Environmental Protection Agency § 98.194

\[ E_{\text{waste},i} = \left[ (SR_{\text{CaO}} \times \text{CaO}_{\text{waste},i}) + (SR_{\text{MgO}} \times \text{MgO}_{\text{waste},i}) \right] \times M_{\text{waste},i} \times \frac{2000}{2205} \]  
(Eq. S-3)

Where:

\( E_{\text{waste},i} \) = Annual CO\(_2\) emissions for calcined lime byproduct/waste type \( i \) that is not sold (metric tons CO\(_2\)).

\( SR_{\text{CaO}} \) = Stoichiometric ratio of CO\(_2\) and CaO for calcium carbonate (see Table S–1 of this subpart) (metric tons CO\(_2\)/metric tons CaO).

\( SR_{\text{MgO}} \) = Stoichiometric ratio of CO\(_2\) and MgO for magnesium carbonate (see Table S–1 of this subpart) (metric tons CO\(_2\)/metric tons MgO).

\( \text{CaO}_{\text{waste},i} \) = Calcium oxide content for calcined lime byproduct/waste type \( i \) that is not sold (metric tons CaO/metric ton lime).

\( \text{MgO}_{\text{waste},i} \) = Magnesium oxide content for calcined lime byproduct/waste type \( i \) that is not sold (metric tons MgO/metric ton lime).

\( M_{\text{waste},i} \) = Annual weight or mass of calcined byproducts/wastes for lime type \( i \) that is not sold (tons).

\( \text{2000/2205} \) = Conversion factor for tons to metric tons.

(iv) You must calculate annual CO\(_2\) process emissions for all kilns using Equation S–4 of this section:

\[ E_{\text{CO}_2} = \sum_{i=1}^{t} \left( \sum_{n=1}^{12} EF_{\text{LIME},i,n} \times M_{\text{LIME},i,n} \right) + \sum_{i=1}^{b} \left( \sum_{n=1}^{12} EF_{\text{LKD},i,n} \times M_{\text{LKD},i,n} \right) + \sum_{i=1}^{z} E_{\text{waste},i} \]  
(Eq. S-4)

Where:

\( E_{\text{CO}_2} \) = Annual CO\(_2\) process emissions from lime production from all kilns (metric tons/year).

\( EF_{\text{LIME},i,n} \) = Emission factor for lime type \( i \) produced, in calendar month \( n \) (metric tons CO\(_2\)/ton lime) from Equation S–1 of this section.

\( M_{\text{LIME},i,n} \) = Weight or mass of lime type \( i \) produced in calendar month \( n \) (tons).

\( EF_{\text{LKD},i,n} \) = Emission factor of calcined byproducts/wastes sold for lime type \( i \) in calendar month \( n \), (metric tons CO\(_2\)/ton byproduct/waste) from Equation S–2 of this section.

\( M_{\text{LKD},i,n} \) = Monthly weight or mass of calcined byproducts/waste sold (such as lime kiln dust, LKD) for lime type \( i \) in calendar month \( n \) (tons).

\( E_{\text{waste},i} \) = Annual CO\(_2\) emissions for calcined lime byproduct/waste type \( i \) that is not sold (metric tons CO\(_2\)) from Equation S–3 of this section.

\( t \) = Number of lime types produced

\( b \) = Number of calcined byproducts/wastes that are sold

\( z \) = Number of calcined byproducts/wastes that are not sold

(v) Calculate and report under subpart C of this part (General Stationary Fuel Combustion Sources) the combustion CO\(_2\) emissions from each lime kiln according to the applicable requirements in subpart C.


§ 98.194 Monitoring and QA/QC requirements.

(a)(a) You must determine the total quantity of each type of lime product that is produced and each calcined byproduct/waste (such as lime kiln dust) that is sold. The quantities of each should be directly measured monthly with the same plant instruments used for accounting purposes, including but not limited to, calibrated weigh feeders, rail or truck scales, and barge measurements. The direct measurements of each lime product shall be reconciled annually with the difference in the beginning of and end of year inventories for these products, when measurements represent lime sold.

(b) You must determine the annual quantity of each calcined byproduct/waste generated that is not sold by either direct measurement using the same instruments identified in paragraph (a) of this section or by using a calcined byproduct/waste generation rate.
(c) You must determine the chemical composition (percent total CaO and percent total MgO) of each type of lime product that is produced and each type of calcined byproduct/waste sold according to paragraph (c)(1) or (2) of this section. You must determine the chemical composition of each type of lime product that is produced and each type of calcined byproduct/waste sold on a monthly basis. You must determine the chemical composition for each type of calcined byproduct/waste that is not sold on an annual basis.

(1) ASTM C25–06 Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime (incorporated by reference—see §98.7).


(d) You must use the analysis of calcium oxide and magnesium oxide content of each lime product that is produced and that is collected during the same month as the production data in monthly calculations.

(e) You must follow the quality assurance/quality control procedures (including documentation) in National Lime Association’s CO₂ Emissions Calculation Protocol for the Lime Industry English Units Version, February 5, 2008 Revision—National Lime Association (incorporated by reference—see §98.7).

§98.196 Data reporting requirements.

In addition to the information required by §98.3(c), each annual report must contain the information specified in paragraphs (a) or (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 by §98.36 and the information listed in paragraphs (a)(1) through (8) of this section.

(1) Method used to determine the quantity of lime that is produced and sold.

(2) Method used to determine the quantity of calcined lime byproduct/waste sold.

(3) Beginning and end of year inventories for each lime product that is produced, by type.

(4) Beginning and end of year inventories for calcined lime byproducts/wastes sold, by type.

(5) Annual amount of calcined lime byproduct/waste sold, by type (tons).

(6) Annual amount of lime product sold, by type (tons).

(7) Annual amount of calcined lime byproduct/waste that is not sold, by type (tons).

(8) Annual amount of lime product not sold, by type (tons).

(b) If a CEMS is not used to measure CO₂ emissions, then you must report the information listed in paragraphs (b)(1) through (17) of this section.

(1) Annual CO₂ process emissions from all kilns combined (metric tons).

(2) Monthly emission factors for each lime type produced.

(3) Monthly emission factors for each calcined byproduct/waste by lime type that is sold.

§98.195 Procedures for estimating missing data.

For the procedure in §98.193(b)(1), a complete record of all measured parameters used in the GHG emissions calculations is required (e.g., oxide content, quantity of lime products, etc.). Therefore, whenever a quality-assured value of a required parameter is unavailable, a substitute data value for the missing parameter shall be used in the calculations as specified in paragraphs (a) or (b) of this section. You must document and keep records of the procedures used for all such estimates.

(a) For each missing value of the quantity of lime produced (by lime type), and quantity of calcined byproduct/waste produced and sold, the substitute data value shall be the best available estimate based on all available process data or data used for accounting purposes.

(b) For missing values related to the CaO and MgO content, you must conduct a new composition test according to the standard methods in §98.194 (c)(1) or (c)(2).