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Noise Test Data for the 10 kW Bergey Excel Wind Turbine

The following noise level data was taken by NREL at the US-DOE National Wind Technology Center in Boulder, Colorado. The tests were conducted in accordance with IEC 61400-11, "Wind Turbine Generator Systems, Part 11 - Acoustic Noise Measurement Techniques". The sampling microphone was 40m (131 ft) from the base of the 37m (120 ft) wind turbine tower. The full research paper is available at <http://www.bergey.com/Technical/AIAA%202004-1185.pdf>

The data shows that the Excel wind turbine is less than 5 dBA above background noise, unless the inverter is off-line (e.g., power outage). Please note that wind speeds above 14 meters/second (31 miles per hour) are rare.

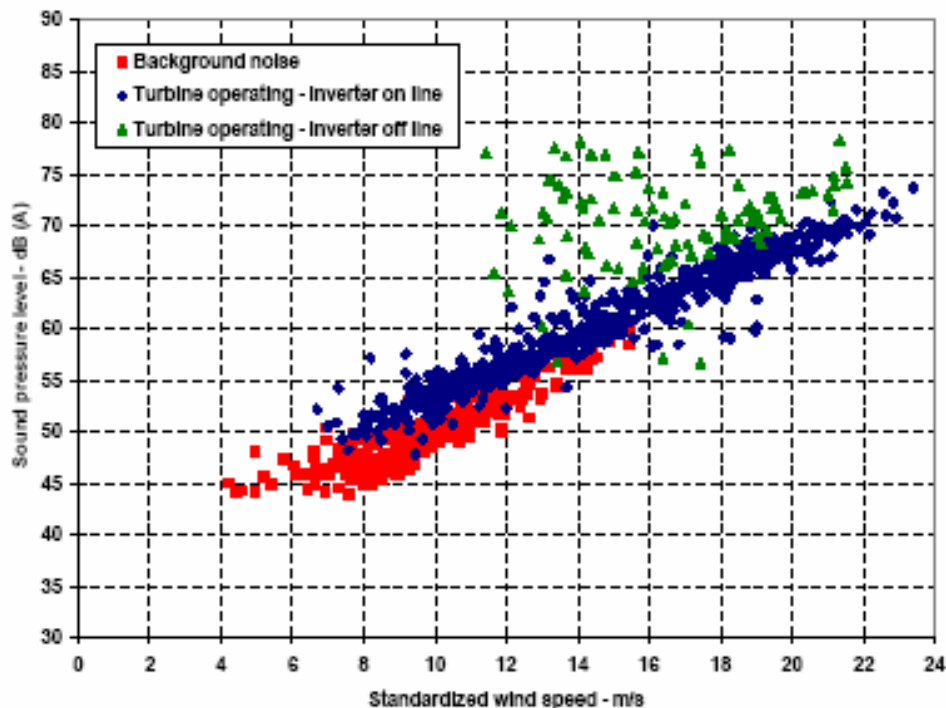


Figure 2. 10-second average sound pressure level for Bergey Excel-S with SH3052 airfoils

The American Wind Energy Association is finalizing approval of a new certification standard for small wind turbines. One parameter will be the Rated Sound Level. The Rated Sound Level is the sound level at 60 m (200 ft) that the wind turbine will not exceed 95% of the time in a 5 m/s (11 mph) average wind speed site. NREL has calculated the ratings for several small wind turbines they have tested. The results are presented below.

Turbine Tested	Wind Turbine Operating Alone		Wind Turbine Plus Background
	Sound Power Level (dBA)	Sound Pressure Level (dBA) at 60 m	Sound Pressure Level (dBA) at 60 m
Bergey XL.1	78.7	38.1	50.3
Air X	85.2	44.6	51.1
Air 403	86.7	46.1	51.5
Whisper H40	91.0	50.4	53.2
Excel SH3052	93.4	52.8	54.7
NorthWind 100	97.0	56.4	57.3
AOC 15/50	102.3	61.7	62.0
Excel DW00	105.1	64.8	65.8
10m/s wind speed - 50 dBA background			

The Sound Power Level is the total noise right at the source – the top of the tower. Sound diminishes with distance. The Sound Pressure Level is the sound a listener would hear at the distance given, in this case 60m (200 ft). Note that the Excel is only adding 4.7 dBA above the background sound of 50 dBA. 50 dBA of background sound is the wind noise in a 10 m/s (22.3 mph) wind.