

RULE 1153.1 EMISSIONS OF OXIDES OF NITROGEN FROM COMMERCIAL FOOD OVENS

(a) Purpose and Applicability

The purpose of this rule is to reduce nitrogen oxide emissions from gaseous and liquid fuel-fired combustion equipment as defined in this rule. This rule applies to in-use ovens, dryers, smokers, and roasters with nitrogen oxide emissions from fuel combustion that require a South Coast Air Quality Management District permit and are used to prepare food or beverages for human consumption. This rule does not apply to solid fuel-fired combustion equipment, fryers, char broilers, or boilers, water heaters, thermal fluid heaters, and process heaters subject to District Rules 1146, 1146.1, or 1146.2.

(b) Definitions

- (1) ANNUAL HEAT INPUT means the amount of heat released by fuels burned in a burner or unit during a calendar year, based on the fuel's higher heating value.
- (2) BTU means British thermal unit or units.
- (3) COMBUSTION MODIFICATION means replacement of a burner, burners, fuel or combustion air delivery systems, or burner control systems.
- (4) COMBUSTION SYSTEM means a specific combination of burner, fuel supply, combustion air supply, and control system components identified in a permit application to the District, application for certification pursuant to subdivision (e) of this rule, or District permit.
- (5) FOOD OVEN means an oven used to heat, cook, dry, or prepare food or beverages for human consumption.
- (6) GASEOUS FUEL means natural gas; compressed natural gas (CNG); liquefied petroleum gasses (LPG), including but not limited to propane and butane; synthetic natural gas (SNG); or other fuels transported by pipeline or containers as a gas or in liquefied form, where the fuel is a gas at ambient temperature and atmospheric pressure.
- (7) HEAT INPUT means the higher heating value of the fuel to the burner or UNIT measured as BTU per hour.

- (8) HEAT OUTPUT means the enthalpy of the working fluid output of a burner or UNIT.
- (9) INFRARED BURNER means a burner with ceramic, metal fiber, sintered metal, or perforated metal flame-holding surface; with more than 50% of the heat output as infrared radiation; that is operated in a manner where the zone including and above the flame-holding surface is red and does not produce observable blue or yellow flames in excess of ½ inch (13 mm) in length; and with a RATED HEAT INPUT CAPACITY per square foot of flame holding surface of 100,000 BTU per hour or less.
- (10) IN-USE UNIT means any UNIT that is demonstrated to the Executive Officer that it was in operation at the current location prior to July 1, 2014.
- (11) NO_x EMISSIONS means the sum of nitrogen oxide and nitrogen dioxide in flue gas, collectively expressed as nitrogen dioxide.
- (12) PROTOCOL means a South Coast Air Quality Management District approved set of test procedures for determining compliance with emission limits for applicable equipment.
- (13) RADIANT TUBE HEATING means an indirect heating system with a tube or tubes; burner(s) that fire(s) within the tube(s); and where heat is transferred by conduction, radiation, and convection from the burner flame and combustion gases to the tube(s) and the heat is then transferred to the process by radiation and convection from the heated tube(s) without any direct contact of process materials with burner flames and combustion gasses.
- (14) RATED HEAT INPUT CAPACITY means the gross HEAT INPUT of the combustion UNIT specified on a permanent rating plate attached by the manufacturer to the device. If the UNIT or COMBUSTION SYSTEM has been altered or modified such that its gross HEAT INPUT is higher or lower than the rated HEAT INPUT capacity specified on the original manufacturer's permanent rating plate, the modified gross HEAT INPUT shall be considered as the RATED HEAT INPUT CAPACITY.
- (15) 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;
- (C) For a government agency: a duly authorized person.
- (16) **ROASTER** means an oven used to dry roast nuts, coffee beans, or other plant seeds. **ROASTER** includes coffee roasting units with an integrated afterburner that is the only heat source, which also provides heat to roast the coffee beans. **ROASTER** does not include fryers used for oil roasting of nuts or other seeds.
- (17) **THERM** means 100,000 BTU.
- (18) **UNIT** means any oven, dryer, smoker, or **ROASTER** requiring a District permit and used to prepare food or beverages for human consumption. **UNIT** does not mean any solid fuel-fired combustion equipment; fryer, including fryers used for nut roasting; char broiler; or boiler, water heater, thermal fluid heater, or process heater subject to District Rules 1146, 1146.1, or 1146.2 that provides heat to a **UNIT** through a heat exchange system.
- (c) **Requirements**
 - (1) In accordance with the compliance schedule in Table 2, any person owning or operating an in-use unit subject to this rule shall not operate the unit in a manner that exceeds carbon monoxide (CO) emissions of 800 ppm by volume, referenced to 3% oxygen (O₂), and the applicable nitrogen oxide emission limit specified in Table 1.

Table 1 – NO_x Emission Limit

Equipment Category(ies)	NO_x Emission Limit		
	PPM @ 3% O ₂ , dry or Pound/mmBTU heat input		
	Process Temperature		
	<i>≤ 500° F</i>	<i>> 500° F and < 900° F</i>	<i>≥ 900° F</i>
In-use units with only radiant tube heating	60 ppm or 0.073 lb/mmBTU	60 ppm or 0.073 lb/mmBTU	60 ppm or 0.073 lb/mmBTU
Other in-use units	40 ppm or 0.042 lb/mmBTU	60 ppm or 0.073 lb/mmBTU	60 ppm or 0.073 lb/mmBTU

Table 2 – Compliance Schedule for In-Use Units

Equipment Category(ies)	Permit Application Shall be Submitted By	Unit Shall Be in Compliance On and After
Griddle ovens and ovens used solely for making pita bread and manufactured prior to 1994	October 1, 2017	July 1, 2018
Other unit manufactured prior to 1992	October 1, 2015	July 1, 2016
Other unit manufactured between 1992 to 2000	October 1, 2018	July 1, 2019
Any unit manufactured after 2000	October 1 of the year prior to the compliance date	July 1 of the year the unit is 20 years old

- (2) Unit age shall be based on:
 - (A) The original date of manufacture of the unit as determined by:
 - (i) Original manufacturer's identification or rating plate permanently fixed to the equipment. If not available, then;
 - (ii) Invoice from manufacturer or distributor for purchase of equipment. If not available, then;
 - (iii) Information submitted to AQMD with prior permit applications for the specific unit. If not available, then;
 - (iv) Unit shall be deemed by AQMD to be 20 years old.
- (3) In accordance with the schedule in the permit, owners or operators of units shall determine compliance with the emission limit specified in Table 1 pursuant to the provisions of subdivisions (d) or (e) using a District approved test protocol. The test protocol shall be submitted to the District at least 150 days prior to the scheduled test and approved by the District Source Testing Division.
- (4) Identification of Units
 - (A) New Manufactured Units

The manufacturer shall display the model number and the rated heat input capacity of the unit complying with subdivision (c) on a permanent rating plate. The manufacturer shall also display the District certification status on the unit when applicable.
 - (B) Modified Units

The owner or operator of a unit with a combustion modification shall display the modified rated heat input capacity for the unit and

individual burners on new permanent supplemental rating plates installed in an accessible location on the unit and every burner. The gross heat input shall be based on the maximum fuel input corrected for fuel heat content, temperature, and pressure. Gross heat input shall be demonstrated by a calculation based on fuel consumption recorded by an in-line fuel meter by the manufacturer or installer. The permanent rating plates shall include the date the unit and burners were modified and the date any replacement burners were manufactured. If a unit is modified, the rated heat input capacity shall be calculated pursuant to subparagraph (c)(4)(B). The documentation of rated heat input capacity for modified units shall include the name of the company and person modifying the unit, a description of all modifications, the dates the unit was modified, and calculation of rated heat input capacity. The documentation for modified units shall be signed by the highest ranking person modifying the unit.

- (5) The owner or operator shall maintain on site a copy of all documents identifying the unit's rated heat input capacity. The rated heat input capacity shall be identified by a manufacturer's or distributor's manual or invoice and permanent rating plates attached to the unit and individual burners pursuant to subparagraph (c)(4)(B).
- (6) On or after (date of adoption), any person owning or operating a unit subject to this rule shall perform combustion system maintenance in accordance with the manufacturer's schedule and specifications as identified in the manual or other written materials supplied by the manufacturer or distributor. The owner or operator shall maintain on site at the facility where the unit is being operated a copy of the manufacturer's, distributor's, installer's, or maintenance company's written maintenance schedule and instructions and retain a record of the maintenance activity for a period of not less than three years. The owner or operator shall maintain on site at the facility where the unit is being operated a copy of the District certification or District approved source test reports, conducted by an independent third party, demonstrating the specific unit complies with the emission limit. The source test report(s) must identify that the source test was conducted pursuant to a District approved protocol. The model and serial numbers of the specified unit

shall clearly be indicated on the source test report(s). The owner or operator shall maintain on the unit in an accessible location a permanent rating plate. The maintenance instructions, maintenance records, and the source test report(s) or District certification shall be made available to the Executive Officer upon request.

- (7) Any person owning or operating a unit subject to this rule complying with an emission limit in Table 1 expressed as pounds per million BTU shall install and maintain in service non-resettable, totalizing, fuel meters for each unit's fuel(s) prior to the compliance determination specified in paragraph (c)(3). Owners or operators of a unit with a combustion system that operates at only one firing rate that complies with an emission limit using pounds per million BTU shall install a non-resettable, totalizing, time or fuel meter for each fuel.
- (8) Unit fuel and electric use meters that require electric power to operate shall be provided a permanent supply of electric power that cannot be unplugged, switched off, or reset except by the main power supply circuit for the building and associated equipment or the unit's safety shut-off switch. Any person operating a unit subject to this rule shall not shut off electric power to a unit meter unless the unit is not operating and is shut down for maintenance or safety.
- (9) **Compliance by Certification**
For units that do not allow adjustment of the fuel and combustion air for the combustion system by the owner or operator, and upon approval by the Executive Officer, an owner or operator may demonstrate compliance with the emission limit and demonstration requirement of this subdivision by certification granted to the manufacturer for any model of unit or specific combustion system sold for use in the District. Any unit or combustion system certified pursuant to subdivision (e) shall be deemed in compliance with the emission limit in Table 1 and demonstration requirement of this subdivision, unless a District conducted or required source test shows non-compliance.
- (10) **Alternate Compliance Plan**
Owners or operators of facilities with three or more in-use units with compliance dates in the same year or two consecutive years may request a delay and phase-in of the compliance dates in Table 2 for the affected units. The term of the alternate compliance plan shall be no more than 3

years for 3 or 4 units and no more than 5 years for 5 or more units. At least one unit shall comply with the applicable emission limit by July 1 of the first applicable compliance date in Table 2 for the affected units and at least one unit shall comply with the applicable emission limit by July 1 of each year thereafter. The alternate compliance plan shall identify the units included in the plan and a schedule identifying when the compliance determination for each unit will be completed and when each unit will comply with the emission limit. All units must demonstrate compliance with the applicable emission limit of this rule before the end of the term of the alternate compliance plan.

(d) Compliance Determination

- (1) All compliance determinations pursuant to paragraphs (c)(1), (c)(3), (c)(7), (c)(9), (c)(10) and this subdivision shall be calculated:
 - (A) Using a District approved test protocol averaged over a period of at least 15 and no more than 60 consecutive minutes; and
 - (B) After unit start up.

Each compliance determination shall be made in the maximum heat input range at which the unit normally operates. An additional compliance determination shall be made using a heat input of less than 35% of the rated heat input capacity.

For compliance determinations after the initial approved test, the operator is not required to resubmit a protocol for approval if: there is a previously approved protocol and the unit has not been altered in a manner that requires a permit alteration; and rule or permit emission limits have not changed since the previous test.

- (2) All parts per million emission limits specified in subdivision (c) are referenced at 3 percent volume stack gas oxygen on a dry basis.
- (3) Compliance with the NO_x and CO emission limits of subdivision (c) and determination of stack-gas oxygen and carbon dioxide concentrations for this rule shall be determined according to the following procedures:
 - (A) District Source Test Method 100.1 – Instrumental Analyzer Procedures for Continuous Gaseous Emission Sampling (March 1989);

- (B) ASTM Method D6522-00 – Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers;
 - (C) United States Environmental Protection Agency Conditional Test Method CTM-030 – Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Emissions from Natural Gas-Fired Engines, Boilers and Process Heaters Using Portable Analyzers;
 - (D) District Source Test Method 7.1 – Determination of Nitrogen Oxide Emissions from Stationary Sources (March 1989);
 - (E) District Source Test Method 10.1 – Carbon Monoxide and Carbon Dioxide by Gas Chromatograph/Non-Dispersive Infrared Detector (GC/NDIR) – Oxygen by Gas Chromatograph-Thermal Conductivity (GC/TCD) (March 1989);
 - (F) Any alternative test method determined approved before the test in writing by the Executive Officers of the District, the California Air Resources Board, and the United States Environmental Protection Agency.
- (4) For any operator who chooses to comply using pound per million BTU, NO_x emissions in pounds per million BTU of heat input shall be calculated using procedures in 40 CFR Part 60, Appendix A, Method 19, Sections 2 and 3.
 - (5) Records of source tests shall be maintained on site and made available to District personnel upon request. Emissions determined to exceed any limits established by this rule through the use of any of the test methods specified in subparagraphs (d)(3)(A) through (d)(3)(F) and paragraph (d)(4) shall constitute a violation of this rule.
 - (6) All compliance determinations shall be made using an independent contractor to conduct testing, which is approved by the Executive Officer under the Laboratory Approval Program for the applicable test methods.
 - (7) For equipment with two or more units in series, including afterburners and other VOC, toxics, or PM control equipment subject the SCAQMD Rule 1147, or multiple units with a common exhaust, the owner or operator may

demonstrate compliance with the emission limits in Table 1 by one of the following:

- (A) Test each unit separately and demonstrate each unit’s compliance with the applicable limit; or
- (B) Test only after the last unit in the series and at the end of a common exhaust for multiple units, when all units are operating, and demonstrate that the series of units either meet:
 - (i) The lowest emission limit in Table 1 applicable to any of the units in series; or
 - (ii) A heat input weighted average of all the applicable emission limits in Table 1 using the following calculation.

$$\text{Weighted Limit} = \frac{\sum [(EL_X) * (Q_X)]}{\sum [Q_X]}$$

Where:

X is any and all units or processes

EL_X = emission limit for unit or process X

Q_X = heat input for unit or process X during test

(e) Certification

(1) Unit Certification

For units that do not allow adjustment of the fuel and combustion air for the combustion system by the owner or operator, any manufacturer or distributor that distributes for sale or sells units or combustion systems for use in the District may elect to apply to the Executive Officer to certify such units or combustion systems as compliant with subdivision (c).

(2) Manufacturer Confirmation of Emissions

Any manufacturer’s application to the Executive Officer to certify a model of unit or combustion system as compliant with the emission limit and demonstration requirement of subdivision (c) shall obtain confirmation from an independent contractor that is approved by the Executive Officer under the Laboratory Approval Program for the necessary test methods prior to applying for certification that each unit model complies with the

applicable requirements of subdivision (c). This confirmation shall be based upon District approved emission tests. A District approved protocol shall be adhered to during the confirmation testing of all units and combustion systems subject to this rule. Emission testing shall comply with the requirements of paragraphs (d)(1) through (d)(6) except emission determinations shall be made at greater than 90% rated heat input capacity and an additional emission determination shall be made at a heat input of less than 35% of the rated heat input capacity.

- (3) When applying for unit(s) or combustion system(s) certification, the manufacturer shall submit to the Executive Officer the following:
 - (A) A statement that the model of unit or combustion system is in compliance with subdivision (c). The statement shall be signed and dated by the manufacturer's responsible official and shall attest to the accuracy of all statements;
 - (B) General Information
 - (i) Name and address of manufacturer;
 - (ii) Brand name, if applicable;
 - (iii) Model number(s), as it appears on the unit or combustion system rating plate(s);
 - (iv) List of all combustion system components; and
 - (v) Rated Heat Input Capacity, gross output of burner(s) and number of burners;
 - (C) A description of each model of unit or combustion system being certified; and
 - (D) A source test report verifying compliance with the applicable emission limit in subdivision (c) for each model to be certified. The source test report shall be prepared by the confirming independent contractor and shall contain all of the elements identified in the District approved Protocol for each unit tested. The source test shall have been conducted no more than ninety (90) days prior to the date of submittal to the Executive Officer.
- (4) When applying for unit or combustion system certification, the manufacturer shall submit the information identified in paragraph (e)(3) no more than ninety (90) days after the date of the source test identified in subparagraph (e)(3)(D) and at least 120 days prior to the date of the

proposed sale and installation of any District certified unit or combustion system.

- (5) The Executive Officer shall certify a unit or combustion system model or models which complies with the provisions of subdivision (c) and of paragraphs (e)(2), (e)(3), and (e)(4).
- (6) Certification status shall be valid for seven years from the date of approval by the Executive Officer. After the seventh year, recertification shall be required by the Executive Officer according to the requirements of paragraphs (e)(2), (e)(3), and (e)(4).

(f) Enforcement

- (1) The Executive Officer may inspect certification records and unit installation, operation, maintenance, repair, combustion system modification, and test records of owners, operators, manufacturers, distributors, retailers, and installers of units located in the District, and conduct such tests as are deemed necessary to ensure compliance with this rule. Tests shall include emission determinations, as specified in paragraphs (d)(1) through (d)(4), (d)(6) and (d)(7).
- (2) An emission determination specified under paragraph (f)(1) that finds emissions in excess of those allowed by this rule or permit conditions shall constitute a violation of this rule.

(g) Exemptions

- (1) The provisions of this rule shall not apply to units:
 - (A) Subject to the nitrogen oxide limits of District Rules 1109, 1110.2, 1111, 1112, 1117, 1121, 1134, 1135, 1146, 1146.1, 1146.2, 1147; or
 - (B) Subject to registration pursuant to District Rule 222; or
 - (C) Located at RECLAIM facilities.
- (2) The provisions of this rule shall not apply to char broilers; fryers, including fryers used for nut or other seed roasting; and emission control equipment including but not limited to afterburners.
- (3) The provisions of paragraphs (c)(1) and (c)(3) of this rule shall not apply to units with daily emissions of 1 pound per day or less as documented by:
 - (A) A rated heat input capacity of less than 325,000 BTU per hour;

- (B) A permit condition that limits emissions to 1 pound per day or less, including but not limited to, fuel usage limit, time of use limit, or process limit that results in emissions of 1 pound per day or less;
 - (C) Daily recordkeeping of unit operation, an installed unit specific non-resettable time meter and the following specified rated heat input capacities operating the specified number of hours every day:
 - (i) Less than or equal to 400,000 BTU per hour and operating less than or equal to 16 hours per day; or
 - (ii) Less than or equal to 800,000 BTU per hour and operating less than or equal to 8 hours per day; or
 - (iii) Less than or equal to 1,200,000 BTU per hour and operating less than or equal to 5 hours per day.
 - (D) Daily recordkeeping of unit use, including but not limited to time records of unit operation using an installed unit specific non-resettable time meter, daily fuel consumption, and daily process rate.
- (4) The provisions of paragraph (c)(3) of this rule shall not apply to units heated solely with infrared burners.
- (h) Mitigation Fee Compliance Option
- (1) An owner or operator of a unit may elect to delay the applicable compliance date in Table 2 three years by submitting an alternate compliance plan and paying an emissions mitigation fee to the District in lieu of meeting the applicable NO_x emission limit in Table 1.
 - (2) Compliance Demonstration
An owner or operator of a unit electing to comply with the mitigation fee compliance option shall:
 - (A) Submit an alternate compliance plan and pay the mitigation fee to the Executive Officer at least 150 days prior to the applicable compliance date in Table 2, and
 - (B) Maintain on-site a copy of verification of mitigation fee payment and AQMD approval of the alternate compliance plan that shall be made available upon request to AQMD staff.

(3) Plan Submittal

The alternate compliance plan submitted pursuant to paragraphs (h)(1) and (h)(2) shall include:

- (A) A completed AQMD Form 400A with company name, AQMD Facility ID, identification that the application is for a compliance plan (section 7 of form), and identification that the request is for the Rule 1153.1 mitigation fee compliance option (section 9 of the form);
- (B) Attached documentation of unit fuel use for previous 3 years, description of weekly operating schedule, unit permit ID, unit heat rating (BTU/hour), and fee calculation;
- (C) Filing fee payment; and
- (D) Mitigation fee payment as calculated by Equation 1.

Equation 1:

$$MF = R * (3 \text{ years}) * (L_1 - L_0) * (AF) * (k)$$

Where,

MF = Mitigation fee, \$

R = Fee Rate = \$12.50 per pound (\$6.25 per pound for a small business with 10 or fewer employees and gross annual receipts of \$500,000 or less)

L₁ = Default NO_x emission factor, 0.136 lbs of NO_x/mmBTU for gaseous fuels, and 0.160 lb/mmBTU for fuel oils

L₀ = Applicable NO_x emission limit specified in Table 1 in lbs/mmBTU

AF = Annual average fuel usage of unit for previous 5 years, mmscf/yr for natural gas or gallons for liquid fuel

k = unit conversion for cubic feet of natural gas to BTU = 1,050 BTU/scf, 95,500 BTU/gallon for LPG, and 138,700 BTU/gallon for fuel oil

(4) Rule 1147 Mitigation Fee Plan Submittal

A mitigation fee compliance plan submitted pursuant to District Rule 1147 may be used to comply with the requirements of this paragraph so long as the owner/operator of the unit notifies the Executive Officer at least 150 days prior to the applicable compliance date in Table 2.