

# **PTB Through-Bolt**

**heavy duty  
one piece  
torque controlled**

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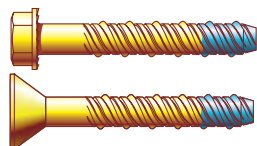
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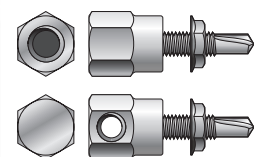
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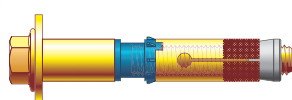
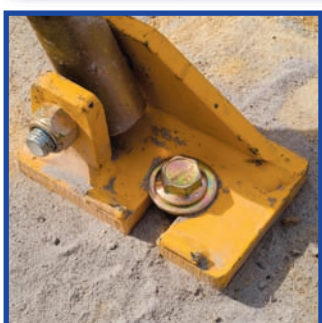
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# PTB Through-Bolt

## Introduction

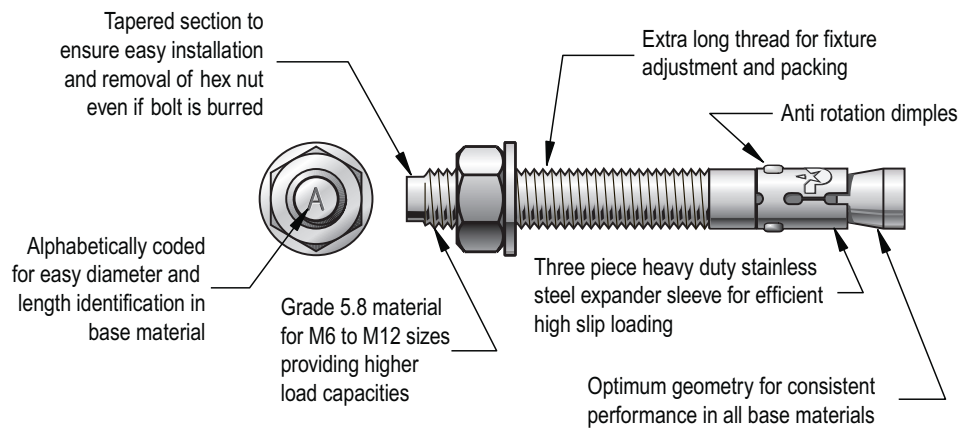


The PTB Through-Bolt anchor is a one piece, torque controlled, expansion style anchor available in carbon steel and hot dipped galvanised steel.

## Description

### PTB Through-Bolt anchor

The PTB Through-Bolt anchor diameter is the same as that of the hole size, which eliminates the need for hole potting or layout. It is designed with a reduced section on the threaded end and a tapered expansion section on the working end of the anchor, on which a heavy duty stainless steel three piece expander sleeve is mounted.

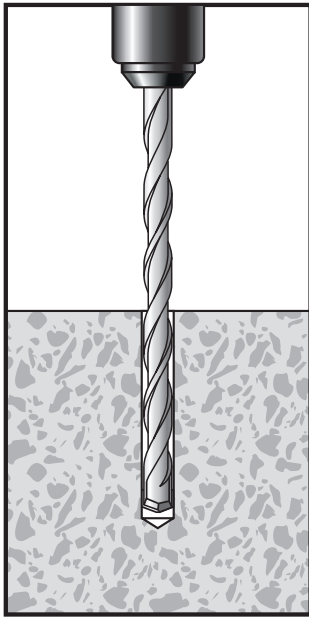


During installation, the reduced section on the threaded end prevents damage to the threads of the anchor. The heavy duty three piece expander sleeve is situated directly above the tapered expansion section of the anchor body and the raised dimples on the expander sleeve prevents the anchor from spinning in the drilled hole during tightening.

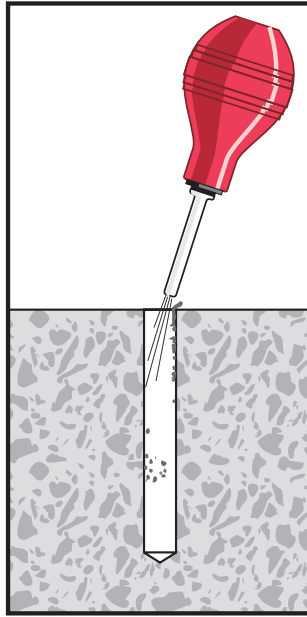
As the anchor is tightened, the body is pulled upwards causing the tapered expansion section to compress the sleeve circumferentially against the wall of the drilled hole. The PTB Through-Bolt provides easy torque setting with minimal effort in all base materials.

## Material specifications

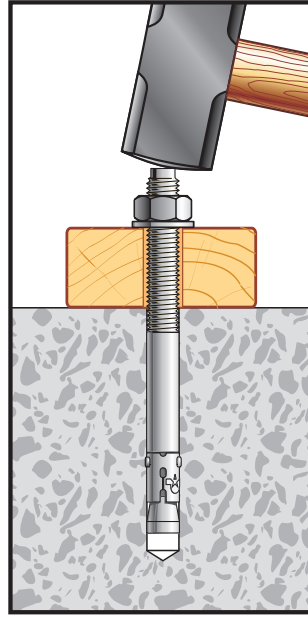
Anchor components	Carbon Steel	Hot Dipped Gavanised
Anchor body		
M6 – M12	class 5.8	class 5.8
M16 – M20	class 4.6	class 4.6
Expander Sleeve	Grade 430 stainless steel	Grade 430 stainless steel
Washer	Hardened carbon steel	Hardened carbon steel
Nut	Carbon steel property class 8	Carbon steel property class 8
Plating	Electroplated zinc in accordance with AS 1789 - 2003 Coating thickness 5 microns min.	Hot Dip Galvanised in accordance with AS 4680 - 1999 Coating thickness 42 microns min

**Installation procedure**

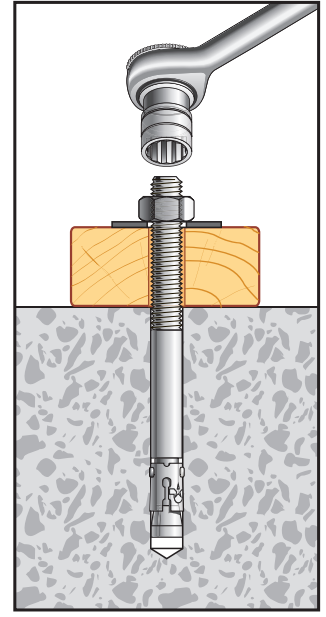
Using the proper diameter bit, drill a hole into the base material to a depth of at least 13mm or one anchor diameter deeper than the embedment required.



Blow the hole clean of dust and other material.



Drive the anchor through the fixture into the anchor hole until the nut and washer is firmly seated against the fixture. Be sure the anchor is driven to the required embedment depth.

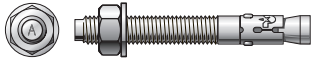


Tighten the anchor by turning the head 3 to 4 turns or by applying the guide installation torque from the finger tight position.

## Anchor sizes and styles

The anchor length published for the standard threaded PTB Through-Bolt is 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, along with the nut and washer thickness. The nut and washer thickness is equal to the nominal anchor diameter. This will be the minimum anchor length required.

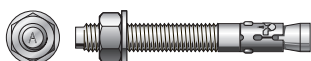
### Zinc plated carbon steel, hex head PTB Through-Bolt



Carbon steel PTB Through-Bolt anchors are manufactured from carbon steel which is plated with commercial bright zinc and a supplementary chromate treatment.

Part No	Description	Drill Ø mm	Depth mm	Fixture thickness mm	Box qty	Carton qty	Identification code
PTB06085	6 x 85mm	6	50	26	100	1000	E
PTB06120	6 x 120mm			61	50	500	G
PTB08080	8 x 80mm	8	55	15	50	500	G
PTB08100	8 x 100mm			35			M
PTB08120	8 x 120mm			55			O
PTB10065	10 x 65mm	10	45	10	25	250	C
PTB10090	10 x 90mm		60	17			G
PTB10120	10 x 120mm		60	47			I
PTB12080	12 x 80mm	12	60	5	25	250	A
PTB12100	12 x 100mm		60	25		250	C
PTB12140	12 x 140mm		80	45		150	I
PTB16105	16 x 105mm	16	80	5	25	100	E
PTB16125	16 x 125mm		100	10		100	G
PTB16140	16 x 140mm		100	20		100	I
PTB16190	16 x 190mm		100	70		50	O
PTB20125	20 x 125mm	20	100	5	10	50	A
PTB20160	20 x 160mm		120	20		40	E
PTB20200	20 x 200mm		120	60		30	G

### Carbon steel, galvanised PTB Through-Bolt



Hot Dipped Galvanized PTB Through-Bolt anchors are manufactured from steel which has a hot dipped galvanised coating.

Part No	Description	Drill Ø mm	Depth mm	Fixture thickness mm	Box qty	Carton qty	Identification code
PTBG08080	8 x 80mm	8	55	15	50	500	G
PTBG08100	8 x 100mm			35			M
PTBG08120	8 x 120mm			55			O
PTBG10065	10 x 65mm	10	45	10	25	250	C
PTBG10090	10 x 90mm		60	17			G
PTBG10120	10 x 120mm		60	47			I
PTBG12080	12 x 80mm	12	60	5	25	250	A
PTBG12100	12 x 100mm		60	25		250	C
PTBG12140	12 x 140mm		80	45		150	I
PTBG16105	16 x 105mm	16	80	5	25	100	E
PTBG16125	16 x 125mm		100	10		100	G
PTBG16140	16 x 140mm		100	20		100	I
PTBG16190	16 x 190mm		100	70		50	O
PTBG20125	20 x 125mm	20	100	5	10	50	A
PTBG20160	20 x 160mm		120	20		40	E
PTBG20200	20 x 200mm		120	60		30	G

## Performance data

### Working stress design

Allowable working load capacities for carbon steel PTB Through-Bolt

BOLT SIZE mm	DRILL SIZE mm	EMBED. DEPTH mm	GUIDE TORQUE Nm	15 MPa concrete		32 MPa concrete		40 MPa concrete	
				Tension kN	Shear kN	Tension kN	Shear kN	Tension kN	Shear kN
M6	6	30	5	1.4	2.0	2.0	2.0	2.3	2.0
		50		2.1	2.9	3.0	2.9	3.5	2.9
M8	8	40	15	2.8	4.4	4.0	4.4	4.6	4.4
		55		3.2	5.5	4.5	5.5	5.2	5.5
M10	10	50	25	3.5	6.7	5.0	6.7	5.8	6.7
		60		4.5	7.5	6.3	7.5	7.3	7.5
M12	12	50	45	3.3	5.4	4.7	5.4	5.4	5.4
		60		3.9	6.5	5.5	6.5	6.4	6.5
		80		6.7	10.5	9.5	10.5	11.0	10.5
M16	16	60	110	4.5	9.6	6.3	9.6	7.3	9.6
		80		6.8	12.8	9.6	12.8	11.1	12.8
		100		10.7	16.3	15.1	16.3	17.4	16.3
M20	20	80	180	10.4	14.4	11.9	14.4	13.7	14.4
		100		10.8	20.5	15.3	20.5	17.7	20.5
		120		13.0	24.0	18.4	24.0	21.2	24.0

NOTE: Incorporated safety factor (Tension and shear)  $F_{sc} = 3$  (concrete)  
 $F_{ss} = 2.5$  (steel)

### Limit state design

Limit state design capacities for carbon steel PTB Through-Bolt

BOLT SIZE mm	DRILL SIZE mm	EMBED. DEPTH mm	GUIDE TORQUE Nm	15 MPa concrete		32 MPa concrete		40 MPa concrete	
				Tension kN	Shear kN	Tension kN	Shear kN	Tension kN	Shear kN
M6	6	30	5	2.5	3.7	3.6	3.7	4.2	3.7
		50		3.8	5.2	5.4	5.2	6.2	5.2
M8	8	40	15	5.1	7.9	7.2	7.9	8.3	7.9
		55		5.7	10.0	8.1	10.0	9.4	10.0
M10	10	50	25	6.4	12.1	9.0	12.1	10.4	12.1
		60		8.0	13.5	11.3	13.5	13.1	13.5
M12	12	50	45	6.0	9.8	8.5	9.8	9.8	9.8
		60		7.0	11.7	9.9	11.7	11.4	11.7
		80		12.1	18.9	17.1	18.9	19.7	18.9
M16	16	60	110	8.0	17.3	11.3	17.3	13.1	17.3
		80		12.2	23.0	17.3	23.0	20.0	23.0
		100		19.2	29.3	27.2	29.3	31.4	29.3
M20	20	80	180	15.1	25.9	21.4	25.9	24.7	25.9
		100		19.5	36.9	27.5	36.9	31.8	36.9
		120		23.4	43.2	33.1	43.2	38.2	43.2

NOTE:  $\phi = 0.6$  (Incorporated strength reduction factor – concrete)  
 $\phi = 0.8$  (Incorporated capacity factor – steel)

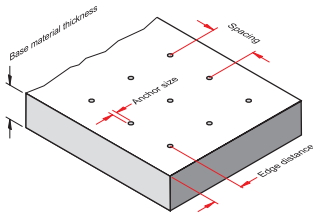
## Design criteria

### Base material thickness

The minimum recommended thickness of base material, BMT, when using the PTB Through Bolt is 125% of the embedment to be used. For example, when installing an anchor to a depth of 100mm, the base material thickness should be 125mm.

### 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 HOLE SIZE Ø mm	Spacing distance, S (mm) Tension and Shear					
	10d	9d	8d	7d	6d	5d
6	60	54	48	42	36	30
8	80	72	64	56	48	40
10	100	90	80	70	60	50
12	120	108	96	84	72	60
16	160	144	128	112	96	80
20	200	180	160	140	120	100
<b>Rs</b>	<b>1.00</b>	<b>0.90</b>	<b>0.80</b>	<b>0.70</b>	<b>0.60</b>	<b>0.50</b>

### Edge distance – Tension

An edge distance, E, of 12 anchor diameters (12d) should be used to obtain the maximum tension load. The minimum recommended edge distance, E, is 5 anchor diameters (5d) at which point the tension load should be reduced by 20%. The following table lists the load reduction factor, Re, for each anchor diameter, d, based on the anchor centre to edge distance.

ANCHOR HOLE SIZE Ø mm	Edge distance, E (mm) Tension only							
	12d	11d	10d	9d	8d	7d	6d	5d
6	72	66	60	54	48			
8	96	88	80	72	64	56	48	40
10	120	110	100	90	80	70	60	50
12	144	132	120	108	96	84	72	60
16	192	176	160	144	128	112	96	80
20	240	220	200	180	160	140	120	100
<b>Re(t)</b>	<b>1.00</b>	<b>0.97</b>	<b>0.94</b>	<b>0.91</b>	<b>0.89</b>	<b>0.86</b>	<b>0.83</b>	<b>0.80</b>

### Edge distance – Shear

For shear loads, an edge distance, E, of 12 anchor diameters (12d) should be used to obtain the maximum load. The minimum recommended edge distance, E, is 5 anchor diameters (5d) at which point the shear load should be reduced by 50%. The following table lists the load reduction factor, Re, for each anchor diameter, d, based on the anchor centre to edge distance.

ANCHOR HOLE SIZE Ø mm	Edge distance, E (mm) Shear only							
	12d	11d	10d	9d	8d	7d	6d	5d
6	72	66	60	54	48			
8	96	88	80	72	64	56	48	40
10	120	110	100	90	80	70	60	50
12	144	132	120	108	96	84	72	60
16	192	176	160	144	128	112	96	80
20	240	220	200	180	160	140	120	100
<b>Re(s)</b>	<b>1.00</b>	<b>0.93</b>	<b>0.86</b>	<b>0.79</b>	<b>0.71</b>	<b>0.64</b>	<b>0.57</b>	<b>0.50</b>



## Suggested specification

	Example
Product name	PTB Through-Bolt
Part number	PTB20200
Size	20 x 200mm
Embedment depth	100mm
Minimum spacing and edge distance	Spacing 200mm, Edge distance: 240mm
	Product to be installed in accordance with published installation procedure

## Notes



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