



PLASTIC RECYCLING, INC.
ENGINEERED RECYCLED COMPOUNDS

PRI WHITEPAPER

VARIABILITY ABSORPTION.

How vertical integration turns inconsistent recycled feedstocks into stable, spec-grade compounds — and why that changes the risk equation for procurement and materials teams.

THE PROBLEM

WHY RECYCLED MATERIAL MAKES BUYERS NERVOUS

Most materials engineers and procurement leads have the same instinct about recycled resin: **it's inconsistent, and inconsistency is risk**. That instinct is not wrong. It is the single most rational objection to post-consumer recycled (PCR) material — and it is the objection PRI was built to answer.

Recycled feedstock is, by its nature, variable. A truckload of post-consumer curbside bales, end-of-life vehicle (ELV) plastics, or automotive shredder residue (ASR) is not a uniform input. It carries a mix of polymers, colors, contaminants, additives, and degradation histories that no two loads share equally. For a plant running tight specification windows, that variability shows up where it hurts most: at the molding machine, in failed qualification runs, in lot-to-lot drift, and in scrap.

So buyers do the sensible thing. They either avoid recycled content entirely, or they accept it only after extensive, expensive qualification — and then re-test every lot, because they don't trust it to stay consistent. The result is a market where the *demand* for recycled content is rising fast (driven by ESG targets and regulation) but the *confidence* in recycled supply lags far behind.

"The problem was never whether recycled material could exist. It was whether it could behave the same way, every shipment, every time. That is an engineering problem — and it is the one we solve."

— THE PRI OPERATING PHILOSOPHY

THE CORE IDEA

SOMEONE HAS TO ABSORB THE VARIABILITY

Here is the principle that defines how PRI operates: **variability in recycled material does not disappear — someone absorbs it**. Either the recycler absorbs it upstream, through sorting, formulation, compounding, and validation, or the customer absorbs it downstream, at their own process, on their own equipment, at their own cost.

Most of the recycled-plastics market pushes variability downstream. Material is cleaned, pelletized, and sold — and whatever inconsistency remains becomes the customer's problem to manage. PRI is built on the opposite model. **We absorb the variability upstream, inside our processes, so that what leaves our facility is stable, defined, and repeatable.**

This is why PRI describes itself not as a recycler or a compounder, but as a **material engineering company**. Recycled streams are not the product — they are the input. The product is engineered material performance with a known, controlled specification.

HOW IT WORKS

THE TWO-STAGE MODEL

Variability absorption is not a slogan — it is a physical process with two distinct sides. Upstream, PRI takes on the complexity. Downstream, the customer receives the result.

↑ UPSTREAM — PRI ABSORBS	↓ DOWNSTREAM — YOU RECEIVE
Variable, inconsistent feedstock arrives. PRI performs lot identification, segregation, washing, density separation, optical and triboelectric sorting, rubber and contaminant removal, controlled formulation, compounding, vacuum degassing, and in-line quality control. Every source of inconsistency is managed here, before the material is ever pelletized.	Stable, consistent, spec-grade pellets. Defined melt flow rate, mechanical properties, and lot-to-lot repeatability. Material that runs on your existing equipment without process adjustments — and that holds its specification from one shipment to the next.

The distinction matters because it changes where the engineering effort lives. In a commodity recycled-pellet model, the customer's engineers spend their time compensating for an unpredictable input. In PRI's model, **that engineering work has already been done** — upstream, by people whose entire job is absorbing that complexity.

THE PROCESS

WHERE VARIABILITY IS REMOVED

- 1 Feedstock Management**
 Incoming streams — curbside bales, ELV and ASR scrap, WEEE plastic fraction, and post-industrial scrap — are lot-identified, segregated, and traceability-tracked from day one. Variability is assessed at entry, not discovered later.
- 2 Preparation & Sorting**
 Size reduction, washing, density separation, optical sorting, and electrostatic separation eliminate the life-cycle noise: dirt, wrong polymers, metals, inks, and instability. The output is clean, homogeneous material with predictable feeding behavior.
- 3 Advanced Compounding**
 Multiple recycled streams, additives, fillers, and colors are combined under controlled gravimetric dosing, with vacuum degassing for volatile removal. This is where variable inputs become a defined formulation.
- 4 Quality & Validation**
 In-line quality control and in-house laboratory testing confirm the material meets its specification window before it ships — with ISCC PLUS mass-balance traceability and a Certificate of Analysis per lot.

WHY IT'S CREDIBLE

VERTICAL INTEGRATION IS THE ENABLER

Absorbing variability is only possible if you control the entire chain. A company that buys cleaned flake from someone else cannot absorb what it never saw. PRI controls the material from incoming bale to finished pellet — which is what makes consistent output achievable rather than aspirational.

That control is backed by capability built over **38 years of operations** across **six facilities** in Indiana, Tennessee, and South Carolina, with roughly **200 million pounds of annual capacity**. It is validated by an in-house laboratory that performs the overwhelming majority of mechanical, thermal, chemical, and color testing on-site — so every specification claim is proven internally, not outsourced.

38

YEARS OF OPERATIONS

~200M

LBS ANNUAL CAPACITY

99%

TESTING PERFORMED IN-
HOUSE

4x

FDA LETTERS OF NO
OBJECTION

WHAT IT MEANS FOR YOU

THE RISK EQUATION, CHANGED

For a procurement or materials team, variability absorption changes the calculation in concrete ways:

- **Lower qualification effort.** Because the material arrives consistent and spec-defined, you do less testing and validation to approve it — and less re-testing lot to lot.
- **Run on existing equipment.** Defined melt flow and mechanical properties mean PRI material drops into your process without machine adjustments or reformulation.
- **Predictable supply behavior.** Lot-to-lot repeatability removes the hidden cost of recycled content: the scrap, downtime, and rework that inconsistency creates.
- **Documented, certified content.** ISCC PLUS mass-balance traceability and per-lot Certificates of Analysis give your sustainability and quality teams the paperwork they need.

In short: PRI's model reframes recycled content from a *risk you manage* into a *specification you can trust*. The variability still exists — it is simply absorbed before the material reaches you.

SEE IT ON YOUR OWN PARTS

The most convincing proof of variability absorption is a sample that runs on your equipment, to your specification, lot after lot. Request a sample and validate it against your own process.

REQUEST A SAMPLE AT [PLASTIC-RECYCLING.NET](https://plastic-recycling.net) →

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