NYC Buildings Department
280 Broadway, New York, NY 10007

Robert D. LiMandri, Commissioner

BUILDINGS BULLETIN 2011-004

Technical

Supersedes: Buildings Bulletin 2009-015

Issuer: Fatma M. Amer, P.E.
First Deputy Commissioner

Issuance Date: February 17, 2011

Purpose: This document establishes a protocol for material acceptance, installation, testing, inspection, approval and maintenance criteria of wind turbine product assemblies

Related Code/Zoning Section(s):	AC	28-103	BC	Chapter 16
	AC	28-113	1RCNY	101-06
	ECC	Chapter 6		

Subject(s): Renewable energy sources; wind turbine assemblies; Wind turbines, acceptance criteria; Wind turbines, testing; Wind turbines, installation; Wind turbines, inspection; Wind turbines, approval; Wind turbines, maintenance

In accordance with Article 113 of Title 28 of the New York City Administrative Code (AC §28-113.1 et seq.), certain materials identified in the Construction Codes or by the Commissioner must be tested in accordance with the relevant standard or standards by a Department-approved testing agency. The testing agency must list or label the material to show that the material complies with the applicable standard. In addition, in accordance with Article 103 of Title 28 of the New York City Administrative Code (AC §28-103.9), the Commissioner has the authority to require testing of alternate materials in accordance with recognized test standards approved by the Commissioner. This bulletin provides the criteria for material acceptance, size, location and installation of wind turbine assemblies in New York City.

I. Material Acceptance Criteria for use in New York City. Wind turbine assemblies and components shall meet the following acceptance criteria:

A. **Product and testing standards.** The following standards shall govern the manufacture and testing of wind turbine assemblies and their components:

1. IEC Standard 61400-2, "*Wind turbines – Part 2: Design requirements for small wind turbines*"[1];
2. IEC Standard 61400-11, "*Wind turbine generator systems – Part 11: Acoustic noise measurement techniques*"[2];
3. IEC Standard 61400-12-1, ed. 1, "*Wind turbines – Part 12-1: Power performance measurements of electricity producing wind turbines*"[3];
4. IEC Standard 61400-1, "*Wind turbines – Part 1: Design requirements*"[4]
5. DOD Military Standard 810G, Test Method 509.5, *"Salt Fog"* [5]

B. **Material testing certification and listing or labeling.** Testing certification and listing or labeling shall be by a third-party testing laboratory accredited under ISO/IEC Standard 17025-2005 in accordance with 1 RCNY §101-06. Such testing laboratory shall conduct tests for IEC 61400-2, IEC 61400-11, IEC Standard 61400-12-1, and DOD Mil-Std-810G, Methods 509.5 and 521.3. Testing by the manufacturer or a company affiliated with the manufacturer shall not be accepted.

C. **New York City regulations.** All wind turbine assemblies proposed for installation in the City of New York shall comply with all applicable codes, laws and rules, including but not limited to:

1. New York City Construction Codes;
2. New York City Electrical Code;
3. New York City Fire Code;
4. New York City Zoning Resolution;
5. New York City Department of Environmental Protection regulations regarding noise.
6. New York City Department of Transportation regulations regarding projections into the public right-of-way.

D. **Additional acceptance criteria.** Wind turbine assemblies proposed for installation in the City of New York shall meet the following additional acceptance criteria:

1. The diameter of the sweep area on a wind turbine shall not exceed 9 feet, 10 inches (three meters), unless a greater diameter is approved under paragraphs A 10 and B of part II.
2. Wind turbine assemblies exceeding 9 feet 10 inches (three meters) in wind sweep diameter shall be permitted only on a project-specific basis, and shall be engineered, including mast or other supporting structure, for the particular conditions at the project site. See part II of this bulletin for additional requirements.

II. Project design, wind turbine assembly installation and sign-off. Wind turbine assembly installations shall be designed, installed, inspected and signed off in accordance with the following:

A. Design. The installation of any wind turbine assembly on a building or site shall be engineered by a registered design professional, including the following:

1. **Codes.** The installation of the wind turbine shall be in accordance with the provisions of all applicable laws and regulations, including but not limited to those listed in paragraph C of part I of this bulletin.
2. **Foundation.** The foundation and mast of a free-standing wind turbine shall be engineered.
3. **New buildings.** New buildings shall be designed to sustain the forces and vibration of the wind turbine. Such design shall be identified in the new building structural drawings, and other drawings as applicable. The wind turbine Alteration Type 2, Directive 14 application shall reference the new building application as the primary application job number in Section 11A of the PW1 form – see paragraph B of part II of this bulletin.
4. **Existing buildings.** Existing buildings shall be examined by a registered design professional for structural adequacy and capacity to support the wind turbine assembly and all forces that may result from the wind turbine assembly installation. If the building cannot sustain such potential forces, an engineered design shall be provided to mitigate the inadequate structural conditions.
5. **Rooftops.** Location of the wind turbine assembly on rooftops shall be in accordance with section 504 of the New York City Fire Code.

6. **Ice formation.** Wind turbine assemblies exceeding 9 feet 10 inches (three meters) in wind sweep diameter shall be made to stop rotating when ice formation occurs.
7. **Installation design.** The installation design shall be in accordance with the manufacturer's recommendations, the conditions of labeling or listing and the installation requirements set forth in the standards referenced in part I of this bulletin.
8. **Zoning.** The wind turbine assembly shall comply with the NYC Zoning Resolution, including height and setback requirements.
9. **Separation.** Wind turbine assemblies shall be physically separated from recreational or other areas accessible to persons other than trained personnel or the turbine owner or representative.
10. **Peer review required.** For wind turbine assemblies with a sweep area exceeding that specified in paragraph D 1 of part I of this bulletin, the building structural design or mast foundation design, mast design, wind turbine installation design, and electrical, mechanical and noise-mitigation design shall undergo peer review. The peer reviewer(s) shall be retained by the owner and shall be approved by the Department prior to commencing the review.

B. Construction document approval and permits required. The wind turbine assembly installation shall be filed as an Alteration Type 2, Directive 14 application and shall require an associated electrical permit.

1. Technical requirements. Prior to construction document approval, the applicant shall comply, regarding the proposed wind turbine assembly installation application, with the following general technical requirements:

a. Plot plan. The plot plan shall show site bounds and location of the building on the site, the location of the wind turbine system elements on the building and/or site, the location of and description of any trees or other structures that, were they to fall, could come into contact with any part of the wind turbine system, and the location and identity of any city infrastructure services, utility lines or other potential hazards on the building and/or site.

b. Location drawings. Site plan, roof plan(s), elevation(s) and/or other drawings sufficient to show and describe the wind turbine system elements, their arrangement and operation. The roof plan shall show that the wind turbine assembly does not obstruct access for both firefighting, in accordance with section 504 of the New York City Fire Code, and maintenance of all roof equipment. If a site installation, the site plan shall show access for firefighting and maintenance to and around site buildings and the wind turbine assembly in accordance with section 504 of the New York City Fire Code.

c. Anchorage drawings. Drawings showing the foundation and/or anchorage of the wind turbine assembly and related equipment.

d. Existing building work. Design and construction drawings reflecting construction work necessary to enable the building structure, roof structure, structural work related to the wind turbine system, roof drainage systems and roof covering to sustain required loads and comply with the regulations listed in paragraph C of part I.

2. Special Inspections listed. In accordance with section BC 1704.13, special inspections required prior to installation approval shall be listed and described in the construction documents. All special inspections shall address both electrical and construction requirements in accordance with the manufacturer's recommendations, the conditions of listing or labeling, Chapter 12 of IEC 61400-2, the codes as referenced in part I and the approved construction drawings. Special inspections shall address at a minimum structural, mechanical, electrical and acoustical conditions, systems, operation and/or testing results.

3. **Monitoring and maintenance program.** The monitoring and maintenance program, including but not limited to the manufacturer's recommendations, requirements of IEC 61400-2 and as set forth in part III below, shall be required prior to construction document approval. Such program shall include monthly monitoring for the first year of any wind turbine, semi-annually thereafter for any wind turbine with less than or equal to the wind sweep limits set forth in paragraph D1 of part I of this bulletin, and quarterly thereafter for any wind turbine exceeding the limits set forth in paragraph D1 of part I of this bulletin.

4. **Professional certification not permitted.** Applications including wind turbine assemblies shall require examination and approval by the Department. Professional certification shall not be permitted.

5. **Peer review.** For projects requiring peer review in accordance with paragraph A10 of part II, the reports of such peer reviews shall be signed, sealed and filed as a required item prior to construction document approval.

6. **Interconnection – required item for permit.** Prior to construction permit, the permit 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 of the wind turbine assembly with the electrical grid.

C. Installation. Installation of the wind turbine assembly shall be in accordance with manufacturer's recommendations and the approved construction documents.

D. Inspection. Inspections shall be required as follows:

1. **Electrical work.** The electrical work shall be inspected by the Department.

2. **Construction work special inspections.** The wind turbine assembly installation and associated structural work shall be subject to special inspection by registered design professional(s) pursuant to the New York City Construction Codes, Department rules, this bulletin and the approved construction documents.

III. Monitoring. The owner shall monitor the installation following sign-off in accordance with the approved monitoring and maintenance program as required by paragraph B3 of part II. The owner shall maintain such monitoring records for inspection by the Department, for 1) a period of three years after installation, and 2) after the wind turbine assembly has been installed for three years, the prior three years at any given time while the assembly remains in place. In the event that the owner and/or engineer identifies a defect that could put building occupants or the public at risk, the owner shall ensure that the wind turbine is shut down and the Department shall be notified immediately. All defects shall be reported in the monitoring records. Such monitoring program shall include, but not be limited to, the following:

A. Monitoring by a New York State-licensed professional engineer. The following monitoring shall be performed by a New York State-licensed professional engineer:

1. Visual inspection of welds, bolts and materials for structural fatigue and/or corrosion, including corrosion related to salt fog or other environmental conditions;
2. Visual inspection of structural support and continued security of anchorage system;
3. Effect of wind turbine assembly on building materials, systems and/or structure, such as cracks, vibration, materials separation, leaks, etc.

B. Other monitoring. In addition to monitoring by a professional engineer in accordance with paragraph A above, the following monitoring shall also be performed by an engineer or other competent person:

1. General wear and tear;
2. Maintenance and routine inspections in accordance with section 12.4 of IEC 61400-2;
3. Annual energy generated by wind turbine assembly in kWh;
4. Proper operation of electrical and mechanical components and system;
5. Log of noise complaints;
6. Noise measurements at closest point of occupied space within building from the closest wind turbine and at furthest point on the property line from the most distant wind turbine;
7. Log of wind turbine stoppage due to excessive rotation;
8. Log of repairs, adjustments, replacements and maintenance;
9. Report of peak wind speeds encountered, and dates of wind speeds exceeding 110% of those permitted for the location by the New York City Construction Codes;
10. Other inspections as the manufacturer may recommend.

IV. Pilot projects pursuant to Buildings Bulletin 2009-015. This bulletin supersedes Buildings Bulletin 2009-015. Pilot projects with complete applications submitted to the Department prior to the effective date of this bulletin shall be permitted to remain for the two-year pilot period. However, upon the expiration date of the two-year pilot period, such wind turbine(s) and installation shall conform to the requirements of this bulletin, or the wind turbine(s) shall be dismantled and removed from the installation and operation shall cease on the site.

---

[1] IEC Standard 61400-2, Second Edition, "*Wind turbines – Part 2: Design requirements for small wind turbines*" published by the International Electrotechnical Commission

[2] IEC Standard 61400-11, Second Edition, "*Wind turbine generator systems – Part 11: Acoustic noise measurement techniques*" published by the International Electrotechnical Commission

[3] IEC Standard 61400-12-1, First Edition, "*Wind turbines – Part 12-1: Power performance measurements of electricity producing wind turbines*" published by the International Electrotechnical Commission

[4] IEC Standard 61400-1, Third Edition, "*Wind turbines – Part 1: Design requirements*" published by the International Electrotechnical Commission.

IEC. International Electrotechnical Commission, 3, rue de Varembé, P.O. Box 131, CH-1211 GENEVA 20, Switzerland; www.iec.ch; Phone +41 22 919 02 11; Fax: +41 22 919 03 00; E-mail: inmail@iec.ch.

[5] Military Standard 810G, Test Methods 509.5, *"Salt Fog,"* and 521.3, *"Icing/Freezing Rain"*, published by the United States Department of Defense.

United States Department of Defense, United States Army Developmental Test Command, http://www.dtc.army.mil/publications/MIL-STD-810G.pdf .