Basic Principles of Safety – HVAC

Your Objectives:

At the end of the lesson, you should be able to understand how **HVAC**s play an important role at the workplace.

HVAC: Heating, **V**entilation and **A**ir **C**onditioning

Heating, _____ , and air conditioning (**HVAC**) is any one of several systems of interior and vehicular environmental comfort, the goal being to provide _____ thermal comfort and adequate and positively superior indoor air quality.

HVAC is integral to residential structures (single family homes, apartment buildings, hotels and senior-home living premises), medium to large industrial and office buildings, _____, as well as inside vehicles (cars, trains, aircraft, ships and submarines and other marine environments) and above all, in _____ and lab facilities, where safety and health is paramount.

A proper ventilation system makes up one of the most important factors in maintaining adequate indoor _____ quality in buildings. Ventilating, or ventilation (the "V" in HVAC), is the _____ of exchanging or substituting air in a given space so as to provide high-quality indoor air. Oftentimes, ventilation _____ to voluntary delivery of outside air into a building's indoor environment. Apart from introducing outside air, ventilation maintains consistent interior air circulation, preventing air stagnation. Either way, this involves _____ control, oxygen replenishment, and the removal of excess moisture and/or heat. Filtration gets

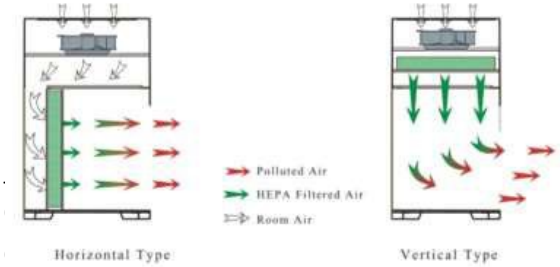
rid of undesirable odours, carbon dioxide and other gases and pollutants, but also possibly smoke, dusts, and last but not least, airborne [ ] .

HEPA (High Efficiency Particulate Air) filters are filters for capturing particulates from (interior and exterior) airflow, affecting the **depth filters** and then [ ] particles with an aerodynamic diameter of less than 1 µm. Particles include bacteria and viruses, pollen, mite eggs and excretion, soil and [ ], aerosols, and smoke biomass (e.g., wood, charcoal, dung, or crop residue, etc.)

Depending on the **separation efficiency**, particulate filters are divided into:

- High [ ] particulate filters, or ULPA (Ultra Low Penetration Air filter)
- HEPAs (High Efficiency Particulate Air filter)
- High-performance particle filters, or EPA (Efficient Particulate Air filter).

In



whereby

the higher the number, the higher the guaranteed degree of [ ] .

The European standard for the classification of particulate filters is EN 1822-1: 2009.

According to the known filter [ ] , performance particles of approx. 0.1 to 0.3 micrometres are the hardest to separate (MPPS = most penetrating particle size). Both [ ] and smaller particles are separated better depending on their physical properties.

Current standards classify EPA, HEPA and ULPA according to their effectiveness for these grain sizes using a test aerosol [ ] from di-2-ethylhexyl sebacate (DEHS). A distinction is made between the overall efficiency of the filter and the worst / weakest local point:

	Filter class	Degree of separation (total)	Degree of separation (local)
EPA	E10	> 85%	—
	E11	> 95%	—
	E12	> 99.5%	—
HEPA	H13	> 99.95%	> 99.75%
	H14	> 99.995%	> 99.975%
ULPA	U15	> 99.9995%	> 99.9975%
	U16	> 99.99995%	> 99.99975%
	U17	> 99.999995%	> 99.9999%

Particulate filter classes according to EN 1822-1: 2009

In contrast to the [ ] of the European standards, the United States only has the term HEPA with a fixed degree of separation. According to EN 1822-1: 1998, the degree of separation is [ ] to that of filter class H13. According to DOE-STD-3020-97, it is >99.97% for particles with a size of 0.3 µm.

Aufgabe Lückentext:

Folgende Wörter bitte in den Lückentext einfüllen.
Jedes Wort kommt einmal vor.
Bitte Gross- und Kleinbuchstaben beachten.

air, bacteria, both, comparable, dusts, effects, Europe, filtering, hospitals, larger, made, performance, process, refers, scope, separation, skyscrapers, temperature, ventilation