Bolt anchor FAZ II Plus dynamic

Design values for cyclic fatigue loading[1] of a single anchor in cracked or non-cracked normal concrete of strength class C20/25[2].
For the design the complete current assessment ETA-20/0897 of 22.05.2023 has to be considered.

					Cracked concrete				Non-cracked concrete			
					Design values of tension ($\Delta N_{Ed,max}$) and shear loads ($\Delta V_{Ed,max}$); minimum spacing (s_{min}) and edge distances (c_{min}) with reduced loads				Design values of tension ($\Delta N_{Ed,max}$) and shear loads ($\Delta V_{Ed,max}$); minimum spacing (s_{min}) and edge distances (c_{min}) with reduced loads			
Type	Material/ surface	Effective anchorage depth h_{ef} [mm]	Minimum member thickness h_{min} [mm]	Installation torque T_{inst} [Nm]	$\Delta N_{Ed,max}$ [3] [kN]	$\Delta V_{Ed,max}$ [3] [kN]	s_{min} [3] [mm]	c_{min} [3] [mm]	$\Delta N_{Ed,max}$ [3] [kN]	$\Delta V_{Ed,max}$ [3] [kN]	s_{min} [3] [mm]	c_{min} [3] [mm]
FAZ II Plus 16	gvz	65	140	110	6.0	4.7	65	65	6.4	4.7	65	65
	gvz	85	140	110	6.4	4.7	65	65	6.4	4.7	65	65
	gvz	160	240	110	6.4	4.7	65	65	6.4	4.7	65	65
	R	65	140	110	3.1	6.0	65	65	3.1	6.0	65	65
	R	85	140	110	3.1	6.0	65	65	3.1	6.0	65	65
	R	160	240	110	3.1	6.0	65	65	3.1	6.0	65	65
FAZ II Plus 20	gvz	100	160	200	8.8	6.1	95	85	8.8	6.1	95	95
	gvz	180	270	200	8.8	6.1	95	85	8.8	6.1	95	95
	R	100	160	200	4.7	9.4	95	85	4.7	9.4	95	95
	R	180	270	200	4.7	9.4	95	85	4.7	9.4	95	95
FAZ II Plus 24	gvz	125	200	270	14.7	9.5	100	100	14.7	9.5	100	135
	R	125	200	270	6.9	13.6	100	100	6.9	13.6	100	135

[1] The design values of the cyclic fatigue loading apply for load cycles > 10^8 in accordance with design method I acc. to TR061 – for unknown static lower load. If the static lower load is known and / or for lower number of load cycles higher load values are possible. The partial safety factors as regulated in the design standard are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \times h_{ef}$. Drill hole cleaning acc. to assessment.

[2] For higher concrete strength classes up to C50/60 higher permissible loads may be possible. - see assessment. The concrete is assumed to be standard-reinforced.

[3] In the case of combinations of tensile loads and shear loads, with reduced or minimum spacing and edge distances (anchor groups) the design must be carried out in accordance with the provisions of the complete assessment.

Loads

Bolt anchor FAZ II Plus

Permissible loads of a single anchor[1] in normal concrete of strength class C20/25.
For the design the complete current assessment ETA-19/0520 of 24.05.2023 has to be considered.

					Cracked concrete				Non-cracked concrete			
					Permissible tension (N_{perm}) and shear loads (V_{perm}); minimum spacing (s_{min}) and edge distances (c_{min}) with reduced loads				Permissible tension (N_{perm}) and shear loads (V_{perm}); minimum spacing (s_{min}) and edge distances (c_{min}) with reduced loads			
Type	Material/ surface[2]	Effective anchorage depth h_{ef} [mm]	Minimum member thickness h_{min} [mm]	Instal-lation torque T_{inst} [Nm]	N_{perm}[3] [kN]	V_{perm}[3] [kN]	s_{min}[3] [mm]	c_{min}[3] [mm]	N_{perm}[3] [kN]	V_{perm}[3] [kN]	s_{min}[3] [mm]	c_{min}[3] [mm]
FAZ II Plus 6	gvz	40	80	8	0.7	4.3	35	40	5.0	4.3	35	40
	gvz	80	120	8	0.7	4.3	35	40	5.0	4.3	35	40
	R	40	80	8	0.7	5.0	35	40	5.0	5.0	35	40
	R	80	120	8	0.7	5.0	35	40	5.0	5.0	35	40
FAZ II Plus 8	gvz	35	80	20	2.6	8.5	35	40	4.9	9.3	40	40
	gvz	45	85	20	3.8	9.3	35	40	6.7	9.3	40	40
	gvz	90	140	20	3.8	9.3	35	40	6.7	9.3	40	40
	R	35	80	20	2.6	8.5	35	40	4.9	10.1	40	40
	R	45	85	20	3.8	10.1	35	40	6.7	10.1	40	40
	R	90	140	20	3.8	10.1	35	40	6.7	10.1	40	40
FAZ II Plus 10	gvz	40	80	45	4.1	10.8	40	45	5.9	15.0	40	45
	gvz	60	100	45	6.2	15.0	40	45	9.5	15.0	40	45
	gvz	100	150	45	6.2	15.0	40	45	9.5	15.0	40	45
	R	40	80	45	4.1	10.8	40	45	5.9	15.1	40	45
	R	60	100	45	6.2	15.1	40	45	9.5	15.1	40	45
	R	100	150	45	6.2	15.1	40	45	9.5	15.1	40	45
FAZ II Plus 12	gvz	50	100	60	5.8	18.0	50	55	8.3	21.1	50	55
	gvz	70	120	60	9.5	21.1	50	55	10.5	21.1	50	55
	gvz	125	190	60	9.5	21.1	50	55	10.5	21.1	50	55
	R	50	100	60	5.8	18.0	50	55	8.3	24.1	50	55
	R	70	120	60	9.5	24.1	50	55	10.5	24.1	50	55
	R	125	190	60	9.5	24.1	50	55	10.5	24.1	50	55
FAZ II Plus 16	gvz	65	140	110	8.6	27.5	65	65	12.3	39.1	65	65
	gvz	85	140	110	12.9	39.1	65	65	18.4	39.1	65	65
	gvz	160	240	110	12.9	39.1	65	65	18.4	39.1	65	65
	R	65	140	110	8.6	27.5	65	65	12.3	39.3	65	65
	R	85	140	110	12.9	40.6	65	65	18.4	40.6	65	65
	R	160	240	110	12.9	40.6	65	65	18.4	40.6	65	65
FAZ II Plus 20	gvz	100	160	200	16.4	47.4	95	85	23.4	47.4	95	95
	gvz	180	270	200	16.4	47.4	95	85	23.4	47.4	95	95
	R	100	160	200	16.4	52.5	95	85	23.4	61.7	95	95
	R	180	270	200	16.4	61.7	95	85	23.4	61.7	95	95
FAZ II Plus 24	gvz	125	200	270	22.9	73.3	100	100	32.7	73.3	100	135
	R	125	200	270	22.9	73.3	100	100	32.7	90.3	100	135

[1] Design according to EN 1992-4:2018 (for static resp. quasi-static loads). The partial safety factors for material resistance as regulated in the ETA as well as a partial safety factor for load actions of $\gamma_L = 1.4$ are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1.5 \times h_{ef}$. Accurate data see ETA.

[2] Further steel grades, versions and technical data see ETA, e.g. for dry internal conditions, galvanised steel (gvz); for damp interiors and for outdoor use, stainless steel (R).

[3] In the case of combinations of tensile and shear loads, bending moments with reduced or minimum spacing and edge distances (anchor groups), the design must be carried out in accordance with the provisions of the complete ETA and the provisions of the EN 1992-4:2018. We recommend using our anchor design software C-FIX.