

## UPM AND NANOTECHNOLOGY

### What is Nanotechnology?

Nanotechnology is engineering of functional systems at the molecular scale of 1 - 100 nanometers (nm). It offers a wide range of new opportunities to improve existing materials and create new materials with high added value. Due to their smaller size, altered volume and surface ratio, nanomaterials show different physical and chemical properties than their related bulk materials and therefore have drawn major interest. Nanosized materials bear the potential of many new applications in many fields and industries. The advantages of nanotechnology are being used for example in coatings, computer chips, suntan lotion, clothing, cosmetics and medical devices.

The International Organization for Standardization defines the term "nanomaterial" as "material with any external dimensions in the nanoscale or having internal structure or surface structure in the nanoscale". The term "nanoscale" is defined as size range from approximately 1 nm to 100 nm. The EU Commission has given the following recommendation for defining nanomaterial (2011/696/EU): "Nanomaterial means a natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50 % or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm-100 nm".

### UPM paper products

UPM recognizes the concerns of its' various interest groups concerning nanoparticles and nanomaterials in general. Currently UPM isn't using any intentionally manufactured nanomaterials as a raw material in paper production. For more information about UPM paper products pls. contact Mrs. Anne Lihvonen.

### UPM Biofibrils

UPM has run development projects of nano and micro fibrillated cellulose hydrogel since 2008. Raw material for this type of fibrillated cellulose (UPM Biofibrils) is natural based wood pulp. The development of UPM Biofibrils is part of UPM's renewal and Biofore strategy. UPM Biofibrils can be used as a high-performance additive in e.g. paints and coatings, concrete, oil drilling fluids and various other industrial applications where an efficient alternative for stabilization of particles is needed. UPM offers a special grade of fibrillated cellulose for cell culture applications (UPM GrowDex). UPM Biofibrils is also studied as an additive for paper and packaging applications. UPM Biofibrils can help to make a product stronger, lighter or thinner, depending on the end use. Often the product gives a more environmentally friendly alternative to a traditionally used solution.

The understanding of nanomaterials continues to develop both in terms of their potential risks as well as their potential benefits. The paper and board sector is working, in close liaison with other industry sectors, to improve this understanding as a key factor in the responsible development of nanotechnologies. UPM is committed to the precautionary principle and its policy is to comply with all existing and evolving laws and regulations related to the use of all materials. UPM actively promotes comprehensive research on the safe use of nanotechnology applications. In practice this is realized through co-operation projects, such as NanoReg, with the Finnish Safety and Chemicals Agency (TUKES) and the Finnish Institute of Occupational Health (TTL). In addition, UPM participates in work carried via the Finnish Forest Industries Federation and has active dialogue with the European Chemicals Agency (ECHA). For more information about the UPM Biofibrils pls. contact Dr. Michael Duetsch, Director, Biochemicals.

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