

Iron and Steel Production

Monitoring Checklist



Final Rule: Mandatory Reporting of Greenhouse Gases

What Must Be Monitored Under the Carbon Mass Balance Method?

**Measure these parameters on an annual basis
(unless otherwise noted)...**

For Each Taconite Indurating Furnace

- | | |
|---|--|
| <input type="checkbox"/> Mass of solid fuel combusted each month (metric tons) | <input type="checkbox"/> Average carbon content of greenball (taconite) pellets (percent by weight) |
| <input type="checkbox"/> Average carbon content of solid fuel (percent by weight) | <input type="checkbox"/> Mass of fired pellets produced by furnace each month (metric tons) |
| <input type="checkbox"/> Volume of gaseous fuel combusted each month (standard cubic feet [scf]) | <input type="checkbox"/> Average carbon content of the fired pellets (percent by weight) |
| <input type="checkbox"/> Average carbon content of gaseous fuel (kilogram [kg] C per kg of fuel) | <input type="checkbox"/> Mass of air pollution control residue collected each month (metric tons) |
| <input type="checkbox"/> Average molecular weight of gaseous fuel (kg/kg-mole) | <input type="checkbox"/> Average carbon content of air pollution control residue (percent by weight) |
| <input type="checkbox"/> Volume of liquid fuel combusted each month (gallons) | <input type="checkbox"/> Annual production quantity of taconite pellets (metric tons) |
| <input type="checkbox"/> Average carbon content of liquid fuel (kg C per gallon of fuel) | <input type="checkbox"/> Annual operating hours |
| <input type="checkbox"/> Mass of greenball (taconite) pellets fed to furnace each month (metric tons) | |

For Each Basic Oxygen Process Furnace

- | | |
|---|--|
| <input type="checkbox"/> Mass of molten iron charged to furnace each month (metric tons) | <input type="checkbox"/> Mass of molten steel produced by furnace each month (metric tons) |
| <input type="checkbox"/> Average carbon content of molten iron (percent by weight) | <input type="checkbox"/> Average carbon content of steel (percent by weight) |
| <input type="checkbox"/> Mass of ferrous scrap charged to furnace each month (metric tons) | <input type="checkbox"/> Mass of slag produced by furnace each month (metric tons) |
| <input type="checkbox"/> Average carbon content of ferrous scrap (percent by weight) | <input type="checkbox"/> Average carbon content of slag (percent by weight) |
| <input type="checkbox"/> Mass of flux materials (e.g., limestone, dolomite) charged to furnace each month (metric tons) | <input type="checkbox"/> Mass of air pollution control residue collected each month (metric tons) |
| <input type="checkbox"/> Average carbon content of the flux materials (percent by weight) | <input type="checkbox"/> Average carbon content of air pollution control residue (percent by weight) |
| <input type="checkbox"/> Mass of carbonaceous materials (e.g., coal, coke) charged to furnace each month (metric tons) | <input type="checkbox"/> Annual production quantity of steel (metric tons) |
| <input type="checkbox"/> Average carbon content of the carbonaceous materials (percent by weight) | <input type="checkbox"/> Annual operating hours |

For Each Non-Recovery Coke Oven Battery

- | | |
|---|--|
| <input type="checkbox"/> Mass of coal charged to battery each month (metric tons) | <input type="checkbox"/> Average carbon content of air pollution control residue (percent by weight) |
| <input type="checkbox"/> Average carbon content of coal (percent by weight) | <input type="checkbox"/> Annual production quantity of coke (metric tons) |
| <input type="checkbox"/> Mass of coke produced by battery each month (metric tons) | <input type="checkbox"/> Annual operating hours |
| <input type="checkbox"/> Average carbon content of coke (percent by weight) | |
| <input type="checkbox"/> Mass of air pollution control residue collected each month (metric tons) | |

For Each Sinter Process

- | | |
|---|--|
| <input type="checkbox"/> Volume of gaseous fuel combusted each month (scf) | <input type="checkbox"/> Average carbon content of sinter pellets (percent by weight) |
| <input type="checkbox"/> Average carbon content of gaseous fuel (kg c per kg fuel) | <input type="checkbox"/> Mass of air pollution control residue collected each month (metric tons) |
| <input type="checkbox"/> Average molecular weight of gaseous fuel (kg/kg-mole) | <input type="checkbox"/> Average carbon content of air pollution control residue (percent by weight) |
| <input type="checkbox"/> Mass of sinter feed material each month (metric tons) | <input type="checkbox"/> Annual production quantity of sinter (metric tons) |
| <input type="checkbox"/> Average carbon content of sinter feed material (percent by weight) | <input type="checkbox"/> Annual operating hours |
| <input type="checkbox"/> Mass of sinter produced each month (metric tons) | |

For Each Electric Arc Furnace

- | | |
|---|--|
| <input type="checkbox"/> Mass of direct reduced iron charged to furnace each month (metric tons) | <input type="checkbox"/> Average carbon content of carbonaceous materials (percent by weight) |
| <input type="checkbox"/> Average carbon content of iron (percent by weight) | <input type="checkbox"/> Mass of molten steel produced by furnace each month (metric tons) |
| <input type="checkbox"/> Mass of ferrous scrap charged to furnace each month (metric tons) | <input type="checkbox"/> Average carbon content of steel (percent by weight) |
| <input type="checkbox"/> Average carbon content of ferrous scrap (percent by weight) | <input type="checkbox"/> Mass of slag produced by furnace each month (metric tons) |
| <input type="checkbox"/> Mass of flux materials (e.g., limestone, dolomite) charged to furnace each month (metric tons) | <input type="checkbox"/> Average carbon content of slag (percent by weight) |
| <input type="checkbox"/> Average carbon content of flux materials (percent by weight) | <input type="checkbox"/> Mass of air pollution control residue collected each month (metric tons) |
| <input type="checkbox"/> Mass of carbon electrode consumed each month (metric tons) | <input type="checkbox"/> Average carbon content of air pollution control residue (percent by weight) |
| <input type="checkbox"/> Average carbon content of carbon electrode (percent by weight) | <input type="checkbox"/> Annual production quantity of steel (metric tons) |
| <input type="checkbox"/> Mass of carbonaceous materials (e.g., coal, coke) charged to furnace each month (metric tons) | <input type="checkbox"/> Annual operating hours |

For Each Argon-Oxygen Decarburization Vessel

- | | |
|--|--|
| <input type="checkbox"/> Mass of molten steel charged to vessel each month (metric tons) | <input type="checkbox"/> Mass of air pollution control residue collected each month (metric tons) |
| <input type="checkbox"/> Average carbon content of molten steel before decarburization (percent by weight) | <input type="checkbox"/> Average carbon content of air pollution control residue (percent by weight) |
| <input type="checkbox"/> Average carbon content of molten steel after decarburization (percent by weight) | |

For Each Direct Reduction Furnace

- | | |
|--|--|
| <input type="checkbox"/> Volume of gaseous fuel combusted each month (scf) | <input type="checkbox"/> Mass of iron produced each month (metric tons) |
| <input type="checkbox"/> Average carbon content of gaseous fuel (percent by weight) | <input type="checkbox"/> Average carbon content of iron (percent by weight) |
| <input type="checkbox"/> Average molecular weight of gaseous fuel (kg/kg-mole) | <input type="checkbox"/> Mass of non-metallic materials produced each month (metric tons) |
| <input type="checkbox"/> Mass of iron ore or iron ore pellets fed to furnace each month (metric tons) | <input type="checkbox"/> Average carbon content of non-metallic materials (percent by weight) |
| <input type="checkbox"/> Average carbon content of iron ore (percent by weight) | <input type="checkbox"/> Mass of air pollution control residue collected each month (metric tons) |
| <input type="checkbox"/> Mass of carbonaceous materials (e.g., coal, coke) charged to furnace each month (metric tons) | <input type="checkbox"/> Average carbon content of air pollution control residue (percent by weight) |
| <input type="checkbox"/> Average carbon content of carbonaceous materials (percent by weight) | <input type="checkbox"/> Annual production quantity of iron (metric tons) |
| <input type="checkbox"/> Mass of other materials charged to furnace each month (metric tons) | <input type="checkbox"/> Annual operating hours |
| <input type="checkbox"/> Average carbon content of other materials (percent by weight) | |

What Must Be Monitored to Determine Emissions from Coke Oven Pushing?

- Annual mass of coke produced (metric tons)
- Mass of coal charged to the coke ovens each month (metric tons)
- Annual operating hours

What are the Requirements for Using the Site-Specific Emission Factor Method?

- Conduct a performance test and measure CO₂ emissions from all exhaust stacks for the process and calculate the average hourly CO₂ emission rate (metric tons CO₂/hr).
- Calculate the site-specific emission factor for the process in metric tons of CO₂ per metric ton of feed or production, as applicable, by dividing the average hourly CO₂ emission rate during the test by the average hourly feed or production rate during the test.
- Measure the process production rate or feed rate, as applicable, during the test and calculate the average rate for the test period in metric tons per hour.
- Calculate CO₂ emissions for the process by multiplying the emission factor by the total amount of feed or production, as applicable, for the reporting period.

Other Requirements for Using the Site-Specific Emission Factor Method:

The annual performance test must occur under representative performance (i.e., performance based on normal operating conditions) of the affected process. If your process operates under different conditions as part of normal operations in such a manner that CO₂ emissions change by more than 20 percent (e.g., routine changes in the carbon content of the sinter feed or change in grade of product), you must perform emission testing and develop separate emission factors for these different operating conditions and determine emissions based on the number of hours the process operates and the production or feed rate (as applicable) at each specific different condition. Specific performance test requirements for each process are listed in subpart Q of the rule.

What are the Monitoring Requirements for Using a CEMS?

Report the relevant information required under 40 CFR subpart C (General Stationary Fuel Combustion Sources) for the Tier IV calculation methodology.

See also the information sheet for Iron and Steel Production (EPA-430-F-09-018R) at: www.epa.gov/climatechange/emissions/downloads/infosheets/ironandsteelproduction.pdf.

This document is provided solely for informational purposes. It does not provide legal advice, have legally binding effect, or expressly or implicitly create, expand, or limit any legal rights, obligations, responsibilities, expectations, or benefits in regard to any person. This information is intended to assist reporting facilities/owners in understanding key provisions of the final rule.