Setting Global Standards for Nanotechnology

As the nanotechnology industry evolves, the need for globally relevant standards – from particle properties and terminology to health, safety, and the environment – is becoming increasingly apparent. This article, the first in a series, introduces how the U.S. is influencing nano-related standards on the international scene.

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The burgeoning nanotechnology industry has created a critical need for standards to support the cross-border trade of nano-related goods and services while also protecting the environment and the health and safety of consumers. These standards can only be set if there is active engagement by the same individuals and organizations that are working to advance the technology. Stakeholder insights and knowledge help to identify the priorities for standard-setting that will impact the widespread commercialization of nanotechnology and its influence in areas ranging from medicine to energy conservation.

The Building Blocks: Cross-Sector Coordination

In 2004, the American National Standards Institute (ANSI) formed its Nanotechnology Standards Panel (ANSI-NSP) in direct response to a request from the Office of Science and Technology Policy in the Executive Office of the President of the United States. This group serves as a cross-sector coordinating body that facilitates the development of standards in the area of nanotechnology. The Panel does not itself develop standards; rather, ANSI-NSP works with other national, regional, and international standards bodies, as well as industry, academic, and government stakeholders, to establish work plans, harmonize efforts, and mitigate duplication or overlap.

By soliciting participation from nanotechnology-related sectors and academia that have not traditionally participated in the voluntary standards system, the Panel provides opportunities for experts to identify and shape the specific needs to be addressed.

The next advancements came in 2005 and 2006, respectively, when the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) each formed Technical Committees (TCs) to create and promote the implementation of nanotechnology standards. As the official U.S. national body to ISO and, via the U.S. National Committee, the IEC, ANSI offers U.S. stakeholders a voice on the global stage.

IEC's TC 113, *Nanotechnology standardization for electrical and electronic products and systems*, focuses on relevant nanotechnological aspects in developing generic standards for electrical and electronic products and systems. This includes electronics,

optics, magnetics and electromagnetics, electroacoustics, multimedia, telecommunication, and energy production. Dr. Thomas Chapin of Underwriters Laboratories represents the U.S. as chairman of TC 113, and the USNC-approved U.S. Technical Advisory Group (TAG) to TC 113 is administered by the National Electrical Manufacturers Association (NEMA).

A TAG develops national input on technical issues, submitting contributions on behalf of its constituents and responding to the contributions of other nations. Accordingly, delegations comprised of TAG members present these positions to ISO, where consensus agreements are reached.

Every member of a TAG has an equal voice, from industry giants to smaller organizations and institutions that focus specifically on the development of nanoscale materials.

Working with a broader perspective, ISO's TC 229, *Nanotechnologies*, develops standards that support the nanotechnology industry, specifically in the areas of terminology, nomenclature, measurement, and instrumentation. The Committee's scope of work also includes specifications for reference materials, test terminologies, modeling and simulation, and science-based health, safety, and environmental practices. Nearly thirty nations participate actively in the TC; nine additional countries monitor the work of the TC as observers.

The TC's technical activities are divided among four Working Groups* (WGs):

- WG 1, Terminology and nomenclature;
- WG 2, Measurement and characterization;
- WG 3, Health, Safety and Environment; and
- WG 4, Material specifications.

TC 229/WG 3, which deals with the development of science-based standards in the areas of health, safety, and

TC 229/WG 3 Set to Publish Technical Report on Occupational Safety Practices

WG 3, the group within TC 229 that focuses on the health, safety, and environmental aspects of nanotechnology, finalized plans to publish a guidance document, *Health and safety practices in occupational settings relevant to nanotechnologies*.

"This Technical Report, which builds on NIOSH guidance, represents a major milestone toward responsible development of nanotechnology and is expected to be widely adopted as a foundation for national nanotechnology occupational safety and health programs around the world," said Vladimir Murashov, special assistant on nanotechnology to the director of the National Institute for Occupational Safety and Health (NIOSH), and the project leader for this initiative.

As nanotechnologies gain new commercial applications, issues of safety will continue to arise. However, as the report states, the occupational health and safety effects of new nanomaterials are mostly unknown. The report explores questions of the occupational safety and health risks raised by bringing nanomaterials into the workplace, and the international standards that are needed to address these issues.

environmental aspects of nanotechnologies, is convened by Steven Brown of Intel Corporation.

Across the board, the United States participates actively in the work of ISO/TC 229 and its subsidiary bodies.

National input is developed by U.S. TAG to ISO/TC 229, a group that is accredited and administered by ANSI. Working primarily via correspondence or meeting in-person as needed, the TAG reviews documents and position statements from other countries and formulates U.S. positions for consideration at meetings of ISO/TC 229 and its WGs. The TAG also provides information about ISO's standards development activities to the U.S. nanotechnology community, including stakeholders from the industry, government, academic, and standards and conformity assessment communities.

Call for Participation

Through the work of ANSI-NSP, participation in IEC TC 113 and ISO/TC 229 – via the respective U.S. TAGs – and leadership of the TC 229 WG on health, safety, and environmental aspects of nanotechnology, the U.S. is influencing how nanotechnology standards will shape the future of multiple industries across the world.

Interested parties are encouraged to join these efforts and participate actively in the groups of interest:

- For more information on ANSI-NSP, visit www.ansi.org/nsp.
- For more information on the U.S. TAG for ISO/TC 229, visit www.ansi.org/iscotc229tag.
- To participate in ANSI-NSP or join the U.S. TAG for ISO/TC 229, please contact Heather Benko (212.642.4912, hbenko@ansi.org).

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*The work of ISO/TC 229 and its WGs will be explained in more detail during this series.