

**RULE 361. ~~SMALL BOILERS, GENERATORS, AND PROCESS HEATERS~~ BOILERS, STEAM GENERATORS, AND PROCESS HEATERS (Between 2-5 MMBtu/hr)**  
(Adopted 1/17/2008, revised 6/20/2019)

**A. Applicability**

This rule shall apply to any boiler, steam generator, ~~or~~ and process heater with a rated heat input capacity ~~of~~ greater than 2 million British thermal units per hour and less than 5 million British thermal units per hour.

**B. Exemptions**

1. The provisions of this rule shall not apply to:

a. ~~P~~rocess heaters, kilns, furnaces, and dryers, where the products of combustion come into direct contact with the material to be heated.

b. ~~E~~quipment that does not require a permit under the provisions of Rule 202, Exemptions to Rule 201. ~~G. Notwithstanding the above, this exemption shall not apply to any AB 617 Industrial Unit.~~

~~c. existing units until March 15, 2016.~~

2. Section D.1 and D.3 requirements shall not apply to any ~~dual fuel~~ unit while forced to burn non-gaseous fuel during times of public utility imposed natural gas curtailment. This exemption shall not exceed 168 cumulative hours of operation per calendar year excluding equipment testing time not exceeding 24 hours per calendar year.

**C. Definitions**

See Rule 102, Definitions, for definitions not limited to this rule. For the purposes of this rule, the following definitions shall apply:

“AB 617 Industrial Unit” means any unit located at a facility that, as of January 1, 2017, was subject to a market-based compliance mechanism adopted by the state board pursuant to Health and Safety Code §38562(c).

**“Annual Heat Input”** means the total heat input of fuels burned by a unit in a calendar year, as determined from the higher heating value and cumulative annual usage of each fuel.

“Atmospheric Unit” means any unit with a non-sealed combustion chamber in which natural draft is used to exhaust combustion gases.

**“Boiler or Steam Generator”** means any combustion equipment ~~permitted to be~~ fired with liquid and/or gaseous and/or solid ~~fossil~~ fuel; that is used to produce steam or to heat water. Boiler or Steam Generator does not include any fired or unfired waste heat recovery boiler that is used to recover or augment ~~sensible~~ heat from the exhaust of any combustion equipment.

“Digester Gas” means gas derived from the decomposition of organic matter in a digester.

**“Existing Unit”** means any unit installed prior to January 17, 2008 which ~~is~~ has not ~~been~~ a modified ~~unit~~ as defined herein. Any unit that is an AB 617 Industrial Unit, as defined in this rule, is not considered an existing unit.

“Field Gas” means any gaseous fuel extracted from a production well that:

1. is processed and/or used as fuel in equipment located in the same oil and gas production field as the production well, and
2. does not meet the California Public Utility Commission quality pipeline standards as specified in *General Order 58-A*.

~~“Higher Heating Value (HHV)” means the total heat liberated per mass of fuel burned (British thermal unit per pound), when fuel and dry air at standard conditions undergo complete combustion and all resulting products are brought to their standard states at standard conditions.~~

“Landfill Gas” means gas derived from the decomposition of waste in a landfill.

~~“Modified Unit” means any unit that has a burner or burners replaced or where the unit is replaced in its entirety on or after January 17, 2008. Modified units are considered new units.~~

“Modification” or “Modify” means any of the following actions:

1. Replacing a burner or burners on a unit; or
2. Removing a unit from the site of its original installation and installing it at a different location. A unit that is reinstalled within the same stationary source is not modified.

~~“New Unit” means any unit that is not an existing unit. A modified unit is considered a new unit.~~

~~“Process Heater” means any external combustion equipment permitted to be fired with liquid and/or gaseous fuel and/or solid fuel and which transfers heat from combustion gases to water or process streams. Process Heater does not include any kiln or oven used for drying, baking, curing, cooking, calcinating or vitrifying or any unfired waste heat recovery heater that is used to recover sensible heat from the exhaust of any combustion equipment.~~

~~“Rated Heat Input Capacity” (million British thermal units per hour) means the heat input capacity specified on the manufacturer’s nameplate of the combustion unit, typically reported in million Btu per hour. If the combustion unit has been physically modified such that its maximum heat input is different than the heat input capacity specified on the nameplate, the modified maximum heat input shall be considered as the rated heat input. The new maximum heat input must be certified, in writing, by the manufacturer or installer and engineering calculations supporting the new maximum heat input rating must be submitted to and approved by the District. The District may require the modified maximum heat input capacity to be demonstrated by a fuel meter while operating the unit at maximum capacity.~~

“Parts Per Million” or “ppm” means parts per million by volume expressed on a dry gas basis.

“Shutdown Period” means the period of time during which a unit is taken from an operational to a non-operational status by allowing it to cool down from its operating temperature to a cold or ambient temperature as the fuel supply is turned off.

“Startup Period” means the period of time during which a unit is brought from a shutdown status to its operating temperature and pressure.

~~“Unit” means any boiler, steam generator, or process heater.~~

~~“Utility Natural Gas” means natural gas supplied by a public gas utility company that meets Public Utility Commission quality pipeline standards as specified in *General Order 58-A*.~~

#### **D. Requirements – Emission Standards**

1. For units that are installed prior to January 1, 2020:

- a. ~~By January 1, 2020, No~~ owner or operator shall operate ~~any new or modified unit or, after January 1, 2020, any existing unit,~~ in excess of the emission limits set forth in Table 1 below; ~~and following limits, subject to Section D.2 below:~~
- b. No owner or operator shall operate any unit that was installed or modified between January 17, 2008 and December 31, 2019 in excess of the emission limits set forth in Table 1 below. ~~Oxides of Nitrogen emissions shall not exceed 30 parts per million by volume at 3 percent oxygen.~~
- c. ~~Carbon Monoxide emissions shall not exceed 400 parts per million by volume at 3 percent oxygen.~~

**Table 1: Emission Limits for Units Installed Prior to January 1, 2020**

<u>Fuel Type</u>	<u>NOx Emission Limit (ppm at 3% O2)</u>	<u>CO Emission Limit (ppm at 3% O2)</u>
<u>All Fuels</u>	<u>30</u>	<u>400</u>

- 2. The provisions of Section D.1 shall not apply to any existing unit that meets the following:
  - a. The existing unit operates with an annual heat input, from all fuels, at or below 1.8 billion British thermal units per calendar year as verified by a District-approved, non-resettable, temperature and pressure corrected, totalizing fuel meter ~~that is installed no later than December 31, 2016;~~ and
  - b. The owner or operator implements the District-approved Rule 361 Compliance Plan that was submitted to the District prior to March 15, 2016 ~~required under Section K.3 for the life of the unit;~~ and
  - c. The owner or operator demonstrates to the Control Officer compliance with the requirements specified in Sections F, G, ~~H and I,~~ and J.
- 3. On or after January 1, 2020, no owner or operator shall install or modify any unit unless the unit complies with the emission limits set forth in Table 2 below.

**Table 2: Emission Limits for Units Installed On or After January 1, 2020**

<u>Fuel Type</u>	<u>NOx Emission Limit (ppm at 3% O2)</u>	<u>CO Emission Limit (ppm at 3% O2)</u>
<u>Natural Gas or Field Gas: non-atmospheric units</u>	<u>9</u>	<u>400</u>
<u>Natural Gas or Field Gas: atmospheric units</u>	<u>12</u>	<u>400</u>
<u>Landfill Gas</u>	<u>25</u>	<u>400</u>
<u>Digester Gas</u>	<u>15</u>	<u>400</u>
<u>Liquefied Petroleum Gas</u>	<u>20</u>	<u>400</u>
<u>All other fuels</u>	<u>30</u>	<u>400</u>

- 4. On or before June 20, 2020, all AB 617 Industrial Units shall operate in compliance with the emission limits specified in Section D.3.

### E. Requirement - Loss of Low-Use Exemption

Any owner or operator of any existing unit ~~claiming that qualified for~~ the Section D.2 low-use exemption where the unit's annual heat input in any calendar year exceeds 1.8 billion British thermal units shall comply with the following:

1. Within 120 days after the end of the calendar year during which the unit exceeded 1.8 billion British thermal units of annual heat input, submit an Authority to Construct permit application for installation of control equipment or a replacement unit; and
2. Within 365 days after the end of the calendar year during which the unit exceeded 1.8 billion British thermal units of annual heat input, demonstrate to the Control Officer and maintain compliance with Section D.3~~4~~ for the life of the unit; and
3. Maintain compliance with the remaining requirements of Section D.2 until compliance with Section D.3~~4~~ is achieved.

### F. Requirements – Compliance Determination

1. Any owner or operator of any unit fired exclusively on ~~utility~~ natural gas and any unit subject to the Section D.2 low-use exemption shall be tuned-up pursuant to the requirements of Section G~~F~~. The District may, at its discretion, require any owner or operator of any unit subject to this rule to perform a source test per the test methods listed in Section H~~F~~. An owner or operator may choose to comply with this section by performing District-approved source testing in lieu of tune-ups.
2. Except for units subject to the Section D.2 low-use exemption, any owner or operator of any unit ~~not~~ fired on fuels other than~~exclusively on utility~~ natural gas shall perform District-approved source testing not less than once every 24 months using the source test methods listed in Section H~~F~~. After the third required compliance source test, the District may, at its discretion, allow the owner or operator of the unit to perform tune-ups in lieu of source testing per the requirements of Section G~~F~~.
3. All emission determinations shall be made in the as-found operating condition, except no compliance determination shall be established during unit start-up, shutdown, or under breakdown conditions.
- 3.4. Start-up or shutdown intervals shall not last longer than is necessary to reach stable temperatures and conditions. All emission control systems shall be in operation and emissions shall be minimized, to the extent possible, during startup and shutdown periods.
4. ~~Any owner or operator of any unit found not to be in compliance with Section D.1 requirements as a result of the tune-up procedure shall notify the District in writing within 7 days. The notification shall include a copy of the Rule 361 Tune-Up Report, the actions taken to get the unit into compliance, and the next steps to achieve compliance. Failure to bring the unit into compliance with the requirements of Section D.1 within 15 days of the initial tune-up attempt shall constitute a violation of this rule.~~

### ~~G. Requirements – Recordkeeping~~

~~All owners or operators of units subject to this rule shall keep all records listed below onsite for a period of five years and the records shall be made readily available to the District upon request:~~

1. ~~Rule 361 Tune-Up Reports and test firing records.~~
2. ~~Source test reports.~~

- ~~3. For existing units subject to Section D.2:
  - ~~a. Monthly and annual fuel use logs for each fuel type.~~
  - ~~b. Meter calibration records.~~~~
- ~~4. Records of emergency nongaseous fuel use per Section B.2. These records shall include the dates, operating hours, and volumes of nongaseous fuel used and documentation of fuel sulfur content.~~

#### ~~H. Requirements – Reporting~~

- ~~1. The records required pursuant to Section G shall be submitted to the District by March 1<sup>st</sup> for the prior calendar year.~~
- ~~2. Source test reports shall be submitted to the District within 45 days of test completion.~~

#### I.G. Requirements – Unit Tuning

The owner or operator of any unit subject to the tune-up requirements of this rule shall comply with the following requirements:

1. Perform tuning at least twice per year, (at intervals from 4 to 8 months apart) in accordance with the procedures described in the attached District Rule 361 Tune-Up Procedures. Units subject to [the](#) Section D.1 [or D.3](#) emission standards shall follow the procedure requirements to measure oxides of nitrogen and carbon monoxide levels using a District-approved, calibrated portable analyzer.
2. If the unit does not operate throughout a continuous six-month period within a calendar year, then only one tune-up is required for that calendar year.
3. No tune-up is required during a calendar year for any unit that is not operated during that calendar year; ~~this~~ [The](#) unit may [still](#) be test fired to verify availability of the unit for its intended use, but once test firing is completed, it shall be shutdown. If test firing exceeds 24 hours per year, then [within thirty \(30\) days of exceeding the 24 hour per year limit, a tune-ups shall be conducted pursuant to follow the requirements of this S](#)~~ection I.1.~~
4. [Any owner or operator of any unit found to be in noncompliance with Section D requirements as a result of the tune-up procedure shall notify the District in writing within 7 days. The notification shall include a copy of the Rule 361 Tune-Up Report, the actions taken to get the unit into compliance, and the next steps to achieve compliance. Failure to bring the unit into compliance with the requirements of Section D.1 and D.3 within 15 days of the initial tune-up attempt shall constitute a violation of this rule.](#)

#### J.H. Requirements - Source Testing

- ~~1. The owner or operator of any unit subject to this Rule shall perform an initial source test on each unit at the time of installation and modification to verify compliance with the oxides of nitrogen and the carbon monoxide emission limits of Section D.1.a and D.1.b. After the initial source test, source tests shall be performed biennially to demonstrate compliance with Section D.1.a and Section D.1.b. For facilities with more than 10 units subject to Section D.1.a and Section D.1.b requirements, the Control Officer may, on a case by case basis, approve an alternate source test schedule for up to one half of the units every other year. Such a request shall be submitted with the Plan required in Section J.2.~~

- ~~2.1.~~ The owner or operator of any unit subject to [the source testing provisions of](#) this Rule shall submit a Source Test Plan to the District and obtain District written approval prior to the start of any source test. The ~~draft Source Test~~ Plan shall be filed with the District at least 30 days before the start of each source test. The District shall be notified of the date of source testing ~~a unit~~ at least 14 days prior to testing to arrange a mutually agreeable test date.
- ~~3.2.~~ Source testing shall be performed by a source test contractor certified by the [California Air Resources Board](#). District required source testing shall not be performed by an owner or operator unless approved by the Control Officer.
- ~~4.3.~~ The owner or operator of any unit subject to [the](#) source test requirements of this rule shall use the test methods and procedures [listed](#) below:
- a. Oxides of Nitrogen: Environmental Protection Agency Method ~~7E10~~ or [California Air Resources Board Method 100](#).
  - b. Carbon ~~m~~Monoxide: Environmental Protection Agency Method ~~107E~~ or [California Air Resources Board Method 100](#).
  - c. [Stack Gas Oxygen: Environmental Protection Agency Method 3 or 3A or California Air Resources Board Method 100.](#)
  - ~~e.d.~~ Fuel rate: District-approved metering system, calibrated within 60 calendar days of the test date. -Public Utility Company regulated fuel meters relied on by operators for testing may be allowed an alternative calibration schedule upon approval by the Control Officer. Results must be corrected for pressure and temperature to standard conditions.
  - ~~d.~~ ~~Determination of the stack gas smoke spot number using one of the following methods:~~
    - ~~1. American Society of Testing and Materials ASTM D2156-94 (2003), "Standard Test Method for Smoke Density in Flue Gases from Burning Distillate Fuels", American Society of Testing and Materials International.~~
    - ~~2. Bacharach True Spot® Smoke Test Kit.~~
    - ~~3. Alternative methods for determining the stack gas smoke spot number approved by the Control Officer in writing.~~
  - ~~e.~~ ~~Any alternative source test method approved in writing by the Control Officer that is found to be comparable in accuracy to the procedure in this Section and approved by the Air Resources Board and the Environmental Protection Agency.~~
  - ~~f.e.~~ [All source tests shall consist of](#) At a minimum, [of](#) three 30 minute tests ~~runs shall be performed for compliance with Sections J.4.a and J.4.b.~~ The average concentration from the ~~three~~ test runs shall be used for determining compliance.

## I. Requirements – Recordkeeping

[All owners or operators of units subject to this rule shall keep all records listed below onsite for a period of five years and the records shall be made readily available to the District upon request:](#)

- [1. Rule 361 Tune-Up Reports and test-firing records.](#)
- [2. Source test reports.](#)
- [3. For existing units subject to the Section D.2 low-use exemption:](#)

- a. Monthly and annual fuel use logs for each fuel type.
- b. Fuel meter calibration records.
4. Records of emergency non-gaseous fuel use per Section B.2. These records shall include the dates, operating hours, and volumes of non-gaseous fuel used.

**J. Requirements – Reporting**

1. The records required pursuant to Section I.1, I.3, and I.4 shall be submitted to the District by March 1<sup>st</sup> for the prior calendar year.
2. Source test reports, required pursuant to Section I.2, shall be submitted to the District within 45 days of test completion.

**K. Compliance Schedule – Existing Units**

The owner or operator of any existing unit subject to this rule shall meet the following compliance schedule:

- ~~1. Existing units shall apply for a Permit to Operate by April 16, 2008 in accordance with Rule 202.~~
- ~~2. Obtain an Authority to Construct permit prior to installation or modification of any new or modified unit.~~
- ~~3. The owner or operator of any unit requesting the low use exemption in Section D.2 shall comply with the requirement to submit a *Rule 361 Compliance Plan* for District review and approval prior to March 15, 2016. The District approved fuel meters shall be installed by no later than December 31, 2016. The *Rule 361 Compliance Plan* shall include:
  - ~~a. The company name, District Facility ID number, facility address, current operating permit number, facility contact information.~~
  - ~~b. A list of all subject units with their rated heat input capacity, District Device ID number, anticipated annual heat input.~~
  - ~~c. For gaseous fuels, the proposed non-resettable temperature and pressure corrected totalizing fuel meter(s) specifications. For liquid fuels, the proposed non-resettable totalizing fuel meter(s) specifications. For solid fossil fuels, provide the methods of fuel throughput monitoring to be used that will achieve the same level of fuel monitoring accuracy as the meters required for the measurement of gaseous and liquid fuels described above. Include the fuel meter manufacturer, model number, technical brochure, and manufacturer recommended calibration schedule.~~
  - ~~d. For each unit, identify which Rule 361 Tuning Procedure will be used (see Attachment).~~~~
- ~~4. On or before January 30, 2019, the owner or operator of any existing unit shall:
  - ~~a. For units subject to Section D.1 emission standards, apply for an Authority to Construct permit.~~
  - ~~b. For units subject to the Section D.2 low use provision, provide the annual fuel heat input data for years 2017 and 2018.~~~~

~~5.1.~~ On or before January 1, 2020, the owner or operator of any existing unit shall: ~~demonstrate final compliance with this Rule.~~

a. For units subject to the Section D.1 emission standards, demonstrate final compliance with the emission standards in Section D.1.

b. For units subject to the Section D.2 low-use exemption, conduct the initial tune-up pursuant to Section G.

**L. Compliance Schedule – AB 617 Industrial Units**

1. On or before September 20, 2019, the owner or operator of any AB 617 Industrial Unit that does not meet the emission standards in Section D.3, as listed in the unit's Permit to Operate, shall apply for an Authority to Construct permit.

2. On or before June 20, 2020, the owner or operator of any AB 617 Industrial Unit shall operate in compliance with the emission standards in D.3.



## ATTACHMENT

### SBCAPCD Rule 361 Tune-Up Procedures<sup>1</sup>

#### PROCEDURE A

#### Equipment Tuning Procedure for Forced Draft-Fired Equipment<sup>2</sup>

Nothing in this Equipment Tuning Procedure shall be construed to require any act or omission that would result in unsafe conditions or would be in violation of any regulation or requirement established by Factory Mutual, Industrial Risk Insurers, National Fire Prevention Association, the California Department of Industrial Relations (Occupational Safety and Health Division), the Federal Occupational Safety and Health Administration, or other relevant regulations and requirements.

As used in this procedure, the requirement to measure Oxides of Nitrogen (NO<sub>x</sub>) ~~readings~~ is only required if the unit being tuned is subject to the requirements of Section D.1 ~~or D.3 (i.e., 30 ppmvd at 3 % oxygen [O<sub>2</sub>]).~~ NO<sub>x</sub> (as NO<sub>2</sub>) measurements shall be taken with a portable analyzer in accordance with the South Coast Air Quality Management District (SCAQMD) Combustion Gas Periodic Monitoring Protocol (May 1, 2009), or an equivalent method approved by the Control Officer. Only District approved portable NO<sub>x</sub> and CO analyzers may be used. The portable analyzer shall be calibrated per ASTM Test Method D-6522-00 (reapproved 2005) prior to each use, in accordance with the SCAQMD Combustion Gas Periodic Monitoring Protocol (May 1, 2009), and ~~calibration~~ records shall be submitted as part of the *Rule 361 Tune-Up Report*. ~~Analyzer readings shall be taken pursuant to ASTM Test Method D-6522-00 (reapproved 2005).~~ Steps in the Tune-Up Procedure below not applicable to specific units may be omitted.

1. Operate the unit at the firing rate most typical of normal operation. If the unit experiences significant load variations during normal operation, operate it at its average firing rate.
2. At this firing rate, record stack gas temperature, oxygen concentration, and carbon monoxide concentration and NO<sub>x</sub> concentration (also record the smoke-spot number<sup>3</sup> for liquid fuels only) and the observed flame condition after unit operation stabilizes at the firing rate selected. Note these readings in the *Rule 361 Tune-Up Report* as the "*Initial As-Found Conditions*". If the excess oxygen in the stack gas is at the lower end of the range of typical minimum values<sup>4</sup>, and if the carbon monoxide emissions are low and there is not smoke, the unit is probably operating at near optimum efficiency ~~at this particular firing rate~~. However, complete the remaining portion of this procedure to determine whether still lower oxygen levels are practical. ~~For units subject to Section D.1, n~~ Note whether the NO<sub>x</sub> and carbon monoxide values comply with the applicable limits specified in the unit's Permit to Operate.

<sup>1</sup> These Rule 361 tune-up procedures differ from SCAQMD Rule 1146.1 and Ventura Rule 74.15.1 ~~since (e.g., NO<sub>x</sub> (as NO<sub>2</sub>)) readings are required to be taken in addition to the CO reading if the unit is subject to~~ a 30 ppm (or lower) NO<sub>x</sub> limit, as specified in the rule Section D.1).

<sup>2</sup> This tuning procedure is based on a tune-up procedure developed by KVB, Inc. for the EPA.

<sup>3</sup> The smoke-spot number can be determined with ~~American Society of Testing and Materials~~ ASTM Test Method D-2156-~~0994~~ (2013~~03~~), "Standard Test Method for Smoke Density in Flue Gases from Burning Distillate Fuels," ~~American Society of Testing and Materials International~~ or with the Bacharach method.

<sup>4</sup> Typical minimum oxygen levels for boilers at high firing rates are:  
a. For natural gas: 0.5% - 3%  
b. For liquid fuels: 2% - 4%

3. Increase combustion air flow to the furnace until stack gas oxygen levels increase by one to two percent over the level measured in Step 2. As in Step 2, record the stack gas temperature, oxygen concentration, carbon monoxide concentration, NO<sub>x</sub> concentration (also record the smoke-spot number<sup>5</sup> for liquid fuels only), and the observed flame condition for these higher oxygen levels after boiler operation stabilizes.
4. Decrease combustion air flow until the stack gas oxygen concentration is at the level measured in Step 2. From this level, gradually reduce the combustion air flow, in small increments. After each increment, record the stack gas temperature, oxygen concentration, carbon monoxide concentration, NO<sub>x</sub> concentration, smoke-spot number (for liquid fuels) and the observed flame condition.
5. Continue to reduce combustion air flow stepwise, until one of these limits is reached:
  - a. Unacceptable flame conditions - such as flame impingement on furnace walls or burner parts, excessive flame carryover, or flame instability.
  - b. Stack gas carbon monoxide concentrations greater than 400 ppm~~vd~~ or NO<sub>x</sub> concentrations greater than the applicable limit as specified in the unit's Permit to Operate~~30 ppmvd (as corrected to 3% O<sub>2</sub>).~~
  - c. Smoking at the stack.
  - d. Equipment-related limitations - such as low windbox/furnace pressure differential, built in air-flow limits, etc.
6. Develop an oxygen/carbon monoxide curve (for gaseous fuels) or oxygen/smoke curve (for liquid fuels) similar to those shown in Figures 1 and 2 using the excess oxygen, and carbon monoxide or smoke-spot number data obtained at each combustion air flow setting.
7. From the curves prepared in Step 6, find the stack gas oxygen levels where the carbon monoxide emissions or smoke-spot number equal the following values:

<u>Fuel</u>	<u>Measurement</u>	<u>Value</u>
Gaseous	carbon monoxide <del>E</del> missions	400 parts per million
#1 & #2 oils	smoke-spot number	number 1
#4 <u>oil</u>	<del>oil</del> smoke-spot number	number 2
#5 <u>oil</u>	<del>oil</del> smoke-spot number	number 3
Other oils	smoke-spot number	number 4

The above conditions are referred to as the carbon monoxide or smoke threshold, or as the minimum excess oxygen level.

Compare this minimum value of excess oxygen to the expected value provided by the combustion unit manufacturer. If the minimum level found is substantially higher than the value provided by the combustion unit manufacturer, burner adjustments can probably be made to improve fuel and air mixing, thereby allowing operation with less air.

8. Add 0.5 to 2.0 percent to the minimum excess oxygen level found in Step 7 and reset burner controls to operate automatically at this higher stack gas oxygen level. This margin above the minimum oxygen level accounts for fuel variations, variations in atmospheric conditions, load changes, and nonrepeatability or play in automatic controls.

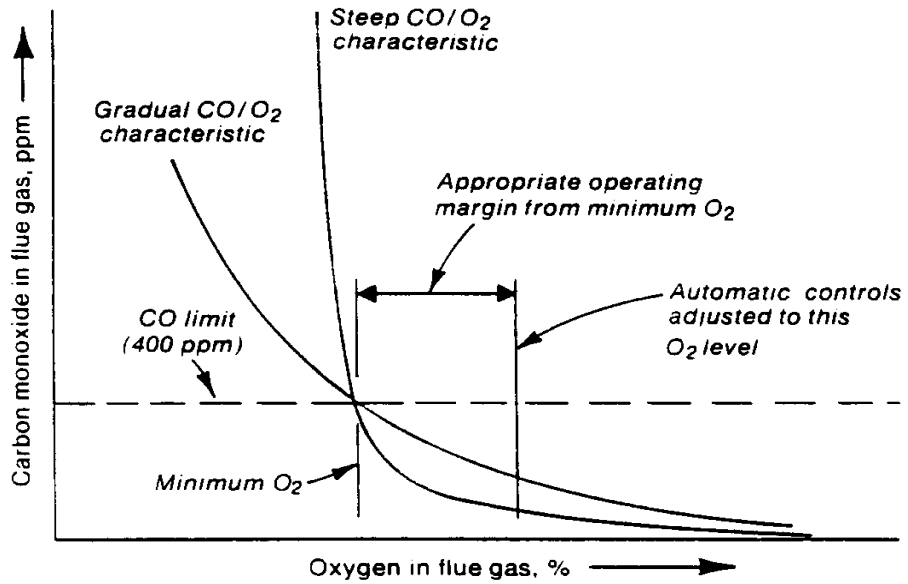
<sup>5</sup>~~The smoke spot number can be determined with American Society of Testing and Materials ASTM Test Method D-2156-94 (2003), "Standard Test Method for Smoke Density Flue Gases from Burning Distillate Fuels," American Society of Testing and Materials International or with the Bacharach method.~~

9. If the load of the combustion unit varies significantly during normal operation, repeat Steps 1-8 for firing rates that represent the upper and lower limits of the range of the load. Because control adjustments at one firing rate may affect conditions at other firing rates, it may not be possible to establish the optimum excess oxygen level at all firing rates. If this is the case, choose the burner control settings that give best performance over the range of firing rates. If one firing rate predominates, settings should optimize conditions at that rate.
10. Verify that the new settings can accommodate the sudden changes that may occur in daily operation without adverse effects. Do this by increasing and decreasing load rapidly while observing the flame and stack. If any of the conditions in Step [5.4](#) result, reset the combustion controls to provide a slightly higher level of excess oxygen at the affected firing rates. Next, verify these new settings in a similar fashion. Then make sure that the final control settings are recorded at steady-state operating conditions for future reference.
11. Take a final combustion analysis for NO<sub>x</sub> concentration, carbon monoxide concentration and oxygen concentration ([also record the smoke-spot number for liquid fuels only](#)). Note these readings, as well as the stack temperature and flame condition, in the *Rule 361 Tune-Up Report* as the “*Final As-Tuned Conditions*.” Confirm that the final settings result in compliance with the regulatory limits. **If compliance with [the emission limits specified in the unit’s Permit to Operate](#) ~~Section D.1~~ is not achievable, take actions and provide notification to the District pursuant to the requirements of Section ~~FG~~.4.**
12. When the above checks and adjustments have been made, prepare a *Rule 361 Tune-Up Report*. The report shall include all recorded data and combustion analysis data for the unit; the manufacturer, model number and serial number of the portable NO<sub>x</sub>/CO analyzer; the name, title, signature, company name, and contact information of person performing the tune-up; and date the tune-up was performed. The *Rule 361 Tune-Up Report* shall clearly indicate the “*Initial As-Found Conditions*” and the “*Final As-Tuned Conditions*” and shall (if applicable) state whether Section D.1 [and D.3](#) emission standards for NO<sub>x</sub> and ~~CO~~<sup>carbon</sup> ~~monoxide~~ were met. Calibration records shall be submitted as part of the *Rule 361 Tune-Up Report*.

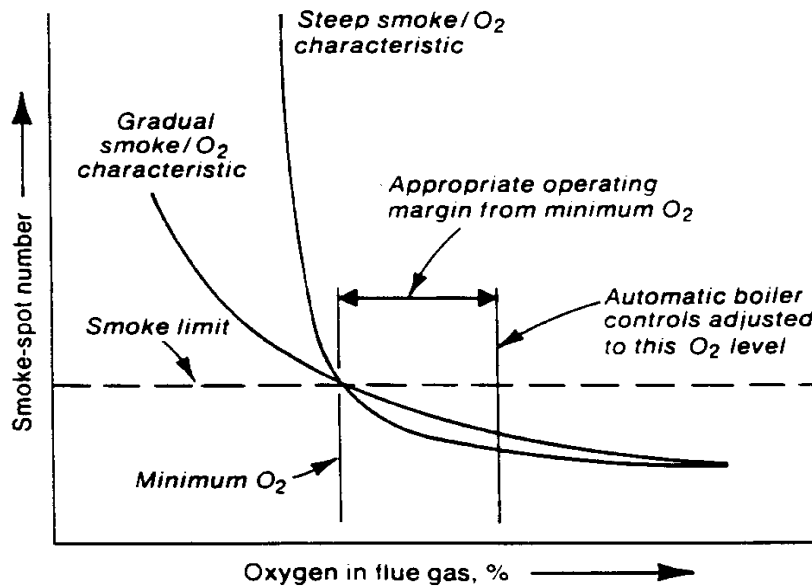
**NOTE**

The owner/operator may propose an alternative tuning procedure that meets the same basic requirements of the procedure outlined above for District review and approval. The District may assess fees to reimburse its costs associated with the review of the alternative procedure using either Section I.C.~~4~~ or Section III.C of Rule 210, [Fees](#). District approval of the alternative tuning procedure must be obtained prior to its use.

**Figure 1**  
Oxygen/Carbon Monoxide Characteristic Curve



**Figure 2**  
Oxygen/Smoke Characteristic Curve



## PROCEDURE B Equipment Tuning Procedure for Natural Draft-Fired Equipment

Nothing in this Equipment Tuning Procedure shall be construed to require any act or omission that would result in unsafe conditions or would be in violation of any regulation or requirement established by Factory Mutual, Industrial Risk Insurers, National Fire Prevention Association, the California Department of Industrial Relations (Occupational Safety and Health Division), the Federal Occupational Safety and Health Administration, or other relevant regulations and requirements.

As used in this procedure, the requirement to measure Oxides of Nitrogen (NO<sub>x</sub>) ~~readings~~ is only required if the unit being tuned is subject to the requirements of Section D.1 ~~or D.3 (i.e., 30 ppmvd at 3% oxygen [O<sub>2</sub>])~~. ~~NO<sub>x</sub> (as NO<sub>2</sub>) measurements shall be taken with a portable analyzer in accordance with the South Coast Air Quality Management District Combustion Gas Periodic Monitoring Protocol (May 1, 2009), or an equivalent method approved by the Control Officer. Only District approved portable NO<sub>x</sub> and CO analyzers may be used.~~ The portable analyzer shall be calibrated ~~per ASTM Test Method D-6522-00 (reapproved 2005) prior to each use~~ in accordance with the [SCAQMD Combustion Gas Periodic Monitoring Protocol \(May 1, 2009\)](#), and ~~C~~ calibration records shall be submitted as part of the *Rule 361 Tune-Up Report*. ~~Analyzer readings shall be taken pursuant to ASTM Test Method D-6522-00 (reapproved 2005).~~ Steps in the Tune-Up Procedure below not applicable to specific units may be omitted.

### 1. [PRELIMINARY ANALYSIS](#) ~~Preliminary Analysis~~

- a. Verify that the boiler, steam generator, or process heater (unit) is operating at the lowest pressure or temperature that will satisfy load demand. This pressure or temperature will be used as a basis for comparative combustion analysis before and after tune-up.
- b. Verify that the unit operates for the minimum number of hours and days necessary to perform the work required.
- c. Verify that the size of air supply openings is in compliance with applicable codes and regulations. Air supply openings must be fully open when the burner is firing and air flow must be unrestricted.
- d. Verify that the vent is in good condition, properly sized and free from obstruction.
- e. Perform an as-found (i.e., prior to any adjustments) combustion analysis for carbon monoxide concentration, NO<sub>x</sub> concentration, oxygen concentration and measure the stack temperature and note the flame condition at both high and low fire, if possible. Note these readings in the *Rule 361 Tune-Up Report* as the "Initial As-Found Conditions". Also record the following:
  - (1) Inlet fuel pressure at burner at high and low firing rates.
  - (2) Pressure above draft hood or barometric damper at high, medium, and low firing rates.
  - (3) Steam pressure, water temperature, or process fluid pressure or temperature entering and leaving the unit.
  - (4) Inlet fuel use rate if meter is available.

### 2. CHECKS AND CORRECTIONS

- a. Clean all dirty burners or burner orifices. Verify that fuel filters and moisture traps are in place, clean, and operating properly. Confirm proper location and orientation of burner diffuser spuds, gas canes, etc. Replace or repair all damaged or missing burner parts.
- b. Remove external and internal sediment and scale from heating surfaces.

- c. Verify that the necessary water or process fluid treatment is being used [to minimize scale and corrosion](#). Confirm flushing and/or blowdown schedule.
- d. Repair all leaks. In addition to the high-pressure lines, check the blow-off, drain, safety valve, bypass lines, and, if used, the feed pump.

3. SAFETY CHECKS

- a. Test primary and secondary low water level controls.
- b. Check operating and limit pressure and temperature controls.
- c. Check pilot safety shut off operation.
- d. Check safety valve pressure setting and verify that the setting is consistent with unit load requirements.
- e. Check limit safety control and spill switch.

4. ADJUSTMENTS

Perform the following checks and adjustments on a warm unit at high fire:

- a. Adjust unit to fire at the maximum inlet fuel use rate: record fuel manifold pressure.
- b. Adjust draft and/or fuel pressure to obtain acceptable, clean combustion at high, medium, and low firing rates. The carbon monoxide value should not exceed 400 parts per million at 3% oxygen.
- c. Verify that unit light-offs are smooth and safe. Perform a reduced fuel pressure test at both high and low firing rates in accordance with the manufacturer's instructions.
- d. Check and adjust the modulation controller. Verify proper, efficient, and clean combustion through the range of firing rates.

When optimum performance has been achieved, record all data.

5. FINAL TEST

After adjustments, perform a final combustion analysis for carbon monoxide concentration, NO<sub>x</sub> concentration, oxygen concentration, and measure the stack temperature and note the flame condition on the warm unit at high, medium, and low firing rates, if possible. Note these readings in the *Rule 361 Tune-Up Report* as the "*Final As-Tuned Conditions*". Also record the following:

- ~~i.~~ a. Inlet fuel pressure at burner at high, [medium](#), and low firing rates.
- ~~ii.~~ b. Pressure above draft hood or barometric damper at high, medium, and low firing rates.
- ~~iii.~~ c. Steam pressure, water temperature, or process fluid pressure or temperature entering and leaving the unit.
- ~~iv.~~ d. Inlet fuel use rate if meter is available.

If the unit is subject the Section D.1 [or D.3](#) limits for NO<sub>x</sub> (~~30 ppmvd at 3% O<sub>2</sub>~~) and carbon monoxide (~~400 ppmvd at 3% O<sub>2</sub>~~), confirm that the final settings result in compliance with the regulatory limits. **If compliance [with the emission limits specified in the unit's Permit to Operate](#) is not**

achievable, takes actions and provide notification to the District pursuant to the requirements of Section ~~F~~G.4.

6. RULE 361 TUNE-UP REPORT

When the above checks and adjustments have been made, prepare a *Rule 361 Tune-Up Report*. The report shall include all recorded data and combustion analysis data for the unit; the manufacturer, model number and serial number of the portable NO<sub>x</sub>/CO analyzer; the name, title, signature, company name and contact information of person performing the tune-up; and date the tune-up was performed. The *Rule 361 Tune-Up Report* shall clearly indicate the “*Initial As-Found Conditions*” and the “*Final As-Tuned Conditions*” and shall (if applicable) state whether Section D.1 and D.3 emission standards for NO<sub>x</sub> and CO were met. Calibration records shall be submitted as part of the *Rule 361 Tune-Up Report*.

NOTE

The owner or operator may propose an alternative tuning procedure that meets the same basic requirements of the procedure outlined above for review and approval by the Control Officer. The District may assess fees to reimburse its costs associated with the review of the alternative procedure using either Section I.C.~~d~~ or Section III.C of Rule 210. Control Officer approval of the alternative tuning procedure must be obtained in writing prior to its use.