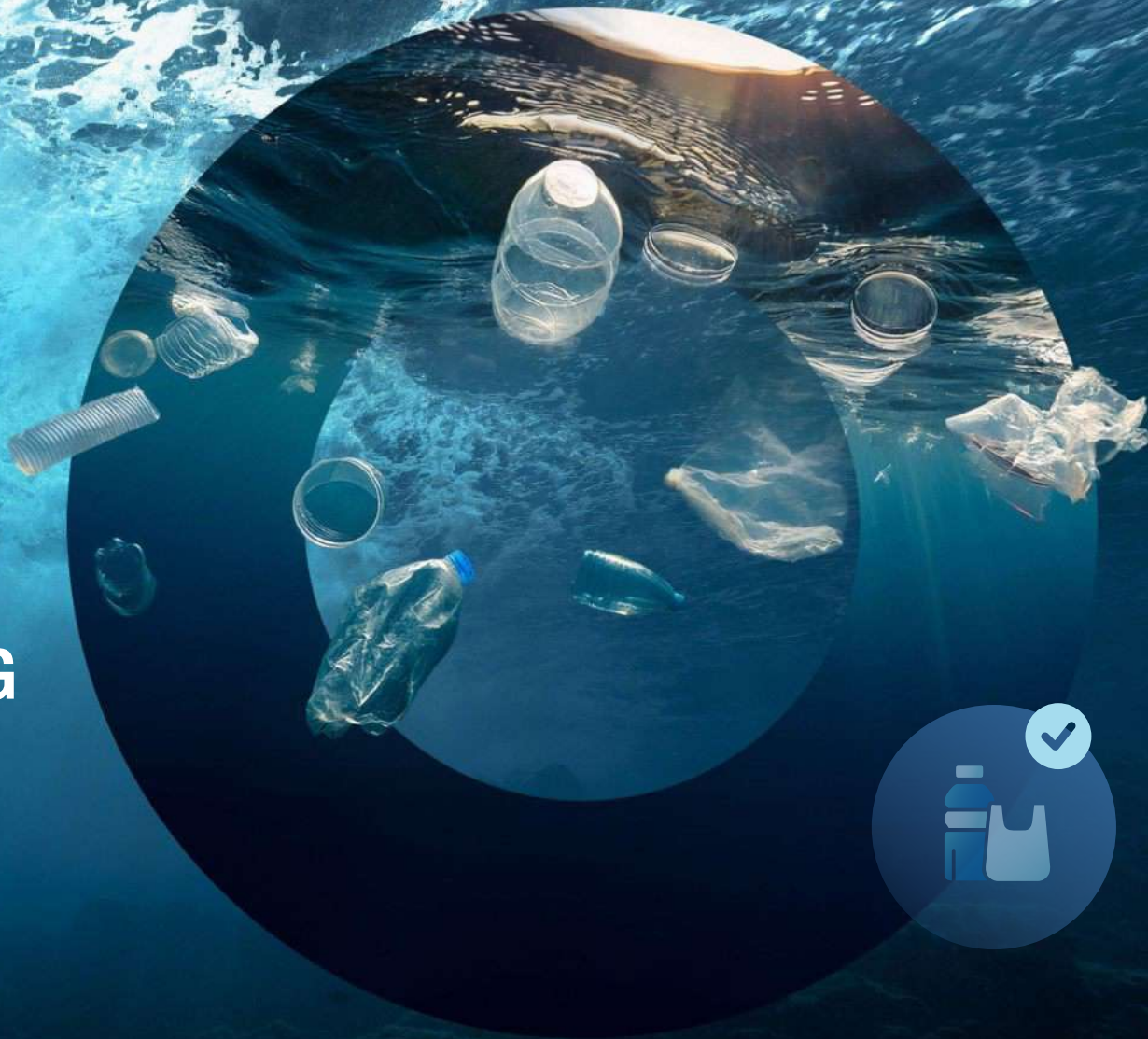


Best Practice Manual for Development of

MINIMUM STANDARDS AND TECHNICAL REQUIREMENTS FOR PLASTIC PACKAGING AND LABELING

Southeast Asia Regional Program on Combating
Marine Plastics (SEA-MAP) Regional Project



An ASEAN project supported by the World Bank

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ACRONYMS

A	ACB	ASEAN Centre for Biodiversity
	ACCB	Accreditation Council for Certification Bodies
	ACCSQ	ASEAN Consultative Committee for Standards and Quality
	ACE	ASEAN Centre for Energy
	AEC	ASEAN Economic Community
	AFBA	ASEAN Food & Beverage Alliance
	AIGE	ASEAN Institute for Green Economy
	AMS	ASEAN Member States
	ASEAN	Association of Southeast Asian Nations
	ASEAN RAP	ASEAN Regional Action Plan on Combating Marine Debris in the ASEAN Member States (2021-2025)
	ASEC	ASEAN Secretariat
	AMME	ASEAN Ministerial Meeting on the Environment
	ASCC	ASEAN Socio-Cultural Community
	ASOEN	ASEAN Senior Officials on the Environment
	AWEN	ASEAN Women Entrepreneurs' Network
	AWGCC	ASEAN Working Group on Climate Change
	AWGCME	ASEAN Working Group on Coastal and Marine Environment
	AWGCW	ASEAN Working Group on Chemicals and Waste
	AWGEE	ASEAN Working Group on Environmental Education

	AWGESC	ASEAN Working Group on Environmentally Sustainable Cities
	AWGNCB	ASEAN Working Group on Nature Conservation and Biodiversity
	AWGWRM	ASEAN Working Group on Water Resources Management

B	B2B	Business-to-Business
	B2C	Business-to-Consumer
	BSI	British Standards Institution

C	CAAC	Certification Asia Accreditation Council
	CEFTA	Central European Free Trade Agreement
	CBSEA	Coordinating Body on the Seas of East Asia
	COMPED	Cambodian Education and Waste
	CIT-CFF	Management Organization Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security

D	DENR	Department of Environment and Natural Resources of the Philippines
	DOSM	Department of Standardization and Metrology of Lao PDR
	DTI-BPS	Bureau of Philippine Standards of the Department of Trade and Industry

E	EU	European Union
	EFQM	European Foundation Quality Management
	EPR	Extended Producer Responsibility
	E-READI	Enhanced Regional EU-ASEAN Dialogue Instrument
	ESF	Environmental and Social Framework
	ESMF	Environmental and Social Management Framework
	ESSs	Environmental and Social Standards

G	GPAP	Global Plastic Action Partnership
	GSP	Generalized system of preferences

I	INC	Intergovernmental Negotiating Committee
	ISC	Institute for Standards of Cambodia
	IEC	International Electrotechnical Commission
	ISO	International Organization for Standardization
	IUCN	International Union for Conservation of Nature

M	MARD	Viet Nam's Ministry of Agriculture and Rural Development
	MSMEs	Micro-, Small- and Medium-Sized Enterprises

N	NSB	National Standards Bodies
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T	TIS	Thai Industrial Standard
	TISI	Thai Industrial Standards Institute



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EXECUTIVE SUMMARY

Combating marine plastic pollution requires a comprehensive approach that addresses the entire plastic packaging lifecycle - from upstream design and manufacturing decisions to downstream collection, recycling, and end-of-life management. Standardization in plastic packaging and labelling presents an opportunity for the ASEAN region to strengthen its response to address marine plastic pollution effectively. Harmonized standards enable consistent approaches to recyclability, recycled content, reuse systems, and end-of-life management, while facilitating regional trade and reducing technical barriers.

As ASEAN continues to work towards accomplishing the actions outlined in the ASEAN Regional Action Plan for Combating Marine Debris (RAP), the guidance provided in this Best Practice Manual for the Development of Minimum Standards and Technical Requirements for Plastic Packaging and Labeling (hereinafter, the Manual) is envisaged to enhance regional coordination, improve recyclability and circularity of plastic materials, reduce marine plastic pollution, and strengthen capacity for sustainable plastic packaging management across ASEAN.

About the Manual

This Manual is designed as a user-friendly digital resource, allowing readers to easily navigate and explore specific topics of interest. It serves as a practical, standalone tool for a wide range of users – including policymakers, standards bodies, industry leaders, and other relevant stakeholders across ASEAN.

The Manual supports Action 4 of the ASEAN Regional Action Plan for Combating Marine Debris in ASEAN Member States (RAP). It serves to improve the understanding of and to support the development of standards and labelling for more sustainable plastic packaging as well as the move towards harmonizing standards and mutual recognition of labelling for plastic packaging in the ASEAN region.



• **Recommended Best Practices:**

Concrete, evidence-based actions that demonstrate **what to do to** address identified gaps, offering practical implementation steps drawn from successful case studies and international good practices.

• **Guiding Principles:**

High-level, values-based foundations that establish **why** sustainable plastic packaging standards are needed, defining the overarching objectives and core values that should guide standards development and implementation.

• **Key Technical Requirements:**

Specific, actionable measures that define **how** standards should be operationalised, providing concrete technical criteria, support mechanisms, and institutional arrangements necessary for effective implementation and enforcement.

Key Concepts and Framework

This Manual is built on a comprehensive framework for sustainable plastic packaging standards and labelling schemes, comprising six Recommended Best Practices (Chapter 5). Each Recommended Best Practice is underpinned by a specific Guiding Principle (Chapter 4) and supported by a corresponding Key Technical Requirement (Chapter 4). Understanding how these three elements work together is essential for effective implementation:

Recommended Best Practices

Recommended Best Practices represent the implementation strategies that demonstrate **what to do** to address specific gaps identified in the current ASEAN landscape of plastic packaging standards. They are concrete, field-tested actions that combine guidance with practical implementation steps for both individual ASEAN Member States (AMS) and the region as a whole. Each Best Practice is an evidence-based intervention drawn from successful case studies and international good practices, providing stakeholders with clear, actionable pathways to achieve sustainability objectives across the entire packaging lifecycle - from the design and material selection for plastics packaging to treatment and recovery of waste generated from packaging.

Recommended Best Practice 1

Ensuring that Essential Standards Across the Plastic Packaging Lifecycle are Available

Essential standards for plastic packaging and products are identified and promoted for wider adoption, leveraging key international standards to support technically sound, economically viable, and socially responsible solutions;

Recommended Best Practice 2

Strengthening the Implementation of Essential Standards

Adoption and enforcement are supported through concrete measures such as supportive policies, updated legislation, and targeted incentives, with a focus on sustainability, circularity, and labelling practices across the supply chain;

Recommended Best Practice 3

Harmonizing Standards and Regional Guidelines

Common ASEAN guidelines and technical criteria for labelling, recyclability, and biodegradability are developed to ensure a consistent approach across AMS, aligned with international good practices;

Recommended Best Practice 4

Establishing Mutual Recognition Arrangements (MRAs) for Labels and Conformity Assessment

Regional collaboration is fostered by enabling recognition of certifications and conformity assessments across AMS, reducing duplication and technical trade barriers;

Recommended Best Practice 5

Ensuring availability of Supporting Infrastructure

Public and private investment in waste management systems, testing laboratories, and other critical infrastructure is encouraged to support effective standards development and implementation; and

Recommended Best Practice 6

Enhancing Capacity Building Efforts, Collaboration and Knowledge Sharing

Regional platforms for training, collaboration, and information exchange are promoted to ensure that all stakeholders have the skills and knowledge to implement, monitor, and audit standards effectively.



Guiding Principles

Guiding Principles establish **why** sustainable plastic packaging standards matter. They are high-level, values-based foundations that define the overarching objectives and core values, such as market relevance, sustainability, harmonisation, regional coordination, infrastructure development, and social responsibility. Thus, Guiding Principles ensure that standards address not only technical considerations but also encompass social aspect, economic viability, and environmental protection throughout the entire plastic packaging lifecycle.

The six Guiding Principles are:

Guiding Principles

1

Relevance, effectiveness, coherence

Guiding Principles

2

Embed sustainability and circularity

Guiding Principles

3

Development and adoption of harmonized standards and labeling

Guiding Principles

4

Regionally coordinated implementation measures

Guiding Principles

5

Infrastructure development

Guiding Principles

6

Social responsibility

Key Technical Requirements

Key Technical Requirements serve as the operational bridge that translates Guiding Principles into **how** standards should function in practice. They provide guidance for the sustainable implementation and effective utilization of standards. They define specific, measurable, and actionable technical criteria, supporting mechanisms, and institutional arrangements necessary for effective implementation. They ensure that plastic packaging and labeling meet the requirements of sustainability, recyclability, and effective management throughout the entire lifecycle, in line with international best practices. Each Recommended Best Practice is supported by one Key Technical Requirement.

The six Key Technical Requirements are:

- Key Technical Requirement 1
Implementation support across the lifecycle
- Key Technical Requirement 2
Integrated management systems
- Key Technical Requirement 3
Adoption of harmonized practices across AMS
- Key Technical Requirement 4
Legally binding arrangements
- Key Technical Requirement 5
Infrastructure for compliance and verification
- Key Technical Requirement 6
Stakeholder engagement and education

Case Studies

The Manual features detailed Best Practice Case Studies that illustrate successful approaches already implemented within the region. These case studies highlight:

- The impact and benefits of existing initiatives;
- The role of government and stakeholder engagement;
- Implementation costs, and operational, considerations; and
- Monitoring and evaluation protocols.

Vision for the Future

By embedding proven practices and encouraging collective action, the Manual supports ASEAN's transition toward a more sustainable and circular economy.

Implementation Strategy

A phased approach enables ASEAN and its Member States (AMS) to tailor actions to their national contexts and priorities:

- **Short-term :**
Focus on raising awareness and adopting essential standards; and
- **Medium- to long-term :**
Emphasize policy development, regional harmonization, infrastructure investment, and collaborative efforts.



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Definition of Standard:

Standards in the context of this manual are published documents that contain agreed rules or guidelines that specify product, service or process characteristics, including quality, quantity developed through a consultative process. The different types of standards include those that specify test methods, harmonized terminology, management systems, safety and environmental requirements. The references to standards include those published by national, regional and international standards bodies. Standards are published as documents available for voluntary application, but become mandatory when incorporated in regulations.

Roles of Standardization bodies and competent authorities:

- **Standardisation bodies** are organizations that develop, publish, and maintain technical standards through consensus among experts from industry, government, and civil society. Examples include International Organization for Standardization (ISO), European Committee for Standardization (CEN), Department of Standards Malaysia (DSM), Thai Industrial Standards Institute (TISI), etc.
- **Competent authorities** are government-designated bodies responsible for enforcing regulations and ensuring compliance. Their roles include granting authorisations and permits, conducting market surveillance, and taking enforcement action against non-compliant products or activities.



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1

INTRODUCTION

The Manual supports Action 4 of the *ASEAN Regional Action Plan for Combating Marine Debris in ASEAN Member States* (RAP). It serves to improve the understanding of and to support the development of standards and labeling for more sustainable plastic packaging well as the move towards harmonizing standards and mutual recognition of labeling for plastic packaging in the ASEAN region. It identifies the Recommended Best Practices, underpinned by Guiding Principles and Key Technical Requirements needed for developing and establishing minimum standards for plastic packaging, covering aspects like labeling, recycled content, biodegradability, and compostability.

This Chapter outlines the purpose and practical use of the Manual. It provides an overview of the plastic packaging lifecycle, relevant standards, and labelling requirements. Key types of plastic packaging are introduced, followed by a brief overview of case studies that illustrate real-world applications and challenges. This Chapter help sreaders to navigate the Manual and apply its guidance effectively.



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RECOMMENDED BEST PRACTICES

1.1

Purpose and Use of the Manual

This Manual is designed to improve the understanding and promote the development of standards and labeling for sustainable plastic packaging across the ASEAN region.

It serves as a comprehensive resource designed to support policymakers, standardization bodies, trade associations, and private sector stakeholders across AMS in establishing and implementing standards for plastic packaging and labelling. The Manual draws upon a stocktaking review and gap analysis of current developments and the application of plastic packaging standards and labelling across AMS. It examines the availability of relevant standards, identifies trends, and highlights challenges in the adoption and development of standards within AMS.

The guidance aims to support a cohesive and sustainable approach to packaging that aligns with international best practices. In addition, it incorporates insights from relevant documents including a World Bank commissioned study on *“Guiding Principles and Associated Minimum Technical Requirements: Regional Guidance on Standards and Labeling for Sustainable Plastic Packaging in the ASEAN Region”*.

Standards in the context of this manual are published documents that contain agreed rules or guidelines that specify product, service or process characteristics, including quality, quantity developed through a consultative process. The different types of standards include those that specify test methods, harmonized terminology, management systems, safety and environmental requirements. The references to standards include those published by national, regional and international standards bodies. Standards are published as documents available for voluntary application, but become mandatory when incorporated in regulations.

The Manual is structured to mirror the lifecycle of developing, implementing and enforcing standards, as well as the lifecycle of plastic packaging, comprising upstream, downstream and cross-cutting economic activities. Users can navigate through the

Manual's sections to access specific guidance on plastic packaging standards and labelling covering critical aspects of both upstream and downstream, processes including those applicable to for recyclability, recycled content, reuse, biodegradability, and compostability. Additionally, it references cross-cutting standards, that apply at various stages of the lifecycle of plastics packaging and across the supply chain to address traceability, labelling, supply chain sustainability and compliance verification.

Users may refer to good practice case studies included in the Manual that showcase successful implementation of plastic packaging and labelling standards. These case studies demonstrate sustainable and effective applications, as well as the lessons learned.

THE MANUAL EXAMINES THE AVAILABILITY OF RELEVANT STANDARDS, IDENTIFIES TRENDS, AND HIGHLIGHTS CHALLENGES IN THE ADOPTION AND DEVELOPMENT OF STANDARDS WITHIN AMS.

Notably, the proposed Recommended Best Practices provide strategic guidance for both individual AMS and the ASEAN region as a whole, focusing on the gaps identified in the current landscape of plastic packaging in ASEAN through six key areas:

1. Ensuring availability and adoption of essential international standards;
2. Strengthening implementation through supportive policies and legislation;
3. Harmonizing regional guidelines for labelling and environmental claims;
4. Establishing mutual recognition arrangements to reduce trade barriers;
5. Promoting investment in critical infrastructure such as waste management systems and testing laboratories; and
6. Enhancing capacity building efforts through regional training programs for regulators, businesses, and certification bodies.

By adopting these Recommended Best Practices, ASEAN as a region and individual AMS can enhance regulatory coherence, support innovation and accelerate the shift towards a sustainable and circular economy.



1.2

Plastic Packaging Lifecycle

The plastic packaging lifecycle comprises two interconnected phases (Hahladakis and Iacovidou 2018) - upstream and downstream - each presenting unique processes (Figure 1).

The upstream segment covers raw materials production (including chemical industries producing monomers, additives, processing aids, inks, adhesives, coatings and other chemical components constituting the plastic materials), intermediate materials for the production of plastic pellets, manufacturers of masterbatches, films, preforms and other semi-finished products, design and manufacturing of finished packaging products by plastic converters, printers, manufacturers of finished packaging products, and distribution of empty packaging by distributors, vendors and importers.

Critical upstream decisions include selecting appropriate polymer types (such as PET, HDPE, LDPE, PP or PS) and integrating necessary additives like plasticizers, stabilizers, and colorants. These choices are fundamental, as they shape both the packaging's functional performance and its potential for future recyclability. Standards such as ISO 14006 for eco-design and ISO 18602 for packaging optimization provide frameworks for incorporating environmental considerations into design decisions. Consequently,

upstream considerations regarding material formulation and recyclability-focused design establish the groundwork for effective resource circulation in subsequent phases.

After distribution, plastic packaging enters the downstream phase, where it is used either by industries or consumers. This is followed by additional downstream stages, which include the collection, sorting, recycling/recovery, and eventually, disposal or energy recovery where both formal and informal sectors are involved. The downstream journey is heavily influenced by national policies such as Extended Producer Responsibility (EPR), consumer behavior, local collection infrastructure, and the effectiveness of sorting facilities.

Effective material identification through standards and standardized labelling systems, such as resin identification codes (ISO 11469 or ASTM D7611), becomes critical for proper sorting and recycling. Contamination, either from food residues or mixing of incompatible polymers, can significantly degrade the quality and value of recyclable plastics, often resulting in material being downcycled into lower-grade products or sent to final disposal, removed from the productive economy. Standards for recycled content verification and quality assurance, such as

those outlined in ISO 15270 for plastics waste recovery, help maintain material integrity throughout the recycling process. Mechanical recycling is the most common downstream process, but successive reprocessing cycles can compromise material integrity, creating obstacles for achieving true closed-loop systems across many plastic categories.

Emerging sorting technologies and alternative recycling approaches, including chemical recycling methods, offer promising solutions to downstream challenges. However, these technological advances achieve optimal effectiveness when paired with upstream improvements, particularly enhanced design strategies and improved recyclability communication. Environmental labelling standards (such as ISO 14021, 14024, 14025) provide frameworks for communicating recyclability information to consumers, whilst traceability standards (such as ISO 22005) support supply chain transparency and material flow tracking.

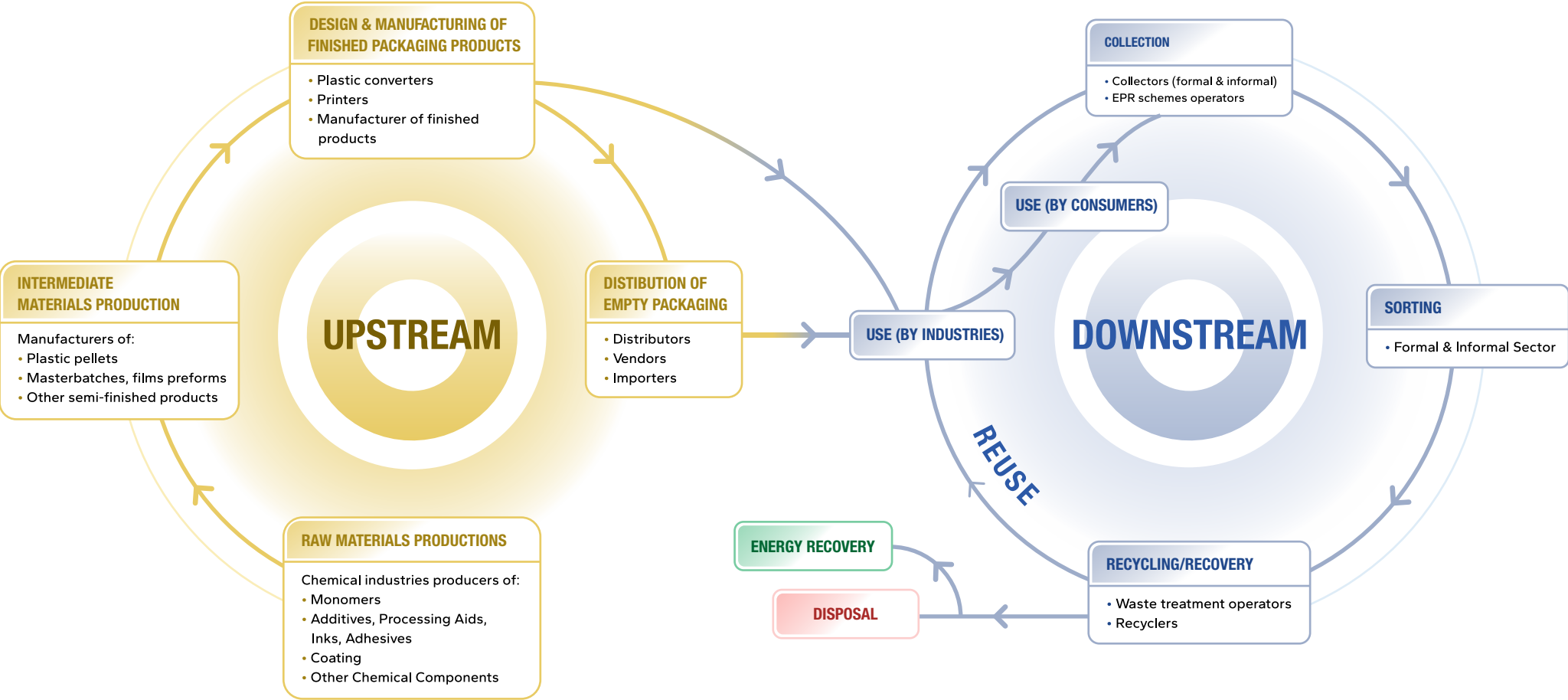
The synergy between upstream and downstream phases proves essential: strategic upstream decisions regarding design and material selection directly influence downstream recyclability and quality retention, thereby facilitating progress towards a genuinely circular plastics system.

Ultimately, plastic packaging represents an interconnected system where initial upstream decisions fundamentally influence downstream performance. Achieving an effective “closed loop” and maximizing resource value recovery, while reducing the environmental impact, requires an integrated strategy that combines thoughtful design, strategic material selection, consumer education, and sophisticated recycling infrastructure.

THE SYNERGY BETWEEN THE UPSTREAM AND DOWNSTREAM PHASES PROVES ESSENTIAL: STRATEGIC UPSTREAM DECISIONS REGARDING DESIGN AND MATERIAL SELECTION DIRECTLY INFLUENCE DOWNSTREAM RECYCLABILITY AND QUALITY RETENTION, THEREBY FACILITATING PROGRESS TOWARDS A GENUINELY CIRCULAR PLASTICS SYSTEM.



Figure 1. Lifecycle of Plastic Packaging



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1.3

Lifecycle of Standards

The development, implementation and maintenance of standards follow defined processes that are generally adopted by international, regional and national standards bodies. This Manual is structured to mirror the lifecycle of standards, commencing from the needs identification stage to the implementation and monitoring phases. The processes and practices for standardization that AMS have adopted are based on international practices as elaborated in *ISO/IEC Guide 59:2019 - ISO and IEC recommended practices for standardization (ISO 2019)* and Annex 3 to the WTO/TBT Agreement: *Code of Good Practice for the preparation, adoption and application of standards (ISO 2019)*. The stages in the lifecycle of standards are as summarized below, and a more comprehensive description of the lifecycle is presented in Annex 2 of this Manual:



Identification of needs

- Identification of the needs for a standard and conceptualization of its scope and objectives.



Development and consensus building of standards:

- Development of the draft standard, considering input from all relevant stakeholders, and taking into consideration the technologies available, and the already existing standards; and
- Reviewing the draft standard and reaching a consensus within a committee managed by a standardization body that represents all relevant stakeholders.



Approval and publication of standards:

- Approval and adoption of the standard by the relevant standardization body⁴.



Implementation and enforcement of standards:

There are two pathways for implementation of standards. The selection of the pathway is dependent on the content of the standard. The first pathway relies on voluntary measures, and the second pathway is selected when authorities decide that compliance should be mandatory to achieve policy objectives.

1 Implementation by voluntary adoption by the stakeholders in their supply chain to enhance business processes, and through government policy initiatives, providing incentives, enhancing awareness, providing necessary training, and capacity building. This includes certification, inspection, testing and verification services provided by conformity assessment bodies on a voluntary basis; and

2 Implementation through legislation that makes compliance to standards mandatory and includes penalties imposed for non-compliance.



Monitoring and evaluation of standards

- Monitoring stakeholders' use and compliance of standards using sales, certification data and surveys;
- Monitoring the effectiveness of compliance through regular testing, participation in conformity assessment programs, and market surveillance; and
- Evaluation of relevance and effectiveness through feedback and surveys leading to possible updates or withdrawal/replacement of the standards, if required.

⁴ In case where the standard is developed by a competent authority without the involvement of a standardization body, the development process is determined by the legislation administered by the competent authority. The process includes consultation with stakeholders, formal approval through legally prescribed procedures, and making the standard publicly available.



1.4

Labeling

Labels are means of communicating information to users about a product or material. Labels on plastics packaging may provide information on the materials of the packaging and additional information relating to recycling, reuse, compostability and other environmental characteristics. Such information facilitates and encourages the uptake of sustainable practices by enabling the effective selection and sorting of plastics for recovery and recycling, and other end-of-life treatments. International standards have harmonized codes and symbols to enable easy identification of the resins used in packaging materials. Other international standards define additives and properties of the packaging materials. These standards are of critical importance in supporting recycling and end-of-life treatment.

A range of international standards and guidelines are available to ensure that the information provided in labels is verified and credible. In addition, legislation is enacted in several countries to ensure that misleading information is penalized. Eco-labeling is a category of labelling that is used to indicate compliance with criteria of sustainability or ecological schemes and programs, which can be applied to both the product and/or the product's packaging. ISO has published a series of standards that contain guidelines for developing eco-labels that provide principles and methods for composition labeling.

ISO standards identify three types of eco-labeling practices:

TYPE 1



Eco-labeling involves a third-party evaluation based on ISO 14024:1999.

Assessing multiple lifecycle criteria. Type 1 eco-labels are voluntary and can be awarded by governmental or private non-commercial entities. They indicate that a product is environmentally preferable in specific categories, such as recyclability, compostability, and reusability. These labels serve as a guide for consumers, offering certification that supports informed purchasing decisions. In the ASEAN region, an example of Type 1 Eco-labelling is Singapore's *Green Label*⁵, implemented by the Singapore Environment Council;

TYPE 2



Eco-labeling is based on self-declared environmental performance, according to ISO 14021:1999.

These declarations are suitable for both consumer and business-to-business (B2B) communications. Although they do not involve third-party certification, they must be verifiable, for instance through B2B audits. They should be specific to the environmental aspect being declared and encompass all significant lifecycle stages of the product. In the ASEAN region, an example of Type 2 Eco-labelling is Thailand's *Green Label*⁶, implemented by the Thailand Environment Institute; and

TYPE 3



Environmental declarations are based on Environmental Product Declarations (EPDs) according to ISO 14025:2006.

These declarations provide standardized information about the environmental impact of a product throughout its lifecycle and are primarily aimed at business-to-business communication. In the ASEAN region, an example of Type 3 Eco-labelling is Indonesia's *SNI Ecolabel*⁷, implemented by the Badan Standardisasi Nasional (National Standardization Agency of Indonesia).

Clear and detailed standards, as well as guidelines, ensure that labeling not only meets regulatory compliance, but that it also functions effectively in guiding users and other stakeholders towards sustainable practices.

⁵ <https://www.sgls.sec.org.sg/>
⁶ <https://greenlabel.tei.or.th/en/about-green-label/>
⁷ <https://bsn.go.id/main/berita/detail/12769/standar-nasional-indonesia-menuju-ekolabel-tipe-iii>



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1.5

Types of Plastic Packaging

The Manual includes plastic packaging used in both Business-to-Business (B2B) and Business-to-Consumer (B2C) operations. Additionally, the Manual covers packaging materials destined to come into contact with food, feed, nutraceutical, and medicinal products, which are subject to specific requirements related to composition, traceability, and hygiene practices.

The Manual covers a broad range of packaging types, including but not limited to:



Hard to recycle single-use packaging*

such as carrier bags, wrappers for food and non-food products (e.g., confectionery wraps), disposable containers for takeout, single-use articles such as straws, cutlery and lids;

*) SUP are not reusable and they are not collected and recycled due to small size, lightweight nature and high rate of contamination.



Sales packaging for consumer products

such as plastic bags, mono and multilayer flexible films (including stretchable and shrinkable films), multi-component laminated films, trays and lids for modified atmosphere packaging;



Secondary and transport packaging

such as wrapping films, bubble films, films made of foamed polymers; and

It addresses critical issues related to various types of plastics packaging, including labelling, recyclability, recycled content, reuse and refill, biodegradability, compostability, inclusion of substances of concern, and possible restrictions thereof.



Recyclable plastic packaging

such as containers, flacons and bottles.

1.6

Overview of Case Studies

The transition to **sustainable plastic packaging** in the ASEAN region requires a holistic approach, targeting every stage of the packaging lifecycle – from design and material selection to end-of-life management. To guide this transition, a set of **priority focus areas** have been identified, each addressing a key challenge or opportunity for more circular, resource-efficient, and environmentally responsible packaging systems.

The case studies were selected based on their relevance vis-à-vis the ASEAN RAP and their demonstrated impact in both regional and international contexts. Each case study represents a critical lever for change, whether by reducing the generation of plastic waste, improving the quality and safety of recycled materials, enhancing consumer guidance and transparency, or enabling effective monitoring and enforcement of standards. The case studies were chosen not only for their technical robustness and innovation, but also for their practical feasibility, scalability, and alignment with the region's economic and governance realities.

The case studies have been selected on the premise that implementing these will result in packaging materials that promote plastic circularity and reduce plastic pollution. These focus areas of the case studies are informed by expert judgement and are supported by a range of studies and publications⁸. The main focus areas that are covered by the case studies include:



Reuse systems for packaging:

Exploring standards and practical models that enable packaging to be used multiple times, reducing reliance on single-use plastics and supporting the development of circular business models;



Biodegradability and compostability:

Establishing rigorous criteria and testing protocols to ensure that plastics labelled as compostable or biodegradable truly break down in relevant environments, thereby preventing persistent pollution and supporting organic waste management. While biodegradable and compostable plastics are often promoted as environmentally friendly alternatives to conventional plastics, their effective contribution to sustainable plastic packaging systems is highly dependent on the existence of appropriate industrial composting facilities. In the context of AMS, such infrastructures do not currently exist. In addition, compostable plastics can contaminate mechanical recycling streams if they are not properly separated. This reduces the quality and economic value of recycled plastics and may impair mechanical recyclability. For such reasons, use of biodegradable/compostable plastics cannot yet be considered as a viable solution to plastic pollution in the AMS;

Biodegradability and compostability of plastics do not include oxo-degradability



Recycling and recycled content:

Promoting standards that facilitate the efficient collection, sorting, recycling, and verification of recycled content in new products, thus closing the material loop and supporting the growth of domestic recycling industries;



Traceability and labeling:

Implementing clear, harmonized labelling systems – such as resin identification codes and eco-labels – to provide reliable information to consumers, recyclers, and regulators, and to support effective sorting, recycling, and market surveillance; and



Eco-labeling and third-party certification:

Building consumer trust and enabling green procurement through credible, independently verified environmental claims on packaging.

⁸ Useful references include the following, which provide literature context:

European Environment Agency (2024). The role of plastics in Europe's circular economy. Publications Office of the European Union. <https://data.europa.eu/doi/10.2800/30>

United Nations Environment Programme (2021). From Pollution to Solution: A global assessment of marine litter and plastic pollution. Synthesis. Nairobi. https://malaysia.un.org/sites/default/files/2022-02/POLSOLSum_1.pdf

World Bank (2021). Plastic Circularity Market Study Series: Thailand, Malaysia and the Philippines. <https://www.worldbank.org/en/region/eap/publication/plastic-circularity-market-study-series-thailand-malaysia-and-the-philippines>

Ellen MacArthur Foundation (2022). Upstream Innovation: a guide to packaging solutions. <https://www.ellenmacarthurfoundation.org/upstream-innovation/overview>

PACE (2021). Circular Economy Action Agenda: Plastics. https://pacecircular.org/sites/default/files/2021-02/circular-agenda-plastics-feb2021_FINAL.pdf

PREVENT Waste Alliance (2024). Guidelines on Minimum Requirements for Plastic Waste Recovery & Crediting Standards. https://prevent-waste.net/wp-content/uploads/2025/06/250602_GIZ_Perevent_PlasticWasteRecovery_A4.pdf



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This Manual presents twelve case studies, which were identified on the basis of their relevance with the AMS experiences (see Table 1) and that include three examples from other jurisdictions - Australia’s application of ISO 20400 on sustainable procurement, France’s development and implementation of the Triman Logo, and the ASTM standard on resin identification codes. The number of case studies was chosen to provide a focused yet representative view, ensuring clarity and accessibility for readers.

Together, these case studies highlight both the successes and challenges encountered in advancing plastic packaging standards and labelling. The inclusion of non-ASEAN cases is valuable, as they showcase internationally recognized approaches to embedding sustainability criteria in procurement processes and to establishing clear, harmonized labelling systems. By examining these diverse examples, stakeholders across the region can gain practical insights into the technical, economic, and governance requirements, as well as effective monitoring protocols and capacity needs that underpin real-world impact. These international experiences offer proven methodologies and frameworks that can inspire and inform the development, alignment, and enforcement of robust standards in the ASEAN context, tailored to the regional realities and needs, and supporting the region’s transition towards circularity. Further details of the case studies are provided in Annex 3.

Table 1. List of Case Studies selected for this Manual

No.	Country	Case Study
1	Singapore	Singapore's Standards Development System
2	Philippines	Application of ISO 14855 on Determination of Biodegradability and Compostability
3	Philippines	Application of ISO 18603 on Packaging and the Environment – Reuse
4	Australia	Application of ISO 20400 on Sustainable Procurement
5	Malaysia	Application of ISO 14067 on Carbon Footprint Certification for Plastic Packaging
6	France	Development and Application of the Triman Logo
7	United States	Application of ASTM D7611 - Standard for Resin Identification Codes
8	Thailand	Label-Free Bottles Initiative
9	ASEAN	ASEAN Cosmetic Directive (ACD)
10	ASEAN	Mutual Recognition Agreements for Food Safety Standards
11	Thailand	Application of TIS 3635-2566 based on the ISO 15270:2008 to Recovery and Recycling of Plastic Waste
12	Malaysia	SIRIM Eco-Labeling Scheme based on ISO 14024



CURRENT LANDSCAPE OF PLASTICS PACKAGING STANDARDS IN ASEAN

A collection of various pieces of plastic and metal waste, including bottle caps, a can, a cup, and crumpled foil, scattered on a red background with wavy patterns.

2.1

Availability of Standards and Trends in Standardization

A substantial collection of international standards addressing the design, production, and use of plastic packaging and applicable throughout its entire lifecycle is currently available. These standards provide a foundation for adopting internationally recognized best practices.

This section offers an overview of the available standards, and the additional standards needed to support plastic packaging sustainability and related labeling requirements. Table 2 highlights the areas where the availability of existing standards falls short, as well as key opportunities to improve standardization efforts for plastic packaging across AMS.

There is a growing body of international standards on plastic waste, developed by the International Organization for Standardization (ISO) and various national standardization bodies in more developed economies. These standards are publicly available for purchase and use by all. Stakeholders in AMS can reference or apply these international standards directly, even without formal adoption or republication as national standards.

Adopting these international standards as national standards encourages broader uptake by both government authorities and the private sector. Adoption also facilitates incorporation into national legislation and enhances enforcement. Typically, national standardization bodies retain the copyright to republished standards, which then gain the status of nationally recognized documents. This, in turn, promotes voluntary implementation by stakeholders and supports integration into national regulatory frameworks.

The standards identified in Table 2 are organized according to the upstream and downstream processes within the plastics packaging lifecycle, as detailed in Section 2.3 of this Manual. Standards that are relevant to all phases of the lifecycle are included in Section 2.1 (cross-cutting section).



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Availability of Standards and Key Trends

Table 2. Summary of availability of standards and key trends

CONTENT OF STANDARDS NEEDED	AVAILABILITY IN AMS	GAPS IN AMS
UPSTREAM STANDARDS		
DESIGN-FOR-RECYCLING, DESIGN-FOR-REUSE AND ADDRESSING UNNECESSARY PACKAGING	Most AMS have adopted articulated policies that emphasize the need for sustainable packaging design, therefore promoting “design-for-recycling” and minimizing unnecessary packaging. However, the support of these policies by technical standards remains inconsistent. Some AMS have started referencing eco-design principles (e.g., ISO 14006 and ISO 14009), often on a voluntary basis. Philippines, Thailand and Viet nam have adopted these international standards on general guidelines on eco-design (ISO 14006, ISO 14009). Standards like ISO 18601 (General requirements for the use of ISO standards in the field of packaging and the environment) and ISO 18602 (Optimization of the packaging system) are under consideration but not yet adopted.	Philippines, Thailand and Viet Nam have adopted general eco-design standards (i.e., ISO 14006), while no AMS has adopted packaging-specific standards such as ISO 18601 and ISO 18602. This indicates a critical gap in the availability of guidance on packaging design for reuse and recyclability. The European standard EN 13430:2004 defines the requirements for packaging material and presents a framework for self-assessment to determine whether the requirements have been met. It also provides practical guidance in assessing recyclability. This norm has not yet been adopted in AMS.
STANDARDS FOR PLASTICS REUSE	Reuse systems and circular models (both closed- and open-loop) based on ISO 18603, which provides guidance on reuse, are being piloted, notably in the Philippines and Viet Nam.	ISO 18603 is acknowledged but rarely integrated into national frameworks.
SAFETY OF RECYCLED PLASTICS IN FOOD CONTACT PACKAGING	Growing attention is paid to safety of recycled plastics used in food-contact applications, especially recycled PET. The safety concerns associated with it are, however, addressed through legislative measures rather than voluntary standards. Safety requirements of food packaging are also addressed in regulations rather than Standards. There are notably two international standards supporting food safety associated to packaging materials, (i.e., BRCGS Global Standard Packaging Materials and ISO 22002-4. These standards address generic requirements for safety of food packaging, The requirements set thereof can also be extended to recycled PET. The BRCGS is widely utilized on a voluntary basis across ASEAN as compliance support for B2B transactions, especially in export and trade. Thailand has formally adopted the ISO 22002-24 Standard.	Food safety is typically governed by regulations rather than voluntary standards, as safety requirements fall under the jurisdiction of national regulatory authorities. Recycling of plastic in food-contact applications requires specialized systems to assess safety and ensure regulatory compliance. However, infrastructures and facilities for food-grade recycling are limited across many AMS. Even where relevant standards exist, their implementation is often incomplete or inconsistent.



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CONTENT OF STANDARDS NEEDED	AVAILABILITY IN AMS	GAPS IN AMS
BIODEGRADABLE AND COMPOSTABLE PACKAGING	There is an extensive range of international standards on biodegradability and compostability for plastics and for specific articles made of compostable plastics (e.g., tableware). Philippines, Singapore, Thailand, and Viet Nam have adopted standards related to biodegradability and compostability (e.g., ISO 17088, ISO 14855-2, ISO 20200)	Philippines, Singapore, Thailand and Viet Nam have adopted or partially adopted the relevant available international standards. However, infrastructure for composting, regulatory mechanisms to support enforcement are often lacking. Biodegradability/compostability cannot be considered as a preferred solution for the prevention of plastic pollution, as it requires specific treatment plants and costly separate collection systems, both of which are mostly not yet available in the AMS. Biodegradable/compostable plastics cannot be handled by recycling processes as the presence of these materials jeopardizes the quality of the general plastic streams and hinders the further recycling of plastics.
QUALITY AND TRACEABILITY OF PLASTIC RECYCLATE	ISO 15343 is a standard focused on traceability and verification of recycled plastic content. Global certification bodies are offering EN/ISO 15343 certification services worldwide, including in Southeast Asia.	The ASEAN regional framework does not currently list ISO 15343 among officially adopted or endorsed standards.



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CONTENT OF STANDARDS NEEDED	AVAILABILITY IN AMS	GAPS IN AMS
DOWNSTREAM STANDARDS		
STANDARDS FOR PLASTICS RECYCLING	A substantial range of international standards on plastics recycling and recycled content exists. Singapore and Thailand have adopted ISO 15270 "Guidelines for the recovery and recycling of plastics waste", the application of which remains nevertheless limited. The ISO standard for reuse of packaging, ISO 18603, has also been adopted by Philippines and Viet Nam.	There are gaps in the adoption of standards on plastics recycling, recycled content, and associated standards on labeling. Malaysia, Singapore, Thailand and Viet Nam have adopted ISO 15270 (recycling). Philippines and Viet Nam have adopted ISO 18603 (reuse). There are associated gaps in the availability of recycling and reuse policies, infrastructure, and legislation to facilitate and encourage recycling and reuse. Philippines and Viet Nam have adopted policies for supporting reuse; however, the challenge of establishing adequate infrastructure and supporting regulations, such as those supporting EPR, remains. EN 13429 is a European standard that defines requirements and methods for reusable packaging, focusing on design, use, return systems, and reuse cycles to support sustainable packaging within a circular economy; this standard represents a useful benchmark, but it has not been adopted in the AMS. Standards for recycle quality and recycled content (e.g., ISO 1402 "self-declared environmental claims") are also not uniformly applied.
STANDARDS FOR END-OF-LIFE MANAGEMENT	Most AMS support post-consumer waste management initiatives. Philippines, Thailand and Viet Nam have defined standards or protocols for material sorting, recyclability evaluation, or compostability testing.	Standards on composting of plastics (ISO 14855-1,-2 Biodegradability of plastic materials, ISO 17088 - Specifications for compostable plastics, ISO 5412 - compostable plastic bags) and labeling (ASTM D7611/D 7611M Standard practice for coding plastic manufactured articles for resin identification ISO/TR 18568 Marking for material identification) to support end of life have not been widely adopted in AMS.
GENERAL STANDARDS ON SUSTAINABILITY AND CIRCULARITY	The recently published ISO 59000 series of standards on the circular economy is an addition to the existing package.	The recently published ISO 59000 series of standards on circularity has not been adopted by any AMS.



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CONTENT OF STANDARDS NEEDED	AVAILABILITY IN AMS	GAPS IN AMS
CROSS-CUTTING STANDARDS		
STANDARDS FOR TRACEABILITY, LABELING.	Indonesia, Malaysia Philippines, Singapore and Viet Nam have adopted the generic ISO 14020 environmental labeling standards, although their implementation varies. Malaysia has adopted several product-specific eco-labeling standards. Standards for traceability, such as the ISO 22005, are well established in the food sector; they are therefore applicable to some extent also to food packaging. <i>ASEAN published the ASEAN Guide to Traceability of Food and Feed in 2021</i> (ASEAN Secretariat 2021). Traceability systems specific for packaging, in particular plastic packaging, do not exist as stand-alone standards but are present in other schemes such as the BRCGS (BRCGS 2025).	The adoption of standards on coding and labeling of plastics has been adopted by Philippines and Thailand. Existing traceability systems, such as ISO 22005 and ASEAN's Guide on Traceability for Food and Feed (2021), have potential applicability to plastics packaging but are not yet widely implemented for this purpose. Clear and consistent labeling for recyclability, biodegradability, and end-of-life instructions is lacking in most AMS. Labeling standards and codes are not yet harmonized in ASEAN.
STANDARDS ON DEFINITIONS AND TERMINOLOGY	Terms such as “recyclable”, “biodegradable”, or “compostable” are not standardized regionally, leading to market confusion and misleading claims.	Standards on definitions and terminology have not been adopted or harmonized in ASEAN. Harmonized implementation of international standards is highly desired, or at least mutual recognition of standards adopted by some AMS across the ASEAN region.
HARMONIZATION OF STANDARDS ON LABELING ACROSS AMS	Labelling of plastics packaging for identification of materials and for ecolabeling is implemented in several AMS.	The recycling industry is unevenly distributed in the AMS, this leads to inconsistencies in recycling processes and a substantial lack of free trade across borders. This is accentuated by a lack of provision for harmonization of standards for plastic packaging.



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CONTENT OF STANDARDS NEEDED	AVAILABILITY IN AMS	GAPS IN AMS
SUPPLY CHAIN SAFETY AND SUSTAINABILITY	Indonesia, Philippines and Viet Nam have adopted ISO 2040 guide on sustainable procurement and ISO 3710 on sustainable development. These standards provide general guidance on managing associated risks across the supply chain. Application of these is, however, typically limited.	Although international frameworks like ISO 20400 on sustainable procurement and ISO 37101 on sustainable development exist, their adoption across AMS is sparse. A region-wide uptake of such standards is essential to manage supply chain risks and support sustainable procurement.
MANAGEMENT SYSTEM STANDARDS	AMS have widely adopted international standards on quality systems management (ISO 9000 series) and environmental risks management (ISO 14000 series). These are hence available for applications in dealing with all stages in the lifecycle of plastic packaging.	Although international standards on managing quality systems (ISO 9000 series) and environmental risks (ISO 14000 series) are widely adopted, their use for recycling and end-of-life treatment processes is limited.
COMPLIANCE AND VERIFICATION AND INFRASTRUCTURE SUPPORT	The international suite of compliance and verification standards, such as ISO/IEC 17000:2020, ISO/IEC 17007:2009, ISO/IEC 17011:2017 ¹⁴ , published by ISO/IEC are widely adopted and available in AMS. These are available for the implementation of measures dealing with all stages of the lifecycle of plastic packaging. The range of ISO/IEC standards includes those that prescribe requirements for infrastructure to support implementation and enforcement.	Compliance and verification standards published by ISO/IEC are widely adopted in AMS. These are available for implementation of measures dealing with all stages of the lifecycle of plastics packaging. The range of ISO/IEC standards includes those that prescribe requirements for infrastructure to support implementation and enforcement. However, ensuring compliance is challenging due to the limited availability of local testing laboratories, certified auditors and harmonized mutual recognition arrangements. Monitoring capacity is also limited, with unclear institutional responsibility and limited budget. Moreover, many businesses in the AMS view downstream standards as cost centers, rather than value drivers due to limited incentives or recognition in procurement systems. This leads to low engagement of the private sector.

¹⁴ List of Standards by ISO/CASCO Committee on conformity assessment:
<https://www.iso.org/committee/54998/x/catalogue/pi/1/u/O/w/O/d/O>



2.2

Challenges

The stocktaking review and gap analysis identified significant gaps in standards uptake and labeling for plastic packaging across AMS. The analysis highlights disparities between current frameworks and the standards needed to support a cohesive and sustainable approach to packaging - aligned with international best practices and with the view of supporting the region's efforts to support the transition to a circular economy.

Gaps were identified in upstream, downstream, and cross-cutting aspects of the plastic packaging lifecycle, including packaging design, food safety, biodegradability, recyclability, reuse systems, labeling, traceability, supply chain sustainability, and infrastructure.

The findings also reveal structural and implementation gaps at the policy level, in infrastructure, and in the approaches adopted. While some AMS have established standards, many lack the enabling mechanisms necessary for effective implementation.

Implementing suitable measures may support ASEAN and AMS to improve standardization, infrastructure, legislation, and related public policy initiatives. Standards defining technical requirements for recycled content, product design for recyclability, and environmental performance are needed to support the circular economy objectives while maintaining safety of the recycled products (e.g., for food contact materials).

Standards facilitate trade and market access, helping to build consumers' trust and transparency through labelling and certification, empowering consumers to make informed choices, and driving demand for sustainable products.

The achievement of these objectives is dependent on addressing several constraints, such as:



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Fragmented policy and regulatory frameworks:

A requirement for a coherent system that integrates standards into national policies and regulations. Standards often exist in isolation from environmental laws, trade regulations, and waste management strategies, resulting in inconsistency and limited implementation and enforcement;



Insufficient incentives and supporting regulatory mechanisms:

Regulatory support is often necessary, and focusing solely on voluntary uptake is insufficient. Furthermore, without incentives, the adoption and effectiveness of standards would be limited;



Limited institutional capacity and technical expertise:

National standards bodies, certification bodies, and regulatory agencies require trained personnel and access to up-to-date scientific and technical knowledge, particularly in areas like recycled content, biodegradability, and food contact materials;



Lack of industry awareness and engagement:

Understanding and involvement of industry stakeholders can create a momentum for adopting and implementing relevant standards, particularly in markets where regulation is weak;



Inadequate infrastructure and investment:

Essential systems such as waste collection, sorting, and recycling, combined with limited private sector investment, are required for the practical implementation of standards for recyclable and compostable plastics. Without this foundational infrastructure, there is little incentive or capacity for implementation of standards for recycling and other treatments;



Limited regional coordination and harmonization:

The lack of harmonized standards in ASEAN hampers intra-regional trade and progress towards a circular economy. Divergent national standards increase compliance costs for manufacturers and exporters. Harmonizing standards and regulations would facilitate trade, mutual recognition of certifications, and regional policy coordination;



Fragmented support for capacity building and awareness:

Training for industry stakeholders and certification bodies, as well as investment in consumer awareness, remains limited. This leads to limited understanding and low adoption of standards. While some AMS have testing capacity, broader investment in skills and capabilities is needed across the region;



Capacity gaps:

The National Standards Bodies of some AMS still require further capacity to develop or adopt the required plastic packaging-specific standards in a timely manner. AMS with larger economies lead in adoption of standards, while smaller economies face resource and skills constraints; and



Building trust and confidence in compliance:

Trust and a sense of compliance with technical standards by all relevant stakeholders (e.g., policymakers, regulatory agencies, manufacturers, users and consumers) are highly important to the development of national systems. The increased adoption of ISO standards supplemented by national standard development at AMS level, effectively enhance trust and confidence in plastic packaging standards.



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3

GUIDING PRINCIPLES AND TECHNICAL REQUIREMENTS

A set of guiding principles and key technical requirements have underpinned the development of this Manual. These principles define the considerations that should be referenced in adopting and implementing standards that address the concerns of end-of-life of plastic packaging. These principles and technical requirements are elaborated below.



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These principles and the relevant technical requirements are recommended to be referenced in adopting and implementing standards that address the concerns of plastic packaging and waste. The guiding principles are based on a combination of relevant features of the ISO/IEC Guide 59:2019 *“ISO and IEC recommended practices for standardization by national bodies”* and the World Bank commissioned study titled *“Guiding Principles and Associated Minimum Technical Requirements: Regional Guidance on Standards and Labeling for Sustainable Plastic Packaging in the ASEAN Region”*. The guiding principles ensure that the standards adopted for plastics packaging align with international standards and are implemented in accordance with ASEAN's needs.

The guiding principles set broad objectives and a strategic direction for sustainable plastic packaging. Each guiding principle is supported by strategies, which provide guidance to enable its implementation.

The minimum technical requirements provide the supporting actions needed to apply these standards in practice. They offer long-term guidance for the sustainable implementation and effective utilization of the standards set by the Guiding Principles.

The guiding principles and the minimum technical requirements are interlinked: the success of one is related to one or more of the others.

Guiding Principle 1

Relevance, effectiveness, coherence

Standards and labelling systems should effectively address the needs of the market with regard to the reduction of plastic waste and environmental damage. The standards should be adequate to address all categories of plastic waste through the standards lifecycle. Conflicts and duplication with other standards should be avoided. Standards should support compliance with technical regulations, emphasizing the importance of achieving cost-effectiveness and market competitiveness to ensure that they support sustainable practices that are widely adopted.

Guidance under Principle 1:

- A.** Standards should be developed with stakeholders' inputs and address their needs, with particular consideration for vulnerable groups whose livelihoods depend on plastic packaging waste management;
- B.** Standards should be up-to-date through periodic review and be revised to reflect technical, social, and economic conditions;
- C.** Harmonization of standards for plastics packaging should be enhanced to establish a framework and foundation for addressing the concerns of plastics packaging wastes in a collaborative manner, facilitating trade and removing technical barriers to trade;
- D.** Support for implementation of standards through communication to consumers, incentives, labeling and regulation to eliminate negative practices; and
- E.** Cost effective implementation of standards and labelling.



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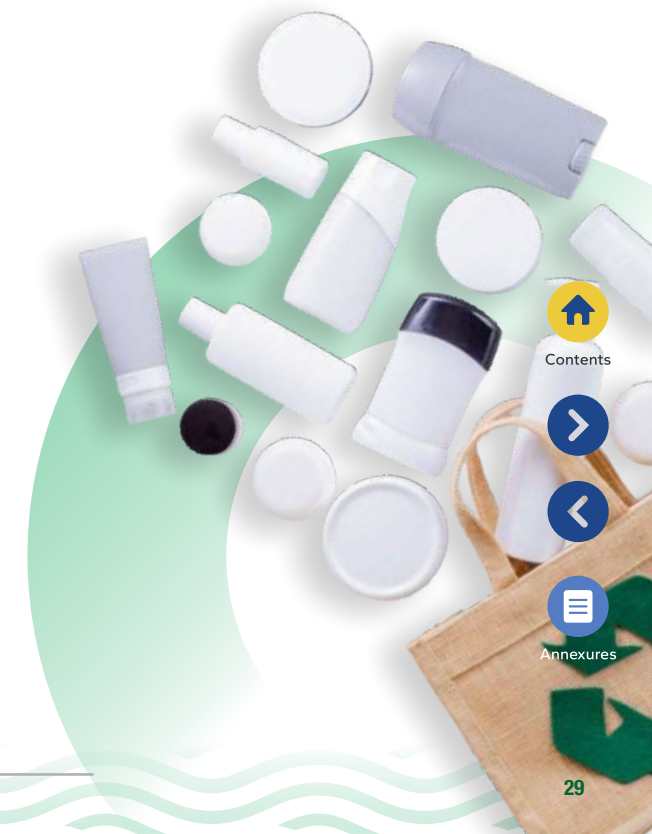
Key technical requirement 1:*Implementation support across the life cycle*

Responsible authorities should ensure that supporting measures for promotion and education of identified essential standards, establishment of mandatory labeling schemes for identification of resins and end of life treatments are implemented. These key standards are reported in Chapter 5 (Table 3). Development of voluntary certification and ecolabeling programs for plastics packaging is required to enable and support industry led measures.

A competent and coherent system for the development and implementation of standards required for plastics packaging is needed in all AMS. It is recommended that this system include:

- Establishment of national standard development committees with responsibility for required standards on plastics packaging, with key stakeholders being represented. To that end, it must be noted that the development of standards related to plastic packaging, waste management, and sustainability involves a wide range of stakeholders across government, industry, civil society, and international development partners. These include:
 - **Government agencies such as Ministries of Environment, National Standardization Bodies, Customs, *inter alia*¹⁵;**
 - **Industry and private sector, such as manufacturers and brand owners, packaging and plastic converters, recyclers, Micro-, Small- and Medium-Sized Enterprises (MSMEs), retailers and importers, and industrial associations;**
 - **Third-party certification bodies, laboratories and research institutes supporting development of test protocols; Civil society such as consumer advocacy groups, non-governmental organizations;**
 - **Informal sector (waste pickers, collectors, etc.)**
- Adoption of key international standards as national standards, pursuing the integration of essential standards into national legislation and policies, accompanied by incentives and awareness-raising measures;
- Strengthening the capacity of standardization bodies in AMS to foster active collaboration with manufacturers, industry associations, and consumers to ensure that standards are relevant and market aligned;
- Establishment of labeling certification programs and policy initiatives of the government supporting packaging waste and broader concerns of sustainability and circularity; and
- Participation in international standards development committees responsible for plastics packaging standards and supporting technologies, such as:
 - **ISO/TC 207 – Environmental Management;**
 - **ISO/TC 122 – Packaging;**
 - **ISO/TC 323 – Circular Economy; and**
 - **ISO/TC 61 – Plastics.**

¹⁵ Ideally, the competent AMS-level national agencies should conduct their activities in coordination with the approach taken with the relevant ASEAN-level Sectoral Bodies and Working Groups, such as ASOEN, SEOM, AWGCME and ACCSQ, *inter alia*.



Guiding Principle 2

2

Embed sustainability and circularity

Sustainability and circularity considerations should guide the development and implementation of standards. This is particularly significant for standards that provide guidance on the design phase of the product packaging and for defining labelling requirements.

Guidance under Principle 2:

- A. Identify and adopt all essential standards that provide for sustainability, including those that minimize packaging, avoid substances of concern, support recycling or reuse;**

B. Develop and implement standards to ensure plastic packaging waste is of sufficient quality for recycling or reuse; and

C. Standards should additionally address sustainability across the value chain of sustainable packaging through standards for sustainable procurement, traceability and risk management.
- Management systems standards to be applied to processes in the whole Lifecycle of plastic packaging (design, raw material procurement, production, use, and end-of-life) and related labeling to ensure effective implementation;

Enhanced credibility of operators and enhanced compliance through in- built monitoring of plastic packaging standards and labeling standards and support to regulatory and voluntary programs; and

Ensure availability of standards and certification services for management systems (e.g., ISO9000, ISO14000 and others, as applicable).

Key Technical Requirement 2:
Integrated management systems

Management system standards provide widely accepted international best practices and methodologies to organizations, covering the whole lifecycle of plastics packaging to ensure implementation and monitoring of requirements. Certification bodies are management system standards available in AMS to support the adoption and verification of the implementation of these standards. These include:

Guiding Principle 3

3

Development and adoption of harmonized standards and labeling

Harmonization of standards within the ASEAN region may enable coherent and integrated solutions. It is recommended that standards and labelling practices that support labeling, recycling, reuse and end of life treatment options be harmonized. The implementation of standards and labeling through a common approach across all AMS would ensure credibility, clarity and transparency, enabling traceability of the packaging through the lifecycle

Guidance under Principle 3:

- A. Harmonizing national standards on the basis of international corresponding standards;**
- B. Optimization of processes for cost efficiency;**
- C. Ensuring traceability through comprehensive labelling systems;**
- D. Ensuring credible environmental labels claims through accredited compliance and verification systems; and**
- E. Developing harmonized labeling requirements on packaging to support traceability, end-of-life, or recycling.**

Key Technical Requirement 3:
Adoption of harmonized practices across AMS

This will support the harmonization of standards for plastics packaging in ASEAN. ASEAN has an existing arrangement for the harmonization of standards, for instance under the ASEAN Consultative Committee for Standards and Quality (ACCSQ). Existing coordination modalities can be

further strengthened by adopting a coherent program of work dedicated to plastic packaging and labeling based upon the regional harmonization and adoption of international standards and the corresponding good practices. It has been noted that since all AMS are members of ISO, they are free to adopt and republish these standards as national standards without limitations. This covers:

- Adoption of good practices for plastic packaging composition, manufacturing, and labeling in the region;
- Common understanding regarding principles of standards for plastic packaging and labeling in AMS; and
- Availability of standards for plastics packaging waste such as those for collection, sorting, recycling, reuse and composting.

Support alignment with international standards (e.g., ISO, ASTM) for global compatibility and recognition, and use of standardized criteria for labeling facilitating identification, sorting, recycling, end-of-life disposal.

Guiding Principle 4

4

Regionally coordinated implementation measures

A viable and coordinated regional approach to addressing the concerns of plastics packaging waste and the associated environmental concerns should be underpinned by mutual recognition of labeling, inspection, and certification requirements based on harmonized standards. This will ensure that measures to address plastics packaging waste do not create additional barriers to trade and enable comprehensive regionwide implementation programs.

Guidance under Principle 4:

- A. It is recommended that ASEAN establish an arrangement to harmonize the implementation of standards for plastics packaging across its life cycle;
- B. It is recommended that ASEAN establish arrangements for authorities from AMS to collaborate on mutual recognition of labeling and certification of plastics packaging; and
- C. It is recommended that AMS establish common requirements on plastics packaging labels and mutual recognition of these labels.

Key Technical Requirement 4:
Legally binding arrangements

Mutual recognition requires a legally binding agreement between AMS. Such arrangements are important for the effective implementation of mutual recognition, as they ensure consistency, trust and enforceability in labelling and certification. Without such arrangements, implementation may be fragmented and unreliable. Although developing a legally binding framework can be challenging due to differing national systems, it is feasible, particularly if the AMS build on existing ASEAN mutual recognition experiences. Starting with policy dialogue and technical alignment, the AMS can progressively work towards a formal agreement that benefits all parties.

Guiding Principle 5

5

Infrastructure development

An adequate infrastructure for development and implementation of standards and labeling is required to support plastics packaging waste avoidance and/or recycling.

Guidance under Principle 5:

- A. Infrastructure should be available for developing and maintaining required standards;
- B. Ensuring standards and physical infrastructure for recycling and waste recovery are available; and
- C. Standards are available to provide requirements for compliance and verification infrastructure (for certification testing, verification and inspections).

Key Technical Requirement 5:
Infrastructure for compliance and verification including testing laboratories, labeling and certification programs and services

This requirement emphasizes the need to develop and ensure the allocation of resources and responsibilities organizations and systems for all stages of standards lifecycle from development to implementation, enforcement, monitoring and evaluation. They include:

- Availability of compliance and verification facilities within AMS to evaluate compliance with packaging standards;
- Implementation of regular monitoring systems and audits to ensure ongoing compliance with standards and labeling;
- Research and development initiatives to innovate and improve processes, material types and quality; and
- Monitoring effective implementation of initiatives through comparison of compliance and verification data against performance indicators.



Guiding Principle 6

6

Social responsibility

This guiding principle underscores the importance of businesses taking responsibility for the broader impact of their packaging practices on society and will provide a framework that encourages ethical sourcing, community engagement, and fair labor practices.

Guidance under Principle 6:

- A. Engaging stakeholders in the development of standards in an inclusive manner, reflecting the divergent views and interests of all impacted groups a; and
- B. Standards are implemented throughout the lifecycle to ensure safety and fair labour practices, as well as ethical sourcing.

Key Technical Requirement 6:
Stakeholder engagement and education

This should include capacity development for conformity assessment and labeling bodies on standards for sustainable plastic packaging and labelling when required and also consumer awareness campaigns to educate them to understand standards and labeling, throughout their lifecycle.

This requirement will support:

- Education programs for relevant stakeholders, particularly private sector entities within the plastics packaging value chain, to improve understanding of plastic packaging standards, their meaning and their use;
- Capacity development for conformity assessment and labelling bodies on standards for sustainable plastic packaging and relevant labelling requirements; and
- Promotion of awareness campaigns to private sector organizations and consumers to educate them about standards and labelling systems, and to increase their understanding of how these systems are applied throughout the standards lifecycle.



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4

RECOMMENDED BEST PRACTICES

These proposed Recommended Best Practices are intended for both individual AMS and ASEAN at the regional level. They aim to address the gaps identified in Chapter 3 on the current landscape of plastic packaging standards in ASEAN. In addition, these Recommended Best Practices identify and reference the Guiding Principles and Key Technical Requirements that should inform the adoption and implementation of standards concerning plastic packaging and the waste generated from it.

The implementation of these Recommended Best Practices requires efforts from each AMS and needs to be further supported by regional coordination and collaboration. Sections 5.1 to 5.6 of this chapter elaborate on six Recommended Best Practices. Coordination and collaboration at the ASEAN regional level is a practice that ASEAN should consider as the appropriate *modus operandi*, and this is discussed in Section 5.7.



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4.1

Recommended Best Practice

Ensuring that Essential Standards Across the Plastic Packaging Lifecycle are Available

Best Practice 1
Ensuring that Essential Standards Across the Plastic Packaging Lifecycle are Available promotes the broader adoption of key international standards throughout the plastic packaging lifecycle.

The scope of standards adopted should support economically viable solutions and ensure social responsibility, in addition, to providing technical solutions.

This Recommended Best Practice is underpinned by:

- **Guiding Principle 1:** Relevance, effectiveness, coherence; and
- **Key Technical Requirement 1:** Implementation support across the life cycle.

AMS can ensure the availability of essential standards for plastic waste by establishing a list of standards required across the entire lifecycle of plastic packaging.

Given that the issue of plastic packaging waste is complex and closely linked to broader concerns such as sustainability and circularity, it should be addressed through a wide range of coordinated actions. These broader considerations should be taken into account when setting priorities for standards development.

The recommended phased actions should include:

- Action 1** Adoption of a minimum set of key international standards
- Action 2** Ensuring availability of appropriate standards development Committees
- Action 3** Participate in international standards development committees
- Action 4** Adoption of a comprehensive suite of standards that support the implementation of measures for the whole life cycle of plastics packaging

It is recommended that AMS adopt or develop a range of supporting standards essential for the effective and comprehensive implementation of measures across the plastic packaging lifecycle. These may include standards covering the following areas:

- **Packaging design**
Standards for recyclable and reusable packaging, as well as minimizing unnecessary packaging;
- **Material specifications**
Requirements for the types and quality of materials used in packaging;
- **Food safety**
Standards ensuring the safety of recycled or reused plastics in contact with food;
- **Biodegradability and compostability**
Criteria for environmentally friendly packaging materials. See Best Practice Case Study 2 on Thailand's experience implementing PNS ISO 14855-1:2013 Determination of the ultimate aerobic biodegradability of plastic materials, a core upstream requirement;

- **Recycling and reuse**
Guidelines and methods for recycling, reuse, and addressing single-use plastics. See Best Practice Case Study 3, which demonstrates the Philippines' adoption of PNS ISO 18603:2021 standard titled "Packaging and the Environment – Reuse", a core international standard for reuse;
- **Circularity**
Standards supporting the transition to a circular economy;
- **Traceability and End-of-Life Management**
Requirements for tracking plastic materials and managing their disposal or reuse. Refer to Best Practice Case Study 4 on Australia's approach to adopting ISO 20400 on sustainable procurement;
- **Coding and Labeling**
Standards for plastic identification, eco-labeling, and consumer information;
- **Supply Chain Safety and Sustainability**
Standards for sustainable procurement, risk management, and safe handling throughout the supply chain;



• Management System Standards

Frameworks for managing environmental and quality aspects of plastic packaging. See Best Practice Case Study 5 on Malaysia’s implementation of ISO 14067 Carbon Footprint Certification for Plastics Packaging at Moldex Manufacturing, which exemplifies lifecycle management; and

• Compliance and Verification

Methods for testing, certification, and verification, along with the necessary supporting infrastructure.

AMS may adopt available key international standards within ASEAN as national standards in a relatively short timeframe. Alternatively, AMS may consider referencing international standards in their lists, as these standards can be utilized prior to the formal adoption of nationally developed standards. The key international standards recommended as an essential suite of standards to be explored across AMS are listed in Table 3, arranged in accordance with the lifecycle of plastics packaging. AMS are recommended to review and supplement this list to strengthen their national policies and programs.

Table 3. Key international standards

Stage in Lifecycle	Standards	Application
Upstream, Design of Packaging	ISO 18601–18606: Packaging and environment. ISO 14009: Guidelines for incorporating material circulation in design and development.	Design of packaging (for recycling, for-reuse, addressing unnecessary packaging). Standards on material specifications.
Upstream, Identification Codes and Labeling	ASTM D 7611/D 7611M Standard practice for coding plastic manufactured articles for resin identification. ISO/TR 18568 Marking for material identification. ISO 14021/24/25 (environmental labeling).	Marking and labeling for material recommendations and properties.
Biodegradability and Compostability	ISO 14855-1,-2 Biodegradability of plastic materials. ISO 17088 - Specifications for compostable plastics. ISO 5412- compostable plastic bags.	To support composting of plastics packaging waste.
Downstream - Recycling	ISO 15720-Guidelines for the recovery and recycling of plastics waste.	Recycling of Plastics.
Downstream - Reuse	ISO 1860 Packaging and the environment – Reuse.	Systems for reuse of plastics.
Downstream – End-of-Life	ISO 15720-Guidelines for the recovery and recycling of plastics waste. ISO 18605: Packaging and the environment – Energy recovery. ISO 14044 – Life cycle assessment – Requirements and guidelines. ISO 24161 Waste collection and transportation management – Vocabulary. ASTM D6400-23 Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities End of Life treatment.	End of Life treatment.
Cross-cutting Standards	ISO 20400 (sustainable procurement). ISO 59000 series of standards (circular economy).	Supporting sustainable practices and adoption of circularity.

Annex 2 provides details on the lifecycle of standards and outlines the roles of policymakers and other stakeholders in the development of standards. Policymakers and responsible authorities tasked with mitigating plastic pollution and promoting sustainable industry and waste management practices should work closely with national standards bodies to identify the standards needed to support the implementation and compliance of broader policy objectives, such as promoting recycling and achieving reduction goals. Efficient standards development is exemplified by the transparent and consultative process described in Best Practice Case Study 1 on Standard Development System in Singapore, which highlights the benefits of inclusive national standards development.

AMS, in collaboration with their respective NSBs, are recommended to:

- 
Establish Standards Committees tasked with developing and adopting standards related to plastics packaging and waste management;
- 
Ensure that policymakers support NSBs in implementing standards development programs, so that required standards are either created or adapted from international benchmarks; and
- 
Ensure that policymakers and other key stakeholders are actively involved in the relevant standards committees.

In addition, relevant parties and NSBs in AMS should:

Participate in the relevant international standards committees dealing with the relevant standards;

Establish a list of priority standards to support the implementation of national policies and initiatives on plastics packaging waste reduction and associated supporting actions. The priorities can be identified based on the requirements of current policies and interactions with businesses and industry; and

Take prompt action to establish a plan for adopting existing international standards identified as critical for addressing concerns related to plastic packaging waste, as national standards.



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Case Studies Exemplifying Best Practice 1
Adoption of essential standards across the
plastics packaging lifecycle

CASE STUDY 1

Singapore’s Standards Development Systems

Singapore's Standards Development System stands out as a case study for ASEAN due to its transparent, inclusive, and internationally aligned approach to standards creation and maintenance. The process begins with the identification of market or regulatory needs, with proposals accepted from a wide array of stakeholders including industry, academia, and government agencies. Technical committees, comprising subject-matter experts, draft standards - often referencing ISO, IEC, or other global benchmarks to ensure compatibility and facilitate trade. Public consultation is a pivotal phase, enabling businesses, civil society, and consumers to comment on draft standards, with all feedback systematically reviewed and incorporated prior to final endorsement by the Singapore Standards Council. The central government, through Enterprise Singapore, provides strong leadership, funding, and technical support, while sectoral ministries collaborate on standards relevant to their policy domains.

The following section provides a synopsis of several case studies that exemplify Recommended Best Practice 1. For a comprehensive overview of the administrative, technical, financial, and monitoring and enforcement requirements for each case study, please refer to Annex 3.

- The strengths of this system include the following:
- Ability to rapidly address emerging technologies through mechanisms like Technical References and Workshop Agreements;
 - Robust stakeholder engagement;
 - Commitment to periodic review - every five years or sooner if needed - to ensure standards remain relevant and effective;
 - Rigorous technical validation, pilot testing, and benchmarking against international practices prior to finalization, ensuring scientific and practical credibility;
 - Regular reviews, market studies, and impact assessments conducted by Enterprise Singapore and the Singapore Standards Council; and
 - Utilizing digital platforms to facilitate real-time feedback and maintain transparent audit trails.

Nevertheless, challenges persist, particularly the need for continuous engagement to keep pace with rapidly evolving sectors. Despite government subsidies, the costs associated with process modifications, training, and third-party certification can be significant for smaller enterprises.

This case is especially relevant for ASEAN as it demonstrates how a standards system can be both rigorous and flexible, balancing national priorities with global trends and fostering a culture of quality, safety, and innovation.

- Key lessons for ASEAN include:
- The value of transparent stakeholder engagement;
 - Systematic alignment with international standards;
 - Phased and inclusive implementation; and
 - The use of digital tools for monitoring and consultation.

By adopting similar approaches, other AMS can enhance standards harmonization, facilitate mutual recognition, and drive regional integration.

SINGAPORE’S STANDARDS DEVELOPMENT
SYSTEM STANDS OUT AS A CASE STUDY FOR
ASEAN DUE TO ITS TRANSPARENT, INCLUSIVE,
AND INTERNATIONALLY ALIGNED APPROACH
TO STANDARDS CREATION AND MAINTENANCE.

Table 4. Lessons learned from Singapore's Standard Development System

Key Aspect	Lesson Learned
Rationale	Transparent, consultative standards development addresses market gaps and supports national priorities.
Government Support	Strong leadership and funding from Enterprise Singapore and multi-agency coordination.
Technical Requirements	International alignment (ISO, IEC), scientific validation, and rigorous public consultation.
Monitoring Protocols	Periodic reviews, stakeholder feedback, digital tracking, and market impact assessments.
Strengths	Global compatibility, inclusive participation, adaptability, and support for innovation.
Challenges	Compliance costs for SMEs, ensuring rapid updates for emerging tech, and sustaining engagement.
Sectoral Impact	Facilitates trade, enhances product quality, and supports Singapore's standard development process.
Replication Potential	This model can inform ASEAN-wide harmonization and best practice for standards development.

CASE STUDY 2

Biodegradability and Compostability (Phillipines) PNS ISO 14855

The Philippines' adoption of PNS ISO 14855-1:2013 and related standards for plastic biodegradability showcases a robust approach to aligning national protocols with international benchmarks. These standards, recommended by the Bureau of Philippine Standards (BPS) and referenced by the National Ecolabelling Program - Green Choice Philippines provide clear methodologies for assessing how plastics break down under controlled composting conditions. The system is supported by various government agencies, including the Department of Trade and Industry (DTI), the Department of Environment and Natural Resources (DENR), and local government units, which help drive both regulatory compliance and technical innovation.

Strengths of the Philippines' approach include:

- The use of internationally recognized standards;
- Strong government backing;
- A tiered fee structure that encourages participation by smaller enterprises; and
- Detailed monitoring protocols requiring temperature, humidity, aeration, and CO₂ evolution to be measured, ensuring that certified products genuinely meet biodegradability claims.

Remaining challenges include:

- The energy intensity of producing biodegradable plastics;
- The need for more specialized testing laboratories; and
- The risk of incomplete degradation if composting conditions are not properly maintained. National standards like PNS ISO 14855-1:2013 ensure that biodegradable and compostable packaging is tested and certified under controlled laboratory conditions. However, the existence of these standards does not guarantee that all such packaging is collected and treated under controlled, real-world conditions. While compliance audits and recognized testing laboratories exist, the actual infrastructure for collection and controlled treatment appears uneven across the country, with many local government units facing significant challenges in waste management infrastructure.

The Philippines' experience offers valuable lessons for ASEAN including:

- The importance of harmonizing with global standards;
- The need for transparent and rigorous monitoring; and
- The benefits of government support and stakeholder engagement.
- These practices can serve as a model for other AMS aiming to improve the environmental sustainability of packaging and promote upstream circular economy principles.

Table 5. Lessons learned from Philippines' adoption of PNS ISO 14855-1:2013 and related standards for plastic biodegradability

Key Aspect	Lesson Learned
Rationale	Adopting ISO-based standards ensures credible, internationally aligned biodegradability assessments.
Government Support	Multi-agency involvement (DTI, DENR, LGUs, PCIEERD) drives implementation, compliance, and innovation.
Technical Requirements	Laboratory testing under controlled composting; CO ₂ evolution is measured for certification.
Monitoring Protocols	Defined processes for temperature, humidity, aeration, and CO ₂ monitoring; audits by BPS ensure compliance.
Strengths	International recognition, tiered fees for SMEs, strong regulatory backing, and support for circular economy.
Challenges	Compliance costs for SMEs, ensuring rapid updates for emerging tech, and sustaining engagement.
Environmental Impact	Reduces landfill waste and plastic pollution; supports soil health and carbon sequestration.
Replication Potential	Practices can inform ASEAN-wide harmonization and regional ecolabelling or standards development.



CASE STUDY 3

Recovery and Packaging and the Environment - Reuse (Philippines)
- Adoption of the ISO 18603 standard

The Philippines' PNS ISO 18603:2021 standard on "Packaging and the Environment – Reuse" is an adaptation of the international ISO 18603:2013 standard. It defines the criteria and assessment procedures for packaging to be classified as reusable, forming part of a broader suite of standards aimed at reducing the environmental impact of packaging across its lifecycle. The Bureau of Philippine Standards (BPS), under the Department of Trade and Industry (DTI), leads the implementation and compliance assessment, with support from the Department of Environment and Natural Resources (DENR) and local government units (LGUs).

Implementing this standard involves investment in redesign, infrastructure, and systems for tracking and managing reusable packaging, as well as ongoing quality assurance and compliance costs. The transition to reuse systems brings significant environmental and socioeconomic benefits, including reduced waste, job creation across the value chain, and the empowerment of waste workers through formal integration and training. The launch of the Philippine Reuse Consortium (PRC) in 2025 further institutionalized the reuse movement, fostering collaboration between government, civil society, and business.

Monitoring protocols involve both government and third-party actors. The BPS Product Testing Laboratory (BPSTL) and the Philippine Center for Environmental Protection and Sustainable Development, Inc. (PCEPSDI) conduct regular audits, inspections, and performance reviews to ensure compliance and continuous improvement.

Table 6. Lessons learned from the Philippines' adoption of PNS ISO 18603:2021 standard on packaging and the environment – reuse

Key Aspect	Lesson Learned
Rationale	Adopting ISO 18603 ensures packaging reuse is systematically assessed, reducing environmental impact.
Government Support	Strong multi-agency involvement (DTI-BPS, DENR, LGUs) ensures enforcement, resources, and advocacy.
Technical Requirements	Packaging must be durable, easy to clean, and integrated into a tracked reuse system; compliance requires technical documentation and testing.
Monitoring Protocols	Annual BPS inspections, documentation checks, and third-party audits by PCEPSDI/Green Choice Philippines.
Strengths	Promotes circular economy, creates jobs, empowers waste workers, and supports SMEs and social enterprises.
Challenges	Upfront redesign and system costs, need for consumer buy-in, and scaling up infrastructure for reuse.
Environmental Impact	Reduces packaging waste, conserves resources, and supports sustainable consumption and production.
Replication Potential	Framework and partnerships can inform ASEAN-wide reuse initiatives and standards harmonization.

CASE STUDY 4

Sustainable Procurement Australia - ISO 20400

Australia's adoption of ISO 20400 for sustainable procurement represents a comprehensive, good practice approach to embedding sustainability across public and private sector purchasing. The Australian Department of Climate Change, Energy, the Environment and Water (DCCEEW) leads policy implementation, supported by a network of state and local initiatives, and underpinned by robust national frameworks such as the Environmentally Sustainable Procurement Policy and the National Waste Policy Action Plan.

Transitioning to sustainable procurement, particularly for plastic packaging, requires upfront investment in new materials, supplier audits, and certification processes. Ongoing costs are linked to compliance monitoring and life cycle assessments. However, these are balanced by significant long-term benefits, including reduced landfill costs, access to government incentives, enhanced market reputation, and alignment with global sustainability standards. Technical requirements are clearly defined, with a target of 50% recycled content in packaging by 2025, elimination of problematic plastics, and a strong emphasis on recyclability and clear labelling.

Monitoring protocols involve regular supplier audits, contractual sustainability clauses, and performance metrics tracked by both federal and state agencies.

The “Building the Business Case for Sustainable Procurement in Australia – Guidance 2019” is a pivotal resource, providing practical frameworks and real-world examples to help organizations justify and implement ISO 20400.

The adoption of ISO 20400 can deliver measurable environmental benefits – reducing plastic waste, lowering carbon emissions, and protecting biodiversity – while also fostering a culture of continuous improvement and knowledge sharing. Australia's implementation of ISO 20400 is particularly relevant for the ASEAN sector because it demonstrates how clear government leadership, comprehensive policy frameworks, and practical guidance can drive successful sustainable procurement.

The Australian case offers actionable strategies for integrating international standards into national and local contexts, balancing environmental, social, and economic priorities throughout the supply chain. Its experience shows how robust monitoring, stakeholder engagement, and transparent criteria can overcome barriers and deliver measurable benefits – insights that AMS can adapt to accelerate their own sustainable procurement initiatives and harmonize practices across the region.

Table 7 Lessons learned from Australia's adoption of ISO 20400 for sustainable procurement

Key Aspect	Lesson Learned
Rationale	ISO 20400 ensures sustainability is systematically integrated into procurement, reducing environmental impact and supporting a circular economy.
Government Support	Strong national and subnational leadership, with clear mandates and incentives for sustainable procurement.
Technical Requirements	Specific recycled content targets, elimination of problematic plastics, and certified supplier criteria ensure high standards.
Monitoring Protocols	Regular audits, contract clauses, and KPI tracking by government agencies ensure compliance and continuous improvement.
Strengths	Drives circular economy, reduces waste, builds market trust, and aligns with international best practices.
Challenges	Upfront costs for materials and compliance, supplier readiness, and need for ongoing capacity building.
Environmental Impact	Significant reduction in plastic waste, lower carbon footprint, and enhanced biodiversity protection.
Replication Potential	Australia's model and guidance resources are adaptable for ASEAN and international contexts.



CASE STUDY 5

ISO 14067 GHG Certification for Plastic Packaging (Malaysia)

Moldex Manufacturing, a Malaysian company specializing in plastic pallets made from recycled materials, has set a national benchmark by achieving ISO 14067 certification for the carbon footprint of its products. This case study illustrates best practices in carbon footprint certification for recycled plastics, reflecting how industry leaders in Malaysia and across ASEAN can align with global sustainability standards and respond to evolving market and regulatory demands. Moldex's certification journey was driven by rising demand for verified climate credentials, anticipation of stricter environmental regulations, and a strong commitment to environmental stewardship.

The certification process, delivered in partnership with BSI, involves a comprehensive life cycle assessment (LCA), robust data tracking, and independent third-party verification. Technical requirements include detailed LCA in line with ISO 14040/44, transparent data management, and regular audits by qualified external auditors. Ongoing monitoring protocols, including internal digital tracking and transparent public reporting, underpin the credibility and sector-wide impact of Moldex's achievement.

Moldex's journey was underpinned by strong government support – providing technical assistance, capacity building, and alignment with international standards – to boost export market recognition. While

initial investments in training, audits, and process upgrades were required, potential benefits are measurable reductions in carbon footprint, increased resource efficiency, and improved access to environmentally conscious markets. The company's leadership and transparent reporting could encourage broader sectoral adoption, supporting Malaysia's transition toward a circular and low-carbon economy.

Moldex's experience demonstrates that ISO 14067 certification is achievable and beneficial – not only for market access but also for genuine climate action. The process delivers clear business and environmental benefits, but resource intensity and technical complexity may pose barriers for smaller firms. Strong institutional support and capacity building are essential for wider adoption.

The Moldex case highlights the importance of clear technical requirements, robust monitoring protocols, and public-private collaboration for successful certification and sector-wide transformation. These insights provide a practical roadmap for other AMS aiming to replicate such achievements and advance their own low-carbon, circular economy goals.

Table 8. Lessons learned from Malaysia's ISO 14067 carbon footprint certification for plastic packaging at Moldex Manufacturing

Key Aspect	Lesson Learned
Rationale	Respond proactively to market demand, regulatory trends, and climate commitments.
Government Support	Leverage national frameworks, technical assistance, and capacity building to lower barriers for certification.
Technical Requirements	Ensure robust life cycle assessment (LCA), data quality, and independent third-party verification.
Monitoring Protocols	Maintain regular audits, ongoing data tracking, and transparent public reporting for credibility.
Strengths	Achieve carbon reductions, resource efficiency, and improved export market access.
Challenges	Address initial investment needs (training, audits, process upgrades), especially for SMEs.
Sectoral Impact	Encourage industry-wide adoption by demonstrating clear business and environmental benefits.
Replication Potential	Align national and international standards, foster public-private collaboration, and share lessons learned.



4.2

Recommended Best Practice

Strengthening the Implementation of Essential Standards

Best Practice 2.
Strengthening the Implementation
of Essential Standards

This Best Practice 2 aims to support the adoption and enforcement of essential standards through concrete measures such as supportive policies, updated legislation, and targeted incentives. Essential standards should include those that promote sustainability throughout supply chains, circularity, and labelling practices.

This Recommended Best Practice is underpinned by:

- **Guiding Principle 2:**
Embed sustainability and circularity; and
- **Key Technical Requirement 2:**
Integrated management systems.

Strengthening the implementation of standards and labelling systems requires a combination of legal, institutional, financial, and technical measures that extend beyond voluntary compliance. Standards are typically published as publicly available and non-mandatory documents that may be implemented by any interested parties. However, standards become mandatory when they are directly referenced in legislation or enforced by regulatory agencies as part of specific regulations.

AMS can enhance the implementation of plastic packaging standards identified as critical to maximize their impact. Several approaches are available to AMS for strengthening the implementation of these essential standards:

- **Mandatory compliance could be achieved through conformity assessment schemes.** These schemes require full compliance to specified standards through factory inspection or production process assessment, to verify ongoing quality and process control, and ensuring consistency.
- **Require mandatory compliance through incorporation into legal frameworks,** supported by monitoring and enforcement mechanisms to ensure consistent application of the standard across industries and geographies;

- **Provide financial and other incentives to encourage compliance** making these incentives conditional upon participation in certification and/or verification schemes. This can be accompanied by promotional and awareness programs and education programs for targeting SMEs; and

- **Include essential standards in new policies, legislation and regulations** or policy implementation guidance documents, ensuring that essential standards are utilized as a catalyst to drive implementation and compliance.

AMS have developed a substantial range of **policies and strategies addressing plastics packaging waste** and proposed a range of measures to implement these policies. Standards often provide additional in-depth guidance and methodologies to governments, regulators and industry. It would be useful for the policies and the measures contained to be mapped to applicable standards to facilitate implementation of the policies.

Examples of policies and strategies that would benefit from standards include, among others:



Brunei Darussalam:
No plastic bag every day, Initiative by Department of Environment, Parks and Recreation, Ministry of Development;



Cambodia:
Circular Economy (CE) Strategy and Action Plan, 7 June 2022;



Indonesia:
Perpres No 8320181. Presidential Regulation on Marine Debris Management;



Lao PDR:
Green Public Procurement Action Plan of Lao PDR 2022-2025, Vision 2030, No. 6350/MoNRE, 29 December 2022;



Malaysia:
Roadmap Towards Zero Single Use –Plastics 2018-2030. Ministry of Energy, Science, Technology, Environment & Climate Change;



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**Myanmar:**

National Waste Management Strategy and Master Plan (2018-2030), Environmental Conservation Department for the Ministry of Natural Resources and Environmental Conservation, the Myanmar National Plastic Management Action Plan (2026-2035);

**Philippines:**

Resolution No. 1363, s. 2020, National Solid Waste Management Commission of the Department of Environment and Natural Resources;

**Singapore:**

Packaging Partnership Programme, administered by the Singapore Manufacturing Federation in partnership with the National Environmental Agency;

**Thailand:**

Plastic Waste Management Roadmap B.E. 2561-2573 (2018-2030), Ministry of Natural Resources and Environment; and

**Viet Nam:**

Decision No. 1746/QĐ-TTg of the Prime Minister: On promulgating the National Action Plan on Ocean Plastic Waste Management to 2030.

Four international standards – **ISO 18601–18606** (packaging and the environment), **ISO 14021/14024/14025** (environmental labeling), **ISO 20400** (sustainable procurement), and **ISO 59000 series** (circular economy) – provide a solid foundation for sustainable materials management and product responsibility across the value chain. However, to realize their full potential, governments must actively support their uptake and application. The implementation of these standards can be encouraged through their embedding in legislation, providing incentives, and by means of certification programs within AMS. Certification bodies can be provided with incentives to develop such schemes and training and education provided to industry to support compliance.

Standards for labelling should be addressed in a similar manner for all other standards. Labelling becomes a regulatory requirement when incorporated into legislation, while voluntary labelling programs are implemented by certification bodies. The enhancement of implementation will be achieved through a mandatory requirement for plastics packaging materials to bear mandatory labeling to support recycling especially if these are based on harmonised standards. Harmonization of each type requires specific approaches. Additionally, exported products may need to be labelled to meet the requirements of external labelling programs. See Best Practice Case Study 6 on France's Triman Logo for an example of strong mandatory labelling and its role as an enforcement mechanism to support compliance with environmental regulations.

Policymakers and responsible authorities can take a range of measures to strengthen implementation directly. These should include raising awareness, embedding essential standards in regulation, providing incentives, and supporting the development of a circular economy, as elaborated below.

Enhancing awareness, training, and capacity building, and equipping organizations with the knowledge and resources needed to comply with standards and track progress, are suitable early initiatives. Implementation through voluntary certification and labeling in AMS should continue to be encouraged and expanded. AMS have established credible certification bodies and industry should be encouraged and incentivized to use these services. Such services can be further enhanced by developing suitable ecolabeling standards and voluntary implementation programs such as the one showcased in Case Study 12 (Eco-labeling in Malaysia). This can be supplemented by providing necessary training and potentially engaging third-party services for conformity assessment, ensuring that all stakeholders are well-prepared to implement the standards effectively.

AMS can further enhance implementation of essential standards through regulation, providing incentives and supporting the development of a circular economy through the measures elaborated below.

Building trust and confidence: Building trust and confidence is essential for the development of national systems at the AMS level that are embraced by all relevant stakeholders, including policymakers, regulatory agencies, manufacturers, users, and consumers. For example, in electrotechnical safety and industrial standardization, ASEAN has achieved a high level of trust, compliance, and enforcement, resulting in a harmonized industrial base and common safety requirements, which in turn builds consumer confidence in locally manufactured products. Similarly, ASEAN may wish to approach plastic packaging and labelling with the aim of achieving comparable outcomes, for instance by adopting ISO standards alongside AMS-level standard development, thereby enabling effective standard development, implementation, and monitoring for plastic packaging.



Recommended phased actions:

ACTION 1

Strengthen regulatory frameworks with essential standards:

Regulatory frameworks should embed essential standards to drive sustainable packaging practices. For instance, ISO 18601–18606, which addresses the environmental impact of packaging, can be referenced in national regulations to require packaging producers and importers to comply with design-for-recycling principles, limit over-packaging, and ensure the recyclability of materials. Similarly, national eco-labelling regulations can be aligned with ISO 14021 (self-declared claims), ISO 14024 (Type I environmental labels), and ISO 14025 (Type III environmental declarations). This alignment ensures that producers’ environmental claims are transparent, verifiable, and comparable across borders. The development and implementation of EPR legislation would provide a strong incentive for businesses and industry to voluntarily adopt standards that reduce the environmental impact of plastic packaging waste.

ACTION 2

Implement incentive-based mechanisms:

Incentive-based mechanisms – such as green procurement policies, tax benefits, or access to financing for certified businesses – can accelerate compliance with sustainability standards. ISO 20400 on sustainable procurement provides guidance for integrating sustainability considerations into purchasing decisions. Governments, as major consumers, can lead by example by prioritizing products that comply with environmental and social standards, thereby creating market demand for sustainably designed goods and services.

ACTION 3

Foster the development of a circular economy:

The transition to a circular economy, supported by the emerging ISO 59000 series of standards, which are currently under development to guide the transition to a circular economy, requires significant institutional coordination. These standards, currently under development, will help structure strategies around waste minimization, product life extension, resource efficiency, and closed-loop systems. Effective implementation should be underpinned by inter-agency cooperation, alignment with national circular economy roadmaps, and active private sector engagement.

ACTION 4

Implementation of EPR and assessment of EPR compliance

Implementation of EPR and assessment of EPR compliance will be facilitated when AMS reference standardized methodologies. ISO 15270:2008: ISO 14040 Environmental management - Life cycle assessment - Principles and framework, ISO 14044 Environmental management - Life cycle assessment - Requirements and guidelines and ISO 15270:2008 Plastics - Guidelines for the recovery and recycling of plastics waste provide good references for this purpose.

Annex 2 provides details on the lifecycle of standards. Policymakers and responsible authorities should take a lead role in strengthening the implementation and enforcement of standards through the stages of the lifecycle.



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Case Study Exemplifying Recommended Best Practice 2
Strengthening implementation of essential standards

CASE STUDY 6

Development and Application of the Triman Logo (France)

The Triman Logo, introduced under France's AGEC Law, is a national benchmark for clear, mandatory recycling labelling on consumer packaging and products. This case study was selected to illustrate best practices in waste sorting and circular economy policy, showing how unified labelling can drive improved recycling rates and consumer engagement. The Triman system is driven by regulatory requirements, strong government backing, and integration with EPR frameworks, ensuring producers are responsible for end-of-life management.

Implementation requires strict adherence to design and placement rules, with product-specific Info-Tri sorting instructions regulated by eco-organizations. Ongoing monitoring through audits and reporting, combined with substantial penalties, underpins the system's credibility and effectiveness. While costs are mainly borne by producers and can be significant for SMEs, the benefits include higher recycling rates, reduced landfill, and greater public awareness.

The following section provides a case study that exemplifies Recommended Best Practice 2 For comprehensive details on the administrative, technical, financial, and monitoring and enforcement requirements associated with this case study, please refer to Annex 3.

Table 9. Lessons learned from France's adoption of the Triman Logo as a mandatory label

Key Aspect	Lesson Learned
Rationale	Respond to circular economy and waste reduction goals with clear, consumer-facing labelling.
Government Support	Ensure strong legislative backing, public awareness, and EPR integration.
Technical Requirements	Maintain strict design, placement, and Info-Tri rules for clarity and consistency.
Monitoring Protocols	Enforce through audits, reporting, and significant penalties for non-compliance.
Strengths	Drives recycling rates, supports circular economy, and gives clear guidance to consumers.
Challenges	Implementation costs for producers, especially SMEs; complexity for diverse product lines.
Sectoral Impact	Industry-wide compliance, standardization, and investment in recycling infrastructure.
Replication Potential	Offers a robust template for AMS aiming to improve waste sorting and recycling.



4.3

Recommended Best Practice

Harmonizing Standards and Regional Guidelines

Best Practice 3.
Harmonizing Standards and Regional Guidelines

This Best Practice 3 aims at aims at developing common ASEAN guidelines and technical criteria for labeling, recyclability, and biodegradability claims to ensure consistency across Member States.

This Recommended Best Practice is underpinned by:

- **Guiding Principle 3:**
Development and adoption of harmonized standards and labeling; and
- **Key Technical Requirement 3:**
Adoption of harmonized practices across AMS.

A **harmonized collection of plastic packaging labeling standards** would provide the foundation for a coherent system across ASEAN, clearly communicate material type, recyclability, and proper disposal instructions through consistent symbols, terminology, and color coding. This unified approach would reduce consumer confusion, facilitate proper waste sorting, support cross-border trade, and create economies of scale for packaging producers, while accommodating different languages through visual symbols and considering varying waste management capabilities across AMS through tiered implementation approaches.

A **program and mechanism for overall adoption and harmonization** of the full range of standards related to plastics packaging waste would ensure comprehensive and long-term impact. This could include the development of comprehensive ASEAN-wide standards to verify recycled content in plastic packaging (similar to BSI Flex 6228), including testing methodologies, chain-of-custody documentation requirements, and certification procedures.

Such a framework would establish credible verification mechanisms to support recycled content claims, create market transparency, drive demand for recycled materials, support policy initiatives like minimum recycled content requirements, and provide a level playing field for businesses operating across multiple AMS. The same principles could be applied to the ASEAN standards for biodegradable and compostable packaging, incorporating precise definitions, standardized testing protocols aligned with regional environmental conditions, certification requirements, and clear labeling guidelines.

ASEAN's existing platform under the ACCSQ and related arrangements for harmonizing standards should be utilized. It is recommended that arrangements be made to collaborate with ACCSQ and to utilize the existing platform. ACCSQ, a body established under the ASEAN Economic Ministers, is assigned the responsibility of “monitoring the effective implementation of the relevant provisions of this Agreement in respect of standards, technical regulations and conformity assessment procedures”

under Article 78.3(b) of the ASEAN Trade in Goods Agreement (ATIGA)¹⁷. As stated in Annex 2, ACCSQ’s programs do not currently include plastics packaging. Therefore, collaboration with ACCSQ is necessary to expand the scope of harmonization to include standards on plastics packaging in the standards harmonization program.

ACCSQ has established Working Group 1 on Standards to implement the work on harmonization of standards and adopted the “**ASEAN Guidelines for the Harmonization of Standards**”. These guidelines prescribe a process for harmonizing standards in AMS, in collaboration with Standards Bodies in AMS. The guidelines include a monitoring mechanism, and the harmonized standards are published on the ASEAN Trade Repository¹⁸. Best Practice Case Study 7 on the United States’ application of ASTM D7611 (Standard for Resin Identification Codes) offers relevant guidance for ASEAN in standardizing the coding and labelling of plastic packaging, thereby facilitating recycling, regulatory compliance, and consumer awareness.

¹⁶ Article 73, 2a) states that the “Member States shall take any of the following possible measures or their combinations to mitigate, if not totally eliminate, unnecessary technical barriers to trade: (a) harmonise national standards with relevant international standards and practices.

¹⁷ Available at <https://atr.asean.org/>



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Given that the current harmonization scope does not include standards on plastics packaging, there is a need to develop a collaborative arrangement that would lead to responsibilities assigned to identify standards for harmonization and manage a process for consultation on standards required for plastics packaging. ASEAN, potentially through the ASEAN Senior Officials on Environment (ASOEN) and the Senior Economic Officials Meeting (SEOM), may wish to consider proposing the establishment of a **task force/focus group on plastics packaging standards in cooperation between AWCME and ACCSQ**. This task force is envisaged to consist of nominated representatives from all AMS to represent relevant national standards committees and/or interests in this sector, which may regularly convene to discuss ways forward in efforts towards realizing the harmonization of plastic packaging and labelling in the ASEAN region, utilizing the “ASEAN Guidelines for the Harmonization of Standards” as a reference document.

Standards for labelling should be addressed in a similar manner as other standards. Labeling is a regulatory requirement when it is part of legislation and in parallel labeling is implemented in voluntary programs operated by certification bodies. The harmonization of each type requires specific approaches. In addition, exported products may be labeled to meet the requirements of external labelling programs. For example, Best Practice Case Study 8 highlights Thailand’s ‘*Label-free Initiative*’ as an

innovative solution on plastic packaging, demonstrating the potential for harmonizing across ASEAN to support design for recyclability initiatives. Similarly, Best Practice Case Study 9 examines the ASEAN Cosmetic Directive as a model for establishing a mechanism for regional harmonization, which may be applied to plastic packaging standards.

Harmonizing standards is both a collective and individual responsibility. The identification of standards to be harmonized should be undertaken collectively, while individual AMS should ensure that these harmonized standards are subsequently adopted in their respective jurisdictions.



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Case Studies Exemplifying Recommended Best Practice 3
Regional guidelines for harmonized standards

CASE STUDY 7

Standard for Resin Identification Codes (US) ASTM D7611

The United States’ ASTM D7611 standard, which establishes the Resin Identification Code (RIC) system for plastic articles, is a widely recognized international framework for classifying plastics by resin type. This case is included as it illustrates how clear and standardized labelling can improve recycling efficiency, material traceability, and support circular economy goals – key priorities for AMS. While not formally adopted in ASEAN, the standard is widely used by major brands and referenced by state-level legislation in the United States, making it a practical model for regional harmonization and cross-border trade.

The RIC system, managed by ASTM International, uses a simple numerical code (1–7) placed within a solid triangle, along with an abbreviation (e.g., “2 HDPE”) to identify resin types. Technical requirements include legible, non-prominent placement of the symbol on plastic products, and strict separation from environmental claims to avoid consumer confusion. Monitoring is generally conducted through state-level audits, industry compliance checks, and supporting documentation, although there is no centralized enforcement mechanism. For businesses, costs may

The following section provides a synopsis of several case studies that exemplify Recommended Best Practice 3. Please see Annex 3 for a complete presentation of the administrative, technical, financial and monitoring and enforcement requirements for each case study.

include tooling adjustments, label changes, and compliance audits, while governments may incur costs for enforcement, infrastructure, and public education.

Key strengths of ASTM D7611 include its simplicity, international acceptance, and its capacity to facilitate both consumer awareness and industrial sorting processes. However, challenges remain: the system is sometimes misinterpreted as a recyclability label, and adoption in ASEAN would require investment in retraining and possible infrastructure upgrades. The case underscores the importance of clear labelling standards, effective monitoring, and public education to avoid misleading claims and maximize environmental benefits.

For ASEAN, ASTM D7611 offers a replicable approach to unify resin identification, support regional recycling efforts, and align with global trade practices, especially if integrated with existing ISO-based standards. This hybrid approach could ease the transition and support sector-wide improvements in plastics management across the region.

Table 10. Lessons learned from United States’ Application of ASTM D7611 Standard for Resin Identification Codes)

Key Aspect	Lesson Learned
Rationale	Promote clear, standardized resin labelling to improve sorting, recycling, and trade harmonization.
Government Support	State-level laws and local programs drive compliance; industry-led adoption in absence of federal mandates.
Technical Requirements	Use of numerical code (1–7) in a solid triangle, with abbreviation, placed inconspicuously; no recyclability claims.
Monitoring Protocols	State audits, industry checks, and documentation; no central enforcement but strong regulatory guidance.
Strengths	Simple, internationally recognized, facilitates sorting and reduces contamination in recycling.
Challenges	Misinterpretation as a recyclability symbol; legacy use of outdated symbols; transition costs in new markets.
Sectoral Impact	Supports material traceability, higher-quality recycled plastics, and cross-border trade.
Replication Potential	Can complement ISO-based systems in ASEAN with phased, hybrid adoption and stakeholder education.



CASE STUDY 8

Label-Free Bottles Initiative (Thailand)

The Label-Free Bottles Initiative in Thailand is a pioneering example of packaging innovation aligned with the country's Bio-Circular-Green (BCG) Economy Model and serves as a valuable model for AMS. This initiative eliminates traditional labels from PET bottles, instead using embossing, laser printing, or QR codes to display essential product information directly on the bottle or cap. By removing labels and adhesives, the process significantly reduces recycling contamination, streamlines sorting, and improves the quality of recycled PET, directly supporting circular economy goals.

Strong regulatory support underpins this initiative, with agencies such as the Thai Industrial Standards Institute (TISI), the Ministry of Natural Resources and Environment (MONRE), and the Department of Pollution Control (DPC). These bodies have developed standards and guidelines promoting clear PET bottles and recycling-friendly design, while local governments drive implementation through education and partnerships. Technical requirements focus on monomaterial clear PET, direct printing for traceability, and strict durability testing to ensure product safety.

Transitioning to label-free bottles involves notable costs for redesign, new technology, compliance, and consumer education, particularly for smaller manufacturers. Monitoring is conducted through accredited testing (e.g., SGS Thailand, TISI), regulatory compliance checks, and ongoing recyclability audits. While dedicated standards for label-free packaging are still developing, continuous market feedback and lifecycle assessments are used to guide improvements.

The main strengths of the initiative include its capacity to reduce recycling contamination, enhance material recovery, and foster industry innovation, positioning Thailand as a regional leader in sustainable packaging. Challenges include initial transition costs, consumer acceptance, and evolving monitoring protocols. For ASEAN in the regional context, Thailand's approach demonstrates how regulatory alignment, industry engagement, and phased adoption can support harmonized, high-quality recycling systems across the region.

Table 11. Lessons learned from Thailand's Label-Free Bottles Initiative

Key Aspect	Lesson Learned
Rationale	Eliminate labels to reduce recycling contamination and support circular economy goals.
Government Support	Strong national standards and local implementation; broad stakeholder engagement.
Technical Requirements	Monomaterial clear PET; direct embossing or printing; durability testing.
Monitoring Protocols	Accredited lab testing, regulatory compliance, ongoing audits and consumer feedback.
Strengths	Reduces contamination, improves rPET quality, supports closed-loop recycling, drives innovation.
Challenges	Transition costs, need for consumer education, evolving monitoring standards.
Sectoral Impact	Raises sustainability standards, improves recycling infrastructure, positions Thailand as a leader.
Replication Potential	Suitable for ASEAN-wide adoption with phased rollout and stakeholder engagement.



CASE STUDY 9

ASEAN Cosmetic Directive

The **ASEAN Cosmetic Directive (ACD)** is a regionally harmonized regulatory framework adopted by all ten AMS in 2003 and fully implemented since 2008. It was designed to ensure the safety, quality, and free movement of cosmetic products across the region. Developed as part of ASEAN's commitment to economic integration, the ACD was the region's first mutual recognition arrangement, serving as a model for regulatory cooperation in Southeast Asia.

The directive harmonizes technical requirements by providing clear definitions of cosmetic products, establishing comprehensive ingredient lists (including prohibited, restricted, and permitted substances), and mandating Good Manufacturing Practice (GMP) and detailed labelling standards. Instead of pre-market approval, the ACD implements a Product Notification System, where companies must notify or register products with national authorities, submitting documentation on safety, formulation, and claims.

Monitoring and enforcement are achieved through post-market surveillance, with national regulatory agencies conducting audits, product testing, and compliance checks, while the ASEAN Cosmetic Committee (ACC) and the ACCSQ coordinate regional enforcement and information-sharing.

Key strengths of the ACD include its ability to reduce technical barriers to trade, facilitate regulatory compliance, enhance consumer protection, and promote sustainability through safer ingredients and improved packaging practices. However, challenges remain, such as the initial and ongoing costs of compliance for both governments and businesses, uneven enforcement capacity across Member States, and a lack of transparent cost data.

The ACD is a particularly good practice example for this Manual because it demonstrates how harmonized technical requirements, clear labelling protocols, and strong monitoring can foster trade, protect consumers, and drive industry-wide improvements. Lessons learnt from the ACD – such as the importance of phased capacity building, stakeholder engagement, mutual recognition, and transparent monitoring – are directly applicable to the plastics sector. By adopting a similar approach, ASEAN could develop harmonized standards for plastic packaging that improve recyclability, ensure safety, and support regional sustainability goals, while enabling efficient cross-border trade and regulatory alignment.

Table 12. Lessons learned from ASEAN's Cosmetic Directive

Key Aspect	Lesson Learned
Rationale	Harmonize regulations to boost trade, safety, and sustainability.
Government Support	Strong regional leadership, capacity building, and industry collaboration.
Technical Requirements	Clear product definitions, ingredient lists, GMP, and labeling.
Monitoring Protocols	National audits, regional coordination, industry self-checks, consumer reporting.
Strengths	Trade facilitation, improved safety, sustainability, and regulatory agility.
Challenges	Implementation costs, uneven enforcement, limited cost transparency.
Sectoral Impact	Model for regulatory harmonization and sustainable growth in ASEAN.
Replication Potential	Framework can inform harmonization in plastics/packaging, with adaptations for sector-specific needs.



4.4

Recommended Best Practice

Establishing Mutual Recognition Arrangements (MRAs) for Labels and Conformity Assessment

Best Practice 4.
Establishing Mutual Recognition Arrangements (MRAs)

for Labels and Conformity Assessment aims at fostering regional collaboration by recognizing certifications and conformity assessments across AMS, reducing duplication and trade barriers.

This Recommended Best Practice is underpinned by:

- **Guiding Principle 4:**
Regionally coordinated implementation measures; and
- **Key Technical Requirement 4:**
Legally binding arrangements.

It is recommended that ASEAN initiate regional discussions to develop MRAs for labels and conformity assessment results across all AMS. Such arrangements would eliminate duplicative testing and certification, reduce compliance costs for businesses operating across multiple AMS, facilitate regional trade, and build capacity across AMS through technical cooperation and knowledge sharing.

The diversity in the level and type of regulation for labeling and certification and inspection presents several challenges in establishing mutual recognition for labels and conformity assessment results within AMS. As AMS have independent regulatory systems, there is no provision for development of common national regulations and requirements; this diversity needs to be factored in any arrangement developed. It is recommended that a flexible arrangement be established that essentially provides a platform for recognition to agree on labeling, certification, inspection, and verification requirements. Other factors to be considered include:

- **Identification of focal points for each AMS** for the development and maintenance of the recognition arrangement, taking into account differences in legislation, the existence of multiple agencies in some AMS and regulatory systems between AMS;

- **Establishment of a task force or focus group** in ASEAN to undertake the development of the relevant MRAs. This may be done by initiating joint efforts between the environment and economic (standards) sectors, for example;

- **Identification of harmonized standards to be referenced** in the recognition arrangement; and

- **Establishment of the scope of recognition arrangement.**

The MRA should accommodate situations where some AMS regulate particular requirements while others rely on voluntary programs to address aspects of plastics packaging wastes.

The development of an MRA would call for an agreement at ASEAN level. Given the cross-cutting nature of this matter, it is proposed to include the establishment of a special task force with the involvement of all AMS.

Case Study 10 provides an example of MRAs and harmonized regulatory regimes within ASEAN, established through a legally binding instrument signed by relevant ASEAN Ministers that can be referenced in developing the arrangement for plastics packaging waste.¹⁹ See Best Practice Case Study 10 on ASEAN Mutual Recognition Arrangement for Food Safety Standards, which would be an ideal starting point to link existing agreements for food products with their associated packaging.

¹⁹ ASEAN. (2025). ASEAN Sectoral Mutual Recognition Arrangement (MRAs). <https://asean.org/asean-sectoral-mutual-recognition-arrangement-mras>



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Case Study Exemplifying Best Practice 4
Establish mutual recognition arrangements

CASE STUDY 10

ASEAN Mutual Recognition Arrangements for Food Safety Standards

The ASEAN Mutual Recognition Arrangements (MRAs) for Food Safety Standards represent a regionally harmonized framework adopted by ASEAN to ensure the safety, quality, and seamless trade of food products across Southeast Asia. Developed in support of ASEAN's broader economic integration agenda, these MRAs are designed to reduce technical barriers to trade by enabling mutual recognition of food safety certifications, laboratory testing, and inspection systems among AMS.

The MRAs harmonize technical requirements by mandating internationally recognized standards - such as ISO/IEC 17025 for laboratory testing and ISO/IEC 17020 for inspection protocols - and require national regulations to be aligned with Codex Alimentarius guidelines. Rather than relying on repeated testing and certification, the MRAs establish a system of mutual trust, where accredited certificates from any AMS are accepted throughout the region. Monitoring is ensured through regular audits of accredited laboratories and inspection bodies, robust data sharing through the ASEAN Rapid Alert System for Food and Feed (ARASFF), and continuous capacity-building initiatives. The ACCSQ

The following section provides a case study that exemplifies Recommended Best Practice 4. Please see Annex 3 for a complete presentation of the administrative, technical, financial and monitoring and enforcement requirements for this case study.

plays a central coordinating role, facilitating technical guidance, policy alignment, and collaboration among AMS, while national governments invest in laboratory upgrades, training, and institutional support.

Key strengths of the MRAs include their ability to streamline regulatory compliance, eliminate redundant testing and certification, lower costs for businesses, and support food security and consumer protection. However, challenges persist, such as the significant initial investments required for laboratories and training, uneven implementation capacity across AMS, and limited publicly available cost data.

The ASEAN MRAs for food safety offer a valuable good practice example for the development of standards and labelling for plastic packaging in the region. They demonstrate how mutual recognition, harmonized technical requirements, monitoring, and capacity building can create an efficient, trusted, and sustainable regulatory environment.

Table 13. Lessons learned from ASEAN's Mutual Recognition Arrangements for Food Safety Standards

Key Aspect	Lesson Learned
Rationale	Harmonize food safety standards to boost trade, consumer protection, and regional food security.
Government Support	Strong regional leadership, capacity building, and national investments in laboratories and training.
Technical Requirements	Internationally recognized testing (ISO/IEC 17025), inspection (ISO/IEC 17020), and Codex-based standards.
Monitoring Protocols	National and regional audits, data sharing (ARASFF), periodic reviews, and capacity-building activities.
Strengths	Trade facilitation, cost savings, improved food safety, and regulatory consistency.
Challenges	Implementation costs, uneven enforcement, and limited cost transparency.
Sectoral Impact	Model for regulatory harmonization and sustainable growth in ASEAN's food sector.
Replication Potential	Framework can inform harmonization in plastics/packaging, with adaptations for sector-specific needs.



4.5

Recommended Best Practice

Availability of Supporting Infrastructure

Best Practice 5.

Availability of Supporting Infrastructure

encourages both public and private investment in waste management systems, testing laboratories, and other infrastructure critical for effective standards implementation.

This Recommended Best Practice is underpinned by:

- **Guiding Principle 5:** Infrastructure development; and
- **Key Technical Requirement 5:** Infrastructure for compliance and verification including testing laboratories, labeling and certification programs and services.

As observed from the current landscape of plastics packaging standards in the region, many standards relevant to AMS are already available at the international level and could be readily adopted. However, several AMS may face challenges in implementing these standards within a short time frame due to infrastructure limitations. For example, effective composting of plastics and various recycling processes require appropriate infrastructure for collection, sorting, and treatment. The development of infrastructure for recycling and end-of-life treatment can be accelerated by fostering a supportive and conducive business environment.

AMS may wish to consider the following actions:

- **Providing incentives** (financial, regulatory, market-based, innovation & collaboration with universities and technology developers and consumer-based incentives) **and public funds** to support investments in recycling and end of life treatment such as composting;
- **Establishing EPR and other legislation** to disincentivize production of plastics waste packaging and encourage reuse, recycling and end-of-life treatments; and

- **Promoting consumer education and establishing a suitable collection and sorting systems for plastics waste** to enable better functioning of recycling and end of life treatment. This would require implementation of appropriate policies and development of public waste collection and treatment systems. See Best Practice Case Study 11 on Thailand's TIS 3635-2566 Guidelines for the recovery and recycling of plastic waste.

While the development of infrastructure for recycling and reuse, as well as for end-of-life treatment is undertaken by individual AMS, the exchange of information and sharing of expertise would facilitate and guide infrastructural development. ASEAN could establish common targets and exchange information on the progress made. There is additionally an opportunity for ASEAN to develop an arrangement for knowledge sharing among AMS of testing, certification and inspection resources.



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Case Studies Exemplifying Best Practice 5
Availability of supporting infrastructure

The following section provides a case study that exemplifies Recommended Best Practice 5. Please see Annex 3 for a complete presentation of the administrative, technical, financial and monitoring and enforcement requirements for this case study.

CASE STUDY 11

Recovery and Recycling of Plastic Waste (Thailand) ISO 15270 / TIS 3635-2566

The TIS 3635-2566 standard, adopted in Thailand and based on ISO 15270:2008, provides a comprehensive framework for the recovery and recycling of plastic waste, aligning national practices with international benchmarks to support the country's circular economy ambitions.

This standard, together with Notification No. 435 B.E. 2565 (2022), creates a regulatory environment that not only authorizes the use of recycled PET in food contact applications (subject to strict safety assessments by the Thai FDA), but also sets out clear technical and quality requirements for recycling processes, material standards, and product specifications. The case was selected as a case study as it demonstrates how technical requirements, robust monitoring, and multi-agency coordination can advance plastic waste management and enhance product safety.

Key strengths of TIS 3635-2566 include its alignment with global standards, its support for the use of post-consumer recycled plastics in high-value applications, and its contribution to the reduction of plastic waste entering landfills and natural environments. The standard improves traceability, conformity, and process control within the recycling sector, and enables the use of standardized symbols and labelling to facilitate sorting and consumer participation.

However, challenges remain, such as the significant costs of certification, compliance, and infrastructure upgrades (with certification fees set by TISI and further costs for testing, documentation, and process modification), as well as the potential economic burden on SMEs and informal sector recyclers. Implementation is further complicated by infrastructure gaps, limited capacity for monitoring and enforcement, and the need for ongoing training and support for all actors in the recycling chain.

Monitoring protocols under TIS 3635-2566 require accredited inspection and certification bodies to conduct regular audits, while the Thai FDA (supported by scientific experts and universities) is responsible for the safety assessment of recycled PET in food contact applications. The Plastics Institute of Thailand (PITH) also provides testing, certification, and capacity-building support, helping businesses to comply and compete in both domestic and export markets. The standard's effectiveness relies on efficient collection systems, robust traceability, and strong collaboration between government, industry, and civil society. Social and environmental risks – such as energy use in recycling, contamination, and social inequities among waste collectors – are recognized, and the standard's implementation is expected to evolve as infrastructure and stakeholder capacity improve.

Table 14. Lessons learned from Thailand's TIS 3635-2566: Guidelines for the recovery and recycling of plastic waste

Key Aspect	Lesson Learned
Rationale	Harmonize plastic recycling standards to boost trade, circularity, and environmental protection.
Government Support	Strong multi-agency coordination, capacity building, and investments in infrastructure.
Technical Requirements	Alignment with ISO 15270:2008, clear quality and safety standards, standardized labelling.
Monitoring Protocols	Accredited audits, FDA safety assessments, PITH testing, and cross-sector collaboration.
Strengths	Global alignment, trade facilitation, improved recycling quality, and support for circular economy.
Challenges	Certification costs, SME burden, infrastructure gaps, and limited monitoring capacity.
Sectoral Impact	Model for regulatory harmonization and sustainable plastics management in ASEAN.
Replication Potential	Framework can inform harmonization in plastics/packaging across ASEAN, with local adaptation.

4.6

Recommended Best Practice

Enhancing Capacity Building Efforts, Collaboration and Knowledge Sharing

Best Practice 6.

Enhancing Capacity Building Efforts, Collaboration and Knowledge Sharing

helps to create regional training programs for regulators, businesses, and certification bodies to ensure they have the skills and knowledge to implement, monitor, and audit the standards effectively.

This Recommended Best Practice is underpinned by:

- **Guiding Principle 6:** Social responsibility; and
- **Key Technical Requirement 6:** Stakeholder engagement and education.

Capacity building and awareness raising are essential. Regulatory agencies, industry stakeholders, and certification bodies must be equipped with the knowledge and skills necessary to interpret and apply standards effectively. Without this foundational capacity, enforcement may be weak or inconsistent, and the private sector may face uncertainty regarding compliance requirements.

Many AMS would benefit by strengthening their capabilities in developing and implementing standards and labeling for plastic packaging. Robust systems for monitoring, certification, and enforcement must be established or enhanced, including investment in infrastructure for product testing, third-party certification, and market surveillance. Governments could also consider establishing national or regional databases to track compliance and enhance transparency.

The capacity building may include the following considerations:

- **Strengthening national laboratories, certification bodies, and testing facilities** to support verification and labeling compliance;

- **Supporting the standards development** through encouraging multi-stakeholders including regulators, industry associations and private sector, SMEs, and civil society to participate in technical committees and other platforms;

- **Increasing awareness of available standards** and of the benefits for all stakeholders deriving from the implementation, so as to increase use and reference of these standards by policymakers, regulators and industry. The process of awareness creation should include the presentation of case studies and success stories;

- **Providing regular regional training** for regulators, businesses, and auditors to ensure alignment in the interpretation and implementation of standards; and

- **Develop/strengthen monitoring, certification, and enforcement mechanisms.**

Such capacity building could be achieved through technical expertise exchanges, training and joint research initiatives on regionally appropriate standards, and supporting the implementation across ASEAN. See Best Practice Case Study 12 on Malaysia's SIRIM Eco-labelling Scheme as an example of the application of an eco-label to drive both certification and public awareness, which are key to capacity building.

The establishment of a regional hub for resources and information sharing would be one of the means that can be undertaken towards narrowing capacity gaps across AMS. Such a hub could ensure consistent interpretation and application of standards, facilitate knowledge transfer, coordinate with international standards bodies, and accelerate the harmonization process through targeted technical assistance and shared resources. The hub could support:

- ✓ **Exchanging information on policy initiatives and their implementation;**
- ✓ **Developing and harmonizing standards;**
- ✓ **Promoting cooperation and exchanging progress in labeling and certification initiatives;**
- ✓ **Facilitating the sharing of training resources among AMS; and**
- ✓ **Enabling access to testing, certification and verification services when these are not domestically available.**



Case Study Exemplifying Recommended Best Practice 6

Enhancing capacity building efforts, collaboration and knowledge sharing

CASE STUDY 12

SIRIM Eco-Labeling Scheme (Malaysia) based on ISO 14020 series

The SIRIM Eco-Labeling Scheme in Malaysia is the country's official Type I environmental labelling program, recognized nationally and internationally for promoting environmentally friendly products and services - including plastic packaging. The scheme is rooted in ISO 14024 principles, ensuring that certification is based on credible, third-party assessment of a product's compliance with stringent environmental criteria. Products awarded the SIRIM Eco-Labeling mark have demonstrated reduced environmental impact across their life cycle, such as lower material use, reduced emissions, and enhanced recyclability or biodegradability.

SIRIM Berhad is responsible for developing the eco-labelling criteria, while SIRIM QAS International is the accredited certification body responsible for assessment, testing, and certification. The scheme is strongly supported by the Malaysian Government, especially through policy frameworks like the Twelfth Malaysia Plan and green procurement initiatives. Local authorities play a key role in public awareness campaigns to increase consumer understanding and uptake.

The following section provides a case study that exemplifies Recommended Best Practice 6. Please see Annex 3 for a complete presentation of the administrative, technical, financial and monitoring and enforcement requirements for this case study.

To achieve certification, manufacturers must submit comprehensive documentation – such as life cycle assessments, sourcing and manufacturing details, and waste management protocols – to demonstrate compliance with the relevant eco-labelling criteria. The total cost of certification is determined on a case-by-case basis and includes application, assessment, factory audits, product testing, and ongoing surveillance fees. SIRIM QAS International provides tailored quotations upon application, and ongoing compliance is ensured through regular and unannounced audits, market sampling, and feedback mechanisms.

The key strengths of the SIRIM Eco-Labeling Scheme rest in its international credibility, robust monitoring protocols, and its ability to drive market access and eco-innovation. While the scheme encourages innovation and supports Malaysia's commitments to the UN Sustainable Development Goals (particularly SDG 12 on Responsible Consumption and Production), challenges remain in terms of compliance costs and the need for technical support for SMEs. Overall, the SIRIM Eco-Labeling Scheme stands as a robust model for environmental certification in Malaysia and offers high potential for replication across ASEAN and other emerging markets.

Table 15. Lessons learned from Malaysia's SIRIM Eco-Labeling Scheme

Key Aspect	Lesson Learned / Experience
Rationale	Eco-labeling builds consumer trust and drives green innovation in packaging and products.
Government Support	Strong multi-level involvement: SIRIM Berhad develops criteria, SIRIM QAS certifies, government policy and procurement frameworks drive adoption, and local authorities promote awareness.
Technical Requirements	Comprehensive LCAs, documentation, and proof of reduced impact; rigorous audit protocols.
Monitoring Protocols	Regular and unannounced audits, periodic surveillance audits (typically every two years), and random market sampling maintain high standards and ongoing compliance.
Strengths	International credibility, market access, drives eco-innovation, supports SDGs.
Challenges	Compliance costs, technical complexity, and limited SME capacity.
Environmental Impact	Reduces waste, emissions, and resource use; supports circular economy goals.
Replication Potential	Provides a robust, internationally aligned model for ASEAN and emerging markets.



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4.7

Recommended Best Practice

ASEAN Regional Collaboration and Cooperation in the Development and Implementation of Standards for Plastics Packaging

Regional initiatives demonstrate the potential for institutional collaboration and knowledge sharing on marine plastics solutions. ASEAN demonstrated its commitment to combating marine debris by adopting the Bangkok Declaration on Combating Marine Debris in ASEAN Region in 2019, accompanied by the ASEAN Framework of Action on Marine Debris, which articulates the need for regional and national actions. Building on these foundations, the ASEAN RAP was endorsed in 2021.

ASEAN's role as a regional institution is pivotal in supporting the objective of this Manual, which is to improve understanding and support the development of standards and labeling for more sustainable plastic packaging and move towards harmonizing standards and mutual recognition of labeling for plastic packaging in the ASEAN region. To support the objective, the Manual proposes the following recommendations:

A. Enhance collaboration and coordination among relevant ASEAN Working Groups and Sectoral Bodies that have an interest, relevant purview, and mandate to undertake activities related to plastics packaging waste and standards (e.g., AWGCME, ACCSQ, AWGCC and others) by establishing an appropriate regional coordination mechanism; and

B. Consider the following initial topics for collaboration and cooperation, in line with the proposed Guiding Principles. Each initiative would require the establishment of a suitable mechanism agreed by the relevant ASEAN Sectoral Bodies. Operationally, this mechanism could take the form of joint task forces or coordination committees with defined terms of reference and adequate representation from relevant AMS authorities:

- The harmonization of standards for plastics packaging, as detailed in Recommended Best Practice 3;
- The development of mutual recognition as detailed under Recommended Best Practice 4;
- The sharing of resources of relevance to conformity assessment and the information exchange for infrastructural development, as detailed under Recommended Best Practice 5; and
- The establishment of a regional hub for knowledge sharing and capacity building, as detailed in Recommended Best Practice 6.



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4.8

Recommended Best Practice

Priorities for Implementation of Recommended Best Practices

Sustainable packaging and reduction of plastic packaging wastes is a complex endeavor that requires a multi-activity and long-term plan. Standards are a vital support element in enabling the achievement of the desired objectives, providing important methods and guidance. A regionwide achievement will be facilitated through establishing a collection of **Harmonized Standards**, enhancing **Regional Collaboration** and obtaining **Stakeholder Commitment** to ensure effective implementation of planned measures.

The implementation of the recommendations is best carried out in phases. The proposed priority actions are split into three (3) phases. However, AMS with a substantial level of existing programs may wish to accelerate the implementation of the 2nd and 3rd phases.

Table 16. Recommended implementation by phases

SHORT TERM ACTION (1-2 YEARS) 1 Increase awareness among stakeholders by conducting capacity building workshops, seminars and training (Recommended Best Practice 6) Proposed Stakeholders Involved: ASEAN Working Groups and Sectoral Bodies (e.g., AWGCM, ACCSQ WG1 and WG2); National Standards Bodies (NSB); Environmental Authorities; Industry Associations. Relevant Agencies at AMS level: NSB and Environmental Authorities.	SHORT TERM ACTION (1-2 YEARS) 3 Develop, promote, and monitor implementation of policies for plastic packaging waste reduction and treatment. Identify standards that can support the implementation of existing policies (Recommended Best Practice 2) Proposed Stakeholders Involved: NSB; Environmental Authorities; Relevant AMS Ministries; and Local Governments. Relevant Agencies at AMS Level: Relevant Ministries and NSB.
SHORT TERM ACTION (1-2 YEARS) 2 Adopt and promote essential standards across the plastic packaging lifecycle based upon international good practices (Recommended Best Practice 1) Proposed Stakeholders Involved: NSB, Environmental Authorities; Relevant AMS Ministries; and Industry Associations. Relevant Agencies at AMS Level: Environmental Authorities and Relevant Ministries.	SHORT TERM ACTION (1-2 YEARS) 4 Initiate a program for the harmonization of relevant standards in ASEAN and development of mutual recognition of labels (Recommended Best Practices 3 and 4) Proposed Stakeholders Involved: Environmental Authorities; Relevant AMS Ministries; Accreditation Bodies; Testing Laboratories; and Industry. Relevant Agencies at AMS Level: Relevant Ministries and Accreditation Bodies.

MEDIUM TERM ACTION (3-5 YEARS)



Support the development of infrastructure programs for testing and certification, including for labeling (Recommended Best Practice 5)

Proposed Stakeholders Involved:

Environmental Authorities; Relevant AMS Ministries; Accreditation Bodies; Testing Laboratories; and Industry.

Relevant Agencies at AMS level:

Relevant Ministries and Accreditation Bodies.

MEDIUM TERM ACTION (3-5 YEARS)



Support the development of infrastructure for recycling, reuse and end-of-life treatment by ensuring standards and certification programs are available (Recommended Best Practice 5)

Proposed Stakeholders Involved:

Environmental Authorities; Relevant AMS Ministries; Accreditation Bodies; Certification Bodies; Testing Laboratories; and Industry.

Relevant Agencies at AMS level:

Relevant Ministries and Industry.

MEDIUM TERM ACTION (3-5 YEARS)



Enhance labeling systems for circularity aligned with international requirements with a view to harmonize across ASEAN (Recommended Best Practice 2)

Proposed Stakeholders Involved:

ASEAN Working Groups and Sectoral Bodies (e.g., AWGCME, ACCSQ WG1 and WG2); Industry Associations; and Industry.

Relevant Agencies at AMS level:

NSB.

LONG TERM ACTION (6-10 YEARS)



Ensure availability and implementation of a comprehensive suite of harmonized standards across ASEAN (Recommended Best Practice 1)

Proposed Stakeholders Involved:

ASEAN Working Groups and Sectoral Bodies (e.g., ACCSQ WG1); and NSB.

Relevant Agencies at AMS level:

NSB.

LONG TERM ACTION (6-10 YEARS)



Ensure development of a regional collaboration platform for standards and conformity assessment and labeling to foster regional trade in sustainable packaging materials (Recommended Best Practice 6)

Proposed Stakeholders Involved:

ASEAN Working Groups and Sectoral Bodies (e.g., AWGCME; ACCSQ WG1 and WG2).

Relevant Agencies at AMS level:

NSB, Accreditation Bodies and Environmental Authorities (as relevant to the ASEAN Sectoral Bodies discussing these matters).

LONG TERM ACTION (6-10 YEARS)



Ensure regionally harmonized mutual recognition arrangements (Recommended Best Practice 4)

Proposed Stakeholders Involved:

ASEAN Working Groups and Sectoral Bodies (e.g., AWGCME; ACCSQ WG 2).

Relevant Agencies at AMS level:

Relevant Ministries (as relevant to the ASEAN Sectoral Bodies discussing these matters).

In conclusion, strengthening the implementation of essential standards goes beyond a technical exercise, but it is also a strategic priority for aligning economic development with sustainability goals. By embedding key international standards into national policies, enabling market incentives, and building institutional capacity, it is envisaged that AMS would be in a better position to enhance regulatory coherence, support innovation, and drive the transition towards a more sustainable and circular regional economy.



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ANNEXURES

This Chapter includes various annexes necessary to support the understanding and use of the Manual. These annexes are intended to provide additional details, data, and documentation that is essential for understanding and implementing the standards.

Annex 1.
Essential Standards for Each Lifecycle Phase

Annex 2.
Lifecycle of the Standard Development Process

Annex 3.
Best Practice Case Studies

Annex 4.
Additional Resources

Annex 5.
Terminology and Definitions

REFERENCES

ASEAN Secretariat (2021): ASEAN Guideline on Traceability for Food and Feed. Available online at <https://asean.org/wp-content/uploads/2021/12/FAFD-31.-ASEAN-GuideTraceability-Food-and-Feed-adopted-SOM-AMAF-26.2.2021.pdf>, checked on 6/27/2025.

BRCGS (2024): Global Standard Packaging Materials (Issue 7). BRCGS. Available online at <https://www.brcgs.com/product/global-standard-packaging-materials-issue-7/p-26982/>, checked on 9/17/2025.

BRCGS (2025): Discover BRCGS. BRCGS. Available online at <https://www.brcgs.com/about-brcgs/why-brcgs/>, updated on 2025, checked on 9/17/2025.

Hahladakis, John N.; Iacovidou, Eleni (2018): Closing the loop on plastic packaging materials: What is quality and how does it affect their circularity? In The Science of the total environment 630, pp. 1394–1400. DOI: 10.1016/j.scitotenv.2018.02.330.

ISO (2019): ISO/IEC Guide 59:2019. ISO and IEC recommended practices for standardization by national bodies. Available online at <https://www.iso.org/standard/71917.html>, updated on 6/27/2025, checked on 6/27/2025.

PCEPSDI (2025): About Green Choice Philippines. Philippine Center for Environmental Protection and Sustainable Development Inc (PCEPSDI). Available online at <https://pcepsdi.org.ph/programme/green-choice-philippines/about-green-choice-philippines/>, updated on 2025, checked on 9/17/2025.



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Essential Standards for Each Lifecycle Phase

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Table A1. 1.

Standards applicable to design-for-recycling and design-for-reuse and Addressing unnecessary packaging

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO 14006	Environmental management systems - Guidelines for incorporating eco-design	Management of eco-design as part of the environmental management system.
ISO 14009	Environmental management systems - Guidelines for incorporating material circulation in design and development	Guidelines for assisting organizations in establishing, documenting, implementing, maintaining and continually improving material circulation in their design and development in a systematic manner, using an Environmental Management System (EMS) framework.
ISO 14040	Environmental management. Life cycle assessment. Principles and framework	The standards describes the principles and framework for Life Cycle Assessment (LCA) including: definition of the goal and scope of the LCA, the Life Cycle Inventory analysis (LCI) phase, the Life Cycle Impact Assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations of the LCA, the relationship between the LCA phases, and conditions for use of value choices and optional elements.
ISO 14044	Environmental management. Life cycle assessment. Requirements and guidelines	SO 14044:2006 specifies requirements and provides guidelines for Life Cycle Assessment (LCA) including: definition of the goal and scope of the LCA, the life cycle inventory analysis (LCI) phase, the life cycle impact assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations of the LCA, relationship between the LCA phases, and conditions for use of value choices and optional elements.
ISO 14047	Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification	ISO 14047 specifies principles, requirements and guidelines for the quantification and reporting of the Carbon Footprint of a Product (CFP), in a manner consistent with International Standards on Life Cycle Assessment (LCA) (ISO 14040 and ISO 14044).



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ISO 18601	Packaging and the environment — General requirements for the use of ISO standards in the field of packaging and the environment	ISO 18601:2013 outlines the general requirements for the use of ISO standards in the field of packaging and the environment. The primary objective of this standard is to provide a framework for evaluating the environmental impact of packaging throughout its lifecycle. It aims to ensure that packaging is designed, produced, and disposed of in a manner that minimizes its environmental footprint. It also addresses the reduction of hazardous substances in packaging materials, promoting the use of safer alternatives.
ISO 18602	Packaging and the environment — Optimization of the packaging system	ISO 18602:2013 specifies several criteria for assessing the environmental impact of packaging. These criteria are designed to ensure that the packaging is optimized for its intended function while minimizing its environmental footprint. Here are the key criteria: Optimization of Material Content: The weight or volume of the packaging material must be optimized to fulfill its functions without excess. Minimization of Hazardous Substances: Recyclability: The packaging should be designed to be easily recyclable, ensuring that materials can be recovered and reused. Energy Recovery: If recycling is not feasible, the packaging should be suitable for energy recovery processes.
ISO/TR 18568	Packaging and the environment — Marking for material identification	ISO/TR 18568:2021 provides guidelines for marking packaging materials to facilitate their identification for recycling and recovery processes. The document includes examples of markings, which can be words, numbers, or symbols, to identify the materials used in packaging. Abbreviations: Short forms or abbreviations of material names, like “PET” for polyethylene terephthalate or “HDPE” for high-density polyethylene. Words: Full names of materials or instructions for disposal and recycling.
CEN/TR 13910	Packaging – Report on criteria and methodologies for life cycle analysis of packaging	This is a technical report that establishes a set of best practice guidelines for undertaking those aspects of life cycle assessment specific to packaging and distribution systems.
CEN CR 12340	Packaging – Recommendations for conducting life-cycle inventory analysis of packaging systems	This technical report establishes set of guidelines of best practice undertaking those aspects of the life-cycle inventory analysis specific to packaging systems.
CEN CR 13504	Packaging – Material recovery – Criteria for a minimum content of recycled material	This technical report addresses the criteria for a minimum content of recycled material in packaging for appropriate types of packaging, and deals with the criteria that will influence the acceptable level of recycled material and the methodology by which such content can be monitored.



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Table A1. 2.

Standards used in Food safety considerations in recycling and reuse

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
BRCGC ed. 7	BRC Global Standard for Packaging Materials	The BRC Global Standard for Packaging Materials is a comprehensive framework designed to ensure the safety, quality, and legality of packaging used in various industries. With its focus on hazard management, process control, and continuous improvement
ISO 22002-4	Prerequisite programmes on food safety – Part 4: Food packaging manufacturing	ISO/TS 22002-4 is a technical specification that defines Prerequisite Programs (PRPs) for food packaging manufacturing as part of a Food Safety Management System (FSMS) , especially when used alongside ISO 22000 . This standard provides sector-specific requirements to ensure food packaging materials are manufactured in a way that minimizes food safety risks



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Table A1. 3.

Standards used for Biodegradable and compostable packaging

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO 14855-1	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions — Method by analysis of evolved carbon dioxide Part 1: General method	ISO 14855-1 specifies a method to determine the aerobic biodegradability of plastics under controlled composting conditions by measuring carbon dioxide (CO ₂) evolution and the plastic's disintegration at the test's conclusion.
ISO 14855-2	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions — Method by analysis of evolved carbon dioxide Part 2: Gravimetric measurement of carbon dioxide evolved in a laboratory-scale test	ISO 14855-2 specifies a method to determine the aerobic biodegradability of plastics under controlled composting conditions by measuring carbon dioxide (CO ₂) evolution, optimizing biodegradation through controlled humidity, aeration, and temperature.
ISO 17088	Plastics – Organic recycling – Specifications for compostable plastics	ISO 17088 specifies procedures and requirements for plastics, and products made from plastics, that are suitable for recovery through organic recycling.
ISO 18606	Packaging and the environment — Organic recycling	ISO 18606:2013 specifies procedures and requirements for packaging that are suitable for organic recycling.



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ISO 15985	Plastics — Determination of the ultimate anaerobic biodegradation under high-solids anaerobic-digestion conditions — Method by analysis of released biogas	ISO 15985:2014 specifies a method for the evaluation of the ultimate anaerobic biodegradability of plastics based on organic compounds under high-solids anaerobic-digestion conditions by measurement of evolved biogas at the end of the test.
ISO 5430	Plastics – Ecotoxicity testing scheme for soluble decomposition intermediates from biodegradable plastic materials and products used in the marine environment – Test methods and requirements	ISO 5430 specifies test methods and evaluation criteria by addressing potential ecotoxicological adverse effects on marine organisms. The soluble degradation products of plastic materials, including intermediates and residues from biodegradation, can harm marine species. These plastics are often used in marine-related products like fish farming nets, dolly ropes, floats, buoys, and other non-fishing applications.
ISO 20200	Plastics – Determination of the degree of disintegration of plastic materials under composting conditions in a laboratory-scale test	ISO 20200 specifies a method of determining the degree of disintegration of plastic materials when exposed to a laboratory-scale composting environment.
ISO 5412	Plastics – Industrial compostable plastic shopping bags	ISO 5412 specifies the requirements, test methods, test regulations, packaging, transportation and storage of industrial compostable plastic shopping bags.
ISO 5424	Plastics – Industrial compostable plastic drinking straws	ISO 5424 specifies the terms and definitions, basic requirements, technical requirements, test methods, test regulations, and packaging of industrial compostable plastic drinking straws.



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ISO 5148	Plastics – Determination of specific aerobic biodegradation rate of solid plastic materials and disappearance time (DT50) under mesophilic laboratory test conditions	ISO 5148 specifies a method to determine the specific aerobic biodegradation rate of solid, non-water soluble plastic materials under mesophilic conditions.
ISO 14852	Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium – Method by analysis of evolved carbon dioxide	ISO 14852 specifies a method, by measuring the amount of carbon dioxide evolved, for the determination of the degree of aerobic biodegradability of plastic materials, including those containing formulation additives.
ISO 23832	Plastics – Test methods for determination of degradation rate and disintegration degree of plastic materials exposed to marine environmental matrices under laboratory conditions	ISO 23832 specifies test methods for the measurement of the physical degradation of samples made with plastics materials when exposed to marine environmental matrices under aerobic conditions at laboratory scale.
ISO 16929	Plastics – Determination of the degree of disintegration of plastic materials under defined composting conditions in a pilot-scale test	ISO 16929 defines a test method used to determine the degree of disintegration of plastic materials in a pilot-scale aerobic composting test under defined conditions.
ISO 23977-1	Plastics – Determination of the aerobic biodegradation of plastic materials exposed to seawater – Part 1: Method by analysis of evolved carbon dioxide	ISO 23977-1 specifies a laboratory test method for determining the degree and rate of the aerobic biodegradation level of plastic materials.



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ISO 23977-2	Plastics – Determination of the aerobic biodegradation of plastic materials exposed to seawater – Part 2: Method by measuring the oxygen demand in closed respirometer	ISO 23977-2 specifies a laboratory test method for determining the degree and rate of the aerobic biodegradation level of plastic materials.
ISO 19679	Plastics – Determination of aerobic biodegradation of non-floating plastic materials in a seawater/sediment interface – Method by analysis of evolved carbon dioxide	ISO 19679 specifies a test method to determine the degree and rate of aerobic biodegradation of plastic materials when settled on marine sandy sediment at the interface between seawater and the seafloor, by measuring the evolved carbon dioxide (Co2).
ISO 22403	Plastics – Assessment of the intrinsic biodegradability of materials exposed to marine inocula under mesophilic aerobic laboratory conditions – Test methods and requirements	ISO 22403 specifies test methods and criteria for showing intrinsic biodegradability in marine environments of virgin plastic materials and polymers without any preliminary environmental exposure or pre-treatment.
ISO 22404	Plastics – Determination of the aerobic biodegradation of non-floating materials exposed to marine sediment – Method by analysis of evolved carbon dioxide	ISO 22404 specifies a laboratory test method to determine the degree and rate of aerobic biodegradation level of plastic materials. This test method can also be applied to other materials.
ISO 17556	Plastics – Determination of the ultimate aerobic biodegradability of plastic materials in soil by measuring the oxygen demand in a respirometer or the amount of carbon dioxide evolved	ISO 17556 specifies a method for determining the ultimate aerobic biodegradability of plastic materials in soil by measuring the oxygen demand in a closed respirometer or the amount of carbon dioxide evolved.



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ISO 13975	Plastics – Determination of the ultimate anaerobic biodegradation of plastic materials in controlled slurry digestion systems – Method by measurement of biogas production	ISO 13975 specifies a method of evaluating the ultimate anaerobic biodegradability of plastic materials in a controlled anaerobic slurry digestion system with a solids concentration not exceeding 15%, which is often found for the treatment of sewage sludge, livestock faeces or garbage.
ISO 14851	Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium – Method by measuring the oxygen demand in a closed respirometer	ISO 14851 specifies a method, by measuring the oxygen demand in a closed respirometer, for the determination of the degree of aerobic biodegradability of plastic materials, including those containing formulation additives.
ISO 14855-1	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions – Method by analysis of evolved carbon dioxide – Part 1: General method	ISO 14855-1 specifies a method for the determination of the ultimate aerobic biodegradability of plastics, based on organic compounds, under controlled composting conditions by measurement of the amount of carbon dioxide evolved and the degree of disintegration of the plastic at the end of the test.
ISO 14855-2	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions – Method by analysis of evolved carbon dioxide – Part 2: Gravimetric measurement of carbon dioxide evolved in a laboratory-scale test	ISO 14855-2 specifies a method for determining the ultimate aerobic biodegradability of plastic materials under controlled composting conditions by gravimetric measurement of the amount of carbon dioxide evolved.
ISO 18830	Plastics – Determination of aerobic biodegradation of non-floating plastic materials in a seawater/sandy sediment interface – Method by measuring the oxygen demand in closed respirometer	ISO 18830 specifies a test method to determine the degree and rate of aerobic biodegradation of plastic materials when settled on marine sandy sediment at the interface between seawater and the seafloor, by measuring the oxygen demand in a closed respirometer.



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ISO 14853	Plastics – Determination of the ultimate anaerobic biodegradation of plastic materials in an aqueous system – Method by measurement of biogas production	ISO 14853 specifies a method for the determination of the ultimate anaerobic biodegradability of plastics by anaerobic microorganisms.
ISO 15985	Plastics – Determination of the ultimate anaerobic biodegradation under high-solids anaerobic-digestion conditions – Method by analysis of released biogas	ISO 15985 specifies a method for the evaluation of the ultimate anaerobic biodegradability of plastics based on organic compounds under high-solids anaerobic-digestion conditions by measurement of evolved biogas at the end of the test.
ISO 10210	Plastics – Methods for the preparation of samples for biodegradation testing of plastic materials	ISO 10210 describes methods for the preparation of test samples used in the determination of the ultimate aerobic and anaerobic biodegradability of plastic materials in an aqueous medium, soil, controlled compost or anaerobic digesting sludge.
CEN/TR 17910	Biodegradable plastics – Status of standardization and new prospects	CEN/TR 17910 provides an in-depth understanding of the current state of standardization in the field of biodegradable plastics.
DIN EN 17428	Packaging – Determination of the degree of disintegration under simulated home composting conditions	DIN EN 17428 specifies a laboratory scale test method for determining the degree of disintegration of test items when exposed to well-managed home composting conditions by the weight evaluation method (WE method) using sieving and evaluation by weighing.



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BS EN 17417	Determination of the ultimate biodegradation of plastics materials in an aqueous system under anoxic (denitrifying) conditions – Method by measurement of pressure increase	BS EN 17417 provides a comprehensive method for determining the ultimate biodegradation of plastic materials in an aqueous system under anoxic (denitrifying) conditions.
EN 13592	Plastics sacks for household waste collection – Types, requirements and test methods	EN 13592 specifies the general characteristics, test methods and requirements for sacks, bags and bin liners, made from plastic films, used for household waste collection, or household selective waste collection including collection of biodegradable waste for organic recycling (biodegradation and composting).
CEN/TR 15351	Plastics – Guide for vocabulary in the field of degradable and biodegradable polymers and plastic items	CEN/TR 15351 provides the vocabulary to be used in the field of polymers and plastic materials and items.
EN 13432/AC	Packaging – Requirements for packaging recoverable through composting and biodegradation – Test scheme and evaluation criteria for the final acceptance of packaging	EN 13432/AC specifies the requirements for packaging materials and products to be considered biodegradable and compostable.
EN 14045	Packaging – Evaluation of the disintegration of packaging materials in practical oriented tests under defined composting conditions	EN 14045 is used to evaluate the disintegration of packaging materials in a pilot-scale aerobic composting test under defined conditions.
EN 14046	Packaging – Evaluation of the ultimate aerobic biodegradability of packaging materials under controlled composting conditions – Method by analysis of released carbon dioxide	EN 14046 specifies a method for the evaluation of the ultimate aerobic biodegradability of packaging materials based on organic compounds under controlled composting conditions by measurement of released carbon dioxide at the end of the test.



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EN 14047	Packaging – Determination of the ultimate aerobic biodegradability of packaging materials in an aqueous medium – Method by analysis of evolved carbon dioxide	EN 14047 specifies a method to evaluate the ultimate biodegradability of packaging materials and its constituents by measurement of CO ₂ evolution.
EN 14048	Packaging – Determination of the ultimate aerobic biodegradability of packaging materials in an aqueous medium – Method by measuring the oxygen demand in a closed respirometer	EN 14048 specifies a method to evaluate the ultimate biodegradability of packaging materials and its constituents by measurement of O ₂ -consumption.
ASTM D6400	Standard specification for labeling of plastics designed to be aerobically composted in municipal or industrial facilities	ASTM D6400 covers plastics and products made from plastics that are designed to be composted in municipal and industrial aerobic composting facilities.
ASTM D7991	Standard test method for determining aerobic biodegradation of plastics buried in sandy marine sediment under controlled laboratory conditions	ASTM D7991 provides a test method to simulate how plastics degrade in seawater-soaked sand, allowing for the controlled assessment of their biodegradability in a marine context.
ASTM D7475	Standard test method for determining the aerobic degradation and anaerobic biodegradation of plastic materials under accelerated bioreactor landfill conditions	ASTM D7475 provides a test method to determine the degree and rate of aerobic degradation (as indicated by loss of tensile strength, molecular weight, possibly resulting in disintegration and fragmentation) and anaerobic biodegradation of plastic materials in an accelerated aerobic-anaerobic bioreactor landfill test environment.



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ASTM D6954	Standard guide for exposing and testing plastics that degrade in the environment by a combination of oxidation and biodegradation	ASTM D6954 provides a framework or road map to compare and rank the controlled laboratory rates of degradation and degree of physical property losses of polymers by thermal and photooxidation processes as well as the biodegradation and ecological impacts in defined applications and disposal environments after degradation.
ASTM D5988	Standard test method for determining aerobic biodegradation of plastic materials in soil	ASTM D5988 provides a test method to determine under laboratory conditions of the degree and rate of aerobic biodegradation of plastic materials, including formulation additives, in contact with soil.
ASTM D5526	Standard test method for determining anaerobic biodegradation of plastic materials under accelerated landfill conditions	ASTM D5526 provides a test method to determine the degree and rate of anaerobic biodegradation of plastic materials in an accelerated-landfill test environment.
ASTM D5511	Standard test method for determining anaerobic biodegradation of plastic materials under high-solids anaerobic-digestion conditions	ASTM D5511 provides a test method to determine the degree and rate of anaerobic biodegradation of plastic materials in high-solids anaerobic conditions.
ASTM D6691	Standard test method for determining aerobic biodegradation of plastic materials in the marine environment by a defined microbial consortium or natural sea water inoculum	ASTM D6691 provides a test method to determine the degree and rate of aerobic biodegradation of plastic materials (including formulation additives) exposed to pre-grown population of at least ten aerobic marine microorganisms of known genera or the indigenous population existing in natural seawater.
ASTM D5338	Standard test method for determining aerobic biodegradation of plastic materials under controlled composting conditions, incorporating thermophilic temperatures	ASTM D5338 provides a test method to determine the degree and rate of aerobic biodegradation of plastic materials on exposure to a controlled-composting environment under laboratory conditions, at thermophilic temperatures.



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Table A1. 4.

Standards used for recycled content

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO 15270	Plastics — Guidelines for the recovery and recycling of plastics waste	ISO 15270:2008 provides guidance for the development of standards and specifications covering plastics waste recovery, including recycling. It also establishes the quality requirements that should be considered in all steps of the recovery process, and provides general recommendations for inclusion in material standards, test standards and product specifications.
ISO 5677	Testing and characterization of mechanically recycled polypropylene (PP) and polyethylene (PE) for intended use in different plastics processing techniques	ISO 5677 specifies test methods for assessing important properties of mechanically recycled polypropylene [PP (REC)] and polyethylene [PE (REC)] in granular or pellet form for use in conventional plastics processing techniques.
BSI Flex 6228: v2.0 2022-04	Plastic packaging – Assessment of recycled content within polyethylene terephthalate (PET) virgin material and recyclate blended packaging materials produced from mechanical recycling methods – Specification and test methods	BSI Flex 6228: v2.0 2022-04 specifies requirements for determining recycled plastic content, contained within PET packaging products, that has been produced through mechanical recycling methods from plastic waste streams.
CEN/TR 15353	Plastics – Recycled plastics – Guidelines for the development of standards for recycled plastics	CEN/TR 15353 provides a scheme for the characterization of sorted plastics wastes, laying out those properties for which the supplying party of the waste makes information available to the receiving party.
CEN/TS 16010	Plastics – Recycled plastics – Sampling procedures for testing plastics waste and recyclates	CEN/TS 16010 specifies a system for sampling procedures for testing plastics waste and recyclates which take into account the specifics of the plastics waste and recyclates.



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CEN/TS 16011	Plastics – Recycled plastics – Sample preparation	CEN/TS 16011 specifies the preparation of samples of recycled plastics prior to testing and takes account of the specifics of the material.
CEN/TS 16861	Plastics – Recycled plastics – Determination of selected marker compounds in food grade recycled polyethylene terephthalate (PET)	CEN/TS 16861 specifies an analytical method for testing food grade, recycled polyethylene terephthalate (PET).
CEN/TS 17627	Plastics – Recycled plastics – Determination of solid contaminants content	CEN/TS 17627 specifies a method for determination by melt filtration of solid contaminants content in a sample of recycled thermoplastic material, evaluating their number and, optionally, their size and substance (material).
CR 13504	Packaging – Material recovery – Criteria for a minimum content of recycled material	CR 13504 addresses the criteria for a minimum content of recycled material in packaging for appropriate types of packaging and deals with the criteria that will influence the acceptable level of recycled material and the methodology by which such content can be monitored.
EN 15342	Plastics – Recycled plastics – Characterization of polystyrene (PS) recyclates	EN 15342 defines a method of specifying delivery condition characteristics for polystyrene (PS) recyclates.
EN 15343	Plastics – Recycled plastics – Plastics recycling traceability and assessment of conformity and recycled content	EN 15343 specifies the procedures needed for the traceability of recycled plastics. This gives the basis for the calculation procedure for the recycled content of a product.
EN 15344	Plastics – Recycled plastics – Characterization of polyethylene (PE) recyclates	EN 15344 defines a method of specifying delivery conditions for polyethylene (PE) recyclates. It gives the most important characteristics and associated test methods for assessing PE recyclates intended for use in the production of semi-finished/finished products.



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EN 15345	Plastics – Recycled Plastics – Characterization of polypropylene (PP) recyclates	EN 15345 defines a method of specifying delivery conditions for Polypropylene (PP) recyclates. It gives the most important characteristics and associated test methods for assessing a single batch of PP recyclates intended for use in the production of semi-finished/finished products.
EN 15346	Plastics – Recycled plastics – Characterization of poly(vinyl chloride) (PVC) recyclates	EN 15346 defines a method of specifying delivery conditions for poly(vinyl chloride) (PVC) recyclates. It gives the most important characteristics and associated test methods for assessing of PVC recyclates intended for use in the production of semi-finished/finished products.
EN 15347	Plastics – Recycled plastics – Characterization of plastics wastes	EN 15347 provides a scheme for the characterisation of plastics wastes, laying out those properties for which the supplier of the waste shall make information available to the purchaser, and identifying test methods where applicable.
EN 15348	Plastics – Recycled plastics – Characterization of poly(ethylene terephthalate) (PET) recyclates	EN 15348 defines a method of specifying delivery conditions for poly(ethylene terephthalate) (PET) recyclates. It gives the most important characteristics and associated test methods for assessing PET recyclates intended to be used for the production of semi-finished/finished products.



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Table A1. 5.

Standards used for reuse systems

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO 18603	Packaging and the environment – Reuse	Specifies the requirements for a packaging to be classified as reusable and sets out procedures for assessment of meeting the requirements, including the associated systems.



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Table A1. 6.

Standards for supporting implementation of circular system

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO 14009	Environmental management systems - Guidelines for incorporating material circulation in design and development	This document gives guidelines for assisting organizations in establishing, documenting, implementing, maintaining and continually improving material circulation in their design and development in a systematic manner, using an Environmental Management System (EMS) framework.
ISO 59004	Circular Economy - Vocabulary, principles and guidance for implementation	ISO 59004 is a part of the ISO 59000 family of standards, specifically designed to foster a shift towards a circular economy. This standard provides comprehensive guidance applicable to any type of organization. It includes defining key terms and concepts, outlining a vision for a circular economy, elucidating core principles, and offering practical guidance for actionable steps towards sustainability.
ISO 59040	Circular economy - Product circularity data sheet	This document establishes a general methodology for information exchange supporting the interoperability of circular economy related information, based on the use of a Product Circularity Data Sheet (PCDS). This document specifies requirements for completing a PCDS by an organization, regardless of its type, size and nature, when acquiring or supplying products in order to permit the exchange of circular economy related information about those products.
ISO 59020	Circular economy - Measuring and assessing circularity performance	ISO 59020 sets forth requirements and guidance for organizations to measure and assess their circularity performance within defined economic systems. This document aims to standardize the process by which organizations collect and calculate data using mandatory and optional circularity indicators, ensuring consistent and verifiable results. It provides a structured framework for setting system boundaries, selecting appropriate indicators, and interpreting data to evaluate the circularity performance at multiple levels—from regional and inter-organizational to organizational and product-specific levels.



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BS 8001	Framework for implementing the principles of the circular economy in organizations - Guide	BS 8001 gives guidance to organizations of all types and sizes, on the steps they can take to transition to a circular mode of operation. Specifically, it aims to provide organizations with an understanding of: What the circular economy is and how it may be relevant both now and in the future; and how to implement the principles of the circular economy in order to create direct and indirect value as a result of process, product/service or business model innovation.
ISO/TR 16218:2013	Packaging and Environment - Processes for chemical recovery	ISO 16218:2013 covers used packaging, although the processes described are not specific for used packaging and can be used for recovery of other materials of same type. Processes for chemical recovery of used packaging are applicable for plastic packaging or biomass-based packaging.
ISO 15270:2008	Plastics - Guidelines for the recovery and recycling of plastics waste	The standard establishes the different options for the recovery of plastics waste arising from pre-consumer and post-consumer sources. It also establishes the quality requirements that should be considered in all steps of the recovery process, and provides general recommendations for inclusion in material standards, test standards and product specifications.



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Table A1. 7.

Standards used for end-of-life management

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO 14021	Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling)	Specifies requirements for self-declared environmental claims (Type II environmental labelling)
ISO 14024	Environmental labels and declarations - Type I environmental labelling - Principles and procedures	The principles and procedures for Type I environmental labeling programs are addressed in ISO 14024:2018. This standard outlines the development of Type I environmental labeling programs, including the selection of product categories, product environmental criteria, and product function characteristics. It also covers the assessment and demonstration of compliance
ISO 14025	Environmental labels and declarations - Type III environmental declarations - Principles and procedures	This standard establishes the guidelines for developing Type III environmental declaration programs and the declarations themselves. It includes the use of the ISO 14040 series of standards in the development process
ISO 16620-5	Plastics - Biobased content Part 5: Declaration of biobased carbon content, biobased synthetic polymer content and biobased mass content	ISO 16620-5:2015 specifies a method for determining the biobased mass content in plastic products. This method involves radiocarbon analysis and elemental analysis to measure the biobased content
ASTM D6400-23	Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities	This specification covers plastics and products made from plastics that are designed to be composted in municipal and industrial aerobic composting facilities. The properties in this specification are those required to determine if plastics and products made from plastics will compost satisfactorily, including biodegrading at a rate comparable to known compostable materials. The purpose of this specification is to establish standards for identifying products and materials that will compost satisfactorily in commercial and municipal composting facilities.



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ASTM D6868-21	Standard Specification for Labeling of End Items that Incorporate Plastics and Polymers as Coatings or Additives with Paper and Other Substrates Designed to be Aerobically Composted in Municipal or Industrial Facilities	The method described by ASTM D6868-21 is a standard specification for labeling end items that incorporate plastics and polymers as coatings or additives with paper and other substrates designed to be aerobically composted in municipal or industrial facilities.
ASTM D 7611/D 7611M	Standard practice for coding plastic manufactured articles for resin identification	ASTM D 7611/D 7611M is a standard practice for coding plastic manufactured articles for resin identification, using a system of numbers and abbreviations, to help with recycling and material identification.



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Table A1. 8.

Standards used for Labeling requirements and methods

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO 14021	Environmental labels and declarations — Self-declared environmental claims (Type II environmental labeling)	ISO 14021 specifies requirements for self-declared environmental claims, including statements, symbols and graphics, regarding products. It further describes selected terms commonly used in environmental claims and gives qualifications for their use.
ISO 14024	Environmental labels and declarations — Type I environmental labeling — Principles and procedures	ISO 14024 establishes the principles and procedures for developing Type I environmental labeling programs, including the selection of product categories, product environmental criteria and product function characteristics, and for assessing and demonstrating compliance. ISO 14024:2018 also establishes the certification procedures for awarding the label.
ISO 14025	Environmental labels and declarations – Type III environmental declarations – Principles and procedures	ISO 14025 establishes the principles and specifies the procedures for developing Type III environmental declaration programs and Type III environmental declarations. It specifically establishes the use of the ISO 14040 series of standards in the development of Type III environmental declaration programs and Type III environmental declarations.
ISO 14026	Environmental labels and declarations – Principles, requirements, and guidelines for communication of footprint information	ISO 14026 provides principles, requirements and guidelines for footprint communications for products addressing areas of concern relating to the environment. ISO 14026:2017 also provides requirements and guidelines for footprint communication programs, as well as requirements for verification procedures.
ISO/TS 14027	Environmental labels and declarations – Development of product category rules	ISO/TS 14027 provides principles, requirements and guidelines for developing, reviewing, registering and updating Product Category Rules (PCR) within a Type III environmental declaration or footprint communication programs based on Life Cycle Assessment (LCA) according to ISO 14040 and ISO 14044 as well as ISO 14025, ISO 14046 and ISO/TS 14067.



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ASTM D 7611/D 7611M	Standard practice for coding plastic manufactured articles for resin identification	ASTM D 7611/D 7611M is a standard practice for coding plastic manufactured articles for resin identification, using a system of numbers and abbreviations, to help with recycling and material identification.
ASTM D6400	Standard specification for labeling of plastics designed to be aerobically composted in municipal or industrial facilities	ASTM D6400 covers plastics and products made from plastics that are designed to be composted under aerobic conditions in municipal and industrial aerobic composting facilities, where thermophilic conditions are achieved.



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Table A1. 9.

Standards used for Safe and Sustainable Supply Chains

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO 14052	Environmental management - Material flow cost accounting - Guidance for practical implementation in a supply chain	ISO 14052 provides guidance for the practical implementation of Material Flow Cost Accounting (MFCA) in a supply chain. MFCA fundamentally traces the flows and stocks of materials within an organization, quantifies these material flows in physical units (e.g., mass, volume) and evaluates the costs associated with material flows and energy uses.
ISO 20400	Sustainable procurement — Guidance	ISO 20400 provides guidance to organizations, independent of their activity or size, on integrating sustainability within procurement, as described in ISO 26000. It is intended for stakeholders involved in, or impacted by, procurement decisions and processes.
ISO 37101	Sustainable development in communities - Management system for sustainable development - Requirements with guidance for use	ISO 37101 establishes requirements for a management system for sustainable development in communities, including cities, using a holistic approach, with a view to ensuring consistency with the sustainable development policy of communities.
PAS 510	Plastic pellets, flakes and powders. Handling and management throughout the supply chain to prevent their leakage to the environment. Specification.	PAS 510 gives requirements for the handling and management of plastic pellets, flakes, and powders throughout the supply chain to prevent spills, leaks, and loss to the environment.



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PAS 7000	Supply chain risk management. Supplier prequalification.	PAS 7000 aims to help organizations make informed choices about whether or not to engage with a potential supply chain partner. The PAS can also help suppliers demonstrate their capabilities.
BS 25700	Organizational Responses to Modern Slavery. Guidance.	BS 25700 provides guidance for organizations to address the risk of modern slavery, including prevention, identification, mitigation and reporting.



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Table A1. 10.

Management Systems Standards to support effective implementation

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO 9001	Quality management systems - Requirements	ISO 9001 is a globally recognized standard for quality management. It helps organizations of all sizes and sectors to improve their performance, meet customer expectations and demonstrate their commitment to quality. Its requirements define how to establish, implement, maintain, and continually improve a Quality Management System (QMS).
ISO 14001	Environmental management systems - Requirements with guidance for use	ISO 14001 provides a framework for organizations to design and implement an EMS and continually improve their environmental performance.
ISO 14002-1	Environmental management systems - Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area Part 1: General	ISO 14002-1 gives general guidelines for organizations seeking to systematically manage environmental aspects or respond to the effects of changing environmental conditions within one or more environmental topic areas, based on ISO 14001.
ISO 14002-2	Environmental management systems — Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area Part 2: Water	ISO 14002-2 gives general guidelines for organizations seeking to address water-related environmental aspects, environmental impacts, environmental conditions, and the associated risks and opportunities within an environmental management system in accordance with ISO 14001.



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ISO 14004	Environmental management systems — General guidelines on implementation	ISO 14004 provides guidance for an organization on the establishment, implementation, maintenance and improvement of a robust, credible and reliable environmental management system.
ISO 14006	Environmental management systems — Guidelines for incorporating ecodesign	ISO 14006 gives guidelines for assisting organizations in establishing, documenting, implementing, maintaining and continually improving their management of ecodesign as part of an Environmental Management System (EMS).
ISO 14009	Environmental management systems — Guidelines for incorporating material circulation in design and development	ISO 14009 gives guidelines for assisting organizations in establishing, documenting, implementing, maintaining and continually improving material circulation in their design and development in a systematic manner, using an Environmental Management System (EMS) framework.
ISO 14033	Environmental management — Quantitative environmental information — Guidelines and examples	ISO 14033 gives guidelines for systematic and methodical acquisition and review of quantitative environmental information and data about systems. It supports the application of standards and reports on environmental management.



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Table A1. 11.

Standards used for Compliance and Verification

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
ISO/IEC 17021-1	Conformity assessment. Requirements for bodies providing audit and certification of management systems – Part 1: Requirements	ISO/IEC 17021-1 contains principles and requirements for the competence, consistency and impartiality of bodies providing audit and certification of all types of management systems.
ISO/IEC 17021-2	Conformity assessment — Requirements for bodies providing audit and certification of management systems Part 2: Competence requirements for auditing and certification of environmental management systems	ISO/IEC 17021-2 specifies additional competence requirements for personnel involved in the audit and certification process for Environmental Management Systems (EMS) and complements the existing requirements of ISO/IEC 17021-1.
ISO/IEC 17021-3	Conformity assessment — Requirements for bodies providing audit and certification of management systems Part 3: Competence requirements for auditing and certification of quality management systems	ISO/IEC 17021-3 specifies additional competence requirements for personnel involved in the audit and certification process for Quality Management Systems (QMS) and complements the existing requirements of ISO/IEC 17021-1.
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories	ISO/IEC 17025 is the international standard for testing and calibration laboratories. It sets out requirements for the competence, impartiality, and consistent operation of laboratories, ensuring the accuracy and reliability of their testing and calibration results.



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ISO/IEC 17065	Conformity assessment. Requirements for bodies certifying products, processes and services	ISO/IEC 17065 contains requirements for competence, consistent operation and impartiality of product, process and service certification bodies.
ISO 37301	Compliance management systems – Requirements with guidance for use	ISO 37301 is an international standard for Compliance Management Systems (CMS). It provides guidelines for establishing, developing, implementing, evaluating, maintaining, and improving an effective and responsive compliance management system within organizations.
ISO 37301: 2021/Amd 1:2024	Compliance management systems – Requirements with guidance for use Amendment 1: Climate action changes	This amendment applies to ISO 37301:2021
ISO 19011	Guidelines for auditing management systems	ISO 19011 is an international standard that provides guidelines for auditing management systems, including quality management systems (ISO 9001) and environmental management systems (ISO 14001). It outlines the principles of auditing, managing audit programs, and conducting management system audits.



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Table A1. 12.

Standards used as infrastructure to support implementation of standards

DOCUMENT IDENTIFIER	TITLE	KEY PROVISIONS
BRCGS ed. 6	BRC Global Standard for Packaging Materials	The BRC Global Standard for Packaging Materials, is an internationally recognized certification standard developed by the British Retail Consortium (BRC). It is specifically designed to ensure the safety, quality, and legal compliance of packaging materials used in a wide range of industries, including food, consumer products, and pharmaceuticals.
ISO/IEC 17011	Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies	ISO/IEC 17011 specifies requirements for the competence, consistent operation and impartiality of accreditation bodies assessing and accrediting conformity assessment bodies.
ISO/IEC 17020	Conformity assessment — Requirements for the operation of various types of bodies performing inspection	ISO/IEC 17020 specifies requirements for the competence of bodies performing inspection and for the impartiality and consistency of their inspection activities.
ISO/IEC 17021-1	Conformity assessment — Requirements for bodies providing audit and certification of management systems — Part 1: Requirements	ISO/IEC 17021-1 contains principles and requirements for the competence, consistency and impartiality of bodies providing audit and certification of all types of management systems.
ISO/IEC 17029	Conformity assessment — General principles and requirements for validation and verification bodies	This standard contains general principles and requirements for the competence, consistent operation and impartiality of bodies performing validation/verification as conformity assessment activities.



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ISO/IEC 17030	Conformity assessment — General requirements for third-party marks of conformity	This standard provides general requirements for third-party marks of conformity, including their issue and use.
ISO/TS 17033	Ethical claims and supporting information — Principles and requirements	This standard contains principles and requirements for developing and declaring ethical claims and for providing supporting information, where specific standards have not been developed, or to supplement existing standards.
ISO/IEC 17040	Conformity assessment — General requirements for peer assessment of conformity assessment bodies and accreditation bodies	ISO/IEC 17040 specifies the general requirements for the peer assessment process to be carried out by agreement groups of accreditation bodies or conformity assessment bodies. It addresses the structure and operation of the agreement group only insofar as they relate to the peer assessment process.
ISO/IEC 17065	Conformity assessment — Requirements for bodies certifying products, processes and services	This standard contains requirements for the competence, consistent operation and impartiality of product, process and service certification bodies.



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ANNEX.2

Lifecycle of the Standard Development Process

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OVERVIEW

The development of standards by all the National Standards Bodies (NSBs) in AMS is guided by two international references:

- 1. ISO/IEC Guide 59:2019-ISO: *Recommended practices for standardization by national bodies*²⁰, and
- 2. ANNEX 3 of the WTO/TBT Agreement - Code of Good Practice for the Preparation, adoption and Application of Standards.

The principles and broad procedures for the development of standards are defined in these two documents and are adopted by all the NSBs. All AMS NSBs are members of the International Organization for Standardization (ISO). Each NSB however defines its specific implementation procedures based on the shared and agreed international principles. As the development of standards is a consensus process, NSBs establish and manage specialist technical committees to undertake the actual development of national standards.

Harmonization of standards in ASEAN: The ASEAN Consultative Committee on Standards and Quality (ACCSQ) is assigned the role of overseeing and managing standardization in ASEAN by provisions in the *ASEAN Trade in Goods Agreement*. All ASEAN NSBs are represented in the ACCSQ which has dedicated a Working Group (WG1) to implement these functions and has adopted *the ASEAN Guidelines for Harmonisation of Standards* to define policy guidance. This policy guidance fully aligns with ANNEX 3 of the WTO/TBT agreement. WG 1 currently focuses on the harmonization of standards and has a defined procedure for harmonizing standards in coordination with ASEAN NSBs.

The harmonization of standards under ACCSQ has to date focussed in sectors where ACCSQ has market integration initiatives. As such these have not included the area of plastics and plastics packaging. New arrangements will be needed to coordinate and enable harmonization of these standards at the regional level. However, development of standards on plastics packaging faces no special obstacle within ASEAN NSBs.

These principles in the WTO Code include the following:

- Harmonizing or relying on international standards in developing national standards when available.
 - Ensuring standards do not create unnecessary trade barriers.
 - Avoiding duplication.
 - Make every effort to achieve a national consensus on the standards they develop.
 - Ensuring transparency by publishing a program for standards development and publishing adopted standards.
 - Ensuring that a period of at least 60 days for the submission of comments on the draft standard by interested parties.
- The ISO/IEC Guide 59 contains guidance for the implementation of principles of the TBT Agreement and further details on:
- ISO and IEC standards as a basis for national standards.
 - Specifying standards based on performance requirements.
 - Submission of comments on the draft standard by stakeholders.
 - Publishing of standards.
 - Procedure for appeals from interested parties.

The process and procedures adopted by the NSBs in ASEAN for the development and adoption of standards are based on the overall processes defined by ISO/IEC Directives, Part 1 Procedures for the technical work - Procedures specific to ISO²¹ in its procedures. All AMS are authorized to and continue to adopt or adapt a substantial number of international standards into their national standards system.

The lifecycle of standards has distinct features and requirements. Further details and explanations are available in the ISO/IEC Directives.



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A2.1

Lifecycle of Standards

A2.1.1

Identifying Needs for Standards

The development of a standard requires substantial resources, and it is important for National Standards Bodies to ensure that there is a process and criteria in place to evaluate and review that standards proposed to be developed are relevant, supported by affected stakeholders and are expected to serve desired objectives.

Table A2. 1. Stage and explanatory notes for identifying needs for standards

STAGE	DOCUMENT NAME	EXPLANATORY NOTES
Preliminary and Proposal stage	Preliminary work item or new work item proposal	New projects are identified through a variety of methods- stakeholder requests, consultation, and directives from government authorities. In this regard government agencies responsible for environment and waste management and civil society organisations may submit proposals for the development of new standards or the adoption of an existing international standard to the NSB to address their needs. Stakeholders may propose the development of new standards to the NSB and may at this stage provide a concept note or even a preliminary draft. NSBs conduct a review and establish a consultative process to approve and include in the work programme to formally initiate a new work item project.
Preparatory stage	Working draft	This work is undertaken with the inputs from a specialist working group of experts/technical committee appointed by the NSB. The work of developing a working draft is dependent on the information that is made available by the requesting party.



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A2.1.2

Development and Consensus Building

The development process is normally undertaken by technical committees of stakeholder representatives. This is to ensure that all interests are considered and that the standard developed is widely accepted and implemented. In some situations, specialists sub-committees or working groups may be established to support the technical committees in the development process.

Table A2. 2. Stage and explanatory notes for development and consensus building for standards

STAGE	DOCUMENT NAME	EXPLANATORY NOTES
Committee stage	Committee draft	The working draft is then deliberated in a technical committee representing a balance of stakeholders established by the NSB. The committee draft progresses to the next stage when a consensus within the technical committee is established.
Enquiry stage	Enquiry draft	The technical committee approves the release of the draft for public enquiry for a defined period (usually 60 days). The NSB invites all interested parties to review and submit comments on the draft. These comments are collated and reviewed by the technical committee to establish a renewed consensus.



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A2.1.3

Approval and Publication of Standards

National standards bodies define an authority that will review that the standard has been developed in accordance with defined processes and is in conformance with the NSB's requirements. This may be an individual or a high level committee. It should be noted that the internationally established guidelines require that standards once approved are announced and published.

Table A2. 3. Stage and explanatory notes for approval and publication of standards

STAGE	DOCUMENT NAME	EXPLANATORY NOTES
Approval stage	Final draft	NSBs define the authority (a committee/council or senior official) to grant final approval of the draft standard upon ensuring that the due process has been complied.
Adoption and Publication stage	National Standard	The approval of the standard is publicly notified, and the standard is published in digital and/or electronic form and made available for procurement by all parties. It should be noted that copyrights of standards vest with the NSB and the usually recovers its costs through sales of standards.



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A2.1.4
Implementation and enforcement

National Standards are voluntary documents and available for use by all interested parties. However, standards do attain a mandatory status when these are incorporated in legislation. Governments may choose to legislate the use of standards to achieve policy objectives when voluntary use is inadequate and stronger measures are necessary to change industry and consumer behaviours.

Standards are important repositories of current technical information and best practices. Thus, are good tools to support the transfer of technical information, management practices and process requirements to potential users of the standards, hence ideal tools for enhancing awareness, training and capacity building.

Table A2. 4. Stage and explanatory notes for approval and publication of standards

STAGE	DOCUMENT NAME	EXPLANATORY NOTES
Voluntary Implementation	National Standard	All stake holders, including policy makers, businesses, industry and certification bodies, test laboratories, inspection bodies, NGOs may reference or directly use the standards. Standards Bodies and other stakeholders may conduct promotional, awareness and training programmes on the application of critical standards to support achievement of specific objectives in dealing with plastics packaging waste.
Mandatory Implementation	National Standard	Regulatory authorities may mandate the application of any standard in legislation by direct reference or supporting administrative measures. The content of a standard does not include requirements and details pertaining to implementing legislation or administrative requirements for implementation such as defined responsibilities, processes and penalties for non-compliance. These are contained in the enabling legislation.
Market Surveillance	Mandatory Standards and Standards used for Certification	Market surveillance is undertaken when standards are made mandatory or as part of certification programmes. Regulatory agencies implement surveillance programmes that may include inspections along the supply chain or when products are in the market. When mandatory certification is made a regulatory requirement, monitoring and surveillance is supported by the responsible certification body. Regulatory agencies may impose penalties for non-compliance. Compliance monitoring is prescribed in voluntary eco labelling and certification programmes. Certification bodies undertake this to maintain credibility and may suspend or withdraw certification in cases of noncompliance. The surveillance activities may include: Inspection of production and records, - Collection of samples for testing and verification of compliance - Audits of suppliers.



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A2.1.5
Monitoring and Evaluation

Monitoring of the use and implementation of standards is usually undertaken by the NSBs as custodian of the standards. Implementing organisation such as certification and policy makers, inspection bodies, testing laboratories, regulatory agencies would take a wider perspective and monitor effectiveness of the standards in serving to achieve their desired overall objectives. It is essential that users of standards understand that they have the responsibility and ability to give feedback to NSBs when evaluation proves that published standards are no longer appropriate.

It should be further noted that it is established international practice for a mandatory evaluation of standards for continuing validity on a five-year cycle. This may lead to a revision, revalidation, or withdrawal.

Market surveillance is systematically undertaken when standards are mandatory or the basis of ecolabelling and other certification programmes. Record keeping and reporting obligations when built into regulatory requirements and certification programmes facilitate implementation and compliance.

Table A2. 5. Stage and explanatory notes for approval and publication of standards

STAGE	DOCUMENT NAME	EXPLANATORY NOTES
Monitoring	National Standard	NSB may monitor use through sales data, user surveys, application for conformity assessment. Users of standards will be concerned on the effectiveness of the standards in achieving the targets Monitoring in ASEAN is limited to harmonised standards that are in the database of harmonised standards, (https://atr.asean.org/links/search/) which currently does not include standards on plastics packaging.
Evaluation and Review	National Standard under review and revision	NSBs have a periodic review cycle and stakeholders are usually invited to provide feedback. The evaluation would include use of the standards and changes in technology, economic, and social conditions and in legislation. NSBs, with the advice of stakeholder technical committees, decide on the next course of action- i.e. revision, revalidation or withdrawal.



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A2.2

Ensuring Availability of Standards for Plastics Packaging and their Implementation Across their Lifecycle

Standards enable and facilitate the implementation of measures to reduce the negative impacts of plastics waste packaging. AMS authorities and policy makers responsible for plastics packaging waste may make a range of interventions across the Lifecycle of standards to ensure that appropriate standards are available and are effectively implemented. These interventions are elaborated below.

I. Identification of needs and initiating development.

As key stakeholders responsible policy makers in government and regulatory authorities can take the lead in identifying the needs for standards and collaborate with national standards bodies to develop or adopt available international standards.

II. Participate in developing standards

Policymakers and regulatory authorities should take a key role, to ensure that technical committees developing standards on plastics packaging are established by the national standards bodies and they are represented in these committees. In addition, cooperate with the NSB to participate in relevant international standards committees to keep track of standards being developed and consider potential adoption as national standards.

III. Regional harmonisation

Policy makers and regulatory authorities should seek to collaborate with national focal points dealing with ASEAN's programme for harmonisation of standards under the ACCSQ to propose and support the harmonisation of these standards within ASEAN.

IV. Implementation in voluntary certification programmes.

Policy makers and regulatory authorities should promote and cooperate with accreditation and certification bodies within each AMS to develop supportive labeling and certification programmes based on recognised standards to encourage voluntary measures by industry. The support could include initiatives to increase uptake by through consumer awareness programmes, providing financial and other incentives.

V. Implementation to support policy initiatives

AMS have implemented a range of policies on plastics pollution and plastics waste plastics sustainability, such as those on EPR and elimination of single use plastics. It would be most useful if guidance on the use of identified standards is developed, published and promoted to parties affected to enhance implementation of the policies.

VI. Implementation in Regulation

Policymakers and regulatory authorities have an option of relying on voluntary measures or legislation to address plastics waste concerns. Serious consideration should be given to legislating certain critical standards such as those for labeling for identification of materials and end of life treatment, use of recycled material and reuse. The enforcement of these standards would provide a framework with the AMS to develop viable infrastructure for recycling, end of use treatments, and reuse.

VII. Monitoring and evaluation

Policymakers and regulators should include the use of identified critical standards as part of the monitoring of effectiveness of policies on plastics waste and sustainability. This could be jointly undertaken with the support of the NSB and measures such as the sales of standards, the use of standards in certification and surveys of industry. The monitoring should lead to an evaluation of the continuing relevance of standards available and the need for updates and new standards.



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ANNEX.3

Case Studies

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CASE STUDY 1.

Singapore’s Standards Development System (Singapore)

Overview of Singapore’s Standards Development Process

The standards development process in Singapore is grounded in a transparent, consultative, and iterative framework that encourages participation from all relevant sectors. It typically begins with the identification of a market gap, regulatory demand, or emerging technological opportunity. Stakeholders such as industry associations, research institutions, government agencies, or even individual experts can submit proposals for new standards or the revision of existing ones. Upon approval, technical committees composed of subject-matter experts are established to draft the standard, often referencing international benchmarks like ISO or IEC standards to ensure global compatibility. A public consultation phase follows, during which the draft standard is published for feedback from a broader audience including businesses, academia, civil society, and consumers. This feedback is carefully reviewed and integrated into the final document. The Singapore Standards Council then conducts a final assessment and endorses the standard for publication. This stepwise approach ensures that standards are not only technically sound but also socially and economically aligned with stakeholder needs¹. Additional mechanisms such as the use of Technical References (TRs) and Workshop Agreements (WAs) allow Singapore to respond swiftly to emerging needs or evolving technologies without waiting for the full standardization cycle to conclude².

¹ Enterprise Singapore (n.d.–b)
² Enterprise Singapore (2024)
³ Enterprise Singapore (n.d.–c)

Support from Central or Local Governments

The role of the central government, particularly through Enterprise Singapore, is pivotal in sustaining a robust standards development system. As a statutory board under the Ministry of Trade and Industry, Enterprise Singapore provides institutional leadership and policy direction for the entire standardization ecosystem. It allocates funding for research, facilitates the operation of technical committees, and promotes stakeholder engagement through workshops, outreach events, and technical capacity-building programs. The Singapore Standards Council, appointed by the Ministry,

functions as an independent oversight body to ensure that due process is followed in all stages of standard development. In addition, specific ministries such as the Ministry of Sustainability and the Environment may collaborate on sectoral standards aligned with environmental policies, while the Infocomm Media Development Authority contributes to ICT-related standards. This multi-agency coordination ensures that standardization efforts support national strategic priorities such as sustainability, digitalization, and trade facilitation³.



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Indications of the applicable costs

Developing, implementing, and maintaining standards involves a variety of cost categories that are critical to consider for long-term system sustainability:

- **Consultation and Development Costs:** These cover expenses for organizing stakeholder engagements, technical committee meetings, research and drafting activities, and validation studies. Such costs are often subsidized by Enterprise Singapore to encourage wide participation and reduce entry barriers for SMEs.
- **Compliance and Certification Costs:** Once a standard is enacted, businesses may need to invest in process modifications, new equipment, training, and third-party certifications to demonstrate compliance. These are especially pertinent in regulated sectors such as construction, food safety, and electronics.
- **Administrative and Operational Costs:** These include the ongoing costs of standard maintenance, updates, publication, and dissemination. Digital platforms for public consultations, documentation archiving, and user-friendly access to standards are also part of this category. Enterprise Singapore typically absorbs much of these costs, with minimal fees charged to standard users to encourage adoption^{4,5}. Some entrepreneurs, especially in tech and green sectors, report that despite the benefits of credibility and international access, the cost of compliance with international standards can disproportionately impact SMEs and startups during early growth phases⁶.

⁴ Enterprise Singapore (n.d.–b)
⁵ Enterprise Singapore (n.d.–c)
⁶ Eugene K B Tan (2020)
⁷ Enterprise Singapore (n.d.–b)
⁸ Enterprise Singapore (n.d.–a)
⁹ Enterprise Singapore (n.d.–a)
¹⁰ Nanyang Technological University (2025)

Technical Requirements

Technical standards in Singapore are developed with a strong emphasis on scientific rigor, interoperability, and future-readiness:

- **International Alignment:** Singapore routinely harmonizes its national standards with international frameworks like ISO, IEC, and ITU. This strategy enhances Singapore's global trade competitiveness and reduces duplication in conformity assessments for export-oriented businesses^{7,8}.
- **Rigorous Validation:** Before finalization, draft standards undergo technical validation including pilot testing, benchmarking against global practices, and expert review. Criteria such as feasibility, cost-effectiveness, safety, environmental impact, and industry acceptance are systematically evaluated. This ensures that standards are both practically implementable and aligned with regulatory requirements. Singapore's standards ecosystem is further strengthened by sectoral institutions such as the NTU Standards Development Organization (NTU–SDO), which supports electrical and electronic standards and represents Singapore in international bodies like the IEC¹⁰.



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Direct Users

Industry in Singapore can benefit from the standards development system led by Enterprise Singapore by actively participating in a collaborative framework that aligns national standards with global best practices, fostering innovation, market access, and regulatory compliance. National Standardization Bodies and Regulatory Authorities can draw on this case study to improve their approaches to developing standards.

¹¹ Enterprise Singapore (n.d.–c)
¹² Enterprise Singapore (n.d.–a)

Benefits

The comprehensive nature of Singapore's standards development system translates into multifaceted benefits for the economy, consumers, and the public sector:

- **Enhanced International Trade:** By aligning local standards with global norms, Singapore minimizes technical trade barriers and fosters mutual recognition agreements with trading partners. This facilitates the export of goods and services while attracting foreign investment into sectors that value regulatory predictability.
- **Improved Product Quality and Safety:** Stringent technical standards ensure that products and services meet quality benchmarks, reducing the risk of defects, recalls, or safety hazards. This protects consumers and boosts brand confidence for Singapore-made products.
- **Inclusive Industry Participation and Innovation:** The standards development process is designed to be participatory, ensuring that industry voices, particularly SMEs are heard. This inclusiveness promotes broader adoption, encourages innovation through early engagement with emerging technologies, and ensures that standards remain practical and market-relevant^{11, 12}.



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Monitoring Protocols

To ensure that the developed standards remain effective, relevant, and up to date, Singapore has instituted robust monitoring protocols:

- **Periodic Reviews:** All Singapore Standards are subject to systematic review every five years or earlier if warranted by technological advances or industry feedback. The review process may lead to the reaffirmation, revision, or withdrawal of the standard depending on its continued relevance and effectiveness.
- **Stakeholder Feedback Mechanisms:** Enterprise Singapore maintains open channels for post-implementation feedback from users, certification bodies, and industry associations. This allows for real-time insights into practical challenges and opportunities for improvement.
- **Impact Assessment and Market Surveillance:** Enterprise Singapore conducts market studies and regulatory impact assessments to evaluate how widely standards are adopted, their influence on compliance behavior, and their effectiveness in meeting policy goals. These assessments inform future updates and identify gaps in enforcement.
- **Digital Monitoring Tools:** The standards system leverages digital platforms for tracking user engagement with standards, collecting public comments, and facilitating transparent audit trails. These tools enhance responsiveness and data-driven decision-making^{13, 14}.
- **Public feedback through Newsletters:** Monthly bulletins such as the Singapore Standards Newsletter highlight newly issued or revised standards and invite public feedback on draft documents, fostering transparency and accountability in implementation¹⁵.

Current State and Market Uptake

- Government agencies, including Enterprise Singapore and the Singapore Standards Council (SSC), continue to lead standards development and oversight in collaboration with industry and academic stakeholders for continual updates.
- Major sustainability initiatives such as the Singapore Green Plan 2030 and mandatory packaging waste reporting require companies to align with Singapore standards governing recyclability, safety, and environmental reporting¹⁶.
- Technical References (TR) frameworks like TR109, issued by SSC for sustainable packaging practices, are increasingly adopted by local and multinational companies as benchmarks for 3R (Reduce, Reuse, Recycle) compliance, driving uptake especially in packaging and Fast-Moving Consumer Goods (FMCG) sectors¹⁷.
- Leading Singapore companies and multinational brands systematically integrate national standards into product design, packaging, and regulatory disclosures to meet customer expectations and legal requirements¹⁸. More than 76% of the top 100 companies now incorporate climate risk and sustainability reporting driven by new standard regimes¹⁹.

¹³ Enterprise Singapore (n.d.–b)
¹⁴ Enterprise Singapore (n.d.–c)
¹⁵ TOPPAN NEXT Pte. Ltd. (2024)
¹⁶ Geetika Chhatwal 17-Dec-25; NEA 2025
¹⁷ NEA 2022, 2025.
¹⁸ NEA 2022, 2025; ACRA 2025; Singapore Statutes Online 2025.
¹⁹ KPMG 2024.



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CASE STUDY 2.

Application of ISO 14855 on Determination of Biodegradability and Compostability (Philippines)

PNS ISO 14855-1:2013²⁰ Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions

The biodegradability standards **PNS ISO 14855-1:2013** and **PNS ISO 14855-2:2013** are crucial for assessing the ultimate aerobic biodegradability of plastics under controlled composting conditions. These standards are part of the broader ISO 14855 series, which provide methodologies for evaluating how plastic materials decompose into carbon dioxide and biomass when subjected to composting environments. They were approved for adoption as a Philippine National Standard by the Bureau of Product Standards upon the recommendation of the Technical Committee on Plastic and Plastic Products (BPS/TC 45).

The significance of these standards lies in their ability to simulate real-world composting conditions, thereby offering a reliable measure of how biodegradable a plastic material is. This is particularly important for the sustainability of plastic packaging, as it helps ensure that materials can break down efficiently, reducing environmental impact and supporting waste management strategies. The Philippines' Green Choice Philippines (GCP) Ecolabelling Program references ISO 14855 standards, including PNS ISO 14855-1:2013, as the basis for certifying packaging products as biodegradable and compostable. GCP requires at least 90% biodegradation under controlled aerobic conditions within 180 days, aligned with ISO 14855-1 protocols²¹. Internationally, ISO 14855-1 is part of DIN CERTCO's certification schemes for compostability²². This reinforces its recognition as a valid method for biodegradability testing.

²⁰ ISO (2012)
²¹ Green Choice Philippines
²² Din Certco (2023)

Support from Central or Local Governments

- **Department of Trade and Industry (DTI):** Through its Bureau of Philippine Standards (BPS), the DTI plays a crucial role in implementing biodegradability standards, ensuring that products meet national and international standards for environmental sustainability.
- **Local Government Units (LGUs):** LGUs often support national standards through local ordinances that promote the use of biodegradable materials, aligning with broader environmental policies.
- **Department of Environment and Natural Resources (DENR):** The DENR typically supports initiatives that align with environmental protection, which includes promoting standards that ensure the biodegradability of materials.
- **Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD):** This council may support research and development efforts related to biodegradability standards, fostering innovation in sustainable materials.



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Indications of the applicable costs²³

²³ Bureau of Philippine Standards (n.d.)

- **Initial and Annual License Fees:** The fees for obtaining a Philippine Standard (PS) Quality and/or Safety Certification Mark License vary significantly depending on the size of the establishment. Micro-sized establishments face lower fees, starting at Php 5,000 for an original license, while large-sized establishments pay up to Php 12,500. Similarly, annual license fees range from Php 2,500 for micro-sized to Php 6,250 for large-sized establishments. This tiered structure implies that smaller businesses are given some financial leeway compared to larger businesses, possibly to encourage compliance and certification among smaller players.
- **Audit Fees:** These fees are structured per man-hour and also vary by establishment size. For micro-sized establishments, the fee is Php 100.00 per man-hour, whereas large-sized establishments are charged Php 500.00 per man-hour. This cost structure suggests that larger businesses are expected to have more complex operations requiring more extensive auditing, hence the higher fees.
- **Import Commodity Clearance (ICC) and Statement of Confirmation (SOC):** Both these services have processing fees based on the value of the invoice for importation. Fees start at Php 5,000 for invoices up to Php 500,000 and increase to Php 10,000 for invoices over Php 1 million. This indicates that higher-value imports are subject to higher processing fees, reflecting the increased scrutiny and potential risk associated with high-value goods.
- **Additional Costs:** Testing fees are charged by the BPS-recognized Testing Laboratory, and inspection fees are similarly structured. These additional costs suggest that the overall cost of certification can vary widely depending on the specifics of the business's operations and the logistics involved in certification. Testing laboratories such as SGS Philippines and DOST-ITDI's SPTL charge additional fees for ISO 14855 testing, depending on CO₂ monitoring duration and reporting complexity.

Technical Requirements

- For a product to be certified under these standards, it must undergo rigorous testing to ensure it meets the criteria for biodegradability as outlined in the ISO 14855 series. This involves controlled composting conditions where the evolution of carbon dioxide is measured to determine the degree of biodegradation.
- The Import Commodity Clearance (ICC) Certification under the Product Certification Scheme (PCS) in the Philippines requires a product test report to verify compliance with relevant Philippine National Standards (PNS). This report must be issued by a testing laboratory recognized by the Department of Trade and Industry - Bureau of Philippine Standards (DTI-BPS). The DTI-BPS provides its own testing facility where importers can have their products tested. The DTI-BPS Testing Laboratory is equipped with various testing equipment capable of evaluating electrical, electronic, chemical, mechanical, and consumer products. It also features an internal calibration laboratory to ensure the accuracy and reliability of its test results. This facility not only serves for product testing but also supports research and standards development activities within the DTI-BPS.
- They have a list of BPS recognized testing laboratories but there is none specifically for the testing of biodegradable/compostable packaging.



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Direct Users

The primary users of these Standards are manufacturers of biodegradable plastics, testing laboratories, regulatory authorities, certification bodies, environmental consultants, purchasers of compostable products, and operators of composting facilities, all of whom rely on these standards to assess, verify, and regulate the biodegradability of plastic materials under controlled composting conditions.

Benefits

Positive environmental impacts:

- **Reduction in Landfill Waste:** Biodegradable packaging decomposes into carbon dioxide, water, and biomass under controlled composting conditions, significantly reducing the volume of waste sent to landfills. This helps alleviate the pressure on already overburdened waste management systems.
- **Support for Circular Economy:** Compostable materials can be reintegrated into the environment as nutrients, supporting soil health and reducing the need for synthetic fertilizers.
- **Lower Plastic Pollution:** By breaking down efficiently, biodegradable materials help reduce the accumulation of persistent plastic waste in marine and terrestrial environments.
- **Carbon Sequestration Potential:** Composting biodegradable materials can contribute to carbon sequestration when the resulting compost is used in soil, although this depends on the composting process and conditions.

Possible adverse Impacts:

- The production of biodegradable packaging can require more energy than conventional plastics, especially if the feedstocks are grown using intensive agricultural methods. The cultivation, harvesting, and processing of these agricultural feedstock consume significant energy and resources, including water, fertilizers, and fuel. Additionally, if not composted under the specific conditions outlined in the standards, some biodegradable materials may not degrade fully, leading to microplastic pollution. However, the energy intensity of production must be weighed against the long-term environmental benefits. While conventional plastics may be less energy intensive to produce, their environmental costs, such as pollution and persistence in ecosystems, are far greater over time.

Monitoring Protocols

Monitoring protocols play a critical role in ensuring that biodegradable packaging achieves its intended environmental objectives. These protocols must not only verify whether biodegradable plastics are present in the market but also assess whether these materials comply with the relevant biodegradability standards in practice. A robust monitoring system is essential to track the application of the standards and confirm that the materials being marketed as biodegradable truly meet their claims.

To ensure that biodegradable materials are effectively monitored and evaluated, the following key areas should be addressed:

Controlled Composting Conditions

1. **Temperature Monitoring:** Composting systems must maintain optimal temperatures between 50°C and 60°C to support microbial activity and effective degradation. Continuous monitoring is crucial to avoid temperature fluctuations that could hinder the biodegradation process.
2. **Humidity Control:** Maintaining appropriate moisture levels (typically 50-60%) is essential for microbial activity. Sensors should be deployed to monitor and adjust humidity levels to ensure consistent composting conditions.
3. **Aeration:** Proper aeration is critical to prevent anaerobic conditions, which can lead to methane emissions. Monitoring oxygen levels ensures that the composting process remains aerobic and environmentally safe.

Carbon Dioxide Evolution

The release of carbon dioxide during composting is a direct indicator of biodegradation. Standards require the measurement of CO₂ evolution, which involves using gas analyzers or infrared sensors to track CO₂ levels over time. This data provides a quantitative measure of how effectively the material is breaking down.

Physical and Chemical Testing

Regular sampling of the compost is necessary to analyze its chemical composition (e.g., carbon-to-nitrogen ratio) and physical properties (e.g., particle size). These tests help assess the progress of biodegradation and ensure that the compost meets quality standards.



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Microbial Activity

Monitoring microbial populations provides insights into the health and efficiency of the composting process. Techniques such as DNA sequencing or culture-based methods can be used to identify active microbial communities and evaluate their role in the biodegradation process.

Compliance Audits

The Bureau of Philippine Standards (BPS) conducts compliance audits to ensure that manufacturers and composting facilities adhere to biodegradability protocols. These audits may include on-site inspections, reviews of monitoring data, and independent testing of compost samples to verify compliance with the standards.

Recommendations for Improved Monitoring Protocols

To enhance the effectiveness of monitoring protocols, the following steps are recommended:

1. Standardized Testing Facilities:

- Establish dedicated testing laboratories specifically for biodegradable and compostable packaging. These facilities should be equipped with advanced monitoring tools, such as real-time gas analyzers, automated composting systems, and microbial analysis equipment, to ensure consistent and reliable results.

2. Lifecycle Analysis:

- Incorporate lifecycle analysis into monitoring protocols to evaluate the overall environmental impact of biodegradable packaging. This should include assessments of energy consumption, resource use, and greenhouse gas emissions during production, distribution, and composting.

3. Public Transparency:

- Require manufacturers to publish biodegradability test results and environmental impact assessments. This transparency would promote accountability, build consumer trust, and encourage broader adoption of biodegradable materials.

Existing Testing Facilities in the Philippines

1. Simulation Packaging Testing Laboratory (SPTL) and Green Packaging Laboratory (GPL):

- These facilities, established by the Department of Science and Technology (DOST) through the Industrial Technology Development Institute (ITDI), conduct tests on sustainable packaging, including biodegradable materials. They aim to ensure compliance with safety and performance standards.

2. BPS-Recognized Testing Facilities:

- The Bureau of Philippine Standards (BPS) recognizes certain laboratories for compliance testing. However, there is currently no laboratory exclusively dedicated to biodegradable or compostable packaging testing, highlighting the need for more specialized facilities.

3. SGS Philippines:

- SGS provides biodegradability and compostability testing services, offering certifications based on international standards such as EN 13432 and ISO 14855. These services help evaluate the environmental impact of materials and ensure compliance with global sustainability standards



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Current State and Market Uptake

- Pressure from regulators and consumers has pushed more companies toward certification based on ISO14855, as part of compliance with local environment standards and packaging regulations²⁴.
- The Department of Science and Technology (DOST) supports innovation in green packaging, referencing international standards including ISO14855 to measure compostability and biodegradability when awarding environmental certification to local manufacturers²⁵.
- Local firms, like Philippine Bioresins Corp., have developed plastics meeting biodegradability thresholds per DOST verification protocols, aligning with ISO14855 and related ASTM standards²⁶.
- Large scale entities, such as San Miguel Corp., have announced adoption of certified biodegradable packaging, indicating initial market movement²⁷.

²⁴ Green Choice Philippines 2018.
²⁵ Green Choice Philippines 2018.
²⁶ Biogone; Green Choice Philippines 2018.
²⁷ Biogone.



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CASE STUDY 3.

Application of ISO 18603 on Packaging and the Environment – Reuse (Philippines)

The Philippines’ PNS ISO 18603:2021 on “Packaging and the Environment – Reuse”

The **Philippines’ PNS ISO 18603:2021 standard**, titled “**Packaging and the Environment – Reuse**” is part of a series of standards that address the environmental impacts of packaging throughout its lifecycle. This specific standard delineates the criteria for packaging to be classified as reusable. It provides guidelines for assessing whether a packaging system meets these requirements, ensuring that the reuse process is efficient and environmentally beneficial. It was approved for adoption as Philippine National Standard by the Bureau of Philippine Standards upon the recommendation of the Technical Committee on Packaging and Packaging Materials (BPS/TC 40).

The standard is an **adoption of ISO 18603:2013²⁸**, which is part of a broader set of standards aimed at minimizing the environmental footprint of packaging. These standards, including **ISO 18601 to ISO 18606**, provide a comprehensive framework for packaging sustainability. They cover various aspects such as the optimization of packaging design, the reduction of hazardous substances, and the promotion of reuse and recycling. In the Philippines, assessments related to compliance with PNS ISO 18603:2021 are primarily conducted by the Bureau of Philippine Standards (BPS) through its Standards Conformity Division. BPS is responsible for evaluating whether packaging reuse systems meet the national standard, particularly when products apply for Import Commodity Clearance (ICC) or Philippine Standard (PS) Certification Marks.

²⁸ ISO (2013)

Support from Central or Local Governments

- **Bureau of Philippine Standards (BPS)** continuously ensures that consumer protection is upheld, and continual improvement of the industry is reinforced. Alongside two (2) other bureaus under the Fair-Trade Group (FTG) of the Department of Trade and Industry (DTI), the BPS empowers consumers and enables businesses in its capacity as the National Standards Body (NSB) of the Philippines through the development of Philippine National Standards (PNS).
- **Department of Environment and Natural Resources (DENR)**: Oversees the implementation and compliance with the standard, ensuring alignment with national environmental policies.
- **Department of Trade and Industry (DTI)**: Promotes the adoption of the standard among businesses and provides support for compliance through incentives and resources.
- **Local Government Units (LGUs)**: Facilitate local enforcement and community engagement to promote packaging reuse practices.



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Indications of the applicable costs

- **Redesign and Development Costs:** Investment in redesigning packaging to meet reuse criteria, which may involve new materials and design processes to ensure durability and ease of cleaning.
- **Infrastructure and System Costs:** Establishing systems to track and manage the reuse of packaging, such as setting up collection points or integrating tracking technologies.
- **Quality Assurance and Compliance Costs:** Implementing procedures to ensure that reused packaging maintains safety and quality standards, including fees for audits and testing by recognized bodies.
- **Training and Education Costs:** Training staff and educating stakeholders about the new practices and standards, which can involve costs related to workshops, materials, and ongoing support.
- **Certification and Regulatory Costs:** Costs associated with certification processes to demonstrate compliance with the standard, which could include fees for audits and testing by recognized bodies.

Technical Requirements

- **Design for Reuse:** Packaging must be designed to withstand multiple use cycles, ensuring durability and ease of cleaning.
- **System Integration:** Establishment of systems to track and manage the reuse of packaging, ensuring compliance with the standard.
- **Infrastructure Development:** Establishing collection, cleaning, and redistribution systems, as well as tracking technologies for reuse cycles.
- **Quality Assurance:** Procedures to ensure that reused packaging maintains safety and quality standards.
- **Compliance:** Applicants must provide technical files demonstrating compliance, such as durability test reports, lifecycle assessments, and operational procedures for reuse systems²⁹.

Direct Users

The users of this Standard include packaging manufacturers, product producers, retailers, regulatory authorities, certification bodies, environmental consultants, and waste management organisations. These stakeholders utilise the standard to design, assess, certify, and regulate reusable packaging systems, ensuring compliance with environmental requirements and promoting sustainable packaging practices within the country.

²⁹ ISO (2013)



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Benefits

³⁰ Wang (2025)

• Socioeconomic Benefits:

Reuse systems have the potential to generate employment opportunities in various stages of the value chain, including the collection, cleaning, and redistribution of reusable packaging. For instance, small-scale businesses like zero-waste sari-sari stores and carinderias provide local employment while promoting sustainable practices. Additionally, the establishment of infrastructure for reuse systems, such as collection points, cleaning facilities, and tracking technologies—can spur investments and create jobs in logistics, technology, and waste management sectors. These systems also encourage entrepreneurship by enabling small businesses and social enterprises to innovate and thrive in the growing market for sustainable packaging solutions.

• Empowering Waste Workers:

The transition to reuse systems provides an opportunity to integrate waste workers into formal systems, ensuring fair wages, training, and safer working conditions. The Philippine Reuse Consortium (PRC) has emphasized the importance of a "just transition" for waste workers, advocating for frameworks that protect their livelihoods while equipping them with new skills. This approach not only uplifts marginalized communities but also strengthens the overall waste management ecosystem by leveraging the expertise of waste workers.

• Environmental Benefits:

Reduces waste and resource consumption by promoting multiple-use cycles for packaging, given that the standard is really being translated into reuse initiatives in the country and that consumers are willing to participate in reuse systems which may require extensive awareness campaigns. The launch of the **Philippine Reuse Consortium (PRC)** in January 2025³⁰ marked a significant step in institutionalizing reuse systems. As the national chapter of the Asia Reuse Consortium, the PRC brought together civil society organizations, government agencies, and businesses to tackle the challenges of SUPs. Its five-year roadmap includes: Advocating for progressive laws and policies to support reuse systems; Scaling up existing reuse models and fostering cross-sectoral partnerships; Supporting waste workers through education, training, and fair compensation; Driving innovation through research and investment in sustainable technologies.



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Monitoring Protocols

- **BPS Product Testing Laboratory (BPSTL)**

One of the requirements to be granted the Import Commodity Clearance (ICC) Certification under the Product Certification Scheme (PCS) is a product test report to determine if the subject imported products are compliant to relevant Philippine National Standard (PNS). The test report is issued by a testing laboratory recognized by the DTI-BPS. The DTI-BPS has the same testing facility where importers may have their sample product tested.

- On the government side, the **Bureau of Philippine Standards of the Department of Trade and Industry (DTI-BPS)** serves as the National Standards Body (NSB) of the Philippines and is mandated to develop, promulgate, and implement standards for all products in the Philippines, to promote standardization activities in the country, and to ensure the manufacture, production, and distribution of quality products for the protection of the consumer.
- On the **non-government side, the Philippine Center for Environmental Protection and Sustainable Development, Inc. (PCEPSDI)** is a non-stock, non-profit organization serving as the administrator of the **National Eco Labelling Programme – Green Choice Philippines (NELP-GCP)**. The goal of the organization is to nurture a greener and more sustainable society, emphasizing the responsible use of resources and prioritizing environmentally conscious practices.
- The National Ecolabeling Programme – **Green Choice Philippines (NELP-GCP) is a voluntary, multiple criteria-based, and third-party programme** that aims to encourage clean manufacturing practices and consumption of environmentally preferable products and services. This programme is seen as an important marketing instrument to complement laws and regulations for environmentally preferable products and a guide to consumers' purchasing preference.
- Annual monitoring activities conducted by BPS include reviews of documentation, facilities inspections, and verification of systems supporting reuse objectives as outlined in PNS ISO 18603:2021. These monitoring activities are facilitated through the BPS Product Testing Laboratory (BPSTL), which provides technical evaluation services and ensures compliance through routine inspections and documentation checks³¹.
- Independent monitoring by the Philippine Center for Environmental Protection and Sustainable Development, Inc. (PCEPSDI) through its Green Choice Philippines ecolabelling program may include site visits, audits, and post-certification performance reviews³².

Current State and Market Uptake

- Most adoption of ISO18603 criteria is seen in pilot certification programs and targeted sustainability campaigns, with major players exploring reusable packaging systems³³.
- Several industry and NGO reports confirm growing interest in reusable packaging, but highlight supply-side barriers, such as the lack of infrastructure, consumer awareness, and supporting logistics needed for closed-loop reuse systems³⁴.
- Further integration of ISO18603 within extended producer responsibility (EPR) schemes and sustainability-driven procurement policy will likely accelerate market uptake in the future³⁵.

³¹ Department of trade and industry, Bureau of Philippine Standards (2025)

³² Green Choice Philippines 2018

³³ Green Choice Philippines 2018

³⁴ Green Choice Philippines 2018; Atty. Gregorio Rafael P. Bueta 2022.

³⁵ Atty. Gregorio Rafael P. Bueta 2022.



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CASE STUDY 4.

Application of ISO 20400 on Sustainable Procurement (Australia)

Adoption of ISO 20400 in Australia

Australia has been a pioneer in adopting ISO 20400, the international standard for sustainable procurement, and integrating its principles into public and private sector practices. **The Sustainable Procurement Guide (2024)**³⁶ by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) complements ISO 20400 by providing clear, actionable guidelines for embedding sustainability into procurement decisions.

Plastic packaging, a major contributor to environmental degradation, has been a key focus area. By aligning with ISO 20400 aims to reduce plastic waste, increase recycled content, and foster a circular economy. These efforts are supported by government policies, industry collaboration, and innovative practices that promote the use of sustainable packaging materials. Australia's approach is further reinforced through the National Waste Policy Action Plan (2019), which outlines targets for reducing waste generation, boosting resource recovery, and phasing out problematic single-use plastics³⁷.

³⁶ DCCEEW (2024)
³⁷ Australian Government (2019)
³⁸ Ecobuy (n.d.)
³⁹ Australian ISO 20400 Committee (2018)

Support from Central or Local Governments

The Australian government has demonstrated strong leadership in promoting sustainable procurement, particularly through the Environmentally Sustainable Procurement Policy, introduced in stages from July 2024.

- **Federal Initiatives:**
 - The policy mandates that all government agencies incorporate sustainability criteria into procurement decisions, including the use of recycled materials in plastic packaging.
 - **The Commonwealth Procurement Rules (CPRs)** require agencies to evaluate environmental sustainability alongside price and quality when procuring goods and services.
- **State-Level Engagement:** States such as New South Wales and Victoria have implemented complementary policies, including bans on problematic plastics and incentives for businesses adopting sustainable packaging solutions.

- **Circular Economy Focus:** The government's procurement practices align with circular economy principles, prioritising products that are durable, repairable, reusable, and recyclable.
- **Local Government Role:** The Australian Local Government Association (ALGA) and state platforms like Sustainable Choice NSW and EcoBuy (Victoria) provide resources and guidance for councils to implement sustainable procurement.³⁸
- **Industry Guidance:** The Australian ISO 20400 Committee's "Building the Business Case for Sustainable Procurement in Australia – Guidance 2019" contextualises the standard for Australian organisations.³⁹



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Indications of the applicable costs⁴⁰

The transition to sustainable procurement practices, particularly for plastic packaging, involves both costs and long-term benefits:

- Initial Costs:**
- Transitioning to sustainable packaging materials, such as recycled plastics, may incur higher upfront costs compared to traditional virgin plastics.
 - Investments in supplier audits, certifications, and market research to identify sustainable options.
- Ongoing Costs:**
- Monitoring supplier compliance with sustainability criteria.
 - Conducting Life Cycle Assessments (LCAs) to evaluate the environmental impact of packaging materials.
- Cost Offsets and Benefits:**
- Reduced landfill costs due to improved recyclability.
 - Access to government grants and subsidies, such as those under the Recycling Modernisation Fund.
 - Enhanced reputation and market access, particularly in environmentally conscious markets.

⁴⁰ Australian ISO 20400 Committee (2018)
⁴¹ DCCEEW (2024)

Technical Requirements

The **Sustainable Procurement Guide**⁴¹ outlines specific technical requirements for plastic packaging, aligned with ISO 20400:

- Material Standards:**
- Use of recycled content in packaging, with a target of 50% recycled material by 2025.
 - Elimination of problematic plastics, such as polystyrene and PVC.
- Design Principles:**
- Packaging must be designed for recyclability, reusability, or compostability.
 - Clear labelling to support consumer recycling efforts.
- Supplier Criteria:**
- Suppliers must demonstrate compliance with environmental certifications and standards, such as ecolabels.
 - Preference for suppliers offering take-back or end-of-life schemes for packaging.



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Direct Users

The users of this Standard include procurement professionals, supply chain managers, sustainability officers, regulatory authorities, certification bodies, consultants, and organizations across both public and private sectors. These stakeholders use the standard to integrate sustainability principles into procurement processes, improve supplier selection, enhance organizational responsibility, and ensure alignment with environmental, social, and economic objectives.

Benefits

Adopting ISO 20400 and the **Sustainable Procurement Guide** has delivered significant environmental benefits:

Reduction in Plastic Waste:

- Increased use of recycled content has diverted tonnes of plastic from landfills.
- Phasing out single-use plastics has reduced litter and marine pollution.

Lower Carbon Footprint:

- Using recycled plastics requires less energy than producing virgin plastics, thereby reducing greenhouse gas emissions.

Biodiversity Protection:

- Mitigating plastic pollution has reduced harm to marine and terrestrial ecosystems.

Consumer Awareness:

- Clear labelling and sustainable design have educated consumers on recycling and waste reduction.

Monitoring Protocols

The Sustainable Procurement Guide provides a comprehensive framework for monitoring and evaluating sustainability in procurement. The responsibility for monitoring lies primarily with procurement teams within federal and state agencies, with national oversight and guidance from the DCCEEW, and support from the Australian ALGA at the local council level. External auditors and third-party verifiers may also be engaged to ensure compliance with ISO 20400 and relevant ecolabel standards.

Monitoring and evaluation activities include:

Performance Metrics:

- Tracking the percentage of packaging that is recyclable, reusable, or compostable.
- Measuring the amount of recycled content used in packaging.
- Assessing the reduction in overall plastic usage.

Supplier Audits:

- Regular audits are conducted to ensure that suppliers comply with sustainability criteria and hold valid certifications.

Contract Management:

- Procurement contracts include specific sustainability clauses, such as requirements for recycled content and waste reduction.
- Key performance indicators (KPIs) are established to track progress, ensure accountability, and identify areas for improvement.

Knowledge Sharing:

- Agencies and businesses are encouraged to share their experiences and best practices, fostering a culture of continuous improvement and collaboration across sectors.

Current State and Market Uptake

- ISO20400 has been adopted as an Australian Standard AS ISO20400 in May 2018 and used as a best-practice framework to inform procurement policies and template.
- Commonwealth Procurement Rules mandates all Commonwealth procurement officials to consider environmental and social sustainability when determining “value for money”⁴².
- The Department of Finance’s ClauseBank includes sustainable procurement model clauses drawn directly from the ISO 20400 frameworks⁴³.
- Effective from 1 July 2024, the Environmentally Sustainable Procurement (ESP) Policy requires federal agencies to implement sustainable procurement in construction, ICT, and major procurement categories⁴⁴.

⁴² Australian ISO 20400 Committee (2018)
⁴³ Department of Finance, Australia Government [These guidance will be further updated to reflect changes made to the Commonwealth Procurement Rules that take effect on 17 November 2025]
⁴⁴ DCCEEW 2024a



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CASE STUDY 5.

Application of ISO 14067 on Carbon Footprint Certification for Plastic Packaging (Malaysia)

ISO 14067 Carbon Footprint Certification for Plastics Packaging at Moldex Manufacturing⁴⁵

Moldex Manufacturing, a leading Malaysian plastic recycling specialist with a strong commitment to sustainability and quality, became the first plastic manufacturing company in Malaysia to receive ISO 14067 carbon footprint certification from BSI (British Standards Institution), a globally recognized certification body. While Moldex chose BSI for its international credibility and market reach, it is important to note that SIRIM QAS International—Malaysia’s national certification body—also offers ISO 14067 certification for companies seeking to verify and communicate the carbon footprint of their products⁴⁶.

- **Market Demand:** Both domestic and international clients increasingly require transparent, third-party-verified carbon footprint information to meet their own sustainability commitments and regulatory obligations.
- **Regulatory Alignment:** Moldex anticipated the tightening of environmental regulations, particularly in export markets such as the EU, where carbon footprint disclosure is becoming a prerequisite for market access.
- **Corporate Responsibility:** Demonstrating climate action and environmental stewardship is key to enhancing brand reputation and building trust with stakeholders. Moldex’s longstanding ISO Team, in place for nearly three decades, was instrumental in guiding the company towards alignment with ISO 14067 standards.

Moldex received their ISO 14067 Verification Opinion Statement (VOS) presented by the Managing Director of BSI in Malaysia, Evelyn Chye, as the first plastic manufacturing company in the country to achieve this. The verification reports act as proof that the company’s products meet the standards required by final users, particularly in the European market. Moldex, which has maintained an ISO Team for nearly three decades, sought expert guidance to align with ISO 14067 standards⁴⁷.

Support from Central or Local Governments

- **Institutional Support:** SIRIM QAS International, under SIRIM Berhad (a wholly government-owned entity), has offered ISO 14067 certification and eco-labelling services since 2014, making international carbon footprint standards accessible to Malaysian industry.⁴⁸
- **Policy Alignment:** National frameworks such as the Twelfth Malaysia Plan promote the use of international standards like ISO 14067 to drive low-carbon development and boost export competitiveness.
- **Capacity Building:** Government agencies and SIRIM QAS provide technical assistance, workshops, and training on Life Cycle Assessment (LCA) and carbon footprint methodologies to help companies—especially SMEs—implement ISO 14067 effectively.
- **Market Incentives:** Integration of ISO 14067 into national eco-labelling and green procurement schemes gives certified products preferential access to public procurement and export markets.
- **Industry Collaboration:** The government works with industry associations and international certification bodies to ensure ISO 14067 is practical, recognized, and keeps pace with global best practices.

⁴⁵ Moldex Manufacturing Sdn. Bhd. (2023)
⁴⁶ SIRIM QAS (2025b)
⁴⁷ Bernard Business Consulting (n.d.)
⁴⁸ Hanns Seidel Stidtung (2022); SIRIM QAS (2022)



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Indications of the applicable costs

There is no single fixed price for ISO 14067 certification, as costs depend on a variety of factors, including company size, product complexity, supply chain length, and the chosen certification body. Key cost drivers include the availability and quality of data, the number of product variants or functional units assessed, the scope of the carbon footprint study (e.g., cradle-to-gate vs. cradle-to-grave), requirements for third-party verification, and whether the process is integrated with ISO 14001 or supported by LCA software tools⁴⁹. Certification typically involves a multi-week process, from initial scoping and data collection to impact assessment, reporting, and optional third-party verification.

For Governments and Institutions:

- Initial Costs: Investment in training government officials and SIRIM QAS assessors, developing digital infrastructure for certification tracking, and running public awareness campaigns on product carbon footprinting.
- Ongoing Costs: Monitoring compliance, conducting audits, and maintaining technical infrastructure and capacity-building programs.

For Businesses (e.g., Moldex Manufacturing):

- Compliance Costs: Investment in LCA studies, process upgrades (e.g., more efficient machinery, higher recycled content), and documentation to meet ISO 14067 requirements.
- Certification Fees: BSI or SIRIM QAS charges for application, document review, on-site audits, and periodic recertification. These fees are scaled to business size and product complexity, making them accessible to SMEs.
- Training and Capacity Building: Costs for staff training, technical workshops, and consulting support.
- Supplier Engagement: Resources dedicated to working with suppliers for better data and process improvements.

⁴⁹ Pacific Certification - Inspection & Certification (n.d.)
⁵⁰ BSI (2025)

Technical Requirements⁵⁰

ISO 14067 certification for plastic pallets required Moldex to meet strict technical standards, including.

- **Life Cycle Assessment (LCA):** Conducting a robust LCA, covering all stages from raw material sourcing (with a focus on recycled content) to end-of-life, in line with ISO 14067 guidance.
- **Data Quality and Traceability:** Ensuring transparent, high-quality data on energy, materials, and emissions across the value chain.
- **Process and Product Controls:** Implementing measures for continuous improvement in carbon performance, such as upgrading machinery and increasing recycled content.
- **Verification and Auditing:** Undergoing independent verification and regular audits by BSI/SIRIM QAS International, including site visits, document checks, and interviews with staff.
- **Eco-Labeling:** Products certified under ISO 14067 are eligible for the SIRIM Eco-Labeling Scheme, which is based on ISO 14024 and provides additional market recognition for environmental performance.



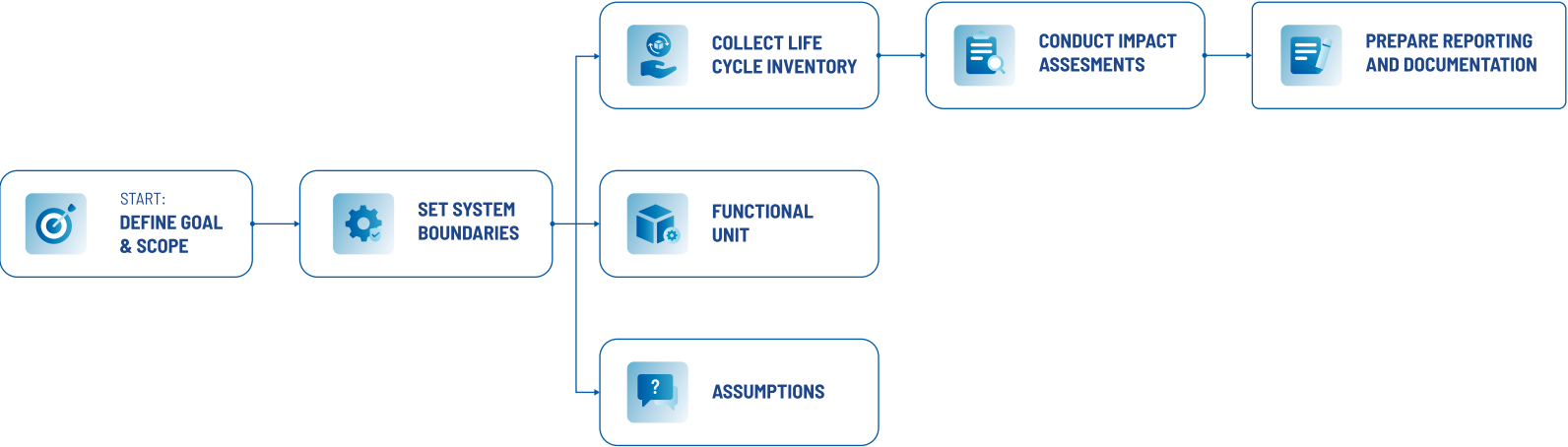
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Pacific Certifications Describe in a Graphical Way What are the Requirements of ISO 14067⁵¹

They must begin by clearly defining the functional unit and system boundaries for each product, ensuring that the scope of analysis is both precise and relevant. A comprehensive life cycle inventory must then be conducted to quantify all energy and material flows associated with the product. Greenhouse gas (GHG) emissions identified during this process are converted into CO₂ equivalents using recognized global warming potentials (GWP). Where products share inputs or outputs, consistent allocation rules must be applied. It is essential to document all assumptions, exclusions, and modelling choices to maintain clarity and reproducibility. Data quality is upheld through a focus on transparency, representativeness, and completeness. Organizations are also required to provide full CFP reports, with the option of third-party review or independent verification to enhance credibility. Finally, CFP values should be continuously updated in response to new data, improved methodologies, or changes in product design, ensuring that the assessment remains accurate and relevant over time.



⁵¹ Pacific Certification - Inspection & Certification (n.d.)

Direct Users

The users of this Standard include manufacturers, product designers, environmental consultants, sustainability managers, certification bodies, regulatory authorities, and organizations seeking to assess, communicate, or improve the climate impact of their products. These stakeholders use the standard to measure greenhouse gas emissions associated with products, support environmental claims, inform product development, and comply with sustainability reporting requirements.

Benefits⁵²

- **Reduced Carbon Footprint:** Quantifiable reductions in the carbon footprint of Moldex's plastic pallets, supporting Malaysia's climate goals and the company's own sustainability targets.
- **Resource Efficiency:** Increased use of recycled plastics, reduced energy consumption, and optimized logistics, leading to lower environmental impact.
- **Market Access and Reputation:** Enhanced access to export markets and improved brand reputation, as buyers increasingly demand third-party verified climate credentials.
- **Cost Savings:** By pinpointing and addressing carbon hotspots, organizations can optimize resource use, leading to significant cost reductions through lower energy consumption and minimized waste.
- **Industry Shift:** The certification process encourages other Malaysian plastics producers to adopt green practices, contributing to sector-wide improvements and innovation.

Monitoring Protocols

- **Post-Certification Audits:** BSI as well as SIRIM QAS International conducts regular audits, including site inspections and data verification, to confirm ongoing adherence to certification requirements.
- **Internal Monitoring:** Moldex tracks energy use, material inputs, and emissions using digital systems, enabling real-time performance management.
- **Industry Self-Regulation:** Moldex and other certified companies are encouraged to conduct internal audits and quality checks to maintain high standards.
- **Stakeholder Feedback:** Mechanisms for customer and supply chain feedback support ongoing improvement and transparency.
- **Public Reporting:** Certified companies often publish their carbon footprint results to build trust with stakeholders and demonstrate leadership.

Current State and Market Uptake

- In 2022, approximately 26% manufacturing companies in Malaysia⁵³ reported their carbon footprint⁵⁴. Moldex Manufacturing's success to leverage ISO14064-1 and ISO14-67 certification for growth and create competitive advantage⁵⁵ is expected to drive further industry shift.

⁵² Safdie (2024)
⁵³ These organisations have however not sought 3rd party certification for their report.
⁵⁴ Ibrahim et al. 2024.
⁵⁵ Bernard Business Consulting 2025.



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CASE STUDY 6.

Development and Application of the Triman Logo (France)

Triman Logo – France



The Triman Logo was introduced in France in 2015 as a mandatory recycling symbol to guide consumers in sorting and recycling products and packaging. It is part of the country's broader environmental strategy under the AGECL Law (Anti-Waste Law for a Circular Economy), which aims to reduce waste and promote a circular economy⁵⁶. The logo is complemented by the Info-Tri system, which provides detailed sorting instructions for consumers⁵⁷.

The requirement to label products with the Triman Logo has been incorporated into the French Environmental Code (Article L541-9-3) and came into effect on 1 January 2022. The Triman Logo is mandatory for all recyclable household packaging, textiles, footwear, furniture, tyres, and paper products that are intended to enter household waste. Additionally, as of 1 January 2022, the Triman regulations have been extended to include electronic devices, batteries, and related items⁵⁸. Its goal is to simplify waste sorting, increase recycling rates, and reduce landfill waste.

⁵⁶ Ellen MacArthurFoundation (2021)

⁵⁷ Re_fashion (2022)

⁵⁸ ecosistant (2022)

Support from Central or Local Governments

The implementation of the Triman logo and associated “info-tri” (sorting information) system in France is carried out through coordinated responsibilities across several ministries and agencies:

- The Ministère de la Transition écologique (Ministry of Ecological Transition) leads the regulatory development of product- and packaging-waste sorting requirements and the circular economy strategy. Under the provisions of the AGECL Law (Law n° 2020-105 of 10 February 2020) and the Environmental Code (Article L. 541-9-3 et seq.), it defines the need for a mandatory symbol and sorting instructions
- The Ministère de l'Économie et des Finances (Ministry of Economy & Finance) participates in approving the graphic charter for the “info-tri” label in conjunction with the Triman logo (e.g., it co-validated the harmonised “Sorting Info” design for household packaging)
- The ADEME (the French Environment & Energy Management Agency) supports technical guidance, publishes user-manuals and monitors implementation of labelling and consumer-information requirements
- Producers, importers and distributors (i.e., economic operators placing products on the French market) are responsible for affixing the Triman logo and sorting instructions on packaging, as per the Environment Code and associated decrees (e.g., Decree n° 2021-835 of 29 June 2021)
- The eco-organisations under the Extended Producer Responsibility (EPR) framework – such as CITEO for packaging – work with manufacturers and the public authorities to define sector-specific sorting instructions and to raise consumer awareness
- The state regulatory authorities enforce compliance: for example, failure to include the required labelling may lead to administrative sanctions under Article L. 541-9-4 of the Environmental Code

In practice, this means that the Ministry of Ecological Transition sets policy direction and regulatory obligations; the Ministry of Economy & Finance endorses the labelling design and monitors market-impact aspects; ADEME issues technical guidance; eco-organisations operationalise the EPR systems and interface with industry and consumers; and industry actors must implement the labelling obligations in their packaging, with the government holding oversight and enforcement authority.



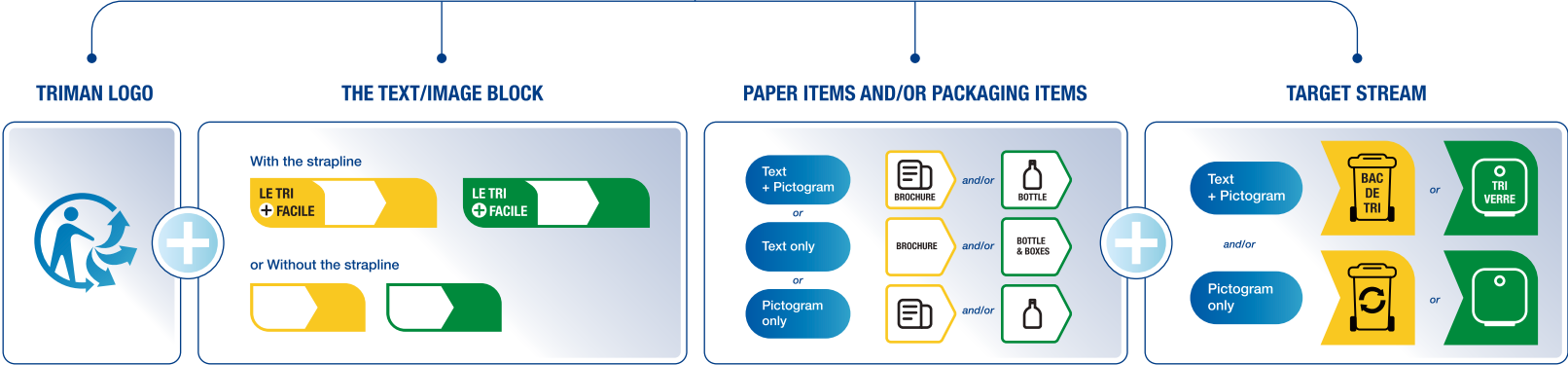
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COMPONENTS OF TRIMAN LOGO

4 ELEMENTS TO BE INCLUDED



The Triman Logo is considered as a cornerstone of France's recycling and waste management strategy, demonstrating the effectiveness of clear labelling and government-backed initiatives. The Triman Logo can serve as a model for other nations seeking to enhance their waste management systems.

⁵⁹ CITEO (2023)

⁶⁰ CITEO (2023)

The components of the sorting info marking (source: citeo.com⁽⁵⁹⁾)

EXAMPLE



The components of the sorting info marking (source: citeo.com⁽⁶⁰⁾)



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Indications of the applicable costs

The implementation of the Triman Logo involves costs primarily borne by producers. Exact costs are not available online.

- **Packaging Updates:** Companies must redesign packaging to include the logo and Info-Tri instructions.
- **Administrative Costs:** Businesses must ensure compliance with labelling regulations.

⁶¹ CITEO (2023)

Technical Requirements

The implementation of the Triman Logo and its associated sorting instructions is governed by specific regulations and guidance documents, ensuring standardisation and clarity for both producers and consumers. Key requirements include:

- **Design:** The Triman Logo features a human figure with three arrows forming a circular shape, symbolising recyclability. The design specifications, including dimensions and proportions, are outlined in the French Environmental Code (Article L541-9-3) and further detailed in guidance documents issued by several organisations such as CITEO⁶¹. Any alterations to the logo's design are prohibited to maintain consistency.
- **Placement:** The logo must be clearly visible on the product, its packaging, or accompanying documentation. For small packaging or space-constrained products, digital alternatives, such as QR codes linking to sorting instructions, are permitted.
- **Sorting Instructions:** The Triman Logo must be accompanied by Info-Tri, a system of sorting instructions that guides consumers on how to properly dispose of each component of the product or packaging. The content and format of these instructions are regulated by eco-organisations like CITEO or Valobat and are tailored to the specific materials and their recyclability

Direct Users

The users of the Triman logo include manufacturers, importers, and distributors of products and packaging subject to sorting and recycling requirements, as well as retailers who place such products on the French market. Regulatory authorities oversee compliance, while consumers rely on the logo for guidance on proper sorting and recycling.



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Benefits

- **Commitment to Recycling and Environmental Responsibility:** the logo serves as a prompt for consumers to think green, indicating that this product's packaging material is recyclable and should be disposed of correctly⁶².
- **Increased Recycling Rates:** The Triman Logo facilitates to improve recycling rates in France by clear sorting instructions provided alongside the logo. This will help France to achieve the recycling rate of non-hazardous non-mineral waste by 65% by 2025⁶³.
- **Support for a Circular Economy:** The Triman Logo is a key element of France's circular economy strategy, ensuring that recyclable materials are properly collected and reintegrated into production cycles. This reduces reliance on virgin materials and supports sustainable resource management.
- **Economic Benefits:** The implementation of the Triman Logo under the EPR framework has generated funding for recycling infrastructure.

Monitoring Protocols

The French government ensures compliance through:

- **Audits:** Compliance with Triman and Info-Tri obligations is monitored and enforced through France's EPR system, DGCCRF (Direction générale de la concurrence, de la consommation et de la répression des fraudes) — the French consumer protection and fraud control authority under the Ministry of Economy and Finance — conducts market inspections and audits to ensure that producers and importers display the Triman logo correctly and comply with labelling rules. DGCCRF inspectors can demand proof of compliance, inspect packaging, and issue administrative fines for non-conforming products.
- **Reporting:** All producers placing packaging on the French market must first register with ADEME to obtain an Identification Number (IDU), which confirms compliance with national EPR obligations. They must then join a PRO, such as CITEO, and declare annually the types, quantities, and materials of packaging placed on the market. These declarations, submitted through the PRO's online portal, determine the eco-contributions (fees) owed. Fees are eco-modulated based on design criteria such as recyclability and the use of recycled content.
- **Penalties for Non-Compliance:** Articles L.541-9-4 and R.541-192 establish penalties for failing to display the Triman logo or sorting information (Info-Tri) on packaging, products, or accompanying materials. Non-compliant producers may face administrative fines up to €15,000 per infraction for legal entities, and up to €3,000 for individuals. Each product type or batch sold without proper labelling can be treated as a separate offence, so the penalty can be rather heavy.

Current State and Market Uptake

- 90% of French citizens recognize the logo and associate it with trust⁶⁴
- Increase in recycling volumes per capita between 2017 and 2023 by 37%⁶⁵ indicating more recycled materials per person
- Around 26% decrease in packaging waste ending in household residual waste⁶⁶. The significant reduction signifies the role of clear labeling and regulatory mandate in reducing sorting errors.

⁶² Cutler (2024)
⁶³ Statistical Data and Studies Department (2021)
⁶⁴ Helmut Minor 2025.
⁶⁵ Helmut Minor 2025.
⁶⁶ Helmut Minor 2025.



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CASE STUDY 7.

Application of ASTM D7611 - Standard for Resin Identification Codes (Global, United States)

ASTM D7611 Standard for Resin Identification Codes (RIC)⁶⁷

The **ASTM D7611** Standard, titled Standard Practice for Coding Plastic Manufactured Articles for Resin Identification, serves as a framework for marking plastic products with a Resin Identification Code (RIC). This system categorizes plastics into seven primary resin types, such as polyethylene terephthalate (PET), high-density polyethylene (HDPE), and others, to aid in their identification and sorting for recycling.

The standard was originally developed by the **Society of the Plastics Industry (SPI)** in 1988, then adopted and modernized by **ASTM International** starting in 2010. The system was later revised to replace the “chasing arrows” symbol with a solid equilateral triangle to better focus on resin identification rather than recyclability. ASTM D7611 is managed by Subcommittee D20.95 on Recycled Plastics, under ASTM Committee D20 on Plastics.

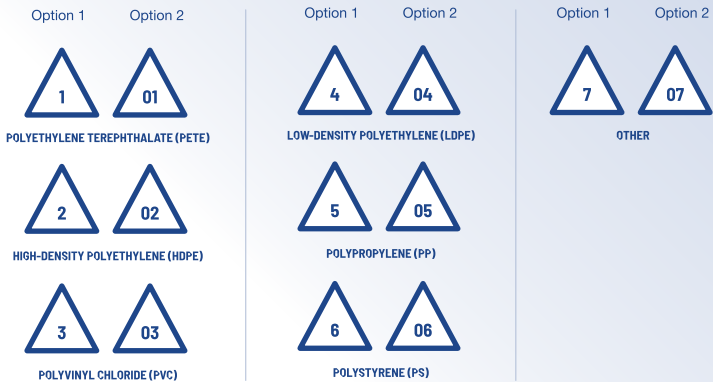
There is no federal regulation in the United States that mandates the use of the Resin Identification Code (RIC) or compliance with ASTM D7611/D7611M, the standard that establishes the requirements for the RIC system. However, several states, including California, have enacted laws requiring the use of RICs on certain products, such as plastic bottles⁶⁸.

⁶⁷ ASTM (2013); 3M Packaging Solution (2006)
⁶⁸ Shen (2023)

RIC (FORMER VERSION)



RIC (CURRENT VERSION)



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No ASEAN country has formally adopted ASTM D7611 as a national or regional standard for resin identification, according to available documentation and regional practices. Although not formally adopting ASTM D7611 the standard is being used voluntarily by large brand owners. Nevertheless, in general, most ASEAN countries rely on ISO-based standards such as ISO 11469 (for material marking) and ISO 15270 (for recycling and recovery of plastics). For example, **Thailand's TIS 11469**, which incorporates ISO 11469, mandates the marking of plastic products with abbreviations for material type, such as PET or HDPE, to aid in recycling and sorting processes. Similarly, the **Philippines** utilizes **PNS ISO 11469**, which is also derived from ISO standards, to ensure plastic materials are clearly marked, making them easier to identify and process for recycling. While these standards do not replicate the numerical coding system of ASTM D7611, they serve a similar function by facilitating material traceability and supporting recycling efforts.

The key difference lies in the approach: while ISO 11469 focuses on using standardized abbreviations for material identification, ASTM D7611 uses a simple numerical coding system (1–7) combined with a triangular symbol to classify resins. This distinction means that ASTM D7611 is more focused on simplifying resin identification for sorting at the product level, whereas ISO standards emphasize broader material marking and system-level traceability. As a result, while the ISO standards are widely adopted in ASEAN due to their global alignment, ASTM D7611 remains unique in its focus, with potential to complement these frameworks if integrated into regional practices.

The adoption of ASTM D7611 across ASEAN could unify resin identification processes, simplify cross-border recycling, and align with international trade practices. For instance, countries like Thailand and the Philippines, which already use ISO-based labeling systems, could benefit from integrating ASTM D7611's simple numerical coding system (1–7) alongside their existing frameworks to enhance regional harmonization. The globally recognized nature of ASTM D7611 could also support exports to markets like the U.S., where the system is widely understood and utilized. However, challenges remain, including the current reliance on ISO-based standards like ISO 11469 and ISO 15270, which are already embedded in national policies and systems. Transitioning to ASTM D7611 would require significant investments in retraining and infrastructure updates, which vary in sophistication across ASEAN countries. To address these barriers, a hybrid approach that combines ASTM D7611 with existing ISO standards, phased implementation, and regional coordination could be pursued, supported by educational campaigns to ensure stakeholder acceptance and public understanding.

Support from Central or Local Governments

The adoption and implementation of ASTM D7611 in the United States is supported by state-level regulations and initiatives, as the system plays a critical role in resin identification for waste management and recycling. While no federal mandate exists for the use of ASTM D7611 or Resin Identification Codes (RICs), at least 36 states have enacted laws requiring the use of RICs for plastic products like bottles and rigid containers. These regulations often reference the RIC system, which is standardized under ASTM D7611, though some states do not explicitly mention the ASTM standard itself.

States with Mandatory RIC Regulations

- **California:** Under California Public Resources Code (Cal. PRC 18015)⁶⁹, rigid plastic containers and bottles must be labeled with appropriate RICs. These codes facilitate compliance with state recycling laws and support the effective sorting of materials.
- **Florida**⁷⁰: Florida law (Fla. Stat. § 403.708) mandates RIC labeling on single-use rigid plastic containers and bottles. The law ensures that labels include both the resin code number and the corresponding resin abbreviation, such as "1 PETE" for polyethylene terephthalate.
- **New Jersey(Justia Law, 2020):** New Jersey requires plastic bottles and containers to display RICs, specifying both the resin number and abbreviation (e.g., "2 HDPE" for high-density polyethylene), aligning with ASTM D7611 codes.

Other States Promoting RICs

- States like Minnesota and Washington encourage the use of RICs to achieve sustainability objectives. While not explicitly referencing ASTM D7611, these states support resin identification to improve waste management and recycling efficiency.

Local Government Role

Many local governments incorporate RIC systems, as outlined in ASTM D7611, into their municipal recycling programs. By requiring proper labeling, local authorities facilitate accurate sorting and improve the quality of recycled materials. This also helps reduce contamination in recycling streams and supports broader waste reduction goals.

⁶⁹ Justia Law (2024)

⁷⁰ The Florida Senate (2019)



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Indications of the applicable costs

Cost for firms:

- **Tooling and Mold Adjustments:** Common costs for modifying or replacing injection molds in industrial manufacturing. Mold modification costs depend on the size and complexity of the mold, as well as the number of products that require updates.
- **Labeling Costs:** Printing and material costs for labels are relatively low in large production runs. This estimate is derived from average costs in packaging and labeling industries (estimated to be around \$0.01 to \$0.05 per item.)
- **Compliance audits:** Costs for compliance audits depend on whether they are conducted internally or by third party auditors. Third-party certifications for environmental or quality standards like ISO 14001 typically fall within a range of \$500 to \$5,000 per year.
- **Transition costs:** Rebranding and redesigning packaging to meet new standards often involve significant costs, especially for firms with diverse product lines. These costs include graphic design, communication, and transition planning.

Costs for Government:

- **Monitoring and Enforcement:** Costs of deploying inspectors, conducting facility audits, and maintaining compliance programs.
- **Investment in infrastructure (to sort and recycle products with RIC):** Advanced sorting technologies, such as optical sorting machines for plastics, are expensive but critical for effective recycling systems. The costs for this depend on the infrastructure already available.
- **Policy Development:** Costs for drafting regulations, stakeholder consultations, and public awareness campaigns.

Technical Requirements

- The technical requirements under ASTM D7611 include:
- Symbols must be **molded, imprinted, or raised on all rigid plastic containers large enough** to accommodate the minimum symbol size.
 - The marking consists of a **solid-line equilateral triangle with a number (1-7) for the resin type and an acronym (e.g., PET, HDPE) below the triangle.**
 - Symbols must be **legible and placed in non-conspicuous locations to avoid misleading environmental claims.**

Direct Users

The users of this Standard include plastic manufacturers, packaging producers, recyclers, waste management companies, product designers, regulatory authorities, and certification bodies. These stakeholders use the standard to identify and sort plastic materials efficiently, facilitate recycling processes, ensure compliance with labelling requirements, and support sustainable waste management practices.



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Benefits

Improved Recycling Efficiency:

- The RIC system provides clear identification of plastic resin types, enabling better sorting and processing of recyclable materials.
- Reduces contamination in recycling streams, which improves the quality of recycled plastics and increases their market value.

Support for Circular Economy:

- Facilitates the reuse of materials by ensuring plastics are correctly identified and directed to appropriate recycling pathways.
- Encourages the use of mono-material designs, which are easier to recycle compared to multi-layer or composite plastics.

Reduction in Plastic Waste:

- Helps divert plastics from landfills and incineration by promoting proper recycling.
- Reduces environmental pollution, including marine plastic waste, by streamlining waste recovery processes.

Consumer Education and Awareness:

- The RIC symbols raise consumer awareness about plastic types and encourage responsible disposal and recycling behavior.

Import to pay attention to misleading environmental claims

- Consumers often misinterpret the Resin Identification Code (RIC) as a recyclability symbol, especially when it was historically associated with the “chasing arrows” design.
- Incorrect labeling or positioning of terms like “recyclable” near the RIC symbol can lead consumers to believe that all items bearing the code are always recyclable, which is not true. Recycling depends on local infrastructure and the type of product, not just the resin type.
- If terms like “recyclable,” “biodegradable,” or “compostable” are printed close to or alongside the ASTM D7611 codes, companies run the risk of violating truth-in advertising laws (The **U.S. Federal Trade Commission's (FTC) Green Guides** require that environmental claims must be substantiated and not misleading.)
- The FTC has explicitly recommended placing the RIC in a non-conspicuous location to avoid conveying a “recyclability” message.



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Monitoring Protocols

Compliance with ASTM D7611 is monitored through audits conducted by manufacturers and suppliers. Suppliers are required to update codes and acronyms if the resin used in a product changes. Additionally, ASTM International encourages contributions from stakeholders to continuously improve the standard. While there is no centralized enforcement body, compliance is often driven by regulatory requirements and industry practices.

- **State-Level Oversight:** In states like **California**, regulators monitor compliance with laws that mandate the use of RICs on certain plastic products. California's Public Resources Code specifies the format of the RIC, requiring a number inside a triangle and accompanying letters below the symbol. Regular audits and inspections ensure manufacturers meet these requirements.
- **Labeling Guidelines:** ASTM D7611 stipulates that RICs must not imply recyclability. States enforce this by ensuring the symbol is used solely for resin identification. The standard prohibits environmental claims like "recyclable" from appearing near the RIC to prevent misleading consumers.
- **Industry Cooperation:** Manufacturers and recyclers are often required to submit documentation proving compliance. For example, plastic bottles must feature a correct RIC code molded or imprinted on the product, which is verified during inspections.

Challenges in Enforcement

- **Legacy Labeling:** Some older products still use the outdated “chasing arrows” symbol instead of the updated solid triangle required by ASTM D7611. States with older laws may allow these symbols to persist, creating inconsistencies in enforcement.
- **Misinterpretation of RICs:** Despite ASTM D7611's clarification that RICs indicate resin type and not recyclability, some manufacturers and consumers continue to misinterpret the symbol. States must conduct public education campaigns to address this confusion.

Current State and Market Uptake

- In the United States: ASTM D7611 is widely used and supported by state regulations, covering a majority of states that mandate RIC labeling, especially on bottles and rigid plastics. It plays a critical role in recycling infrastructure and public education.
- In ASEAN: No formal adoption exists; most countries rely on ISO standards (e.g., ISO 11469). Large brands voluntarily use ASTM D7611 but widespread regional adoption faces challenges due to entrenched ISO use, costs, and infrastructure divergence. A hybrid integration approach could foster harmonization and enhance regional recycling practices, supporting trade with ASTM D7611-using markets⁷¹.

⁷¹ OECD



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CASE STUDY 8.

Label-Free Bottles Initiative (Thailand)

Label-Free Bottles Initiative in Thailand

On 6th February 2025 the Ministry of Public Health proposes to allow voluntary “label-free” techniques (e.g., embossing, engraving) and digital labelling (e.g., QR code) to provide all mandatory information for food. This would allow avoiding the use of paper labels, adhesives and inks, making recycling easier and more effective. The Thai Industrial Standards (TIS), responsible for developing standards for plastic containers for drinking water and food, hasn’t developed a “label-free” standards per se yet, but the existing standards set the technical baseline (materials, performance, markings) that any label-free design must meet to reflect new formats

CP Group affiliates, such as CPAXtra and CP ALL have showcased label-free (or low-ink/laser-marked) bottled water pilots as sustainability initiatives, while beverage brands like Singha have publicly promoted label-free bottled water in Thailand, helping normalize the concept with consumers.

Overall, Thailand has undertaken a significant step towards sustainability by advocating the adoption of label-free polyethylene terephthalate (PET) bottles, aligning with the country’s broader Bio-Circular-Green (BCG) Economy Model. The initiative promotes packaging circularity by eliminating conventional labels, thus simplifying the recycling process and significantly reducing contamination during recycling, enhancing both efficiency and effectiveness of material recovery

The initiative primarily involves producing plastic bottles without printed labels or shrink sleeves. This simple but impactful change increases the recyclability of PET bottles by reducing contamination during sorting and eliminating the need for label removal during recycling processes. It aligns with global trends pushing for minimalist, monomaterial packaging that supports high-quality mechanical recycling. In December 2024, the Thai Food and Drug Administration (FDA) and the Department of Pollution Control (DPC) collaborated on draft amendments that would allow the use of embossing, laser printing, and QR codes for product information on label-free bottles, eliminating the need for printed labels^{72, 73}.

Support from Central or Local Governments

Thai Industrial Standards Institute (TISI): Operating under the Ministry of Industry, TISI is actively involved in formulating mandatory national standards, including new guidelines specifically addressing the sustainable packaging of plastic containers for drinking water. This support includes technical and regulatory frameworks ensuring compliance with quality and safety standards⁷⁴. In March 2023, the Federation of Thai Industries (FTI) and TISI jointly introduced national packaging guidelines encouraging the use of clear PET over colored bottles, as clear PET commands significantly higher market prices and improves recyclability⁷⁵.

- **Ministry of Natural Resources and Environment (MONRE):** MONRE champions sustainability through its Plastic Waste Management Roadmap (2018-2030), explicitly promoting recycling-friendly design practices and waste reduction initiatives⁷⁶.
- **Department of Pollution Control (DPC):** The DPC plays a crucial role in setting and enforcing policies aimed at the elimination of plastic waste imports by 2025, bolstering domestic recycling infrastructure and creating a robust market for recyclable packaging solutions⁷⁷.
- **Local Government Units (LGUs):** Municipal and provincial authorities have been instrumental in facilitating local implementation through community engagement, public-private partnerships, and comprehensive recycling education and awareness campaigns.

⁷² Leatherhead Food Research (2025b)
⁷³ Yilia Ye (2024)
⁷⁴ SGS (2014)SGS (2024)
⁷⁵ THE nation (2023)
⁷⁶ Enviliacne ASIA (n.d.)
⁷⁷ SWEAP (2023)



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Indications of the applicable costs

- **Redesign and Production Costs:** Transitioning to label-free PET bottles requires significant initial investments, including redesigning molds and integrating advanced printing technologies for direct application of product information onto bottles or caps. These adjustments necessitate upgrades to existing manufacturing and packaging processes^{78, 79}.
- **Compliance and Certification Costs:** Adherence to stringent safety and quality standards necessitates considerable investment in laboratory testing, certifications, and monitoring to meet national and international regulatory requirements, particularly those proposed by TISI⁸⁰.
- **Consumer Education and Marketing Costs:** Given the departure from traditional packaging conventions, substantial efforts and expenditures in consumer education, marketing, and branding strategies are necessary to ensure consumer acceptance and mitigate any potential market risks associated with the adoption of innovative packaging formats⁸¹. While cost savings from eliminating adhesive labels are promising, most manufacturers are still evaluating long-term cost-effectiveness through pilot projects and recyclability studies⁸².

Technical Requirements

- **Direct Printing Requirements:** Essential consumer and regulatory information, including production dates and barcodes, must be directly etched or printed onto the bottle or cap surfaces to ensure traceability without hindering recyclability^{83, 84}.
- **Monomaterial Bottle Design:** Strict guidelines mandate the exclusive use of clear PET without supplementary materials such as adhesives, inks, or additional labels, facilitating seamless recycling and maximizing material recovery efficiency⁸⁵.
- **Material Durability and Stability:** Label-free bottles are required to maintain structural integrity, ensuring product safety and shelf-life stability across varied climatic conditions prevalent in Thailand. Robust material testing protocols are crucial to guarantee compliance with these performance standards⁸⁶.

Direct Users

The users include beverage manufacturers, packaging producers, retailers, recyclers, waste management companies, regulatory authorities, and environmental organizations. These stakeholders are responsible for designing, producing, distributing, collecting, and managing label-free bottles, ensuring compliance with sustainability goals, and promoting the initiative to reduce packaging waste and enhance recycling efficiency.

⁷⁸ ChemLinked (2024)
⁷⁹ Leatherhead Food Research (2025a)
⁸⁰ SGS (2024)
⁸¹ Khaosod (2024)
⁸² Leatherhead Food Research (2025a)
⁸³ ChemLinked (2024)
⁸⁴ Leatherhead Food Research (2025a)
⁸⁵ Saladplate (2023)
⁸⁶ Leatherhead Food Research (2025a)



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Benefits

Environmental Benefits:

- The removal of labels significantly reduces contamination, thus improving the quality and efficiency of recycling processes, contributing directly to the circular economy by producing higher-quality recycled PET (rPET)⁸⁷
- Simplification of waste sorting processes enhances the operational efficiency of Material Recovery Facilities (MRFs), further supporting the establishment of effective closed-loop recycling systems^{88, 89}.

Socioeconomic Benefits:

- Encourages innovation within the packaging industry, positioning Thailand as a regional leader in sustainable packaging solutions and potentially increasing its global market competitiveness⁹⁰.
- Responds to growing global consumer demand for environmentally sustainable products, opening new markets and economic opportunities for Thai businesses⁹¹.

Monitoring Protocols

- **Standard Compliance Testing:** Label-free PET bottles must undergo rigorous testing to meet national and international safety standards. Accredited testing facilities, including SGS Thailand and TISI, play crucial roles in this compliance process^{92, 93}.
- **Regulatory Compliance on Labelling:** Products must adhere strictly to regional trade standards (ASEAN, WTO) and domestic labelling requirements, ensuring comprehensive consumer information dissemination and regulatory compliance^{94, 95}.
- **Market Feedback and Recyclability Assessments:** Ongoing evaluations, including consumer acceptance studies and recyclability audits, are essential for monitoring initiative success and making data-driven adjustments as necessary⁹⁶.

⁸⁷ Saladplate (2023)
⁸⁸ ChemLinked (2024)
⁸⁹ Enviliacne ASIA (n.d.)

⁹⁰ Bangkok Post (2024)
⁹¹ Chung Hua Institution for Economic Research (2024)
⁹² SGS (2024)

⁹³ Labels & Labeling (2025)
⁹⁴ World Trade Organization (2025)
⁹⁵ RYT9 (2024)

Monitoring Protocols

Recommendations for Improved Monitoring Protocols

- **Development of Specialized Testing Standards:** Establish and implement dedicated regulatory standards for label-free PET packaging, emphasizing comprehensive assessments of printing durability, readability, and recycling compatibility.
- **Public Education and Engagement Initiatives:** Intensify awareness campaigns and educational initiatives aimed at consumers to enhance understanding of the benefits and proper disposal practices associated with label-free packaging.
- **Lifecycle Assessment Integration:** Systematically incorporate lifecycle assessments (LCAs) to evaluate and compare environmental impacts comprehensively between label-free packaging and conventional PET bottles, facilitating informed decision-making and policy development.

Existing Testing and Industry Responses

- **SGS Thailand:** Provides established testing services for PET packaging compliance with international standards, such as ISO 14855 and EN 13432, although exclusive testing protocols for label-free packaging have yet to be fully developed and implemented⁹⁷.
- **Industry Innovation:** Initiatives like the launch of SIG's DomeMini carton bottles highlight the industry's proactive response to consumer demand for sustainable packaging alternatives, demonstrating market readiness and commitment to ecological sustainability⁹⁸.

Current State and Market Uptake

- The initiative's full environmental and economic potential depends on coupling label removal with recycled-content mandates/incentives, investment in recycling infrastructure, market development for rPET, and supportive social/policy measures to protect livelihoods and ensure equitable transitions.

⁹⁶ Khaosod (2024)
⁹⁷ Labels & Labeling (2025)
⁹⁸ Khaosod (2024)

⁹⁹ Benyathiar et al. 2022; Samitthiwetcharong et al. 2023; Ding and Zhu 2023.



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CASE STUDY 9.

ASEAN Cosmetic Directive (ACD) (ASEAN)

ASEAN Cosmetic Directive (ACD)¹⁰⁰

The ASEAN Cosmetic Directive (ACD) is a landmark regulatory framework adopted in 2003 by the 10 AMS. The directive aims to harmonize the regulation of cosmetic products across the region, ensuring consumer safety, enhancing product quality, and facilitating the free movement of cosmetics within ASEAN. Fully implemented by 2008, the ACD aligns with international standards, particularly the European Union's Cosmetic Directive, making it a globally recognized framework.

The ACD replaced pre-market approval systems with a Product Notification System, allowing faster market access while maintaining oversight. It also established common technical requirements for ingredients, labelling, and manufacturing practices, ensuring uniformity across the region. This harmonization has bolstered trade, improved regulatory efficiency, and strengthened ASEAN's position as a unified economic bloc.

The ACD is an example of how regional harmonization can create a win-win situation for governments, businesses, and consumers. By establishing uniform technical requirements, streamlining regulatory processes, and fostering collaboration, the ACD has enhanced consumer safety, boosted intra-ASEAN trade, and strengthened the region's global competitiveness. Its focus on sustainability and robust monitoring protocols further ensure that the directive remains relevant and impactful in the long term.

¹⁰⁰ ASEAN Secretariat (2006)

Support from Central or Local Governments

The success of the ACD has been largely driven by strong support from AMS governments:

- **Commitment to Regional Integration:** AMS governments prioritized the ACD as a key initiative under the ASEAN Economic Community (AEC) blueprint, which aims to create a single market and production base in the region.
- **Capacity Building:** Governments provided training and technical assistance to regulatory authorities and industries, ensuring smooth implementation. For example:
 - Workshops on Good Manufacturing Practices (GMP).
 - Training on the use of the Packaging Recyclability Evaluation Portal (PREP) for assessing product compliance.
- **Regulatory Alignment:** National regulatory bodies aligned their domestic laws with the ACD, ensuring uniform enforcement across the region.
- **Industry Engagement:** Governments actively collaborated with industry stakeholders, including multinational corporations and Small and Medium Enterprises (SMEs), to ensure the directive was practical and beneficial.

This collaborative approach demonstrated political will and a commitment to consumer protection, fostering trust among stakeholders.



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Indications of the applicable costs

For Governments:

- **Initial Costs** (Training regulatory officials on the ACD's requirements, developing infrastructure for the Product Notification System, and Conducting public awareness campaigns to educate stakeholders)
- **Ongoing Costs** (Monitoring compliance and enforcing regulations, coordinating with other AMS to ensure consistency)

For Businesses:

- **Compliance Costs** (reformulating products to meet ingredient restrictions and technical requirements, updating packaging and labelling to align with ACD standards)
- **Notification Fees:** Companies must pay nominal fees to notify regulatory authorities about their products. These fees vary by country but are generally affordable, especially for SMEs.
- **Training and Certification:** Businesses invested in training staff and obtaining GMP certifications to comply with manufacturing requirements.

While these costs posed initial challenges, the streamlined regulatory environment and expanded market access under the ACD have significantly benefited businesses, especially those operating regionally.

Technical Requirements¹⁰¹

The ACD established uniform technical requirements to ensure product safety and quality. These include:

- **Definition and Scope of Cosmetic Products:** The ACD strictly defines what constitutes a cosmetic product and ensures that only products meeting this definition and falling within the regulatory scope can be marketed in ASEAN, providing clarity and consistency for both industry and regulators.
- **Ingredient Compliance:** All ingredients used in cosmetic products must comply with ASEAN's regularly updated lists of prohibited, restricted, and permitted substances, reflecting international safety standards and scientific assessments to ensure consumer protection.
- **Comprehensive Labeling:** Cosmetic products must display detailed labeling, including the product name, intended function, complete ingredient list, manufacturer or importer details, batch number, expiry date, and necessary warnings, all in a language understood by consumers in the market where the product is sold.
- **Good Manufacturing Practice (GMP):** Manufacturing of cosmetics must adhere to ASEAN Good Manufacturing Practice guidelines, requiring companies to maintain robust quality management systems, hygienic facilities, and well-trained staff to guarantee safety and product consistency.
- **Product Notification and Registration:** Before entering the market, each cosmetic product must be notified to or registered with the relevant national regulatory authority, with companies providing comprehensive documentation such as the product formula, certificates, and evidence for any product claims.
- **Post-Market Surveillance and Record-Keeping:** Ongoing compliance is enforced through post-market surveillance, internal audits, and meticulous record-keeping, with companies required to maintain accessible technical and safety information for regulatory review at any time.

¹⁰¹ Ad Standards Council (2023); ASEAN Cosmetics Association (2019)



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Direct Users

The users include cosmetic manufacturers, importers, exporters, distributors, regulatory authorities, testing laboratories, certification bodies, and retailers. These stakeholders utilize the Directive to ensure cosmetic products comply with safety, labelling, and quality requirements, facilitate market access within ASEAN, and uphold consumer protection standards.

Benefits

While the ACD primarily focuses on consumer safety and trade, it has also contributed to environmental benefits:

- **Promoting Sustainable Ingredients:** By restricting harmful chemicals, the ACD encourages the use of safer, more sustainable alternatives, reducing environmental pollution from cosmetic production and disposal.
- **Waste Reduction:** standardized labelling and packaging requirements have led to better recycling practices, particularly in countries with advanced waste management systems.
- **Regional Collaboration on Sustainability:** The ACD has paved the way for discussions on incorporating sustainability into cosmetic regulations, such as banning microplastics and promoting eco-friendly packaging.
- **Industry Shift Towards Green Practices:** Multinational corporations operating in ASEAN have adopted environmentally friendly practices to comply with both the ACD and global sustainability trends, influencing local businesses to follow suit.

Monitoring Protocols

• Post-Market Surveillance¹⁰²

Regulatory authorities in each ASEAN Member State (AMS) are empowered to conduct periodic and unannounced checks on cosmetic products available in the market, including audits of Product Information Files and sample testing for compliance with the ASEAN Cosmetic Directive. Authorities can take enforcement actions such as product recalls, bans, or fines in cases of non-compliance or safety risks. The shift from pre-market approval to robust post-market surveillance is a core mechanism of the ACD, ensuring ongoing product safety and regulatory compliance.

• Regional Collaboration

AMS regulatory bodies work together through the ASEAN Cosmetic Committee (ACC), which facilitates information sharing on non-compliant products, coordinates enforcement across borders, and updates the directive in response to emerging safety concerns or scientific developments. The ACC and its technical working groups meet regularly to harmonise approaches, review implementation, and strengthen cooperation among countries.

• Industry Self-Regulation

Businesses are strongly encouraged to conduct their own internal audits and quality checks, maintaining up-to-date records and ensuring their products consistently meet ACD requirements. Companies must keep technical and safety documentation readily accessible for inspection by authorities at any time.

• Consumer Feedback Mechanisms

Many AMS have established hotlines, online platforms, or other channels where consumers can report safety concerns or non-compliant products directly to authorities. Consumer complaints and reports are an important trigger for regulatory investigations and enforcement actions, helping to identify issues that may not be detected through routine surveillance.

¹⁰² Ad Standards Council (2025); ASEAN Secretariat (n.d.–d)



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Current State and Market Uptake

The ACD has been widely adopted across ASEAN, with strong industry buy-in¹⁰³:

- **Business Uptake:** Major cosmetic manufacturers-both multinational and local-integrated ACD requirements into operations, easing cross-border trade. SMEs, despite initial costs, benefited from easier market entry and reduced regulatory complexity.
- **Consumer Benefits:** Standardized labeling and safer formulations improved consumer trust and awareness.
- **Trade Growth:** Harmonization boosted intra-ASEAN trade in cosmetics, while making the region more attractive to global investors.
- **Environmental Shifts:** Restrictions on harmful chemicals and standardized packaging supported sustainability goals and encouraged green innovation.

¹⁰³ Neeranard Jinachai et al. 2016



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CASE STUDY 10.

Mutual Recognition Agreements for Food Safety Standards (ASEAN)

ASEAN Mutual Recognition Agreements (MRAs) for Food Safety Standards¹⁰⁴

The ASEAN Mutual Recognition Agreements (MRAs) for Food Safety Standards were established to foster economic integration among AMS by harmonizing food safety standards and facilitating trade in the region. These agreements aim to reduce technical barriers to trade by ensuring that certifications and standards for food safety are mutually recognized across member countries. By aligning food safety protocols, the MRAs promote trust among AMS, enhance regional food security, and improve access to global markets for ASEAN-produced food products. The MRAs cover areas such as laboratory testing, inspection, and certification of food products, ensuring that these processes meet internationally recognized standards.

Central to the development and implementation of these MRAs is the ASEAN Consultative Committee for Standards and Quality (ACCSQ). The ACCSQ plays a pivotal role in harmonizing standards across ASEAN, ensuring that MRAs are aligned with international benchmarks, and fostering collaboration among AMS. It acts as a coordinating body, facilitating the alignment of national policies with regional agreements and providing technical guidance to member states.

¹⁰⁴ ASEAN Secretariat (2018)

Support from Central or Local Governments

AMS governments have played a pivotal role in implementing and supporting the MRAs. They have provided financial and institutional backing to establish and upgrade national food safety agencies, laboratories, and inspection bodies. Collaborative training programmes have also been initiated to build the capacity of food safety professionals across the region.

Governments have worked closely with the ASEAN Secretariat to align national regulations with regional standards, ensuring consistency and compliance. Additionally, AMS governments actively engage with stakeholders, including the private sector and civil society, to encourage participation and ensure smooth implementation.



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Indications of the applicable costs

The implementation of MRAs involves several costs, which are typically borne by governments, businesses, and industry stakeholders. Key cost elements include:

- **Laboratory Upgrades:** Investment in modern equipment to meet international testing standards.
- **Training Programs:**
Building technical expertise among food safety inspectors and laboratory personnel.
- **Certification Costs:**
Businesses may incur costs for obtaining certifications that comply with MRA standards.
- **Administrative Costs:**
Governments and regional bodies bear costs for harmonisation efforts, such as drafting policies, conducting workshops, and monitoring compliance.

These costs can be reduced through promoting capacity-building initiatives and fostering regional cooperation, which enables resource sharing and reduces duplication of efforts. It is because the sector-specific ASEAN MRAs support industries by improving access to conformity assessment processes. Furthermore, the harmonisation of standards across AMS removes the necessity for repeated testing and assessments¹⁰⁵.

Technical Requirements

The MRAs outline specific technical requirements to ensure food safety and quality across the region. These include:

- **Testing Standards:** Laboratories must adhere to ISO/IEC 17025 standards¹⁰⁶ for testing and calibration competence.
- **Inspection Protocols:** Inspection bodies must comply with ISO/IEC 17020 standards¹⁰⁷ to ensure impartiality and technical competence.
- **Harmonized Regulations:** Member states must align their national food safety standards with ASEAN's harmonised standards, which are based on Codex Alimentarius Commission (CAC) (e.g. CAC/GL 62-2007, CAC/GL 27-1997¹⁰⁸) guidelines.
- **Certification Processes:** Mutual recognition of certificates issued by accredited bodies within ASEAN ensures seamless trade without redundant testing or inspections.

These requirements are designed to facilitate trade while maintaining high standards of food safety and consumer protection.

Direct Users

The users include food manufacturers, exporters, importers, regulatory authorities, certification bodies, testing laboratories, trade associations, and retailers. These stakeholders rely on MRAs to facilitate cross-border trade, ensure compliance with harmonized food safety standards, streamline certification and inspection processes, and promote consumer protection throughout the ASEAN region.

¹⁰⁵ ASEAN Secretariat (2014)
¹⁰⁶ ASEAN Secretariat (2015)
¹⁰⁷ ASEAN Secretariat (2015)
¹⁰⁸ ASEAN Secretariat (n.d.–a)



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Benefits

ASEAN MRAs for Food Safety Standards offer many benefits for food safety standards, such as:

- **Facilitation of Trade:** MRAs help eliminate technical barriers to trade by recognising the equivalence of food safety standards and conformity assessments across ASEAN member states. This reduces the need for duplicate testing and certification for products traded within the region, thus streamlining trade processes and reducing costs.
- **Harmonization of Standards:** The MRAs encourage the harmonisation of food safety standards and regulatory frameworks among ASEAN countries, making it easier for businesses to comply with a single set of requirements.
- **Efficient Resource Use:** By eliminating redundant testing and certification, MRAs save time and reduce costs for businesses from duplication in testing and certification, thus lead to more efficient use of resources.
- **Capacity Building and Collaboration:** The development and implementation of MRAs often involve collaborative efforts among member states, leading to capacity building and the exchange of best practices in food safety and regulatory standards.

Monitoring Protocols

To ensure the effectiveness of the MRAs, a monitoring protocol has been established¹⁰⁹:

- **Monitoring:** it is a section (Section 4.4) of the MRAs to regulate how the food control systems and competent authorities at national level operate.
- **Regular Audits:** Accredited laboratories and inspection bodies undergo periodic audits to ensure continued compliance with MRA standards.
- **Certification / Conformity Assessment:** The certification process and conformity assessment bodies are periodically reviewed to ensure their operations align with MRA requirements.
- **Data Sharing:** AMS share data on food safety incidents and non-compliance cases through the ASEAN Rapid Alert System for Food and Feed (ARASFF)^{110,111}.
- **Capacity Building:** Continuous training and knowledge-sharing initiatives are conducted to address emerging food safety risks and improve compliance.

Current State and Market Uptake

- The MRAs have gained traction across ASEAN, demonstrating clear benefits:
- **Trade Facilitation:** Mutual recognition has significantly reduced duplicate testing and certification, lowered costs and accelerating cross-border food trade¹¹².
 - **Resource Efficiency:** Shared conformity assessment mechanisms prevent wasted resources on repetitive procedures.
 - **Improved Institutional Capacity and Outcomes:** Food safety institutions are stronger, compliance has improved, and public health outcomes are better in places where MRAs or related regulatory harmonization is implemented¹¹³.

¹⁰⁹ ASEAN Secretariat (2018)
¹¹⁰ ASEAN Secretariat (n.d.–c)
¹¹¹ ASEAN Secretariat (n.d.–b)
¹¹² Roslee Saad
¹¹³ JICA 2023.

CASE STUDY 11.

Application of TIS 3635-2566 based on the ISO 15270:2008 to Recovery and Recycling of Plastic Waste (Thailand)

TIS 3635-2566: Guidelines for the recovery and recycling of plastic waste Notification of the Ministry of Public Health (No. 435), B.E. 2565 (2022)

The **TIS 3635-2566 standard**¹¹⁴ in Thailand is directly based on the **ISO 15270:2008 guidelines**¹¹⁵, which provide comprehensive directions for the recovery and recycling of plastic waste. This standard is maintaining identical specifications to the ISO standard and primarily uses the English version as its reference. It serves as a guideline for setting standards and desired characteristics for the recycling of plastic waste, including reuse.

The standard is used in combination with the Notification No 435 B.E. 2565 (2022), which represents an amendment of the Thai food contact legislation (Ministry of Health Notification No. 295 (2005)). Among others, the Notification authorizes the use of recycled PET for the manufacturing of bottles for water and soft drink applications, subject to safety assessment carried out by the Thai FDA. An ad-hoc Committee has been created in the Thai FDA, responsible for development and control of the quality and safety parameters of the PET recycling processes.

The regulatory environment created by these measures offers options for recycling plastic waste primarily from post-consumer sources. It outlines quality and safety requirements to be considered in the recycling process and provides general recommendations for compiling material standards, test methods, and product specifications. The process steps, requirements, recommendations, and terminology presented in this standard are intended for general application.

¹¹⁴ TISI (2023)
¹¹⁵ ISO (2008); Khaosod (2024)

Support from Central or Local Governments

Ministry of Industry (MOI)

- Thai Industrial Standards Institute (TISI): Responsible for establishing technical regulations and standards on plastic compositions and labeling. It ensures that plastic products meet specific standards before they are marketed.
- Department of Industrial Works (DOI): Manages industrial processes and controls hazardous waste by products from plastic manufacturing.

Ministry of Natural Resources and Environment (MNRE)

- Pollution Control Department (PCD): Develops the Roadmap on Plastic Waste Management for 2018-2030, focusing on reducing plastic waste and promoting recycling.
- Plastic Waste Management Sub-Committee: Establishes national plans to address plastic waste issues.

Department of Climate Change and Environment (DCCE)

- Oversees climate change-related issues and ensures compliance with international agreements.

Ministry of Commerce (MOC)

- Department of Foreign Trade (DFT): Controls the import and export volumes and specifications of plastic materials, including waste.
- Thai Food and Drug Administration: the Thai FDA is a regulatory body under the Ministry of Public Health, responsible for ensuring the safety, efficacy, and quality of food, drugs, medical devices, and cosmetics in Thailand. It enforces laws, issues approvals, monitors compliance, and promotes public health and consumer protection.



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Indications of the applicable costs

- The cost of certification for Post-Consumer Recycled (PCR) resin in Thailand involves various fees associated with the **certification, testing, and compliance processes**.
- For instance, the **Thai Industrial Standards Institute (TISI)** yields the following information for accreditation:
 - **Inspection Body Accreditation**¹¹⁶: The process involves an application fee of 1,000 Baht, a document review fee of 3,000 Baht, and an assessment fee of 5,000 Baht per man-day. This ensures that the inspection body meets the necessary standards for monitoring compliance with TIS No. 3635-2566.
 - **Certification Body Accreditation**¹¹⁷: This involves an application fee of 1,000 Baht, a document review fee of 30,000 Baht, and a certificate issuance fee of 10,000 Baht per certificate. These fees support the certification body in maintaining compliance and ensuring products meet TIS No. 3635-2566 standards.
- Furthermore, businesses may incur additional costs related to implementing the standards, such as modifying manufacturing practices, updating labeling, and ensuring comprehensive documentation. These changes are necessary to align with the standards like TIS 3636-2566, which could further influence the total cost of compliance.
- For precise and detailed cost information, consultations with TISI and the Plastics Institute of Thailand (PITH) must happen in the next months, as these organizations can provide tailored guidance based on specific certification needs.

¹¹⁶ Thai Industrial Standards Institute (n.d.–b)
¹¹⁷ Thai Industrial Standards Institute (n.d.–a)

Technical Requirements

Need for effective recovery systems, including:

- **Efficient Collection Systems:** Establishing systems for the efficient collection and sorting of plastics to ensure high-quality input for recycling processes.
- **Traceability and Conformity:** Implementing traceability systems to ensure that recovered plastics meet specific quality standards and conform to regulatory requirements.
- **Process Monitoring and Control:** Developing procedures for monitoring and controlling recycling operations to maintain quality and efficiency.
- **Development of Specifications:** Creating detailed specifications for recovered plastics, including guidelines for their use in new products.

Support available:

- TIS No. 3635-2566: Symbols for recycling plastics: By specifying symbols, sizes, and positions for recycling plastics, TIS No. 3635-2566 facilitates better identification and sorting of plastics, which is crucial for effective recycling processes. This specification helps in standardizing the recycling process, making it easier to implement and monitor.
- Plastics Institute of Thailand (PITH) has a testing and certification center as well as a certification program for Post Consumer Certified (PCR) products. One part of it is Certification and application for the label of raw materials or products containing PCR Resin is a certification to enhance the competitiveness of entrepreneurs in the recycled plastic industry. It also helps to develop the country's overall waste management system.
- The Thai FDA has published guidelines for safety assessment of processes for recycled PET in food contact applications. The scientific guidelines are reported in *"Criteria, conditions and guidelines for the evaluation of the efficiency of the production process of recycled plastics. and the safety of recycled plastic pellets for food contact materials"*, while the practical guide for applicants is reported in *"Preparation of documents and evidence for submission of test results to assess the efficiency of the production process of recycled plastics. and the safety of recycled plastic pellets for food contact materials- Manual for Industries"*.



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Direct Users

The users of this Standard include manufacturers and importers of the relevant products, distributors, retailers, regulatory authorities, certification bodies, testing laboratories, and waste management organizations. These stakeholders use the standard to ensure product compliance, facilitate certification and market access, support quality assurance, and promote safe and sustainable practices within the Thai market.

Benefits

1. Reduction in Plastic Waste:

- The adoption of TIS 3635-2566 and the associated roadmap significantly reduces the volume of plastic waste entering landfills and the environment. By promoting the recovery and recycling of post-consumer plastics, the standards aim to minimize the environmental footprint of plastic waste, particularly single-use plastics.
- Encouraging the use of recycled materials, such as PET in food-grade applications, diverts waste from landfills and reduces the accumulation of plastics in natural ecosystems, including waterways and oceans.

2. Improved Recycling Practices:

- The standard establishes clear guidelines for the recovery, sorting, and processing of plastic waste, leading to more efficient recycling systems. This results in better resource utilization, reduced energy consumption, and minimized environmental degradation.
- By setting quality and safety requirements for recycled materials, the standard ensures that recycled plastics meet high standards, reducing the risk of contamination and improving the overall sustainability of plastic products.

3. Support for Circular Economy:

- The alignment of TIS 3635-2566 with ISO 15270:2008 promotes a circular economy by encouraging the reuse of plastic materials. This reduces the demand for virgin plastics, conserves natural resources, and lowers greenhouse gas emissions associated with plastic production.
- The use of recycled PET in food-grade applications demonstrates the potential for creating closed-loop systems where materials are continuously reused, reducing the need for new raw materials.

4. Global Alignment and Trade Opportunities:

- By aligning with international standards, Thailand positions itself as a leader in sustainable waste management practices. This alignment facilitates trade opportunities by ensuring that recycled plastic products meet global market requirements, enhancing the competitiveness of Thai manufacturers.

5. Public Awareness and Participation:

- The standard promotes public awareness of proper plastic waste management through the use of standardized symbols and labeling. This helps consumers identify recyclable materials and encourages participation in recycling programs, further reducing waste at the source.

Potential Environmental and Social Risks and Impacts

1. Energy and Resource Use in Recycling:

- While recycling reduces the need for virgin plastic production, the recycling process itself can be energy and resource intensive. The collection, transportation, and processing of plastic waste require significant energy inputs, which may contribute to greenhouse gas emissions if not managed efficiently.
- The washing and reprocessing of plastics, particularly for food-grade applications, consume large amounts of water and chemicals, potentially leading to secondary environmental impacts if waste streams are not properly treated.

2. Contamination Risks:

- Improper sorting and recycling practices can lead to contamination of recycled plastics, reducing their quality and usability. Contaminated plastics may also pose health risks, particularly in food-grade applications, if safety assessments are not rigorously enforced.
- Contamination of the environment can occur if recycling facilities lack proper waste management systems for by-products or residues generated during the recycling process.



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3. Social Inequities in Waste Collection:

- The success of recycling systems often depends on informal waste collectors, who may face poor working conditions and limited access to social protection. Without formalizing and supporting these workers, the adoption of the standard could exacerbate existing social inequities in the waste management sector.
- The transition to standardized recycling practices may also marginalize small-scale recyclers who lack the resources to comply with new requirements, concentrating benefits among larger industrial players.

4. Economic Burden on Small Businesses:

- Compliance with the standard may require businesses to invest in new technologies, modify manufacturing processes, and obtain certifications, which can be costly. Small and Medium-sized Enterprises (SMEs) may struggle to bear these costs, potentially limiting their participation in the recycling market.

5. Limited Infrastructure and Capacity:

- The effectiveness of the standard depends on the availability of adequate infrastructure for collection, sorting, and recycling. In regions with limited infrastructure, the adoption of the standard may have minimal impact, and plastic waste may continue to accumulate in landfills or the environment.
- The lack of specialized facilities for testing and certifying recycled materials may delay the implementation of the standard and reduce its effectiveness.

Monitoring Protocols

ISO 15270:2008 itself emphasizes the importance of establishing efficient collection and monitoring procedures, including specific guides and specifications for recovered plastics, and rules for traceability and assessment of conformity. It must be discussed with stakeholders if these monitoring procedures are being followed in Thailand.

Support of having TIS No. 3635-2566: standardized symbols and labeling helps in the monitoring process by providing clear guidelines that can be easily checked for compliance. It ensures that all stakeholders in the recycling chain understand and follow the same standards, facilitating efficient monitoring and enforcement.

Monitoring of PET recycling authorized processes against the conditions of authorization is made possible through direct involvement of the Thai FDA and external scientific experts in Universities.

Current State and Market Uptake

- Regulatory green-light for rPET in food contact (2022) enabled higher-value end uses and catalyzed industry pilots and guidance¹¹⁸.
- Pioneering rPET for food packaging indicates regulatory acceptance and industry movement¹¹⁹.

¹¹⁸ JETRO 2025.
¹¹⁹ SGS 2024a.



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CASE STUDY 12.

SIRIM Eco-Labeling Scheme based on ISO 14024 (Malaysia)

SIRIM Eco-Labeling Scheme Malaysia¹²⁰

The SIRIM Eco-Labeling Scheme is an initiative aimed at promoting environmentally friendly products in Malaysia. This scheme is crucial for enhancing the sustainability of plastic packaging by ensuring that products meet specific environmental standards.

The SIRIM Eco-labelling mark serves as an assurance to consumers about the environmental benefits of a product, thereby influencing purchasing decisions towards more sustainable options. This initiative is based on ISO 14024, which outlines principles and procedures for Type I environmental labelling, ensuring credibility and international recognition. It encourages companies to innovate in reducing environmental impacts through design and materials choices aligned with life cycle thinking¹²¹.

¹²⁰ SIRIM QAS (2025a)

¹²¹ Global Ecolabelling Network (2024)

Support from Central or Local Governments

- **National Environment Agency (NEA):** Implements and oversees the initiative, ensuring compliance with environmental regulations and promoting sustainable practices across supermarkets.
- **Malaysian Government:** Provides policy support through frameworks like the Zero Waste Masterplan and encourages alignment with national sustainability goals.
- **Local Authorities:** Engage in awareness campaigns and support the distribution of educational materials to inform the public about the initiative's benefits.

Indications of the applicable costs

- **Operational Costs:** Supermarkets incur costs related to implementing the charge system, including updating payment systems and training staff.
- **Public Awareness Costs:** Investment in campaigns and materials to educate consumers about the charge and its environmental benefits.
- **Compliance Costs:** Supermarkets must adhere to reporting requirements, including the costs associated with tracking and auditing bag usage and proceeds.



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Technical Requirements

- Accounting systems and customer check-out stations in supermarkets need to incorporate the bag charge seamlessly.
- **Staff Training:** Employees require training to handle customer inquiries and manage the charge effectively.
- **Reporting Infrastructure:** Systems must be in place to track the number of bags sold and the allocation of proceeds, ensuring transparency and accountability. Outlets that are required to charge for bags need to display specific posters and a dedicated checkout sticker.
- **Certification Criteria and Environmental Requirements:** To achieve SIRIM Eco-Labeling certification, products must demonstrate environmental benefits through reduced material consumption, lower emissions, and enhanced recyclability or biodegradability. Certification criteria align with ISO 14024 and require comprehensive documentation, including Life Cycle Assessments (LCAs), sourcing information, manufacturing processes, and waste management protocols¹²².

Direct Users

Besides consumers, who are among the major users of the policy, stakeholders include product manufacturers, importers, retailers, certification bodies, regulatory authorities, procurement professionals, and environmental consultants. These stakeholders utilize the scheme to certify and promote environmentally preferable products, demonstrate compliance with eco-labeling standards, support sustainable procurement, and guide consumers towards environmentally responsible purchasing decisions.

¹²² Global Ecolabelling Network (2024)
¹²³ Novrizal and Oktapianus (2024)
¹²⁴ Fauziah Fazil (2024)
¹²⁵ Fauziah Fazil (2024)

Benefits

- **Waste Reduction:** Significant decrease in the use of disposable bags, which was the intended outcome of the policy, leading to reduced waste and lower landfill usage.
- **Resource Conservation:** Promotes the use of reusable bags, conserving raw materials and reducing carbon emissions associated with bag production and disposal.
- **Public Engagement:** Encourages consumers to adopt more sustainable habits, contributing to broader environmental awareness and action. Eco-labelled products contribute to reducing Malaysia's overall environmental impact through lower greenhouse gas emissions, minimized waste, and more efficient use of resources. These contributions support Malaysia's commitments to the UN Sustainable Development Goals (SDGs), particularly SDG 12 on Responsible Consumption and Production. Furthermore, certification under this scheme drives innovation within industries by encouraging the adoption of cleaner technologies and sustainable materials¹²³.

Monitoring Protocols

- **Annual Reporting:** Supermarkets are required to report annually on the number of bags distributed and how the proceeds are used, ensuring transparency.
- **NEA Audits:** Regular audits by the NEA to verify compliance with the charge and the effective use of proceeds.
- **Feedback Mechanisms:** Systems in place to gather consumer feedback on the initiative's effectiveness and areas for improvement. Products are also randomly sampled from the open market and tested independently to ensure continued compliance with certification criteria¹²⁴.
- **Surveillance Audits:** After initial certification, SIRIM QAS conducts regular surveillance audits once every two years. These audits repeat the factory inspection process, verifying ongoing compliance with eco-labeling standards and the manufacturer's quality control plans. If non-conformities are detected during any audits, the manufacturer is required to take corrective actions. Failure to resolve issues can result in suspension or revocation of the eco-label license¹²⁵.



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Current State and Market Uptake

- SIRIM Eco-label is viewed as credible: Independent testing and accreditation through ISO/IEC 17025 ensure the credibility of SIRIM Eco-Label¹²⁶.
- Expansion of SIRIM to other sectors, such as ECO 086 reflects the growing industry alignment and uptake. There are currently 95 eco label standards published by SIRIM covering a diverse range - including , among others, metal, concrete , paper, plastic products¹²⁷.

¹²⁶ Novrizal and Oktapianus 2024.

¹²⁷ SIRIM 2024.



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Publication bibliography

3M Packaging Solution (2006): Description: Rigid Packaging Plastic Material Code System. Available online at <https://multimedia.3m.com/mws/media/296959O/cgs179-pkg-spec.pdf?HqRYhJbPNXCWME4PFcbPFcCBBBBB>, checked on 6/30/2025.

ACRA (2025): Climate Reporting and Assurance Roadmap in Singapore. ACRA. Available online at <https://www.acra.gov.sg/docs/default-source/default-document-library/sustainability-reporting/climate-reporting-and-assurance-roadmap-in-singapore.pdf>, checked on 12/17/2025.

Ad Standards Council (2023): ASEAN Cosmetic Documents. Cosmetic Directive. Available online at https://asc.com.ph/rules_by_category/cosmetics/asean-cosmetic-documents/cosmetic-directive/, updated on 3/18/2023, checked on 7/15/2025.

Ad Standards Council (2025): ASEAN Cosmetic Directive. Institutional Arrangements. Available online at https://asc.com.ph/rules_by_category/cosmetics/asean-cosmetic-documents/cosmetic-directive/institutional-arrangements/, updated on 3/18/2023, checked on 7/15/2025.

ASEAN Cosmetics Association (2019): Technical Documents ACD. Available online at <https://aseancosmetics.org/uploads/UserFiles/File/TECHNICAL%20DOCUMENTS/Technical%20Documents.pdf>, checked on 7/15/2025.

ASEAN Secretariat (n.d.a): ASEAN Mutual Recognition Arrangement for Inspection and Certification Systems on Food Hygiene for Prepared Foodstuff Products. Available online at <https://agreement.asean.org/media/download/20180522045752.pdf>, checked on 12/15/2025.

ASEAN Secretariat (n.d.b): ASEAN Rapid Alert System for Food and Feed. Available online at <http://www.arasff.net/>, updated on 6/30/2025, checked on 6/30/2025.

ASEAN Secretariat (n.d.c): ASEAN Rapid Alert System for Food and Feed (ARASFF). Available online at <https://asean.org/wp-content/uploads/2022/04/ANNEX-6-ARASFF-Rules-and-Procedures-Final-1.pdf>, checked on 6/30/2025.

ASEAN Secretariat (n.d.d): General Information-Booklet on ASEAN Harmonized Cosmetic Regulatory Scheme. Available online at <https://www.asean.org/wp-content/uploads/2021/08/General-Information-Booklet-on-ASEAN-Harmonized-Cosmetic-Regulatory-Scheme.pdf>, checked on 7/15/2025.

ASEAN Secretariat (2006): General Information Booklet on the ASEAN Harmonised Cosmetic Regulatory Scheme. Available online at <https://asean.org/wp-content/uploads/images/archive/19014-1.pdf>, checked on 6/30/2025.

ASEAN Secretariat (2014): Guidelines for The Development of Mutual Recognition Arrangements. Available online at <https://asean.org/wp-content/uploads/2021/08/Guidelines-for-The-Development-of-Mutual-Recognition-Arrangements.pdf>, checked on 6/30/2025.

ASEAN Secretariat (2015): ASEAN Guidelines for Accreditation and Conformity Assessment. Available online at <https://asean.org/wp-content/uploads/2021/01/ASEAN-Guidelines-for-Accreditation-and-Conformity-Assessment-1.pdf>, checked on 6/30/2025.

ASEAN Secretariat (2018): 2018 ASEAN Sectoral Mutual Recognition Arrangement for Inspection and Certification Systems on Food Hygiene for Prepared Foodstuff Products. Available online at <https://cil.nus.edu.sg/wp-content/uploads/2019/02/2018-MRA-Prep-Foodstuff-Pdts.pdf>, checked on 6/30/2025.

ASTM (2013): ASTM Plastics Committee Releases Major Revisions to Resin Identification Code (RIC) Standard. Available online at <https://www.astm.org/news/press-releases/astm-plastics-committee-releases-major-revisions-resin-identification-code-ric-standard>, updated on 6/30/2025, checked on 6/30/2025.

Atty. Gregorio Rafael P. Bueta (2022): Extended Producer Responsibility Options for Packaging in the Philippines. Rethinking Plastics – Circular Economy Solutions to Marine Litter. Available online at <https://rethinkingplastics.eu/media/acfupload/extended-producer-responsibility-options-for-packaging-in-the-philippines.pdf>, checked on 12/17/2025.

Australian Government (2019): National Waste Policy Action Plan. Available online at <https://www.dceew.gov.au/environment/protection/waste/publications/national-waste-policy-action-plan>, checked on 12/15/2025.

Australian ISO 20400 Committee (2018): Building the Business Case for Sustainable Procurement in Australia 2019. Available online at <https://www.iso20400.org/wp-content/uploads/2019/03/Building%20the%20Business%20Case%20for%20Sustainable%20Procurement%20in%20Australia%202019.pdf>, checked on 7/16/2025.



Contents



Annexures

Bangkok Post (2024): ThaiNamthip advances sustainability agenda and spearheads packaging circularity in Thailand. Available online at <https://www.bangkokpost.com/business/general/2805470/thainamthip-advances-sustainability-agenda-and-spearheads-packaging-circularity-in-thailand>, updated on 6/30/2025, checked on 6/30/2025.

Benyathiar, Patnarin; Kumar, Pankaj; Carpenter, Gregory; Brace, John; Mishra, Dharmendra K. (2022): Polyethylene Terephthalate (PET) Bottle-to-Bottle Recycling for the Beverage Industry: A Review. In *Polymers* 14 (12). DOI: 10.3390/polym14122366.

Bernard Business Consulting (n.d.): How Moldex Manufacturing Leveraged ISO 14064-1 and ISO 14067 for Growth and Create Competitive Advantage. Available online at <https://bernardbc.com/case-study/how-moldex-manufacturing-leveraged-iso-14064-1-and-iso-14067-for-growth-and-create-competitive-advantage/>, updated on 10/3/2024, checked on 7/7/2025.

Bernard Business Consulting (2025): How Moldex Manufacturing Leveraged ISO 14064-1 and ISO 14067 for Growth and Create Competitive Advantage. Bernard Business Consulting. Available online at <https://bernardbc.com/case-study/how-moldex-manufacturing-leveraged-iso-14064-1-and-iso-14067-for-growth-and-create-competitive-advantage/>, checked on 12/15/2025.

Biogone: San Miguel to use biodegradable plastic in most of its packaging – Philippines. Available online at <https://www.biogone.com.au/news/san-miguel-to-use-biodegradable-plastic-in-most-of-its-packaging-philippines/>, checked on 12/17/2025.

BSI (2025): ISO 14067 - GHGs – Carbon footprint of products. Available online at <https://www.bsigroup.com/en-GB/products-and-services/standards/iso-14067-ghgs-carbon-footprint-of-products/>, updated on 7/14/2025, checked on 7/14/2025.

Bureau of Philippine Standards (n.d.): BPS Product Certification Schedule of Fees. Available online at https://bps.dti.gov.ph/images/SCD_Documents/BPS_PCB_Schedule_of_Fees.pdf, checked on 12/15/2025.

ChemLinked (2024): Thailand Advances Sustainable Packaging Initiative with Label-Free Bottle Proposal. Available online at <https://sustainability.chemlinked.com/news/thailand-advances-sustainable-packaging-initiative-with-label-free-bottle-proposal>, updated on 6/30/2025, checked on 6/30/2025.

Chung Hua Institution for Economic Research (2025): Committee on Technical Barriers to Trade - Notification - Thailand - Mineral water : labelling. Available online at <https://web.wto.org.tw/Page/16165/407628>, updated on 6/30/2025, checked on 6/30/2025.

CITEO (2023): Sorting Info. A simplified guide to the new sorting label for household packaging and graphic paper. Available online at https://bo.citeo.com/sites/default/files/2023-11/2023_CITEO_Guide%20info-tri%20simpli%C3%A9_OCT2023_EN_0.pdf, checked on 6/30/2025.

Cutler, Christian (2024): Decoding the Triman Logo in Packaging Design | CuCo Creative. Available online at <https://www.cucocreative.co.uk/recent-news/decoding-the-triman-logo-new-packaging-design-labeling-laws>, updated on 7/25/2024, checked on 6/30/2025.

DCCEEW (2024a): Environmentally Sustainable Procurement Policy. Department of Climate Change, Energy, the Environment and Water. Available online at <https://www.dcceew.gov.au/sites/default/files/documents/environmentally-sustainable-procurement-policy.pdf>, checked on 12/16/2025.

DCCEEW (2024b): Sustainable Procurement Guide, Department of Climate Change, Energy, the Environment and Water. Available online at <https://www.dcceew.gov.au/sites/default/files/documents/sustainable-procurement-guide-2024.pdf>, checked on 12/15/2025.

Department of Finance, Australia Government: Sustainable Procurement. Department of Finance. Available online at <https://www.finance.gov.au/government/procurement/clubbank/sustainable-procurement>, checked on 12/16/2025.

Department of Finance, Australia Government (2023): Commonwealth Procurement Rules. Department of Finance. Available online at <https://www.finance.gov.au/sites/default/files/2023-06/Commonwealth%20Procurement%20Rules%20-%2013%20June%202023.pdf>, checked on 12/16/2025.

Department of Trade and Industry, Bureau of Philippine Standards (n.d.): BPS Product Testing Laboratory (BPSTL). Available online at <https://bps.dti.gov.ph/product-test/bps-product-testing-laboratory-bpstl>, checked on 12/15/2025.



Contents



Annexures

Din Certco (2021): Certification Scheme "Products Made of Compostable Materials (DIN-Geprüft). Available online at https://www.dincertco.de/media/dincertco/dokumente_1/certification_schemes/baw_din-geprueft_certification_scheme.pdf, checked on 14.07.2025.

Ding, Qian; Zhu, Heping (2023): The Key to Solving Plastic Packaging Wastes: Design for Recycling and Recycling Technology. In Polymers 15 (6). DOI: 10.3390/polym15061485.

ECO-Buy Limited (2013): Guide for sustainable procurement of services. ECO-Buy Limited. Available online at https://sustainable-procurement.org/fileadmin/templates/sp_platform/lib/sp_platform_resources/tools/push_resource_file.php?uid=df0e49f3, updated on 12/15/2025.

ecosistant (2022): The Triman Logo: Obligations for e-commerce in France. Available online at <https://www.ecosistant.eu/en/triman-logo/>, updated on 4/9/2025, checked on 6/30/2025.

Ellen MacArthurFoundation (2021): France 's Anti-waste and Circular Economy Law: eliminating waste and promoting social inclusion. Available online at https://content.ellenmacarthurfoundation.org/m/54c053dd73f80168/original/France-s-Anti-waste-and-Circular-Economy-Law.pdf?_gl=1*1gc6xa3*_ga*MjA5ODI2NjAzMi4xNzUyNDk4Mjk4*_ga_V32N675KJX*czE3NTI0OTgyODgkbzE3ZzAkdDE3NTI0OTgyOTgkajU4JGwwJGgw*_gcl_au*MzUxMzA4NTEyLjE3NTI0OTgyOTc., checked on 7/14/2025.

Enterprise Singapore (n.d.a): Comment on Draft Standards. Available online at <https://www.enterprisesg.gov.sg/grow-your-business/boost-capabilities/quality-and-standards/comment-on-draft-standards>, updated on 6/30/2025, checked on 6/30/2025.

Enterprise Singapore (n.d.b): Participate in Standards Development. Available online at <https://www.enterprisesg.gov.sg/grow-your-business/boost-capabilities/quality-and-standards/participate-in-standards-development>, updated on 6/30/2025, checked on 6/30/2025.

Enterprise Singapore (n.d.c): Singapore Standards Council (SSC). Available online at <https://www.enterprisesg.gov.sg/grow-your-business/boost-capabilities/quality-and-standards/singapore-standards-council>, updated on 6/30/2025, checked on 6/30/2025.

Enterprise Singapore (2024): Standards, Technical References and Workshop Agreements. Government of Singapore. Available online at <https://www.enterprisesg.gov.sg/grow-your-business/boost-capabilities/quality-and-standards>, checked on 7/7/2025.

Enviliacne ASIA (n.d.): Thailand, Draft Sustainable Packaging Act. Available online at <https://enviliacne.com/regions/southeast-asia/th/th-waste/th-packaging-act>, updated on 6/30/2025, checked on 6/30/2025.

Eugene K B Tan (2020): International Standards: Catalyst or Barrier for Innovative Entrepreneurship in Singapore?, checked on 7/7/2025.

Fazil, Fauziah (2024): ENSURING QUALITY & COMPLIANCE : SIRIM PRODUCT CERTIFICATION SCHEME, APPRAISAL SCHEME & COMPLIANCE APPROVAL. Available online at https://www.biwwec.com/public/images/files/presentation/sutcon2024/01.SIRIM_QAS_-_FAUZIAH_FADZIL.pdf, checked on 12/15/2025.

Geetika Chhatwal (17-Dec-25): How Singapore Leads Asia's Sustainability Movement. Kadence International. Available online at <https://kadence.com/knowledge/how-singapore-leads-asias-sustainability-movement/>, updated on 17-Dec-25, checked on 17-Dec-25.

Global Ecolabelling Network (2024): SIRIM Eco-Labeling Scheme (SIRIM QAS International). Available online at <https://globalecolabelling.net/organisation/sirim-eco-labelling-scheme/>, checked on 7/15/2025.

Green Choice Philippines (2018): NELP-GCP-20220037 Packaging Products. National Ecolabelling Programme. Available online at <https://pcepsdi.org.ph/wp-content/uploads/2018/04/GCP-20220037-Packaging-Products.pdf>, checked on 7/14/2025.

Hanns Seidel Stidung (2022): Sustainable Consumption and Production. Baseline Research for ASEAN. Available online at <https://www.hss.de/publikationen/sustainable-consumption-and-production-pub2205.pdf>, checked on 12/15/2025.

Helmut Minor (2025): Bravo Triman! – Three Years of Sorting Instructions in France. envenance. Available online at <https://www.envenance-global.com/bravo-triman-three-years-of-triman-labelling-in-france>, checked on 12/17/2025.



Contents



Annexures

Ibrahim, Khairunnisa; Jais, Mohamad; Md Isa, Abu Hassan; Jaffary, Muhammad Adzlan Syah Ahmad (2024): Unveiling the Green Truth: How Transparent Are Malaysian Manufacturing Companies About Their Carbon Footprint. In *ijafr* 14 (4), p. 20. DOI: 10.5296/ijafrv14i4.22327.

ISO (2008): ISO 15270:2008. Plastics — Guidelines for the recovery and recycling of plastics waste. Available online at <https://www.iso.org/standard/45089.html>, updated on 6/30/2025, checked on 6/30/2025.

ISO (2012): ISO 14855-1:2012. Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions — Method by analysis of evolved carbon dioxide Part 1: General method. Available online at <https://www.iso.org/standard/57902.html>, updated on 6/30/2025, checked on 6/30/2025.

ISO (2013): ISO 18603:2013. Packaging and the environment — Reuse. Available online at <https://www.iso.org/standard/55871.html>, updated on 6/30/2025, checked on 6/30/2025.

JETRO (2025): Sustainable Business for Carbon Neutrality - Vol.4. Japan External Trade Organization. Available online at https://www.jetro.go.jp/newsletter/bangkok/2025/JETRO_Sustainable_Catalog4_EN.pdf, checked on 12/17/2025.

JICA (2023): Annual Report 2023. JICA. Available online at https://www.jica.go.jp/english/about/disc/report/2023/_icsFiles/afieldfile/2023/12/15/2023_all.pdf, checked on 12/17/2025.

Justia Law (2020): 2020 New Jersey Revised Statutes - Title 13 - Conservation and Development - Parks and Reservations: Section 13:1E-99.41 - Material code labels on bottles, containers; required. Available online at <https://law.justia.com/codes/new-jersey/2020/title-13/section-13-1e-99-41/>, updated on 7/14/2025, checked on 7/14/2025.

Justia Law (2024): 2024 California Code - Public Resources Code - PRC. DIVISION 12.7 - PLASTIC WASTE : CHAPTER 2 - Containers and Packaging : Section 18015. Available online at <https://law.justia.com/codes/california/code-prc/division-12-7/chapter-2/section-18015/>, updated on 7/14/2025, checked on 7/14/2025.

Khaosod (2024): SIG DomeMini Carton Bottle Eco-Friendly Debuts in Thailand. Available online at <https://www.khaosodenglish.com/news/business/2025/04/24/sig-domemini-carton-bottle-eco-friendly-debuts-in-thailand/>, updated on 4/25/2025, checked on 6/30/2025.

KPMG (2024): Singapore Achieves Progress in Sustainability Reporting, Outperforming Global Benchmarks. KPMG. Available online at <https://kpmg.com/sg/en/media/press-releases/2024/11/singapore-achieves-progress-in-sustainability-reporting--outperf.html>, checked on 12/17/2025.

Labels & Labeling (2025): Labelexpo Southeast Asia 2025 returns with focus on sustainability. Available online at <https://www.labelsandlabeling.com/news/labelexpo/labelexpo-southeast-asia-2025-returns-focus-sustainability>, updated on 6/30/2025, checked on 6/30/2025.

Leatherhead Food Research (2025a): Innovative packaging: how label-free bottles are shaping the future in Asia. Available online at <https://www.leatherheadfood.com/news-detail/blog-label-free-bottles-asia/>, updated on 6/30/2025, checked on 6/30/2025.

Leatherhead Food Research (2025b): Recent developments in label-free packaging.

Moldex Manufacturing Sdn. Bhd. (2023): About Us - Moldex Manufacturing Sdn. Bhd. MOLDEX and International Standard for GHG Emissions Inventories and Verification. Available online at <https://moldex.com.my/about-us/>, updated on 3/19/2024, checked on 7/7/2025.

Nanyang Technological University, Singapore (n.d.): Standards Development Organisation. Available online at <https://www.ntu.edu.sg/erian/research-focus/standards-development-organisation>, updated on 2025, checked on 12/15/2025.

NEA (2022): New Technical Reference To Guide Companies On Sustainable Packaging Practices. National Environment Agency. Available online at <https://www.nea.gov.sg/media/news/news/index/new-technical-reference-to-guide-companies-on-sustainable-packaging-practices?>, updated on 12/17/2025.

NEA (2025): Mandatory Packaging Reporting. National Environment Agency. Available online at <https://www.nea.gov.sg/our-services/waste-management/mandatory-packaging-reporting?>, updated on 12/17/2025.



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Annexures

Neeranard Jinachai; Puree Anantachoti; Win Winit-Watjana (2016): Exploring competitiveness of Thailand's cosmetic industry using Porter's diamond model 40 (4), pp. 172–178. Available online at <https://thaiscience.info/Journals/Article/TJPS/10984258.pdf>.

Novrizal, Mohammad; Oktapiamus, Yobel Manuel (2024): Initiating the Implementation of Eco-Labeling to Build the Pivot of Green Economy Growth in the Asean Economic Community (1). Available online at <https://doi.org/10.2478/vjls-2024-0004>, checked on 12/15/2025.

OECD (2025): OECD Economic Outlook, Volume 2025 Issue 1: Tackling Uncertainty, Reviving Growth. OCED. Available online at https://www.oecd.org/en/publications/2025/06/oecd-economic-outlook-volume-2025-issue-1_1fd979a8.html, checked on 12/17/2025.

Pacific Certification - Inspection & Certification (n.d.): ISO 14067 - Greenhouse Gases - Carbon Footprint of Products. Available online at <https://pacificcert.com/iso-14067-greenhouse-gas-carbon-footprint-standard/>, updated on 6/2/2025, checked on 7/14/2025.

Re_fashion (2022): Q&R Special: "Info-TRI" Sorting Information Label. Available online at <https://pro.refashion.fr/sites/default/files/fichiers/FAQ%20sp%C3%A9cial%20INFO%20TRI%20-%20V2%20-%20EN.pdf>, checked on 6/30/2025.

Roslee Saad: ASEAN Conformity Assessment Technical Infrastructure. FAO. Available online at https://www.fao.org/fileadmin/user_upload/rap/Asia-Pacific_Forestry_Week/doc/Stream_4/ST4_24Feb_ASEAN_governance_mechanisms_Saad.pdf, checked on 12/17/2025.

RYT9 (2024): Coca-Cola Thailand and ThaiNamthip Introduce more Bottles Made from 100% Recycled PET. Available online at <https://www.ryt9.com/en/prg/276356>, updated on 6/30/2025, checked on 6/30/2025.

Safdie, Stephanie (2024): ISO 14067: Meaning, Standard and Requirements - Greenly. Available online at <https://greenly.earth/en-gb/blog/company-guide/iso-14067-meaning-standard-and-requirements>, updated on 7/14/2025, checked on 7/14/2025.

Saladplate (2023): Mineral Water Brands In Asia That Adopt Label-Free Packaging - Saladplate. Available online at <https://www.saladplate.com/mineral-water-brands-in-asia-that-adopt-label-free-packaging/>, updated on 1/31/2024, checked on 6/30/2025.

Samitthiwetcharong, Sutisa; Kullavanijaya, Pratin; Suwanteep, Koltip; Chavalparit, Orathai (2023): Towards sustainability through the circular economy of plastic packaging waste management in Rayong Province, Thailand. In J Mater Cycles Waste Manag 25 (4), pp. 1–17. DOI: 10.1007/s10163-023-01657-0.

SGS (2014): Thailand Proposes Mandatory Standard for Plastic Containers for Drinking Water | SGS. Available online at <https://www.sgs.com/en/news/2024/12/safeguards-18024-thailand-proposes-mandatory-standard-for-plastic-containers-for-drinking-water>, updated on 6/30/2025, checked on 6/30/2025.

SGS (2024a): SG 180/24. SGS. Available online at <https://www.sgs.com/en/news/2024/12/safeguards-18024-thailand-proposes-mandatory-standard-for-plastic-containers-for-drinking-water>, checked on 12/17/2025.

SGS (2024b): Thailand Proposes Mandatory Standard for Plastic Containers for Drinking Water. Available online at <https://www.sgs.com/en/news/2024/12/safeguards-18024-thailand-proposes-mandatory-standard-for-plastic-containers-for-drinking-water>, updated on 6/30/2025, checked on 6/30/2025.

Shen, Yvette (2023): Packaging Recycling and Sustainability Symbols in the US: An Overview. Available online at https://www.compliancegate.com/united-states-packaging-recycling-symbols/#Resin_Identification_Code, updated on 10/5/2023, checked on 6/30/2025.

Singapore Statutes Online (2025): Food Regulations: Part III: General Provisions. Attorney-General's Chambers of Singapore. Available online at <https://sso.agc.gov.sg/SL/SFA1973-RG1?ProvIds=P1III->, checked on 12/17/2025.

SIRIM (2024): Star Special. SIRIM. Available online at <https://cdn.thestar.com.my/Components/Flyin/PDF/Sirim2024.pdf>, checked on 12/17/2025.

SIRIM QAS (2022): ISO 14067 PRODUCT CARBON FOOTPRINT (CFP). Available online at <https://prism.sirim.my/s/product/iso-14067/01t5g000005SGFqAAO>, updated on 7/7/2024, checked on 7/7/2025.

SIRIM QAS (2025a): SIRIM QAS: Boost Market Appeal with Eco-Labeling Scheme. Available online at <https://www.sirim-qas.com.my/service/eco-labeling-scheme/>, updated on 6/5/2025, checked on 6/30/2025.



Contents



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SIRIM QAS (2025b): SIRIM QAS: Measure Environmental Impact with ISO 14067 Product Carbon Footprint. Available online at <https://www.sirim-qas.com.my/service/iso-14067-product-carbon-footprint-cfp/>, updated on 6/5/2025, checked on 6/30/2025.

Statistical Data and Studies Department (2021): Waste Generation and Recycling. Extract from France's 2021 Environmental Performance Review. Available online at <https://www.statistiques.developpement-durable.gouv.fr/media/5654/download?inline#:~:text=RECYCLING%20TRENDS%20IN%20FRANCE,waste%20were%20reused%20as%20materials>, checked on 6/30/2025.

SWEAP (2023): Thailand Sets 2025 Target for Import Ban on Plastic Waste. Available online at <https://www.sweap.eu/thailand-sets-2025-target-for-import-ban-on-plastic-waste/>, updated on 6/30/2025, checked on 6/30/2025.

Thai Industrial Standards Institute (n.d.a): Certification Body Accreditation Process and Fees. Available online at https://www.tisi.go.th/data/accreditation/cb/CB_accreditation_process.pdf, checked on 7/15/2025.

Thai Industrial Standards Institute (n.d.b): Inspection Body Accreditation Process and Fees. Available online at https://www.tisi.go.th/data/accreditation/ib/IB_accreditation_process.pdf, checked on 7/15/2025.

The Florida Senate (2019): Chapter 403 Section 708 - 2019 Florida Statutes. Available online at <https://www.flsenate.gov/laws/statutes/2019/403.708>, updated on 7/14/2025, checked on 7/14/2025.

THE nation (2023): Better recycling of PET plastic bottles needed, 11/8/2023.

TISI (2023): Plastics - Guidelines for the Recovery and Recycling of Plastic Waste. Available online at <https://a.tisi.go.th/t/?n=7481>, updated on 6/30/2025, checked on 6/30/2025.

TOPPAN NEXT Pte. Ltd. (2024): Singapore Standards Monthly Updates. Available online at <https://www.singaporestandardseshop.sg/Newsletter/Newsletter/bf6c4948-f330-49f8-b3ee-61f8f219f2ed>, checked on 12/15/2025.

Wang, Nickie (2025): Turning the tide on plastic - Manila Standard. Available online at <https://manilastandard.net/spotlight/ms-38th-anniversary-empowering-a-sustainable-tomorrow/314555659/turning-the-tide-on-plastic.html>, updated on 2/9/2025, checked on 6/30/2025.

World Trade Organization (2025): NOTIFICATION. Available online at <https://web.wtocommerce.org.tw/downloadFiles/13317/407800/00TtvETRr1huFzDb00000gUAzPxotJii6OlnUK5ggu4IyUpx7CVvfXJDtr0tZueHirwEVJYPc2vnnoUR3W2uP0l4ai7Q==>, checked on 6/30/2025.

Yilia Ye (2024): Recent developments in label-free packaging. In Chemlinked, 12/30/2024



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ANNEX.4

Additional Resources

This annexure will provide any additional resources, such as templates, checklists, and guidelines, which can support the implementation and compliance with the standards.

LITERATURE

This chapter will list all the literature referenced in the Manual, displayed in the APA 7th Edition style.

It will include citations for all sources referenced in the text, ensuring that readers can easily locate and verify the information provided in the Manual.

Authors will be mentioned in brackets in the text to provide proper attribution and enhance the credibility of the content.

References

1. Hahladakis, J. N., & Iacovidou, E. (2018). Closing the loop on plastic packaging materials: What is quality and how does it affect their circularity? The Science of the Total Environment, 630, 1394–1400. <https://doi.org/10.1016/j.scitotenv.2018.02.330>
2. ISO. (2019). ISO/IEC Guide 59:2019: ISO and IEC recommended practices for standardization by national bodies. <https://www.iso.org>
3. WTO (n.d.). Agreement on Technical Barriers to Trade. https://www.wto.org/english/docs_e/legal_e/downloads_e/TBT_en.pdf
4. European Environment Agency (2024). The role of plastics in Europe's circular economy. Publications Office of the European Union. <https://data.europa.eu/doi/10.2800/30;>
5. United Nations Environment Programme (2021). From Pollution to Solution: A global assessment of marine litter and plastic pollution. Synthesis. Nairobi. https://malaysia.un.org/sites/default/files/2022-02/POLSOLSum_1.pdf
6. World Bank (2021). Plastic Circularity Market Study Series: Thailand, Malaysia and the Philippines. <https://www.worldbank.org/en/region/eap/publication/plastic-circularity-market-study-series-thailand-malaysia-and-the-philippines>
7. World Bank (2021). Market Study for Vietnam: Plastics Circularity Opportunities and Barriers. <https://www.worldbank.org/en/country/vietnam/publication/market-study-for-vietnam-plastics-circularity-opportunities-and-barriers>
8. Ellen MacArthur Foundation (2022). Upstream Innovation: a guide to packaging solutions. <https://www.ellenmacarthurfoundation.org/upstream-innovation/overview>
9. PACE (2021). Circular Economy Action Agenda: Plastics. https://pacecircular.org/sites/default/files/2021-02/circular-agenda-plastics-feb2021_FINAL.pdf
10. PREVENT Waste Alliance (2024). Guidelines on Minimum Requirements for Plastic Waste Recovery & Crediting Standards. https://prevent-waste.net/wp-content/uploads/2025/06/250602_GIZ_Perevent_PlasticWasteRecovery_A4.pdf
11. ASEAN. (2021). ASEAN Guideline on Traceability for Food and Feed. <https://asean.org/wp-content/uploads/2021/12/FAFD-31.-ASEAN-GuideTraceability-Food-and-Feed-adopted-SOM-AMAF-26.2.2021.pdf>
12. BRCGS' Global Standards for Food Safety, Packaging Materials, Storage and Distribution, Consumer Products, Agents and Brokers, Retail, Gluten Free, Plant-Based and Ethical Trading are widely used in manufacturing and retail to provide assurance to customers that products are safe, legal and of high quality. <https://www.brcgs.com/about-brcgs/why-brcgs/>



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Publications from ASEAN Member States

Singapore’s Publications

- 1. TR 109:2023+C1:2024 Sustainable packaging guiding framework and practices (Singapore)
<https://www.singaporestandardseshop.sg/Product/SSPdtDetail/17bbdf4c-5954-4197-ac58-2a3f347b1522>
- 2. Technical Guidelines for the Import and Export of Plastic Waste
<https://www.nea.gov.sg/docs/default-source/our-services/pollution-control/hazardous-waste/technical-guidelines-for-transboundary-movement-control-of-plastic-waste.pdf>
- 3. Logo for Products with reduced packaging
<https://www.packaging-partnership.org.sg/index.php/logo-products-reduced-packaging-lprp/about-logo-products-reduced-packaging-lprp>
- 4. Singapore: Packaging Partnership Programme, administered by the Singapore Manufacturing Federation in partnership with the National Environmental Agency <https://www.nea.gov.sg/our-services/waste-management/3r-programmes-and-resources/reducing-our-use-of-disposables#:~:text=NEA%20has%20disallowed%20the%20usage,the%20Productive%20Hawker%20Centres%20programme.>

Vietnam’s Publications

- 5. Reducing Our Use of Disposables Viet Nam Green Label Criteria for Biodegradable plastic shopping bag
<https://thuvienphapluat.vn/van-ban/Thuong-mai/Quyet-dinh-154-QD-BTNMT-2014-cong-bo-tieu-chi-Nhan-xanh-Viet-Nam-Bo-Tai-nguyen-Moi-truong-248895.aspx>
- 6. Decision No. 1746/QĐ-TTg of the Prime Minister: On promulgating the National Action Plan on Ocean Plastic Waste Management to 2030
<https://vanban.chinhphu.vn/default.aspx?pageid=27160&doid=198482>

Philippines’ Publications

- 7. GREEN CHOICE PHILIPPINES NELP-GCP-2003004 POLYETHYLENE & POLYPROPYLENE PACKAGING MATERIALS
<https://app.sist.org.cn/label/Upload/ProductFile/862700d8-ef64-4ebc-96ab-6a9fbaf647a0.pdf>
- 8. Philippines: Resolution No. 1363, s. 2020, National Solid Waste Management Commission of the Department of Environment and Natural Resources
<https://emb.gov.ph/wp-content/uploads/2020/02/2020-NSWMC-RESO-NO.-1363-SERIES-OF-2020-SINGLE-USE-PLASTICS.pdf>

Malaysia’s Publications

- 9. Malaysia Plastics Sustainability Roadmap 2021 - 2030. | UNEP Law and Environment Assistance Platform
<https://leap.unep.org/en/countries/my/national-legislation/malaysia-plastics-sustainability-roadmap-2021-2030>
- 10. Roadmap towards Zero Single Use Plastics 2018-2030
<https://www.pmo.gov.my/wp-content/uploads/2019/07/Malaysia-Roadmap-Towards-Zero-Single-Use-Plastics-2018-2030-m-min.pdf>

Brunei Darussalam’s Publications

- 11. No plastic bag every day, Initiative by Department of Environment, Parks and Recreation, Ministry of Development
<http://www.env.gov.bn/SitePages/NO%20PLASTIC%20BAG%20EVERYDAY%20INITIATIVE.aspx>
Cambodia:



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Cambodia's Publications

12. Circular Economy (CE) Strategy and Action Plan, 7 June 2022.
<https://www.undp.org/cambodia/publications/circular-economy-ce-strategy-and-action-plan>

Lao PDR's Publications

13. Green Public Procurement Action Plan of Lao PDR 2022-2025, Vision 2030, No. 6350/MoNRE, 29 December 2022
<https://www.oneplanetnetwork.org/sites/default/files/from-crm/GPPAP2023%2520Final%2520Lao%2526EN.pdf>

Myanmar's Publications

14. National Waste Management Strategy and Master Plan (2018-2030), Environmental Conservation Department for the Ministry of Natural Resources and Environmental Conservation. <https://www.unep.org/ietc/resources/policy-and-strategy/national-waste-management-strategy-and-master-plan-myanmar-2018-2030>

Thailand's Publications

15. Plastic Waste Management Roadmap B.E. 2561-2573 (2018-2030), Ministry of Natural Resources and Environment
https://www.pcd.go.th/wp-content/uploads/2020/05/pcdnew-2020-05-27_06-47-53_174751.pdf

16. Action Plan on Plastic Waste Management Phases I (2020-2022) https://www.pcd.go.th/wp-content/uploads/2021/10/pcdnew-2021-10-20_03-49-42_906382.pdf

Indonesia's Publications

17. Roadmap and National Action Plan for Indonesia's Circular Economy 2025-2045
<https://un-pageindonesia.org/en/publication/read/circular-economy-roadmap-and-national-action-plan-for-2025-2045>

18. Perpres No 8320181. Presidential Regulation on Marine Debris Management
<https://peraturan.bpk.go.id/Details/94716/perpres-no-83-tahun-2018>



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ANNEX.5

Terminology and Definitions

This chapter provides clear definitions of common terminologies used throughout the Manual. The goal is to ensure a common understanding and consensus among all stakeholders involved in the development and implementation of standards for plastic packaging and labeling. Thus, they aim at eliminating ambiguity and enhancing clarity of the Manual.

Accreditation	A statement issued by an independent body conveying confirmation of a conformity assessment body's competence to carry out specific conformity assessment tasks (ISO/IEC 17000: 2004)	Conformity assessment	Demonstration that specified requirements are fulfilled. Specified requirements may be stated in normative documents such as regulations, standards and technical specifications and can be detailed or general (ISO/IEC 17000 (en).
Bio-based plastics	Plastics that include materials that are wholly or partly of biogenic origin (ISO 16620-1). Plastics produced from renewable feedstocks such as corn, potatoes, and sugarcane, or other biomass, rather than fossil fuels (UNEP 2020).	Compostable plastic	Plastic that undergoes degradation by biological processes during composting to yield CO ₂ , water, inorganic compounds and biomass at a rate consistent with other known compostable materials and leave no visible, distinguishable or toxic residue (ISO 17088:2021).
Biodegradation	Degradation caused by biological activity, especially by enzymatic action, leading to a significant change in the chemical structure of a material (ISO 472:2013).	Compostable packaging	A packaging or packaging component is compostable if it is in compliance with relevant international compostability standards and if its successful post-consumer collection, (sorting), and composting is proven to work in practice and at scale (Ellen MacArthurFoundation 2020.
Biodegradable plastic	Biodegradable plastics are plastics that can be broken down by living organisms into elements that are found in nature, such as CO ₂ or methane, water, and biomass. When true biodegradation is complete, no microplastics should remain. Biodegradable plastics can be manufactured from renewable feedstocks or fossil fuels (UNEP 2020).	Circularity	Degree of alignment with the principles for a circular economy (ISO 59004:2024).
Certification	A procedure by which a third party gives written or other assurance that a product, process or service conforms to specified requirements (ISO/IEC 17000: 2004)	Design for Recycling	A design principle addressing the recyclability of all sorts of items and therefore including end-of-life considerations at an early Lifecycle stage (GIZ 2021).
Chemical recycling	Chemical Recycling converts e. g. polymeric waste by changing its chemical structure to produce products (e.g., waxes) or substances (e.g., oil and gas) that are used as raw materials for the manufacturing of plastics or other products. Products exclude those used as fuels or means to generate energy. There are different chemical recycling technologies such as pyrolysis, solvolysis, gasification, hydro-cracking and depolymerisation (BPF 2025).	Eco-design / environmentally conscious design / design for environment / green design / environmentally sustainable design	Design and development based on a Lifecycle perspective aimed at supporting sustainable development (ISO 59004:2024).



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Extended Producer Responsibility (EPR)

An environmental policy approach that makes producers responsible for their products along the entire lifecycle, including at the post-consumer stage (OECD 2025).

Label

Describes a logo or stamp highlighting a product or service's specific characteristic(s), which may also be used as a form of trademark. A label may or may not represent a certification (UNEP 2020).

Mechanical Recycling

A method processing by which plastics is recovered from plastics wastes without intentionally changing the basic polymeric structure of the material. Plastic waste undergoes sorting processes in specialized sorting facilities to separate different plastic streams. After cleaning and grinding the sorted plastic waste, the material is recovered by melting and reshaping (e.g. regranulating) processes (pellets, flakes or powders), to be used in the manufacture of plastic parts and products (BPF 2025).

Plastic Packaging

An item made of plastic that is intended to be used by an economic operator for the containment, protection, handling, delivery or presentation of products to another economic operator or to an end-user and that can be differentiated into packaging formats based on its function, material and design.

Post-consumer recycled content

Proportion, by mass, of post-consumer recycled material in a product or packaging (Ellen MacArthurFoundation 2020).

Recyclable packaging

A packaging or packaging component is recyclable if its successful post-consumer collection, sorting, and recycling is proven to work in practice and at scale (Ellen MacArthurFoundation 2020).

Reduce

Refers to the strategy of lowering associated resource use by reducing demand for a product. This can also involve increasing efficiency in product manufacturing or consuming fewer natural resources (ISO 59004:2024).

Reuse of packaging

Operation by which packaging is refilled or used for the same purpose for which it was conceived, with or without the support of auxiliary products present on the market, enabling the packaging to be refilled (Ellen MacArthurFoundation 2020).

Reverse Logistics

Process of managing, collecting and moving products from their current location after the end of use for the purpose of recovering or retaining value through proper handling (ISO 59004:2024).

Single-Use Plastic Packaging

A packaging product that is made wholly or partly from plastic and that is not conceived, designed or placed on the market to accomplish, within its life span, multiple trips or rotations by being returned to a producer for refill or re-used for the same purpose for which it was conceived.

Standard

Document established by consensus by a recognised body, that provides, for common and repeated use, rules, guidelines, or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context (ISO/IEC Guide 2).

Regulation

Document providing binding legislative rules that is adopted by an authority (ISO/IEC Guide 2).

Substances of Concern

Refers to substances that are classified as hazardous according to international standards (e.g., IARC, ECHA and others), or that negatively affects the reuse and recycling of materials in the product in which they are present.



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Take-back system	A manufacturer or retailer-led system that collects unwanted products or materials from customers and returns them to the processing and production cycle (Roy et al. 2023).
Technical Regulation	Regulation that provides requirements either directly or by referring to or incorporating the content of a standard, technical specification or code of practice (ISO/IEC Guide 2). <i>Note: A technical regulation may be supplemented by technical guidance that outlines some means of compliance with the requirements of the regulation. i.e. deemed to satisfy provision.</i>
Virgin plastic	Plastics that have not been previously used or subjected to processing other than for their original production. In other words, plastic that is not produced from post-consumer or pre-consumer recycled material (Ellen MacArthurFoundation 2020).

References

BPF (2025): Glossary of Terms Related to Chemical Recycling. British Plastics Federation (BPF). Available online at <https://www.bpf.co.uk/hub/glossary.aspx#ChemicalRecycling>, checked on 9/17/2025.

Ellen MacArthurFoundation (2020): New Plastics Economy, Global Commitment: Commitments, Vision and Definition. Available online at <https://content.ellenmacarthurfoundation.org/m/256fa8102007b8ca/original/The-Global-Commitment-Commitments-Visions-and-Definitions.pdf>, checked on 6/27/2025.

GLZ (2021): Design-for-recycling (D4R) – State of play. Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ). Available online at https://www.giz.de/de/downloads/2021-06%20Design%20for%20recycling_barrierefrei.pdf, checked on 6/27/2025.

OECD (2025): Extended producer responsibility and economic instruments. Available online at <https://www.oecd.org/en/topics/extended-producer-responsibility-and-economic-instruments.html>, checked on 6/27/2025.

Roy, Shimul; Chu, Ying Yi Jodie; Chopra, Shauhrat S. (2023): Life cycle environmental impact assessment of cotton recycling and the benefits of a Take-Back system. In Resources, Conservation & Recycling Advances 19, p. 200177. DOI: 10.1016/j.rcradv.2023.200177.

UNEP (2020): "Can I Recycle This?". A Global Mapping and Assessment of Standards, Labels and Claims on Plastic Packaging. Available online at https://www.oneplanetnetwork.org/sites/default/files/from-crm/unep_ci_2020_can_i_recycle_this_1.pdf.



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