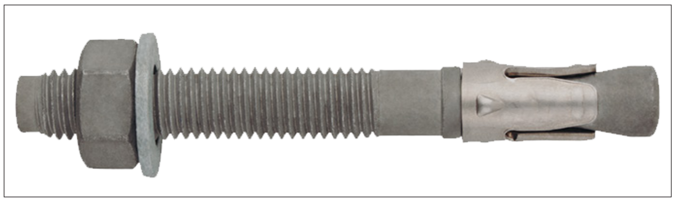
# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018



## PRODUCT DATA

**Head Type:** Hexagon Bolt

**Coating:** Galvanised 40μm (DIN 125 or DIN 9021)

**Nut:** Galvanised 40μm (DIN 934)

**Clip:** 304 Stainless Steel

## PRODUCT DESCRIPTION

The Macsim Wedge Anchor is an expansion anchor with controlled torque with an ETA Approval (Option 1) for use in cracked and non cracked concrete. **(38AG) - Complies with Australian standard AS5216: 2018.**

## DESIGN LOAD RANGE

From 5,00 to 33,3 kN (non-cracked).

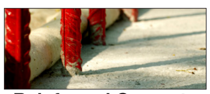
From 3,3 to 20,0 kN (cracked).

## BASE MATERIAL

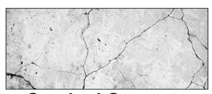
Concrete class from C20/25 to C50/60 cracked or non-cracked.

Stone

Concrete



Reinforced Concrete



Cracked Concrete

## APPLICATIONS

- Anchor plates.
- Metallic structures.
- Bridges.
- Urban fitments.
- Protective fences.
- Catenaries.
- Elevators.
- Pipe supports.

## • ASSESSMENTS

- Option 1 (Cracked and non-cracked concrete).
- Fire Resistance R30-120.

CE

12
Técnicas Expansivas S.L.
Segador 13. Logroño. Spain
ETA 12/0397
1219
Structural fixings in concrete

FIRE RESISTANCE

## INSTALLATION METHOD

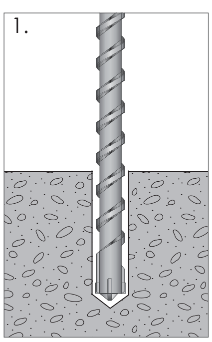
1. Drill Correct Diameter and depth of hole as specified.
2. Clean hole by brushing and blowing out dust carefully.
3. Push Anchor through fixture and hammer down until flush with surface.
4. Using a calibrated Torque Wrench apply correct torque setting as specified. The torque setting is critical, under torque may lead to slipping of the anchor before load capacity is reached, over torque may lead to permanent damage to the anchor and potential critical failure under loads.

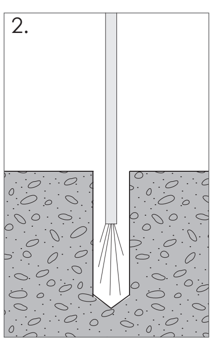
### OVERHEAD PROCEDURE

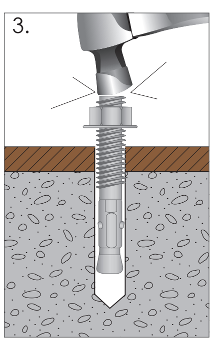
5. Following the installation procedure (steps 1-4 above) it is critical to ensure the Anchor is then locked into position. This is attained by pulling the Anchor down approximately 5mm away from the hole employing the use of a Claw Hammer or other applicable tool. This procedure ensures the Anchor is expanded fully and hence locked correctly into position.

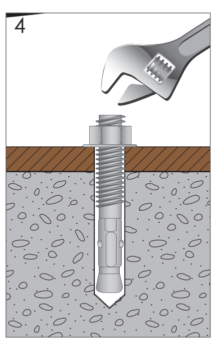
## ADVANTAGES

- Easy installation.
- Use in cracked and non-craked concrete.
- Use for medium-heavy duty loads.
- Pre-installation or through the drill-hole of the fixture.
- Variety of lengths and diameters: flexibility in assembly.
- For static and quasi-static loads.

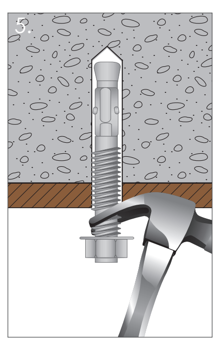



OVERHEAD PROCEDURE



# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

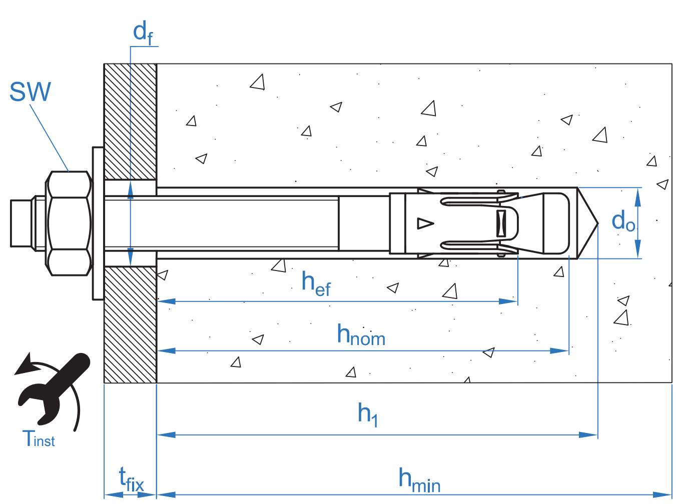
## MECHANICAL PROPERTIES

| SIZE | | | M10 | M12 | M16 |
|---|---|---|---|---|---|
| **Cone area section** | | | | | |
| $A_s$ | (mm²) | Cone area section | 41,8 | 55,4 | 103,9 |
| $f_{u,s}$ | (N/mm²) | Characteristic tension resistance | 750 | 730 | 700 |
| $f_{y,s}$ | (N/mm²) | Yield strength | 600 | 585 | 560 |
| **Threaded area section** | | | | | |
| $A_s$ | (mm²) | Cone area section | 58,0 | 84,3 | 157,0 |
| $f_{u,s}$ | (N/mm²) | Characteristic tension resistance | 600 | 600 | 600 |
| $f_{y,s}$ | (N/mm²) | Yield strength | 480 | 480 | 480 |

## INSTALLATION DATA

| SIZE | | | M10 | M12 | M16 |
|---|---|---|---|---|---|
| Code | | | 38AG10XXX | 38AG12XXX | 38AG16XXX |
| $d_0$ | (mm) | Nominal diameter of drill bit | 10 | 12 | 16 |
| $T_{ins}$ | (Nm) | Installation torque moment | 40 | 60 | 100 |
| $d_f \leq$ | (mm) | Diameter of clearance hole in the fixture | 12 | 14 | 18 |
| $h_1$ | (mm) | Minimum drill hole depth | 75 | 85 | 105 |
| $h_{nom}$ | (mm) | Installation depth | 68 | 80 | 97 |
| $h_{ef}$ | (mm) | Effective embedment depth | 60 | 70 | 85 |
| $h_{min}$ | (mm) | Minimum base material thickness | 120 | 140 | 170 |
| $t_{fix}$ | (mm) | Maximum thickness of fixture | L-80 | L-96 | L-117 |
| $S_{cr,N}$ | (mm) | Critical spacing | 180 | 210 | 255 |
| $C_{cr,N}$ | (mm) | Critical edge distance | 90 | 105 | 128 |
| $S_{cr,sp}$ | (mm) | Critical distance (splitting) | 300 | 350 | 510 |
| $C_{cr,sp}$ | (mm) | Critical edge distance | 150 | 175 | 255 |
| $S_{min}$ | (mm) | Minimum spacing | 60 | 70 | 128 |
| $C_{min}$ | (mm) | Minimum edge spacing | 60 | 70 | 128 |
| SW | (mm) | Installation wrench | 17 | 19 | 24 |

***L = Total anchor length**



## WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

### Resistances in C20/25 concrete for an isolated anchor, without effects of edge distance or spacing

#### Characteristic Resistance $N_{Rk}$ and $V_{Rk}$

| TENSION | | | | | | SHEAR | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | | M10 | M12 | M16 | SIZE | | | M10 | M12 | M16 |
| $N_{Rk}$ | Non-cracked concrete | kN | 16,0 | 30,0 | 35,0 | $V_{Rk}$ | Non-cracked concrete | kN | 17,4 | 25,3 | 47,1 |
| $N_{Rk}$ | Cracked concrete | kN | 9,0 | 16,0 | 25,0 | $V_{Rk}$ | Cracked concrete | kN | 17,4 | 25,3 | 47,1 |

#### Design Resistance $N_{Rd}$ and $V_{Rd}$

| TENSION | | | | | | SHEAR | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | | M10 | M12 | M16 | SIZE | | | M10 | M12 | M16 |
| $N_{Rd}$ | Non-cracked concrete | kN | 10,7 | 20,0 | 23,3 | $V_{Rd}$ | Non-cracked concrete | kN | 13,9 | 20,2 | 37,7 |
| $N_{Rd}$ | Cracked concrete | kN | 6,0 | 10,7 | 16,7 | $V_{Rd}$ | Cracked concrete | kN | 13,9 | 20,2 | 37,7 |

#### Maximum Loads Recommended $N_{rec}$ and $V_{rec}$

| TENSION | | | | | | SHEAR | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | | M10 | M12 | M16 | SIZE | | | M10 | M12 | M16 |
| $N_{rec}$ | Non-cracked concrete | kN | 7,6 | 14,3 | 16,7 | $V_{rec}$ | Non-cracked concrete | kN | 9,9 | 14,5 | 26,9 |
| $N_{rec}$ | Cracked concrete | kN | 4,3 | 7,6 | 11,9 | $V_{rec}$ | Cracked concrete | kN | 9,9 | 14,5 | 26,9 |

### Simplified calculation method

**European Technical Assessment ETA 12/0397**

Simplified version of the calculation method according to ETAG 001, annex C. Resistance is calculated according to the data shown in assessment ETA 12/0397.

- Influence of concrete strength.
- Influence of edge distance.
- Influence of spacing between anchors.
- Influence of reinforcements.
- Influence of base material thickness.
- Influence of load application angle.
- Valid for a group of two anchors.

The calculation method is based on the following simplification: Different loads do not act on individual anchors, without eccentricity.

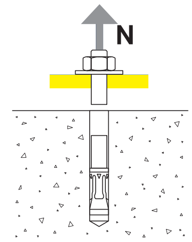
# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

## Tension Loads

- Steel design resistance: $N_{Rd,s}$
- Pull-out design resistance: $N_{Rd,p} = N^{o}_{Rd,p} \cdot \Psi_{c}$
- Concrete cone design resistance: $N_{Rd,c} = N^{o}_{Rd,c} \cdot \Psi_{b} \cdot \Psi_{s,N} \cdot \Psi_{c,N} \cdot \Psi_{re,N}$
- Concrete splitting design resistance: $N_{Rd,sp} = N^{o}_{Rd,c} \cdot \Psi_{b} \cdot \Psi_{s,sp} \cdot \Psi_{c,sp} \cdot \Psi_{re,N} \cdot \Psi_{h,sp}$

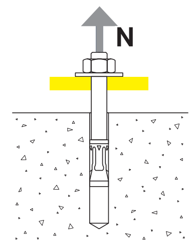
### Steel Design resistance

| $N_{Rd,s}$ | | | | |
|---|---|---|---|---|
| SIZE | | M10 | M12 | M16 |
| $N^{o}_{Rd}$ | kN | 20,9 | 26,9 | 48,5 |




### Pull-out design resistance

| $N_{Rd,p} = N^{o}_{Rd,p} \cdot \Psi_{c}$ | | | | | |
|---|---|---|---|---|---|
| SIZE | | | M10 | M12 | M16 |
| $N^{o}_{Rd,p}$ | Non-cracked concrete | kN | 10,7 | 20,0 | 23,3 |
| $N^{o}_{Rd,p}$ | Cracked concrete | kN | 6,0 | 10,7 | 16,7 |



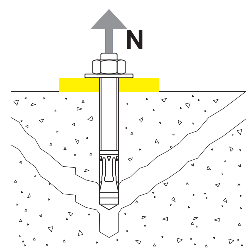

### Concrete cone design resistance

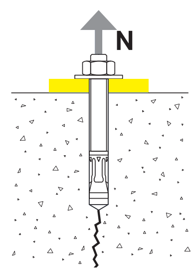
$$N_{Rd,c} = N^{o}_{Rd,c} \cdot \Psi_{b} \cdot \Psi_{s,N} \cdot \Psi_{c,N} \cdot \Psi_{re,N}$$

### Concrete splitting design resistance*

| $N_{Rd,sp} = N^{o}_{Rd,c} \cdot \Psi_{b} \cdot \Psi_{s,sp} \cdot \Psi_{c,sp} \cdot \Psi_{re,N} \cdot \Psi_{h,sp}$ | | | | | |
|---|---|---|---|---|---|
| SIZE | | | M10 | M12 | M16 |
| $N^{o}_{Rd,c}$ | Non-cracked concrete | kN | 15,6 | 19,7 | 26,4 |
| $N^{o}_{Rd,c}$ | Cracked concrete | kN | 11,2 | 14,1 | 18,8 |

*Concrete splitting design resistance must only be considered for non-cracked concrete.



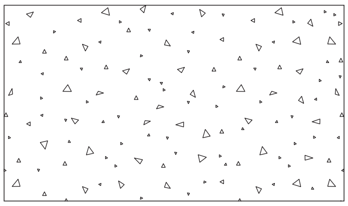



# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

## Coefficients of influence

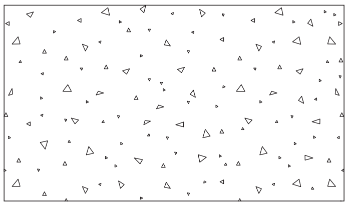
**Influence of concrete strength resistance in pull-out failure $\Psi_c$**

| | | M10 | M12 | M16 |
|---|---|---|---|---|
| $\Psi_c$ | C 20/25 | 1,0 | 1,0 | 1,0 |
| | C 30/37 | 1,16 | 1,22 | 1,22 |
| | C 40/50 | 1,31 | 1,41 | 1,41 |
| | C 50/60 | 1,41 | 1,55 | 1,55 |



**Influence of concrete strength in concret cone and splitting failure $\Psi_b$**

| | | M10 | M12 | M16 |
|---|---|---|---|---|
| $\Psi_b$ | C 20/25 | 1,0 | | |
| | C 30/37 | 1,22 | | |
| | C 40/50 | 1,41 | | |
| | C 50/60 | 1,55 | | |

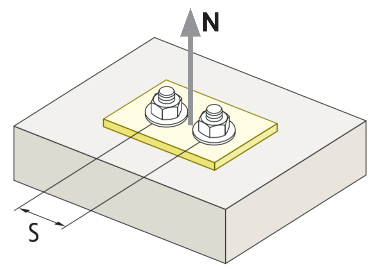


$$\Psi_b = \sqrt{\frac{f_{ck,cube}}{25}} \geq 1$$

## WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

### Coefficients of influence

| Influence of spacing (concrete cone) $\Psi_{s,N}$ | | | |
|---|---|---|---|
| S (mm) | M10 | M12 | M16 |
| 60 | 0,67 | Invalid value | |
| 65 | 0,68 | | |
| 70 | 0,68 | 0,67 | |
| 80 | 0,72 | 0,69 | |
| 85 | 0,74 | 0,70 | |
| 90 | 0,75 | 0,71 | |
| 100 | 0,78 | 0,74 | |
| 105 | 0,79 | 0,75 | |
| 110 | 0,81 | 0,76 | |
| 120 | 0,83 | 0,79 | |
| 125 | 0,85 | 0,80 | |
| 126 | 0,85 | 0,80 | |
| 128 | 0,86 | 0,80 | 0,75 |
| 130 | 0,86 | 0,81 | 0,76 |
| 135 | 0,88 | 0,82 | 0,78 |
| 144 | 0,90 | 0,84 | 0,79 |
| 150 | 0,92 | 0,86 | 0,82 |
| 165 | 0,96 | 0,89 | 0,83 |
| 170 | 0,97 | 0,90 | 0,85 |
| 180 | 1,00 | 0,93 | 0,88 |
| 195 | | 0,96 | 0,89 |
| 200 | | 0,98 | 0,91 |
| 210 | | 1,00 | 0,93 |
| 220 | | | 0,94 |
| 225 | | | 0,99 |
| 252 | Value without reduction = 1 | | 1,00 |

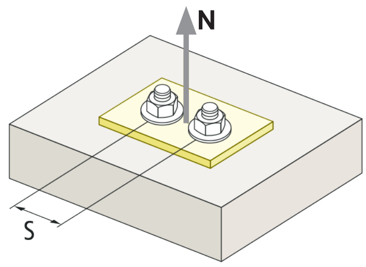



$$\Psi_{s,N} = 0,5 + \frac{S}{2 \cdot S_{cr,N}} \leq 1$$

# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

## Coefficients of influence

| Influence of spacing (concrete splitting) $\Psi_{s,sp}$ | | | |
|---|---|---|---|
| S (mm) | M10 | M12 | M16 |
| 60 | 0,60 | Invalid value | |
| 65 | 0,61 | | |
| 70 | 0,62 | 0,60 | |
| 80 | 0,63 | 0,61 | |
| 85 | 0,64 | 0,62 | |
| 90 | 0,65 | 0,63 | |
| 100 | 0,67 | 0,64 | |
| 110 | 0,68 | 0,66 | |
| 125 | 0,71 | 0,68 | |
| 128 | 0,71 | 0,68 | 0,63 |
| 135 | 0,73 | 0,69 | 0,63 |
| 140 | 0,73 | 0,70 | 0,64 |
| 150 | 0,75 | 0,71 | 0,65 |
| 160 | 0,77 | 0,73 | 0,66 |
| 165 | 0,78 | 0,74 | 0,66 |
| 168 | 0,78 | 0,74 | 0,66 |
| 180 | 0,80 | 0,76 | 0,68 |
| 192 | 0,82 | 0,77 | 0,69 |
| 200 | 0,83 | 0,79 | 0,70 |
| 210 | 0,85 | 0,80 | 0,71 |
| 220 | 0,87 | 0,81 | 0,72 |
| 260 | 0,93 | 0,87 | 0,75 |
| 288 | 0,98 | 0,91 | 0,78 |
| 300 | 1,00 | 0,93 | 0,79 |
| 336 | | 0,98 | 0,83 |
| 350 | | 1,00 | 0,84 |
| 412 | | | 0,90 |
| 425 | | | 0,92 |
| 500 | | | 0,99 |
| 510 | Value without reduction = 1 | | 1,00 |

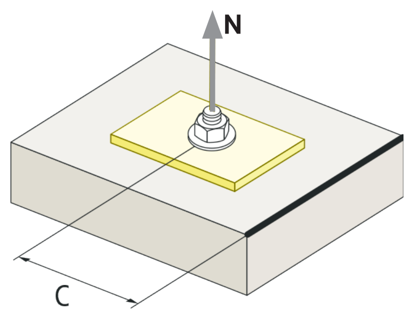



$$\Psi_{s,sp} = 0{,}5 + \frac{S}{2 \cdot S_{cr,sp}} \leq 1$$

# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

## Coefficients of influence

| Influence of concrete edge distance (splitting) $\Psi_{c,sp}$ | | | |
|---|---|---|---|
| S (mm) | M10 | M12 | M16 |
| 60 | 0,57 | Invalid value | |
| 65 | 0,59 | | |
| 70 | 0,62 | 0,57 | |
| 75 | 0,64 | 0,59 | |
| 80 | 0,66 | 0,61 | |
| 83 | 0,67 | 0,62 | |
| 84 | 0,68 | 0,62 | |
| 85 | 0,68 | 0,63 | |
| 90 | 0,70 | 0,65 | |
| 96 | 0,73 | 0,67 | |
| 100 | 0,75 | 0,68 | |
| 105 | 0,77 | 0,70 | |
| 110 | 0,80 | 0,72 | |
| 125 | 0,87 | 0,78 | |
| 128 | 0,89 | 0,80 | 0,64 |
| 130 | 0,90 | 0,80 | 0,64 |
| 135 | 0,92 | 0,82 | 0,66 |
| 144 | 0,97 | 0,86 | 0,68 |
| 150 | 1,00 | 0,89 | 0,70 |
| 168 | | 0,97 | 0,74 |
| 175 | | 1,00 | 0,76 |
| 180 | | 1,02 | 0,78 |
| 206 | | | 0,85 |
| 213 | | | 0,87 |
| 250 | | | 0,98 |
| 255 | Value without reduction = 1 | | 1,00 |



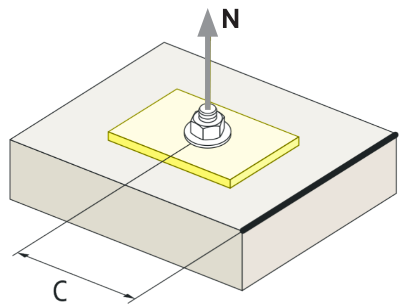

$$\Psi_{c,sp} = 0{,}35 + \frac{0{,}5 \cdot c}{C_{cr,sp}} + \frac{0{,}15 \cdot c^2}{C_{cr,sp}^{\,2}} \leq 1$$

# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

## Coefficients of influence

| Influence of concrete edge distance (concrete cone) $\Psi_{c,N}$ | | | |
|---|---|---|---|
| S (mm) | M10 | M12 | M16 |
| 60 | 0,75 | Invalid value | |
| 63 | 0,77 | | |
| 65 | 0,79 | | |
| 70 | 0,83 | 0,75 | |
| 72 | 0,85 | 0,76 | |
| 75 | 0,87 | 0,78 | |
| 180 | 0,91 | 0,82 | |
| 83 | 0,94 | 0,84 | |
| 85 | 0,96 | 0,85 | |
| 90 | 1,00 | 0,89 | |
| 98 | | 0,95 | |
| 100 | | 0,96 | |
| 105 | | 1,00 | |
| 110 | | | |
| 113 | | | |
| 125 | | | |
| 126 | | | |
| 128 | Value without reduction = 1 | | 1,00 |

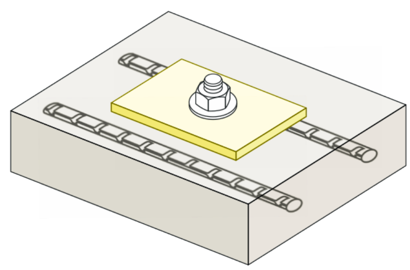
*The critical concrete edge distance matches the minimum concrete edge distance




$$\Psi_{c,N} = 0,35 + \frac{0,5 \cdot c}{C_{cr,N}} + \frac{0,15 \cdot c^2}{C_{cr,N}^{\,2}} \leq 1$$

| Influence of reinforcements $\Psi_{re,N}$ | | | |
|---|---|---|---|
| $\Psi_{re,N}$ | M10 | M12 | M16 |
| | 0,80 | 0,85 | 0,93 |

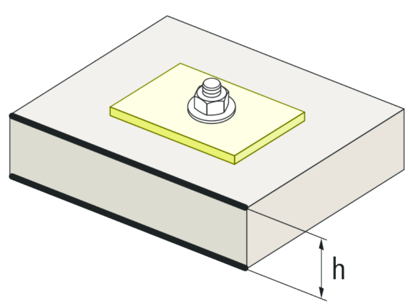
*This factor only applies for a high density of reinforcements. If in the area of the anchor there are reinforcements with a distancing of ≥ 150 mm (any diameter) or with a diameter ≤ 10 mm and a distancing of ≥ 100 mm, a $f_{re,N}$ =1 factor may be applied.



$$\Psi_{re,N} = 0,5 + \frac{h_{ef}}{200} \leq 1$$

| Influence of base material thickness $\Psi_{h,sp}$ | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $\Psi_{h,sp}$ | h/hef | 2,00 | 2,20 | 2,40 | 2,60 | 2,80 | 3,00 | 3,20 | 3,40 | 3,60 | ≥3,68 |
| | $\Psi_{h,sp}$ | 1,00 | 1,07 | 1,13 | 1,19 | 1,25 | 1,31 | 1,37 | 1,42 | 1,48 | 1,50 |

$$\Psi_{h,sp} = \left(\frac{h}{2 \cdot h_{ef}}\right)^{2/3} \leq 1,5$$



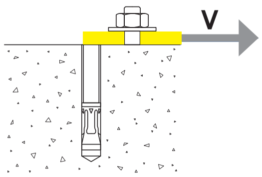
## WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

### Shear Loads

- Steel design resistance without lever arm: $V_{Rd,s}$
- Pry-out design resistance: $V_{Rd,cp} = k \cdot N^{o}_{Rd,c}$
- Concrete edge design resistance: $V_{Rd,c} = V^{o}_{Rd,c} \cdot \Psi_b \cdot \Psi_{se,V} \cdot \Psi_{c,V} \cdot \Psi_{re,V} \cdot \Psi_{,V} \cdot \Psi_{h,V}$

### Steel Design resistance

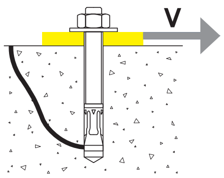
| $V_{Rd,s}$ | | | | |
|---|---|---|---|---|
| **SIZE** | | **M10** | **M12** | **M16** |
| $V_{Rd,s}$ | kN | 13,9 | 20,2 | 37,7 |




### Pry-out design resistance*

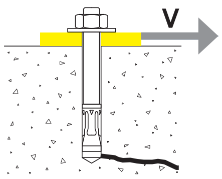
| $V_{Rd,cp} = k \cdot N^{o}_{Rd,c}$ | | | |
|---|---|---|---|
| **SIZE** | **M10** | **M12** | **M16** |
| k | 2 | 2 | 2 |

* $N^{o}_{Rd,c,}$ Concrete cone design resistance for tension loads




### Concrete edge resistance

| $V_{Rd,c} = V^{o}_{Rd,c} \cdot \Psi_b \cdot \Psi_{se,V} \cdot \Psi_{c,V} \cdot \Psi_{re,V} \cdot \Psi_{,V} \cdot \Psi_{h,V}$ | | | | | |
|---|---|---|---|---|---|
| **SIZE** | | | **M10** | **M12** | **M16** |
| $V^{o}_{Rd,c}$ | Non-cracked concrete | kN | 8,9 | 11,5 | 15,9 |
| | Cracked concrete | kN | 6,3 | 8,2 | 11,3 |

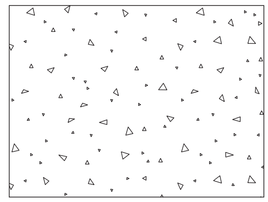


# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

## Coefficients of influence

**Influence of concrete strength in concrete edge failure $\Psi_b$**

| | | M10 | M12 | M16 |
|---|---|---|---|---|
| $\Psi_b$ | C 20/25 | | 1,00 | |
| | C 30/37 | | 1,22 | |
| | C 40/50 | | 1,41 | |
| | C 50/60 | | 1,55 | |



$$\Psi_b = \sqrt{\frac{f_{ck,cube}}{25}} \geq 1$$

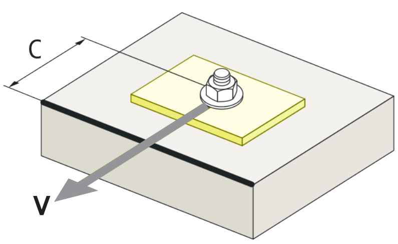
**Influence OF edge distance and spacing $\Psi_{se,V}$**

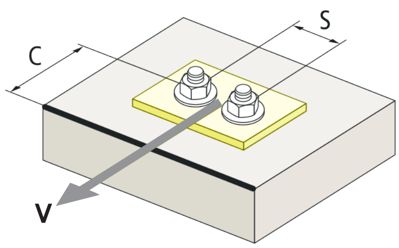
**FOR ONE ANCHOR ONLY**

| $c/h_{ef}$ | 0,50 | 0,75 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | 2,25 | 2,50 | 2,75 | 3,00 | 3,25 | 3,50 | 3,75 | 4,00 | 4,50 | 5,00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Isolated | 0,35 | 0,65 | 1,00 | 1,40 | 1,84 | 2,32 | 2,83 | 3,38 | 3,95 | 4,56 | 5,20 | 5,86 | 6,55 | 7,26 | 8,00 | 9,55 | 11,18 |

**FOR TWO ANCHORS**

| s/c | $c/h_{ef}$ | 0,50 | 0,75 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | 2,25 | 2,50 | 2,75 | 3,00 | 3,25 | 3,50 | 3,75 | 4,00 | 4,50 | 5,00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1,0 | 0,24 | 0,43 | 0,67 | 0,93 | 1,22 | 1,54 | 1,89 | 2,25 | 2,64 | 3,04 | 3,46 | 3,91 | 4,37 | 4,84 | 5,33 | 6,36 | 7,45 |
| | 1,5 | 0,27 | 0,49 | 0,75 | 1,05 | 1,38 | 1,74 | 2,12 | 2,53 | 2,96 | 3,42 | 3,90 | 4,39 | 4,91 | 5,45 | 6,00 | 7,16 | 8,39 |
| | 2,0 | 0,29 | 0,54 | 0,83 | 1,16 | 1,53 | 1,93 | 2,36 | 2,81 | 3,29 | 3,80 | 4,33 | 4,88 | 5,46 | 6,05 | 6,67 | 7,95 | 9,32 |
| | 2,5 | 0,32 | 0,60 | 0,92 | 1,28 | 1,68 | 2,12 | 2,59 | 3,09 | 3,62 | 4,18 | 4,76 | 5,37 | 6,00 | 6,66 | 7,33 | 8,75 | 10,25 |
| | ≥3,0 | 0,35 | 0,65 | 1,00 | 1,40 | 1,84 | 2,32 | 2,83 | 3,38 | 3,95 | 4,56 | 5,20 | 5,86 | 6,55 | 7,26 | 8,00 | 9,55 | 11,18 |



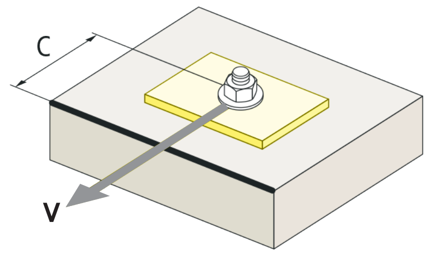

$$\Psi_{se,V} = \left(\frac{c}{h_{ef}}\right)^{1,5}$$

$$\Psi_{se,V} = \left(\frac{c}{h_{ef}}\right)^{1,5} \cdot \left(1 + \frac{s}{3 \cdot c}\right) \cdot 0,5 \leq \left(\frac{c}{h_{ef}}\right)^{1,5}$$

# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

## Coefficients of influence

| Influence of concrete edge distance $\Psi_{c,V}$ | | | |
|---|---|---|---|
| S (mm) | M10 | M12 | M16 |
| 60 | 0,70 | Invalid value | |
| 65 | 0,69 | 0,71 | |
| 70 | 0,68 | 0,70 | |
| 80 | 0,66 | 0,68 | |
| 85 | 0,65 | 0,68 | 0,72 |
| 90 | 0,64 | 0,67 | 0,71 |
| 100 | 0,63 | 0,65 | 0,69 |
| 105 | 0,62 | 0,65 | 0,69 |
| 110 | 0,62 | 0,64 | 0,68 |
| 120 | 0,61 | 0,63 | 0,67 |
| 125 | 0,60 | 0,63 | 0,66 |
| 130 | 0,60 | 0,62 | 0,66 |
| 135 | 0,59 | 0,62 | 0,65 |
| 140 | 0,59 | 0,61 | 0,65 |
| 150 | 0,58 | 0,60 | 0,64 |
| 160 | 0,57 | 0,60 | 0,63 |
| 170 | 0,57 | 0,59 | 0,62 |
| 175 | 0,56 | 0,59 | 0,62 |
| 180 | 0,56 | 0,58 | 0,62 |
| 190 | 0,55 | 0,58 | 0,61 |
| 200 | 0,55 | 0,57 | 0,60 |
| 210 | 0,54 | 0,56 | 0,60 |
| 220 | 0,54 | 0,56 | 0,59 |
| 230 | 0,53 | 0,55 | 0,59 |
| 240 | 0,53 | 0,55 | 0,58 |
| 250 | 0,53 | 0,54 | 0,58 |
| 260 | 0,52 | 0,54 | 0,57 |
| 270 | 0,52 | 0,54 | 0,57 |
| 280 | 0,51 | 0,53 | 0,56 |
| 290 | 0,51 | 0,53 | 0,56 |
| 300 | 0,51 | 0,53 | 0,56 |

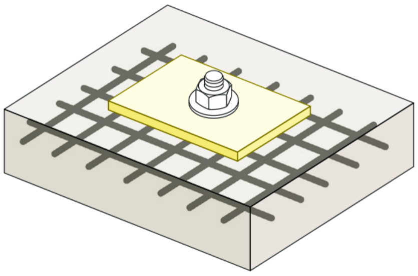



$$\Psi_{c,V} = \left(\frac{d}{c}\right)^{0,20}$$

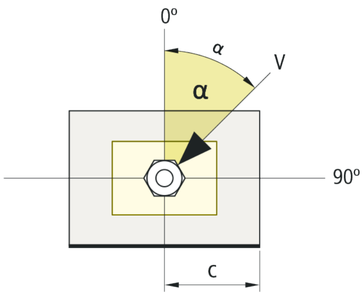
# WEDGE ANCHORS ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

## Coefficients of influence

| Influence of reinforcements $\Psi_{re,V}$ | | | |
|---|---|---|---|
| | Without perimetral reinforcements | Perimetral reinforcements ≥Ø12mm | Perimetral reinforcements with brackets ≤ 100mm |
| Non-cracked concrete | 1 | 1 | 1 |
| Cracked concrete | 1 | 1,2 | 1,4 |

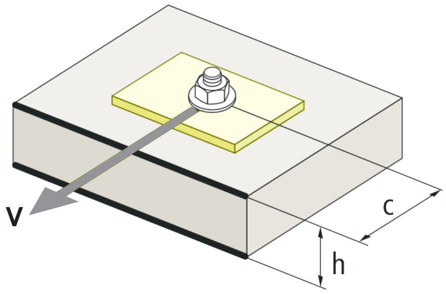


| Influence of load application angle $\Psi_{\alpha,V}$ | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Angle, α(°) | 0° | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| $\Psi_{\alpha,V}$ | 1,00 | 1,01 | 1,05 | 1,13 | 1,24 | 1,40 | 1,64 | 1,97 | 2,32 | 2,50 |




$$\Psi_{\alpha,V} = \sqrt{\frac{1}{(\cos \alpha_v)^2 + \left(\frac{\sin \alpha_v}{2,5}\right)^2}} \geq 1$$

| Influence of load application angle $\Psi_{\alpha,V}$ | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| h/c | 0,15 | 0,30 | 0,45 | 0,60 | 0,75 | 0,90 | 1,05 | 1,20 | 1,35 | ≥1,5 |
| $\Psi_{h,V}$ | 0,32 | 0,45 | 0,55 | 0,63 | 0,71 | 0,77 | 0,84 | 0,89 | 0,95 | 1,00 |




$$\Psi_{h,V} = \left(\frac{h}{1,5 \cdot c}\right)^{0,5} \geq 1,0$$

# WEDGE ANCHORS - ETA Approved (38AG) - Complies with Australian standard AS5216: 2018

## FIRE RESISTANCE

### Characteristic Resistance*

| TENSION | | | | SHEAR | | | |
|---|---|---|---|---|---|---|---|
| | M10 | M12 | M16 | | M10 | M12 | M16 |
| RF30 | 0,9 | 1,7 | 3,1 | RF30 | 0,9 | 1,7 | 3,1 |
| RF60 | 1,3 | 2,4 | 3,7 | RF60 | 0,8 | 1,3 | 2,4 |
| RF90 | 0,6 | 1,1 | 2,0 | RF90 | 0,6 | 1,1 | 2,0 |
| RF120 | 0,5 | 0,8 | 1,6 | RF120 | 0,5 | 0,8 | 1,6 |

*The safety factor for design resistance under fire exposure is $\gamma_{M,fi}$=1 (in abscence of other national regulations). As a eresult the Characteristic Resistance is the same as Design Resistance.

### Maximum Load Recommended

| TENSION | | | | SHEAR | | | |
|---|---|---|---|---|---|---|---|
| | M10 | M12 | M16 | | M10 | M12 | M16 |
| RF30 | 0,6 | 1,2 | 2,2 | RF30 | 0,6 | 1,2 | 2,2 |
| RF60 | 0,6 | 0,9 | 1,7 | RF60 | 0,6 | 0,9 | 1,7 |
| RF90 | 0,4 | 0,8 | 1,4 | RF90 | 0,4 | 0,8 | 1,4 |
| RF120 | 0,4 | 0,6 | 1,1 | RF120 | 0,4 | 0,6 | 1,1 |

## RANGE INFORMATION

| CODE | SIZE | Ø | Maximum thickness of fixture | Box Qty | Outer Box Qty |
|---|---|---|---|---|---|
| 38AG10070 | M10 X 70 | 10 | 5 | 100 | 400 |
| 38AG10090 | M10 X 90 | 10 | 10 | 100 | 400 |
| 38AG10120 | M10 X 120 | 10 | 35 | 100 | 200 |
| 38AG12080 | M12 X 80 | 12 | 4 | 50 | 300 |
| 38AG12110 | M12 X 110 | 12 | 14 | 50 | 200 |
| 38AG12130 | M12 X 130 | 12 | 34 | 50 | 200 |
| 38AG12150 | M12 X 150 | 12 | 54 | 50 | 100 |
| 38AG12180 | M12 X 180 | 12 | 84 | 50 | 150 |
| 38AG16125 | M16 X 125 | 16 | 8 | 25 | 100 |
| 38AG16145 | M16 X 145 | 16 | 28 | 25 | 100 |
| 38AG16175 | M16 X 175 | 16 | 58 | 25 | 50 |