Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment ETA-18/0957 of 22 June 2020

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Würth cable and pipe fixings
Product family to which the construction product belongs	Power-actuated fastener for multiple use in concrete for non-structural applications
Manufacturer	Adolf Würth GmbH & Co. KG Reinhold-Würth-Straße 12-17 74653 Künzelsau DEUTSCHLAND
Manufacturing plant	Würth Herstellwerke
This European Technical Assessment contains	24 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 330083-03-0601, Edition 10/2019

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Specific Part

1 Technical description of the product

The Würth cable and pipe fixings consists of the power-actuated fastener (Würth Nails NG CSM-1 HFB and NG CS-2 HFB) made of galvanized steel and the fixture according to Annex A1 and A2 made of galvanized steel or polyamide. The power-actuated fasteners are placed into the concrete without previous drill by using a gas-actuated fastening tool (Würth DIGA CSM-1 or Würth DIGA CS-2 POWER). They are anchored in the concrete by sintering and mechanical interlock.

The product description is given in Annex A.

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

The performances given in Section 3 are only valid if the fixing is used in compliance 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 fixing of at least 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 and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristics for resistance - Characteristic resistance - Resistance to steel failure under shear load with lever arm - Spacing, edge distances, member thickness, embedment depth	 F_{Rk} see Annex C1 to C13 $M^0_{Rk,s}$ No performance assessed. c_{min}, s_{min}, h_{min}, h_{ef}: see Annex B2
Displacements	No performance assessed.
Durability	See Annex B1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire - fasteners and fixtures made of metal - fixtures made of polyamide	 Class A1 No performance assessed.
Resistance to fire	No performance assessed.

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

In accordance with EAD No. 330083-03-0601, the applicable European legal act is: 1997/463/EC (EU).

The system to be applied is: 2+

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

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 22 June 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Baderschneider

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Würth cable and pipe fixings: Description of the product

Table A1: Fixtures made of plastics

No.	Power tool	Material	Product	Nail length	Picture of the fixture
[-]	[-]	[-]	[-]	[mm]	[-]
1	DIGA CS	Plastics	W-GFIXBK-929 0864 929 xxx	$l_{nail} \geq 27$mm	
2	DIGA CS	Plastics	W-GFIXBDK-939 0864 939 xxx	$l_{nail} \geq 27$mm	
3	DIGA CS	Plastics	W-QUICLIP 0864 930 xxx W-QUICLIP Plus 0864 935 xxx	$l_{nail} \geq 27$mm	
4	DIGA CS	Plastics	W-KKB Plus 0864 930 255	$l_{nail} \geq 27$mm	
5	DIGA CS	Plastics	W-KSH-935 Plus 0864 935 102	$l_{nail} \geq 32$mm	
6	DIGA CS	Plastics	W-KSH-935 Plus Double 0864 935 105	$l_{nail} \geq 32$mm	
7	DIGA CS	Plastics	W-KBB-935 Plus 0864 935 110	$l_{nail} \geq 32$mm	
8	DIGA CS	Plastics	W-KBB_935 Plus double 0864 935 120	$l_{nail} \geq 32$mm	
9	DIGA CS	Plastics	KSH-Allrounder-Hoch 0971 651 xxx	$l_{nail} \geq 32$mm	
10	DIGA CS	Plastics	ELMO 0971 555 0xx	$l_{nail} \geq 27$mm	

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Würth cable and pipe fixings: Description of the product

Table A2: Fixtures made of steel

No.	Power tool	Material	Product	Nail length	Picture of the fixture
[-]	[-]	[-]	[-]	[mm]	[-]
11	DIGA CS	Steel	W-GFIXB-927 0864 927	$l_{nail} \geq 22$mm	
12	DIGA CS	Steel	W-GFIXBD-927 0864 927	$l_{nail} \geq 22$mm	
13	DIGA CS	Steel	W-GWA-M8 0864 911 008	$l_{nail} \geq 27$mm	

Würth Nail HFB: NG CSM-1 HFB and NG CS-2 HFB

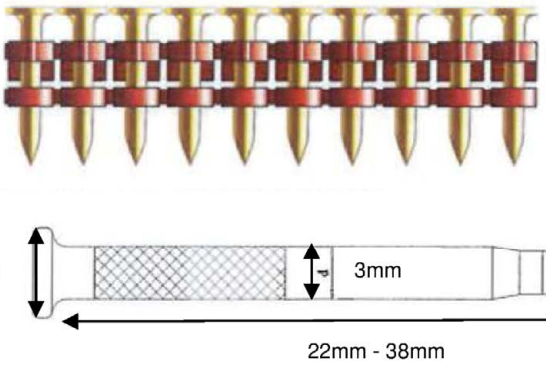

Table A3: Dimensions and Material

Würth DIGA		HFB nail
Use for gas tool	[-]	**CSM-1 and CS-2 Power**
Length of nail	[mm]	22-38
Shaft diameter	[mm]	3,0
Head diameter	[mm]	6,3
Material	[-]	Hardened C-steel
Plastic collation	[-]	Polyethylene (red/green/yellow)
Electro or mechanical zinc plating	[-]	≥ 5µm

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Würth cable and pipe fixings: Dimensions and materials

Table A4: Fixtures made of steel

No.	Power tool	Material	Concrete strength class	Min. member thickness	Min. h_{ef}	Product	Sizes and dimensions
[-]	[-]	[-]	[-]	[mm]	[mm]	[-]	[-]
1	DIGA CS	HDPE, grey	C50/60 with DIGA CSM-1 C40/50 with DIGAS CS-2 POWER	80	18	W-GFIXBK-929 0864 929 xxx	see Annex C1
2	DIGA CS	HDPE, grey		80	18	W-GFIXBDK-939 0864 939 xxx	see Annex C2
3	DIGA CS	Polyamide PA, grey		80	18	W-QUICLIP 0864 930 xxx W-QUICLIP Plus 0864 935 xxx	see Annex C3
4	DIGA CS	Polyamide PA 6, White/grey		80	18	W-KKB Plus 0864 930 255	see Annex C4
5	DIGA CS	Polyamide PA, grey		80	18	W-KSH 935 Plus 0864 935 102	see Annex C5
6	DIGA CS	Polyamide PA, grey		80	18	W-KSH 935 Plus 0864 935 105	see Annex C6
7	DIGA CS	Polyamide PA, white		80	18	W-KBB_935 Plus 0864 935 110	see Annex C7
8	DIGA CS	Polyamide PA, white		80	18	W-KBB_935 Plus Doppel 0864 935 120	see Annex C8
9	DIGA CS	Polyamide PA, grey		80	18	KSH-Allrounder-Hoch 0971 651 xxx	see Annex C9
10	DIGA CS	Polyamide PA, grey white		80	18	ELMO 0971 555 0xx	see Annex C10

Würth-Electro-Fixings made of metal

No.	Power tool	Material	Concrete strength class	Min. member thickness	Min. h_{ef}	Product	Dimensions
[-]	[-]	[-]	[-]	[mm]	[mm]	[-]	[-]
11	DIGA CS	Steel zinc plated > 5µm	C50/60 with DIGA CSM-1 C40/50 with DIGAS CS-2 POWER	80	18	W-GFIXB-927 0864 927 xxx	see Annex C11
12	DIGA CS	Steel zinc plated > 5µm		80	18	W-GFIXBD-927 0864 927 xxx	see Annex C12
13	DIGA CS	Steel zinc plated > 5µm		80	18	W-GWA-M8 0864 911 008	see Annex C13

Würth cable and pipe fixings	Annex A3
Dimensions and Materials	

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Specifications of Intended Use

Anchorages subject to

- Fixtures for dead loads acting on the fasteners by stiff or flexibles cables and pipes.

Base material

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C20/25 to C50/60 according to EN 206-1:2000 for use of setting tool DIGA CSM-1.
- Strength classes C20/25 to C40/50 according to EN 206-1:2000 for use of setting tool DIGA CS-2 POWER.
- For cracked and non-cracked concrete.
- Anchorges in two-dimensional load-bearing structures (slabs and walls).

Use conditions (Environmental conditions)

- Structures subject to dry conditions
- Minimum long-term temperature of 0 °C (Short term temperature is - 20 °C)
- Maximum long-term temperature of +80 °C for fixtures made of steel and +24 °C for fixtures made of plastic (short term temperature is 35°C)

Design

- The anchorages are designed in accordance with EN 1992-4:2018 Design Method C.
- The fastener is to be used only for multiple use for non-structural applications with following definition:

  Number of fixing points $n_1 \geq 4$,

  Number of fasteners per fixing point $n_2 = 1$,

  Design value of actions per fixing point $F_{Ed} \leq 0{,}6$ kN.
- The design of the fixture is such that in the case of excessive slip or failure of one fastener the load can be transmitted to neighboring fasteners without significantly violating the requirements on the fixture in the serviceability and ultimate limit state.
- The resistances are given in the Annexes C1 to C13 are valid for one fixture. A potential influence of an eccentric load introduction into the power-actuated nail is taken into consideration for the given resistances.

Würth cable and pipe fixings	Annex B1
Intended use: Specifications	

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Table B1: Installation parameters

Würth DIGA			**HFB nail**	
Use for gas tool		[-]	**CSM-1**	**CS-2 Power**
Maximum concrete strength class		[-]	C50/60	C40/50
Effective embedment depth	h_{ef}	[mm]	≥ 18	≥ 18
Average anchorage depth when used in maximum concrete strength class	$h_{ef,m}$	[mm]	25	22
Diameter of clearance hole in the fixture	d_f	[mm]	3,5	3,5
Max. thickness of the fixture	t_{fix}	[mm]	L – 21 mm	L – 21 mm
Minimum member thickness	h_{min}	[mm]	80	80
Minimum spacing	s_{min}	[mm]	200	200
Minimum edge distance	c_{min}	[mm]	150	150

Installation:

- Fastener installation carried out by appropriately qualified personnel.
- Fastener installation in accordance with the manufacturer's specifications and drawings and using the specified installation device.
- Fasteners to be installed perpendicular to the surface of the base material.
- When setting, pay attention to setting defects. A setting defect is present if the nail can be pull out of the concrete by hand.
- Fasteners to be installed ensuring not less than the minimum effective anchorage depth of 18 mm. If the embedment depth is smaller than the minimum effective anchorage depth the nail must be assumed as a setting defect and it must not be loaded.
- Damages on the concrete surface, caused by setting defects, have to be repaired according to EN 1504. A new fastener is set at a minimum distance away of 100 mm of the edge of the damaged surface.
- Use of setting tools according to Annex B3.

Würth cable and pipe fixings	Annex B2
Intended use: Installation parameters	

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Würth-cable-pipe-fixings: Installation tools

Table 6: Tools and nails

DIGA CSM-1	DIGA CS-2 Power
	
Würth DIGA CSM-1 Gas actuated tool	Würth DIGA CS-2 POWER (long track version) Würth DIGA CS-2 POWER (short track version) Gas actuated tool

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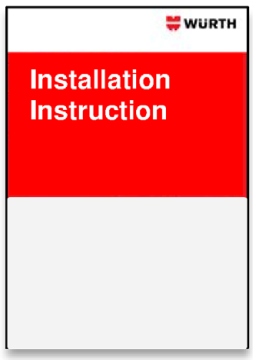
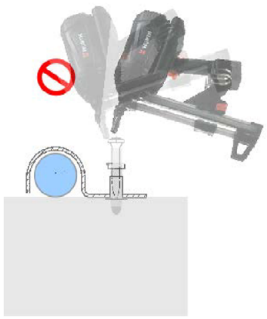
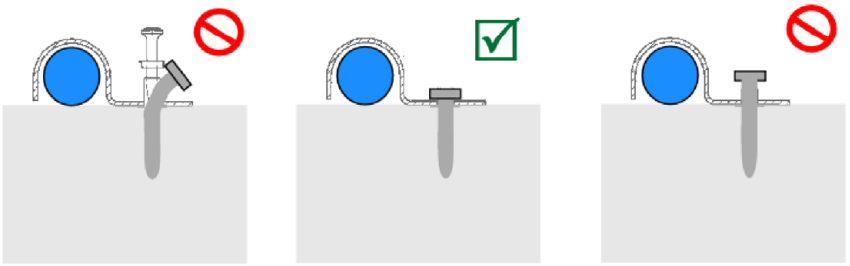
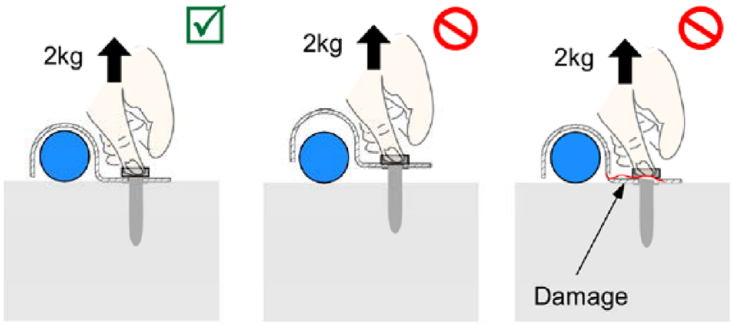
Installation of the product

(1) Read instruction	(2) Take the tools, nails, power and fixtures acc. to this ETA	(3) fix the fixture on the concrete
		
(4) fix perpendicular to the surface	**(5) control visible setting defects**	
		

(6) control not visible setting defects



Würth cable and pipe fixings	Annex B4
Intended use: Installation procedure	

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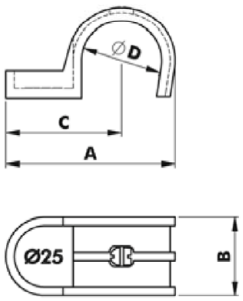
Würth W-GFIXBK 929

Picture of the fixture:

Dimensions and material of the fixture:



Size	A [mm]	B [mm]	C [mm]	D [mm]
16	41	23	30	16
18	42,5	23	30,75	18
20	44,5	23	31,75	20
22	46,5	23	32,75	22
25	49	23	34	25
28	51,5	23	35,25	28
32	55	23	37	32
Material: HDPE, grey				

Characteristic resistance of the fastener including fixture (F_{Rk}):

GFIXBK 929			16	18	20	22	25	28	32
Power Tool		[-]	DIGA CS						
Nail		[-]	HFB acc. to Annex A2						
Characteristic resistance	$F_{Rk,21°C}$	[N]	17,6						
Characteristic resistance	$F_{Rk,35°C}$	[N]	14,1						
Partial factor	γ_M	[-]	1,5 [1)]						

[1)] In Absence of other national regulations

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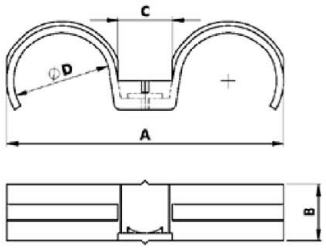
Würth W-GFIXBDK-939

Picture of the fixture:

Dimensions and material of the fixture:



Size	A [mm]	B [mm]	C [mm]	D [mm]
16	58	20	19	16-19
18	68	20	19	20-23
20	81	20	20	25-28

Material: HDPE, grey

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-GFIXBDK 929			16	18	20	22	25	28	32
Power Tool		[-]	DIGA CS						
Nail		[-]	HFB acc. to Annex A2						
Characteristic resistance	$F_{Rk,21°C}$	[N]	17,6						
Characteristic resistance	$F_{Rk,35°C}$	[N]	14,1						
Partial factor	γ_M	[-]	1,5 [1)]						

[1)] In Absence of other national regulations

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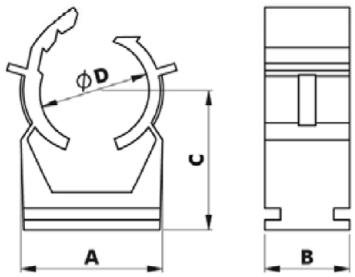
Würth W-QUICLIP and W-QUICLIP Plus

Picture of the fixture:

Dimensions and material of the fixture:



Size	A [mm]	B [mm]	C [mm]	D [mm]
15	24	16	23	15 – 18
20	29	16	29	20 – 25
26	36	16	33	26 – 32
35	42	17	37	35 – 40
47	51,5	17	46	47 – 50
Material: Polyamide PA, grey				

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-QUICLIP and W-QUICLIP Plus			15	20	26	35	47
Power Tool		[-]	DIGA CS				
Nail		[-]	HFB acc. to Annex A2				
Characteristic resistance	$F_{Rk,21°C}$	[N]	19,8				
Characteristic resistance	$F_{Rk,35°C}$	[N]	15,8				
Partial factor	γ_M	[-]	1,5 [1)]				

[1)] In Absence of other national regulations

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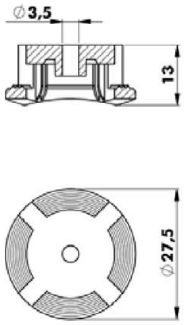
Würth W-KKB Plus

Picture of the fixture:

Dimensions and material of the fixture:



Size	L [mm]	B [mm]	H [mm]	D [mm]
27,7	-	3,5	13	27,5
Material: PA 6, white/grey				

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-KKB Plus			**27,7**
Power Tool		[-]	DIGA CS
Nail		[-]	HFB acc. to Annex A2
Characteristic resistance	$F_{Rk,21°C}$	[N]	44
Characteristic resistance	$F_{Rk,35°C}$	[N]	35,2
Partial factor	γ_M	[-]	1,5 [1)]
Remark		[-]	Tension loading only

[1)] In Absence of other national regulations

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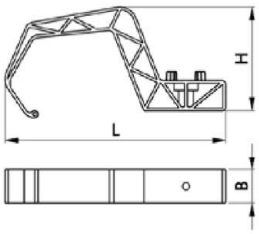
Würth W-KSH 935 Plus

Picture of the fixture:

Dimensions and material of the fixture:



Size	L [mm]	B [mm]	H [mm]	D [mm]
20	115	19	45	-
Material: Polyamide PA, grey				

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-KSH 935			20
Power Tool		[-]	DIGA CS
Nail		[-]	HFB acc. to Annex A2
Characteristic resistance	$F_{Rk,21°C}$	[N]	10,1
Characteristic resistance	$F_{Rk,35°C}$	[N]	8,1
Partial factor	γ_M	[-]	1,5 [1)]

[1)] In Absence of other national regulations

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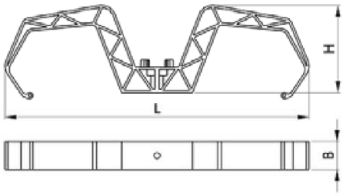
Würth W-KSH 935 Plus

Picture of the fixture:

Dimensions and material of the fixture:



Size	L [mm]	B [mm]	H [mm]	D [mm]
40	216	19	58	-
Material: Polyamide PA, grey				

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-KSH 935			40
Power Tool		[-]	DIGA CS
Nail		[-]	HFB acc. to Annex A2
Characteristic resistance	$F_{Rk,21°C}$	[N]	10,1
Characteristic resistance	$F_{Rk,35°C}$	[N]	8,1
Partial factor	γ_M	[-]	1,5 [1)]

[1)] In Absence of other national regulations

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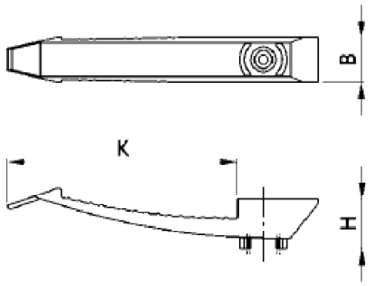
Würth W-KBB 935 Plus

Picture of the fixture:

Dimensions and material of the fixture:



Size	K [mm]	B [mm]	H [mm]	D [mm]
8	100	17	19	-
Material: Polyamide PA, white				

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-KBB 935			**8**
Power Tool		[-]	DIGA CS
Nail		[-]	HFB acc. to Annex A2
Characteristic resistance	$F_{Rk,21°C}$	[N]	7,0
Characteristic resistance	$F_{Rk,35°C}$	[N]	5,6
Partial factor	γ_M	[-]	1,5 [1)]
Remark		[-]	Tension loading only

[1)] In Absence of other national regulations

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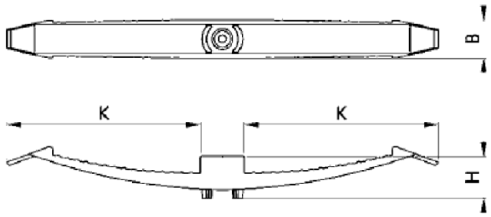
Würth W-KBB 935

Picture of the fixture:

Dimensions and material of the fixture:



Size	L [mm]	B [mm]	H [mm]	D [mm]
16	100	17	19	-
Material: Polyamide PA, white				

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-KBB 935			16
Power Tool		[-]	DIGA CS
Nail		[-]	HFB acc. to Annex A2
Characteristic resistance	$F_{Rk,21°C}$	[N]	7,0
Characteristic resistance	$F_{Rk,35°C}$	[N]	5,6
Partial factor	γ_M	[-]	1,5 [1)]
Remark		[-]	Tension loading only

[1)] In Absence of other national regulations

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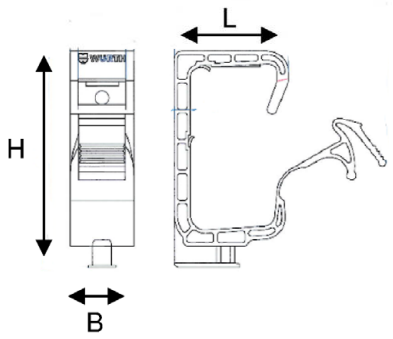
Würth KSH-Allrounder

Picture of the fixture:

Cable collector
KSH-Allrounder

Quick Installation
Clip DIGA CS

Dimensions and material of the fixture:



Size	L [mm]	B [mm]	H [mm]	D [mm]
20	48	28	93	-
40	60	28	128	-
50	68	28	138,5	-
Material: Polyamide PA, grey				

Characteristic resistance of the fastener including fixture (F_{Rk}):

KSH-Allrounder			20-H	40-H	50-H	20-Q	40-Q	50-Q
			Application vertical			Application transverse		
Power Tool		[-]	DIGA CS					
Nail		[-]	HFB acc. to Annex A2					
Characteristic resistance	$F_{Rk,21°C}$	[N]	13,2			8,8		
Characteristic resistance	$F_{Rk,35°C}$	[N]	10,6			7,0		
Partial factor	γ_M	[-]	1,5 [1)]					

[1)] In Absence of other national regulations

Würth cable and pipe fixings	Annex C9
Performances	

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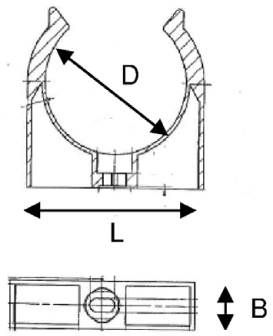
Würth ELMO

Picture of the fixture:

Dimensions and material of the fixture:



Size	L [mm]	B [mm]	H [mm]	D [mm]
16	23	14,6	-	16
20	28	14,6	-	20
25	34	14,6	-	25
32	42	14,6	-	32
40	52	14,6	-	40
50	63	19	-	50
63	78	20	-	63
Material: Polyamide PA, grey / white				

Characteristic resistance of the fastener including fixture (F_{Rk}):

ELMO			16	20	25	32	40	50	63
Power Tool		[-]	DIGA CS						
Nail		[-]	HFB acc. to Annex A2						
Characteristic resistance	$F_{Rk,21°C}$	[N]	22,0						
Characteristic resistance	$F_{Rk,35°C}$	[N]	17,6						
Partial factor	γ_M	[-]	1,5 [1)]						

[1)] In Absence of other national regulations

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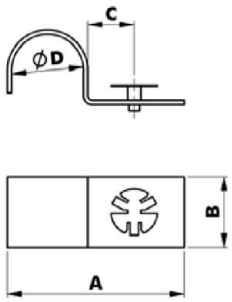
Würth W-GFIXB-927

Picture of the fixture:

Dimensions and material of the fixture:



Size	A [mm]	B [mm]	C [mm]	D [mm]
16	45	20	19	16
18	48	20	19	18
20	52	20	19	20
22	52	20	19	22
24	55	20	19	24
28	60	20	19	28
Steel, zinc plated				

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-GFIXD-927			16	18	20	22	24	28
Power Tool		[-]	DIGA CS					
Nail		[-]	HFB acc. to Annex A2					
Characteristic resistance	$F_{Rk,24°C-80°C}$	[N]	15,0					
Partial factor	γ_M	[-]	1,5 [1)]					

[1)] In Absence of other national regulations

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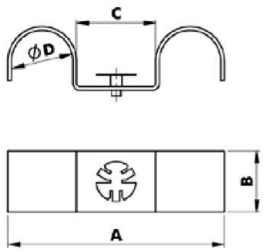
Würth W-GFIXBD-927

Picture of the fixture:

Dimensions and material of the fixture:



Size	A [mm]	B [mm]	C [mm]	D [mm]
16	64	20	26	16
18	70	20	26	18
20	72	20	26	20
22	76	20	26	22
24	80	20	26	24
28	90	20	26	28
Steel, zinc plated				

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-GFIXBD-927			16	18	20	22	24	28
Power Tool		[-]	DIGA CS					
Nail		[-]	HFB acc. to Annex A2					
Characteristic resistance	$F_{Rk,24°C-80°C}$	[N]	15,0					
Partial factor	γ_M	[-]	1,5 [1)]					

[1)] In Absence of other national regulations

Würth cable and pipe fixings	Annex C12
Performances	

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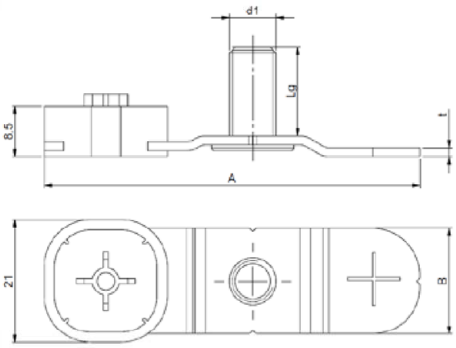
Würth W-GWA – M8

Picture of the fixture:

Dimensions and material of the fixture:



d1 [-]	A [mm]	B [mm]	t [mm]	Lg [mm]
M8	64	18	1,5	15
Steel, zinc plated				

Characteristic resistance of the fastener including fixture (F_{Rk}):

W-GWA – M8			M8
Power Tool		[-]	DIGA CS
Nail		[-]	HFB acc. to Annex A2
Characteristic resistance	$F_{Rk,24°C-80°C}$	[N]	13,2
Partial factor	γ_M	[-]	1,5 [1)]

[1)] In Absence of other national regulations