

# CONTROLLING HEALTH HAZARDS WHEN WORKING WITH TUBALL™: QUESTIONS to ASK BEFORE STARTING

Here are some questions you should ask yourself before starting work with nanomaterials		Here are some options you can use to reduce exposure to TUBALL™ in the workplace – these options correspond with the questions on the left		
FORM	CONTROL BAND 4 <b>DRY POWDER</b>	CONTROL BAND 2–3 <b>SUSPENDED IN LIQUID</b>	CONTROL BAND 1 <b>PHYSICALLY BOUND/ENCAPSULATED</b> (typically the lowest potential for exposure)	
<p><b>FORM</b> Have you done a job hazard analysis? What is the physical form of the nanomaterial? How much are you using? Can you reduce exposure to the nanomaterial by changing its form (creating a suspension) or by reducing the amount used in each batch?</p>	<p><b>See the Appendix I flowchart and Appendix IV in the SH&amp;U guideline for TUBALL™ for general information</b></p>			
<p><b>WORK ACTIVITY</b> How are you using TUBALL™? Could your work activity cause exposure? Is the likelihood of exposure low or high? Can you change the way to do the activity to reduce the exposure?</p>	<p><b>Applies to dry TUBALL™ powder:</b> - <b>High potential for exposure:</b> dumping bags of TUBALL™ powder, manual bagging/transferring or sieving - <b>Lower potential for exposure:</b> scooping/weighing of TUBALL™ powder</p>	<p><b>Applies to TUBALL™ suspended in liquids:</b> - <b>Higher potential for exposure:</b> Spraying, open-top sonication, producing a mist - <b>Lower potential for exposure:</b> liquid spillage cleaning, blender cleaning, pipetting small amounts, brushing</p>	<p><b>Applies to physically bound/encapsulated TUBALL™:</b> - <b>Higher potential for exposure:</b> Cutting, grinding, sanding, drilling, abrasive blasting, thermal release - <b>Lower potential for exposure:</b> use of solid TUBALL™ MATRIX products, manual cutting and sanding polymer nanocomposites, painting/coating with a roller or brush</p>	
<p><b>ENGINEERING CONTROLS</b> Based on the form and work activity, which engineering controls will be effective? What are the key design and operational requirements for the control? How does the non-nanomaterial base material or liquid affect exposure?</p>	<p><b>Applies to dry TUBALL™ powder:</b> <b>Are exposure monitoring studies available?</b> <b>YES - Follow Good Practice</b> <b>NO - Could TUBALL™ nanoparticles become airborne deliberately?</b> <b>YES</b> - Control type <b>D</b> is applicable <b>NO - Could TUBALL™ nanoparticles become airborne inadvertently?</b> <b>NO - Follow Good Practice</b> <b>YES</b> - Control types <b>B</b> or <b>C</b> are applicable</p>	<p><b>Applies to TUBALL™ suspended in liquids:</b> <b>Are exposure monitoring studies available?</b> <b>YES - Follow Good Practice</b> <b>NO - Could an aerosol be produced?</b> <b>NO - Follow Good Practice</b> <b>YES - Intentionally?</b> <b>NO</b> - Control types <b>B</b> or <b>C</b> are applicable <b>YES</b> - Control type <b>C</b> is applicable</p>	<p><b>Applies to physically bound/encapsulated TUBALL™:</b> <b>Are exposure monitoring studies available?</b> <b>YES - Follow Good Practice</b> <b>NO</b> - Perform an exposure monitoring study OR: - Control type <b>A</b> is applicable IF there is low potential for exposure - Control type <b>B</b> is applicable IF there is high potential for exposure</p>	
<p><b>ADMINISTRATIVE CONTROLS</b> Have you considered the role of administrative controls? Have you set up a plan for waste management? Have you considered what to do in the event of a spill or how you will maintain your equipment and machinery?</p>	<p><b>Applies to TUBALL™ powder and TUBALL™ suspended in liquids:</b> - Establish an Exposure Control Plan and a Risk Assessment! - Store material in sealed containers/bags (double contained) - Use absorbent paper/sticky mats - Use SOPs to ensure good practices - Follow rules of good housekeeping</p>		<p><b>Applies to physically bound/encapsulated TUBALL™:</b> <b>Follow Good Practice</b></p>	
<p><b>PERSONAL PROTECTIVE EQUIPMENT</b> If the measures above do not effectively control the hazard, what PPE can be used? Have you also considered PPE for the non-nanomaterial base material or liquid?</p>	<p><b>Applies to dry TUBALL™ powder:</b> - Full nonwoven coverall and hood - P3 respirator type - see the table in Appendix V - Double gloves (nitrile - or NBR rubber) - Disposable over-booties for shoes - Close-fitting safety glasses - Long trousers (no cuffs)</p>	<p><b>For all mixtures involving TUBALL™, the precautions according to the Safety Data Sheet should be followed</b> Section 8 of the SDS is relevant only</p>		<p>- <b>Lower potential for exposure:</b> Section 8 of SDS is relevant only</p> <p>- <b>High potential for exposure:</b></p> <ul style="list-style-type: none"> <li>• Lab coat</li> <li>• P2 respirator type if potential for dust - see the table in Appendix V</li> <li>• NBR (nitrile rubber) gloves or cotton gloves treated with solid bound material</li> <li>• Safety glasses</li> </ul>
<p><b>WASTE &amp; DISPOSAL</b></p>	<p><b>Disposal of any waste containing TUBALL™ should follow and comply with all applicable local, regional and national waste regulations, including those that are not specific to nanomaterials.</b> See the SH&amp;U guideline for TUBALL™ for precautionary measures.</p>			
<p><b>SPILL &amp; ACCIDENTAL RELEASE</b></p>	<p>- Evacuate employees from an area with accidental release or spill of TUBALL™ - Use tested and certified vacuum equipment</p> <p>Recommended <b>PPE for TUBALL™ spill clean-up:</b></p> <ul style="list-style-type: none"> <li>- Safety goggles</li> <li>- Nitrile gloves</li> <li>- Nonwoven lab coat or coverall</li> </ul> <p><b>All residues resulting from the clean-up of a spill or accidental release (including filters, wipes, absorbent mats and materials) should be treated as hazardous waste</b></p>	<p>- Dry sweeping should be avoided - Use tested and certified vacuum equipment - HEPA vacuum cleaners with minimum H14 filters are most effective - A sticky mat – daily new - A respirator such as a dust mask (filter P3)</p>	<p><b>Applies to physically bound/encapsulated TUBALL™:</b> <b>Follow Good Practice</b></p>	

### CONTROL TYPES

least effective

**A** Capturing and receiving hood, ideally discharged to a safe place outside. HEPA or ULPA+ filtration to be used if recirculated back to the workplace.

**B** Partial enclosure with HEPA or ULPA+ filtration with recirculation to the workplace.

**C** Partial enclosure with HEPA or ULPA+ filtration and discharged to a safe place outside.

most effective

**D** Full enclosure with HEPA or ULPA+ filtration and discharged to a safe place outside.