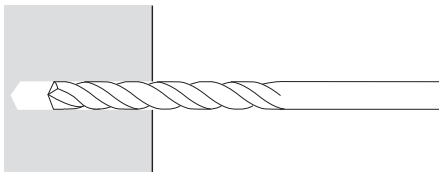
EXPANDET®

Technical Sheet No. 313

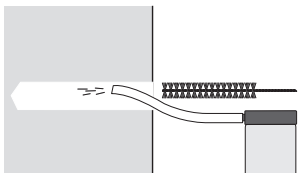
EXPANSION BOLT

Installation:

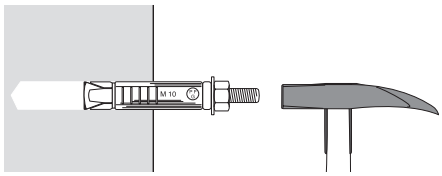
For fixing of heavy objects in solid brick and concrete



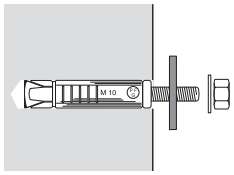
1 Drill a hole with correct diameter and depth



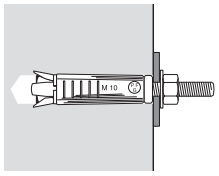
2 Clean the drilled hole thoroughly



3 Insert the Expansion Bolt flush with the wall



4 Mount the fixture and tighten the nut to required setting torque



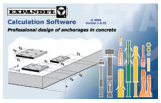
5 The installation i finished

Note Only use M6 and M8 bolts in solid brick

Advantages:

Extensive programme.
High load capacities in solid materials.
Fixture can be removed without affecting the anchor.
Torque-controlled expansion.

Anchorage can be designed in Expandet Calculation Software.



Materials:

Expansion Bolt is supplied with:

Cone:	8.8 steel in accordance with EN 20898-2
Shield:	Cold formed steel, zink plated min. 5 μm.
Ferrule:	Cold formed (EN 10205)
Spring coil:	DIN 17223 BL 1, class B

Approvals:

Expansion Bolt M6-M12 with bolt in 8.8 steel are CE marked and have European Technical Approval (ETA) in option 8 (ETA-01/0012)

ETA CE
European Technical Approval - Option 8

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Technical Sheet No. 313 CE

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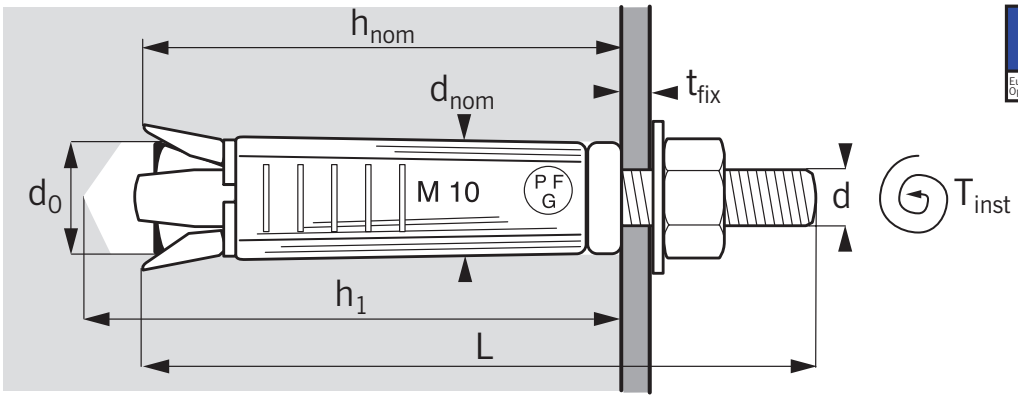

European Technical Approval - Option 8

Type	Dimensions				Fixing					Load Capacities			
Sortiment	**d**	**d_{nom}**	**L**	**t_{fix}**	**d_0**	**h_1**	**h_{nom}**	**T_{inst}**	**h_{min}**	**S_{rec}**	**C_{rec}**	**N_{Rd}**	**V_{Rd}**
Expandet Expansion Bolt	Bolt dia-meter mm	Outside diameter of anchor mm	Anchor length mm	Thickness of fixture (Max.) mm	Drill hole diameter mm	depth of drill hole (Min.) mm	Embed-ment depth mm	Required setting torque Nm	Thickness of concrete member, min. mm	Recom-mended spacing mm	Recom-mended edge distance mm	**Design resistance** tension kN◆	**Design resistance** shear kN◇
K550AC	M6	10	60	15	10	55	40	6,0	100	60	60	3,3	6,4
K560AC	M6	10	75	30	10	55	40	6,0	100	60	60	3,3	6,4
K590AC	M8	14	85	30	14	55	40	14,0	100	75	75	6,0	9,9
K600AC	M8	14	75	20	14	65	50	14,0	100	75	75	6,0	9,9
K610AC	M8	14	100	45	14	65	50	14,0	100	75	75	6,0	9,9
K650AC	M10	16	90	20	16	75	60	27,0	120	90	90	8,0	18,4
K680AC	M10	16	100	30	16	75	60	27,0	120	90	90	8,0	18,4
K670AC	M10	16	110	40	16	75	60	27,0	120	90	90	8,0	18,4
K690AC	M10	16	120	50	16	75	60	27,0	120	90	90	8,0	18,4
K700AC	M10	16	140	70	16	75	60	27,0	120	90	90	8,0	18,4
K750AC	M12	20	110	20	20	100	80	46,0	160	120	120	10,6	26,4
K770AC	M12	20	120	30	20	100	80	46,0	160	120	120	10,6	26,4
K800AC	M12	20	155	65	20	100	80	46,0	160	120	120	10,6	26,4
K870AC	M16	25	140	25	25	120	110	110,0	200	150	150	11,9	50,2

◆ Design resistance for tension is valid for a single anchor in concrete C20/25 (B20) not influenced by edge distance and/or spacing:
$C \geq C_{min}$ and $S \geq 3\ h_{ef}$.
$\Psi_{re,N} = 1$ (Normal reinforcement according to ETAG 001, Annex C - 5.2.2.4).

◇ Design resistance for shear is valid for a single anchor in concrete ≥C20/25 (B20) not influenced by edge distance and/or spacing:
$C \geq 10\ h_{ef}$ and $S \geq 3\ h_{ef}$.

combined resistance shall be verified if both tension and shear actions are applied. See "*Principles for fastening*" page 5 (Verification method 2).

Partial safety factor for material (γ_m) is included in accordance with product ETA. Partial safety factor for actions γ_f has to be applied in accordance with national building code. Max. recommended permissible load capacity: N_{Rd};V_{Rd} divided with γ_f. If no guidance for γ_f exists ETAG 001, Annex C recommends factor 1,35 for permanent actions and factor 1,5 for variable actions.

When calculating load capacities for anchors or anchorgroup use Expandet Calculation Software allowing for design with individual edge distance and spacing in accordance with ETAG 001, Annex C, Design Metode A.
Download Expandet Calculation Software for free at www.expandet.com.

Important: Read Expandet's "*Principles for fastening*" for general information on fastening as well as information on limited liability. (Can be downloaded at www.expandet.com)

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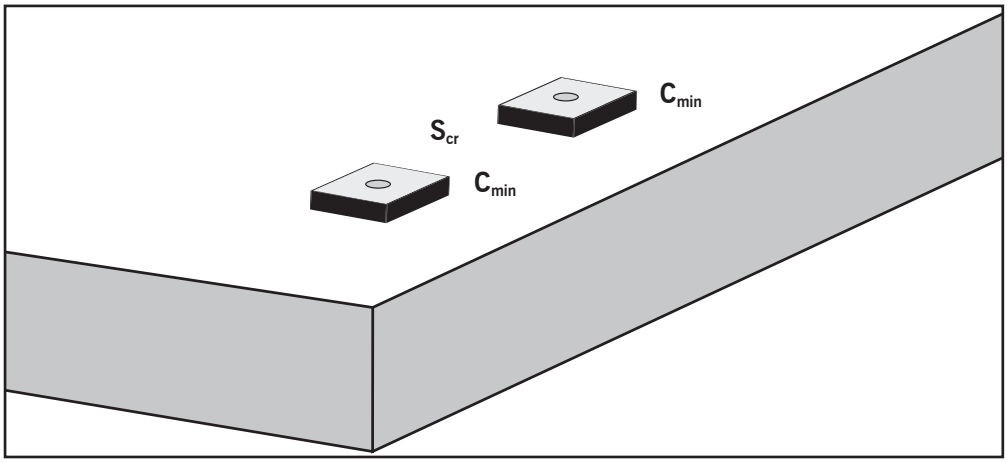

Design shear load capacities for a single anchor at minimum edge distance (C_{min})

Expansion shield		M6	M8	M10	M12	M16
h_{nom} (embedment depth)	mm	40	50	60	80	
$V_{Rd,c}$	kN	3,7◆	5,6◆	7,9◆	13,8◆	
C_{min}	mm	60	75	90	120	150
S_{cr}	mm	180	225	270	360	450

◆ Design shear load capacity is valid at minimum edge distance in concrete C20/25 providing that spacing is ≥ S_{cr} and the use of threaded rod or similar in minimum 8.8 steel.

Partial safety factor for edge failure (γ_{mc}) is included in accordance with product ETA.

Use Expandet Calculation Software for calculation of load capacities for single anchors and anchor groups in accordance with ETAG 001, Annex C - Design metode A.

Design shear load capacities (steel failure) and resistance against bending (lever arm) for Expansion Bolt

Expansion shield		M6	M8	M10	M12	M16
$V_{Rd,S}$	kN	6,4◆	11,2◆	18,4◆	26,4◆	50,2◆
M_{Rd}	Nm	9,6◆	24,0◆	48,0◆	84,0◆	212,0◆

◆ Design shear load capacity includes safety factor for material (γ_{ms}) in accordance with product ETA.

Use Expandet Calculation Software for calculation of load capacities for single anchors and anchor groups in case of fixings affected by bending due to either distance or non-bearing mounting surface in accordance with ETAG 001, Annex C - Design metode A.

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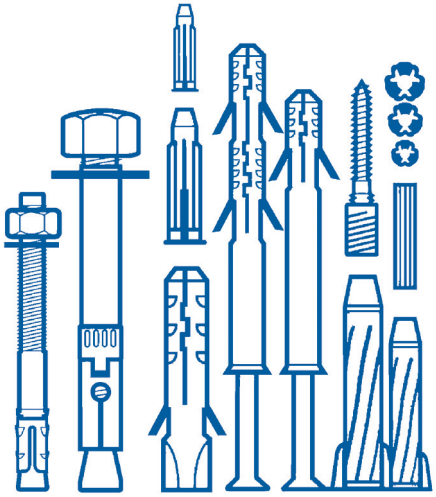
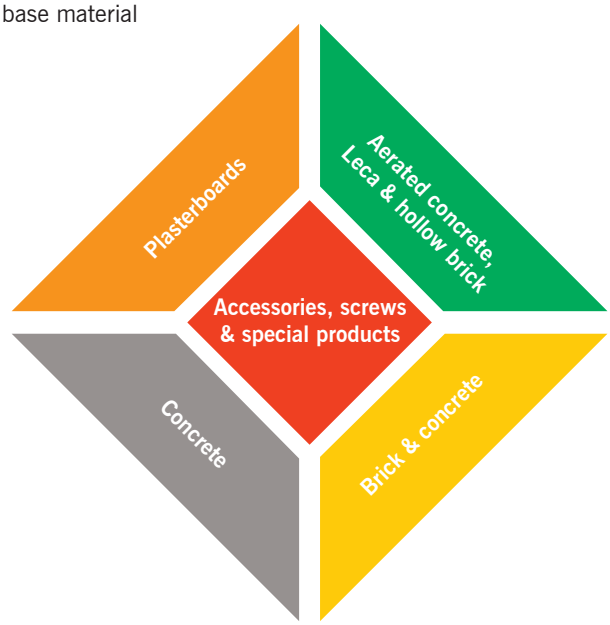


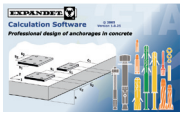
Expandet Screw Anchors A/S was established in 1955 and was pioneers in the field of fastener products for concrete and brickwork - being the first company to patent a fastener made in plastic. We are devoted to a constant development of our product range, which now covers the entire range of anchors and fasteners for both professional and DIY.

We have - with our base-material orientated colour code system - made it easy to choose the right anchor for the right base material



EXPANDET CALCULATION SOFTWARE

Expandet Calculation Software offers the possibility for design of single anchors and anchors groups in concrete according to ETAG 001, Annex C with our range of products that are defined according to CC Method. This includes our range of anchor systems approved for structural connections with CE-marking.



TERMINOLOGY

Code	Unit	Definition
d	Mx	Bolt diameter
d_{nom}	mm	Outside diameter of anchor
L	mm	Anchor length
L_{bolt}	mm	Bolt / screw length
L_{thread}	mm	Length of metric thread
L_{th}	mm	Available internal thread length
L_{sdmin}	mm	Minimum screw in depth
d_o	mm	Drill hole diameter
h_1	mm	Depth of drilled hole
h_{nom}	mm	Anchor embedment depth
h_{ef}	mm	Effective anchorage depth
h	mm	Thickness of member (concrete, brickwall etc.)
h_{min}	mm	Minimum thickness of member
h_f	mm	Minimum cavity behind wall
t_{fix}	mm	Thickness of fixture
$b_{fix1; 2}$	mm	Witdt of fixture: b_{fix1} (direction 1) & b_{fix2} (direction 2)
T_{inst}	Nm	Required setting touque
S	mm	Spacing between anchors in an anchorgroup
S_1; S_2	mm	Spacing between anchors in an anchorgroup: S_1 (direction 1) & S_2 (direction 2)
$S_{cr, N}$	mm	Characteristic spacing for ensuring the transmission of the characteristic resistance of a single anchor in case of concrete cone failure
$S_{cr, sp}$	mm	Characteristic spacing for ensuring the transmission of the characteristic resistance of a single anchor in case of splitting failure
S_{rec}	mm	Recommended spacing (for full resistance)
S_{min}	mm	Minimum allowable spacing
S_{cr}	mm	Characteristic spacing at a defined edge distance
C	mm	Edge distance
C_1;C_2	mm	Edge distance fra anchor to edge: C_1 (direction 1) & C_2 (direction 2)
$C_{cr, N}$	mm	Characteristic edge distance for ensuring the transmission of the characteristic resistance of a single anchor in case of concrete cone failure
$C_{cr, sp}$	mm	Characteristic edge distance for ensuring the transmission of the characteristic resistance of a single anchor in case of splitting failure
C_{rec}	mm	Recommended edge distance (for full resistance)
C_{min}	mm	Minimum allowable edge distance
C_{cr}	mm	Characteristic edge distance at a difined spacing
N_{Rd}	kN	Design resistance, tension
$N_{Rd, s}$	kN	Design resistance, tension (steel failure)
$N_{Rd, p}$	kN	Design resistance, tension (pull out failure)
$N_{Rd, c}$	kN	Design resistance, tension (concrete cone failure)
$N_{Rd, sp}$	kN	Design resistance, tension (splitting failure)
V_{Rd}	kN	Design resistance, shear
$V_{Rd, s}$	kN	Design resistance, shear (steel failure)
$V_{Rd, c}$	kN	Design resistance, shear (concrete pryout failure, concrete edge failure)
F_{Rd}	kN	Design resistance, independent of load directioin
M_{Rd}	Nm	Design resistance, bending moment
γ_M		Partial safety factor for material
γ_{Ms}		Partial safety factor for material, steel failure
γ_{Mp}		Partial safety factor for material, pull out failure
γ_{Mc}		Partial safety factor for material, concrete cone failure
γ_{Msp}		Partial safety factor for material, splitting failure
N_{Sd}	kN	Design value of tensile actions acting on a single anchor or the fixture of an anchor group
V_{Sd}	kN	Design value of shear actions acting on a single anchor or the fixture of an anchor group
γ_f		Partial safety factor for actions
N_{rec}	kN	Maximum recommended tension load
V_{rec}	kN	Maximum recommended shear load
F_{rec}	kN	Maximum recommended load, independent of load direction
f_{ck}	N/mm²	Characteristic concrete compression strength messured on cylinders
$f_{ck, cube}$	N/mm²	Characteristic concrete compression strength messured on cubes
F_{yk}	N/mm²	Characteristic steel yield strength
F_{uk}	N/mm²	Characteristic steel ultimate tensile strength

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