

## **Guide to safe manufacture and for activities involving nanoparticles at workplaces in BASF AG**

- 1. This guideline is intended for application during manufacture and activities involving**
  - free nanoparticle dust and
  - products containing nanoparticle dust**at the workplace.**

- 2. The inhalation of nanoparticle dust can represent a health hazard. Increased inhalation exposure should therefore be ruled out by taking suitable protective measures.**

Increased inhalation exposure to ultrafine dust occurs when the indicative occupational exposure concentrations are exceeded. Until these values have been defined, exposure of employees should not exceed that of non-contaminated ambient air.

- 3. The health risk associated with dermal exposure to nanoparticle dust is currently estimated as low. In activities involving working materials, dermal exposure should be prevented by taking suitable protective measures in accordance with the applicable safety standards.**

- 4. Exposure to nanoparticles is prevented mainly by technical measures and, if required, by organizational and personal protective measures.**

- 5. As far as possible, nanoparticles are manufactured and used in closed systems.**

Manufacture and activities involving nanoparticles in closed systems are regarded as emission-free.

During operational failures, as for example in the case of leakage, suitable protective measures are to be taken to prevent exposure.

**6. If working steps involving potential emission of nanoparticles are necessary that cannot be performed within closed systems, technical and organizational measures to reduce dust formation are additionally taken.**

Working steps such as filling or transfilling, milling, packaging or sampling are subject to the risk of dust emission.

Additional extractor systems can be used as a technical measure with a successful history of use.

**The technical measures are also supplemented by personal protective measures.**

Suitable personal protective measures to prevent inhalation exposure are respiratory filters of filter class P2 and P3.

If required, a higher protection level can be achieved by using tightly sealing particle filters, for example by the use of a full-face mask with P3 respiratory filter or self-contained breathing apparatus.

Dermal exposure is prevented by applying the usual safety standards for the handling of working materials. Accordingly, chemical resistant gloves and disposable protective overalls are used.

In these cases a higher level of protection can be achieved by the use of chemical protective suits.

**7. Working areas potentially subject to nanoparticle emissions are monitored by workplace or exposure measurement.**

A suitable method at present is the technical monitoring of working areas by total dust measurement (respirable fraction) in accordance with the BG Institute for Occupational Safety and Health (BGIA) Online Folder, Method 7284, and fine dust measurement (alveolar dust fraction) according to BGIA Method 6068.

In addition, working areas will also be monitored in future by the scanning mobility particle size measuring technique, for example with the GRIMM SMPS + C system, to determine the number of particles and the particle size distribution.