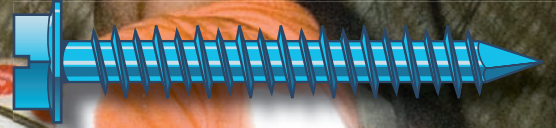


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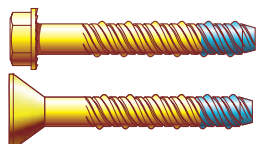
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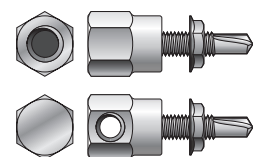
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Simple to install
Removable
Vibration resistant



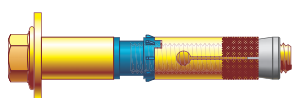
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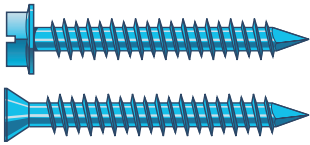
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TAPPER™

Introduction



The TAPPER Anchoring System is a family of screw anchors, specially designed drill bits, and installation tools designed to meet the needs of most light to medium duty applications in concrete, block, and brick.

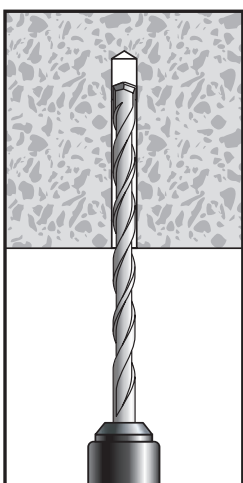
Description

The TAPPER concrete screw anchor is produced in either hex washer head or Phillips head styles from Perma-Seal® coated carbon steel. The Perma-Seal® version is available in various lengths in both 3/16" (5mm) and 1/4" (6.5mm) diameters. The anchor is fast and easy to install providing a neat, finished appearance. Suitable base materials for the TAPPER include poured concrete, brick, and concrete block for applications in new construction, remodeling, and maintenance. It is removable and re-usable in the same anchor hole. The components of the TAPPER Anchoring System include either a hex washer head or Phillips head screw anchor, a series of specially designed drill bits, and installation tools to provide a matched tolerance anchoring system. During installation, the specially designed nail point guides the anchor into a pre-drilled hole. As the anchor is driven into the hole using a TAPPER installation tool, the threads cut into the walls of the hole to provide a tight friction fit. Unlike other systems, the full size thread design at the working end of the anchor insures a positive grip, even in soft or thin walled materials.

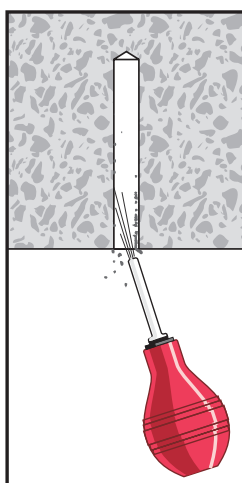
Material specifications

Anchor component	Material
Anchor body	Case hardened AISI 1022
Coating	Perma-Seal™ Fluoropolymer

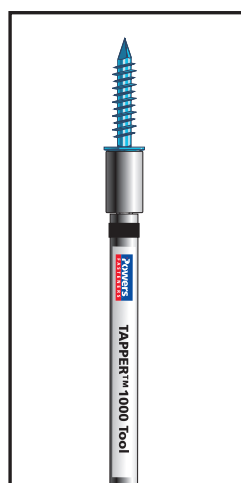
Installation procedure



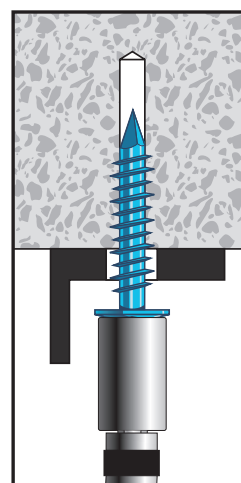
Drill a hole into the base material to a depth of at least one anchor diameter deeper than the embedment required. A TAPPER™ drill bit should be used



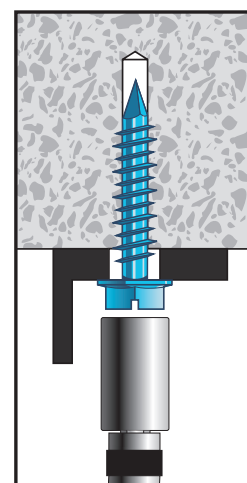
Blow the hole clean of dust and other material.



Select the TAPPER™ installation tool and drive socket to be used. Insert the TAPPER™ head into the socket or Phillips head driver



Place the point of the TAPPER™ through the fixture into the predrilled hole and drive the anchor in one steady continuous motion until it is fully seated at the proper embedment.



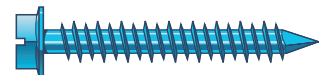
The driver will automatically disengage from the head of the TAPPER™.

Anchor sizes and styles

The following tables list the sizes and styles of standard TAPPER anchors. Hex head TAPPER anchors are measured from below the washer while flat head TAPPER anchors are measured end to end. To select the proper 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. This will be the minimum anchor length required. **Do not select a length that will result in an embedment into the base material which is greater than 45mm to 50mm. Most concrete screw anchors cannot be properly driven to a depth of more than 50mm, especially in denser base materials.**

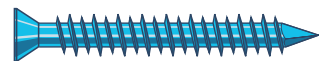
TAPPER™ Hex head

Part No	Description	Drill Ø inches	Embedment depth mm	Box qty	Carton qty
2700	3/16" x 1-1/4" (5 x 32mm)				
2702	3/16" x 1-3/4" (5 x 45mm)				
2704	3/16" x 2-1/4" (5 x 58mm)				
2706	3/16" x 2-3/4" (5 x 70mm)	5/32"	25	100	500
2708	3/16" x 3-1/4" (5 x 83mm)				
2710	3/16" x 3-3/4" (5 x 95mm)				
2712	3/16" x 4" (5 x 100mm)				
2720	1/4" x 1-1/4" (6.5 x 32mm)				
2722	1/4" x 1-3/4" (6.5 x 45mm)				
2724	1/4" x 2-1/4" (6.5 x 58mm)				
2726	1/4" x 2-3/4" (6.5 x 70mm)	3/16"	25	100	500
2728	1/4" x 3-1/4" (6.5 x 83mm)				
2730	1/4" x 3-3/4" (6.5 x 95mm)				
2732	1/4" x 4" (6.5 x 100mm)				



TAPPER™ CSK head

Part No	Description	Drill Ø inches	Embedment depth mm	Box qty	Carton qty
2740	3/16" x 1-1/4" (5 x 32mm)				
2742	3/16" x 1-3/4" (5 x 45mm)				
2744	3/16" x 2-1/4" (5 x 58mm)				
2746	3/16" x 2-3/4" (5 x 70mm)	5/32"	25	100	500
2748	3/16" x 3-1/4" (5 x 83mm)				
2750	3/16" x 3-3/4" (5 x 95mm)				
2752	3/16" x 4" (5 x 100mm)				
2760	1/4" x 1-1/4" (6.5 x 32mm)				
2762	1/4" x 1-3/4" (6.5 x 45mm)				
2764	1/4" x 2-1/4" (6.5 x 58mm)				
2766	1/4" x 2-3/4" (6.5 x 70mm)				500
2768	1/4" x 3-1/4" (6.5 x 83mm)	3/16"	25	100	
2770	1/4" x 3-3/4" (6.5 x 95mm)				
2772	1/4" x 4" (6.5 x 100mm)				
2774	1/4" x 5" (6.5 x 125mm)				100
2776	1/4" x 6" (6.5 x 150mm)				



NOTE: For very hard brickwork and concrete above 30 to 32 MPa, Powers recommend that only the 1/4" (6.5mm) Tapper Concrete Screw Anchor with a 5.5mm Tapper masonry drill bit be used.

TAPPER™ Drill bits

TAPPER Drill Bits in the diameters listed are nominal size. 3/16" and 1/4" Perma-Seal TAPPER anchors must be installed with special tolerance TAPPER drill bits.

Carbide Drill Bits for Perma-Seal® TAPPER™

Tolerance Range = 0.168" to 0.175" for the 5/32" and 0.202" to 0.204" for the 3/16" bits.

D-shank TAPPER™ Drill



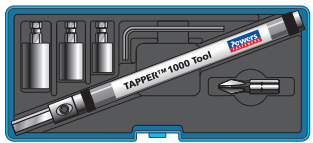
Part No	Description	Length	Box	Carton
		mm	qty	qty
2783	5/32" x 5-1/2"	100		
2789	3/16" x 7-1/2"	150	1	10

SDS-shank TAPPER™ Drill



Part No	Description	Length	Box	Carton
		mm	qty	qty
2794	5/32" x 7"	125		
2797	3/16" x 7"	125	1	N/A

TAPPER™ Installation tools



Part No	Description	Max screw length	Length	Box	Carton
		mm	mm	qty	qty
2791	TAPPER 1000 tool / 140mm	100	140		
2792	Condribe 2000 tool / 115mm	70	115	1	N/A
2795	1000 SDS Extension (200mm) / 190mm	150	190		

NOTE: For very hard brickwork and concrete above 30 to 32 MPa, Powers recommend that only the 1/4" (6.5mm) Tapper Concrete Screw Anchor with a 5.5mm Tapper masonry drill bit be used.

Installation specifications

Perma -Seal® Carbon steel hex head TAPPER™

Anchor size	3/16" (5mm)	1/4" (6.5mm)
TAPPER Drill bit size	5/32"	3/16"
Fixture clearance hole	1/4"	5/16"
Thead size	11-16	1/4-15
Head height	7/64"	9/64"
Head width	1/4"	5/16"
Washer O.D.	11/32"	13/32"
Washer thickness	1/32"	1/32"
Coating	Perma-Seal® Fluoropolymer	

Perma-Seal® Carbon steel CSK head TAPPER™

Anchor size	3/16" (5mm)	1/4" (6.5mm)
TAPPER Drill bit size	5/32"	3/16"
Fixture clearance hole	1/4"	5/16"
Thead size	11-16	1/4-15
Phillips head O.D.	3/8"	1/2"
Phillips head height	9/64"	3/16"
Phillips bit size	2	3
Coating	Perma-Seal® Fluoropolymer	

Performance data

Working stress design

Allowable working load capacities for carbon steel TAPPER™										
ANCHOR SIZE mm	DRILL SIZE mm	EMBEDMENT DEPTH mm	15 MPa concrete		32 MPa concrete		Concrete block		Red brick	
			Tension kN	Shear kN	Tension kN	Shear kN	Tension kN	Shear kN	Tension kN	Shear kN
5	5	25	0.8	1.2	0.9	1.4	0.8	1.2	0.8	1.2
		32	1.1	1.4	1.3	1.6	1.0	1.3	1.4	1.4
		38	1.3	1.5	1.5	1.6	1.2	1.4	1.6	1.6
		45	1.7	1.6	1.9	1.7	1.5	1.6	1.7	1.7
6.5	6.5	25	1.0	1.6	1.2	2.1	0.9	1.5	1.2	2.2
		32	1.4	2.1	2.0	2.7	1.1	1.6	1.5	2.3
		38	1.9	2.5	2.4	2.9	1.4	1.8	1.7	2.4
		45	2.5	2.9	2.9	3.0	1.6	2.2	1.8	2.7

NOTE: Incorporated safety factor (Tension and shear) $F_{sc} = 3$ (concrete).

Limit state design

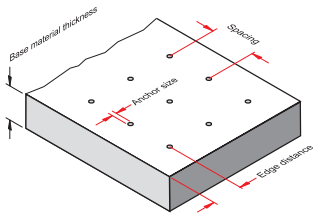
Limit state design capacities for carbon steel TAPPER™										
ANCHOR SIZE mm	DRILL SIZE mm	EMBEDMENT DEPTH mm	15 MPa concrete		32 MPa concrete		Concrete block		Red brick	
			Tension kN	Shear kN	Tension kN	Shear kN	Tension kN	Shear kN	Tension kN	Shear kN
5	5	25	1.5	2.2	1.7	2.5	1.4	2.1	1.4	2.2
		32	2.0	2.5	2.4	2.9	1.7	2.3	2.4	2.5
		38	2.3	2.7	2.8	2.9	2.2	2.6	2.8	2.8
		45	3.0	3.0	3.5	3.1	2.8	2.9	3.0	3.1
6.5	6.5	25	1.7	3.0	2.1	3.7	1.6	2.7	2.1	3.9
		32	2.5	3.7	3.5	4.9	2.0	2.9	2.7	4.2
		38	3.5	4.5	4.2	5.2	2.5	3.3	3.0	4.4
		45	4.4	5.2	5.3	5.5	3.0	4.0	3.3	4.8

NOTE: Incorporated strength reduction factor (Tension and shear) $\phi = 0.6$

Design criteria

Base material thickness

The minimum recommended thickness of base material, BMT, when using the TAPPER™ is 125% of the embedment to be used for solid materials. For example, when installing an anchor to a depth of 40mm, the base material thickness should be 50mm. This does not apply to the face shell or block wall.



Spacing between anchors

To obtain the maximum load in tension or shear, a spacing, S, of 10 anchor diameters (10d) should be used. The minimum recommended anchor spacing, S, is 5 anchor diameters (5d) at which point the load should be reduced by 50%. The following table lists the load reduction factor, Rs, for each anchor diameter, d, based on the center to center anchor spacing.

ANCHOR SIZE Ø	Spacing distance, S (mm) Tension and Shear					
	10d	9d	8d	7d	6d	5d
3/16" (5mm)	50	45	40	35	30	25
1/4" (6.5mm)	65	58.5	52	45.5	39	32.5
Rs	1.00	0.90	0.80	0.70	0.60	0.50

Edge distance – Tension

An edge distance, E, of 10 anchor diameters (10d) should be used to obtain the maximum tension load. The minimum recommended edge distance, E, is 3 anchor diameters (3d) at which point the tension load should be reduced by 28%. The following table lists the load reduction factor, Re, for each anchor diameter, d, based on the anchor centre to edge distance.

ANCHOR SIZE Ø	Edge distance, E (mm) Tension only							
	10d	9d	8d	7d	6d	5d	4d	3d
3/16" (5mm)	50	45	40	35	30	25	20	15
1/4" (6.5mm)	65	58.5	52	45.5	39	32.5	26	19.5
Re(t)	1.0	0.96	0.92	0.88	0.84	0.80	0.76	0.72

Edge distance – Shear

For shear loads, an edge distance, E, of 10 anchor diameters (10d) should be used to obtain the maximum load. The minimum recommended edge distance, E, is 3 anchor diameters (3d) at which point the shear load should be reduced by 84%. The following table lists the load reduction factor, Re, for each anchor diameter, d, based on the anchor centre to edge distance.

ANCHOR SIZE Ø	Edge distance, E (mm) Tension only							
	10d	9d	8d	7d	6d	5d	4d	3d
3/16" (5mm)	50	45	40	35	30	25	20	15
1/4" (6.5mm)	65	58.5	52	45.5	39	32.5	26	19.5
Re(s)	1.00	0.88	0.76	0.64	0.52	0.40	0.28	0.16

Suggested specification

	Example
Product name	Tapper
Head style	Hex head
Part number	2730
Size	1/4" x 3/4" (6.5 x 100mm)
Embedment depth	25mm
Minimum spacing and edge distance	Spacing: 65mm, Edge distance: 60mm
	Product to be installed in accordance with published installation procedure



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