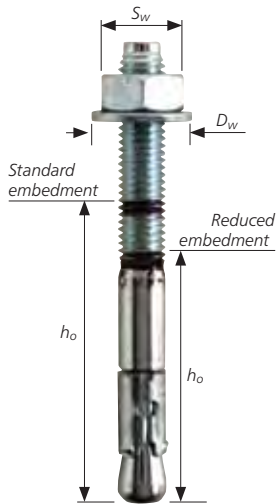


Product Information



DESCRIPTION

The RAWL® Throughbolt range has been developed to meet the changing demands of the market in terms of product approval levels, ease of fixing and product quality. The versatile through fixing for use in a wide range of applications in concrete of 20N/mm² and over.

Available in:

Zinc plated steel,
Hot dip galvanized,
Stainless steel grade A4.

For European Approvals see p. 6/7

TYPICAL APPLICATIONS

- Cladding restraint
- Curtain wall
- Balustrading
- Barriers
- Handrails
- Racking
- Structural Steel
- Bollards.

SUITABLE FOR USE IN:

Concrete

FEATURES

1. Embedment depth markings to ensure correct installation.
2. Cold formed body ensures constant dimensional accuracy.
3. Optimum cone angle for controlled expansion.
4. Tested and approved by the independent UK and international approval bodies.

RAWL® R-SPT Throughbolt - Zinc Plated



BOLT SIZE (d)	HOLE IN CONCRETE (mm) (d _o)	BOLT LENGTH (mm) (l)	NUT DIAMETER (mm) (A _F) (S _w)	WASHER DIAMETER (mm) (D _w)	THREAD LENGTH (mm) (l _G)	HOLE DIAMETER IN FIXTURE (mm) (l _G)	STANDARD EMBEDMENT			REDUCED EMBEDMENT			MINIMUM SUBSTRATE THICKNESS (mm) (h _{min})	REC. TORQUE (mm) (T _{inst})	ZINC PLATED	
							MINIMUM HOLE DEPTH (mm) (h _o)	EFFECTIVE EMBEDMENT (mm) (h _{ef})	MAXIMUM FIXTURE THICKNESS (mm) (T _{fix})	MINIMUM HOLE DEPTH (mm) (h _o)	EFFECTIVE EMBEDMENT (mm) (h _{ef})	MAXIMUM FIXTURE THICKNESS (mm) (T _{fix})			PRODUCT CODE	NEW CODE
M6	6	40	10	12.5	15	6.5	—	—	—	24	16	7	100	5	56-102	R-SPT-06040/7
		55			25		—	—	—	30	22	16			56-104	R-SPT-06055/16
		70			35		50	42	12	30	22	32			56-108	R-SPT-06070/12
		85			50		50	42	26	30	22	46			56-110	R-SPT-06085/26
		95			60		50	42	36	30	22	56			56-112	R-SPT-06095/36
M8	8	50	13	17	14	9	—	—	—	40	26	5	100	15	56-114	R-SPT-08050/5
		65			25		—	—	—	40	33	15			56-116	R-SPT-08065/15
		80			40		55	48	15	40	33	30			56-120	R-SPT-08080/15
		95			55		55	48	30	40	33	45			56-122	R-SPT-08095/30
		115			75		55	48	50	40	33	65			56-125	R-SPT-08115/50
M10	10	150			70		55	48	85	40	33	100			56-123	R-SPT-08115/85
		65	17	21	21	11	—	—	—	50	37	5	100	25	56-129	R-SPT-10065/5
		80			30		60	52	7	50	40	16			56-128	R-SPT-10080/7
		95			45		60	52	22	50	40	32			56-132	R-SPT-10095/22
		115			65		60	52	42	50	40	52			56-136	R-SPT-10115/42
		130			80		60	52	57	50	40	67			56-138	R-SPT-10130/57
M12	12	150			100		60	52	77	50	40	87			56-137	R-SPT-10150/77
		80	19	24	30	13	—	—	—	60	48	5	110	45	56-139	R-SPT-12080/5
		100			40		80	69	4	60	48	24			56-140	R-SPT-12100/4
		120			60		80	69	24	60	48	44			56-144	R-SPT-12120/24
		135			75		80	69	39	60	48	58			56-148	R-SPT-12135/39
		150			90		80	69	54	60	48	73			56-150	R-SPT-12150/54
M16	16	180			100		80	69	84	60	48	103			56-147	R-SPT-12180/84
		220			120		80	69	124	60	48	143			56-149	R-SPT-12220/124
		235			140		80	69	139	60	48	158			56-146	R-SPT-12235/139
		90	24	30	32	18	—	—	—	50	37	20	130	110	56-154	R-SPT-16090/20
		105			55		—	—	—	80	67	5			56-153	R-SPT-16105/25
M20	20	125			45		100	89	5	80	67	25			56-155	R-SPT-16125/5
		140			60		100	89	20	80	67	40			56-152	R-SPT-16140/20
		150			70		100	89	30	80	67	50			56-163	R-SPT-16150/30
		180			100		100	89	60	80	67	80			56-156	R-SPT-16180/60
		220			140		100	89	100	80	67	120			56-158	R-SPT-16220/100
M24	24	280			140		100	89	160	80	67	180			56-157	R-SPT-16280/160
		125	30	37	65	22	—	—	—	100	85	5	160	180	56-159	R-SPT-20125/5
		160			65		120	105	20	100	85	40			56-160	R-SPT-20160/20
		200			100		120	105	60	100	85	80			56-164	R-SPT-20200/60
		300			100		120	105	160	100	85	180			56-166	R-SPT-20300/160
		180	36	44	65	26	135	112	20	120	92	35	200	320	56-168	R-SPT-24180/20
M24	24	260			65		135	112	100	120	92	115			56-172	R-SPT-24260/100
		300			105		135	112	140	120	92	155			56-175	R-SPT-24300/140

Product Information

RAWL® R-SPT Throughbolt - Hot Dip Galvanized

BOLT SIZE (d)	HOLE IN CONCRETE (mm) (d _o)	BOLT LENGTH (mm) (l)	NUT DIAMETER (mm) (A _F) (S _W)	WASHER DIAMETER (mm) (D _W)	THREAD LENGTH (mm) (l _G)	HOLE DIAMETER IN FIXTURE (mm) (l _G)	STANDARD EMBEDMENT			REDUCED EMBEDMENT			MINIMUM SUBSTRATE THICKNESS (mm) (h _{min})	REC. TORQUE (mm) (T _{inst})	HOT DIP GALVANIZED	
							MINIMUM HOLE DEPTH (mm) (h _o)	EFFECTIVE EMBEDMENT (mm) (h _{ef})	MAXIMUM FIXTURE THICKNESS (mm) (T _{fix})	MINIMUM HOLE DEPTH (mm) (h _o)	EFFECTIVE EMBEDMENT (mm) (h _{ef})	MAXIMUM FIXTURE THICKNESS (mm) (T _{fix})			PRODUCT CODE	NEW CODE
M8	8	50	13	17	14	9	—	—	—	40	26	5	100	15	56-814	R-SPT-HD-08050/5
		65			25		—	—	—	40	33	15			56-816	R-SPT-HD-08065/15
		80			40		55	48	15	40	33	30			56-820	R-SPT-HD-08080/15
		95			55		55	48	30	40	33	45			56-822	R-SPT-HD-08095/30
		115			75		55	48	50	40	33	65			56-825	R-SPT-HD-08115/50
M10	10	65	17	21	21	11	—	—	—	50	37	5	100	25	56-829	R-SPT-HD-10065/5
		80			30		60	52	7	50	39	16			56-828	R-SPT-HD-10080/7
		95			45		60	52	22	50	40	32			56-832	R-SPT-HD-10095/22
		115			65		60	52	42	50	40	52			56-836	R-SPT-HD-10115/42
		130			80		60	52	57	50	40	67			56-838	R-SPT-HD-10130/57
M12	12	80	19	24	30	13	—	—	—	60	48	5	110	45	56-839	R-SPT-HD-12080/5
		100			40		80	69	4	60	48	24			56-840	R-SPT-HD-12100/4
		120			60		80	69	24	60	48	44			56-844	R-SPT-HD-12120/24
		135			75		80	69	39	60	48	58			56-848	R-SPT-HD-12135/39
		150			90		80	69	54	60	48	75			56-850	R-SPT-HD-12150/54
M16	16	105	24	30	55	18	—	—	—	80	65	5	130	110	56-853	R-SPT-HD-16105/25
		140			60		100	89	20	80	67	40			56-852	R-SPT-HD-16140/20
		180			100		100	89	60	80	67	80			56-856	R-SPT-HD-16180/60
		220			140		100	89	100	80	67	120			56-858	R-SPT-HD-16220/100
M20	20	125	30	37	65	22	—	—	—	100	80	5	160	180	56-859	R-SPT-HD-20125/5
		160			65		120	105	20	100	85	40			56-860	R-SPT-HD-20160/20
		200			100		120	105	60	100	85	80			56-864	R-SPT-HD-20200/60
M24	24	260	36	44	65	26	135	112	100	120	92	115	200	320	56-872	R-SPT-HD-24260/100

RAWL® R-SPT Throughbolt - Stainless Steel Grade 316 (A4)

BOLT SIZE (d)	HOLE IN CONCRETE (mm) (d _o)	BOLT LENGTH (mm) (l)	NUT DIAMETER (mm) (A _F) (S _W)	WASHER DIAMETER (mm) (D _W)	THREAD LENGTH (mm) (l _G)	HOLE DIAMETER IN FIXTURE (mm) (l _G)	STANDARD EMBEDMENT			REDUCED EMBEDMENT			MINIMUM SUBSTRATE THICKNESS (mm) (h _{min})	REC. TORQUE (mm) (T _{inst})	STAINLESS STEEL GRADE 316 (A4)	
							MINIMUM HOLE DEPTH (mm) (h _o)	EFFECTIVE EMBEDMENT (mm) (h _{ef})	MAXIMUM FIXTURE THICKNESS (mm) (T _{fix})	MINIMUM HOLE DEPTH (mm) (h _o)	EFFECTIVE EMBEDMENT (mm) (h _{ef})	MAXIMUM FIXTURE THICKNESS (mm) (T _{fix})			PRODUCT CODE	NEW CODE
M6	6	55	10	12.5	25	6.5	—	—	—	30	22	16	100	5	56-604	R-SPT-A4-06055/16
		85			50		50	42	26	30	22	46			56-610	R-SPT-A4-06085/26
M8	8	50	13	17	14	9	—	—	—	40	26	5	100	15	56-614	R-SPT-A4-08050/5
		65			25		—	—	—	40	33	15			56-616	R-SPT-A4-08065/15
		80			40		55	48	15	40	33	30			56-620	R-SPT-A4-08080/15
		105			25		55	48	40	40	33	55			56-624	R-SPT-A4-080105/40
M10	10	65	17	21	21	11	—	—	—	50	37	5	100	25	56-627	R-SPT-A4-10065/5
		80			30		60	52	7	50	39	16			56-628	R-SPT-A4-10080/7
		95			45		60	52	22	50	40	32			56-632	R-SPT-A4-10095/22
		115			65		60	52	42	50	40	52			56-636	R-SPT-A4-10115/42
		130			80		60	52	57	50	40	67			56-638	R-SPT-A4-10130/57
M12	12	100	19	24	40	13	80	69	4	60	48	24	110	45	56-640	R-SPT-A4-12100/4
		120			60		80	69	24	60	48	44			56-644	R-SPT-A4-12120/24
		135			75		80	69	39	60	48	58			56-648	R-SPT-A4-12135/39
		150			90		80	69	54	60	48	75			56-650	R-SPT-A4-12150/54
M16	16	105	24	30	55	18	—	—	—	80	65	5	130	110	56-651	R-SPT-A4-16105/25
		140			60		100	89	20	80	67	40			56-652	R-SPT-A4-16140/20
		180			100		100	89	60	80	67	80			56-656	R-SPT-A4-16180/60
		220			140		100	89	100	80	67	120			56-658	R-SPT-A4-16220/100
M20	20	125	30	37	65	22	—	—	—	100	80	5	160	180	56-659	R-SPT-A4-20125/5
		160			65		120	105	20	100	85	40			56-660	R-SPT-A4-20160/20
		200			100		120	105	60	100	85	80			56-664	R-SPT-A4-20200/60
		300			100		120	105	160	100	85	180			56-666	R-SPT-A4-20300/160
M24	24	260	36	44	65	26	135	112	100	120	92	115	200	320	56-672	R-SPT-A4-24260/100

Specification Data

RAWL® SPT Throughbolt Zinc Plated Performance Data

SIZE	CONCRETE, $f_{ck,cube} = 30\text{N/mm}^2$ (C20/25)														CHARACTERISTIC EDGE DISTANCE (mm)	CHARACTERISTIC SPACING (mm)
	STANDARD EMBEDMENT DEPTH						REDUCED EMBEDMENT DEPTH									
	CHARACTERISTIC LOAD (kN)		DESIGN RESISTANCE (Factored) (kN)		RECOMMENDED LOAD (Unfactored) (kN)		CHARACTERISTIC LOAD (kN)		DESIGN RESISTANCE (Factored) (kN)		RECOMMENDED LOAD (Unfactored) (kN)					
	TENSION (N_{Rk})	SHEAR (V_{Rk})	TENSION (N_{Rd})	SHEAR (V_{Rd})	TENSION (N_{rec})	SHEAR (V_{rec})	TENSION (N_{Rk})	SHEAR (V_{Rk})	TENSION (N_{Rd})	SHEAR (V_{Rd})	TENSION (N_{rec})	SHEAR (V_{rec})	TENSION & SHEAR ($C_{cr,N}$)($C_{cr,V}$)	TENSION & SHEAR ($S_{cr,N}$)($S_{cr,V}$)		
M6	6.8	7.1	3.1	3.9	2.6	3.3	4.5	4.7	2.1	2.6	1.8	2.2	60	80		
M8	10.5	13.6	4.9	7.5	4.1	6.3	8.5	10.1	4.0	5.6	3.3	4.7	80	100		
M10	15.1	18.4	7.0	10.2	5.8	8.5	10.7	15.3	5.0	8.5	4.2	7.1	100	120		
M12	23.7	26.6	11.0	14.8	9.2	12.3	15.0	22.9	7.0	12.7	5.8	10.6	120	150		
M16	36.6	50.3	17.0	28.0	14.2	23.3	23.0	42.5	10.7	23.6	8.9	19.7	160	180		
M20	45.7	73.3	21.2	40.7	17.7	33.9	38.0	63.2	17.6	35.1	14.7	29.3	190	260		
M24	52.8	94.5	24.4	52.5	20.3	43.8	48.9	87.2	22.7	48.4	18.9	40.3	250	300		

For further explanations on calculations please see pages 10 and 11

Edge Distance Zinc Plated (Concrete Only)

EDGE (mm)	TENSILE: EDGE REDUCTION FACTORS							SHEAR: EDGE REDUCTION FACTORS						
	M6	M8	M10	M12	M16	M20	M24	M6	M8	M10	M12	M16	M20	M24
30	0.60													
40	0.73	0.60						0.64						
50	0.87	0.73						0.82	0.62					
60	1.00	0.87	0.65					1.00	0.74	0.60				
80		1.00	0.83	0.65					1.00	0.80	0.67			
100			1.00	0.83	0.65					1.00	0.84	0.62		
120				1.00	0.77	0.65					1.00	0.74	0.58	
140					0.88	0.77	0.65				0.87	0.73	0.58	
160					1.00	0.88	0.74				1.00	0.82	0.66	
190						1.00	0.83					1.00	0.78	
220							0.91						0.88	
250							1.00						1.00	

Spacing (Concrete Only)

SPACING (mm)	TENSILE & SHEAR REDUCTION FACTORS						
	M6	M8	M10	M12	M16	M20	M24
30							
40	0.65						
50	0.77	0.65					
60	0.88	0.77	0.65				
80	1.00	0.88	0.77	0.65			
100		1.00	0.88	0.77	0.65		
120			1.00	0.88	0.77		
150				1.00	0.88	0.74	
180					1.00	0.83	0.74
190						0.91	0.83
220						1.00	0.91
260							1.00

RAWL® SPT Throughbolt Stainless Steel Performance Data

SIZE	CONCRETE, $f_{ck,cube} = 30\text{N/mm}^2$ (C20/25)															
	STANDARD EMBEDMENT DEPTH						REDUCED EMBEDMENT DEPTH						CHARACTERISTIC EDGE DISTANCE (mm)		CHARACTERISTIC SPACING (mm)	
	CHARACTERISTIC LOAD (kN)		DESIGN LOAD (factored) (kN)		RECOMMENDED LOAD (unfactored) (kN)		CHARACTERISTIC LOAD (kN)		DESIGN LOAD (factored) (kN)		RECOMMENDED LOAD (unfactored) (kN)					
	TENSION (N_{Rk})	SHEAR (V_{Rk})	TENSION (N_{Rd})	SHEAR (V_{Rd})	TENSION (N_{rec})	SHEAR (V_{rec})	TENSION (N_{Rk})	SHEAR (V_{Rk})	TENSION (N_{Rd})	SHEAR (V_{Rd})	TENSION (N_{rec})	SHEAR (V_{rec})	TENSION ($C_{cr,N}$)	SHEAR ($C_{cr,V}$)	TENSION & SHEAR ($S_{cr,N}$) ($S_{cr,V}$)	
M6	7.6	8.0	3.5	4.4	2.9	3.7	5.0	5.7	2.3	3.2	1.9	2.7	60	80	120	
M8	11.1	14.7	5.1	8.1	4.3	6.8	9.2	11.3	4.3	6.3	3.6	5.3	80	100	150	
M10	17.5	23.1	8.1	12.8	6.8	10.7	11.1	19.3	5.2	10.7	4.3	8.9	100	110	170	
M12	26.3	33.5	12.2	18.6	10.2	15.5	17.2	28.7	8.0	15.9	6.7	13.3	120	140	210	
M16	40.5	61.4	18.8	34.1	15.7	28.4	28.1	51.8	13.0	28.8	10.8	24.0	160	180	270	
M20	54.3	96.0	25.1	53.3	20.9	44.4	47.1	79.4	21.8	36.5	18.2	30.4	190	210	310	
M24	64.7	131.2	30.0	72.9	25.0	60.8	60.9	103.4	28.2	57.5	23.5	47.9	230	230	350	

Edge Distance Stainless Steel (Concrete Only)

EDGE (mm)	TENSILE: EDGE REDUCTION FACTORS							SHEAR: EDGE REDUCTION FACTORS						
	M6	M8	M10	M12	M16	M20	M24	M6	M8	M10	M12	M16	M20	M24
30	0.60													
40	0.73	0.60						0.60						
50	0.87	0.70						0.74	0.50					
60	1.00	0.81	0.65					1.00	0.74	0.61				
80		1.00	0.83	0.70					1.00	0.87	0.60			
100			1.00	0.85	0.65					1.00	0.70			
110				0.92	0.71						0.81	0.60		
120				1.00	0.77	0.65					1.00	0.74	0.60	
140					0.88	0.75	0.61					0.86	0.71	0.62
160					1.00	0.85	0.70					1.00	0.83	0.72
180						0.95	0.79						0.88	0.78
190						1.00	0.83						1.0	0.89
210							0.91							1.0
230							1.0							1.0

Spacing (Concrete Only)

SPACING (mm)	TENSILE & SHEAR REDUCTION FACTORS						
	M6	M8	M10	M12	M16	M20	M24
30							
40							
50							
60	0.65						
80	0.77	0.67					
100	0.88	0.75	0.68				
120	1.00	0.85	0.76	0.70			
150		1.00	0.90	0.80	0.70		
170				0.86	0.75	0.70	
210				1.00	0.85	0.79	0.70
230					0.90	0.83	0.74
270					1.00	0.91	0.83
310						1.00	0.91
350							1.00

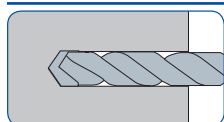
Reduction Factors - Edge and Spacing Distances for Rawl® SPT.

The full characteristic edge and spacing distances shown in the table above are the minimum allowable for the quoted DESIGN RESISTANCE or RECOMMENDED LOAD, depending on your design method.

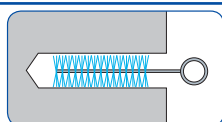
Where these dimensions are not achievable, the appropriate reduction factor/s from the tables below must be applied to the DESIGN RESISTANCE or RECOMMENDED LOAD. Choose the required bolt diameter across the top of the appropriate table and read down the left hand column until actual edge or spacing distance is found.

Read off the reduction factor where the two lines intersect (interpolate as required). Multiply this factor by the DESIGN RESISTANCE or RECOMMENDED LOAD quoted in the table. On the occasion that multiple close edge and/or spacing distances occur, the appropriate reduction factors must be applied.

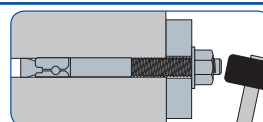
Installation



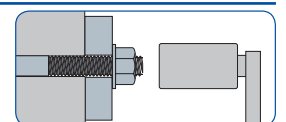
1. Drill a hole of required diameter and depth.



2. Remove debris and thoroughly clean hole with brush and pump.



3. Lightly tap the throughbolt through the fixture into the hole with a hammer, until fixing depth is reached.



4. Tighten to the recommended torque.