



Emission Factor Guidance for NSR Regulated Pollutants

June 2024



State of Oregon
Department of Environmental Quality

This document was prepared by
Oregon Department of Environmental Quality
Air Quality Program Operations
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

Contact: Jill Inahara
Phone: 503-229-5696
800-452-4011
Fax: 503-229-6124
www.oregon.gov/deq



Translation or other formats

[Español](#) | [한국어](#) | [繁體中文](#) | [Русский](#) | [Tiếng Việt](#) | [العربية](#)
800-452-4011 | TTY: 711 | deqinfo@deq.oregon.gov

Non-discrimination statement

DEQ does not discriminate on the basis of race, color, national origin, disability, age, sex, religion, sexual orientation, gender identity, or marital status in the administration of its programs and activities. Visit [DEQ's Civil Rights and Environmental Justice page](#).

Disclaimer

This directive is intended solely as guidance for DEQ employees. It does not constitute rulemaking by the Environmental Quality Commission and may not be relied upon to create an enforceable right or benefit, substantive or procedural, enforceable at law or in equity, by any person. With written managerial approval, DEQ employees may deviate from this directive. DEQ anticipates revising this directive from time to time as conditions warrant.

Document development

Prepared By: Janice Tacconi
Janice Tacconi (Jul 29, 2024 08:21 PDT) Date: _____
Janice Tacconi

Reviewed By: Joshua Alexander Date: _____
Josh Alexander
Mark Bailey
Mark Bailey (Aug 19, 2024 17:09 PDT) Date: _____
Mark Bailey
Lisa Ball
Lisa Ball (Aug 19, 2024 17:19 PDT) Date: _____
Lisa Ball
Zachary J. Loboy
Zachary J. Loboy (Aug 21, 2024 12:49 PDT) Date: _____
Zack Loboy
Tim Wollerman Date: _____
Tim Wollerman

Signed By: Ali Mirzakhali Date: _____
Ali Mirzakhali

Translation or other formats

[Español](#) | [한국어](#) | [繁體中文](#) | [Русский](#) | [Tiếng Việt](#) | [العربية](#)
800-452-4011 | TTY: 711 | deqinfo@deq.oregon.gov

Non-discrimination statement

DEQ does not discriminate on the basis of race, color, national origin, disability, age or sex in administration of its programs or activities. Visit DEQ's [Civil Rights and Environmental Justice page](#).

Table of contents

1. Intent/Purpose/Statement of Need
2. Applicability
3. Summary
4. Background
5. Definitions
6. List of acronyms used in this IMD
7. Directive
8. List of Tables and/or Figures
9. Appendices
10. Record of Revisions to IMD

1. Intent/Purpose/Statement of Need

This Internal Management Directive is an update to the May 1, 2012, IMD based on experience gained in implementing that IMD. This IMD describes the procedure the Air Quality Division of DEQ will use to establish a consistent approach when determining emission factors to calculate emissions for permitted sources.

2. Applicability

This directive applies to Air Quality permit writers who are establishing or correcting baseline emission rates, netting bases and Plant Site Emission Limits for Air Contaminant Discharge Permits and Title V permits, which are used to track New Source Review applicability. New Source Review pollutants are those pollutants for which Significant Emission Rates have been established (OAR 340-200-0020). This IMD provides direction on selecting or calculating emission factors to calculate annual emissions. It does not address short term emissions rates or other emission calculation methods such as mass balance.

3. Summary

In DEQ's permitting program, the Plant Site Emission Limit (PSEL) program relies on use of emission factors to set facility wide pollutant emission limits. This IMD provides permit writers and the regulated community guidance on setting and verifying emission factors used to calculate PSELs. The guidance includes a presumptive hierarchy of the types of information that can be used for setting emission factors. It also provides guidance on the frequency of emission factor verification source tests based on type of facility and total pollutant emissions.

4. Background

EPA's 2008 national enforcement priority focused on three industry sectors: glass, cement and acid production. During their review EPA found inconsistencies with how DEQ has historically established baseline emission rates and requested DEQ establish clear instruction for permitting staff. In addition, EPA had concerns specifically over the practice of adding a cushion to emission level calculations.

Fundamental Plant Site Emission Limit concepts

PSELs (permitted emissions) and baseline emission rates (actual emissions during the baseline period) are annual values, calculated as 12 month rolling totals.

The goal of the emission calculations is to best estimate these annual rates. Process emissions may vary from day to day and an emission factor based on an average emission rate may over- or underestimate actual emissions. However, the average emission rate is still a better estimator of emissions over the long term. For this reason, emission factors should normally use an average value, rather than a value that is closer to the short-term worst case, for establishing PSELs and determining baseline emissions.

Sources determine compliance with their PSELs each month, frequently by using emission factors included in their permits along with the recorded monthly process parameters for the preceding month. Emission factors represent an average of a range of emission rates; some emissions units¹ may have emission rates greater than the emission factor and others may have emission rates less than the emission factor. Given the range in emission rates, emission factors are not enforceable permit limits. Source testing should be required to verify emission factors for larger emissions units but not as a compliance tool. Emission factors will be changed if warranted with new, more accurate data. Any change in emission factors will require an analysis of the applicability of any regulatory program, such as New Source Review/Prevention of Significant Deterioration or state New Source Review.

Past practice prior to May 1, 2012, was to add a 20% cushion or a standard deviation to source test data in the calculation of baseline emission rates and PSELs to account for process and test method variability. In recent years, this practice has not been used, although some permits still exist where average emission factors were augmented. EPA stated that because PSELs are based on annual emissions, not short-term emissions, an average of all representative source test data should be used without any cushion. Average source test data would be more representative of annual actual emissions.

The number of permits that have cushions built into their baseline emission rates and PSELs is unknown but is estimated to be low since the implementation of the 05/01/12 Emission Factor IMD. Removing the cushion from the calculation of these values should lower both the baseline emission rate and the PSEL proportionately but there may be implications for previous applicability determinations. The removal of the cushion should also lower the default fees that are assessed for Title V sources if they pay on their PSELs rather than actual emissions.

¹ Emissions units for Title V sources, device or activity for ACDP sources.

5. Definitions and References

[AP - 42 Vol. I Introduction, www.epa.gov/ttnchie1/ap42/c00s00.pdf](http://www.epa.gov/ttnchie1/ap42/c00s00.pdf)

Recommended Procedures for Development of Emissions Factors and Use of the WebFIRE Emissions Factor Database, EPA-454/R-XX-XXX REVISED DRAFT REPORT, http://www.epa.gov/ttn/chief/efpac/procedures/procedures_draft122010.pdf

40 CFR Part 60 Standards of Performance for New Stationary Sources Subpart A – General Provisions; 60.14 Modification.

http://edocket.access.gpo.gov/cfr_2010/julqtr/pdf/40cfr60.14.pdf

40 CFR Part 60 Appendix C—Determination of Emission Rate Change,

http://edocket.access.gpo.gov/cfr_2004/julqtr/pdf/40cfr60.c.pdf

Plant Site Emission Limits - OAR 340, division

222 New Source Review - OAR 340, division 224

Definitions - OAR 340, division 200

6. Acronyms Used in This Directive

<u>Acronym</u>	<u>Complete word/phrase</u>
CEMS	Continuous emissions monitoring
system CO	Carbon monoxide
CO ₂	Carbon dioxide
5 yr	Emission factors that should be tested once every five (5) years. If there is no previous data, two source tests are required during the permit term, separated by at least one year, until three tests are complete. If there is any reason to believe an emissions unit has changed or degraded, additional source testing may be required.
EF	Emission Factor
FSA	Fuel sampling and analysis - based on supplier's
certificate IPT	Initial performance test only
MB	Material balance
NA	Not applicable, emission factors that are not expected to be verified during the life of the permit.
NO _x	Nitrogen oxides
NSR	New Source Review
PEMS	Predictive emissions monitoring
system PM	Particulate matter
PM ₁₀	Particulate matter less than 10
microns PM _{2.5}	Particulate matter less than 2.5
microns PSD	Prevention of Significant
Deterioration PTE	Potential to emit
SO ₂	Sulfur dioxide
VOC	Volatile organic compound

7. Directive

Using the procedures in the Methods section of this directive, permit writers should:

- Update emission factors immediately if the new source test data shows an applicable requirement is triggered and determine whether enforcement action is warranted;
- Update emission factors at permit renewal when new representative source test data is available if no new applicable requirement is triggered.
- Follow the hierarchy of the different type of information used to select emission factors;
- Make corrections whenever they discover that a baseline emission rate or PSEL has not been calculated consistent with this IMD; and
- Include source test requirements in new permits and permit renewals based on the guidance in Table 1 of this directive.

8. Methods

Calculating Emissions

There are a number of options for selecting an emission factor, but it is ultimately a case-by-case determination. Permit writers must select the method that best approximates PSELs and is used to calculate potential emissions for permitting and actual emissions on an annual basis. The following list is a presumptive hierarchy of the types of information that should best approximate actual emissions, but each individual case may be different:

1. Continuous Emissions Monitoring System data
2. Source test data
3. Source test data from similar equipment
4. Vendor specifications or guarantees
5. Trade or technical association data (e.g., National Council for Air and Stream Improvement, National Particleboard Association, etc.)
6. DEQ emission factors
7. Compilation of EPA Air Pollutant Emission Factors (AP-42 or Webfire)
8. Other state or regional air quality department-published emission factors
9. Engineering judgment based on sound assumptions about the source type, industry, or site-specific conditions

When emission factors are used to calculate emissions, the following approach explains the above hierarchy in more detail and should be used to improve the consistency and correctness of the baseline emission rates, PSELs, and actual emissions:

- Use all site-specific source test data whenever available, even if it is only one test, provided that it is representative of the process during the time period under consideration.

No correction, cushion (20%), or standard deviation should be added to the emission factor.² Removal of a cushion may require re-review of old source test reports.

- If a process has different emissions based on changes to raw materials, products or operating conditions, emission factors may be needed for each operating condition. This would require establishing multiple emission factors and tracking the amount of time operated under each process/product.
- If representative source-specific data cannot be obtained, emissions information from equipment vendors, particularly emission performance guarantees or actual test data from similar equipment is typically a better source of information for permitting decisions than trade or technical association data, DEQ emission factors, or AP-42. Because vendor guarantees may represent a maximum emission rate, source tests should be required to validate the emission factor and potentially adjust it, if needed.
- If no emissions information from equipment vendors or actual test data from similar equipment is available, emission factors from trade or technical association data, DEQ, other state or regional air agencies, or AP-42 should typically be used. Whenever emission factors are used, permit writers should be aware of their limitations in accurately representing a particular facility. The risks of using emission factors in such situations should be evaluated against the costs of further testing or analyses. See the documents in the References section for discussion of emission factor variability.
 - The source should propose whichever they believe is most representative of their process. If a range of emission factors is provided, use the arithmetic mean of the range to set the baseline emission rate and the PSEL.
 - If AP-42 emissions factors have a low rating, such as D or below, alternate published emission factors may be preferred.
 - Also, if more recently updated emission factors are available, those may be preferred over AP-42 or DEQ emission factors.
 - The permit writer should question emission factors where published emission factors from different literature sources are very different from one another, especially if the use of one or the other results in an inflated baseline emission rate.
 - If the source proposes an emission factor that appears to be inappropriate or invalid, then it should be backed up with additional technical support or source test data.
 - If there is an equipment specific emission limit, the PSEL could be based on that (i.e. 0.1 lb/MMBtu NO_x, 30 day average).
- The reference for the emission factors should be documented in great detail. Clearly explaining where the emission factor came from will help the next permit writer understand the basis of the emission factor.
- Changes to the emission factors establishing the baseline emission rate, netting basis and the PSEL should typically be done at permit renewal unless an applicability determination such as NSR/PSD changes the source's status.

² For NAAQS modeling, facilities may use maximum emission rates so that they are not required to re-run the model if a source test indicates emissions are above the average emission factor. The emission factors used in modeling must not be less than those used for PSEL compliance; however, higher emission factors used in modeling may be appropriate, especially for modeling short term impacts.

How to Establish Emission Factors from CEMS data

- If a facility has a CEMS, the PSEL will be determined using the maximum 12 month rolling average emission factor with PTE production quantity or throughput. The 12 month rolling average emission factor should be calculated from existing CEMS data from the last ten years (if available), by dividing the CEMS data in pounds per month emitted by the actual monthly production or throughput. An average EF for a shorter time period may not be adequate for PSEL determination because there is too much variability. PSEL compliance should be based on CEMS data. The source will need to use airflow monitoring or an “F- factor” (for combustion units) to convert the CEMS data from concentrations to pounds per hour. If airflow monitoring is not available, it may be possible to substitute the last source test airflow value or an average of recent source tests if the airflow is not highly variable.

How to Use Source Test Data

As with calculating emissions, there are a number of options for using source test data, and it is ultimately a case-by-case determination. The following procedures are recommended for most situations, but an individual case may be different:

- If the baseline emission rate or PSEL is set from source test data, the arithmetic mean (average) of all source test data that is representative of the period should be used.
- Over time, the emissions from an emissions unit may change due to ongoing routine maintenance, improved operation, or degradation due to aging. Even though the emissions unit has not been physically modified since the baseline period, current emissions may be different enough from baseline emissions that earlier source tests are more applicable to the baseline period and later source tests are more applicable to current operations.
- For emissions units that are tested on a frequent schedule, such as quarterly, no more than 10 years of data should be used in the emission factor calculation.
- If the emissions unit is only tested once every five years or less, all valid source test data should be used to calculate the emission factor, unless the process has changed or been modified in a way that changes the emissions.
- The permit writer must assess whether a source test is valid for use in determining the emission factor. Test irregularities or process irregularities could result in test results that are not representative of normal operation. Source test coordinators can help evaluate the validity of the source test for determining the emission factor.
- For sources with variable operations (e.g., different raw materials, different fuels, different products), there is sometimes a need to develop multiple emission factors to use in PSEL compliance reporting (e.g., EF1 for product 1, EF2 for product 2). In other cases, where the variability in operations is hard to reduce to a few emission factors, a source test should be conducted under worst case conditions to develop an emission factor that is conservatively representative of the source’s operations.

When to update Emission Factors Based on New Source Test Data

- At each permit renewal, the permit writer should add new source test data to the review report and calculate a revised arithmetic mean of the representative source test results to determine the emission factor. The emission factor in the permit should be updated at every renewal when new source test data is available.
- If the source test data shows that an applicable requirement has been triggered, revision of the emission factors should be done immediately to determine whether a potential enforcement action is necessary.
- For sources that must do additional compliance testing (not EF verification testing), this data should be evaluated to see if the emission factor should be updated.

Emission Factor Revisions

- Modeling required because of NSR/PSD may need to be redone if the emission factor increases due to new source test data and enforcement may be warranted. In most cases, PSEs set as a result of NSR/PSD cannot be changed without re-opening the NSR/PSD permit and revising the air quality analysis.
- Note that General ACDPs have established emission factors, with a few exceptions. In this case, a site specific emission factor should be set if the source test indicates the emission factor is at least +/-10% from the emission factor in the permit. This may require the facility to get a Simple ACDP since the emission factors in the General ACDP cannot be changed, although some General ACDPs may allow use of alternate emission factors with DEQ approval.

Emission Factor Verification Source Test Frequency

Table 1 at the end of this IMD includes emissions units and the recommended source test frequency for emission factor verification testing. The emission thresholds are the Plant Site Emission Limits contribution for that emissions unit from the detail sheets of the review report. Controlled emissions represent emissions from units with add-on pollution control equipment. The source test would be used to verify the emission factor and could be the basis for adjusting the emission factor during permit renewal or through a permit modification and potential enforcement action if the source's status changes.

Source testing is not recommended for most emissions units with PTE of less than 10 tons per year (or 5 tons per year for particulate matter), unless there is reason to believe the emissions unit is not operating in compliance with an emission limit, could contribute to an exceedance of regulatory program thresholds, or no representative data is available. Additional source testing is strongly recommended at the frequency in Table 1 if there is any reason to believe an emissions unit has changed or degraded. For pollutants with an SER less than 10 tons per year, source testing at lower emission levels may be warranted.

Considerations for Emission Factor Verification Source Tests

- Emission factor verification testing is not recommended for all emissions units due to the cost of testing. There may be little value in testing smaller emissions units and for emission unit types that have been extensively tested.
- For equipment with poor quality or no published emission factors or source test data from similar equipment, emission factor verification testing may be warranted more frequently than that listed in Table 1.
- If there isn't any data that is representative of the current configuration of the emissions unit, then the source should conduct at least one emission factor verification test to establish an emission factor for purposes of the PSEL. More testing or the requirement to use a CEMS may be necessary if the emission data is highly variable.
- Process variations (e.g., different products, different operational rates/loads) and seasonal variations (e.g., wet fuel versus dry fuel in a wood fired boiler) that significantly affect the emissions rate should be considered when determining the scope of emission factor verification testing. Source testing at the worst-case emitting scenario may overestimate emissions but is a simpler way to determine potential to emit rather than testing at different scenarios and tracking operation in each scenario.
- For emissions units with several emission factor verification tests that show little variation, testing at a lower frequency than listed in Table 1 would be appropriate.
- Even if no emission factor verification test is recommended, a compliance test for an emission limit may be appropriate (i.e., grain loading testing for PM).
- If the facility is close to a permitting limit (such as becoming a major source or triggering NSR/PSD), additional testing beyond the Table 1 guidelines may be appropriate.
- For some equipment such as turbines, testing at various loads and/or startup and shutdown periods may be appropriate.
- If a Title V facility opts to develop verified emission factors for fee purposes, additional testing will be needed to qualify the process for use of verified emission factors.

How to Use Published Emission Factors

Emission factors may be available from a variety of sources, and the applicability and quality of the published emission factors must be evaluated. Published emission factors that use source tests from multiple facilities are preferable. AP-42 updated emission factors and South Coast Air Quality Management District (SCAQMD) emission factors are generally acceptable. Where AP-42 emission factors have not been updated but trade organizations have developed and maintained more recent emission factors from recent source tests, the trade organization emission factor would be preferable. When using published emission factors, the arithmetic mean of any published data should be used.

Note: reference the exact table (i.e., AP-42 10.6.2-2) and any selected variables used to calculate an emission factor (i.e., silt loading for roads) in the emission detail sheets.

Applicability Determinations

If DEQ receives a new source test report with an emission factor that is higher than the existing emission factor, the permit writer should reevaluate previous applicability determinations such as:

- New Source Review/Prevention of Significant Deterioration;
- NESHAP;
- NSPS;
- Permit type; or
- PSEL modeling analysis.

If the analysis shows that an applicable requirement is triggered, DEQ should determine whether or not the owner or operator violated terms of the permit or regulations in effect at the time of construction or modification, based on the revised emission factor. Emission factors are not enforceable limits; therefore, source test data showing an emission factor higher than that in the permit does not trigger enforcement action unless an applicable requirement is triggered. This applicability review should be conducted as soon as possible after receipt of the source test report. The permit writer should refer to the Enforcement Guidance for Field Staff to determine next steps for enforcement and consult with the Office of Compliance and Enforcement as needed.

Freezing Baseline

- The concept of “freezing” the baseline emission rate was taken out of the rules in 2011. The current definition of “baseline emission rate” in OAR 340-222-0048 contains the following regarding changes:
 - (6) The baseline emission rate will be recalculated only under the following circumstances:
 - (a) For greenhouse gases, if actual emissions are reset in accordance with OAR 340-222- 0051(3);
 - (b) If a material mistake or an inaccurate statement was made in establishing the production basis for the baseline emission rate;
 - (c) If a more accurate or reliable emission factor is available; or
 - (d) If emissions units that were previously not included in baseline emission rate must be included as a result of rule changes.In effect, the production basis is frozen (except for material mistakes or inaccurate statements) but correcting emission factors is allowed.
- When setting the baseline emission rate, the same emission factor should be used for the baseline period and the PSEL as long as no changes were made to the emissions unit after the baseline period.
 - It is not always possible to tell what changes have been made to the emissions unit since baseline to know whether the source test data after the baseline date is applicable to the baseline period. If available information indicates the baseline emission rate was set incorrectly, the permit writer should make corrections.
 - Often emissions units have been changed enough that subsequent source tests would not represent baseline emissions and therefore should not be used to set the baseline emission rate.

- If a control device has been added, inlet/outlet source testing could be required to establish the baseline and current emission factors. The inlet data would be used to establish the baseline emission rate and the outlet data would be used to establish current emissions.

In cases where changes have been made since the baseline period, AP-42 or literature data may have to be used to set the baseline emission rate. Source test data since the modification can then be used to set the PSEL.

Example 1. New source test data, determining if applicability changes.

In this case, the only CO emissions from the source were previously assumed to be from natural gas combustion. A source test to verify the CO emissions indicated that the process generated much higher CO emissions than from natural gas combustion, so the emission factor was corrected. With total PTE of 587 tons/year, as shown below, the facility went from a Generic PSEL of 99 tons/year CO to becoming a Title V facility with over 100 tons/year and triggered PSD.

CO Emissions

EU Process	Prior Permit EF	ST Result EF	Production (tons)	Prior Emissions PTE (tons/yr)	Emissions w/ST EF (tons/yr)
	(lb/MMCF natural gas)	(lb/ton product)			
Rotary coarse	84	54.1	10737	20	290
Flameblown	84	376.9	586	2	110
Rotary fine	84	230.2	1616	3	186
			Total	25	587

8. List of tables and/or figures

Table 1. Emission Factor Verification Source Test Frequency

Facility Category	Emission Unit Category	Pollutant	Uncontrolled emission units		Controlled emissions unit
			<10 tons (PM<5 tons)	>10 tons (PM>5 tons)	
Steam Generating Units/Boilers	Boiler – hogged wood, sanderdust or mixed biomass (existing ¹)	PM/PM ₁₀ /PM _{2.5} , SO ₂ , NO _x , CO, VOC	NA	5 yr	5 yr.
	Boiler – hogged wood, sanderdust or mixed biomass (new ¹)	NO _x	NA	CEMS>40 tons or 5 yr.	CEM
		PM/PM ₁₀ /PM _{2.5} , SO ₂ , CO, VOC	NA	5 yr	5 yr

Facility Category	Emission Unit Category	Pollutant	Uncontrolled emission units		Controlled emissions unit
			<10 tons (PM<5 tons)	>10 tons (PM>5 tons)	
	Boiler – natural gas (<100 MMBtu/hr heat input)	PM/PM ₁₀ /PM _{2.5} CO, NO _x , VOC, SO ₂	NA	NA	5 yr
	Boiler – natural gas (>100 MMBtu/hr heat input)	NO _x ,	CEMS/PEMS or 5 yr		
		PM/PM ₁₀ /PM _{2.5} , SO ₂ , CO, VOC	NA	IPT	5 yr
	Boiler - oil and coal (existing ¹)	PM/PM ₁₀ /PM _{2.5} , CO, NO _x , VOC	NA	5 yr	5 yr
		SO ₂	NA	FSA ₁	5 yr
	Boiler - oil and coal (new ¹)	SO ₂ , NO _x , CO	CEMS/PEMS or 5 yr		
		PM/PM ₁₀ /PM _{2.5} , VOC	NA	5 yr	5 yr
	Boiler – biogas, syngas or biochar	NO _x , CO,	IPT	5 yr	5 yr
		SO ₂	IPT/FSA	5 yr/FSA	5 yr
		PM/PM ₁₀ /PM _{2.5} , VOC	NA, IPT (solid fuels only)	IPT	IPT
Wood Products	Dryers - steam	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		VOC	NA	5 yr	5 yr
	Dryers – direct fire and boiler exhaust gas	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		VOC, NO _x , CO	NA	5 yr	5 yr
		SO ₂	FSA	FSA	5 yr
	MDF, Particleboard, Hardboard or OSB Press Vents	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		VOC	NA	5 yr	5 yr
	Plywood Press, Board Coolers, LVL Press	PM/PM ₁₀ /PM _{2.5} , VOC	NA	NA	NA
	Material handling (cyclones and baghouses, other point sources)	PM/PM ₁₀ /PM _{2.5}	NA	NA	NA
	Surface coating	VOC	NA	MB	5 yr
	Pyrolysis units	VOC	NA	5 yr	5 yr
	Fugitive emissions - chip and fuel piles	PM/PM ₁₀ /PM _{2.5} , VOC	NA	NA	NA
	Lumber Kiln	PM/PM ₁₀ /PM _{2.5} , VOC	NA	NA	NA
	Fugitive emissions - road dust	PM/PM ₁₀ /PM _{2.5}	NA	NA	NA
Food or Grain or other Agricultural processing	dryers, fryers, cookers, roasters	PM/PM ₁₀ /PM _{2.5} , CO, NO _x , SO ₂ , VOC	NA	5 yr	5 yr
	Bakery Ovens	VOC	NA	5 yr	5 yr
Asphalt plants	Drum dryers	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		CO, NO _x , SO ₂ , VOC	NA	IPT	5 yr.
	Silos	PM/PM ₁₀ /PM _{2.5}	NA	NA	NA
		VOC	NA	NA	NA
	Fugitives - material handling and road dust	PM/PM ₁₀ /PM _{2.5}	NA	NA	NA

Facility Category	Emission Unit Category	Pollutant	Uncontrolled emission units		Controlled emissions unit
			<10 tons (PM<5 tons)	>10 tons (PM>5 tons)	
Electric generating combustion turbines	Simple cycle and combined cycle	NO _x , CO	NA	CEMS or 5 yr	CEMS or 5 yr
		PM/PM ₁₀ /PM _{2.5}	NA	NA	5 yr
		SO ₂	NA	FSA/5 yr	5 yr
		VOC	NA	5 yr	NA
Gas Turbines	Gas Turbines - natural gas	PM/PM ₁₀ /PM _{2.5}	NA	NA	5 yr
		CO	NA	5 yr	5 yr
		NO _x	NA	5 yr	5 yr
		VOC	NA	NA	NA
		SO ₂	FSA	FSA	NA
Pulp and Paper	Recovery furnaces	PM/PM ₁₀ /PM _{2.5}	5 yr	5 yr	5 yr
		NO _x	NA	CEMS>40 tons or 5 yr.	CEMS
		CO, VOC, SO ₂	NA	5 yr	5 yr
	Recovery furnace	TRS	CEMS	CEMS	CEMS
	Lime Kiln	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		CO, NO _x , VOC, SO ₂	NA	5 yr	5 yr
		TRS	CEMS	CEMS	CEMS
	Smelt dissolving tank vents	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		TRS	NA	5 yr	5 yr
	Misc. vents	TRS	NA	5 yr	5 yr
	Non-condensable gas incinerator	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		CO, NO _x , VOC, SO ₂	NA	5 yr	5 yr
		TRS	NA	5 yr	5 yr
	Paper Machines	PM/PM ₁₀ /PM _{2.5}	NA	NA	NA
		CO, NO _x , VOC, SO ₂	NA	NA	NA
		TRS	NA	NA	NA
	Bleach Plants	VOC	NA	5 yr	5 yr on control device
Incinerators	Municipal waste combustors	See OAR 340-230-0340			
	Hospital waste	See OAR 340-230-0410			
	Crematories	See General Permit			
	Air Curtain Incinerators	See General Permit			
	Sewage sludge	NO _x	NA	CEMS>40 tons or 5 yr.	CEMS
		PM/PM ₁₀ /PM _{2.5} , SO ₂ , CO, VOC	NA	5 yr	5 yr
Primary and secondary smelting of metals	Dryers	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		CO, NO _x , SO ₂ , VOC	NA	5 yr	5 yr.
	Electric arc furnace	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		CO, NO _x , VOC, SO ₂	NA	5 yr	5 yr

Facility Category	Emission Unit Category	Pollutant	Uncontrolled emission units		Controlled emissions unit
			<10 tons (PM<5 tons)	>10 tons (PM>5 tons)	
	Reheat furnace	PM/PM ₁₀ /PM _{2.5} , CO, NO _x , VOC, SO ₂	NA	5 yr	5 yr
	Pot rooms/roof vents	PM/PM ₁₀ /PM _{2.5}	NA	NA	5 yr
		Fluoride	NA	NA	5 yr
		CO, NO _x , VOC, SO ₂			
	Acid Etching	NO _x , fluorides ²	NA	5 yr	5 yr
Surface coating	Entire process	VOC	NA	MB	MB, 5 yr on control device
Fiberglass Production	Entire process	VOC	NA	NA	5 yr on control device
Chemical manufacturing	reactors and other process equipment	VOC	NA	5 yr	5 yr
Printing	presses and dryers	VOC	NA	5 yr	MB, 5 yr on control device
Asphalt roofing	converters	VOC	NA	5 yr	MB
Engines, diesel	Non-emergency engines & emergency engines	PM/PM ₁₀ /PM _{2.5}	NA	5 yr	5 yr
		CO, NO _x , SO ₂ , VOC	NA	FSA/5 yr	5 yr
Engines, gas or landfill gas	Non-emergency engines	PM/PM ₁₀ /PM _{2.5} , CO, NO _x	NA	5 yr	5 yr
		SO ₂ , VOC	NA	5 yr	5 yr
Kilns: Cement or mineral	Kiln	PM/PM ₁₀ /PM _{2.5} , CO, NO _x , VOC, SO ₂	NA	5 yr	5 yr
Soil remediation		VOC	NA	5 yr	MB, 5 yr on control device
Electronics	entire process	VOC	NA	MB	MB, 5 yr on control device
		Fluorides	IPT	5 yr	IPT or 5 yr
All Other	Any process not listed above	PM/PM ₁₀ /PM _{2.5} , CO, NO _x , VOC, SO ₂	NA	5 yr	5 yr

¹ Existing and new are defined in the applicable New Source Performance Standard for the emissions unit. Wherever CEMs are listed in this table (excluding pulp and paper emissions units), monitoring requirements included in the applicable NSPS or acid rain rules should be reviewed.

² Testing may also include HCl, HNO₃ or HF.

Table Acronyms

FSA Fuel Sulfur Analysis

IPT Initial Performance

Test MB Mass Balance

10. Record of Revisions to IMD

Revision	Date	Changes	Editor
	5/1/2012	Updated with EPA guidance on removing cushion from emission factors	Jill Inahara
	12/18/2023	Updated to new template, updated Table 1 test frequencies and clarified emission factor changes.	Janice Tacconi