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*Unofficial electronic compilation of the
U.S. EPA Final Rule on Mandatory Reporting of Greenhouse Gases
incorporated by reference in California's Regulation for the
Mandatory Reporting of Greenhouse Gas Emissions*

Unofficial Electronic Compilation

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ARB's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (title 17, California Code of Regulations (CCR), sections 95100-95157) incorporated by reference certain requirements promulgated by the United States Environmental Protection Agency (U.S. EPA) in its Final Rule on Mandatory Reporting of Greenhouse Gases (Title 40, Code of Federal Regulations (CFR), Part 98). Specifically, section 95100(c) of ARB's regulation incorporated those requirements promulgated by U.S. EPA as published in the Federal Register on October 30, 2009, July 12, 2010, September 22, 2010, October 28, 2010, November 30, 2010, December 17, 2010, and April 25, 2011.

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**40 CFR Part 98
Subpart N**

Mandatory Reporting of Greenhouse Gases

PART 98—MANDATORY GREENHOUSE GAS REPORTING

Subpart N—Glass Production

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§98.140 Definition of the source category.

(a) A glass manufacturing facility manufactures flat glass, container glass, pressed and blown glass, or wool fiberglass by melting a mixture of raw materials to produce molten glass and form the molten glass into sheets, containers, fibers, or other shapes. A glass manufacturing facility uses one or more continuous glass melting furnaces to produce glass.

(b) A glass melting furnace that is an experimental furnace or a research and development process unit is not subject to this subpart.

§98.141 Reporting threshold.

You must report GHG emissions under this subpart if your facility contains a glass production process and the facility meets the requirements of either §98.2(a)(1) or (2).

§98.142 GHGs to report.

You must report:

(a) CO₂ process emissions from each continuous glass melting furnace.

(b) CO₂ combustion emissions from each continuous glass melting furnace.

(c) CH₄ and N₂O combustion emissions from each continuous glass melting furnace. You must calculate and report these emissions under subpart C of this part (General Stationary Fuel Combustion Sources) by following the requirements of subpart C.

(d) CO₂, CH₄, and N₂O emissions from each stationary fuel combustion unit other than continuous glass melting furnaces. You must report these emissions under subpart C of this part (General Stationary Fuel Combustion Sources) by following the requirements of subpart C.

§98.143 Calculating GHG emissions.

You must calculate and report the annual process CO₂ emissions from each continuous glass melting furnace using the procedure in paragraphs (a) and (b) of this section.

(a) For each continuous glass melting furnace that meets the conditions specified in §98.33(b)(4)(ii) or (iii), you must calculate and report under this subpart the combined process and combustion CO₂ emissions by operating and maintaining a CEMS to measure CO₂ emissions according to the Tier 4 Calculation Methodology specified in §98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part (General Stationary Fuel Combustion Sources).

(b) For each continuous glass melting furnace that is not subject to the requirements in paragraph (a) of this section, calculate and report the process and combustion CO₂ emissions from the glass melting furnace by using either the procedure in paragraph (b)(1) of this section or the procedure in paragraphs (b)(2) through (b)(7) of this section, except as specified in paragraph (c) of this section.

(1) Calculate and report under this subpart the combined process and combustion CO₂ emissions by operating and maintaining a CEMS to measure CO₂ emissions according to the Tier 4 Calculation Methodology specified in §98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part (General Stationary Fuel Combustion Sources).

(2) Calculate and report the process and combustion CO₂ emissions separately using the procedures specified in paragraphs (b)(2)(i) through (b)(2)(vi) of this section.

(i) For each carbonate-based raw material charged to the furnace, obtain from the supplier of the raw material the carbonate-based mineral mass fraction.

(ii) Determine the quantity of each carbonate-based raw material charged to the furnace.

(iii) Apply the appropriate emission factor for each carbonate-based raw material charged to the furnace, as shown in Table N-1 to this subpart.

(iv) Use Equation N-1 of this section to calculate process mass emissions of CO₂ for each furnace:

$$E_{CO_2} = \sum_{i=1}^n MF_i \cdot (M_i \cdot \frac{2000}{2205}) \cdot EF_i \cdot F_i \tag{Eq. N-1}$$

Where:

ECO₂ = Process emissions of CO₂ from the furnace (metric tons).

n = Number of carbonate-based raw materials charged to furnace.

MF_i = Annual average mass fraction of carbonate-based mineral i in carbonate-based raw material i (percentage, expressed as a decimal).

M_i = Annual amount of carbonate-based raw material i charged to furnace (tons).

2000/2205 = Conversion factor to convert tons to metric tons.

EF_i = Emission factor for carbonate-based raw material i (metric ton CO₂ per metric ton carbonate-based raw material as shown in Table N-1 to this subpart).

F_i = Fraction of calcination achieved for carbonate-based raw material i, assumed to be equal to 1.0 (percentage, expressed as a decimal).

(v) You must calculate the total process CO₂ emissions from continuous glass melting furnaces at the facility using Equation N-2 of this section:

$$CO_2 = \sum_{i=1}^k E_{CO_2i} \quad (\text{Eq. N-2})$$

Where:

CO₂ = Annual process CO₂ emissions from glass manufacturing facility (metric tons).

E_{CO₂i} = Annual CO₂ emissions from glass melting furnace i (metric tons).

k = Number of continuous glass melting furnaces.

(vi) Calculate and report under subpart C of this part (General Stationary Fuel Combustion Sources) the combustion CO₂ emissions in the glass furnace according to the applicable requirements in subpart C.

(c) As an alternative to data provided by the raw material supplier, a value of 1.0 can be used for the mass fraction (MF_i) of carbonate-based mineral i in Equation N-1 of this section.

§98.144 Monitoring and QA/QC requirements.

(a) You must measure annual amounts of carbonate-based raw materials charged to each continuous glass melting furnace from monthly measurements using plant instruments used for accounting purposes, such as calibrated scales or weigh hoppers. Total annual mass charged to glass melting furnaces at the facility shall be compared to records of raw material purchases for the year.

(b) You must measure carbonate-based mineral mass fractions at least annually to verify the mass fraction data provided by the supplier of the raw material; such measurements shall be based on sampling and chemical analysis using ASTM D3682-01 (Reapproved 2006) Standard Test Method for Major and Minor Elements in Combustion Residues from Coal Utilization Processes (incorporated by reference, see §98.7) or ASTM D6349-09 Standard Test Method for Determination of Major and Minor Elements in Coal, Coke, and Solid Residues from Combustion of Coal and Coke by Inductively Coupled Plasma—Atomic Emission Spectrometry (incorporated by reference, see §98.7).

(c) You must determine the annual average mass fraction for the carbonate-based mineral in each carbonate-based raw material by calculating an arithmetic average of the monthly data obtained from raw material suppliers or sampling and chemical analysis.

(d) You must determine on an annual basis the calcination fraction for each carbonate consumed based on sampling and chemical analysis using an industry consensus standard. This chemical analysis must be conducted using an x-ray fluorescence test or other enhanced testing method published by an industry consensus standards organization (e.g., ASTM, ASME, API, etc.).

§98.145 Procedures for estimating missing data.

A complete record of all measured parameters used in the GHG emissions calculations is required (e.g., carbonate raw materials consumed, etc.). If the monitoring and quality assurance procedures in §98.144 cannot be followed and data is missing, you must use the most appropriate of the missing data procedures in paragraphs (a) and (b) of this section. You must document and keep records of the procedures used for all such missing value estimates.

(a) For missing data on the monthly amounts of carbonate-based raw materials charged to any continuous glass melting furnace use the best available estimate(s) of the parameter(s), based on all available process data or data used for accounting purposes, such as purchase records.

(b) For missing data on the mass fractions of carbonate-based minerals in the carbonate-based raw materials assume that the mass fraction of each carbonate based mineral is 1.0.

§98.146 Data reporting requirements.

In addition to the information required by §98.3(c), each annual report must contain the information specified in paragraphs (a) and (b) of this section, as applicable.

(a) If a CEMS is used to measure CO₂ emissions, then you must report under this subpart the relevant information required under §98.36 for the Tier 4 Calculation Methodology and the following information specified in paragraphs (a)(1) and (a)(2) of this section:

- (1) Annual quantity of each carbonate-based raw material charged to each continuous glass melting furnace and for all furnaces combined (tons).
- (2) Annual quantity of glass produced by each glass melting furnace and by all furnaces combined (tons).

(b) If a CEMS is not used to determine CO₂ emissions from continuous glass melting furnaces, and process CO₂ emissions are calculated according to the procedures specified in §98.143(b), then you must report the following information as specified in paragraphs (b)(1) through (b)(9) of this section:

- (1) Annual process emissions of CO₂ (metric tons) for each continuous glass melting furnace and for all furnaces combined.
- (2) Annual quantity of each carbonate-based raw material charged (tons) to each continuous glass melting furnace and for all furnaces combined.
- (3) Annual quantity of glass produced (tons) from each continuous glass melting furnace and from all furnaces combined.
- (4) Carbonate-based mineral mass fraction (percentage, expressed as a decimal) for each carbonate-based raw material charged to a continuous glass melting furnace.
- (5) Results of all tests used to verify the carbonate-based mineral mass fraction for each carbonate-based raw material charged to a continuous glass melting furnace, as specified in paragraphs (b)(5)(i) through (b)(5)(iii) of this section.
 - (i) Date of test.
 - (ii) Method(s) and any variations used in the analyses.
 - (iii) Mass fraction of each sample analyzed.
- (6) The fraction of calcination achieved for each carbonate-based raw material, if a value other than 1.0 is used to calculate process mass emissions of CO₂.
- (7) Method used to determine fraction of calcination.
- (8) Total number of continuous glass melting furnaces.
- (9) The number of times in the reporting year that missing data procedures were followed to measure monthly quantities of carbonate-based raw materials or mass fraction of the carbonate-based minerals for any continuous glass melting furnace (months).

§98.147 Records that must be retained.

In addition to the information required by §98.3(g), you must retain the records listed in paragraphs (a), (b), and (c) of this section.

(a) If a CEMS is used to measure emissions, then you must retain the records required under §98.37 for the Tier 4 Calculation Methodology and the following information specified in paragraphs (a)(1) and (a)(2) of this section:

- (1) Monthly glass production rate for each continuous glass melting furnace (tons).
- (2) Monthly amount of each carbonate-based raw material charged to each continuous glass melting furnace (tons).

(b) If process CO₂ emissions are calculated according to the procedures specified in §98.143(b), you must retain the records in paragraphs (b)(1) through (b)(5) of this section.

- (1) Monthly glass production rate for each continuous glass melting furnace (metric tons).
- (2) Monthly amount of each carbonate-based raw material charged to each continuous glass melting furnace (metric tons).
- (3) Data on carbonate-based mineral mass fractions provided by the raw material supplier for all raw materials consumed annually and included in calculating process emissions in Equation N-1 of this subpart.
- (4) Results of all tests used to verify the carbonate-based mineral mass fraction for each carbonate-based raw material charged to a continuous glass melting furnace, including the data specified in paragraphs (b)(4)(i) through (b)(4)(v) of this section.
 - (i) Date of test.
 - (ii) Method(s), and any variations of the methods, used in the analyses.
 - (iii) Mass fraction of each sample analyzed.
 - (iv) Relevant calibration data for the instrument(s) used in the analyses.
 - (v) Name and address of laboratory that conducted the tests.
- (5) The fraction of calcination achieved for each carbonate-based raw material (percentage, expressed as a decimal), if a value other than 1.0 is used to calculate process mass emissions of CO₂.

(c) All other documentation used to support the reported GHG emissions.

§98.148 Definitions.

All terms used in this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

Table N-1 of Subpart N—CO₂ Emission Factors for Carbonate-Based Raw Materials

Carbonate-Based Raw Material – Mineral	CO₂ Emission Factor^a
Limestone – CaCO ₃	0.440
Dolomite – CaMg(CO ₃) ₂	0.477
Sodium carbonate/soda ash – Na ₂ CO ₃	0.415
Barium carbonate – BaCO ₃	0.223
Potassium carbonate – K ₂ CO ₃	0.318

Table N-1 of Subpart N—CO₂ Emission Factors for Carbonate-Based Raw Materials

Carbonate-Based Raw Material – Mineral	CO₂ Emission Factor^a
Lithium carbonate – Li ₂ CO ₃	0.596
Strontium carbonate – SrCO ₃	0.298

^a Emission factors in units of metric tons of CO₂ emitted per metric ton of carbonate-based raw material charged to the furnace.