SCS Certification Standard for Responsible Chemical Recycling

Applicable to advanced, chemical, and molecular recycling

SCS-004

Version 1.0 – June 2026

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SCS Standards and Assurance Systems
2000 Powell Street, Ste. 600
Emeryville, CA 94608 USA
510-452-8000 | 510-452-8001 fax
Email: standards@scsstandards.org

Additional information can also be found at SCS Standards: www.scsstandards.org

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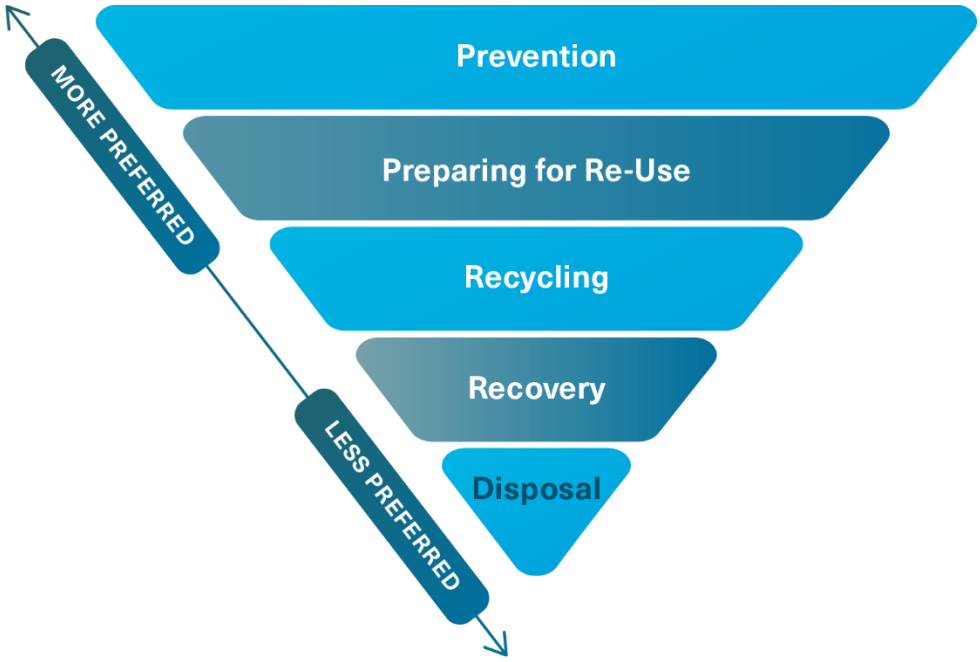
1. Introduction

Chemical recycling, also referred to as advanced or molecular recycling, refers to technologies that convert waste streams–including organics, plastics, and other engineered products–back into basic chemical building blocks, which can then be used to make new, virgin-like plastics and other products.[1] Chemical recycling complements mechanical recycling and other recycling technologies to implement a sustainable circular economy in order to increase the volume of material diverted from landfill, incineration, or environmental pollution. Per the Waste Hierarchy[2] (see Figure 1), the leading decision-making framework in the waste management sector, waste reduction and reuse should be prioritized over recycling.

The purpose of the Certification standard for Responsible Chemical Recycling (hereinafter SCS-004) is to establish a credible basis for independently assessing and certifying the environmentally and socially responsible production of chemically recycled materials, considering the processes, materials, and environmental and social impacts involved in chemical recycling. SCS-004 also aims to bring transparency to chemical recycling operations.

Figure 1: Waste Management Hierarchy



[1] US Plastics Pact. Responsible Production Guidelines for ACM Recycling. May 2024. https://usplasticspact.org/responsible-production-guidelines-for-acm-recycling/.
[2] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, Article 4. https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en.

The development of SCS-004 was initiated by the Ocean Plastics Leadership Network (OPLN)[3] following the Responsible Production Guidelines to Ensure Progressive Advanced / Chemical / Molecular Recycling Operations White Paper, published in May 2024 by the US Plastics Pact.[4] This standard was developed with the support, input, feedback, and direction of chemical recyclers, supply chain actors, brands, and civil society.

1.1 Intended Users

1.1.1 SCS-004 is applicable worldwide to organizations conducting advanced, chemical, or molecular recycling that are seeking to demonstrate their commitment to implementing responsible recycling practices.

1.2 Language

1.2.1 The verb "shall" is used in indicators to indicate a requirement of the standard. The term "should" is used to indicate a recommendation. The verb "can" is used to express an ability to perform an action. The verb "may" is used to express permission to perform an action that is not a requirement. The verb "might" is used to express a condition that could potentially exist.

1.2.2 Key terms and definitions, acronyms, and abbreviations related to this standard can be found in Appendix A.

2. Scope and Limitation

2.1 Scope

2.1.1 SCS-004 is a voluntary certification for chemical recyclers, which may be referred to as a processing unit, units, or site, as applicable for the particular chemical recycling operation.

2.1.2 SCS-004 is applicable to recyclers, such as those handling polymers (e.g., plastics, textiles, elastomers), and to different advanced, chemical, and molecular recycling technologies, such as pyrolysis, solvolysis, depolymerization, and gasification.

2.2 Limitations

2.2.1 Conformance with the requirements of this standard is no guarantee of regulatory compliance. It is the user's responsibility to establish appropriate conditions for such considerations and to determine the applicability of regulatory limitations before use.

[3] Ocean Plastics Leadership Network (OPLN). https://opln.org/.
[4] US Plastics Pact. Responsible Production Guidelines for ACM Recycling. May 2024. https://usplasticspact.org/responsible-production-guidelines-for-acm-recycling/.

2.2.2 SCS-004 does not support recycled content claims, as this is outside of the scope of this standard. A chain of custody certification will be necessary to carry any such claims through the value chain.

2.3 System Boundaries

2.3.1 SCS-004 is applicable to any organization conducting chemical recycling. Recognizing the diversity of technologies and the varying sizes, structures, and operations of companies involved in chemical recycling, SCS-004 permits users to establish an appropriate system boundary based on their specific context. See Appendix B for examples of system boundaries and how certified chemical recyclers may interact with each other and with upstream and downstream actors.

2.3.2 The system boundary will be defined at the time of application for certification and confirmed in the scoping stages of the audit. Regardless, there are some requirements that are applicable only to the organization, site, or processing unit. These requirements are identified in the system boundary column next to each requirement. Requirements may be applicable to the organization (most general), the site, or the processing unit (most specific). The system boundary will be disclosed on the chemical recycler's certificate.

2.3.3 In general, environmental impacts are measured at the processing unit level. If unfeasible, measurements may be made at the site level (e.g., for integrated assets) if a justification is provided. Social impacts are measured at the site level.

3. Conformance

3.1 Conformance to the Standard

3.1.1 SCS-004 indicators are contained in sections 4-8 of this document, as shown in Table 1. Each section contains one or more criteria. Each criterion contains one or more indicators. To achieve and maintain certification, a chemical recycler is required to meet all applicable Core indicators.

3.1.1.1 The chemical recycler will conduct an annual self-assessment of its site's compliance with applicable laws and regulations. Where an applicable law or regulation is more stringent than an SCS-004 standard requirement, the law will prevail. Where the SCS-004 standard requirement is more stringent, the requirements of this standard will prevail.

3.1.1.2 Where an indicator or criterion is not applicable to a chemical recycler, the chemical recycler will provide justification.

3.1.1.3 Where analytical instrumentation is not available for direct measurements (e.g., integrated assets), a chemical recycler may conduct an engineering assessment to calculate what is applicable to the chemical processing unit in scope. Justification will be required.

3.1.1.4 Activity data, emissions factors, formulas, and calculations must be available to the certification body in a verifiable (e.g., Excel document) and unlocked format that allows all calculations and input data to be fully traceable and clearly linked to the results. For CFP/LCA results (see section 6.7) under Pathway A, calculations are not required.

3.1.1.5 Activity data must cover a 12-month period or may be less if the site has not been active for 12 consecutive months. The activity data must be as up to date as possible or cover the previous calendar or financial year.

3.1.1.6 The chemical recycler will make all relevant, documented information available to the certification body and suitable for the purposes of an audit. All information provided to the certification body will remain confidential and will only be shared between the chemical recycler and the certification body, in accordance with the relevant signed confidentiality agreements and unless specified otherwise in this document (see section 5.2.5).

Table 1. Summary of Criteria

Section	#	Criterion
4. General Requirements	4.1	Management System
	4.2	Operational Permits
5. Operations and Transparency	5.1	Chain of Custody
	5.2	Feedstock
6. Environmental Impacts	6.1	Environmental Commitment
	6.2	Energy Intensity
	6.3	Operational Atmospheric Emissions
	6.4	Water Management
	6.5	Waste Management
	6.6	Scope 1 and Scope 2 Emissions
	6.7	Life Cycle Assessment
7. Social Impacts, Equity, and Human Rights	7.1	Human Rights Policy and Public Commitment
	7.2	Community Engagement and Impacts Assessment
	7.3	Community Development
	7.4	Occupational Health & Safety
8. Claims and Logo Use	8.1	General Conformance Requirements
	8.2	Claims Options

3.1.2 Certification is valid for a period of three years from the date of issuance. To maintain a valid certification status, certified entities must undergo and successfully complete a surveillance audit annually and a recertification audit every three years, conducted by an SCS Standards-approved certification body in accordance with the SCS-004 Certification Body Requirements. Failure to complete the surveillance or recertification audits within the specified timeframe will result in the suspension or termination of the certificate.

3.1.3 The energy intensity (see section 6.2), atmospheric emissions (see section 6.3), water management (see section 6.4), and greenhouse gas (GHG) emissions (see section 6.6) are valid

for a period of three years from the date of initial calculation and establish a baseline for continuous improvement. If significant changes (defined as deviations exceeding 10% in operational activity data) occur within the three-year validity period–such as modifications to the production process, changes in the product formula, plant shutdowns or turnarounds, supplier changes, or updates to the database used for measurements and calculations–the baseline shall be updated and reviewed at the annual recertification audit following the change. For the CFP/LCA results (see section 6.7), the three-year validity period also applies when Pathway B is selected. In the case of Pathway A, the critical review is valid for a period of five years.

3.1.4 Mandatory indicators are categorized as Core, with additional optional indicators (see Table 2) categorized as:

- Plus, to recognize performance, encourage continuous improvement, and provide a pathway to better performance; and
- Trailblazer, to achieve recognition and promote best practices in respective categories.

Table 2. Conformity Thresholds by Certification Level

Core	To achieve and maintain Core certification, the chemical recycler shall meet all applicable Core requirements.
Plus	To achieve a Plus level of certification, the chemical recycler shall meet all applicable Core requirements and all applicable Plus requirements.
Trailblazers	At any time and at any level of certification (Core or Plus), a chemical recycler can opt to meet Trailblazer requirements that allow it to achieve recognition and promote best practices in its respective categories.

3.1.5 The chemical recycler may request to be evaluated against only Core indicators, or expand to Plus indicators or any of the Trailblazer requirements in any year following or at initial certification, provided that the scope of the audit is expanded or reduced accordingly.

3.1.6 To support conformance with SCS-004, the chemical recycler can consult its certification body to leverage data collected for other certification programs such as ISCC PLUS or Responsible Care® (see Appendix C).

3.2 Trailblazer Recognition

3.2.1 Certified chemical recyclers may seek to be recognized as “Trailblazers” in any of the five categories listed in Table 3.

3.2.2 Trailblazer recognition requires conformance with the indicators in the relevant Trailblazer category as indicated in Table 3.

Table 3. Applicable Indicators to Earn Trailblazer Recognition

Trailblazer Category	Applicable Indicators
Risk Assurance	6.1.3 and 7.4.4
Transparency & Disclosure	5.1.8 and 5.2.7 and 6.7.8
Water Stewardship	6.4.4
Zero Waste	6.5.6
Social Impact	7.1.5 and 7.3.6

3.3 Nonconformities

3.3.1 All nonconformities issued at an initial audit must be closed (i.e., correction and corrective action plan implemented) within six months of the closing meeting, or a new audit will be required.

3.3.2 All major nonconformities issued at a recertification audit must be closed for a new certificate to be issued.

3.4 Complaints and Appeals

3.4.1 A chemical recycler has the right to appeal a certification decision within 30 days of receiving the final report. Appeals are submitted to the certification body for evaluation and resolution.

3.4.2 Complaints are handled directly by the approved certification body. If a satisfactory resolution is not found, a complaint may be elevated to SCS Standards.

Certification Requirements

4. General Requirements

4.1 Management System

Ensures consistent delivery of products that meet customer and regulatory requirements while supporting risk management, continuous improvement, and organizational effectiveness.

Indicator		Level	System Boundary
4.1.1	As part of understanding its organizational context, the chemical recycler shall implement a Management System that includes at minimum: a) **Legal and Regulatory Compliance:** Procedures to identify and comply with applicable laws, regulations, and requirements. b) **Stakeholder Identification and Mapping:** Identify and map internal and external stakeholders who are or could be interested in the site's activities, impacted by the site, or have an impact on the site. c) **Risk Management:** Assessment and control of risks related to operations, chemical safety, and environmental and social impacts.	Core	Organization or Site
4.1.2	As part of its operational planning and control, the chemical recycler shall implement a Management System that includes at minimum: a) **Process Control:** Documented procedures for the safe and efficient execution of processes. b) **Emergency Preparedness and Response:** Plans for chemical incidents, spills, fires, and other risks.		
4.1.3	To ensure **personnel competence, training, and awareness**, the chemical recycler shall, as part of its management system, implement programs to train personnel in safe, ethical, and sustainable practices.		
4.1.4	To ensure effective **supplier and contractor management**, the chemical recycler shall, as part of its management system, evaluate and control the supply chain to ensure responsible practices.		
4.1.5	As part of performance evaluation and improvement, the chemical recycler shall implement a Management System that includes at minimum: a) **Monitoring and Measurement:** Indicators to evaluate environmental, social, and quality performance. b) **Corrective and Preventive Actions:** Procedures to address nonconformities and prevent recurrence.		

	c) **Management Review:** Periodic evaluation of the system to ensure its effectiveness and continuous improvement.		
4.1.6	To ensure **transparency and effective reporting**, the chemical recycler shall, as part of its management system, communicate its results and performance to stakeholders.		
4.1.7	The organization shall develop and implement a procedure to control and retain documentation and records.		
4.1.8	Documents and records shall be securely maintained and retained for a minimum period of five years.		

4.2 Operational Permits

Ensures compliance with applicable regulations.

Indicator		**Level**	**System Boundary**
4.2.1	The chemical recycler shall obtain and maintain all necessary operating and environmental permits required to lawfully conduct collection, processing, and recycling activities in compliance with applicable national and international laws, including regulations on public health, safety, and land use. These permits shall be both available and accessible to the public.	Core	Site or Processing Unit

5. Operations and Transparency

5.1 Chain of Custody

Ensures the traceability of inputs and outputs in line with approved methods, regulatory requirements, and sustainability schemes.

Indicator		Level	System Boundary
5.1.1	The chemical recycler shall implement a Chain Of Custody (COC) model to validate the use of inputs (recovered materials) and any claims made on outputs (recycled materials) using specified characteristics of the inputs. The following COC models are approved by this standard: a) Identity Preserved; b) Segregated; c) Controlled Blending; and d) Mass Balance (rolling average method or the credit method). The following attribution approaches are allowed: energy use attribution and material-to-material attribution (see Appendix A). Note: Multiple COC models may be applied at a site, in which case each one will need to be audited, and systems to avoid double-counting shall be implemented.	Core	Organization, Site or Processing Unit
5.1.2	The ACM recycler shall hold a valid third-party COC certification for its operations (e.g., ISCC PLUS).	Core	Organization or Site
5.1.3	If the chemical recycler does not carry valid third-party certification of its COC model(s) and attribution approach(es) (where applicable), the chemical recycler shall: a) develop, maintain, and implement a COC procedure that is aligned with ISO 22095, or ISO 22095-2 in the case of Mass Balance; and b) develop, maintain, and implement an internal control mechanism that includes conducting annual internal audits against its COC procedure.	Core	Organization or Site
5.1.4	All COC claims shall comply with applicable laws and regulations in the markets where the products are offered.	Core	Organization or Site
5.1.5	The chemical recycler shall disclose the COC model used. At a minimum, the COC model shall be disclosed with each consignment, on product-level claims, and on the chemical recycler's certificate. If		

	Mass Balance is used, the chemical recycler shall disclose the attribution approach (energy use attribution and material-to-material attribution). For example: A chemical recycler could employ the ISO 22095-2 designation system.		
5.1.6	The chemical recycler shall measure and offer to share, and share upon request, with its buyers the annual average conversion rate[5] of recovered material into recycled material using actual production data (i.e., primary data) alongside the COC model used. $$Conversion\ rate = \frac{amount\ of\ recycled\ material\ produced}{amount\ of\ recovered\ material\ used\ as\ process\ input}$$ Note: The COC model used may impact the amount of recycled material produced.		
5.1.7	The chemical recycler shall maintain a list of all conversion rates for the processing of recovered material and evidence showing how they have been derived.		
5.1.8	**Transparency & Disclosure Trailblazer:** The chemical recycler shall report annual average conversion rates annually in a manner that is both public and accessible to all stakeholders. The public disclosure of conversion rates shall be accompanied by a description of the factors influencing conversion rates (e.g., including a range of conversion rates, type and quality of feedstock, type of output).	Trailblazer	Organization or Site

5.2 Feedstock

Demonstrates commitment to process hard-to-recycle materials to prevent such materials from entering the environment.

Indicator		Level	System Boundary
5.2.1	Recovered material shall only be received from suppliers that provide a self-declaration regarding the waste type (i.e., post-consumer, post-industrial, or unspecified/mixed post-consumer/post-industrial) of all of their material sold to the chemical recycler for the purposes of recycling.	Core	Site or Processing Unit
5.2.2	The chemical recycler shall develop a feedstock sourcing plan that prioritizes the sourcing and recycling of hard-to-recycle materials.	Core	Processing Unit

[5] Conversion rate is sometimes known as recycling efficiency, e.g., in ISO/DIS 15270-4:2025.

5.2.3	After the first year of certification and every year thereafter, the chemical recycler shall demonstrate the implementation of its sourcing plan.		
5.2.4	The chemical recycler shall disclose information related to its recovered material to its buyers, including, at a minimum: a) the quantity of recovered material used as feedstock for each consignment; and b) the percentage of the post-consumer recycled (PCR) and post-industrial recycled (PIR), and mix/unspecified material in each consignment.		
5.2.5	The chemical recycler shall document the total amount of recovered material by type (PCR, PIR, or mixed/unspecified) that has been processed through the facility in the previous calendar year. Note: The collection of this information will allow SCS Standards to publish, annually, the aggregated amount of material recovered by certified chemical recyclers. A minimum of five certified chemical recyclers is required before any aggregated results may be shared or published. This protects confidentiality and prevents identification of individual certificate holders		
5.2.6	The chemical recycler shall demonstrate that at least one recovered material feedstock stream: a) would, in the absence of chemical recycling, be landfilled, incinerated, or reach the environment as pollution as evidenced, for example, by historical disposal records, supplier declarations, or waste stream analysis; or b) would, in the absence of chemical recycling, not be able to be recycled within a geographical area due to volume, timing, scale, limited recycling technology options, specification requirements for certain industry categories,[6] and/or inadequate collection method. Note: At least one recovered material feedstock stream is understood as a regular batch, as defined by the chemical recycler.	Plus	Processing Unit
5.2.7	**Transparency & Disclosure Trailblazer:** The chemical recycler shall disclose, in a manner that is both public and accessible to all stakeholders, the total amount of recovered material by type that has been processed through the processing unit to date (e.g., "To date X lbs. of plastic waste diverted"). Note: Disclosure may be made through corporate reporting, annual reports, etc. Amounts may be aggregated at the corporate level for all certified entities.	Trailblazer	Processing Unit

[6] Chemical recycling may enable the recovered material to meet specification requirements for certain industry categories, including sensitive end uses where traditional recycling methods do not provide the necessary quality or compliance.

6. Environmental Impacts

6.1 Environmental Commitment

Defines and publicly communicates plans and actions for reducing environmental impact.

Indicator		Level	System Boundary
6.1.1	The chemical recycler shall establish structured commitments and action plans supported by measurable targets, achievable actions, and defined timeframes to reduce its environmental impact (e.g., through waste management, water management, reducing its atmospheric emissions, reducing its carbon footprint).	Core	Organization or Site
6.1.2	The chemical recycler shall communicate its commitments and plans to reduce its environmental impacts in a manner that is both public and accessible to all stakeholders.	Plus	Organization or Site
6.1.3	**Risk Assurance Trailblazer:** The chemical recycler shall hold a valid ISO 14001 Environmental Management System certification.	Trailblazer	Organization or Site

6.2 Energy Intensity

Allows monitoring, reporting, and reduction in energy intensity over time. Provides valuable data for LCA studies.

Indicator		Level	System Boundary
6.2.1	The chemical recycler shall develop a program to measure and track the gross energy intensity specific to the chemical recycling process. $$Energy\ Intensity = \frac{Energy\ input\ consumed}{Amount\ of\ recycled\ material\ produced}$$	Core	Processing Unit
6.2.2	After the first year of certification and every year thereafter, the chemical recycler shall demonstrate the implementation of its program to measure and track the energy intensity of its processes.		
6.2.3	The chemical recycler shall demonstrate continuous improvement in reducing the energy intensity of its processes relative to the established baseline and shall communicate progress in a manner that is both public and accessible to all stakeholders.	Plus	Processing Unit

6.3 Operational Atmospheric Emissions

Allows monitoring, reporting, and reduction in atmospheric emissions resulting from the recycling processes.

Indicator		Level	System Boundary
6.3.1	The chemical recycler shall annually calculate and disclose, in a manner that is both public and accessible to all stakeholders, the following absolute atmospheric emissions: a) carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), volatile organic compounds (VOCs), lead (Pb), ground-level ozone (O_3), particulate matter ($PM_{2.5}$, PM_{10}, and total PM); b) hazardous air pollutants (HAPs),[7] or equivalent regulated atmospheric emissions identified under the chemical recycler's local or national regulatory system, to the extent that such emissions occur at the facility; and c) greenhouse gases: methane, carbon dioxide, nitrous oxide, fluorinated gases.	Core	Site or Processing Unit
6.3.2	After the first year of certification and every year thereafter, the chemical recycler shall demonstrate the implementation of its program to measure and track the atmospheric emissions of its processes.		
6.3.3	The chemical recycler shall demonstrate continuous improvement in the reduction of the relative atmospheric emissions listed in section 6.3.1 by measuring: $$Relative\ atmospheric\ emissions = \frac{Total\ gate\ to\ gate\ emissions}{Tonne\ of\ Recyclate}$$ Reductions shall be measured at the processing unit, or if not possible (e.g., for integrated assets), at the site level. Justification shall be provided.	Plus	Site or Processing Unit

[7] See list of HAPs at https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications.

6.4 Water Management

Ensures transparency, accountability, and continuous improvement in water withdrawals and discharges.

Indicator		Level	System Boundary
6.4.1	The chemical recycler shall develop a method to measure and monitor its annual volume of water withdrawal and water discharges, and shall disclose this in a manner that is both public and accessible to all stakeholders. Note: Water discharge includes quantity, quality, and discharge location. Water withdrawal excludes sanitary, potable, and safety water.	Core	Processing Unit
6.4.2	After the first year of certification and every year thereafter, the chemical recycler shall demonstrate the implementation of its method to measure its water withdrawal and discharges.		
6.4.3	The chemical recycler shall implement a plan and demonstrate continuous improvement to reduce its water consumption per unit of production by measuring: $$Water\ Consumption = \ Total\ water\ withdrawal\ - Total\ water\ Discharge$$	Plus	Processing Unit
6.4.4	**Water Stewardship Trailblazer:** The chemical recycler's water management program shall be third-party certified. For example: The water management program may be certified to the SCS-116 Water Stewardship and Resiliency standard or the Alliance for Water Stewardship standard.	Trailblazer	Processing Unit

6.5 Waste Management

Promotes the correct disposition of wastes generated during the chemical recycling processes and waste reduction over time.

Indicator		Level	System Boundary
6.5.1	The chemical recycler shall ensure all inputs and outputs from chemical recycling meet applicable regulatory requirements.	Core	Processing Unit
6.5.2	The chemical recycler shall develop a waste management plan to treat and dispose of hazardous and non-hazardous waste (including hazardous liquid) from its processes in a manner that is safe and appropriate for the category of waste.		
6.5.3	After the first year of certification and every year thereafter, the chemical recycler shall demonstrate the implementation of its waste management plan.		
6.5.4	The chemical recycler shall implement a plan and demonstrate continuous improvement to decrease waste of recycling target material from its processes, per unit of production, including those that are landfilled, incinerated, or leak to the environment.	Plus	Processing Unit
6.5.5	The chemical recycler shall implement a plan and demonstrate continuous improvement to decrease waste from its processes, per unit of production, including those that are landfilled, incinerated, or leak to the environment. For example: By finding new markets for by-products to enter the circular economy.		
6.5.6	**Zero Waste Trailblazer:** The chemical recycler shall be third-party zero-waste certified. For example: The chemical recycler may be certified to UL 2799 or the SCS-110 Zero Waste standard.	Trailblazer	Site or Processing Unit

6.6 Scope 1 and Scope 2 Emissions

Ensures accountability, reporting, and continuous reduction in greenhouse gas emissions.

Indicator		Level	System Boundary
6.6.1	The chemical recycler shall measure or calculate its Scope 1 and Scope 2 GHG emissions and develop a GHG inventory according to the GHG Protocol Corporate Accounting and Reporting standard or ISO 14064-1 that has been verified to ISO 14064-3 by a qualified third-party that is ISO 14065 accredited.[8]	Core	Processing Unit
6.6.2	The chemical recycler shall disclose annually, in a manner that is both public and accessible to all stakeholders, its overall Scope 1 and Scope 2 greenhouse gas emissions at the processing unit level (e.g., in tCO_2 eq/year). Note: Data used to demonstrate conformity with other schemes, such as ISCC, may be repurposed by the chemical recycler for verification against this standard.		
6.6.3	The chemical recycler shall develop a renewable electricity transition plan to increase its utilization and acquisition of non-fossil or renewable electricity (e.g., by using solar, wind, hydropower, geothermal, ocean, nuclear power), with the ultimate objective of transitioning to 100% renewable or non-fossil electricity to reduce its Scope 2 emissions. Note: Energy Attribute Certificates (EAC) are allowable, including but not limited to Renewable Energy Certificates (RECs) and Guarantees of Origin (GO). These EACs can be procured as unbundled or "bundled" through Power Purchase Agreements (PPAs).	Plus	Processing Unit
6.6.4	After the first year of certification and every year thereafter, the chemical recycler shall demonstrate progress against its non-fossil or renewable electricity transition plan, including an increase in the proportion of electricity sourced from renewable or non-fossil sources.		

[8] If the chemical recycler's Scope 1 and Scope 2 GHG inventory has not been third-party verified prior to its audit, verification of these emissions may be conducted as part of the SCS-004 audit, provided that the verifier meets the applicable qualification and accreditation requirements.

6.7 Life Cycle Assessment

Ensures and transparently reports product environmental impacts.

Indicator		Level	System Boundary
6.7.1	[Pathway A] The chemical recycler shall calculate a cradle-to-gate CFP (i.e., GHG emissions/CO_2-eq) according to ISO 14067 or the GHG Protocol Product Life Cycle Accounting and Reporting standard that has undergone a critical review conducted by an independent, qualified third party in accordance with ISO 14071.	Core	Organization or Site
6.7.2	[Pathway B] If the chemical recycler does not meet section 6.7.1: a) The chemical recyclers shall develop, implement, and maintain a Carbon Footprint of a Product (CFP) procedure that conforms to the quantification methodology laid out in either ISO 14067 or the GHG Protocol Product Life Cycle Accounting and Reporting standard. b) The chemical recyclers shall calculate a cradle-to-gate CFP (i.e., GHG emissions/CO2-eq) according to ISO 14067 or the GHG Protocol Product Life Cycle Accounting and Reporting standard and the following: ▪ To represent climate change impacts, the most recent[9] IPCC Global Warming Potential (GWP100) characterization factors available shall be used, expressed in kilograms of CO_2-equivalent (kg CO_2-eq). ▪ Where analytical instrumentation is not available for direct measurements and engineering estimates are used instead, these calculations shall also be documented and made available to the auditor. ▪ For secondary sources, accepted databases for obtaining emission factors include Ecoinvent, GREET, Sphera, IPCC, and OCI+.[10] Even when data is sourced from an accepted database, it shall remain subject to auditor validation, considering that the data must be recent, geographically and technologically appropriate, and aligned with the relevant methodological framework. Emission factors shall be the most current at the time of application and updated at least every three years (if annual process data remain largely unchanged) or more often (if there are major changes to processes). ▪ For upstream inputs entering the processing unit system boundary (excluding feedstock), third-party verified emission factors based on primary activity data may be accepted if the	Core	Site or Processing Unit

[9] 'Most recent' refers to the latest available version. However, if a new version has been released and there has not been sufficient time to transition, previous versions may still be used temporarily.

[10] Additional databases may be accepted by SCS Standards in the future and published on the SCS Standards website.

	methodology used is clearly documented and complies with the requirements of this standard, and the activity data was verified at a reasonable level of assurance. ▪ For systems with multiple outputs, process subdivision is the preferred approach. When subdivision is not feasible, the total GHG emissions should be allocated among the main product and co-product(s) based on their economic value or physical properties (e.g., mass or energy), in accordance with the ratio of the economic value of the co-products specified in the Together for Sustainability (TfS) guidelines 7F.[11] In order to define the prices used in the analysis and for economic allocation, a yearly average shall be applied. In cases of significant price volatility (e.g., 100%), a multi-year average shall be used to ensure representation of a stable market price. ▪ GHG emissions shall not be allocated to wastes and residues as they are considered to have zero emissions at their point of generation. The classification of a material as a co-product or waste/residue shall follow the guidance of Directive 2008/98/EC (including TfS and ISCC EU interpretation). The terms 'by-product' and 'co-product' can be used interchangeably. An indication that further use is uncertain arises when the material lacks a market beyond energy applications and/or holds insignificant economic value. The economic value may be considered insignificant if the material's price per unit is 15% or less compared to that of the main product, according to ISCC EU guidelines.		
6.7.3	The chemical recycler shall offer to share, and share upon request, with its buyers its product carbon footprint.	Core	Organization or Site
6.7.4	The chemical recycler shall demonstrate continuous improvement in reducing its climate change impact relative to the established baseline.	Plus	Site or Processing Unit
6.7.5	[Pathway A] The chemical recycler shall conduct a cradle-to-gate product LCA according to ISO 14040 and ISO 14044 that has undergone critical review, conducted by an independent, qualified third party in accordance with ISO 14071, and that includes, at minimum, the following impact categories: a) Freshwater Eutrophication; b) Marine Eutrophication; c) Acidification or Terrestrial Acidification; d) Energy Resources: Non-Renewable or Fossil Resource Scarcity; and e) Climate Change (as specified in section 6.7.1).	Plus	Organization or Site

[11] Together for Sustainability, Product Carbon Footprint Guideline for the Chemical Industry: https://www.tfs-initiative.com/pcf-guideline.

	The chemical recycler shall refer to existing LCIA methods and provide a clear justification for the selected methodology.[12]		
6.7.6	[Pathway B] If the chemical recycler does not meet section 6.7.5: a) The chemical recycler shall develop, implement, and maintain an ISO 14044 and ISO 14040-conforming life cycle assessment (LCA) procedure, including the following: ▪ Where analytical instrumentation is not available for direct measurements, and engineering estimates are used instead, these calculations shall also be documented and made available to the auditor. ▪ For secondary sources, accepted databases for obtaining emission factors include Ecoinvent, GREET, Sphera, IPCC, and OCI+.[13] Even when data is sourced from an accepted database, it remains subject to auditor validation, considering that the data must be recent, geographically and technologically appropriate, and aligned with the relevant methodological framework. Emission factors shall be the most current at the time of application and updated at least every three years (if annual process data remain largely unchanged) or more often (if there are major changes to processes). ▪ For upstream inputs (excluding feedstock) entering the processing unit system boundary, third-party verified emission factors based on primary activity data may be accepted if the methodology used is clearly documented and complies with the requirements of this standard, and the activity data was verified at a reasonable level of assurance. ▪ For systems with multiple outputs, process subdivision is the preferred approach. When subdivision is not feasible, the environmental impacts should be allocated among the main product and co-product(s) based on their economic value or physical properties (e.g., mass or energy), following the guidance provided in TfS.[14] ▪ Environmental impacts shall not be allocated to wastes and residues as they are considered to have zero emissions at their point of generation. The classification of a material as a co-product or waste/residue shall follow the guidance of Directive 2008/98/EC (including TfS and ISCC EU interpretation). The terms 'by-product' and 'co-product' can be used interchangeably. An indication that further use is uncertain arises when the material lacks a market beyond energy applications and/or holds insignificant economic value. The economic value may be considered	Plus	Organization or Site

[12] Chemicals Recycling Europe recommends using the latest Environmental Footprint (EF) characterization factors for assessments within the European context, and the TRACI methodology for the North American context. For other regions, EF characterization factors are a recommended starting point, with additional LCIA methodologies encouraged for comparative testing.

[13] Additional databases may be accepted by SCS Standards in the future and published on the SCS Standards website.

[14] Together for Sustainability, Product Carbon Footprint Guideline for the Chemical Industry: https://www.tfs-initiative.com/pcf-guideline.

	insignificant if the price per unit of the material is 15% or less compared to that of the main product.[15] b) The chemical recycler shall conduct a cradle-to-gate product LCA according to ISO 14040 and ISO 14044 that includes, at minimum, the following impact categories: ▪ Freshwater Eutrophication; ▪ Marine Eutrophication; ▪ Acidification or Terrestrial Acidification; ▪ Energy Resources: Non-Renewable or Fossil Resource Scarcity; and ▪ Climate Change (as specified in section 6.7.2). The chemical recycler shall refer to existing LCIA methods and provide a clear justification for the selected methodology.[16]		
6.7.7	The chemical recycler shall offer to share, and share upon request, with its buyers the impact results of its calculations and LCA study, and shall ensure that all assumptions are explicitly documented. Note: This will allow buyers to calculate the cradle-to-gate impacts of their intermediate materials and producers of final products to conduct a comparative cradle-to-gate LCA against a virgin or fossil equivalent.	Plus	Organization or Site
6.7.8	**Transparency & Disclosure Trailblazer:** At Core level of certification, the chemical recycler shall report in a manner that is both public and accessible to all stakeholders: ▪ its CFP; and ▪ the most recent impact results of its calculations and a summary of its LCA study, where available.	Trailblazer	Organization or Site

[15] ISCC EU 202-5 Waste and Residues, Version 4.1.

[16] Chemicals Recycling Europe recommends using the latest Environmental Footprint (EF) characterization factors for assessments within the European context, and the TRACI methodology for the North American context. For other regions, EF characterization factors are a recommended starting point, with additional LCIA methodologies encouraged for comparative testing.

7. Social Impacts, Equity, and Human Rights

7.1 Human Rights Policy and Public Commitment

Demonstrates commitment to respecting Human Rights and promotes respect for Human Rights across its supply chain.

Indicator		Level	System Boundary
7.1.1	Guided by the United Nations Guiding Principles on Business and Human Rights (UNGPs), the chemical recycler shall have a public commitment to respect internationally recognized human rights that includes, at a minimum, the following topics: a) prohibiting the use of child and forced labor; b) workplace free of discrimination; c) fostering, cultivating, and preserving a culture of diversity, equity, and inclusion (DEI); d) recognizing the freedom of association; e) observing minimum wages and working hours; f) complying with applicable labor and employment laws; and g) empowering employees and other stakeholders to anonymously report concerns or potentially unlawful practices at the workplace without retaliation.	Core	Organization
7.1.2	After the first year of certification and every year thereafter, the chemical recycler shall report on and provide evidence of implementation of its public commitment to respect internationally recognized human rights, including, at a minimum, the list in section 7.1.1 (e.g., through a code of conduct)		
7.1.3	The chemical recycler shall implement its public commitment through a company code of conduct or business process.	Plus	Organization
7.1.4	The chemical recycler shall communicate its code of conduct or business process to external upstream supply chain partners.		
7.1.5	**Social Impact Trailblazer:** The chemical recycler shall require compliance with its code of conduct or business process requirements to external upstream supply chain partners.	Trailblazer	Organization

7.2 Community Engagement and Impacts Assessment

Provides safe mechanisms for communities to collaborate with the organization, thereby fostering mutual trust.

Indicator		Level	System Boundary
7.2.1	The chemical recycler shall identify communities that are interested in, or that are of interest to, the organization, and that affect, or are affected by, its operations (e.g., workers, neighbors, vulnerable groups, advocacy groups).	Core	Site
7.2.2	The chemical recycler shall develop a community engagement plan that includes, at a minimum: a) accessible, inclusive, and effective communication channels to share information on risks, opportunities, and impacts, while proactively identifying issues or concerns, especially for vulnerable and disadvantaged community members; b) mechanisms for two-way communication between the community and the chemical recycler; and c) a grievance mechanism.		
7.2.3	After the first year of certification and every year thereafter, the chemical recycler shall demonstrate the implementation of its community engagement plan.		
7.2.4	The chemical recycler shall develop a system to identify and assess the direct and indirect impacts of its operations on the neighboring communities.	Plus	Site
7.2.5	After the first year of certification, the chemical recycler shall develop and implement an action plan to mitigate identified potential and actual direct and indirect impacts of its operations in neighboring communities.		

7.3 Community Development

Promotes and contributes to the development of local communities.

Indicator		Level	System Boundary
7.3.1	The chemical recycler shall develop a system to identify and assess the needs of its workforce and neighboring communities.	Core	Site
7.3.2	The chemical recycler shall develop an internal workforce development program to: a) promote the fair treatment, non-discrimination, and equality of opportunity of workers; b) establish, maintain, and improve the worker-management relationship;		

	c) develop collaborative partnerships that promote fair treatment, non-discrimination, and equality of opportunity for all workers; and d) address barriers to accessing development and opportunities. For example: The chemical recycler could foster open communication through feedback opportunities and by maintaining an open-door policy.		
7.3.3	Based on the needs identified in section 7.3.1, the chemical recycler shall develop, in consultation with the community, an external community development program to provide relevant needs-based benefits. For example, the program could: a) provide skills development, workforce readiness, and capacity building (e.g., open days for job applications and CV writing). b) provide quality job creation and actions to encourage local hiring, including for higher-paid or executive positions (with "local" clearly defined) (e.g., vocational training centers to promote awareness of advanced recycling and career pathways, or asset piloting). c) address barriers to accessing development and opportunities (e.g., participation in local job fairs, partnering with government, NGOs, and businesses, contributing to existing programs, or collaborating with colleges for internships).		
7.3.4	After the first year of certification and every year thereafter, the ACM recycler shall demonstrate the implementation of its internal workforce and community development programs.		
7.3.5	The chemical recycler shall publicly report on the performance of its community development program (e.g., in an annual report or on a public-facing website).	Plus	Site
7.3.6	**Social Impact Trailblazer:** The chemical recycler shall be third-party certified to a social compliance standard. For example: The chemical recycler may be certified to SA8000, SMETA, or ISO 26000.	Trailblazer	Site

7.4 Occupational Health & Safety

Promotes and ensures a safe working environment.

Indicator		Level	System Boundary
7.4.1	The chemical recycler shall develop a fit-for-purpose Occupational Health & Safety (OH&S) program that includes, at a minimum: a) training of employees; and b) occupational prevention plan for risks and hazards, including both physical and psychological safety.	Core	Site
7.4.2	After the first year of certification and every year thereafter, the chemical recycler shall demonstrate the implementation of its OH&S program.		
7.4.3	The chemical recycler shall report on the performance of its OH&S program in a manner that is both public and accessible to all stakeholders.	Plus	Site
7.4.4	**Risk Assurance Trailblazer:** The chemical recycler shall hold a valid ISO 45001 OH&S Management System certification.	Trailblazer	Site

8. Claims and Logo Use

8.1 General Conformance Requirements

8.1.1 All claims language and/or certification logo usage shall:

8.1.1.1 Be reviewed and approved by the certification body prior to use;

8.1.1.2 Conform to the SCS Standards Claims and Marks Usage Requirements; and

8.1.1.3 Comply with US Federal Trade Commission guidelines or other national guidelines if outside of the US.

8.1.2 Any claims made by the chemical recycler in connection with this standard shall only be in reference to its own certification.

8.2 Claims Options

8.2.1 All claims made in relation to this standard, including on the certificate, in association with the certification logo, and in marketing material, shall contain a reference to the description of the COC model. If Mass Balance is used, all claims shall specify the method and attribution approach.

8.2.2 All claims shall relate to the certified organization, site, or processing unit. For example: “[Recycler] operates a responsible advanced recycling processing unit.”

8.2.3 Origin claims are acceptable. For example: “[Material] was produced in a responsible chemical recycling processing unit on a Mass Balance energy use attribution basis.”

Appendix A. Terms and Definitions

Below are the key terms and definitions, acronyms, and abbreviations related to this standard.

List of acronyms

- CFP: Carbon Footprint of a Product (also known as PCF, Product Carbon Footprint)
- COC: Chain of Custody
- ISO: International Organization for Standardization
- GHG: Greenhouse Gas
- GRI: Global Reporting Initiative
- GWP: Global Warming Potential
- LCA: Life Cycle Assessment
- LCIA: Life Cycle Impact Assessment
- MRF: Materials Recovery Facility
- PCR: Post-consumer Recycled material
- PIR: Post-industrial Recycled materials

Definitions

Action plan. A structured document that outlines the specific steps an organization will take to address identified risks or impacts. It includes clearly defined actions, assigned responsibilities, timelines, and required resources, and incorporates mechanisms for monitoring, reviewing, and continuously improving the effectiveness of those actions over time.

Audit evidence. Records, statements of fact, or other verifiable information relevant to the audit criteria.

Audit findings. Results of the evaluation of the collected audit evidence against audit criteria.

Carbon Footprint of a Product (CFP). The sum of greenhouse gas emissions and greenhouse gas removals in a product system, expressed as carbon dioxide equivalents and based on a life cycle assessment using the single impact category of climate change.[17] Also known as Product Carbon Footprint (PCF).

Certification. The third-party attestation related to an object of conformity assessment.

Certification body. A third-party organization that is approved and authorized by SCS Standards to conduct independent audits to assess conformance with this standard.

[17] ISO 14050:2020 Environmental Management–Vocabulary.

Chain of Custody (COC). The process by which inputs and outputs and associated information are transferred, monitored, and controlled as they move through each step in the relevant supply chain.[18]

Chemical recycling. A term used to describe technologies that convert waste streams–including organics, plastics, and other engineered products–back into usable raw materials, which can then be used to make new, virgin-like plastics and other products.[19] Sometimes referred to as advanced or molecular recycling.

Chemical recycler. Entity that undertakes chemical recycling operations.

Chemical recycling technologies. Non-mechanical processes used in chemical recycling that can be classified as biochemical depolymerization (e.g. enzymolysis), chemical depolymerization (e.g., solvolysis, methanolysis, hydrolysis, and glycolysis), and thermochemical conversion (e.g., pyrolysis and gasification).[20]

Client. A chemical recycler that seeks certification. This entity could be an applicant or an existing certified operation.

Community member. A stakeholder in geographic proximity to the chemical recycler.

Conformance. Adherence to pertinent normative requirements. Distinguished from compliance, which often refers to legal requirements, conformance in the context of assessments to voluntary standards refers to fulfillment of applicable standard requirements. See “Nonconformity.”

Consignment. A shipment of goods into or out of the system boundary. A consignment may be made up of one batch or a mixture of several batches.

Continuous improvement. Recurring activity to enhance performance.[21] It is a systematic, sustained effort to identify opportunities for enhancement and implement changes that lead to better efficiency, effectiveness, and alignment with strategic goals.

Controlled Blending Chain of Custody (COC) model. A Chain of Custody model in which materials or products with a set of specified characteristics are mixed according to certain criteria with materials or products without that set of characteristics, resulting in a known proportion of the specified characteristics in the final output.[22]

> Note 1 to entry: This Chain of Custody model is also referred to as the "single percentage method."

[18] ISO 22095:2020 Chain of custody – General terminology and models.
[19] Adapted from US Plastics Pact, 2024.
[20] US Plastics Pact, 2024. https://usplasticspact.org/responsible-production-guidelines-for-acm-recycling/.
[21] ISO 14050:2020 Environmental Management–Vocabulary.
[22] ISO 22095:2020 Chain of custody–General terminology and models.

Conversion rate. The mass fraction of inputs converted to outputs in a system boundary. Sometimes known as Recycling Efficiency (RE).[23]

Direct impacts. Changes resulting from activities, products, or services that are directly controlled by the organization**.**

Disclosure. The act of making specific information publicly available, often related to an organization's operations, financials, environmental impact, or social practices. Disclosure is about transparency.

Feedstock. A raw material that is used for processing or manufacturing another product. It can also be referred to as 'Input.'

Feedstock Sourcing Plan. A documented strategy for procuring material(s) (the input or recovered material) used to make other material(s) or product(s) (the output or recycled material).

Greenhouse Gas (GHG). Gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds.[24] Greenhouse gases, as defined by the Kyoto Protocol, are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6), and nitrogen trifluoride (NF3).

Global Warming Potential (GWP). Index, based on the radiative properties of greenhouse gases, measuring the radiative forcing following a pulse emission of a unit mass of a given greenhouse gas in the present-day atmosphere, integrated over a chosen time horizon, relative to that of carbon dioxide (CO_2).[25]

Hard-to-recycle materials. Items that are typically incompatible with currently established collection, sortation, and recycling processes due to their composition, contamination, or a lack of infrastructure. These materials may require specialized processes or facilities to be properly recycled, and many end up in landfills because currently established recycling systems cannot handle them. Examples of currently hard-to-recycle materials include film and flexibles, multilayer packaging, contaminated or degraded plastics, and foam.

> Note: Over time, as infrastructure expands and markets and technologies develop, what is hard to recycle today may not be considered hard to recycle in the future.

Identity Preserved COC model. A Chain of Custody model in which the materials or products originate from a single source and their specified characteristics are maintained throughout the supply chain.[26]

[23] ISO/DIS 15270-4:2025 Plastics — Guidelines for the recovery and recycling of plastics waste — Part 4: Chemical recycling.
[24] ISO 59004:2024 Circular economy—Vocabulary, principles and Guidance for implementation.
[25] ISO 14050:2020 Environmental Management–Vocabulary.
[26] ISO 22095:2020 Chain of custody–General terminology and models.

Indirect impacts. Changes caused by aspects that the organization can influence but does not directly control.

Input. Material or product that enters an organization or part of an organization.[27] It can also be referred to as 'Feedstock.' In this standard, recovered materials are inputs to the recycling process.

Life Cycle. Consecutive and interlinked stages from raw material acquisition or generation from natural resources to final disposal.[28] The scope of the Life Cycle, as used in this standard, is defined by the chemical recycler and encompasses outputs from the certified chemical recycling process.

Life Cycle Assessment (LCA). Compilation and assessment of the inputs, outputs, and the potential environmental impacts of a product system throughout its life cycle.[29]

Life Cycle Impact Assessment (LCIA). Phase of Life Cycle Assessment aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts for a product system throughout the life cycle of the product.[30]

Management System. A set of interrelated or interacting elements of an organization to establish policies and objectives, and processes to achieve those objectives.[31]

Mass Balance COC Model. A Chain of Custody model in which materials or products with a set of specified characteristics are mixed according to defined criteria with materials or products without that set of characteristics.

> Note 1 to entry: The proportion of the input with specified characteristics might only match the initial proportions on average and will typically vary across different outputs.
> Note 2 to entry: The Mass Balance model establishes the relation between inputs and outputs with specified characteristics and the distribution of those inputs and outputs via an attribution model.
> Note 3 to entry: For the Mass Balance model, two implementation methods are specified: the rolling average percentage method and the credit method.
> Note 4 to entry: In the Mass Balance model, the credit cannot be traded between different organizations. There are two implementation methods: the rolling average percentage method and the credit method.[32]

[27] ISO 22095:2020 Chain of custody–General terminology and models.
[28] ISO 14050:2020 Environmental Management–Vocabulary.
[29] ISO 14050:2020 Environmental Management–Vocabulary.
[30] ISO 14040:2006 Environmental Management — Life cycle assessment — Principles and framework.
[31] ISO 9000:2015 Quality management systems — Fundamentals and vocabulary.
[32] ISO 22095-2:2026 Chain of custody–Mass balance–Requirements and guidelines.

Chain of Custody and Mass Balance[33]

COC is a process by which inputs and outputs and associated information are transferred, monitored, and controlled within and between organizations. The purpose of a COC system is to provide credibility that a given material or product has a set of specified characteristics. There are five internationally recognized COC models that allow this:

- Identity Preserved (see ISO 22095)
- Segregated (see ISO 22095)
- Controlled Blending (see ISO 22095)
- Mass Balance (see ISO 22095-2)
- Book & Claim (see ISO 22095-3)

Within the Mass Balance model, there are two implementation methods: the rolling average percentage method and the credit method. Within the Mass Balance credit method, credits representing the specified characteristics can be attributed proportionally or non-proportionally to outputs. In the chemical industry in particular, the debate around the use of outputs for energy recovery has led to a further distinction in attribution approaches, which are defined in this standard as follows:

Mass Balance Energy Use Attribution Approach. Sometimes referred to as "free attribution." Credit method calculation approach, which allows the reallocation and attribution of specified characteristics from all material outputs, including those used for auto-consumption, where credits are assigned to outputs irrespective of outputs provided that:

- It excludes losses;
- It is technically feasible;
- The like-for-like principle is met; and
- Credits are attributed within the defined system boundary.

For example: Waste plastic is converted into pyrolysis oil, pyrolysis gas, and char through a pyrolysis recycling technology.

- If the waste plastic is used directly for energy generation and does not go through a pyrolysis reaction, it is considered a loss.
- If the pyrolysis oil, pyrolysis gas, and char are sold for further use, the credits from the oil, gas, and char can be included in the Mass Balance credit account.
- If the char is landfilled and the pyrolysis gas flared, these are losses.
- If the char, oil, and gas are recovered and used energetically for internal process (i.e., auto-consumed), the credits from the char, oil, and gas can be included in the Mass Balance credit account.

Mass Balance Material-to-Material Attribution Approach. Sometimes referred to as "fuel-use exempt" or "fuel-use excluded." Credit method calculation approach, which allows attribution of specified characteristics to outputs, provided that:

- It intentionally excludes materials that are used down the value chain as fuels or for energy recovery;
- It excludes losses;

[33] Adapted from ISO 22095:2020; ISO 22095-2:2026; ISO 22095-3:2026; ISEAL Chain of custody models and definitions, V2.0, July 2025.

- It excludes recycled material that is auto-consumed;
- It is technically feasible;
- The like-for-like principle is met; and
- Credits are attributed within the defined system boundary.

For example: Waste plastic is converted to syngas through a gasification recycling technology.

- If the syngas is further derived into another chemical like methanol, acetic anhydride, or specialty aldehydes, and these chemicals are then used as an ingredient to make cellulosics, fibers, coatings, medicine, food additives, plastic, or several other products, then the credits from the syngas can be included in the Mass Balance credit account.
- If the syngas is used to produce flammable liquids like diesel through Fischer-Tropsch, then the credits from the syngas are excluded from the Mass Balance credit account.

Another example: Waste plastic is converted to monomers through a depolymerization recycling technology. These monomers are used to make plasticizers, plastics, or other materials that are used for applications such as consumer goods, durables, packaging, and coolants. Because these chemicals are not designed for use in the fuel production supply chain, only credits that lead to materials downstream are included in the Mass Balance credit account.

Below are additional terms defined to help understand the attribution approaches:

Losses are understood as:

- Input (i.e., recovered material) consumed directly for energetic purposes to power internal processes that have not undergone recycling.
- The portion of input materials that cannot be recovered or converted into usable outputs during the chemical recycling process (e.g., inputs used energetically in the recycling process, non-recyclable residues, unintended emissions, or process losses).
- Excluding input material that is sorted out before recycling (e.g., contaminants such as woodchips and metals that are removed from the feedstock entering the chemical recycling process)

Under no circumstances can the specified characteristics of any lost material be reattributed or allocated to another output.

Auto-consumption is understood as output (i.e., chemically converted feedstock) that is recovered and consumed to power internal processes.
Under the Mass Balance energy-use attribution approach, the specified characteristics of outputs used for auto-consumption or sold for energy use can be reattributed or allocated to another output.

Energy Recovery is understood as the production of useful energy through direct and controlled combustion.[34] For example, producing hot water, steam, or electricity are common forms of energy recovery.

Technically feasible and the **like-for-like** principle are understood as defined in ISO 22095-2.

[34] ISO/DIS 15270-4:2025 Plastics — Guidelines for the recovery and recycling of plastics waste — Part 4: Chemical recycling.

Nonconformity. A failure to meet a certain section, criterion, or indicator of the standard, which may be categorized as Major or Minor, defined as follows:

- **Major Nonconformity.** A failure to adhere to one or more requirements of the standard that is either persistent, recurrent, unaddressed, or has the potential to result in a critical failure to achieve the objectives of the requirement(s).
- **Minor Nonconformity.** A failure to adhere to one or more requirements of the standard that is temporary, isolated, and that does not result in a critical failure to achieve the objectives of the requirement(s).

Onsite audit. An audit conducted in person at the client's site.

Organization. In this standard, refers to the entity that owns or manages a certified processing unit.

Output. Material or product that leaves an organization or part of an organization.

> Note: output might include other products resulting from production processes.[35] In this standard, the recycled material is an output of the recycling process.

Policy. Intentions and direction of an organization as formally expressed by its top management.[36]

Post-consumer material. Material generated by households or by commercial, industrial, and institutional facilities in their role as end-users of the product that can no longer be used for its intended purpose. This includes returns of materials from the distribution chain.[37] To be considered post-consumer, any material returned from the distribution chain must come from end-users.

Post-industrial material. Material diverted from the waste stream during the manufacturing process. Excluded is the reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.[38] Also referred to as "pre-consumer material."

Procedure. A documented, specified way to carry out an activity or a process.

Process. Set of interrelated or interacting activities that use inputs to deliver an intended output.[39]

Processing unit. The section or system within a facility where specific chemical or physical operations are carried out to transform recovered materials into recycled materials (i.e., where chemical recycling occurs).

Product. A physical-based object designed for or utilized with a purpose.

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[35] ISO 22095:2020 Chain of custody–General terminology and models.
[36] ISO 14050:2020 Environmental Management–Vocabulary.
[37] ISO 14021:2016 Environmental labels and declarations—Self-declared environmental claims.
[38] ISO 14021:2016 Environmental labels and declarations—Self-declared environmental claims.
[39] ISO 22095:2020 Chain of custody–General terminology and models.

Publicly disclose. Information that is available to the public in means that are appropriate to the environment in which the processing unit is based (e.g., website, public report).

Management System. A set of policies, processes, and procedures required for planning and execution (production/development/service) in the core business area of an organization (i.e., areas that can impact the organization's ability to meet customer requirements).[40]

Reasonable assurance. Level of assurance where the nature and extent of the verification activities have been designed to provide a high but not absolute level of assurance on historical data and information.[41] A reasonable level of assurance means that the verifier obtains sufficient and appropriate evidence to express a positive opinion that the sustainability information, such as GHG emissions data or LCA results, is free from material misstatement and has been prepared in accordance with the applicable criteria (e.g., ISO 14064, ISO 14040/44, GHG Protocol).[42]

Recovered material. Material that has been separated, diverted, or removed from the waste stream in order to be recycled or used to substitute virgin raw materials.[43]

Recycled material. Material that has been reprocessed from recovered material through a manufacturing process and made into a final product or intermediate that can be incorporated into a product.[44] Also known as 'recyclate.' Examples of recycled material include but are not limited to: pyrolysis oil, rDMT (recycled Dimethyl terephthalate), inorganic recovery of platinum group metals, syngas, ethane, LPG (liquefied petroleum gas), gas oil, naphtha, and natural gas.

Recycling. Activities to obtain recovered resources for use in a process or a product, excluding energy recovery.[45]

Recycling Target Material. The specific type of recovered material that a recycling process is designed to convert into recycled material.

> For example, polyolefin-rich plastic waste may be the target recycling material for a pyrolysis facility.

Renewable resource. Resource that can be naturally or artificially grown or replenished within a foreseeable time frame by processes found in nature.[46]

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[40] ISO 9001:2015 Quality management systems–Requirements.
[41] ISO 14064-3:2019 Greenhouse gases Part 3: Specification with guidance for the verification and validation of greenhouse gas statements.
[42] Adapted from ISSA 5000. General Requirements for Sustainability Assurance Engagements. 2024.
[43] Adapted from ISO/DIS 15270-4:2025 Plastics — Guidelines for the recovery and recycling of plastics waste — Part 4: Chemical recycling.
[44] ISO/DIS 15270-4:2025 Plastics — Guidelines for the recovery and recycling of plastics waste — Part 4: Chemical recycling.
[45] ISO 59004:2024 Circular economy—Vocabulary, principles and Guidance for implementation.
[46] ISO 59004:2024 Circular economy—Vocabulary, principles and Guidance for implementation.

Report. The structured presentation and communication of information, typically through formal documents (e.g., annual reports, sustainability reports, financial statements).

Segregated COC Model. A Chain of Custody model in which specified characteristics of a material or product are maintained from the initial input to the final output.

> Note 1 to entry: Addition of material with different characteristics and/or grade to the input is not allowed.
> Note 2 to entry: Commonly, material from more than one source contributes to a chain of custody under the segregated model.[47]

Self-Declaration. Affidavits that must be completed and signed by waste suppliers before they can deliver sustainable material into the supply chain.

Site. A designated geographical area where multiple manufacturing operations take place. These operations may share infrastructure, resources, and assets, while encompassing a variety of activities.

Stakeholder. A person or organization that can affect, be affected by, or perceive itself to be affected by a decision or activity.

Supply chain. Those involved, through upstream and downstream linkages, in activities delivering value in the form of a product to different interested parties.[48]

Surveillance audit. An assessment of a client against the applicable standard requirements to verify continued conformance, required at periodic intervals to maintain certification.

Suspension. The temporary invalidation of the certificate.

System boundary. A boundary based on a set of criteria representing which unit processes are a part of the system under study.

Termination. The revocation or cancellation of the certification, which can be voluntary or involuntary. Also referred to as withdrawal.

Third party. A person or body that is recognized as being independent of the parties involved regarding the issue in question.

Transparency. The open, comprehensive, and understandable presentation of information.

Waste. Substances or objects of which the holder intends or is required to dispose.[49]

[47] ISO 22095:2020 Chain of custody–General terminology and models.
[48] ISO14050:2020 Environmental Management–Vocabulary.
[49] ISO 14021:2016 Environmental labels and declarations—Self-declared environmental claims.

Waste stream. The complete flow of waste from its domestic or industrial source to recovery, recycling, or final disposal.

Water consumption. The total water withdrawal minus the total water discharged at a site over a defined period of time that has been incorporated into products, or generated as waste, has evaporated, transpired, or been consumed, or is polluted to the point of being unusable by other users, and is therefore not discharged back to surface water, groundwater, seawater, or a third party over the course of the annual reporting period.[50]

Water discharge. Total volume of water that is released by an organization back into the environment or to a different location after it has been withdrawn and used.[51]

Water quality. The physical, chemical, biological, and organoleptic (taste-related) properties of water.[52]

Water withdrawal. Total volume of water taken from any source for use in an organization's operations, which can include surface water, ground water, municipal water supplies, etc.[53]

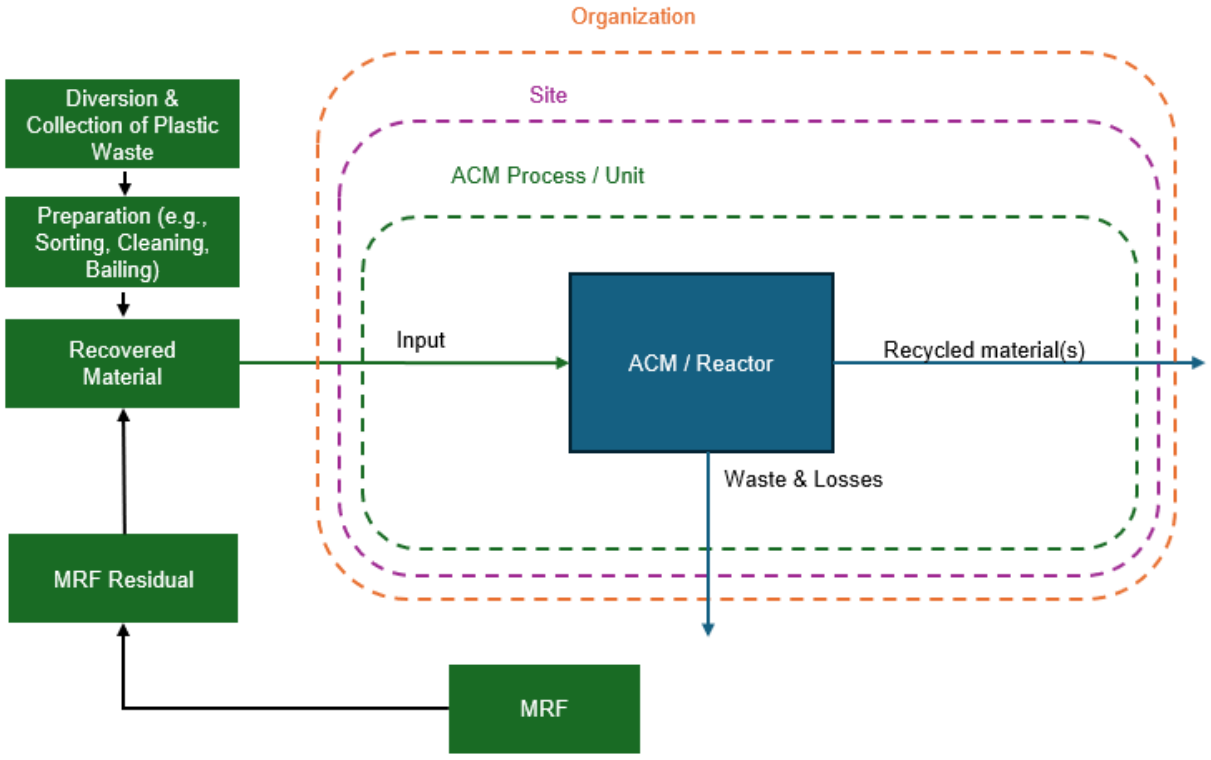
[50] Adapted from Global Reporting Initiative (GRI) 303: Water and Effluents 2018.
[51] Global Reporting Initiative (GRI) 303: Water and Effluents 2018.
[52] CDP Water Security. 2022.
[53] Global Reporting Initiative (GRI) 303: Water and Effluents 2018.

Appendix B. Informative - Examples of System Boundaries

In example 1:

- The chemical recycling processing unit operates independently.
- The chemical recycling processing unit receives recovered material as input feedstock (e.g., post-consumer plastic waste) that it processes to produce recycled material (e.g., intermediate raw material such as pyrolysis oil or rDMT).
- The diversion, collection, and preparation of waste is outside the organization's boundary (note that these activities may be conducted inside or outside the organization or site).
- Input feedstocks may also come from MRFs (Materials Recovery Facilities) or mechanical recycling residual waste.
- The organization, site, and processing unit are the same.

Example 1 – Standalone Chemical Recycling Processing Unit



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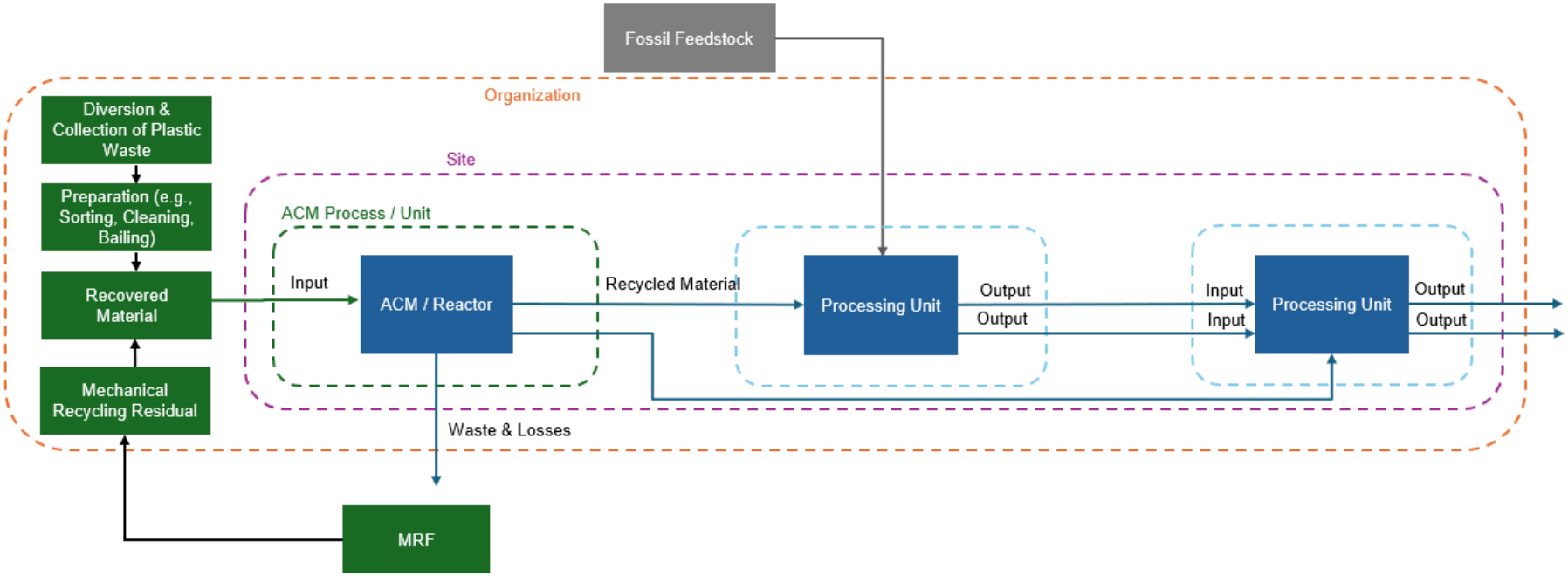
In example 2:

- The chemical recycling processing unit is part of a larger process.
- The recycled materials (e.g., intermediate raw material such as Pyrolysis oil or rDMT) can be further processed onsite (e.g., secondary processing such as hydrotreatment) or sold to third parties for further processing.
- The organization operates one site only (note that the organization may include multiple sites, and one site may include multiple processing units; however, only the chemical processing unit(s) are in scope of certification).
- The diversion, collection, and preparation of waste is done within the organization's boundary (note that these activities may be conducted inside or outside the organization or site).
- Input feedstocks may also come from MRFs or mechanical recycling residual waste.

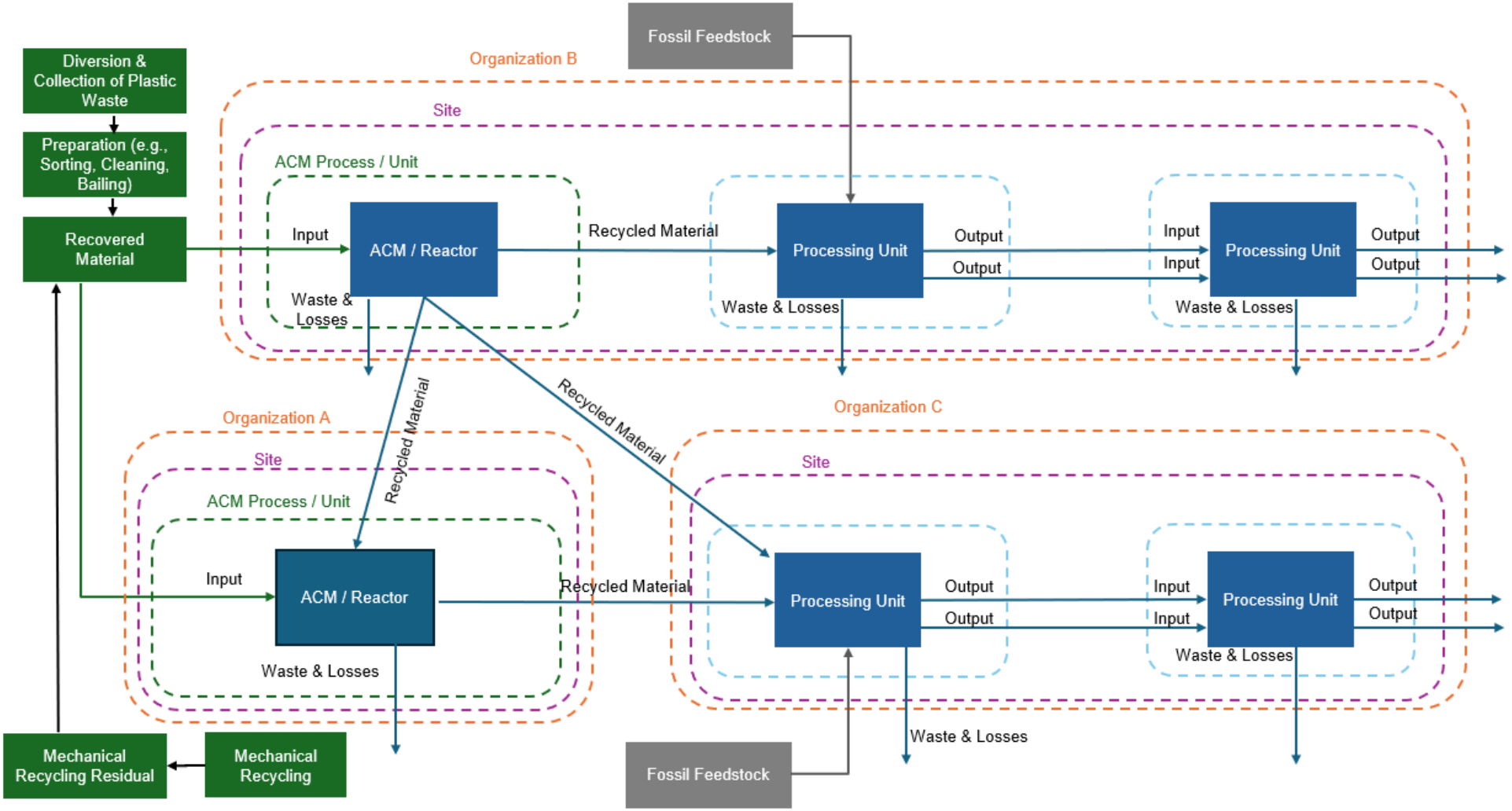
Example 2 – Chemical recycling processing unit as part of integrated processes



In example 3:

- The chemical recycling processing units in Organization A and Organization B are certified.
- Organization C does not yet operate commercial chemical recycling technologies and purchases recycled materials from certified companies (Organizations A and B).
- Organization C cannot make any claims.

Example 3 – Interactions between standalone and integrated chemical recyclers and supply chain actors



Appendix C. Resources and Guidance

To meet the requirements of this standard, users may consult and leverage data from their existing programs and certifications, such as:

- CDP disclosures;
- Global Reporting Initiative (GRI
- International Sustainability and Carbon Certification (ISCC)
- ISO 9001:2015 - Quality Management Systems
- ISO 14001:2015 - Environmental Management Systems
- ISO 59014: 2024 - Environmental Management and Circular Economy
- Responsible Care®
- Science Based Targets initiative
- Third-party verified corporate carbon inventories, product carbon footprints, life cycle assessments, and environmental product declarations

Appendix D. References and Bibliography

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- ISO 22095:2020 Chain of custody – General terminology and models.
- ISO 22095-2:2026 Chain of custody — Mass balance — Requirements and guidelines.
- ISO 22095-3:2026 Chain of Custody — Book and Claim — Requirements and guidelines.
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