

**REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 12
NITROGEN OXIDES FROM GLASS MELTING FURNACES**

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REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 12
NITROGEN OXIDES FROM GLASS MELTING FURNACES

(Adopted January 19, 1994)

9-12-100 GENERAL

9-12-101 Description: This Rule limits the emission of nitrogen oxides (NO_x) from glass melting furnaces.

9-12-110 Exemptions: The requirements of this Rule shall not apply to the following:

110.1 Furnaces in which all the heat required for melting is provided by electric current from electrodes submerged in the molten glass, except that heat may be supplied by fossil fuels for start-up when the furnace contains no molten glass.

110.2 Furnaces with a production capacity of 4550 kilograms (5 short tons) of glass per day or less.

9-12-200 DEFINITIONS

9-12-201 Glass Melting Furnace: Any unit in which heat is used to produce molten glass.

9-12-202 Idling: Operation at less than 25 percent of the production capacity stated on the Permit to Operate.

9-12-203 Nitrogen Oxide Emissions (NO_x): The sum of nitric oxide (NO) and nitrogen dioxide (NO₂) in the flue gas, collectively expressed as nitrogen dioxide.

9-12-204 Pull: To remove glass from the furnace.

9-12-205 Shutdown: The period of time during which a furnace is allowed to cool from operating temperature to a cooler temperature.

9-12-206 Start-up: The period of time during which a furnace is heated to operating temperature from a lower temperature.

9-12-300 STANDARDS

9-12-301 Emission Limit: A person subject to this Rule shall reduce nitrogen oxides emissions (NO_x) from any glass melting furnace pursuant to the following increments of progress until emissions do not exceed the emission limit of 2.75 grams of NO_x per kilogram (5.5 lbs of NO_x per short ton) of glass pulled, averaged over any consecutive 3-hour period excluding start-up, shutdown, and idling periods.

301.1 Effective January 1, 1997, a person shall not emit NO_x from any glass melting furnace at a rate in excess of 90 percent of the baseline emission rate established pursuant to Section 9-12-403.

301.2 Effective January 1, 1999, a person shall not emit NO_x from any glass melting furnace at a rate in excess of 75 percent of the baseline emission rate established pursuant to Section 9-12-403.

301.3 Effective January 1, 2001, a person shall not emit NO_x from any glass melting furnace at a rate in excess of 55 percent of the baseline emission rate established pursuant to Section 9-12-403, and this percentage shall be reduced by 10 percent effective each January 1 thereafter until NO_x emissions do not exceed the emission limit set forth in Section 9-12-301.

9-12-400 ADMINISTRATIVE REQUIREMENTS

9-12-401 Compliance Schedule: A person subject to this Rule shall follow the compliance schedule below:

- 401.1 By February 1, 1995, submit a list of the quantity of glass produced, average cullet content, and average electric boost rate for each furnace on each day for calendar year 1994.
- 401.2 By March 1, 1995, submit for District approval proposed furnace operating parameters for source tests, as required by Section 9-12-402.
- 401.3 By August 1, 1995, conduct District-approved source tests for determining the baseline emission rate pursuant to Section 9-12-403.
- 401.4 By September 1, 1995, submit the results of each source test conducted pursuant to Section 9-12-401.3 accompanied by the supporting data required by Section 9-12-402.3.
- 401.5 By 12 months prior to the effective date of an increment of progress pursuant to Section 9-12-301, submit a complete application for any Authority to Construct necessary to achieve compliance with that increment of progress.

9-12-402 Furnace Operating Parameters for Source Tests: Source tests pursuant to Sections 9-12-403 and 9-12-404 shall be conducted while furnaces are operating within District-approved parameters established as follows:

- 402.1 A person subject to this Rule shall submit proposed ranges of operating parameters for APCO approval. These ranges shall be representative of operation at or near maximum sustained production capacity as determined from data submitted pursuant to Section 9-12-401.1. Proposed ranges shall include, at a minimum, ranges for excess oxygen as measured at the top of the regenerators, bridgewall temperature, firing rate, electric boost rate, cullet content, and pull rate.
- 402.2 The APCO shall review the proposed ranges of parameters. Ranges representative of operation at or near maximum sustained production capacity will be approved by the APCO in writing.
- 402.3 For each source test conducted pursuant to Sections 9-12-403 and 9-12-404, sufficient data to confirm that the furnace was operated within the approved parameters shall be submitted with the source test results. At a minimum this data shall include average excess oxygen as measured at the top of the regenerators, average bridgewall temperature, average firing rate, average electric boost rate, average cullet content, and average pull rate.

9-12-403 Baseline Emission Rate Determinations: A person subject to this Rule shall establish the baseline emission rate for each glass melting furnace as follows:

- 403.1 One or more District-approved source tests shall be conducted for each furnace in accordance with the requirements of Sections 9-12-601 through 9-12-604.
- 403.2 Each source test shall be conducted while the furnace is operating within parameters approved by the APCO pursuant to Section 9-12-402.
- 403.3 Where one source test is conducted for a furnace, the baseline emission rate for that furnace shall be the emission rate per ton of glass pulled as determined by the source test.
- 403.4 Where more than one source test is conducted for a furnace, the baseline emission rate for that furnace shall be the sum of the mass emissions per hour as determined by each source test divided by the sum of the glass production per hour as determined for each source test.

9-12-404 Compliance Determinations: A person subject to this Rule shall demonstrate compliance with Section 9-12-301 for each glass melting furnace as follows:

- 404.1 By April 1, 1997, and by each April 1 thereafter, one or more District-approved source tests shall be conducted for each furnace in accordance with the provisions of Sections 9-12-601 through 9-12-604.
- 404.2 Each source test shall be conducted while the furnace is operating within parameters approved by the APCO pursuant to Section 9-12-402.
- 404.3 Where one source test is conducted for a furnace, the emission rate for that furnace shall be the emission rate per ton of glass as determined by the source test.
- 404.4 Where more than one source test is conducted for a furnace, the emission rate for that furnace shall be the sum of the mass emissions per hour as

determined by each source test divided by the sum of the glass production per hour as determined for each source test.

404.5 Source test results shall be submitted to the APCO (Attn: Source Test Section) by May 1 of each year.

9-12-500 MONITORING AND RECORDS

9-12-501 Production Monitoring: Any person who operates a glass melting furnace subject to this Rule shall maintain a means of determining the quantity of glass pulled during a source test administered pursuant to Sections 9-12-601 through 9-12-604.

9-12-502 Fuel Monitoring: Any person who operates a glass melting furnace subject to this Rule shall maintain a non-resettable totalizing fuel meter which monitors fuel usage for each glass melting furnace.

9-12-600 MANUAL OF PROCEDURES

9-12-601 Determination of Nitrogen Oxides: Emissions of nitrogen oxides shall be determined using the source test procedure set forth in the District Manual of Procedures, Volume IV, ST-13A or B, as modified by Section 9-12-603.

9-12-602 Determination of Oxygen: Emissions of oxygen shall be determined using the source test procedure set forth in the District Manual of Procedures, Volume IV, ST-14, as modified by Section 9-12-603.

9-12-603 Sampling and Averaging Period: Sampling shall be conducted for three hours of continuous furnace operation as specified in Section 9-12-301. Concentrations of nitrogen oxides and oxygen shall be averaged over three hours.

9-12-604 Calculation of Mass Emission Rate Per Ton of Glass Pulled: For purposes of determining compliance with Section 9-12-301, concentration of nitrogen oxides shall be converted to a mass emission rate pursuant to EPA Method 19, 40 CFR Part 60 Appendix A, and this result shall be converted to a mass emission rate per ton of glass pulled.