

TROY TECHNICAL

POLYMERS & RESINS

WEEKLY REPORT

October 10 - October 16, 2026 | Issue 2026-W41

**Qualification evidence across formulation,
processing, durability and circularity**

10

ANALYZED ARTICLES

9

PRIORITY THEMES

Issued 2026-10-16 | English edition | fixed approved cover artwork



Polymers & Resins: the boundary moved from isolated claims to qualification evidence

10 English articles were reviewed independently from the Japanese edition. Ten themes are retained for management decisions.

SIGNAL 01 | SYSTEM / ADOPTION

Evonik, Toyotsu Chemiplas, Sanyo Chemical: PU Recycling Roadmap

Primary-source report: Evonik, Toyotsu Chemiplas, and Sanyo Chemical have partnered to establish a chemical recycling model for polyurethane (PU) foam in Japan.

SIGNAL 02 | TECH / PROCESS

LIFE BIOBCOMPO: Plant-fibre biocomposites for Stellantis vehicles

Primary-source report: The LIFE BIOBCOMPO project has developed a lightweight biocomposite using renewable cellulose fibres to replace conventional mineral fillers in automotive parts.

SIGNAL 03 | SYSTEM / ADOPTION

Recyclamine® Technology: Thermoformable and Recyclable Epoxy System

Collected report (not independently verified): Recyclamine® technology introduces a dynamic epoxy system that combines the mechanical performance of thermosets with the ability to be thermoformed and chemically recycled.

SIGNAL 04 | SYSTEM / ADOPTION

Toray Recycled Fiber: 93% Recycled Polyester-Nylon Specs and Timeline

Collected report (not independently verified): Toray Industries has developed a polyester-nylon composite fiber containing at least 93% recycled material by mass.

DECISION

Focus this week's management attention on qualification evidence across formulation, processing, durability and circularity. Move only when the linked evidence can be reproduced under your own operating conditions.

THREE MANAGEMENT MOVES

1. Buyers: select applications where performance data can justify qualification effort and switching cost.
2. Suppliers: provide process windows, reliability data, traceability and recovery economics with the material.
3. Executives: track scale, price, long-term reliability, regulation, recyclability and customer qualification.

EVIDENCE DISCIPLINE

FACT states what the collected English source reports. BUSINESS READ and ACTION are editorial interpretations. UNKNOWN lists information that the source file does not establish. A linked article is not treated as independent confirmation of every claim.

Five numbers or evidence anchors that require conditions

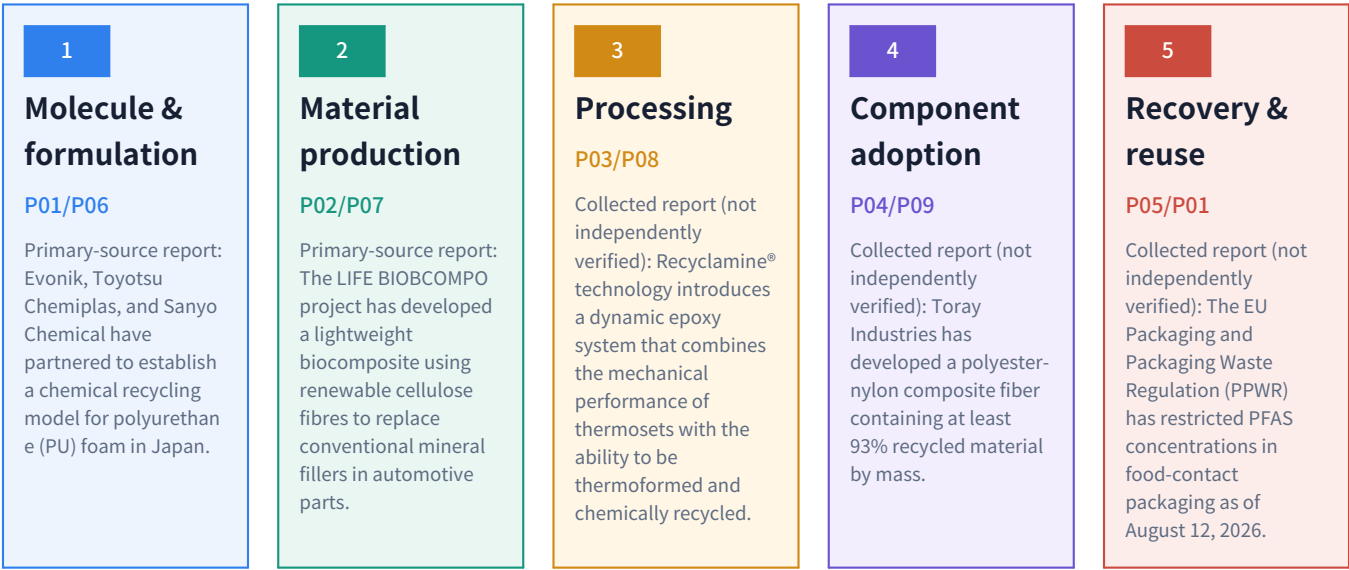
~10,000 A08	SOURCE-BOUND CONDITION BIOBCOMPO vehicles since 2022
~20% A08	SOURCE-BOUND CONDITION BIOBCOMPO non-fossil content
~8% A08	SOURCE-BOUND CONDITION Part weight reduction vs mineral-filled
>=93% A10	SOURCE-BOUND CONDITION Toray fiber recycled content by mass
OPEN A03	SOURCE-BOUND CONDITION Application-specific impurities and reprocessing, reproducibility and deployment terms remain unproven. Published claims are not customer-qualified performance.

HOW TO USE THESE NUMBERS

Each value is shown with the condition stated in the collected English article. Do not compare values across different test methods, device sizes, operating temperatures or commercial stages without normalizing those conditions.

Where the value chain moved

Each stage combines one leading theme and one supporting theme. The report treats handoffs as evidence transfers, not decorative arrows.



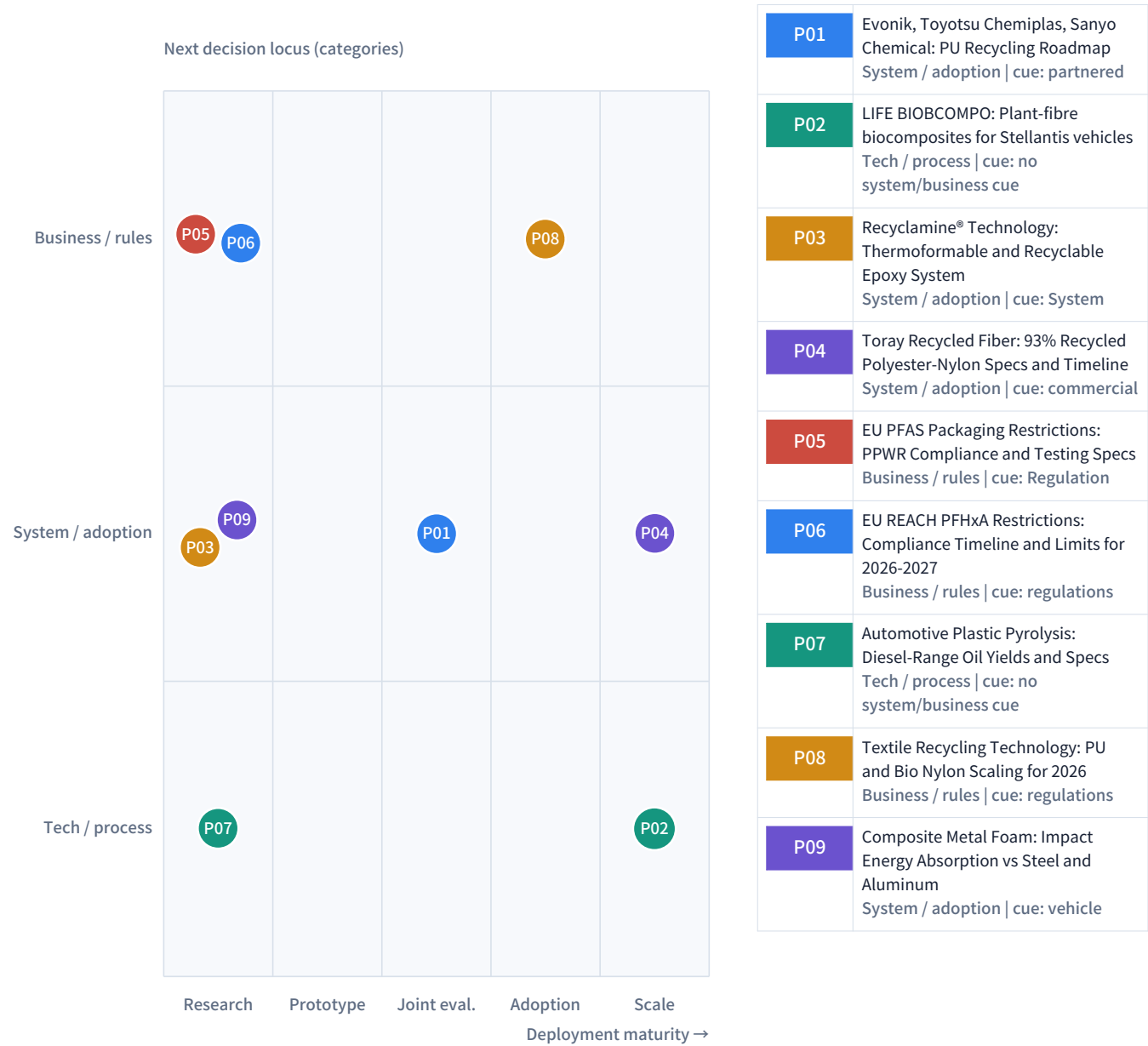
EVIDENCE REQUIRED AT EACH HANDOFF

Molecule & formulation to Material production	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck scale, price, long-term reliability, regulation, recyclability and customer qualification.
Material production to Processing	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck scale, price, long-term reliability, regulation, recyclability and customer qualification.
Processing to Component adoption	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck scale, price, long-term reliability, regulation, recyclability and customer qualification.
Component adoption to Recovery & reuse	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck scale, price, long-term reliability, regulation, recyclability and customer qualification.

COMMON CONTROL POINT

No theme moves to a commercial commitment until a named owner has reproduced the relevant evidence and documented scale, price, long-term reliability, regulation, recyclability and customer qualification.

Priority map: maturity and next decision locus



REPRODUCIBLE POSITIONING RULE
Horizontal position uses five discrete stages: Research, Prototype, Joint evaluation, Product adoption and Scale. The vertical bands classify the next decision locus: Tech / process, System / adoption, or Business / rules (including supply systems). Article-title cues take precedence; the overview is used only when the title is silent. These are categories, not impact ranks. Bubble diameter reflects the editorial score.

For legibility, scores of 18 or below use an 18-pt bubble diameter; underlying scores are unchanged.

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P01

Evonik, Toyotsu Chemiplas, Sanyo Chemical: PU Recycling Roadmap

A03 | System / adoption | Joint evaluation

2026-10-13

FACT

Primary-source report: Evonik, Toyotsu Chemiplas, and Sanyo Chemical have partnered to establish a chemical recycling model for polyurethane (PU) foam in Japan. The initiative utilizes a hydrolysis-based process to recover high-purity polyols and amines from post-consumer and post-industrial waste for reuse in new PU products.

WHY IT MATTERS

In practical terms, Evonik, Toyotsu Chemiplas, Sanyo Chemical needs separate tests of recovered properties and impurities and reprocessing before the result becomes an adoption case.

BUSINESS READ

For Evonik, Toyotsu Chemiplas, Sanyo Chemical, compare recovered properties and impurities and reprocessing under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Evonik, Toyotsu Chemiplas, Sanyo Chemical on recovered properties against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific impurities and reprocessing, reproducibility and deployment terms remain unproven. Published claims are not customer-qualified performance.

EDITORIAL SCORE 18/25 | MATURITY 3/5 | DECISION LOCUS: SYSTEM / ADOPTION

P02

LIFE BIOBCOMPO: Plant-fibre biocomposites for Stellantis vehicles

A08 | Tech / process | Scale-up

2026-10-13

FACT

Primary-source report: The LIFE BIOBCOMPO project has developed a lightweight biocomposite using renewable cellulose fibres to replace conventional mineral fillers in automotive parts. Since 2022, approximately 10,000 vehicles have been equipped with these materials, demonstrating a viable path from laboratory research to industrial scale.

WHY IT MATTERS

In practical terms, LIFE BIOBCOMPO needs separate tests of property retention and processing temperature before the result becomes an adoption case.

BUSINESS READ

For LIFE BIOBCOMPO, compare property retention and processing temperature under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare LIFE BIOBCOMPO on property retention against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific processing temperature, reproducibility and deployment terms remain unproven. Published claims are not customer-qualified performance.

EDITORIAL SCORE 19/25 | MATURITY 5/5 | DECISION LOCUS: TECH / PROCESS

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P03

Recyclamine® Technology: Thermoformable and Recyclable Epoxy System

A06 | System / adoption | Research

2026-10-14

FACT

Collected report (not independently verified): Recyclamine® technology introduces a dynamic epoxy system that combines the mechanical performance of thermosets with the ability to be thermoformed and chemically recycled. This allows cured composite components to be reshaped, repaired, and recovered, extending the material's value across its entire lifecycle.

WHY IT MATTERS

In practical terms, Recyclamine® Technology needs separate tests of recovered properties and impurities and reprocessing before the result becomes an adoption case.

BUSINESS READ

For Recyclamine® Technology, compare recovered properties and impurities and reprocessing under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Recyclamine® Technology on recovered properties against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific impurities and reprocessing, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 15/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

P04

Toray Recycled Fiber: 93% Recycled Polyester-Nylon Specs and Timeline

A10 | System / adoption | Scale-up

2026-10-15

FACT

Collected report (not independently verified): Toray Industries has developed a polyester-nylon composite fiber containing at least 93% recycled material by mass. This innovation enables premium apparel aesthetics and performance without relying on PFAS in water-repellent agents, with a commercial launch targeted for fall/winter 2027.

WHY IT MATTERS

In practical terms, Toray Recycled Fiber needs separate tests of recovered properties and impurities and reprocessing before the result becomes an adoption case.

BUSINESS READ

For Toray Recycled Fiber, compare recovered properties and impurities and reprocessing under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Toray Recycled Fiber on recovered properties against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific impurities and reprocessing, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 17/25 | MATURITY 5/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P05

EU PFAS Packaging Restrictions: PPWR Compliance and Testing Specs

A01 | Business / rules | Research

2026-10-13

FACT

Collected report (not independently verified): The EU Packaging and Packaging Waste Regulation (PPWR) has restricted PFAS concentrations in food-contact packaging as of August 12, 2026. Compliance requires manufacturers to move beyond "no intentionally added" declarations toward rigorous chemical verification and the adoption of PFAS-free barrier materials.

WHY IT MATTERS

In practical terms, EU PFAS Packaging Restrictions needs separate tests of substance and jurisdiction and assay and effective date before the result becomes an adoption case.

BUSINESS READ

For EU PFAS Packaging Restrictions, compare substance and jurisdiction and assay and effective date under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare EU PFAS Packaging Restrictions on substance and jurisdiction against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific assay and effective date, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 15/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

P06

EU REACH PFHxA Restrictions: Compliance Timeline and Limits for 2026-2027

A02 | Business / rules | Research

2026-10-08

FACT

Collected report (not independently verified): The European Union is implementing new REACH restrictions on PFHxA and related substances in textiles and footwear starting October 10, 2026. These regulations establish strict concentration limits of 25 ppb for PFHxA and 1,000 ppb for related substances, signaling a broader regulatory shift toward PFAS elimination in the apparel industry.

WHY IT MATTERS

In practical terms, EU REACH PFHxA Restrictions needs separate tests of substance and jurisdiction and assay and effective date before the result becomes an adoption case.

BUSINESS READ

For EU REACH PFHxA Restrictions, compare substance and jurisdiction and assay and effective date under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare EU REACH PFHxA Restrictions on substance and jurisdiction against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific assay and effective date, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 15/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P07

Automotive Plastic Pyrolysis: Diesel-Range Oil Yields and Specs

A04 | Tech / process | Research

2026-10-14

FACT

Collected report (not independently verified): Research into the catalytic pyrolysis of automotive plastic waste (APW) demonstrates that iron-modified clay catalysts can increase oil yields to 78.6%. The resulting oil exhibits a calorific value of 49.85 MJ/kg, suggesting a viable pathway for recovering diesel-range fuels from end-of-life vehicles.

WHY IT MATTERS

In practical terms, Automotive Plastic Pyrolysis needs separate tests of property retention and processing temperature before the result becomes an adoption case.

BUSINESS READ

For Automotive Plastic Pyrolysis, compare property retention and processing temperature under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Automotive Plastic Pyrolysis on property retention against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific processing temperature, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 14/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

P08

Textile Recycling Technology: PU and Bio Nylon Scaling for 2026

A05 | Business / rules | Product adoption

2026-10-14

FACT

Collected report (not independently verified): The textile industry is transitioning toward a circular model to meet EU ESPR regulations and 2030 carbon targets, with the APAC recycling market projected to grow at a CAGR of 12-15% in high-tech segments. Key advancements include chemical depolymerization for PU and polyester, and bio-based intermediates for nylon production.

WHY IT MATTERS

In practical terms, Textile Recycling Technology needs separate tests of recovered properties and impurities and reprocessing before the result becomes an adoption case.

BUSINESS READ

For Textile Recycling Technology, compare recovered properties and impurities and reprocessing under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Textile Recycling Technology on recovered properties against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific impurities and reprocessing, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 17/25 | MATURITY 4/5 | DECISION LOCUS: BUSINESS / RULES

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P09

Composite Metal Foam: Impact Energy Absorption vs Steel and Aluminum

A09 | System / adoption | Research

2026-10-15

FACT

Collected report (not independently verified): Engineers at North Carolina State University have demonstrated that Composite Metal Foam (CMF) significantly reduces vehicle deceleration and head-injury risk during high-speed frontal collisions. Computational simulations show that CMF rails can reduce maximum deceleration by up to 84% compared to conventional rectangular rails.

WHY IT MATTERS

In practical terms, Composite Metal Foam needs separate tests of property retention and processing temperature before the result becomes an adoption case.

BUSINESS READ

For Composite Metal Foam, compare property retention and processing temperature under the same application conditions. Request source protocols before extrapolating to customer use. This is an editorial inference.

ACTION

Within 30 days, R&D and quality should compare Composite Metal Foam on property retention against a baseline; deliver an acceptance and stop-rule sheet.

UNKNOWN

Application-specific processing temperature, reproducibility and deployment terms remain unproven. Confirm the original primary record.

EDITORIAL SCORE 15/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

Playbook and 0-5 year roadmap

STAKEHOLDER	NOW 0-30 DAYS	NEXT 1-12 MONTHS	LATER 1-5 YEARS
Operating companies	select applications where performance data can justify qualification effort and switching cost	Run production-like qualification with explicit acceptance and stop criteria.	Build a portfolio and architecture that can absorb technology and supplier changes.
Materials, equipment and technology suppliers	provide process windows, reliability data, traceability and recovery economics with the material	Create shared reliability, process-window and failure-analysis data with customers.	Standardize interfaces, traceability, lifecycle support and recovery services.
Trading, investment and legal teams	Map scale, price, long-term reliability, regulation, recyclability and customer qualification.	Contract for capacity, quality, change notice, liability, alternatives and exit.	Diversify regional, technical and customer concentration risk.

ROADMAP

NOW 0-30 DAYS Evidence ledger Owner: Strategy + quality Deliverable: claim, source, condition, owner	NOW 0-30 DAYS Risk screen Owner: Procurement + legal Deliverable: unknowns, alternatives, stop	NEXT 1-12 MONTHS Joint qualification Owner: R&D + supplier Deliverable: process window and failure data
NEXT 1-12 MONTHS Commercial gate Owner: Business + finance Deliverable: unit economics and capacity	LATER 1-5 YEARS Platform strategy Owner: Executive team Deliverable: portfolio and interface roadmap	LATER 1-5 YEARS Service layer Owner: Operations + channel Deliverable: monitoring, maintenance and recovery

GO / NO-GO GATES

GATE	OWNER	REQUIRED EVIDENCE	NO-GO CONDITION
G1 Evidence	Quality	Source, test conditions and reproducibility	No traceable evidence
G2 Integration	R&D	Interface, process window and failure analysis	Cannot meet system conditions
G3 Commercial	Business	Capacity, total cost, contract and alternatives	Economics or supply cannot be supported
G4 Lifecycle	Operations	Monitoring, maintenance, change notice and exit	No accountable operating plan

ANALYZED ARTICLES | ITEMS 01-10

Every title and URL is displayed in full. URLs wrap without shortening and remain clickable. A verified-reference label means the translated HTML did not retain its original source URL.

ID	FULL ARTICLE TITLE	FULL SOURCE / VERIFIED REFERENCE URL - CLICKABLE
A01	EU PFAS Packaging Restrictions: PPWR Compliance and Testing Specs	https://www.innovationnewsnetwork.com/eliminating-forever-chemicals-from-europes-packaging-supply-chain/74632/
A02	EU REACH PFHxA Restrictions: Compliance Timeline and Limits for 2026-2027	https://natlawreview.com/article/new-eu-pfhxa-limits-take-effect-amid-expanding-pfas-rules-apparel-and-textiles
A03	Evonik, Toyotsu Chemiplas, Sanyo Chemical: PU Recycling Roadmap	https://www.evonik.com/en/news/press-releases/2026/10/evonik-toyotsu-chemiplas-and-sanyo-chemical-launch-polyurethane-pu-recycling-initiative-in-japan.html
A04	Automotive Plastic Pyrolysis: Diesel-Range Oil Yields and Specs	https://www.plasticsengineering.org/2026/10/automotive-plastic-waste-pyrolysis-produces-diesel-range-oil-012337/
A05	Textile Recycling Technology: PU and Bio Nylon Scaling for 2026	https://fanterco.com/pu-recycling-and-bio-nylon-fabric-through-advanced-textile-recycling-technology/
A06	Recyclamine® Technology: Thermoformable and Recyclable Epoxy System	https://www.windsystemsmag.com/value-extension-of-composites-via-thermoformable-and-recyclable-epoxy-system/
A07	SOLiD Project: Scaling European Solid-State Battery Manufacturing	https://www.innovationnewsnetwork.com/solid-scaling-european-manufacturing-of-solid-state-lithium-metal-batteries/72552/
A08	LIFE BIOBCOMPO: Plant-fibre biocomposites for Stellantis vehicles	https://cinea.ec.europa.eu/news-events/news/life-biobcompo-lightweight-car-parts-made-plant-fibres-now-rolling-out-europes-roads-2026-10-13_en
A09	Composite Metal Foam: Impact Energy Absorption vs Steel and Aluminum	https://www.thomasnet.com/insights/can-lightweight-metal-foam-make-car-crashes-safer/
A10	Toray Recycled Fiber: 93% Recycled Polyester-Nylon Specs and Timeline	https://impressionsmagazine.com/news/toray-recycled-polyester-nylon-fiber-artirosa-cx/170803/

Scope: retrieving a source does not independently validate performance, cost or clinical utility. The claim ledger distinguishes announcements, papers and secondary reporting. Material published before the reporting week is continuing context, not a new event. Editorial inferences and actions are not investment or medical advice.

Polymers_Resins — Selected Articles

Date: 2026-10-18

Articles: 10

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#01 EU PFAS Packaging Restrictions: PPWR Compliance and Testing Specs

Published October 13, 2026 Innovation News Network UK



OVERVIEW

The EU Packaging and Packaging Waste Regulation (PPWR) has restricted PFAS concentrations in food-contact packaging as of August 12, 2026. Compliance requires manufacturers to move beyond "no intentionally added" declarations toward rigorous chemical verification and the adoption of PFAS-free barrier materials.

Key Findings

EU regulations now prohibit the placement of food-contact packaging on the market if PFAS concentrations meet or exceed specific thresholds. These limits apply to the packaging content itself rather than the amount of substance migrating into food. Notably, there are no exceptions for packaging containing recycled materials, and manufacturing items before the deadline does not exempt remaining stocks from these rules.

Technical Details

The PPWR establishes three distinct concentration thresholds for enforcement:

- 25 parts per billion for any individual PFAS via targeted analysis.
- 250 parts per billion for the sum of targeted PFAS (including precursor degradation).
- 50 parts per million for PFAS including polymers.

Additionally, a separate REACH restriction regarding PFHxA, its salts, and related substances in paper and cardboard food-contact materials took effect on October 10, 2026.

Background & Context

Verification remains a challenge due to the gap between supplier assurances and analytical evidence. A 2025 Swedish study found that extractable organic fluorine was detected in 47% of tested paper-based packages, suggesting unintentional presence despite restrictions on intentional additions. Furthermore, analytical methods can vary; research from February 2026 by Nestlé's Quality Assurance Center and the Centre Technique du Papier indicated that aqueous extraction may overestimate organic fluorine by failing to remove inorganic fluorides, suggesting that thermal preparation may improve distinction.

Significance & Outlook

Industry players must now integrate chemical verification into daily production and refine procurement specifications to cover the entire supply chain. Technical alternatives to fluorochemicals are emerging, such as Ahlstrom's mechanical refining and densification to create inherent grease barriers. Other trials involving UPM, BOBST, and Siegwerk have demonstrated that combining coated and uncoated papers with water-based inks and heat-sealing lacquers can maintain print quality and sealability on existing flexographic equipment.

Source: <https://www.innovationnewsnetwork.com/eliminating-forever-chemicals-from-europes-packaging-supply-chain/74632/>

Collected: October 17, 2026 | Automated Research System (AI)

#02 EU REACH PFHxA Restrictions: Compliance Timeline and Limits for 2026-2027

Published October 08, 2026 Beveridge & Diamond PC USA



OVERVIEW

The European Union is implementing new REACH restrictions on PFHxA and related substances in textiles and footwear starting October 10, 2026. These regulations establish strict concentration limits of 25 ppb for PFHxA and 1,000 ppb for related substances, signaling a broader regulatory shift toward PFAS elimination in the apparel industry.

Key Findings

Regulation (EU) 2024/2462 amends Annex XVII of REACH to prohibit specific concentrations of undecafluorohexanoic acid (PFHxA), its salts, and PFHxA-related substances. The restriction first applies on October 10, 2026, to clothing, accessories, and footwear for the general public. This will expand on October 10, 2027, to cover all other textiles, leather, furs, and hides.

Technical Details

The regulation sets the following concentration limits measured in homogeneous material:

- PFHxA and its salts: 25 parts per billion (ppb) or more.
- PFHxA-related substances: 1,000 ppb or more.

PFHxA-related substances are defined as those likely to break down into PFHxA based on molecular structure. While numerical limits are established, the regulation does not prescribe a specific testing method. Exclusions apply to certain construction textiles and personal protective equipment. Products placed on the market before the respective 2026 and 2027 deadlines are not subject to these restrictions.

Background & Context

Unlike EU directives, this regulation is binding and directly applicable across all Member States without requiring national implementing legislation, though enforcement and penalties remain national responsibilities. This measure coincides with broader PFAS restrictions in Europe. France prohibited PFAS in consumer clothing and footwear on January 1, 2026, with limits of 25 ppb for targeted analysis (excluding polymers) and 50 ppm for PFAS including polymers. Denmark implemented a restriction on July 1, 2026, prohibiting products containing total fluorine at or above 50 mg F/kg.

Significance & Outlook

The shift toward stricter PFAS limits necessitates that manufacturers and importers evaluate supply chains and review supplier specifications. Because requirements differ across jurisdictions regarding covered compounds, concentration thresholds, and testing approaches, companies must combine analytical testing with upstream chemical controls and compliance documentation to ensure market access in the EU.

Source: <https://natlawreview.com/article/new-eu-pfhxa-limits-take-effect-amid-expanding-pfas-rules-apparel-and-textiles>

Collected: October 17, 2026 | Automated Research System (AI)

#03 Evonik, Toyotsu Chemiplas, Sanyo Chemical: PU Recycling Roadmap

Published October 13, 2026 PU Magazine International Germany



OVERVIEW

Evonik, Toyotsu Chemiplas, and Sanyo Chemical have partnered to establish a chemical recycling model for polyurethane (PU) foam in Japan. The initiative utilizes a hydrolysis-based process to recover high-purity polyols and amines from post-consumer and post-industrial waste for reuse in new PU products.

Key Findings

Evonik, Toyotsu Chemiplas Corporation, and Sanyo Chemical Industries, Ltd. have launched a collaborative initiative to develop a scalable polyurethane (PU) foam recycling model in Japan. The partnership integrates collection networks, logistics, and chemical recycling technology to convert discarded foam into recycled polyols and amines. The ultimate objective is the commercialization of this recycling model within the Japanese market.

Technical Details

The initiative centers on Evonik's proprietary hydrolysis-based chemical recycling process. Unlike mechanical recycling, which often results in lower-value applications, this chemical approach recovers raw materials with high purity and consistent quality. Key technical aspects include:

- **Input Materials:** The system targets both post-consumer polyurethane foam and post-industrial production scrap.
- **Output:** The process yields recycled polyols and amines that serve as "drop-in" solutions for PU manufacturers.
- **Performance:** Evonik has already successfully produced new polyurethane foam using 100 percent recycled polyol derived from this process.

The partners will jointly evaluate the entire value chain, including collection, sorting, and the manufacture of new products. This evaluation includes quality assessments and updates to Evonik's existing life cycle assessment to reflect the specific Japanese value chain.

Background & Context

Polyurethane foam is ubiquitous in automotive seats, mattresses, and furniture, but is frequently incinerated or sent to landfills. To address this, the three companies have divided responsibilities based on core competencies: Toyotsu Chemiplas manages coordination, collection networks, and logistics; Sanyo Chemical provides expertise in process technology and polyol development; and Evonik contributes the hydrolysis technology and technical expertise.

Significance & Outlook

By recovering valuable raw materials, the initiative aims to close the loop in flexible polyurethane foam production and reduce the carbon footprint compared to virgin materials. This collaboration is part of Evonik's broader strategy to scale PU recycling globally through value chain partnerships.

Source: <https://www.evonik.com/en/news/press-releases/2026/10/evonik-toyotsu-chemiplas-and-sanyo-chemical-launch-polyurethane-pu-recycling-initiative-in-japan.html>

Collected: October 17, 2026 | Automated Research System (AI)

#04 Automotive Plastic Pyrolysis: Diesel-Range Oil Yields and Specs

Published October 14, 2026 Plastics Engineering USA



OVERVIEW

Research into the catalytic pyrolysis of automotive plastic waste (APW) demonstrates that iron-modified clay catalysts can increase oil yields to 78.6%. The resulting oil exhibits a calorific value of 49.85 MJ/kg, suggesting a viable pathway for recovering diesel-range fuels from end-of-life vehicles.

Key Findings

Catalytic pyrolysis of automotive plastic waste significantly outperforms thermal pyrolysis in terms of liquid yield. While thermal pyrolysis alone produced an average oil yield of 41%, the use of a modified clay catalyst increased the average yield to approximately 68%. The peak oil yield of 78.6% was achieved at a temperature of approximately 416°C with a catalyst loading of about 24% by weight.

Technical Details

The study utilized feedstock recovered directly from end-of-life vehicle components—primarily front and rear bumpers, which accounted for 86.6% of the sample weight. The material composition included acrylonitrile butadiene styrene (ABS), high- and low-density polyethylene (HDPE and LDPE), polypropylene (PP), polystyrene (PS), and fiberglass. To optimize the process, researchers used bentonite clay modified through iron pillaring to alter surface acidity and pore structure.

Experimental parameters ranged from temperatures of 350°C to 521°C and catalyst loadings of 6% to 34% by weight. The findings indicate that while the catalyst increased the volume of liquid produced, temperature was the primary driver of product composition. Temperatures above 450°C resulted in heavier, waxier oil, whereas lower temperatures favored diesel-range organics.

Fuel Properties and Specifications

The produced oil demonstrated several properties comparable to commercial diesel, including a flash point of 113°C, total aromatics of 3.55% by area, and a calorific value of 49.85 MJ/kg. The oil was dominated by branched heptenes and heptanes. However, density and viscosity exceeded standard diesel specifications due to the presence of long-chain hydrocarbon fractions.

Significance and Outlook

Pyrolysis offers a promising route for the circular use of automotive plastics, moving beyond the study of heterogeneous automotive shredder residue to direct component recovery. To meet commercial diesel specifications, the researchers suggest further processing via distillation and centrifugation, or optimizing reaction conditions through longer residence times and lower temperatures to reduce heavier fractions.

Source: <https://www.plasticsengineering.org/2026/10/automotive-plastic-waste-pyrolysis-produces-diesel-range-oil-012337/>

Collected: October 17, 2026 | Automated Research System (AI)

#05 Textile Recycling Technology: PU and Bio Nylon Scaling for 2026

Published October 14, 2026 Fanterco イタリア



OVERVIEW

The textile industry is transitioning toward a circular model to meet EU ESPR regulations and 2030 carbon targets, with the APAC recycling market projected to grow at a CAGR of 12-15% in high-tech segments. Key advancements include chemical depolymerization for PU and polyester, and bio-based intermediates for nylon production. These technologies enable a closed-loop "Textile-to-Textile" (T2T) system to replace linear supply chains.

Key Findings

The textile industry is facing a "Compliance Wall" due to the EU Ecodesign for Sustainable Products Regulation (ESPR), which introduces a ban on destroying unsold textiles and the implementation of the Digital Product Passport (DPP). While the value of potentially recyclable textiles in the Western Hemisphere exceeds \$350 billion, only about 1% of used clothing is currently recycled into new garments. To address this, the industry is shifting from mechanical recycling to advanced chemical depolymerization and bio-based materials.

Technical Details

- **PU Recycling (RePURpose):** A collaboration between the Danish Technological Institute (DTI) and Ecco utilizes a two-tier model. "ReUSE" integrates post-industrial scraps to reduce virgin PU consumption by 20% or more. "ReCYCLE" uses chemical depolymerization via heat and catalysts to break PU down into regenerated polyols, which are then repolymerized into virgin-grade PU.
- **Polyester Depolymerization:**
 - Carbios uses enzymatic recycling at 65°C to break polyester waste into PTA and MEG monomers.
 - Eastman CRT gasifies plastic waste into synthesis gas (carbon monoxide and hydrogen) to create high-purity acetate yarns.
 - PerPETual utilizes glycolysis to convert PET bottles into high-quality esters.
- **Bio Nylon:** Genomatica produces bio-based nylon 6 intermediates by using microorganisms to ferment plant-based sugars into bio-caprolactam, removing the reliance on crude oil.

Background & Context

Linear "take-make-waste" models are becoming legal and financial liabilities for carbon-intensive synthetics. Mechanical recycling of polyester has reached technical limits because it shortens fiber length and reduces tensile strength. Consequently, B2B procurement is shifting toward high-integrity T2T systems to improve Higg Index MSI scores and meet 2027 DPP reporting requirements.

Significance & Outlook

The transition to bio nylon and regenerated PU allows brands to secure "Circular Assets" rather than just reducing waste. With the APAC market for high-tech recycling segments growing at a CAGR of 12-15%, these technologies are essential for brands racing to meet 2030 sustainability mandates.

Source: <https://fanterco.com/pu-recycling-and-bio-nylon-fabric-through-advanced-textile-recycling-technology/>

Collected: October 17, 2026 | Automated Research System (AI)

#06 Recyclamine® Technology: Thermoformable and Recyclable Epoxy System

Published October 14, 2026 CompositesWorld (implied by content related to "Composites Growth Faces a Lightweighting Cost Barrier - Plastics Engineering" source) USA



OVERVIEW

Recyclamine® technology introduces a dynamic epoxy system that combines the mechanical performance of thermosets with the ability to be thermoformed and chemically recycled. This allows cured composite components to be reshaped, repaired, and recovered, extending the material's value across its entire lifecycle.

Key Findings

The Recyclamine® technology platform enables a high-performance epoxy system that integrates dynamic and cleavable functionality into a single polymer network. Unlike conventional thermosets, which are permanently crosslinked after curing, this system allows for thermoforming, repair, and closed-loop chemical recycling without sacrificing the structural integrity typically expected of epoxy-based composites.

Technical Details

The system functions by utilizing dynamic bonds within the crosslinked epoxy matrix that respond to temperature. Under normal service conditions, the structure remains stable to ensure dimensional integrity and durability. However, when exposed to controlled elevated temperatures, these bonds can exchange and rearrange, allowing the material to change shape and relax stress without melting or degrading.

Experimental data indicates that ground material from cured thermoformable epoxy can fuse under heat and compression at 180°C for 30 minutes. This process retains a significant level of the original mechanical performance, whereas conventional epoxy remains infusible under the same conditions.

Background & Context

Traditionally, the composite industry has faced a trade-off between thermosets and thermoplastics. Thermosets offer superior mechanical strength, thermal stability, and chemical resistance but cannot be reshaped once cured. Thermoplastics offer flexibility and recyclability but often fail to match the mechanical performance required for critical structural applications. The Recyclamine® system addresses this gap by providing a thermoset that offers flexibility at the end of manufacturing and at the end of its useful life.

Significance & Outlook

This technology shifts the perception of composite parts from fixed, end-state structures to adaptable assets. By enabling the modification and repair of cured components, it reduces the need to replace entire parts due to manufacturing defects or design changes. This capability is particularly relevant for high-value structures in the wind energy, automotive, transportation, aerospace, and industrial composite sectors, as it preserves embedded value and reduces material consumption before the material reaches the chemical recycling stage.

Source: <https://www.windssystemsmag.com/value-extension-of-composites-via-thermoformable-and-recyclable-epoxy-system/>

Collected: October 17, 2026 | Automated Research System (AI)

#07 SOLiD Project: Scaling European Solid-State Battery Manufacturing

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OVERVIEW

The EU-funded SOLiD project is developing a sustainable pilot-scale process for solid-state lithium-metal batteries to increase energy density by up to 70% compared to lithium-ion. By integrating dry electrode processing and AI-driven digital twins, the project aims to move solid-state technology from the lab to industrial production.

Key Findings

The SOLiD project has developed a scalable manufacturing framework for next-generation solid-state lithium-metal batteries (SSBs). Key breakthroughs include the implementation of roll-to-roll (R2R) dry extrusion coating for cathodes and the development of a polyester-based polymer electrolyte, PESDA, which retains 95% of capacity after 120 cycles in prototype cells and exhibits tensile yields up to 250% before failure.

Technical Details

To eliminate toxic solvents and energy-intensive drying, SOLiD utilizes R2R dry extrusion coating to blend active cathode material, polymer binder electrolyte, and conductive additives. The use of ALD-protected NMC811 allows this process to occur under ambient conditions, removing the requirement for dry rooms. On the anode, the project scaled pulsed laser deposition (PLD) to create lithium layers under 10 micrometres in thickness, topped with a protective lithium-alloy layer to prevent dendrite formation.

The production line incorporates a digital twin—an AI-driven feedback and feedforward system. This system integrates data from particle detection, optical monitoring, and electrochemical impedance spectroscopy to provide near real-time quality assurance and optimize yields.

Background and Context

Launched in September 2022, SOLiD consists of 13 partners across eight countries. The project addresses the limitations of traditional lithium-ion batteries, specifically the volatility of liquid electrolytes and the reliance on critical raw materials like cobalt. By replacing graphite anodes with lithium metal and using solid polymers, these SSBs can store up to 70% more energy in the same volume while reducing fire risks.

Significance and Outlook

The transition to pilot-scale production—including kilo-scale ALD processing and validated roll-to-roll PLD-deposited lithium in coin cells—marks a shift toward industrial viability. These advancements provide a roadmap for European battery sovereignty by creating a template for future gigafactories that prioritize recyclability by design and reduced environmental impact through solvent-free manufacturing.

Source: <https://www.innovationnewsnetwork.com/solid-scaling-european-manufacturing-of-solid-state-lithium-metal-batteries/72552/>

Collected: October 17, 2026 | Automated Research System (AI)

#08 LIFE BIOBCOMPO: Plant-fibre biocomposites for Stellantis vehicles

Published October 13, 2026 CORDIS Europe



OVERVIEW

The LIFE BIOBCOMPO project has developed a lightweight biocomposite using renewable cellulose fibres to replace conventional mineral fillers in automotive parts. Since 2022, approximately 10,000 vehicles have been equipped with these materials, demonstrating a viable path from laboratory research to industrial scale.

Key Findings

The LIFE BIOBCOMPO project has successfully transitioned a plant-fibre biocomposite from the laboratory to commercial production. The material has been industrialised for use in the dashboards of Lancia Ypsilon cars, with roughly 10,000 vehicles on the road featuring these parts since 2022. The project was led by components manufacturer SAPA, in partnership with Sòphia High Tech Group and FCA Italy (now Stellantis Europe) Centro Ricerche Fiat, with Stellantis serving as the end customer.

Technical Details

The developed biocomposite replaces conventional mineral fillers with renewable cellulose fibres. Key technical specifications include:

- **Composition:** Approximately 20% of the material is non-fossil, derived from cellulose fibres.
- **Weight Reduction:** Vehicle parts produced with this biocomposite are around 8% lighter than those made with traditional mineral-filled materials.
- **Manufacturing Compatibility:** The material is compatible with standard injection-moulding machines, allowing integration into existing production lines without major modifications.

Background & Context

The project aimed to address two primary challenges in the automotive sector: reducing overall vehicle weight to lower CO2 emissions and replacing fossil-based and mineral raw materials with natural fibres. A critical component of the project was the validation of the material under real vehicle conditions rather than solely at the laboratory scale. This process was supported by the LIFE Programme, which provided "close-to-market" support to bridge the gap between research and industrial application, including business coaching and access to expert networks.

Significance & Outlook

The project concluded in 2023, resulting in the creation of approximately 36 jobs at SAPA. Following the successful deployment in the Lancia Ypsilon, SAPA continues to develop further formulations based on bio-based and recycled materials for the automotive industry. The project demonstrates that lightweighting via biocomposites is scalable provided the materials can survive real driving conditions and fit existing manufacturing infrastructure.

Source: https://cinea.ec.europa.eu/news-events/news/life-biobcompo-lightweight-car-parts-made-plant-fibres-now-rolling-out-europes-roads-2026-10-13_en

Collected: October 17, 2026 | Automated Research System (AI)

#09 Composite Metal Foam: Impact Energy Absorption vs Steel and Aluminum

Published October 15, 2026 Thomasnet USA



OVERVIEW

Engineers at North Carolina State University have demonstrated that Composite Metal Foam (CMF) significantly reduces vehicle deceleration and head-injury risk during high-speed frontal collisions. Computational simulations show that CMF rails can reduce maximum deceleration by up to 84% compared to conventional rectangular rails. This lightweight material offers a path to increasing occupant safety without adding vehicle weight.

Key Findings

Composite Metal Foam (CMF) significantly outperforms conventional rail materials in absorbing crash energy during 55 mph frontal collisions. When compared to a double-octagonal rail of equal length and weight, CMF reduces maximum vehicle deceleration by approximately 38%, while reducing overall crash severity and the Head Injury Criterion (HIC) by about 45%. The performance gap is more pronounced against conventional rectangular rails, where CMF reduces maximum deceleration by about 84%, crash severity by approximately 94%, and HIC by about 83%.

Technical Details

CMF is a lightweight material composed of hollow metal or alloy spheres embedded within a metallic matrix. This internal structure allows the material to progressively absorb compressive forces during an impact. Unlike traditional materials that may transmit the load rapidly through the vehicle structure, CMF deforms in a controlled manner to manage enormous impact forces and slow the rate of deceleration.

Background and Context

Current vehicle bumper systems and front rails are designed to deform progressively to protect the passenger compartment. Most manufacturers currently utilize either rectangular steel rails or double-octagonal aluminum rails. However, the energy-absorbing capacity of these conventional materials is limited, which can lead to rapid vehicle deceleration and increased risk of injury to occupants during high-speed collisions.

Significance and Outlook

The research led by Dr. Afsaneh Rabiei suggests that CMF rails can match the length and weight of conventional rails while absorbing far more energy. By reducing the severity of the impact and the predicted risk of head injuries, CMF provides a technical solution for increasing occupant and vehicle safety in high-speed frontal collisions without the penalty of added vehicle weight.

Source: <https://www.thomasnet.com/insights/can-lightweight-metal-foam-make-car-crashes-safer/>

Collected: October 17, 2026 | Automated Research System (AI)

#10 Toray Recycled Fiber: 93% Recycled Polyester-Nylon Specs and Timeline

Published October 15, 2026 Impressions USA



OVERVIEW

Toray Industries has developed a polyester-nylon composite fiber containing at least 93% recycled material by mass. This innovation enables premium apparel aesthetics and performance without relying on PFAS in water-repellent agents, with a commercial launch targeted for fall/winter 2027.

Key Findings

Toray Industries has engineered a composite fiber consisting of polyester and nylon that incorporates at least 93% recycled content by mass. This recycled percentage applies specifically to the raw yarn rather than the final garment. The company has integrated this fiber into a new textile collection called ARTIROSA CX, designed for premium casual apparel, urban outdoor clothing, and outerwear for men and women.

Technical Details

The development utilizes Toray's polymer design and composite spinning technologies to overcome the quality consistency challenges typically associated with combining different recycled polymers. The resulting ARTIROSA CX textiles are characterized by a crisp feel and a dense, finely textured surface.

Depending on the specific material selection and finishing, the textiles can be engineered for the following functional properties:

- Waterproofing
- Durable water repellency
- Wind resistance

Notably, Toray states that the water-repellent agents used in ARTIROSA CX do not intentionally include substances classified as per- and polyfluoroalkyl substances (PFAS).

Background and Context

The project leverages expertise from Toray's &+ recycled fiber brand. The development responds to fashion industry demand for sustainable materials that do not compromise on drape, texture, durability, or appearance. To achieve the final textile, Toray combined its composite spinning with weaving, knitting, dyeing, and finishing techniques from Japanese textile-producing regions.

Significance and Outlook

Toray is targeting a commercial launch for the ARTIROSA CX collection in fall/winter 2027, with projected sales of 200,000 meters in the first year. Moving forward, the company intends to evaluate production scalability and research methods to further increase recycled content in composite fibers. Future design expansions may include nylon blends, combinations with natural fibers, and additional finishing techniques.

Source: <https://impressionsmagazine.com/news/toray-recycled-polyester-nylon-fiber-artirosa-cx/170803/>

Collected: October 17, 2026 | Automated Research System (AI)