INDO CONSTRUCTION FASTENING SYSTEMS

A brand of Indo Spark Group Since 1978

TBA

Through Bolt Anchor

Indo Construction Fastening Systems

Indo Construction Fastening Systems (ICFS) is a 45 years company, having expertise and operations in the following three verticals:

- ICFS Anchor Fastening Systems
- Construction Services
- ICFS Anchor Designer

We have chemical and mechanical anchors usable for installing furniture, fixtures & structures at site. Based on the design load parameters, we even suggest correct type of chemical, diameter of anchor bolts, embedment depth and chemical consumption per hole.

Our story

«From an automotive workshop employing just 2 in 1978 to what we are today-a well-known, successful, respectable, leading business house in India.

It was indeed a long journey. A journey full of challenges, hardships, bottlenecks. But we came out intact and grew many folds - vertical and horizontal.

The best assets of ours, I think are our reputation for honesty, fair dealing, timely delivery and quality.

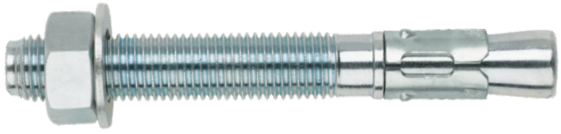
As I look back there are two main factors which made Indo Spark blossom. First is the wisdom and honesty of our chairperson Mr. Tilakchand Ingale along with his trust in the employees and second is the wholehearted, sincere, hard work put up by our employees – young and old including technicians and workmen.

One thing is certain

We have never stopped growing.

Sandeep Ingale, CEO Indo Spark Group

Through Bolt Anchor (TBA)



Characteristics

- Roughness working principles; installation by controlled torque.
- Use for high loads.
- Valid for two installation depths.
- Easy installation.
- Use in non-cracked concrete.
- Previous installation, or through the fixture.
- Use for static or quasi-static loads.
- Zinc plated version.
- Variety of lengths and sizes, assembly flexibility.
- Available in ICSF design software

Base Material

Size Range : M6 - M24

Maximum Loads Recommended In Non Cracked Concrete [kg]

Applications

- Structural applications in non-cracked concrete.
- Safety barriers.
- Billboards, machinery, boilers, signals, Steel beams,etc.
- Fixings wood structures in concrete.

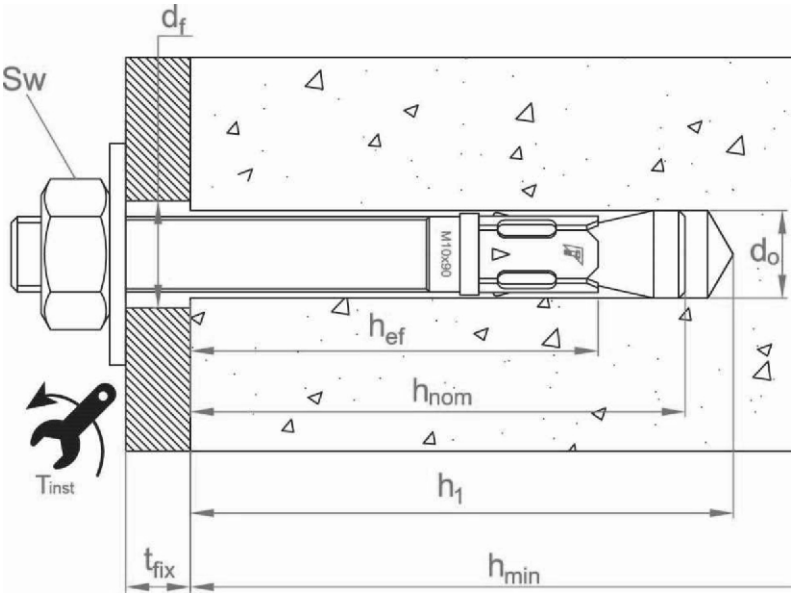
Applications Examples

Through Bolt Anchor

Range

Code	Size	Photo	Component	Material
TBA	M6 to M24		Bolt, Clip, Nut, Washer	Carbon steel cold formed, zinc-plated ≥ 5µm Carbon steel, zinc-plated ≥ 5µm DIN 934 class 6 ISO 898-1 zinc plated ≥ 5µm DIN 125, DIN 9021 o DIN 440 zinc-plated ≥ 5µm

Installation Data



Installation Parameters

General installation parameters									Standard installation depth								Reduced installation dep								
Family	Code	Size	Drill bit diameter	Fixture clearance hole	Torque	Minimum allowable spacing	Minimum allowable edge distance	Minimum concrete thick ness	Depth of drill hole hole >	Install-ation depth	Effective anchor age depth	Thickn ess of fixture <	Critical spacing (Concente cono)	Critical edge distance (Concrete)	Critical Spacing (splitting)	Critical edge distance (splitting)	Minimum Concrete thickne	Depth of drill hole>	Install-ation depth	Effective anchor age depth	Thick ness of fixture <	Critical spacing (Concente cono)	Critical edge distance (Concrete)	Critical Spacing (splitting)	Critical edge distance (splitting)
	[--]	[--]	d_0 [mm]	d_f [mm]	T_{inst} [Nm]	s_{min} [mm]	c_{min} [mm]	h_{min} [mm]	h_1 [mm]	h_{nom} [mm]	h_{ef} [mm]	t_{fix} [mm]	$s_{cr,N}$ [mm]	$c_{cr,N}$ [mm]	$s_{cr,sp}$ [mm]	$c_{cr,sp}$ [mm]	h_{min} [mm]	h_1 [mm]	h_{nom} [mm]	h_{ef} [mm]	t_{fix} [mm]	$s_{cr,N}$ [mm]	$c_{cr,N}$ [mm]	$s_{cr,sp}$ [mm]	$c_{cr,sp}$ [mm]
TBA	TBA06045	M6 x 45	6	7	7	35	35	100	55	49.5	40	—	120	60	160	80	–	–	–	–	1	–	–	–	–
	TBA06055	M6 x 55										—									11				
	TBA06060	M6 x 60										2									—				
	TBA06065	M6 x 65										7									—				
	TBA06070	M6 x 70										12									—				
	TBA06080	M6 x 80										22									—				
	TBA06085	M6 x 85										27									—				
	TBA06090	M6 x 90										32									—				
	TBA06100	M6 x 100										42									—				
	TBA06110	M6 x 110										52									—				
	TBA06120	M6 x 120										62									—				
	TBA06130	M6 x 130										72									—				
	TBA06140	M6 x 140										82									—				
	TBA06150	M6 x 150										92									—				
	TBA06160	M6 x 160										102									—				
	TBA06170	M6 x 170										112									—				
	TBA06180	M6 x 180										122									—				
	TBA08050	M8 x 50	8	9	20	40	–	–	–	–	–	-	–	–	–	–	100	40	35	23	4	69	35	140	70
	TBA08060	M8 x 60					–	–	–	–	–	-	–	–	–	–	100	50	46.5	35	3	105	53	140	70
	TBA08065	M8 x 65					–	–	–	–	–	-	–	–	–	–					8				
	TBA08075	M8 x 75					40	100	55	59.5	48	5	144	72	192	96					18				
	TBA08090	M8 x 90										20									33				
	TBA08115	M8 x 115										45									43				
	TBA08120	M8 x 120										50									58				
	TBA08130	M8 x 130										60									63				
	TBA08155	M8 x 155										85									73				

Installation Parameters

General installation parameters									Standard installation depth								Reduced installation dep								
Family	Code	Size	Drill bit diameter	Fixture clearance hole	Torque	Minimum allowable spacing	Minimum allowable edge distance	Minimum concrete thick ness	Depth of drill hole hole >	Install-ation depth	Effective anchor age depth	Thickn ess of fixture <	Critical spacing (Concente cono)	Critical edge distance (Concrete)	Critical Spacing (splitting)	Critical edge distance (splitting)	Minimum Concrete thickne	Depth of drill hole>	Install-ation depth	Effective anchor age depth	Thick ness of fixture <	Critical spacing (Concente cono)	Critical edge distance (Concrete)	Critical Spacing (splitting)	Critical edge distance (splitting)
	[--]	[--]	d_0 [mm]	d_f [mm]	T_{inst} [Nm]	s_{min} [mm]	c_{min} [mm]	h_{min} [mm]	h_1 [mm]	h_{nom} [mm]	h_{ef} [mm]	t_{fix} [mm]	$s_{cr,N}$ [mm]	$c_{cr,N}$ [mm]	$s_{cr,sp}$ [mm]	$c_{cr,sp}$ [mm]	h_{min} [mm]	h_1 [mm]	h_{nom} [mm]	h_{ef} [mm]	t_{fix} [mm]	$s_{cr,N}$ [mm]	$c_{cr,N}$ [mm]	$s_{cr,sp}$ [mm]	$c_{cr,sp}$ [mm]
TBA	TBA10065	M10 x 65					—	—	—	—	—	—	—	—	—	—	100	55	52	40	1	120	60	168	84
	TBA10070	M10 x 70					—	—	—	—	—	—	—	—	—	—					3				
	TBA10080	M10 x 80					—	—	—	—	—	—	—	—	—	—					13				
	TBA10090	M10 x 90										10									23				
	TBA10100	M10 x 100										20									33				
	TBA10120	M10 x 120										40									53				
	TBA10140	M10 x 140	10	12	35	50	50					60					100	60	53.5	42	73	126	63	168	84
	TBA10150	M10 x 150						110	75	66.5	55	70	165	83	220	110					83				
	TBA10160	M10 x 160										80									93				
	TBA10170	M10 x 170										90									103	–	–	–	–
	TBA10210	M10 x 210										130									143				
	TBA10230	M10 x 230										150									163				
	TBA12075	M12 x 75					–	–	–	–	–	-	–	–		–	100	60	55	43	5	129	65	200	100
	TBA12080	M12 x 80					–	–	–	–	–	-	–	–	–	–					3				
	TBA12090	M12 x 90					–	–	–	–	–	-	–	–	–	–					13				
	TBA12100	M12 x 100										8									2				
	TBA12110	M12 x 110										18									33				
	TBA12120	M12 x 120	12	14	60	70	70					28			–						43				
	TBA12140	M12 x 140										48					100	70	62	50	63	150	75	200	100
	TBA12160	M12 x 160						130	85	77	65	68	195	98	260	130					83				
	TBA12180	M12 x 180										88									103				
	TBA12220	M12 x 220										128									143				
	TBA12250	M12 x 250										158									173				

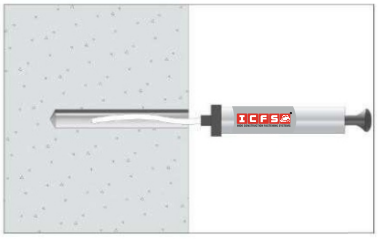
Installation Parameters

General installation parameters								Standard installation depth									Reduced installation dep								
Family	Code	Size	Drill bit diameter	Fixture clearance hole	Torque	Minimum allowable spacing	Minimum allowable edge distance	Minimum concrete thick ness	Depth of drill hole hole >	Install-ation depth	Effective anchor age depth	Thickn ess of fixture <	Critical spacing (Concrete cono)	Critical edge distance (Concrete)	Critical Spacing (splitting)	Critical edge distance (splitting)	Minimum Concrete thickne	Depth of drill hole>	Install-ation depth	Effective anchor age depth	Thick ness of fixture <	Critical spacing (Concrete cono)	Critical edge distance (Concrete)	Critical Spacing (splitting)	Critical edge distance (splitting)
	[--]	[--]	d_0 [mm]	d_f [mm]	T_{inst} [Nm]	s_{min} [mm]	c_{min} [mm]	h_{min} [mm]	h_1 [mm]	h_{nom} [mm]	h_{ef} [mm]	t_{fix} [mm]	$s_{cr,N}$ [mm]	$c_{cr,N}$ [mm]	$s_{cr,sp}$ [mm]	$c_{cr,sp}$ [mm]	h_{min} [mm]	h_1 [mm]	h_{nom} [mm]	h_{ef} [mm]	t_{fix} [mm]	$s_{cr,N}$ [mm]	$c_{cr,N}$ [mm]	$s_{cr,sp}$ [mm]	$c_{cr,sp}$ [mm]
TBA	TBA14080	M14 x 80					—	—	—	—	—	—	—	—	—	—	100	65	59	42	5	126	63	300	150
	TBA14100	M14 x 100					—	—	—	—	—	—	—	—	—	—	100	85	79	62	5	186	93	300	150
	TBA14120	M14 x 120					—	—	—	—	—	12									–				
	TBA14145	M14 x 145	14	16	90	80	80					37									–				
	TBA14170	M14 x 170						150	100	91	75	62	225	113	300	150	–	–	–	–	–	–	–	–	–
	TBA14220	M14 x 220										112									–				
	TBA14250	M14 x 250										142									--				
	TBA16090	M16 x 90						–	–	–	–	–	–	–	–	–	100	75	69	49	4	147	74	260	130
	TBA16110	M16 x 110						–	–	–	–	–	–	–	–	–					7				
	TBA16125	M16 x 125										3									22	–	–	–	–
	TBA16145	M16 x 145	16	18	120	90	90					23					130	90	84.5	65	42				
	TBA16170	M16 x 170						168	110	103.5	84	48	252	126	280	140					67				
	TBA16220	M16 x 220										98									117				
	TBA16250	M16 x 250										128									147				
	TBA16280	M16 x 280										158									177				
	TBA20120	M20 x 120										–					150	105	93	71	5	213	107	300	150
	TBA20170	M20 x 170	20	22	240	135	135					23									47				
	TBA20220	M20 x 220						206	135	125	103	73	309	155	360	180	150	107	97	75	97	225	113	300	150
	TBA20270	M20 x 270										123									147				
	TBA24180	M24 x 180	24	26	250	160	160	250	155	143	125	10	375	188	560	280	—	—	—	—	—	—	—	—	—
	TBA24260	M24 x 260										90									—				

Concrete Installation

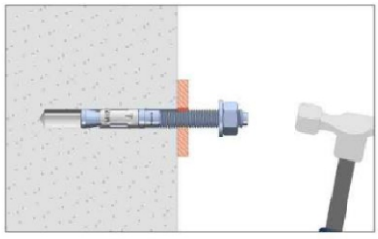
1. DRILLING

- Check the concrete is well compacted and without significant porosity.
- Suitable for dry, wet and flooded holes.
- Use drill in hammer mode.
- Drill according to specified depths in previous tables



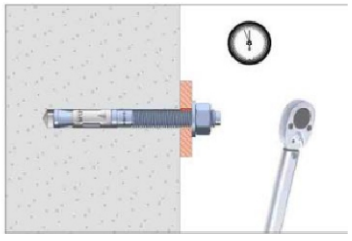
2. BLOW AND CLEAN

- Clean the hole from dust and concrete remains.
- Use blow pump and brush.



3. INSTALL

- Insert the anchorage according to data specified in previous tables.
- Use a hammer in case of need. DOMTA tool could be used alternatively. Installation could be performed through the fixture or before setting the fixture



4. APPLY THE TORQUE

- Apply the nominal torque specified in previous tables.
- Use torque wrench in order to ensure correct installation.

Resistances

Resistances in concrete class C20/25 for an isolated anchor without spacing or concrete edge distance effects are indicated in the following table:

Characteristic Resistance [kN]

General parameters			Standard installation depth		Reduced installation depth	
Family	Code	Size	Tension N_{Rk}	Shear V_{Rk}	Tension N_{Rk}	Shear V_{Rk}
TBA	TBA06045	M6 x 45	6.15	5.10	----	----
	TBA06055	M6 x 55	6.15	5.10	----	----
	TBA06060	M6 x 60	7.40	5.10	----	----
	TBA06065	M6 x 65	7.40	5.10	----	----
	TBA06070	M6 x 70	7.40	5.10	----	----
	TBA06080	M6 x 80	7.40	5.10	----	----
	TBA06085	M6 x 85	7.40	5.10	----	----
	TBA06090	M6 x 90	7.40	5.10	----	----
	TBA06100	M6 x 100	7.40	5.10	----	----
	TBA06110	M6 x 110	7.40	5.10	----	----
	TBA06120	M6 x 120	7.40	5.10	----	----
	TBA06130	M6 x 130	7.40	5.10	----	----
	TBA06140	M6 x 140	7.40	5.10	----	----
	TBA06150	M6 x 150	7.40	5.10	----	----
	TBA06160	M6 x 160	7.40	5.10	----	----
	TBA06170	M6 x 170	7.40	5.10	----	----
	TBA06180	M6 x 180	7.40	5.10	----	----
	TBA08050	M8 x 50	----	----	5.43	5.43
	TBA08060	M8 x 60	----	----	10.00	10.19
	TBA08065	M8 x 65				
	TBA08075	M8 x 75	13.00	9.30	10.00	10.19
	TBA08090	M8 x 90	13.00	9.30	10.00	10.19
	TBA08115	M8 x 115	13.00	9.30	10.00	10.19
	TBA08120	M8 x 120	13.00	9.30	10.00	10.19
	TBA08130	M8 x 130	13.00	9.30	10.00	10.19
	TBA08155	M8 x 155	13.00	9.30	10.00	10.19
	TBA10065	M10 x 65	----	----	12.45	12.45
	TBA10070	M10 x 70	----	----	13.39	13.39
	TBA10080	M10 x 80	19.00	14.70	13.39	13.39
	TBA10090	M10 x 90	19.00	14.70	13.39	13.39
	TBA10100	M10 x 100	19.00	14.70	13.39	13.39
	TBA10120	M10 x 120	19.00	14.70	13.39	13.39
	TBA10140	M10 x 140	19.00	14.70	13.39	13.39
	TBA10150	M10 x 150	19.00	14.70	13.39	13.39
	TBA10160	M10 x 160	19.00	14.70	13.39	13.39
	TBA10170	M10 x 170	19.00	14.70	13.39	13.39
	TBA10210	M10 x 210	19.00	14.70	13.39	13.39
	TBA10230	M10 x 230	19.00	14.70	13.39	13.39
	TBA12075	M12 x 75	----	----	13.87	13.87
	TBA12080	M12 x 80	----	----	17.39	17.39
	TBA12090	M12 x 90	----	----	17.39	17.39
	TBA12100	M12 x 100	25.78	20.60	17.39	17.39
	TBA12110	M12 x 110	25.78	20.60	17.39	17.39
	TBA12120	M12 x 120	25.78	20.60	17.39	17.39
	TBA12140	M12 x 140	25.78	20.60	17.39	17.39
	TBA12160	M12 x 160	25.78	20.60	17.39	17.39
	TBA12180	M12 x 180	25.78	20.60	17.39	17.39
	TBA12220	M12 x 220	25.78	20.60	17.39	17.39
	TBA12250	M12 x 250	25.78	20.60	17.39	17.39

Characteristic Resistance [kN]

General parameters			Standard installation depth		Reduced installation depth	
Family	Code	Size	Tension N_{Rk}	Shear V_{Rk}	Tension N_{Rk}	Shear V_{Rk}
TBA	TBA14080	M14 x 80	----	----	13.39	13.39
	TBA14100	M14 x 100	----	----	24.02	28.10
	TBA14120	M14 x 120	31.95	28.10	----	----
	TBA14145	M14 x 145	31.95	28.10	----	----
	TBA14170	M14 x 170	31.95	28.10	----	----
	TBA14220	M14 x 220	31.95	28.10	----	----
	TBa14250	M14 x 250	31.95	28.10	----	----
	TBA16090	M16 x 90	----	----	16.87	16.87
	TBA16110	M16 x 110	----	----	25.78	38.40
	TBA16125	M16 x 125	37.87	38.40	25.78	38.40
	TBA16145	M16 x 145	37.87	38.40	25.78	38.40
	TBA16170	M16 x 170	37.87	38.40	25.78	38.40
	TBA16220	M16 x 220	37.87	38.40	25.78	38.40
	TBA162250	M16 x 140	37.87	38.40	25.78	38.40
	TBA16280	M16 x 250	37.87	38.40	25.78	38.40
	TBA20120	M16 x 280	37.87	38.40	25.78	38.40
	TBA06170	M20 x 120	----	----	29.43	58.86
	TBA20170	M20 x 170	51.42	56.30	31.95	63.90
	TBA20220	M20 x 220	51.42	56.30	31.95	63.90
	TBA20270	M20 x 270	51.42	56.30	31.95	63.90
	TBA24180	M24 x 180	50.00	84.70	----	----
	TBA24260	M24 x 260	50.00	84.70	----	----

1 KN ≈ 100 kg
Values *underlined and in italics* show Steel failure, **bold** values concrete failure and other indicate pull out failure.

Design Resistances [kN]

General parameters			Standard installation depth		Reduced installation depth	
Family	Code	Size	Tension N_{Rd}	Shear V_{Rd}	Tension N_{Rd}	Shear V_{Rd}
TBA	TBA06045	M6 x 45	4.10	4.08	----	----
	TBA06055	M6 x 55	4.10	4.08	----	----
	TBA06060	M6 x 60	5.29	4.08	----	----
	TBA06065	M6 x 65	5.29	4.08	----	----
	TBA06070	M6 x 70	5.29	4.08	----	----
	TBA06080	M6 x 80	5.29	4.08	----	----
	TBA06085	M6 x 85	5.29	4.08	----	----
	TBA06090	M6 x 90	5.29	4.08	----	----
	TBA06100	M6 x 100	5.29	4.08	----	----
	TBA06110	M6 x 110	5.29	4.08	----	----
	TBA06120	M6 x 120	5.29	4.08	----	----
	TBA06130	M6 x 130	5.29	4.08	----	----
	TBA06140	M6 x 140	5.29	4.08	----	----
	TBA06150	M6 x 150	5.29	4.08	----	----
	TBA06160	M6 x 160	5.29	4.08	----	----
	TBA06170	M6 x 170	5.29	4.08	----	----
	TBA06180	M6 x 180	5.29	4.08	----	----
	TBA08050	M8 x 50	----	----	3.62	3.62
	TBA08060	M8 x 60	----	----	6.67	6.79
	TBA08065	M8 x 65	----	----	6.67	6.79
	TBA08075	M8 x 75	9.29	7.44	6.67	6.79
	TBA08090	M8 x 90	9.29	7.44	6.67	6.79
	TBA08115	M8 x 115	9.29	7.44	6.67	6.79
	TBA08120	M8 x 120	9.29	7.44	6.67	6.79
	TBA08130	M8 x 130	9.29	7.44	6.67	6.79
	TBA08155	M8 x 155	9.29	7.44	6.67	6.79
	TBA10065	M10 x 65	----	----	8.30	8.30
	TBA10070	M10 x 70	----	----	8.93	8.93
	TBA10080	M10 x 80	12.67	11.76	8.93	8.93
	TBA10090	M10 x 90	12.67	11.76	8.93	8.93
	TBA10100	M10 x 100	12.67	11.76	8.93	8.93
	TBA10120	M10 x 120	12.67	11.76	8.93	8.93
	TBA10140	M10 x 140	12.67	11.76	8.93	8.93
	TBA10150	M10 x 150	12.67	11.76	8.93	8.93
	TBA10160	M10 x 160	12.67	11.76	8.93	8.93
	TBA10170	M10 x 170	12.67	11.76	8.93	8.93
	TBA10210	M10 x 210	12.67	11.76	8.93	8.93
	TBA10230	M10 x 230	12.67	11.76	8.93	8.93
	TBA12075	M12 x 75	----	----	9.25	9.25
	TBA12080	M12 x 80	----	----	11.60	11.60
	TBA12090	M12 x 90	----	----	11.60	11.60
	TBA12100	M12 x 100	17.19	16.48	11.60	11.60
	TBA12110	M12 x 110	17.19	16.48	11.60	11.60
	TBA12120	M12 x 120	17.19	16.48	11.60	11.60
	TBA12140	M12 x 140	17.19	16.48	11.60	11.60
	TBA12160	M12 x 160	17.19	16.48	11.60	11.60
	TBA12180	M12 x 180	17.19	16.48	11.60	11.60
	TBA12220	M12 x 220	17.19	16.48	11.60	11.60
	TBA12250	M12 x 250	17.19	16.48	11.60	11.60

Characteristic Resistance [kN]

General parameters			Standard installation depth		Reduced installation depth	
Family	Code	Size	Tension N_{Rd}	Shear V_{Rd}	Tension N_{Rd}	Shear V_{Rd}
TBA	TBA14080	M14 x 80	----	----	8.93	8.93
	TBA14100	M14 x 100	----	----	16.01	22.48
	TBA14120	M14 x 120	21.30	22.48	----	----
	TBA14145	M14 x 145	21.30	22.48	----	----
	TBA14170	M14 x 170	21.30	22.48	----	----
	TBA14220	M14 x 220	21.30	22.48	----	----
	TBA14250	M14 x 250	21.30	22.48	----	----
	TBA16090	M16 x 90	----	----	11.25	11.25
	TBA16110	M16 x 110	----	----	17.19	30.72
	TBA16125	M16 x 125	25.25	30.72	17.19	30.72
	TBA16145	M16 x 145	25.25	30.72	17.19	30.72
	TBA16170	M16 x 170	25.25	30.72	17.19	30.72
	TBA16220	M16 x 220	25.25	30.72	17.19	30.72
	TBA16250	M16 x 250	25.25	30.72	17.19	30.72
	TBA16280	M16 x 280	25.25	30.72	17.19	30.72
	TBA20120	M20 x 120	----	----	19.62	39.24
	TBA20170	M20 x 170	34.28	45.04	21.30	42.60
	TBA20220	M20 x 220	34.28	45.04	21.30	42.60
	TBA20270	M20 x 270	34.28	45.04	21.30	42.60
	TBA24180	M24 x 180	27.78	67.76	----	----
	TBA24260	M24 x 260	27.78	67.76	----	----

1 KN ≈ 100 kg
Values *underlined and in italics* show Steel failure, **bold** values concrete failure and other indicate pull out failure.

Maximum Loads Recommended [kN] (with γF= 1.4)

General parameters			Standard installation depth		Reduced installation depth	
Family	Code	Size	Tension N_{rec}	Shear V_{rec}	Tension N_{rec}	Shear V_{rec}
TBA	TBA06045	M6 x 45	2.93	2.91	----	----
	TBA06055	M6 x 55	2.93	2.91	----	----
	TBA06060	M6 x 60	3.78	2.91	----	----
	TBA06065	M6 x 65	3.78	2.91	----	----
	TBA06070	M6 x 70	3.78	2.91	----	----
	TBA06080	M6 x 80	3.78	2.91	----	----
	TBA06085	M6 x 85	3.78	2.91	----	----
	TBA06090	M6 x 90	3.78	2.91	----	----
	TBA06100	M6 x 100	3.78	2.91	----	----
	TBA06110	M6 x 110	3.78	2.91	----	----
	TBA06120	M6 x 120	3.78	2.91	----	----
	TBA06130	M6 x 130	3.78	2.91	----	----
	TBA06140	M6 x 140	3.78	2.91	----	----
	TBA06150	M6 x 150	3.78	2.91	----	----
	TBA06160	M6 x 160	3.78	2.91	----	----
	TBA06170	M6 x 170	3.78	2.91	----	----
	TBA06180	M6 x 180	3.78	2.91	----	----
	TBA08050	M8 x 50	----	----	2.58	2.58
	TBA08060	M8 x 60	----	----	4.76	4.85
	TBA08065	M8 x 65	----	----	4.76	4.85
	TBA08075	M8 x 75	6.63	5.31	4.76	4.85
	TBA08090	M8 x 90	6.63	5.31	4.76	4.85
	TBA08115	M8 x 115	6.63	5.31	4.76	4.85
	TBA08120	M8 x 120	6.63	5.31	4.76	4.85
	TBA08130	M8 x 130	6.63	5.31	4.76	4.85
	TBA08155	M8 x 155	6.63	5.31	4.76	4.85
	TBA10065	M10 x 65	----	----	5.93	5.93
	TBA10070	M10 x 70	----	----	6.38	6.38
	TBA10080	M10 x 80	9.05	8.40	6.38	6.38
	TBA10090	M10 x 90	9.05	8.40	6.38	6.38
	TBA10100	M10 x 100	9.05	8.40	6.38	6.38
	TBA10120	M10 x 120	9.05	8.40	6.38	6.38
	TBA10140	M10 x 140	9.05	8.40	6.38	6.38
	TBA10150	M10 x 150	9.05	8.40	6.38	6.38
	TBA10160	M10 x 160	9.05	8.40	6.38	6.38
	TBA10170	M10 x 170	9.05	8.40	6.38	6.38
	TBA10210	M10 x 210	9.05	8.40	6.38	6.38
	TBA10230	M10 x 230	9.05	8.40	6.38	6.38
	TBA12075	M12 x 75	----	----	6.61	6.61
	TBA12080	M12 x 80	----	----	8.28	8.28
	TBA12090	M12 x 90	----	----	8.28	8.28
	TBA12100	M12 x 100	12.28	11.77	8.28	8.28
	TBA12110	M12 x 110	12.28	11.77	8.28	8.28
	TBA12120	M12 x 120	12.28	11.77	8.28	8.28
	TBA12140	M12 x 140	12.28	11.77	8.28	8.28
	TBA12160	M12 x 160	12.28	11.77	8.28	8.28
	TBA12180	M12 x 180	12.28	11.77	8.28	8.28
	TBA12220	M12 x 220	12.28	11.77	8.28	8.28
	TBA12250	M12 x 250	12.28	11.77	8.28	8.28

General parameters			Standard installation depth		Reduced installation depth	
Family	Code	Size	Tension N_{rec}	Shear V_{rec}	Tension N_{rec}	Shear V_{rec}
TBA	TBA14080	M14 x 80	----	----	6.38	6.38
	TBA14100	M14 x 100	----	----	11.44	16.06
	TBA14120	M14 x 120	15.22	16.06	----	----
	TBA14145	M14 x 145	15.22	16.06	----	----
	TBA14170	M14 x 170	15.22	16.06	----	----
	TBA14220	M14 x 220	15.22	16.06	----	----
	TBa14250	M14 x 250	15.22	16.06	----	----
	TBA16090	M16 x 90	----	----	8.03	8.03
	TBA16110	M16 x 110	----	----	12.28	21.94
	TBA16125	M16 x 125	18.03	21.94	12.28	21.94
	TBA16145	M16 x 145	18.03	21.94	12.28	21.94
	TBA16170	M16 x 170	18.03	21.94	12.28	21.94
	TBA16220	M16 x 220	18.03	21.94	12.28	21.94
	TBA162250	M16 x 140	18.03	21.94	12.28	21.94
	TBA16280	M16 x 250	18.03	21.94	12.28	21.94
	TBA20120	M16 x 280	18.03	21.94	12.28	21.94
	TBA06170	M20 x 120	----	----	14.01	28.03
	TBA20170	M20 x 170	24.49	32.17	15.22	30.43
	TBA20220	M20 x 220	24.49	32.17	15.22	30.43
	TBA20270	M20 x 270	24.49	32.17	15.22	30.43
	TBA24180	M24 x 180	19.84	48.40	----	----
	TBA24260	M24 x 260	19.84	48.40	----	----

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Values *underlined and in italics* show Steel failure, **bold** values concrete failure and other indicate pull out failure.

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