



Innovations in dermal protection against liquid chemicals

Dstl Liquid penetration under pressure test – required for both Challenge 1 and Challenge 2



Introduction

In order to compare the ability of different fabrics to prevent the breakthrough of liquid, innovators are requested to undertake the following test. This method detects if the material allows liquid to penetrate through and is not dependent upon the process by which the protection is afforded. This is a simple screening test intended to give an initial indication of the performance of any proposed technical solution and not related to any of the other standards stated in the Competition Document.

For Challenge 1 the testing and results make up part of the final deliverable report.

For Challenge 2 the testing and results should be included in your initial proposal. Please note that .pdf and .docx files cannot be attached to your proposal. The text and images will need to be submitted as your answer to Section 3, question L in the submission portal.

Liquids to be tested

Required liquids for the test are in the table below.

Liquid	CAS Number	Surface tension (mN·m ⁻¹ @ 20 °C)
Decane (oil 6 in BS EN 14991)	124-18-5	23.5
Silicone Oil with a viscosity of 5 mPa·s	63148-62-9	21
Water	7732-18-5	72
Water 3 as defined in BS EN 23232, 90% water, 10% IPA	7732-18-5 / 67-63-0	42



Method

Single droplets of the low surface tension liquids should be used to determine the likelihood of liquid breakthrough. Droplet sizes of 1, 5 and 10 microlitres should be used to understand the maximum volume which can be prevented from penetrating.

1. A fabric swatch of at least 2.5 cm in diameter, to give a surface area of at least 5 cm² should be placed on a piece of filter paper (Whatman® qualitative filter paper, ashless, Grade 40) on a flat surface.
2. The liquid droplet should be placed on the fabric. All droplets are to be placed as a single drop in the centre of the swatch. A photograph of the droplet should be taken to demonstrate the wetting behaviour.
3. A PTFE disc and appropriate weight selected to apply 20 kPa of force (1 kg for a 5 cm² disc size) to the droplet and textile should be immediately placed on top.
4. The force must be applied for 5 minutes before being removed.
5. The filter paper should be examined to determine if liquid has been forced through the fabric to cause wetting. If wetting is observed on the filter paper then the fabric has failed the test.

