Terminology

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- *Agglomerate:* a group of particles held together by relatively weak forces (for example, Van der Waals), that may break apart into smaller *particles* upon processing.

- *Aggregate:* a discrete group of particles in which the various individual components are not easily broken apart, such as in the case of *primary particles* that are strongly bonded together (for example, fused, sintered, or metallically bonded particles).

- *Bound engineered nano-object (BENO): engineered nano-objects* that, under reasonably foreseeable conditions encountered in the work, are contained within a matrix that would be expected to prevent the *nano-objects* from being separately mobile and a potential source of exposure. An *engineered nano-object* dispersed and fixed within a polymer matrix, incapable, as a practical matter, of becoming airborne, would be "bound".

- *Engineered Nanomaterial:* Material that is intentionally produced to have specific properties or specific composition and is either a *nano-object* or is *nanostructured.*

  Note: Volume Specific Surface Area (VSSA) has been suggested as a parameter (in addition to particle size) to differentiate particulate nanomaterial from non-nanomaterial, suggesting that ≥ 60 m^2/cm^3 be considered as nanomaterial since a 100 nm spherical non-porous particle of 1 g/cm^3 density would have a BET specific surface area of 60 m^2/g. For instance, a particulate with a bulk density of 1 g/cm^3 and a BET specific surface area of 60 m^2/g would have a VSSA of 60 m^2/cm^3, i.e., (BET SSA)*(bulk density), (60 m^2/g)*(1g/cm^3). As another example, a particulate with a bulk density of 4.26 g/cm^3 and a BET specific surface area of 14 m^2/g would have a VSSA of 60 m^2/cm^3, i.e., (BET SSA)*(bulk density), (14 m^2/g)*(4.26 g/cm^3).

- *Engineered nano-object (ENO):* Material that is intentionally produced to have specific properties or specific composition and has one, two or three external dimensions in the *nanoscale.*

  Note: Examples of *engineered nano-objects* include intentionally produced *nanoparticles, nanofibres, nanoplates,* fullerenes, nanotubes, nanowires, nanoplates, *nanoscale* metals or metal oxides, quantum dots, etc.

- *Engineered nano-object worker:* a worker who performs any of the following activities: handles or works with "free" or "unbound" *ENOs* such as powders or liquid dispersions containing *ENOs* or *agglomerates* thereof; performs machining, sanding, drilling, or other types of mechanical disruption of materials containing *BENOs*; routinely spends time in an area in which *ENOs* have the potential to become dispersed in the air; cleanup of spills or waste material containing "free" or "unbound" *ENOs*; works on or performs maintenance of equipment that might contain

or bear “free” or “unbound” *ENOs* and that could release “free” or “unbound” *ENOs* during servicing or maintenance.

Note: Those exposed to *incidental nano-objects* or *nanoparticles* are not considered *engineered nano-object* workers.

- *Incidental nanoparticles: nanoparticles* which are NOT intentionally produced to have specific properties or specific composition.

Note: *Incidental nanoparticles* may be by-products formed whenever something is burned or combusted (e.g., burning of diesel fuel, natural gas, firewood, candles, incense, tobacco, etc.), formed during hot processes (e.g., smelting, welding, soldering, thermal cutting, thermal spraying, asphalt fumes, working around molten lead crystal glass, bakery, frying, gas ovens, etc.), laser beam processing, and high speed grinding.

- *Nanofibre: nano-object* with two similar dimensions in the *nanoscale* and the third dimension significantly larger

- *Nano-object:* material with one, two or three external dimensions in the nanoscale

- *Nanoparticle: nano-object* with all three external dimensions in the *nanoscale*

Note: there is some disagreement on how many dimensions of a particle must be confined to the *nanoscale* in order for the particle to be considered a *nanoparticle*. Some consider particles with at least one dimension confined to the *nanoscale* to be a *nanoparticle*, while others consider particles with at least two dimensions confined to the *nanoscale*, and others consider particles with all three dimensions confined to the *nanoscale*. The definition chosen herein is in accordance with that defined by the ISO Technical Committee 229 Nanotechnologies.

- *Nanoplate: nano-object* with one external dimension in the *nanoscale* and the two other dimensions significantly larger

- *Nanoscale:* size range from approximately 1 nanometers (nm) to 100 nm

- *Nanostructured:* Having an internal or surface structure at the *nanoscale*.

Note: An *agglomerate* or *aggregate* of *nano-objects* is considered *nanostructured* whether the size of the *agglomerate* or *aggregate* is within the *nanoscale* or larger than the *nanoscale*, e.g., a 100 micrometer size *agglomerate* of carbon nanotubes is larger than the *nanoscale* but is *nanostructured* since the carbon nanotubes are *nano-objects*.

- *Particle:* a small object that behaves as a whole unit in terms of its transport and properties.

- *Primary particle:* smallest identifiable subdivision of a particulate system

Note: For example, the discrete *particles* within an *agglomerate* or *aggregate*

Unbound engineered nano-object (UENO): engineered nano-objects that, under reasonably foreseeable conditions encountered in the work, are not contained within a matrix that would be expected to prevent the *engineered nano-objects* from being separately mobile and a potential source of exposure. An *engineered nano-object* suspended as an aerosol or in a liquid would be “unbound” or “free”.