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for construction products



European Technical Assessment

ETA-21/0703 of 2 September 2024

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 nails NG CS-2/3 HFBX and
NG CSM-1 HFBX for gas actuated
pin driver DIGA CS-2 POWER, DIGA CS-3,
DIGA CSM-1 and Sympafix GT/C70

Product family
to which the construction product belongs

Power-actuated fastener in concrete for
redundant non-structural applications

Manufacturer

Adolf Würth GmbH & Co. KG
Reinhold-Würth-Straße 12-17
74653 Künzelsau
DEUTSCHLAND

Manufacturing plant

Werk 6

This European Technical Assessment
contains

11 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 06/2022

This version replaces

ETA-21/0703 issued on 2 September 2022

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Specific Part

1 Technical description of the product

The Würth nails NG CS-2/3 HFBX and NG CSM-1 HFBX are power-actuated fasteners which are placed into the concrete without previous drill by use of a gas actuated tool DIGA CS-2 POWER, DIGA CS-3, DIGA CSM-1 and Sympafix GT/C70.

They are anchored in the concrete by sintering and mechanical interlock.

The fastener (nail) is made of galvanised steel. The nails are arranged and connected with each other by special plastic strips that guides the nails in the gas actuated tool magazine.

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 fastener 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 fastener 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
Characteristic values of resistance	See Annex B2 and C1
Displacements	See Annex C1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C1

3.3 Aspects of durability

Essential characteristic	Performance
Durability	See Annex B1

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

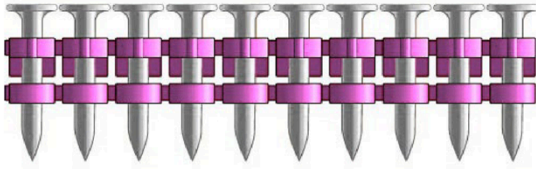
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 2 September 2024 by Deutsches Institut für Bautechnik

Beatrix Wittstock
Head of Section

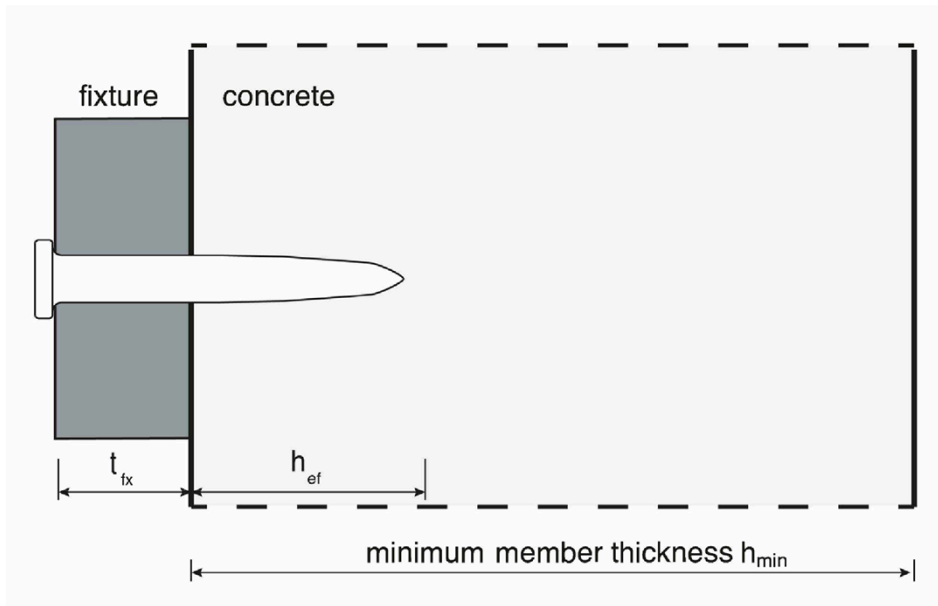
beglaubigt:
Baderschneider

Nail Types



Würth nails
NG CS-2/3 HFBX and NG CSM-1 HFBX

Installed condition



Würth nails NG CS-2/3 HFBX and NG CSM-1 HFBX for gas actuated pin driver DIGA CS-2 POWER, DIGA CS-3, DIGA CSM-1 and Sympafix GT/C70

Product

Annex A1

Würth nails NG CS-2/3 HFBX und NG CSM-1 HFBX

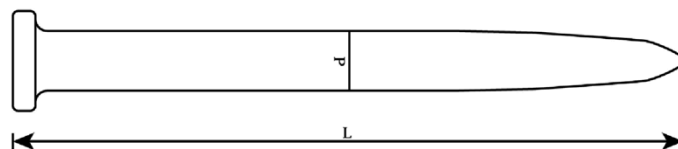


Table 1: Dimensions and materials

Würth DIGA®		HFBX nails		
For use with gas tool	[-]	DIGA CS-2 POWER DIGA CS-3	DIGA CSM-1	Sympafix GT/C70
Length of nails L	[mm]	22 - 38	22 - 65	22 - 70
Shaft diameter d	[mm]	3,0		
Head diameter D	[mm]	6,3		
Material nail	[-]	Hardened C-steel		
Material plastic collation	[-]	Polyethylene		
Zinc plating	[-]	Mech. galvanized min. 8 µm		

Würth nails NG CS-2/3 HFBX and NG CSM-1 HFBX for gas actuated pin driver DIGA CS-2 POWER, DIGA CS-3, DIGA CSM-1 and Sympafix GT/C70

Material and Dimensions

Annex A2

Specification of intended use

Anchorage subject to:

- Static and quasi-static loads.
- Fire exposure

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C20/25 to C40/50 according to EN 206-1:2000
- For cracked and non-cracked concrete.
- Anchorage in two-dimensional load-bearing structures (slabs and walls).

Use conditions (Environmental conditions):

- Structures subject to dry conditions.

Design:

- Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored. The position of the anchor is indicated on the drawings (e.g. position of the fastener relative to reinforcement or to supports etc.).
- The anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- The anchorages are designed in accordance with EN 1992-4:2018.
- The fastener is to be used only for multiple use for non-structural applications with following definition:
 - Number of fixing points $n_1 \geq 6$,
 - Number of fasteners per fixing point $n_2 = 1$,
 - Design value of actions F_{Ed} per fixing point $n_3 \leq 0,3$ 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.

Installation:

- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

Würth nails NG CS-2/3 HFBX and NG CSM-1 HFBX for gas actuated pin driver DIGA CS-2 POWER, DIGA CS-3, DIGA CSM-1 and Sympafix GT/C70

Intended use

Annex B1

Table 2: Installation parameters (no previous drilling needed)

Würth DIGA®			HFBX nails		
For use with gas tool		[-]	DIGA CS-2 POWER DIGA CS-3	DIGA CSM-1	Sympafix GT/C70
Maximum concrete strength class		[-]	C50/60		
Effective anchorage depth	h_{ef}	[mm]	≥ 15		
Average anchorage depth when used in maximum concrete strength class	$h_{ef,m}$	[mm]	22		
Diameter of clearance hole in the fixture	d_f	[mm]	3,5		
Max. Thickness of fixture	t_{fix}	[mm]	L - 21 mm	L – 18 mm	
Member thickness, edge distances and spacing					
Minimum member thickness	h_{min}	[mm]	80		
Minimum spacing	s_{min}	[mm]	200		
Minimum edge distance	c_{min}	[mm]	150		

Installation instructions

- 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 15 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 1504-3:2005. 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 and B4. The setting tool shall be complied with EN 792-13:2009.

Würth nails NG CS-2/3 HFBX and NG CSM-1 HFBX for gas actuated pin driver DIGA CS-2 POWER, DIGA CS-3, DIGA CSM-1 and Sympafix GT/C70

Installation parameters, installation instructions

Annex B2

Gas actuated tool and gas can

Würth DIGA CS-2 POWER (long track version) and DIGA CS-2 POWER (short track version)
105 Joule gas actuated tool



Würth DIGA CS-3
105 Joule gas actuated tool



Würth nails NG CS-2/3 HFBX and NG CSM-1 HFBX for gas actuated pin driver DIGA CS-2 POWER, DIGA CS-3, DIGA CSM-1 and Sympafix GT/C70

Gas tools DIGA CS-2 POWER and DIGA CS-3 and corresponding gas can

Annex B3

DIGA CSM-1
150 Joule gas actuated tool



Sympafix GT/C70
150 Joule gas actuated tool



Würth nails NG CS-2/3 HFBX and NG CSM-1 HFBX for gas actuated pin driver DIGA CS-2 POWER, DIGA CS-3, DIGA CSM-1 and Sympafix GT/C70

Gas tools DIGA CS-2 POWER and DIGA CS-3 and corresponding gas can

Annex B3

Table 3: Characteristic values, Design method C

Würth DIGA®			HFBX nails
Characteristic resistance for all load directions cracked concrete	$F_{Rk,cr}$	[N]	100
Characteristic resistance for all load directions non-cracked concrete	$F_{Rk,ucr}$	[N]	150
Characteristic resistance for steel failure with lever arm	$M^0_{Rk,s}$	[NM]	2,27
Partial safety factor	γ_M ¹⁾	[-]	1,5
Characteristic spacing	s_{cr}	[mm]	200
Characteristic edge distance	c_{cr}	[mm]	150
Displacements for all load directions	δ_0, δ_∞	[mm]	≤ 0,1

¹⁾ In absence of other national regulations

Table 4: Characteristic values under fire exposure

Fire resistance class	Würth DIGA®		HFBX nails	
R 30	Characteristic resistance for all load directions	$F_{Rk,fi}$	[N]	24
	Characteristic resistance for steel failure with lever arm	$M^0_{Rk,s,fi}$	[NM]	0,035
	Partial safety factor	$\gamma_{M,fi}$ ¹⁾	[-]	1,0
	Characteristic spacing	s_{cr}	[mm]	200
	Characteristic edge distance	c_{cr}	[mm]	150 ²⁾

¹⁾ In absence of other national regulations

²⁾ If the fire attack is from more than one side, the edge distance shall be $c \geq 300$ mm.

Würth nails NG CS-2/3 HFBX and NG CSM-1 HFBX for gas actuated pin driver DIGA CS-2 POWER, DIGA CS-3, DIGA CSM-1 and Sympafix GT/C70

Characteristic values

Annex C1