



BUILDINGS BULLETIN 2009-015

Technical

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Purpose: This document establishes a protocol for acceptance criteria development, testing and approval of wind turbine product assemblies

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Section(s): EC Chapter 6

Subject(s): Renewable energy sources, wind turbine assemblies

In accordance with Section 28-113 of the Administrative Code, products that are identified in the Construction Codes or that the Commissioner identifies must be tested in accordance with national consensus standards by a Department-approved testing agency and be listed by such testing agency as having passed the acceptance standards of the test. In the case of wind turbine assemblies to be mounted on or near buildings or in otherwise occupied areas, there is no such national consensus standard for other than electrical components and there is no nationally recognized testing laboratory that performs testing on wind turbine assemblies. As wind turbines have the promise of generating distributed renewable power, in recognition of New York City's long-term PlaNYC initiative to reduce carbon emissions and in the interest of the safety of New Yorkers, the Department establishes the following protocol by which manufacturers may have their products approved by the Commissioner.

A. Product Testing Procedure. All wind turbine assemblies proposed for installation in the City of New York shall be listed and the components of such wind turbine assemblies shall be listed as well. In the absence of a national consensus standard for wind turbine assemblies and of the testing by nationally recognized testing laboratories, manufacturers shall do the following:

1. **Product Assembly Acceptance Criteria Development.** The manufacturer shall engage the services of a third-party engineering firm with expertise in wind behavior, wind turbines and/or aeronautical engineering, and with at least one principal licensed and registered to practice engineering in New York State. Such engineering firm shall develop detailed structural, mechanical, electrical and safety acceptance criteria for the product assembly for which the manufacturer seeks approval. Such acceptance criteria may involve: 1) the editing of one or more existing standards (e.g. ASTM, IEC 61400 series) to make it specifically applicable to the product assembly; 2) writing entirely new acceptance criteria; or 3) a combination of modified existing standards and original acceptance criteria.
 - a. **Acceptance Criteria.** Such acceptance criteria shall include but not be limited to the following:

- i. Compliance with all applicable codes, laws and rules, including but not limited to:
 - (1) The New York City Construction Codes;
 - (2) The New York City Electrical Code;
 - (3) The New York City Fire Code;
 - (4) Energy Conservation Construction Code of New York State;
 - (5) New York City Zoning Resolution;
 - (6) New York City Department of Environmental Protection regulations regarding noise.
 - ii. Consideration of additional safety issues, including but not limited to:
 - (1) Turbulence effects;
 - (2) Wind conditions for operation;
 - (3) Effects of harmonic vibrations;
 - (4) The tendency of the wind turbine to “throw” ice or heavy snow or to be affected by snow or ice;
 - (5) Lightning effects;
 - (6) Mast or other support structure and connections to turbine and to building structure;
 - (7) Avian impact.
 - b. **Testing Recommendations.** The engineering firm shall make recommendations regarding the following:
 - i. List of existing testing standards;
 - ii. Detailed protocols for new or modified existing testing standards – the protocols shall describe test methodology and acceptance criteria;
 - iii. Qualifications and requirements for the testing laboratory performing such tests;
 - iv. Limitations for use or application.
 - c. **Installation and Maintenance Recommendations.** The engineering firm shall make recommendations regarding the following:
 - i. Installation and testing recommendations for the installed product assembly;
 - ii. Periodic inspections of the wind turbine assembly and components, including but not limited to frequency of inspections, welds, bolts, materials and structural fatigue.
 - d. **Other Requirements.** The engineering firm shall:
 - i. Provide a listing of testing laboratories that could carry out the firm’s recommended testing of the product assembly;
 - ii. Provide new copies of any existing standards that are modified for the product assembly acceptance criteria. Such standards shall be the latest edition.
- 2. **Product Assembly Acceptance Criteria Approval.** The Department will review the proposed acceptance criteria and may solicit comments by industry experts. The written results of the Department’s review will be sent to the manufacturer. The manufacturer and the engineering firm shall amend the proposed acceptance criteria as requested by the Department and, upon a satisfactory submission, the Department will approve the acceptance criteria.
- 3. **Product Assembly Testing.** Each manufacturer shall have a representative sample of the wind turbine assembly tested in accordance with the approved acceptance criteria by a testing laboratory approved by the Department. Upon successful testing, the engineering firm shall provide its certified test report with conditions of use as applicable to the Department. Upon acceptance of the test report, the Department will notify the engineering firm and the manufacturer of such acceptance and the conditions under which the product assembly may be used in New York City.
- 4. **Plan approval and permits required.** This protocol applies only to the development of acceptance criteria and the testing of a wind turbine product assembly; it does not serve as an approval of the installation of a wind turbine that conforms to the developed acceptance criteria. Any such installation design shall be filed with the Department for plan approval and both

construction and electrical permits shall be required. Wind turbine assembly installations shall be tested prior to final inspection and sign-off or certificate of occupancy in accordance with the above-mentioned codes and the installation testing recommendations set forth in the approved product assembly acceptance criteria. Wind turbine assembly installations shall undergo periodic inspections following sign-off or certificate of occupancy in accordance with the approved product assembly acceptance criteria, but no more than every 12 months, and shall maintain records of such inspections for Department's review during the life of the installation.

B. Pilot Projects. Pilot projects may be approved by the Department for installation prior to the requirements set forth in Section A subject to the following conditions:

1. Limitation. The following limitations shall apply to all pilot projects submitted for approval by the Department:

a. Power Capacity. No wind turbine assembly capacity shall exceed two kilowatts and the entire installation on a building or within a tax lot, whichever is larger, shall not exceed 10 kilowatts in capacity.

b. Clearance. The wind turbine assembly installation on a building shall be set back from pedestrians, private streets and public ways by a distance to be determined by the registered design professional but in no event less than 25 feet. Wind turbines shall be prohibited on a roof or roof setback used for recreational purposes.

2. Filing for Pilot Project Approval. The following documents shall be submitted to the Office of Technical Certification and Research ("OTCR") by the owner or registered design professional for approval of the pilot project for a wind turbine assembly installation:

a. Form OTCR2 – Alternative Material Acceptance Criteria Application. Complete the application and check the Pilot Project box in Section 2.

b. Manufacturer's Certification. The manufacturer shall certify the following:

i. That the wind turbine assembly was designed to safely withstand the wind conditions to which the proposed installation will be subjected in accordance with the New York City Building Code.

ii. That such manufacturer will commence and complete the Product Testing Procedure in Section A of this Buildings Bulletin prior to the expiration of the pilot project.

c. Owner's Certification. The owner shall provide a signed affidavit with the following language:

"I attest that I am the owner of the premises at [address, county]; that I am requesting approval of Construction Application No. _____ and Electrical Application No. _____ regarding the installation of a wind turbine assembly or assemblies on such premises. I further attest that I understand that no consensus standard exists in the United States for wind turbine assemblies and that the wind turbine assembly that I propose to install on my property has not undergone product testing by a nationally recognized testing laboratory as is normally required in accordance with §28-113 of the Administrative Code of the City of New York. I understand further that this proposed pilot project, if approved by the New York City Department of Buildings, will expire two years from the date of sign-off of the electrical permit and that the wind turbine installation must be removed unless the manufacturer shall have undergone the Product Testing Procedure established in Section A of this Buildings Bulletin 2009-015, and the Department shall have accepted the engineer's certified test report. "

3. **Plan approval and permits required.** The wind turbine assembly installation shall require both a construction and an electrical permit. The application for construction drawing approval, Form PW1, shall be filed by a registered design professional in the respective borough office of the Department. The application for electrical permit, Form ED16A, shall be filed by a New York City-licensed master electrician.
 - a. **Codes.** The installation of a wind turbine assembly on a building shall comply with the New York City Construction Codes, the New York State Energy Conservation and Construction Code, the New York City Electrical Code, the New York City Fire Code, the New York City Zoning Resolution and all other applicable laws and rules.
 - b. **Utility Coordination.** Prior to construction document approval, the applicant shall provide to the Department either documentation from the utility company confirming that the electrical interconnection requirements have been preliminarily satisfied or an affidavit from the owner that there will be no interconnection with the electrical grid.
 - c. **Technical Requirements.** Prior to construction document approval, the applicant shall comply, regarding the proposed wind turbine installation application, with the general technical requirements for the installation of photovoltaic panels set forth in 1RCNY §105-02(e)(1)(ii)(A), (B), (C), (E), (F), (G) and (I).
4. **Monitoring.** The owner shall retain a New York State-licensed professional engineer to monitor the installation during the pilot project period, and shall retain reports of inspections for the Department's reference for three years following sign-off of the electrical permit. In the event of failure or damage, the engineer shall notify the Department immediately and recommend termination of the pilot project if appropriate. Monitoring, inspections and reports shall include, but not be limited to, the following:
 - a. Report of daily wind speed and direction monitoring for each six-month period;
 - b. Report of power generated by wind turbine installation in kW;
 - c. All recommendations by the manufacturer's engineer, upon approval of the wind turbine assembly acceptance criteria by the Department;
 - d. Visual inspection of welds, bolts and materials for structural fatigue;
 - e. Visual inspection of structural support and continued security of attachment system;
 - f. Proper operation of electrical and mechanical components and system;
 - g. Effect of wind turbine assembly on building materials, systems and/or structure, such as cracks, noise, materials separation, leaks, etc.;
 - h. General wear and tear;
 - i. Log of noise complaints;
 - j. Log of wind turbine stoppage due to excessive rotation;
 - k. Log of repairs, adjustments, replacements and maintenance.
5. **Termination of Pilot Project.** Upon the Department's approval of the manufacturer's test report in accordance with Section A(3) of this Buildings Bulletin or close of business on the date two years after the final sign-off of the electrical permit, the pilot project shall be terminated. If the Department has not approved the manufacturer's test report by the close of business on the date two years after the final sign-off of the electrical permit, then the installation shall be removed within 90 days at the owner's cost and the owner shall notify OTCR of such removal in writing.