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ICC-SWCC™

SUMMARY REPORT SWCC-10-20

Manufacturer: **Wind Resource, LLC**
Wind Turbine Model: **Skystream 3.7**
(240 VAC, 1-phase, 60 Hz)
Certification Number: **SWCC-10-20**



The above-identified Small Wind Turbine is certified under the ICC–SWCC Small Wind Turbine Certification Program to be in conformance with the *AWEA Small Wind Turbine Performance and Safety Standard (AWEA 9.1–2009)*. For the ICC-SWCC Certificate visit: www.smallwindcertification.org.

This report summarizes the results of testing and certification of the Skystream 3.7 turbine manufactured by Wind Resource, LLC in Kansas City, Missouri, in accordance with *AWEA Standard 9.1-2009*. The Skystream 3.7 is a 3-blade, downwind, horizontal axis wind turbine with a swept area of 10.9 m².

Power Performance testing was performed by WINDTEST in Kaiser-Wilhelm-Koog, Germany from November 14, 2008, to March 22, 2009. Acoustic testing was performed by WINDTEST in Kaiser-Wilhelm-Koog, Germany on August 13, 2009. The Acoustic data was re-analyzed by the National Renewable Energy Lab (NREL) to conform to the AWEA Standard. Safety and Function testing was performed by NREL in 2005 and 2008 in Golden, Colorado. Duration testing was conducted at the USDA/ARS facility in Bushland, Texas from January 29, 2007, to March 31, 2008.

1. Turbine Ratings

The DS3000 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 | 3,420 kWh |
| AWEA Rated Sound Level | 41.2 dB(A) |
| AWEA Rated Power @ 11 m/s | 2.1 kW |
| Peak Power @ 14 m/s | 2.4 kW |

4. Power Curve



5. Tabulated Power Curve

| | R UHFHWHGMP | OHYHODLUGHLWRIP | | DWHRU | DWHRU | RPELHG | |
|----|--------------|-----------------|------|-------------|-------------------|-------------------|------------------|
| L | EHLW LG6SHHG | 3RHU 2WSW | s | P LWH DPSOH | 6WDGDUG 8FHUWDLW6 | 6WDGDUG 8FHUWDLW8 | 6WDGDUG 8FHUWDLW |
| | P | | | | Y | Y | |
| 1 | 0.56 | -18 | - | 468 | 0 | 11 | 11 |
| 2 | 1.04 | -18 | - | 1204 | 0.0 | 10.0 | 10.0 |
| 3 | 1.52 | -18 | - | 2082 | 0.0 | 10.0 | 10.0 |
| 4 | 2.02 | -17 | - | 3471 | 0.0 | 10.0 | 10.0 |
| 5 | 2.51 | -12 | - | 5236 | 0.0 | 10.0 | 10.0 |
| 6 | 3.00 | 3 | 0.02 | 6353 | 0.0 | 11.0 | 11.0 |
| 7 | 3.51 | 34 | 0.12 | 6465 | 0.0 | 13.0 | 13.0 |
| 8 | 4.03 | 84 | 0.20 | 9502 | 0.0 | 17.0 | 17.0 |
| 9 | 4.46 | 132 | 0.23 | 9778 | 0.0 | 20.0 | 20.0 |
| 10 | 5.00 | 203 | 0.25 | 6018 | 1.0 | 23.0 | 23.0 |
| 11 | 5.49 | 285 | 0.26 | 5407 | 1.0 | 30.0 | 30.0 |
| 12 | 6.00 | 391 | 0.28 | 4924 | 1.0 | 39.0 | 39.0 |
| 13 | 6.50 | 510 | 0.28 | 4619 | 2.0 | 46.0 | 46.0 |
| 14 | 6.99 | 643 | 0.29 | 4570 | 2.0 | 54.0 | 54.0 |
| 15 | 7.49 | 799 | 0.29 | 4194 | 3.0 | 66.0 | 66.0 |
| 16 | 7.99 | 968 | 0.29 | 3534 | 3.0 | 75.0 | 75.0 |

| | | | | | | | |
|----|-------|-------|------|------|------|-------|-------|
| 17 | 8.50 | 1,146 | 0.28 | 3093 | 3.0 | 82.0 | 82.0 |
| 18 | 8.99 | 1,333 | 0.28 | 2543 | 3.0 | 93.0 | 93.0 |
| 19 | 9.48 | 1,531 | 0.27 | 1688 | 4.0 | 102.0 | 102.0 |
| 20 | 9.98 | 1,745 | 0.27 | 959 | 6.0 | 113.0 | 114.0 |
| 21 | 10.47 | 1,938 | 0.26 | 553 | 7.0 | 110.0 | 110.0 |
| 22 | 10.97 | 2,101 | 0.24 | 335 | 8.0 | 96.0 | 96.0 |
| 23 | 11.47 | 2,242 | 0.23 | 182 | 9.0 | 88.0 | 89.0 |
| 24 | 11.93 | 2,301 | 0.21 | 105 | 10.0 | 51.0 | 52.0 |
| 25 | 12.45 | 2,363 | 0.19 | 47 | 21.0 | 50.0 | 54.0 |
| 26 | 12.97 | 2,403 | 0.17 | 27 | 21.0 | 43.0 | 48.0 |
| 27 | 13.50 | 2,403 | 0.15 | 25 | 15.0 | 35.0 | 38.0 |
| 28 | 13.99 | 2,425 | 0.14 | 33 | 14.0 | 39.0 | 41.0 |
| 29 | 14.52 | 2,388 | 0.12 | 37 | 17.0 | 43.0 | 46.0 |
| 30 | 15.02 | 2,412 | 0.11 | 38 | 13.0 | 39.0 | 42.0 |
| 31 | 15.45 | 2,403 | 0.10 | 32 | 11.0 | 36.0 | 38.0 |
| 32 | 15.99 | 2,393 | 0.09 | 14 | 17.0 | 36.0 | 39.0 |
| 33 | 16.50 | 2,321 | 0.08 | 12 | 19.0 | 66.0 | 69.0 |

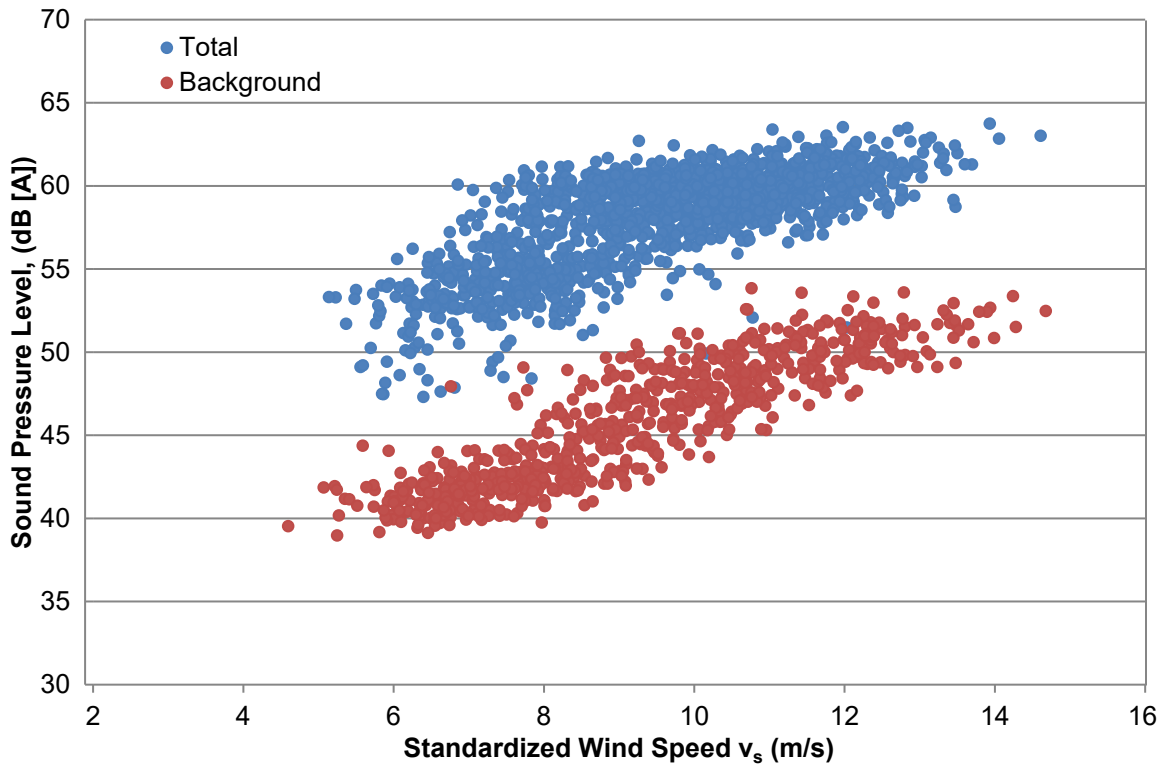
6. Tabulated Acoustic Data

The Skystream 3.7 was tested in accordance with Section 3 of *AWEA Standard 9.1-2009*. The tabulated sound pressure and sound power levels are is provided for specific wind speed bins.

| Wind Speed at 10m Height <i>m/s</i> | Sound Power Level <i>dB(A)</i> | Combined Uncertainty <i>dB(A)</i> |
|--|-----------------------------------|--------------------------------------|
| 6 | 80.7 | 2.4 |
| 7 | 83.4 | 2.4 |
| 8 | 85.5 | 2.4 |
| 9 | 87.3 | 2.4 |
| 10 | 87.9 | 1.6 |
| 11 | 88.3 | 1.5 |
| 12 | 89.1 | 1.5 |

7. Graphical Acoustic Data

10-second averaged sound pressure levels as a function of standardized wind speed.



8. Duration Testing

The Skystream 3.7 successfully completed a Duration Test for an IEC Class II Small Wind Turbine. The testing was performed from January 29, 2007 to March 31, 2008 with an Operational Time Fraction of 90.8 %.

9. Mechanical Strength Analysis

The mechanical strength analysis was found to be in conformance with *IEC 61400-2* as modified by *AWEA Standard 9.1 – 2009* for an IEC Class II Small Wind Turbine.

10. Safety and Function Testing

Safety and Function testing was found to be in conformance with sections 4.3 and 4.4 of *AWEA Standard 9.1 – 2009*.

11. Manufacturer Tower Design Requirements (ICC-SWCC is not responsible for any errors in the document below, which is provided by the manufacturer).

