MECHANICAL ANCHORS

Tapper *Concrete Scew Anchor*

Type 410 & 304 Stainless Steel

PRODUCT DESCRIPTION

The Tapper fastening system is a family of screw anchors for light to medium duty applications in concrete, masonry block and brick base materials. The Tapper is fast and easy to install and provides a neat, finished appearance. The Tapper screw anchor is engineered with matched tolerance drill bits and installation tools designed to meet the needs of the user and also provide optimum performance.

For every project, it is important to consider several things before making a selection: The proper head style, the color or finish that is desired, and the required level of corrosion resistance. The Tapper screw anchor is available in 410 and 304 stainless steels. Head styles include a hex head and Phillips flat head.

GENERAL APPLICATIONS AND USES

410 Stainless Steel Tappers

- Screen Enclosures
- Exterior Metal Lighting or Fixtures
- Storm Shutters
- Light Duty Industrial Applications

304 Stainless Steel Tappers

- Exterior Applications
- Marine Applications
- Food and Beverage Facilities
- Waste and Water Treatment Plants

FEATURES AND BENEFITS

+ Consistent performance in high and low strength concrete
+ Nominal drill bit size is the same as the anchor diameter
+ Anchor can be installed through standard fixture holes
+ Length ID code and identifying marking stamped on head of each anchor
+ Anchor design allows for follow-up expansion after setting under tensile loading

APPROVALS AND LISTINGS

Miami Dade County Notice of Acceptance (NOA) 09-0714.04

GUIDE SPECIFICATIONS

CSI Divisions: *03151 - Concrete Anchoring, 04081 - Masonry Anchorage and 05090 - Metal Fastenings.* Concrete Screw Anchors shall be Tapper as supplied by Powers Fasteners, Inc., Brewster, NY.

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410 Stainless Steel

304 Stainless Steel

ANCHOR MATERIALS

Type 410 Stainless Steel
Type 304 Stainless Steel

ANCHOR SIZE RANGE (TYP.)

3/16" diameter x 1-1/4" to 2-3/4" length
1/4" diameter x 1-1/4" to 6" length

SUITABLE BASE MATERIALS

Normal-Weight Concrete
Structural Lightweight Concrete
Hollow Concrete Masonry (CMU
Solid Brick Masonry

INSTALLATION SPECIFICATIONS

304 Stainless Steel Tapper

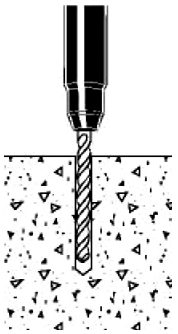
Dimension	Anchor Diameter, d	
	1/4" HEX	1/4" PFH
Tapper Drill Bit Size, d_{bit} (in.)	3/16	3/16
Fixture Clearance Hole, d_h (in.)	5/16	5/16
Thread Size (UNC)	1/4-14	1/4-14
Head Height (in.)	9/64	3/16
Head Width (in.)	5/16	1/2 O.D.
Washer O.D., d_w (in.)	13/32	N/A
Washer Thickness, (in.)	1/32	N/A
Hex Driver (in.) / Phillips Driver	3/8	#3

410 Stainless Steel Tapper

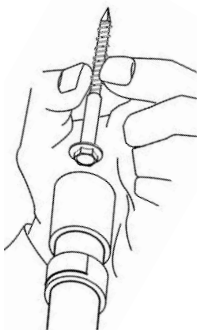
Dimension	Anchor Diameter, *d*	
	1/4" HEX	1/4" PFH
Tapper Drill Bit Size, d_{bit} (in.)	3/16	3/16
Fixture Clearance Hole, d_h (in.)	5/16	5/16
Thread Size (UNC)	1/4-14	1/4-14
Head Height (in.)	9/64	3/16
Head Width (in.)	5/16	1/2 O.D.
Washer O.D., d_w (in.)	13/32	N/A
Washer Thickness, (in.)	1/32	N/A
Hex Driver (in.) / Phillips Driver	3/8	#3

Installation Procedure

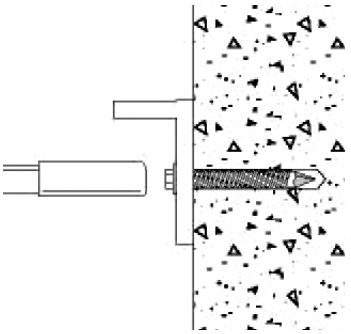
Using the proper diameter bit, drill a hole into the base material to a depth of at least 1/4" deeper than the embedment required. The Tapper drill bit must be used. Blow the hole clean of dust and other material.



Select the Tapper installation tool and drive socket to be used. Insert the head of the Tapper into the hex head socket or Phillips head driver. Set the drill motor to the "rotation only" mode.



Place the point of the Tapper through the fixture into the pre-drilled hole and drive the anchor in one steady continuous motion until it is fully seated at the proper embedment. The driver will automatically disengage from the head of the Tapper.



MATERIAL SPECIFICATIONS

Anchor Component	304 Stainless Steel	410 Stainless Steel
Anchor Body	Type 304 Stainless Steel	Type 410 Stainless Steel
Coating/Plating/Finish	Passivated	Class 4 Sealcoat (1500 hour rating for ASTM B salt test undamaged coating reference). For consideration for exterior applications please contact Powers Fasteners.

PERFORMANCE DATA

Ultimate Load Capacities for Stainless Steel Tapper Screw Anchor in Normal-Weight Concrete[1,2]

Nominal Anchor Diameter d in. (mm)	Anchor Material	Minimum Embedment Depth h_v in. (mm)	Minimum Concrete Compressive Strength							
			f'c = 2,500 psi (17.3 MPa)		f'c = 3,000 psi (20.7 MPa)		f'c = 4,000 psi (27.6 MPa)		f'c = 6,000 psi (41.4 MPa)	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	Type 304 Stainless Steel	1	500 (2.3)	1,180 (5.3)	600 (2.7)	1,180 (5.3)	700 (3.2)	1,180 (5.3)	700 (3.2)	1,180 (5.3)
		1-1/4 (31.8)	855 (3.8)	1,265 (5.7)	855 (3.8)	1,265 (5.7)	1,015 (4.6)	1,340 (6.0)	1,320 (5.9)	1,340 (7.4)
		1-1/2 (31.8)	1,140 (5.1)	1,340 (6.0)	1,220 (5.5)	1,340 (6.0)	1,340 (6.0)	1,320 (5.9)	1,580 (7.1)	1,340 (7.4)
		1-3/4 (44.5)	1,140 (5.1)	1,640 (7.4)	1,520 (6.8)	1,640 (7.4)	1,580 (7.1)	1,640 (7.4)	1,580 (7.1)	1,640 (7.4)
3/16 (4.7)	Type 410 Stainless Steel	7/8	-	-	220 (1.0)	865 (3.8)	250 (1.1)	1,000 (4.4)	-	-
		1-1/4 (38.1)	-	-	465 (2.0)	1,115 (5.0)	540 (2.9)	1,285 (5.7)	-	-
1/4 (6.4)		1-1/2	-	-	2,160 (9.7)	2,420 (10.9)	2,160 (9.7)	2,420 (10.9)	2,160 (9.7)	2,420 (10.9)

1. Tabulated load values are for anchors installed in concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
2. Ultimate load capacities must be reduced by a minimum safety factor of 4.0 or greater to determine allowable working load. Consideration of safety factors of 10 or higher may be necessary depending upon the application such as life safety or overhead.

Allowable Load Capacities for Stainless Steel Tapper Screw Anchor in Normal-Weight Concrete[1,2,]

Nominal Anchor Diameter d in. (mm)	Anchor Material	Minimum Embedment Depth h_v in. (mm)	Minimum Concrete Compressive Strength							
			f'c = 2,500 psi (17.3 MPa)		f'c = 3,000 psi (20.7 MPa)		f'c = 4,000 psi (27.6 MPa)		f'c = 6,000 psi (41.4 MPa)	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	Type 304 Stainless Steel	1	125 (0.6)	295 (1.3)	150 (0.7)	295 (1.3)	175 (0.8)	295 (1.3)	175 (0.8)	1,180 (5.3)
		1-1/4 (31.8)	215 (1.0)	315 (1.4)	215 (1.0)	315 (1.4)	255 (1.1)	335 (1.5)	305 (1.4)	1,340 (7.4)
		1-1/2 (31.8)	285 (1.3)	335 (1.5)	305 (1.4)	335 (1.5)	330 (1.5)	335 (1.5)	330 (1.5)	1,340 (7.4)
		1-3/4 (44.5)	360 (1.6)	1,640 (1.5)	380 (1.7)	410 (1.8)	395 (1.8)	410 (1.8)	395 (1.8)	1,640 (7.4)
3/16 (4.7)	Type 410 Stainless Steel	7/8	-	-	55 (0.25)	215 (0.9)	64 (0.3)	250 (1.1)	-	-
		1-1/4 (38.1)	-	-	115 (0.5)	280 (1.3)	135 (0.6)	320 (1.4)	-	-
1/4 (6.4)		1-1/2	-	-	540 (2.4)	605 (2.7)	540 (2.4)	605 (2.7)	540 (2.4)	605 (2.7)

1. Allowable load capacities listed are calculated using and applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
2. Critical and minimum spacing and edge distances as well as reduction factors for intermediate spacing and edge distances are listed in Design Criteria section.

PERFORMANCE DATA

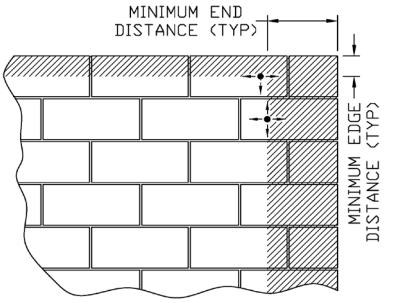
Ultimate and Allowable Load Capacities for Tapper Screw Anchor in Structural Lightweight Concrete[1,2,3]

Nominal Anchor Diameter d in. (mm)	Anchor Material	Minimum Embedment Depth h_v in. (mm)	Tension, lbs (kN)						Shear, lbs (kN)	
			Minimum Concrete Compressive Strength (f'_c)							
			3,000 psi (20.7 MPa)		4,000 psi (27.6 MPa)		5,000 psi (34.5 MPa)		$f'_c \geq 3{,}000$ psi (20.7 MPa)	
			Ultimate Load	Allowable Load	Ultimate Load	Allowable Load	Ultimate Load	Allowable Load	Ultimate Load	Allowable Load
1/4 (6.4)	Type 304 Stainless Steel	1-1/2 (38.1)	270 (1.2)	70 (0.3)	300 (1.4)	75 (0.3)	325 (1.5)	80 (0.4)	520 (2.3)	130 (0.6)

1. Tabulated load values are for anchors installed in structuarl sand-lightweight concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
2. Allowable load capacities listed are calculated using and applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending upon the application such as life safety or overhead.
3. Linear interpolation may be used to determine allowable loads for intermediate compressive strengths.

Allowable Load Capacities for Tapper Screw Anchor in Hollow Block[1,2,3,4,5]

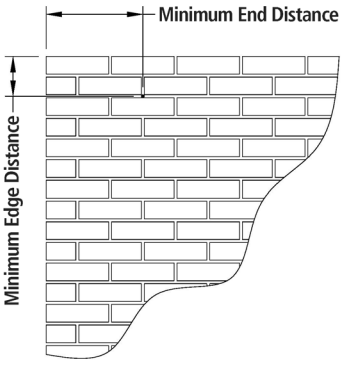
Nominal Anchor Diameter d in. (mm)	Anchor Material	Minimum Embedment Depth h_v in. (mm)	Lightweight, Medium & Normal Weight CMU	
			$f'_c \geq 3{,}000$ psi (13.8 MPa)	
			Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	Type 410 Stainless Steel	1 (25.4)	140 (0.6)	210 (0.9)
	Type 304 and Type 410 Stainless Steel	1-1/4 (31.8)	120 (0.5)	205 (0.9)
		1-1/2 (38.1)	145 (0.7)	245 (1.1)
		1-3/4 (44.5)	145 (0.7)	245 (1.1)



1. Tabulated load values are for anchors installed in minimum 6-inch wide, minimum Grade N, Type II, lightweight, medium-weight or normal-weight concrete masonry units conforming to ASTM C 90. Mortar must be minimum Type N. Masonry compressive strength must be at the specified minimum at the time of installation ($f'm \geq 2{,}000$ psi).
2. Allowable load capacities listed are calculated using an applied safety factor of 5.0.
3. The tabulated values are applicable for screw anchors installed at a critical spacing between screw anchors of 16 times the screw anchor diameter. The screw anchors may be reduced to a minimum spacing distance of 8 times the screw diameter provided the allowable loads are reduced by 70 percent. Linear interpolation for allowable loads may be used for intermediate spacing distances.
4. The tabulated values are applicable for screw anchors installed at a minimum edge distance of 12 times the screw anchor diameter unless otherwise noted.
5. The tabulated values are applicable for installations into the face shell of the masonry member. The face shell thickness must be able to accomodate the specified embedment depth. Masonry cells may be grouted.

Allowable Load Capacities for Tapper Screw Anchor in BrickMasonry[1,2,3,4,5]

Nominal Anchor Diameter d in. (mm)	Anchor Material	Minimum Embedment Depth h_v in. (mm)	Brick Masonry	
			$f'_c \geq 1{,}300$ psi (9.0 MPa)	
			Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	Type 410 Stainless Steel	1 (25.4)	145 (0.6)	288 (1.3)
	Type 304 and Type 410 Stainless Steel	1-1/4 (31.8)	160 (0.7)	330 (1.5)
		1-1/2 (38.1)	190 (0.9)	345 (1.6)
		1-3/4 (44.5)	190 (0.9)	345 (1.6)



1. Tabulated load values are for anchors installed in multiple wythe, minimum Grade SW, solid clay brick masonry walls conforming to ASTM C 62. Mortar must be minimum Type N. Masonry compressive strength must be at the specified minimum at the time of installation ($f'm \geq 1{,}300$ psi).
2. Allowable load capacities are calculated using an applied safety factor of 5.0.
3. Linear interpolation may be used to determine allowable load capacities for intermediate embedments.
4. The tabulated values are for anchors installed at a minimum edge and end distance of 4 inches.
5. The tabulated values are for anchors installed at a minimum of 12 anchor diameters on center for 100 percent capacity. Spacing distances may be reduced to 6 anchor diameters on center provided the capacities are reduced by 50 percent. Linear interpolation may be used for intermediate spacing distances.

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DESIGN CRITERIA

Combined Loading

For anchors loaded in both shear and tension, the combination of loads should be proportioned as follows:

$$\left(\frac{N_u}{N_n}\right) + \left(\frac{V_u}{V_n}\right) \leq 1$$

Where: N_u = Applied Service Tension Load
N_n = Allowable Tension Load
V_u = Applied Service Shear Load
V_n = Allowable Shear Load

Load Adjustment Factors for Spacing and Edge Distances in Normal-Weight Concrete[1]

Anchor Dimension	Load Type	Critical Distance (Full Anchor Capacity)	Critical Load Factor	Minimum Distance (Reduced Capacity)	Minimum Load Factor
Spacing (s)	Tension and Shear	s_{cr} = 12d	$F_{NS} = F_{VS} = 1.0$	s_{min} = 6d	$F_{NS} = F_{VS} = 0.50$
Edge Distance (c)	Tension and Shear	c_{cr} = 12d	$F_{NC} = F_{VC} = 1.0$	c_{min} = 6d	$F_{NC} = F_{VC} = 0.50$

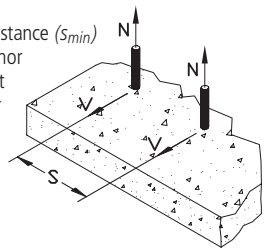
1. Load values, found in the Performance Data Tables, are multiplied by the reduction factors when spacing edge distances are less than critical distances. Linear interpolation is allowed for spacing and edge distances that fall between critical and minimum distances. When a group of anchors is affected by both reduced spacing and edge distance, the spacing and edge distance reduction factors must be combined (multiplied).

Spacing Reduction Factors -Tension (F_{NS})

Spacing, Tension (F_{NS}) & Shear (F_{VS})				
Diameter (in)		3/16	1/4	3/8
S_{cr} (in)		2-1/4	3	4-1/2
s_{min} (in)		1-1/8	1-1/2	2-1/4
Spacing, s (in.)	1-1/8	0.50	-	-
	1-1/2	0.67	0.50	-
	2	0.89	0.67	-
	2-1/4	1.00	0.75	0.50
	2-1/2	-	0.83	0.56
	3	-	1.00	0.67
	3-1/2	-	-	0.78
	4	-	-	0.89
	4-1/2	-	-	1.00

Notes: For anchors loaded in tension and shear, the critical edge distance *(s_{cr})* is equal to 12 anchor diameters (12*d*) at which the anchor achieves 100% of load.

Minimum edge distance *(s_{min})* is equal to 6 anchor diameters (6*d*) at which the anchor achieves 50% of load.

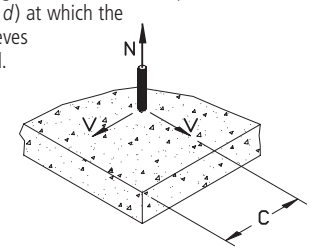


Spacing Reduction Factors -Tension (F_{NS})

Spacing, Tension (F_{NS}) & Shear (F_{VS})				
Diameter (in)		3/16	1/4	3/8
S_{cr} (in)		2-1/4	3	4-1/2
s_{min} (in)		1-1/8	1-1/2	2-1/4
Spacing, s (in.)	1-1/8	0.50	-	-
	1-1/2	0.67	0.50	-
	2	0.89	0.67	-
	2-1/4	1.00	0.75	0.50
	2-1/2	-	0.83	0.56
	3	-	1.00	0.67
	3-1/2	-	-	0.78
	4	-	-	0.89
	4-1/2	-	-	1.00

Notes: For anchors loaded in tension and shear, the critical edge distance *(c_{cr})* is equal to 12 anchor diameters (12*d*) at which the anchor achieves 100% of load.

Minimum edge distance *(c_{min})* is equal to 6 anchor diameters (6*d*) at which the anchor achieves 50% of load.



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ORDERING INFORMATION

Hex head Tapper anchors are measured from below the washer while flat head Tapper anchors are measured end to end. To select the proper minimum anchor length, determine the embedment depth required to obtain the desired load capacity. Then add the thickness of the fixture, including any spacers or shims, to the embedment depth.

Do not select a length that will result in an embedment into the base material which is greater than 1 3/4" to 2".
Most concrete screw anchors cannot be properly driven to a depth of more than 2", especially in denser base materials.

Type 304 Stainless Steel Tapper, Hex Head & Flat Head

Catalog Number		Size	Standard Box	Standard Carton	Wt./ 100	Drill Bit Reference	
HEX	PFH					Straight	SDS HEX
2880	2887	1/4" x 1-1/4"	100	500	1-1/2	2894	2790
2881	2888	1/4" x 1-3/4"	100	500	1-3/4	2894	2790
2882	2889	1/4" x 2-1/4"	100	500	2	2895	2790
2883	2890	1/4" x 2-3/4"	100	500	2-3/4	2895	2790

One drill bit is packaged in each box of Tappers.

Type 410 Stainless Steel Tapper, Hex Head & Flat Head

Catalog Number		Size	Standard Box	Standard Carton	Wt./ 100	Drill Bit Reference	
HEX	PFH					Straight	SDS HEX
4180	4185	3/16" x 1-1/4"	100	500	1-1/2	2781	2793
4181	4186	3/16" x 1-3/4"	100	500	1-3/4	2781	2793
4182	4187	3/16" x 2-1/4"	100	500	2	2782	2793
4183	4188	3/16" x 2-3/4	100	500	2-3/4	2782	2793
4110	4118	1/4" x 1-3/4"	100	500	2-3/4	2785	2796
4112	4120	1/4" x 1-3/4"	100	500	2-3/4	2785	2796
4114	4123	1/4" x 2-1/4"	100	500	2-3/4	2786	2796
4116	4124	1/4" x 2-3/4"	100	500	2-3/4	2786	2796
4117	4125	1/4" x 3-1/4"	100	500	2-3/4	2785	2796
4119	-	1/4" x 3-3/4"	100	500	2-3/4	2785	2796
4127	-	1/4" x 4"	100	500	2-3/4	2786	2797
4128	-	1/4" x 5"	100	500	2-3/4	2788	-
4129	-	1/4" x 6"	100	500	2-3/4	2788	-

One drill bit is packaged in each box of Tappers.

ORDERING INFORMATION

Carbide Drill Bits for 410 Stainless Steel Tapper
(Do not use with Type 304 Stainless Steel)

Straight Shank

Catalog Number	Size	Drill Bit Range	Usable Length	Standard Tube	Wt./ 10
2781	5/32″ x 3-1/2″	0.168″ - 0.175″	2″	10	1/4
2782	5/32″ x 4-1/2″		3″	10	1/4
2783	5/32″ x 5-1/2″		4″	10	1/4
2785	3/16″ x 3-1/2″	0.202″ - 0.204″	2″	10	1/4
2786	3/16″ x 4-1/2″		3″	10	1/4
2787	3/16″ x 5-1/2″		4	10	1/2
2788	3/16″ x 6-1/2″		5	10	1/2
2789	3/16″ x 7-1/2″		6″	10	1/2

Hex Shank SDS-Plus

Catalog Number	Size	Drill Bit Range	Usable Length	Standard Tube	Wt./ 10
2793	5/32″ x 5″	0.168″ - 0.175″	3″	1	1
2794	5/32″ x 7″		5″	1	1
2796	3/16″ x 5″	0.202″ - 0.204″	3″	1	1
2797	3/16″ x 7″		5″	1	1

Carbide Drill Bits for Type 304 Stainless Steel Tapper

Straight Shank

Catalog Number	Size	Drill Bit Range	Usable Length	Standard Tube	Wt./ 10
2894	3/16″ x 3-1/2″	0.168″ - 0.175″	3″	1	1
2797	3/16″ x 7″		5″	1	1

Hex Shank SDS-Plus

Catalog Number	Size	Drill Bit Range	Usable Length	Standard Tube	Wt./ 10
2790	3/16″ x 5″	0.215″ - 0.216″	3″	1	1

Installation Tool for 1/4″ Tapper

Catalog Number	Description	Max Screw Length	Max. Bit Length	Standard Tube	Wt./ Each
2791	Tapper 1000 Tool Kit	4″	5-1/2″	1	3/4
2795	1000 SDS Extension (8″)	6″	7-1/2″	1	1/2