

Definitions of Respirable Fraction Nov 2009

The ISO (International Standards Organisation), ACGIH (American Conference of Governmental Industrial Hygienists) and CEPN (European Committee for Standardisation) formally agreed in 1993 on a convention to classify airborne particles into different aerosol fractions based on the penetration of these particles in the various regions of the respiratory tract.

These are described in Nieboer et al. (2005)

“Inhalable aerosol fraction” is the fraction of total airborne particles that enters the body through the nose and/or mouth during breathing. This fraction corresponding to particles with aerodynamic diameter (d_{ae}) $\leq 100 \mu\text{m}$ is relevant to health effects anywhere in the respiratory tract such as rhinitis, nasal and lung cancer and systemic effects.

“Thoracic aerosol fraction” is a sub fraction of the inhalable fraction [$d_{ae} < 30 \mu\text{m}$] composed of particles that can penetrate into the tracheo-alveolar region of the lung and is important for asthma, bronchitis, and lung cancer “

Respirable aerosol fraction” (or alveolar fraction) is the sub fraction of the inhaled particles [$d_{ae} < 10 \mu\text{m}$] that penetrates into the alveolar region of the lung (i.e., includes the respiratory bronchioles, the alveolar ducts and sacs) and is pertinent to the development of such chronic diseases as pneumoconiosis and emphysema.

American Conference of Governmental Industrial Hygienists (ACGIH) 1993. Threshold limit values for chemical substances and physical agents. ACGIH, Cincinnati, Ohio.

European Committee for Standardisation (CEN) 1993. Workplace atmospheres – Size fraction definitions for measurement of airborne particles. CEN Standard EN 481, Brussels.

Nieboer, E., Thomassen, Y., Chashchin, V., Odland, J.O. 2005. Occupational exposure assessment of metals. JEM 7: 411-415.