



HILTI TECHNICAL BULLETIN

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Subject: Design parameters for Hilti HIT-HY 200 for concrete strengths up to 10,000 psi (70 MPa)

ACI 318 Chapter 17 and CSA A23.3 Annex D limit the design of post-installed anchors to concrete strengths to a maximum of 8,000 psi and 55 MPa, respectively. ESR-3187 and ELC-3187 provide data with the same concrete strength limitations for design in accordance with ACI 318 and CSA A23.3.

Hilti has performed tests of HIT-HY 200 in external test laboratories in concrete strengths up to 10,000 psi (70 MPa). Tests have shown no decrease in bond strength in concretes between 8,000 psi (55 MPa) and 10,000 psi (90 MPa) concrete. Tests have also shown the concrete strength up to 10,000 psi (70 MPa) can be used for concrete breakout failure modes, similar to cast-in anchors. This document expands the relevant design parameters in ACI 318 and CSA A23.3 for Hilti HIT-HY 200 up to concrete strengths of 10,000 psi (70 MPa).

Tensile loading parameters for f'_c between 8,000 psi and 10,000 psi (between 55 MPa and 70 MPa for CSA A23.3 design)

Parameter	ACI 318-14	CSA A23.3-14	Recommendation
Steel capacity	§17.4.1	§D.6.1	Independent of concrete strength
Concrete breakout capacity	§17.4.2	§D.6.2	k_c factors in ESR-3187 and ELC-3187 valid using f'_c up to 10,000 psi (70 MPa) for calculation.
Bond capacity	§17.4.5	§D.6.5	Increase factors in ESR-3187 and ELC-3187 limited to 8,500 psi (ACI 318 design) and 55 MPa (CSA A23.3 design) concrete.
ϕ (ACI and CSA) R (CSA only)	§17.3.3	§D.5.3	Factors in ESR-3187 and ELC-3187 valid.

Shear loading parameters for f'_c between 8,000 psi and 10,000 psi (between 55 MPa and 70 MPa for CSA A23.3 design)

Parameter	ACI 318-14	CSA A23.3-14	Recommendation
Steel capacity	§17.5.1	§D.7.1	Independent of concrete strength
Concrete breakout capacity	§17.5.2	§D.7.2	Calculations valid using f'_c up to 10,000 psi (70 MPa).
Concrete pryout capacity	§17.5.3	§D.7.3	k_c factors in ESR-3187 and ELC-3187 valid using f'_c up to 10,000 psi (70 MPa) for calculation.
ϕ (ACI and CSA) R (CSA only)	§17.3.3	§D.5.3	Factors in ESR-3187 and ELC-3187 valid.

Treatment of other parameters for f'_c between 8,000 psi and 10,000 psi (between 55 MPa and 70 MPa for CSA A23.3 design)

Parameter	ACI 318-14	CSA A23.3-14	Recommendation
Minimum edge distances, spacings, and concrete thicknesses	§17.7	§D.9	Equivalent to published values in ESR-3187 and ELC-3187.
Installation	n/a	n/a	Same as ESR-3187 and ELC-3187, but the only installation conditions permitted are in dry and water-saturated concrete.

Please feel free to contact our Engineering Technical Services department for more information or any questions.

Hilti Engineering Technical Services – United States
(877) 749-6337 toll free
hnatechnicalservices@hilti.com

Hilti Engineering Technical Services – Canada
(800) 363-4458 toll free
CATechnicalServices@hilti.com