



ETA Option 7 Approved  
toughbolt for simple and  
economical applications.



[ETA-11/0080](#), [UK-DoP-e11/0080](#)

## FEATURES



## Material

Carbon Steel, Zinc Plated and Passivated



## APPLICATIONS

### Header member

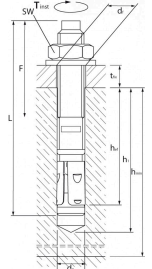
- non-cracked concrete

### For Use With

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TECHNICAL DATA

Product Dimensions



References	Item Code	Tun / DB nr.	NOB nr.	Thread diameter [mm]	Drill Ø x Depth of Drilled Hole [d0 x h1] [mm]	Max. Fixture Thickness [tfix] [mm]	Ø Fixture Hole [df] [mm]	Embedment depth [hef] [mm]	Total Length [L] [mm]	Thread length [f] [mm]	Packaging [pce]
WA M6-65/10	WA06065	-	-	6	6x55	10	7	40	65	30	100
WA M6-85/30	WA06085	-	-	6	6x55	30	7	40	85	40	100
WA M8-68/5	WA08068	-	-	8	8x65	5	9	45	68	40	50
WA M8-73/10	WA08073	-	-	8	8x65	10	9	45	73	45	50
WA M8-83/20	WA08083	-	-	8	8x65	20	9	45	83	45	50
WA M8-93/30	WA08093	-	-	8	8x65	30	9	45	93	50	50
WA M8-103/40	WA08103	-	-	8	8x65	40	9	45	103	50	50
WA M8-113/50	WA08113	-	-	8	8x65	50	9	45	113	60	50
WA M8-133/70	WA08133	-	-	8	8x65	70	9	45	133	85	50
WA M8-163/100	WA08163	-	-	8	8x65	100	9	45	163	100	50
WA M10-78/5	WA10078	-	-	10	10x70	5	12	50	78	40	50
WA M10-83/10	WA10083	-	-	10	10x70	10	12	50	83	40	50
WA M10-93/20	WA10093	-	-	10	10x70	20	12	50	93	50	50
WA M10-103/30	WA10103	-	-	10	10x70	30	12	50	103	50	50
WA M10-113/40	WA10113	-	-	10	10x70	40	12	50	113	60	50
WA M10-123/50	WA10123	-	-	10	10x70	50	12	50	123	60	50
WA M10-143/70	WA10143	-	-	10	10x70	70	12	50	143	70	50
WA M10-173/100	WA10173	-	-	10	10x70	100	12	50	173	80	50
WA M10-213/140	WA10213	-	-	10	10x70	140	12	50	213	100	50
WA M10-233/160	WA10233	-	-	10	10x70	160	12	50	233	125	50
WA M12-104/5	WA12104	-	-	12	12x90	5	14	65	104	60	25
WA M12-109/10	WA12109	-	-	12	12x90	10	14	65	109	60	25
WA M12-119/20	WA12119	-	-	12	12x90	20	14	65	119	70	25
WA M12-129/30	WA12129	-	-	12	12x90	30	14	65	129	70	25
WA M12-139/40	WA12139	-	-	12	12x90	40	14	65	139	80	25
WA M12-149/50	WA12149	-	-	12	12x90	50	14	65	149	100	25
WA M12-179/80	WA12179	-	-	12	12x90	80	14	65	179	110	25
WA M12-199/100	WA12199	-	-	12	12x90	100	14	65	199	110	25
WA M12-219/120	WA12219	-	-	12	12x90	120	14	65	219	125	25
WA M12-239/140	WA12239	-	-	12	12x90	140	14	65	239	125	25
WA M12-259/160	WA12259	-	-	12	12x90	160	14	65	259	125	20
WA M16-110/5	WA16110	-	-	16	16x110	5	18	70	110	50	20
WA M16-151/30	WA16151	-	-	16	16x110	30	18	80	151	80	20
WA M16-171/50	WA16171	-	-	16	16x110	50	18	80	171	80	20

References	Item Code	Tun / DB nr.	NOB nr.	Thread diameter [mm]	Drill Ø x Depth of Drilled Hole [d0 x h1] [mm]	Max. Fixture Thickness [tfix] [mm]	Ø Fixture Hole [df] [mm]	Embedment depth [hef] [mm]	Total Length [L] [mm]	Thread length [f] [mm]	Packaging [pce]
WA M16-201/80	WA16201	-	-	16	16x110	80	18	80	201	100	10
WA M16-221/100	WA16221	-	-	16	16x110	100	18	80	221	100	10
WA M16-261/140	WA16261	-	-	16	16x110	140	18	80	261	110	10
WA M16-281/160	WA16281	-	-	16	16x110	160	18	80	281	125	10
WA M16-321/200	WA16321	-	-	16	16x110	200	18	80	321	150	10
WA M20-120/5	WA2012	-	-	20	20x130	5	22	100	120	100	10
WA M20-173/30*	WA20173	-	-	20	20x130	30	22	100	173	100	10
WA M20-193/60*	WA20193	-	-	20	20x130	60	22	100	193	100	10
WA M20-223/80*	WA20223	-	-	20	20x130	80	22	100	223	125	10
WA M20-263/120*	WA20263	-	-	20	20x130	120	22	100	263	150	10

\* Not included in the approval

Recommended loads / for single anchors / with no edge distances or spacings

References	Non-cracked concrete								Non-cracked concrete		Bending moment <sup>(1-6)</sup> [Nm]
	Tension <sup>(1-2)</sup> [kN]				Shear <sup>(1-3)</sup> [kN]				Tension - N <sub>R,d</sub>	Shear - V <sub>R,d</sub>	
	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	C20/25 [kN]	C20/25 [kN]	
WA M6-65/10	4.3	4.6	5	5.3	3.4	3.4	3.4	3.4	-	-	5.7
WA M6-85/30	4.3	4.6	5	5.3	3.4	3.4	3.4	3.4	-	-	5.7
WA M8-68/5	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	-	-	13.8
WA M8-73/10	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	-	-	13.8
WA M8-83/20	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	-	-	13.8
WA M8-93/30	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	-	-	13.8
WA M8-103/40	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	-	-	13.8
WA M8-113/50	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	-	-	13.8
WA M8-133/70	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	-	-	13.8
WA M8-163/100	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	-	-	13.8
WA M10-78/5	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M10-83/10	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M10-93/20	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M10-103/30	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M10-113/40	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M10-123/50	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M10-143/70	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M10-173/100	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M10-213/140	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M10-233/160	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	-	-	27.1
WA M12-104/5	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-109/10	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-119/20	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-129/30	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-139/40	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-149/50	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-179/80	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-199/100	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-219/120	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-239/140	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M12-259/160	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	-	-	47.1
WA M16-110/5	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	-	-	111
WA M16-151/30	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	-	-	111
WA M16-171/50	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	-	-	111
WA M16-201/80	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	-	-	111

References	Non-cracked concrete								Non-cracked concrete		Bending moment <sup>(1-6)</sup> [Nm]
	Tension <sup>(1-2)</sup> [kN]				Shear <sup>(1-3)</sup> [kN]				Tension - N <sub>R,d</sub>	Shear - V <sub>R,d</sub>	
	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	C20/25 [kN]	C20/25 [kN]	
WA M16-221/100	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	-	-	111
WA M16-261/140	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	-	-	111
WA M16-281/160	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	-	-	111
WA M16-321/200	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	-	-	111
WA M20-120/5	-	-	-	-	-	-	-	-	-	-	-
WA M20-173/30*	19.9	19.9	19.9	19.9	26.7	26.7	26.7	26.7	-	-	141.4
WA M20-193/60*	19.9	19.9	19.9	19.9	26.7	26.7	26.7	26.7	-	-	141.4
WA M20-223/80*	19.9	19.9	19.9	19.9	26.7	26.7	26.7	26.7	-	-	141.4
WA M20-263/120*	19.9	19.9	19.9	19.9	26.7	26.7	26.7	26.7	-	-	141.4

\* Not included in the approval

1. The recommended loads have been calculated using the partial safety factors for resistances stated in ETA-approval(s) and with a partial safety factor for actions of  $\gamma_F=1.4$ . The loading figures are valid for unreinforced concrete and reinforced concrete with a rebar spacing  $s \geq 15$  cm (any diameter) or with a rebar spacing  $s \geq 10$  cm, if the rebar diameter is 10 mm or smaller.

2. The figures for shear are based on a single anchor without influence of concrete edges. For anchorages close to edges ( $c \leq \max [10 \text{ hef}; 60d]$ ) the concrete edge failure shall be checked per ETAG 001, Annex C, design method A.

3. Concrete is considered non-cracked when the tensile stress within the concrete is L equals the tensile stress within the concrete induced by external loads, anchors loads included).

Design capacities - single anchor - no edge distances

References	Design capacity - Non-cracked concrete <sup>(3)</sup>								Bending moment M <sub>Rd</sub> [Nm]
	Tension - N <sub>Rd</sub> <sup>(1)</sup> [kN]				Shear - V <sub>Rd</sub> <sup>(1-2)</sup> [kN]				
	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	
WA M6-65/10	6	6.5	7	7.4	4.8	4.8	4.8	4.8	8
WA M6-85/30	6	6.5	7	7.4	4.8	4.8	4.8	4.8	8
WA M8-68/5	8	9.8	11.3	12.4	7.6	7.6	7.6	7.6	19.3
WA M8-73/10	8	9.8	11.3	12.4	7.6	7.6	7.6	7.6	19.3
WA M8-83/20	8	9.8	11.3	12.4	7.6	7.6	7.6	7.6	19.3
WA M8-93/30	8	9.8	11.3	12.4	7.6	7.6	7.6	7.6	19.3
WA M8-103/40	8	9.8	11.3	12.4	7.6	7.6	7.6	7.6	19.3
WA M8-113/50	8	9.8	11.3	12.4	7.6	7.6	7.6	7.6	19.3
WA M8-133/70	8	9.8	11.3	12.4	7.6	7.6	7.6	7.6	19.3
WA M8-163/100	8	9.8	11.3	12.4	7.6	7.6	7.6	7.6	19.3
WA M10-78/5	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38
WA M10-83/10	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38
WA M10-93/20	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38
WA M10-103/30	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38
WA M10-113/40	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38
WA M10-123/50	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38
WA M10-143/70	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38

References	Design capacity - Non-cracked concrete <sup>(3)</sup>								Bending moment M <sub>Rd</sub> [Nm]
	Tension - N <sub>Rd</sub> <sup>(1)</sup> [kN]				Shear - V <sub>Rd</sub> <sup>(1-2)</sup> [kN]				
	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	
WA M10-173/100	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38
WA M10-213/140	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38
WA M10-233/160	10.7	13	15	16.5	11.9	13.6	13.6	13.6	38
WA M12-104/5	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-109/10	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-119/20	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-129/30	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-139/40	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-149/50	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-179/80	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-199/100	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-219/120	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-239/140	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M12-259/160	17.6	21.5	24.9	27.3	20	20	20	20	66
WA M16-110/5	24.1	29.4	34	37.3	37.6	37.6	37.6	37.6	155.3
WA M16-151/30	24.1	29.4	34	37.3	37.6	37.6	37.6	37.6	155.3
WA M16-171/50	24.1	29.4	34	37.3	37.6	37.6	37.6	37.6	155.3
WA M16-201/80	24.1	29.4	34	37.3	37.6	37.6	37.6	37.6	155.3
WA M16-221/100	24.1	29.4	34	37.3	37.6	37.6	37.6	37.6	155.3
WA M16-261/140	24.1	29.4	34	37.3	37.6	37.6	37.6	37.6	155.3
WA M16-281/160	24.1	29.4	34	37.3	37.6	37.6	37.6	37.6	155.3
WA M16-321/200	24.1	29.4	34	37.3	37.6	37.6	37.6	37.6	155.3
WA M20-120/5	27.9	27.9	27.9	27.9	37.4	37.4	37.4	37.4	198
WA M20-173/30*	27.9	27.9	27.9	27.9	37.4	37.4	37.4	37.4	198
WA M20-193/60*	27.9	27.9	27.9	27.9	37.4	37.4	37.4	37.4	198
WA M20-223/80*	27.9	27.9	27.9	27.9	37.4	37.4	37.4	37.4	198
WA M20-263/120*	27.9	27.9	27.9	27.9	37.4	37.4	37.4	37.4	198

1. The design loads have been calculated using the partial safety factors for resistances stated in ETA-approval(s). The loading figures are valid for unreinforced concrete and reinforced concrete with a rebar spacing  $s \geq 15$  cm (any diameter) or with a rebar spacing  $s \geq 10$  cm, if the rebar diameter is 10mm or smaller.

2. The figures for shear are based on a single anchor without influence of concrete edges. For anchorages close to edges ( $c \leq \max [10 \text{ hef}; 60d]$ ) the concrete edge failure shall be checked per ETAG 001, Annex C, design method A.

3. Concrete is considered non-cracked when the tensile stress within the concrete is  $\sigma_L + \sigma_R \leq 0$ . In the absence of detailed verification  $\sigma_R = 3 \text{ N/mm}^2$  can be assumed ( $\sigma_L$  equals the tensile stress within the concrete induced by external loads, anchors loads included).

\*Not covered by ETA-11/0080

Recommended capacities - single anchor - no edge distances

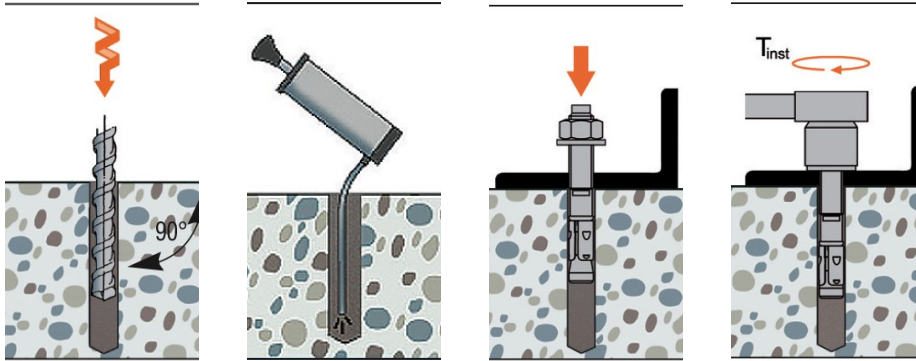
References	Recommended capacity - Non-cracked concrete								Bending moment $M_{rec}^{(1-6)}$ [Nm]
	Tension - $N_{rec}^{(1-2)}$ [kN]				Shear - $V_{rec}^{(1-3)}$ [kN]				
	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	
WA M6-65/10	4.3	4.6	5	5.3	3.4	3.4	3.4	3.4	5.7
WA M6-85/30	4.3	4.6	5	5.3	3.4	3.4	3.4	3.4	5.7
WA M8-68/5	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	13.8
WA M8-73/10	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	13.8
WA M8-83/20	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	13.8
WA M8-93/30	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	13.8
WA M8-103/40	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	13.8
WA M8-113/50	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	13.8
WA M8-133/70	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	13.8
WA M8-163/100	5.7	7	8.1	8.9	5.4	5.4	5.4	5.4	13.8
WA M10-78/5	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M10-83/10	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M10-93/20	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M10-103/30	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M10-113/40	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M10-123/50	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M10-143/70	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M10-173/100	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M10-213/140	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M10-233/160	7.6	9.3	10.7	11.8	8.8	9.7	9.7	9.7	27.1
WA M12-104/5	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M12-109/10	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M12-119/20	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M12-129/30	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M12-139/40	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M12-149/50	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M12-179/80	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M12-199/100	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1

References	Recommended capacity - Non-cracked concrete								Bending moment $M_{rec}^{(1-6)}$ [Nm]
	Tension - $N_{rec}^{(1-2)}$ [kN]				Shear - $V_{rec}^{(1-3)}$ [kN]				
	C20/25	C30/37	C40/50	C50/60	C20/25	C30/37	C40/50	C50/60	
WA M12-219/120	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M12-239/140	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M12-259/160	12.6	15.4	17.8	19.5	14.3	14.3	14.3	14.3	47.1
WA M16-110/5	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	111
WA M16-151/30	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	111
WA M16-171/50	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	111
WA M16-201/80	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	111
WA M16-221/100	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	111
WA M16-261/140	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	111
WA M16-281/160	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	111
WA M16-321/200	17.2	21	24.3	26.7	26.9	26.9	26.9	26.9	111
WA M20-120/5	19.9	19.9	19.9	19.9	26.7	26.7	26.7	26.7	-
WA M20-173/30*	19.9	19.9	19.9	19.9	26.7	26.7	26.7	26.7	141.4
WA M20-193/60*	19.9	19.9	19.9	19.9	26.7	26.7	26.7	26.7	141.4
WA M20-223/80*	19.9	19.9	19.9	19.9	26.7	26.7	26.7	26.7	141.4
WA M20-263/120*	19.9	19.9	19.9	19.9	26.7	26.7	26.7	26.7	141.4

1. The recommended loads have been calculated using the partial safety factors for resistances stated in ETA-approval(s) and with a partial safety factor for actions of  $\gamma_F=1.4$ . The loading figures are valid for unreinforced concrete and reinforced concrete with a rebar spacing  $s \geq 15$  cm (any diameter) or with a rebar spacing  $s \geq 10$  cm, if the rebar diameter is 10 mm or smaller.
2. The figures for shear are based on a single anchor without influence of concrete edges. For anchorages close to edges ( $c \leq \max [10 \text{ hef}; 60d]$ ) the concrete edge failure shall be checked per ETAG 001, Annex C, design method A.
3. Concrete is considered non-cracked when the tensile stress within the concrete is  $\sigma_L + \sigma_R \leq 0$ . In the absence of detailed verification  $\sigma_R = 3 \text{ N/mm}^2$  can be assumed ( $\sigma_L$  equals the tensile stress within the concrete induced by external loads, anchors loads included).

INSTALLATION

Installation



Percer le trou

Dépoussiérer le trou

Monter la cheville au travers de la pièce à fixer

Appliquer le couple de serrage

Spacing, Edge Distance and Member Thickness

References	Ø drilling hole [d0] [mm]	Min. drill depth [h1] [mm]	&Oslmash drilling fixture [df] [mm]	Wrench size [SW] [mm]	Installation torque [Tinst] [Nm]	Embedment depth [hef] [mm]	Min. support thickness [hmin] [mm]	Characteristic spacing <sup>(5)</sup> - S <sub>cr,N</sub> [scr,N] [mm]	Characteristic edge distance [ccr,N] [mm]
WA M6-65/10	6	55	7	10	8	40	100	120	60
WA M6-85/30	6	55	7	10	8	40	100	120	60
WA M8-68/5	8	65	9	13	15	45	100	135	68
WA M8-73/10	8	65	9	13	15	45	100	135	68
WA M8-83/20	8	65	9	13	15	45	100	135	68
WA M8-93/30	8	65	9	13	15	45	100	135	68
WA M8-103/40	8	65	9	13	15	45	100	135	68
WA M8-113/50	8	65	9	13	15	45	100	135	68
WA M8-133/70	8	65	9	13	15	45	100	135	68
WA M8-163/100	8	65	9	13	15	45	100	135	68
WA M10-78/5	10	70	12	17	30	50	100	150	75
WA M10-83/10	10	70	12	17	30	50	100	150	75
WA M10-93/20	10	70	12	17	30	50	100	150	75
WA M10-103/30	10	70	12	17	30	50	100	150	75
WA M10-113/40	10	70	12	17	30	50	100	150	75
WA M10-123/50	10	70	12	17	30	50	100	150	75
WA M10-143/70	10	70	12	17	30	50	100	150	75
WA M10-173/100	10	70	12	17	30	50	100	150	75
WA M10-213/140	10	70	12	17	30	50	100	150	75
WA M10-233/160	10	70	12	17	30	50	100	150	75
WA M12-104/5	12	90	14	19	50	65	130	195	98
WA M12-109/10	12	90	14	19	50	65	130	195	98
WA M12-119/20	12	90	14	19	50	65	130	195	98
WA M12-129/30	12	90	14	19	50	65	130	195	98
WA M12-139/40	12	90	14	19	50	65	130	195	98
WA M12-149/50	12	90	14	19	50	65	130	195	98



References	Ø drilling hole [d0] [mm]	Min. drill depth [h1] [mm]	&Oslmash drilling fixture [df] [mm]	Wrench size [SW] [mm]	Installation torque [Tinst] [Nm]	Embedment depth [hef] [mm]	Min. support thickness [hmin] [mm]	Characteristic spacing <sup>(5)</sup> - S <sub>cr,N</sub> [scr,N] [mm]	Characteristic edge distance [ccr,N] [mm]
WA M12-179/80	12	90	14	19	50	65	130	195	98
WA M12-199/100	12	90	14	19	50	65	130	195	98
WA M12-219/120	12	90	14	19	50	65	130	195	98
WA M12-239/140	12	90	14	19	50	65	130	195	98
WA M12-259/160	12	90	14	19	50	65	130	195	98
WA M16-110/5	16	110	18	24	100	80	160	240	120
WA M16-151/30	16	110	18	24	100	80	160	240	120
WA M16-171/50	16	110	18	24	100	80	160	240	120
WA M16-201/80	16	110	18	24	100	80	160	240	120
WA M16-221/100	16	110	18	24	100	80	160	240	120
WA M16-261/140	16	110	18	24	100	80	160	240	120
WA M16-281/160	16	110	18	24	100	80	160	240	120
WA M16-321/200	16	110	18	24	100	80	160	240	120
WA M20-120/5	20	130	22	30	200	100	200	300	150
WA M20-173/30*	20	130	22	30	200	100	200	300	150
WA M20-193/60*	20	130	22	30	200	100	200	300	150
WA M20-223/80*	20	130	22	30	200	100	200	300	150
WA M20-263/120*	20	130	22	30	200	100	200	300	150

\* Not included in the approval

Installation data

References	Min. edge distance [cmin] [mm]	Minimum spacing [smin] [mm]	Characteristic spacing <sup>(5)</sup> - S <sub>cr,N</sub> [scr,N] [mm]	Characteristic edge distance [ccr,N] [mm]
WA M6-65/10	40	30	120	60
WA M6-85/30	40	30	120	60
WA M8-68/5	40	40	135	68
WA M8-73/10	40	40	135	68
WA M8-83/20	40	40	135	68
WA M8-93/30	40	40	135	68
WA M8-103/40	40	40	135	68
WA M8-113/50	40	40	135	68
WA M8-133/70	40	40	135	68
WA M8-163/100	40	40	135	68
WA M10-78/5	50	50	150	75
WA M10-83/10	50	50	150	75
WA M10-93/20	50	50	150	75
WA M10-103/30	50	50	150	75
WA M10-113/40	50	50	150	75
WA M10-123/50	50	50	150	75
WA M10-143/70	50	50	150	75
WA M10-173/100	50	50	150	75
WA M10-213/140	50	50	150	75
WA M10-233/160	50	50	150	75
WA M12-104/5	70	70	195	98
WA M12-109/10	70	70	195	98
WA M12-119/20	70	70	195	98
WA M12-129/30	70	70	195	98
WA M12-139/40	70	70	195	98
WA M12-149/50	70	70	195	98
WA M12-179/80	70	70	195	98
WA M12-199/100	70	70	195	98
WA M12-219/120	70	70	195	98
WA M12-239/140	70	70	195	98

References	Min. edge distance [cmin] [mm]	Minimum spacing [smin] [mm]	Characteristic spacing <sup>(5)</sup> - $S_{cr,N}$ [scr,N] [mm]	Characteristic edge distance [ccr,N] [mm]
WA M12-259/160	70	70	195	98
WA M16-110/5	90	90	240	120
WA M16-151/30	90	90	240	120
WA M16-171/50	90	90	240	120
WA M16-201/80	90	90	240	120
WA M16-221/100	90	90	240	120
WA M16-261/140	90	90	240	120
WA M16-281/160	90	90	240	120
WA M16-321/200	90	90	240	120
WA M20-120/5	120	120	300	150
WA M20-173/30*	120	120	300	150
WA M20-193/60*	120	120	300	150
WA M20-223/80*	120	120	300	150
WA M20-263/120*	120	120	300	150