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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 38091.2-2019

Nanotechnologies -- Occupational risk management applied to engineered nanomaterials -- Part 2: Use of the control banding approach

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Foreword

GB/T 38091 "Occupational Risk Management of Nanotechnology Engineering Nanomaterials" is divided into the following two parts.

--- Part 1. Principles and methods;

--- Part 2. Control the application of the classification method.

This part is the second part of GB/T 38091.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This section uses the translation method equivalent to ISO /T S12901-2.2014 "Nanotechnology Engineering Nanomaterials Occupational Risk Management

Part 2. Controlling the application of classification methods.

The documents of our country that have a consistent correspondence with the international documents referenced in this part are as follows.

---GB/T 32269-2015 Terms and definitions of nanotechnology nanoobjects Nanoparticles, nanofibers and nanosheets

(ISO /T S27687.2008, IDT)

This section has made the following editorial changes.

--- Adjusted the order of the references.

This part was proposed by the Chinese Academy of Sciences.

This part is under the jurisdiction of the National Nanotechnology Standardization Technical Committee (SAC/TC279).

This section drafted by. National Nanoscience Center, Beijing Labor Protection Science Research Institute, China Center for Disease Control and Prevention

Health and Poison Control Institute, Zhejiang Provincial Center for Disease Control and Prevention.

Introduction

It is currently known that nano-objects and their aggregates and agglomerates larger than 100 nm (Nano-objects, andtheiraggregatesand

Agglomeratesgreaterthan100nm, NOAA) exhibits properties different from non-nano-sized (bulk) materials, including toxicology

nature. Since current Occupational Exposure Limits (OELs) are mostly based on bulk materials, they may not be suitable for NOAA. Jian

In the absence of NOAA-related specifications, the control grading method can be used as the initial method to control NOAA exposure in the workplace.

Note 1. Aggregates and agglomerates smaller than 100 nm are considered to be nano-objects.

Controlled grading is a practical method for storms of potentially harmful substances with unknown or undetermined toxicological properties in the workplace.

Dew control and lack of quantitative exposure assessment. If there are occupational exposure limits (OELs), refer to OELs, this method can be supplemented

Traditional quantitative methods for air sampling and analysis. This method combines professional judgment and monitoring, and the occupational ring according to the similarity of hazard and exposure.

Classification can provide an alternative risk assessment and risk management process. Based on the hazard and exposure range (grade),

The program applies a range of control techniques (eg, full ventilation and containment) to specific chemicals.

In general, control grading is based on the idea that people may be exposed to multiple chemicals, meaning that risks are diverse, but at risk

The usual methods of control are limited. These risk control methods are divided into different levels ("strict") depending on the level of protection that can be provided.

Control is the highest level of protection). The greater the potential for hazards, the higher the level of protection required for exposure control.

Control grading was originally a safe working method developed by the pharmaceutical industry for new chemicals with little or no toxicity information.

The method considers the exposure assessment status and classifies these new chemicals

according to the toxicity of similar known chemicals, and pre-made

The associated safe work procedures are associated. Thus each level corresponds to a corresponding control scheme [18]. According to this philosophy, British health and

The safety management department has developed an easy-to-use procedure called COSHH [7][10][16], which mainly benefits the inability to obtain a specific occupational health.

Small or medium-sized enterprises guided by biologists. Similar implementations were used in the implementation guidelines given by the German Federal Institute for Occupational Safety and Health.

Procedure [5]. The Stoffenmanager tool [17] embodies a further development that combines a hazard grading procedure and base similar to COSHH.

An exposure grading procedure for an exposure process model to facilitate understanding and use by non-professional users.

Given the uncertainty of the potential health risk level of work-related NOAA, the risk rating of control grading for nanomaterials

It is quite useful for evaluation and management. It can be managed in an active or retroactive manner for risk management. In an active implementation

Existing control measures (if any) are not used as input variables for potential exposure grading, while in retrospective implementations, existing control measures

As an input variable. Both methods are described in this section. Although control grading seems to be theoretically applicable to the storm of nanomaterials

Dew control, but few comprehensive analytical tools are currently available for evolving nanotechnology operations. Maynard proposed a concept control

The hierarchical model is given and the same four control methods as COSHH are given [15]. Paik et al. [20] [27] proposed a slightly different approach.

The method is called "ControlBandingNanotool". This method takes into account NOAA's existing toxicological knowledge.

The control grading framework proposed in the previous publications was applied. However, the range of values for controlling hierarchical nanotool applications is suitable for small scales.

Study type operations (less than 1g) may not be suitable for large-scale production applications. At the same time, for controlling engineering in large-scale production applications

Several specific control grading tools have been published for inhalation exposure of

nanomaterials [6][12][13][14][23]. All of these tools define hazards

Grades and inhalation exposure levels are combined into a two-dimensional matrix to derive risk control scores (active implementation).

Schneider et al. [22] developed a conceptual model for the evaluation of inhalation exposure of engineered nanomaterials, presenting a model for future exposures.

A general framework. This framework is used in conjunction with the Stoffenmanager tool and the AdvancedREACH tool (ART) [17][24][25]

Inhalation exposes the same structure as the conceptual model. According to this conceptual model, they developed the "StoffenmanagerNano" control grader

[26], which includes both active implementation and retrospective (risk grading) implementation.

In addition, the French Food Environment and Occupational Health and Safety Agency (ANSES) has developed a control grading tool specifically for nanomaterials.

The tool is described in a report entitled "Development of a specific control grading tool for nanomaterials" [11].

In the development of any NOAA control grading method, the biggest challenge is to decide which parameters need to be considered, a nano object corresponding

A related criterion for controlling the grading method and what operational control strategy is employed at different operational levels.

This section presents guidelines for controlling and managing occupational risks based on a control grading methodology designed specifically for NOAA. Manufacturing

It is the responsibility of the business and importer to determine whether the material of interest contains NOAA in accordance with current national or international regulations and to provide safety data.

Related information in the table (SDS) and labels. Companies can use this information to identify hazards and implement appropriate controls. This section is not intended to

Providing advice for this decision-making process is not a substitute for rules and regulations, so companies must comply with current legal requirements.

It is emphasized that the control grading method applied to engineering NOAA requires assumptions about difficult to obtain data. Therefore, control points

Level tool users have reliable skills in chemical risk prevention, especially in material-related risk prevention. The success of this method

Implementation requires the user's solid professional ability and critical evaluation of potential occupational exposure, as well as the use of control grading