

Focus on IFA's work

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Permobil – a compact device for permeation measurement

Problem

Under practical conditions, chemical protective gloves and clothing must resist permeation by chemicals for a minimum duration. In accordance with the EU PPE Directive, 89/686/EEC, chemical protective gloves must be subjected to type testing, and the manufacturer is obliged to conduct quality surveillance during production. Permeation testing is generally performed with the chemicals against which the glove is intended to provide protection, and under standardized conditions.

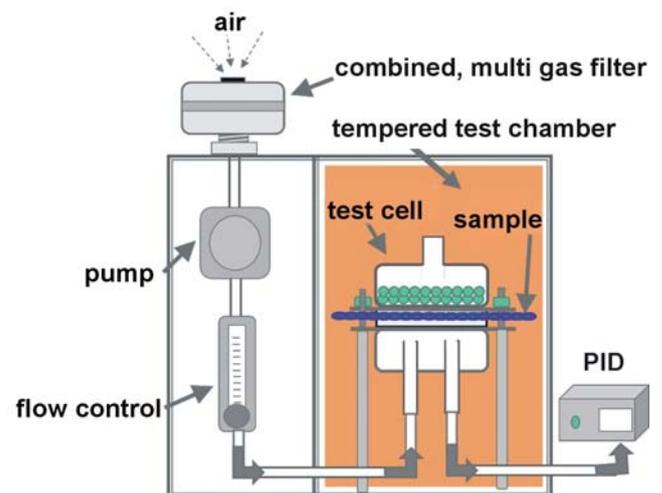
In the past, relatively expensive laboratory apparatus was required for the performance of permeation measurements. Conclusive measurements could not be performed, for example during production, without entailing substantial cost.

Activities

At its own initiative and in co-operation with an equipment manufacturer, the IFA has developed a compact unit for permeation testing on glove materials intended for protection against liquid organic solvents. Key requirements of this unit were that it satisfy all test conditions set out in DIN EN 374-3, and that it be of compact design.

Results and Application

The portable unit possesses a test chamber with electronically controlled thermal stabilization. The temperature is regulated by a ventilated combination of electric heating element and thermoelectric cooling.



Permeation unit (schematic diagram)

For the test, the material sample is clamped within a standardized cell and the test substance applied to the front. The carrier gas flowing through the detection side of the cell is pumped from the ambient air and purified by a combined multi-type gas filter. Downstream closed-loop control ensures precise adjustment of the carrier gas flow.

A standard photo ionization detector (PID) is used to measure the hazardous substance concentration in the carrier gas to the rear of the sample following permeation.

The unit can be used by both manufacturers and users of personal protective equipment (PPE) for conducting permeation measurements.

Manufacturers can use it not only to test the suitability of new PPE during development, but also to demonstrate ongoing product quality control during production. The requirements imposed by a monitoring body that valid evidence be furnished of the inspection measures performed for quality assurance purposes during production can thus be met.

A further field of application is the selection of suitable chemical protective gloves in plants. Where no valid information is available on suitable protective gloves for the substances used, this deficit can easily be eliminated by means of this device.

Finally, the unit is particularly suitable for training: the phenomena of permeation can be demonstrated effectively in any seminar room.

Area of Application

All sectors

Additional Information

- Source for the test facility for procurement: LABC-Labortechnik, Müller & Zillger GbR, Josef-Dietzgen-Strasse 1, D-53773 Hennef www.labc.de
- DIN EN 374-3: Protective gloves against chemicals and micro-organisms – Part 3: Determination of resistance to permeation by chemicals (12.03). Beuth, Berlin 2003
- BGI 868: Chemikalienschutzhandschuhe (01.08). Carl Heymanns, Cologne 2008
- Directive 89/686/EEC: Personal Protective Equipment, 21 December 1989. OJ L 399, pp. 18-38

Expert Assistance

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

Literature Requests

IFA, Central Division