SOMA

# P/P-C/P-E polyester

## Product Information

European Technical Approval
ETAG 001-5 Option 7
Anchoring into concrete
ETA-13/0208

MEDIUM

FAST

## Description

Our **Polyester (P)** chemical anchor has been specially formulated to cure quickly and is suitable for applications in concrete and masonry. **Winter Grade Polyester (P-C)** anchoring system has extremely quick curing time to offset cold ambient temperatures during winter seasons, whilst **Tropical Grade Polyester (P-E)** has a slower curing time to offset elevated ambient temperatures. We offer P-E in a 300 ml. / single piston foil pack cartridges and 345 ml side by side cartridges.

***Note:*** *Tropical Grade Polyester (P-E) is not included in the scope of the ETA or other certification.*

## Shelf Life

Cartridges should be stored in their original packaging, the correct way up, in cool conditions (+5°C to +25°C) out of direct sunlight. When stored correctly, the product shelf life will be 12 months from the date of manufacture.

## Health & Safety

For health and safety information please refer to the relevant Safety Data Sheet.

## Base Material

- Concrete
- Solid & hollow masonry
- Hard natural stone
- Solid rock
- Voided stone or rock

## Approvals & Tests

- ETAG 001 Part 5 Option 7 for threaded bars (M8-M24) in galvanized steel 5.8-8.8 & 10.9 and Stainless Steel A4-70; A4-80 & HCR (1.4529) in C20/25 to C50/60 uncracked concrete
- A+ classification according to compulsory French VOC emissions regulation
- Tested according to LEED 2009 EQ c4.1, SCAQMD rule 1168 (2005)

## Features

- Anchors may be placed close to free edges
- Suitable for dry, wet & flooded holes without loss of performance
- Reduced drilling diameters i.e. M20 only requires a 22mm hole and M24 requires only a 26mm hole making it an economical injection system
- Variable embedment depths
- Available in side by side cartridges 345 ml, and single piston foil pack cartridges 300 ml.
- Ratio of 10:1
- Available in grey, stone and white resulting colours

## Accessories

- Applicators
- Mixing nozzles
- Cleaning blow pump
- Cleaning brushes
- High flow mixing nozzles
- Extension tubes
- Resin stoppers
- Plastic sleeves

## Uses/Applications

- Canopies
- Boilers
- Bicycle racks
- Hand rails
- Masonry supports
- Signs
- Safety barriers
- Balcony fences
- Racking
- Machinery
- Satellite dishes

# **P/P-C/P-E** Polyester / winter / tropical grade

## Product Data Sheet

Contents

# P/P-C/P-E Polyester / winter / tropical grade

## Product Data Sheet

### Polyester (P) Working & Loading Times

| Resin cartridge Temperature °C | T Work minutes | Base Material Temperature °C | T Load minutes |
|---|---|---|---|
| +5 to +10 | 12 | +5 to +10 | 120 |
| +10 to +20 | 6 | +10 to +20 | 80 |
| +20 to +25 | 4 | +20 to +25 | 40 |
| +25 to +30 | 3 | +25 to +30 | 30 |
| +30 to +35 | 2 | +30 to +35 | 20 |
| +35 to +40 | 1.5 | +35 to +40 | 15 |
| +40 | 1.5 | +40 | 10 |

*Note: T Work is the typical time to gel at the highest temperature in the range.*

### Polyester Winter Grade (P-C) Working & Loading Times

| Resin cartridge Temperature °C | T Work minutes | Base Material Temperature °C | T Load minutes |
|---|---|---|---|
| Min +5 | 10 | -5 to +5 | 180 |
| +5 to +10 | 5 | +5 to +10 | 60 |
| +10 to +20 | 3 | +10 to +20 | 40 |
| +20 to +25 | 2.5 | +20 to +25 | 20 |
| +25 to +30 | 2 | +25 to +30 | 15 |
| +30 | 2 | +30 | 10 |

*Note: T Work is the typical time to gel at the highest temperature in the range.*
*P-C may be used at low temperatures (minimum application of -10°C) if the cartridge/resin temperature is kept above +5°C*

### Polyester (P-E) Working & Loading Times

| Resin cartridge Temperature °C | T Work minutes | Base Material Temperature °C | T Load minutes |
|---|---|---|---|
| minimum +10 | 40 | +10 to +15 | 6 hours |
| +10 to +15 | 30 | | 6 hours |
| +15 to +20 | 20 | +15 to +20 | 5 hours |
| +20 to +25 | 15 | +20 to +25 | 180 |
| +25 to +30 | 10 | +25 to +30 | 150 |
| +30 to +35 | 8.5 | +30 to +35 | 90 |
| +35 to +40 | 7.5 | +35 to +40 | 75 |
| +40 to +45 | 5 | +40 to +45 | 60 |
| +45 to +50 | 3.5 | +45 to +50 | 45 |
| +50 | 2.5 | +50 | 30 |

*Note: T Work is the typical time to gel at the highest temperature in the range.*
*Note: Tropical Grade Polyester (P-E) is not included in the scope of the ETA or other certification.*

### Physical Properties

| Property | | Unit | Value | Test Standard |
|---|---|---|---|---|
| Density | | g/cm³ | 1.7 | ASTM D 1875 @ +20°C |
| Compressive Strength | 4 hours | N/mm² | 50 | BS6319 |
| | 24 hours | | 60 | ASTM D 695 @ +20°C |
| | 7 days | | 74 | |
| Compressive E-Modulus | 7 days | GN/m² | 3.13 | ASTM D 695 M @ +20°C |
| Tensile Strength | 24 hours | N/mm² | 11 | ASTM D 638 @ +20°C |
| | 7 days | | 13 | |
| Tensile Strength Elongation at Break | 24 hours | % | 0.09 | ASTM D 638 @ +20°C |
| | 7 days | | 0.12 | |
| Flexural Strength | 7 days | N/mm² | 24 | ASTM D 790 @ +20°C |

# **P/P-C/P-E** Polyester / winter / tropical grade

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## Product Data Sheet

### Chemical Resistance

The P chemical mortar has undergone extensive chemical resistance testing. The results are summarised in the table below.

| Chemical Environment | Concentration | Result |
|---|---|---|
| Aqueous Solution Acetic Acid | 10% | ✓ |
| Acetone | 100% | × |
| Aqueous Solution Aluminium Chloride | Saturated | ✓ |
| Aqueous Solution Aluminium Nitrate | 10% | ✓ |
| Ammonia Solution | 5% | × |
| Jet Fuel | 100% | × |
| Benzene | 100% | × |
| Benzoic Acid | Saturated | ✓ |
| Benzyl Alcohol | 100% | × |
| Sodium Hypochlorite Solution | 5 - 15% | ✓ |
| Butyl Alcohol | 100% | C |
| Calcium Sulphate Aqueous Solution | Saturated | ✓ |
| Carbon Monoxide | Gas | ✓ |
| Carbon Tetrachloride | 100% | × |
| Chlorine Water | Saturated | × |
| Chloro Benzene | 100% | × |
| Citric Acid Aqueous Solution | Saturated | ✓ |
| Cyclohexanol | 100% | ✓ |
| Diesel Fuel | 100% | C |
| Diethylene Glycol | 100% | ✓ |
| Ethanol | 95% | × |
| Ethanol Aqueous Solution | 20% | C |
| Heptane | 100% | C |

| Chemical Environment | Concentration | Result |
|---|---|---|
| Hexane | 100% | C |
| Hydrochloric Acid | 10% | ✓ |
| | 15% | ✓ |
| | 25% | C |
| Hydrogen Sulphide Gas | 100% | ✓ |
| Isoproyl Alcohol | 100% | × |
| Linseed Oil | 100% | ✓ |
| Lubricating Oil | 100% | ✓ |
| Mineral Oil | 100% | ✓ |
| Paraffin / Kerosene (Domestic) | 100% | C |
| Phenol Aqueous Solution | 1% | × |
| Phosphoric Acid | 50% | ✓ |
| Potassium Hydroxide | 10% / pH13 | C |
| Sea Water | 100% | C |
| Styrene | 100% | × |
| Sulphur Dioxide Solution | 10% | ✓ |
| Sulphur Dioxide (40°C) | 5% | ✓ |
| Sulphuric Acid | 10% | ✓ |
| | 50% | ✓ |
| Turpentine | 100% | C |
| White Spirit | 100% | ✓ |
| Xylene | 100% | × |

✓ = Resistant to 75°C with at least 80% of physical properties retained.
C = Contact only to a maximum of 25°C. × = Not Resistant

### Installation Parameters

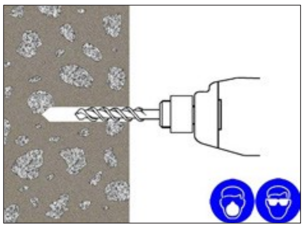
| Size | | | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|---|---|
| Nominal drill hole diameter | $Ød_0$ | [mm] | 10 | 12 | 14 | 18 | 22 | 26 |
| Diameter of cleaning brush $d_b$ | $d_b$ | [mm] | 14 | 14 | 20 | 20 | 29 | 29 |
| Torque moment $T_{inst}$ | $T_{inst}$ | [Nm] | 10 | 20 | 40 | 80 | 150 | 200 |
| $h_{ef,min} = 8d$ | | | | | | | | |
| Depth of drill hole $h_0$ | $h_0$ | [mm] | 64 | 80 | 96 | 128 | 160 | 192 |
| Minimum edge distance $c_{min}$ | $c_{min}$ | [mm] | 35 | 40 | 50 | 65 | 80 | 96 |
| Minimum spacing $s_{min}$ | $s_{min}$ | [mm] | 35 | 40 | 50 | 65 | 80 | 96 |
| Minimum thickness of member $h_{min}$ | $h_{min}$ | [mm] | $h_{ef}$ + 30 mm ≥ 100 mm | | | | $h_{ef} + 2d_0$ | |
| $h_{ef,max} = 12d$ | | | | | | | | |
| Depth of drill hole $h_0$ | $h_0$ | [mm] | 96 | 120 | 144 | 192 | 240 | 288 |
| Minimum edge distance $c_{min}$ | $c_{min}$ | [mm] | 50 | 60 | 70 | 95 | 120 | 145 |
| Minimum spacing $s_{min}$ | $s_{min}$ | [mm] | 50 | 60 | 70 | 95 | 120 | 145 |
| Minimum thickness of member $h_{min}$ | $h_{min}$ | [mm] | $h_{ef}$ + 30 mm ≥ 100 mm | | | | $h_{ef} + 2d_0$ | |

# **P/P-C/P-E** Polyester / winter / tropical grade

## Product Data Sheet

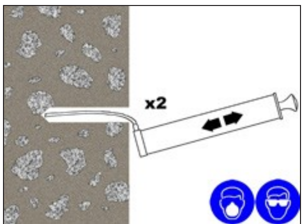
### Solid Substrate Installation Method

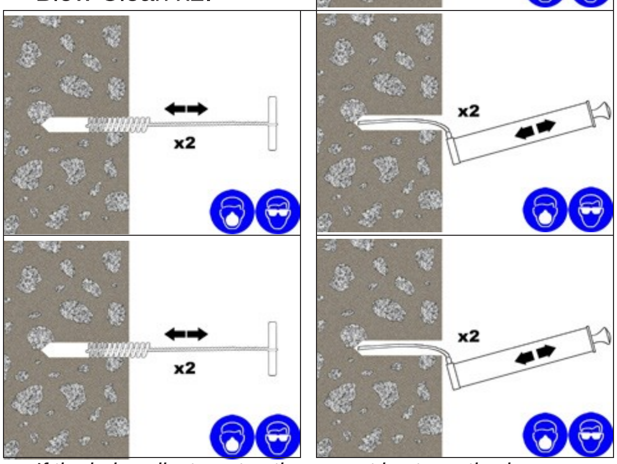
1. Drill the hole to the correct diameter and depth. This can be done with either a rotary percussion or rotary hammer drilling machine depending upon the substrate.



2. Thoroughly clean the hole in the following sequence using the DF Brush with the required extensions and a source of clean compressed air. For holes of 400mm or less deep, a Blow Pump may be used:

   Blow Clean x2.
   Brush Clean x2.
   Blow Clean x2.
   Brush Clean x2.
   Blow Clean x2.

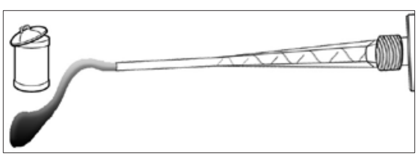



*If the hole collects water, the current best practice is to remove standing water before cleaning the hole and injecting the resin. Ideally, the resin should be injected into a properly cleaned, dry hole. However, this product may also be used in a flooded hole.*

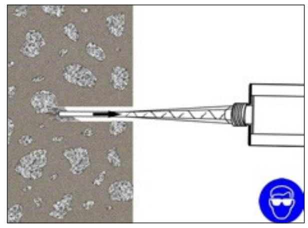
3. Select the appropriate static mixer nozzle for the installation, open the cartridge/foil pack and screw nozzle onto the mouth of the cartridge. Insert the cartridge into a good quality applicator.

4. Extrude the first part of the cartridge to waste until an even colour has been achieved without streaking in the resin.

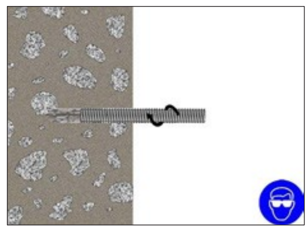


5. If necessary, cut the extension tube to the depth of the hole and push onto the end of the mixer nozzle, and (for rebars 16mm dia. or more) fit the correct resin stopper to the other end. Attach extension tubing and resin stopper.

6. Insert the mixer nozzle (resin stopper / extension tube if applicable) to the bottom of the hole. Begin to extrude the resin and slowly withdraw the mixer nozzle from the hole ensuring that there are no air voids as the mixer nozzle is withdrawn. Fill the hole to approximately ½ to ¾ full and withdraw the nozzle completely.



7. Insert the clean threaded bar, free from oil or other release agents, to the bottom of the hole using a back and forth twisting motion ensuring all the threads are thoroughly coated. Adjust to the correct position within the stated working time.

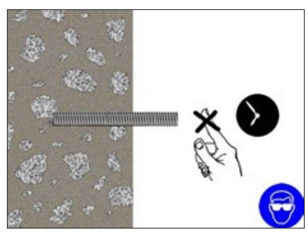


8. Any excess resin will be expelled from the hole evenly around the steel element showing that the hole is full.

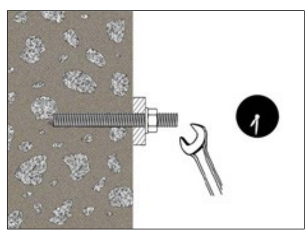
   This excess resin should be removed from around the mouth of the hole before it sets.

9. Leave the anchor to cure.

   Do not disturb the anchor until the appropriate loading time, has elapsed depending on the substrate conditions and ambient temperature.



10. Attach the fixture and tighten the nut to the recommended torque. Do not overtighten.

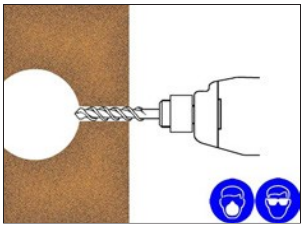


# P/P-C/P-E Polyester / winter / tropical grade

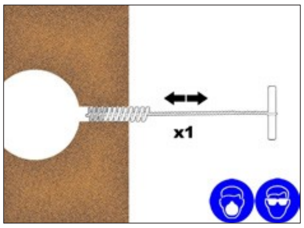
## Product Data Sheet

### Hollow Substrate Installation Method

1. Drill the hole to the correct diameter and depth. This should be done with a rotary percussion drilling machine to reduce spalling.

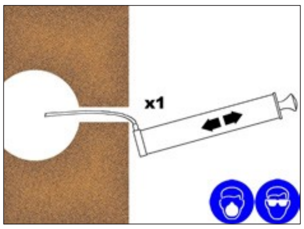


2. Thoroughly clean the hole in the following sequence using the DF Brush with the required extensions and a source of clean compressed air. For holes of 400mm or less deep, a Blow Pump may be used:



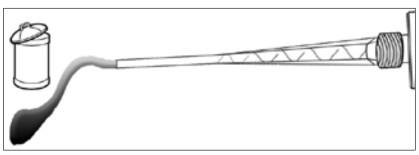

Brush Clean x1.

Blow Clean x1.

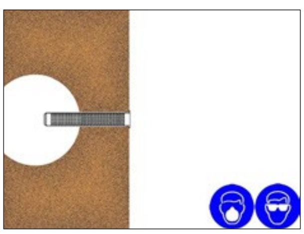



3. Select the appropriate static mixer nozzle for the installation, open the cartridge/foil pack and screw nozzle onto the mouth of the cartridge. Insert the cartridge into a good quality applicator.

4. Extrude the first part of the cartridge to waste until an even colour has been achieved without streaking in the resin.

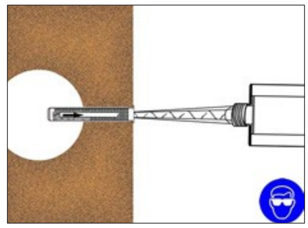


5. Select the appropriate perforated sleeve and insert into the hole.



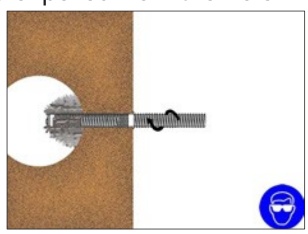
6. Insert the mixer nozzle to the bottom of the perforated sleeve, withdraw 2-3mm then begin to extrude the resin and slowly withdraw the mixer nozzle from the hole ensuring that there are no air voids as the mixer nozzle is withdrawn. Fill the perforated sleeve and withdraw the nozzle completely.

7. Insert the clean threaded bar, free from oil or other release agents, to the bottom of the hole using a back and forth twisting motion ensuring all the threads are thoroughly coated. Adjust to the correct position within the stated working time.



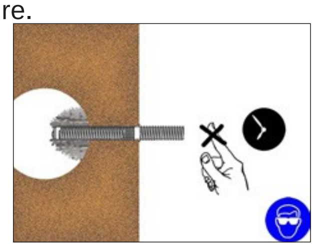
8. Any excess resin will be expelled from the hole evenly around the steel element showing that the hole is full.

This excess resin should be removed from around the mouth of the hole before it sets.

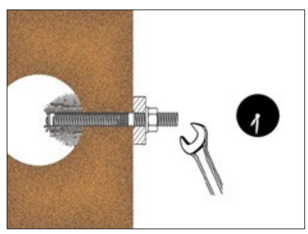


9. Leave the anchor to cure.

Do not disturb the anchor until the appropriate loading time, has elapsed depending on the substrate conditions and ambient temperature.



10. Attach the fixture and tighten the nut to the recommended torque. Do not overtighten.



# **P/P-C/P-E** Polyester / winter / tropical grade

## Product Data Sheet

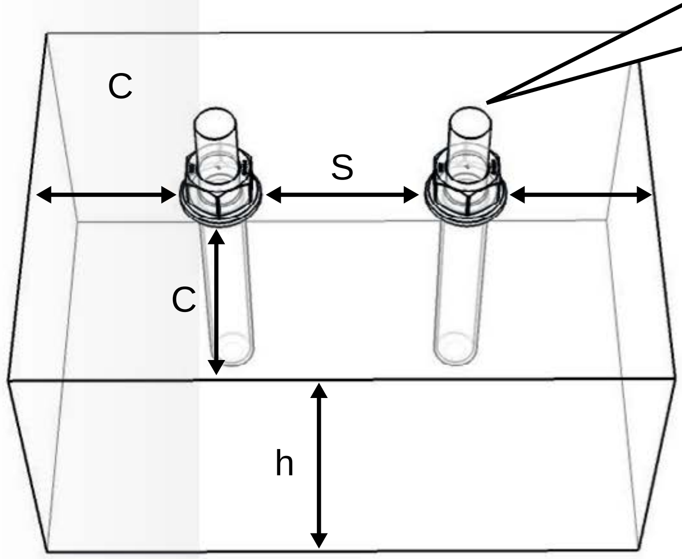
### Theoretical Number of Fixings Per Cartridge

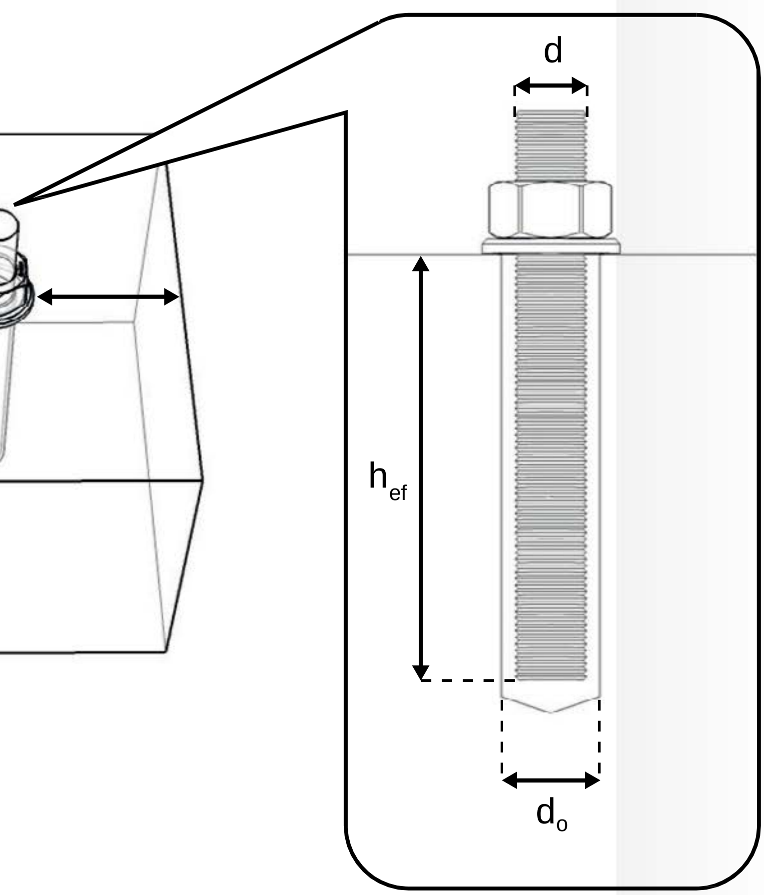
Applies to solid substrates

| Cartridge Volume | $h_{ef}$ | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|---|
| | | Drilling Ø 10mm | Drilling Ø 12mm | Drilling Ø 14mm | Drilling Ø 18mm | Drilling Ø 22mm | Drilling Ø 26mm |
| 345 ml | 8d | 124 | 77 | 51 | 27 | 16 | 10 |
| | 10d | 100 | 61 | 40 | 22 | 14 | 9 |
| | STD | 100 | 69 | 46 | 27 | 15 | 10 |
| | 12d | 84 | 50 | 34 | 18 | 11 | 7 |
| 300 ml | 8d | 106 | 65 | 43 | 23 | 13 | 8 |
| | 10d | 85 | 52 | 34 | 18 | 11 | 7 |
| | STD | 85 | 58 | 38 | 23 | 12 | 8 |
| | 12d | 71 | 43 | 29 | 15 | 9 | 5 |

*Note: Jobsite/contractor installations usually result in more resin being injected than the theoretical requirement resulting in lower number of fixings per cartridge. The reduction to the number of fixings per cartridge in practice is greater for smaller diameter holes and shallower embedment depths.*

### Installation diagram




**Glossary**

- d anchor nominal diameter
- $d_o$ drilled hole diameter
- $h_{ef}$ effective bond length
- C close edge distance
- S anchor spacing
- h concrete member thickness

# P/P-C/P-E Polyester / winter / tropical grade

Product Data Sheet

## Steel Failure Information - Threaded Bars

### Characteristic resistance values to tension load

| Steel Failure - Characteristic resistance | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size | | | M8 | M10 | M12 | M16 | M20 | M24 |
| Steel grade 5.8 | $N_{Rk,s}$ | [kN] | 18 | 29 | 42 | 79 | 123 | 177 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.5 | | | | | |
| Steel grade 8.8 | $N_{Rk,s}$ | [kN] | 29 | 46 | 67 | 126 | 196 | 282 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.5 | | | | | |
| Steel grade 10.9 | $N_{Rk,s}$ | [kN] | 37 | 58 | 84 | 157 | 245 | 353 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.4 | | | | | |
| Stainless steel grade A4-70 | $N_{Rk,s}$ | [kN] | 26 | 41 | 59 | 110 | 172 | 247 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.9 | | | | | |
| Stainless steel grade A4-80 | $N_{Rk,s}$ | [kN] | 29 | 46 | 67 | 126 | 196 | 282 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.6 | | | | | |
| Stainless steel grade 1,4529 | $N_{Rk,s}$ | [kN] | 26 | 41 | 59 | 110 | 172 | 247 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.5 | | | | | |

### Characteristic resistance values to shear load

| Steel Failure - without lever arm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size | | | M8 | M10 | M12 | M16 | M20 | M24 |
| Steel grade 5.8 | $V_{Rk,s}$ | [kN] | 9 | 15 | 21 | 39 | 61 | 88 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.25 | | | | | |
| Steel grade 8.8 | $V_{Rk,s}$ | [kN] | 15 | 23 | 34 | 63 | 98 | 141 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.25 | | | | | |
| Steel grade 10.9 | $V_{Rk,s}$ | [kN] | 18 | 29 | 42 | 79 | 123 | 177 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.5 | | | | | |
| Stainless steel grade A4-70 | $V_{Rk,s}$ | [kN] | 13 | 20 | 30 | 55 | 86 | 124 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.56 | | | | | |
| Stainless steel grade A4-80 | $V_{Rk,s}$ | [kN] | 15 | 23 | 34 | 63 | 98 | 141 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.33 | | | | | |
| Stainless steel grade 1,4529 | $V_{Rk,s}$ | [kN] | 13 | 20 | 30 | 55 | 86 | 124 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.25 | | | | | |

| Steel Failure - with lever arm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size | | | M8 | M10 | M12 | M16 | M20 | M24 |
| Steel grade 5.8 | $M^o_{Rk,s}$ | [N.m] | 19 | 37 | 66 | 166 | 325 | 561 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.25 | | | | | |
| Steel grade 8.8 | $M^o_{Rk,s}$ | [N.m] | 30 | 60 | 105 | 266 | 519 | 898 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.25 | | | | | |
| Steel grade 10.9 | $M^o_{Rk,s}$ | [N.m] | 37 | 75 | 131 | 333 | 649 | 1123 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.50 | | | | | |
| Stainless steel grade A4-70 | $M^o_{Rk,s}$ | [N.m] | 26 | 52 | 92 | 233 | 454 | 786 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.56 | | | | | |
| Stainless steel grade A4-80 | $M^o_{Rk,s}$ | [N.m] | 30 | 60 | 105 | 266 | 519 | 898 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.33 | | | | | |
| Stainless steel grade 1,4529 | $M^o_{Rk,s}$ | [N.m] | 26 | 52 | 92 | 233 | 454 | 786 |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.25 | | | | | |
| Concrete pryout failure | | | | | | | | |
| Factor k from TR 029 Design of bonded anchors pt 5.2.3.3 | | | 2 | | | | | |
| Partial safety factor | $\gamma_{Ms}$ | [-] | 1.5 | | | | | |

# **P/P-C/P-E** Polyester / winter / tropical grade

Product Data Sheet

## Using P/P-C/P-E with Threaded Bars

### Combined pullout and concrete cone failure in non-cracked concrete C20/25

| Size | | | | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|---|---|---|
| Characteristic bond resistance in non-cracked concrete | | | | | | | | | |
| Characteristic bond resistance dry/wet concrete and flooded hole | | $\tau_{Rk}$ | [N/mm²] | 9.50 | 9.00 | 8.50 | 8.00 | 7.50 | 7.00 |
| Partial safety factor | | $\gamma_{Mc}$ | [-] | 1,8 | | | | | |
| Factor for concrete | C30/37 | $\Psi_c$ | [-] | 1,12 | | | | | |
| | | | | 1,19 | | | | | |
| | | | | 1,30 | | | | | |

### Tension load calculations for combined concrete cone & pullout failure at various embedment depths

using threaded rods in dry / wet / flooded, uncracked, C20/25 concrete. Temperature range -40°C to +80°C.

| Property | Symbol | Unit | Anchor Size | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | M8 | M10 | M12 | M16 | M20 | M24 |
| Effective Embedment Depth = 8d | $h_{ef}$ | mm | 64 | 80 | 96 | 128 | 160 | 192 |
| Characteristic Load (Combined Concrete Cone & Pullout Failure) | $N^0_{Rk,p}$ | kN | 15.28 | 22.62 | 30.76 | 51.47 | 75.40 | 101.34 |
| Partial Safety Factor | $\gamma_{Mc}$ | - | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| Effective Embedment Depth = 10d | $h_{ef}$ | mm | 80 | 100 | 120 | 160 | 200 | 240 |
| Characteristic Load (Combined Concrete Cone & Pullout Failure) | $N^0_{Rk,p}$ | kN | 19.10 | 28.27 | 38.45 | 64.34 | 94.25 | 126.67 |
| Partial Safety Factor | $\gamma_{Mc}$ | - | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| Effective Embedment Depth = STD | $h_{ef}$ | mm | 80 | 90 | 110 | 128 | 170 | 210 |
| Characteristic Load (Combined Concrete Cone & Pullout Failure) | $N^0_{Rk,p}$ | kN | 19.10 | 25.45 | 35.25 | 51.47 | 80.11 | 110.84 |
| Partial Safety Factor | $\gamma_{Mc}$ | - | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| Effective Embedment Depth = 12d | $h_{ef}$ | mm | 96 | 120 | 144 | 192 | 240 | 288 |
| Characteristic Load (Combined Concrete Cone & Pullout Failure) | $N^0_{Rk,p}$ | kN | 22.92 | 33.93 | 46.14 | 77.21 | 113.10 | 152.00 |
| Partial Safety Factor | $\gamma_{Mc}$ | - | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |

1. *Characteristic loads are valid for combined concrete cone and pullout failure as defined by TR029 only. All other failure modes, including steel failure, detailed in TR029 as well as including combined effects of tension and shear, must be considered in accordance with TR029.*
2. *Characteristic loads are valid for single anchors without close edge, anchor spacing or eccentric loading considerations.*
3. *Tabulated values are valid for temperture range -40°C to +80°C (Max LTT = +50°C; Max STT = +80°C).*
4. *Tabulated values are only valid for the installation conditions stated. Other conditions, such as different temperature ranges, may affect the performance of the product.*
5. *Long term temperatures are those that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, eg: diurnal cycling.*
6. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm² for C20/25 concrete.*
7. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

# P/P-C/P-E Polyester / winter / tropical grade

## Product Data Sheet

### Tension load calculations for combined concrete cone & pullout failure at 8d embedment depth

using threaded rods in dry / wet / flooded, uncracked, C20/25 concrete. Temperature range -40°C to +80°C.

| Property | Symbol | Unit | Anchor Size | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | M8 | M10 | M12 | M16 | M20 | M24 |
| Nominal Anchor Diameter | d | mm | 8 | 10 | 12 | 16 | 20 | 24 |
| Characteristic Bond Strength | $\tau_{Rk}$ | N/mm² | 9.50 | 9.00 | 8.50 | 8.00 | 7.50 | 7.00 |
| Effective Embedment Depth | $h_{ef}$ | mm | 64 | 80 | 96 | 128 | 160 | 192 |
| Characteristic Load (Combined Concrete Cone and Pullout Failure) | $N^0_{Rk,p}$ | kN | 15.28 | 22.62 | 30.76 | 51.47 | 75.40 | 101.34 |
| Partial Safety Factor | $\gamma_{Mc}$ | - | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| Characteristic Anchor Spacing (Splitting Failure) | $S_{cr,sp}$ | mm | 256 | 320 | 384 | 384 | 480 | 576 |
| Characteristic Edge Distance (Splitting Failure) | $C_{cr,sp}$ | mm | 128 | 160 | 192 | 192 | 240 | 288 |
| Characteristic Anchor Spacing (Combined Concrete Cone and Pullout Failure) | $S_{cr,Np}$ | mm | 180 | 219 | 255 | 330 | 400 | 464 |
| Characteristic Edge Distance (Combined Concrete Cone and Pullout Failure) | $C_{cr,Np}$ | mm | 90 | 110 | 128 | 165 | 200 | 232 |

1. *Characteristic loads are valid for combined concrete cone and pullout failure as defined by TR029 only. All other failure modes, including steel failure, detailed in TR029 as well as including combined effects of tension and shear, must be considered in accordance with TR029.*
2. *Characteristic loads are valid for single anchors without close edge, anchor spacing or eccentric loading considerations.*
3. *Tabulated values are valid for temperture range -40°C to +80°C (Max LTT = +50°C; Max STT = +80°C).*
4. *Tabulated values are only valid for the installation conditions stated. Other conditions, such as different temperature ranges, may affect the performance of the product.*
5. *Long term temperatures are those that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, eg: diurnal cycling.*
6. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm² for C20/25 concrete.*
7. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

Reduction factors for close edge:
Combined concrete cone and pullout failure

| Close Edge Distance, C (mm) | Anchor Size | | | | | |
|---|---|---|---|---|---|---|
| | M8 | M10 | M12 | M16 | M20 | M24 |
| 35 | 0.56 | | | | | |
| 40 | 0.59 | 0.55 | | | | |
| 50 | 0.66 | 0.60 | 0.56 | | | SIBLE |
| 65 | 0.78 | 0.69 | 0.63 | 0.56 | | |
| 80 | 0.90 | 0.78 | 0.70 | 0.61 | 0.56 | |
| 92 | N/R | 0.86 | 0.76 | 0.65 | 0.59 | 0.57 |
| 96 | | 0.89 | 0.78 | 0.67 | 0.61 | 0.58 |
| 100 | | 0.91 | 0.80 | 0.68 | 0.62 | 0.59 |
| 110 | | 0.98 | 0.86 | 0.72 | 0.65 | 0.62 |
| 113 | | N/R | 0.87 | 0.73 | 0.66 | 0.63 |
| 120 | | | 0.91 | 0.76 | 0.68 | 0.65 |
| 130 | | | 0.97 | 0.80 | 0.71 | 0.68 |
| 135 | | | N/R | 0.82 | 0.73 | 0.69 |
| 140 | | | | 0.85 | 0.74 | 0.71 |
| 150 | | | | 0.89 | 0.78 | 0.74 |
| 160 | | | | 0.93 | 0.81 | 0.77 |
| 170 | | | | 0.98 | 0.84 | 0.80 |
| 175 | | | | N/R | 0.86 | 0.81 |
| 180 | | | | | 0.88 | 0.83 |
| 190 | | | | | 0.92 | 0.86 |
| 200 | | | | | 0.95 | 0.89 |
| 210 | | | | | 0.99 | 0.93 |
| 213 | | | | | N/R | 0.94 |
| 220 | | | | | | 0.96 |
| 232 | | | | | | N/R |

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a single anchor with a single close edge. Tabulated values must not be used if multiple close edges exist.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Close edge distances must exceed or be equal to the minimum close edge distance ($C_{min}$) as defined in the ETA.*

Reduction factors for anchor spacing:
Combined concrete cone and pullout failure

| Anchor Spacing, S (mm) | Anchor Size | | | | | |
|---|---|---|---|---|---|---|
| | M8 | M10 | M12 | M16 | M20 | M24 |
| 35 | 0.67 | | | | | |
| 40 | 0.68 | 0.65 | | | | |
| 50 | 0.70 | 0.67 | 0.65 | | | |
| 65 | 0.73 | 0.70 | 0.67 | 0.63 | | |
| 80 | 0.77 | 0.73 | 0.69 | 0.65 | 0.63 | |
| 96 | 0.80 | 0.76 | 0.72 | 0.67 | 0.64 | 0.65 |
| 100 | 0.81 | 0.77 | 0.73 | 0.68 | 0.65 | 0.65 |
| 125 | 0.87 | 0.82 | 0.77 | 0.71 | 0.68 | 0.68 |
| 150 | 0.92 | 0.86 | 0.81 | 0.74 | 0.70 | 0.70 |
| 175 | 0.98 | 0.91 | 0.85 | 0.78 | 0.73 | 0.73 |
| 185 | N/R | 0.93 | 0.87 | 0.79 | 0.74 | 0.74 |
| 200 | | 0.95 | 0.89 | 0.81 | 0.76 | 0.75 |
| 225 | | N/R | 0.93 | 0.84 | 0.78 | 0.77 |
| 270 | | | N/R | 0.90 | 0.83 | 0.82 |
| 275 | | | | 0.90 | 0.84 | 0.82 |
| 300 | | | | 0.94 | 0.87 | 0.85 |
| 351 | | | | N/R | 0.92 | 0.89 |
| 400 | | | | | 0.97 | 0.94 |
| 426 | | | | | N/R | 0.96 |
| 450 | | | | | | 0.99 |
| 464 | | | | | | N/R |

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a group of 2 anchors with the geometry defined by "S" and "$S_{cr,Np}$" but without close edge considerations.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Anchor spacing distances must exceed or be equal to the minimum anchor spacing ($S_{min}$) as defined in the ETA.*

# **P/P-C/P-E** Polyester / winter / tropical grade

SOMA

## Product Data Sheet

### Tension load calculations for combined concrete cone & pullout failure at std embedment depth

using threaded rods in dry / wet / flooded, uncracked, C20/25 concrete. Temperature range -40°C to +80°C.

| Property | Symbol | Unit | Anchor Size | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | M8 | M10 | M12 | M16 | M20 | M24 |
| Nominal Anchor Diameter | d | mm | 8 | 10 | 12 | 16 | 20 | 24 |
| Characteristic Bond Strength | $\tau_{Rk}$ | N/mm² | 9.50 | 9.00 | 8.50 | 8.00 | 7.50 | 7.00 |
| Effective Embedment Depth | $h_{ef}$ | mm | 80 | 90 | 110 | 128 | 170 | 210 |
| Characteristic Load (Combined Concrete Cone and Pullout Failure) | $N^0_{Rk,p}$ | kN | 19.10 | 25.45 | 35.25 | 51.47 | 80.11 | 110.84 |
| Partial Safety Factor | $\gamma_{Mc}$ | - | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| Characteristic Anchor Spacing (Splitting Failure) | $S_{cr,sp}$ | mm | 320 | 360 | 440 | 384 | 510 | 630 |
| Characteristic Edge Distance (Splitting Failure) | $C_{cr,sp}$ | mm | 160 | 180 | 220 | 192 | 255 | 315 |
| Characteristic Anchor Spacing (Combined Concrete Cone and Pullout Failure) | $S_{cr,Np}$ | mm | 180 | 219 | 255 | 330 | 400 | 464 |
| Characteristic Edge Distance (Combined Concrete Cone and Pullout Failure) | $C_{cr,Np}$ | mm | 90 | 110 | 128 | 165 | 200 | 232 |

1. *Characteristic loads are valid for combined concrete cone and pullout failure as defined by TR029 only. All other failure modes, including steel failure, detailed in TR029 as well as including combined effects of tension and shear, must be considered in accordance with TR029.*
2. *Characteristic loads are valid for single anchors without close edge, anchor spacing or eccentric loading considerations.*
3. *Tabulated values are valid for temperture range -40°C to +80°C (Max LTT = +50°C; Max STT = +80°C).*
4. *Tabulated values are only valid for the installation conditions stated. Other conditions, such as different temperature ranges, may affect the performance of the product.*
5. *Long term temperatures are those that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, eg: diurnal cycling.*
6. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm² for C20/25 concrete.*
7. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

### Reduction factors for close edge: Combined concrete cone and pullout failure

| Close Edge Distance, C (mm) | Anchor Size | | | | | |
|---|---|---|---|---|---|---|
| | M8 | M10 | M12 | M16 | M20 | M24 |
| 40 | 0.59 | | | | | |
| 45 | 0.63 | 0.57 | | | | |
| 50 | 0.66 | 0.60 | 0.56 | | | |
| 55 | 0.70 | 0.63 | 0.58 | 0.54 | | SIBLE |
| 60 | 0.74 | 0.66 | 0.60 | 0.56 | | |
| 65 | 0.78 | 0.69 | 0.63 | 0.57 | | |
| 70 | 0.82 | 0.72 | 0.65 | 0.61 | | |
| 80 | 0.90 | 0.78 | 0.70 | 0.63 | | |
| 85 | 0.94 | 0.81 | 0.72 | 0.65 | | |
| 90 | 0.98 | 0.85 | 0.75 | 0.65 | | |
| 92 | N/R | 0.86 | 0.76 | 0.68 | 0.59 | |
| 100 | | 0.91 | 0.80 | 0.70 | 0.62 | |
| 105 | | 0.95 | 0.83 | 0.73 | 0.63 | 0.61 |
| 113 | | N/R | 0.87 | 0.78 | 0.66 | 0.63 |
| 125 | | | 0.94 | 0.82 | 0.70 | 0.66 |
| 135 | | | N/R | 0.89 | 0.73 | 0.69 |
| 150 | | | | N/R | 0.78 | 0.74 |
| 175 | | | | | 0.86 | 0.81 |
| 200 | | | | | 0.95 | 0.89 |
| 213 | | | | | N/R | 0.94 |
| 225 | | | | | | 0.98 |
| 232 | | | | | | N/R |

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a single anchor with a single close edge. Tabulated values must not be used if multiple close edges exist.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Close edge distances must exceed or be equal to the minimum close edge distance ($C_{min}$) as defined in the ETA.*

### Reduction factors for anchor spacing: Combined concrete cone and pullout failure

| | Anchor Size | | | | | |
|---|---|---|---|---|---|---|
| | M8 | M10 | M12 | M16 | M20 | M24 |
| 40 | 0.69 | | | | | |
| 45 | 0.70 | 0.67 | | | | |
| 50 | 0.71 | 0.68 | 0.65 | | | |
| 55 | 0.72 | 0.69 | 0.66 | | | |
| 60 | 0.73 | 0.70 | 0.67 | | | |
| 65 | 0.74 | 0.71 | 0.68 | 0.63 | | |
| 70 | 0.75 | 0.72 | 0.69 | 0.64 | | |
| 80 | 0.78 | 0.73 | 0.70 | 0.65 | | |
| 85 | 0.79 | 0.74 | 0.71 | 0.66 | 0.64 | |
| 90 | 0.80 | 0.75 | 0.72 | 0.67 | 0.64 | |
| 100 | 0.82 | 0.77 | 0.73 | 0.68 | 0.65 | |
| 105 | 0.83 | 0.78 | 0.74 | 0.69 | 0.66 | 0.66 |
| 125 | 0.87 | 0.82 | 0.77 | 0.71 | 0.68 | 0.68 |
| 150 | 0.93 | 0.87 | 0.81 | 0.74 | 0.71 | 0.71 |
| 175 | 0.98 | 0.91 | 0.85 | 0.78 | 0.73 | 0.73 |
| 185 | N/R | 0.93 | 0.87 | 0.79 | 0.74 | 0.74 |
| 200 | | 0.96 | 0.89 | 0.81 | 0.76 | 0.75 |
| 225 | | N/R | 0.93 | 0.84 | 0.79 | 0.78 |
| 250 | | | 0.97 | 0.87 | 0.81 | 0.80 |
| 270 | | | N/R | 0.90 | 0.84 | 0.82 |
| 300 | | | | 0.94 | 0.87 | 0.85 |
| 351 | | | | N/R | 0.92 | 0.90 |
| 400 | | REDUCTION | | | 0.97 | 0.94 |
| 426 | | | | | N/R | 0.97 |
| 450 | | | | | | 0.99 |
| 464 | | | | | | N/R |

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a group of 2 anchors with the geometry defined by "S" and "$S_{cr,Np}$" but without close edge considerations.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Anchor spacing distances must exceed or be equal to the minimum anchor spacing ($S_{min}$) as defined in the ETA.*

# **P/P-C/P-E** Polyester / winter / tropical grade

## Product Data Sheet

### Tension load calculations for combined concrete cone & pullout failure at 12d embedment depth

using threaded rods in dry / wet / flooded, uncracked, C20/25 concrete. Temperature range -40°C to +80°C.

| Property | Symbol | Unit | Anchor Size | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | M8 | M10 | M12 | M16 | M20 | M24 |
| Nominal Anchor Diameter | d | mm | 8 | 10 | 12 | 16 | 20 | 24 |
| Characteristic Bond Strength | $\tau_{Rk}$ | N/mm² | 9.50 | 9.00 | 8.50 | 8.00 | 7.50 | 7.00 |
| Effective Embedment Depth | $h_{ef}$ | mm | 96 | 120 | 144 | 192 | 240 | 288 |
| Characteristic Load (Combined Concrete Cone and Pullout Failure) | $N^{0}_{Rk,p}$ | kN | 22.92 | 33.93 | 46.14 | 77.21 | 113.10 | 152.00 |
| Partial Safety Factor | $\gamma_{Mc}$ | - | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| Characteristic Anchor Spacing (Splitting Failure) | $S_{cr,sp}$ | mm | 384 | 480 | 576 | 576 | 720 | 864 |
| Characteristic Edge Distance (Splitting Failure) | $C_{cr,sp}$ | mm | 192 | 240 | 288 | 288 | 360 | 432 |
| Characteristic Anchor Spacing (Combined Concrete Cone and Pullout Failure) | $S_{cr,Np}$ | mm | 180 | 219 | 255 | 330 | 400 | 464 |
| Characteristic Edge Distance (Combined Concrete Cone and Pullout Failure) | $C_{cr,Np}$ | mm | 90 | 110 | 128 | 165 | 200 | 232 |

1. *Characteristic loads are valid for combined concrete cone and pullout failure as defined by TR029 only. All other failure modes, including steel failure, detailed in TR029 as well as including combined effects of tension and shear, must be considered in accordance with TR029.*
2. *Characteristic loads are valid for single anchors without close edge, anchor spacing or eccentric loading considerations.*
3. *Tabulated values are valid for temperture range -40°C to +80°C (Max LTT = +50°C; Max STT = +80°C).*
4. *Tabulated values are only valid for the installation conditions stated. Other conditions, such as different temperature ranges, may affect the performance of the product.*
5. *Long term temperatures are those that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, eg: diurnal cycling.*
6. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm² for C20/25 concrete.*
7. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

Reduction factors for close edge:
Combined concrete cone and pullout failure

| Close Edge Distance, C (mm) | Anchor Size | | | | | |
|---|---|---|---|---|---|---|
| | M8 | M10 | M12 | M16 | M20 | M24 |
| 50 | 0.66 | | | | | |
| 60 | 0.74 | | | | | |
| 70 | 0.82 | 0.72 | 0.65 | | | |
| 75 | 0.85 | 0.75 | 0.67 | | | |
| 80 | 0.90 | 0.78 | 0.70 | | | |
| 92 | N/R | 0.86 | 0.76 | | | |
| 100 | | 0.91 | 0.80 | 0.68 | | |
| 113 | | N/R | 0.87 | 0.73 | | |
| 120 | | | 0.91 | 0.76 | 0.68 | |
| 125 | | | 0.94 | 0.78 | 0.70 | |
| 135 | | | N/R | 0.82 | 0.73 | |
| 145 | | | | 0.87 | 0.76 | 0.72 |
| 150 | | | | 0.89 | 0.78 | 0.74 |
| 175 | | | | N/R | 0.86 | 0.81 |
| 200 | | | | | 0.95 | 0.89 |
| 213 | | | | | N/R | 0.94 |
| 225 | | | | | | 0.98 |
| 232 | | | | | | N/R |

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a single anchor with a single close edge. Tabulated values must not be used if multiple close edges exist.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Close edge distances must exceed or be equal to the minimum close edge distance ($C_{min}$) as defined in the ETA.*

Reduction factors for anchor spacing:
Combined concrete cone and pullout failure

| Anchor Spacing, S (mm) | Anchor Size | | | | | |
|---|---|---|---|---|---|---|
| | M8 | M10 | M12 | M16 | M20 | M24 |
| 50 | 0.72 | | | | | |
| 60 | 0.74 | 0.71 | | | | |
| 70 | 0.76 | 0.73 | | | | |
| 75 | 0.77 | 0.74 | 0.71 | | | |
| 80 | 0.78 | 0.75 | 0.71 | | | |
| 90 | 0.80 | 0.76 | 0.73 | | | |
| 100 | 0.82 | 0.78 | 0.75 | 0.70 | | |
| 120 | 0.87 | 0.82 | 0.78 | 0.73 | 0.69 | |
| 145 | 0.92 | 0.86 | 0.81 | 0.76 | 0.72 | 0.72 |
| 175 | 0.98 | 0.91 | 0.86 | 0.79 | 0.75 | 0.75 |
| 185 | N/R | 0.93 | 0.88 | 0.81 | 0.76 | 0.75 |
| 200 | | 0.96 | 0.90 | 0.82 | 0.78 | 0.77 |
| 225 | | 1.00 | 0.93 | 0.85 | 0.80 | 0.79 |
| 250 | | | 0.97 | 0.88 | 0.83 | 0.81 |
| 270 | | | 1.00 | 0.91 | 0.85 | 0.83 |
| 300 | | | | 0.94 | 0.88 | 0.86 |
| 351 | | | | N/R | 0.93 | 0.90 |
| 400 | | | | | 0.98 | 0.95 |
| 426 | | | | | N/R | 0.97 |
| 450 | | | | | | 0.99 |
| 464 | | | | | | N/R |

1. *Tabulated values are only applicable for instances where combined concrete cone and pullout failure is the controlling failure mode as described by TR029. All other failure modes must be considered and different reduction factors may apply.*
2. *Tabulated values are based on a group of 2 anchors with the geometry defined by "S" and "$S_{cr,Np}$" but without close edge considerations.*
3. *Anchors with geometry different to that defined in the above table must be considered separately and the tabulated values must not be used.*
4. *Interpolation is allowed.*
5. *Tabulated values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*
6. *Anchor spacing distances must exceed or be equal to the minimum anchor spacing ($S_{min}$) as defined in the ETA.*

# **P/P-C/P-E** Polyester / winter / tropical grade

SOMA

Product Data Sheet

## Using P/P-C/P-E in Masonry

The below data is for threaded roads installed into various types of masonry using perforated sleeves and, in some cases, internally threaded sockets used in combination with perforated sleeves. The data represents an application in the worst case position in a masonry unit, as this can be difficult to assess if the wall is rendered.

### Hollow Bricks: Type RC 40

| Fixing Type | | Sleeve Size mm | Drill ø mm | Min. Drill Depth mm | Recommended Tensile Load kN | Recommended Shear Load kN | Installation Torque Nm |
|---|---|---|---|---|---|---|---|
| Threaded Bar | Socket | | | | | | |
| M8 | - | 15 or 16 x 85 | 15 or 16 | 90 | 0.65 | 1.60 | 6 |
| M10 | - | 15 or 16 x 85 | 15 or 16 | 90 | 0.65 | 1.60 | 6 |
| M12 | - | 15 or 16 x 85 | 15 or 16 | 90 | 0.65 | 1.60 | 6 |
| - | M8 x 80 | 20 x 85 | 20 | 90 | 0.80 | 1.85 | 6 |
| - | M10 x 80 | 20 x 85 | 20 | 90 | 0.80 | 1.85 | 6 |
| - | M12 x 80 | 20 x 85 | 20 | 90 | 0.80 | 1.85 | 6 |

### Hollow Bricks: Type B40

| Fixing Type | | Sleeve Size mm | Drill ø mm | Min. Drill Depth mm | Recommended Tensile Load kN | Recommended Shear Load kN | Installation Torque Nm |
|---|---|---|---|---|---|---|---|
| Threaded Bar | Socket | | | | | | |
| M8 | - | 15 or 16 x 130 | 15 or 16 | 135 | 0.80 | 1.80 | 6 |
| M10 | - | 15 or 16 x 130 | 15 or 16 | 135 | 0.80 | 1.80 | 6 |
| M12 | - | 15 or 16 x 130 | 15 or 16 | 135 | 0.80 | 1.80 | 6 |
| - | M8 x 80 | 20 x 85 | 20 | 90 | 0.65 | 1.80 | 6 |
| - | M10 x 80 | 20 x 85 | 20 | 90 | 0.65 | 1.80 | 8 |
| - | M12 x 80 | 20 x 85 | 20 | 90 | 0.65 | 1.80 | 8 |

### Solid Bricks and Blocks

| Anchor Size | Recommended Load kN Tension or shear | | | |
|---|---|---|---|---|
| | Brickwork 20.5N/mm$^2$ | Brickwork 7N/mm$^2$ | Brickwork 3.5N/mm$^2$ | Brickwork 2.8N/mm$^2$ |
| M8 | 1.4 | 0.6 | 0.5 | 0.4 |
| M10 | 2.9 | 1.3 | 0.9 | 0.7 |
| M12 | 4.0 | 2.0 | 1.1 | 0.9 |
| M16 | 5.0 | 3.0 | Sizes above M12 are not recommended | |
| M20 | Sizes above M16 are not recommended | | | |
| | | | | |

*Do not install more than one fixing into a single masonry unit.*

- In solid masonry, anchors should be spaced at a distance equal to or greater than 100mm centre to centre, and no less than 200mm from an edge.
- In hollow masonry, anchors should be spaced at a distance equal to or greater than 200mm centre to centre, and no less than 250mm from an edge.

# P/P-C/P-E Polyester / winter / tropical grade

Product Data Sheet

## Important Notes

### Use in Porous Substrates

This bonded anchor is not intended for use as a cosmetic or decorative product. When anchoring into porous or reconstituted stone it is recommended that technical assistance is sought. Due to the nature of the product, migration of the monomer in the resin may cause staining in certain materials. If you are still uncertain, it is advisable to test the resin by applying it in a small, discrete area and testing before using the resin on the project.

### Important Note

Whilst all reasonable care is taken in compiling technical data on the Company's products, all recommendations or suggestions regarding the use of such products are made without guarantee, since the conditions of use are beyond the control of the Company. It is the customer's responsibility to satisfy himself that each product is fit for the purpose for which he intends to use it, that the actual conditions of use are suitable and that, in the light of our continual research and development programme the information relating to each product has not been superseded.

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