



## Center for Agricultural Air Quality Engineering & Science

# AIR QUALITY REGULATIONS REGARDING PARTICULATE MATTER

### FACT SHEET

The Environmental Protection Agency (EPA) is responsible for creating, modifying and enforcing standards for air quality.

These standards, the National Ambient Air Quality Standards (NAAQS), regulate particulate matter (PM) in order to protect the public from adverse health effects. When the standard first came into being in 1971, total suspended particulate matter (TSP) was chosen as the size indicator for PM regulation. Over the last 20 years, the NAAQS for PM has been modified twice (1987 and 1997) to include size specific standards for PM<sub>10</sub> and PM<sub>2.5</sub>, respectively.

- PM<sub>10</sub> refers to the mass fraction of particles less than or equal to 10 micrometers (µm) in aerodynamic equivalent diameter (AED).
- PM<sub>2.5</sub> refers to the mass fraction of particles less than or equal to 2.5 µm AED.

Health effects studies conducted in the 1980s indicated adverse health effects could be more closely correlated with concentrations of smaller particles than with those represented by a TSP concentration. The American Conference of Governmental Industrial Hygienists separates particulate matter into three categories, including inhalable, thoracic and respirable particles (ACGIH, 1997).

- The inhalable fraction of particles can be described as all of the particulate matter in the air that can be taken in by the human respiratory system.
- The thoracic fraction of particles represents particles that can penetrate to the lower thoracic regions of the human respiratory system. In an effort to prevent adverse health effects caused by the coarse fraction of thoracic particles, the EPA established the PM<sub>10</sub> standard in 1987. As the standard for PM<sub>10</sub> was established, it included all particles less than or equal to 10 µm AED.
- In 1997, the EPA further modified the NAAQS to include a standard for PM<sub>2.5</sub> based on epidemiological studies which indicated a relationship between mortality rates and concentrations of respirable particles. The new PM<sub>2.5</sub> standard came under fire from the U.S. trucking industry and was detained in the federal court system for several years before it was finally implemented. The trucking industry (and others) founded their argument on the basis that PM<sub>2.5</sub> was already regulated by the PM<sub>10</sub> standard.
- Proposed PM coarse standard: The “coarse fraction” of thoracic particles refers to the mass fraction of particles between 10 and 2.5 µm AED. In an effort to more appropriately regulate the coarse fraction of thoracic particles, the EPA is proposing to introduce a new standard for PM Coarse, or PM<sub>10-2.5</sub>. This new standard, if adopted, will regulate the concentration of particulate matter between 2.5 and 10 µm. The intended goal of this standard is to regulate the size fraction of particles for which the PM<sub>10</sub> standard was intended. The proposed concentration limit for the new PM<sub>10-2.5</sub> standard is 75 µg/m<sup>3</sup> on a 24-hour-average basis. The basis for this concentration limit can be found by subtracting 10 µg/m<sup>3</sup> from the difference in the current PM<sub>2.5</sub> and PM<sub>10</sub> standards of 65 and 150 µg/m<sup>3</sup>, respectively ((150 – 65) - 10) = 85 – 10 = 75 µg/m<sup>3</sup>).



Texas Agricultural Experiment Station  
THE TEXAS A&M UNIVERSITY SYSTEM

### References:

American Conference of Governmental Industrial Hygienists (ACGIH). 1997. 1997 Threshold Limit Values and Biological Exposure Indices. Cincinnati, OH: ACGIH.