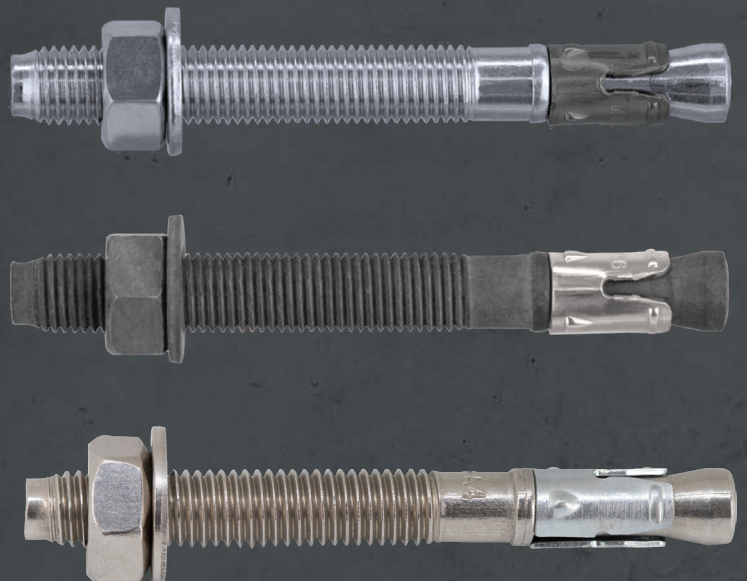


TDS | 1007.7

THRU-BOLT™ PRO STUD ANCHOR

SIMPLIFIED DESIGN METHOD



THRU-BOLT™ PRO





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THRU-BOLT™ PRO STUD ANCHOR

□ CARBON STEEL ZINC CLEAR

■ CARBON STEEL SHERARDISED (GALVANISED)

■ STAINLESS STEEL 316 A4

ICCONS® THRU-BOLT™ PRO is a pre-assembled torque controlled mechanical stud anchor, which when tightened draws the tapered end of the bolt into the expander clip expanding it to create expansion forces against the wall of the hole.

- Heavy duty Carbon steel in Zinc Clear and Galvanised
- Corrosion resistant 316 S/S
- Thru fixing for fast installation
- Anchor Diameter = Hole Diameter (eg M12 anchor, 12mm Hole)
- Engineered Clip designed for high loads and prevents anchor rotation

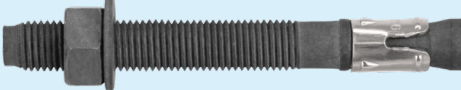
Thru-Bolt™ Pro Zinc Clear Internal Part No.	Thru-Bolt™ Pro-G Sherardised (Galvanised) External Part No.	Thru-Bolt™ Pro-SS Stainless Steel 316 (A4) External Part No.	Description	Thread Size (mm)	Drill Diameter (mm)	Zinc & Gal Min. Anchor Embedment (mm)	316 S/S Min. Anchor Embedment (mm)	Zinc & Gal Max. Fixture Thickness (mm)	316 S/S Max. Fixture Thickness (mm)	Installation Torque Setting (Nm)	 qty.	 qty.
TB06085			6 × 85mm	M6	6	50	-	26	-	7	100	1000
TB06120			6 × 120mm					61			50	500
TB10065	TB10065G	TB10065SS	10 × 65mm	M10	10	45	50	10	5	40	25	250
TB12080	TB12080G	TB12080SS	12 × 80mm	M12	12	60	60	4	3	60	25	250
TB16105	TB16105G	TB16105SS	16 × 105mm	M16	16	80	75	5	10	100	25	100
TB20125	TB20125G	TB20125SS	20 × 125mm	M20	20	100	90	5	10	200	10	60

Note: Galvanised parts are coated using a Sherardised process

Information contained in this technical document is based on testing by the manufacturer and should be reviewed and approved by a design professional responsible for the given application. Technical data contained in this document does not comply with AS5216. For safety critical fastening applications designed in accordance with AS5216, please refer to the ICCONS® website for a complete suite of compliant post-installed chemical and mechanical anchoring products.

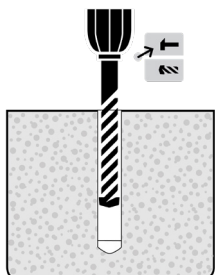


MATERIAL SPECIFICATIONS

Code	Size	Components	Material
THRU-BOLT™ PRO	M6 - M20 	Wedgebolt Clip Nut Washer	Carbon steel, galvanised $\geq 5 \mu\text{m}$ Carbon steel, sherardised $\geq 15 \mu\text{m}$ DIN 934, galvanised $\geq 5 \mu\text{m}$ DIN 125, DIN 9021, galvanised $\geq 5 \mu\text{m}$
THRU-BOLT™ PRO-G	M8 - M20 	Wedgebolt Clip Nut Washer	Carbon steel, sherardised $\geq 40 \mu\text{m}$ A4 Stainless steel DIN 934, sherardised $\geq 40 \mu\text{m}$ DIN 125, DIN 9021, sherardised* $\geq 40 \mu\text{m}$
THRU-BOLT™ PRO-SS	M8 - M20 	Wedgebolt Clip Nut Washer	Stainless steel, grade A4 Stainless steel, grade A4 galvanised $\geq 5 \mu\text{m}$ ISO 4042 Zn5/An/T0 Stainless steel, grade A4 with antifriction coating DIN 125, DIN 9021, DIN 440 stainless steel, grade A4
TBITM6-10 Thru-Bolt installation Tool M6 TO M10		Tool for anchor installation using percussion hammer drilling machine	
TBITM12-20 Thru-Bolt installation Tool M12 TO M20			

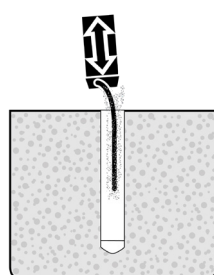
* Sherardising is a process of galvanisation of ferrous metal surfaces, also called dry galvanising. The process involves heating the steel up to 500°C in a closed rotating drum that contains metallic zinc dust.

INSTALLATION



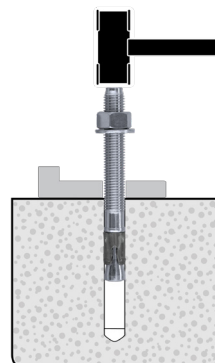
DRILL HOLE

Use drill in hammer mode. Drill to specified diameter and depth for the required size.



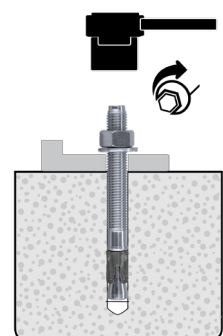
BLOW AND CLEAN

Clean the drill hole completely of dust and debris. Use blow pump.



INSTALL

Insert the anchor in the hole to the specified embedment depth. Use hammer if required; Thru-Bolt installation Tool (TBIT) can be used alternatively. The installation may be done through the fixture baseplate.



APPLY TORQUE

Apply nominal installation torque using a torque wrench. Once installed verification of the total length of the anchor can be made through the letter on the head.



PREFORMANCE

RECOMMENDED LOADS

THRU-BOLT™ PRO ZINC CLEAR / GALVANISED			N _{rec} TENSION			V _{rec} SHEAR		
Anchor Size (mm)	Drill Size (mm)	Anchor Embedment Depth (mm)	Zinc Clear Galvanised			Zinc Clear Galvanised		
			20MPa (kN)	32MPa (kN)	40MPa (kN)	20MPa (kN)	32MPa (kN)	40MPa (kN)
6	6	50	2.2	2.9	3.4	2.1	2.1	2.1
10	10	45	3.2	4.1	4.5	3.2	4.1	4.5
12	12	60	4.9	6.2	6.9	4.9	6.2	6.9
16	16	80	8.4	10.7	11.9	16.3	16.3	16.3
20	20	100	12.2	15.5	17.3	24.6	25.5	25.5

Note: Load capacities above incorporate a safety factor of 3 for concrete and 2.5 for steel. All loads are representative of a single anchor installed remote from an edge. The above information has been derived from laboratory test results using NATA calibrated equipment.

Limit State Design - Multiply the above loads by 1.8 (Concrete) and 2 (Steel) to determine the Limit State Design capacities.

THRU-BOLT™ PRO STAINLESS STEEL 316 (A4)			N _{rec} TENSION			V _{rec} SHEAR		
Anchor Size (mm)	Drill Size (mm)	Anchor Embedment Depth (mm)	Zinc Clear Galvanised			Zinc Clear Galvanised		
			20MPa (kN)	32MPa (kN)	40MPa (kN)	20MPa (kN)	32MPa (kN)	40MPa (kN)
10	10	50	3.4	4.3	4.7	3.4	4.3	4.7
12	12	60	4.9	6.2	6.9	4.9	6.2	6.9
16	16	75	8	10.2	11.3	16.3	16.3	16.3
20	20	90	12	14.7	16.4	23.4	25.5	25.5

Note: Load capacities above incorporate a safety factor of 3 for concrete and 2.5 for steel. All loads are representative of a single anchor installed remote from an edge. The above information has been derived from laboratory test results using NATA calibrated equipment.

Limit State Design - Multiply the above loads by 1.8 (Concrete) and 2 (Steel) to determine the Limit State Design capacities.

COMBINED TENSION & SHEAR LOADING

For combined tension and shear load applications the following equations shall be satisfied;

$$N_{\text{applied}} / N_{\text{rec}} \leq 1 \quad V_{\text{applied}} / V_{\text{rec}} \leq 1 \quad (N_{\text{applied}} / N_{\text{rec}}) + (V_{\text{applied}} / V_{\text{rec}}) \leq 1.2$$

N_{applied} = Applied Tension Load

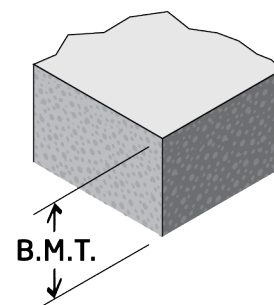
N_{rec} = Recommended Tension Load

V_{applied} = Applied Shear Load

V_{rec} = Recommended Shear Load

BASE MATERIAL THICKNESS

Base material thickness should be 1.5 x h_{embed.} or a minimum of 75mm, always use the greater of the two values.





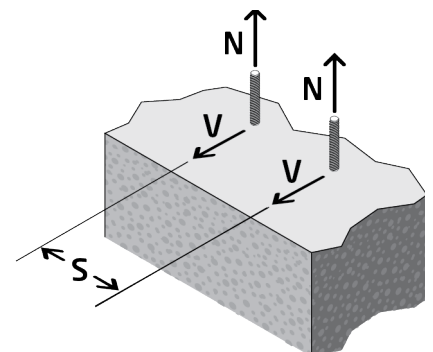
DESIGN CONDITIONS

SIMPLIFIED DESIGN METHOD

When anchor spacing or edge distances are less than critical distances, Recommended Working Load capacities must be multiplied by the appropriate reduction factors. Linear interpolation is allowed for intermediate anchor spacing and edge distances between critical and minimum distances. If an anchor/anchor group is affected by multiple reduced spacing and edge distances, the spacing and edge reduction factors must be multiplied together to give a total effect on the anchor / anchor group performance.

SPACING REDUCTION FACTORS ($S_t + S_s$) - TENSION AND SHEAR

d (mm)	6	10	12	16	20
h_{embed}	50	45	60	80	100
S_{cr} (mm)	100	90	120	160	200
S_{min} (mm)	50	45	60	80	100
Spacing (S) mm	45	0.5			
	50	0.5	0.56		
	55	0.55	0.61		
	60	0.6	0.67	0.5	
	70	0.7	0.78	0.58	
	80	0.8	0.89	0.67	0.5
	90	0.9	1	0.75	0.56
	100	1		0.83	0.63
	110			0.92	0.69
	120			1	0.75
	140				0.88
	160				1
	180				
	200				



Note: To achieve 100% anchor capacity, critical spacing (S_{cr}) is equal to $2 \times h_{embed}$. Minimum spacing (S_{min}) is equal to h_{embed} at which the anchor achieves 50% of capacity.

EDGE DISTANCE REDUCTION FACTORS (C_T) - TENSION

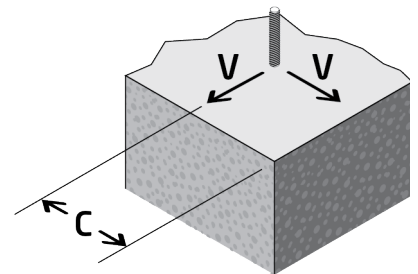
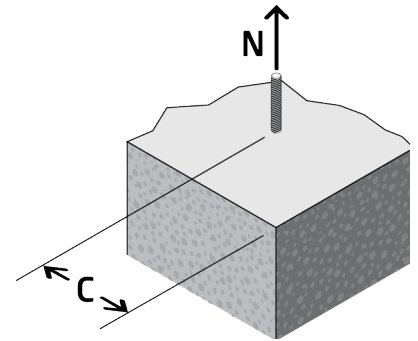
d (mm)	6	10	12	16	20
C _{cr} (mm)	72	120	144	192	240
C _{min.} (mm)	30	50	60	80	100
Edge Distance (C) mm					
30	0.75				
40	0.81				
50	0.87	0.75			
60	0.93	0.79	0.75		
72	1	0.83	0.79		
80		0.86	0.81	0.75	
96		0.91	0.86	0.79	
100		0.93	0.87	0.8	0.75
120		1	0.93	0.84	0.79
144			1	0.89	0.83
192				1	0.91
240					1

Note: To achieve 100% anchor capacity, critical edge distance (C_{cr}) is equal to 12d (12 x anchor diameter). Minimum edge distance (C_{min}) is equal to (5d) at which the anchor achieves 75% of capacity.

EDGE DISTANCE REDUCTION FACTORS (C_S) - SHEAR

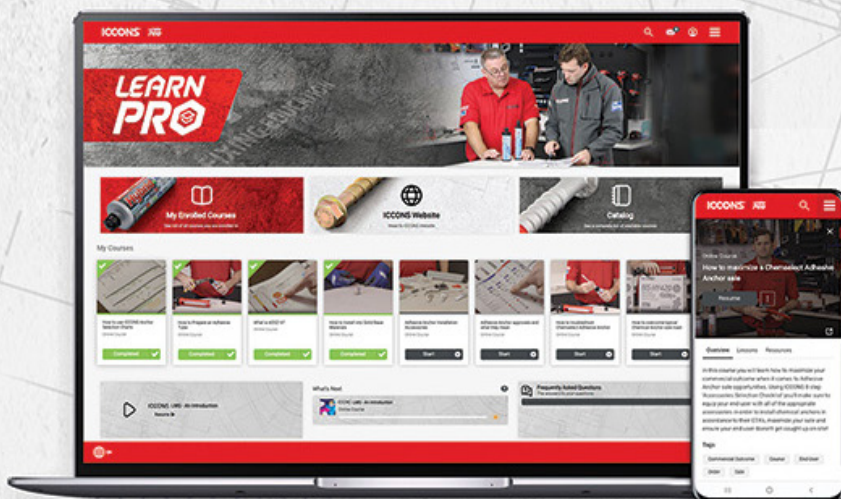
d (mm)	6	10	12	16	20
C _{cr} (mm)	72	120	144	192	240
C _{min.} (mm)	30	50	60	80	100
Edge Distance (C) mm					
30	0.35				
40	0.5				
50	0.66	0.35			
60	0.81	0.44	0.35		
72	1	0.55	0.44		
80	1	0.63	0.5	0.35	
96		0.78	0.63	0.44	
100		0.81	0.66	0.47	0.35
120		1	0.81	0.58	0.44
144		1	1	0.72	0.55
192			1	1	0.78
240				1	1

Note: To achieve 100% anchor capacity, critical edge distance (C_{cr}) is equal to 12d (12 x anchor diameter). Minimum edge distance (C_{min}) is equal to (5d) at which the anchor achieves 35% of capacity.





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