



OUTCOME FROM A RECENT OECD SURVEY ON SAFETY TESTING OF NANOPLASTICS

Eugene Choi, Policy Analyst
Environment, Health and Safety Division
Environment Directorate
OECD



Organization for Economic Cooperation and Development



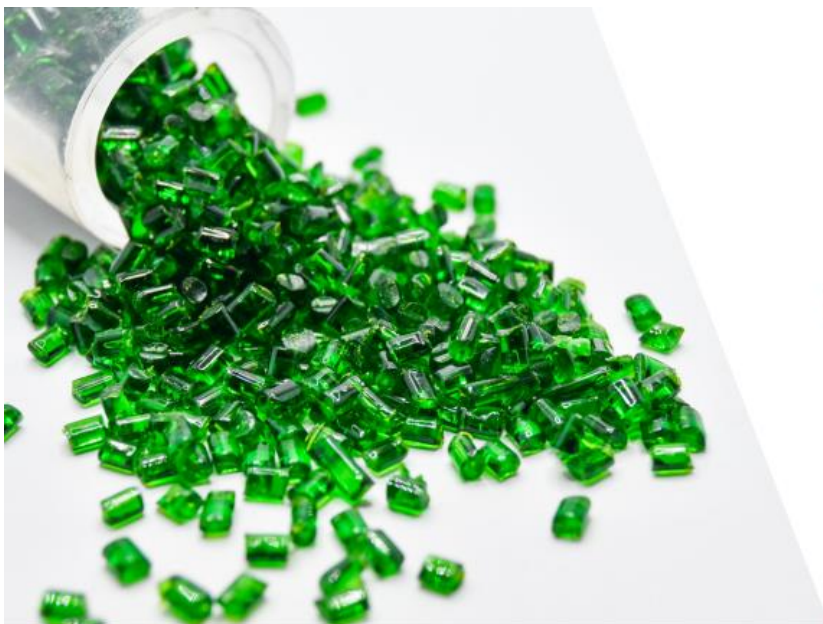
Environment
Directorate

Environment Policy
Committee (EPOC)

Chemical and
Biotechnology
Committee (CBC)



Chemical Management and Plastics at OECD



Chemicals Management and Plastics

An overview of OECD resources

OECD, CHEMICALS MANAGEMENT AND PLASTICS

For 50 years, the OECD has been dedicated to protecting health and the environment by promoting chemical safety worldwide. Modern life without chemicals would be inconceivable; chemicals are part of our daily life. The polymers and other substances that make up plastics are all chemicals. Therefore, the tools and approaches that have been developed for chemical assessment and management can be used in the context of plastics 'ingredients'. This brochure presents examples of OECD work on chemicals relevant to plastics.





Chemical Management and Plastics at OECD

OECD
Definition of
Polymers



1990s

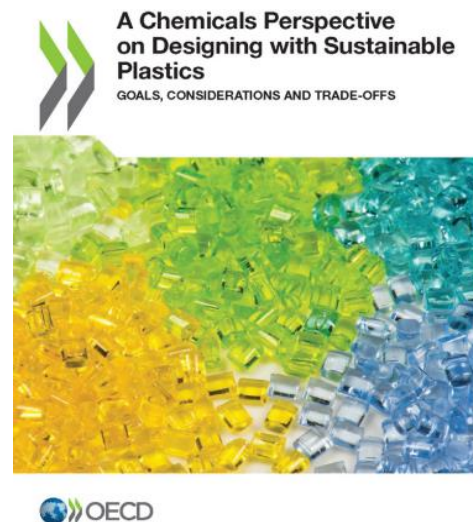
OECD Criteria for Decision
Making Regarding Low Concern
for Polymers



1993 – 2007

No Agreement Reached
Several countries used the
discussion to build reduced
regulations that are fit-for-purpose

Restricted Use - À usage restreint



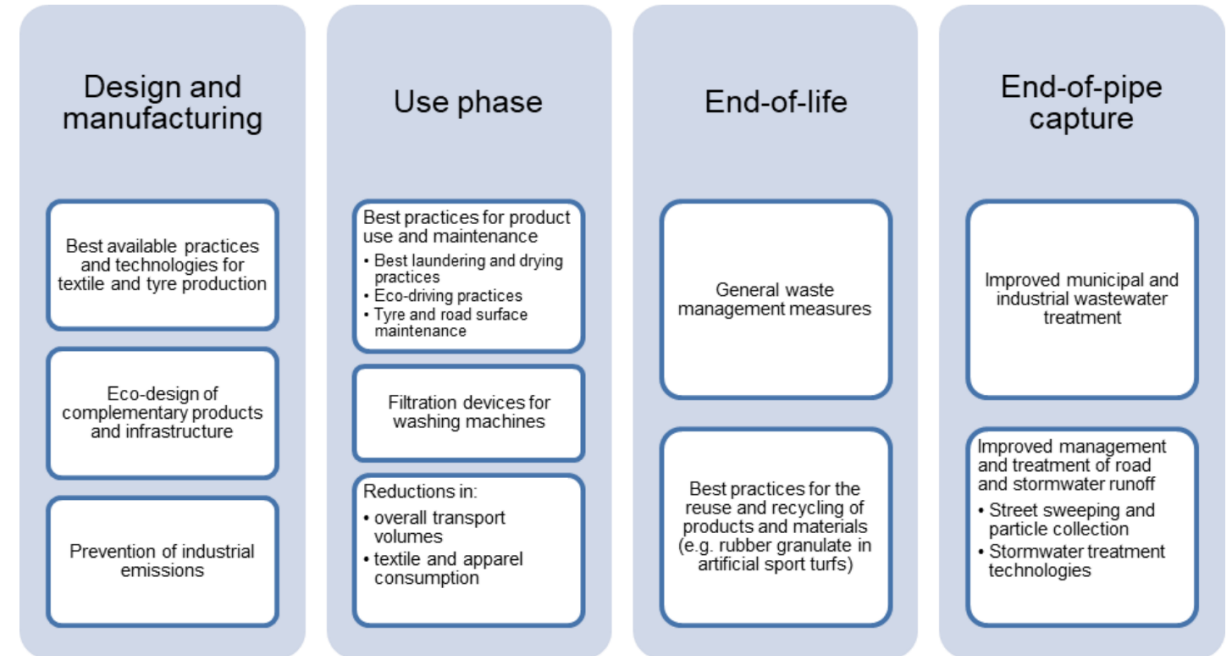
2021





OECD Work on Microplastics

Figure 3.1. Overview of microplastics mitigation entry points and actions (for textiles and tyres)



Policies to Reduce Microplastics Pollution in Water

FOCUS ON TEXTILES AND TYRES



OECD, 2021





Chemical Management and Mitigation Policies for Plastics at OECD

Chemical Perspective
Sustainable Design

Policy Perspective
Circular Economy
Reduction in Production and Use



Can OECD Test Guidelines be used for nanoplastics?

Test Guideline	+	GLP	=	MAD
Internationally harmonised methods for evaluating chemical safety		Principles and conditions under which laboratory studies are conducted, reported and recorded		Studies conducted using OECD TG and according to GLP fall under the Mutual Acceptance of Data

MAD is a legal agreement among all member and partner countries that share a common data requirement to accept the data generated by other member countries

OECD Council Act on MAD (1981)

ANNEX I: OECD Test Guidelines

→ scientific standard that establishes the relevance and reliability of the method

ANNEX II: OECD Principles of Good Laboratory Practice

→ quality standard

~200 OECD Test Guidelines





OECD Test Guidelines and Guidance Documents for Nanomaterials

Physical-Chemical Properties

- [TG 124 on the \(Volume\) Specific Surface Area of MNs](#)
- [TG 125 on particle size and size distribution of MNs](#)
- [TG 126 on the Determination of the Hydrophobicity Index of Nanomaterials Through an Affinity Measurement](#)

Under preparation

- Guidance Document (GD) on Determination of solubility and dissolution rate of NMs in water and relevant synthetic biological media
- GD on identification and quantification of the surface chemistry and coatings on nano- and microscale materials
- TG + GD on Determination of the Dustiness of Manufactured Nanomaterials
- GD on the determination of concentrations of nanoparticles in biological samples for (eco)toxicity studies



OECD Test Guidelines and Guidance Documents for Nanomaterials

Effects on Biotic Systems

- [GD on Testing Nanomaterials using OECD TG 312 “Leaching in Soil Columns”](#)
- [GD 317: Aquatic and Sediment Ecotoxicity Testing](#)
- [Adaptation of OECD Test Guidelines 201, 202 and 203 for the determination of the ecotoxicity of MNs](#)

Environmental Fate & Behaviour

- [TG 318: Dispersion Stability in Simulated Environmental Media](#)
- [Scoping review for a tiered approach for reliable bioaccumulation assessment of MNs in environmental organisms minimising use of higher tier vertebrate tests](#)
- [Study Report on a test for removal in wastewater treatment plants of gold manufactured nanomaterials](#)
- [GD on assessing the apparent accumulation potential for NMs](#)
- [GD 318: Guidance Document for the Testing of Dissolution and Dispersion Stability of Nanomaterials, and the Use of the Data for Further Environmental Testing and Assessment](#)

Under preparation

- TG on dissolution rate of NMs in aquatic environment
- GD Environmental abiotic transformation of Nanomaterials



OECD Test Guidelines and Guidance Documents for Nanomaterials

Health Effects

- [Study Report and Lessons learned on the Adaptation of *In Vitro* Mammalian Cell Based Genotoxicity TGs for Testing of MNs](#)
- [DRP Applicability of the key event-based TG 442D for *in vitro* skin sensitisation testing of NMs](#)
- [28 Day \(sub-acute\) Inhalation toxicity study](#) **TG 412**
- [90 Day \(Subchronic\) Toxicity Study](#) **TG 413**

Under preparation

- GD on toxicokinetics to accommodate testing of nanoparticles
- GD on in vitro testing for Intestinal Fate of Orally Ingested Nanomaterials
- Validation of the In Vitro Micronucleus Assay for Engineered Nanomaterials

Other Relevant documents

★1

- Guidance Notes on Sample Preparation and Dosimetry 3rd Edition
- Guidance Document on Grouping (includes Nanomaterials)
- Identification of exposure metrics for use in evaluation of inhalation exposure to nano-objects and their aggregates and agglomerates (NOAA) in the workplace

Under preparation

- Guidance on Release Tests for Manufactured Nanomaterials



OECD survey and workshop on Safety Testing of Nanoplastics

- OECD Workshop on Safety Testing of Nanoplastics with a focus on Reference Materials (RMs) and Test Materials
- Paris, OECD (hybrid)
- 12 – 14 November 2025

- OECD Survey on Safety Testing of Nanoplastics
 - OECD Steering Group on Nanoplastics (Expert Group representing OECD Member States, BIAC, and other organizations)



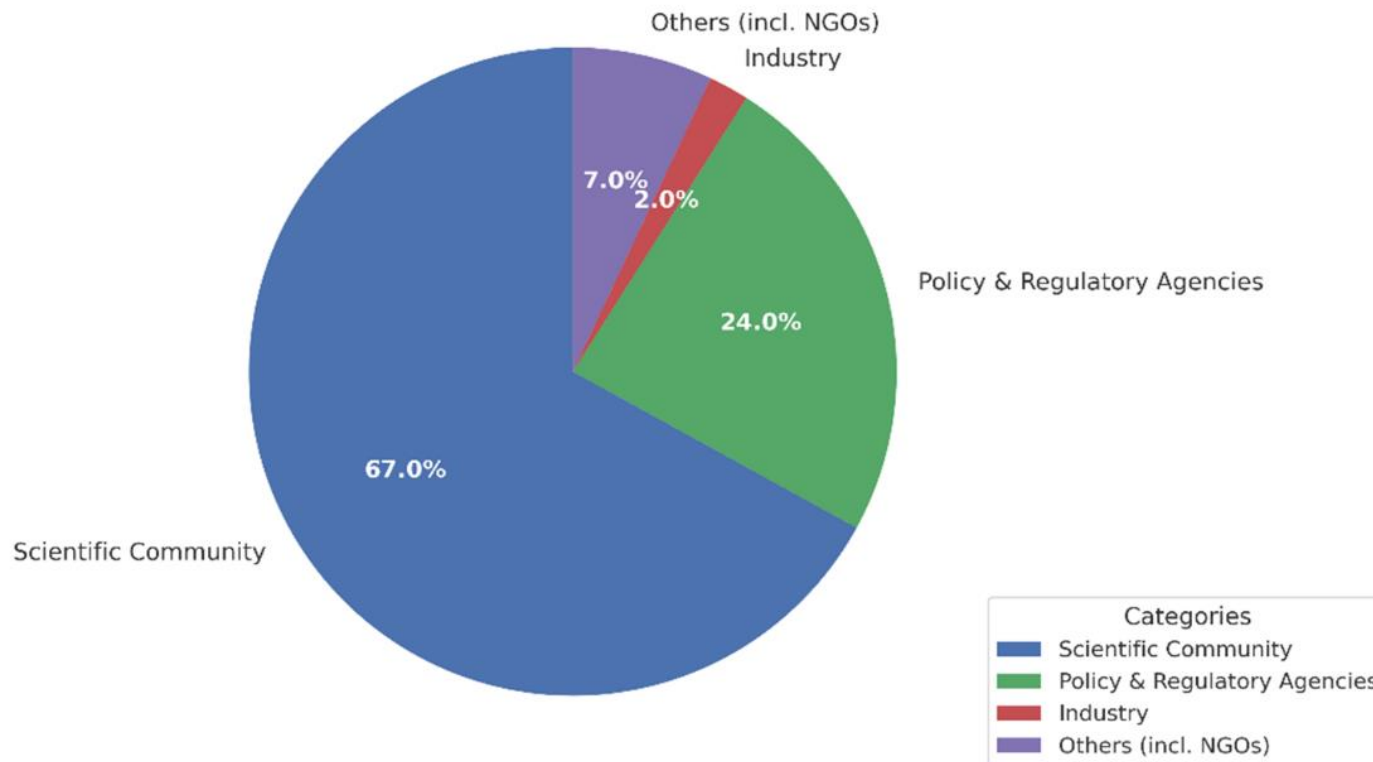
OECD Survey on Nanoplastics

- Objectives :
 - Mapping awareness and ongoing activities related to the safety testing of nanoplastics
 - Identifying challenges and needs in the safety testing of nanoplastics; and
 - Seeking recommendation on OECD Workshop on Safety Testing of Nanoplastics



Survey respondents by occupation/field

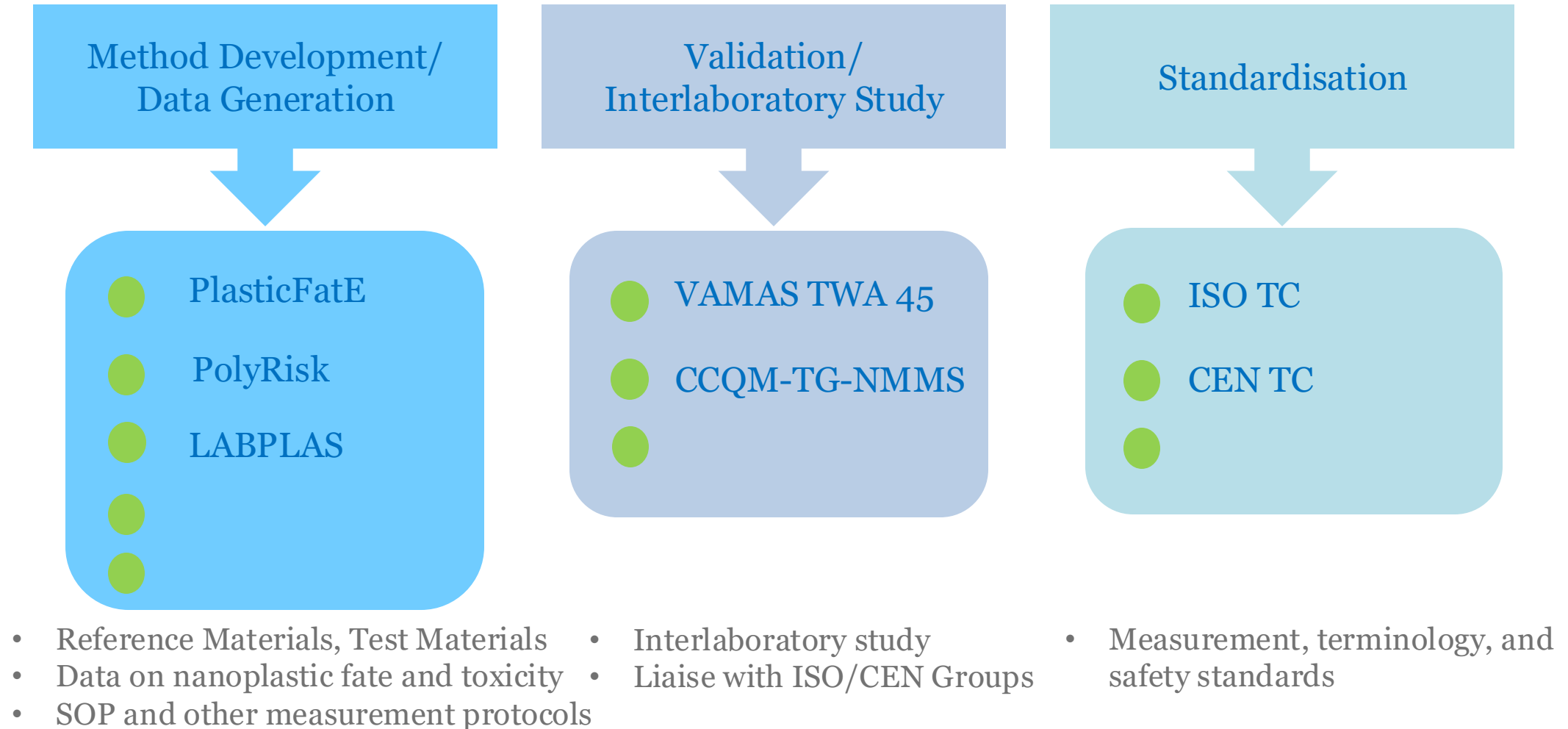
Respondents by Occupation/Field



32 respondents from 17 countries, including Columbia, Mexico, Norway, the UK, the US, France, Portugal, Australia, Japan, Germany, Sweden, Canada, Spain, Brazil, Korea, Switzerland, and Croatia, as well as BIAC.



Survey Outcome I: Mapping ongoing activities





Survey Outcome II: Challenges in Safety Testing of Nanoplastics

Responses received on the issues related to safety testing of nanoplastics

Issue presented	Number of responses that identified the given issue as a challenge	%
Lack of standardization and established guidelines	29	90.6%
Lack of widely accepted certified reference materials (CRMs) for nanoplastics	28	87.5%
Difficulty in distinguishing nanoplastics from natural organic matter in real samples	25	78.1%
Lack of analytical techniques (size and polymer type limitations)	24	75.0%
Limited resources	13	40.6%
Complexity of testing irregularly shaped nanoplastics	11	34.4%
Unclear definitions of nanoplastics	10	31.3%
Others	10	31.3%



Survey Outcome II: Challenges in Safety Testing of Nanoplastics

Responses received on the main challenges for enforcing a regulatory framework for the safety testing of nanoplastics

Challenges presented	Number of responses that identified the given challenge as a priority	%
Scientific uncertainties	29	93.5%
Technological limitations	26	83.9%
Economic factors	14	45.2%
Others (see Table 6)	6	19.4%



Survey Outcome II: Challenges in Safety Testing of Nanoplastics

- **Suggested way towards a regulatory framework for nanoplastic safety testing**

Reference Materials (RMs)	• Environmentally relevant nanoplastics with fully physicochemical characterization • Libraries of nanoplastic samples depending on sizes, shapes, polymer compositions, surface chemistries, weathered materials, etc that can be accessed globally. • Tailor RMs for different purposes (e.g., toxicology, exposure assessment, analytical calibration, etc)
Analytical and Detection Methods	• Need detection/quantification methods for real-world complex matrices (e.g., soil, water, sediments, tissues) • Standardize instruments, protocols, and SOPs
Standards, Guidelines & Harmonisation	• Harmonize definitions, terminology, SOPs, and make necessary adaptation of OECD Test Guidelines • Ensure minimum reporting requirements for publications (e.g., particle properties, exposure conditions, analytical details)



Survey Outcome III: Reference Materials (RMs) and Test Materials (TMs) for safety testing of micro- and nanoplastics

- Few commercial options for reference nanoplastics
- Available reference materials not applicable to the study needs due to incompatibility for size, side components, and available quantity
- Reference material standards (ISO/IEC 17034) not generally followed (based on the survey results).
- Additional well-defined characterisation criteria are needed for reference nanoplastics, which could be application-specific.



OECD Workshop on Safety Testing of Nanoplastics

- Where is the knowledge gap?
- What are the minimum criteria needed for reproducible and comparable studies?
- What are the existing sources and lessons learned from the work on microplastics and nanomaterials that can be applied to nanoplastics?
- Are current regulatory frameworks (hazard identification, characterisation, exposure assessment, risk assessment, etc) applicable to nanoplastics assessment and management?



Thank you!



OECD > Topics > Testing of chemicals

Testing of chemicals

Around 1000 new chemicals enter the market every year. Ensuring the safety of chemicals is a challenge that countries cannot deal with alone. To tackle this, the OECD developed Guidelines for the Testing of Chemicals and Good Laboratory Practice standards to ensure reliable data, saving EUR 309 million annually through the Mutual Acceptance of Data (MAD) system and avoiding duplicative testing.

Policy sub-issue



For more information:



<https://www.oecd.org/chemicalsafety/>



[@OECD_ENV](https://twitter.com/OECD_ENV)



[OECD Environment](https://www.linkedin.com/company/oecd-environment/)



<http://bit.ly/youtube-chemical-safety>

Eugene Choi
Eugene.choi@oecd.org