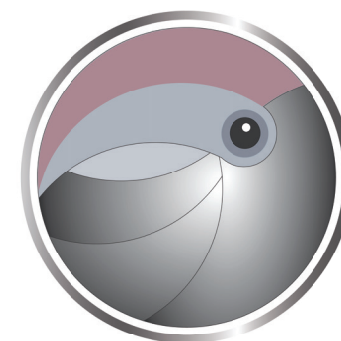


FLAMINGo IN BRIEF

The **FLAMINGo** project aims to develop a highly efficient production of advanced multi-materials with a nanocomponent and introduce them in the conventional metallurgical and forming industrial technologies for production of electric vehicle components. The **assessment** of FLAMINGo's engineered nanomaterials contribution to the pre-existing occupational exposure have been assessed from formulation to the recycling phases of the advanced multi-materials. **Risk management** strategies have also been proposed to limit the risks identified. Note that natural and/or incidental nanomaterials may exist already in workplaces when high-energy processes are involved.



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FLAMINGo

Fabrication of Lightweight
Aluminium Metal Matrix
nano-Composites
and Validation
in Green Vehicles



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FLYER BY



SAFETY TO
NANOMATERIALS IN
THE WORKPLACE:
GENERAL GUIDELINES

WHAT ARE NANOMATERIALS?

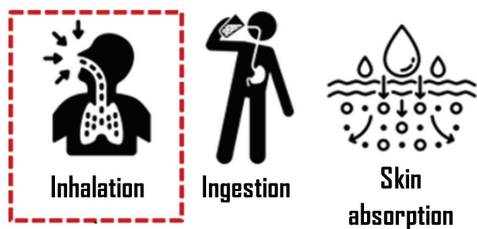
Nanomaterials, defined by the European Commission, encompass natural, incidental, or manufactured/engineered materials existing as solid particles or aggregates/agglomerates.

To qualify as a nanomaterial, over 50% of particles in the size distribution must meet at least one of these criteria:

- External dimensions fall within 1 nm to 100 nm range;
- Elongated shape (e.g. rod, fiber, tube) with two dimensions < 1 nm and one > 100 nm;
- Plate-like shape with one dimension < 1 nm and others > 100 nm.

EXPOSURE ROUTES TO HUMAN BEINGS

During nanoparticles life cycle, human beings can be exposed via inhalation, dermal penetration and ingestion. Along the different stages of materials' use, it is in occupational settings where the highest risk of exposure to engineered nanoparticles can be found, which can lead to serious health effects in a medium to long term.



Main exposure route



WORKPLACE SOURCE RELEASES

Critical activities

- High energy processes: physical and chemical synthesis, machining, abrasion, mechanical;
- Ordinary handling: weighing, mixing, transferring, packaging, cleaning, maintenance.



RISK ASSESSMENT METHODOLOGY AND REGULATIONS

If nanomaterials are present in the workplace, the employer shall assess any risks to the safety and health of workers. The assessment of hazards and risks associated with nanomaterials should be carried out on a case-by-case basis.

Workplace risk assessment requires to know



In the European Union, nanomaterials are covered by the same regulatory framework that ensures the safe use of all chemicals and mixtures, i.e. REACH and CLP regulations. Several organizations have been developing research activities with specific relevance for regulatory issues related to nanomaterials.



RISK CONTROL STRATEGIES

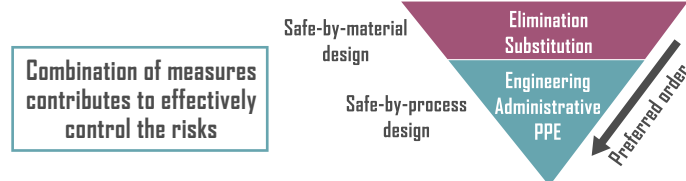
Limiting exposure to risks at work is essential for worker protection. The optimum course of action for controlling exposures can be established via the hierarchy of controls, i.e.

1. Safe-by-material design/ Hazard/ Toxicity control:

Modification of nanomaterial properties while maintaining their functionality.

2. Safe-by-process design/ Exposure control:

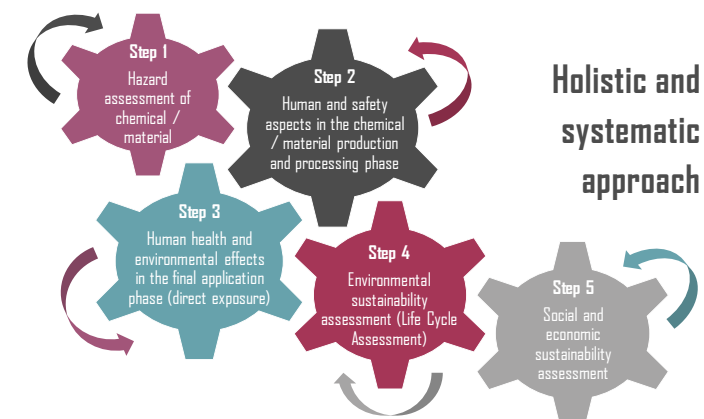
Reduce the release of nanomaterials from industrial processes or limit the exposure of workers.



Combination of measures contributes to effectively control the risks

As a preventive safe-by-material design measure, nanomaterial powders were embedded in a matrix in the FLAMINGo formulation phase, since a matrix containing nanomaterials represents a low level of human exposure (except if they are subjected to cutting or grinding processes).

SAFE AND SUSTAINABLE BY DESIGN (SSBD) FRAMEWORK



For more information, please access the European Commission's website: <https://environment.ec.europa.eu/topics/chemicals>