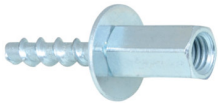
WCS1 Concrete Screws

High performance concrete screws for multiple use for non-structural applications

Anchor types

WCS1H 6x40
WCS1H 6x60

- **WCS1H** High performance corrosion resistant concrete screw with hexagon head



WCS1N 6x35
WCS1N 6x55

- **WCS1N** High performance concrete screw with a female internal M8/M10 thread

WCS1M 6x35
WCS1M 6x55

- **WCS1M** High performance concrete screw with male thread connection

WCS1P 6x40

- **WCS1P** High performance concrete screw with a pan head with torx T30

Features and benefits

- ETA ETAG001 Part 6 approval for multiple use for non-structural applications
- Simple and quick installation procedure
- High load capacity
- Approved for use in precast prestressed hollow core slabs
- Up to 2 anchoring depths provide maximum installation flexibility
- Reduced edge and anchor spacing distances
- Fire resistance class R30-R120 for design of anchorages under exposure to fire

Approvals and certificates

- European Technical Assessment
- Fire Test Report

ETA-16/0516, 16 August 2018
ETA-16/0516, 16 August 2018

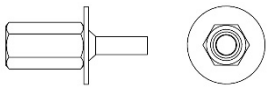
Suitable base materials

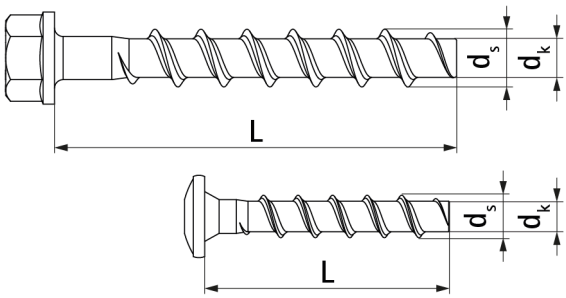
- Non-cracked concrete, C20/25 to C50/60
- Cracked concrete, C20/25 to C50/60
- Precast prestressed hollow core slabs, C30/37 to C50/60
- Fire-exposed concrete, C20/25 to C50/60

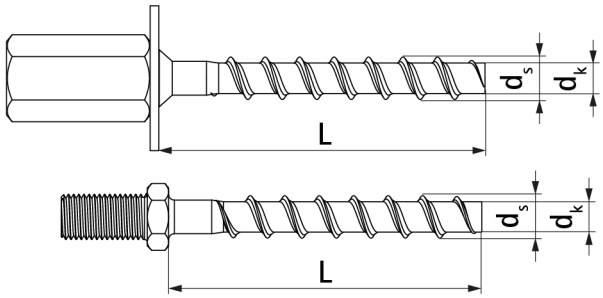
Typical applications

- Pipe systems
- Suspended rail installations
- Ventilation systems and ducts
- Prestressed precast hollow core concrete slabs

Product details

Article	Description	Size	Length	Shaft diameter	Thread diameter	Head configuration
			L [mm]	d_k [mm]	d_s [mm]	
625 3 606	WCS1N 6x35 M8/10	6	35	5.1	7.5	
625 3 696	WCS1N 6x55 M8/10	6	55	5.1	7.5	
625 3 104	WCS1M 6x35 M8	6	35	5.1	7.5	
625 3 106	WCS1M 6x55 M8	6	55	5.1	7.5	
625 3 006	WCS1P 6x40	6	40	5.1	7.5	
625 3 304	WCS1H 6x40	6	40	5.1	7.5	
625 3 306	WCS1H 6x60	6	60	5.1	7.5	





Packaging details

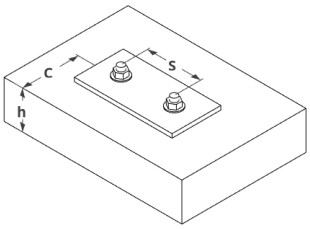
Article	Description	Pack 1		Pack 2	
		[pcs]	EAN13	[pcs]	EAN13
625 3 606	WCS1N 6x35 M8/10	50	8712993315833	-	-
625 3 696	WCS1N 6x55 M8/10	50	8712993058099	-	-
625 3 104	WCS1M 6x35 M8	100	8712993157761	800	8712993173440
625 3 106	WCS1M 6x55 M8	100	8712993315734	800	8712993173457
625 3 006	WCS1P 6x40	100	8712993315710	800	8712993173464
625 3 304	WCS1H 6x40	100	8719942004046	800	8719942004053
625 3 306	WCS1H 6x60	100	8712993315772	800	8712993173471

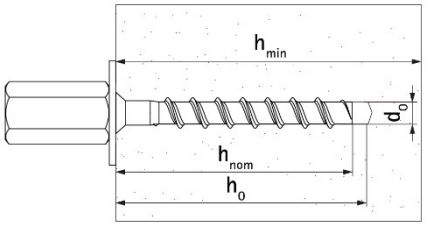
Mechanical properties

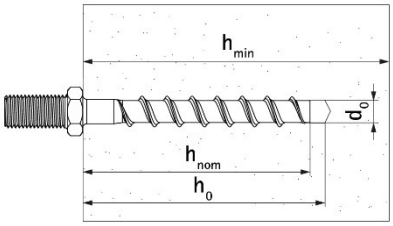
Property			ETA-16/0516	
			WCS1N, WCS1M, WCS1P	WCS1H
Material			Carbon Steel EN 10263-4	
Coating			Galvanized according to EN ISO 4042	Zinc flake coating according to EN ISO 10683 (≥5µm)
Characteristic steel yield strength	f_{yk}	[N/mm²]	560	
Characteristic steel ultimate strength	f_{uk}	[N/mm²]	700	
Elongation at rupture	A_5	[%]	≤ 8	

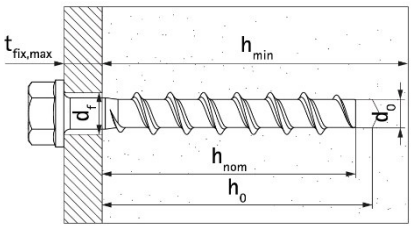
Installation parameters for concrete

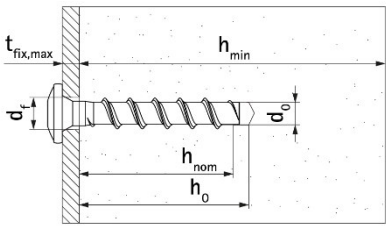
Anchor Type			WCS1N, WCS1M, WCS1P, WCS1H	
Anchor Size			6	6
Nominal embedment depth	h_{nom}	[mm]	35	55
Drill hole diameter	d_0	[mm]	6	6
Cutting diameter of drill bit	d_{cut}	[mm]	6.40	6.40
Depth of drill hole	h_0	[mm]	40	60
Diameter of clearing hole in the fixture	d_f	[mm]	8	8
Max fixture thickness	$t_{fix,max}$	[mm]	L - h_{nom}	L - h_{nom}
Minimum concrete member thickness	h_{min}	[mm]	80	100
Minimum edge distance	C_{min}	[mm]	35	40
Minimum anchor spacing	S_{min}	[mm]	35	40
Max. impact screw driver torque		[Nm]	160	160



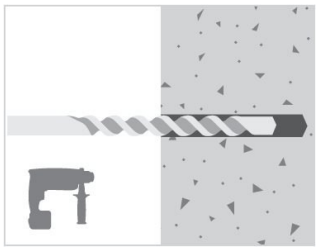


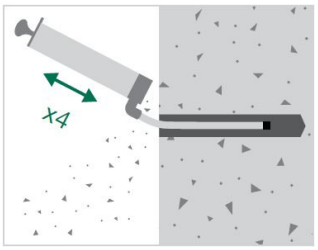


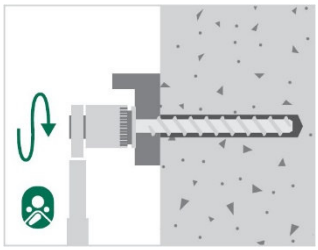


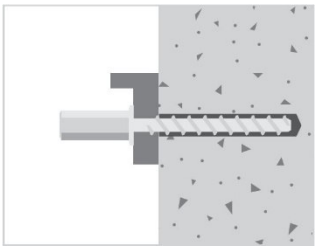


Instructions for installation in concrete









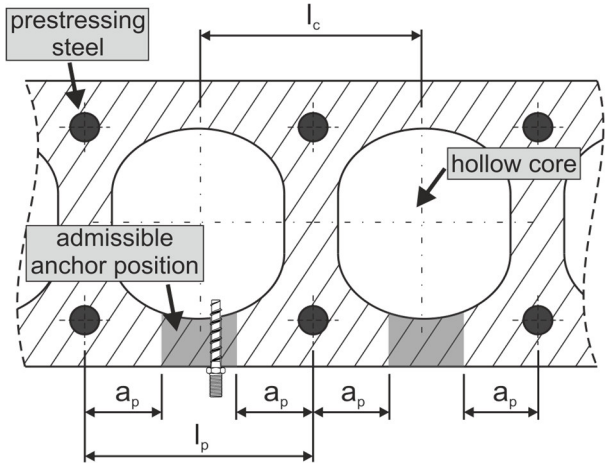
Recommended loads for multiple use for non-structural applications in C20/25 concrete for single anchors[1)]

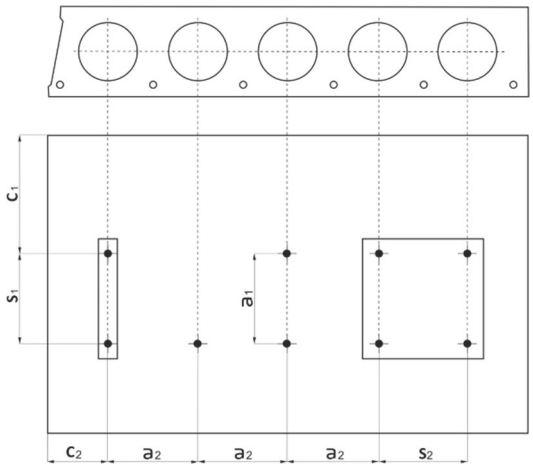
Anchor Type			WCS1N, WCS1M, WCS1P, WCS1H	
Anchor Size			6	6
Nominal embedment depth	h_{nom}	[mm]	35	55
Tension				
Recommended load for cracked and non-cracked concrete[2)]	N_{rec}	[kN]	0.60	3.57
Shear				
Recommended load for cracked concrete[2)]	V_{rec}	[kN]	2.40	4.00
Recommended load for non-cracked concrete[2)]	V_{rec}	[kN]	3.40	4.00

1) Single anchors are anchors not affected by concrete edge and anchor spacing influence.
2) Recommended load includes partial safety factor and an overall partial safety factor for action of 1.4. The partial safety factor for action depends on the type of loading and shall be taken from national regulations. All anchor failure modes and the entire relevant product European Technical Assessment must be considered for anchor design.

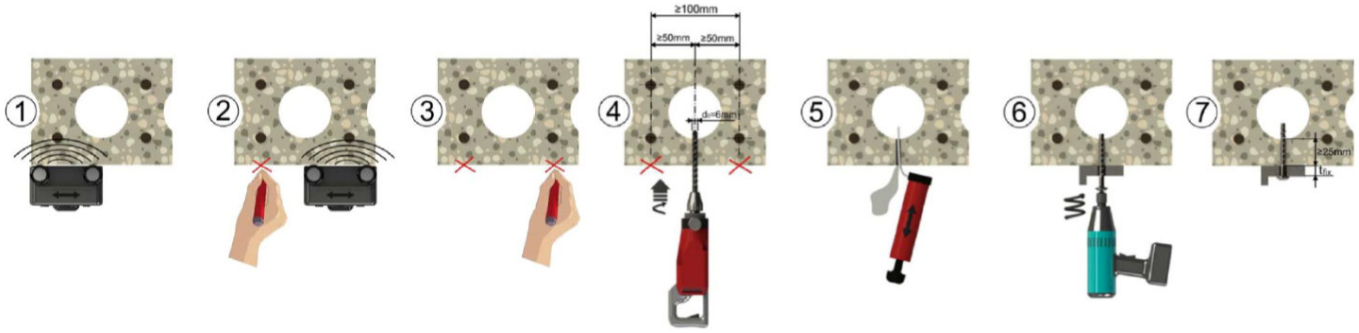
Installation parameters for precast prestressed hollow core slabs

Anchor Type			WCS1N, WCS1M, WCS1P, WCS1H
Anchor Size			6
Minimum edge distance	C_{min}	[mm]	≥ 100mm
Minimum anchor spacing	S_{min}	[mm]	≥ 100mm
Minimum distance between anchor groups	S_{min}	[mm]	≥ 100mm
Core distance	l_c	[mm]	≥ 100mm
Prestressing steel distance	l_p	[mm]	≥ 100mm
Distance between anchor positions and prestressing steel	a_p	[mm]	≥ 50mm





Instructions for installation precast prestressed hollow core slabs



Recommended loads for multiple use for non-structural applications in precast prestressed hollow core slabs C30/37 to C50/60 for single anchors[1)]

Anchor Type			WCS1N, WCS1M, WCS1P, WCS1H		
Anchor Size			6		
Bottom flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 35
All load directions					
Recommended load[2)]	F_{Rec}	[kN]	0.4	0.8	1.2

1) Single anchors are anchors not affected by concrete edge and anchor spacing influence.
2) Recommended load includes partial safety factor and an overall partial safety factor for action of 1.4. The partial safety factor for action depends on the type of loading and shall be taken from national regulations. All anchor failure modes and the entire relevant product European Technical Assessment must be considered for anchor design.

Recommended loads for multiple use for non-structural applications in concrete under fire exposure for single anchors[1) 2)]

Anchor Type				WCS1N, WCS1M, WCS1P, WCS1H	
Anchor Size				6	6
Nominal embedment depth		h_{nom}	[mm]	35	55
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$)					
Fire resistance class R30-R120					
R30	Characteristic resistance for all directions	$F_{Rk,s,fi30}$	[kN]	0.9	1.2
R60		$F_{Rk,s,fi60}$	[kN]	0.8	1.2
R90		$F_{Rk,s,fi90}$	[kN]	0.6	1.2
R120		$F_{Rk,s,fi120}$	[kN]	0.4	0.8
R30	Characteristic bending resistance	$M^0_{Rk,s,fi30}$	[kN]	0.9	1.2
R60		$M^0_{Rk,s,fi60}$	[kN]	0.8	1.2
R90		$M^0_{Rk,s,fi90}$	[kN]	0.6	1.2
R120		$M^0_{Rk,s,fi120}$	[kN]	0.4	0.8
R30-R120	Edge distance	$C_{cr,fi}$	[mm]	2 x h_{ef}	
R30-R120	Spacing	$S_{cr,fi}$	[mm]	4 x h_{ef}	

The characteristic resistance for pull-out failure, concrete cone failure, concrete pry-out failure and concrete edge failure shall be calculated according to TR 020 or CEN/TS 1992/4
1) Single anchors are anchors not affected by concrete edge and anchor spacing influence.
2) Not for using in prestressed hollow core slabs

The definition and requirements of multiple use for non-structural applications

The definition of multiple use according to the Member States is given in ETAG 001 Part 6, Annex 1. In the absence of a definition by a Member State the following default values may be taken:

Minimum number of anchors per fixing point	Minimum number of fixing points	Maximum design value of actions per fixing point
[n_1]	[n_2]	[n_3]
3	1	2.0 kN
4	1	3.0 kN

The maximum design value of actions per fixing point might be increased if in the design it is shown that the requirements on the strength and stiffness of the fixture in the serviceability and ultimate states after the failure of one anchor are fulfilled.

Design method for anchorages for multiple use for non-structural applications

The design of the fixture is such that, in the case of excessive slip or failure of one anchor, the load can be transmitted to neighbouring anchors without significantly violating the requirements on the fixture in the serviceability and ultimate limit state.

For example the design of the fixture may specify the number n_1 of fixing points to fasten the fixture and the number n_2 of anchors per fixing point. Furthermore by specifying the design value of actions N_{Sd} on a fixing point to a value ≤ n_3 (kN) up to which the strength and stiffness of the fixture are fulfilled and the load transfer in the case of excessive slip or failure of one anchor need not to be taken into account in the design of the fixture.