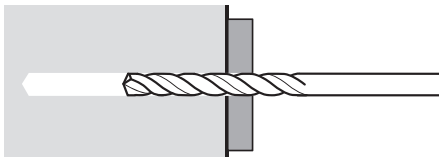
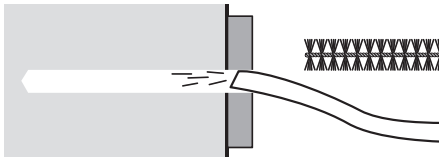
# MULTI-MONTI

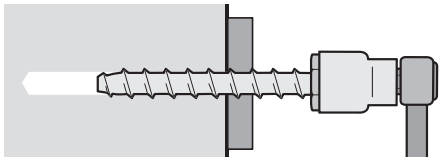
## Installation:



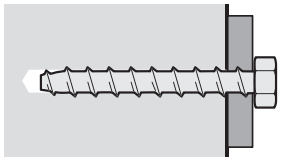
1 Drill a hole with correct diameter and depth through fixture and into the concrete



2 Clean the drilled hole thoroughly



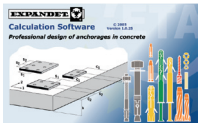
3 Screw in the Multi-Monti - manual or machine driven



4 The installation is finished

## Advantages:

Expansion free.
Through fixing.
Installation is economic and easy - without use of special tools.
Reduction of installation time up to 50%.
Torque control is not required.
Can be installed close to edges.
Anchorages can be designed in Expandet Calculation Software.




**For fixing of brackets, balcony railings, suspended ceilings, wood- and steel structures etc. in concrete and other solid base materials**

## Materials:

Multi-Monti is supplied in zinc plated minimum 5 $\mu$m.
Zinc plated: Steel in accordance with EN 10263-4
Multi-Monti in Stainless A4 and HCR steel is only supplied on request.

## Approvals:

**Zinc plated:**
M 6 to M10 are fire tested in accordance with DIN 4102-1.
M7,5 to M10 are VdS-approved.

Fire Resistance Classification F120

VdS

EXPANDET®

EXPANDET SCREW ANCHORS A/S
Svendebuen 2-6
3230 Græsted
Danmark

Telephone: +45 70 22 79 79
Telefax: +45 70 22 79 89

www.expandet.com
expandet@expandet.dk

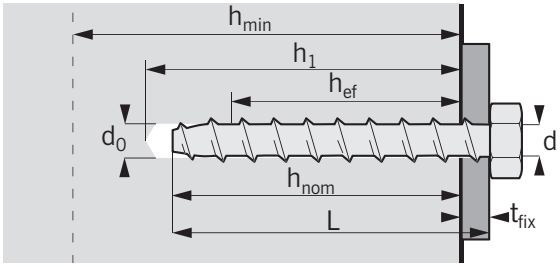
Version 09.001

Grafik: Vedkom / Expandet

# Technical Sheet No. 401b

EXPANDET

# MULTI-MONTI




| Type | | Dimensions | | | | Fixing | | | | | | | | Load Capacities | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Non-cracked concrete | | Cracked concrete | |
| | | d | L | | $t_{fix}$ | $d_0$ | $h_1$ | $h_{nom}$ | $h_{ef}$ | $T_{inst}$ | $h_{min}$ | $S_{min}$ | $C_{min}$ | $N_{Rd}$ | $V_{Rd}$ | $N_{Rd}$ | $V_{Rd}$ |
| Multi-Monti | | Bolt diameter mm | Anchor length mm | Key size mm | Thickness of fixture (Max.) mm | Drill diameter mm | Depth of drilled hole (Min.) mm | Embedment depth mm | Effective anchorages depth mm | Max. setting torque Nm (1) | Thickness of concrete member, min., mm | Minimum allowable spacing mm | Minimum allowable edge distance mm | Design resistance tension kN◆ | shear kN◇ | Design resistance tension kN◆ | shear kN◇ |
| **with internal combi thread, zinc plated** | | | | | | | | | | | | | | | | | |
| MMS-I | 7,5x55 | 7,5 | 55 | 13 | - | 6 | 60 | 55 | 40,0 | - | 100 | 50 | 50 | 4,1 | 4,9 | 2,9 | 4,9 |
| **with external thread, zinc plated** | | | | | | | | | | | | | | | | | |
| MMS-ST | 6x60 | 6 | 60 | 8 | 15 | 5 | 55 | 50 | 36,5 | 12 | 90 | 40 | 30 | 4,2 | 4,1 | 3,6 | 4,1 |
| MMS-ST | 7,5x70 | 7,5 | 70 | 10 | 25 | 6 | 55 | 50 | 36,0 | 20 | 90 | 40 | 40 | 3,6 | 4,9 | 2,5 | 4,9 |
| MMS-ST | 10x80 • | 10 | 80 | 13 | 25 | 8 | 65 | 55 | 39,0 | 50 | 100 | 50 | 50 | 5,6 | 10,7 | 4,1 | 10,7 |
| **with large head, zinc plated** | | | | | | | | | | | | | | | | | |
| MMS-MS | 7,5x50 | 7,5 | 50 | T30 | 5 | 6 | 50 | 45 | 31,5 | 20 | 90 | 50 | 50 | 3,3 | 4,9 | 2,2 | 4,2 |
| **with pan head, zinc plated** | | | | | | | | | | | | | | | | | |
| HMS-P | 5x30 | 5 | 30 | T20 | 1 | 4 | 35 | 30 | 20,5 | - | 80 | 30 | 30 | 1,8 | 2,6 | 1,3 | 2,2 |
| HMS-P | 5x50 | 5 | 50 | T20 | 15 | 4 | 40 | 35 | 24,8 | - | 80 | 30 | 30 | 2,5 | 2,6 | 1,8 | 2,6 |
| **with countersunk head, zinc plated** | | | | | | | | | | | | | | | | | |
| HMS-F | 6x40 | 6 | 40 | T30 | 10 | 5 | 35 | 30 | 19,5 | - | 90 | 40 | 30 | 2,0 | 3,5 | 1,4 | 2,5 |
| MMS-F | 6x60 | 6 | 60 | T30 | 15 | 5 | 50 | 45 | 32,3 | - | 90 | 40 | 30 | 3,0 | 3,9 | 2,0 | 3,6 |
| MMS-F | 6x80 | 6 | 80 | T30 | 35 | 5 | 50 | 45 | 32,3 | - | 90 | 40 | 30 | 3,0 | 3,9 | 2,0 | 3,6 |
| **with eye, zinc plated** | | | | | | | | | | | | | | | | | |
| HMS-R | 6x40 | 6 | 40 | Tool | - | 5 | 45 | 40 | 28,0 | - | 90 | 40 | 30 | 2,2 | 1,9 | 1,6 | 1,9 |

• Included in ETA-approval.

◆ Design resistance for tension is valid for a single anchor in concrete C20/25 not influenced by edge distance and/or spacing: $C \geq 1{,}5\ h_{ef}$ and $S \geq 3\ h_{ef}$. If $1{,}5\ h_{ef} < C_{min}$: $C \geq C_{min}$ 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 not influenced by edge distance and/or spacing: $C \geq 10\ h_{ef}$ and $S \geq 3\ h_{ef}$.

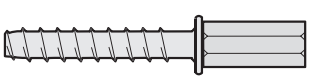
(1) Torque is recommended maximum.

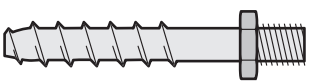
Combined resistance shall be verified if both tension and shear actions are applied. See *"Principles for Fastening"* page 5 (Verification Method 2).

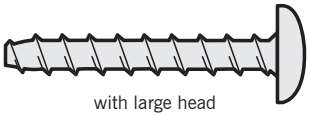
Partial safety factor for material ($\gamma_m$) is included. Partial safety factor for action ($\gamma_f$) has to be applied in accordance with national building code. If no guidance for $\gamma_f$ exists ETAG 001, Annex C recommends factor 1,35 for permanent actions and factor 1,5 for variable actions.

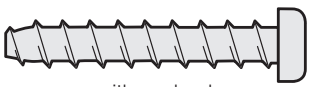
When calculating load capacities for anchors or anchorgroup use Expandet Calculation Software allowing for design with individual edge distance and spacing in accordance with ETAG 001, Annex C, Design Method A. Download Expandet Calculation Software for free at www.expandet.com.

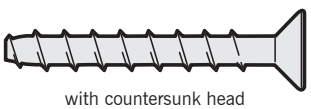
**Important:** See Expandet's "*Principles for fastening*" for general information on fastening as well as information on limited liability.
(Can be downloaded at www.expandet.com)

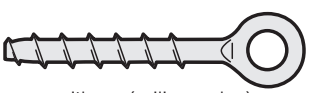

with internal combi thread


with external thread


with large head


with pan head


with countersunk head


with eye (ceiling anchor)


EXPANDET

EXPANDET SCREW ANCHORS A/S
Svendebuen 2-6
3230 Græsted
Danmark

Telephone: +45 70 22 79 79
Telefax: +45 70 22 79 89

www.expandet.com
expandet@expandet.dk



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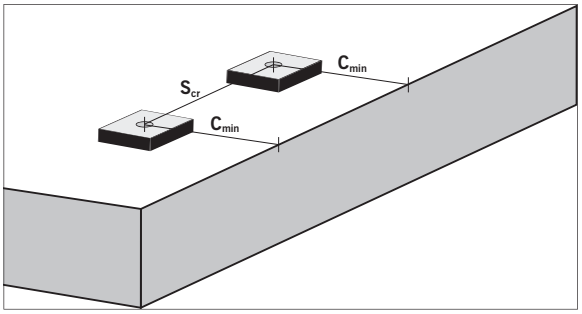
# MULTI-MONTI




## Design shear load capacity for a single anchor at minimum edge distance ($C_{min}$)◆

| HMS EG / MMS EG | | HMS-P | | MMS-St 6 | MMS-St 7,5 | MMS-St 10 | HMS-F 6x40 | MMS-F 6x60 | MMS-F 6x80 | MMS-I | MMS-MS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h_{nom}$ Embedment depth | mm | 30 | 35 | 50 | 50 | 65 | 30 | 45 | 45 | 55 | 45 |
| $V_{Rd,c}$ (cracked concrete) | kN* | 0,7 | 0,7 | 1,2 | 1,3 | 2,1 | 0,9 | 1,2 | 1,2 | 1,4 | 1,3 |
| $V_{Rd,c}$ (non-cracked concrete) | kN* | 0,9 | 1,0 | 1,7 | 1,9 | 2,9 | 1,2 | 1,7 | 1,7 | 1,9 | 1,8 |
| $C_{min}$ | mm | 30 | 30 | 30 | 40 | 50 | 30 | 30 | 30 | 40 | 40 |
| $S_{cr}$ | mm | 90 | 90 | 90 | 120 | 150 | 90 | 90 | 90 | 120 | 120 |

◆ Above design shear load capacity is valid at minimum edge distance in concrete C20/25 providing that characteristic spacing is ≥ $S_{cr}$. Partial safety factor for edge failure ($\gamma_{mc}$) is included.

Use Expandet Calculation Software for calculation of load capacities for single anchors and anchor groups in accordance with ETAG 001, Annex C - Design Method A. Get Expandet Calculation Software for free at www.expandet.com.

## Design shear load capacity for steel failure and resistance against bending (lever arm) for a single anchor, zinc plated◇

| HMS EG / MMS EG | | HMS-P | | MMS-St 6 | MMS-St 7,5 | MMS-St 10 | HMS-F 6x40 | MMS-F 6x60 | MMS-F 6x80 | MMS-I | MMS-MS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h_{nom}$ Embedment depth | mm | 30 | 35 | 50 | 50 | 65 | 30 | 45 | 45 | 55 | 45 |
| $V_{Rd,S}$ | kN | 2,6 | 2,6 | 4,1 | 4,6 | 10,7 | 4,1 | 4,1 | 4,1 | 4,6 | 4,6 |
| $M_{Rd}$ | Nm | | | 6,6 | 12,6 | 25,3 | 6,6 | 6,6 | 6,6 | 12,6 | 12,6 |

◇ Design shear load capacity include partial safety factor for material ($\gamma_{ms}$).

Use Expandet Calculation Software for calculation of load capacities for single anchors and anchor groups in accordance with ETAG 001, Annex C - Design Method A. Get Expandet Calculation Software for free at www.expandet.com.

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Svendebuen 2-6
3230 Græsted
Danmark

Telephone: +45 70 22 79 79
Telefax: +45 70 22 79 89

www.expandet.com
expandet@expandet.dk

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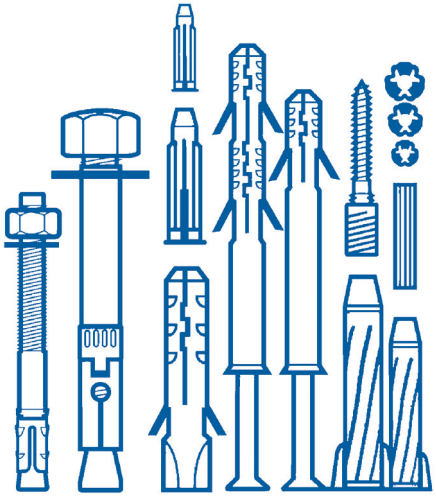
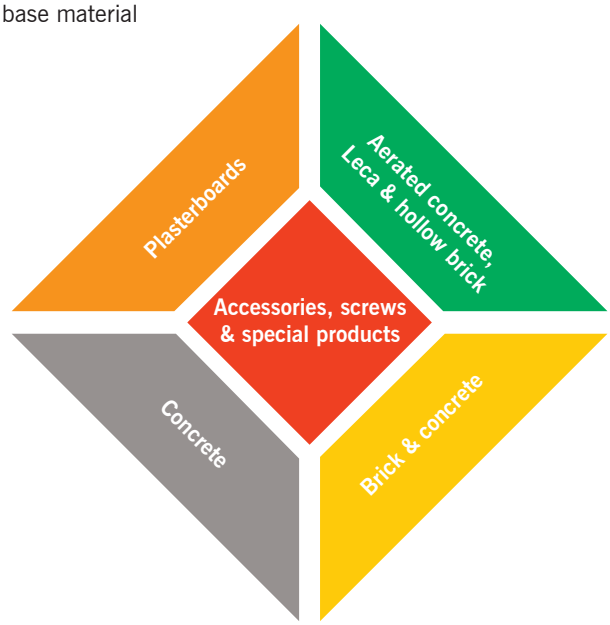
## EXPANDET SCREW ANCHORS A/S



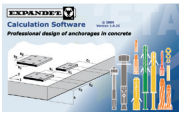
Expandet Screw Anchors A/S was established in 1955 and was pioneers in the field of fastener products for concrete and brickwork - being the first company to patent a fastener made in plastic. We are devoted to a constant development of our product range, which now covers the entire range of anchors 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 |
| $\gamma_M$ | | Partial safety factor for material |
| $\gamma_{Ms}$ | | Partial safety factor for material, steel failure |
| $\gamma_{Mp}$ | | Partial safety factor for material, pull out failure |
| $\gamma_{Mc}$ | | Partial safety factor for material, concrete cone failure |
| $\gamma_{Msp}$ | | 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 |
| $\gamma_f$ | | 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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Svendebuen 2-6
3230 Græsted
Danmark

Telephone: +45 70 22 79 79
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