



# AMBEX ANCHORING CAPSULES AAC

Cementitious Anchoring Capsule for Rebars and Dowels

AAC TECHNICAL INFORMATION

## DESCRIPTION

The Ambex Anchoring Capsules - AAC are a cementitious non-shrink grout designed for the anchoring of rebar or dowels in concrete, masonry or rock. This dry pre-mixed cement grout is encapsulated in a water permeable wrapping and once the grout capsule is saturated in water it becomes a fast setting thixotropic grout and is easily inserted in the anchoring hole. Ambex Anchoring Capsules - AAC are manufactured according to ISO-9002 standards and contain a mix of calcium aluminate cement, screened silica sand and selected additives.

## USES

Can be used for civil engineering, architectural, mining or geological projects with plain, threaded or deformed rebars or dowels.

- Structural repairs
- Dams and tunnels
- Bridges
- Highway and airport slabs
- Wharves and canal structures
- Reservoirs and water structures
- Retaining or building walls
- Concrete formwork anchors
- Mining anchors
- Mining - grout plugs for exploratory holes

## ADVANTAGES

- Simple and economical
- Easy to install
- Easy handling and storage
- Reduces installation time and costs
- No product mixing on site
- No special tools and equipment required
- High early strengths
- Can be installed in cold weather at -17°C (0°F)
- Thixotropic mix
- Stable water/cement ratio
- No toxic emanation or fumes
- Environmentally friendly
- Does not contain calcium chloride
- Can be used underwater

## SIZES

1. Capsule AAC-13: 13mm (1/2") diameter  
200mm (8") long
  2. Capsule AAC-19: 19mm (3/4") diameter  
300mm (12") long
  3. Capsule AAC-25: 25mm (1") diameter  
300mm (12") long
- Additional sizes available on special order.
  - Capsule placer available for AAC-25.

## TECHNICAL INFORMATION

Tests performed by independent laboratories.

|   | Metric                    | Imperial                        |
|---|---------------------------|---------------------------------|
| Water/Cement Ratio                        | 0.32                      | 0.32                            |
| Net weight (dry): AAC-25                  | ±240g                     | ± 0.5 lbs.                      |
| AAC-19                                    | ±145g                     | ± 0.3 lbs.                      |
| AAC-13                                    | ±50g                      | ± 0.1 lbs.                      |
| Density (dry)                             | 1.5-1.7 g/cm <sup>3</sup> | 93.6-106.1 lbs./ft <sup>3</sup> |
| Compressive strength (ASTM C-109-28 days) | 48.2 MPa                  | 6990 psi                        |

|  |             |
|--|-------------|
| Soaking time                               | 1 to 2 min. |
| Working time 20°C (68°F)                   | 10 min.     |
| Initial setting time (ASTM C-191)          | 6 min.      |
| Final setting time (ASTM C-191)            | 26 min.     |
| Expansion (ASTM C-1090)                    | 0.05%       |
| Freeze-thaw resistance (C-666, 312 cycles) | 100%        |

## PACKAGING

|                  | AAC-13           | AAC-19           | AAC-25              |
|------------------|------------------|------------------|---------------------|
| Capsules per bag | 160              | 45               | 42                  |
| Weight per 1 bag | 8kg<br>(17.5lbs) | 6.8kg<br>(15lbs) | 10.3kg<br>(22.7lbs) |
| Bags per skid    | 132              | 180              | 132                 |

## GENERAL INFORMATION

- Consult an engineer for structural design and capacity.
- Engineer must evaluate substrate and anchoring conditions.
- Contact Ambex representative if hole sizes and depths differ from chart.
- Underwater: Strength may be reduced by 30% depending on application.
- Cold weather applications may have slower initial setting time.

## SAFETY DIRECTIVES

This product contains cement and will react with water. It can inflame eyes and skin. In the case of direct contact with eyes, rinse several times with water, do not rub eyes and see a doctor. Wearing rubber gloves, dust-mask and safety glasses is highly recommended. Keep away from children. The Material Safety Data Sheet (MSDS) is available on request.

## STORAGE

Cementitious material is sensitive to humidity. Store in a dry area where there is no humidity or freezing. Shelf life up to 2 years if well protected.

## WARRANTY

Ambex Concrete Technologies Inc. warrants that this product will perform as presented when used as described herein. Ambex does not give any other implicit or explicit warranty. Ambex's liability is limited to the replacement of the product considered defective.

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# AMBEX ANCHORING CAPSULES - AAC

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| Nominal rebar size | Recommended hole diameter mm (inch) | Capsule size mm (inch) | Embedment Depth mm (inch) | Fy Ultimate pullout strength KN | Fy Ultimate pullout strength lbs | Fy/F'y | Minimum embedment to develop yield strength of steel mm (inch) | F'y Yield strength of steel KN (lbs) |
|--------------------|-------------------------------------|------------------------|---------------------------|---------------------------------|----------------------------------|--------|--|--------------------------------------|
| 10M (#3)           | 16 (5/8)                            | 13 (1/2)               | 100 (4)                   | 17.8                            | 4001                             | 0.44   | 146 (5 3/4)  | 40 (8990)                            |
|                    |                                     |                        | 125 (5)                   | 28.9                            | 6497                             | 0.72   |  |                                      |
|                    |                                     |                        | 150 (6)                   | 42.0                            | 9442                             | 1.05   |  |                                      |
| 12M (#4)           | 19 (3/4)                            | 13 (1/2)               | 100 (4)                   | 21.5                            | 4833                             | 0.41   | 165 (6 1/2)  | 53 (11914)                           |
|                    |                                     |                        | 150 (6)                   | 39.8                            | 8947                             | 0.75   |  |                                      |
|                    |                                     |                        | 200 (8)                   | 83.8                            | 18838                            | 1.58   |  |                                      |
| 15M (#5)           | 19 (3/4)                            | 13 (1/2)               | 100 (4)                   | 41.7                            | 8947                             | 0.52   | 184 (7 3/8)  | 80 (17984)                           |
|                    |                                     |                        | 150 (6)                   | 64.0                            | 14387                            | 0.80   |  |                                      |
|                    |                                     |                        | 200 (8)                   | 87.5                            | 19670                            | 1.09   |  |                                      |
| 15M (#5)           | 23 (7/8)                            | 19 (3/4)               | 100 (4)                   | 48.4                            | 10880                            | 0.61   | 180 (7)  | 80 (17984)                           |
|                    |                                     |                        | 150 (6)                   | 63.0                            | 14255                            | 0.79   |  |                                      |
|                    |                                     |                        | 200 (8)                   | 91.3                            | 20529                            | 1.14   |  |                                      |
| 20M (#6)           | 23 (7/8)                            | 19 (3/4)               | 150 (6)                   | 82.4                            | 18524                            | 0.68   | 190 (7 1/2)  | 120 (26977)                          |
|                    |                                     |                        | 200 (8)                   | 131.6                           | 29584                            | 1.09   |  |                                      |
|                    |                                     |                        | 300 (12)                  | 161.3                           | 36260                            | 1.34   |  |                                      |
| 25M (#8)           | 28 (1 1/8)                          | 25 (1)                 | 200 (8)                   | 215.6                           | 48467                            | 1.07   | 200 (8)  | 200 (44961)                          |
|                    |                                     |                        | 300 (12)                  | 268.1                           | 60269                            | 1.34   |  |                                      |
| 30M (#9)           | 38 (1 1/2)                          | 25 (1)                 | 300 (12)                  | 364.0                           | 81827                            | 1.30   | 250 (10)   | 280 (62946)                          |
|                    |                                     |                        | 400 (16)                  | 382.0                           | 85874                            | 1.36   |  |                                      |
| 35M (#11)          | 42 (1 5/8)                          | 25 (1)                 | 300 (12)                  | 398.4                           | 89560                            | 0.99   | 300 (12)   | 400 (89924)                          |
|                    |                                     |                        | 400 (16)                  | over 400 **                     | over 89924 **                    |        |  |                                      |

- \* The hole and rebar diameter may vary. Use the smallest hole diameter that allows easy insert of capsule and rebar.
- \* Tests made at 28 days and 20 °C ( 68 °F).
- \* Concrete compressive strength > 35 MPa ( 5080 psi).

- \* Steel 400 MPa. (58000 psi).
- \* Tests made by Independent laboratory, Qualitas, Montreal, Qc, Canada.
- \*\*Hydraulic jack capacity: 400 KN ( 89923.58 lbs.).

## ESTIMATE OF THE NUMBER OF CAPSULES REQUIRED FOR YOUR PROJECT

CALCULATION FORMULA FOR ESTIMATE :

$$N = \{3,142 * L ((D/2)^2 - (R/2)^2)\} \div V$$

R: Rebar diameter in mm (inch)

D: Hole diameter in mm (inch)

L : Hole depth in mm (inch)

V: V= 21,225mm<sup>3</sup> (1.3 in<sup>3</sup>) for capsule AAC-13

V= 72,600mm<sup>3</sup> (4.4 in<sup>3</sup>) for capsule AAC-19

V= 125,600mm<sup>3</sup> (7.7 in<sup>3</sup>) for capsule AAC-25

N: Minimum number of capsules required (estimate)

## RECOMMENDED INSTALLATION PROCEDURE

1. DRILL ANCHORING HOLES: Drill holes as per recommended minimum dimensions in above table. For faster and easier installation, increase hole diameter up to 6mm (1/4") greater than the bar diameter for bars up to 25M (#8). For different hole sizes and lengths contact Ambex representative.

2. CLEAN ANCHORING HOLES: The hole must be clean before inserting the grout capsule. Clean with water pressure or air pressure to eliminate all dust and contaminants. Clean holes from bottom out. Residual water must be removed. Anchoring holes must be clean prior to inserting the grout capsule.

3. SOAK THE GROUT CAPSULES IN WATER: Soak the grout capsules in clean water for 1 to 2 minutes or until bubbles cease coming out of the capsules. Water temperature can be

between 2°C (36°F) and 25°C (77°F). In cold weather conditions, water and capsules can be warmed up to 25°C (77°F) to accelerate the setting time of the capsule.

4. INSERT THE GROUT CAPSULE IN THE ANCHORING HOLE: Working time of the grout capsule is about 10 minutes at 20°C (68°F). Twist off end with staple and insert open end in hole. Do not remove the wrapping of the grout capsule. Insert the grout capsule in hole. A capsule can be cut to required length when an anchoring hole does not require a full capsule. The remaining part can be used for another anchoring hole.

5. INSERT BAR IN THE ANCHORING HOLE: Insert bar without rotating it through the capsule that is already in the hole. Use a hammer if required. Do not touch or move bar before final setting time. DO NOT ROTATE REBAR.

## TECHNICAL SERVICE

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