

(Adopted December 1, 1978)(Amended July 8, 1983)(Amended November 6, 2009)  
(Amended September 5, 2014) (Preliminary Draft October 2017)

**RULE 1111. REDUCTION OF NO<sub>x</sub> EMISSIONS FROM NATURAL-GAS-FIRED, FAN-TYPE CENTRAL FURNACES**

(a) Purpose and Applicability

The purpose of this rule is to reduce NO<sub>x</sub> emissions from ~~natural gas-fired, fan-type~~ central furnaces, as defined in this rule. This rule applies to manufacturers, distributors, sellers, and installers of residential and commercial fan-type central furnaces, requiring either single-phase or three-phase electric supply, used for comfort heating with a rated heat input capacity of less than 175,000 BTU per hour, or, for combination heating and cooling units, a cooling rate of less than 65,000 BTU per hour.

(b) Definitions

- (1) ANNUAL FUEL UTILIZATION EFFICIENCY (AFUE) is defined in Section 10.1 of Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.
- (2) BTU means British thermal unit or units.
- (3) CONDENSING FURNACE means a high-efficiency furnace that uses a second heat exchanger to extract the latent heat in the flue gas by cooling the combustion gasses to near ambient temperature so that water vapor condenses in the heat exchanger, is collected and drained.
- (4) FAN-TYPE CENTRAL FURNACE is a self-contained space heater using natural gas, or any fan-type central furnace that is in natural gas-firing mode, providing for circulation of heated air at pressures other than atmospheric through ducts more than 10 inches in length that have:
  - (A) a RATED HEAT INPUT CAPACITY of less than 175,000 BTU per hour; or
  - (B) for combination heating and cooling units, a cooling rate of less than 65,000 BTU per hour.
- (5) HEAT INPUT means the higher heating value of the fuel to the furnace measured as BTU per hour.

- (6) NO<sub>x</sub> EMISSIONS means the sum of nitrogen oxide and nitrogen dioxide (oxides of nitrogen) in the flue gas, collectively expressed as nitrogen dioxide.
  - (7) RATED HEAT INPUT CAPACITY means the gross HEAT INPUT of the combustion device.
  - (8) RESPONSIBLE OFFICIAL means:
    - (A) For a corporation: a president or vice-president of the corporation in charge of a principal business function or a duly authorized person who performs similar policy-making functions for the corporation, or
    - (B) For a partnership or sole proprietorship: general partner or proprietor, respectively.
  - (9) SINGLE FIRING RATE means the burners and control system are designed to operate at only one fuel input rate and the control system cycles burners between the maximum heat output and no heat output.
  - (10) USEFUL HEAT DELIVERED TO THE HEATED SPACE is the AFUE (expressed as a fraction) multiplied by the heat input.
  - (11) VARIABLE FIRING RATE means the burners and control system are designed to operate at more than one fuel input rate and the control system cycles burners between two or more heat output rates and no heat output.
  - (12) WEATHERIZED means designed for installation outside of a building, equipped with a protective jacket and integral venting, and labeled for outdoor installation.
- (c) Requirements
- (1) A manufacturer shall not, after January 1, 1984, manufacture or supply for sale or use in the South Coast Air Quality Management District ~~natural gas-fired, fan-type~~ central furnaces, unless such furnaces meet the requirements of paragraph (c)(3).
  - (2) A person shall not, after April 2, 1984, sell or offer for sale within the South Coast Air Quality Management District ~~natural gas-fired, fan-type~~ central furnaces unless such furnaces meet the requirements of paragraph (c)(3).
  - (3) ~~Natural gas-fired, fan-type~~ central furnaces shall:
    - (A) not emit more than 40 nanograms of oxides of nitrogen (calculated as NO<sub>2</sub>) per joule of useful heat delivered to the heated space; and

- (B) be certified in accordance with subdivision (d) of this rule.
- (4) On or after October 1, 2012, a person shall not manufacture, supply, sell, offer for sale, or install, for use in the South Coast Air Quality Management District, ~~natural gas-fired, fan-type~~ central furnaces subject to this rule, unless such furnace complies with the applicable emission limit and compliance date set forth in Table 1 and is certified in accordance with subdivision (d) of this rule.

Table 1 – Furnace NOx Limits and Compliance Schedule

Compliance Date	Equipment Category	NOx Emission Limit (nanograms/Joule *)
October 1, 2012	Mobile Home Furnace	40
April 1, 2015	Condensing Furnace	14
October 1, 2015	Non-condensing Furnace	14
October 1, 2016	Weatherized Furnace	14
October 1, 2018	Mobile Home Furnace	14

\* Nanograms of oxides of nitrogen (calculated as NO<sub>2</sub>) per joule of useful heat delivered to the heated space

- (5) Any manufacturer of fan-type central furnaces regulated by this rule may elect to pay a per unit mitigation fee ~~of \$200 for each condensing, furnace and \$150 for each non-condensing, weatherized, or mobile home furnace distributed or sold into the SCAQMD according to the schedule set forth in Table 2,~~ in lieu of meeting the 14 nanogram/Joule NOx emission limit in Table 1 of paragraph (c)(4) of this rule. ~~A manufacturer may elect to pay the per unit mitigation fee for a time period of no more than 36 months after the applicable compliance date in Table 1 of paragraph (c)(4).~~ A manufacturer shall submit an alternate compliance plan for each 12 month time period after the applicable compliance date during which the manufacturer elects to pay the mitigation fee in lieu of meeting the NOx emission limit.

Table 2 – Alternative Compliance plan mitigation fee schedule

<u>Equipment Category</u>	<u>Alternate Compliance Plan Period</u>		<u>Mitigation Fee</u>
	<u>On and After</u>	<u>End Date</u>	
<u>Condensing Furnace</u>	<u>April 1, 2015</u>	<u>Date of Adoption</u>	<u>\$200</u>
	<u>Date of Adoption</u>	<u>March 31, 2020</u>	<u>\$400-\$500 (TBD)</u>
<u>Non-condensing Furnace</u>	<u>October 1, 2015</u>	<u>Date of Adoption</u>	<u>\$150</u>
	<u>Date of Adoption</u>	<u>September 30, 2019</u>	<u>\$400-\$500 (TBD)</u>
<u>Weatherized Furnace</u>	<u>October 1, 2016</u>	<u>Date of Adoption</u>	<u>\$150</u>
	<u>Date of Adoption</u>	<u>September 30, 2021</u>	<u>\$400-\$500 (TBD)</u>
<u>Mobile Home Furnace</u>	<u>October 1, 2018</u>	<u>September 30, 2022</u>	<u>\$400-\$500 (TBD)</u>

- (A) Any manufacturer electing to comply using this mitigation fee option shall submit to the SCAQMD an alternate compliance plan no later than 60 days prior to the applicable compliance date that includes the following:
- (i) a letter with the name of the manufacturer requesting the mitigation fee compliance option signed by a responsible official identifying the category of fan-type central furnaces and the 12 month alternate compliance period that the mitigation fees cover;
  - (ii) an estimate of the quantity of applicable Rule 1111 fan-type central furnaces to be distributed or sold into the SCAQMD during the alternate compliance period, which estimate shall be based on total distribution and sales records or invoices of condensing, non-condensing, weatherized or mobile home fan-type central furnaces that were distributed or sold into the SCAQMD during the 12 month period of July 1 to June 30 prior to the applicable compliance date, along with supporting documentation;
  - (iii) a completed SCAQMD Form 400A with company name, identification that application is for an alternate compliance plan (section 7 of form), identification that the request is for

- the Rule 1111 mitigation fee compliance option (section 9 of form), and signature of the responsible official;
- (iv) a check for payment of the alternate compliance plan filing fee (Rule 306, section (c)).
- (B) The manufacturer shall submit to the Executive Officer a report signed by the responsible official for the manufacturer identifying by model number the quantity of Rule 1111 fan-type central furnaces actually distributed or sold into SCAQMD and a check for payment of mitigation fees for the applicable 12 month alternate compliance period for the quantity of applicable Rule 1111 fan-type central furnaces distributed or sold into the SCAQMD during the alternate compliance period. The report and the payment of mitigation fees must be submitted to the SCAQMD no later than thirty (30) days after the end of each 12-month mitigation fee alternate compliance period.

(d) Certification

- (1) The manufacturer shall have each appliance model tested in accordance with the following:
- (A) Oxides of nitrogen measurements, test equipment, and other required test procedures shall be in accordance with AQMD Method 100.1.
- (B) Operation of the furnace shall be in accordance with the procedures specified in Section 4.0 of Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.
- (2) One of the two formulas shown below shall be used to determine the nanograms of oxides of nitrogen per joule of useful heat delivered to the heated space:

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

$$N = \frac{3.655 \times 10^{10} \times P}{(20.9 - Y) \times Z \times E}$$

Where:

N = nanograms of emitted oxides of nitrogen per joule of useful heat.

P = concentration (ppm volume) of oxides of nitrogen in flue gas as tested.

U = volume percent CO<sub>2</sub> in water-free flue gas for stoichiometric combustion.

H = gross heating value of fuel, BTU/cu.ft. (60°F, 30-in. Hg).

C = measured volume percent of CO<sub>2</sub> in water-free flue gas, assuming complete combustion and no CO present.

E = AFUE, percent (calculated using Table 2).

Y = volume percent of O<sub>2</sub> in flue gas.

Z = heating value of gas, joules/cu. meter (0.0°C, 1 ATM).

- (3) At least 120 days prior to the date a furnace model is first shipped to a location in the AQMD for use in the District, the manufacturer shall submit to the Executive Officer the following:
- (A) A statement that the model is in compliance with subdivision (c). (The statement shall be signed by a responsible official and dated, and shall attest to the accuracy of all statements.)
  - (B) General Information
    - (i) Name and address of manufacturer.
    - (ii) Brand name.
    - (iii) Model number, as it appears on the furnace rating plate.
  - (C) A description of the furnace and specifications for each model being certified.
  - (D) Executive Officer approved emission test protocol and emission test results verifying compliance with the applicable NO<sub>x</sub> limit specified in Table 1.
- (e) Identification of Compliant Units
- (1) The manufacturer of the furnace complying with subdivisions (c) and (d) shall display the following on the shipping container label and rating plate of the furnace:
    - (A) Model number;
    - (B) Heat input capacity;
    - (C) Applicable NO<sub>x</sub> emission limit in Table 1; and
    - (D) Date of manufacture or date code.
  - (2) Any non-certified furnace shipped to a location in the South Coast Air Quality Management District for distribution or sale outside of the District

shall have a label on the shipping container identifying the furnace as not certified for use in the District.

(f) Enforcement

The Executive Officer may periodically conduct such tests as are deemed necessary to ensure compliance with subdivision (c), (d), (e)<sub>2</sub> and (h).

(g) Exemptions

(1) The provisions of this rule shall not apply to furnaces installed in mobile homes before October 1, 2012.

(2) For furnaces manufactured, purchased, and delivered to the South Coast Air Quality Management District prior to the applicable compliance date in Table 1, any person may, until 300 days after the applicable compliance date, sell, offer for sale, or install such a furnace in the District, so long as the furnace meets the requirements of paragraph (c)(3) and subdivisions (d) and (e).

~~(h) Rebate Incentives for Early Compliance~~

~~Any manufacturer of natural gas-fired, fan-type central furnaces subject to this rule that distributes and sells into the District furnaces that comply with the 14 nanograms/Joule emission limit 90 days prior to the applicable compliance date in Table 1 of paragraph (c)(4) may submit a compliance plan for early compliance to the Executive Officer and to receive on a first-come first-served basis from the AQMD a rebate payment of \$75 for each 14 nanograms/Joule certified furnace and \$90 for each high efficiency 14 nanograms/Joule certified furnace with AFUE of 90% or greater distributed and sold into the District, provided funds are available on the date documentation on the number of units distributed and sold is submitted to the AQMD. Total rebate payments to all manufacturers shall not exceed \$3,000,000.~~

~~(i) Technology Assessment~~

~~On or before April 1, 2013, the Executive Officer shall conduct a technology assessment and shall report to the Governing Board on the status of manufacturers' progress towards compliance with the 14 nanograms/Joule emission limit for nitrogen oxides.~~