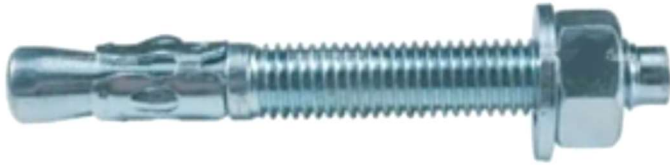


CSA Wedge Anchor

Expansion anchor for uncracked concrete



Sizes	Benefits	Applications
CSA (M8-M16)	- Torque-controlled mechanical expansion allows immediate load application - Setting mark - Cold-formed to prevent breaking during installation - Raised impact section prevents thread damage during installation - Drill bit size is same as anchor size for easy installation.	- Cable Tray - Machine - Fences - Fastening of Seats - Handrail

Base material

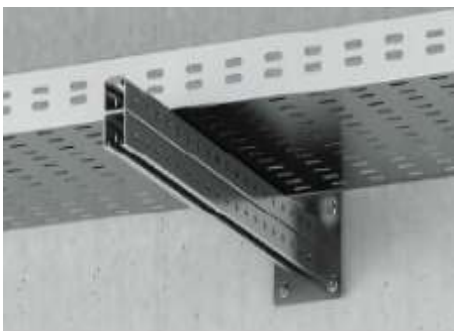


Concrete C20/25, non-cracked

Basic loading data (for a single anchor)

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Concrete as specified in the table
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$



Effective anchorage depth for static ^{a)}

Anchor size			M8		M10		M12		M16	
Eff. anchorage depth range	h_{ef}	[mm]	30	40	40	50	50	65	65	80

Mean ultimate resistance

Anchor size			M8		M10		M12		M16	
Tension $N_{Ru,m}$	CSA	[kN]	3.4	6.9	8.6	12.1	13.8	17.2	20.7	25.9
Shear $V_{Ru,m}$	CSA	[kN]	3.4	6.9	8.6	12.1	13.8	17.2	20.7	25.9

Characteristic resistance

Anchor size			M8		M10		M12		M16	
Tension N_{Rk}	CSA	[kN]	2.0	3.9	4.9	6.9	7.8	9.8	11.8	14.7
Shear V_{Rk}	CSA	[kN]	2.0	3.9	4.9	6.9	7.8	9.8	11.8	14.7

Design resistance

Anchor size			M8		M10		M12		M16	
Tension N_{Rd}	CSA	[kN]	1.4	2.8	3.5	4.9	5.6	7.0	8.4	10.5
Shear V_{Rd}	CSA	[kN]	1.4	2.8	3.5	4.9	5.6	7.0	8.4	10.5

Recommended loads ^{a)}

Anchor size			M8		M10		M12		M16	
Tension N_{Rec}	CSA	[kN]	1.0	2.0	2.5	3.5	4.0	5.0	6.0	7.5
Shear V_{Rec}	CSA	[kN]	1.0	2.0	2.5	3.5	4.0	5.0	6.0	7.5

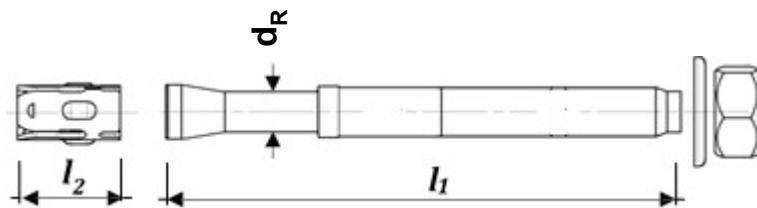
- a) With overall partial safety factor for action $\gamma = 1.4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.
- b) As recommended loads are given in the table, combinations of tensile and shear loads, bending moments and reduced edge and axial spacing (anchor groups) cannot be carried out.

Materials**Mechanical properties ^{a)}**

Anchor size			M8		M10		M12		M16	
Nominal tensile strength	f_{uk}	[N/mm ²]	400		400		400		400	
Yield strength	f_{yk}	[N/mm ²]	320		320		320		320	
Stressed cross-section, thread	A_s	[mm ²]	36,6		58,0		84,3		157	
Stressed cross-section, neck	$A_{s, neck}$	[mm ²]	26,9		39,6		63,6		105,7	
Moment of resistance	W	[mm ³]	31,2		62,3		109,2		277,5	
Char. bending resistance for rod or bolt with 5.8 steel grade	$M^0_{Rk,s}$	[Nm]	15.0		29.9		52.4		133.2	

Material quality

Part		Material
Bolt	CSA	Carbon steel, galvanized to min. 5 μ m

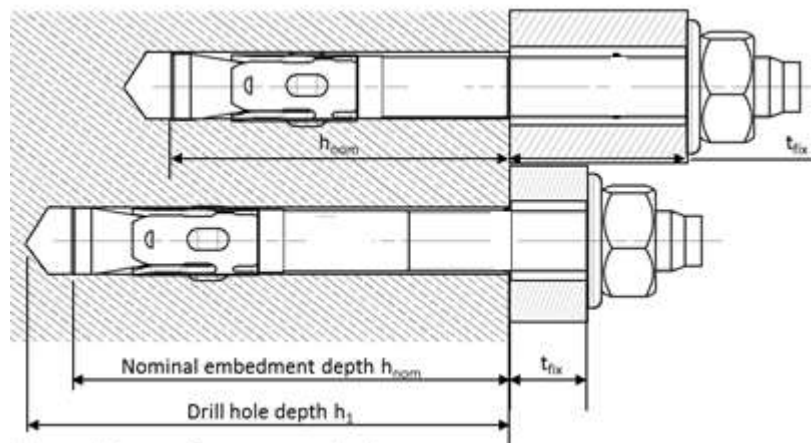


Setting information

Setting details ^{a)}

Anchor size			M8		M10		M12		M16	
Effective anchorage depth	h_{ef}	[mm]	30	40	40	50	50	65	65	80
Nominal embedment depth	h_{nom}	[mm]	39	49	51	61	62	77	81	96
Nominal diameter of drill bit	d_0	[mm]	8		10		12		16	
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45		10,45		12,5		16,5	
Depth of drill hole	$h_1 \geq$	[mm]	45	55	60	70	70	85	90	105
Min. thickness of fixture ^{b)}	$t_{fix,min}$	[mm]	5	0	5	0	5	0	5	0
Max. thickness of fixture ^{b)}	$t_{fix,max}$	[mm]	20	10	35	25	70	55	35	20
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9		12		14		18	
Torque moment	T_{inst}	[Nm]	15		30		50		100	
Width across nut flats	SW	mm]	13		17		19		24	

a) The values are only valid for CSA with standard washer.



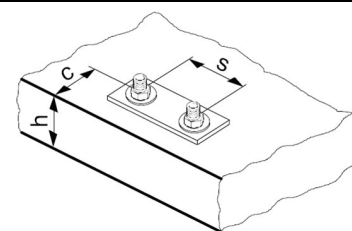
Installation equipment

Anchor size	M8	M10	M12	M16
Rotary hammer	Hammer Drill Bosch/ Makita			
Other tools	Blow out pump, hammer, torque wrench			

Setting parameters ^{a)}

Anchor size			M8		M10		M12		M16	
Effective anchorage depth	CSA	h_{ef} [mm]	30	40	40	50	50	65	65	80
Minimum base material thickness	CSA	$h_{min} \geq$ [mm]	100	100	100	120	140	140	130	170
Minimum spacing	CSA	$s_{min} \geq$ [mm]	60	60	70	70	80	80	120	100
Minimum edge distance	CSA	$c_{min} \geq$ [mm]	60	60	70	70	90	90	120	100
Critical spacing for splitting failure ^{b)}	CSA	$s_{cr,sp}$ [mm]	180	240	240	300	300	390	390	480
Critical edge distance for splitting failure ^{b)}	CSA	[mm]	90	120	120	150	150	195	195	240
Critical spacing for concrete cone failure ^{b)}	CSA	$s_{cr,N}$ [mm]	90	120	120	150	150	195	195	240
Critical edge distance for concrete cone failure ^{b)}	CSA	$c_{cr,N}$ [mm]	45	60	60	75	75	97,5	97,5	120

a) In a case of smaller edge distance and spacing than $c_{cr,sp}$, $s_{cr,sp}$, and $s_{cr,N}$ the load values shall be reduced according ETAG 001, Annex C.



Setting instruction

- The CSA suitable for pre-positioned and push-through installation.
- Prior to installation, place the hex nut in the optimal position (the drive-in pin projects by approx. 3 mm out of the hex nut).
- When the torque is applied, the cone bolt is pulled into the expansion clip and expands it against the drill hole wall.

