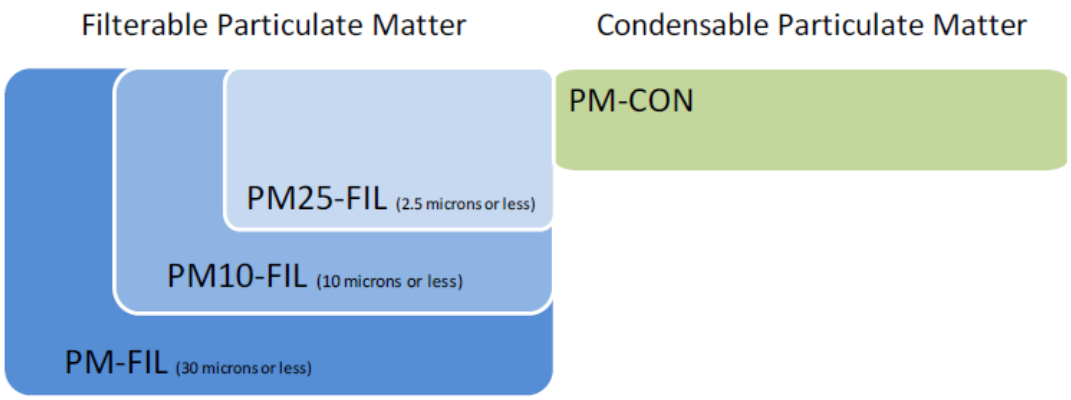
PARTICULATE MATTER (PM)

Particulate matter (PM) is identified in two different categories - filterable and condensable. The easiest way to visualize these categories is to imagine a stack testing sampling train where exhaust gas first passed through a filter material and then through a condenser. Material captured on the filter is called "filterable particulate matter". Any material passing through the filter and captured by the condenser is called "condensable particulate matter".

There are three filterable PM particle size ranges used in the emission inventory; suspended particulate matter (30 microns or less), respirable particulate matter (10 microns or less), and fine particulate matter (2.5 microns or less). Smaller micron particles are a subset of the larger sized particles. Therefore, if reporting fine particulate matter ($PM_{2.5}$) emissions, also report respirable particulate matter (PM_{10}) and suspended (PM) emissions. Another consideration is that PM_{10} and PM emissions must be greater than or equal to the $PM_{2.5}$ emissions reported. Likewise, if reporting PM_{10} emissions, you should also report the process's PM emissions. Again, the PM emissions must be greater than or equal to the PM_{10} emissions. These particulate fractions are not additive ($PM_{2.5} + PM_{10} \neq PM$).

Condensable PM (PM-CON) is typically present as a gas in stacks operating at an elevated temperature and condenses into liquid or solid particles smaller than 1 micron in diameter when cooled to near ambient conditions at the stack's exit. PM-CON may be present any time the stack's temperature is greater than the ambient temperature, but most notably in stacks from combustion processes. With the exception of flue gas desulfurization (FGD), most air pollution control devices designed to control particulates do not control condensable particulate matter emissions. As a result, condensable PM emissions can easily out-weigh the filterable particulate matter emissions at the stack's exit. PM-CON emissions must be reported if available.

The diagram below illustrates the various PM types and their relationship with each other.



Particulate Matter Codes:

Code	Represents
PM-PRI	PM_{30} Filterable (< 30 micron) + Condensable (no size distinction) Emissions
PM10-PRI	PM_{10} Filterable (< 10 micron) + Condensable (no size distinction) Emissions
PM25-PRI	PM_{25} Filterable (< 2.5 micron) + Condensable (no size distinction) Emissions
PM-FIL	PM_{30} Filterable Emissions (< 30 micron)
PM10-FIL	PM_{10} Filterable Emissions (< 10 micron)
PM25-FIL	PM_{25} Filterable Emissions (< 2.5 micron)
PM-CON	Condensable Particulate Emissions (no size distinction)

In the past, the Arkansas Department of Environmental Quality (ADEQ) has seen inconsistent use of emission factors and problems regarding PM reporting, which weakens data reliability in the inventory. Additionally, for PM-CON where data has not been provided by the facility, the USEPA has made their own condensable estimates and used those in their emission evaluations for modeling, risk assessment, and ultimately rule-making. Therefore, ADEQ is requesting continued special attention to reporting PM emissions. This is especially true for facilities having combustion sources, primary metals production processes, or secondary metals production processes where PM-CON emissions are expected to occur.

If available, more reliable estimating methods such as stack test data or vendor control device design guarantees are preferred over using AP-42 emission factors. If PM-CON stack test data has been collected using an appropriate EPA Reference Method, using those measured rates is the preferred method for creating a source-specific PM-CON emission factor. It is far better for facility estimates to be provided than it is for the USEPA to make them.

A combination of various estimation methods, such as AP-42 and the PM Calculator, may be needed to estimate PM filterable factions and condensable emissions when site-specific stack test data is not available.

Examples: (Mandatory minimum reported PM pollutants are shown in bold)

A) If a permitted process lists an emission limit for PM_{10}, emissions must be reported for **PM10-PRI** in addition to PM10-FIL and PM-CON (if available). Emissions must also be reported for **PM-PRI** and PM-FIL (if available) with PM-PRI emissions being equal to or greater than the PM10-PRI emissions

B) If a permitted process lists an emission limit for $PM_{2.5}$, emissions must be reported for **PM25-PRI** in addition to PM25-FIL and PM-CON (if available), **PM10-PRI** in addition to PM10-FIL (if available), and **PM-PRI** (as well as PM-FIL if it is available) with PM-PRI emissions being equal to or greater than the PM10-PRI emissions and PM10-PRI emissions being equal to or greater than PM25-PRI emissions

C) If a permitted process lists an emission limit for PM_{10} FIL, emissions must be reported for **PM10-PRI** in addition to **PM10-FIL** and **PM-CON** (where PM10-FIL + PM-CON = PM10-PRI). Emissions must also be reported for **PM-PRI** and **PM-FIL** (where PM-FIL + PM-CON = PM-PRI) with PM-PRI emissions being equal to or greater than the PM10-PRI emissions