PermaSURE® What is it? What does it Do? Why is it Important?

Lakeland's Innovative Technology Helps You Manage Risk by Easily Monitoring Safe-Use Time

Q What is PermaSURE®?

A An on-line tool and smart-phone app that calculates safe-use times for ChemMax 3, ChemMax 4 Plus and Interceptor Plus for use against over 4000 chemicals.

Q What does PermaSURE® do?

A Calculates permeation rates according to temperature. Important because temperature affects permeation rate:

- For every 50°F (10°C) rise in temperature the rate of permeation may double.
- Permeation testing is conducted at a temperature of 80°F (23°C).

So permeation test data is likely to be wrong for users working in temperatures higher than 80°F (or 23°C)!

Q Why is PermaSURE® important?

A Because many chemicals have only long term effects:

- Chemicals with short term effects, such as burns, are more straightforward because pain means a user will be immediately aware of contamination.
- Contamination by chemicals with ONLY long term effects, such as carcinogens, may not be apparent at all.

So users undertaking a regular task with such chemicals, might be coming into contact regularly without knowing, with resultant health problems developing only months or years later.

Q Whats the difference between permeation test data and PermaSURE®?

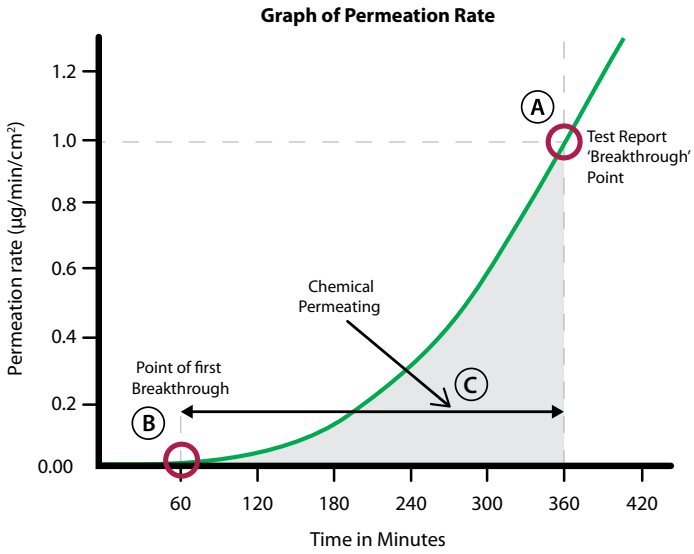
A PermaSURE® is NOT simply an alternative method of obtaining the same information provided by permeation test data:

4.1 What does permeation test data tell you?

- Permeation test breakthrough does NOT measure when a chemical first breaks through the fabric.
- It measures when the RATE OF PERMEATION reaches a particular speed:
  - CE test EN 6529: 0.1µg /min/cm^2 OR 1.0µg/min/cm^2
  - US ASTM F739: 0.1µg/min/cm^2

The graph shows the difference between permeation Test Breakthrough, **A**, and First Breakthrough, **B**. Between the two, **C**, the chemical is permeating through the fabric at an increasing rate.

- So test breakthrough time does NOT MEAN THAT NONE OF THE CHEMICAL HAS BROKEN THROUGH. In fact, at the breakthrough time, some of the chemical has already broken through the fabric and may have come into contact with the wearer.
- Note: 1.0µg is one millionth of a gram so a very small volume. However, the rate is measured per minute per cm2, so cumulative volume over time will be much greater, and
- Small amounts may be a problem if the chemical is highly toxic and/or has long term effects and/or the task is repeated regularly over an extended period.
- The introduction to the EN 6529 permeation test states the test information should be used only for COMPARISON of fabric performance and is not suitable to indicate how long a garment can be safely used.



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4.2 What does PermaSURE® tell you?

- PermaSURE® uses permeation rate, area and duration of contamination, along with toxicity limits of the chemical, to assess how long a suit can be safely used before the possible volume permeated reaches a level that might cause harm.
- So whereas test data assesses how long to reach a specific rate of permeation under laboratory conditions, **PermaSURE® calculates how long a suit can be safely worn in variable real world conditions including varying temperatures.**

Q How does PermaSURE® work?

A

- It uses molecular modelling to calculate permeation through a fabric polymer.
- This modelling is based on well-established science relating to:
  - The molecular structure of the chemical
  - The molecular structure of the polymers in the chemical suit fabric
- If both are known, the rate of permeation can be modelled accurately.
- *The system was developed by a UK company in conjunction with the UK Government Porton Down Defence Science and Technology Laboratory (Dstl) as part of its program to develop solutions for protection against chemical warfare agents (such agents are included in the PermaSURE® database of over 4000 chemicals)*

Q Are there any other advantages of PermaSURE®?

A

- It works on any browser enabled P.C., lap-top, tablet or smartphone.
- It is simple to use, with results obtained quickly. Training can be provided in 20 minutes anywhere in the world, either by Lakeland sales staff on a face-to-face basis or via internet conference.
- It provides instant access to basic hazard information on over 4000 chemicals along with a single click link to the Chemical Safety Data Sheet on the Centre for Disease Control website.
- It can be used to provide supervisors and staff with tables of safe use times at different temperatures - something not possible using test data.
- For emergency response teams, PermaSURE® can, in seconds, provide an indication of how long they can safety work with over 4000 chemicals.

Q Do I need PermaSURE®?

A

Key Questions to Consider:

- **What chemicals do you have on site that have long term effects and how do you know users are not coming into contact with them?**
  - Users may not be aware of contact with the chemical, and if test data is relied on for assessment of protection, they may unknowingly be coming into contact with it regularly.
- **What is the temperature in the work area and how much does it vary during a single day or seasonally?**
  - Permeation rate increases with temperature and permeation testing is conducted at 80°F (ASTM) or 21°C (CE) - *so in higher temperatures, test data may be wrong.*
- **How do you decide a chemical suit is safe to use against a specific chemical?**
  - Test Breakthrough is NOT when the chemical first breaks through the fabric but when the permeation rate reaches a particular speed. So at test breakthrough, the chemical has already been permeating through the fabric. In the case of chemicals with only long term effects, this could be critical in the future.
- **Do you have a range of changing chemicals on site?**
  - PermaSURE® allows you to quickly access key chemical hazard data on over 4000 chemicals and to rapidly assess how long a chemical suit can be safely used, ensuring users stay within the time when possible contamination could cause harm - and accounting for variations in conditions such as temperature.

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