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Hilti HIT-HY 200-A/R with a large annular gap between base plate and rod

Dear Sir/Madam,

The Hilti HIT-HY 200-A/R injection mortars have only been thoroughly tested for use in standard anchoring applications, where the annular gap i.e. difference between clearance hole on the baseplate and threaded rod diameter, is in the range of 2-3 mm, as stated in the corresponding European Technical Assessments ETA-11/0493 and ETA-12/0084 in alignment with the EOTA TR 029 – Design of bonded anchors (now superseded by EN 1992-4:2018).

EOTA TR 029, section 1.1.: larger annular gaps can be accepted in these cases:

a) For fastenings loaded in tension only a larger diameter of the clearance hole is acceptable if a correspondent washer is used.

b) For fastenings loaded in shear or combined tension and shear if the gap between the hole and the fixture is filled with mortar of sufficient compression strength or eliminated by other suitable means.

EN 1992-4:2018, section 6.2.2.1: Only fastenings with no hole clearances or clearances in the direction of the shear load complying with Table 6.1 are covered.

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_f 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.

EN 1992-4:2018, section 6.2.2.2: 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 (≥ 40 N/mm^2) or eliminated by other suitable means may be considered to have no hole clearance.

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Due to its high compressive strength (>100 N/mm^2) and low shrinkage, the Hilti HIT-HY 200-A/R injection mortars are considered suitable for this purpose, usually up to 5 mm gap.

Special care must be put regarding the proper installation (i.e. filling the gap without voids), for which a typical procedure requires the use of 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.

References:

[1] ETA-11/0493, version 28.07.2017, for anchoring applications (link)
[2] ETA-12/0084, version 28.07.2017, for anchoring applications (link)
[2] Technical Report EOTA TR 029, Design of bonded fasteners, version June 2007 (link)
[3] EN 1992-4:2018, Design of fastenings for use in concrete

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