## 11.8 Clay And Fly Ash Sintering

NOTE: Clay and fly ash sintering operations are no longer conducted in the United States. However, this section is being retained for historical purposes.

### 11.8.1 Process Description[1-3]

Although the process for sintering fly ash and clay are similar, there are some distinctions that justify a separate discussion of each process. Fly ash sintering plants are generally located near the source, with the fly ash delivered to a storage silo at the plant. The dry fly ash is moistened with a water solution of lignin and agglomerated into pellets or balls. This material goes to a traveling-grate sintering machine where direct contact with hot combustion gases sinters the individual particles of the pellet and completely burns off the residual carbon in the fly ash. The product is then crushed, screened, graded, and stored in yard piles.

Clay sintering involves the driving off of entrained volatile matter. It is desirable that the clay contain a sufficient amount of volatile matter so that the resultant aggregate will not be too heavy. It is thus sometimes necessary to mix the clay with finely pulverized coke (up to 10 percent coke by weight). In the sintering process, the clay is first mixed with pulverized coke, if necessary, and then pelletized. The clay is next sintered in a rotating kiln or on a traveling grate. The sintered pellets are then crushed, screened, and stored, in a procedure similar to that for fly ash pellets.

### 11.8.2 Emissions And Controls[1]

In fly ash sintering, improper handling of the fly ash creates a dust problem. Adequate design features, including fly ash wetting systems and particulate collection systems on all transfer points and on crushing and screening operations, would greatly reduce emissions. Normally, fabric filters are used to control emissions from the storage silo, and emissions are low. The absence of this dust collection system, however, would create a major emission problem. Moisture is added at the point of discharge from silo to the agglomerator, and very few emissions occur there. Normally, there are few emissions from the sintering machine, but if the grate is not properly maintained, a dust problem is created. The consequent crushing, screening, handling, and storage of the sintered product also create dust problems.

In clay sintering, the addition of pulverized coke presents an emission problem because the sintering of coke-impregnated dry pellets produces more particulate emissions than the sintering of natural clay. The crushing, screening, handling, and storage of the sintered clay pellets creates dust problems similar to those encountered in fly-ash sintering. Emission factors for both clay and fly-ash sintering are shown in Tables 11.8-1 and 11.8-2.

Table 11.8-1 (Metric Units). EMISSION FACTORS FOR CLAY AND FLY ASH SINTERING[a]

| Source (SCC) | Filterable[b] | | | | Condensable PM[c] | | | |
|---|---|---|---|---|---|---|---|---|
| | PM | | PM-10 | | Inorganic | | Organic | |
| | kg/Mg Of Material | EMISSION FACTOR RATING | kg/Mg Of Material | EMISSION FACTOR RATING | kg/Mg Of Material | EMISSION FACTOR RATING | kg/Mg Of Material | EMISSION FACTOR RATING |
| Fly ash crushing, screening, sintering, and storage (3-05-009-01)[d] | 55 | E | ND | | ND | | ND | |
| Clay/coke mixture sintering (3-05-009- 02)[e] | 20 | E | ND | | ND | | ND | |
| Clay/coke mixture crushing, screening, and storage (3-05-009-07)[f] | 7.5 | E | ND | | ND | | ND | |
| Natural clay sintering (3-05-009-03)[g] | 6 | E | ND | | ND | | ND | |
| Natural clay crushing, screening, and storage (3-05-009-04)[f] | 6 | E | ND | | ND | | ND | |

[a] Factors represent uncontrolled emissions unless otherwise noted. SCC = Source Classification Code. ND = no data.
[b] Filterable PM is that PM collected on or prior to the filter of an EPA Method 5 (or equivalent) sampling train.
[c] Condensable PM is that PM collected in the impinger portion of a PM sampling train.
[d] Reference 1.
[e] References 3-5; for 90% clay, 10% pulverized coke; traveling grate, single pass, up-draft sintering machine.
[f] Based on data in Section 11.19-2.
[g] Reference 2; rotary dryer sinterer.

Table 11.8-2 (English Units). EMISSION FACTORS FOR CLAY AND FLY ASH SINTERING[a]

| Source (SCC) | Filterable[b] | | | | Condensable PM[c] | | | |
|---|---|---|---|---|---|---|---|---|
| | PM | | PM-10 | | Inorganic | | Organic | |
| | lb/ton Of Material | EMISSION FACTOR RATING | lb/ton Of Material | EMISSION FACTOR RATING | lb/ton Of Material | EMISSION FACTOR RATING | lb/ton Of Material | EMISSION FACTOR RATING |
| Fly ash crushing, screening, sintering, and storage (3-05-009-01)[d] | 110 | E | ND | | ND | | ND | |
| Clay/coke mixture sintering (3-05-009-02)[e] | 40 | E | ND | | ND | | ND | |
| Clay/coke mixture crushing, screening, and storage (3-05-009-07)[f] | 15 | E | ND | | ND | | ND | |
| Natural clay sintering (3-05-009-03)[g] | 12 | E | ND | | ND | | ND | |
| Natural clay crushing, screening, and storage (3-05-009-04)[f] | 12 | E | ND | | ND | | ND | |

[a] Factors represent uncontrolled emissions unless otherwise noted. SCC = Source Classification Code. ND = no data.
[b] Filterable PM is that PM collected on or prior to the filter of an EPA Method 5 (or equivalent) sampling train.
[c] Condensable PM is that PM collected in the impinger portion of a PM sampling train.
[d] Reference 1.
[e] References 3-5; for 90% clay, 10% pulverized coke; traveling grate, single pass, up-draft sintering machine.
[f] Based on data in Section 11.19-2.
[g] Reference 2; rotary dryer sinterer.

References For Section 11.8


1. *Air Pollutant Emission Factors, Final Report*, Resources Research, Inc., VA, prepared for National Air Pollution Control Administration, Durham, NC, under Contract No. PA-22-68-119, April 1970.

2. Communication between Resources Research, Inc., Reston, VA, and a clay sintering firm, October 2, 1969.

3. Communication between Resources Research, Inc., Reston, VA, and an anonymous air pollution control agency, October 16, 1969.

4. J. J. Henn, *et al.*, *Methods For Producing Alumina From Clay: An Evaluation Of Two Lime Sinter Processes*, U. S. Bureau Of Mines, Department Of Interior, Washington, DC, Report of Investigation No. 7299, September 1969.

5. F. A. Peters, *et al*., *Methods For Producing Alumina From Clay: An Evaluation Of The Lime-Soda Sinter Process*, U. S. Bureau Of Mines, Department Of Interior, Washington, DC, Report of Investigation No. 6927, 1967.