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**Preparation of an international legally binding instrument on plastic pollution, including in the marine environment**

# Information on the Relevance of the Globally Harmonized System of classification and labelling of chemicals to plastics and associated chemicals submitted by the United Nations Institute for Training and Research

## Note by the secretariat

1. The annex to the present note contains the document entitled "*Relevance of the Globally Harmonized System of classification and labelling of chemicals (GHS) to plastics and associated chemicals in the context of the negotiations towards a Global Plastics Treaty*".

2. The document presented in the annex has been submitted by the United Nations Institute for Training and Research (UNITAR), it is presented as received and has not been formally edited.

## Annex

**Information that could be of relevance to the intergovernmental negotiating committee submitted by the United Nations Institute for Training and Research (UNITAR)**

# Relevance of the Globally Harmonized System of classification and labelling of chemicals (GHS) to plastics and associated chemicals

## in the context of the negotiations towards a Global Plastics Treaty

## I. Introduction

1. This report aims to contribute to the global conversations on hazard classification and communication of chemicals based on the Globally Harmonized System of classification and labelling of chemicals (GHS) with respect to the possible applications under a future International Legally Binding Instrument (ILBI) on Plastic Pollution, including in the marine environment (referred to in this document as the "Plastics Treaty").

2. This document tries to address Frequently Asked Questions that delegates, observers, and any other stakeholders might have during the intersessional and negotiating process and beyond (including ratification and implementation phases). It is intended to be as concrete and practical as possible, covering the topics in a simple but comprehensive manner.

3. Readers interested in digging deeper into other specific areas of GHS implementation are encouraged to consult existing reports and training materials freely available at https://unece.org/about-ghs, https://unitar.org/sustainable-development-goals/planet/our-portfolio/globally-harmonized-system-classification-and-labelling-chemicals and https://chemicalsandwaste.wixsite.com/ghs-partnership.

## II. Frequently Asked Questions

*About the Globally Harmonized System of classification and labelling of chemicals (GHS)*

- **What is the GHS?** The GHS is an internationally agreed-upon methodology for defining, classifying, and communicating chemical hazards through labels and safety data sheets (SDS). It is contained in a document known as the "Purple book." The GHS itself is not a regulation or a standard. Authorities can implement this system from the official GHS text through their own regulatory process and procedures.

- **What is its objective?** Enhance the protection of human health and the environment by providing an internationally comprehensible system for hazard classification and communication and serves as the foundation for all countries to develop national programs to ensure the safe use of chemicals through the value chain.

- **Is the GHS freely available?** The Purple Book is available open, free of charge, and in six languages (English, French, Chinese, Spanish, Russian, and Arabic). The latest edition (10th, year 2023) is available online at https://unece.org/transport/dangerous-goods/ghs-rev10-2023

- **How is the GHS maintained and updated?** The UN ECOSOC Sub-Committee of Experts[1] on the GHS acts as custodian of the system, managing and giving direction to the harmonization process, keeping the system up-to-date, promoting understanding and use of the system, and preparing work programs and recommendations. The "Purple book" is typically updated every two years.

- **How is the GHS implemented worldwide?** While significant progress has been made, the GHS is still not operational in more than 120 countries, as the GCO-II notes. However, it is important to highlight that the GHS has been implemented in most countries with the highest weight in chemical world trade. To support the global push for its implementation, the Global Framework on Chemicals (GFC) agreed to a new target on the GHS: Target B6[2].

- **Does the GHS cover hazards or risks?** The GHS covers hazards and has always been dedicated to the classification and communication of hazards. The only exception is that risk-based labelling is permitted for consumer products with chronic health hazards (for more information, see Annex 5 of the "Purple Book"). The GHS is not intended to harmonize risk management procedures (risk assessment and control). However, successful hazard communication alerts the user to the presence of a hazard and the need to minimize exposures and the resulting risks. Moreover, since the basic approach to risk assessment considers exposure in conjunction with the data regarding potential hazards, GHS also serves as a basis for risk management[3].

| risk = hazard × exposure |
|---|

[1] Composition and membership, frequency of meetings, and other aspects: https://unece.org/transport/dangerous-goods/ecosoc-bodies-dealing-chemicals-safety

[2] GFC Target B6: By 2030, all Governments have implemented the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) in all relevant sectors as appropriate for their national circumstances.

[3] For more information about the relevance of GHS in a risk assessment, please refer to "WHO human health risk assessment toolkit: chemical hazards, second edition." Geneva: World Health Organization; 2021 (IPCS harmonization project document, no. 8). Licence: CC BY-NC-SA 3.0 IGO.

- **Which hazards are currently covered under the GHS?** The GHS covers physical, health and environmental hazards. There are twenty-nine hazard classes in total: seventeen physical hazard classes, ten health hazard classes, and two environmental hazard classes, as shown in Table 1. The hazard class may be further divided into hazard categories, indicating their degree or severity.

Table 1. The twenty-nine hazard classes under the GHS rev10.

| **Physical Hazards** | **Health Hazards** | **Environmental Hazards** |
|---|---|---|
| 1) Explosives<br>2) Flammable Gases<br>3) Aerosols and Chemicals Under Pressure<br>4) Oxidizing Gases<br>5) Gases Under Pressure<br>6) Flammable Liquids<br>7) Flammable Solids<br>8) Self-Reactive Substances and Mixtures<br>9) Pyrophoric Liquids<br>10) Pyrophoric Solids<br>11) Self-Heating Substances<br>12) Substances which, in contact with water, emit flammable gases<br>13) Oxidizing Liquids<br>14) Oxidizing Solids<br>15) Organic Peroxides<br>16) Corrosive to Metals<br>17) Desensitized Explosives | 1) Acute Toxicity<br>2) Skin Corrosion/Irritation<br>3) Serious Eye Damage/Eye Irritation<br>4) Respiratory or Skin Sensitization<br>5) Germ Cell Mutagenicity<br>6) Carcinogenicity<br>7) Reproductive Toxicology<br>8) Specific Target Organ Toxicity – Single Exposure<br>9) Specific Target Organ Toxicity – Repeated exposure<br>10) Aspiration | 1) Hazardous to the Aquatic Environment<br>2) Hazardous to the Ozone Layer |

- **What is the scope of the GHS?** The GHS applies to pure substances and their dilute solutions and to mixtures. Articles, as defined in the Hazard Communication Standard (29 CFR 1910.1200) of the US Occupational Safety and Health Administration[4], are outside the scope of the system. The GHS applies during all stages of the chemical life cycle (research, production, storage, transport, and use), but the application may differ according to the stage. For example, a plastic bottle is not covered by the GHS because it is an article. However, GHS would apply at the workplace to the substances and mixtures that have gone into the production and manufacturing process of the bottle. Also, GHS would apply to the chemicals released during the use and disposal that could affect the consumers, the public, and the environment.

- **How does the GHS apply to mixtures[5]?** Application varies depending on the hazard class. For physical hazards, the classification of a mixture usually requires testing. For health and environmental hazards, classification depends on the amount of information available for the mixture and its components, and is based on the following sequence: 1) Experimental data for the entire mixture (except for e.g. carcinogens, mutagens and reproductive toxins), 2) Where test data are not available for the mixture itself, bridging principles, and 3) If test data are not available and the bridging principles cannot be applied, data on the relevant components of the mixture. Relevant components are those present in the mixture above the cut-off values/concentration limits established for each hazard class.

- **Does the GHS apply to waste?** As previously mentioned, GHS could be used for all stages of the chemical's lifecycle, including the waste stage, with its transport and storage phases. However, waste are usually complex mixtures with unknown composition. At the global level, as set out in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal[6], hazardous characteristics are based on the hazard classification system included in the United Nations Recommendations on the Transport of

[4] As defined in the Hazard Communication Standard (29 CFR 1910.1200) of the US Occupational Safety and Health Administration: "a manufactured item other than a fluid or particle which is formed to a specific shape or design during manufacture; which has end use function(s) dependent in whole or in part upon its shape or design during end use; and which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (…), and does not pose a physical hazard or health risk to employees.

[5] The GHS defines mixtures as "mixtures or solutions composed of two or more substances in which they do not react."

[6] See Article 1.1 (a) and Annex III to the Basel Convention, available at: https://www.basel.int/TheConvention/Overview/TextoftheConvention/tabid/1275/Default.aspx

Dangerous Goods[7]. At the national level, the Parties to the Convention may use other classification systems to ensure that hazardous wastes are managed in an environmentally sound manner.

*About the GHS and the Plastics Treaty*

- **Which chemicals related to plastic production, products, and waste are under the scope of the GHS?** From a chemical perspective, plastic products are complex mixtures of one or more polymers, fillers, several additives, and many (often unidentified) non-intentionally added substances (NIAS). A wide array of chemicals has been identified as associated with plastics and plastic production across a wide range of applications. Several groups of these chemicals are a major concern due to their high toxicity and potential to migrate or be released from plastics, including specific flame retardants, certain UV stabilizers, per- and polyfluoroalkyl substances (PFASs), aromatic amines, alkylphenols, aromatic ethers, bisphenols, phthalates, organometallics, parabens, and chlorinated paraffin. All of these chemicals are under the scope of the GHS. Therefore, if a plastic product falls under the definition of *mixture*, and is not defined as an *article*, it would be covered within the scope of the GHS. Figure 1 below represents the scope of the current GHS rev10 throughout the plastics value chain.

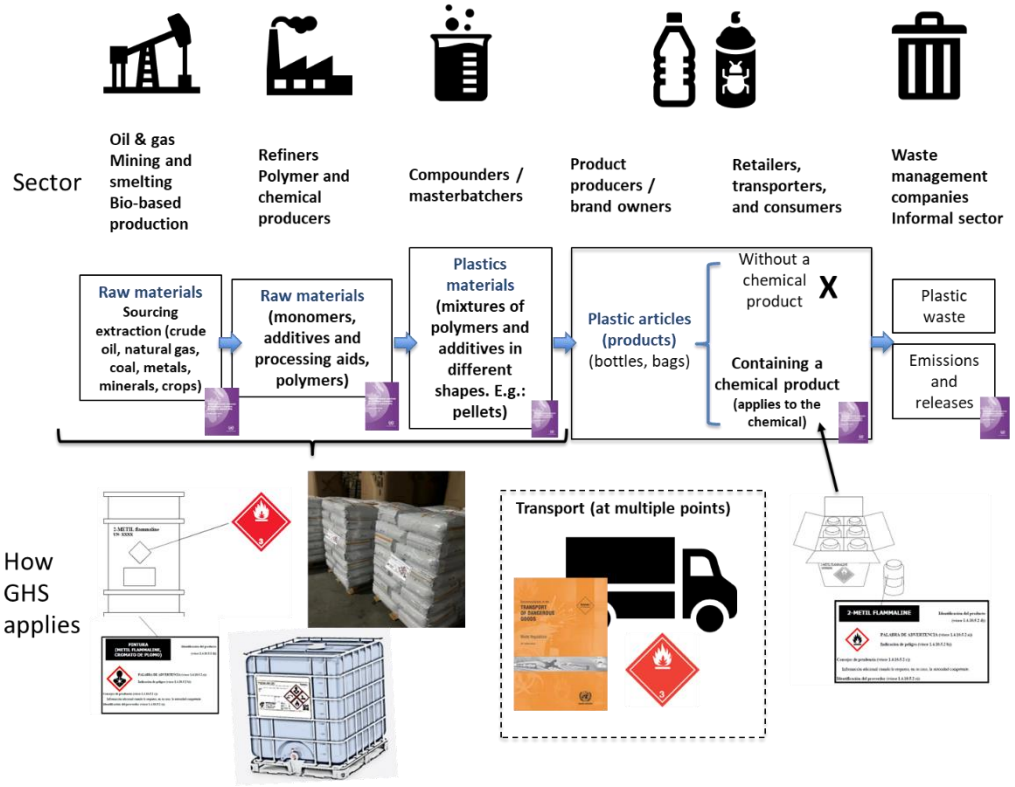


Figure 1. Simplified scheme of the scope of the GHS rev10 throughout the plastics value chain.

- **Which topics under the discussions for the Plastics Treaty are related to the GHS?** At its fourth session (INC-4), the Intergovernmental Negotiating Committee to develop an international legally binding instrument on plastic pollution, including in the marine environment, established an intersessional working group to identify and analyze criteria and non-criteria based approaches with regard to plastic products and chemicals of concern in plastic products, and product design focusing on recyclability and reusability of plastic products, considering their uses and applications. Members from this group referred to existing instruments and approaches as examples for the development of criteria-based approaches under the future instrument. Among the examples of instruments already addressing some of the chemicals of concern in plastic products, the GHS was proposed as an international mechanism of "criteria for hazard class identification." Additionally, in previous versions of the draft text of the Plastic Treaty (Zero Draft[8]), GHS was also proposed as a mechanism for marking and labelling.

- **How can the GHS contribute to the Plastics Treaty?** The GHS can contribute by: 1) Identifying substances of concern and establishing prioritization criteria based on GHS hazard classes and categories (e.g. carcinogenic,

[7] The Basel Convention Expert Working Group on the review of Annexes is currently reviewing Annex III to the Convention, including whether to incorporate relevant environmental, human health and delayed hazard characteristics of the GHS. See https://www.basel.int/Implementation/LegalMatters/LegalClarity/ReviewofAnnexes/AnnexesI,III,IVandrelatedaspectsofAnnexes/Activities20242025/tabid/9794/Default.aspx

[8] The Zero Draft is available here: https://wedocs.unep.org/bitstream/handle/20.500.11822/44526/RevisedZeroDraftText.pdf

reproductive toxicant, specific target organ toxicity, long-term aquatic hazard); 2) Classifying the raw materials used in the production of plastics and communicating these hazards to workers through labels and SDS[9]; 3) Classifying the substances released during the use and disposal of plastics and communicating these hazards to consumers and the general public through labels.

- **What is the role of the GHS in identifying chemicals and ensuring transparency and traceability in plastics?** 1) GHS acts as a main global reference to classify and communicate chemical hazards, promoting comprehensive management of plastics and related chemicals, creating accountability across plastic value chains, and facilitating safety assessments and the development of safer plastics; 2) Certain communication elements from the GHS, such as pictograms, signal words, hazard statements, and precautionary statements, could also be used under the Plastic Treaty as a reference for communicating relevant information on plastic articles (even if articles are not under the scope of GHS, as previously explained); 3) The GHS criteria for hazard classification could be used to elaborate positive lists of chemicals allowed to be used in plastic articles moving towards sustainable design and safe and non-toxic circularity of plastics and associated chemicals[10].

- **Which other hazards are considered across some national, regional, and international frameworks where the GHS cannot (currently) support classification and labelling of plastic products?** Some properties mentioned in the document "Compilation document of INC questionnaire responses for Expert Group 2[11]" were proposed as classification criteria but are not yet covered under the GHS as hazard classes. These are 1) Endocrine disruption, 2) Persistence, bioaccumulation[12] and toxicity (PBT) 3) Terrestrial Toxicity 4) Mobility/migration in the environment (air, water, biota, etc.)[13]. However, all of these hazards are covered in some form by the GHS. Endocrine disruption may be included in the hazard classes Reproductive Toxicity or Specific Target Organ Toxicity[14]; Bioaccumulation is a property considered for the definition of criteria for the hazard class Long-Term Hazards to the Aquatic Environment; Terrestrial Toxicity, Mobility/Migration in the Environment (air, water, Biota, etc.) should be included in Section 12 of the SDS when these data are available. The GHS clarifies that "if data for any of these properties are not available, they should still be listed on the SDS with a statement that data are not available."

## III. References


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[9] Labels and SDS contain the hazard information in the form of hazard pictograms, hazard statements, signal words and other communication elements (for example, product name or identifier, hazardous ingredients -where appropriate-, and name and address of the company)

[10] An example of implementation of a positive list for a plastic product (food packaging) can be found in the technical regulation MERCOSUR/GMC/RES N°02/12

[11] Available at : https://wedocs.unep.org/bitstream/handle/20.500.11822/46005/Compilation_of_EG2_questionnaire_responses.pdf

[12] Degradability is the potential for the substance or the appropriate constituents of a mixture to degrade in the environment, either through biodegradation or other processes, such as oxidation or hydrolysis. Bioaccumulation is the potential for the substance or certain constituents of a mixture to accumulate in biota and, possibly, pass through the food chain. Persistence may be defined as the resistance of a substance to transformation by degradation processes.

[13] Mobility in soil is the potential of a substance or the constituents of a mixture, if released to the environment, to move under natural forces to the groundwater or to a distance from the site of release.

[14] For information about the ongoing discussion on endocrine disruption within the UN ECOSOC Sub-Committee of Experts, please visit https://unece.org/transport/dangerous-goods/ecosoc-bodies-dealing-chemicals-safety

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