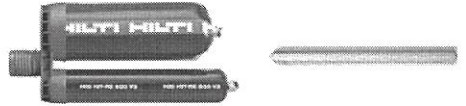


www.hilti.com

Company:		Page:	1
Address:		Specifier:	
Phone   Fax:		E-Mail:	
Design:	SS rod	Date:	11/19/2025
Fastening point:			

Specifier's comments:

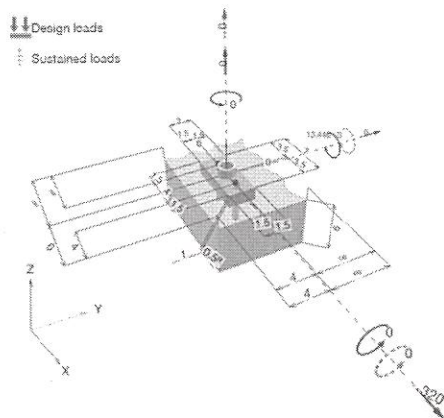
### 1 Input data



Anchor type and diameter:	HIT-RE 500 V3 + HAS-R 304/316 SS 5/8
Item number:	2045007 HAS-R 316 SS 5/8"x7 5/8" (element) / 2123401 HIT-RE 500 V3 (adhesive)
Specification text:	Hilti $\varnothing$ 5/8 in HIT-RE 500 V3 + HAS-R 304/316 SS with 3.125 in nominal embedment depth per ICC-ES ESR-3814 , Hammer drill bit installation per MPII
Effective embedment depth:	$h_{ef,opti} = 3.125$ in. ( $h_{ef,limit} = 4.500$ in.)
Material:	ASTM F 593
Evaluation Service Report:	ESR-3814
Issued   Valid:	5/1/2025   1/1/2027
Proof:	Design Method ACI 318-19 / Chem
Shear edge breakout verification:	Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)
Stand-off installation:	grouted standoff, restraint level (anchor plate): 2.00; $e_b = 1.000$ in.; $t = 0.500$ in. grout compressive strength $> f'_c = 4,000$ psi
Anchor plate <sup>R</sup> :	$l_x \times l_y \times t = 7.000$ in. x 3.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	Steel pipe, PIPE1-1/2XS; (L x W x T) = 1.900 in. x 1.900 in. x 0.200 in.
Base material:	uncracked concrete, 4000, $f'_c = 4,000$ psi; $h = 6.000$ in., Temp. short/long: 32/32 °F
Installation:	<b>Hammer drilled hole, Installation condition: Dry</b>
Reinforcement:	tension: not present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: none or $<$ No. 4 bar

<sup>R</sup> - The anchor calculation is based on a rigid anchor plate assumption.

#### Geometry [in.] & Loading [lb, in.lb]



www.hilti.com

Company:	Page: 6
Address:	Specifier:
Phone   Fax:	E-Mail:
Design:   SS rod	Date: 11/19/2025
Fastening point:	

### 4 Shear load

	Load $V_{ua}$ [lb]	Capacity $\phi V_n$ [lb]	Utilization $\beta_v = V_{ua}/\phi V_n$	Status
Steel Strength*	160	6,509	3	OK
Steel failure (with lever arm)*	160	1,133	15	OK
Pryout Strength (Concrete Breakout Strength controls)**	320	11,260	3	OK
Concrete edge failure in direction x+**	320	2,839	12	OK

\* highest loaded anchor    \*\*anchor group (relevant anchors)  
 When the input edge distance is set to "infinity", edge breakout verification is not performed in that direction

#### 4.1 Steel Strength

$V_{sa}$  = ESR value      refer to ICC-ES ESR-3814  
 $\phi V_{steel} \geq V_{ua}$       ACI 318-19 Table 17.5.2

#### Variables

$A_{se,v}$ [in. <sup>2</sup> ]	$f_{uta}$ [psi]
0.23	100,000

#### Calculations

$V_{sa}$ [lb]
13,560




#### Results

$V_{sa}$ [lb]	$\phi_{steel}$	$\phi_{eb}$	$\phi V_{sa}$ [lb]	$V_{ua}$ [lb]
13,560	0.600	0.800	6,509	160

HAS AND HIT-Z ANCHOR RODS

The following technical data is for HAS threaded rods and HIT-Z anchor rods available in the standard pre-cut rod program and the extended rod program.

Specifications and physical properties of Hilti HAS threaded rods and Hilti HIT-Z anchor rods

Threaded Rod Specification	Units	Specified Ultimate Strength, $f_{uta}$		Minimum Specified Yield Strength 0.2% Offset, $f_{ya}$	$f_{uta} / f_{ya}$	Elongation, Min. %	Reduction of Area, Min. %	Specification for Nuts and Washers
		min.	max. <sup>5</sup>					
<b>CARBON STEEL</b> HAS-V-36 / HAS-V-36 HDG ASTM F1554, Grade 36 <sup>1,2,8</sup>  HAS-E-55 / HAS-E-55 HDG ASTM F1554, Grade 55 <sup>1,2,8</sup>  HAS-B-105 / HAS-B-105 HDG ASTM A193, Grade B7 <sup>1,3</sup> ASTM F1554, Grade 105 <sup>1,2,8</sup> 	psi (MPa)	58,000 (400)	80,000 (552)	36,000 (248)	1.61	23	40	<b>Nuts:</b> ASTM A194/194M, Grade 2H, Heavy or ASTM A563-15 Grade A Heavy Hex (zinc/HDG) or ASTM A563-15 Grade A Hex (zinc) or A563-15 Grade C Hex (HDG) <b>Washers:</b> ASTM F436 Type 1
	psi (MPa)	75,000 (517)	95,000 (655)	55,000 (379)	1.36	21	30 (3/8" - 2") 22 (2-1/4" - 2-1/2")	
	psi (MPa)	125,000 <sup>(6)</sup> (862) <sup>(6)</sup>	150,000 (1,034)	105,000 (724)	1.19	16 (B7) 15 (Gr. 105)	50 (B7) 45 (Gr. 105)	<b>Nuts:</b> ASTM A194/194M, Grade 2H, Heavy or ASTM A563-15 Grade C Hex <b>Washers:</b> ASTM F436 Type 1
	psi (MPa)	94,200 (650)	NA	75,300 (519)	1.25	8	20	
<b>STAINLESS STEEL</b> HIT-Z Anchor rod (HIT-HY 200 V3 only) Unalloyed carbon steel <sup>1</sup>	psi (MPa)	100,000 (690)	150,000 (1,034)	65,000 (448)	1.54	20	-	<b>Nuts:</b> ASTM F594  <b>Washers:</b> ASTM A240 and ANSI B18.22.1 Type A Plain
	psi (MPa)	85,000 (586)	140,000 (966)	45,000 (310)	1.89	25	-	
	psi (MPa)	75,000 <sup>(7)</sup> (517) <sup>(7)</sup>	NA	30,000 (207)	2.50 <sup>(7)</sup>	30	50	
	psi (MPa)	94,200 (650)	NA	75,300 (519)	1.25	8	20	

<sup>1</sup> All carbon steel threaded rods are zinc plated in accordance with ASTM F1941 Fe/Zn 5 AN, with nuts and washers zinc plated in accordance with ASTM B633 SC 1 Type III.

All hot-dipped galvanized threaded rods, nuts, and washers are zinc plated in accordance with ASTM F2329.

<sup>2</sup> Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

<sup>3</sup> Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.

<sup>4</sup> Standard Steel Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

<sup>5</sup> Maximum specified steel strength according to ASTM standard. NA indicates that ASTM standard does not publish a maximum value.

<sup>6</sup> For designs according to CSA A23.3-14 Annex D, the maximum value of  $f_{ua}$  is 860 MPa (124,700 psi) per clause D.6.1.2.

<sup>7</sup> For calculating steel strength, ACI 318-14 section 17.4.1.2 and CSA A23.3-14 clause D.6.1.2 limit the ultimate strength to 1.9  $f_{ya}$ .

Thus,  $f_{uta} = 57,000$  psi (393 MPa) for calculation purposes when determining steel strength in tension ( $N_{ta}$ ) and shear ( $V_{sa}$ ).

<sup>8</sup> 3/8-inch dia. threaded rods are not included in the ASTM F1554 standard. Hilti 3/8-inch dia. HAS-V, HAS-E, and HAS-E-B (incl. HDG) threaded rods meet the chemical composition and mechanical property requirements of ASTM F1554.