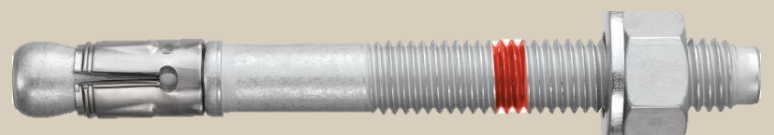




HST-3 EXPANSION ANCHOR



Technical Datasheet

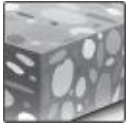

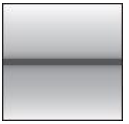




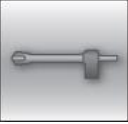
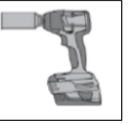




Update: Apr-20



HST3 Expansion anchor

Ultimate-performance expansion anchor for cracked concrete and seismic

| Anchor version | Benefits |
|--|--|
|  <p>HST3 HST3-R (M8-M24)</p> | <ul style="list-style-type: none"> - Highest resistance for reduced member thickness, short spacing and edge distances - Increased undercut percentage in combination with optimized coating - Suitable for non-cracked and cracked concrete C 12/15 to C 80/95 - Highly reliable and safe anchor for structural seismic design with ETA C1/C2 approval - Flexibility with two embedment depths included in the ETA |
|  <p>HST3-BW HST3-R-BW (M8-M24)</p> | <ul style="list-style-type: none"> - Minimum edge and spacing distances reduced by up to 25% compared to HST - Design tension resistance increased by up to 66% compared to HST - Product and length identification mark facilitates quality control and inspection |

| Base material | | Load conditions | | | | | |
|---|--|--|--|--|--|--|--|
|  <p>Concrete (non-cracked)</p> |  <p>Concrete (cracked)</p> |  <p>Static/ quasi-static</p> |  <p>Seismic ETA-C1/C2</p> |  <p>Fire resistance</p> | | | |
| Installation conditions | | Other information | | | | | |
|  <p>Hammer drilled holes</p> |  <p>Diamond drilled holes</p> |  <p>Hollow drill-bit drilling</p> |  <p>Impact wrench with adaptative torque module</p> |  <p>European Technical Assessment</p> |  <p>CE conformity</p> |  <p>PROFIS Anchor design Software</p> |  <p>FM approved</p> |

Approvals / certificates

| Description | Authority / Laboratory | No. / date of issue |
|---|------------------------|---------------------------|
| European technical assessment ^{a)} | DIBt, Berlin | ETA-98/0001 / 2018-02-09 |
| Fire test report | DIBt, Berlin | ETA-98/0001 / 2018-02-09 |
| Shock approval M10 - M24 | BABS, Spiez Laboratory | BZS D 08-602 / 2019-01-29 |

a) All data given in this section according to ETA-98/0001, issue 2018-02-09.

Static and quasi-static loading (for a single anchor)

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Steel failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$

Effective anchorage depth for static

| Anchor size | | M8 | M10 | | M12 | | M16 | | M20 | M24 |
|----------------------|---------------|----|-----|----|-----|----|-----|----|-----|-----|
| Eff. Anchorage depth | h_{ef} [mm] | 47 | 40 | 60 | 50 | 70 | 65 | 85 | 101 | 125 |

Characteristic resistance

| Anchor size | | M8 | M10 | | M12 | | M16 | | M20 | M24 | |
|-----------------------------|------------------|------|------|------|------|------|------|------|------|------|-------|
| Non-cracked concrete | | | | | | | | | | | |
| Tension N_{Rk} | HST3/HST3-BW | [kN] | 12,0 | 12,8 | 22,0 | 17,9 | 25,0 | 26,5 | 39,6 | 51,3 | 60,0 |
| | HST3-R/HST3-R-BW | | 12,0 | 12,8 | 22,0 | 17,9 | 25,0 | 26,5 | 39,6 | 51,3 | 60,0 |
| Shear V_{Rk} | HST3/HST3-BW | [kN] | 13,8 | 21,9 | 23,6 | 34,0 | 35,4 | 54,5 | 55,3 | 83,9 | 94,0 |
| | HST3-R/HST3-R-BW | | 15,7 | 25,6 | 25,3 | 31,1 | 36,7 | 48,6 | 63,6 | 97,2 | 115,0 |
| Cracked concrete | | | | | | | | | | | |
| Tension N_{Rk} | HST3/HST3-BW | [kN] | 8,0 | 9,1 | 15,0 | 12,7 | 20,0 | 18,9 | 28,2 | 36,5 | 40,0 |
| | HST3-R/HST3-R-BW | | 8,5 | 9,1 | 15,0 | 12,7 | 20,0 | 18,9 | 28,2 | 36,5 | 40,0 |
| Shear V_{Rk} | HST3/HST3-BW | [kN] | 13,8 | 21,9 | 23,6 | 34,0 | 35,4 | 54,5 | 55,3 | 83,9 | 94,0 |
| | HST3-R/HST3-R-BW | | 15,7 | 24,3 | 25,3 | 31,1 | 36,7 | 48,6 | 63,6 | 97,2 | 115,0 |

Design resistance

| Anchor size | | M8 | M10 | | M12 | | M16 | | M20 | M24 | |
|-----------------------------|------------------|------|------|------|------|------|------|------|------|------|------|
| Non-cracked concrete | | | | | | | | | | | |
| Tension N_{Rd} | HST3/HST3-BW | [kN] | 8,0 | 8,5 | 14,7 | 11,9 | 16,7 | 17,6 | 26,4 | 34,2 | 40,0 |
| | HST3-R/HST3-R-BW | | 8,0 | 8,5 | 14,7 | 11,9 | 16,7 | 17,6 | 26,4 | 34,2 | 40,0 |
| Shear V_{Rd} | HST3/HST3-BW | [kN] | 11,0 | 17,5 | 18,9 | 27,2 | 28,3 | 43,6 | 44,2 | 67,1 | 62,7 |
| | HST3-R/HST3-R-BW | | 12,6 | 20,5 | 20,2 | 24,9 | 29,4 | 38,9 | 50,9 | 77,8 | 88,5 |
| Cracked concrete | | | | | | | | | | | |
| Tension N_{Rd} | HST3/HST3-BW | [kN] | 5,3 | 6,1 | 10,0 | 8,5 | 13,3 | 12,6 | 18,8 | 24,4 | 26,7 |
| | HST3-R/HST3-R-BW | | 5,7 | 6,1 | 10,0 | 8,5 | 13,3 | 12,6 | 18,8 | 24,4 | 26,7 |
| Shear V_{Rd} | HST3/HST3-BW | [kN] | 11,0 | 16,2 | 18,9 | 23,6 | 28,3 | 42,9 | 44,2 | 67,1 | 62,7 |
| | HST3-R/HST3-R-BW | | 12,6 | 16,2 | 20,2 | 23,6 | 29,4 | 38,9 | 50,9 | 77,8 | 83,9 |

Recommended loads^{a)}

| Anchor size | | M8 | M10 | M12 | M16 | M20 | M24 | | | | |
|-----------------------------|------------------|------|-----|------|------|------|------|------|------|------|------|
| Non-cracked concrete | | | | | | | | | | | |
| Tension N_{Rec} | HST3/HST3-BW | [kN] | 5,7 | 6,1 | 10,5 | 8,5 | 11,9 | 12,6 | 18,8 | 24,4 | 28,6 |
| | HST3-R/HST3-R-BW | | 5,7 | 6,1 | 10,5 | 8,5 | 11,9 | 12,6 | 18,8 | 24,4 | 28,6 |
| Shear V_{Rec} | HST3/HST3-BW | [kN] | 7,9 | 12,5 | 13,5 | 19,4 | 20,2 | 31,1 | 31,6 | 47,9 | 44,8 |
| | HST3-R/HST3-R-BW | | 9,0 | 14,6 | 14,5 | 17,8 | 21,0 | 27,8 | 36,3 | 55,5 | 63,2 |
| Cracked concrete | | | | | | | | | | | |
| Tension N_{Rec} | HST3/HST3-BW | [kN] | 3,8 | 4,3 | 7,1 | 6,1 | 9,5 | 9,0 | 13,4 | 17,4 | 19,0 |
| | HST3-R/HST3-R-BW | | 4,0 | 4,3 | 7,1 | 6,1 | 9,5 | 9,0 | 13,4 | 17,4 | 19,0 |
| Shear V_{Rec} | HST3/HST3-BW | [kN] | 7,9 | 11,6 | 13,5 | 16,8 | 20,2 | 30,6 | 31,6 | 47,9 | 44,8 |
| | HST3-R/HST3-R-BW | | 9,0 | 11,6 | 14,5 | 16,8 | 21,0 | 27,8 | 36,3 | 55,5 | 59,9 |

a) With overall partial safety factor for action $\gamma = 1,4$, The partial safety factors for action depend on the type of loading and shall be taken from national regulations,

Seismic loading (for a single anchor)

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$
- $\alpha_{gap} = 1,0$ (using Hilti seismic filling set)

Effective anchorage depth for seismic C2 and C1

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 |
|---------------------------------------|----|-----|-----|-----|-----|-----|
| Eff, Anchorage depth h_{ef} [mm] | 47 | 60 | 70 | 85 | 101 | - |

Characteristic resistance in case of seismic performance C2

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 | | |
|--------------------------|--------------------|------|-----|------|------|------|------|---|
| Tension $N_{Rk,seis}$ | HST3 / HST3-BW | [kN] | 3,0 | 10,4 | 17,9 | 24,0 | 31,1 | - |
| | HST3-R / HST3-R-BW | | 3,4 | 10,4 | 17,9 | 24,0 | 31,1 | - |
| Shear $V_{Rk,seis}$ | HST3 / HST3-BW | [kN] | 9,9 | 19,0 | 28,6 | 48,5 | 84,3 | - |
| | HST3-R / HST3-R-BW | | 9,9 | 17,2 | 27,6 | 42,5 | 67,4 | - |

Design resistance in case of seismic performance C2

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 | | |
|--------------------------|--------------------|------|-----|------|------|------|------|---|
| Tension $N_{Rd,seis}$ | HST3 / HST3-BW | [kN] | 2,0 | 6,9 | 11,9 | 16,0 | 20,7 | - |
| | HST3-R / HST3-R-BW | | 2,3 | 6,9 | 11,9 | 16,0 | 20,7 | - |
| Shear $V_{Rd,seis}$ | HST3 / HST3-BW | [kN] | 7,9 | 15,2 | 22,9 | 38,8 | 66,3 | - |
| | HST3-R / HST3-R-BW | | 7,9 | 13,8 | 22,1 | 34,0 | 53,9 | - |

Characteristic resistance in case of seismic performance C1

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 | | |
|--------------------------|--------------------|------|------|------|------|------|------|---|
| Tension $N_{Rk,seis}$ | HST3 / HST3-BW | [kN] | 7,5 | 12,0 | 17,9 | 24,0 | 31,1 | - |
| | HST3-R / HST3-R-BW | | 7,5 | 12,0 | 17,9 | 24,0 | 31,1 | - |
| Shear $V_{Rk,seis}$ | HST3 / HST3-BW | [kN] | 16,6 | 25,8 | 39,0 | 60,9 | 99,4 | - |
| | HST3-R / HST3-R-BW | | 19,5 | 28,4 | 44,3 | 70,2 | 99,4 | - |

Design resistance in case of seismic performance C1

| Anchor size | | M8 | M10 | M12 | M16 | M20 | M24 |
|--------------------------|-------------------------|------|------|------|------|------|-----|
| Tension $N_{Rd,seis}$ | HST3 / HST3-BW [kN] | 5,0 | 8,0 | 11,9 | 16,0 | 20,7 | - |
| | HST3-R / HST3-R-BW [kN] | 5,0 | 8,0 | 11,9 | 16,0 | 20,7 | - |
| Shear $V_{Rd,seis}$ | HST3 / HST3-BW [kN] | 13,3 | 20,6 | 31,2 | 48,7 | 66,3 | - |
| | HST3-R / HST3-R-BW [kN] | 15,6 | 22,7 | 33,2 | 54,5 | 66,3 | - |

Fire resistance

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$
- Hilti technical data for concrete strength class C55/67 to C80/95: for a structural element that fulfills the requirements according to DIN EN 1992-1-2 the fire resistance of C20/25 could be assumed.
- partial safety factor for resistance under fire exposure $\gamma_{M,fi}=1,0$ (in absence of other national regulations)

Effective anchorage depth for static

| Anchor size | | M8 | M10 | M12 | M16 | M20 | M24 | | | |
|----------------------|---------------|----|-----|-----|-----|-----|-----|----|-----|-----|
| Eff. Anchorage depth | h_{ef} [mm] | 47 | 40 | 60 | 50 | 70 | 65 | 85 | 101 | 125 |

Characteristic resistance

| Anchor size | | M8 | M10 | M12 | M16 | M20 | M24 | | | |
|---------------------------|-----------------------|-----|-----|------|-----|------|------|------|------|------|
| Fire Exposure R30 | | | | | | | | | | |
| Tension $N_{Rk,fi}$ | HST3/HST3-BW [kN] | 0,9 | 1,5 | 2,4 | 2,3 | 5,0 | 4,4 | 7,1 | 9,1 | 12,6 |
| | HST3-R/HST3-R-BW [kN] | 1,9 | 1,8 | 3,0 | 3,2 | 5,0 | 4,7 | 7,1 | 9,1 | 12,6 |
| Shear $V_{Rk,fi}$ | HST3/HST3-BW [kN] | 0,9 | 1,5 | 2,4 | 2,3 | 5,2 | 4,4 | 9,7 | 15,2 | 21,9 |
| | HST3-R/HST3-R-BW [kN] | 4,9 | 4,7 | 11,8 | 8,9 | 17,1 | 16,9 | 31,9 | 37,0 | 62,8 |
| Fire Exposure R120 | | | | | | | | | | |
| Tension $N_{Rk,fi}$ | HST3/HST3-BW [kN] | 0,6 | 0,8 | 0,9 | 0,8 | 1,3 | 1,5 | 2,4 | 3,8 | 5,4 |
| | HST3-R/HST3-R-BW [kN] | 1,5 | 1,5 | 2,4 | 2,5 | 4,0 | 3,8 | 5,6 | 7,3 | 10,1 |
| Shear $V_{Rk,fi}$ | HST3/HST3-BW [kN] | 0,6 | 0,8 | 0,9 | 0,8 | 1,5 | 1,5 | 2,4 | 3,8 | 5,4 |
| | HST3-R/HST3-R-BW [kN] | 1,7 | 2,0 | 3,3 | 3,3 | 4,8 | 6,2 | 9,0 | 14,1 | 20,3 |

Design resistance

| Anchor size | | M8 | M10 | M12 | M16 | M20 | M24 | | | |
|---------------------------|-----------------------|-----|-----|------|-----|------|------|------|------|------|
| Fire Exposure R30 | | | | | | | | | | |
| Tension $N_{Rd,fi}$ | HST3/HST3-BW [kN] | 0,9 | 1,5 | 2,4 | 2,3 | 5,0 | 4,4 | 7,1 | 9,1 | 12,6 |
| | HST3-R/HST3-R-BW [kN] | 1,9 | 1,8 | 3,0 | 3,2 | 5,0 | 4,7 | 7,1 | 9,1 | 12,6 |
| Shear $V_{Rd,fi}$ | HST3/HST3-BW [kN] | 0,9 | 1,5 | 2,4 | 2,3 | 5,2 | 4,4 | 9,7 | 15,2 | 21,9 |
| | HST3-R/HST3-R-BW [kN] | 4,9 | 4,7 | 11,8 | 8,9 | 17,1 | 16,9 | 31,9 | 37,0 | 62,8 |
| Fire Exposure R120 | | | | | | | | | | |
| Tension $N_{Rd,fi}$ | HST3/HST3-BW [kN] | 0,6 | 0,8 | 0,9 | 0,8 | 1,3 | 1,5 | 2,4 | 3,8 | 5,4 |
| | HST3-R/HST3-R-BW [kN] | 1,5 | 1,5 | 2,4 | 2,5 | 4,0 | 3,8 | 5,6 | 7,3 | 10,1 |
| Shear $V_{Rd,fi}$ | HST3/HST3-BW [kN] | 0,6 | 0,8 | 0,9 | 0,8 | 1,5 | 1,5 | 2,4 | 3,8 | 5,4 |
| | HST3-R/HST3-R-BW [kN] | 1,7 | 2,0 | 3,3 | 3,3 | 4,8 | 6,2 | 9,0 | 14,1 | 20,3 |

Materials

Mechanical properties

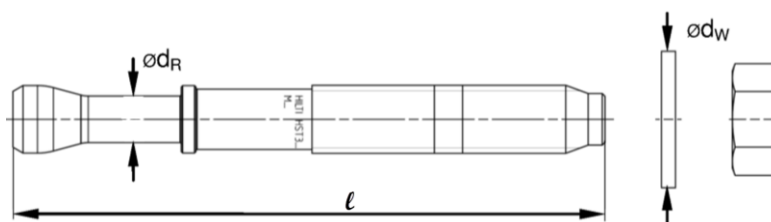
| Anchor size | | M8 | M10 | M12 | M16 | M20 | M24 |
|--|------------------|------|------|------|-----|-----|-----|
| Nominal tensile strength $f_{uk,thread}$ | HST3/HST3-BW | 800 | 800 | 800 | 720 | 700 | 530 |
| | HST3-R/HST3-R-BW | 720 | 710 | 710 | 650 | 650 | 650 |
| Yield strength $f_{yk,thread}$ | HST3/HST3-BW | 640 | 640 | 640 | 576 | 560 | 450 |
| | HST3-R/HST3-R-BW | 576 | 568 | 568 | 520 | 520 | 500 |
| Stressed cross-section A_s | | 36,6 | 58,0 | 84,3 | 157 | 245 | 353 |
| Moment of resistance W | | 31,2 | 62,3 | 109 | 277 | 541 | 935 |
| Char, bending resistance $M^{0}_{Rk,s}$ | HST3/HST3-BW | 30 | 60 | 105 | 240 | 457 | 595 |
| | HST3-R/HST3-R-BW | 27 | 53 | 93 | 216 | 425 | 730 |

Material quality

| Part | | Material |
|------------------|------------------|--|
| Expansion sleeve | HST3/HST3-BW | M10, M16: Galvanized or Stainless steel |
| | HST3-R/HST3-R-BW | M8, M12, M20, M24: Stainless steel |
| Bolt | HST3/HST3-BW | Carbon steel, galvanized, coated (transparent) |
| | HST3-R/HST3-R-BW | Stainless steel A4, cone coated (transparent) |
| Washer | HST3/HST3-BW | Galvanized |
| | HST3-R/HST3-R-BW | Stainless steel A4 |
| Hexagon nut | HST3/HST3-BW | Strength class 8 |
| | HST3-R/HST3-R-BW | Stainless steel A4, coated |

Anchor dimensions of HST3, HST3-BW, HST3-R, HST3-R-BW

| Anchor size | | M8 | M10 | M12 | M16 | M20 | M24 |
|----------------------------|---------------------|-------|-------|-------|-------|-------|-------|
| Maximum length of anchor | $l_{max} \leq$ [mm] | 260 | 280 | 350 | 475 | 450 | 500 |
| Shaft diameter at the cone | d_R [mm] | 5,60 | 6,94 | 8,22 | 11,00 | 14,62 | 17,4 |
| Length of expansion sleeve | l_s [mm] | 13,6 | 16,0 | 20,0 | 25,0 | 28,3 | 36,0 |
| Diameter of washer | $d_w \geq$ [mm] | 15,57 | 19,48 | 23,48 | 29,48 | 36,38 | 43,38 |

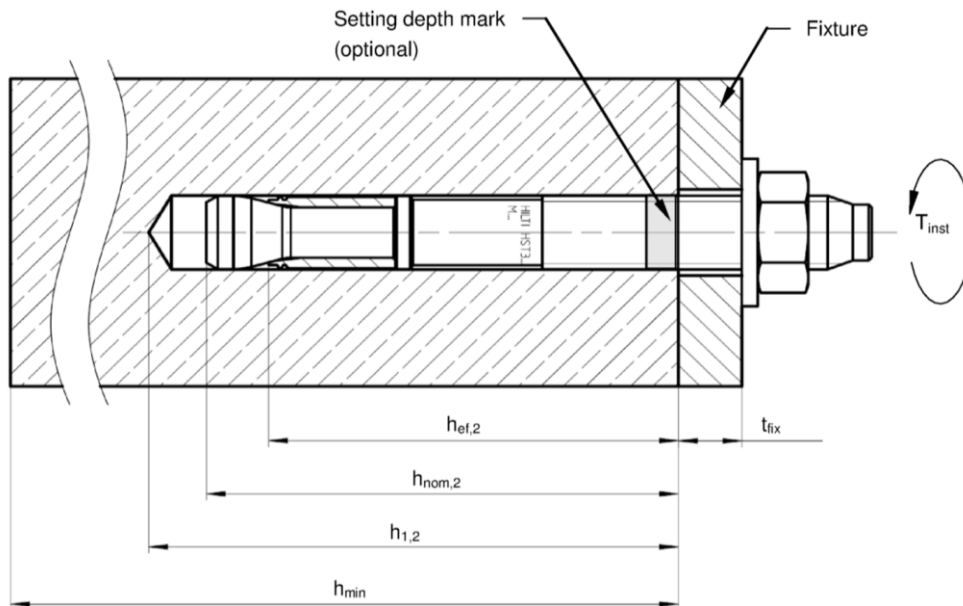


Setting information

Setting details

| Anchor size | | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---------------------|------|-------|------|------|-------|-------|
| Nominal diameter of drill bit | d_o [mm] | 8 | 10 | 12 | 16 | 20 | 24 |
| Cutting diameter of drill bit | $d_{cut} \leq$ [mm] | 8,45 | 10,45 | 12,5 | 16,5 | 20,55 | 24,55 |
| Effective embedment depth | $h_{ef,1}$ [mm] | - | 40 | 50 | 65 | - | - |
| | $h_{ef,2}$ [mm] | 47 | 60 | 70 | 82 | 101 | 125 |
| Drill hole depth ¹⁾ | $h_{1,1} \geq$ [mm] | - | 53 | 68 | 86 | - | - |
| | $h_{1,2} \geq$ | 59 | 73 | 88 | 106 | 124 | 151 |
| Thread engagement length | $h_{nom,1}$ [mm] | - | 48 | 60 | 78 | - | - |
| | $h_{nom,2}$ [mm] | 54 | 68 | 80 | 98 | 116 | 143 |
| Maximum diameter of clearance hole in the fixture | d_f [mm] | 9 | 12 | 14 | 18 | 22 | 26 |
| Torque moment | T_{inst} [Nm] | 20 | 45 | 60 | 110 | 180 | 300 |
| Maximum thickness of fixture | $t_{fix,max}$ [mm] | 195 | 220 | 270 | 370 | 310 | 330 |
| Width across | SW [mm] | 13 | 17 | 19 | 24 | 30 | 36 |

1) In case of diamond drilling +5 mm for M8 to M10 and +2 mm for M12 to M24.



Installation equipment

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 |
|---------------------|--------------------------------------|-----|--------------|-----|-------------|-----|
| Rotary hammer | TE2(-A) – TE30(-A) | | | | TE40 – TE80 | |
| Diamond coring tool | DD-30W, DD-EC1 | | | | | |
| Setting tool | Hilti S7W 6AT 22A – SI-AT-A22 | | | - | | |
| Hollow drill bit | - | | TE-CD, TE-YD | | | |
| Other tools | hammer, torque wrench, blow out pump | | | | | |

Setting parameters of HST3 / HST3-R for M8 and M10

| Anchor Size | | | M8 | | | M10 | | | |
|--|--------------|------|--|--|-----------------------------------|--|--|-----|-----|
| Concrete class | | | C20/25 to C50/60 ^{a)} C55/67 to C80/95 ^{b)} | C12/15 ^{b)} C16/20 ^{b)} | C12/15 to C16/20 ^{a)} | C20/25 to C50/60 ^{a)} C55/67 to C80/95 ^{b)} | C12/15 ^{b)} C16/20 ^{b)} | | |
| Effective anchorage depth | h_{ef} | [mm] | 47 | | 47 | 40 | 60 | | 60 |
| Minimum base material thickness | h_{min} | [mm] | 80 | 100 | 100 | 80 | 100 | 120 | 120 |
| Minimum spacing in <i>non-cracked</i> concrete | s_{min} | [mm] | 35 | 35 | 35 | 50 | 40 | 40 | 70 |
| | for $c \geq$ | [mm] | 55 | 50 | 65 | 95 | 100 | 60 | 90 |
| Minimum spacing in <i>cracked</i> concrete | s_{min} | [mm] | 35 | 35 | 35 | 40 | 40 | 40 | 45 |
| | for $c \geq$ | [mm] | 50 | 50 | 55 | 90 | 100 | 55 | 85 |
| Minimum edge distance in <i>non-cracked</i> concrete | c_{min} | [mm] | 40 | 40 | 50 | 50 | 60 | 50 | 80 |
| | for $s \geq$ | [mm] | 50 | 50 | 80 | 190 | 90 | 90 | 120 |
| Minimum edge distance in <i>cracked</i> concrete | c_{min} | [mm] | 40 | 40 | 40 | 45 | 60 | 45 | 70 |
| | for $s \geq$ | [mm] | 50 | 50 | 75 | 180 | 90 | 80 | 120 |
| Critical spacing for splitting failure and concrete cone failure | $s_{cr,sp}$ | [mm] | 141 | | 188 | 168 | 180 | | 240 |
| | $s_{cr,N}$ | [mm] | 141 | | 141 | 120 | 180 | | 180 |
| Critical edge distance for splitting failure and concrete cone failure | $c_{cr,sp}$ | [mm] | 71 | | 94 | 84 | 90 | | 120 |
| | $c_{cr,N}$ | [mm] | 71 | | 71 | 60 | 90 | | 90 |

Setting parameters of HST3 / HST3-R for M12 and M16

| Anchor Size | | | M12 | | | M16 | | | |
|--|--------------|------|-----------------------------------|--|--|-----------------------------------|--|--|-----|
| Concrete class | | | C20/25 to C50/60 ^{a)} | C20/25 to C50/60 ^{a)} C55/67 to C80/95 ^{b)} | C12/15 ^{b)} C16/20 ^{b)} | C20/25 to C50/20 ^{a)} | C20/25 to C50/60 ^{a)} C55/67 to C80/95 ^{b)} | C12/15 ^{b)} C16/20 ^{b)} | |
| Effective anchorage | h_{ef} | [mm] | 50 | 70 | | 70 | 65 | 85 | |
| Minimum base material | h_{min} | [mm] | 100 | 120 | 140 | 140 | 120 | 140 | 160 |
| Minimum spacing in <i>non-cracked</i> concrete | s_{min} | [mm] | 55 | 50 | 60 | 110 | 75 | 80 | 65 |
| | for c | [mm] | 110 | 100 | 70 | 140 | 140 | 130 | 95 |
| Minimum spacing in <i>cracked</i> concrete | s_{min} | [mm] | 50 | 50 | 50 | 80 | 65 | 80 | 65 |
| | for $c \geq$ | [mm] | 105 | 90 | 70 | 120 | 130 | 130 | 95 |
| Minimum edge distance in <i>non-cracked</i> concrete | c_{min} | [mm] | 60 | 60 | 55 | 90 | 65 | 65 | 65 |
| | for $s \geq$ | [mm] | 210 | 120 | 110 | 190 | 240 | 180 | 150 |
| Minimum edge distance in <i>cracked</i> concrete | c_{min} | [mm] | 55 | 60 | 55 | 80 | 65 | 65 | 65 |
| | for $s \geq$ | [mm] | 210 | 120 | 110 | 170 | 240 | 180 | 150 |
| Critical spacing for splitting failure and concrete cone failure | $s_{cr,sp}$ | [mm] | 180 | 210 | | 280 | 208 | 255 | |
| | $s_{cr,N}$ | [mm] | 150 | 210 | | 210 | 195 | 255 | |
| Critical edge distance for splitting failure and concrete cone failure | $c_{cr,sp}$ | [mm] | 90 | 105 | | 140 | 104 | 128 | |
| | $c_{cr,N}$ | [mm] | 75 | 105 | | 105 | 98 | 128 | |

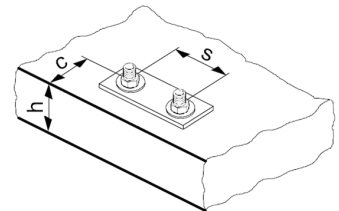
Setting parameters of HST3(-BW) / HST3-R(-BW) for M20 and M24

| Anchor Size | | M20 | | | M24 | | |
|--|----------------|--|-----|--|--|--|-----|
| Concrete class | | C20/25 to C50/60 ^{a)} C55/67 to C80/95 ^{b)} | | C12/15 ^{b)} C16/20 ^{b)} | C20/25 to C50/60 ^{a)} C55/67 to C80/95 ^{b)} | C12/15 ^{b)} C16/20 ^{b)} | |
| Effective anchorage | h_{ef} [mm] | 101 | | 101 | 125 | 125 | |
| Minimum base material | h_{min} [mm] | 160 | 200 | 200 | 250 | 250 | |
| Minimum spacing in <i>non-cracked</i> concrete | HST3 | s_{min} [mm] | 120 | 90 | 90 | 125 | 180 |
| | HST3-BW | for $c \geq$ [mm] | 180 | 130 | 165 | 255 | 375 |
| Minimum spacing in <i>cracked</i> concrete | HST3-R | s_{min} [mm] | 120 | 90 | 90 | 125 | 180 |
| | HST3-R-BW | for $c \geq$ [mm] | 180 | 130 | 165 | 205 | 375 |
| Min. edge distance in <i>non-cracked</i> concrete | HST3 | c_{min} [mm] | 120 | 80 | 90 | 170 | 260 |
| | HST3-BW | for $s \geq$ [mm] | 180 | 180 | 140 | 295 | 400 |
| Min. edge distance in <i>cracked</i> concrete | HST3-R | c_{min} [mm] | 120 | 80 | 120 | 150 | 260 |
| | HST3-R-BW | for $s \geq$ [mm] | 180 | 180 | 270 | 235 | 400 |
| Critical spacing for splitting failure and concrete cone failure | HST3 | $s_{cr,sp}$ [mm] | 384 | | 404 | 375 | 500 |
| | HST3-BW | $s_{cr,N}$ [mm] | 303 | | 303 | 375 | 375 |
| Critical spacing for splitting failure and concrete cone failure | HST3-R | $s_{cr,sp}$ [mm] | 192 | | 202 | 188 | 250 |
| | HST3-R-BW | $s_{cr,N}$ [mm] | 152 | | 152 | 188 | 188 |

a) Data covered by ETA-98/0001 issue 2017-20-07.

b) Data covered by Hilti Technical Data

For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.



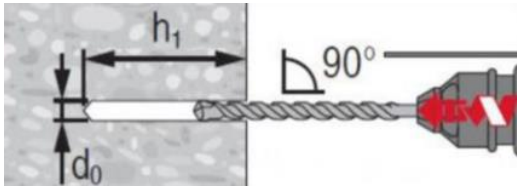
Setting instructions

*For detailed information on installation see instruction for use given with the package of the product

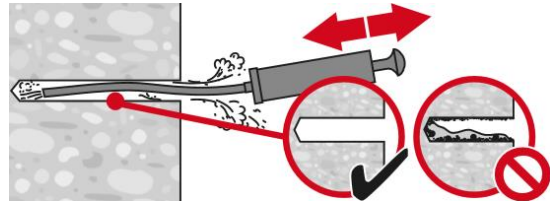
Setting instruction for HST3, HST3-BW, HST3-R, HST3-R-BW

Hammer drilling (M8, M10, M12, M16, M20, M24)

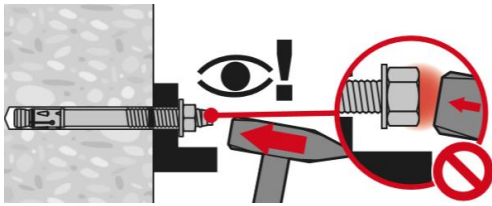
1. Drill the hole



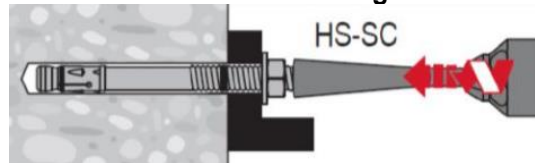
2. Clean the hole



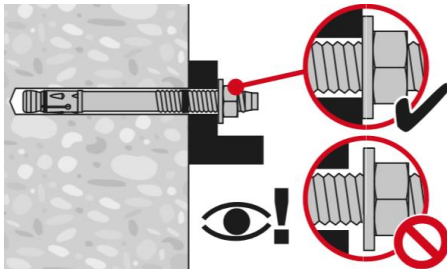
3a. Insert the anchor with hammer



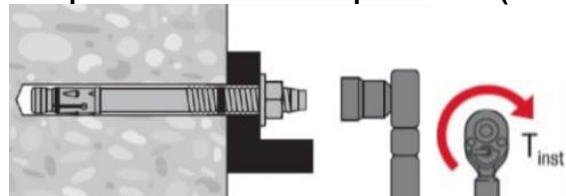
3a. Insert the anchor with setting tool HS-SC



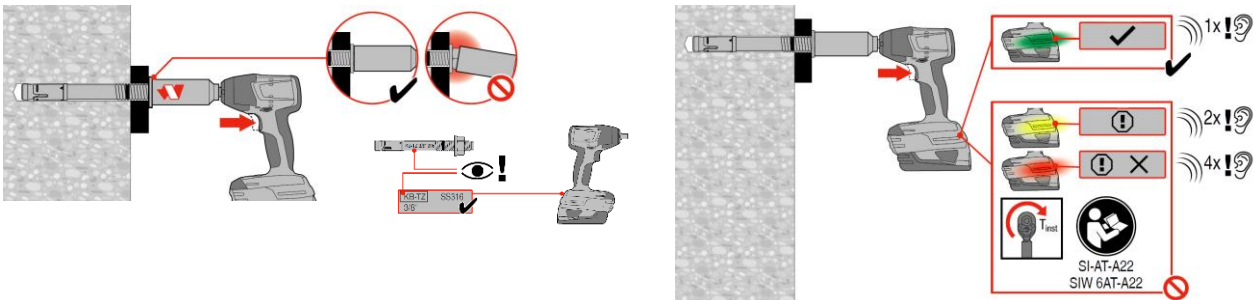
4. Check



5a. Torque with calibrated torque wrench (M8-M24)

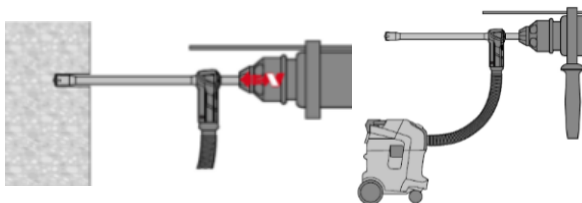


5b. Torque with impact wrench with Adaptive torque module (M8-M12)

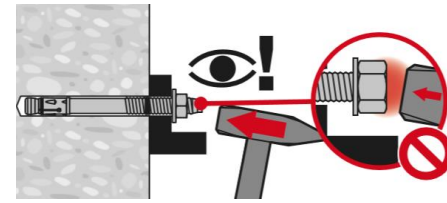


Hollow Drill Bit (M16, M20, M24), no cleaning required

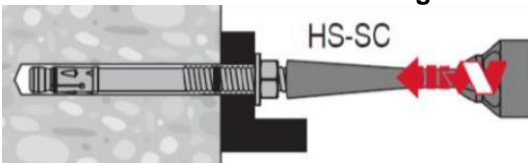
1. Drill the hole with the Hollow drill bit



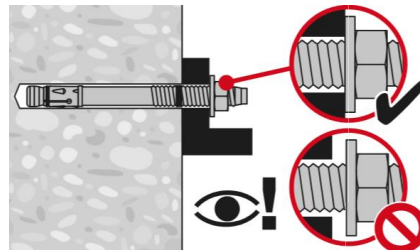
2a. Insert the anchor with hammer



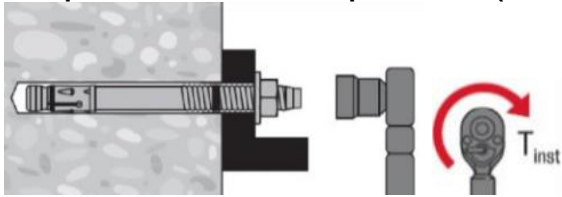
2b. Insert the anchor with setting tool HS-SC



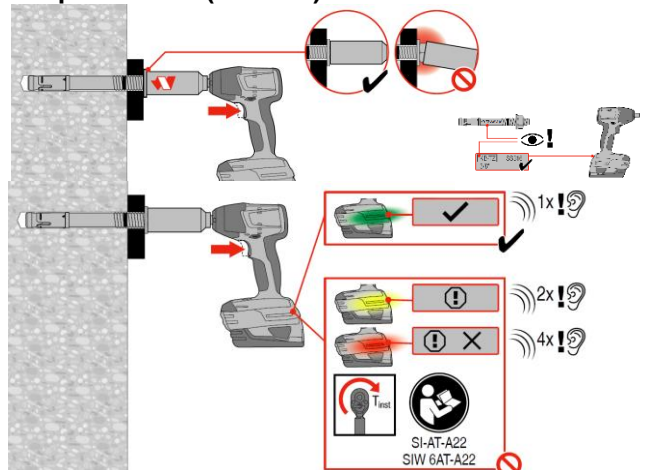
3. Check



5a. Torque with calibrated torque wrench (M8-M24)

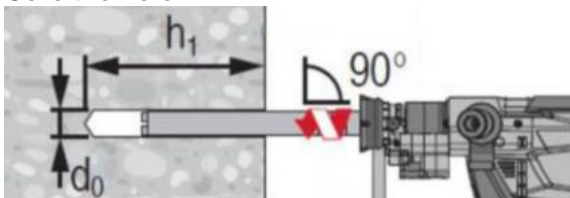


5b. Torque with impact wrench with Adaptive torque module (M8-M12)

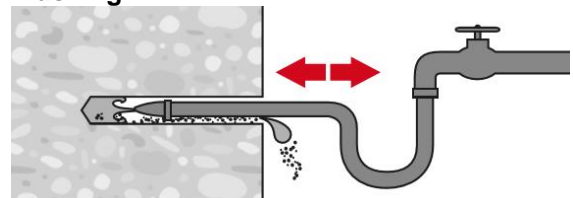


Diamond coring (M8, M10, M12, M16, M20, M24)

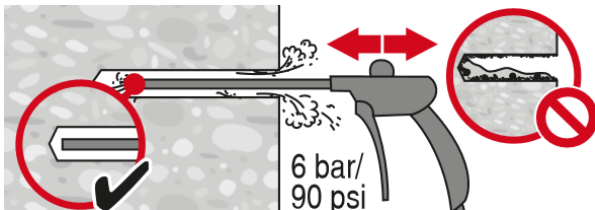
1. Core the hole



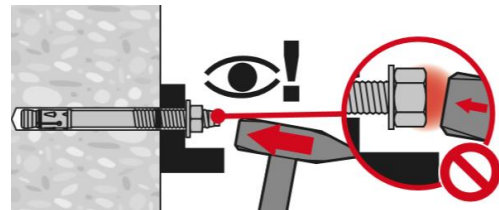
2. Flushing



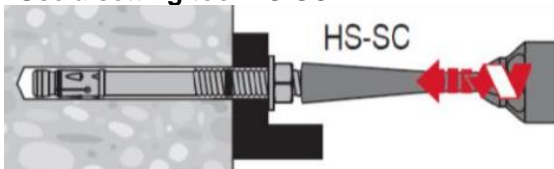
3. Clean the hole



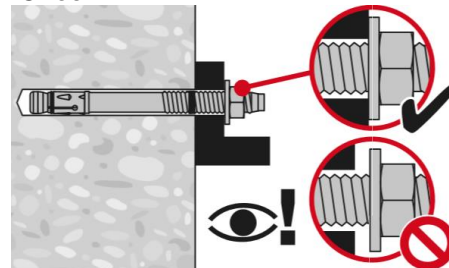
4a. Insert the anchor with hammer



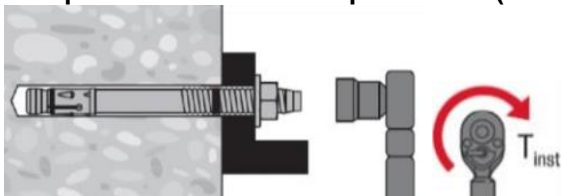
4b. Use a setting tool HS-SC



5. Check



6a. Torque with calibrated torque wrench (M8-M24)



5b. Torque with impact wrench with Adaptive torque module (M8-M12)

