



Noise level, Power curves, Thrust curves

Nordex N117/3000

© Nordex Energy GmbH, Langenhorner Chaussee 600, D-22419 Hamburg, Germany
Alle Rechte vorbehalten. Schutzvermerk ISO 16016 beachten.

Noise level - Nordex N117/3000

Basis: The specified sound power levels are expected values in terms of statistics. Results of single measurements will be within the confidence interval according to IEC 61400-14 [4].

Wind turbine data:

Operational mode: Max power point
Rotor diameter: 117 m

Remarks:

Verification according to: Measurements are to be carried out by a measuring institute accredited for noise emission measurements at wind turbines according to ISO/IEC 17025 [3] at the reference position as defined in IEC 61400-11 [1]. The data analysis must be carried out according to the preferred method 1 of IEC 61400-11 [1]. The tonal penalties in the vicinity of wind turbines K_{TN} based on these measurements are to be determined according to „Technische Richtlinien für Windenergieanlagen“ [2].

Tonality: The noise can be tonal in the vicinity of wind turbines. The specified sound power level includes potential tonal penalties according to „Technische Richtlinien für Windenergieanlagen“ [2], without taking account any tonality $K_{TN} \leq 2$ dB.

Wind speed: The calculation of the standardised wind speed at 10 m height according to IEC 61400-11:2002 [1] is based on a terrain roughness length $z_0 = 0.05$ m. The actual wind speed at 10 m height can be different to the standardised wind speed depending on the actual terrain roughness length.

[1] IEC 61400-11 ed. 2: Wind Turbine Generator Systems – Part 11: Acoustic Noise Measurement Techniques; 2002-12

[2] Technische Richtlinie für Windenergieanlagen – Teil 1: Bestimmung der Schallemissionswerte, Revision 18; FGW 2008-02

[3] ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories; 2005-08

[4] IEC 61400-14, Wind turbines – Part 14: Declaration of apparent sound power level and tonality values, first edition, 2005-03

Noise level - Nordex N117/3000

Standardized wind speed $V_{S(10m)}$ [m/s]	Apparent sound power level					
	hub height 91 m		hub height 120 m		hub height 141 m	
	L_{WA} [dB(A)]	V_H [m/s]	L_{WA} [dB(A)]	V_H [m/s]	L_{WA} [dB(A)]	V_H [m/s]
3.0	96.5	4.3	96.6	4.4	96.7	4.5
4.0	98.0	5.7	98.3	5.9	98.4	6.0
5.0	102.4	7.1	103.2	7.3	103.6	7.5
6.0	105.0	8.5	105.1	8.8	105.2	9.0
7.0	105.6	9.9	105.7	10.3	105.8	10.5
8.0	106.0	11.3	106.0	11.8	106.0	12.0
9.0	106.0	12.8	106.0	13.2	106.0	13.5
10.0	106.0	14.2	106.0	14.7	106.0	15.0
11.0	106.0	15.6	106.0	16.2	106.0	16.5
12.0	106.0	17.0	106.0	17.6	106.0	18.0

Power curves - Nordex N117/3000

Basis: These power curve values according to IEC 61400-12-1 are based on aerodynamic calculations by Nordex Energy GmbH.

Wind turbine data:

Operational mode: Max power point
Rotor diameter: 117 m

Determinations for the power curve verification:

Verification according to: IEC 61400-12-1:2005
Type of anemometer: Thies First Class (Advanced), Risø P2546A or Vector A100
Measurement of power: low voltage side, 660 VAC
Air density: normalization to the nearest air density shown in the table
Filter of turbulence: $9\% \leq TI \leq 15\%$
Filter of wind shear: $a \leq 0.2$ (Hellman exponent)
Wind shear measurement and determination according to the requirements of MEASNET power performance measurement procedure, Version 5, December – 2009, chapter 3.3 and 3.8
Filter of temperature: $2\text{ °C} \leq \theta \leq 25\text{ °C}$
Status signal: Ready for operation without consideration of the cut-out hysteresis (IEC 61400-12-1:2005, database B)

Power curves - Nordex N117/3000

wind speed V_{hub} [m/s]	Power P_{el} [kW] at air density ρ [kg/m ³]								
	0.900	0.925	0.950	0.975	1.000	1.025	1.050	1.075	1.100
3.0	2	3	4	5	6	7	9	10	11
3.5	29	31	33	35	37	39	42	44	46
4.0	82	86	90	93	97	101	104	108	111
4.5	149	155	161	166	172	177	183	188	194
5.0	231	239	247	255	263	271	279	286	294
5.5	328	339	350	361	371	382	393	404	414
6.0	441	455	469	484	498	513	527	541	555
6.5	571	590	609	628	646	665	683	701	719
7.0	723	747	771	795	818	841	864	887	910
7.5	899	929	958	988	1017	1045	1073	1101	1128
8.0	1098	1134	1169	1203	1237	1271	1304	1337	1370
8.5	1312	1352	1392	1432	1472	1511	1551	1590	1629
9.0	1529	1575	1621	1667	1713	1759	1805	1851	1897
9.5	1746	1798	1851	1903	1955	2008	2061	2116	2170
10.0	1961	2019	2077	2136	2197	2258	2315	2374	2433
10.5	2170	2235	2302	2366	2428	2490	2539	2588	2637
11.0	2378	2444	2509	2566	2617	2670	2710	2749	2790
11.5	2564	2619	2673	2720	2762	2805	2835	2866	2896
12.0	2709	2754	2799	2836	2868	2901	2922	2943	2964
12.5	2821	2856	2891	2918	2941	2964	2975	2986	2997
13.0	2903	2928	2953	2970	2983	2996	2998	2999	3000
13.5	2959	2974	2989	2996	2998	3000	3000	3000	3000
14.0	2991	2996	3000	3000	3000	3000	3000	3000	3000
14.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
15.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
15.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
16.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
16.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
17.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
17.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
18.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
18.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
19.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
19.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
20.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
20.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
21.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
21.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
22.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
22.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
23.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
23.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
24.0	3000	3000	3000	3000	3000	3000	3000	3000	3000
24.5	3000	3000	3000	3000	3000	3000	3000	3000	3000
25.0	3000	3000	3000	3000	3000	3000	3000	3000	3000

Power curves - Nordex N117/3000

wind speed V_{hub} [m/s]	Power P_{el} [kW] at air density ρ [kg/m ³]							
	1.125	1.150	1.175	1.200	1.225	1.250	1.275	1.300
3.0	12	13	14	15	16	17	18	19
3.5	48	50	52	54	56	58	60	62
4.0	115	118	122	126	129	133	136	140
4.5	199	205	210	215	221	226	232	237
5.0	302	310	318	325	333	341	348	356
5.5	425	435	446	456	467	477	488	498
6.0	569	583	597	610	624	637	651	664
6.5	737	755	772	790	807	824	841	858
7.0	932	954	976	998	1020	1041	1063	1084
7.5	1156	1183	1210	1237	1263	1290	1316	1342
8.0	1403	1436	1469	1501	1534	1566	1598	1631
8.5	1668	1708	1747	1786	1825	1864	1904	1943
9.0	1944	1991	2038	2085	2131	2176	2223	2269
9.5	2223	2276	2330	2381	2420	2459	2499	2538
10.0	2479	2524	2569	2612	2643	2675	2706	2738
10.5	2675	2712	2749	2783	2807	2830	2854	2877
11.0	2819	2847	2874	2900	2916	2931	2947	2962
11.5	2917	2935	2954	2971	2978	2984	2991	2997
12.0	2975	2984	2993	3000	3000	3000	3000	3000
12.5	2999	2999	3000	3000	3000	3000	3000	3000
13.0	3000	3000	3000	3000	3000	3000	3000	3000
13.5	3000	3000	3000	3000	3000	3000	3000	3000
14.0	3000	3000	3000	3000	3000	3000	3000	3000
14.5	3000	3000	3000	3000	3000	3000	3000	3000
15.0	3000	3000	3000	3000	3000	3000	3000	3000
15.5	3000	3000	3000	3000	3000	3000	3000	3000
16.0	3000	3000	3000	3000	3000	3000	3000	3000
16.5	3000	3000	3000	3000	3000	3000	3000	3000
17.0	3000	3000	3000	3000	3000	3000	3000	3000
17.5	3000	3000	3000	3000	3000	3000	3000	3000
18.0	3000	3000	3000	3000	3000	3000	3000	3000
18.5	3000	3000	3000	3000	3000	3000	3000	3000
19.0	3000	3000	3000	3000	3000	3000	3000	3000
19.5	3000	3000	3000	3000	3000	3000	3000	3000
20.0	3000	3000	3000	3000	3000	3000	3000	3000
20.5	3000	3000	3000	3000	3000	3000	3000	3000
21.0	3000	3000	3000	3000	3000	3000	3000	3000
21.5	3000	3000	3000	3000	3000	3000	3000	3000
22.0	3000	3000	3000	3000	3000	3000	3000	3000
22.5	3000	3000	3000	3000	3000	3000	3000	3000
23.0	3000	3000	3000	3000	3000	3000	3000	3000
23.5	3000	3000	3000	3000	3000	3000	3000	3000
24.0	3000	3000	3000	3000	3000	3000	3000	3000
24.5	3000	3000	3000	3000	3000	3000	3000	3000
25.0	3000	3000	3000	3000	3000	3000	3000	3000

Thrust curves - Nordex N117/3000

Basis:

The represented thrust coefficients are based on aerodynamical calculations of the Nordex Energy GmbH. The thrust curves are only for information and will not be warranted.

Wind turbine data:

Operational mode:

Max power point

Blade regulation:

Pitch

Air density:

to the nearest air density shown in the table

Thrust curves - Nordex N117/3000

wind speed V_{hub} [m/s]	Thrust coefficients c_T [-] at air density ρ [kg/m ³]								
	0.900	0.925	0.950	0.975	1.000	1.025	1.050	1.075	1.100
3.0	0.917	0.918	0.920	0.922	0.924	0.925	0.927	0.929	0.931
3.5	0.890	0.891	0.893	0.895	0.897	0.898	0.900	0.902	0.904
4.0	0.858	0.861	0.863	0.866	0.868	0.871	0.874	0.876	0.879
4.5	0.834	0.838	0.841	0.844	0.848	0.851	0.854	0.857	0.861
5.0	0.814	0.818	0.823	0.827	0.831	0.835	0.839	0.844	0.848
5.5	0.799	0.804	0.809	0.814	0.819	0.824	0.829	0.833	0.839
6.0	0.786	0.792	0.797	0.803	0.808	0.814	0.819	0.825	0.830
6.5	0.770	0.776	0.782	0.789	0.797	0.803	0.810	0.816	0.823
7.0	0.759	0.768	0.776	0.785	0.793	0.801	0.809	0.816	0.824
7.5	0.760	0.770	0.779	0.787	0.795	0.803	0.810	0.817	0.824
8.0	0.761	0.769	0.778	0.786	0.794	0.802	0.809	0.816	0.824
8.5	0.760	0.769	0.778	0.786	0.789	0.788	0.788	0.787	0.787
9.0	0.736	0.735	0.734	0.733	0.733	0.733	0.733	0.734	0.735
9.5	0.680	0.680	0.680	0.680	0.681	0.682	0.683	0.685	0.687
10.0	0.630	0.630	0.631	0.632	0.633	0.635	0.637	0.640	0.643
10.5	0.585	0.585	0.586	0.588	0.590	0.592	0.595	0.598	0.602
11.0	0.544	0.545	0.547	0.549	0.551	0.554	0.557	0.561	0.565
11.5	0.508	0.509	0.511	0.513	0.516	0.519	0.498	0.480	0.464
12.0	0.475	0.477	0.479	0.466	0.448	0.433	0.420	0.407	0.396
12.5	0.445	0.427	0.411	0.397	0.384	0.373	0.363	0.353	0.344
13.0	0.381	0.368	0.356	0.345	0.335	0.326	0.318	0.310	0.302
13.5	0.333	0.323	0.313	0.304	0.296	0.288	0.281	0.274	0.267
14.0	0.295	0.286	0.278	0.270	0.263	0.256	0.250	0.244	0.238
14.5	0.263	0.256	0.248	0.242	0.235	0.230	0.224	0.219	0.214
15.0	0.236	0.230	0.223	0.217	0.212	0.207	0.202	0.197	0.193
15.5	0.213	0.207	0.202	0.197	0.192	0.187	0.183	0.178	0.175
16.0	0.193	0.188	0.183	0.179	0.174	0.170	0.166	0.162	0.159
16.5	0.176	0.171	0.167	0.163	0.159	0.155	0.152	0.148	0.145
17.0	0.161	0.157	0.153	0.149	0.145	0.142	0.139	0.136	0.133
17.5	0.148	0.144	0.140	0.137	0.134	0.130	0.128	0.125	0.122
18.0	0.136	0.133	0.129	0.126	0.123	0.120	0.118	0.115	0.113
18.5	0.126	0.122	0.119	0.116	0.114	0.111	0.109	0.106	0.104
19.0	0.116	0.113	0.111	0.108	0.105	0.103	0.101	0.099	0.097
19.5	0.108	0.105	0.103	0.100	0.098	0.096	0.094	0.092	0.090
20.0	0.100	0.098	0.096	0.093	0.091	0.089	0.087	0.085	0.084
20.5	0.094	0.091	0.089	0.087	0.085	0.083	0.082	0.080	0.078
21.0	0.088	0.085	0.083	0.081	0.080	0.078	0.076	0.075	0.073
21.5	0.082	0.080	0.078	0.076	0.075	0.073	0.072	0.070	0.069
22.0	0.077	0.075	0.073	0.072	0.070	0.069	0.067	0.066	0.065
22.5	0.072	0.071	0.069	0.067	0.066	0.065	0.063	0.062	0.061
23.0	0.068	0.067	0.065	0.064	0.062	0.061	0.060	0.058	0.057
23.5	0.064	0.063	0.061	0.060	0.059	0.057	0.056	0.055	0.054
24.0	0.061	0.059	0.058	0.057	0.056	0.054	0.053	0.052	0.051
24.5	0.057	0.056	0.055	0.054	0.053	0.051	0.050	0.049	0.049
25.0	0.054	0.053	0.052	0.051	0.050	0.049	0.048	0.047	0.046

Thrust curves - Nordex N117/3000

wind speed V_{hub} [m/s]	Thrust coefficients c_T [-] at air density ρ [kg/m ³]							
	1.125	1.150	1.175	1.200	1.225	1.250	1.275	1.300
3.0	0.932	0.934	0.936	0.938	0.939	0.941	0.942	0.943
3.5	0.905	0.907	0.909	0.911	0.912	0.914	0.916	0.917
4.0	0.881	0.884	0.887	0.889	0.892	0.894	0.897	0.899
4.5	0.864	0.867	0.870	0.874	0.877	0.880	0.883	0.886
5.0	0.852	0.856	0.860	0.864	0.867	0.871	0.875	0.879
5.5	0.844	0.849	0.853	0.858	0.863	0.867	0.872	0.876
6.0	0.836	0.841	0.847	0.852	0.857	0.862	0.867	0.872
6.5	0.829	0.835	0.841	0.847	0.853	0.859	0.864	0.870
7.0	0.831	0.837	0.843	0.849	0.855	0.860	0.866	0.871
7.5	0.830	0.836	0.842	0.848	0.853	0.859	0.865	0.870
8.0	0.830	0.836	0.842	0.842	0.842	0.842	0.843	0.843
8.5	0.788	0.788	0.790	0.791	0.792	0.793	0.794	0.796
9.0	0.737	0.739	0.741	0.743	0.745	0.747	0.749	0.752
9.5	0.690	0.693	0.697	0.700	0.702	0.705	0.708	0.711
10.0	0.646	0.650	0.655	0.658	0.661	0.664	0.668	0.671
10.5	0.606	0.611	0.616	0.615	0.586	0.565	0.549	0.533
11.0	0.543	0.523	0.507	0.492	0.479	0.467	0.455	0.445
11.5	0.450	0.438	0.427	0.416	0.406	0.397	0.388	0.380
12.0	0.386	0.376	0.367	0.359	0.351	0.343	0.336	0.329
12.5	0.336	0.328	0.320	0.313	0.306	0.300	0.294	0.288
13.0	0.295	0.288	0.282	0.276	0.270	0.264	0.259	0.254
13.5	0.261	0.255	0.250	0.245	0.240	0.235	0.230	0.226
14.0	0.233	0.228	0.223	0.218	0.214	0.210	0.206	0.202
14.5	0.209	0.204	0.200	0.196	0.192	0.188	0.185	0.181
15.0	0.188	0.184	0.181	0.177	0.174	0.170	0.167	0.164
15.5	0.171	0.167	0.164	0.160	0.157	0.154	0.152	0.149
16.0	0.155	0.152	0.149	0.146	0.143	0.141	0.138	0.136
16.5	0.142	0.139	0.136	0.134	0.131	0.129	0.126	0.124
17.0	0.130	0.127	0.125	0.123	0.120	0.118	0.116	0.114
17.5	0.120	0.117	0.115	0.113	0.111	0.109	0.107	0.105
18.0	0.110	0.108	0.106	0.104	0.102	0.100	0.099	0.097
18.5	0.102	0.100	0.098	0.096	0.095	0.093	0.091	0.090
19.0	0.095	0.093	0.091	0.089	0.088	0.086	0.085	0.083
19.5	0.088	0.086	0.085	0.083	0.082	0.080	0.079	0.078
20.0	0.082	0.081	0.079	0.078	0.076	0.075	0.074	0.072
20.5	0.077	0.075	0.074	0.073	0.071	0.070	0.069	0.068
21.0	0.072	0.070	0.069	0.068	0.067	0.066	0.065	0.064
21.5	0.067	0.066	0.065	0.064	0.063	0.062	0.061	0.060
22.0	0.063	0.062	0.061	0.060	0.059	0.058	0.057	0.056
22.5	0.060	0.059	0.058	0.057	0.056	0.055	0.054	0.053
23.0	0.056	0.055	0.054	0.053	0.052	0.052	0.051	0.050
23.5	0.053	0.052	0.051	0.050	0.050	0.049	0.048	0.047
24.0	0.050	0.049	0.049	0.048	0.047	0.046	0.045	0.045
24.5	0.048	0.047	0.046	0.045	0.045	0.044	0.043	0.043
25.0	0.045	0.044	0.044	0.043	0.042	0.042	0.041	0.040