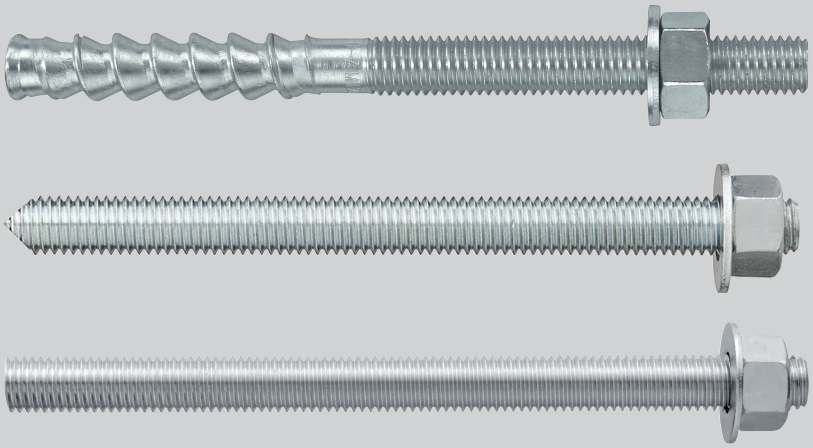
HILTI ANCHOR ROD SPECIFICATIONS AND TECHNICAL DATA

Standard pre-cut anchor rods and extended anchor rod program



As global leaders in chemical anchoring systems, Hilti has provided threaded rod for anchoring applications in materials such as concrete and masonry for many years.

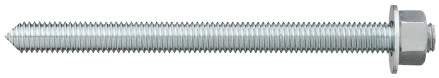
We offer a broad portfolio of high quality pre-cut and custom cut-to-length Hilti anchor rods in thread diameters up to 2 ½ inches that in conjunction with the Hilti injectable mortars and adhesive capsules provide more reliable and higher performing fastening points, and help enable the installer to complete chemical anchoring applications more efficiently, hassle-free, without compromising the budget.

Hilti HIT-Z Anchor rod

SAFESET

For use with Hilti HIT-HY 200 V3 injectable mortar, the Hilti HIT-Z anchor rod provides better safety and load capacity combined with up to 60% faster installation due to zero-cleaning SafeSet Technology*.

* Zero-cleaning with SafeSet Technology with the Hilti HIT-Z anchor rod is currently for use at a base material temperature above 41 °F (+5 °C). For use below 41 °F (+5 °C) and for full installation procedures refer to the product instructions for use on the product packaging or contact Hilti.



Hilti HAS Anchor rod

Broad portfolio of eight different material and coating types including high-strength, hot-dipped galvanized, and stainless steel for the demand of increased performance and usability with capsule systems.

New enhanced carbon steel HAS rod program

All carbon steel HAS rods now meet the requirements of the ASTM F1554, which allows engineers to design ductile fastening points with predictable steel failure for seismic applications in the three most common and relevant steel grades 36, 55 and 105.

ASTM F1554 Compliant

The indication of the steel grade in the head marking and the product name simplifies the selection and identification of the right anchor rods. Included matching high quality nuts and washers will help the installer get the job done quickly, efficiently, and correctly.

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} min.	Specified Ultimate Strength, f_{uta} max. [5]	Minimum Specified Yield Strength 0.2% Offset, f_{ya}	f_{uta} / f_{ya}	Elongation, Min. %	Reduction of Area, Min. %	Specification for Nuts and Washers
CARBON STEEL	**HAS-V-36 / HAS-V-36 HDG** ASTM F1554, Grade 36 [1,2,8] ASTM F1554 Compliant	psi (MPa)	58,000 (400)	80,000 (552)	36,000 (248)	1.61	23	40	**Nuts:** 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) **Washers:** ASTM F436 Type 1
	HAS-E-55 / HAS-E-55 HDG ASTM F1554, Grade 55 [1,2,8] ASTM F1554 Compliant	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")	
	HAS-B-105 / HAS-B-105 HDG ASTM A193, Grade B7 [1,3] ASTM F1554, Grade 105 [1,2,8] ASTM F1554 Compliant	psi (MPa)	125,000 [6] (862) [6]	150,000 (1,034)	105,000 (724)	1.19	16 (B7) 15 (Gr. 105)	50 (B7) 45 (Gr. 105)	**Nuts:** ASTM A194/194M, Grade 2H, Heavy or ASTM A563-15 Grade C Hex **Washers:** ASTM F436 Type 1
	HIT-Z Anchor rod **(HIT-HY 200 V3 only)** Unalloyed carbon steel [1]	psi (MPa)	94,200 (650)	NA	75,300 (519)	1.25	8	20	**Nuts:** ASTM A563 Gr. A **Washers:** ASTM F844, HV and ANSI B18.22.1 Type A Plain
STAINLESS STEEL	**HAS-R 304 / 316** 3/8-in. to 5/8-in. AISI Type 304 / 316 ASTM F 593 CW1 [4]	psi (MPa)	100,000 (690)	150,000 (1,034)	65,000 (448)	1.54	20	-	**Nuts:** ASTM F594 **Washers:** ASTM A240 and ANSI B18.22.1 Type A Plain
	HAS-R 304 / 316 3/4-in. to 1-in. AISI Type 304 / 316 ASTM F 593 CW2 [4]	psi (MPa)	85,000 (586)	140,000 (966)	45,000 (310)	1.89	25	-	
	HAS-R 304 / 316 1/4-in. and 1-1/8-in. to 2-in. ASTM A193 Grade 8(M), Class 1 [3]	psi (MPa)	75,000 [7] (517) [7]	NA	30,000 (207)	2.50 [7]	30	50	
	HIT-Z-R Anchor rod **(HIT-HY 200 V3 only)** Grade 316	psi (MPa)	94,200 (650)	NA	75,300 (519)	1.25	8	20	

[1] 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.
[2] Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
[3] Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
[4] Standard Steel Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
[5] Maximum specified steel strength according to ASTM standard. NA indicates that ASTM standard does not publish a maximum value.
[6] For designs according to CSA A23.3-14 Annex D, the maximum value of f_{uta} is 860 MPa (124,700 psi) per clause D.6.1.2.
[7] 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_{sa}) and shear (V_{sa}).
[8] 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.

STRENGTH DESIGN ACCORDING TO ACI 318

The following steel design information is for Hilti HAS threaded rods and HIT-Z anchor rods according to the material specifications on page 2, used in conjunction with Hilti adhesive anchors designed in accordance with ACI 318 Chapter 17. This includes Hilti HIT-HY 200 V3, HIT-RE 500 V3, HIT-RE 100, HIT-HY 100, and HIT-ICE.

Steel design information for Hilti HAS threaded rods and Hilti HIT-Z anchor rods for use with ACI 318 Chapter 17

Design Information		Symbol	Units	Nominal Rod Diameter (in.)					
				3/8	1/2	5/8	3/4	7/8	1
Rod O.D.		d	in.	0.375	0.5	0.625	0.75	0.875	1
Rod effective cross-sectional area		A_{se}	in.^{2} (mm^2)	0.0775 (50)	0.1419 (92)	0.2260 (146)	0.3345 (216)	0.4617 (298)	0.6057 (391)
HAS-V-36 HAS-V-36 HDG ASTM F1554 Gr. 36 [1,4]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	4,495 (20.0)	8,230 (36.6)	13,110 (58.3)	19,400 (86.3)	26,780 (119.1)	35,130 (156.3)
		V_{sa}	lb (kN)	2,695 (12.0)	4,940 (22.0)	7,865 (35.0)	11,640 (51.8)	16,070 (71.5)	21,080 (93.8)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.6					
	Strength reduction factor Φ for tension [2]	Φ	-	0.75					
	Strength reduction factor Φ for shear [2]	Φ	-	0.65					
HAS-E-55 HAS-E-55 HDG ASTM F1554 Gr. 55 [1,4]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	5,815 (25.9)	10,645 (47.4)	16,950 (75.4)	25,090 (111.6)	34,630 (154.0)	45,430 (202.1)
		V_{sa}	lb (kN)	3,490 (15.5)	6,385 (28.4)	10,170 (45.2)	15,055 (67.0)	20,780 (92.4)	27,260 (121.3)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]					
	Strength reduction factor Φ for tension [2]	Φ	-	0.75					
	Strength reduction factor Φ for shear [2]	Φ	-	0.65					
HAS-B-105 HAS-B-105 HDG ASTM A193 B7 and ASTM F1554 Gr. 105 [1,4]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	9,690 (43.1)	17,740 (78.9)	28,250 (125.7)	41,815 (186.0)	57,715 (256.7)	75,715 (336.8)
		V_{sa}	lb (kN)	5,815 (25.9)	10,645 (47.4)	16,950 (75.4)	25,090 (111.6)	34,630 (154.0)	45,430 (202.1)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]					
	Strength reduction factor Φ for tension [2]	Φ	-	0.75					
	Strength reduction factor Φ for shear [2]	Φ	-	0.65					
HAS-R Stainless Steel ASTM F593, CW Stainless [1]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	7,750 (34.5)	14,190 (63.1)	22,600 (100.5)	28,435 (126.5)	39,245 (174.6)	51,485 (229.0)
		V_{sa}	lb (kN)	4,650 (20.7)	8,515 (37.9)	13,560 (60.3)	17,060 (75.9)	23,545 (104.7)	30,890 (137.4)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]					
	Strength reduction factor Φ for tension [2]	Φ	-	0.65					
	Strength reduction factor Φ for shear [2]	Φ	-	0.60					
HIT-Z Anchor Rod [1] (HIT-HY 200 V3 only)	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	7,305 (32.5)	13,375 (59.5)	21,305 (94.8)	31,470 (140.0)	- -	- -
		V_{sa}	lb (kN)	3,215 (14.3)	5,885 (26.2)	9,375 (41.7)	13,850 (61.6)	- -	- -
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	1.00	0.65			-	
	Strength reduction factor Φ for tension [2]	Φ	-	0.65				-	
	Strength reduction factor Φ for shear [2]	Φ	-	0.60				-	
HIT-Z-R Anchor Rod (HIT-HY 200 V3 only) Stainless Steel [1]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	7,305 (32.5)	13,375 (59.5)	21,305 (94.8)	31,472 (140.0)	- -	- -
		V_{sa}	lb (kN)	4,385 (19.5)	8,025 (35.7)	12,785 (56.9)	18,885 (84.0)	- -	- -
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	1.00	0.75	0.65		-	
	Strength reduction factor Φ for tension [2]	Φ	-	0.65				-	
	Strength reduction factor Φ for shear [2]	Φ	-	0.60				-	

[1] Values provided for Hilti threaded rod materials based on published strengths and calculated in accordance with ACI 318-14 Chapter 17 Eq. 17.4.1.2 and Eq. 17.5.1.2b. Nuts and washers must be appropriate for rod strength.

[2] For use with the load combinations of IBC Section 1605.2, ACI 318-14 5.3, or ACI 318-11 D.4.3, as set forth in ACI 318-14 17.3.3 or ACI 318-11 D.4.3. If the load combinations of ACI 318 Appendix C are used, the appropriate value of Φ must be determined in accordance with ACI 318 D.4.4.

[3] For HIT-RE 500 V3, the value of $\alpha_{v,seis}$ can be increased. Refer to ICC-ES ESR-3814 or contact Hilti.

[4] 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.

STRENGTH DESIGN ACCORDING TO ACI 318

The following steel design information is for Hilti HAS threaded rods according to the material specifications on page 2, used in conjunction with Hilti adhesive anchors designed in accordance with ACI 318 Chapter 17. This includes Hilti HIT-HY 200 V3, HIT-RE 500 V3, HIT-RE 100, HIT-HY 100, and HIT-ICE.

Steel design information for Hilti HAS threaded rods for use with ACI 318 Chapter 17

Design Information		Symbol	Units	Nominal Rod Diameter (in.)						
				1-1/8	1-1/4	1-1/2	1-3/4	2	2-1/4	2-1/2
Rod O.D.		d	in.	1.125	1.25	1.5	1.75	2	2.25	2.5
Rod effective cross-sectional area		A_{se}	in.^{2} (mm^2)	0.7633 (492)	0.9691 (625)	1.405 (906)	1.90 (1,226)	2.50 (1,613)	3.25 (2,097)	4.00 (2,581)
HAS-V-36 HAS-V-36 HDG ASTM F1554 Gr. 36 [1]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	44,270 (196.9)	56,210 (250.0)	81,490 (362.5)	110,200 (490.2)	145,000 (645.0)	- -	- -
		V_{sa}	lb (kN)	26,560 (118.1)	33,725 (150.0)	48,895 (217.5)	66,120 (294.1)	87,000 (387.0)	- -	- -
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.6					-	-
	Strength reduction factor f for tension [2]	ϕ	-	0.75					-	-
	Strength reduction factor f for shear [2]	ϕ	-	0.65					-	-
HAS-E-55 HAS-E-55 HDG ASTM F1554 Gr. 55 [1]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	57,250 (254.7)	72,685 (323.3)	105,375 (468.7)	142,500 (633.9)	187,500 (834.0)	- -	- -
		V_{sa}	lb (kN)	34,350 (152.8)	43,610 (194.0)	63,225 (281.2)	85,500 (380.3)	112,500 (500.4)	- -	- -
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]					-	-
	Strength reduction factor f for tension [2]	ϕ	-	0.75					-	-
	Strength reduction factor f for shear [2]	ϕ	-	0.65					-	-
HAS-B-105 HAS-B-105 HDG ASTM A193 B7 and ASTM F1554 Gr. 105 [1]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	95,415 (424.4)	121,140 (538.9)	175,625 (781.2)	237,500 (1,056.4)	312,500 (1,390.1)	406,250 (1,807.1)	500,000 (2,224.1)
		V_{sa}	lb (kN)	57,250 (254.7)	72,685 (323.3)	105,375 (468.7)	142,500 (633.9)	187,500 (834.0)	243,750 (1,084.2)	300,000 (1,334.5)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]						
	Strength reduction factor f for tension [2]	ϕ	-	0.75						
	Strength reduction factor f for shear [2]	ϕ	-	0.65						
HAS-R Stainless Steel ASTM A193, Gr. 8(M), Class 1 [1]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	43,510 (193.5)	55,240 (245.7)	80,085 (356.2)	108,300 (481.7)	142,500 (633.9)	- -	- -
		V_{sa}	lb (kN)	26,105 (116.1)	33,145 (147.4)	48,050 (213.7)	64,980 (289.0)	85,500 (380.3)	- -	- -
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.6					-	-
	Strength reduction factor f for tension [2]	ϕ	-	0.75					-	-
	Strength reduction factor f for shear [2]	ϕ	-	0.65					-	-

[1] Values provided for Hilti threaded rod materials based on published strengths and calculated in accordance with ACI 318-14 Chapter 17 Eq. 17.4.1.2 and Eq. 17.5.1.2b. Nuts and washers must be appropriate for rod strength.

[2] For use with the load combinations of IBC Section 1605.2, ACI 318-14 5.3, or ACI 318-11 D.4.3, as set forth in ACI 318-14 17.3.3 or ACI 318-11 D.4.3. If the load combinations of ACI 318 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.4.

[3] For HIT-RE 500 V3, the value of $\alpha_{v,seis}$ can be increased. Refer to ICC-ES ESR-3814 or contact Hilti.

STRENGTH DESIGN ACCORDING TO ACI 318

The following are strength design values calculated from data on the previous pages. This is intended for adhesive anchors designed in accordance with ACI 318-14 Chapter 17 (and Appendix D for earlier editions of ACI 318) and can be used in conjunction with the Hilti Simplified Strength Design Tables (refer to Section 3.1.8 of the 2016 and 2017 Hilti Anchor Fastening Technical Guide for more information on the Hilti Simplified Tables). This includes Hilti HIT-HY 200 V3, HIT-RE 500 V3, HIT-RE 100, HIT-HY 100, and HIT-ICE.

Steel design strength for Hilti HAS threaded rods for use with ACI 318-14 Chapter 17

Nominal anchor diameter in.	HAS-V-36 / HAS-V-36 HDG ASTM F1554 Gr. 36 [4,6]			HAS-E-55 / HAS-E-55 HDG ASTM F1554 Gr. 55 [4,5,6]			HAS-B-105 / HAS-B-105 HDG ASTM A193 B7 and ASTM F 1554 Gr. 105 [4,6]			HAS-R Stainless Steel ASTM F593 (3/8-in to 1-in) [5] ASTM A193 (1-1/8-in to 2-in) [4]		
	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)
3/8	3,370 (15.0)	1,750 (7.8)	1,050 (4.7)	4,360 (19.4)	2,270 (10.1)	1,590 (7.1)	7,270 (32.3)	3,780 (16.8)	2,645 (11.8)	5,040 (22.4)	2,790 (12.4)	1,955 (8.7)
1/2	6,175 (27.5)	3,210 (14.3)	1,925 (8.6)	7,985 (35.5)	4,150 (18.5)	2,905 (12.9)	13,305 (59.2)	6,920 (30.8)	4,845 (21.6)	9,225 (41.0)	5,110 (22.7)	3,575 (15.9)
5/8	9,835 (43.7)	5,110 (22.7)	3,065 (13.6)	12,715 (56.6)	6,610 (29.4)	4,625 (20.6)	21,190 (94.3)	11,020 (49.0)	7,715 (34.3)	14,690 (65.3)	8,135 (36.2)	5,695 (25.3)
3/4	14,550 (64.7)	7,565 (33.7)	4,540 (20.2)	18,820 (83.7)	9,785 (43.5)	6,850 (30.5)	31,360 (139.5)	16,310 (72.6)	11,415 (50.8)	18,485 (82.2)	10,235 (45.5)	7,165 (31.9)
7/8	20,085 (89.3)	10,445 (46.5)	6,265 (27.9)	25,975 (115.5)	13,505 (60.1)	9,455 (42.1)	43,285 (192.5)	22,510 (100.1)	15,755 (70.1)	25,510 (113.5)	14,125 (62.8)	9,890 (44.0)
1	26,350 (117.2)	13,700 (60.9)	8,220 (36.6)	34,075 (151.6)	17,720 (78.8)	12,405 (55.2)	56,785 (252.6)	29,530 (131.4)	20,670 (91.9)	33,465 (148.9)	18,535 (82.4)	12,975 (57.7)
1-1/8	33,205 (147.7)	17,265 (76.8)	10,360 (46.1)	42,940 (191.0)	22,330 (99.3)	15,630 (69.5)	71,560 (318.3)	37,215 (165.5)	26,050 (115.9)	32,635 (145.2)	16,970 (75.5)	10,180 (45.3)
1-1/4	42,160 (187.5)	21,920 (97.5)	13,150 (58.5)	54,515 (242.5)	28,345 (126.1)	19,840 (88.3)	90,855 (404.1)	47,245 (210.2)	33,070 (147.1)	41,430 (184.3)	21,545 (95.8)	12,925 (57.5)
1-1/2	61,120 (271.9)	31,780 (141.4)	19,070 (84.8)	79,030 (351.5)	41,095 (182.8)	28,765 (128.0)	131,720 (585.9)	68,495 (304.7)	47,945 (213.3)	60,065 (267.2)	31,235 (138.9)	18,740 (83.4)
1-3/4	82,650 (367.6)	42,980 (191.2)	25,790 (114.7)	106,875 (475.4)	55,575 (247.2)	38,905 (173.1)	178,125 (792.3)	92,625 (412.0)	64,835 (288.4)	81,225 (361.3)	42,235 (187.9)	25,340 (112.7)
2	108,750 (483.7)	56,550 (251.5)	33,930 (150.9)	140,625 (625.5)	73,125 (325.3)	51,190 (227.7)	234,375 (1,042.5)	121,875 (542.1)	85,315 (379.5)	106,875 (475.4)	55,575 (247.2)	33,345 (148.3)
2-1/4	- -	- -	- -	- -	- -	- -	304,690 (1,355.3)	158,440 (704.8)	110,910 (493.3)	- -	- -	- -
2-1/2	- -	- -	- -	- -	- -	- -	375,000 (1,668.1)	195,000 (867.4)	136,500 (607.2)	- -	- -	- -

1 Tensile = $\Phi A_{se,N}\ f_{uta}$ as noted in ACI 318-14 17.4.1.2
2 Shear = Φ 0.60 $A_{se,V}\ f_{uta}$ as noted in ACI 318-14 17.5.1.2b.
3 Seismic Shear = $\alpha_{V,seis}\ \Phi V_{sa}$: Reduction factor for seismic shear only. See ACI 318 for additional information on seismic applications. Seismic shear for HIT-RE 500 V3 may be increased for HAS-E, HAS-B, and HAS-R CW1 and CW2 threaded rods (including HDG rods). Refer to ESR-3814.
4 HAS-V, HAS-E (3/8-in to 2-in), HAS-B, and HAS-R (Class 1; 1-1/8-in to 2-in) threaded rods are considered ductile steel elements (included HDG rods).
5 HAS-E (2-1/4-in to 2-1/2-in) and HAS-R (CW1 and CW2; 3/8-in to 1-in) threaded rods are considered brittle steel elements (including HDG rods).
6 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.

Steel design strength for Hilti HIT-Z anchor rods for use with ACI 318-14 Ch. 17

Nominal anchor diameter in.	HIT-Z (HIT-HY 200 V3 only) [4]			HIT-Z-R (HIT-HY 200 V3 only) Stainless Steel [4]		
	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)
3/8	4,750 (21.1)	1,930 (8.6)	1,930 (8.6)	4,750 (21.1)	2,630 (11.7)	2,630 (11.7)
1/2	8,695 (38.7)	3,530 (15.7)	2,295 (10.2)	8,695 (38.7)	4,815 (21.4)	3,610 (16.1)
5/8	13,850 (61.6)	5,625 (25.0)	3,655 (16.3)	13,850 (61.6)	7,670 (34.1)	4,985 (22.2)
3/4	20,455 (91.0)	8,310 (37.0)	5,400 (24.0)	20,455 (91.0)	11,330 (50.4)	7,365 (32.8)

1 Tensile = $\Phi A_{se,N}\ f_{uta}$ as noted in ACI 318-14 17.4.1.2
2 Shear value for HIT-Z and HIT-Z-R anchor rods is based on static shear testing with $\Phi V_{sa} \leq \Phi\ 0.60\ A_{se,V}\ f_{uta}$ as noted in ACI 318-14 17.5.1.2b.
3 Seismic Shear = $\alpha_{V,seis}\ \Phi V_{sa}$: Reduction factor for seismic shear only. See ACI 318 for additional information on seismic applications. Seismic shear for HIT-RE 500 V3 may be increased for HAS-R rods. Refer to ESR-3814.
4 HAS-R stainless steel threaded rods, HIT-Z, and HIT-Z-R anchor rods are considered brittle steel elements.

LIMIT STATES DESIGN ACCORDING TO CSA A23.3-14

The following steel design information is for Hilti HAS threaded rods and HIT-Z anchor rods according to the material specifications on page 2, used in conjunction with Hilti adhesive anchors designed in accordance with CSA A23.3-14 Annex D. This includes Hilti HIT-HY 200 V3, HIT-RE 500 V3, HIT-RE 100, HIT-HY 100, and HIT-ICE.

Steel design information for Hilti HAS threaded rods and Hilti HIT-Z anchor rods for use with CSA A23.3-14 Annex D

Design Information		Symbol	Units	Nominal Rod Diameter (in.)					
				3/8	1/2	5/8	3/4	7/8	1
Rod O.D.		d	in.	0.375	0.5	0.625	0.75	0.875	1
Rod effective cross-sectional area		A_{se}	in.^{2} (mm^2)	0.0775 (50)	0.1419 (92)	0.2260 (146)	0.3345 (216)	0.4617 (298)	0.6057 (391)
HAS-V-36 HAS-V-36 HDG ASTM F1554 Gr. 36 [1,4]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	4,495 (20.0)	8,230 (36.6)	13,110 (58.3)	19,400 (86.3)	26,780 (119.1)	35,130 (156.3)
		V_{sa}	lb (kN)	2,695 (12.0)	4,940 (22.0)	7,865 (35.0)	11,640 (51.8)	16,070 (71.5)	21,080 (93.8)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.6					
	Strength reduction factor R for tension [2]	R	-	0.80					
	Strength reduction factor R for shear [2]	R	-	0.75					
HAS-E-55 HAS-E-55 HDG ASTM F1554 Gr. 55 [1,4]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	5,815 (25.9)	10,645 (47.4)	16,950 (75.4)	25,090 (111.6)	34,630 (154.0)	45,430 (202.1)
		V_{sa}	lb (kN)	3,490 (15.5)	6,385 (28.4)	10,170 (45.2)	15,055 (67.0)	20,780 (92.4)	27,260 (121.3)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]					
	Strength reduction factor R for tension [2]	R	-	0.80					
	Strength reduction factor R for shear [2]	R	-	0.75					
HAS-B-105 HAS-B-105 HDG ASTM A193 B7 and ASTM F1554 Gr. 105 [1,4]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	9,665 (43.0)	17,695 (78.7)	28,180 (125.4)	41,710 (185.5)	57,575 (256.1)	75,530 (336.0)
		V_{sa}	lb (kN)	5,800 (25.8)	10,615 (47.2)	16,910 (75.2)	25,025 (111.3)	34,545 (153.7)	45,320 (201.6)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]					
	Strength reduction factor R for tension [2]	R	-	0.80					
	Strength reduction factor R for shear [2]	R	-	0.75					
HAS-R Stainless Steel ASTM F593, CW Stainless[1]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	7,750 (34.5)	14,190 (63.1)	22,600 (100.5)	28,435 (126.5)	39,245 (174.6)	51,485 (229.0)
		V_{sa}	lb (kN)	4,650 (20.7)	8,515 (37.9)	13,560 (60.3)	17,060 (75.9)	23,545 (104.7)	30,890 (137.4)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]					
	Strength reduction factor R for tension [2]	R	-	0.70					
	Strength reduction factor R for shear [2]	R	-	0.65					
HIT-Z Anchor Rod [1] (HIT-HY 200 V3 only)	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	7,305 (32.5)	13,375 (59.5)	21,305 (94.8)	31,470 (140.0)	- -	- -
		V_{sa}	lb (kN)	3,215 (14.3)	5,885 (26.2)	9,375 (41.7)	13,850 (61.6)	- -	- -
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	1.00	0.65			-	
	Strength reduction factor R for tension [2]	R	-	0.70				-	
	Strength reduction factor R for shear [2]	R	-	0.65				-	
HIT-Z-R Anchor Rod (HIT-HY 200 V3 only) Stainless Steel[1]	Nominal strength as governed by steel strength	N_{sa}	lb (kN)	7,305 (32.5)	13,375 (59.5)	21,305 (94.8)	31,470 (140.0)	- -	- -
		V_{sa}	lb (kN)	4,385 (19.5)	8,025 (35.7)	12,785 (56.9)	18,885 (84.0)	- -	- -
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	1.00	0.75	0.65		-	
	Strength reduction factor R for tension [2]	R	-	0.70				-	
	Strength reduction factor R for shear [2]	R	-	0.65				-	

[1] Values provided for Hilti threaded rod materials based on published strengths and calculated in accordance with CSA A23.3-14 Annex D Eq. D.2 and Eq. D.31. Nuts and washers must be appropriate for rod strength.
[2] For use with the load combinations of CSA A23.3-14 Clause 8.
[3] For HIT-RE 500 V3, the value of $\alpha_{v,seis}$ can be increased. Refer to ICC-ES ESR-3814 or contact Hilti.
[4] 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.

LIMIT STATES DESIGN ACCORDING TO CSA A23.3-14

The following steel design information is for Hilti HAS threaded rods according to the material specifications on page 2, used in conjunction with Hilti adhesive anchors designed in accordance with CSA A23.3-14 Annex D. This includes Hilti HIT-HY 200 V3, HIT-RE 500 V3, HIT-RE 100, HIT-HY 100, and HIT-ICE.

Steel design information for Hilti HAS threaded rods for use with CSA A23.3-14 Annex D

Design Information		Symbol	Units	Nominal Rod Diameter (in.)						
				1-1/8	1-1/4	1-1/2	1-3/4	2	2-1/4	2-1/2
Rod O.D.		d	in.	1.125	1.25	1.5	1.75	2	2.25	2.5
Rod effective cross-sectional area		A_{se}	in.^{2} (mm^2)	0.7633 (492)	0.9691 (625)	1.405 (906)	1.90 (1,226)	2.50 (1,613)	3.25 (2,097)	4.00 (2,581)
HAS-V-36 HAS-V-36 HDG ASTM F1554 Gr. 36 [1]	Nominal strength as governed by steel strength	N_{sa}	lb	44,270	56,210	81,490	110,200	145,000	-	-
			(kN)	(196.9)	(250.0)	(362.5)	(490.2)	(645.0)	-	-
		V_{sa}	lb	26,560	33,725	48,895	66,120	87,000	-	-
			(kN)	(118.1)	(150.0)	(217.5)	(294.1)	(387.0)	-	-
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.6					-	-
	Strength reduction factor R for tension [2]	R	-	0.80					-	-
	Strength reduction factor R for shear [2]	R	-	0.75					-	-
HAS-E-55 HAS-E-55 HDG ASTM F1554 Gr. 55 [1]	Nominal strength as governed by steel strength	N_{sa}	lb	57,250	72,685	105,375	142,500	187,500	-	-
			(kN)	(254.7)	(323.3)	(468.7)	(633.9)	(834.0)	-	-
		V_{sa}	lb	34,350	43,610	63,225	85,500	112,500	-	-
			(kN)	(152.8)	(194.0)	(281.2)	(380.3)	(500.4)	-	-
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]					-	-
	Strength reduction factor R for tension [2]	R	-	0.80					-	-
	Strength reduction factor R for shear [2]	R	-	0.75					-	-
HAS-B-105 HAS-B-105 HDG ASTM A193 B7 and ASTM F1554 Gr. 105 [1]	Nominal strength as governed by steel strength	N_{sa}	lb	95,185	120,845	175,205	236,930	311,750	405,275	498,800
			(kN)	(423.4)	(537.5)	(779.3)	(1,053.9)	(1,386.7)	(1,802.7)	(2,218.8)
		V_{sa}	lb	57,110	72,505	105,125	142,160	187,050	243,165	299,280
			(kN)	(254.0)	(322.5)	(467.6)	(632.4)	(832.0)	(1,081.6)	(1,331.3)
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.7 [3]						
	Strength reduction factor R for tension [2]	R	-	0.80						
	Strength reduction factor R for shear [2]	R	-	0.75						
HAS-R Stainless Steel ASTM A193, Gr. 8(M), Class 1 [1]	Nominal strength as governed by steel strength	N_{sa}	lb	43,510	55,240	80,085	108,300	142,500	-	-
			(kN)	(193.5)	(245.7)	(356.2)	(481.7)	(633.9)	-	-
		V_{sa}	lb	26,105	33,145	48,050	64,980	85,500	-	-
			(kN)	(116.1)	(147.4)	(213.7)	(289.0)	(380.3)	-	-
	Reduction factor, seismic shear	$\alpha_{v,seis}$	-	0.6					-	-
	Strength reduction factor R for tension [2]	R	-	0.80					-	-
	Strength reduction factor R for shear [2]	R	-	0.75					-	-

[1] Values provided for Hilti threaded rod materials based on published strengths and calculated in accordance with CSA A23.3-14 Annex D Eq. D.2 and Eq. D.31. Nuts and washers must be appropriate for rod strength.
[2] For use with the load combinations of CSA A23.3-14 Clause 8.
[3] For HIT-RE 500 V3, the value of $\alpha_{v,seis}$ can be increased. Refer to ICC-ES ESR-3814 or contact Hilti.

LIMIT STATES DESIGN ACCORDING TO CSA A23.3-14

The following are strength design values calculated from data on the previous pages. This is intended for adhesive anchors designed in accordance with CSA A23.3-14 Annex D and can be used in conjunction with the Hilti Simplified Strength Design Tables (refer to Section 3.1.8 of the 2016 and 2017 Hilti Anchor Fastening Technical Guide for more information on the Hilti Simplified Tables). This includes Hilti HIT-HY 200 V3, HIT-RE 500 V3, HIT-RE 100, HIT-HY 100, and HIT-ICE.

Steel factored resistance for Hilti HAS threaded rods for use with CSA A23.3-14 Annex D

Nominal anchor diameter in.	HAS-V-36 / HAS-V-36 HDG ASTM F1554 Gr. 36 [4,6]			HAS-E-55 / HAS-E-55 HDG ASTM F1554 Gr. 55 [4,5,6]			HAS-B-105 / HAS-B-105 HDG ASTM A193 B7 and ASTM F 1554 Gr. 105 [4,6]			HAS-R Stainless Steel ASTM F593 (3/8-in to 1-in) [5] ASTM A193 (1-1/8-in to 2-in) [4]		
	Tensile[1] N_{sar} lb (kN)	Shear[2] V_{sar} lb (kN)	Seismic Shear[3] $V_{sar,eq}$ lb (kN)	Tensile[1] N_{sar} lb (kN)	Shear[2] V_{sar} lb (kN)	Seismic Shear[3] $V_{sar,eq}$ lb (kN)	Tensile[1] N_{sar} lb (kN)	Shear[2] V_{sar} lb (kN)	Seismic Shear[3] $V_{sar,eq}$ lb (kN)	Tensile[1] N_{sar} lb (kN)	Shear[2] V_{sar} lb (kN)	Seismic Shear[3] $V_{sar,eq}$ lb (kN)
3/8	3,055 (13.6)	1,720 (7.7)	1,030 (4.6)	3,955 (17.6)	2,225 (9.9)	1,560 (6.9)	6,570 (29.2)	3,695 (16.4)	2,585 (11.5)	4,610 (20.5)	2,570 (11.4)	1,800 (8.0)
1/2	5,595 (24.9)	3,150 (14.0)	1,890 (8.4)	7,240 (32.2)	4,070 (18.1)	2,850 (12.7)	12,035 (53.5)	6,765 (30.1)	4,735 (21.1)	8,445 (37.6)	4,705 (20.9)	3,295 (14.7)
5/8	8,915 (39.7)	5,015 (22.3)	3,010 (13.4)	11,525 (51.3)	6,485 (28.8)	4,540 (20.2)	19,160 (85.2)	10,780 (48.0)	7,545 (33.6)	13,445 (59.8)	7,490 (33.3)	5,245 (23.3)
3/4	13,190 (58.7)	7,420 (33.0)	4,450 (19.8)	17,060 (75.9)	9,600 (42.7)	6,720 (29.9)	28,365 (126.2)	15,955 (71.0)	11,170 (49.7)	16,920 (75.3)	9,425 (41.9)	6,600 (29.4)
7/8	18,210 (81.0)	10,245 (45.6)	6,145 (27.3)	23,550 (104.8)	13,245 (58.9)	9,270 (41.2)	39,150 (174.1)	22,020 (97.9)	15,415 (68.6)	23,350 (103.9)	13,010 (57.9)	9,105 (40.5)
1	23,890 (106.3)	13,440 (59.8)	8,065 (35.9)	30,890 (137.4)	17,380 (77.3)	12,165 (54.1)	51,360 (228.5)	28,890 (128.5)	20,225 (90.0)	30,635 (136.3)	17,065 (75.9)	11,945 (53.1)
1-1/8	30,105 (133.9)	16,930 (75.3)	10,160 (45.2)	38,930 (173.2)	21,900 (97.4)	15,330 (68.2)	64,725 (287.9)	36,410 (162.0)	25,485 (113.4)	29,585 (131.6)	16,640 (74.0)	9,985 (44.4)
1-1/4	38,225 (170.0)	21,500 (95.6)	12,900 (57.4)	49,425 (219.9)	27,800 (123.7)	19,460 (86.6)	82,175 (365.5)	46,220 (205.6)	32,355 (143.9)	37,565 (167.1)	21,130 (94.0)	12,680 (56.4)
1-1/2	55,415 (246.5)	31,170 (138.7)	18,700 (83.2)	71,655 (318.7)	40,305 (179.3)	28,215 (125.5)	119,140 (530.0)	67,015 (298.1)	46,910 (208.7)	54,460 (242.2)	30,630 (136.2)	18,380 (81.8)
1-3/4	74,935 (333.3)	42,150 (187.5)	25,290 (112.5)	96,900 (431.0)	54,505 (242.4)	38,155 (169.7)	161,110 (716.6)	90,625 (403.1)	63,435 (282.2)	73,645 (327.6)	41,425 (184.3)	24,855 (110.6)
2	98,600 (438.6)	55,460 (246.7)	33,275 (148.0)	127,500 (567.1)	71,720 (319.0)	50,205 (223.3)	211,990 (943.0)	119,245 (530.4)	83,470 (371.3)	96,900 (431.0)	54,505 (242.4)	32,705 (145.5)
2-1/4	- -	- -	- -	- -	- -	- -	275,585 (1,225.9)	155,020 (689.6)	108,515 (482.7)	- -	- -	- -
2-1/2	- -	- -	- -	- -	- -	- -	339,185 (1,508.8)	190,790 (848.7)	133,555 (594.1)	- -	- -	- -

[1] Tensile = $A_{se,N}$ Φ_s f_{uta} R as noted in CSA A23.3-14 Eq. D.2.
[2] Shear = $A_{se,V}$ Φ_s 0.60 f_{uta} R as noted in CSA A23.3-14 Eq. D.31.
[3] Seismic Shear = $\alpha_{V,seis}$ V_{sar} : Reduction factor for seismic shear only. See CSA A23.3 Annex D for additional information on seismic applications. Seismic shear for HIT-RE 500 V3 may be increased for HAS-E, HAS-B, and HAS-R CW1 and CW2 threaded rods (including HDG rods). Refer to ESR-3814.
[4] HAS-V, HAS-E (3/8-in to 2-in), HAS-B, and HAS-R (Class 1; 1-1/8-in to 2-in) threaded rods are considered ductile steel elements (included HDG rods).
[5] HAS-E (2-1/4-in to 2-1/2-in) and HAS-R (CW1 and CW2; 3/8-in to 1-in) threaded rods are considered brittle steel elements (including HDG rods).
[6] 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.

Steel factored resistance for Hilti HIT-Z anchor rods for use with CSA A23.3-14 Annex D

Nominal anchor diameter in.	HIT-Z (HIT-HY 200 V3 only) [4]			HIT-Z-R (HIT-HY 200 V3 only) Stainless Steel [4]		
	Tensile[1] N_{sar} lb (kN)	Shear[2] V_{sar} lb (kN)	Seismic Shear[3] $V_{sar,eq}$ lb (kN)	Tensile[1] N_{sar} lb (kN)	Shear[2] V_{sar} lb (kN)	Seismic Shear[3] $V_{sar,eq}$ lb (kN)
3/8	4,345 (19.3)	1,775 (7.9)	1,155 (5.1)	4,345 (19.3)	2,420 (10.8)	2,420 (10.8)
1/2	7,960 (35.4)	3,250 (14.5)	2,115 (9.4)	7,960 (35.4)	4,435 (19.7)	3,325 (14.8)
5/8	12,675 (56.4)	5,180 (23.0)	3,365 (15.0)	12,675 (56.4)	7,065 (31.4)	4,590 (20.4)
3/4	18,725 (83.3)	7,650 (34.0)	4,975 (22.1)	18,725 (83.3)	10,435 (46.4)	6,785 (30.2)

[1] Tensile = $A_{se,N}$ Φ_s f_{uta} R as noted in CSA A23.3-14 Eq. D.2.
[2] Shear value for HIT-Z and HIT-Z-R anchor rods is based on static shear testing with $V_{sar} \leq A_{se,V}$ Φ_s 0.60 f_{uta} R as noted in CSA A23.3-14 Eq. D.31.
[3] Seismic Shear = $\alpha_{V,seis}$ V_{sar} : Reduction factor for seismic shear only. See CSA A23.3 Annex D for additional information on seismic applications. Seismic shear for HIT-RE 500 V3 may be increased for HAS-R rods. Refer to ESR-3814.
[4] HAS-R stainless steel threaded rods, HIT-Z, and HIT-Z-R anchor rods are considered brittle steel elements.

TECHNICAL DATA — ALLOWABLE STRESS DESIGN (ASD)

The following technical data is for adhesive anchors that will be designed in accordance with the Allowable Stress Design method (ASD). This includes Hilti HIT-HY 270 for masonry, HIT-HY 200 V3 for masonry, HIT-HY 100 for masonry, HIT-ICE, HIT-HY 10 PLUS, HIT-1, HTE 50 and HVU Capsules.
Note:

- Hilti HAS-V-36 threaded rods are not applicable for use with Hilti HVU Capsules since the end of the rod does not have a chisel point to break and mix the capsules during installation.
- Hilti HIT-Z Anchor Rods do not have ASD load data since they are only used in conjunction with Hilti HIT-HY 200 V3.

Allowable steel strength for Hilti HAS threaded rods [1]

Nominal anchor diameter in.	HAS-V-36 / HAS-V-36 HDG ASTM F1554 Gr. 36 [2]		HAS-E-55 / HAS-E-55 HDG ASTM F1554 Gr. 55[2]		HAS-B-105 and HAS-B-105 HDG ASTM A193 B7 and ASTM F 1554 Gr. 105[2]		HAS-R Stainless Steel ASTM F593 (3/8-in to 1-in) ASTM A193 (1/4-in and 1-1/8-in to 2-in)	
	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)
1/4	-	-	-	-	-	-	925	475
	-	-	-	-	-	-	(4.1)	(2.1)
3/8	2,115	1,090	2,730	1,410	4,555	2,345	3,645	1,875
	(9.4)	(4.8)	(12.1)	(6.3)	(20.3)	(10.4)	(16.2)	(8.3)
1/2	3,755	1,935	4,860	2,505	8,095	4,170	6,480	3,335
	(16.7)	(8.6)	(21.6)	(11.1)	(36.0)	(18.5)	(28.8)	(14.8)
5/8	5,870	3,025	7,595	3,910	12,655	6,520	10,125	5,215
	(26.1)	(13.5)	(33.8)	(17.4)	(56.3)	(29.0)	(45.0)	(23.2)
3/4	8,455	4,355	10,935	5,635	18,225	9,390	12,390	6,385
	(37.6)	(19.4)	(48.6)	(25.1)	(81.1)	(41.8)	(55.1)	(28.4)
7/8	11,510	5,930	14,880	7,665	24,805	12,780	16,865	8,690
	(51.2)	(26.4)	(66.2)	(34.1)	(110.3)	(56.8)	(75.0)	(38.7)
1	15,035	7,745	19,440	10,015	32,400	16,690	22,030	11,350
	(66.9)	(34.5)	(86.5)	(44.5)	(144.1)	(74.2)	(98.0)	(50.5)
1-1/8	19,025	9,800	24,600	12,675	41,005	21,125	18,695	9,630
	(84.6)	(43.6)	(109.4)	(56.4)	(182.4)	(94.0)	(83.2)	(42.8)
1-1/4	23,490	12,100	30,375	15,645	50,620	26,080	23,085	11,890
	(104.5)	(53.8)	(135.1)	(69.6)	(225.2)	(116.0)	(102.7)	(52.9)
1-1/2	33,825	17,425	43,735	22,530	72,895	37,550	33,240	17,125
	(150.5)	(77.5)	(194.5)	(100.2)	(324.3)	(167.0)	(147.9)	(76.2)
1-3/4	46,035	23,715	59,530	30,665	99,220	51,110	45,245	23,305
	(204.8)	(105.5)	(264.8)	(136.4)	(441.4)	(227.3)	(201.3)	(103.7)
2	60,130	30,975	77,755	40,055	129,590	66,760	59,095	30,440
	(267.5)	(137.8)	(345.9)	(178.2)	(576.4)	(297.0)	(262.9)	(135.4)
2-1/4	-	-	-	-	164,015	84,490	-	-
	-	-	-	-	(729.6)	(375.8)	-	-
2-1/2	-	-	-	-	202,485	104,310	-	-
	-	-	-	-	(900.7)	(464.0)	-	-

[1] Steel strength as defined in AISC Manual of Steel Construction (ASD):
Tensile = 0.33 x F_u x Nominal Area
Shear = 0.17 x F_u x Nominal Area

[2] 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.

TECHNICAL DATA — ALLOWABLE STRESS DESIGN (ASD) - CONTINUED

The following technical data is for adhesive anchors that will be designed in accordance with the Allowable Stress Design Method (ASD). This includes Hilti HIT-HY 270 for masonry, HIT-HY 200 V3 for masonry, HIT-HY 100 for masonry, HIT-ICE, HIT-HY 10 PLUS, HIT-1, HTE 50 and HVU Capsules.
Note:

- Hilti HAS-V-36 threaded rods are not applicable for use with Hilti HVU Capsules since the end of the rod does not have a chisel point to break and mix the capsules during installation.
- Hilti HIT-Z Anchor Rods do not have ASD load data since they are only used in conjunction with Hilti HIT-HY 200 V3.

Ultimate steel strength for Hilti HAS threaded rods [1]

Nominal anchor diameter in.	HAS-V-36 / HAS-V-36 HDG ASTM F1554 Gr. 36 [2]			HAS-E-55 / HAS-E-55 HDG ASTM F1554 Gr. 55 [2]			HAS-B-105 / HAS-B-105 HDG ASTM A193 B7 and ASTM F 1554 Gr. 105 [2]			HAS-R Stainless Steel ASTM F593 (3/8-in to 1-in) ASTM A193 (1/4-in and 1-1/8-in to 2-in)		
	Yield lb (kN)	Tensile lb (kN)	Shear lb (kN)	Yield lb (kN)	Tensile lb (kN)	Shear lb (kN)	Yield lb (kN)	Tensile lb (kN)	Shear lb (kN)	Yield lb (kN)	Tensile lb (kN)	Shear lb (kN)
1/4	-	-	-	-	-	-	-	-	-	955	2,100	1,260
	-	-	-	-	-	-	-	-	-	(4.2)	(9.3)	(5.6)
3/8	2,790	4,800	2,880	4,265	6,210	3,725	8,140	10,350	6,210	5,040	8,280	4,970
	(12.4)	(21.4)	(12.8)	(19.0)	(27.6)	(16.6)	(36.2)	(46.0)	(27.6)	(22.4)	(36.8)	(22.1)
1/2	5,110	8,540	5,125	7,805	11,040	6,625	14,900	18,405	11,040	9,225	14,725	8,835
	(22.7)	(38.0)	(22.8)	(34.7)	(49.1)	(29.5)	(66.3)	(81.9)	(49.1)	(41.0)	(65.5)	(39.3)
5/8	8,135	13,345	8,005	12,430	17,260	10,355	23,730	28,765	17,260	14,690	23,010	13,805
	(36.2)	(59.4)	(35.6)	(55.3)	(76.8)	(46.1)	(105.6)	(128.0)	(76.8)	(65.3)	(102.4)	(61.4)
3/4	12,040	19,220	11,530	18,400	24,850	14,910	35,125	41,420	24,850	15,055	28,165	16,900
	(53.6)	(85.5)	(51.3)	(81.8)	(110.5)	(66.3)	(156.2)	(184.2)	(110.5)	(67.0)	(125.3)	(75.2)
7/8	16,620	26,155	15,695	25,395	33,825	20,295	48,480	56,370	33,825	20,775	38,335	23,000
	(73.9)	(116.3)	(69.8)	(113.0)	(150.5)	(90.3)	(215.6)	(250.7)	(150.5)	(92.4)	(170.5)	(102.3)
1	21,805	34,165	20,500	33,315	44,180	26,505	63,600	73,630	44,180	27,255	50,070	30,040
	(97.0)	(152.0)	(91.2)	(148.2)	(196.5)	(117.9)	(282.9)	(327.5)	(196.5)	(121.2)	(222.7)	(133.6)
1-1/8	27,480	43,240	25,945	41,980	55,915	33,550	80,145	93,190	55,915	22,900	42,495	25,495
	(122.2)	(192.3)	(115.4)	(186.7)	(248.7)	(149.2)	(356.5)	(414.5)	(248.7)	(101.9)	(189.0)	(113.4)
1-1/4	34,890	53,385	32,030	53,300	69,030	41,420	101,755	115,050	69,030	29,075	52,465	31,480
	(155.2)	(237.5)	(142.5)	(237.1)	(307.1)	(184.2)	(452.6)	(511.8)	(307.1)	(129.3)	(233.4)	(140.0)
1-1/2	50,590	76,870	46,125	77,290	99,400	59,640	147,550	165,670	99,400	42,160	75,545	45,325
	(225.0)	(341.9)	(205.2)	(343.8)	(442.2)	(265.3)	(656.3)	(736.9)	(442.2)	(187.5)	(336.0)	(201.6)
1-3/4	68,380	104,630	62,780	104,470	135,295	81,180	199,445	225,495	135,295	56,985	102,825	61,695
	(304.2)	(465.4)	(279.3)	(464.7)	(601.8)	(361.1)	(887.2)	(1,003.0)	(601.8)	(253.5)	(457.4)	(274.4)
2	89,935	136,660	81,995	137,400	176,715	106,030	262,315	294,525	176,715	74,945	134,305	80,580
	(400.0)	(607.9)	(364.7)	(611.2)	(786.1)	(471.6)	(1,166.8)	(1,310.1)	(786.1)	(333.4)	(597.4)	(358.4)
2-1/4	-	-	-	-	-	-	341,005	372,755	223,655	-	-	-
	-	-	-	-	-	-	(1,516.9)	(1,658.1)	(994.9)	-	-	-
2-1/2	-	-	-	-	-	-	419,875	460,195	276,115	-	-	-
	-	-	-	-	-	-	(1,867.7)	(2,047.0)	(1,228.2)	-	-	-

[1] Steel strength as defined in AISC Manual of Steel Construction (LRFD):
Yield = F_y x Tensile stress area
Tensile = 0.75 x F_u x Nominal Area
Shear = 0.45 x F_u x Nominal Area

[2] 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.

ORDERING INFORMATION

Hilti HIT-Z Anchor rods for Hilti HIT-HY 200 V3 Anchoring system

HIT-Z Carbon Steel		HIT-Z-R 316 Stainless Steel		HIT-Z (-R) Length Code
Description	Qty	Description	Qty	
3/8" x 3-3/8"	40	**3/8" x 3-3/8"**	40	D
3/8" x 4-3/8"	40	**3/8" x 4-3/8"**	40	F
3/8"x 5-1/8"	40	**3/8"x 5-1/8"**	40	H
3/8" x 6-3/8"	40	**3/8" x 6-3/8"**	40	J
1/2" x 4-1/2"	20	**1/2" x 4-1/2"**	20	F
1/2" x 6-1/2"	20	**1/2" x 6-1/2"**	20	J
1/2" x 7-3/4"	20	**1/2" x 7-3/4"**	20	M
5/8" x 6"	12	**5/8" x 6"**	12	I
5/8" x 8"	12	**5/8" x 8"**	12	M
5/8" x 9-1/2"	12	**5/8" x 9-1/2"**	12	P
3/4" x 6-1/2"	6	**3/4" x 6-1/2"**	6	J
3/4" x 8-1/2"	6	**3/4" x 8-1/2"**	6	N
3/4" x 9-3/4"	6	**3/4" x 9-3/4"**	6	Q

Hilti Rods are now stamped on the end to show grade of steel and overall anchor length!

"/\" = HIT-Z
"J" = Length Code

"HV" = HAS-V-36
"6 1/2" = Length

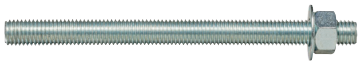
"HE" = HAS-E-55
"6 1/2" = Length

"HB" = HAS-B-105
"6 1/2" = Length

"R1" = 304 SS
"6 1/2" = Length

"R2" = 316 SS
"6 1/2" = Length

Overview of the Hilti HAS standard off-the-shelf anchor rod program for Hilti chemical anchoring systems[1]



HAS-V does not come with chisel point

HAS-E, HAS-B, and HAS-R all come with chisel point

HAS-V-36		HAS-E-55		HAS-B-105		HAS-B-105 HDG Hot-dipped galvanized		HAS-R 304 Stainless Steel		HAS-R 316 Stainless Steel	
Description	Qty	Description	Qty	Description	Qty	Description	Qty	Description	Qty	Description	Qty
1/4" x 3"		-	-	-	-	-	-	-	-	-	-
1/4" x 4-1/2"		-	-	-	-	-	-	-	-	-	-
-	-	**3/8" x 3"**	20	**-**	-	**-**	-	**-**	-	**-**	-
3/8" x 4-3/8"	20	**3/8" x 4-3/8"**	20	**-**	-	**-**	-	**-**	-	**-**	-
3/8" x 5-1/8"	20	**3/8" x 5-1/8"**	20	**3/8" x 5-1/8"**	20	**3/8" x 5-1/8"**	-	**3/8" x 5-1/8"**	20	**3/8" x 5-1/8"**	20
3/8" x 8"	10	**3/8" x 8"**	10	**-**	-	**-**	-	**3/8" x 8"**	10	**3/8" x 8"**	10
-	-	**3/8" x 12"**	10	**-**	-	**-**	-	**-**	-	**-**	-
-	-	**1/2" x 3-1/8"**	20	**-**	-	**-**	-	**-**	-	**-**	-
1/2" x 4-1/2"	20	**1/2" x 4-1/2"**	20	**-**	-	**-**	-	**-**	-	**-**	-
1/2" x 6-1/2"	20	**1/2" x 6-1/2"**	20	**1/2" x 6-1/2"**	20	**-**	-	**1/2" x 6-1/2"**	20	**1/2" x 6-1/2"**	20
1/2" x 8"	10	**1/2" x 8"**	10	**-**	-	**1/2" x 8"**	10	**1/2" x 8"**	10	**1/2" x 8"**	10
-	-	**1/2" x 10"**	10	**-**	-	**-**	-	**1/2" x 10"**	10	**1/2" x 11"**	10
-	-	**1/2" x 12"**	10	**-**	-	**-**	-	**-**	-	**1/2" x 12"**	10
5/8" x 6"	10	**5/8" x 6"**	10	**-**	-	**-**	-	**-**	-	**-**	-
5/8" x 8"	10	**5/8" x 8"**	10	**5/8" x 8"**	10	**5/8" x 8"**	10	**5/8" x 7-5/8"**	20	**5/8" x 7-5/8"**	20
5/8" x 10"	10	**5/8" x 9"**	10	**-**	-	**-**	-	**5/8" x 10"**	10	**5/8" x 9"**	10
5/8" x 12"	10	**5/8" x 12"**	10	**-**	-	**5/8" x 12"**	10	**-**	-	**5/8" x 12"**	10
-	-	**5/8" x 17"**	10	**-**	-	**-**	-	**-**	-	**-**	-
3/4" x 6"	10	**3/4" x 6"**	10	**-**	-	**-**	-	**-**	-	**-**	-
3/4" x 8"	10	**3/4" x 8"**	10	**-**	-	**-**	-	**-**	-	**-**	-
3/4" x 10"	10	**3/4" x 10"**	10	**3/4" x 10"**	10	**3/4" x 10"**	10	**3/4" x 9-5/8"**	10	**3/4" x 9-5/8"**	10
-	-	**3/4" x 11"**	10	**-**	-	**-**	-	**-**	-	**3/4" x 10"**	10
3/4" x 12"	10	**3/4" x 12"**	10	**-**	-	**-**	-	**3/4" x 12"**	10	**-**	-
-	-	**3/4" x 14"**	10	**3/4" x 14"**	10	**3/4" x 14"**	10	**3/4" x 14"**	10	**-**	-
3/4" x 16"	10	**3/4" x 17"**	10	**-**	-	**-**	-	**3/4" x 16"**	10	**3/4" x 16"**	10
-	-	**3/4" x 19"**	8	**-**	-	**3/4"x20"**	8	**-**	-	**-**	-
-	-	**3/4" x 21"**	8	**-**	-	**-**	-	**-**	-	**-**	-
-	-	**3/4" x 25"**	4	**-**	-	**-**	-	**-**	-	**-**	-
-	-	**7/8" x 10"**	10	**-**	-	**7/8" x 10"**	10	**7/8" x 10"**	10	**7/8" x 10"**	10
-	-	**7/8" x 13"**	8	**-**	-	**7/8" x 12"**	10	**-**	-	**-**	-
-	-	**-**	-	**-**	-	**7/8" x 16"**	10	**-**	-	**7/8" x 16"**	10
1" x 12"	4	**1" x 12"**	4	**1" x 12"**	4	**-**	-	**1" x 12"**	4	**1" x 12"**	4
-	-	**1" x 14"**	4	**1" x 14"**	4	**-**	-	**-**	-	**-**	-
-	-	**1" x 16"**	2	**1" x 16"**	2	**1" x 16"**	2	**-**	-	**1" x 16"**	2
-	-	**1" x 20"**	2	**1" x 21"**	2	**1" x 21"**	2	**-**	-	**1" x 20"**	2
-	-	**1-1/4" x 16"**	2	**1-1/4" x 16"**	2	**1-1/4" x 16"**	2	**-**	-	**-**	-
-	-	**1-1/4" x 22"**	2	**1-1/4" x 23"**	2	**-**	-	**-**	-	**-**	-

[1] Additional diameters and lengths see extended anchor rod program on page 14.

EXTENDED HILTI ANCHOR ROD PROGRAM ORDERING INFORMATION

The following threaded rod ordering information is for the Hilti extended rod program according to the material specifications on page 2.

Extended rod offering

Nominal anchor diameter (in.)	Min. length in.	Max. length in.	Material: Electro plated – ASTM F1554 Grade 36	Electro plated – ASTM F1554 Grade 55	Electro plated – ASTM F1554 Grade 105	Hot dip galvanized – ASTM F1554 Grade 36	Hot dip galvanized – ASTM F1554 Grade 55	Hot dip galvanized – ASTM F1554 Grade 105	Stainless steel – SS304	Stainless steel – SS316
1/4	2	144							■	■
3/8[1]	2	144	■	■	■	■	■	■	■	■
1/2	2	144	■	■	■	■	■	■	■	■
5/8	3	144	■	■	■	■	■	■	■	■
3/4	4	144	■	■	■	■	■	■	■	■
7/8	4	144	■	■	■	■	■	■	■	■
1	5	144	■	■	■	■	■	■	■	■
1-1/8	6	144	■	□	■	■	□	■	□	□
1-1/4	6	144	■	■	■	■	■	■	■	■
1-1/2	8	144	■	□	■	■	□	■	■	■
1-3/4	9	144	■	□	■	■	□	■	■	■
2	11	144	■	□	■	■	□	■	■	■
2-1/4	12	144			■			■		
2-1/2	13	144			■			■		

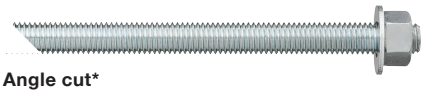
■ = typical lead time 2–4 working days plus shipping [2] □ = available but longer lead time

[1] 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.

[2] up to following quantities: 1/4" to 3/4" > 250 pieces, 7/8" to 1-1/4" > 100 pieces, 1-1/2" to 2-1/2" > 50 pieces. Bigger quantities contact Hilti for lead time.

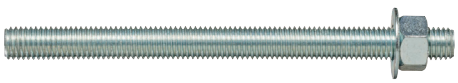
Hilti threaded rods in the Hilti Extended Anchor Rod Program are stamped on the end to show grade of steel.	
H V	HAS-V-36 / HAS-V-36 HDG ASTM F1554, Grade 36
H E	HAS-E-55 / HAS-E-55 HDG ASTM F1554, Grade 55
H B	HAS-B-105 / HAS-B-105 HDG ASTM A193, Grade B7 ASTM F1554, Grade 105
SS304 H R1	HAS-R 304SS 1/4-in. ASTM A193 Grade B8, Class 1 3/8-in. to 5/8-in. AISI Type 304 ASTM F593 CW1 3/4-in. to 1-in. AISI Type 304 ASTM F593 CW2 1-1/8-in. to 2-in. ASTM A193 Grade B8, Class 1
SS316 H R2	HAS-R 316SS 1/4-in. ASTM A193 Grade B8M, Class 1 3/8-in. to 5/8-in. AISI Type 316 ASTM F593 CW1 3/4-in. to 1-in. AISI Type 316 ASTM F593 CW2 1-1/8-in. to 2-in. ASTM A193 Grade B8M, Class 1

TWO END CUT OPTIONS AVAILABLE



Angle cut*

*Not available for HAS-V-36 and HAS-V-36 HDG.



Straight, or flat cut

In the US:
Hilti, Inc.
7250 Dallas Parkway, Suite 1000, Dallas, TX 75024
Customer Service: 1-800-879-8000
en español: 1-800-879-5000
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www.hilti.com

In Canada:
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2201 Bristol Circle
Oakville ON | L6H 0J8
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Customer Service: 1-800-363-4458
Fax: 1-800-363-4459

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The data contained in this literature was current as of the date of publication. Updates and changes may be made based on later testing. If verification is needed that the data is still current, please contact the Hilti Technical Support Specialists at 1-800-879-8000 (U.S.) or 1-800-363-4458 (Canada). All published load values contained in this literature represent the results of testing by Hilti or test organizations. Local base materials were used. Because of variations in materials, on-site testing is necessary to determine performance at any specific site.

DBS • 01/25