

Aeronautica 47-500/750 kW Foundation loads

65 m hub height

Wind class: IEC-IB
Row configuration

Extreme loads on foundation (bottom flange of tower):

Notice!

All extreme loads are **including** a load safety factor of: 1.35
Except for tower and nacelle mass which includes a safety factor of: 0.90

App. nacelle mass kg: 37000
App. tower mass kg: 83000
Total mass incl. safety factor: 120000

Extreme loads including above safety factors:

Horizontal force [kN]:	646
Bending moment [kNm]:	30159
Vertical force [kN]:	1019
Torsional torque [kNm]:	884

Equivalent fatigue loads on foundation (bottom flange on tower):

Equiv. load ranges for diff. cycle numbers m - denotes the S/N - curve slope

The following fatigue loads, should be taken into consideration at the same time:

Vertical force (F_{xT}):

N-ref: 2.41E+08

m	N-ref	N=10E7	N=10E6
3	30.58	88.36	190.37
4	29.05	64.39	114.50
6	29.40	49.98	73.36
8	30.88	45.98	61.31
10	32.56	44.77	56.36
12	34.20	44.59	54.02

Torsional torque (M_{xT}):

N-ref: 7.24E+08

m	N-ref	N=10E7	N=10E6
3	195.76	815.93	1757.86
4	214.02	624.30	1110.18
6	251.59	513.64	753.92
8	287.43	490.91	654.64
10	320.17	491.31	618.52
12	349.51	499.39	605.02

Horizontal force (F_{zh0}):

N-ref: 2.48E+08

m	N-ref	N=10E7	N=10E6
3	33.23	96.94	208.84
4	38.41	85.74	152.47
6	48.02	82.02	120.38
8	56.36	84.20	112.28
10	63.79	87.96	110.74
12	70.55	92.20	111.70

Bending (M_{yh0}):

N-ref: 2.48E+08

m	N-ref	N=10E7	N=10E6
3	1739.02	5072.21	10927.74
4	2051.25	4578.13	8141.19
6	2627.14	4486.74	6585.63
8	3141.23	4692.83	6257.99
10	3610.96	4978.41	6267.44
12	4039.65	5279.19	6395.88

Lines of direction for stiffness properties of foundation:

The foundation should as a minimum have a stiffness equal to a beam of length 2 meter, fixed in one end and with the minimum stiffness properties:

$$EI: 1.50E+11 \text{ Nm}^2$$