DECLARATION OF PERFORMANCE

DoP 0361

for fischer Bolt Anchor FWA Plus (Mechanical anchor for use in concrete) EN

1. Unique identification code of the product-type: **DoP 0361**

2. Intended use/es: **Post-installed mechanical anchor für use in uncracked concrete, see appendix, especially annexes B1 - B3.**

3. Manufacturer: **fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Germany**

4. Authorised representative: **–**

5. System/s of AVCP: **1**

6. European Assessment Document: **EAD 330232-01-0601**
   European Technical Assessment: **ETA-24/0714; 2024-10-15**
   Technical Assessment Body: **ETA-Danmark A/S**
   Notified body/ies: **2873 TU Darmstadt**

7. Declared performance/s:

Mechanical resistance and stability (BWR 1)

Characteristic resistance to tension load (static and quasi-static loading) Method A:

1 Resistance to steel failure: Annex C1
2 Resistance to pull- out failure: Annex C1
3 Resistance to concrete cone failure: Annex C1
4 Robustness: Annex C1
5 Minimum edge distance and spacing: Annex C2
6 Edge distance to prevent splitting under load: Annex C1

Characteristic resistance to shear load (static and quasi-static loading):

7 Resistance to steel failure (shear load): Annex C2
8 Resistance to pry-out failure: Annex C2

Characteristic Resistance for simplified design:

9 Method B: NPD
10 Method C: NPD

Displacements:

11 Displacements under static and quasi-static loading: Annex C2

Characteristic resistance and displacements for seismic performance categories C1 and C2:

12 Resistance to tension load, displacements, category C1: NPD
Resistance to tension load, displacements, category C2: NPD
13 Resistance to shear load, displacements, category C1: NPD
Resistance to shear load, displacements, category C2: NPD
14 Factor for annular gap: NPD

Safety in case of fire (BWR 2)

15 Reaction to fire: Class (A1)

Resistance to fire:

16 Fire resistance to steel failure (tension load): NPD
17 Fire resistance to pull-out failure (tension load): NPD
18 Fire resistance to steel failure (shear load): NPD

Durability:

19 Durability: Annexes A3, B1

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **–**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Dr. Ronald Mihala, Head of Development and Production Management

Jürgen Grün, Managing Director Chemistry & Quality

Tumlingen, 2024-10-29

This DoP has been prepared in different languages. In case there is a dispute on the interpretation the English version shall always prevail.

The Appendix includes voluntary and complementary information in English language exceeding the (language-neutrally specified) legal requirements.

Translation guidance Essential Characteristics and Performance Parameters for Annexes

Mechanical resistance and stability (BWR 1)		
Characteristic resistance to tension load (static and quasi-static loading) Method A:		
1	Resistance to steel failure:	$N_{Rk,s}$ [kN]
2	Resistance to pull-out failure:	$N_{Rk,p}$ [kN], ψ_c [-]
3	Resistance to concrete cone failure:	$k_{cr,N}$, $k_{ucr,N}$ [-], h_{ef}, $c_{cr,N}$ [mm]
4	Robustness:	γ_{inst} [-]
5	Minimum edge distance and spacing:	c_{min}, s_{min}, h_{min} [mm]
6	Edge distance to prevent splitting under load:	$N^0_{Rk,sp}$ [kN], $c_{cr,sp}$ [mm]
Characteristic resistance to shear load (static and quasi-static loading):		
7	Resistance to steel failure (shear load):	$V^0_{Rk,s}$ [kN], $M^0_{Rk,s}$ [Nm], k_7 [-]
8	Resistance to pry-out failure:	k_8 [-]
Characteristic resistance for simplified design:		
9	Method B:	F^0_{Rk} [kN], $M^0_{Rk,s}$ [Nm], ψ_c [-], c_{cr}, s_{cr}, s_{min}, c_{min}, h_{min} [mm]
10	Method C:	F_{Rk} [kN], $M^0_{Rk,s}$ [Nm], c_{cr}, s_{cr}, s_{min}, h_{min} [mm]
Displacements:		
9	Displacements under static and quasi-static loading:	δ_{N0}, $\delta_{N\infty}$, δ_{V0}, $\delta_{V\infty}$ [mm]
Characteristic resistance and displacements for seismic performance categories C1 and C2:		
12	Resistance to tension load, displacements, category C1:	$N_{Rk,s,C1}$, $N_{Rk,p,C1}$ [kN]
	Resistance to tension load, displacements, category C2:	$N_{Rk,s,C2}$, $N_{Rk,p,C2}$ [kN], $\delta_{N,C2}$ [mm]
13	Resistance to shear load, displacements, category C1:	$V_{Rk,s,C1}$ [kN]
	Resistance to shear load, displacements, category C2:	$V_{Rk,s,C2}$ [kN], $\delta_{V,C2}$ [mm]
14	Factor for annular gap:	α_{gap} [-]
Safety in case of fire (BWR 2)		
15	Reaction to fire:	Class
Resistance to fire:		
16	Fire resistance to steel failure (tension load):	$N_{Rk,s,fi}$ [kN]
17	Fire resistance to pull-out failure (tension load):	$N_{Rk,p,fi}$ [kN]
18	Fire resistance to steel failure (shear load):	$V_{Rk,s,fi}$ [kN], $M^0_{Rk,s,fi}$ [Nm]
Durability:		
19	Durability:	Description/Level

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

The FWA Plus is a torque-controlled expansion anchor made of galvanised steel. It is available in the sizes M8, M10, M12 and M16. The expansion is achieved by torque acting on the bolt. As the anchor is prestressed, the cone is pulled into the expansion sleeve and the load applied to the anchor is transferred to the concrete mainly by friction. The anchor body of sizes M8 to M16 is cold-formed. The FWA Plus is suitable for use in uncracked concrete of strength classes C20/25 to C50/60

The product description is given in Annex A and the intended use specifications of the product are detailed in Annex B.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

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

The provisions made in this European Technical Assessment 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 or Assessment Body, 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

Characteristic	Assessment of characteristic
3.1 Mechanical resistance and stability (BWR1)	
Characteristic resistance to tension load (static and quasi-static loading) Method A	
Resistance to steel failure	**Annex C1**
Resistance to pull-out failure	**Annex C1**
Resistance to concrete cone failure	**Annex C1**
Robustness	**Annex B**
Minimum edge distance and spacing	**Annex C2**
Edge distance to prevent splitting under load	**Annex C1**
Characteristic resistance to shear load (static and quasi-static loading)	
Resistance to steel failure under shear load	**Annex C2**
Resistance to pry-out failure	**Annex C2**
Characteristic resistance for simplified design	
Method B	**Not relevant**
Method C	**Not relevant**
Displacements	
Displacements under static and quasi-static loading	**Annex C2**
Characteristic resistance and displacements for seismic performance categories C1 and C2	
Resistance to tension load, displacements	**No performance assessed**
Resistance to shear load, displacements	**No performance assessed**
Factor for annual gap	**No performance assessed**

Characteristic	Assessment of characteristic
3.2 Safety in case of fire (BWR2)	
Reaction to fire	The anchors are made from steel classified as performance **class A1** of the characteristic reaction to fire, in accordance with the provisions of EC decision 96/603/EC, amended by EC Decision 2000/605/EC.
Resistance to fire	
Fire resistance to steel failure (tension load)	**No performance assessed**
Fire resistance to pull-out failure (tension load)	**No performance assessed**
Fire resistance to steel failure (shear load)	**No performance assessed**
3.3 Aspects of durability	
Durability	**Annex B**

See additional information in section 3.9

3.9 General aspects related to the performance of the product

The European Technical Assessment is issued for the product on the basis of agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark 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 Assessment and verification of constancy of performance (AVCP) (hereinafter AVCP) system applied, with reference to its legal base.

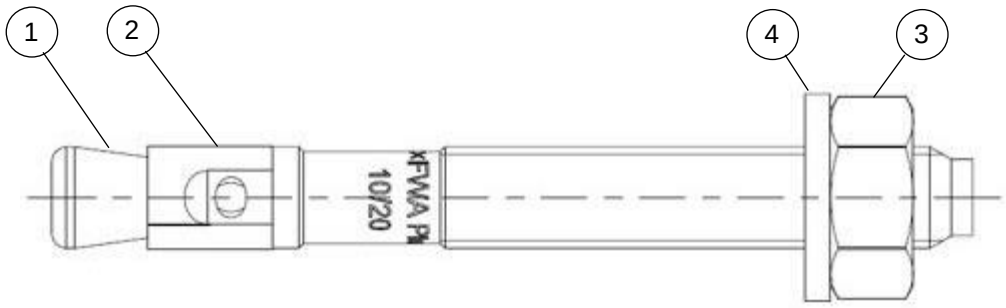
4.1 AVCP system

According to the decision 1996/582/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No. 305/2011) is 1.

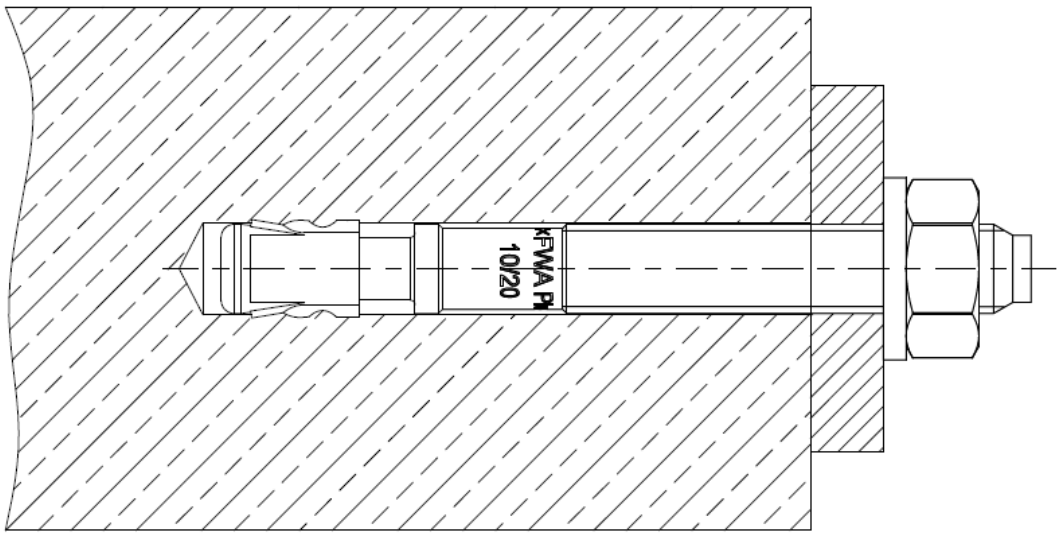
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

Cone bolt manufactured by cold - forming:



① Cone bolt (cold formed)
② Expansion sleeve
③ Hexagon nut
④ Washer

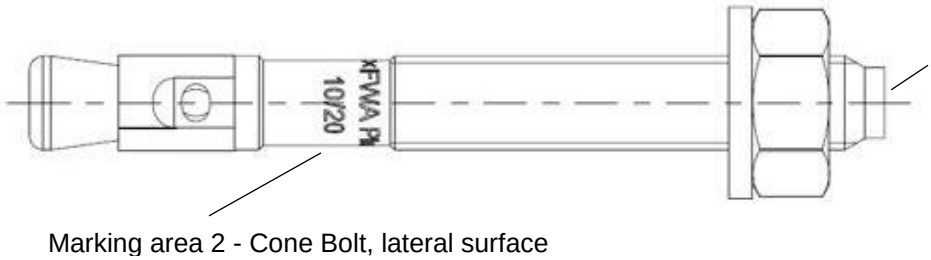


(Fig. not to scale)

fischer Bolt Anchor FWA Plus

Product description
Installed condition

Annex A1



Product marking, example: FWA Plus 10/20x94

Brand | type of fastener placed at marking area 2

Thread size / max. thickness of fixture (t_{fix}) x fastener length (L) placed at marking area 2

Table A2.1: Letter-code on marking area 1 and maximum thickness of fixture t_{fix}:

Marking	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z
Max. t_{fix}	5	10	15	20	25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200	250	300	350	400

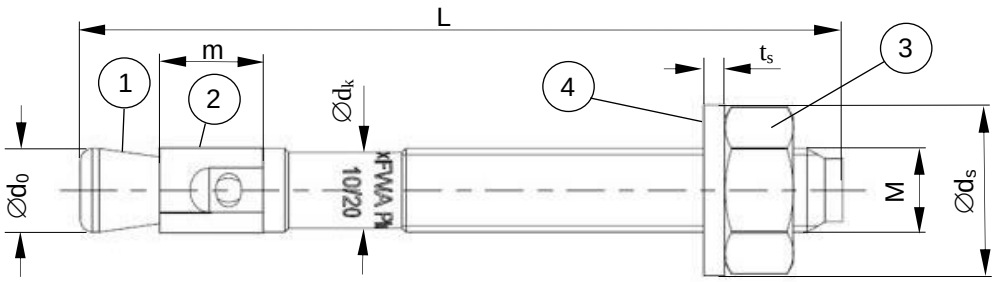


Table A2.2: Fastener dimensions [mm]

Part	Designation			FWA Plus M8	FWA Plus M10	FWA Plus M12	FWA Plus M16
1	Cone bolt	M	=	8	10	12	16
		$\varnothing d_0$	=	7,8	9,8	11,8	15
		$\varnothing d_k$	=	7,1	8,9	10,7	14,6
2	Expansion sleeve	m	=	10,0	12,0	14,0	20,0
3	Hexagon nut	SW	=	13	17	19	24
4	Washer	t_S	≥	1,6	2,0	2,5	3,0
		$\varnothing d_s$	≥	16	20	24	30
Thickness of fixture		t_{fix}	≥	0			
			≤	100	200	200	300
Length of fastener		L_{min}	=	71	84	108	144
		L_{max}	=	166	274	202	421

(Fig. not to scale)

fischer Bolt Anchor FWA Plus

Product description
Product marking, letter code and fastener dimensions

Annex A2
Appendix 6 / 12

Table A3.1: Materials FWA Plus (zinc plated ≥ 5µm, ISO 4042:2022)

Part	Designation	Material
1	Cone bolt	Cold form steel
2	Expansion sleeve	Cold strip
3	Hexagon nut	Steel, property class min. 8
4	Washer	Cold strip

Specifications of intended use

fischer Bolt Anchor FWA Plus	M8	M10	M12	M16
Material: steel, zinc plated	✓			
Static and quasi-static loads				
Uncracked concrete				

Base materials:

- Reinforced or unreinforced normal concrete without fibres of strength classes C20/25 to C50/60 according to EN 206:2013+A2:2021

Use conditions (Environmental conditions):

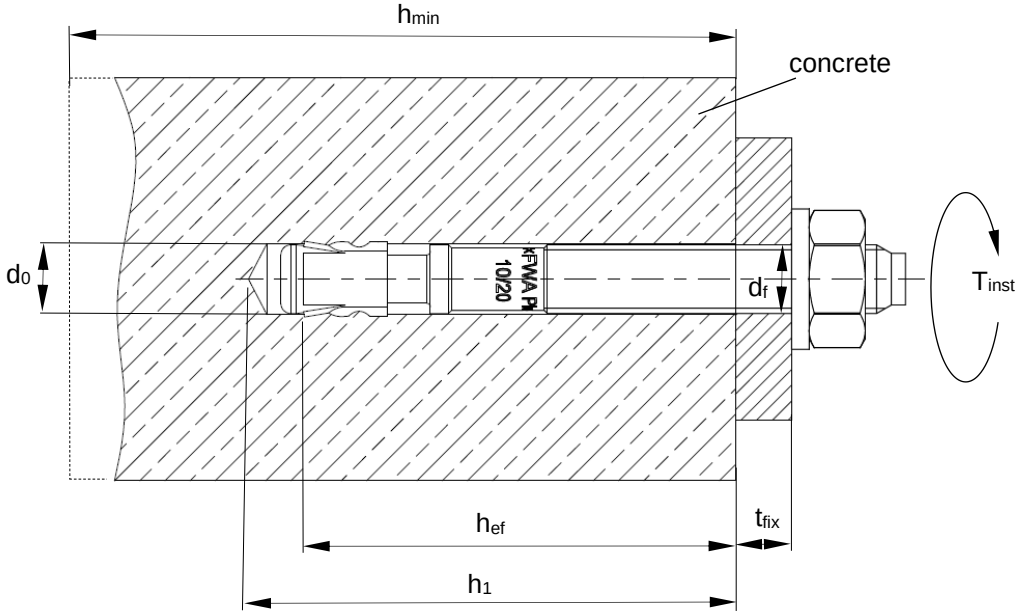
- Structures subject to dry internal conditions.

Design:

- The structural design is conducted under responsibility of a designer experienced in the field of fastenings and concrete works.
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the fastener is indicated on the design drawings (e.g. position of the fastener relative to reinforcement or to supports, etc.)
- Design of fastenings according to EN 1992-4:2018 and TR 055:2018.

Table B2.1: Installation parameters

Type of fastener / size		FWA Plus			
		M8	**M10**	**M12**	**M16**
Nominal drill hole diameter	d_0 =	8	10	12	16
Cutting diameter of drill bit	$d_{cut} \leq$	8,45	10,45	12,5	16,5
Effective embedment depth	$h_{ef} \geq$ [mm]	48	50	70	84
Depth of drill hole in concrete	$h_1 \geq$	65	75	100	120
Diameter of clearance hole in the fixture	$d_f \leq$	9	12	14	18
Required setting torque	T_{inst} = [Nm]	10	15	35	110

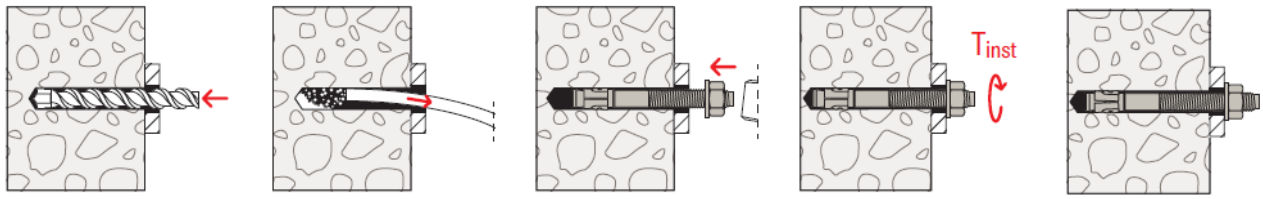


h_{ef} = Effective embedment depth
t_{fix} = Thickness of the fixture
h_1 = Depth of drill hole to deepest point
h_{min} = Minimum thickness of concrete member
T_{inst} = Required setting torque

(Fig. not to scale)

Installation instructions

- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Use of the fastener only as supplied by the manufacturer without exchanging the components of the fastener
- Hammer drilling
- Drill hole created perpendicular +/- 5° to concrete surface, positioning without damaging the reinforcement
- In case of aborted hole: new drilling at a minimum distance twice the depth of the aborted drill hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application



No.	Description
1	Drill the hole by hammer drilling.
2	Clean the hole.
3	Set the fastener.
4	Apply required setting torque T_{inst}
5	Installed fastener

(Fig. not to scale)

Table C1.1: Characteristic values of **tension** resistance under static and quasi-static action

Type of fastener / size			FWA Plus M8	FWA Plus M10	FWA Plus M12	FWA Plus M16
Steel failure						
Characteristic resistance	$N_{Rk,s}$	[kN]	15,5	24,3	35,2	67,5
Partial factor	γ_{Ms} [1)]	[-]	1,50			
Pullout failure						
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	12,4	16,5	28,2	34,9
Increasing factors ψ_c for $N_{Rk,p}$ $N_{Rk,p} = \psi_c \cdot N_{Rk,p}$ (C20/25)	ψ_c	C25/30	1,12			
		C30/37	1,22			
		C35/45	1,32			
		C40/50	1,41			
		C45/55	1,50			
		C50/60	1,58			
Installation sensitivity factor	γ_{inst}	[-]	1,0			
Concrete cone and splitting failure						
Effective embedment depth	h_{ef}	[mm]	48	50	70	84
Factor for uncracked concrete	$k_{ucr,N}$	[-]	11,0 [2)]			
Characteristic spacing	$s_{cr,N}$	[mm]	3 h_{ef}			
Characteristic edge distance	$c_{cr,N}$		1,5 h_{ef}			
Characteristic spacing for splitting failure	$s_{cr,sp}$		192	250	350	504
Characteristic distance for splitting failure	$c_{cr,sp}$		96	125	175	252
Characteristic resistance to splitting	$N^0_{Rk,sp}$	[kN]	min $\{N^0_{Rk,c}; N_{Rk,p}\}$ [3)]			

[1)] In absence of other national regulations
[2)] Based on concrete strength as cylinder strength
[3)] $N^0_{Rk,c}$ according to EN 1992-4:2018

Table C2.1: Characteristic values of **shear** resistance under static and quasi-static action

Type of fastener / size			FWA Plus			
			M8	**M10**	**M12**	**M16**
Installation factor	γ_{inst}	[-]	1,0			
Steel failure without lever arm						
Characteristic resistance	$V^0_{Rk,s}$	[kN]	11	17,4	25,3	40
Partial factor for steel failure	γ_{Ms} 1)	[-]	1,25			
Steel failure with lever arm and concrete pryout failure						
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	22,5	44,8	78,6	199
Partial factor for steel failure	γ_{Ms} 1)	[-]	1,25			
Factor for ductility	k_7	[-]	0,8			
Factor for pryout	k_8	[-]	1		2	
Concrete edge failure						
Effective length of fastener	l_f	[mm]	48	50	70	84
Effective diameter of fastener	d_{nom}	[mm]	8	10	12	16

1) In absence of other national regulations

Table C2.2: Minimum thickness of concrete members, minimum spacing and minimum edge distances

Type of fastener / size			FWA Plus			
			M8	**M10**	**M12**	**M16**
Minimum thickness of member	h_{min}	[mm]	100	120	140	170
Minimum spacing	s_{min}	[mm]	65	95	100	115
Minimum edge distance	c_{min}	[mm]	65	95	100	115

Table C2.3: Displacements under static and quasi static **tension** action

Type of fastener / size			FWA Plus			
			M8	**M10**	**M12**	**M16**
Tension load	N	[kN]	5,7	7,6	18,3	16,2
Displacements	δ_{N0}	[mm]	0,8	1,0	1,2	1,3
	$\delta_{N\infty}$	[mm]	1,2	1,5	1,8	2,0

Table C2.4: Displacements under static and quasi static **shear** action

Type of fastener / size			FWA Plus			
			M8	**M10**	**M12**	**M16**
Shear load	V	[kN]	6,3	9,9	14,5	22,9
Displacements	δ_{V0}	[mm]	1,9	2,7	3,5	3,5
	$\delta_{V\infty}$	[mm]	2,9	4,1	5,3	3,5