

S-343 5kW Wind Turbine

The Endurance S-343 wind turbine is designed to produce renewable energy efficiently, reliably, safely, and quietly. This turbine is ideal for residences, small farms, and wind power demonstration/training applications. It will produce 10,000 - 20,000 kWh per year in appropriate winds.

green energy that works

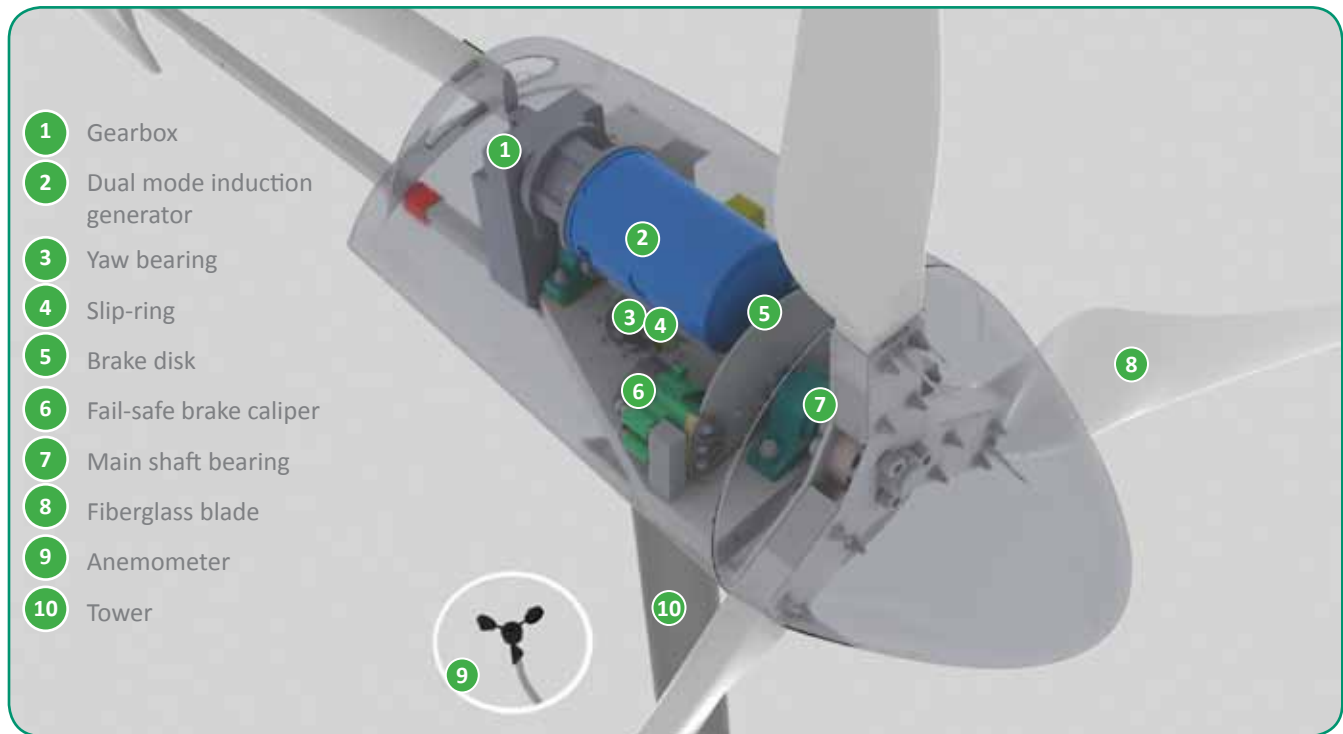
www.endurancewindpower.com

S-343 Benefits

- ❖ Reduces the environmental footprint of your electrical energy supply
- ❖ Eligible for renewable energy credits
- ❖ Promotes community sustainability values
- ❖ Protects against rising energy costs
- ❖ Contributes to energy independence



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1 Gearbox

Drives the generator at full speed while the rotor turns slowly. The gearbox uses rugged, conventional design for long life and high reliability.

2 Dual Mode Induction Generator

Delivers grid-compatible power without an inverter, power electronics, or batteries. This improves efficiency and reliability, and reduces up-front costs. In light winds, the generator operates at a low-voltage setting for maximum efficiency. (Patented Technology)

3 Yaw Bearing

Allows the turbine to pivot into the wind, as guided by the tail.

4 Slip-Ring

Feeds the output power to wires, which run down the tower.

5 Brake Disk

Large 16" disk brake stops the rotor when required, and is located close to the rotor for maximum safety.

6 Fail-Safe Brake Calipers

Dual pneumatic brake calipers operate independently to ensure fail-safe protection against turbine over-speed.

7 Main Shaft Bearings

Durable main shaft bearings were selected to last for the entire life of the turbine.

8 Fiberglass Blades

Designed to quietly and efficiently produce energy, even in light winds.

9 Anemometer

Senses the wind speed to control the turbine operation and shut-down. Winds can be recorded to assess the quality of wind at the site.

10 Towers

Tilt-down towers are available in attractive monopole or economical guyed configurations in sizes from 27.5 to 36.6 meters (90 to 120 ft) comply with height restrictions or to reach the best wind speeds at your site.

Cornerstones of Endurance Design

Production Efficiency

Most distributed wind customers did not select their site for wind resources, but look to generate power from the wind available to them. Endurance wind turbines are designed specifically for less-than-perfect wind conditions.

Swept Area

The blades capture the energy of the wind. The larger the rotor diameter, the more wind energy the turbine captures. The Endurance S-343 has a 6.4m (20.9 ft) rotor diameter- one of the largest rotor diameters per rated kW in its class- to capture the most wind energy.

Motoring

Motoring starts the blades spinning so the turbine operates in lighter wind conditions than if it relied solely on the wind to start.

Generator Type

The induction generator produces electricity that can be transferred to the power grid without inverters. This provides lower equipment and maintenance costs and increases overall power production

Reliability

All Endurance turbines have been extensively tested to ensure customers receive dependable energy production. They are built with proven commercial components for durability and easy support in the future.

Five Year Warranty

Endurance offers one of the best warranties in the wind industry, covering all defective components and labor for five years.

Safe Operation

When the turbine control system detects any fault, such as high wind or a grid power loss, the dual caliper disc brake system activates, safely stopping the turbine until the condition is cleared.

Passive Stall Rotor Design

The fixed-speed rotor aerodynamically stalls the blades as the first layer of protection for the turbine during high winds.

Control and Remote Interface Software

Each Endurance wind turbine is operated safely by an onboard computer system with advance control logic. This system also records data including wind speed and event history. Turbine controls and data are remotely available using the Endurance Remote Interface software.

Quiet Operation

Quiet operation is essential for a wind turbine in a community environment. Endurance turbines use slowly turning blades and high-quality manufactured components to make them the quietest turbines in their class.

Clean Aesthetics

A wind turbine makes a powerful statement about your commitment to the environment and clean energy. Endurance Wind Turbines have clean lines and make an attractive addition to any landscape.

Turbine

| | |
|----------------------|-----------------------------------|
| Configuration | 3 blades, horizontal axis, upwind |
| Rated power @ 11 m/s | 5.2 kW |
| Applications | Direct grid-tie |
| Rotor speed | 166 rpm |
| Cut-in wind speed | 4.1 m/s (9.2 mph) |
| Cut-out wind speed | 24 m/s (54 mph) |
| Survival wind speed | 52 m/s (116 mph) |
| Overall weight | 300 kg (661 lbs) |

Rotor

| | |
|------------------|--|
| Rotor diameter | 6.37 m (20.9 ft) |
| Swept area | 31.9 m ² (343 ft ²) |
| Blade length | 3.08 m (10.1 ft) |
| Blade material | Fiberglass/Epoxy |
| Power regulation | Stall control (constant speed) |

Generator

| | |
|---------------|--|
| Type | Induction generator |
| Configuration | 1 ϕ , 120/240 VAC split-phase @ 60 Hz, patented dual-voltage generation |

Brake & Safety Systems

| | |
|------------------------------------|---|
| Main brake system | Rapid fail-safe mechanical brake on rotor shaft |
| Secondary safety | Redundant fail-safe mechanical brake on rotor shaft |
| Automatic shut down triggered by : | <ul style="list-style-type: none"> - High wind speed - Grid failure - Over-speed - All other fault conditions |

Controls

| | |
|----------------|--|
| Control system | Field-programmable embedded controller |
| User interface | Wireless or wired network software interface for remote monitoring and control |

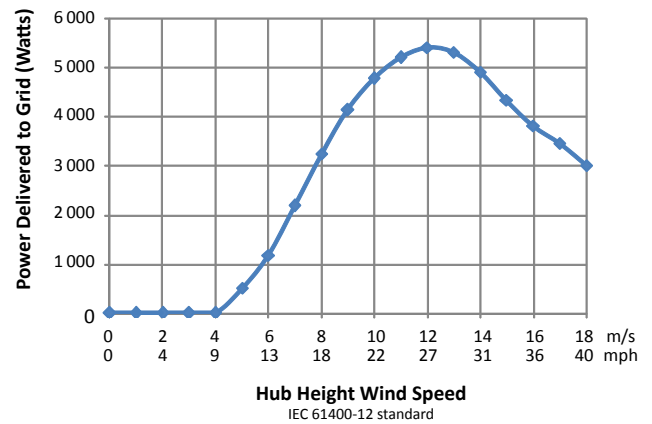
Warranty

| | |
|--------------------|--------------------------|
| Turbine & controls | 5 years parts and labour |
|--------------------|--------------------------|

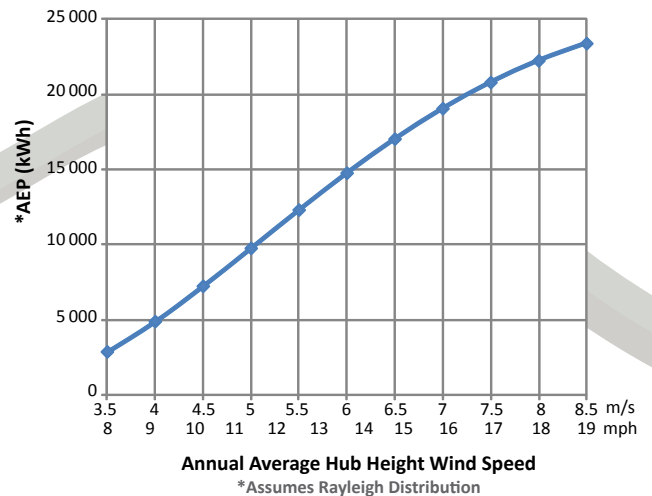
Towers

| | |
|--------------------|---|
| Types | Guyed, 31.1 m (102 ft) or 36.6 m (120 ft) Freestanding monopole, 27.5 m (90 ft) ¹ |
| Maintenance access | All towers are tiltable |

Power Curve



Annual Energy Production (AEP)



| Annual Average Hub Height Wind Speed (m/s) | Annual Energy Production (kWh) |
|--|--------------------------------|
| 3.5 | 2 800 |
| 4.0 | 4 900 |
| 4.5 | 7 200 |
| 5.0 | 9 700 |
| 5.5 | 12 300 |
| 6.0 | 14 800 |
| 6.5 | 17 000 |
| 7.0 | 19 100 |
| 7.5 | 20 800 |
| 8.0 | 22 200 |
| 8.5 | 23 400 |

Wind Speed Conversion Table

| m/s | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 14 |
|------|----|----|----|----|----|----|----|----|----|----|
| km/h | 14 | 18 | 22 | 25 | 29 | 32 | 36 | 40 | 43 | 50 |
| mph | 9 | 11 | 13 | 16 | 18 | 20 | 22 | 25 | 27 | 31 |

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Endurance Wind Power uses 100% renewable energy at its head office and manufacturing plant

¹Available tower sizes vary by region. Contact your local Wind Specialist for more details.