

**REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 6
NITROGEN OXIDES EMISSIONS FROM
NATURAL GAS-FIRED BOILERS AND WATER HEATERS
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**REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 6
NITROGEN OXIDES EMISSIONS FROM NATURAL GAS-FIRED WATER
HEATERS**

(Adopted April 1, 1992)

9-6-100 GENERAL

9-6-101 Description: This rule limits the emissions of nitrogen oxides from natural gas-fired water heaters and boilers.

9-6-110 Exemptions: The requirements of Section 9-6-301 shall not apply to the following:

110.1 Natural gas-fired boilers and water heaters with an rated heat input capacity rating of greater than 2,000,000 ~~75,000~~ BTU per hour.

110.2 Natural gas-fired water heaters used in recreational vehicles.

110.3 Water heaters using a fuel other than natural gas.

110.4 Natural gas-fired pool/spa water heaters with less than 400,000 Btu/hr rated heat input capacity used exclusively to heat swimming pools, ~~and~~ hot tubs or spas.

9-6-200 DEFINITIONS

9-6-201 Boilers and Water Heaters: Any combustion equipment used to heat water or produce steam and that is not exclusively used to produce electricity for sale. For the purposes of this Rule, a boiler does not include any waste heat recovery boiler that is used to recover sensible heat from the exhaust of a combustion turbine or any unfired waste heat recovery boiler that is used to recover sensible from the exhaust of any combustion equipment.

9-6-202 BTU: British thermal unit or units.

9-6-203 Direct-Vent Water Heater: A storage tank water heater with air intake and exhaust ducts that use a gravity system to collect air from outside a building for combustion and exhaust combustion byproducts to the outside of a building.

9-6-204 Heat Input: The heat of combustion released by fuels burned in a unit based on the higher heating value of fuel. This does not include the enthalpy of incoming combustion air.

9-6-2035 Heat Output: The product obtained by multiplying the recovery efficiency, as defined by Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E, by the input rating of the water heater.

9-6-206 Instantaneous Water Heater: A device in which water is heated only when the water flows through a heat exchanger.

9-6-207 Mobile Home Water Heater: A closed vessel manufactured exclusively for mobile home use in which water is heated and is withdrawn for use external to the vessel at pressures not exceeding 160 psig, including the apparatus by which heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210°F (99°C).

9-6-2028 Natural Gas: A mixture of gaseous hydrocarbons containing at least 80 percent methane by volume as determined according to Standard Method ASTM D1945-64.

9-6-209 NO_x Emissions: The sum of nitric oxide and nitrogen dioxide in the flue gas, collectively expressed as nitrogen dioxide.

9-6-210 Pool/Spa Heater: A device in which water is heated when pool or spa water circulates through a heat exchanger.

9-6-211 Power Direct-Vent Water Heater: A storage tank water heater with an air intake duct outside of a building with a blower installed to assist in the expulsion of exhaust gases.

- 9-6-212** **Power-Vent Water Heater:** A storage tank water heater with a blower installed to assist in the expulsion of exhaust gases.
- 9-6-20413** **Input Rating:** The amount of energy a water heater consumes in one hour (BTU/Hour). **Rated Heat Input Capacity:** The heat input capacity specified on the nameplate of the combustion unit.
- 9-6-2014** **Natural Gas-Fired Storage Tank Water Heater:** A closed vessel, in which water is heated by the combustion of natural gas and is withdrawn for use external to the vessel at pressures not exceeding 160 psig, including the apparatus by which heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210⁰F.

9-6-300 STANDARDS

9-6-301 Natural Gas-Fired Storage Tank Water Heaters with an Rated Heat Input Rating Capacity of 75,000 BTU/Hour or Less:

- 301.1 A ~~No~~ person shall ~~not~~ sell, install, or offer for sale within the District any natural gas-fired storage tank water heater, manufactured after July 1, 1992, with an rated heat input capacity rating of 75,000 BTU/Hour or less, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.
- 301.2 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater less than or equal to 50 gallons capacity that is manufactured after January 1, 2009, and that emits more than 10 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to direct-vent, power-vent, power direct-vent water storage tank heaters and water heaters used for mobile homes.
- 301.3 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater greater than 50 gallons capacity that is manufactured after January 1, 2010, and that emits more than 10 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to direct-vent, power-vent, power direct-vent storage tank water heaters and water heaters used for mobile homes.
- 301.4 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater that is manufactured after January 1, 2011, and that emits more than 10 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to water heaters used for mobile homes.

9-6-302 Certification of Boilers and Water Heaters: No person shall sell, install, or offer for sale within the District any ~~W~~water heaters subject to Section 9-6-301, 303, 304, or 305 ~~shall be~~ unless the water heater manufacturer brand name and model is certified in accordance with Sections 9-6-401, ~~and~~ 402, ~~and~~ 403.

9-6-303 Natural Gas-Fired Boilers and Water Heaters with a Rated Heat Input Capacity of 75,001 to 2,000,000 BTU/Hour:

- 303.1 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 75,001 to 400,000 BTU/Hour, inclusive, manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.
- 303.2 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 75,001 to 400,000 BTU/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.
- 303.3 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2008, that emits more than 20

nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 30 ppm NO_x at 3% O₂, dry.

303.4 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 20 ppm NO_x at 3% O₂, dry.

9-6-304 Natural Gas-Fired Mobile Home Water Heaters: No person shall sell, install, or offer for sale within the District any natural gas-fired mobile home water heater manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.

9-6-305 Natural Gas-Fired Pool/Spa Heaters:

305.1 No person shall sell, install, or offer for sale within the District any natural gas-fired pool/spa heater with an input rating from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 55 ppm NO_x at 3% O₂, dry.

305.2 No person shall sell, install, or offer for sale within the District any natural gas-fired pool/spa heater with an input rating from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 20 ppm NO_x at 3% O₂, dry.

9-6-400 ADMINISTRATIVE REQUIREMENTS

9-6-401 Compliance with Emissions Standards: Certification: The manufacturer shall obtain confirmation demonstrate from an independent testing laboratory that each boiler or water heater model it intends to sell or distribute for sale into the District that is subject to the requirements of Section 9-6-301, 303, 304, or 305 has been tested in accordance with the procedures in 9-6-601.

401.1 The measurement of nitrogen oxides emissions shall be conducted in accordance with the Manual of Procedures, Volume IV, Method ST 13B or EPA Reference Method RM-7 (40 CFR Part 60, Appendix A, Test Method 7, including 7A-E).

401.2 Each tested water heater shall be operated in accordance with Section 2.4 of American National Standards ANSI Z21.10.1-1990 at normal test pressure, input rates, and with a five-foot exhaust stack installed during the nitrogen oxides emissions tests.

401.3 The following procedure shall be used to calculate the NO_x emission rate in nanograms of NO_x per joule of heat output:

$$N = \frac{4.566 \times 10^4 \times P \times U}{H \times C \times E}$$

Where:

N = NO_x Emission Rate in nanograms of NO_x emitted per joule of heat output

P = Concentration of NO_x in the flue gas in parts per million (volume)

U = Dry volume percent of CO₂ in flue gas necessary for stoichiometric combustion

H = Gross heating value of the gas, BTU/Cu Ft (at 60°F and 30" Hg)

C = Dry volume percent of CO₂ in flue gas

E = Recovery efficiency, percentage, as defined in Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E.

401.4 The manufacturer may submit to the District an approved SCAQMD certification in lieu of conducting duplicative certification tests.

9-6-402 Application for Certification: Compliance Statement:

- 402.1 Each manufacturer shall submit an application to the APCO for certification of their compliant boiler or water heater model. The application must:
- 1.1 Provide the following general information: name and address of manufacturer, brand name, trade name, model number and heat input rating as it appears on the water heater rating plate.
 - 1.2 Provide a description of the model being certified
 - 1.3 Include a complete certification source test report demonstrating that the boiler or water heater model was tested in accordance with procedures in Section 9-6-601 and a written statement that the model complies with Section 9-6-301, 303, 304, or 305 and is tested in accordance with procedures in Section 9-6-601.
 - 1.4 Be submitted to the District no more than 90 days after the date of the emissions compliance test conducted in accordance with Section 9-6-401.
 - 1.5 Be submitted to the District no less than 90 days before the intention to sell or distribute a new water heater model within the District, or no less than 90 days before the effective dates in Section 9-6-301, 303, 304, 305.
- 402.2 After completing review of the application for certification and source test report, the APCO will approve, or will deny approval of, the device.
- 402.3 Certification status shall be valid for three years from the date of approval by the APCO. After the third year, recertification shall be required according to the requirements in 9-6-402.
- 402.4 In lieu of submitting an application as provided in Section 9-6-402.1, the manufacturer may submit to the District an approved SCAQMD certification that complies with Section 9-6-301, 303, 304, or 305.

9-6-403 Identification: The water heater manufacturer shall display the model number and the certification status of a water heater complying with this rule on the shipping carton and on the rating plate of each unit.

9-6-600 MANUAL OF PROCEDURES

9-6-601 Determination of Emissions: Emissions of oxides of nitrogen from water heaters subject to Section 9-6-301, 303, 304, or 305 shall be tested in accordance with the South Coast Air Quality Management District Protocol: "Nitrogen Oxides Emission Compliance Testing for Natural Gas-Fired Water Heaters and Small Boilers, January 1995", or in accordance with the following provisions: ~~measured as prescribed in the Manual of Procedures, Volume IV, Section St-13B or EPA Reference Method RM-7 (40 CFR Part 60, Appendix A, Test Method 7, including 7A-E).~~

- 601.1 Confirmation shall be based on emission tests of a randomly selected unit of each water heater model.
- 601.2 The measurement of nitrogen oxides emissions shall be conducted in accordance with the Manual of Procedures, Volume IV, Method ST-13B or EPA Reference Method RM-7 (40 CFR Part 60, Appendix A, Test Method 7, including 7A-E).
- 601.3 Each tested water heater shall be operated in accordance with Section 2.4 of American National Standards ANSI Z21.10.1-1990 at normal test pressure, input rates, and with a five-foot exhaust stack installed during the nitrogen oxides emissions tests.
- 601.4 The following procedure shall be used to calculate the NO_x emission rate in nanograms of NO_x per joule of heat output:

$$N = \frac{4.566 \times 10^4 \times P \times U}{H \times C \times E}$$

Where:

N = NO_x Emission Rate in nanograms of NO_x emitted per joule of heat output

- P = Concentration of NO_x in the flue gas in parts per million (volume)
U = Dry volume percent of CO₂ in flue gas necessary for stoichiometric combustion
H = Gross heating value of the gas, BTU/Cu Ft (at 60°F and 30"Hg)
C = Dry volume percent of CO₂ in flue gas
E = Recovery efficiency, percentage, as defined in Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E.