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**Passive neutron dosimetry systems —  
Part 2:  
Methodology and criteria for the  
qualification of personal dosimetry  
systems in workplaces**

*Systèmes dosimétriques passifs pour les neutrons —*

*Partie 2: Méthodologie et critères de qualification des systèmes  
dosimétriques individuels aux postes de travail*

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Published in Switzerland

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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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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For an explanation on 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 the following URL: [www.iso.org/iso/foreword.html](http://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*.

A list of all the parts in the ISO 21909 series can be found on the ISO website.

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](http://www.iso.org/members.html).

## Introduction

ISO 21909-1 provides laboratory-based type tests, and performance requirements for passive neutron dosimetry systems to be used for measurement of personal dose equivalent,  $H_p(10)$ , for neutrons ranging from thermal energy to approximately 20 MeV<sup>[1]</sup>. No distinction between the different techniques available in the marketplace is made in the description of the tests. ISO 21909 (series) aims at covering all passive neutron detectors that can be used as a personal dosimeter in parts of, or in the complete above-mentioned neutron energy range.

The main objective of ISO 21909 series is to achieve correspondence between performance tests and conditions of use at the workplaces. Dosimetry systems complying totally with ISO 21909-1 should give consistent dosimetry results in workplace environments without the requirement of precise information on the characteristics of the radiation fields (neutron energy and direction distributions).

For the case that a dosimetry system does not comply with the full range of requirements in ISO 21909-1 with regard to the dependence of the response on the energy and direction distributions of the neutron fluence, it remains necessary to evaluate the performance of the dosimetry system for the conditions of the workplace. That means that this document is systematically used to qualify at workplaces a dosimetry system that does not fulfil the criteria of ISO 21909-1 on the dependence of the response on neutron energy and direction of incidence.

This document aims to address dosimetry systems with responses that show energy and directional dependencies that do not comply with the test requirements in ISO 21909-1, but that are able to give consistent and reliable dosimetry results at selected workplaces. In this case, a specific study of the workplace where the dosimetry systems are used is necessary to demonstrate that the dosimetry systems are suited for the workplace of application and, if needed, to determine the appropriate corrections to be applied. This document gives requirements for the qualification of the dosimetry system as well as methods for evaluating its performance and qualifying it for use in the workplace.

In cases where the dosimetry system meets the requirements of ISO 21909-1, it may still be desirable to perform a similar study at the workplace to improve the performance of the neutron dosimeters. It is also recommended that this document may be implemented, not only for passive dosimetry systems, but for active dosimetry systems as well.

No qualification or correction of the dosimetry system at a workplace is required if the dosimetry system fulfils the criteria of ISO 21909-1.

All the estimations of the uncertainties in this document have to be considered in accordance with the GUM<sup>[2]</sup>. Uncertainties quoted in this document are provided using a coverage factor  $k=2$ .

