

Reference HST3 & Hexagonal coupling nut compatibility  
Department BU Anchors - Marketing

**March 2023**

**Manufacturer's statement on the compatibility between HST3 and Hexagonal coupling nuts in a seismic condition.**

Dear Sir/Madam,

Hilti [Hexagonal coupling nuts](#) are specifically designed and manufactured to be able to withstand the design tensile strength of Grade 4.8 steel threaded rods of a compatible diameter, guaranteeing the continuity of the elements being connected.

For an M10 (4.6) hexagonal coupling nut, the characteristic tensile capacity is  $N_{Rk,s} = 23.2kN$  and the material safety factor, according to EAD 330232 for 4.6 steel is  $\gamma_{M,s} = 2.0$ . Therefore, the design resistance of an M10 rod coupling nut with 4.6 steel can be calculated to  $N_{Rd,s} = 11.6kN$ . For an M12 (4.6) version of these elements, the characteristic tensile capacity is  $N_{Rk,s} = 33.72kN$ , and the design resistance is consecutively  $N_{Rd,s} = 16.86kN$ .

If these hex coupling nuts are used to connect an M10 or M12 HST3 (8.8) stud anchor (installed into concrete) to a threaded rod in a seismic condition, the governing failure mode of the anchor needs to be found and compared to the design resistance of the coupling nut.

In this case, although the steel capacity of an M10 HST3 (8.8) is **23.2kN**, the maximum design pullout resistance for the M10 HST3 is  $N_{Rd,p,c2} = 6.9kN$  according to its [ETA -98/0001](#). Hence, as the design resistance ( $N_{Rd,s}$ ) of the Coupling nut M10x30 is superior to the pullout resistance ( $N_{Rd,p,c2}$ ) of its compatible HST3, the coupling nut is not expected to fail.

In a similar manner, the steel capacity of an M12 HST3 (8.8) is **32.2kN**, the maximum design pullout resistance for the M12 HST3 is  $N_{Rd,p,c2} = 13kN$  according to its [ETA](#). Hence, as the design resistance ( $N_{Rd,s}$ ) of the Coupling nut M12x40 is superior to the pullout resistance ( $N_{Rd,p,c2}$ ) of its compatible HST3, the coupling nut is not expected to fail.

For fixing into ComFlor® 60 and 80, the [technical data sheet](#) available on Hilti's website can also be consulted for the capacities of HST3 when fixed into this base material.

Please email us at [NZEngineers@hilti.com](mailto:NZEngineers@hilti.com) if you have any other queries or require any further information.

Yours truly,

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Engineering Marketing Manager

