WORKERS HEALTH CENTRE
People I Recovery I Work

Health And Safety Fact Sheet

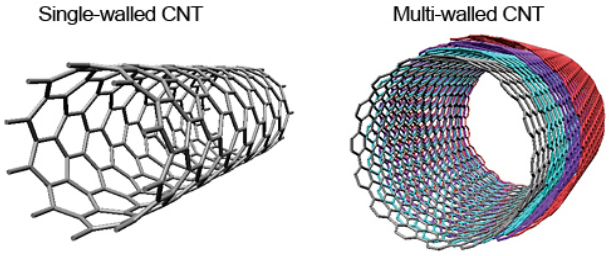
Nanotechnology

Nanotechnology is known as the science of the small. A nanoparticle is 1 billionth of a metre, or 100,000 times smaller than the width of a human hair. Size is not the only characteristic that gives nanoparticles their edge. Once materials are scaled down in size they begin to exhibit new properties, for example optical properties or magnetic properties.

Nanotechnology research and development is moving at a rapid pace and is already contained in over 800 everyday items such as sunscreens and cosmetics, food and building materials. Products developed with nanomaterials can be found in areas as diverse as aviation, automotive industries, food, computing to diagnostics and therapeutics.

Why is there concern over nanoparticles?

Nanoparticles can be hazardous because of their size, surface area and toxicity. They can be inhaled or absorbed through skin. Research published in *Nature Nanotechnology* by researchers from the University of Edinburgh/MRC Centre for Inflammation Research (CIR) in Scotland, has shown that multi walled carbon nano tubes share some of the same needle-thin characteristics as asbestos fibres and when mice were exposed to nano tubes, they had the same physical reaction as an asbestos fibre in the mesothelium.



Other research reports that when nano materials are deposited in the gut or lung, they can enter the blood stream and travel to the liver and brain.

In advice to staff handling nano materials the Massachusetts Institute of Technology in the US says, “Once in the body, some types of nanoparticles may have the ability to translocate and be distributed to other organs, including the central nervous system”.

Australian & International regulation developments

Despite the growing evidence to show that nanomaterials present unique health and safety hazards, no country has introduced nano-specific regulation. Regulators, including Australia, rely on regulations that weren’t designed to protect workers against nano-sized materials.

In a report just released The European Agency for Health and Safety at Work has put nanoparticles at the top of the list of risks for workers. The French government have set a timetable to regulate nanomaterials.

Safe Work Australia has developed a ‘Work Health and Safety Assessment Tool for Handling Engineered Nanomaterials’

http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/547/Work_health_safety_tool_handling_engineered_nanomaterials.pdf

and the ‘Safe Handling and use of Carbon Nanotubes Guide 2012

http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/664/Safe%20Handling%20and%20Use%20of%20Carbon%20Nanotubes.pdf.

The requirements for labelling Products Containing Nanomaterials can be found at Chapter 3.10 of the Labelling of Workplace Hazardous Chemicals Code of Practice September 2015

http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/643/COP_Labelling_of_Workplace_Hazardous_Chemicals.pdf

Workplace activities involving nanomaterials

The following workplace tasks may increase the risk of exposure to nanoparticles:

- working with nanomaterials in liquid media without adequate protection (e.g., gloves) will increase the risk of skin exposure.
- working with nanomaterials in liquid during pouring or mixing operations, or where a high degree of agitation is involved, will lead to an increase likelihood of inhalable and respirable droplets being formed.
- generating nanoparticles in the gas phase in non-enclosed systems will increase the chances of aerosol release to the workplace.
- handling nano-structured powders will lead to the possibility of aerosolisation.
- maintenance on equipment and processes used to produce or fabricate nanomaterials or the clean-up of spills or waste material will pose a potential for exposure to workers performing these tasks.
- cleaning of dust collection systems used to capture nanoparticles can pose a potential for both skin and inhalation exposure.
- machining, sanding, drilling, or other mechanical disruptions of materials containing nanoparticles can potentially lead to aerosolisation of nanomaterials.
- depending on their composition and structure, some nanomaterials may initiate catalytic reactions and increase their fire and explosion potential that would not otherwise be anticipated from their chemical composition alone.

For further information go to:

http://www.actu.asn.au/

http://www.nicnas.gov.au/

http://www.innovation.gov.au/Section/Innovation/Pages/AustralianOfficeofNanotechnology.aspx

http://www.workcover.nsw.gov.au/Pages/default.aspx

http://www.safeworkaustralia.gov.au

For further information and advice contact the Workers Health Centre

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