

This is a preview of "ISO/TS 12901-1:2012". [Click here to purchase the full version from the ANSI store.](#)

First edition
2012-11-15

Nanotechnologies — Occupational risk management applied to engineered nanomaterials —

Part 1: Principles and approaches

Nanotechnologies — Management du risque professionnel relatif aux nanomatériaux manufacturés —

Partie 1: Principes et approches



Reference number
ISO/TS 12901-1:2012(E)

© ISO 2012



COPYRIGHT PROTECTED DOCUMENT

© ISO 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO/TS 12901-1:2012". Click here to purchase the full version from the ANSI store.

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Terms and definitions	1
3 Symbols and abbreviated terms	3
4 Nanomaterial types and characteristics	4
4.1 General.....	4
4.2 Fullerenes.....	5
4.3 Carbon nanotubes.....	5
4.4 Nanowires.....	5
4.5 Quantum dots.....	5
4.6 Metals and metal oxides, ceramics.....	5
4.7 Carbon black.....	5
4.8 Dendrimers.....	6
4.9 Nanoclays.....	6
5 Nanomaterial hazard, exposure and risk	6
5.1 General.....	6
5.2 Potential risk considerations to health from inhalation of NOAAs.....	6
5.3 Potential risk considerations to health from dermal exposure or ingestion.....	7
5.4 NOAAs as hazardous materials.....	8
5.5 Risk of fire and explosion from NOAAs.....	8
6 General approach to managing risks from NOAAs	8
7 Identification and competence of person conducting risk assessment	10
8 Information collection	11
9 Health risk evaluation	11
9.1 General.....	11
9.2 Assessing the hazard.....	12
9.3 Assessing exposure.....	12
9.4 Assessing and prioritizing health risk.....	13
9.5 Document and review.....	13
10 Control of risk	13
10.1 Hierarchy of control.....	13
10.2 Control of exposure.....	14
10.3 Selection of controls.....	15
10.4 Evaluation of the effectiveness of control.....	16
10.5 Information, instruction and training.....	17
11 Measurement methods for evaluating controls	17
11.1 Need for measurement.....	17
11.2 Selection of instruments.....	18
11.3 Sampling strategy.....	20
11.4 Limitations.....	21
12 Health surveillance	22
13 Spillages and accidental releases	22
14 Disposal procedures	23
14.1 Planning the storage and disposal of nanomaterials.....	23
14.2 Storage of nanomaterial waste prior to disposal.....	23
14.3 Disposal of nanomaterial waste.....	23
15 Prevention of fire and explosion	24

This is a preview of "ISO/TS 12901-1:2012". [Click here to purchase the full version from the ANSI store.](#)

Annex A (informative) Control approaches	25
Bibliography	33

This is a preview of "ISO/TS 12901-1:2012". [Click here to purchase the full version from the ANSI store.](#)

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 12901-1 was prepared by Technical Committee ISO/TC 229, *Nanotechnologies*.

ISO/TS 12901 consists of the following parts, under the general title *Nanotechnologies — Occupational risk management applied to engineered nanomaterials*:

- *Part 1: Principles and approaches*

Introduction

The field of nanotechnologies continues to advance rapidly through the development of new materials, products and applications. At the same time, many questions have been raised relating to the potential risks to human health and to the environment of some of these new nanomaterials. Internationally, a large programme of research is underway to understand better and quantify these risks. Although some research is now published, this effort will need to continue for some time. However, those involved in the development and use of nanomaterials now still require to make assessment of the risks and to implement effective risk management approaches based on the best available evidence. International standardization on nanotechnologies should contribute to realizing the potential of this technology for the betterment and sustainability of our world through economic development, improving the quality of life, and also for improving and protecting public health and the environment.

This part of ISO/TS 12901 supports this by describing the principles of an occupational risk management framework and gives practical advice on its implementation based on the best current emerging evidence concerning the potential risks of nanomaterials. ISO/TS 12901-2, which is under development, describes a specific approach based on control banding to further support the implementation of good practice in this area.