

That which belongs to the required knowledge with regard to respiratory protection masks and shall be explained:

Respiratory protection masks are not just respiratory protection masks, rather, under some circumstances they are vital items to be used in different forms for different purposes, such as the currently raging rampantly spreading corona disease, the countering of which requires special protective masks, labelled as FFP products and available for purchase. My recommendations for the use of respiratory protective masks are based on rational consideration, because only protective masks, when really worn and used for their intended purpose, can substantially protect against infection by pathogens.

1. There are three classes of suitable respiratory masks on the market – FFP1, FFP2 and FFP3, which reliably protect against aqueous and oily aerosols, smoke and fine dust, whereby the three FFP protection classes primarily differ with regard to their intended use in terms of protection and differ in the maximum accepted leakage. An 'overall leakage' corresponds to a test with regard to the filter passage and to leaks around the face and nose. On the other hand it ensures that long-term inhalation hazards can be usefully countered.

Respiratory protection masks must primarily protect against respirable fine dust, smoke and saliva droplets and against liquid mists or aerosols, but not against vapour and gas. The respiratory protection mask classes FFP1, FFP2 and FFP3 each provide respiratory protection according to the dependency of the 'overall leakage' as well as of the filtering of particle sizes up to 0.6μ for different pollutant concentrations. 'Overall leakage', as explained, means testing the filter passage and leaks around the face and nose.

a) It must be explained at the outset that, contrary to false and irresponsible claims by mask manufacturers, virologists and know-it-alls, etc., respiratory masks of class FFP1 in no way protect against viruses, but can only provide protection against fine dust particles, fungal spores, all kinds of particles, parasites and, depending on the mask design, against bacteria. Other claims are just window dressing, profit making or know-it-all attitude and so forth.

b) As already explained, the respiratory protection mask system is divided into three FFP classes, the abbreviation FFP stands for 'Filtering Face Piece'. A respiratory protection mask is formed such that it covers the nose and mouth and is composed of different filtering materials. They are useful wherever the maximum permissible concentration of harmful dust particles, smoke, saliva droplets and aerosols in the air we breathe is exceeded and causes health problems. If the limit is exceeded, then respiratory protection masks are just

as necessary and obligatory as in the case of any risk of infection in relation to diseases and rampantly spreading disease, such as influenza and now currently the rampantly spreading corona disease.

c) The protective properties of FFP respiratory protection masks are divided into 3 classes according to DIN EN 149 and as a rule are used as disposable masks to protect the respiratory tract. Used disposable masks are, as a rule, to be disposed of after use.

d) The designation EN 149 corresponds to the name of the European standard for tested FFP respiratory protection masks. These can be recognised by the EN 149 imprint and the CE mark printed on the mask. According to the European standard, the maximum total leakage, therefore the total leakage, which is directed inwards, is 22% for FFP1 masks, 8% for FFP2 masks and 2% for FFP3 masks.

e) FFP filter classes have different capacities, with FFP fine dust masks predominantly being used as half masks or full-face masks of class FFP1, but such masks do not protect against viruses, but reliably serve only to keep out fine dust particles and to protect the respiratory tract from dangerous aerosols of all kinds. In principle, however, FFP1 masks do not correspond to virus protection masks.

f) Respiratory protection mask filters of class FFP1, FFP2 or FFP3 are manufactured industrially, and their protection value depends particularly on the limit value of airborne pathogens.

g) In addition to their filtering performance, FFP masks differ in their features and can, for example, also have exhalation valve filters, whereby such a valve is particularly important when breathing resistance becomes too great due to material conditions.

h) Respiratory protection masks protect against aqueous and oily aerosols, smoke and fine dust in three classes; their protective function is standardised throughout Europe according to EN 149. They are called particle-filtering half masks or fine dust masks, and are subdivided into protection classes FFP1, FFP2 and FFP3.

i) Dangerous fine dust particles can not only be radioactive and carcinogenic, but certain types also damage the entire respiratory system of the body, which can lead to serious long-term effects and the development of severe diseases over decades.

2. All the finest fine dust particles usually float around almost invisibly in the air and endanger the health of human beings. Due to their tiny size, they do not correspond

to negligible dangers, namely especially in certain working areas, but also in the polluted atmosphere. Because of their danger, fine dust particles can also be radioactive and carcinogenic, and if exposed to the particles for many years, the respiratory system of human beings can be very permanently damaged. This means that human beings should protect themselves from fine dust particles by wearing sufficiently suitable respiratory protection masks of certain protection classes, for which so-called FFP masks are suitable, which, on the one hand, are tested through an 'overall leakage', that is to say, by the filter passage and leaks around the face and nose being tested, and which, on the other hand, ensure that long-term inhalation hazards can be usefully countered.

'Overall leakage' testing means that protective masks are checked for possible leaks around the nose, chin or eyes that may occur when worn, as such leaks allow breathing air to escape and aerosols to be released when exhaling, but also when inhaling they allow health-threatening particles to penetrate under the mask and be inhaled. Innovative designs and special filter technologies can counteract such anatomically induced leakage, while also reducing breathing resistance where through an improvement of comfort arises.

3. Recommended against bacterial pathogens are respiratory protective masks of the class FFP2, which certainly cannot guarantee a full repellence of the virus, however protect to a great extent from the inhalation of foreign disease-contaminated respiratory aerosols and from the ingestion of foreign saliva droplets and therewith from such kinds of transmittable disease pathogens.

4. Respiratory protection masks of the protective class 3 or higher also largely reliably protect from viruses, therefore also from the coronavirus COVID-19 as well as from the influenza viruses. As a rule, based on its characteristics, the FFP3 Filter can largely be used as protection from all viruses.

5. OP masks, that is to say, surgical masks, correspond to the highest safety requirements and guarantee the best possible protection against any species and kind of pathogen and therewith also in regard to bacteria and viruses, whereby ultimately, nonetheless, no absolute safety exists, rather only a relative best possible and highest possible safety of 95% exists.

a) OP masks as a rule have therefore a 95% filtration efficiency in regard to bacteria and viruses and have to be tested for an overall leakage and the close fit to the neck and face have to be borne in mind. Surgical masks are usually not used privately, rather in operating theatres and first of all protect the patients, therefore less so the wearer of the masks, because due to these masks, as with all other respiratory protection masks, an ejection of saliva droplets and an escaping of breath aerosols is prevented. However, with that there exists, especially with the surgical masks, the necessity of a close-fitting

mask with mouldable nose piece because only this guarantees a real protective effect.

b) Surgical masks are intended, first of all, to be worn by surgeons performing operations, in order to protect the patient and to a lesser degree the wearer of the mask himself/herself.

6. FFP1-one layer paper face masks, homemade material masks, face, mouth and nose shields of every kind and pocket handkerchiefs as well as neck and head cloths are equally absolutely unsuitable as protection against pathogens because altogether they are not only totally ineffective as respiratory protection means, rather also they create an illusion of safety and are disease promoting.

7. A spreading of pathogens can only be reduced through the wearing of high-quality mouth-nose-protective masks or when there is unexpected coughing or sneezing at least through a tight covering of the mouth and nose with a handkerchief and so forth, as well as by paying attention to hand hygiene.

a) The most important individual hygienic measures are in any case the hand disinfection as well as the wearing of a correctly close fitting respiratory protective mask, which shall at least correspond to the requirements of an industrially manufactured and tested FFP1 mask.

b) Basically in situations in which a contact to suspected cases exists, at least suitable and tested serviceable FFP1 masks ought to be worn. Meanwhile tested FFP2 or FFP3 masks are essential to wear when cases of coughing or sneezing are expected, which indicate illnesses.

c) FFP3 masks are absolutely necessary when coughing is provoked, such as with a bronchoscopy and so forth. When a virus disease is suspected, a person is to be kept isolated, put in a separate room and provided with a mouth-nose-protection until the admission to a hospital.

d) Persons who come in contact with others and direct family members should at least protect themselves with a tested FFP1 mask.

e) Persons who, outside of the direct personal family circle, come in contact with family members who live elsewhere, should wear FFP2 respiratory protection masks as also should be the case inside their house when they must enter due to reasons of providing care or supplies. The same holds with necessary entering of other households.

f) With an epidemic or pandemic the general population can protect itself to a certain extent by the wearing of a suitable respiratory protective mask of at least class FFP2, however never with one-layered paper masks, handkerchiefs, scarves or head scarves and so forth.

g) With persons who, due to wrong advice or due to know-it-all-ism and so forth, wear the wrong respiratory protective masks, the danger always exists that they have a sense of false security and also do not consider and neglect other necessary preventative measures and for that reason become sick or die.