

Filling of hole clearance (annular gap between base plate and anchor) with Hilti HIT-RE500-V3 or Hilti HIT-RE500-V4

Only fastenings with no hole clearance or clearances in the direction of the shear load according to Table 6.1 are covered in EN 1992-4:2018. An annular gap between anchor and baseplate can have a negative effect on the distribution of shear forces.

Table 6.1 — Hole clearance

Dimensions in millimetres														
1	external diameter of fastener d^a or d_{nom}^b	6	8	10	12	14	16	18	20	22	24	27	30	> 30
2	diameter d_t of clearance hole in the fixture	7	9	12	14	16	18	20	22	24	26	30	33	$d + 3$ or $d_{nom} + 3$
^a	If bolt bears against the fixture.													
^b	If sleeve bears against the fixture.													

Applications where bolts are welded to the fixture or screwed into the fixture, or in the cases where any gap between the fastener and the fixture is filled with mortar of sufficient compressive strength ($\geq 40 \text{ N/mm}^2$) or eliminated by other suitable means may be considered to have no hole clearance (see EN 1992-4:2018, section 6.2.2.2).

Often larger clearance holes than provided in Table 6.1 are requested. To fulfill the above conditions Hilti proposes to use Hilti HIT-RE500 (v3 or v4) to fill the annular gap between anchor and baseplate. Due to its high compressive strength ($>100 \text{ N/mm}^2$) and low shrinkage, the injection mortar is considered suitable for this purpose.

Both injection systems Hilti HIT-RE500 (v3 and v4) are covered in a European Technical Assessment (ETA-16/0143 and ETA-20/0541).

Following conditions should be met:

- An appropriate washer (increased diameter and thickness) needs to be used to avoid bending of the washer.
- The clearance hole needs to be fully covered by the washer to guarantee triaxial stress (no slotted holes).
- Special care must be taken on the proper installation (i.e. filling the gap without voids). It is

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required to use an auxiliary cover plate with two holes; one to inject the mortar, and the other one to allow the release of air bubbles. It is the customer responsibility to perform specific testing to confirm the adequacy of the filling procedure.

With this letter following clearance holes filled with Hilti HIT-RE500 are released:

External diameter of fastener [mm]	10	12	14	16	20	22	24	27	30	>30
Diameter of clearance hole in the fixture [mm]	18	20	22	24	28	30	32	35	38	d + 8

Sincerely,



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References:

- [1] ETA-16/0143, for Injection system Hilti HIT-RE 500 V3, issued 14.05.2019
- [2] ETA-20/0541 for Injection system Hilti HIT-RE 500 V4, issued 20.11.2020
- [3] EN 1992-4:2018, Design of fastenings for use in concrete