THRU-BOLT™ PRO

STUD ANCHOR – SIMPLIFIED DESIGN METHOD

TDS | 1007.6

Carbon Steel	Galvanised	316 S/S

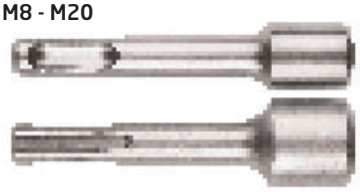
ICCONS® THRU-BOLT™ PRO is a pre-assembled torque controlled mechanical stud anchor, which when tightened draws the tapered end of the bolt into the expander clip expanding it to create expansion forces against the wall of the hole.

- 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

ZINC CLEAR Internal Part No.	GALVANISED External Part No.	316 STAINLESS STEEL External Part No.	Description	Thread Size	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 x 85mm	M6	6	50		26		5	100	1000
TB06120			6 x 120mm					61			50	500
TB10065	**TB10065G**	**TB10065SS**	10 x 65mm	M10	10	45	50	10	5	40	25	250
TB12080	**TB12080G**	**TB12080SS**	12 x 80mm	M12	12	60	60	5	3	60	25	250
TB16105	**TB16105G**	**TB16105SS**	16 x 105mm	M16	16	80	75	5	10	100	25	100
TB20125	**TB20125G**	**TB20125SS**	20 x 125mm	M20	20	100	90	5	10	200	10	60

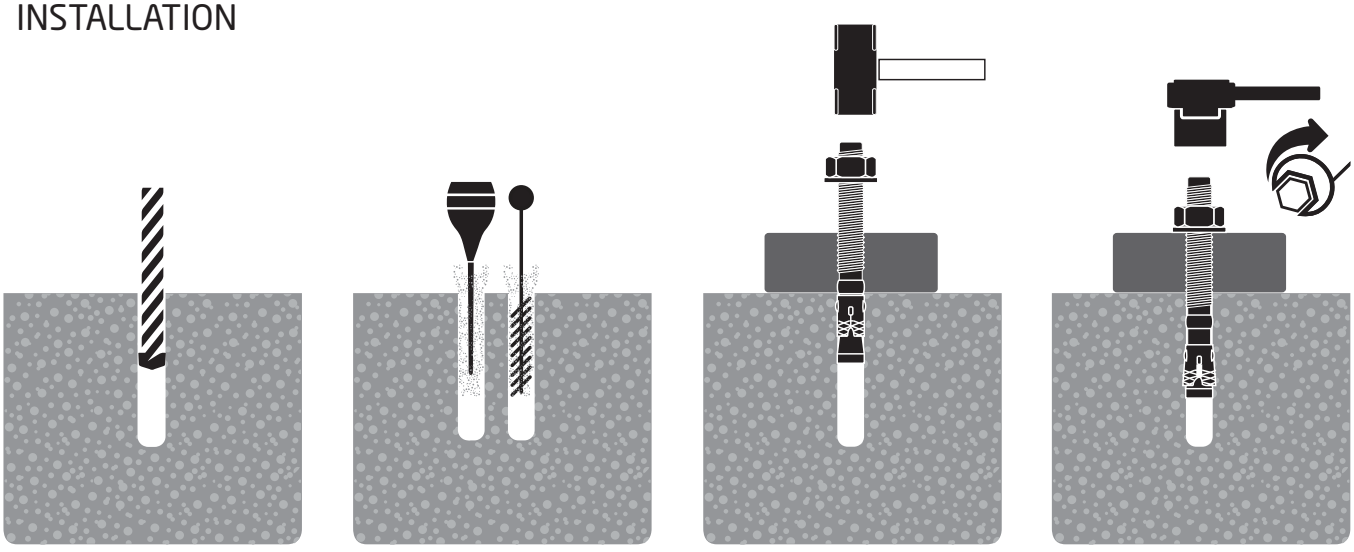
Note: Galvanised parts are coated using a Sherardised process.

MATERIAL SPECIFICATIONS

Code	Size	Components	Material
Thru-Bolt™ PRO-G	**M8 - M20** 	Wedgebolt Clip Nut Washer	Carbon steel, sherardized ≥ 40 µm A4 stainless steel DIN 934, sherardized ≥ 40 µm DIN 125, DIN 9021, sherardized* ≥ 40 µm
Thru-Bolt™ PRO	**M6 - M20** 	Wedgebolt Clip Nut Washer	Carbon steel, galvanized ≥ 5 µm Carbon steel, sherardized ≥ 15 µm DIN 934, galvanized ≥ 5 µm DIN 125, DIN 9021, galvanized ≥ 5 µm
Thru-Bolt™ PRO-SS	**M8 - M20** 	Wedgebolt Clip Nut Washer	Stainless steel, grade A4 Stainless steel, grade A4 galvanised ≥ 5 µm ISO 4042 Zn5/An/T0 Stainless steel, grade A4 with antifriction coating DIN 125, DIN 9021, DIN 440 stainless steel, grade A4
DOMTA available on request	**M8 - M20** 	Tool for anchor installation using percussion hammer drilling machine	

* 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



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

2. **Blow and clean**
Clean the drill hole completely of dust and debris.
Use blow pump and brush

3. **Install**
Insert the anchor in the hole to the specified embedment depth.
Use hammer if required; DOMTA tool can be used alternatively.
The installation may be done through the fixture baseplate.

4. **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.

RECOMMENDED LOADS

THRU-BOLT™ PRO Zinc Clear / Galvanised			RECOMMENDED LOADS					
			N_{rec} TENSION ZINC CLEAR | GALVANISED			V_{rec} SHEAR ZINC CLEAR | GALVANISED		
Anchor Size (mm)	Drill Size (mm)	Anchor Embedment Depth (mm)	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.

STEEL GOVERNING

THRU-BOLT™ PRO 316 Stainless steel			RECOMMENDED LOADS					
			N_{rec} TENSION 316 STAINLESS STEEL			V_{rec} SHEAR 316 STAINLESS STEEL		
Anchor Size (mm)	Drill Size (mm)	Anchor Embedment Depth (mm)	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	**8.0**	**10.2**	**11.3**	**16.3**	**16.3**	**16.3**
20	20	90	**12.0**	**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.

STEEL GOVERNING

COMBINED TENSION & SHEAR LOADING

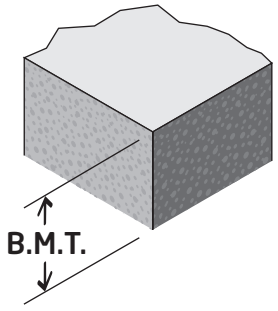
For combined tension and shear load applications the following equations shall be satisfied;

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

Where:
$N_{applied}$ = Applied Tension Load
N_{rec} = Recommended Tension Load
$V_{applied}$ = Applied Shear Load
V_{rec} = Recommended Shear Load

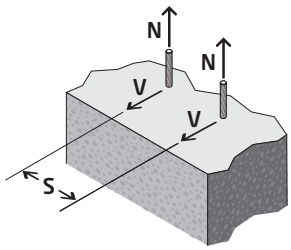
BASE MATERIAL THICKNESS

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



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.

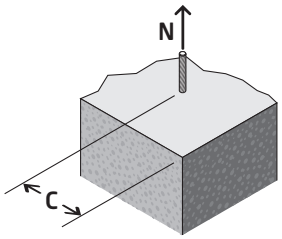
Spacing Reduction Factors (S_t + S_s) – tension and shear



	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		0.50			
	50	0.50	0.56			
	55	0.55	0.61			
	60	0.60	0.67	0.50		
	70	0.70	0.78	0.58		
	80	0.80	0.89	0.67	0.50	
	90	0.90	1.00	0.75	0.56	
	100	1.00		0.83	0.63	0.50
	110			0.92	0.69	0.55
	120			1.00	0.75	0.60
	140				0.88	0.70
	160				1.00	0.80
	180					0.90
	200					1.00

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

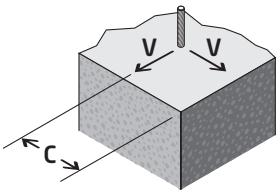
Edge Distance Reduction Factor (C_t) – tension



	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	1.00	0.83	0.79		
	80		0.86	0.81	0.75	
	96		0.91	0.86	0.79	
	100		0.93	0.87	0.80	0.75
	120		1.00	0.93	0.84	0.79
	144			1.00	0.89	0.83
	192				1.00	0.91
	240					1.00

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 Factor (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	0.50				
	50	0.66	0.35			
	60	0.81	0.44	0.35		
	72	1.00	0.55	0.44		
	80	1.00	0.63	0.50	0.35	
	96		0.78	0.63	0.44	
	100		0.81	0.66	0.47	0.35
	120		1.00	0.81	0.58	0.44
	144		1.00	1.00	0.72	0.55
	192			1.00	1.00	0.78
	240				1.00	1.00

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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