

§ 98.84

40 CFR Ch. I (7–1–14 Edition)

Where:

- Cl_{CaO} = Monthly total CaO content of Clinker, wt-fraction.
- Cl_{ncCaO} = Monthly non-calcined CaO content of Clinker, wt-fraction.
- MR_{CaO} = Molecular-weight Ratio of CO₂/CaO = 0.785.
- Cl_{MgO} = Monthly total MgO content of Clinker, wt-fraction.
- Cl_{ncMgO} = Monthly non-calcined MgO content of Clinker, wt-fraction.
- MR_{MgO} = Molecular-weight Ratio of CO₂/MgO = 1.092.

(B) Non-calcined CaO is CaO that remains in the clinker in the form of

CaCO₃ and CaO in the clinker that entered the kiln as a non-carbonate species. Non-calcined MgO is MgO that remains in the clinker in the form of MgCO₃ and MgO in the clinker that entered the kiln as a non-carbonate species.

- (ii) *Kiln-Specific CKD Emission Factor.* (A) Calculate the kiln-specific CKD emission factor for CKD not recycled to the kiln using Equation H-4 of this section.

$$EF_{CKD} = (CKD_{CaO} - CKD_{ncCaO}) * MR_{CaO} + (CKD_{MgO} - CKD_{ncMgO}) * MR_{MgO} \quad (\text{Eq. H-4})$$

Where:

- CKD_{CaO} = Quarterly total CaO content of CKD not recycled to the kiln, wt-fraction.
- CKD_{ncCaO} = Quarterly non-calcined CaO content of CKD not recycled to the kiln, wt-fraction.
- MR_{CaO} = Molecular-weight Ratio of CO₂/CaO = 0.785.
- CKD_{MgO} = Quarterly total MgO content of CKD not recycled to the kiln, wt-fraction.
- CKD_{ncMgO} = Quarterly non-calcined MgO content of CKD not recycled to the kiln, wt-fraction.

MR_{MgO} = Molecular-weight Ratio of CO₂/MgO = 1.092.

(B) Non-calcined CaO is CaO that remains in the CKD in the form of CaCO₃ and CaO in the CKD that entered the kiln as a non-carbonate species. Non-calcined MgO is MgO that remains in the CKD in the form of MgCO₃ and MgO in the CKD that entered the kiln as a non-carbonate species.

- (3) *CO₂ emissions from raw materials.* Calculate CO₂ emissions from raw materials using Equation H-5 of this section:

$$CO_{2,rm} = \sum_{i=1}^m rm * TOCr_m * \frac{44}{12} * \frac{2000}{2205} \quad (\text{Eq. H-5})$$

Where:

- rm = The amount of raw material i consumed annually, tons/yr (dry basis) or the amount of raw kiln feed consumed annually, tons/yr (dry basis).
- CO_{2,rm} = Annual CO₂ emissions from raw materials.
- TOCr_m = Organic carbon content of raw material i or organic carbon content of combined raw kiln feed (dry basis), as determined in § 98.84(c) or using a default factor of 0.2 percent of total raw material weight.
- M = Number of raw materials or 1 if calculating emissions based on combined raw kiln feed.
- 44/12 = Ratio of molecular weights, CO₂ to carbon.

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

- (4) Calculate and report under subpart C of this part (General Stationary Fuel Combustion Sources) the combustion CO₂ emissions from the kiln according to the applicable requirements in subpart C.

[74 FR 56374, Oct. 30, 2009, as amended at 75 FR 66461, Oct. 28, 2010]

§ 98.84 Monitoring and QA/QC requirements.

- (a) You must determine the weight fraction of total CaO and total MgO in

CKD not recycled to the kiln from each kiln using ASTM C114-09, Standard Test Methods for Chemical Analysis of Hydraulic Cement (incorporated by reference, see § 98.7). The monitoring must be conducted quarterly for each kiln from a CKD sample drawn either as CKD is exiting the kiln or from bulk CKD storage.

(b) You must determine the weight fraction of total CaO and total MgO in clinker from each kiln using ASTM C114-09 Standard Test Methods for Chemical Analysis of Hydraulic Cement (incorporated by reference, see § 98.7). The monitoring must be conducted monthly for each kiln from a monthly clinker sample drawn from bulk clinker storage if storage is dedicated to the specific kiln, or from a monthly arithmetic average of daily clinker samples drawn from the clinker conveying systems exiting each kiln.

(c) The total organic carbon content (dry basis) of raw materials must be determined annually using ASTM C114-09 Standard Test Methods for Chemical Analysis of Hydraulic Cement (incorporated by reference, see § 98.7) or a similar industry standard practice or method approved for total organic carbon determination in raw mineral materials. The analysis must be conducted either on sample material drawn from bulk raw kiln feed storage or on sample material drawn from bulk raw material storage for each category of raw material (i.e., limestone, sand, shale, iron oxide, and alumina). Facilities that opt to use the default total organic carbon factor provided in § 98.83(d)(3), are not required to monitor for TOC.

(d) The quantity of clinker produced monthly by each kiln must be determined by direct weight measurement of clinker using the same plant techniques used for accounting purposes, such as reconciling weigh hopper or belt weigh feeder measurements against inventory measurements. As an alternative, facilities may also determine clinker production by direct measurement of raw kiln feed and application of a kiln-specific feed-to-clinker factor. Facilities that opt to use a feed-to-clinker factor must verify the accuracy of this factor on a monthly basis.

(e) The quantity of CKD not recycled to the kiln generated by each kiln must be determined quarterly using the same plant techniques used for accounting purposes, such as direct weight measurement using weigh hoppers, truck weigh scales, or belt weigh feeders.

(f) The annual quantity of raw kiln feed or annual quantity of each category of raw materials consumed by the facility (e.g., limestone, sand, shale, iron oxide, and alumina) must be determined monthly by direct weight measurement using the same plant instruments used for accounting purposes, such as weigh hoppers, truck weigh scales, or belt weigh feeders.

(g) The monthly non-calcined CaO and MgO that remains in the clinker in the form of CaCO₃ or that enters the kiln as a non-carbonate species may be assumed to be a default value of 0.0 or may be determined monthly by careful chemical analysis of feed material and clinker material from each kiln using well documented analytical and calculational methods or the appropriate industry standard practice.

(h) The quarterly non-calcined CaO and MgO that remains in the CKD in the form of CaCO₃ or that enters the kiln as a non-carbonate species may be assumed to be a default value of 0.0 or may be determined quarterly by careful chemical analysis of feed material and CKD material from each kiln using well documented analytical and calculational methods or the appropriate industry standard practice.

[74 FR 56374, Oct. 30, 2009, as amended at 75 FR 66461, Oct. 28, 2010]

§ 98.85 Procedures for estimating missing data.

A complete record of all measured parameters used in the GHG emissions calculations in § 98.83 is required. 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. The owner or operator must document and keep records of the procedures used for all such estimates.