1346.1605 SECTION 1605 TEST METHODS.

The IMC is amended by adding a section to read as follows:

SECTION 1605

TEST METHODS

1605.1 Method of test.

1. **Operational checking.** The flue gas, venting, safety, and operating controls of the appliance shall be checked to ensure proper and safe operation.

2. **Method of test - atmospheric type/induced draft type/fan assisted types.** The appliance shall be allowed to operate until the stack temperature becomes stabilized after which a sample of the undiluted flue products shall be taken from the appliance flue outlet. The sample taken shall be analyzed for carbon monoxide, carbon dioxide, and oxygen. Stack temperature shall be noted.

Note: Appliance designs incorporating induced draft assemblies may require a flue gas sample to be taken after the draft regulator or induced draft fan.

3. **Performance standards for atmospheric type.**

a. Minimum of 75 percent efficiency as determined by flue gas analysis method at appliance flue outlet.

b. Carbon monoxide concentration in flue gas not greater than 0.04 percent.

c. Stack temperature not greater than 700°F (371°C), plus ambient.

d. Carbon dioxide concentration between 8 and 13 percent, inclusive.

e. Oxygen concentration between 4 and 10 percent.

f. Smoke test no higher than #2 for light oils, or #4 for oils heavier than #4.

g. Draft shall be in accordance with burner manufacturer's specifications.

3a. **Performance standards for induced draft type/fan assisted types.**

a. Minimum of 75 percent efficiency as determined by flue gas analysis method at appliance flue outlet.

b. Carbon monoxide concentration in flue gas not greater than 0.04 percent.

c. Stack temperature not greater than 700°F (371°C), plus ambient.

d. Carbon dioxide concentration between 8 and 13 percent, inclusive.

e. Oxygen concentration between 4 and 10 percent, inclusive.

f. Smoke test no higher than #2 for light oils, or #4 for oils heavier than #4.

g. Draft shall be in accordance with burner manufacturer's specifications.

Note: Induced draft and fan assisted types of appliances may require a sample to be taken after the induced draft fan, which may cause oxygen figures in excess of the limits stated. In such cases, safe liquid fuel combustion ratios shall be maintained and be consistent with appliance listing.

4. **Method of test - power type.** The appliance shall be allowed to operate until the stack temperature becomes stabilized after which a sample of the undiluted flue products shall be taken from the appliance flue outlet. The sample shall be analyzed for carbon monoxide, carbon dioxide, and oxygen. Stack temperature shall be recorded.

5. **Performance standards for power type.**

a. Minimum of 80 percent efficiency as determined by flue gas analysis method at appliance flue outlet.

b. Carbon monoxide concentration in the flue gas not greater than 0.04 percent.

c. Stack temperature not greater than 700°F (371°C) plus ambient.

d. Carbon dioxide concentration between 8 and 13 percent, inclusive.

e. Oxygen concentration between 4 and 10 percent, inclusive.

f. Smoke test no higher than #2 for light oils, or #4 for oils heavier than #4.

g. Draft shall be in accordance with burner manufacturer's specifications.

6. **Test records filing; tag.** After completion of the test of newly installed oil or liquid fuel burner equipment as provided in this section, complete test records shall be filed with the building official on an approved form. The tag stating the date of the test and the name of the installer shall be attached to the appliance at the main valve.

7. **Oxygen concentration.**

a. The concentration of oxygen in the undiluted flue products of oil or liquid fuel burners shall in no case be less than 3 percent nor more than 10 percent, shall be in conformance with applicable performance standards and shall be consistent with the appliance listing.

b. The allowable limit of carbon monoxide shall not exceed 0.04 percent.

c. The flue gas temperature of an oil appliance, as taken on the appliance side of the draft regulator, shall not exceed applicable performance standards and shall be consistent with the appliance listing.

8. **Approved oxygen trim system.** The oxygen figures may not apply when there is an approved oxygen trim system on the burner that is designed for that use, including a low oxygen interlock when approved by the building official.

9. **Supervised start-up.**

a. Supervised start-up may be required to verify safe operation of oil or liquid fuel burner and to provide documentation that operation is consistent with this code, listing and approval. Supervised start-up is required for all liquid fuel burners listed in b, c, and d. Supervised start-up requires that the liquid fuel burner shall be tested in the presence of the building official in an approved manner. Testing shall include safety and operating controls, input, flue gas analysis, and venting. Flue gas shall be tested at high, medium, and low fires. Provisions shall be made in the system to allow firing test in warm weather. After completion of the test of newly installed oil or liquid fuel burner equipment as provided in this section, complete test records shall be filed with the building official on an approved form. The tag stating the date of the test and the name of the installer shall be attached to the appliance at the main valve.

b. Oil and liquid fuel burners of 1,000,000 Btu/hr input or more require a supervised start-up as in a.

c. Installation of oxygen trim systems, modulating dampers, or other draft control or combustion devices require a supervised start-up as in a.

d. All direct fired heaters require a supervised start-up as in a.

10. **Control diagram.** A complete control diagram of the installation and suitable operating instructions shall be supplied to the building official.

Statutory Authority: *MS s 16B.59; 16B.61; 16B.64; 326B.101; 326B.106; 326B.13*

History: *29 SR 299; L 2007 c 140 art 4 s 61; art 13 s 4*

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