# HIT-CT 100
# INJECTION MORTAR

## Product Technical Datasheet
## Concrete-to-concrete

**Update: Jun 24**

# HIT-CT 100 injection mortars

## Rebar design (EN 1992-1, EN 1998-1) / Rebar elements / Concrete

| Injection mortar system | | Benefits |
|---|---|---|
|   | Hilti HIT-CT 100<br><br>(330 / 500 ml foil pack) | - safe set technology: Makes installation steps faster, simpler, and safer. Automatic borehole cleaning with hollow drill bits and accurate dosing with HDE.<br>- Suitable for concrete C12/15 to C50/60.<br>- Suitable for dry and water saturated concrete.<br>- For rebar diameters up to 25 mm for static design according to EN 1992-1-1.<br>- Non-corrosive to rebars.<br>- Good load capacity at elevated temperatures.<br>- Suitable for embedment lengths up to 700 mm.<br>- Suitable for applications down to -5 °C concrete temperature. |
|  | Rebar ($\phi$8 - $\phi$25) | |

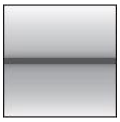
## Application condition

### Base material


Concrete (uncracked)


Concrete (cracked)

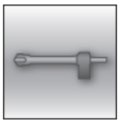
### Load conditions


Static/ quasi-static


Fire Resistance

### Installation conditions


Hammer drilled holes


Hollow drill bit drilling

### Other information


PROFIS Engineering Design Software


Concrete-to-Concrete connections Handbook

### Linked Approvals/Certificates

| Approval no | Application / loading condition | Authority / Laboratory | Date of issue |
|---|---|---|---|
| ETA-24/0147 | Static and quasi-static / Fire | CSTB, Paris | 30-04-2024 |

### Linked Instructions for use

| Material | | | |
|---|---|---|---|
| Injection mortar | IFU Hilti HIT-CT 100 | - | - |
| Dispenser | IFU HDM | IFU HDE 500-22 | IFU HDE 500-A12 |

### Links/QR codes to Hilti Webpage

| Injection mortars / Dispenser | | | |
|---|---|---|---|
| Hilti HIT-CT 100 | HDE 500-22 | HDE 500-A12 | HDM 500 |

### Mechanical properties and dimensions rebar

Mechanical properties and dimensions of the rebars are standardized and can be taken from the ETA

### Material quality

| Part | Material |
|---|---|
| Rebar | Bars and de-coiled rods class B or C according to NDP or NCL of EN 1992-1-1 |

**Static and quasi-static loading based on ETA-24/0147. Design according to EN 1992-1-1**

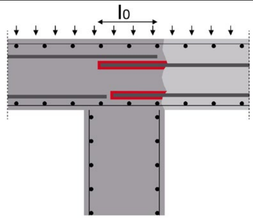
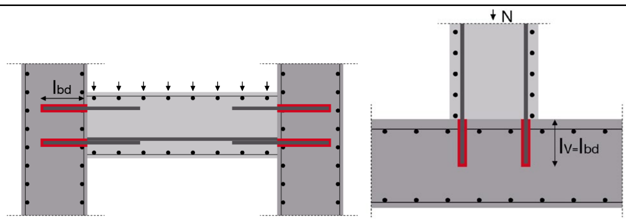
**Note the following for the data in this section:**

For poor bond conditions multiply the values by 0,7. Values valid for uncracked and cracked concrete.

**Design bond strength in N/mm$^2$ for good bond conditions for all drilling methods according to mortar IFU.**

| Rebar - size | Concrete class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | C12/15 | C16/20 | C20/25 | C25/30 | C30/37 | C35/45 | C40/50 | C45/55 | C50/60 |
| [mm] | $f_{bd,PIR}$ [N/mm$^2$] | | | | | | | | |
| ϕ8 - ϕ25 | 1,6 | 2,0 | 2,3 | 2,7 | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 |

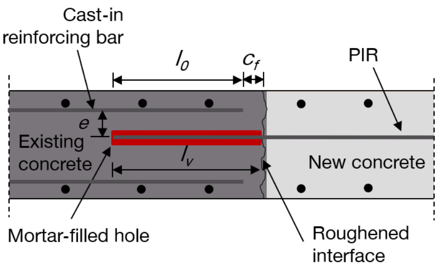
**Minimum anchorage length and minimum lap length**

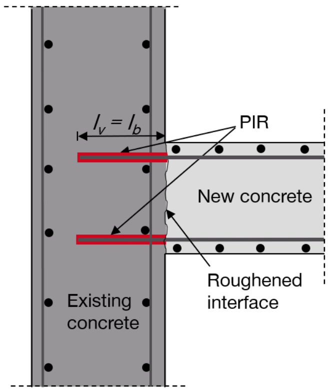
| Post-installed rebar applications as per EN 1992-1-1 | Typical examples |
|---|---|
| Lap splice applications |   |
| End anchorage applications<br>simply supported / compression load-only connections |   |

The minimum anchorage length $\ell_{b,min}$ and the minimum lap length $\ell_{0,min}$ according for applications designed as per EN 1992-1-1 shall be multiplied by relevant **Amplification factor $\alpha_{lb}$** in the table below.

**Amplification factor $\alpha_{lb}$ for the min. anchorage length and min. lap length for all drilling methods.**

| Rebar - size | Concrete class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | C12/15 | C16/20 | C20/25 | C25/30 | C30/37 | C35/45 | C40/50 | C45/55 | C50/60 |
| [mm] | $\alpha_{lb}$ [-] | | | | | | | | |
| ϕ8 - ϕ25 | 1,0 | | | 1,2 | 1,4 | | | | |




Refer to the table for data on dispensers and corresponding maximum embedment depth $\ell_{v,max}$ due to mortar installation limitations

**Minimum Anchorage length and lap length for characteristic steel strength $f_{yk}$ = 500 N/mm$^2$ for good bond conditions**

For specific design cases refer to PROFIS Engineering.

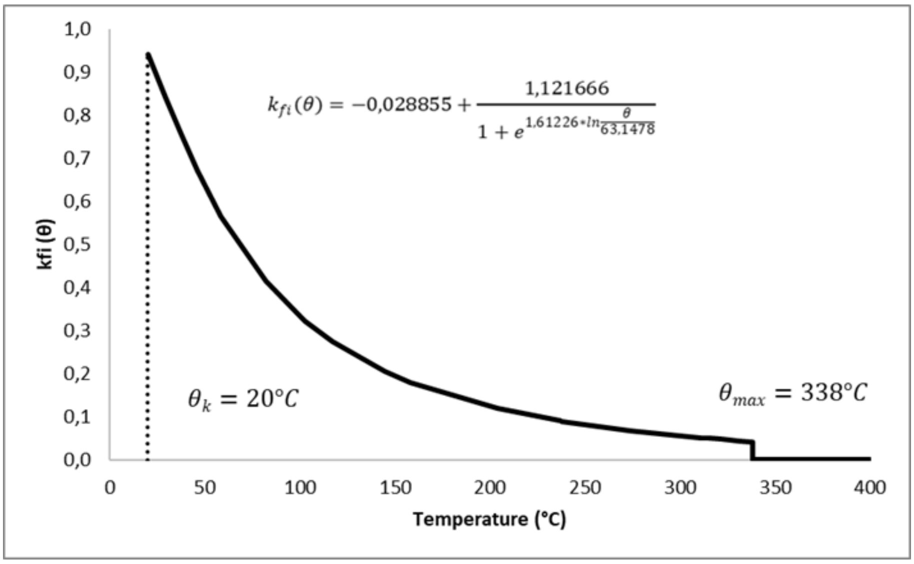
| Rebar-size [mm] | Concrete class | Design Resistance (Yielding) [kN] | $l_{b,min}$ 1) [mm] | $l_{o,min}$ 2) [mm] | $l_{bd,y}$ ($\alpha_2$=1) 3) [mm] | $l_{bd,y}$ ($\alpha_2$=0.7) 4) [mm] | $l_{o,PIR,y}$ ($\alpha_2$=1) 5) [mm] | $l_{o,PIR,y}$ ($\alpha_2$=0.7) 6) [mm] |
|---|---|---|---|---|---|---|---|---|
| ϕ8 | C20/25 | 21,9 | 112 | 200 | 375 | 262 | 562 | 394 |
| | C30/37 to C50/60 | | 140 | 280 | 291 | 204 | 436 | 305 |
| ϕ10 | C20/25 | 34,1 | 141 | 211 | 469 | 328 | 703 | 492 |
| | C30/37 to C50/60 | | 153 | 280 | 364 | 255 | 545 | 382 |
| ϕ12 | C20/25 | 49,2 | 169 | 253 | 562 | 394 | 843 | 590 |
| | C30/37 to C50/60 | | 183 | 280 | 436 | 305 | 654 | 458 |
| ϕ14 | C20/25 | 66,9 | 197 | 295 | 656 | 459 | 984 | 689 |
| | C30/37 to C50/60 | | 214 | 321 | 509 | 356 | 763 | 534 |
| ϕ16 | C20/25 | 87,4 | 225 | 337 | 750 | 525 | 1124 | 787 |
| | C30/37 to C50/60 | | 244 | 366 | 582 | 407 | 873 | 611 |
| ϕ18 | C20/25 | 110,6 | 253 | 380 | 843 | 590 | 1265 | 886 |
| | C30/37 to C50/60 | | 275 | 412 | 654 | 458 | 982 | 687 |
| ϕ20 | C20/25 | 136,6 | 281 | 422 | 937 | 656 | 1406 | 984 |
| | C30/37 to C50/60 | | 305 | 458 | 727 | 509 | 1091 | 763 |
| ϕ22 | C20/25 | 165,3 | 309 | 464 | 1031 | 722 | 1546 | 1082 |
| | C30/37 to C50/60 | | 336 | 504 | 800 | 560 | 1200 | 840 |
| ϕ24 | C20/25 | 196,7 | 337 | 506 | 1124 | 787 | 1687 | 1181 |
| | C30/37 to C50/60 | | 366 | 550 | 873 | 611 | 1309 | 916 |
| ϕ25 | C20/25 | 213,4 | 351 | 527 | 1171 | 820 | 1757 | 1230 |
| | C30/37 to C50/60 | | 382 | 573 | 909 | 636 | 1363 | 954 |

1) Minimum anchorage length for simply supported connections under tension loading assuming $\sigma_{sd} = f_{yd}$
2) Minimum anchorage length for overlap splice joint for $\alpha_6$=1,5
3) Minimum anchorage length for simply supported connections in case of: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5$ = 1,0 - (design for yielding)
4) Minimum anchorage length for simply supported connections in case of: $\alpha_1 = \alpha_3 = \alpha_4 = \alpha_5$ = 1; $\alpha_2$ = 0,7 - (design for yielding)
5) Minimum anchorage length for overlap joint in case of: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5$ = 1.0 - (design for yielding) and $\alpha_6$=1,5
6) Minimum anchorage length for overlap joint in case of: $\alpha_1 = \alpha_3 = \alpha_4 = \alpha_5$ = 1,0; $\alpha_2$ = 0.7 - (design for yielding) and $\alpha_6$=1,5

**Fire resistance based on ETA-24/0147 for working life of 50 years**
For evidence under fire exposure the anchorage length should be calculated according to EN 1992-1- 1:2004+AC:2010 Equation 8.3 using the temperature-dependent bond resistance $f_{bd,fi.}$

For design use PROFIS Engineering.

**Temperature reduction factor $k_{fi}$ (θ) for concrete class C20/25 for good bond conditions**




The design value of the bond strength $f_{bd,fi}$ under fire exposure have to be calculated by the following equation:

$$f_{bd,fi} = k_{b,fi}(\theta) \cdot f_{bd,PIR} \cdot \frac{\gamma_c}{\gamma_{M,fi}}$$

With θ ≤338°C: $k_{fi}(\theta) = \frac{f_{bm}(\theta)}{f_{bd,PIR} \cdot 4{,}3} \leq 1{,}0$

Where: $f_{bm}(\theta) = -0{,}28538 + \frac{11{,}09328}{1 + e^{1{,}61226 \cdot \ln\frac{\theta}{63{,}1478}}}$

$\theta > 338°C$ $k_{fi}(\theta) = 0{,}0$

| | | |
|---|---|---|
| $f_{bd,fi}$ | = | Design value of the bond resistance in case of fire in N/mm² |
| $\theta$ | = | Temperature in °C in the mortar layer |
| $k_{b,fi}(\theta)$ | = | Reduction factor under fire exposure |
| $f_{bd,PIR}$ | = | Design value of the bond resistance in N/mm² in cold condition considering the concrete classes, rebar diameter, the drilling method, and the bond conditions according to EN 1992-1-1 |
| $\gamma_c$ | = | Partial safety factor according to EN 1992-1-1 |
| $\gamma_{M,fi}$ | = | Partial safety factor according to EN 1992-1-2 |

| Bond strength $f_{bd,fi}$ in N/mm² for fire design for concrete classes C20/25 to C50/60 | | | | | | |
|---|---|---|---|---|---|---|
| **Rebar Temperature** | **50°C** | **100°C** | **150°C** | **200°C** | **250°C** | **338°C ($\theta_{max}$)** |
| **$f_{bd,fi}$ [N/mm²]** | 2,20 | 1,15 | 0,67 | 0,42 | 0,28 | 0,14 |

## Setting information

**Installation temperature range**
-5°C to +40°C

**Service temperature range**
Hilti HIT-CT 100 injection mortar may be applied in the temperature ranges given below. An elevated base material temperature may lead to a reduction of the design bond resistance.

| Temperature range | Base material temperature | Maximum long-term base material temperature | Maximum short-term base material temperature |
|---|---|---|---|
| Temperature range I | -40 °C to +80 °C | +50 °C | +80 °C |

**Maximum short term base material temperature**
Short-term elevated base material temperatures are those that occur over brief intervals, e.g., as a result of diurnal cycling.

**Maximum long term base material temperature**
Long-term elevated base material temperatures are roughly constant over significant periods of time.

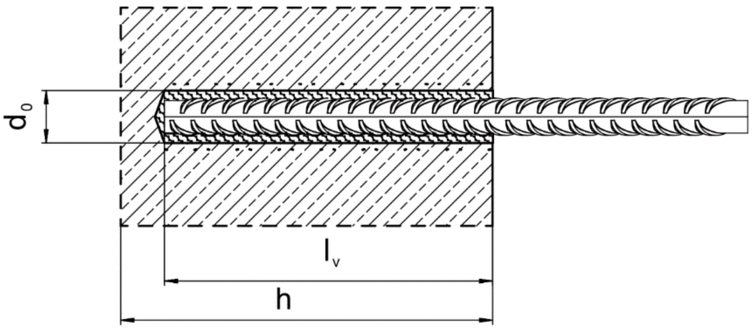
**Curing and working time [a)]**

| Temperature of the base material | Maximum working time | Minimum curing time |
|---|---|---|
| T | $t_{work}$ | $t_{cure}$ [a)] |
| -5°C to 0°C | 30 min | 6 h |
| > 0°C to 5°C | 20 min | 5 h |
| > 5°C to 10°C | 15 min | 4 h |
| > 10°C to 20°C | 8 min | 4 h |
| > 20°C to 30°C | 4 min | 3,5 h |
| > 30°C to 40°C | 1,5 min | 3 h |

a) The curing time data are valid for dry base material only. In wet material the curing times must be doubled.

**Dispensers and corresponding maximum embedment depth $\ell_{v,max}$**

| Rebar | Dispenser | |
|---|---|---|
| | HDM 330, HDM 500 | HDE 500 |
| | $\ell_{v,max}$ [mm] | $\ell_{v,max}$ [mm] |
| **ϕ8 - ϕ16** | 700 | 700 |
| **ϕ18 - ϕ25** | 500 | 700 |

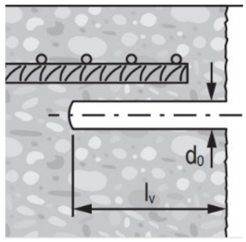


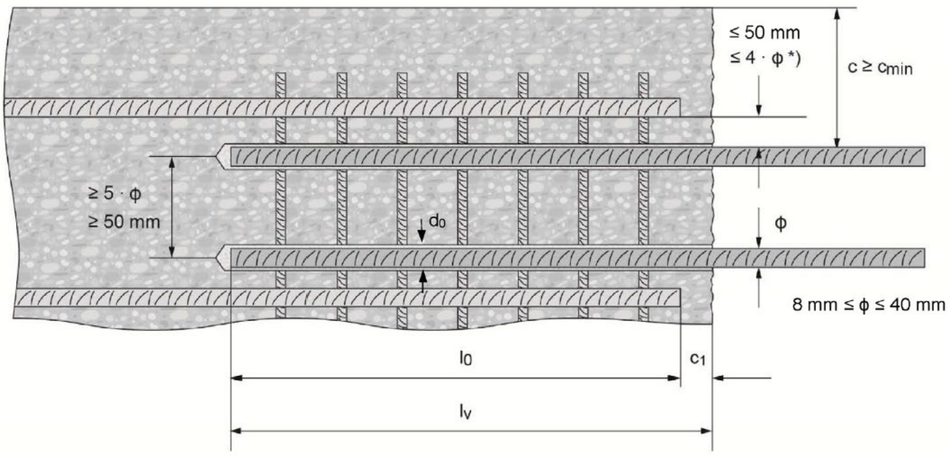

**For detailed setting information on installation see instructions for use (IFU) given with the product.**
**Approved installation methods can be found in the specific ETA/Certificate definitions.**

**Drilling and Installation equipment**

| | | |
|---|---|---|
| Rotary Hammers (Corded and Cordless) |  | TE 2 - TE 80 |
| Dispenser |  | HDE<br>HDM |
| Other tools |  | Blow out pump,<br>Compressed air gun,<br>Set of cleaning brushes |
| |  | Hammer drill bit TE-CX, TE-YX, TE-C, TE-Y |
| |  | Hollow drill bit TE-CD, TE-YD |
| |  | Piston plug |

**Minimum concrete cover $c_{min}$ of the post-installed rebar**

| Drilling method | Bar diameter [mm] | Minimum concrete cover $c_{min}$ [mm] | | |
|---|---|---|---|---|
| | | Without drilling aid | With drilling aid |  |
| Hammer drilling **(HD)** and **(HDB)** | $\phi < 25$ | $30 + 0{,}06 \cdot l_v \geq 2 \cdot \phi$ | $30 + 0{,}02 \cdot l_v \geq 2 \cdot \phi$ | |
| | $\phi = 25$ | $40 + 0{,}06 \cdot l_v \geq 2 \cdot \phi$ | $40 + 0{,}02 \cdot l_v \geq 2 \cdot \phi$ | |
| Compressed air drilling **(CA)** | $\phi < 25$ | $50 + 0{,}08 \cdot l_v$ | $50 + 0{,}02 \cdot l_v$ | |
| | $\phi = 25$ | $60 + 0{,}08 \cdot l_v \geq 2 \cdot \phi$ | $60 + 0{,}02 \cdot l_v \geq 2 \cdot \phi$ | |




*) If the clear distance between lapped bars exceeds $4 \cdot \phi$ or 50 mm, then the lap length shall be increased by the difference between the clear bar distance and the smaller of $4 \cdot \phi$ or 50 mm.

Where, $c$ is concrete cover of post-installed rebar
$c_1 = c_f$ is the end-cover of existing rebar
$d_o$ is the nominal drill bit diameter
$l_0$ is the lap length
$l_v$ is the installation length