

**RULE 2.37**  
**NATURAL GAS-FIRED WATER HEATERS AND SMALL BOILERS**

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## 100 GENERAL

- 101 **PURPOSE:** The purpose of this Rule is to limit the emissions of oxides of nitrogen (NO<sub>x</sub>) from the use of natural gas-fired water heaters.
- 102 **APPLICABILITY:** The provisions of this Rule shall apply to any person that manufactures, offers for sale, sells, or installs any natural gas-fired water heater with a rated heat input capacity less than 1,000,000 British Thermal Units per hour (Btu/hr).
- 103 **SEVERABILITY:** If any provision, clause, sentence, paragraph, section or part of this rule for any reason is judged to be unconstitutional or invalid, such judgement shall not affect or invalidate the remainder of the rule.
- 110 **EXEMPTIONS:** The provisions of this Rule shall not apply to:
- 110.1 Water heaters with a rated heat input of 1,000,000 Btu/hr or greater.
- 110.2 Water heaters used in recreational vehicles.
- 110.3 Water heaters used to heat pools/spas with a rated heat input capacity less than or equal to 400,000 Btu/hr.

## 200 DEFINITIONS

- 201 **BRITISH THERMAL UNIT (BTU):** The amount of heat required to raise the temperature of one pound of water from 59° F to 60° F at one atmosphere.
- 202 **HEAT INPUT:** The actual amount of heat released by natural gas burned in the water heater.
- 203 **HEAT OUTPUT:** The product obtained by multiplying the recovery efficiency, as defined by Title 10, of the Code of Federal Regulation, Section 6.1.3, Part 430, Subpart B, Appendix E<sub>2</sub> by the input rating of the water heater.
- 204 **LARGE WATER HEATER:** A natural gas-fired water heater with a rated heat input capacity ranging from 75,000 - 400,000 Btu/hour.
- 205 **MOBILE HOME WATER HEATER:** A natural gas-fired water heater manufactured exclusively for use in a mobile home.
- 206 **NATURAL GAS:** A mixture of gaseous hydrocarbons containing at least 80 percent methane by volume as determined according to ASTM Test Method D1945-03.
- 207 **POOL / SPA HEATER:** A device through which water is heated when pool or spa water circulates through a heat exchanger.
- 208 **RATED HEAT INPUT CAPACITY:** The heat input capacity specified on the nameplate of the combustion unit. If the combustion unit has been physically altered or modified such that its maximum heat input is different than the heat input capacity specified on the nameplate, the new maximum heat input shall be considered as the rated heat input capacity.

- 209 **SMALL BOILER:** A natural gas-fired water heater with a rated heat input capacity greater than 400,000 but less than 1,000,000 Btu/hour (1 MM Btu/hr).
- 210 **SMALL WATER HEATER:** A natural gas-fired water heater with a rated heat input capacity less than 75,000 BTU/hour.
- 211 **TANKLESS WATER HEATER:** A water heating device that does not use a storage tank to hold heated water. An electric ignition source is used to initiate water heating and then natural gas is introduced to fuel further combustion using multiple modulating burners to heat water on demand.
- 212 **WATER HEATER:** A device that heats water at a thermostatically-controlled temperature including storage tank and tankless units.

### 300 STANDARDS

- 301 **PROHIBITIONS:** No person shall manufacture, offer for sale, sell, or install any natural gas fired water heater with oxides of nitrogen (NOx) emissions in excess of the limits set forth in the compliance schedule indicated below:

Category	Rated Heat Input Capacity (Btu/hour)	NOx Emission Limit Effective 5/31/1995 - 12/31/2009	NOx Emission Limit Effective 1/1/2010 - 12/31/2013	NOx Emission Limit Effective 1/1/2014
Small water heater	< 75,000	40ng/J	10ng/J or 15 ppm NOx @ 3% O <sub>2</sub> dry	10ng/J or 15 ppm NOx @ 3% O <sub>2</sub> dry
Large water heater	75,000 - 400,000	No present standard	40ng/J or 55 ppm NOx @ 3% O <sub>2</sub> dry	14ng/J or 20 ppm NOx @ 3% O <sub>2</sub> dry
Small boiler	> 400,000 - < 1,000,000	No present standard	20ng/J or 30 ppm NOx @ 3% O <sub>2</sub> dry	14ng/J or 20 ppm NOx @ 3% O <sub>2</sub> dry
Mobile home water heater	All	No present standard	40ng/J or 55 ppm NOx @ 3% O <sub>2</sub> dry	40ng/J or 55 ppm NOx @ 3% O <sub>2</sub> dry
Pool/spa heater	> 400,000 - < 1,000,000	No present standard	40ng/J or 55 ppm NOx @ 3% O <sub>2</sub> dry	14ng/J or 20 ppm NOx @ 3% O <sub>2</sub> dry

## 400 ADMINISTRATIVE REQUIREMENTS

401 **COMPLIANCE REPORT:** A manufacturer shall submit to the Air Pollution Control Officer a Compliance Report that demonstrates compliance with Section 301 of this Rule for each water heater model subject to the provisions of this Rule. A manufacturer shall submit a new compliance report for any water heater model whose design is changed in any manner which may alter NO<sub>x</sub> emissions. These Compliance Reports, for either new or altered models, shall be submitted to the District at least 30 days before the water heater model is offered for sale, sold, or installed within the District. The compliance Report shall contain all the following information:

401.1 **General Information:**

- a. Name and address of manufacturer;
- b. Brand name and model;
- c. Model number as it appears on the rating plate of each water heater;
- d. Description of each water heater model being certified; and
- e. Heat input rating.

401.2 **Test Report:**

- a. All compliance test procedures and results for each water heater model; and
- b. All calculations for determining compliance of each water heater model.
- c. The manufacturer may submit to the District an approved Bay Area AQMD Regulation 9 Rule 6 or South Coast AQMD Rule 1121 or 1146.2 certification in lieu of conducting duplicative compliance tests.

401.3 **Compliance Statement:** A signed and dated statement attesting to the accuracy of all statements and information in the Compliance Report.

402 **LABELING:** The manufacturer shall display the model number of the water heater complying with the requirements specified in Section 301 of this Rule on the water heater shipping carton and rating plate.

## 500 MONITORING AND RECORDS

501 **TEST METHODS:** The manufacturer shall have each water heater model tested in accordance with the following:

501.1 Each tested water heater shall be operated in accordance with Section 2.4 of the American National Standards Institute ANSI Z21.10.1,1990 at normal test pressure, input rates, and with a five-foot exhaust stack installed during NO<sub>x</sub> emissions tests.

501.2 The measurement of NO<sub>x</sub> emissions shall be conducted in accordance with the EPA Reference Test Method 7E (40 CFR 60, Appendix A). The determination of CO<sub>2</sub> shall be conducted in accordance with EPA Reference Test Method 3A (40 CFR 60, Appendix A). Other methods require approval by the Air Pollution Control Officer and the U.S. EPA.

501.3 The following procedure shall be used to calculate the NO<sub>x</sub> emissions rate in ng/J (lb/BTU) of heat output:

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

where:

N	=	NO <sub>x</sub> emission rate in nanograms of NO <sub>x</sub> emitted per joule of heat output.
4.566 x 10 <sup>4</sup>	=	unit conversion factor (ppm to nanograms and Btu to joules)
P	=	Concentration of NO <sub>x</sub> in the flue gas in parts per million (volume)
U	=	Dry volume percent of CO <sub>2</sub> in flue gas necessary for stoichiometric combustion
H	=	Gross heating value of the gas, Btu/ft <sup>3</sup> (at 60°F and 30 in Hg)
C	=	Dry volume percent of CO <sub>2</sub> 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.

501.4 A manufacturer that has certified a water heater model to demonstrate compliance with a State or local agency rule that meets the requirements of this Rule may submit the test results to the District in lieu of conducting duplicative testing.

502 **RECORDS:** A manufacturer shall keep Compliance Reports, test reports, and compliance statements for as long as the water heater model is offered for sale, sold, or installed within the District, or for five years, whichever is longer.