

Focus on IFA's work

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Do surgical masks also provide protection to medical personnel?

Problem

Surgical masks are routinely used in many areas of health care, and not only to protect patients. They are frequently also used to protect the respiratory tracts of medical personnel against infectious agents originating from patients.

Whether this non-intended use of the products for respiratory protection purposes is permissible is to be demonstrated by standardized tests conducted in accordance with the requirements governing the simplest form of respiratory protective devices. The studies supplemented a study of similar design conducted in 1995.

Activities

The study was conducted with reference to the European standard for filtering half masks (EN 149) on the products studied:

- Penetration through the filter medium (filter efficacy), by means of sodium chloride as a test aerosol
- Face seal, by means of leakage tests on test subjects
- The inhalation resistances

The level of protection was assessed in accordance with the performance classes defined in the standard. For 12 of the 16 products, additional studies were conducted into the factors responsible for the total inward leakage.



Test subject with surgical mask, prior to the leakage test

These comprise leakage between the mask frame and the wearer's face, and the penetration of the filter material, taken together.

Results and Application

Of the 16 products, only three satisfied the requirements of the standard with regard to both the leakage inward and the filter penetration. The differentiating analysis shows that the contribution made by leakage between the mask frame and the wearer's face increases with rising filter material performance. On products with adequate filtration properties, the leakage between the mask frame and the wearer's face is therefore virtually the sole determining factor.

Particle size and type cease to be relevant in this context. The factors decisive for leakage between the mask frame and the wearer's face are the filter resistance of the material, the geometry and flexibility of the particular face mask product, and its fit on the wearer's face.

Altogether, the recent examination of the surgical masks against the requirements for respiratory protection confirms the results of the study performed in 1995.

The IFA offers a test for manufacturers of surgical masks by which the products' limited suitability for use as respiratory protective devices can be ascertained. This particularly applies to cases of pandemics, when respiratory protective devices are no longer available in sufficient quantities. The test is based upon those employed in the study. Should the tests be passed, the products concerned can be included in a list of approved products.

Area of Application

The health services, particularly clinics, doctors' surgeries and the emergency services; disaster control

Additional Information

- DIN EN 143: Respiratory protective devices – Particle filters – Requirements, testing, marking (02.07). Beuth, Berlin 2007
- Project No. BIA 1067, "Protection through op-face masks and minimum requirements for respiratory protective equipment"
www.dguv.de/ifa, Webcode e73039
- Dreller, S. et al.: Zur Frage des geeigneten Atemschutzes vor luftübertragenen Infektionserregern. Gefahrstoffe – Reinhalt. Luft 66 (2006) No.1/2, pp. 14-24
www.dguv.de/ifa, Webcode d4522

Expert Assistance

IFA, Division 3: Hazardous Substances: handling – protective measures

Literature Requests

IFA, Central Division