# PE Chemical Resin PE310/PE410

Polyester Styrene Free General Purpose Anchor Resin

## *Features and Benefits*

Version: 07/03/2025

- *Good bond strength with High load resistance*
- *Used with all grades of threaded rod*
- *Used in non-cracked concrete and masonry*
- *Fast gelling and curing*
- *Used in dry and wet conditions*
- *Also suitable as a filler for gap and crack filling*
- *Economical fixing resin*
- *Extremely versatile*
- *Close edge distance and small spacing*
- *Manual cleaning up to 20mm diameter and embedment depths of 240mm*
- *ETA 25/0100 for fixing into masonry*

## *Contents*



## *Shelf Life and Storage*

*This product should be stored between +0˚C & +30˚C.*
*The Shelf life of the product is 18 months from the manufacture date.*





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# PE Chemical Resin PE310/PE410

### *Product Description*

Timco PE is a 2-component high strength 10:1 ratio chemical anchoring resin styrene free. It is designed as a fast curing high strength resin fixing anchor for medium loads and is particularly suitable for lower strength substrates and lower load fixings due to its excellent value.

### *Specific Benefits*

- High loads possible
- Studs and other fixings
- Crack and gap filling
- Economical fixing resin

### *Approvals*

- ETA 25/0100 - EAD330076 Solid& Hollow Wall / Masonry Installations

### *Loads, Edge and Spacings based on Characteristic bond strengths - Showing steel failure*

| | Characteristic Resistance (kN) | | Design Resistance (kN) | | Recommended Load (kN) | | Characteristic distances (mm) | | | Min Edge and Spacing (mm) | Nominal Embedment (mm) | Hole Diameter concrete (mm) | Hole Diameter fixture (mm) | Max Torque (Nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size (mm)** | Tension $N_{rk}$ | Shear $V_{rk}$ | Tension $N_{rd}$ | Shear $V_{rd}$ | Tension $N_{rec}$ | Shear $V_{rec}$ | Edge $C_{cr,N}$ | Spacing $S_{cr,N}$ | Edge $C_{cr,V}$ | $C_{min}$, $S_{min}$ | | | | |
| **8** | 15.12 | | 8.40 | | 6.00 | | | | | | 60 | 10 | 9 | 10 |
| | 19.00 | 9.00 | 11.20 | 7.20 | 8.00 | 5.14 | 80 | 160 | 80 | 40 | 80 | | | |
| | 19.00 | | 12.70 | | 9.07 | | | | | | 160 | | | |
| **10** | 18.90 | | 10.50 | | 7.50 | | | | | | 60 | 12 | 12 | 20 |
| | 28.26 | 15.00 | 15.70 | 12.00 | 11.21 | 8.57 | 100 | 200 | 90 | 50 | 90 | | | |
| | 30.20 | | 20.10 | | 14.36 | | | | | | 200 | | | |
| **12** | 26.50 | | 14.72 | | 10.52 | | | | | | 70 | 14 | 14 | 40 |
| | 41.40 | 21.00 | 23.00 | 16.80 | 16.43 | 12.00 | 120 | 240 | 110 | 60 | 110 | | | |
| | 43.80 | | 29.20 | | 20.86 | | | | | | 240 | | | |
| **e stored b** | 38.52 | | 21.40 | | 15.29 | | | | | | 80 | 18 | 18 | 80 |
| **16** | 60.30 | 39.00 | 33.50 | 31.20 | 23.93 | 22.29 | 160 | 320 | 125 | 80 | 125 | | | |
| | 81.60 | | 54.40 | | 38.86 | | | | | | 320 | | | |
| **20** | 45.20 | | 25.11 | | 17.94 | | | | | | 90 | 22 | 22 | 120 |
| | 85.50 | 61.00 | 47.50 | 48.80 | 33.93 | 34.86 | 200 | 400 | 180 | 100 | 170 | | | |
| | 127.40 | | 84.90 | | 60.64 | | | | | | 400 | | | |
| **24** | 56.50 | | 31.39 | | 22.42 | | | | | | 100 | 28 | 26 | 160 |
| | 118.80 | 88.00 | 66.00 | 70.40 | 47.14 | 50.29 | 225 | 450 | 220 | 120 | 210 | | | |
| | 183.60 | | 122.40 | | 87.43 | | | | | | 480 | | | |
| **30** | 67.85 | | 37.69 | | 26.92 | | | | | | 120 | 35 | 32 | 200 |
| | 158.40 | 142.50 | 88.00 | 114.00 | 62.86 | 81.43 | 260 | 520 | 280 | 150 | 280 | | | |
| | 292.00 | | 194.50 | | 138.93 | | | | | | 600 | | | |

= steel failure  Partial safety factor = 1.5



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# PE Chemical Resin PE310/PE410

***Design Resistance used with various stud strengths, material and rebar.***

### *5.8 Grade Steel Studding*

| Stud Diameter | Hole Diameter | Embedment Depth hef | | | | | | | | | | | | | steel failure | | | | | $h_{ef}$ failure | $F_{d,s}$ design load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (mm) | (mm) | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | (mm) | (kN) |
| 8 | 10 | 8.4 | 9.8 | 11.2 | 12.6 | 12.7 | | | | | | | | | | | | | | 91 | 12.7 |
| 10 | 12 | 10.5 | 12.2 | 14.0 | 15.7 | 17.5 | 19.2 | 20.1 | | | | | | | | | | | | 115 | 20.1 |
| 12 | 14 | | 14.7 | 16.8 | 18.9 | 20.9 | 23.0 | 25.1 | 27.2 | 29.2 | | | | | | | | | | 140 | 29.2 |
| 16 | 18 | | | 21.4 | 24.1 | 26.8 | 29.5 | 32.2 | 34.9 | 37.5 | 42.9 | 53.6 | 54.4 | | | | | | | 203 | 54.4 |
| 20 | 22 | | | 22.3 | 25.1 | 27.9 | 30.7 | 33.5 | 36.3 | 39.1 | 44.7 | 55.9 | 67.0 | 78.2 | 84.9 | | | | | 304 | 84.9 |
| 24 | 28 | | | | | 31.4 | 34.6 | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 100.5 | 122 | | | | 389 | 122.4 |
| 27 | 30 | | | | | | 36.3 | 39.6 | 42.9 | 46.2 | 52.8 | 66.0 | 79.2 | 92.4 | 105.6 | 132.0 | 158.4 | 159 | | 482 | 159.1 |
| 30 | 35 | | | | | | | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 100.5 | 125.7 | 150.8 | 169.7 | 188.5 | 619 | 194.5 |
| Depth (mm) | | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | | |

### *8.8 Grade Steel Studding*

| Stud Diameter | Hole Diameter | Embedment Depth hef | | | | | | | | | | | | | | | | | | $h_{ef}$ failure | $F_{d,s}$ design load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (mm) | (mm) | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | (mm) | (kN) |
| 8 | 10 | 8.4 | 9.8 | 11.2 | 12.6 | 14.0 | 15.4 | 16.8 | 18.2 | 19.5 | | | | | | | | | | 140 | 19.5 |
| 10 | 12 | 10.5 | 12.2 | 14.0 | 15.7 | 17.5 | 19.2 | 20.9 | 22.7 | 24.4 | 27.9 | 30.9 | | | | | | | | 177 | 30.9 |
| 12 | 14 | | 14.7 | 16.8 | 18.9 | 20.9 | 23.0 | 25.1 | 27.2 | 29.3 | 33.5 | 41.9 | 45.0 | | | | | | | 215 | 45.0 |
| 16 | 18 | | | 21.4 | 24.1 | 26.8 | 29.5 | 32.2 | 34.9 | 37.5 | 42.9 | 53.6 | 64.3 | 75.1 | 83.7 | | | | | 312 | 83.7 |
| 20 | 22 | | | 22.3 | 25.1 | 27.9 | 30.7 | 33.5 | 36.3 | 39.1 | 44.7 | 55.9 | 67.0 | 78.2 | 89.4 | 111.7 | | | | 468 | 130.7 |
| e stored b | 28 | | | | | 31.4 | 34.6 | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 100.5 | 125.7 | 150.8 | | | 599 | 188.3 |
| 27 | 30 | | | | | | 36.3 | 39.6 | 42.9 | 46.2 | 52.8 | 66.0 | 79.2 | 92.4 | 105.6 | 132.0 | 158.4 | 178.2 | | 742 | 244.8 |
| 30 | 35 | | | | | | | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 100.5 | 125.7 | 150.8 | 169.7 | 188.5 | 952 | 299.2 |
| Depth (mm) | | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | | |



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***Design Resistance used with various stud strengths, material and rebar.***

***10.9 Grade Steel Studding***

10.9 grade studding

| Stud Diameter | Hole Diameter | Embedment Depth hef | | | | | | | | | | | | | | | | | | $h_{ef}$ failure | $F_{d,s}$ design load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (mm) | (mm) | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | (mm) | (kN) |
| 8 | 10 | 8.4 | 9.8 | 11.2 | 12.6 | 14.0 | 15.4 | 16.8 | 18.2 | 19.6 | 22.3 | | | | | | | | | 195 | 27.2 |
| 10 | 12 | 10.5 | 12.2 | 14.0 | 15.7 | 17.5 | 19.2 | 20.9 | 22.7 | 24.4 | 27.9 | 34.9 | | | | | | | | 247 | 43.1 |
| 12 | 14 | | 14.7 | 16.8 | 18.9 | 20.9 | 23.0 | 25.1 | 27.2 | 29.3 | 33.5 | 41.9 | 50.3 | | | | | | | 299 | 62.6 |
| 16 | 18 | | | 21.4 | 24.1 | 26.8 | 29.5 | 32.2 | 34.9 | 37.5 | 42.9 | 53.6 | 64.3 | 75.1 | 85.8 | | | | | 435 | 116.6 |
| 20 | 22 | | | 22.3 | 25.1 | 27.9 | 30.7 | 33.5 | 36.3 | 39.1 | 44.7 | 55.9 | 67.0 | 78.2 | 89.4 | 111.7 | | | | 652 | 182.0 |
| 24 | 28 | | | | | 31.4 | 34.6 | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 100.5 | 125.7 | 150.8 | | | 835 | 262.2 |
| 27 | 30 | | | | | | 36.3 | 39.6 | 42.9 | 46.2 | 52.8 | 66.0 | 79.2 | 92.4 | 105.6 | 132.0 | 158.4 | 178.2 | | 1034 | 341.0 |
| 30 | 35 | | | | | | | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 100.5 | 125.7 | 150.8 | 169.7 | 188.5 | 1326 | 416.7 |
| Depth (mm) | | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | | |

***A4-70 Stainless Steel Studding***

| Stud Diameter | Hole Diameter | Embedment Depth hef | | | | | | | | | | | | | steel failure | | | | | $h_{ef}$ failure | $F_{d,s}$ design load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (mm) | (mm) | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | (mm) | (kN) |
| 8 | 10 | 8.4 | 9.8 | 11.2 | 12.6 | 13.7 | | | | | | | | | | | | | | 98 | 13.7 |
| 10 | 12 | 10.5 | 12.2 | 14.0 | 15.7 | 17.5 | 19.2 | 20.9 | 21.7 | | | | | | | | | | | 124 | 21.7 |
| 12 | 14 | | 14.7 | 16.8 | 18.9 | 20.9 | 23.0 | 25.1 | 27.2 | 29.3 | 31.6 | | | | | | | | | 151 | 31.6 |
| 16 | 18 | | | 21.4 | 24.1 | 26.8 | 29.5 | 32.2 | 34.9 | 37.5 | 42.9 | 53.6 | 58.8 | | | | | | | 219 | 58.8 |
| 20 | 22 | | | 22.3 | 25.1 | 27.9 | 30.7 | 33.5 | 36.3 | 39.1 | 44.7 | 55.9 | 67.0 | 78.2 | 89.4 | 91.7 | | | | 328 | 91.7 |
| 24 | 28 | | | | | 31.4 | 34.6 | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 100.5 | 125.7 | 132.1 | | | 421 | 132.1 |
| 27 | 30 | | | | | | 36.3 | 39.6 | 42.9 | 46.2 | 52.8 | 66.0 | 79.2 | 80.2 | | | | | 1 | 243 | 80.2 |
| 30 | 35 | | | | | | | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 98.1 | | | | 1 | 312 | 98.1 |
| Depth (mm) | | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | | |

*1 = Tensile strength 500N/mm2



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***Design Resistance used with various stud strengths, material and rebar.***

***A4-80 Stainless Steel Studding***

| Stud Diameter | Hole Diameter | Embedment Depth hef | | | | | | | | | | | | | | | | | | $h_{ef}$ failure | $F_{d,s}$ design load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (mm) | (mm) | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | (mm) | (kN) |
| 8 | 10 | 8.4 | 9.8 | 11.2 | 12.6 | 14.0 | 15.4 | 15.7 | | | | | | | | | | | | 112 | 15.7 |
| 10 | 12 | | 12.2 | 14.0 | 15.7 | 17.5 | 19.2 | 20.9 | 22.7 | 24.4 | 24.8 | | | | | | | | | 142 | 24.8 |
| 12 | 14 | | 14.7 | 16.8 | 18.9 | 20.9 | 23.0 | 25.1 | 27.2 | 29.3 | 33.5 | 36.1 | | | | | | | | 172 | 36.1 |
| 16 | 18 | | | 21.4 | 24.1 | 26.8 | 29.5 | 32.2 | 34.9 | 37.5 | 42.9 | 53.6 | 64.3 | 67.2 | | | | | | 251 | 67.2 |
| 20 | 22 | | | 22.3 | 25.1 | 27.9 | 30.7 | 33.5 | 36.3 | 39.1 | 44.7 | 55.9 | 67.0 | 78.2 | 89.4 | 104.8 | | | | 375 | 104.8 |
| 24 | 28 | | | | | 31.4 | 34.6 | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 100.5 | 125.7 | 132.1 | | | 421 | 132.1 |
| 27 | 30 | | | | | | 36.3 | 39.6 | 42.9 | 46.2 | 52.8 | 66.0 | 79.2 | 80.2 | | | | | 2 | 243 | 80.2 |
| 30 | 35 | | | | | | | 37.7 | 40.8 | 44.0 | 50.3 | 62.8 | 75.4 | 88.0 | 98.1 | | | | 2 | 312 | 98.1 |
| Depth (mm) | | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 480 | 540 | 600 | | |

***High bond reinforcing bars Fyk=500N/mm2***

| Rebar Diameter | Hole Diameter | Embedment Depth hef | | | | | | | | | | | | | | | | | | $h_{ef}$ failure | $F_{d,s}$ yield load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (mm) | (mm) | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 500 | 560 | 640 | (mm) | (kN) |
| 8 | 10 | 7.5 | 8.8 | 10.1 | 11.3 | 12.6 | 13.8 | 15.1 | 16.3 | 17.6 | 20.1 | | | | | | | | | 216 | 21.9 |
| 10 | 12 | 9.4 | 11.0 | 12.6 | 14.1 | 15.7 | 17.3 | 18.9 | 20.4 | 22.0 | 25.1 | 31.4 | | | | | | | | 281 | 34.1 |
| 12 | 14 | | 11.9 | 13.6 | 15.3 | 17.0 | 18.7 | 20.4 | 22.1 | 23.8 | 27.1 | 33.9 | 40.7 | | | | | | | 379 | 49.2 |
| 16 | 20 | | | 16.1 | 18.1 | 20.1 | 22.1 | 24.1 | 26.1 | 28.2 | 32.2 | 40.2 | 48.3 | 56.3 | 64.3 | | | | | 549 | 87.4 |
| 20 | 25 | | | 17.6 | 19.8 | 22.0 | 24.2 | 26.4 | 28.6 | 30.8 | 35.2 | 44.0 | 52.8 | 61.6 | 70.4 | 88.0 | | | | 805 | 136.6 |
| 25 | 30 | | | | | 23.6 | 25.9 | 28.3 | 30.6 | 33.0 | 37.7 | 47.1 | 56.6 | 66.0 | 75.4 | 94.3 | 117.8 | | | 1107 | 196.5 |
| 28 | 35 | | | | | | 24.2 | 26.4 | 28.6 | 30.8 | 35.2 | 44.0 | 52.8 | 61.6 | 70.4 | 88.0 | 110.0 | 123.2 | | 1429 | 267.8 |
| 32 | 40 | | | | | | | | 30.1 | 32.4 | 37.0 | 46.3 | 55.5 | 64.8 | 74.0 | 92.5 | 115.6 | 129.5 | 148.0 | 1783 | 349.7 |
| Depth (mm) | | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 160 | 200 | 240 | 280 | 320 | 400 | 500 | 560 | 640 | | |

*1 = Tensile strength 500N/mm2

*2 = Tensile strength 700N/mm2



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# PE Chemical Resin PE310/PE410

### *Bond Strength Factors*

### *Influence of concrete strength on combined pull out and concrete cone resistance*

| Concrete Strength N/mm2 | C15/20 | C20/25 | C25/30 | C30/37 | C35/45 | C40/50 | C45/55 | C50/60 |
|---|---|---|---|---|---|---|---|---|
| Non-Cracked fc = | 0.97 | 1.00 | 1.02 | 1.04 | 1.07 | 1.10 | 1.12 | 1.15 |

### *Influence of environmental conditions in non cracked concrete*

| | | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|---|---|---|---|---|---|---|---|---|
| Temp I 40°C / 24°C | Dry and Wet | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Temp II 80°C / 50°C | Dry and Wet | 0.90 | 0.88 | 0.87 | 0.86 | 0.85 | 0.84 | 0.82 |

Select concrete strength and environmental condition and apply to bond strength table on page 4

e stored b



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# PE Chemical Resin PE310/PE410

***Characteristic and Design Load resistances for REBAR based on characteristic bond strengths for hef 4d (min embedment) to 20d***

| | Non Cracked Concrete | | | | | | Cracked Concrete | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Characteristic Resistance (kN) | | Design Resistance (kN) | | Recommended Load (kN) | | Characteristic Resistance (kN) | | Design Resistance (kN) | | Recommended Load (kN) | | Nominal Embed-ment |
| Rebar | Tension | Shear | Tension | Shear | Tension | Shear | Tension | Shear | Tension | Shear | Tension | Shear | (mm) |
| Ø | $N_{rk}$ | $V_{rk}$ | $N_{rd}$ | $V_{rd}$ | $N_{rec}$ | $V_{rec}$ | $N_{rk}$ | $V_{rk}$ | $N_{rd}$ | $V_{rd}$ | $N_{rec}$ | $V_{rec}$ | |
| 8 | 13.50 | 13.95 | 7.50 | 9.30 | 5.36 | 6.64 | Not Applicable | | Not Applicable | | Not Applicable | | 60 |
| | **18.18** | | **10.10** | | **7.21** | | | | | | | | **80** |
| | 36.18 | | 20.10 | | 14.36 | | | | | | | | 160 |
| 10 | 16.92 | 21.45 | 9.40 | 14.30 | 6.71 | 10.21 | | | | | | | 60 |
| | **25.38** | | **14.10** | | **10.07** | | | | | | | | **90** |
| | 56.52 | | 31.40 | | 22.43 | | | | | | | | 200 |
| 12 | 21.42 | 31.05 | 11.90 | 20.70 | 8.50 | 14.79 | | | | | | | 70 |
| | **33.66** | | **18.70** | | **13.36** | | | | | | | | **110** |
| | 73.26 | | 40.70 | | 29.07 | | | | | | | | 240 |
| 16 | 28.98 | 55.50 | 16.10 | 37.00 | 11.50 | 26.43 | | | | | | | 80 |
| | **45.18** | | **25.10** | | **17.93** | | | | | | | | **125** |
| | 115.74 | | 64.30 | | 45.93 | | | | | | | | 320 |
| 20 | 35.64 | 86.55 | 19.80 | 57.70 | 14.14 | 41.21 | | | | | | | 90 |
| | **67.32** | | **37.40** | | **26.71** | | | | | | | | **170** |
| | 158.40 | | 88.00 | | 62.86 | | | | | | | | 400 |
| 25 | 42.48 | 135.00 | 23.60 | 90.00 | 16.86 | 64.29 | | | | | | | 100 |
| | **89.10** | | **49.50** | | **35.36** | | | | | | | | **210** |
| | 212.04 | | 117.80 | | 84.14 | | | | | | | | 500 |
| e stored b | 43.56 | 168.75 | 24.20 | 112.50 | 17.29 | 80.36 | | | | | | | 110 |
| 28 | **110.88** | | **61.60** | | **44.00** | | | | | | | | **280** |
| | 221.76 | | 123.20 | | 88.00 | | | | | | | | 560 |
| 32 | 54.18 | 220.95 | 30.10 | 147.30 | 21.50 | 105.22 | | | | | | | 130 |
| | **133.20** | | **74.00** | | **52.86** | | | | | | | | **320** |
| | 266.40 | | 148.00 | | 105.71 | | | | | | | | 640 |

**Table notes** : see back page



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### *Bond Strength Factors - REBAR*

### *Influence of concrete strength on combined pull out and concrete cone resistance*

| Concrete Strength N/mm2 (MPa) | C15/20 | C20/25 | C25/30 | C30/37 | C35/45 | C40/50 | C45/55 | C50/60 |
|---|---|---|---|---|---|---|---|---|
| non cracked fc = | 0.97 | 1.00 | 1.02 | 1.04 | 1.07 | 1.10 | 1.12 | 1.15 |

### *Influence of environmental conditions in non cracked concrete*

| | | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 28 | Ø 32 |
|---|---|---|---|---|---|---|---|---|---|
| Temp I 40°C / 24°C | Dry and Wet | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Temp II 80°C / 50°C | Dry and Wet | 0.90 | 0.90 | 0.88 | 0.88 | 0.86 | 0.86 | 0.84 | 0.84 |

**Table notes** : see back page

This product should be stored between +0˚C & +30˚C.



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# PE Chemical Resin PE310/PE410

### *Material Properties for grades of threaded rod*

| | Stud Grade 8.8 | | Stud Grade 10.9 | | Stud Grade A4-70 | | Stud Grade A4-80 | |
|---|---|---|---|---|---|---|---|---|
| **Stud Diameter** | $N_{rk,\,s}$ | $N_{rd,\,s}$ | $N_{rk,\,s}$ | $N_{rd,\,s}$ | $N_{rk,\,s}$ | $N_{rd,\,s}$ | $N_{rk,\,s}$ | $N_{rd,\,s}$ |
| **(mm)** | (kN) | (kN) | (kN) | (kN) | (kN) | (kN) | (kN) | (kN) |
| **M8** | 29.2 | 19.5 | 38.1 | 27.2 | 25.6 | 13.7 | 29.2 | 15.6 |
| **M10** | 46.4 | 30.9 | 60.3 | 43.1 | 40.6 | 21.7 | 46.4 | 24.8 |
| **M12** | 67.4 | 44.9 | 87.7 | 62.6 | 59.0 | 31.6 | 67.4 | 36.0 |
| **M16** | 125.6 | 83.7 | 163.0 | 116.4 | 109.9 | 58.8 | 125.7 | 67.2 |
| **M20** | 196.1 | 130.7 | 255.0 | 182.1 | 171.5 | 91.7 | 196.0 | 104.8 |
| **M24** | 282.5 | 188.3 | 367.0 | 262.1 | 247.1 | 132.1 | 293.0 | 132.1 |
| **M30** | 448.8 | 299.2 | 583.0 | 416.4 | 280.5 | 150.0 | 392.7 | 210.0 |

| | Stud Grade 8.8 | | Stud Grade 10.9 | | Stud Grade A4-70 | | Stud Grade A4-80 | |
|---|---|---|---|---|---|---|---|---|
| **Stud Diameter** | $V_{rk,\,s}$ | $V_{rd,\,s}$ | $V_{rk,\,s}$ | $V_{rd,\,s}$ | $V_{rk,\,s}$ | $V_{rd,\,s}$ | $V_{rk,\,s}$ | $V_{rd,\,s}$ |
| **(mm)** | (kN) | (kN) | (kN) | (kN) | (kN) | (kN) | (kN) | (kN) |
| **M8** | 14.6 | 11.7 | 19.0 | 15.2 | 12.8 | 8.2 | 14.6 | 9.4 |
| **M10** | 23.2 | 18.6 | 30.2 | 24.1 | 20.3 | 13.0 | 23.2 | 14.9 |
| **M12** | 33.7 | 27.0 | 43.8 | 35.1 | 29.5 | 18.9 | 33.7 | 21.6 |
| **M16** | 62.8 | 50.2 | 81.6 | 65.3 | 55.0 | 35.2 | 62.8 | 40.3 |
| **M20** | 98.0 | 78.4 | 127.4 | 101.9 | 85.8 | 55.0 | 98.0 | 62.8 |
| **M24** | 141.2 | 113.0 | 183.6 | 146.8 | 123.6 | 79.2 | 141.2 | 90.5 |
| **M30** | 224.4 | 179.5 | 291.5 | 215.9 | 140.3 | 89.9 | 196.4 | 125.9 |

This pr

| | Rebar BSt 500 to DIN 488 | | Rebar BSt 500 to DIN 488 | |
|---|---|---|---|---|
| **Rebar Diameter** | $N_{rk,\,s}$ | $N_{rd,\,s}$ | $V_{rk,\,s}$ | $V_{rd,\,s}$ |
| **(mm)** | (kN) | (kN) | (kN) | (kN) |
| **8** | 28.0 | 20.0 | 14.0 | 9.3 |
| **10** | 43.0 | 30.7 | 21.5 | 14.3 |
| **12** | 62.0 | 44.3 | 31.0 | 20.7 |
| **14** | 85.0 | 60.7 | 42.5 | 28.3 |
| **16** | 111.0 | 79.3 | 55.5 | 37.0 |
| **20** | 173.0 | 123.6 | 86.5 | 57.7 |
| **25** | 270.0 | 192.9 | 135.0 | 90.0 |
| **32** | 442 | 315.7 | 221 | 147.3 |



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# PE Chemical Resin PE310/PE410

### *Effect of Anchor Spacing - Tension*

| Anchor Spacing | Stud / Rebar Diameter | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | 8 | 10 | 12 | 16 | 20 | 24 | 30 |
| 40 | 0.64 | | | | | | |
| 50 | 0.67 | 0.63 | | | | | |
| 60 | 0.70 | 0.65 | 0.63 | | | | |
| 70 | 0.73 | 0.67 | 0.64 | | | | |
| 80 | 0.76 | 0.69 | 0.66 | 0.63 | | | |
| 90 | 0.79 | 0.72 | 0.68 | 0.64 | | | |
| 100 | 0.82 | 0.74 | 0.70 | 0.65 | 0.63 | | |
| 120 | 0.87 | 0.79 | 0.74 | 0.68 | 0.65 | 0.63 | |
| 150 | 0.96 | 0.86 | 0.80 | 0.73 | 0.68 | 0.65 | 0.63 |
| 160 | 1.00 | 0.88 | 0.82 | 0.74 | 0.70 | 0.66 | 0.64 |
| 175 | | 0.92 | 0.85 | 0.76 | 0.71 | 0.68 | 0.65 |
| 200 | | 1.00 | 0.90 | 0.80 | 0.74 | 0.71 | 0.68 |
| 225 | | | 0.95 | 0.84 | 0.77 | 0.74 | 0.70 |
| 240 | | | 1.00 | 0.86 | 0.79 | 0.76 | 0.72 |
| 250 | | | | 0.87 | 0.80 | 0.77 | 0.73 |
| 275 | | | | 0.91 | 0.83 | 0.80 | 0.75 |
| 280 | | | | 0.92 | 0.84 | 0.80 | 0.76 |
| 300 | | | | 0.95 | 0.86 | 0.82 | 0.78 |
| 320 | | | | 1.00 | 0.88 | 0.85 | 0.80 |
| 350 | | | | | 0.92 | 0.88 | 0.83 |
| 400 | | | | | 1.00 | 0.94 | 0.88 |
| 425 | | | | | | 0.97 | 0.90 |
| 450 | | | | | | 1.00 | 0.93 |
| 480 | | | | | | | 0.96 |
| 520 | | | | | | | 1.00 |

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### *Effect of Edge Distance - Tension*

| Edge Distance | Stud / Rebar Diameter | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | 8 | 10 | 12 | 16 | 20 | 24 | 30 |
| 40 | 0.64 | | | | | | |
| 50 | 0.73 | 0.63 | | | | | |
| 60 | 0.82 | 0.70 | 0.63 | | | | |
| 70 | 0.90 | 0.77 | 0.68 | | | | |
| 80 | 1.00 | 0.84 | 0.74 | 0.63 | | | |
| 90 | | 0.91 | 0.80 | 0.67 | | | |
| 100 | | 1.00 | 0.86 | 0.71 | 0.63 | | |
| 110 | | | 0.92 | 0.76 | 0.66 | | |
| 120 | | | 1.00 | 0.80 | 0.70 | 0.64 | |
| 140 | | | | 0.89 | 0.77 | 0.68 | 0.63 |
| 160 | | | | 1.00 | 0.84 | 0.76 | 0.66 |
| 180 | | | | | 0.91 | 0.84 | 0.72 |
| 200 | | | | | 1.00 | 0.92 | 0.78 |
| 225 | | | | | | 1.00 | 0.86 |
| 250 | | | | | | | 0.94 |
| 260 | | | | | | | 1.00 |

### *Effect of Edge Distance - Shear*

| Edge Distance | Stud / Rebar Diameter | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | 8 | 10 | 12 | 16 | 20 | 24 | 30 |
| 40 | 0.25 | | | | | | |
| 50 | 0.44 | 0.30 | | | | | |
| 60 | 0.63 | 0.48 | 0.30 | | | | |
| 70 | 0.81 | 0.65 | 0.44 | | | | |
| 80 | 1.00 | 0.83 | 0.58 | 0.40 | | | |
| 90 | | 1.00 | 0.72 | 0.53 | | | |
| 100 | | | 0.86 | 0.67 | 0.35 | | |
| 110 | | | 1.00 | 0.80 | 0.44 | | |
| 125 | | | | 1.00 | 0.58 | 0.35 | |
| 140 | | | | | 0.72 | 0.45 | 0.30 |
| 160 | | | | | 0.91 | 0.58 | 0.36 |
| 180 | | | | | 1.00 | 0.71 | 0.47 |
| 200 | | | | | | 0.84 | 0.59 |
| 225 | | | | | | 1.00 | 0.74 |
| 250 | | | | | | | 0.88 |
| 280 | | | | | | | 1.00 |



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# PE Chemical Resin PE310/PE410

### *Minimum Curing Time*

| Concrete Temperature | Gel - Working Time | Minimum curing time in dry concrete | Minimum curing time in wet concrete |
|---|---|---|---|
| **- 10°C *** | 50 min | 240 min | x2 |
| **-5°C *** | 40 min | 180 min | x2 |
| **5°C** | 20 min | 90 min | x2 |
| **15°C** | 9 min | 60 min | x2 |
| **25°C** | 5 min | 30 min | x2 |
| **35°C** | 3 min | 20 min | x2 |

* Resin temperature must be at least 20°C

- Full cure 24 hours

- All specifications based on supplied mixer

### *Temperature Ranges*

| Temperature Range | Concrete Service Temperature | Maximum Long Term Concrete Temp | Maximum Short Term Concrete Temp |
|---|---|---|---|
| **Range I** | -40°C to +40°C | +24°C | +40°C |
| **Range II** | -40°C to +80°C | +50°C | +80°C |

**Service temperature range**: Range of ambient temperatures after installation and during the lifetime of the anchor.

**Short term temperature**: Temperatures within the service temperature range which vary over short intervals,

**e.g. day/night cycles and freeze/thaw cycles.**

**Long term temperature**: Temperature, within the service temperature range, which will be approximately constant

**over significant periods of time.**

Long term temperatures will include constant or near constant temperatures, such as those experienced in cold stores or next to heating installations.

This product should be stored between +0˚C & +30˚C.

### *Physical Properties*

| | N/mm2 | Test Method |
|---|---|---|
| **Compressive Strength** | 52 | EN ISO 604 / ASTM 695 |
| **Flexural Strength** | 15 | EN ISO 178 / ASTM 790 |
| **Flexural Modulus** | 2600 | EN ISO 178 / ASTM 790 |
| **Tensile Strength** | 8 | EN ISO 527 / ASTM 638 |
| **E Modulus** | 4400 | EN ISO 527 / ASTM 638 |
| **VOC Content** | A+ Rating | - |



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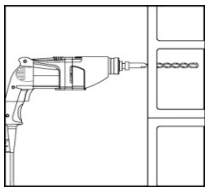
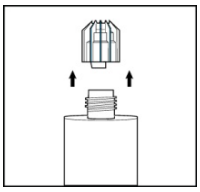
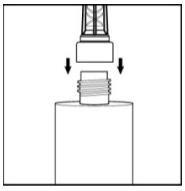
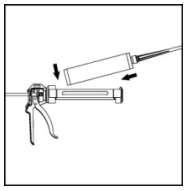
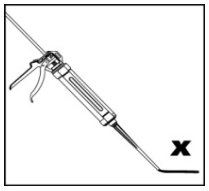
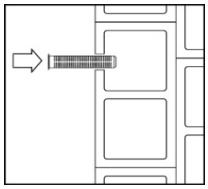
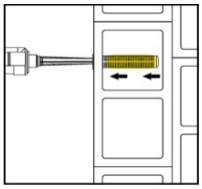
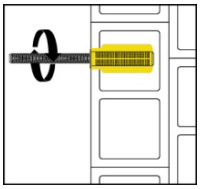
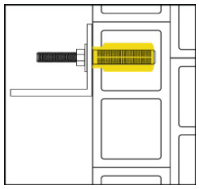
# PE Chemical Resin PE310/PE410

***Installation parameters: drilling hole cleaning and installation HOLLOW WALL***

Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. Remove the threaded cap from the cartridge. Tightly attach the mixing nozzle. Do not modify the mixer in any way. Made sure the mixing element is inside the mixer. Use only the supplied mixer. Insert the cartridge into the dispenser gun. Discard the initial trigger pulls of adhesive. Discard the first 10ml of resin until an even colour is achieved.

Introduce the sleeve of suitable dimensions. Insert the nozzle to the end of the sleeve and inject the resin so long till the sleeve will fill into 100%. Insert the anchor, slowly with a slight twisting motion into the sleeve. Remove excess resin and leave the fixing until minimum couring (loading) times has elapsed.

This product should be stored between +0˚C & +30˚C.



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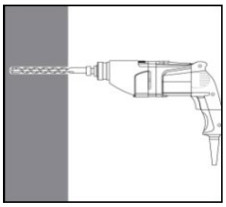
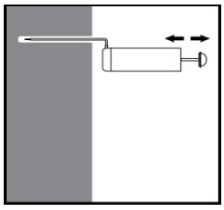
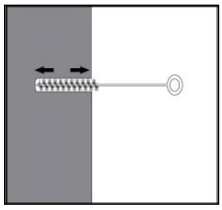
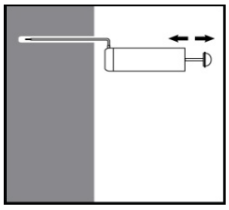
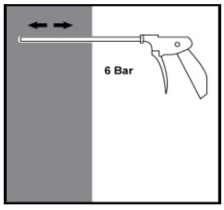
# PE Chemical Resin PE310/PE410

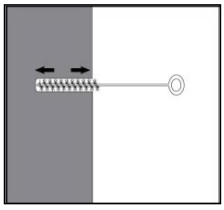
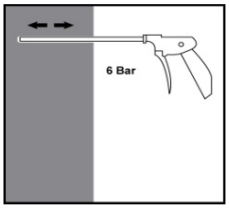
### *Installation parameters: drilling hole cleaning and installation*

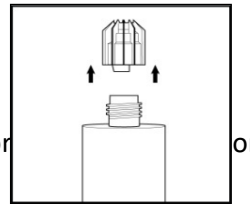
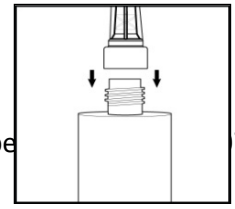
Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. The manual pump shall be used for blowing out bore holes up to diameters do ≤ 24mm and embedment depths up to hef ≤ 10d. Blow out at least 4 times from the back of the bore hole, using an extension if needed. Brush 4 times with the specified brush size (see Table 6) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it. Blow out again with manual pump at least 4 times.

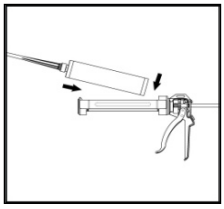
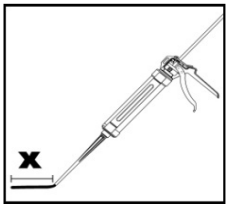
Compressed air cleaning (CAC) for all bore hole diameters do and all bore hole depths



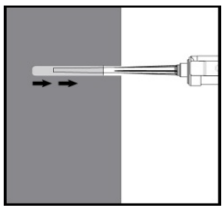
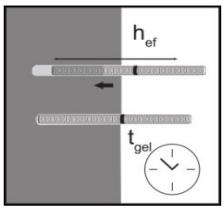



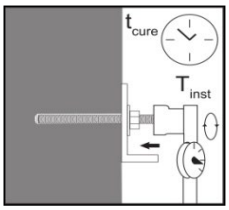

Blow 2 times from the back of the hole (if needed with a nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h). Brush 2 times with the specified brush size (see Table 6) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it.
X 2 Blow out again with compressed air at least 2 times.

This pr  ored be  °C.

Remove the threaded cap from the cartridge. Tightly attach the mixing nozzle. Do not modify the mixer in any way. Made sure the mixing element is inside the mixer. Use only the supplied mixer. Insert the cartridge into the dispenser gun. Discard the initial trigger pulls of adhesive. Discard the first 10ml of resin.




Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull. Fill holes approximately 2/3 full, to ensure that the annular gap between the anchor and the concrete is completely filled with adhesive along the embedment depth. Before use, verify that the threaded rod is dry and free of contaminants. Install the threaded rod to the required embedment depth during the open gel time tgel has elapsed. The working time tgel is given on page 11. The anchor can be loaded after the required curing time tcure. The applied torque shall not exceed the values Tmax given in Table 1 (page 2).



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# PE Chemical Resin PE310/PE410

The design details are fully disclosed in the ETA. The recommended load are valid under the following conditions:

- dry environment
- masonry mortar class more than M2.5
- space distance s ≥ $s_{cr}$
- edge distance c ≥ $c_{cr}$
- joints (vertical and horizontal) are visible and filled with mortar
- no pre-stressing force on the wall
- steel strength of anchor 5.8 or higher
- no interaction of tension and shear loads considered
- temperature range from -40 to +40°C

| **Brick type and strength: solid clay brick with compressive strength ≥ 18 MPa** | | | **Bulk density 1,6 kg/dm3** | | |
|---|---|---|---|---|---|
| **Brick Mateo Pione UNI dimensio 250 x 120 x 60 mm** | | | **M8** | **M10** | **M12** |
| Anchorage depth | $h_{ef}$ | mm | 80 | 85 | 85 |
| Drill diameter (hole diameter) | $d_0$ | mm | 10 | 12 | 14 |
| Minimum wall thickness | $h_{min}$ | mm | 120 | 120 | 120 |
| Minimum space distance parallel to horizontal joint | $s_{cr,\|\|}$ | mm | 240 | 255 | 255 |
| Critical space distance perpendicular to horizontal joint | $s_{cr,\perp}$ | mm | 240 | 255 | 255 |
| Minimal space distance | $s_{min}$ | mm | 240 | 255 | |
| Critical edge distance | $c_{cr}$ | mm | 120 | 127.5 | |
| Minimal edge distance | $c_{min}$ | mm | 120 | 127.5 | |
| Installation torque | $T_{ins}$ | Nm | 2 | | |
| Characteristic tension load | N rk | kN | 3 | 3 | 3 |
| Recommended tension load | N rec | kN | 0.85 | | |
| Characteristic shear load | V rk | kN | 6 | 6 | 6 |
| Recommended shear load | V rec | kN | 1.71 | | |

| **This product should be stored between +0˚C & +30˚C.** | | | **Bulk density 0,9 kg/dm3** | | |
|---|---|---|---|---|---|
| **Brick Doppio UNI dimension 250 x 120 x 120 mm** | | | **M8** | **M10** | **M12** |
| Sleeve dimention (nylon or plastic) | | mm | 12 x 80 | 16 x 85 | |
| Anchorage depth | $h_{ef}$ | mm | 80 | 85 | 85 |
| Drill diameter (hole diameter) | $d_0$ | mm | 12 | 16 | 16 |
| Minimum wall thickness | $h_{min}$ | mm | 120 | 120 | 120 |
| Critical space distance parallel to horizontal joint | $s_{cr,\|\|}$ | mm | 250 | 250 | 250 |
| Critical space distance perpendicular to horizontal joint | $s_{cr,\perp}$ | mm | 120 | 120 | 120 |
| Critical edge distance | $s_{cr}$ | mm | 100 | 100 | 100 |
| Minimal edge distance | $c_{min}$ | mm | 100 | | |
| Installation torque | $T_{ins}$ | Nm | 1,5 | | |
| Characteristic tension load | N rk | kN | 1.5 | 1.5 | 1.5 |
| Recommended tension load | N rec | kN | 0.43 | | |
| Characteristic shear load | V rk | kN | 2 | 2 | 2 |
| Recommended shear load | V rec | kN | 0.57 | | |



T.I. Midwood Co Ltd • Green Lane • Wardle • Nantwich • Cheshire • CW5 6BJ
T: +44 (0) 1829 262805 • F: +44 (0) 1829 261102 • sales@timco.co.uk • www.timco.co.uk

# PE Chemical Resin PE310/PE410

### *Notes*

PAGE 2 :

### *Typical characteristic and design resistance performance with 5.8 grade studding and associated installation data*

All data is based on correct installation - see instructions

No influence of edge and spacing

Minimum base material thickness hef +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d

$h_{ef}$ range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - $f_c$ cube = 25N/mm$^2$ (25MPa)

5.8 grade stud

Temperature range i maximum long term / short term temperature +24/40$^{o}$C

PAGE 3 to 5 :

### *Design Resistance with various stud strengths, material and rebar.*

Note 1 for stainless steel tensile strength is 500N/mm$^2$ (500MPa)

Note 2 for stainless steel tensile strength is 700N/mm$^2$ (500MPa)

Data shown below the minimum embedment depth is for reference only. Please refer to manufacturer for advice.

All data is based on correct installation - see instructions

No influence of edge and spacing

Minimum base material thickness hef +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d

$h_{ef}$ range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - $f_c$ cube = 25N/mm$^2$ (25MPa)

Temperature range i maximum long term / short term temperature +24/40$^{o}$C

This product should be stored between +0˚C & +30˚C.

### *Bond Strength Factors*

Select concrete strength and environmental condition and apply to bond strength table on page 3 to 5

**Partial Safety Factors for pages 2,3,4,5,7 :**

1.8 for all sizes studs

1.8 for all sizes rebar



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