



AWEA Standard Update

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Purpose

- Compare AWEA standard to IEC standards
- Provide an update on the AWEA standard



What is the AWEA Standard?

- AWEA *Small Wind Turbine Performance and Safety Standard* (AWEA Standard 9.1 – 2009)
- Refers to, **with modifications**, existing International Electrotechnical Commission (IEC) standards for small wind turbines
- Written to **ensure the quality** of the wind turbine can be assessed while imposing only **reasonable costs and difficulty** on the manufacturer who chooses to voluntarily certify their product



Disclaimer

The following details regarding the AWEA standard are based upon an unreleased draft and are therefore subject to change.

Certifying to AWEA vs. Type Certification to IEC

Type Certification to IEC

(from IEC TS 61400-22; to replace WT01)

Required

- Full Design Evaluation including
 - Structural Analysis
 - Static Blade Test
 - Design Basis Evaluation
 - Test for Design Data
 - and plenty more...
- Manufacturing Evaluation
- Power Performance
- Safety and Function
- Duration

Optional

- Acoustic Noise
- Power Quality
- Foundation Design Evaluation

Certification to AWEA

Required

- Limited Design Evaluation
 - Structural Analysis
 - Tower dynamics analysis (single/dual speed turbines)
 - Safety evaluation
 - Tower design requirements
- Power Performance
- Safety and Function
- Duration
- Acoustic Noise



AWEA mods to IEC 61400-12-1: **Power Performance Test**

- ❑ Battery banks included for grid-tie with batteries
- ❑ Wire run length, measured from the base of the tower, must be at least 8 rotor diameters and the wiring is to be sized per the manufacturer's installation instructions.
- ❑ Database shall include 10 minutes of data for all wind speeds at least 5 m/s beyond the lowest wind speed at which power is within 95% of Maximum Power (or when sustained output is attained)



AWEA mods to IEC 61400-11: **Acoustic Test**

- ❑ 10-second instead of 1-minute averaging
- ❑ Measure wind speed directly, not from power
- ❑ Method of bins for sound pressures at integer wind speeds
- ❑ Cover as wide a wind speed range as possible, as long as the wind screen remains effective
- ❑ Description of sound during overspeed protection
- ❑ Tonality analysis not required; report prominent tones



AWEA mods to IEC 61400-2: Duration Test

- ❑ The test must include at least 25 hours in wind speeds of 15 m/s (33.6 mph) and above
- ❑ Minor repairs allowed; replacement of major part* = restart the test
- ❑ Observe tower dynamics; report problems
- ❑ Test tower must comply with tower design requirements

* such as blades, main shaft, generator, tower, controller, or inverter



AWEA mods to IEC 61400-2: Strength and Safety

- ❑ Structural analysis using Simplified Equations or Aeroelastic Modeling of, at a minimum:
 - Blade root
 - Main shaft
 - Yaw axis (HAWT)
 - Plus a 'quick check' of the design for need for further analysis
- ❑ Tower dynamics analysis for single/dual speed SWT
- ❑ Evaluation of AWEA safety aspects
- ❑ IEC Safety and Function test
- ❑ Submit tower design requirements
 - Mechanical and electrical connections
 - Minimum blade/tower clearance
 - Maximum tower top loads
 - Maximum allowable tower top deflection



Labeling

- AWEA Rated Power
 - kW @ 11 m/s (24.6 mph)
- AWEA Rated Annual Energy
 - kWh @ annual average wind speed of 5 m/s (11.2 mph), Rayleigh distribution, 100% availability
- AWEA Rated Sound Level
 - level not exceeded 95% of time with average wind speed of 5 m/s (11.2 mph), Rayleigh distribution, and an observer location 60 m (~ 200 ft) from the rotor center
- Meets Safety and Durability Requirements



IEC 61400-2 Updates

- The new edition 3 of IEC 61400-2 will bring closer conformity between IEC and National Standards
- The U.S. may move from the AWEA standard to the new IEC standard when the update is complete



AWEA Standard Status

- ✓ AWEA Standards Coordinating Committee (SCC) commits to creating the standard
- ✓ AWEA Small Wind Turbine Standard Subcommittee (SWTSS) drafts the standard (5 year process)
- ✓ Comments received from Materially Affected Parties (MAP)
- ✓ SWTSS votes on responses & revises draft
- SWTSS votes on final draft**
- Draft standard -> SCC for adoption



For More Information...

- Contact John Dunlop at AWEA:
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- Once AWEA has released the standard, the SWCC will send an announcement to our mailing list.
www.smallwindcertification.org
Click "Get E-mail Updates"



Thank you

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