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ICC-SWCC™

SUMMARY REPORT LPP-16-05

Manufacturer: Bergey Windpower Company
Wind Turbine Model: Excel 15 (240 VAC, 1-phase, 60 Hz)
Certification Number: LPP-16-05

The above-identified Small Wind Turbine (SWT) has been granted Limited Power Performance (LPP) certification by the ICC-SWCC™ Small Wind Certification Program. The Power Performance report was found to be in conformance with the AWEA Small Wind Turbine Performance and Safety Standard (AWEA Standard 9.1 – 2009). This LPP certification does not imply that the SWT has been fully certified by ICC-SWCC. Please refer to the *ICC-SWCC Small Wind Turbine Certification Policy* for more information. Changes to the SWT system design are to be approved by ICC-SWCC. If changes are made to the SWT without approval, this LPP certification is not valid and is not in effect. LPP certification is valid for 18 months from 4 June 2019 to 4 December 2020. For the ICC-SWCC LPP Certificate visit: www.smallwindcertification.org.



This report summarizes the results of Power Performance testing of the Bergey Windpower Company Excel 15 in accordance with AWEA Standard 9.1-2009. The Excel 15 is a 3-blade, upwind, stall-regulated, horizontal axis wind turbine with a rotor diameter of 9.6 m and swept area of 72.4 m². All testing was performed on a turbine system utilizing a Bergey Powersync III grid-tied inverter and a Bergey 30 m (100') guyed lattice tilt-up tower at the Bergey Windpower Company manufacturing facility in Norman, OK. Power Performance testing was performed from 23 March 2017 through 24 March 2017 and 16 March 2018 through 17 April 2018.

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1. Turbine Ratings

The Excel 15 performance testing was conducted in accordance with Section 2 of AWEA Standard 9.1-2009. The resulting turbine ratings, tabulated graphical Annual Energy Production (AEP), and graphical and tabulated power curve are given below.

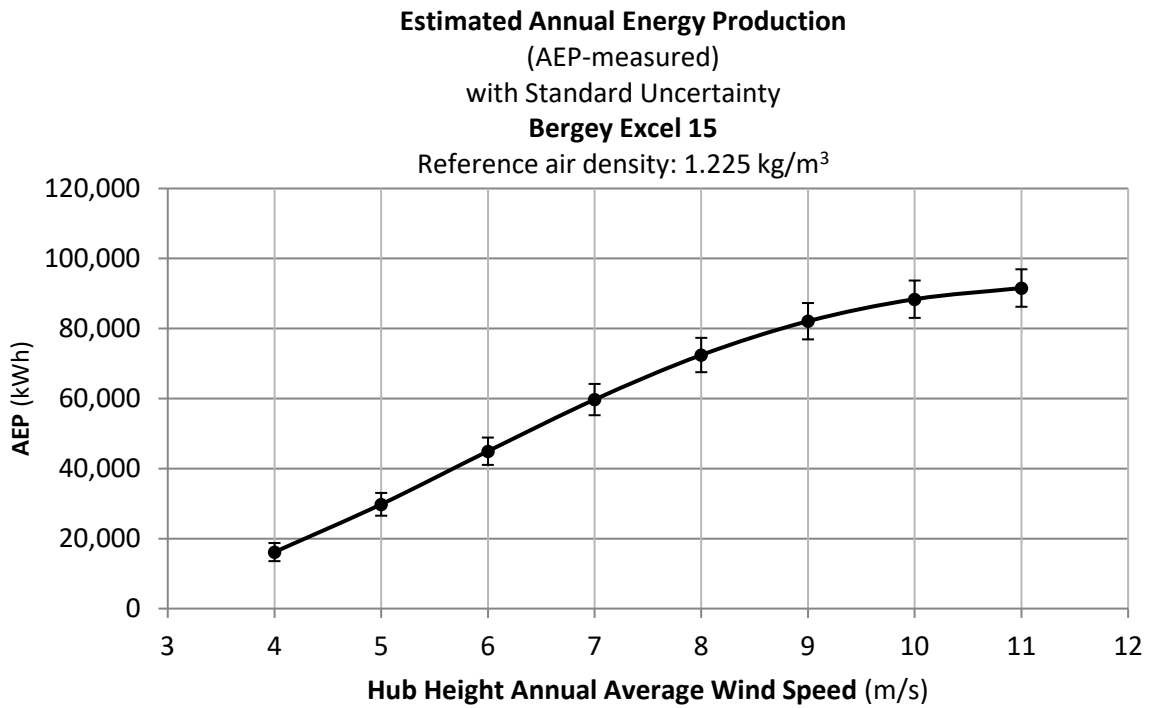
AWEA Rated Annual Energy @ 5 m/s	29,800 kWh
AWEA Rated Sound Level	49.3 dB(A)
AWEA Rated Power @ 11 m/s	15.6 kW
Peak Power @ 16 m/s	20.6 kW

2. Tabulated Annual Energy Production (AEP)

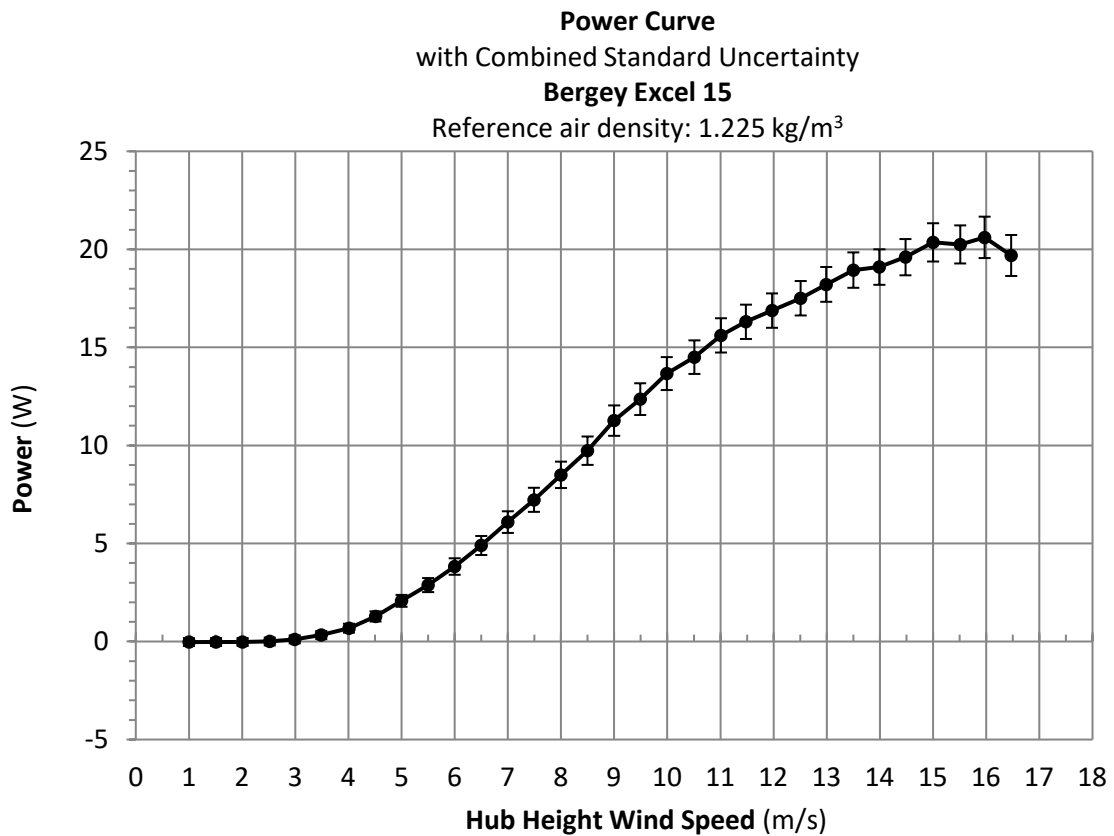
Corrected to a sea level air density of 1.225 kg/m³

Hub Height Annual Average Wind Speed (m/s)	AEP Measured (kWh)	Standard Uncertainty in AEP (kWh)	Standard Uncertainty in AEP (%)	AEP Extrapolated (kWh)
4	16,144	2,591	16.08%	16,144
5	29,786	3,253	10.92%	29,788
6	44,951	3,904	8.68%	45,005
7	59,704	4,468	7.46%	60,158
8	72,433	4,903	6.70%	74,214
9	82,091	5,190	6.21%	86,532
10	88,376	5,334	5.87%	96,705
11	91,569	5,354	5.63%	104,514

3. Annual Energy Production Curve



4. Power Curve



5. Tabulated Power Curve

Corrected to a sea level air density of 1.225 kg/m ³					Category A	Category B	Combined
Bin	Hub Height Wind Speed	Power Output	Cp	1-minute samples	Standard Uncertainty, Si	Standard Uncertainty, Ui	Standard Uncertainty, Ci
	<i>m/s</i>	<i>kW</i>			<i>kW</i>	<i>kW</i>	<i>W</i>
1.0	1.00	-0.029	-0.64	221	0.0003	0.200	0.200
1.5	1.51	-0.028	-0.18	265	0.0003	0.200	0.200
2.0	2.01	-0.025	-0.07	371	0.0004	0.200	0.200
2.5	2.52	0.000	0.00	508	0.0011	0.200	0.200
3.0	2.99	0.108	0.09	616	0.0031	0.202	0.202
3.5	3.49	0.328	0.17	605	0.0067	0.209	0.209
4.0	4.01	0.679	0.24	572	0.0129	0.226	0.227
4.5	4.51	1.280	0.31	646	0.0199	0.257	0.258
5.0	5.00	2.074	0.37	777	0.0269	0.302	0.303
5.5	5.50	2.878	0.39	782	0.0346	0.356	0.358
6.0	6.00	3.824	0.40	765	0.0458	0.417	0.420
6.5	6.50	4.897	0.40	687	0.0587	0.481	0.485
7.0	7.00	6.089	0.40	631	0.0751	0.546	0.552
7.5	7.49	7.226	0.39	538	0.0973	0.606	0.614
8.0	8.00	8.500	0.37	483	0.1174	0.663	0.673
8.5	8.50	9.731	0.36	432	0.1335	0.712	0.724
9.0	9.00	11.265	0.35	393	0.1497	0.761	0.775
9.5	9.49	12.361	0.33	368	0.1640	0.792	0.809
10.0	9.99	13.664	0.31	339	0.1734	0.822	0.840
10.5	10.51	14.502	0.28	290	0.1892	0.834	0.856
11.0	11.01	15.612	0.26	266	0.1955	0.852	0.874
11.5	11.48	16.304	0.24	259	0.1938	0.854	0.875
12.0	11.97	16.876	0.22	210	0.2156	0.851	0.877
12.5	12.51	17.506	0.20	202	0.2076	0.853	0.878
13.0	12.99	18.212	0.19	156	0.2198	0.859	0.887
13.5	13.50	18.942	0.17	125	0.2386	0.871	0.903
14.0	13.99	19.096	0.16	77	0.2680	0.864	0.905
14.5	14.48	19.600	0.15	56	0.2992	0.874	0.924
15.0	15.00	20.355	0.14	40	0.3864	0.897	0.976
15.5	15.51	20.251	0.12	23	0.3944	0.887	0.971
16.0	15.97	20.611	0.11	21	0.5583	0.897	1.056
16.5	16.47	19.687	0.10	14	0.6013	0.855	1.045