Work health and safety assessment tool for handling engineered nanomaterials

INTRODUCTION

Nanotechnologies involve the design, characterisation, production and application of structures, devices and systems by controlling the shape and size at the nanoscale for example, in the size range from approximately one nanometre to 100 nanometres. This involves the manufacture of nanoparticles, nanoobjects, nanostructures or nanoconstructs with at least one dimension less than 100 nanometres to give them useful chemical, physical, electrical or optical properties that can be used in new and enhanced products.

This assessment tool may be used by:

- organisations, to document practices and procedures, and
- work health and safety regulators or occupational hygienists when visiting nanotechnology organisations.

This assessment tool covers information about the work of your business, organisation or research laboratory and allows the user to identify and record the:

- characteristics of the business manufacturing, supplying or using nanotechnology or products that contain engineered nanomaterials
- nanomaterials and processes that are being used
- controls being used to prevent exposure of people to nanoparticles
- information available to businesses, organisations or research laboratories, and
- issues or problems faced by businesses, organisations or research laboratories in managing nanotechnology work health and safety.

This assessment tool has been designed by Safe Work Australia, in consultation with:

Workplace Health and Safety Queensland (WHSQ)	WorkCover NSW
WorkSafe VIC	SafeWork SA
WorkSafe WA	Comcare
Department of Industry, Innovation, Science and Research (DIISR)	National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
Australian Council of Trade Unions (ACTU)	Australian Chamber of Commerce and Industry (ACCI)

Safe Work Australia is examining nanotechnology work health and safety issues through the Nanotechnology Work Health and Safety Program. More information about the Nanotechnology Work Health and Safety Program and other nanotechnology work health and safety resources can be found on the Safe Work Australia website.

Name of Nanotechnology organisation:
Date of assessment:
Name of person/s conducting assessment:

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ENGINEERED NANOMATERIALS WORK HEALTH AND SAFETY INFORMATION

QUESTION 1 - Organisation type

1a. What is the nature of this business in regard to engineered nanomaterials? (Please circle)

- Manufacturing engineered nanomaterials
- Fabricating products using nanomaterials
- Research with engineered nanomaterials
- Importing and/or supplying engineered nanomaterials
- Other (please describe)……..

1b. How many people work in this organisation? (Please circle)

- 1-4
- 5-19
- 20-200
- More than 200

QUESTION 2 - Type of Nanomaterials

2a. How many types of nanomaterial(s) does this organisation handle?

- 1
- 2-5
- 5-10
- More than 10

2b. What type of nanomaterials does this organisation work with and how much is handled daily?

Nanomaterials manufactured, supplied or used		**Physical State**				**Quantity handled daily**				**Major Handling Operation**		
	Nanomaterial details. (for example, substance type e.g. TiO_2, ZnO, or boron nitride nanotubes)	Dry powder	Suspension or liquid	Embedded or bound in other materials	Other	<1mg	1mg to 1gm	1gm to 1kg	>1kg	Manufacture	Supply	Use
Carbon nanotubes												
Quantum dots												
Nano-powders												
Colloidal dispersions												
Fullerenes												
Polymers												
Nanowires												
Nano-crystals												
Carbon black												
Dendrimers												
Nanorods												
Other nanotubes												
Others (please describe)												

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2c. Indicate the form of materials that are used during production or handling processes and storage conditions.

	Material (eg. TiO_2)	**Form of material** (e.g. nanoparticles (powders), micro-sized particles (powders), nanoparticles in suspensions or colloidal dispersions, or nanoparticles embedded or bound in other materials)	**Description of storage system and conditions**, e.g. type of container, environment, etc
Raw materials (materials as supplied)			
Manufactured intermediates **(if any)**			
Final product			

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QUESTION 3 – Processes used

What operating activities does this organisation undertake with engineered nanomaterials?	Additional details on processes used by this organisation for engineered nanomaterials (e.g. type of transport, or type of particle analysis).	Details on how workers perform the activity		
		Number of workers involved	Frequency of the activity	Duration of the activity
Handling/transfer				
Transport				
Mixing/blending/formulating				
Coating				
Storage/disposal				
Waste management				
Maintenance operations				
Particle analysis				
Other (please describe)				

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QUESTION 4 – Controls used to prevent exposure of workers to engineered nanomaterials and other risk management procedures

What control approaches does this organisation use (or has used previously in setting up processes)? **(Please circle)**	**Document further details of the controls used, e.g. the type of equipment, procedures or standards used.**
Equipment design or redesign	
Nanoparticle modification/substitution (e.g. change in chemical, or change in form such as from powder to paste)	
Enclosure of process	
Isolation of work from people	
Fume cupboards/fume hoods	
Other types of local exhaust ventilation, LEV (extraction)	
Are High Efficiency Particulate Air (HEPA) filters used in any extraction systems associated with the controls above?	

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QUESTION 4 – Controls used to prevent exposure of workers to engineered nanomaterials and other risk management procedures (cont.)

What control approaches does this organisation use or has used previously in setting up processes? **(Please circle)**	**Document further details of the controls used, e.g. the type of equipment, procedures or standards used.**
Administrative approaches (e.g. limiting access to work areas, nanomaterial-specific training, or methods for equipment maintenance, cleaning up of spills or material disposal)	
Prevention of the tracking of nanoparticles out of work area on clothing	
Training and induction regarding nanoparticle hazards	
Use of personal protective equipment - PPE, RPE (e.g. gloves, other clothing, respirators, masks, safety glasses, goggles)	
Training on fit checking and fit testing of respirators	
Monitoring of work environment for nanoparticles	
Health surveillance	
Other (please describe)	

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QUESTION 5 – Controls for specific materials or operations

5a. Does this organisation use different controls for nanomaterials than for larger sized chemical substances?

- No (go to 5c)
- Yes (go to 5b)

5b. Describe different controls that this organisation uses for nanomaterials compared to larger size chemical substances.

5c. Does this organisation use different controls for different nanomaterials?

- No (go to 5e)
- Yes (go to 5d)

5d. Describe different controls used for different nanomaterials.

5e. Does this organisation use different controls for different operations (e.g. for mixing, fabrication or handling)?

- No (go to 6)
- Yes (go to 5f)

5f. Describe use of different controls for different operations.

QUESTION 6 – Labelling

6. What labelling or signage does this organisation use on containers and plant where engineered nanoparticles are stored or used?

QUESTION 7 – Material Safety Data Sheet (MSDS/SDS) or other hazard information

7a. Is there an MSDS/SDS at the workplace for the nanomaterial substance or for substances containing nanomaterials?

- Yes (go to 7b)
- No (go to 7d)

7b. Does the MSDS/SDS contain information about nanoscale hazards?

- Yes
- No

7c. Does the MSDS/SDS contain information about nanoscale exposure controls?

- Yes
- No

7d. Is there other information used at this workplace for hazard information?

- Yes (go to 7e)
- No (go to 8a)

7e. Describe this information source (e.g. information sheet from supplier/manufacturer or guidance material).

7f. Are MSDS/SDS and other hazard information readily available to workers?

- Yes
- No

QUESTION 8 – Risk assessments

8a. Has a risk assessment been documented for the organisation's nanotechnology process/es?

- Yes
- No

QUESTION 9 – For manufacturers, importers and suppliers

9a. Does this business manufacture, import or supply products that contain engineered nanomaterials?

- Yes (go to 8b)
- No (go to 9a)

9b. If supplying engineered nanomaterials, is the following information provided about engineered nanomaterials (please circle if yes):

- MSDS/SDS
- Labels
- Other health and safety information
- General product descriptions

QUESTION 10 - General work health and safety issues associated with nanotechnology

10a. Does this organisation need to obtain further information on managing nanotechnology work health and safety issues? (Please circle if yes):

- Information on potential hazards and risks
- Guidance materials (e.g. publications or website information) on:
  - classification
  - providing information on MSDS/SDS and labels
  - risk management, including effective workplace controls and monitoring workplace exposure levels
  - other aspects on nanotechnology work health and safety (please describe)
- Advisory visits by work health and safety specialists, for example, occupational hygienists
- Hazard assessment testing of materials
- Other (please describe)……..

10b. Are there any specific work health and safety issues the organisation has encountered in handling engineered nanomaterials? Please describe.