Introduction to Nanomaterials and Occupational Health

A Training Course for Safety Professionals

Nanomaterials are part of an exciting new area of scientific and technological progress with many potential societal benefits. Research into the health and safety impacts of nanomaterials has raised many questions about how they should be handled in occupational settings.

This eight-hour course will prepare the safety professional or trainer to address issues that may arise in the nanomaterial workplace with a comprehensive review of current knowledge, frameworks for risk management and tools for keeping up with the rapidly expanding knowledge base on nanomaterials’ health and safety impacts.

Course Modules

• Introduction to Nanotechnology and Nanomaterials
• What Workers Need to Know about Nanomaterial Toxicology and Environmental Impacts
• Assessing and Controlling Exposure to Nanomaterials in the Workplace
• Risk Management Approaches for Nanomaterial Workplaces
• Regulations and Standards Relevant to Nanomaterial Workplaces
• Tools and Resources for Further Study

Who Should Take This Course

This course is designed for people with safety and health responsibilities in facilities where nanomaterials are now or may be handled in the future.

• Industrial Hygienists
• Safety Professionals
• Occupational Medicine Professionals
• Environmental, Health and Safety Officers
• Process Safety Engineers
• Lab Managers
• Facility Managers
• Trainers

NO PRIOR KNOWLEDGE OF NANOTECHNOLOGY OR NANOMATERIALS IS REQUIRED

COURSE INSTRUCTORS

Kristen M. Kulinowski, PhD, is an internationally renowned expert in the environmental, health and safety impacts of nanomaterials. She directs the International Council on Nanotechnology (ICON) and is executive director of the Center for Biological and Environmental Nanotechnology at Rice University.

Bruce Lippy, PhD, is a regionally renowned certified industrial hygienist and a certified safety professional. He is an expert in communicating the hazards of operating and maintaining innovative environmental technologies and has served as Director of the National Clearinghouse for Worker Safety and Health Training.

Drs. Kulinowski and Lippy are authors of a recently published white paper for the National Institute for Environmental Health Sciences entitled, “Training Workers on Risks of Nanotechnology.”

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Learning Objectives

**Introduction to Nanotechnology and Nanomaterials**
- Contrast objects at the nanoscale with larger and smaller forms of matter
- Define key terms in nanotechnology
- Explain some of the ways nanomaterial properties differ from molecules and microscale particles
- Describe some of the physical and chemical characteristics that can change at the nanoscale
- Describe some of the major classes of nanomaterials produced today and their properties and potential benefits

**What Workers Need to Know about Nanomaterial Toxicology and Environmental Impacts**
- Find the latest research on the environmental, health and safety (EHS) impacts of nanomaterials using freely available web resources
- Summarize some of the significant EHS research of the past few years
- Understand the significance of the EHS research to occupational safety

**Assessing and Controlling Exposure to Nanomaterials in the Workplace**
- Compare and contrast standard IH sampling and analytical methods with those used for nanoparticles
- Describe the equipment used for nanoparticle sampling and analysis
- Evaluate sampling results and compare them to recommended occupational exposure limits
- Discuss the limitations of nanoparticle sampling and analysis
- Explain the hierarchy of controls and how to apply it to nanoparticles
- Describe the difficulties with substitution
- Describe how a HEPA filter works and its effectiveness against nanoparticles
- Discuss which ventilation systems work best for nanoparticles
- Describe the respiratory protection used by nanoworkers
- List NIOSH’s PPE recommendations for nanoworkers
- Differentiate between qualitative and quantitative fit testing
- Don and doff an elastomeric half-face respirator and/or an N-95 filtering facepiece respirator

**Risk Management Approaches for Nanomaterial Workplaces**
- Explain control banding and give a nanoparticle example
- Describe some of the frameworks that have been developed for managing risks from nanomaterials in the workplace
- Describe the limitations of the current Hazard Communication efforts around engineered nanoparticles

**Regulations and Standards Relevant to Nanomaterial Workplaces**
- State your rights under the OSH Act
- Articulate which OSHA standards apply to nanomaterial workplaces
- Articulate other regulations and standards that are applicable to nanomaterial workplaces

**Tools and Resources for Further Study**
- List several freely available authoritative resources for keeping up-to-date with nanomaterial developments of relevance to occupational safety