



Guidance on Mechanical Plastic Recycling Operations Eligible for ARC Generation



GUIDE

ADVANCING THE USE OF
RECYCLED MATERIALS

recycled
material
STANDARD





Advancing the Use of Recycled Materials

The Recycled Material Standard (RMS) created Attributes of Recycled Content, or ARCs, as a means to fund investment in the recycling system through environmental commodity trading. With the shifting landscape of policy, we anticipate more resources will be available to fund collection, hauling and sortation for residential recyclables. However, as funds for collection and sortation make materials more available, we anticipate a need for expanded capacity and capability at the reprocessing level.

ARCs are generated at the reprocessor level, and each ARC represents the environmental attributes associated with one metric ton of recycled output. Given the complexity of supply chains and recycling operations, there are a variety of types of operations that fall within the scope of “reprocessing”. This document is intended to clarify the intent of the RMS and offer illustrative examples to help prospective ARC generators and certification bodies better understand which types of operations are potentially eligible to generate ARCs, provided they meet all other criteria outlined in the RMS **Framework** and **Plastics Module**.

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SCOPE

The scope of this guidance document is limited to mechanical plastic recycling operations, and does not address chemical recycling operations.

PURPOSE OF ARCS

The purpose of ARCs, as described in the RMS Framework Section 8.2, is to advance the use of recycled materials by driving necessary investment into recycling infrastructure, ultimately increasing recycling capacity, efficiency, and quality. ARCs are intended to be a mechanism to support critical stages of the recycling value chain (i.e. processors) in generating additional benefit through enhanced recycling technology and markets. By investing in reprocessors, we can ensure the critical link between supply and demand continues to grow, ensuring sufficient supply and quality exists to meet stated demand for 2025 and 2030 recycled materials goals.

ARCs may be generated by processors that recycle reclaimed inputs – i.e., converting reclaimed inputs to recycled outputs.

Reclaimed material is defined in 3.14 of the RMS Framework as **“material that would have otherwise been disposed of as waste or used for energy recovery but has instead been collected and recovered [reclaimed] as a material input, in lieu of new primary material, for a recycling or a manufacturing process.”**

Recycled material is defined in 3.16 of the RMS Framework as **“material that was diverted from the waste stream and has been collected, sorted and reprocessed and converted into a feedstock to be used in a product. Recycled material includes post-industrial and post-consumer sources.”**

To be eligible for ARC generation, a process must result in recycled feedstock that is ready to be used as a direct input for the manufacturing of a product without further processing or transformation.

A helpful framework for considering whether an input or output qualifies as “reclaimed” or “recycled” is the **RMS Plastic Material Classification**. As a general rule, materials that fall within the P0, Reclaimed Materials, and P1, Recovered Plastic, categories can be considered reclaimed materials. RMS participants are also encouraged to refer to industry accepted classification systems such as the ISRI Scrap Specification Circular which is updated annually. Scrap bales, as defined by ISRI, generally fall into the P0 and P1 levels.

ARC ELIGIBILITY

Materials that fall within the P3, Polymers (Resins) category can be considered recycled materials. A mechanical recycling process eligible for ARC generation would typically have inputs in the P0 or P1 categories, and outputs in the P3 category. Those outputs would be feedstock for manufacturing operations resulting in outputs within the P4, Plastic Articles, or P5, Plastic Products categories. In some cases of vertically integrated operations, the outputs of the ARC-generating process could themselves fall within the P4 or P5 categories, bypassing the P3 category.

There may be operations within the value chain that add value to either reclaimed or recycled materials (e.g., shredding or densifying for shipping efficiencies), without themselves constituting reprocessing. While RMS recognizes the importance of these activities, they are not eligible for ARC generation. Only processes that transform reclaimed materials into recycled materials, ready for direct manufacturing, are eligible for ARC generation.

When a reclamation process includes an extrusion step to form resin pellets used by a converter to make finished goods, there is no ambiguity that re-processing has occurred. However, when a size reduction process generates regrind, flake, or densified materials it is often the case that additional value-add processing is required before it meets target qualities for conversion.

Value-add activities include, but are not limited to:

- *manual and automated sorting*
- *washing*
- *drying*
- *elutriation*
- *density separation*
- *melt filtration, other forms of contaminant removal*

Metal separation alone does not constitute a value-add activity as it is intrinsic to the grinding or shredding step.

Size reduction alone would not qualify for ARC generation unless it somehow meets the additionality criteria. The following guidelines and examples are meant to illustrate processes and their outputs that are eligible for ARC generation.

GUIDING PRINCIPLES

In order to help both participants and certification bodies determine whether a facility's assets meet the RMS interpretation of reprocessing to qualify for ARC generation, we offer the following guiding principles.

1. *Material must meet the RMS definitions of post-consumer and/or post-industrial plastics.*
2. *Material may only be able to generate an ARC at a single point in the supply chain. Once the ARC is issued, the physical materials have lost recycled status and are referred to as "base materials". This aspect eliminates double counting.*
3. *Size reduction alone does not qualify as reprocessing.*
4. *Reprocessing improves the quality of material to the point where it is suitable for use in a downstream manufacturing process.*
5. *Blending for homogeneity alone does not qualify as reprocessing. Blending materials that result in an altered material mix to meet specification would qualify for ARC generation.*
6. *Metal separation alone does not qualify as reprocessing.*

ILLUSTRATIVE EXAMPLES

The following examples of mechanical recycling and adjacent operations serve to illustrate the types of processes that may be eligible for ARC generation.

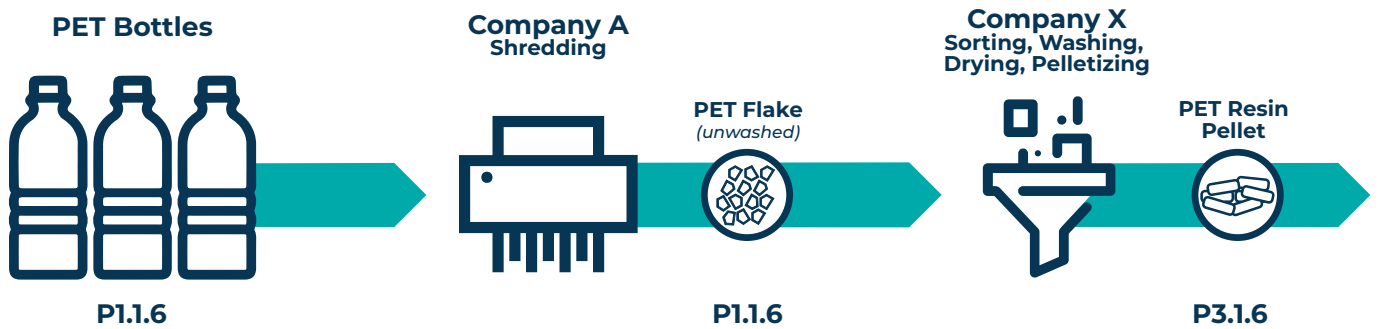
In all cases, in addition to meeting the basic process requirements, participants must meet the additionality requirements defined within Section 7 of the [RMS Plastics Module](#).

In addition to material descriptions, diagrams below include product ID codes from the RMS Material Classification.

Example 1a: Dirty PET Flake

Company A receives post-consumer PET beverage containers from waste collectors. They perform size reduction by shredding the used bottles into flakes to reduce transport costs. They sell the dirty PET flakes to Company X, who cleans the flake and transforms them into pellets. Company A is not eligible for ARC generation.

Explanation: The output from company A falls within the P1 category, and requires further reprocessing before it can enter a product manufacturing process. Company X's process may be eligible for ARC generation.



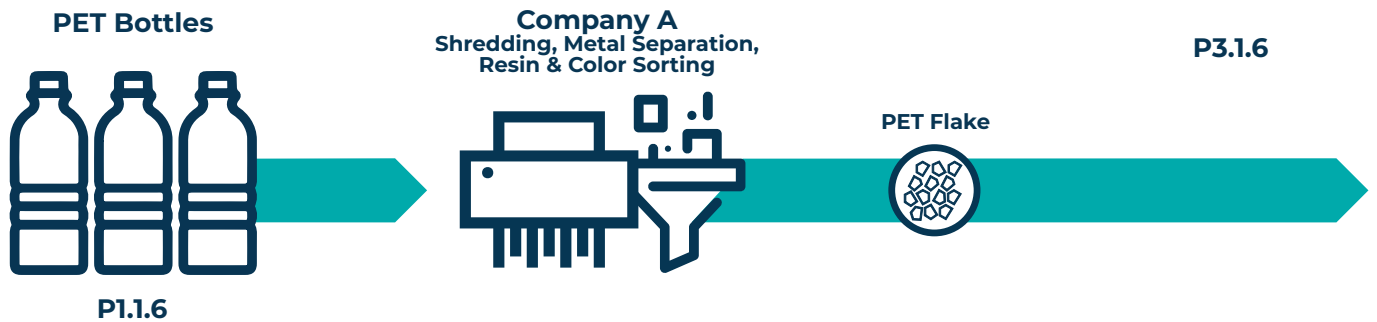
Example 1b: Clean PET Flake

Company A purchases bales of PET bottles or thermoforms. Company A performs shredding, washing and drying. Once the flake is of target quality, some flake is pelletized for sale and some flake is sold to customers. Both pellets and flake are ready for manufacturing and both streams may be eligible for ARC generation.



Example 1c: Sorted Flake

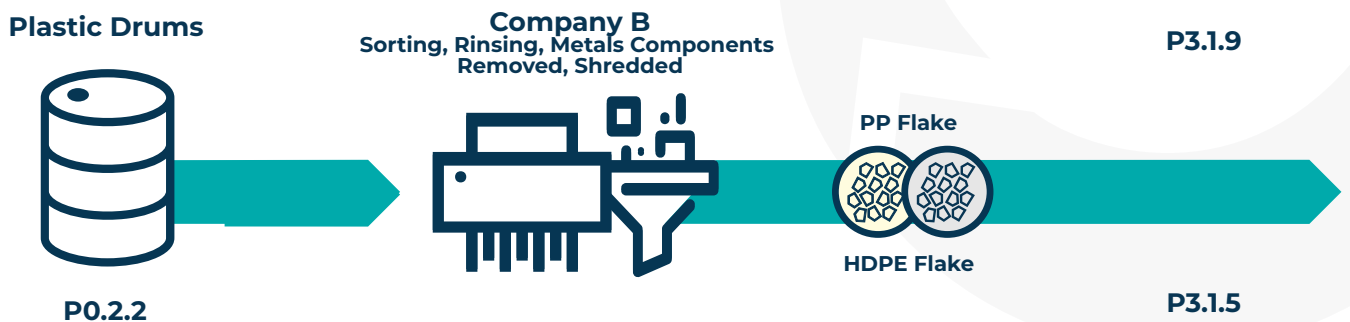
Company A purchases bales of PET bottles or thermoforms. Company A performs shredding, metal separation and color sorting. Once the flake is of target quality, the flake is sold to customers and made into strapping. Company A may be eligible for ARC generation.



Example 2: Post-Consumer Regrind

Company B collects plastic drums, primarily composed of HDPE, PP and other co-polymers from manufacturing facilities and transports them to their facility. They sort the drums by material type and color. Drums are pre-washed if necessary and metal components are removed, and the material is shredded to form reflake. Materials are blended as needed and tested to ensure that they meet customer specifications.

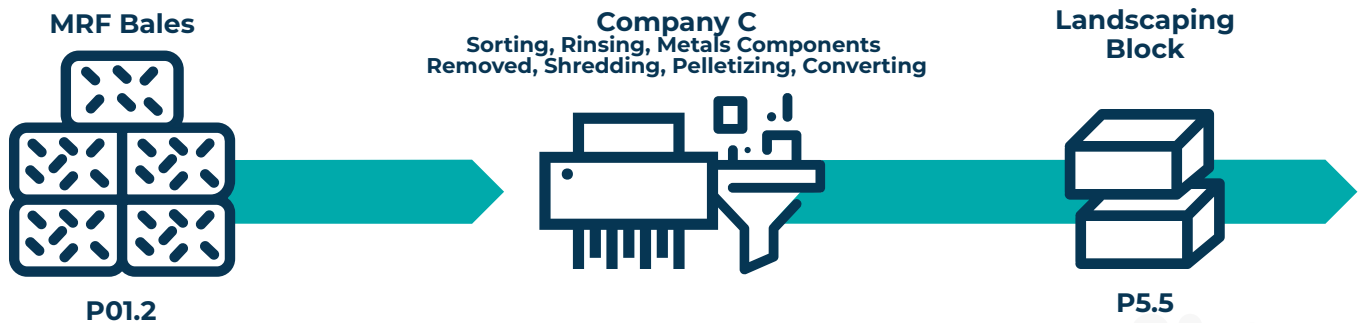
Company B’s customers typically use the material as direct input for manufacturing of products such as pipe, railroad ties, or pallets, without requiring further reprocessing. Company B’s process may be eligible for ARC generation as their operation transforms P1 materials into P3 materials ready to feed into a product manufacturing process.



Example 3: Vertically Integrated Manufacturing Process

Company C purchases mixed plastic waste from material recovery facilities (MRFs) or a broker. They sort, shred, wash, dry, and blend the materials, then mold the clean flake into a finished product that can be used for construction or landscaping projects. These steps may occur across multiple facilities owned by the same company.

Their finished product is sold through retailers and wholesale to customers without a claim of recycled content. Their operation may be eligible for ARC generation, as they are transforming PO materials into P5 products. Although they do not produce a feedstock for other manufacturing operations, their operation does constitute reprocessing because it transforms reclaimed materials into recycled materials.



Example 4: Compounder

Company D purchases clean, RMS chain of custody certified post-consumer and post-industrial recycled plastics in pellet or flake. The materials as received are usable for manufacturing in certain applications, and are often sold directly to those customers.

Other customers have more specific requirements, and Company D is able to add value to the plastics to meet those requirements. They blend different grades of materials, and in some cases additives to enhance the processability, color, or other physical properties of the recycled materials, in order to meet their customers' specifications.

While Company D's input materials have P3 status, because Company D is further improving the quality of the material necessary for their downstream customer's needs, their pelletizing operations are eligible for ARC generation.



Example 5: Toll Processing

Company E purchases bales of post-consumer HDPE containers directly from MRFs. They remove metals and other contaminants, shred the materials, and wash them, resulting in clean HDPE flake. Then, they send the materials to Company F, a toll processing facility, where the materials are pelletized before being returned to Company E's facility. Company E then sells the pellets to customers who use them directly in the manufacture of products. Company E retains legal ownership of the materials while they are at the toll processing facility, and includes these outsourced activities within the scope of its system boundary as specified in Section 5.4.3 of the RMS Framework. Company E's operations may be eligible for ARC generation. Both the flake and the resin pellets could potentially serve as base material for issuing ARCs.

Note: Company E must meet all applicable additionality requirements based on its own facility and equipment, without taking into account any reinvestments or new equipment owned by the toll processor, and the scope of the ARC-generating project must be limited to equipment owned by Company E.



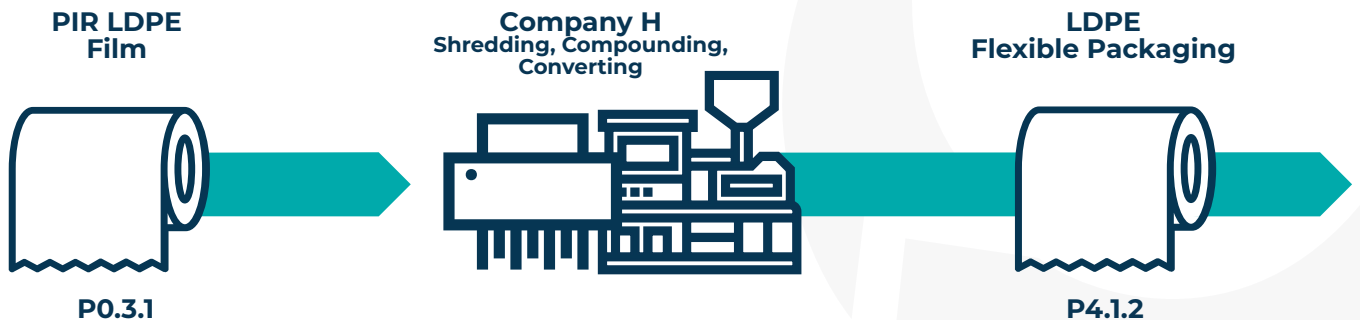
Example 6: Regrind Reused Within a Process

Company G manufactures PET bottles, using virgin resin pellets as a feedstock. When bottles do not meet specifications, they are shredded. This “regrind” is fed back into the same bottle manufacturing process with no further modifications. Because this activity does not qualify the “regrind” as post-industrial recycled material, unlike the post-consumer “regrind” in example 2, this activity does not qualify for ARC generation.



Example 7: New Post-Industrial Recycling Facility

Company H purchases post-industrial LDPE film scrap from flexible packaging converters. They have just invested in a new facility where this film will be shredded, blended with additives, and fed into a new film manufacturing process. They sell the resulting film to a variety of applications. This operation may be eligible for ARC generation.



Example 8: Foamed Plastic Densification

Company I collects expanded polystyrene foam from various residential, institutional and industrial sources. They densify the materials and form pallets of densified PS bricks which are then sold to other companies for further processing. Company I is not eligible for ARC generation.

Explanation: See principle #3. Other than size reduction through densification, there has been no quality improvement to the materials.



DISCLAIMER

This Guidance document has been developed to aid recyclers and auditors in determining what activities may be eligible for ARC generation, particularly when it comes to recycled plastic materials that are sold as flake rather than pelletized. The guidance was developed by the RMS team, in partnership with recyclers and the RMS advisory board with the intent that it represents the current realities of the mechanical recycling process and market for plastics today. If exceptions are encountered during the audit process that do not fall within the examples or interpretation offered in this guidance, auditors and recyclers are encouraged to reach out to the RMS team for further guidance. The RMS reserves the right to update this document at any time.

DEFINITIONS

The RMS seeks to use common industry language when it comes to the stages of recycling, and players in the recycle value chain. For key terms used in this guidance, the RMS is referencing definitions that can be found in the *Association of Plastics Recyclers Plastics Recycling Glossary*.

Converter - Businesses that buy raw material and convert that into finished goods. In the case of plastics, the plastic pellets of specific polymers are converted into items such as fibers, films, sheet, and rigid packaging along with semi-durable and durable goods.

Dirty Flake - The result when a plastic item or package has been granulated, but not washed. This flake will include the residual contents in the packaging, labels and closures on the packaging, and any dirt or contamination from collection and sorting of the packaging.

Flake (or Bottle Flake) - The resulting small, flat shaped pieces of material created when plastic bottles are granulated.

Granulation - The reduction in size of large plastic parts for washing and extrusion by machine processing. Typically, rotating cutting knives are used to cut the plastic to a size that falls through a screen resulting in pieces of plastic in the range of 6 to 12 mm. These pieces are referred to as granulate or flake. Alternately referred to a “grinding”.

Melt Filtration - The process of melting plastic in an extruder and forcing it through a fine screen to filter the melt. Melt filtration is widely used to remove metals, wood and paper, thermoset materials and other unmelted physical contamination from recycled plastics.

Pellets - A form of plastic created when washed flake extruded into a strand and chopped into uniformly sized pieces called pellets, for the purpose of achieving higher bulk density than flake with better feeding and conveying performance.

Reclaimer - A commercial entity that accepts aggregated postconsumer and/or post-industrial plastic materials and performs a series of operations to allow them to return to commerce as useful raw materials or new finished items of commerce.

Recycling - Separating, collecting, processing, marketing and ultimately using a material that otherwise would have been disposed.

Reprocess - To convert recovered materials into a new raw material that can be used to make finished goods. For example, plastic reclaimers reprocess plastic bottles into pellets, which can then be manufactured into new plastic products.

Washed Flake - Flake obtained after dirty flake is washed to remove surface contamination. Washed flake also goes through a variety of other steps to remove contamination and improve uniformity. These steps can include: float/sink tank separation, metals removal, size screening, air separation, and flake color sortation.

ACKNOWLEDGEMENTS

The RMS team would like to thank the companies that contributed to development of this guidance document:

- *ACI Plastics*
- *Evergreen*
- *ADS Recycling and Infiltrator Water Technologies*

ATTRIBUTES OF RECYCLED CONTENT (ARC)



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