

Technical Data

MQ Channel

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February 2015

Technical data for channel profile MQ (zincd)

Definition of axes			Channel profiles									
			MQ-21	MQ-31	MQ-41	MQ-41/3	MQ-52	MQ-72	MQ-21 D	MQ-41 D	MQ-52-72 D	MQ-124 XD
Channel wall thickness	t	[mm]	2.0	2.0	2.0	3.0	2.5	2.75	2.0	2.0	2.5/2.75	3.0
Cross-sectional area	A	[mm ²]	165.3	204.9	245.1	348.4	352.1	492.8	330.6	490.3	844.9	1237.2
Channel weight		[kg/m]	1.44	1.76	2.08	2.91	2.94	4.10	2.90	4.19	7.08	9.84
Delivered length		[m]	3/6	3/6	3/6	3/6	6	6	3/6	3/6	6	6
Material												
S 250 GD (DIN EN 10346)			•	•	•	•	•	•	•	•	•	•
Permissible stress	δ_{perm}	[N/mm ²]	188.3	181.8	175.3	188.3	181.8	175.3	188.3	175.3	175.3	162.3
Surface												
Senzimir galvanized (DIN EN ISO 1401)			•	•	•	•	•	•	•	•	•	•
Cross-section Y-axis												
Axis of gravity A ¹⁾	e_1	[mm]	10.84	16.01	21.13	21.52	26.67	36.79	20.60	41.30	62.02	62.00
Axis of gravity B	e_2	[mm]	9.76	14.99	20.17	19.78	25.33	35.22	20.60	41.30	61.99	62.00
Moment of inertia	I_y	[cm ⁴]	0.92	2.60	5.37	7.02	11.41	28.70	4.98	30.69	115.41	188.04
Reaction modulus A	W_{y1}	[cm ³]	0.85	1.62	2.54	3.26	4.28	7.80	2.42	7.43	18.61	30.33
Reaction modulus B	W_{y2}	[cm ³]	0.94	1.73	2.66	3.55	4.50	8.15	2.42	7.43	18.62	30.33
Radius of gyration	i_y	[cm]	0.74	1.13	1.48	1.42	1.80	2.41	1.23	2.50	3.70	3.90
Permissible moment ²⁾	M_y	[Nm]	159	295	446	614	778	1368	455	1303	3263	4923
z-axis												
Moment of inertia	I_z	[cm ⁴]	4.39	5.83	7.33	10.44	10.79	15.40	8.78	14.67	26.13	31.62
Reaction modulus	W_z	[cm ³]	2.13	2.82	3.55	5.06	5.23	7.46	4.25	7.10	12.65	15.31
Radius of gyration	i_z	[cm]	1.63	1.69	1.73	1.73	1.75	1.77	1.63	1.73	1.76	1.60

• The permissible stress $\sigma_D / \gamma_{G,D}$ where $\gamma = 1.4$. σ_D results from the higher yield strength (point) resulting from cold forming as per DIN 18800-1 2008 and DAST-RILI 016 from 1992: $\sigma_D = f_{yk} / \gamma_M$ where $\gamma_M = 1.1$. According to that results a safety factor of $\gamma = 1.54$ in comparison with the yield strength.

1) For the arithmetical bending dimensioning is the smaller value (W_{y1} , W_{y2}) decisive to ($W_{y1} = I_y / e_1$ bzw. $W_{y2} = I_y / e_2$).

2) $M_y = \delta_{zul} \times \min(W_{y1}, W_{y2})$

Channel selection:

- The given data is based on a single span (simply-supported beam) bearing a single load, F(N), at mid span, L/2.
- If several loads are acting on a single span (simply-supported beam), these may be summated and regarded as a single load acting at mid span. By taking this approach, the design calculation is on the safe side. (- Channel selection table).
- The permissible stress in the steel and the max. deflection, L/200, are not exceeded with the given max. span widths, L (mm).
- The channel's own weight has been considered.

Technical data for channel profiles MQ (max. span width / deflection at single load)

Load F [kN]	MQ-21		MQ-31		MQ-41		MQ-41/3		MQ-52		MQ-72		MQ-21 D		MQ-41 D		MQ-52-72 D		MQ-124 XD	
	L	f	L	f	L	f	L	f	L	f	L	f	L	f	L	f	L	f	L	f
	0.25	133	7	218	11	306	15	337	17	419	21	599	30	288	14	600	28	600	10	600
0.50	95	5	159	8	226	11	254	13	321	16	482	24	216	11	496	25	600	14	600	10
0.75	78	4	131	7	187	9	212	11	268	13	411	21	179	9	424	21	600	19	600	13
1.00	63	3	114	6	163	8	185	9	235	12	364	18	156	8	375	19	600	23	600	16
1.25	51	2	94	4	141	7	166	8	211	11	329	16	140	7	340	17	600	28	600	18
1.50	42	1	78	3	118	5	152	8	193	10	303	15	120	5	313	16	576	29	600	21
1.75	36	<1	67	2	101	3	139	7	175	8	282	14	103	4	288	14	541	27	600	24
2.00	32	<1	59	2	89	3	122	5	154	6	264	13	90	3	254	11	511	26	600	27
2.25	28	<1	52	1	79	2	108	4	137	5	238	11	80	2	227	9	486	24	600	30
2.50	25	<1	47	1	71	2	98	3	124	4	215	9	72	2	205	7	464	23	576	29
2.75	23	<1	43	<1	65	1	89	3	112	3	196	7	66	2	187	6	444	22	554	28
3.00	21	<1	39	<1	59	1	82	2	103	3	180	6	60	1	172	5	415	20	534	27
3.50	18	<1	34	<1	51	<1	70	2	89	2	155	5	52	<1	148	4	360	15	499	25
4.00	16	<1	29	<1	44	<1	61	1	78	2	136	4	45	<1	129	3	317	12	466	23
4.50	14	<1	26	<1	39	<1	54	1	69	1	121	3	-	-	115	2	284	9	418	19
5.00	12	<1	23	<1	36	<1	49	<1	62	1	109	2	-	-	104	2	256	8	380	15
6.00	10	<1	19	<1	30	<1	41	<1	52	<1	91	2	-	-	87	1	220	6	338	13
7.00	9	<1	17	<1	25	<1	35	<1	44	<1	78	1	-	-	75	<1	188	4	287	9
8.00	7	<1	14	<1	22	<1	31	<1	39	<1	68	<1	-	-	65	<1	162	3	243	6

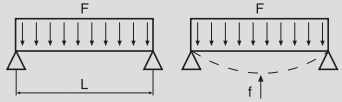
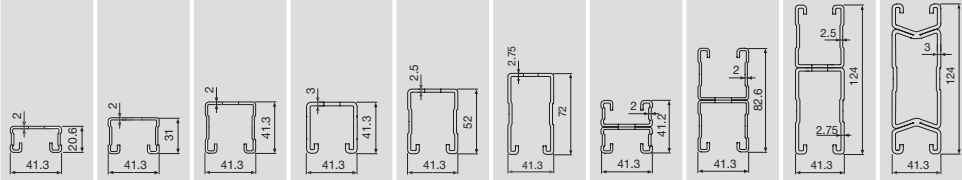
Selection example:

- 1.0 kN (≈ 100 kg) should be carried by a channel with a channel span width L = 100 cm (single span simply supported).

Solution:

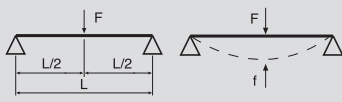
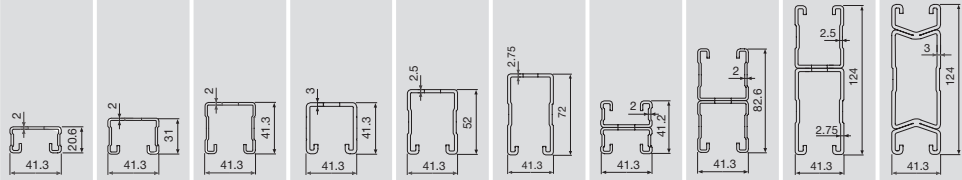
- Select the line with the load, F = 1.0 kN.
- The channels MQ-31 to MQ-124 XD can be used because the permissible span width (table value) is larger or equal to the required span width of L = 100 cm.

Technical data for channel profiles MQ (max. span width / deflection at uniform distributed load)

Load F [kN]	MQ-21		MQ-31		MQ-41		MQ-41/3		MQ-52		MQ-72		MQ-21 D		MQ-41 D		MQ-52-72 D		MQ-124 XD	
	L	f	L	f	L	f	L	f	L	f	L	f	L	f	L	f	L	f	L	f
0.25	164	8	266	13	365	18	394	20	484	24	600	23	340	17	600	22	600	8	600	6
0.50	120	6	198	10	279	14	310	15	387	19	563	28	264	13	578	29	600	11	600	8
0.75	98	5	164	8	233	12	262	13	329	16	493	25	222	11	507	25	600	14	600	10
1.00	86	4	143	7	204	10	230	12	291	15	442	22	195	10	456	23	600	17	600	11
1.25	77	4	128	6	183	9	208	10	263	13	404	20	176	9	417	21	600	19	600	13
1.50	70	4	117	6	168	8	191	10	242	12	374	19	161	8	386	19	600	22	600	15
1.75	65	3	109	5	156	8	177	9	225	11	350	17	150	7	361	18	600	25	600	17
2.00	61	3	102	5	146	7	166	8	211	11	329	16	140	7	340	17	600	28	600	18
2.25	56	3	96	5	138	7	157	8	200	10	312	16	133	7	322	16	591	30	600	20
2.50	51	2	91	5	131	7	149	7	190	9	297	15	126	6	307	15	566	28	600	22
2.75	46	2	85	4	125	6	142	7	181	9	284	14	120	6	293	15	545	27	600	24
3.00	42	2	78	3	118	6	136	7	174	9	273	14	115	6	282	14	525	26	600	26
3.50	36	1	67	3	101	4	126	6	161	8	253	13	103	5	262	13	492	25	600	29
4.00	31	<1	59	2	89	3	118	6	151	8	238	12	90	4	245	12	464	23	576	29
4.50	28	<1	52	2	79	3	108	5	137	6	224	11	-	-	227	11	440	22	548	27
5.00	25	<1	47	1	71	2	98	4	123	5	213	11	-	-	205	9	419	21	524	26
6.00	21	<1	39	<1	59	1	81	3	103	4	180	8	-	-	172	6	385	19	484	24
7.00	17	<1	33	<1	51	1	70	2	88	3	155	6	-	-	147	5	358	18	451	23
8.00	15	<1	29	<1	44	<1	61	2	77	2	136	4	-	-	129	4	317	14	424	21

Technical data for channel profiles MQ (max. load / deflection at single load)

Span width L [cm]	MQ-21		MQ-31		MQ-41		MQ-41/3		MQ-52		MQ-72		MQ-21 D		MQ-41 D		MQ-52-72 D		MQ-124 XD	
	F	f	F	f	F	f	F	f	F	f	F	f	F	f	F	f	F	f	F	f
25	2.53	0.4	4.68	0.3	7.08	0.2	9.78	0.2	12.36	0.2	21.75	0.1	4.29	0.1	8.43	<0.1	15.14	<0.1	50.00	<0.1
50	1.27	1.7	2.35	1.1	3.56	0.8	4.90	0.9	6.20	0.7	10.92	0.5	3.63	0.9	8.43	0.3	15.14	0.2	39.31	0.3
75	0.82	3.8	1.56	2.5	2.37	1.9	3.26	2.0	4.13	1.5	7.27	1.1	2.42	2.0	6.93	0.9	15.14	0.6	26.21	0.6
100	0.45	5.0	1.17	4.5	1.77	3.3	2.44	3.5	3.09	2.7	5.45	1.9	1.81	3.6	5.19	1.7	13.01	1.1	19.64	1.0
125	0.28	6.3	0.82	6.3	1.41	5.2	1.95	5.4	2.47	4.2	4.35	3.0	1.44	5.7	4.14	2.6	10.39	1.8	15.69	1.6
150	0.19	7.5	0.57	7.5	1.17	7.4	1.54	7.5	2.05	6.1	3.62	4.3	1.09	7.5	3.44	3.8	8.65	2.5	13.05	2.3
175	0.14	8.8	0.41	8.8	0.86	8.8	1.12	8.8	1.75	8.3	3.09	5.8	0.79	8.8	2.94	5.2	7.39	3.4	11.17	3.2
200	0.10	10.0	0.31	10.0	0.65	10.0	0.85	10.0	1.40	10.0	2.69	7.6	0.59	10.0	2.56	6.8	6.45	4.5	9.75	4.2
225	0.07	11.3	0.23	11.3	0.51	11.3	0.66	11.3	1.09	11.3	2.39	9.6	0.46	11.3	2.27	8.6	5.72	5.7	8.64	5.3
250	0.05	12.5	0.18	12.5	0.40	12.5	0.52	12.5	0.87	12.5	2.14	11.9	0.36	12.5	2.03	10.6	5.13	7.0	7.75	6.5
275	0.04	13.8	0.14	13.8	0.32	13.8	0.42	13.8	0.71	13.8	1.84	13.8	0.28	13.8	1.84	12.8	4.65	8.5	7.03	7.9
300	0.02	15.0	0.11	15.0	0.26	15.0	0.34	15.0	0.58	15.0	1.53	15.0	0.22	15.0	1.64	15.0	4.24	10.2	6.42	9.4
325	-	-	-	-	0.21	16.3	0.28	16.3	0.48	16.3	1.29	16.3	0.18	16.3	1.38	16.3	3.90	11.9	5.90	11.0
350	-	-	-	-	0.18	17.5	0.23	17.5	0.40	17.5	1.09	17.5	0.14	17.5	1.17	17.5	3.60	13.9	5.45	12.8
375	-	-	-	-	0.14	18.8	0.18	18.8	0.34	18.8	0.93	18.8	0.11	18.8	1.00	18.8	3.35	15.9	5.07	14.7
400	-	-	-	-	0.12	20.0	0.15	20.0	0.29	20.0	0.80	20.0	0.08	20.0	0.86	20.0	3.12	18.1	4.73	16.8
425	-	-	-	-	0.09	21.3	0.12	21.3	0.24	21.3	0.69	21.3	0.06	21.3	0.75	21.3	2.92	20.5	4.42	19.0
450	-	-	-	-	0.08	22.5	0.09	22.5	0.20	22.5	0.60	22.5	0.04	22.5	0.65	22.5	2.67	22.5	4.15	21.3
475	-	-	-	-	0.06	23.8	0.07	23.8	0.17	23.8	0.52	23.8	0.03	23.8	0.56	23.8	2.37	23.8	3.91	23.8
500	-	-	-	-	0.04	25.0	0.05	25.0	0.14	25.0	0.45	25.0	0.29	95.2	0.49	25.0	2.11	25.0	3.48	25.0

Technical data for channel profiles MQ (max. load / deflection at uniform distributed load)

Max. Load F [kN] / deflection f [mm], max. L/200 at uniform distributed load

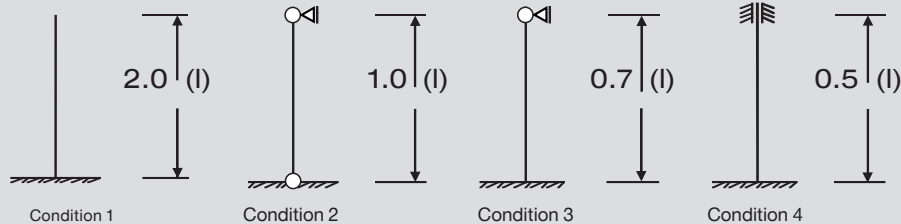
Span width L [cm]	MQ-21		MQ-31		MQ-41		MQ-41/3		MQ-52		MQ-72		MQ-21 D		MQ-41 D		MQ-52-72 D		MQ-124 XD	
	F	f	F	f	F	f	F	f	F	f	F	f	F	f	F	f	F	f	F	f
25	5.10	0.5	9.43	0.4	14.26	0.3	19.64	0.3	24.88	0.2	43.75	0.1	4.29	<0.1	8.43	<0.1	15.14	<0.1	50.00	<0.1
50	2.54	2.2	4.71	1.4	7.12	1.0	9.81	1.1	12.43	0.8	21.86	0.6	4.29	0.7	8.43	0.2	15.14	0.1	50.00	0.2
75	1.30	3.8	3.13	3.2	4.74	2.3	6.53	2.4	8.27	1.9	14.56	1.3	4.29	2.3	8.43	0.7	15.14	0.3	50.00	0.7
100	0.73	5.0	2.08	5.0	3.55	4.1	4.88	4.3	6.19	3.4	10.90	2.4	3.61	4.5	8.43	1.7	15.14	0.8	39.29	1.3
125	0.46	6.3	1.32	6.3	2.75	6.3	3.59	6.3	4.94	5.3	8.70	3.7	2.53	6.3	8.29	3.3	15.14	1.6	31.39	2.0
150	0.31	7.5	0.90	7.5	1.89	7.5	2.47	7.5	4.04	7.5	7.23	5.3	1.74	7.5	6.89	4.7	15.14	2.8	26.11	2.9
175	0.22	8.8	0.65	8.8	1.38	8.8	1.80	8.8	2.95	8.8	6.18	7.2	1.26	8.8	5.88	6.4	14.79	4.3	22.34	4.0
200	0.16	10.0	0.49	10.0	1.04	10.0	1.36	10.0	2.24	10.0	5.39	9.5	0.95	10.0	5.13	8.4	12.91	5.6	19.50	5.2
225	0.11	11.3	0.37	11.3	0.81	11.3	1.05	11.3	1.75	11.3	4.48	11.3	0.73	11.3	4.54	10.7	11.44	7.1	17.28	6.6
250	0.08	12.5	0.29	12.5	0.64	12.5	0.83	12.5	1.40	12.5	3.60	12.5	0.57	12.5	3.85	12.5	10.26	8.8	15.51	8.1
275	0.06	13.8	0.23	13.8	0.52	13.8	0.67	13.8	1.14	13.8	2.95	13.8	0.45	13.8	3.16	13.8	9.30	10.6	14.05	9.8
300	0.04	15.0	0.18	15.0	0.42	15.0	0.54	15.0	0.93	15.0	2.45	15.0	0.36	15.0	2.62	15.0	8.49	12.6	12.83	11.7
325	-	-	-	-	0.34	16.3	0.44	16.3	0.78	16.3	2.06	16.3	0.29	16.3	2.21	16.3	7.80	14.8	11.80	13.7
350	-	-	-	-	0.28	17.5	0.36	17.5	0.65	17.5	1.75	17.5	0.23	17.5	1.87	17.5	7.21	17.2	10.91	15.9
375	-	-	-	-	0.23	18.8	0.29	18.8	0.54	18.8	1.49	18.8	0.18	18.8	1.60	18.8	6.35	18.8	10.13	18.3
400	-	-	-	-	0.19	20.0	0.24	20.0	0.46	20.0	1.28	20.0	0.13	20.0	1.38	20.0	5.53	20.0	9.08	20.0
425	-	-	-	-	0.15	21.3	0.19	21.3	0.38	21.3	1.11	21.3	0.10	21.3	1.19	21.3	4.85	21.3	7.98	21.3
450	-	-	-	-	0.12	22.5	0.15	22.5	0.32	22.5	0.96	22.5	0.07	22.5	1.03	22.5	4.28	22.5	7.05	22.5
475	-	-	-	-	0.09	23.8	0.11	23.8	0.27	23.8	0.83	23.8	0.04	23.8	0.90	23.8	3.79	23.8	6.25	23.8
500	-	-	-	-	0.07	25.0	0.08	25.0	0.22	25.0	0.72	25.0	0.02	25.0	0.78	25.0	3.37	25.0	5.57	25.0

Permissible buckling load for channel profiles MQ

• Flexural buckling certificate according to DIN 18800 and DASt-Rili 016 for C-Profiles (fully supporting cross-section)

Effective length Sk [cm]	MQ-21 [kN]	MQ-31 [kN]	MQ-41 [kN]	MQ-41/3 [kN]	MQ-52 [kN]	MQ-72 [kN]	MQ-21 D [kN]	MQ-41 D [kN]	MQ-52-72 D [kN]	MQ-124X D [kN]
25	28.65	36.26	42.69	64.99	63.61	85.84	60.97	85.41	147.18	199.55
50	22.42	32.49	39.78	59.94	60.57	82.05	55.21	81.40	140.57	189.18
75	14.81	27.46	36.19	53.74	56.29	76.52	47.72	75.71	131.02	175.12
100	9.54	21.43	31.68	45.88	51.11	69.87	38.44	68.83	119.50	157.91
125	6.49	16.06	26.47	37.23	44.88	61.87	29.50	60.56	105.65	137.30
150	4.67	12.10	21.44	29.46	38.12	53.04	22.53	51.55	90.42	115.41
175	3.51	9.33	17.24	23.35	31.74	44.50	17.50	42.99	75.75	95.28
200	-	7.37	13.97	18.76	26.30	37.07	13.88	35.67	63.04	78.50
225	-	5.96	11.46	15.31	21.90	30.98	11.25	29.72	52.65	65.13
250	-	4.91	9.54	12.70	18.41	26.10	9.28	24.99	44.33	54.60
275	-	4.11	8.05	10.69	15.63	22.20	7.79	21.23	37.70	46.29
300	-	-	6.88	9.11	13.41	19.07	6.62	18.22	32.38	39.67
325	-	-	5.94	7.85	11.62	16.54	-	15.79	28.07	34.34
350	-	-	5.17	6.84	10.16	14.46	-	13.80	24.54	29.99
375	-	-	-	-	8.95	12.75	-	12.16	21.63	26.41
400	-	-	-	-	7.94	11.32	-	10.79	19.20	23.42

Flexural buckling:
Rod length l (cm) / euler factor β /Sk (cm) effective length = $l \cdot \beta$



• $V_{\alpha 0} = 1.4 \rightarrow F_0^* =$ permissible buckling load 1.4 * (design value)

• Bend table is only valid for centric buckling loads. The values in this table aren't allowed for offset torque/oblique position/lateral-torsional buckling and must be engineered.

Load drawing	Angle α	0 °	10 °	30 °	45 °	60 °	80 °	90 °
	Recordable tensile load F for MQP-U M12 and M16 under consideration of the angle α	5.0 kN	5.0 kN	3.79 kN	3.29 kN	2.93 kN	2.86 kN	2.86 kN
	The values can be linear interpolated. Shown Load values are characteristic values. The safety factor of the effects is 1.4.							

Technical data for bracket MQK (zincd)

Bracket	L (mm)	Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5
		$F_1 = q \cdot i$ F1 [N]	$\frac{1}{2}$ F1 [N]	 F1 [N]	$\frac{1}{3}$ F2 [N]	$\frac{1}{4}$ F3 [N]
		HST M12 HUS-H 10x100/15/30/40*	HST M12 HUS-H 10x100/15/30/40*	HST M12 HUS-H 10x100/15/30/40*	HST M12 HUS-H 10x100/15/30/40*	HST M12 HUS-H 10x100/15/30/40*
MQK-21/300	300	570	570	280	280	190
MQK-21/450	450	380	380	180	190	120
MQK-41/300	300	1700	1700	850	850	560
MQK-41/450	450	1130	1130	560	560	370
MQK-41/600	600	840	840	420	420	280
MQK-41/1000	1000	490	490	210	240	160
MQK-41/3/300	300	1700	1700	850	850	560
MQK-41/3/450	450	1120	1120	560	560	370
MQK-41/3/600	600	830	830	410	410	270
MQK-41/600/4	600	920	920	460	460	300
MQK-41/1000/4	1000	540	540	210	270	180
MQK-72/450	450	2710	2710	1350	1350	900
MQK-72/600	600	2020	2020	1010	1010	670
MQK-21 D/300	300	1580	1580	790	790	520
MQK-21 D/450	450	1050	1050	520	520	350
MQK-21 D/600	600	780	780	390	390	260
MQK-41 D/1000	1000	1180	1180	590	590	390

* Sustainability of the bracket with the attachment **HST M12** or alternatively with the **HUS-H 10x100** with h_{gr} min 67 mm.

- Load values are for grade \geq C20/25 concrete.
- The bracket's own weight has been considered.
- The load's apply only if the bracket is fastened away from abuilding component edge (fastenings made at component edges must be designed separately).
- Separate verification must be provided that forces are transferred to the respective base material, i.e. steel and concrete.
- The application guidelines in anchor approvals must be observed. Loading values according to approval status October 2013.
- The deflection (deformation) of L/150 was observed in all cases, this being measured at the point of load application.

Technical data for brcket MQK with angle brace (zincd)

Bracket	L (mm)	Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5
		$F_1 = q \cdot i$ F1 [N]	$\frac{1}{2}$ F1 [N]	 F1 [N]	$\frac{1}{3}$ F2 [N]	$\frac{1}{4}$ F3 [N]
		HST M12 HUS-H 10x100/15/30/40*	HST M12 HUS-H 10x100/15/30/40*	HST M12 HUS-H 10x100/15/30/40*	HST M12 HUS-H 10x100/15/30/40*	HST M12 HUS-H 10x100/15/30/40*
MQK-21/450 k	450	4420	1140	520	1970	1750
MQK-41/450 k	450	6390	3450	2390	3190	2130
MQK-41/600 I	600	5540	2580	2840	2510	1890
MQK-41/1000 I	1000	2250	3400	430	1700	1130
MQK-41/3/450 k	450	6380	4420	3070	3190	2120
MQK-41/3/600 I	600	5680	3310	2840	2840	1890
MQK-41/600/4 I	600	5540	2580	2840	2510	1890
MQK-41/1000/4 I	1000	2250	3400	430	1700	1130
MQK-72/450 k	450	6380	6380	3190	3190	2120
MQK-72/600 I	600	5680	5680	2840	2840	1890
MQK-21 D/450 k	450	6380	3280	2270	3190	2120
MQK-21 D/600 I	600	5260	2450	2840	2390	1870
MQK-41 D/1000 I	1000	3380	3380	1690	1690	1120

k = MQK-SK I = MQK-SL

* Sustainability of the bracket with the attachment **HST M12** or alternatively with the **HUS-H 10x100** with h_{gr} min 67 mm.

- Load values are for grade \geq C20/25 concrete.
- The bracket's own weight has been considered.
- The load's apply only if the bracket is fastened away from abuilding component edge (fastenings made at component edges must be designed separately).
- Separate verification must be provided that forces are transferred to the respective base material, i.e. steel and concrete.
- The application guidelines in anchor approvals must be observed. Loading values according to approval status October 2013.
- The deflection (deformation) of L/150 was observed in all cases, this being measured at the point of load application.