en

Static data

Foundation loadings

FEM (LN 303)

1000 EC-H 40 Litronic, Tower system 1000HC
Crane stationary, without climbing equipment, without crane driver elevator

base tower section 1000HC reinf. 11.6m, not to climb

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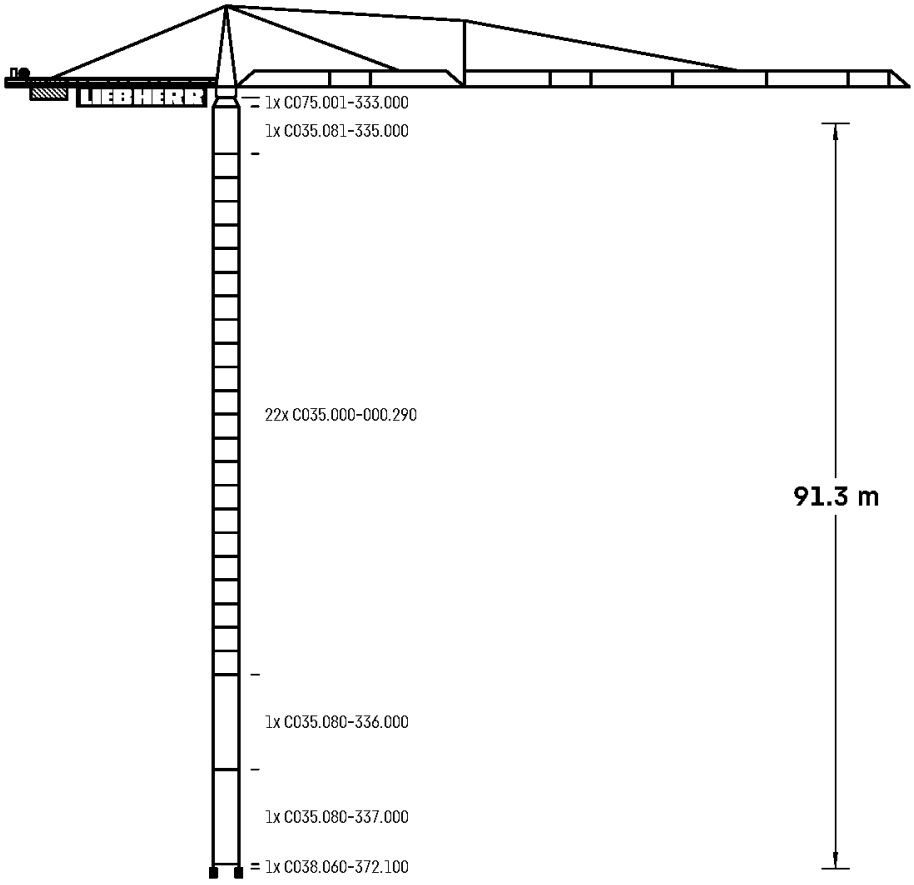

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1 General safety indications

1.1 Safety indications for corner pressure tables and foundation loading tables

WARNING

Danger of accident if the component compatibility list is ignored!

The static data may only be used if the crane erection corresponds with the configuration described, and if the components being used have been selected in observation of the component compatability list.

▶ For further information see “Component compatability list”.

WARNING

Risk of instability!

The foundation or central ballast must correspond with the erection height and the configuration of the crane (with or without climbing equipment). Subsequent installation or removal of the climbing equipment for erection or dismantling of the crane will alter the stability of the crane and the resulting corner pressures or foundation reaction forces.

▶ During applications engineering, observe both corner pressure tables “with climbing equipment” and “without climbing equipment” and take the most unfavourable values into account.

▶ Check central ballast.

WARNING

Risk of instability!

For certain jib lengths, the crane cannot turn freely in the wind without the installation of an additional wind sail.

▶ Mount wind sail as required. For more information, please see: Instruction manual, erection chapter.

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WARNING

Risk of instability!

If tower sections with built-up guide rails for the crane driver elevator are integrated with the tower configuration, the deviating static data shall apply. Guide rails that are installed can result in a decrease to the maximum erection height and an increase in foundation reaction forces, corner forces and the central ballast required.

Crane configurations in which the guide rails remain in the tower section must be considered to be the same as crane configurations with a crane driver elevator installed!

- ▶ Request special static data from the Structural Analysis department at Liebherr-Werk Biberach GmbH.
- ▶ Use the special static data to check the reliability of the crane configuration.
- ▶ If in doubts, remove the guide rails and the interior fittings for entering and exiting from the entire tower configuration.

The corner pressures are characteristic loads and do not include the dead load and hoist load factor.

In case of cranes with multiple rope types, observe the minimum and maximum radius.

In case of stationary configuration of the crane with an undercarriage or cruciform base, the hook heights specified in the corner pressure tables may decrease, depending on the crane configuration.

1.2 Notes on conformity

Based on the number of possible variants and influence parameters during erection of tower cranes, it's important to determine if the selected crane configuration and/or available documentation meet local safety requirements and if conformity is therefore ensured.

The applicability of the documents provided must be checked the operator. In this case, we recommend creating a site-related hazard analysis that takes special consideration of the wind exposure.

1.3 Notes for cranes with climbing tower section

On cranes which require a climbing tower section for the application of a climbing equipment, observe the following:

- The indicated hook height in the corner pressure tables and foundation loading tables always includes climbing tower section.
- When erecting the crane without climbing equipment, the climbing tower section can be replaced with a standard tower section.

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1.4 Symbols used in the corner pressure tables and foundation loading tables

Symbol	Meaning
*	At this hook height, the climbing equipment must be lowered after assembly!
xx	At this hook height, switching to the LM2 load diagram is not permissible! For more information, please see: “Operating manual for the crane driver”, “control desk”.
&	For this hook height, raising and lowering the load and slewing and trolley travelling is not permissible while crane travelling!
+	At this hook height, the use of travelling undercarriages or a cruciform base is not permissible! Only stationary and without travel gears is possible.
°	At this hook height, attachment of a cabin is not permissible! Only possible “without cabin".
@	At this hook height, use with a climbing tower section is not permissible! The climbing tower section must be replaced with a standard tower section.

Tab. 1: Symbols used in the corner pressure tables and foundation loading tables

1.5 Symbols used in the component compatibility list

Symbol	Meaning
*	not for climbing
+	only use once

Tab. 2: Symbols used in the component compatibility list

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2 Explanations concerning stability calculation in accordance with FEM (LN 303)

2.1 Global calculation standards

The most essential requirements for tower cranes globally are for their structures to be as high and as safe as possible. The possible hook heights are not only specified based on the construction or configuration of the crane, but they depend, in particular, on legislation and rules. Considering the different calculation standards, this results in significantly different hook heights.

In crane manufacture, there is no calculation standard that is globally binding. In countries within the European Economic Area (EEA), the EN 14439 Product Standard is the binding framework for tower cranes. In this standard, the safety level which must be complied with, together with the out-of-operation wind load, is clearly defined.

In countries outside the EEA, there are often no binding stipulations so that the specifications of the "Fédération Européenne de la Manutention (FEM)" can often be used in form of the FEM 1.001 Guideline as a substitute.

In the FEM 1.001 Guideline, the out-of-operation wind velocity is presented as a basis for the calculation in such a way that the wind velocity increases in steps with increasing height - the "step profile". In order to obtain a more realistic representation that can be compared in the current standard environment, the Liebherr Company Standard LN 303 defines a minimum wind load for all countries outside the EEA for which no exact requirements have been specified.

2.2 Details regarding the Liebherr Company Standard LN 303

In the Liebherr Company Standard LN 303, an exponential depiction of the wind velocity is used, similar to the wind load according to EN 14439. This makes wind conditions more realistic and comparable with the current standards of construction. The parameters of this wind velocity graph as well as all other necessary safety requirements in LN 303 correspond to at least FEM 1.001 in all aspects.

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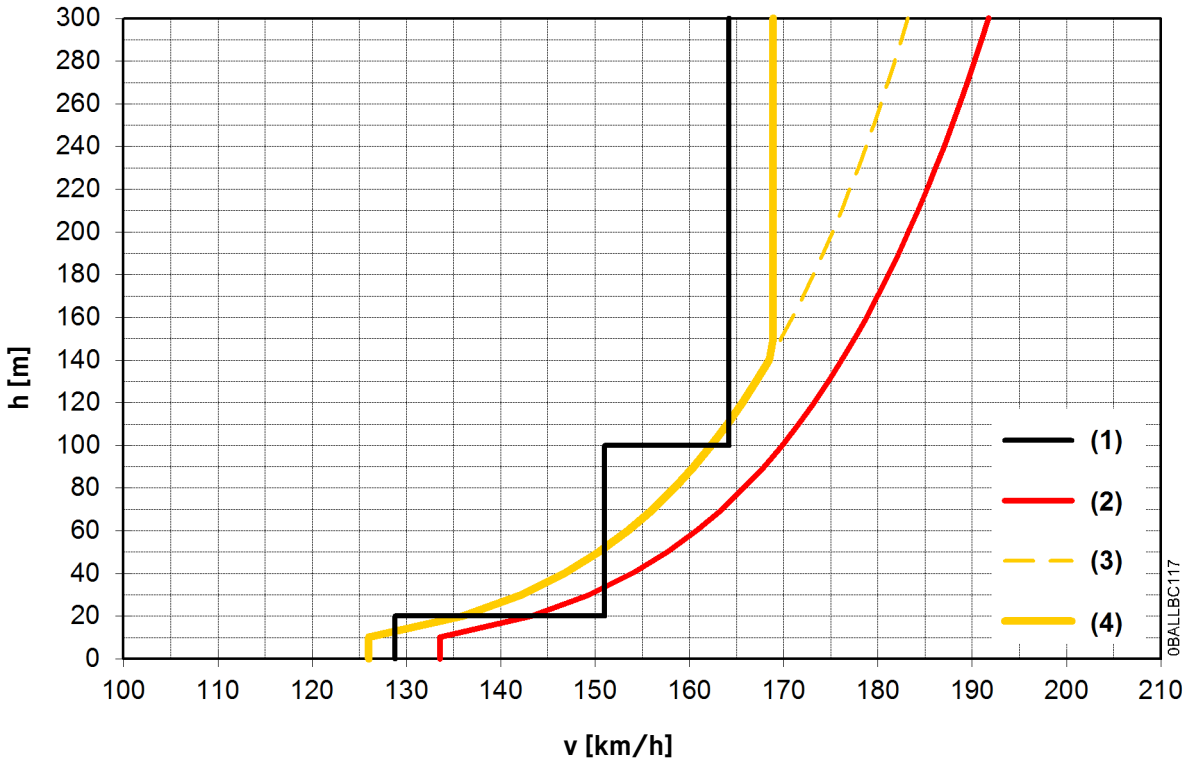

Tab. 3: Comparison of wind velocity graphs FEM 1.001, EN 14439 - C25 and LN 303

(1) FEM 1.001
(2) EN 14439 - C25
(3) LN 303 - free-standing
(4) LN 303 - climbing

The assumption of a constant wind velocity from a tower height of approx. 140 m has been derived from a risk assessment for climbing cranes. The risk assessment assumes a lower probability of occurrence in terms of wind load. The reason for this assumption is a shorter length of stay in the specific situation, combined with the option of safety measures.

In this process, the wind velocity is reduced to approx. 92 % at a maximum height of 300 m, to which the wind velocity profile is applicable. To simplify usage planning, it is assessed consistently above this height. The factor of 92 % stems from a reduction of the recurrence period from 25 years to 10 years, assuming that the length of stay in a climbing situation is less than 3 months. This assumption is valid only for cranes climbing inside or outside with the prerequisite that these cranes - if necessary - can climb down in a safe area if there is a risk of strong wind.

2.3 Using the LN 303 specification

The data sheets and the static forces tables that this specification has been applied to are marked with the abbreviation FEM (LN 303).

Additionally, the offer continues to remain in place to separately investigate increased wind load requirements in particularly windy regions, for example in Hong Kong, Macau or New Zealand.

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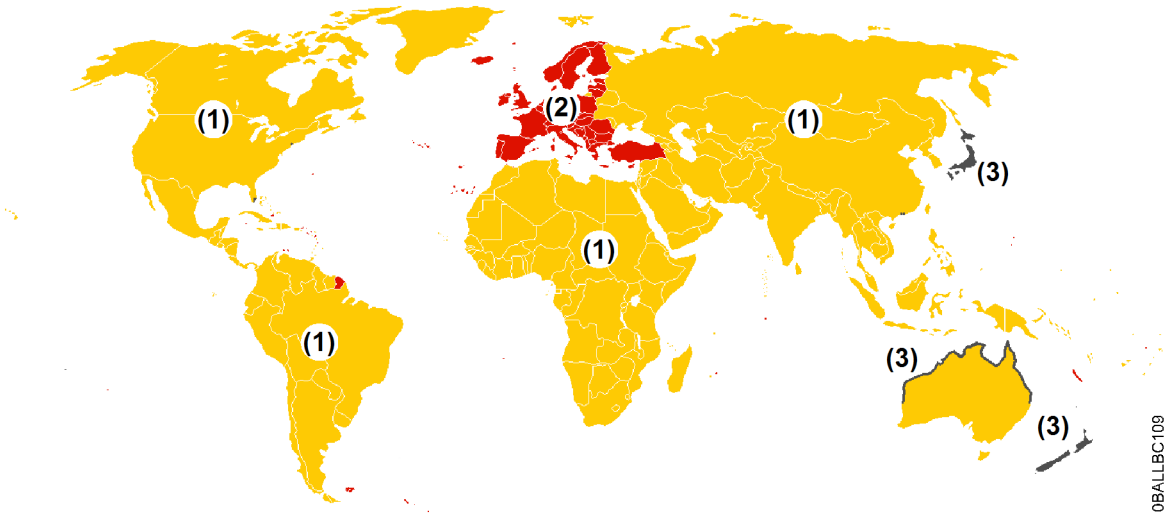

Fig. 2: Geographic overview of specifications to be used

(1) LN 303
(2) EN 14439
(3) LN 303 + special wind load zones

As in the past, the responsibility for the correct assessment and categorisation of the installation sites lies with the crane operator. During this process, it is possible that the necessary information suitable to the installation site cannot be found in the crane's instruction manual. In such cases, please consult Liebherr and request the required supplements to the instruction manual.

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Explanations concerning stability calculation in accordance with FEM (LN 303)

Using the LN 303 specification

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3 Foundation loadings

The following hoist gears have been taken into consideration for the calculation:
- WIW280WZ403
- WIW300VZ432
- WIW300WZ403

Position of trolley out of operation:

Jib	**Radius**
80.00 m	6.00 m
75.00 m	6.00 m
70.00 m	6.00 m
65.00 m	6.00 m
60.00 m	6.00 m
55.00 m	6.00 m
50.00 m	6.00 m
45.00 m	6.00 m
39.50 m	6.00 m
34.50 m	6.00 m

3.1 Component compatibility list

C075.001-333.000	**slewing ring support 1000EC-H - 1000HC** – C075.001-333.000 90032898 l=1.10 m – C075.002-333.000 90035197 l=1.10 m
C035.081-335.000	**climbing section 1000HC 5.8m** – C035.080-332.000 90006298 l=5.80 m – C035.081-332.000 90029380 l=5.80 m – C035.081-335.000 90029659 l=5.80 m
C035.000-000.290 totalling max. l=63.80 m	**substitute tower section 1000HC 2.9m** – C035.081-339.000 90035866 l=2.90 m+ – C035.080-332.000 90006298 l=5.80 m – C035.081-332.000 90029380 l=5.80 m – C035.080-331.000 90024772 l=11.60 m – C035.081-331.000 90029602 l=11.60 m
C035.080-336.000	**base tower section 1000HC 11.6m, not to climb** – C035.080-336.000 90006287 l=11.60 m – C035.081-336.000 90038098 l=11.60 m
C035.080-337.000	**base tower section 1000HC reinf. 11.6m, not to climb** – C035.080-337.000 90006260 l=11.60 m
C038.060-372.100	**foundation anchor 3150HC** – C038.060-372.100 90052378 l=0.56 m

+ may only be used 1 x

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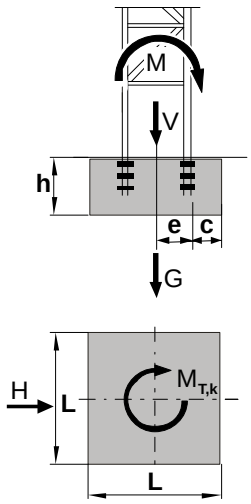
3.2 Jib 80.00 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**80.00 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 964 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	7386	96	2008	2017	135	1870	8121	118	1870	7997	36	1397
1	30.36	7469	98	2043	1521	144	1905	8486	125	1905	8109	38	1431
2	33.26	7554	100	2077	992	154	1939	8870	131	1939	8227	40	1465
3	36.16	7643	102	2111	428	164	1973	9273	138	1973	8350	42	1500
4	39.06	7735	105	2135	294	173	2028	9695	145	2008	8480	44	1534
5	41.96	7912	107	2169	926	183	2063	10137	151	2042	8615	46	1568
6	44.86	8094	109	2203	1593	193	2097	10598	158	2076	8757	48	1603
7	47.76	8282	111	2238	2294	203	2131	11078	164	2111	8904	50	1637
8	50.66	8476	114	2272	3031	213	2166	11577	171	2145	9057	52	1671
9	53.56	8675	116	2306	3803	223	2200	12096	178	2179	9216	54	1706
10	56.46	8881	118	2341	4611	233	2234	12634	184	2214	9381	57	1740
11	59.36	9311	120	2478	5455	243	2269	13191	191	2248	9552	59	1774
12	62.26	9555	123	2512	6335	253	2303	13767	198	2282	9728	61	1809
13	65.16	9806	125	2546	7252	264	2337	14363	204	2317	9911	63	1843
14	68.06	10062	127	2581	8206	274	2372	14978	211	2351	10099	65	1877
15	70.96	10324	129	2615	9196	285	2406	15612	218	2385	10294	67	1912

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	10592	131	2649	10224	295	2440	16266	224	2420	10494	69	1946
17	76.76	10866	134	2684	11289	306	2475	16938	231	2454	10700	71	1980
18	79.66	11146	136	2718	12392	317	2509	17630	238	2488	10912	73	2015
19	82.56	11432	138	2752	13533	327	2543	18341	244	2523	11131	75	2049
20	85.46	11723	140	2787	14712	338	2578	19072	251	2557	11354	77	2083
21	88.36	12021	142	2821	15929	349	2612	19822	257	2591	11584	79	2118
22	91.26	12325	144	2855	17185	360	2646	20590	264	2626	11820	81	2152

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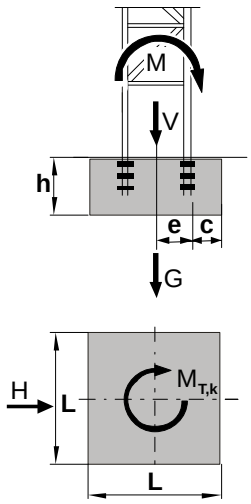
3.3 Jib 75.00 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**75.00 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 934 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	7697	94	1999	2230	135	1844	8329	118	1844	6465	34	1028
1	30.36	7782	96	2033	1735	144	1879	8693	125	1879	6569	36	1062
2	33.26	7870	99	2067	1205	154	1913	9076	131	1913	6679	38	1097
3	36.16	7967	101	2091	642	163	1947	9479	138	1947	6796	40	1131
4	39.06	8141	103	2125	80	173	2003	9901	144	1982	7777	44	1527
5	41.96	8322	106	2159	712	183	2037	10343	151	2016	7913	46	1561
6	44.86	8509	108	2194	1378	193	2071	10804	158	2050	8054	48	1596
7	47.76	8701	110	2228	2079	203	2106	11283	164	2085	8201	50	1630
8	50.66	8900	112	2262	2815	213	2140	11783	171	2119	8354	52	1664
9	53.56	9104	115	2297	3587	223	2174	12301	178	2153	8513	54	1699
10	56.46	9314	117	2331	4395	233	2209	12839	184	2188	8678	57	1733
11	59.36	9531	119	2365	5238	243	2243	13396	191	2222	8849	59	1767
12	62.26	9957	121	2486	6118	253	2277	13972	198	2256	9025	61	1802
13	65.16	10207	124	2520	7034	264	2312	14567	204	2291	9208	63	1836
14	68.06	10464	126	2555	7987	274	2346	15182	211	2325	9396	65	1870
15	70.96	10727	128	2589	8977	285	2380	15816	218	2359	9591	67	1905

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	10995	130	2623	10005	295	2415	16469	224	2394	9791	69	1939
17	76.76	11269	132	2658	11069	306	2449	17141	231	2428	9997	71	1973
18	79.66	11549	135	2692	12172	316	2483	17833	237	2462	10209	73	2008
19	82.56	11836	137	2726	13312	327	2518	18544	244	2497	10427	75	2042
20	85.46	12128	139	2761	14491	338	2552	19274	251	2531	10651	77	2076
21	88.36	12425	141	2795	15708	349	2586	20024	257	2565	10881	79	2111
22	91.26	12729	143	2829	16963	360	2621	20793	264	2600	11116	81	2145

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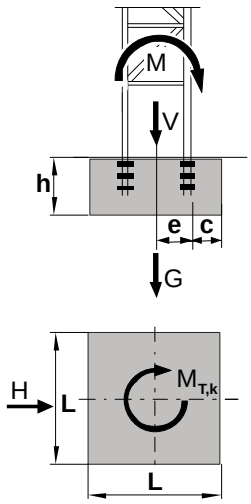
3.4 Jib 70.00 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**70.00 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 864 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	8096	92	1943	2435	135	1770	8517	118	1770	7158	36	1315
1	30.36	8184	94	1978	1941	144	1804	8880	124	1804	7269	38	1349
2	33.26	8275	96	2012	1413	154	1838	9263	131	1838	7387	40	1383
3	36.16	8380	99	2034	851	163	1873	9665	138	1873	7510	42	1418
4	39.06	8560	101	2069	255	173	1907	10087	144	1907	7639	44	1452
5	41.96	8746	103	2103	501	183	1962	10527	151	1941	7774	46	1486
6	44.86	8938	106	2137	1166	192	1996	10987	158	1976	7915	48	1521
7	47.76	9135	108	2172	1866	202	2031	11467	164	2010	8062	50	1555
8	50.66	9339	110	2206	2601	212	2065	11965	171	2044	8215	52	1589
9	53.56	9548	112	2240	3372	222	2099	12483	177	2079	8374	54	1624
10	56.46	9763	115	2275	4178	232	2134	13020	184	2113	8538	56	1658
11	59.36	9985	117	2309	5020	243	2168	13576	191	2147	8709	58	1692
12	62.26	10372	119	2411	5899	253	2203	14151	197	2182	8885	61	1727
13	65.16	10623	121	2446	6814	263	2237	14746	204	2216	9067	63	1761
14	68.06	10880	123	2480	7766	274	2271	15360	211	2250	9256	65	1795
15	70.96	11142	126	2514	8755	284	2306	15993	217	2285	9450	67	1830

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	11411	128	2549	9781	295	2340	16646	224	2319	9650	69	1864
17	76.76	11685	130	2583	10844	305	2374	17318	231	2353	9856	71	1898
18	79.66	11966	132	2617	11945	316	2409	18009	237	2388	10068	73	1933
19	82.56	12252	134	2652	13084	327	2443	18719	244	2422	10285	75	1967
20	85.46	12544	137	2686	14262	338	2477	19448	250	2456	10509	77	2001
21	88.36	12842	139	2720	15477	349	2512	20197	257	2491	10739	79	2036
22	91.26	13146	141	2755	16731	359	2546	20965	264	2525	10974	81	2070

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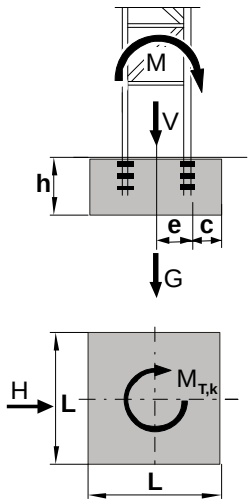
3.5 Jib 65.00 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**65.00 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 805 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	8335	90	1913	2673	135	1719	8748	118	1719	6052	36	1301
1	30.36	8426	92	1948	2179	144	1754	9112	124	1754	6164	38	1335
2	33.26	8468	95	1969	1651	153	1788	9494	131	1788	6281	40	1369
3	36.16	8648	97	2003	1089	163	1822	9896	138	1822	6404	42	1404
4	39.06	8833	99	2038	494	173	1857	10317	144	1857	6533	44	1438
5	41.96	9024	101	2072	262	182	1912	10758	151	1891	6668	46	1472
6	44.86	9221	104	2106	926	192	1946	11218	157	1925	6809	48	1507
7	47.76	9424	106	2141	1626	202	1981	11697	164	1960	6956	50	1541
8	50.66	9632	108	2175	2361	212	2015	12195	171	1994	7109	52	1575
9	53.56	9847	110	2209	3131	222	2049	12712	177	2028	7267	54	1610
10	56.46	10068	113	2244	3937	232	2084	13249	184	2063	7432	56	1644
11	59.36	10294	115	2278	4779	243	2118	13805	191	2097	7602	58	1678
12	62.26	10640	117	2361	5657	253	2152	14380	197	2131	7779	60	1713
13	65.16	10891	119	2395	6572	263	2187	14975	204	2166	7961	63	1747
14	68.06	11148	122	2430	7523	274	2221	15589	211	2200	8149	65	1781
15	70.96	11411	124	2464	8511	284	2255	16222	217	2234	8343	67	1816

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	11679	126	2498	9537	295	2290	16874	224	2269	8543	69	1850
17	76.76	11954	128	2533	10600	305	2324	17545	230	2303	8749	71	1884
18	79.66	12235	131	2567	11701	316	2358	18236	237	2337	8961	73	1919
19	82.56	12521	133	2601	12840	327	2393	18946	244	2372	9179	75	1953
20	85.46	12814	135	2636	14016	338	2427	19675	250	2406	9402	77	1987
21	88.36	13112	137	2670	15231	348	2461	20424	257	2440	9632	79	2022
22	91.26	13416	139	2704	16485	359	2496	21192	264	2475	9867	81	2056

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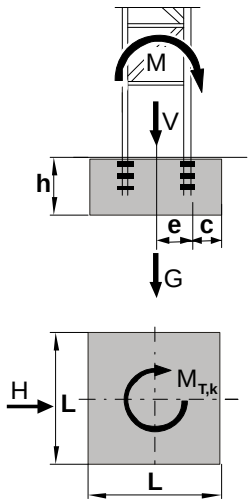
3.6 Jib 60.00 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**60.00 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 748 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	8959	88	1889	2463	134	1672	8527	117	1672	5159	34	973
1	30.36	9054	90	1923	1970	144	1707	8890	124	1707	5264	36	1007
2	33.26	9131	93	1944	1443	153	1741	9272	131	1741	5374	38	1042
3	36.16	9317	95	1978	882	163	1775	9674	137	1775	5491	40	1076
4	39.06	9508	97	2012	287	172	1810	10095	144	1810	5613	42	1110
5	41.96	9705	100	2047	468	182	1865	10535	151	1844	5741	44	1145
6	44.86	9909	102	2081	1131	192	1899	10994	157	1878	5875	46	1179
7	47.76	10118	104	2115	1830	202	1933	11472	164	1913	6015	48	1213
8	50.66	10333	106	2150	2564	212	1968	11970	171	1947	6161	50	1248
9	53.56	10554	109	2184	3334	222	2002	12487	177	1981	6312	52	1282
10	56.46	10781	111	2218	4139	232	2036	13024	184	2016	6470	54	1317
11	59.36	11013	113	2253	4980	242	2071	13579	190	2050	6634	56	1351
12	62.26	11314	115	2314	5857	253	2105	14154	197	2084	6803	58	1385
13	65.16	11565	118	2348	6771	263	2140	14748	204	2119	6978	60	1420
14	68.06	11823	120	2383	7722	273	2174	15361	210	2153	7160	62	1454
15	70.96	12086	122	2417	8709	284	2208	15994	217	2187	7347	64	1488

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	12356	124	2451	9734	294	2243	16646	224	2222	7540	66	1523
17	76.76	12631	127	2486	10796	305	2277	17317	230	2256	7739	68	1557
18	79.66	12912	129	2520	11896	316	2311	18007	237	2290	7944	70	1591
19	82.56	13199	131	2554	13034	326	2346	18716	244	2325	8155	72	1626
20	85.46	13492	133	2589	14210	337	2380	19445	250	2359	8371	74	1660
21	88.36	13791	135	2623	15424	348	2414	20193	257	2393	8594	76	1694
22	91.26	14096	138	2657	16677	359	2449	20961	264	2428	8822	78	1729

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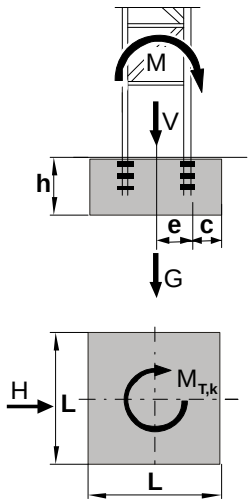
3.7 Jib 55.00 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**55.00 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 635 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	8743	86	2006	2719	134	1781	8764	117	1781	5588	36	1235
1	30.36	8922	88	2040	2226	144	1816	9126	124	1816	5699	38	1270
2	33.26	9107	90	2074	1700	153	1850	9508	131	1850	5816	40	1304
3	36.16	9298	92	2109	1140	163	1884	9909	137	1884	5939	42	1338
4	39.06	9495	95	2143	546	172	1919	10329	144	1919	6068	44	1373
5	41.96	9698	97	2177	208	182	1974	10769	150	1953	6203	46	1407
6	44.86	9907	99	2212	871	192	2008	11228	157	1987	6343	48	1441
7	47.76	10127	102	2252	1569	202	2043	11706	164	2022	6490	50	1476
8	50.66	10349	104	2286	2302	212	2077	12203	170	2056	6642	52	1510
9	53.56	10577	106	2320	3070	222	2111	12719	177	2090	6801	54	1544
10	56.46	10810	108	2355	3875	232	2146	13255	184	2125	6965	56	1579
11	59.36	11050	111	2389	4715	242	2180	13810	190	2159	7135	58	1613
12	62.26	11296	113	2423	5591	252	2214	14385	197	2193	7311	60	1647
13	65.16	11547	115	2458	6504	263	2249	14978	204	2228	7493	62	1682
14	68.06	11804	117	2492	7454	273	2283	15591	210	2262	7681	64	1716
15	70.96	12068	120	2526	8441	284	2317	16223	217	2296	7875	66	1750

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	12337	122	2561	9465	294	2352	16874	224	2331	8075	69	1785
17	76.76	12612	124	2595	10526	305	2386	17545	230	2365	8280	71	1819
18	79.66	12893	126	2629	11625	315	2420	18235	237	2399	8492	73	1853
19	82.56	13180	129	2664	12762	326	2455	18944	243	2434	8709	75	1888
20	85.46	13473	131	2698	13937	337	2489	19672	250	2468	8932	77	1922
21	88.36	13771	133	2732	15150	348	2523	20420	257	2503	9161	79	1956
22	91.26	14076	135	2767	16402	359	2558	21187	263	2537	9397	81	1991

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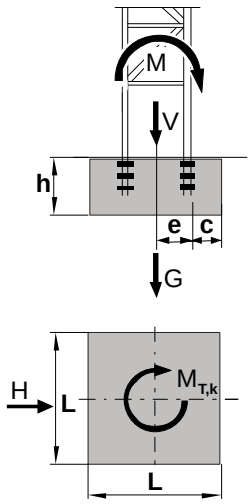
3.8 Jib 50.00 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**50.00 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 563 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	8492	83	1917	2497	134	1667	8530	117	1667	3896	34	933
1	30.36	8578	85	1951	2005	143	1701	8892	124	1701	4001	36	967
2	33.26	8618	88	1969	1479	153	1736	9273	130	1736	4111	38	1001
3	36.16	8789	90	2004	920	162	1770	9674	137	1770	4227	40	1036
4	39.06	8966	92	2038	326	172	1804	10093	144	1804	4350	42	1070
5	41.96	9148	94	2072	427	182	1860	10533	150	1839	4478	44	1104
6	44.86	9336	97	2107	1089	192	1894	10991	157	1873	4612	46	1139
7	47.76	9531	99	2141	1786	201	1928	11468	164	1907	4752	48	1173
8	50.66	9731	101	2175	2518	211	1963	11965	170	1942	4898	50	1207
9	53.56	9937	103	2210	3286	222	1997	12481	177	1976	5049	52	1242
10	56.46	10144	106	2240	4090	232	2031	13017	184	2010	5207	54	1276
11	59.36	10383	108	2274	4929	242	2066	13571	190	2045	5371	56	1310
12	62.26	10628	110	2309	5805	252	2100	14145	197	2079	5540	58	1345
13	65.16	10879	113	2343	6717	262	2134	14738	203	2113	5715	60	1379
14	68.06	11135	115	2377	7666	273	2169	15351	210	2148	5897	62	1413
15	70.96	11398	117	2412	8651	283	2203	15982	217	2182	6084	64	1448

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	11666	119	2446	9675	294	2237	16633	223	2216	6277	66	1482
17	76.76	11940	121	2480	10735	305	2272	17303	230	2251	6476	68	1516
18	79.66	12221	124	2515	11833	315	2306	17993	237	2285	6681	70	1551
19	82.56	12507	126	2549	12969	326	2340	18701	243	2319	6891	72	1585
20	85.46	12799	128	2583	14143	337	2375	19429	250	2354	7108	74	1619
21	88.36	13096	130	2618	15356	348	2409	20176	257	2388	7331	76	1654
22	91.26	13400	132	2652	16607	359	2443	20943	263	2422	7559	78	1688

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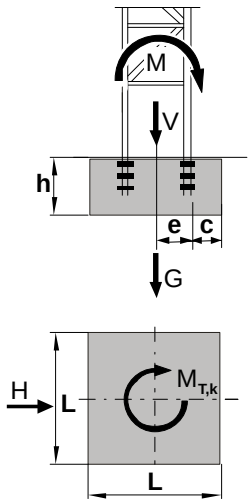
3.9 Jib 45.00 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**45.00 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 510 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	8327	81	1895	2688	134	1615	8710	117	1615	3896	34	933
1	30.36	8416	84	1930	2197	143	1650	9071	124	1650	4001	36	967
2	33.26	8469	86	1946	1672	153	1684	9452	130	1684	4111	38	1001
3	36.16	8644	88	1980	1113	162	1718	9852	137	1718	4227	40	1036
4	39.06	8825	90	2014	521	172	1753	10272	144	1753	4350	42	1070
5	41.96	9012	93	2049	232	182	1808	10710	150	1787	4478	44	1104
6	44.86	9205	95	2083	893	191	1842	11168	157	1821	4612	46	1139
7	47.76	9403	97	2117	1589	201	1876	11645	163	1856	4752	48	1173
8	50.66	9608	100	2152	2321	211	1911	12142	170	1890	4898	50	1207
9	53.56	9818	102	2186	3088	221	1945	12657	177	1924	5049	52	1242
10	56.46	10035	104	2220	3891	231	1980	13192	183	1959	5207	54	1276
11	59.36	10257	106	2255	4729	242	2014	13746	190	1993	5371	56	1310
12	62.26	10485	109	2289	5604	252	2048	14320	197	2027	5540	58	1345
13	65.16	10720	111	2323	6515	262	2083	14912	203	2062	5715	60	1379
14	68.06	10960	113	2358	7463	273	2117	15524	210	2096	5897	62	1413
15	70.96	11206	115	2392	8448	283	2151	16155	217	2130	6084	64	1448

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	11457	118	2426	9471	294	2186	16806	223	2165	6277	66	1482
17	76.76	11715	120	2461	10530	304	2220	17475	230	2199	6476	68	1516
18	79.66	11979	122	2495	11627	315	2254	18164	236	2233	6681	70	1551
19	82.56	12248	124	2529	12763	326	2289	18872	243	2268	6891	72	1585
20	85.46	12524	126	2564	13936	337	2323	19600	250	2302	7108	74	1619
21	88.36	12805	129	2598	15147	347	2357	20347	256	2336	7331	76	1654
22	91.26	13093	131	2632	16397	358	2392	21113	263	2371	7559	78	1688

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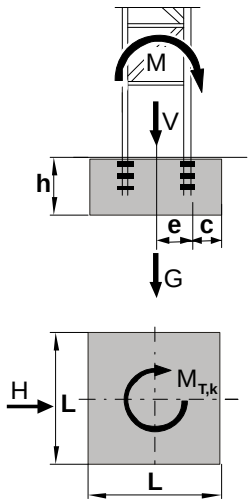
3.10 Jib 39.50 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**39.50 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 510 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	8274	80	2070	2539	134	1753	8598	117	1753	3323	36	1133
1	30.36	8300	82	2084	2046	144	1787	8960	124	1787	3435	38	1168
2	33.26	8475	84	2118	1520	153	1822	9342	131	1822	3552	40	1202
3	36.16	8657	86	2152	959	163	1856	9743	137	1856	3675	42	1236
4	39.06	8844	89	2187	365	172	1890	10163	144	1890	3803	44	1271
5	41.96	9037	91	2221	389	182	1946	10603	150	1925	3938	46	1305
6	44.86	9236	93	2255	1052	192	1980	11061	157	1959	4079	48	1339
7	47.76	9441	96	2290	1750	202	2014	11539	164	1993	4225	50	1374
8	50.66	9652	98	2324	2483	212	2049	12037	170	2028	4378	52	1408
9	53.56	9868	100	2358	3252	222	2083	12553	177	2062	4536	54	1442
10	56.46	10091	102	2393	4056	232	2117	13089	184	2096	4700	56	1477
11	59.36	10320	105	2427	4896	242	2152	13644	190	2131	4871	58	1511
12	62.26	10554	107	2461	5773	252	2186	14219	197	2165	5047	60	1545
13	65.16	10794	109	2496	6686	263	2220	14812	204	2199	5229	62	1580
14	68.06	11041	111	2530	7636	273	2255	15425	210	2234	5416	64	1614
15	70.96	11293	114	2564	8623	284	2289	16057	217	2268	5610	66	1648

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	11551	116	2599	9647	294	2323	16708	224	2302	5810	69	1683
17	76.76	11815	118	2633	10708	305	2358	17379	230	2337	6015	71	1717
18	79.66	12085	120	2667	11807	315	2392	18069	237	2371	6227	73	1751
19	82.56	12360	123	2702	12944	326	2426	18778	243	2405	6444	75	1786
20	85.46	12642	125	2736	14119	337	2461	19506	250	2440	6668	77	1820
21	88.36	12930	127	2770	15332	348	2495	20254	257	2474	6897	79	1854
22	91.26	13223	129	2805	16584	359	2529	21021	263	2508	7132	81	1889

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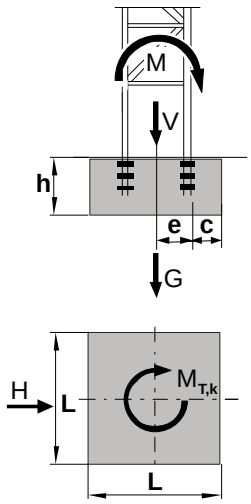
3.11 Jib 34.50 m

WARNING
Refer to the “General notes on safety for foundation loading tables”, as well as the instruction manual for the crane, before applying this static data.

Crane type:	1000 EC-H 40 Litronic Crane stationary, without climbing equipment, without crane driver elevator	**Jib:**	**34.50 m**
Tower system:	1000HC	**Tower section length:**	2.90 m
Base tower:	base tower section 1000HC reinf. 11.6m, not to climb		
Crane base:	foundation anchor 3150HC (C038.060-372.100)		



Conditions for crane stability are:
Jib must be free to weathervane when out of operation!

$$Eccentricity:\ e = \frac{M + (H \cdot h)}{V + G} \leq \frac{L}{3}$$

Ground pressure must not exceed maximum allowable soil pressure!

$$\sigma_B = \frac{2 \cdot (V + G)}{3 \cdot L \cdot c} \leq \sigma_{B\ permissible}$$

$$c = \frac{L}{2} - e$$

G = Weight of foundation

Slewing moment in assembly and operation $M_{T,k}$ = 510 kNm

No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
0	27.46	8111	79	2001	2530	134	1661	8589	117	1661	2831	34	899
1	30.36	8288	81	2035	2037	144	1696	8951	124	1696	2936	36	934
2	33.26	8471	83	2070	1511	153	1730	9333	131	1730	3046	38	968
3	36.16	8659	86	2104	951	163	1764	9734	137	1764	3163	40	1002
4	39.06	8854	88	2138	357	172	1799	10154	144	1799	3286	42	1037
5	41.96	9055	90	2173	397	182	1854	10594	150	1833	3414	44	1071
6	44.86	9261	92	2207	1060	192	1888	11053	157	1868	3548	46	1105
7	47.76	9473	95	2241	1758	202	1923	11531	164	1902	3689	48	1140
8	50.66	9691	97	2276	2492	212	1957	12028	170	1936	3835	50	1174
9	53.56	9915	99	2310	3260	222	1991	12545	177	1971	3987	52	1208
10	56.46	10145	101	2344	4065	232	2026	13080	184	2005	4145	54	1243
11	59.36	10381	104	2379	4905	242	2060	13636	190	2039	4309	56	1277
12	62.26	10623	106	2413	5782	252	2094	14210	197	2074	4479	58	1311
13	65.16	10871	108	2447	6695	263	2129	14803	204	2108	4654	60	1346
14	68.06	11124	110	2482	7644	273	2163	15416	210	2142	4836	62	1380
15	70.96	11384	113	2516	8631	284	2197	16048	217	2177	5024	64	1414

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No. of tower sections	Hook height	Crane in operation			Crane out of operation						Crane during erection		
					Storm from rear			Storm from front					
	[m]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]	M [kNm]	H [kN]	V [kN]
16	73.86	11649	115	2550	9655	294	2232	16700	224	2211	5217	66	1449
17	76.76	11921	117	2585	10717	305	2266	17370	230	2245	5416	68	1483
18	79.66	12198	119	2619	11816	315	2300	18060	237	2280	5622	70	1517
19	82.56	12481	122	2653	12953	326	2335	18769	243	2314	5833	72	1552
20	85.46	12770	124	2688	14128	337	2369	19498	250	2348	6050	75	1586
21	88.36	13065	126	2722	15341	348	2403	20245	257	2383	6273	77	1620
22	91.26	13366	128	2756	16593	359	2438	21012	263	2417	6501	79	1655

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Foundation loadings

Jib 34.50 m

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