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NSAI Standards

Standard Recommendation
S.R. CEN ISO/TS 27687:2009

Nanotechnologies - Terminology and definitions for nano-objects - Nanoparticle, nanofibre and nanoplate (ISO/TS 27687:2008)

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NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

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TECHNICAL SPECIFICATION

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English Version

Nanotechnologies - Terminology and definitions for nano-objects - Nanoparticle, nanofibre and nanoplate (ISO/TS 27687:2008)

Nanotechnologies - Terminologie et définitions relatives aux nano-objets - Nanoparticule, nanofibre et nanofeuillet (ISO/TS 27687:2008)

Nanotechnologien - Terminologie und Begriffe für Nanoobjekte - Nanopartikel, Nanofaser und Nanoplättchen (ISO/TS 27687:2008)

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Foreword

The text of ISO/TS 27687:2008 has been prepared by Technical Committee ISO/TC 229 “Nanotechnologies” of the International Organization for Standardization (ISO) and has been taken over as CEN ISO/TS 27687:2009 by Technical Committee CEN/TC 352 “Nanotechnologies” the secretariat of which is held by BSI.

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S.R. CEN/TS 27687:2009

TECHNICAL SPECIFICATION

ISO/TS 27687

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2009-02-01

Nanotechnologies — Terminology and definitions for nano-objects — Nanoparticle, nanofibre and nanoplate

Nanotechnologies — Terminologie et définitions relatives aux nano-objets — Nanoparticule, nanofibre et nanoplat

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

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ISO/TS 27687 was prepared by Technical Committee ISO/TC 229, *Nanotechnologies*.

In this corrected version of ISO/TS 27687:2008, the caption for Figure 1 b) has been altered, a terminology change has been made in the bottom, right-hand box of Figure 2 and the second line of the NOTE under 4.1 has been altered to align with Figure 1 b).

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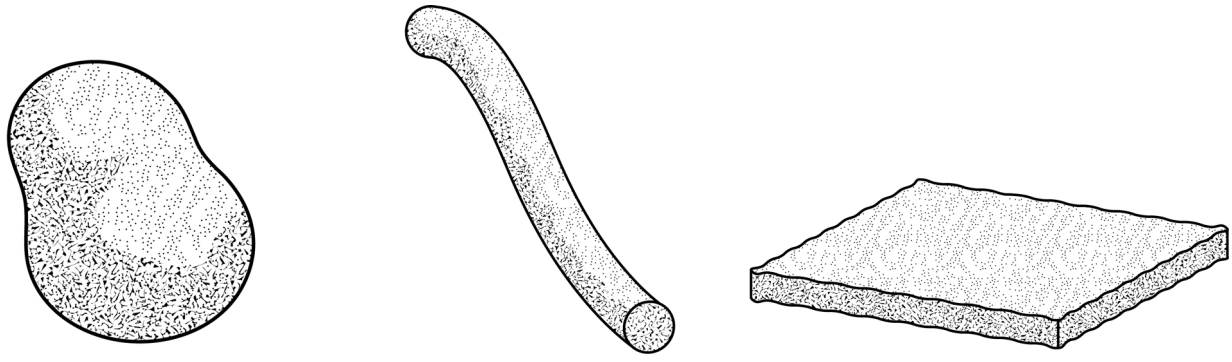
Introduction

As many authorities predict that applications of nanotechnologies will pervade all areas of life and will enable dramatic advances to be realized in all areas of communication, health, manufacturing, materials and knowledge-based technologies, there is an obvious need to provide industry and research with suitable tools to aid the development and application of those technologies. It is also essential that regulators and health and environmental protection agencies have available reliable measurement systems and evaluation protocols supported by well-founded and robust standards.

Often in the field of nanotechnologies, researchers with the aid of microscopes name materials inspired by the shape of objects found in everyday life although the physical size is much smaller. The prefix, nano-, is often added to denote the small size of the object. (The prefix nano-, is also used in S.I. units to indicate 10^{-9} e.g. 1 nanometre = 10^{-9} metre.)

To create a unitary standard, this terminology and definitions document encompasses terms used in both nanosciences and nanotechnologies concerning particles at the nano-scale. Nano-object and other new terms are coined to allow development of a rational hierarchical system of definitions. This hierarchy will allow systematic building of vocabulary and is contained in a larger hierarchy of terms under development for nanotechnologies. This document provides an up-to-date listing of terms and definitions relevant to the area. It forms one part of a projected multi-part terminology and definitions document covering the different aspects of nanotechnologies. It is intended to facilitate communications between organizations and individuals in industry and those who interact with them.

This document is concerned with the definition of terminology and definitions for these small objects. These objects come in several shapes; the three basic shapes referred to in this document are illustrated in Figure 1:



a) nanoparticle **b) nanofibre** **c) nanoplate**

Figure 1 — Schematic diagrams showing some shapes for nano-objects

There is a hierarchical relationship between many of the different terms in the document. Some elements of this are shown in Figure 2 to illustrate some of the relationships that exist.

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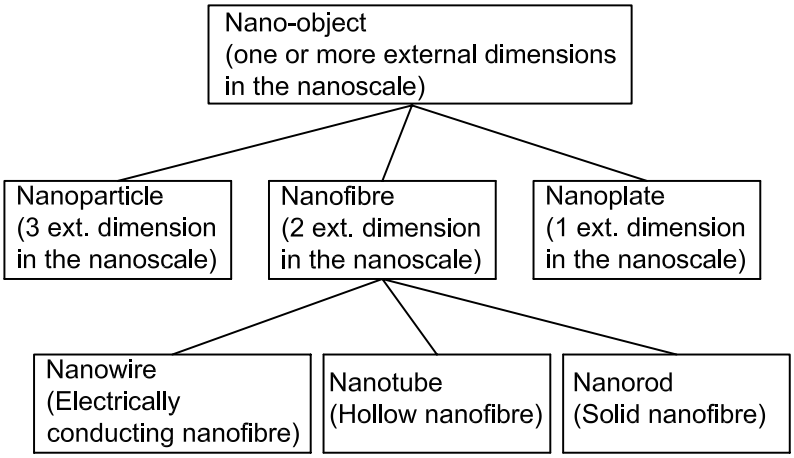

Figure 2 — Fragment of hierarchy of terms related to nano-objects

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Nanotechnologies — Terminology and definitions for nano-objects — Nanoparticle, nanofibre and nanoplate

1 Scope

This Technical Specification lists terms and definitions related to particles in the field of nanotechnologies. It is intended to facilitate communications between organizations and individuals in industry and those who interact with them.

2 Core terms related to particles

2.1
nanoscale
size range from approximately 1 nm to 100 nm

NOTE 1 Properties that are not extrapolations from a larger size will typically, but not exclusively, be exhibited in this size range. For such properties the size limits are considered approximate.

NOTE 2 The lower limit in this definition (approximately 1 nm) is introduced to avoid single and small groups of atoms from being designated as nano-objects or elements of nanostructures, which might be implied by the absence of a lower limit.

2.2
nano-object
material with one, two or three external dimensions in the **nanoscale**

NOTE Generic term for all discrete **nanoscale** objects.

3 Terms concerning particles and assemblies of particles

Nano-objects (for example nanoparticles, nanofibres, and nanoplates see Clause 4), often occur in (large) groups, rather than isolated. For reasons of surface energy, such coexisting nano-objects are likely to interact. In the description of these interactions, the following terms are often used. The following terms are not restricted with respect to physical size and shape. These terms are included for completeness and their importance at the nanoscale.

3.1
particle
minute piece of matter with defined physical boundaries

[ISO 14644-6:2007, definition 2.102]

NOTE 1 A physical boundary can also be described as an interface.

NOTE 2 A particle can move as a unit.

NOTE 3 This general particle definition applies to nano-objects.

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