HFX Adhesive Anchor

Product Description

Hilti HFX is a hybrid adhesive mortar combining resin, hardener, cement and water. It's formulated for fast curing and easy installation in a wide range of concrete and masonry base materials with temperatures from 30°F (0°C) up to 110°F (43°C). HFX is styrene free and virtually odorless.

HFX adhesive anchor system is easy to use and has numerous applications. The system consists of a single self opening adhesive cartridge which fits any standard caulk gun, a mixing nozzle which comes with every cartridge and either a threaded rod, internally threaded insert or other fastening element. HFX is designed for fastenings into solid base materials such as concrete and grout-filled block and is also suitable for fastening into base materials containing voids and holes such as hollow block, lightweight hollow block, brick with holes, and clay tile when used with a screen tube.

Feature

- For use with standard caulk gun
- For many base materials
- Reusable
- Easy to use.

Benefit

- No additional equipment needed. Start working right away
- Good performance from one product for many applications
- Open cartridges may be stored for up to 4 weeks by leaving the mixer attached
- Low dispensing forces. Optional high quality Hilti MD 300 dispenser available

Fastener Components

Solid Base Materials

HAS or HIT-V Threaded Rod

HIS-N Internal Thread Insert

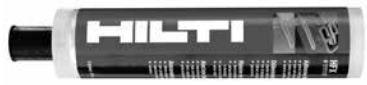
Hollow Base Materials

HAS and HIT-V Threaded Rod

HIT-IC Internal Thread Insert

Screen tube for Hollow base material

HFX-M Mixer



HFX Cartridge

MD 300 Dispenser

Standard Caulk Gun

HFX Adhesive Anchor

HIT-V carbon steel threaded rod specifications

Carbon steel rods conform to ultimate strength specifications of ASTM A307, Grade A (with the exception of elongation %), with a minimum tensile strength of 60.0 ksi (414 MPa). Minimum yield strength of 37.5 ksi (259 MPa) is based on Hilti manufacturing specifications since ASTM A307, Grade A does not have a specified yield strength.

HIT-V nuts conform to SAE J995 Grade 5.

HIT-V washers conform to ASTM F884, HV, and ANSI B18.22.1 Type A plain.

HIT-V rod, nut and washer has an electroplated zinc coating conforming to ASTM B633, SC1.

HAS-E carbon steel threaded rod specifications

Carbon steel rods conform to ISO 898 class 5.8 (with the exception of elongation %) with a minimum tensile strength of 72.5 ksi (500 MPa) and a minimum yield strength of 58 ksi (400 MPa).

HAS-E nuts conform to SAE J995 Grade 5.

HAS-E washers conform to ASTM F884, HV, and ANSI B18.22.1 Type A plain.

HAS-E rod, nut and washer has an electroplated zinc coating conforming to ASTM B633, SC1.

HAS-E B7 high strength threaded rod specifications

Carbon steel rods manufactured from ASTM A193, Grade B7, with a minimum tensile strength of 125 ksi (862 MPa) and a minimum yield strength of 105 ksi (724 MPa).

HAS-E B7 nuts conform to SAE J995 Grade 5.

HAS-E B7 washers conform to ASTM F884, HV, and ANSI B18.22.1 Type A plain.

HAS-E B7 rods, nuts and washers, except the 7/8-in. diameter, have an electroplated zinc coating conforming to ASTM B633, SC1.

HAS-R 304 stainless steel threaded rod specifications

3/8-, 1/2- and 5/8-in. rods manufactured from AISI Type 304 stainless steel conforming to ASTM F593 Condition CW with a minimum tensile strength of 100 ksi (689 MPa) and a minimum yield strength of 65 ksi (448 MPa).

AISI Type 304 stainless steel nuts conform to ASTM F594.

AISI Type 304 stainless steel washers conform to ASTM A240 and ANSI B18.22.1 Type A plain.

HAS-R 316 stainless steel threaded rod specifications

3/8-, 1/2- and 5/8-in. rods manufactured from AISI Type 316 stainless steel with a minimum tensile strength of 100 ksi (689 MPa) and a minimum yield strength of 65 ksi (448 MPa).

AISI Type 316 stainless steel nuts conform to ASTM F594.

AISI Type 316 stainless steel washers conform to ASTM A240 and ANSI B18.22.1 Type A plain.

HIS-N internally threaded insert specifications *

3/8-in. HIS-N is manufactured from 11MnPb30+C carbon steel conforming to DIN 10277-3 with a minimum tensile strength of 71.1 ksi (490 MPa) and a minimum yield strength of 59.5 ksi (410 MPa).

1/2-, and 5/8-in. HIS-N is manufactured from 11MnPb30+C carbon steel conforming to DIN 10277-3 with a minimum tensile strength of 66.7 ksi (460 MPa) and a minimum yield strength of 54.4 ksi (375 MPa).

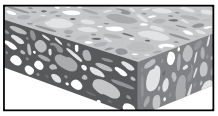
HIS-RN is manufactured from X5CrNiMo 17122 K700 stainless steel conforming to DIN EN 10088-3 with a minimum tensile strength of 101.5 ksi (700 MPa) and a minimum yield strength of 50.8 ksi (350 MPa).

HIT-IC internally threaded insert specifications *

HIT-IC is manufactured from 11MnPb30+C carbon steel conforming to DIN 10277-3 with a minimum tensile strength of 71.1 ksi (490 MPa) and a minimum yield strength of 59.5 ksi (410 MPa).

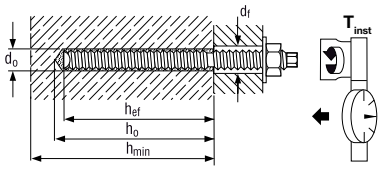
* Common threaded rods (i.e. HIT-V or HAS), or bolts, screw caps, and studs conforming to SAE J995, ASTM A563 C, C3, D, DH, DH3 heavy hex, and ASTM F594, can be used with internally threaded inserts

HFX Adhesive Anchor

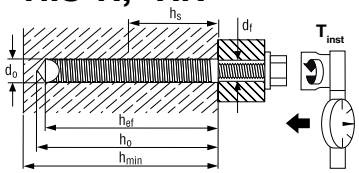


Hilti HFX in concrete

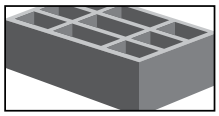
HAS / HIT-V



HIS-N, -RN

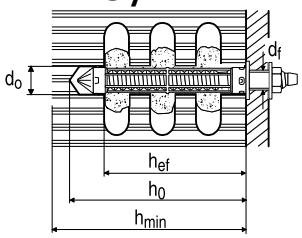


Setting Details		HAS / HIT-V rod			HIS-N insert		
Details \ Anchor Size	in.	3/8	1/2	5/8	3/8	1/2	5/8
d_o: Bit diameter	in.	7/16	9/16	11/16	11/16	7/8	1-1/8
h_0: Min. depth of hole	in.	3-3/4	4-1/2	5-1/8	4-1/2	5-1/8	7
	(mm)	(95)	(115)	(130)	(115)	(130)	(180)
h_{ef}: Nominal anchoring depth	in.	3-1/2	4-1/4	5	4-1/4	5	6-5/8
	(mm)	(90)	(110)	(125)	(110)	(125)	(170)
h_{min}: Min. base material thickness (@ std. embed.)	in.	4-3/4	5-1/2	6-3/4	4-3/4	5-1/2	6-3/4
	(mm)	(120)	(140)	(170)	(140)	(170)	(220)
T_{inst}: Installation torque	ft-lb	15	30	45	15	30	45
	(Nm)	(20)	(40)	(60)	(20)	(40)	(60)
h_s: Unseable thread length	in.	-	-	-	3/8 to 1	1/2 to 1-1/8	5/8 to 1-1/2
	(mm)				(10 to 25)	(12 to 30)	(16 to 40)
Approximate filling volume by dispensing scale at cartridge	units	1	2.5	4	2	3	8
Approximate fastenings per cartridge	#	45	18	11	23	15	6



Hilti HFX in hollow block, brick with holes, and clay tile

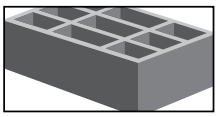
HAS / HIT-V



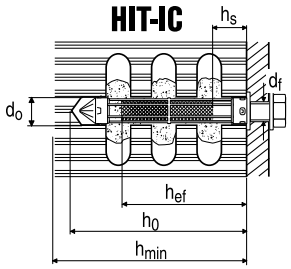
Setting Details		HAS / HIT-V rod						
		Rod Tile	Hollow and Lightweight Block			Brick w/ holes, Clay Tile		
Details \ Anchor Size	in.	1/4 x 2-1/2	5/16 x 2-1/2	3/8 x 3	1/2 x 3-1/8	5/16 x 4	3/8 x 4-3/8	1/2 x 4-1/2
	(mm)	(6.4 x 64)	(7.9 x 64)	(9.5 x 75)	(12.7 x 80)	(7.9 x 100)	(9.5 x 110)	(12.7 x 115)
d_{bt}: bit diameter	in.	1/2	5/8		11/16	5/8		11/16
h_0: Min. depth of hole	in.	2-3/8 [A]	2-3/8 [A]			3-3/4		
	(mm)	(60)	(60)			(95)		
h_{min}: Min. base material thickness	in.	3-1/2	3-1/2			5		
	(mm)	(90)	(90)			(125)		
h_{ef}: Nominal anchoring depth	in.	2	2			3-1/8		
	(mm)	(50)	(50)			(80)		
Required screen tube		HIT-SC 12x50	HIT-SC 16x50		HIT-SC 18x50	HIT-SC 16x85		HIT-SC 18x85
t: Max. thickness fastened	in.	1/4	1/4	5/8	3/4	5/8	3/4	3/4
	(mm)	(6)	(6)	(16)	(19)	(16)	(19)	(19)
T_{inst}: Installation torque	ft-lb	Finger tight	2.2	3	4.5	2.2	3	4.5
	(Nm)		(3)	(4.5)	(6)	(3)	(4)	(6)
Approximate filling volume by dispensing scale at cartridge	units	2		3			6	
Approximate fastenings per cartridge	#	23	15			7		

A Bore hole must extend through face of base material

HFX Adhesive Anchor



Hilti HFX in hollow block, brick with holes, and clay tile



Setting Details		HIT-IC insert						
		Tile	Hollow and Lightweight Block			Brick w/ holes, Clay Tile		
Anchor Size / Details	in.	#14 screw	5/16 x 2	3/8 x 2	1/2 x 2	5/16 x 3-3/16	3/8 x 3-3/16	1/2 x 3-3/16
	(mm)		(7.9 x 50)	(9.5 x 50)	(12.7 x 50)	(7.9 x 80)	(9.5 x 80)	(12.7 x 80)
d_{0t}: bit diameter	in.	1/2	5/8	7/8		5/8	7/8	
h_0: Min. depth of hole	in.	2-3/8 [A]	2-3/8 [A]			3-3/4		
	(mm)	(60)	(60)			(95)		
h_{min}: Min. base material thickness	in.	3-1/2	3-1/2			5		
	(mm)	(90)	(90)			(125)		
h_{ef}: Nominal anchoring depth	in.	2	2			3-1/8		
	(mm)	(50)	(50)			(80)		
Required screen tube		HIT-S12/I	HIT-SC 16x50	HIT-SC 22x50		HIT-SC 16x85	HIT-SC 22x50	
h_s: Unseable thread length	in.	1/2 to 1-1/2	3/8 to 1-1/2			3/8 to 3		
	(mm)	(10 to 35)	(10 to 35)			(10 to 75)		
T_{inst}: Installation torque	ft-lb	Finger tight	2.2	3	4.5	2.2	3	4.5
	(Nm)		(3)	(4)	(6)	(3)	(4)	(6)
Approximate filling volume by dispensing scale at cartridge	units	2	3	4		6	8	
Approximate fastenings per cartridge	#	23	15	11		7	6	

A Bore hole must extend through face of base material

Allowable Steel Strength for Hilti HIT-V and HAS Threaded Rods [1]

Nominal Anchor Diameter in.	HIT-V ASTM A307 Grade A [2]		HAS-E ISO 898 Class 5.8 [2]		HAS-E B7 ASTM A193 B7		HAS-R Stainless Steel ASTM F 593 - AISI 304/316 SS	
	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)
3/8	2,185 (9.7)	1,125 (5.0)	2,640 (11.7)	1,360 (6.0)	4,555 (20.3)	2,345 (10.4)	3,645 (16.2)	1,875 (8.3)
1/2	3,885 (17.3)	2,000 (8.9)	4,700 (20.9)	2,420 (10.8)	8,100 (36.0)	4,170 (18.5)	6,480 (28.8)	3,335 (14.8)
5/8	6,075 (27.0)	3,130 (13.9)	7,340 (32.6)	3,780 (16.8)	12,655 (56.3)	6,520 (29.0)	10,125 (45.0)	5,215 (23.2)

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 HIT-V and HAS-E do not comply with % elongation requirements of ASTM A 307 Grade A and ISO 898-1 specifications and are considered a brittle element.

HFX Allowable and Ultimate Bond/Concrete Capacity for HAS / HIT-V Threaded Rods in Normal Weight Concrete [1,2,3,4]

Nominal Anchor Diameter in	Embedment Depth in (mm)	HFX Allowable Bond/Concrete Capacity				HFX Ultimate Bond/Concrete Capacity			
		Tensile		Shear		Tensile		Shear	
		fc = 2000 psi (13.8 MPa) lb (kN)	fc = 4000 psi (27.6 MPa) lb (kN)	fc = 2000 psi (13.8 MPa) lb (kN)	fc = 4000 psi (27.6 MPa) lb (kN)	fc = 2000 psi (13.8 MPa) lb (kN)	fc = 4000 psi (27.6 MPa) lb (kN)	fc = 2000 psi (13.8 MPa) lb (kN)	fc = 4000 psi (27.6 MPa) lb (kN)
3/8	3-3/8 (86)	1,585 (7.1)	2,290 (10.2)	1,775 (7.9)	2,510 (11.2)	6,340 (28.2)	9,160 (40.7)	7,100 (31.6)	10,040 (44.7)
1/2	4-1/2 (114)	3,000 (13.3)	3,735 (16.6)	3,155 (14.0)	4,465 (19.9)	12,000 (53.4)	14,940 (66.5)	12,620 (56.1)	17,860 (79.4)
5/8	5-5/8 (143)	4,465 (19.9)	6,310 (28.1)	4,930 (21.9)	6,970 (31.0)	17,860 (79.4)	25,240 (112.3)	19,720 (87.7)	27,880 (124.0)

1 Use lower value of either bond/concrete capacity or steel strength of bolt used.
2 Minimum anchor spacing, s_{min} = 3 x h_{ef}. Minimum edge distance, c_{min} = 2 x h_{ef}. h_{ef} is the anchor embedment depth.
3 All values based on holes drilled with a carbide bit and cleaned with a wire bush according to installation instructions provided with the product.
4 Allowable loads are based on a safety factor of 4 from the average ultimate test loads.

HFX Allowable and Ultimate Bond/Concrete Capacity for HIS-N Carbon Steel and HIS-RN Stainless Steel Internally Threaded Inserts [1,2,3,4]

Internal Thread Size in	Embedment Depth in (mm)	HFX Allowable Bond/Concrete Capacity f'c > 2000 psi (13.8 MPa)		HFX Ultimate Bond/Concrete Capacity f'c > 2000 psi (13.8 MPa)	
		Tensile[2] lb (kN)	Shear[2] lb (kN)	Tensile lb (kN)	Shear lb (kN)
3/8 -16 UNC	4-1/4 (108)	2,155 (12.8)	1,205 (7.1)	8,620 (51.1)	4,820 (28.6)
1/2 -13 UNC	5 (127)	3,670 (21.8)	2,280 (13.5)	14,680 (87.1)	9,130 (54.1)
5/8 -11 UNC	6-5/8 (168)	5,575 (33.1)	3,430 (20.4)	22,290 (132.2)	13,735 (81.4)

1 Use lower value of either bond/concrete capacity or steel strength of bolt used.
2 Minimum anchor spacing, s_{min} = 3 x h_{ef}. Minimum edge distance, c_{min} = 2 x h_{ef}. h_{ef} is the anchor embedment depth.
3 All values based on holes drilled with a carbide bit and cleaned with a wire bush according to installation instructions provided with the product.
4 Allowable loads are based on a safety factor of 4 from the average ultimate test loads.

HFX Allowable and Ultimate Bond/Concrete Capacity for HAS / HIT-V Threaded Rods installed in Lightweight Concrete > 3000 psi (20.7 MPa) [1,2,3,4]

Nominal Anchor Diameter in	Embedment Depth in (mm)	Allowable Bond/Concrete Capacity lb (kN)		Ultimate Bond/Concrete Capacity lb (kN)	
		Tensile	Shear	Tensile	Shear
3/8	3-3/8 (86)	1,660 (7.4)	1,195 (5.3)	6,630 (29.5)	4,770 (21.2)
1/2	4-1/2 (114)	2,860 (12.7)	1,830 (8.1)	11,445 (50.9)	7,320 (32.6)
5/8	5-5/8 (143)	3,490 (15.5)	3,565 (15.9)	13,965 (62.1)	14,265 (63.5)

1 Use lower value of either bond/concrete capacity or steel strength of bolt used.
2 Minimum anchor spacing, s_{min} = 3 x h_{ef}. Minimum edge distance, c_{min} = 2 x h_{ef}. h_{ef} is the anchor embedment depth.
3 All values based on holes drilled with a carbide bit and cleaned with a wire bush according to installation instructions provided with the product.
4 Allowable loads are based on a safety factor of 4 from the average ultimate test loads.

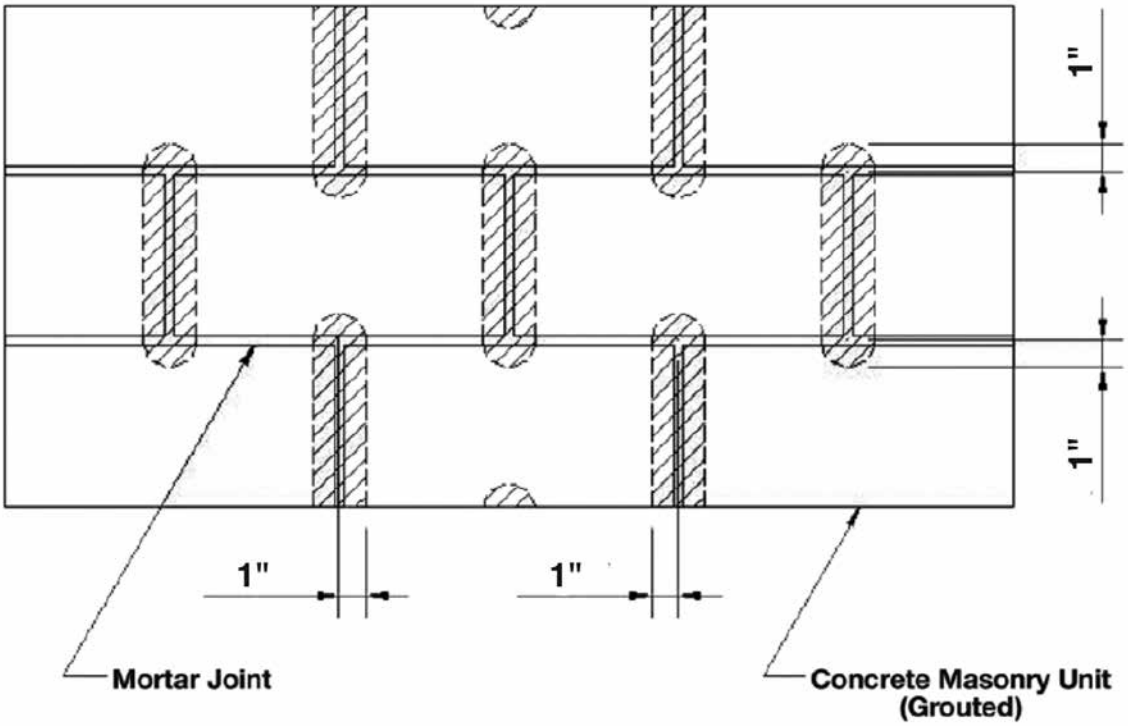
HFX Adhesive Anchor

HFX Allowable Loads for Threaded Rods in Grout-Filled Concrete Masonry Units (ASTM C 90 Block) [1,2,3,4,5,6]

Nominal Anchor Diameter in	Embedment Depth in (mm)	Distance from Edge		Allowable Bond/CMU block Capacity				HFX Ultimate Bond/CMU block Capacity			
				Tension		Shear		Tension		Shear	
		in	(mm)	lb	(kN)	lb	(kN)	lb	(kN)	lb	(kN)
3/8	3-3/8	4	(101.6)	825	(3.7)	1,065	(4.7)	3,300	(14.7)	4,255	(18.9)
	(86)	≥20	(508)	890	(4.0)	1,065	(4.7)	3,565	(15.8)	4,255	(18.9)
1/2	4-1/2	4	(101.6)	990	(4.4)	1,635	(7.3)	3,955	(17.6)	6,545	(29.1)
	(108)	≥20	(508)	1,185	(5.3)	1,755	(7.8)	4,745	(21.1)	7,015	(31.2)
5/8	5-5/8	4	(101.6)	1,285	(5.7)	1,990	(8.8)	5,140	(22.9)	7,950	(35.4)
	(143)	≥20	(508)	1,735	(7.7)	2,430	(10.8)	6,940	(30.9)	9,715	(43.2)

1 Values are for lightweight, medium weight or normal weight concrete masonry units conforming to ASTM C 90 with 2000 psi grout conforming to ASTM C 476
2 Embedment depth is measured from the outside face of the concrete masonry unit.
3 See figure below for permissible locations to install anchors in the face of grout-filled CMU blocks.
4 Values for edge distance between 4 inches and 20 inches can be calculated by linear interpolation.
5 Allowable loads are based on a safety factor of 4 applied to the average ultimate test loads.
6 Use lower value of either bond/CMU block capacity or steel strength of bolt used.

Figure 1 — Locations for HFX in Grout-Filled CMU (Anchor Installation is Restricted to Non-Shaded Area)



HFX Allowable Loads for HAS / HIT-V Threaded Rods in Hollow Concrete Masonry Units, Brick with Holes, Clay Tile [1,2,4]

Anchor Type	Nominal Anchor Diameter in	HAS/HIT-V Short 2-in (51 mm) Embedment		HAS/HIT-V Standard 3-3/8-in (86 mm) Embedment			
		L/W or N/W Hollow Concrete Block		Brick with Holes		Clay Tile	
		Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
HAS / HIT-V Rod	1/4[3]	190 (0.8)	340 (1.5)	365 (1.6)	305 (1.4)	130 (0.6)	100 (0.4)
	5/16	275 (1.2)	505 (2.2)	565 (2.5)	530 (2.4)	150 (0.7)	220 (1.0)
	3/8	290 (1.3)	790 (3.5)	775 (3.4)	930 (4.1)	150 (0.7)	220 (1.0)
	1/2	290 (1.3)	790 (3.5)	775 (3.4)	1,375 (6.1)	150 (0.7)	500 (2.2)

1 Based on using a safety factor of 6 for tension and 4 for shear applied to the average ultimate test loads.
2 Values are for lightweight, medium weight or normal weight concrete masonry units conforming to ASTM C 90. Due to wide strength variations encountered in brick with holes and clay tile, these values should be considered as guide values.
3 1/4" anchor diameter installed at 2-inch embedment in brick with holes and clay tile.
4 See figure below for permitted anchor spacing and edge distance for hollow conditions.

HFX Allowable Loads for HIT-IC Internally Threaded Insert in Hollow Concrete Masonry Units, Brick with Holes, Clay Tile [1,2,4]

Anchor Type	Internal screw/thread size in	HAS/HIT-V Short 2-in (51 mm) Embedment		HAS/HIT-V Standard 3-3/8-in (86 mm) Embedment			
		L/W or N/W Hollow Concrete Block		Brick with Holes		Clay Tile	
		Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
HIT-IC Insert	No. 14 screw w/ insert [3]	180 (.8)	510 (2.3)	300 (1.3)	530 (2.4)	85 (0.4)	150 (0.7)
	5/16	300 (1.3)	635 (2.8)	585 (2.6)	750 (3.3)	175 (0.8)	220 (1.0)
	3/8	300 (1.3)	900 (4.0)	1160 (5.2)	1380 (6.1)	185 (0.8)	435 (1.9)
	1/2	300 (1.3)	900 (4.0)	1160 (5.2)	1635 (7.3)	185 (0.8)	500 (2.2)

1 Based on using a safety factor of 6 for tension and 4 for shear applied to the average ultimate test loads.
2 Values are for lightweight, medium weight or normal weight concrete masonry units conforming to ASTM C 90. Due to wide strength variations encountered in brick with holes and clay tile, these values should be considered as guide values.
3 1/4" anchor diameter installed at 2-inch embedment in brick with holes and clay tile.
4 See figure below for permitted anchor spacing and edge distance for hollow conditions.

Brick with Holes

Spacing:

$s_{cr} = s_{min}$ = 8-inches

Edge Distance:

$c_{cr} = c_{min}$ = 12-inches

Clay Tile

Spacing:

$s_{cr} = s_{min}$ = One (1) anchor per tile cell
8-inches min.

Edge Distance:

$c_{cr} = c_{min}$ = 12-inches (305 mm) from free edge

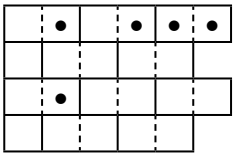
Hollow, normal weight and lightweight concrete block

Spacing:

$s_{cr} = s_{min}$ = One (1) anchor per block cell
8-inches min.

Edge Distance:

$c_{cr} = c_{min}$ = 12-inches (305 mm) min. from free edge



Wall Elevation