



CHEMICAL PROTECTIVE CLOTHING

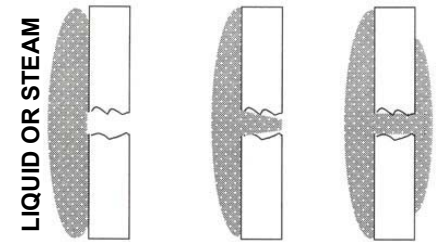
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TSRC Competition 2010/2011

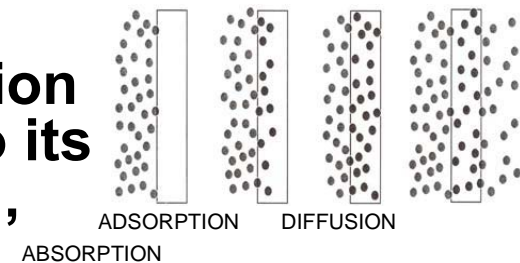
INTRODUCTION

❑ In the case of chemical protective clothing it is necessary to pay special attention to two features that allow the penetration of hazardous substances into the inside of the suit.

❑ **Penetration** is when dangerous chemicals move through the damaged parts in the protective clothing such as unsealed seams, zippers, or physical damages of the material.



❑ **Permeation** is the movement of chemicals through the structure of materials at the molecular level, causing chemical adsorption into the inside of the material and finally to its absorption to the inner side of the material, and direct contact with the body.





EVALUATION OF SEAMS RESISTANCE TO CHEMICALS

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INTRODUCTION

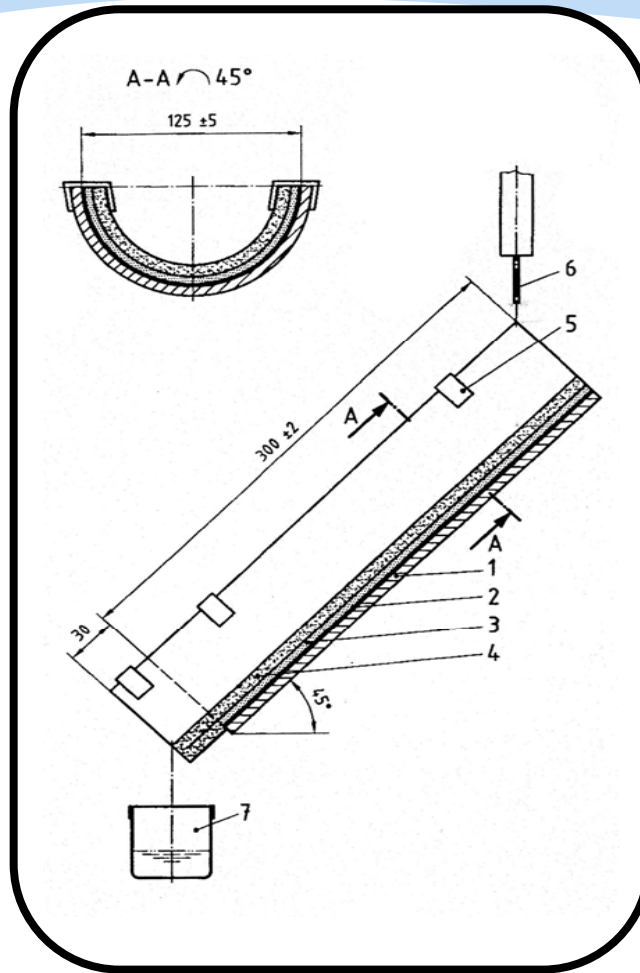
- ❑ This paper tests the effectiveness of denim and its seams as a protective material for penetration of aggressive chemicals.
- ❑ Samples were tested according to the standard HRN EN ISO 6530:2005 Protective clothing-Protection against liquid chemicals-Test method for resistance of materials to penetration by liquids.
- ❑ This method has also been partly modified by measuring the permeability of the seams as the most sensitive areas of the textile material, and different angles of seams in the direction of fluids.



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Schematic drawing according to the standard HRN EN ISO 6530:2005



1. Groove,
2. Protective foil,
3. Filter paper,
4. Test sample,
5. Clamps,
6. Injection needle,
7. Laboratory glass.

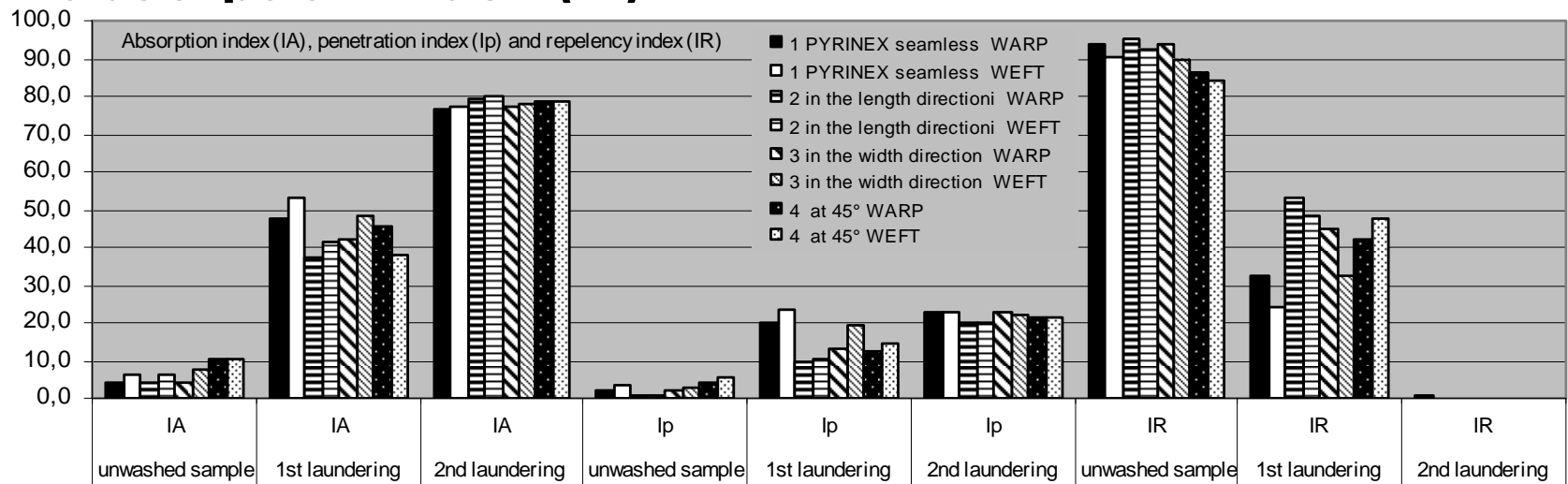
Photo of the device for the measurement of penetration, absorption and repellency of aggressive chemicals

The device for the measurement of the resistance of the textile material to penetration of aggressive chemicals was designed and made at TTF.



RESULTS

The tested samples before the washing process have a great ability to repel liquids from the surface material, i.e. a high repellency index (I_R), while it is zero after the first and second wash. At the same time the washing process causes a rapid increase in absorption index (I_A).



Resistance of the material to penetration of Pyrinex 48 EC (seam type 1.01.02/301.504)



CONCLUSION

- ❑ The unwashed tested samples have a great ability to repel liquids from the surface material due to finishing treatments, showing a high repellency index (I_R).
- ❑ From the results it is concluded that the washing process or its care removes its finish to a very large increase in the index of absorption (I_A), thus the protective function of the examined samples drops rapidly.





THANK YOU!

Acknowledgments

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