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Decontamination of radioactively contaminated surfaces — Testing of decontamination agents for textiles

*Décontamination des surfaces contaminées par la radioactivité —
Essai des agents de décontamination pour les textiles*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 85 *Nuclear energy, nuclear technologies, and radiological protection*, Subcommittee SC 2, *Radiological protection*.

This second edition cancels and replaces the first edition (ISO 9271:1992), which has been technically revised.

The main changes are as follows:

- the scope was rephrased and specified;
- opening to further applications;
- adding of symbols of the used measurands;
- improvement of structure;
- improvement in readability;
- adaption to current standards;
- adding a new form in the Annex with description the properties of the agents to be tested.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Wherever radioactivity is used, there is a risk that textiles can become contaminated through contact with radioactivity in solution or airborne radioactivity.

It is normally necessary to remove this contamination to reduce the risk to staff from accidental intake of the radioactivity on the surface. The ease of decontaminating textiles is therefore an important parameter to consider when selecting materials to use, e.g., for facilities in the nuclear industry, in radionuclide laboratories or nuclear medicine facilities.

This document defines a quantitative method under objective conditions for testing the ease of decontamination of textile fabric. The method enables the comparison of different textile materials to support decisions on textiles for use in different applications.

For the test, radioactive solutions are deposited onto a sample of the material being studied. The solutions contain radionuclides commonly found in nuclear industry (^{60}Co , ^{137}Cs or ^{134}Cs) and are in aqueous form. The textiles are then cleaned with detergents or cleansing agent, to be tested, and the residual activity on the textiles is measured to give a quantitative measure of the ease of decontamination.

Information obtained from the test method will enable the optimization of the choice of decontamination agents for textiles. This should result in lower demands for materials and water in laundry systems, with consequent savings in the cost of radioactive waste processing operations such as filtration, evaporation, solidification and disposal.

If the customer desires that suitability of their decontamination agents is to be tested with other radiochemicals containing alpha- and beta- emitting radionuclides, then other procedures and measurement techniques (like liquid-scintillation-counting) are to be used, which are not described in this document.

Comparative tests can be carried out with all possible combinations of textile materials and radionuclides in homogeneous solutions. Inorganic or organic solutions can be used and they should be based on a solvent which evaporates at room temperature. An assessment of the results of a series of comparative tests is made on the basis of the mean residual pulse rates.

In order to permit the general qualification of a decontamination agent as a single product, this document specifies a test and assessment method based on ^{60}Co and ^{137}Cs or ^{134}Cs applied to internationally standardized cotton fabric. These two radionuclides were selected because they are the most important sources of contamination in the nuclear industry. The cotton fabric selected is the only reference material available in this field. The assessment of the result of a single test is made using an assessment table of final residual pulse rates based on inter-laboratory experiments.