



# State of Oregon Department of Environmental Quality

## Instructions for Using Emission Factors

DEQ has compiled some of the more commonly used emission factors to assist the applicant with estimating pollutant emissions related to their processes. In doing so, DEQ does not guarantee the accuracy of the emission factors. Source-specific emissions data from continuous emissions monitoring systems (CEMS), material balances, or source testing (stack tests) should always be used instead of generic emission factors; unless it has been determined that the actual emissions data is not representative of current or future source operations. When actual emissions data are not available, emission factors can be used to estimate the emissions keeping in mind the limitations of the emission factor and possible repercussions of inaccurate estimations.

### What is an emission factor?

An emission factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (e.g., pounds of particulate matter emitted per ton of rock crushed). Such factors facilitate estimation of emissions from various sources of air pollution. In most cases, these factors are simply averages of all available data of acceptable quality, and are generally assumed to be representative of long-term averages for all facilities in the source category (i.e., a population average). The general equation for emission estimation is:

$$E = A \times EF \times (100 - ER / 100)$$

where:

E = emissions,  
A = activity rate,  
EF = emission factor, and  
ER = overall emission reduction efficiency, %

In most cases, emission factors are based on some actual emission data representative of the source category as a whole. However, emission factors can also be based on engineering estimates, extrapolation from similar processes, material balances, very limited data, and various other techniques. As such, not all emission factors provide the same level of confidence for the final emission estimation. Even in situations where there may be considerable data available, the emission factor still only represents the average emissions for the process and may not provide a very good estimate of actual emissions over a short period of time; especially if there are any process variations that significantly affect the emissions rate.

For significant sources of pollutant emissions (emissions units with emissions greater than 10 tons per year except for particulate, which is 5 tons per year) at larger sources (e.g., those with Standard ACDPs or Title V permits), DEQ will usually<sup>1</sup> require that a source test be performed during the permit term to verify that the emission factor used to establish the PSEL is reasonable. If there are three source tests for individual pieces of equipment in an emissions unit that are representative of the current configuration of the emissions unit, no further source testing is required for emission factor verification. If there are less than three source tests, one source test during the permit term is required. If there is no previous data,

two source tests are required during the permit term until three tests are complete. If there is any reason to believe an emissions unit has changed or degraded, additional source testing is required at the frequency stated above until three tests are complete.

If it is shown that actual emissions are considerably higher than estimated, it may be necessary to modify the permit. Of particular concern would be a new or modified source in which the estimated emissions increase using an emission factor was only slightly below the significant emission rate for a pollutant and it is later discovered that the emissions increase is greater than the significant emission rate. In this case, the source should have performed a New Source Review (NSR) or Prevention of Significant Deterioration (PSD) analysis prior to beginning operations. Failure to do the proper analysis up front could result in enforcement action.

For smaller sources of emissions (e.g., most rock crushers, ready-mix concrete plants, feed, grain, and seed facilities), the recognized emission factors are probably sufficient for estimating emissions and establishing Plant Site Emission Limits.

For a more complete discussion of emission factors, refer to the Introduction of EPA's AP-42.

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<sup>1</sup> The feasibility of conducting testing should be considered before requiring testing. For instance, PM<sub>2.5</sub> testing is not recommended for wet stacks or small stacks that physically cannot accommodate the PM<sub>2.5</sub> sizing apparatus.

## Common Emission Factors

Emission factors can be obtained from EPA's AP-42 and WebFIRE on the internet at: [WebFire Search | US EPA](#). Many industry groups also provide technical assistance for determining appropriate emissions factors. Some of the more common emission factors are provided in the following forms:

Form Number	Description
AQ-EF01	Feed and Seed Processes
AQ-EF02	Wood products
AQ-EF03	Wood products PM <sub>10</sub> and PM <sub>2.5</sub> fractions
AQ-EF04	Oil fired boilers
AQ-EF05	Gas fired boilers
AQ-EF06	Asphalt and aggregate industries
AQ-EF07	Portable power generators
AQ-EF08	PM <sub>2.5</sub> fractions of PM <sub>10</sub>
AQ-EF09	HAP and VOC Emission Factors for Lumber Drying

## Alternative formats

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email [deqinfo@deq.state.or.us](mailto:deqinfo@deq.state.or.us).