

Residential Windmill Preventive Maintenance

All moving machinery requires some form of preventive maintenance, even if the bearings are permanently lubricated. The following suggestions are some items that should be considered by the homeowner of a windmill. All checks should be performed at least annually, unless the manufacturer recommends a more frequent interval.

1. Perform the manufacturer recommended maintenance items at the time intervals required. All mechanical connections should be checked to assure the integrity of the connection. A torque wrench may be required to verify mechanical connections. A table of torque values (if not already provided) can be made for each mechanical connection. Electrical connections should be visually inspected or checked as noted below. Any joints requiring lubrication must be lubricated with the specified lubricant.
2. All points of rotation should be checked to verify operating freely. Check that anchoring points for rotating elements are at the correct torque values. Blades should be inspected for possible cracking, chipping, flaking, or other signs of abnormal stress.
3. Residential windmills typically output AC voltage of variable frequency that is converted to a DC voltage to feed the batteries and/or inverters. A DMM (Digital Multi-Meter) or DVM (Digital Volt Meter) can check both the AC and DC voltage, while the windmill is operating (making sure the meter is set to the correct range). The voltages should be logged at various wind speeds, so any deviation from normal can be detected. A clamp ammeter (may be part of the DMM) can check current. Again readings should be recorded. The breaker box used to “brake” the windmill is a good location for voltage readings; the current readings can be taken nearby on the wires to/from the breaker box.
4. Although not supposed to be moving, the tower (whatever type) is subject to stresses that can weaken any component. Check all accessible tower supports at least annually, e.g., guy wires for correct tension, bolts & nuts for correct torque, safety wire integrity, and turnbuckle tension.
5. Check system grounding for connection integrity at least annually. This includes any grounds at the tower site, as well as normal electrical system grounding.
6. Manufacturers often make improvements to their products. Although these improvements may not be necessary, they could well improve the productivity of the system. Contact the manufacturer to determine if equipment upgrades are available, then purchase and install as appropriate.
7. A PM (Preventive Maintenance) board in an often-accessed location can be a good reminder of what system is to be checked, when to check, and what to check. Results can be documented in a simple log (e.g., a spread sheet), both to confirm checks were done, as well as provide data for failure analysis, should that unfortunate action occur.

All these checks take an investment in time (equipment should already be available), but can prevent major problems that will cost a lot more time and money to repair.