ARROW	h_{ef}	[mm]	30	40	50
	ARROW-LIP			30	40	50
Installation torque		T_{inst}	[Nm]	8	15	35
Passage hole diameter		d_f	[mm]	9	12	14
Minimum screwing length		l_{smin}	[mm]	8	10	12
Thread length	ARROW	l_{smax}	[mm]	13	17	21
	ARROW-LIP	l_{smax}	[mm]	13	17	21
<i>Design method C</i>						
Minimum member thickness		h_{min}	[mm]	80	80	80
Minimum edge distance		c_{cr}	[mm]	150	150	150
Minimum spacing		s_{cr}	[mm]	200	200	200

Topmaker ARROW Drop-in anchor

Intended Use

Installation parameters and Design method C

Annex B2

Table 5: Characteristic values for all loading directions, C20/25 to C50/60

Topmaker ARROW					
Design method C			M8	M10	M12
Characteristic resistance (C20/25 to C50/60)	F_{Rk}^0	[kN]	4,0	4,0	6,0
Partial safety factor	γ_M	[-]	1,5 ²⁾	2,1 ³⁾	1,8 ⁴⁾
Design value of resistance	F_{Rd}	[kN]	2,7	1,9	3,3
Characteristic spacing	s_{cr}	[mm]	200	200	200
Characteristic edge distance	c_{cr}	[mm]	150	150	150
Shear load with lever arm					
Characteristic bending moment, steel grade 4.6	$M_{Rk,s}^0$ ⁵⁾	[Nm]	14,9	29,8	52,3
Partial safety factor	γ_M ¹⁾	[-]	1,67	1,67	1,67
Design value	$M_{Rd,s}^0$	[Nm]	8,9	17,8	31,3
Characteristic bending moment, steel grade 5.6/5.8	$M_{Rk,s}^0$ ⁵⁾	[Nm]	18,6	37,3	65,5
Partial safety factor	γ_M ¹⁾	[-]	1,67	1,67	1,67
Design value	$M_{Rd,s}^0$	[Nm]	11,1	22,3	39,2
Characteristic bending moment, steel grade 8.8	$M_{Rk,s}^0$ ⁵⁾	[Nm]	29,8	51,2	104,6
Partial safety factor	γ_M ¹⁾	[-]	1,25	1,25	1,25
Design value	$M_{Rd,s}^0$	[Nm]	23,8	41,0	83,7
Displacements					
Applied load	F	[kN]	1,9	1,4	2,4
Displacements at short term	δ_{F0}	[mm]	0,54	0,60	0,79
Displacements at long term	$\delta_{F\infty}$	[mm]	0,07	0,07	0,07

¹⁾ In absence of other national regulations

²⁾ The value contains an installation safety factor $\gamma_2 = 1,0$

³⁾ The value contains an installation safety factor $\gamma_2 = 1,4$

⁴⁾ The value contains an installation safety factor $\gamma_2 = 1,2$

⁵⁾ The characteristic bending moment $M_{Rk,s}^0$ for equation 5.5 in ETAG001 Annex C

Topmaker ARROW Drop-in anchor

Design according to ETAG001, Annex C

Caractéristique resistance for all loading directions
Design values - Displacements

Annex C1

Table 6: Characteristic values under fire exposure in concrete C20/25 to C50/60 in any load direction without lever arm, Design method C

Fire resistance class	Topmaker ARROW			M8	M10	M12
Tension and shear ¹⁾						
R 30	Characteristic resistance	$F_{Rk,fi}^{2)}$	[kN]	0,37	0,87	1,69
R 60	Characteristic resistance	$F_{Rk,fi}^{2)}$	[kN]	0,33	0,75	1,26
R 90	Characteristic resistance	$F_{Rk,fi}^{2)}$	[kN]	0,26	0,58	1,10
R 120	Characteristic resistance	$F_{Rk,fi}^{2)}$	[kN]	0,18	0,46	0,84
Shear load with lever arm ¹⁾						
R 30	Char. bending resistance	$M_{Rk,fi}^{2)}$	[Nm]	0,37	1,12	2,62
R 60	Char. bending resistance	$M_{Rk,fi}^{2)}$	[Nm]	0,34	0,97	1,97
R 90	Char. bending resistance	$M_{Rk,fi}^{2)}$	[Nm]	0,26	0,75	1,70
R 120	Char. bending resistance	$M_{Rk,fi}^{2)}$	[Nm]	0,19	0,60	1,31

¹⁾ In case of fire attack from more than one side, the edge distance shall be $\geq 300\text{mm}$

²⁾ In absence of other national regulations the partial safety factor for resistance under fire exposure.

$\gamma_{M,fi} = 1,0$ is recommended

Topmaker ARROW Drop-in anchor

Design according to **ETAG001, Annex C**
Characteristic resistance under fire exposure

Annex C2