Technical

ISO/TS 12901-1

Nanotechnologies — Occupational risk management applied to engineered nanomaterials —

Part 1: Principles and approaches

Nanotechnologies — Gestion du risque professionnel appliquée aux nanomatériaux manufacturés —

Partie 1: Principes et approches

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This document was prepared by Technical Committee ISO/TC 229, *Nanotechnologies*.

This second edition cancels and replaces the first edition (ISO/TS 12901-1:2012), which has been technically revised.

The main changes are as follows:

— clauses have been updated and new references have been added to reflect recent research findings;

— a new subclause dedicated to graphene has been introduced in Clause 5;

— Clause 6 has been reorganized and eye exposure and accidental injection risks have been added for potential risk considerations from other potential routes of exposure;

— subclause 6.3 has been expanded and reorganized into two subclauses;

— Figure 1 has been added to Clause 7;

— text related to protection from ocular exposure has been added in 11.2 and substantial changes have been made to the personal protective equipment subclause;

— a new subclause, 11.3.4, has been introduced, focusing on safety by design;

— In 11.3.5 concerning state-of-the-art approaches, the reference to Clause A.1 has been removed and replaced with references to ISO/TR 12885 and other relevant documents;

— in 11.4, which discusses the evaluation of control measures, Clauses A.2 to A.4 have been removed and references to ISO/TR 18637:2016 and other relevant documents have been incorporated;

— Tables 1, 2 and 3 have been added;

— significant changes have been implemented in Clause 15;

— Annexes A, B and C have been added.

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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. Several research programs have been launched at the international level to better understand and quantify these risks. Although some research is already published, this effort will need to continue for some time, as those involved in the development and use of nanomaterials need to assess the risks of nanotechnologies 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 document supports this aim by describing the principles of an occupational risk management framework for nano-objects, and their aggregates and agglomerates (NOAA) greater than 100 nm and gives practical advice on its implementation based on the best current emerging evidence concerning the potential risks of nanomaterials. ISO/TS 12901-2 describes a specific approach based on control banding to further support the implementation of good practice in this area[1].

This document applies to such components, whether in their original form or incorporated in materials or preparations from which they can be released during their life cycle. However, as for many other industrial processes, nanotechnological processes can generate by-products in the form of unintentionally produced NOAAs, that can be linked to health and safety issues that need to be addressed as well.