Task O1/A1

COMPARATIVE STUDY ON THE NORMATIVE FOR APPLYING OF NANOMATERIALS ON STONE PRODUCTS IN GERMANY

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1. INTRODUCTION

The use of nanomaterials is representing a revolution in improving the performance of products made from natural stone. The mechanical characteristics of stone materials have increased their properties thanks to the use of coatings and surface treatments based on the application of nanoparticles and nanocomposites. But at the same rate as the quality of the material has increased with the application of these nanocomposites, the safety of workers is being greatly compromised. Nanomaterials are an invisible threat to workers' health.

Despite the advantages they offer, many workers are not aware that they are working with them, and their harmful effects are not yet clear. Numerous studies stablish that there are proven health risks linked to various manufactured nanomaterials, which, given their size, can interact at the cellular level.

This report is included in the task “O1-A1. Comparative study on the normative for applying of nanomaterials on stone products”, corresponding to Intellectual Output 1 " Guideline of risks, health and environmental prevention measures in safe production and use of nanomaterials in Stone Sector" of the NanoSafe project.

A comparative study report has been prepared on the current regulations concerning the application of nanomaterials in stone products in the partner countries and in the European Union, including technical, occupational health and safety and environmental protection requirements.

This document provides the target group with an updated version of all published regulations. It has also enabled the consortium to develop the training environment on safety in the application of nanotechnology in accordance with the regulations on safety at work.

All the partners took part in this activity in a collaborative effort to make available to society, in a more accessible and simplified form, all the regulatory measures established in terms of health and safety and risk prevention by the competent authorities.

This report and all the information about the project are available in the following url:
- NanoSafe project web: https://www.nanosafeproject.eu/

2. GERMAN NORMATIVE FOR APPLYING OF NANOMATERIALS ON STONE PRODUCTS

Nanomaterials related German standards:

	
Empfehlung für die Gefährdungsbeurteilung bei Tätigkeiten mit Nanomaterialien am Arbeitsplatz; Bundesanstalt für Arbeitsschutz und Arbeitsmedizin/Verband der Chemischen Industrie e.V. https://www.vci.de/vci/downloads-vci/2012-05-29-nanoleitfaden-endfassung2012.pdf	**Recommendation for the risk assessment for activities with nanomaterials in the workplace;** Federal Institute for Occupational Safety and Health / Association of the Chemical Industry e.V.
TRGS 527 Tätigkeiten mit Nanomaterialien; Bundesanstalt für Arbeitsschutz und Arbeitsmedizin https://www.baua.de/DE/Angebote/Rechtstexte-und-Technische-Regeln/Regelwerk/TRGS/pdf/TRGS-527.pdf?__blob=publicationFile&v=3	**TRGS 527 Activities with nanomaterials;** Federal Institute for Occupational Safety and Health
TRGS 600 Substitution; Bundesanstalt für Arbeitsschutz und Arbeitsmedizin https://www.baua.de/DE/Angebote/Rechtstexte-und-Technische-Regeln/Regelwerk/TRGS/pdf/TRGS-600.pdf?__blob=publicationFile	**TRGS 600 Substitution;** Federal Institute for Occupational Safety and Health
Beurteilung eines möglichen Krebsrisikos von Nanomaterialien und von aus Produkten freigesetzten Nanopartikeln; Stellungnahme des Bundesinstituts für Risikobewertung und des Umweltbundesamtes vom 15. April 2010 www.uba.de/uba-info-medien/4068.html	**Assessment of a possible cancer risk from nanomaterials and from nanoparticles released from products;** Statement by the Federal Institute for Risk Assessment
Benutzung von Atemschutzgeräten; DGUV Regel 112-190 http://publikationen.dguv.de/dguv/pdf/10002/r-190.pdf	**Use of breathing apparatus;** DGUV Rule 112-190
Nano-Liste **Nanoteilchen in Bau- und Reinigungsprodukten;** Berufsgenossenschaft der Bauwirtschaft BG BAU https://www.bgbau.de/fileadmin/Gisbau/Nanoliste28.09.2017.pdf	**Nano list** **Nanoparticles in construction and cleaning products;** BG BAU trade association for the construction industry

Verantwortlicher Umgang mit Nanotechnologien; Bericht und Empfehlungen der NanoKommission der deutschen Bundesregierung (2008) https://www.dguv.de/medien/inhalt/praevention/themen_a_z/gefahrstoffe/nanotechnologie/prinzipienpap.pdf Hinweis: eventuell nicht mehr aktuell	**Responsible use of nanotechnologies**; Report and Recommendations of the NanoKommission of the German Federal Government (2008) Note: possibly no longer up to date
Nanomaterialien am Arbeitsplatz; 10 Fragen und Antworten zum Umgang mit Nanomaterialien am Arbeitsplatz https://www.dguv.de/fb-rci/sachgebiete/gefahrstoffe/nanotechnologie/nanomaterialien/index.jsp	**Nanomaterials in the workplace;** 10 questions and answers on the handling of nanomaterials in the workplace.
Nano-Portal: Sicheres Arbeiten mit Nanomaterialien “Nanorama“ - interaktive Tools zum sicheren Arbeiten mit Nanomaterialien http://nano.dguv.de/home/ Unterseite: → http://nano.dguv.de/nanorama/bgbau/ Im Panorama der Baustelle sind klickbare Stationen zu Nanomaterialien in der Bauwirtschaft versteckt. Abgebildet sind Arbeitssituationen, wie sie auf Baustellen angetroffen werden können. Klicken Sie auf Werkzeuge, Produkte und Handwerker und beantworten Sie Fragen zu: • mögliche Exposition - "Ampelfrage" • Produktinformation - Pop-up mit Infos	**Nano-Portal: Working safely with nanomaterials** "Nanorama" - interactive tools for working safely with nanomaterials → Subpage: http://nano.dguv.de/nanorama/bgbau/ Clickable stations on nanomaterials in the construction industry are hidden in the construction site panorama. Pictured are work situations as they can be encountered on construction sites. Click on tools, products and craftsmen and answer questions about: - possible exposure - "traffic light question" - Product information - pop-up with info
Risikogruppierung für Nanomaterialien am Arbeitsplatz Bewertung von Nanomaterialien im Kontext der REACH-Verordnung https://www.dguv.de/medien/ifa/de/pub/grl/pdf/2019_069.pdf	**Risikogruppierung für Nanomaterialien am Arbeitsplatz** Assessment of nanomaterials in the context of the REACH Regulation

Einsatz von Nanotechnologien in Architektur und Bauwesen vom Hessisches Ministerium für Wirtschaft, Verkehr und Landesentwicklung https://www.vditz.de/fileadmin/media/publications/pdf/Einsatz.pdf	**Use of Nanotechnologies in Architecture and Construction trade** by Hessian Ministry of Economics, Transport and Regional Development
Nano im Baugewerbe Institut für Technikfolgen-Abschätzung der Österreichischen Akademie der Wissenschaften Nr. 032 Juni 2012 Sabine Greßler, André Gazsó. https://docplayer.org/58979153-Nano-im-baugewerbe-einleitung.html	**Nano in construction trade** Institute of Technology Assessment of the Austrian Academy of Sciences No. 032 June 2012 Sabine Greßler, André Gazsó.
EU-*Project* Nano-Cathedral Offizielle Projektseite Seite (englischsprachig), 2015-2018 https://www.nanocathedral.eu	**EU-Project Nano-Cathedral** Official project page, 2015-2018

3. CONCLUSION

Nanotechnology is described as a key technology of the 21st century. Many everyday products such as cosmetics, paints or textiles are already based on the use of nanotechnology or contain nanomaterials. New applications are added almost every day. The economic importance of nanotechnologies is already enormous. In Germany, 950 companies deal with nanotechnologies and thus achieve a turnover of 14 billion euros. Ascending trend!

Also in the construction and natural stone industries, auxiliary materials that contain nanoparticles are being used more and more frequently. These are in particular glazes, water repellants, cleaning agents, laying and grouting mortars. When using these nanomaterials, suitable protective measures such as wearing gloves and breathing masks must be observed.

Almost all of the previously listed articles show that nanomaterials can have an impact on the body and the environment. Several criteria have to be taken into account:

a) Appearance of nanomaterial, e.g. gaseous, liquid, fibrous.

b) Resistance, e.g. water-soluble, insoluble

c) Toxicity

and

the absorption mechanisms and effects on living organisms (e.g. eyes, mucous membranes, skin). Due to the complexity, focal points should be set in the project.