Filter Tow Newsletter

Q3 2025

Dear valued customer,

As a leading manufacturer of cellulose acetate products, Eastman is committed to doing what's right for our customers and the planet. That includes using sound science and innovation as the core foundation in our production of cellulose acetate and everything else we make.

Among our convictions is that scientific evidence must guide public understanding and influence environmental policy. This prompts us to ask, "What evidence exists to prove how long filters made of various materials persist in the environment?"

Consumers and companies need an accurate understanding of this to make informed choices. Researchers need this information to predict potential associated risks. And legislators should use this information to develop meaningful policy. Among the policies under consideration by some governments is to ban single-use plastics and replace them with materials that don't stay in the environment.

Some people assume cigarette filters last indefinitely in the marine environment, resulting in chronic exposure that harms animals and humans. But there's not much proof of this.

Non-peer-reviewed estimates suggest filters could last for up to a decade. In contrast, recent peer-reviewed research found that cellulose acetate and paper filters degrade in the environment in about the same amount of time. This provides scientific evidence of cellulose acetate's impact on the environment.

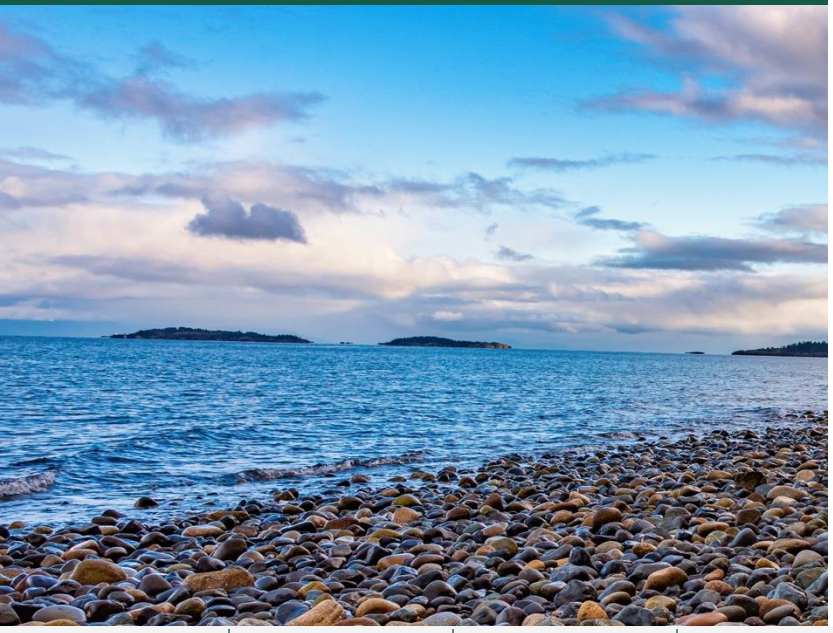
Eastman does not support or excuse littering or pollution. Our intent is to provide transparency on the quality of available information about cellulose acetate. This transparency includes sharing science-based information on our products' environmental impact compared to that of competing materials.

Erwin Dijkman

Division President, Chemical Intermediates and Fibers

Under the microscope

A closer look at cellulose acetate filter persistence in marine waters



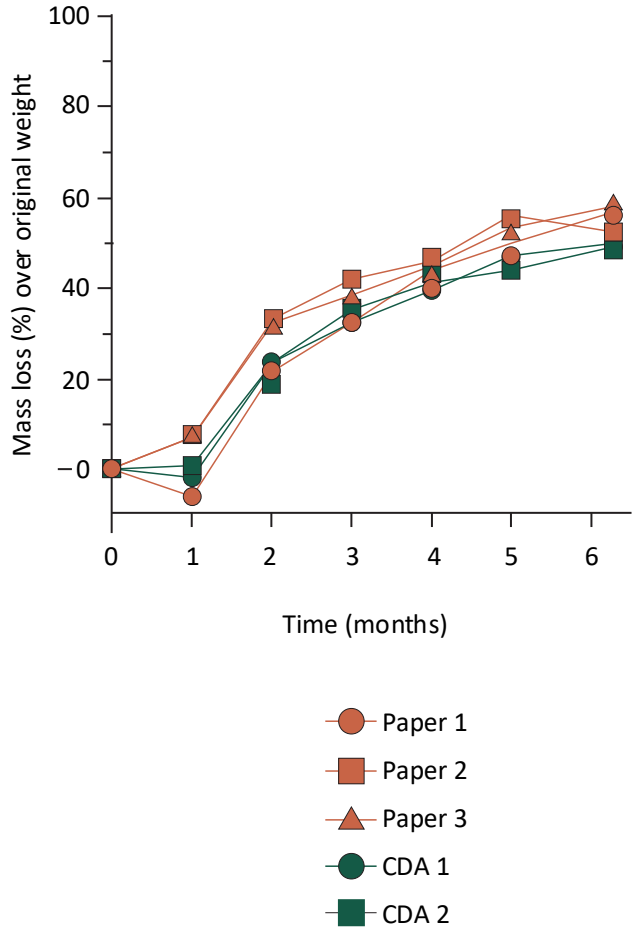
At Eastman, we believe that science is the foundation of transparency – and that transparency empowers better choices for people, products and the planet. That's why we invest in research that goes deeper — challenging assumptions and revealing truths that help our customers make smarter, more sustainable decisions.

One of the most persistent assumptions in the industry is that paper filters have a shorter lifespan than cellulose acetate (CDA) in the ocean. However, recent studies are proving otherwise — especially when it comes to marine biodegradability and resource efficiency.

In a comprehensive study, **"Initial estimates of the lifetime of unsmoked cellulose diacetate and paper cigarette filters in the coastal ocean,"** conducted by the Woods Hole Oceanographic Institution (WHOI), researchers tested filter persistence in marine waters using a sophisticated, flow-through mesocosm system that simulates real-world ocean conditions.

The results were surprising. After six months, both cellulose acetate and paper filters lost approximately 50% of their original mass — demonstrating similar degradation rate and lifespan in the ocean, as illustrated in the graph.

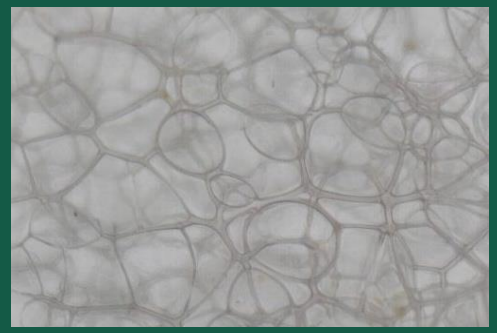
So what does this mean? If you're relying on paper filters to solve filter pollution in marine environments, it means it's time to take a closer look. While paper filters are believed to be the most sustainable solution for filters, they are not likely to offer a better environmental outcome. Like CDA, paper filters do not persist in the ocean — but they carry upstream environmental trade-offs that must be considered. More on this later in the newsletter.



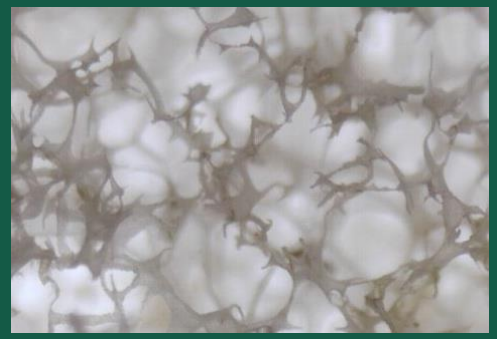
Cellulose dictate foam

A side-by-side microscopic image of cellulose diacetate foam before and after 36 weeks in seawater. The team found that cellulose diacetate foams lost 65%–70% of their original mass. (Photos by Bryan James, WHOI)

New CDA



After 36 weeks



Under the microscope

A closer look at cellulose acetate filter persistence in marine waters

Even more compelling, in this **bioplastic product foaming study**, **WHOI** researchers **recognized CDA as the fastest-degrading biopolymer tested in marine conditions**, underscoring its potential not only for filters but for a range of end-use applications at risk of entering marine environments.

What made the study especially exciting is its real-world application. Researchers found that by adding small pores (a technique called foaming), they realized a drastic acceleration in breakdown, with the foamed CDA losing 65%–70% of its original mass within 36 weeks in an ocean-like setting. This shows **Eastman's cellulose acetate materials will not contribute to microplastic pollution.**

CDA foams degraded 15 times faster than solid plastic — and even faster than paper — in seawater.

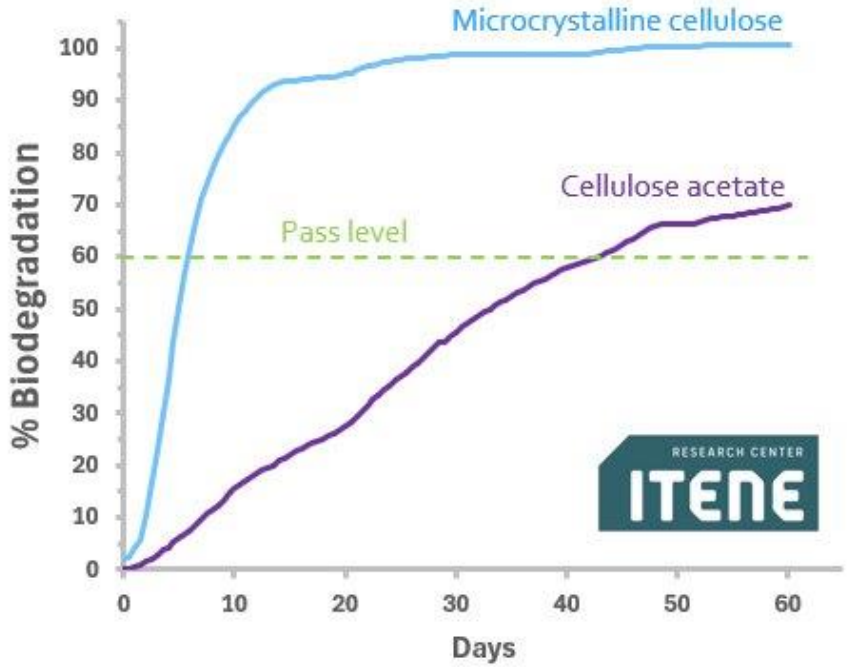
Cellulose acetate is not an environmental persistence problem.

The science says so.

Made from renewable wood pulp, cellulose acetate is a certified biodegradable material. It has earned multiple "OK biodegradable" certifications from TÜV Austria across industrial and home composting as well as freshwater and soil environments.

It has also met the biodegradation thresholds set by the European Chemical Agency (ECHA) testing scheme — making it eligible for exemption from the regulation for synthetic polymer microparticles. CDA reached 60% biodegradation in less than the prescribed 60 days as shown in the graph.

Yet, despite this convincing evidence, misconceptions persist. It remains a popular belief that cellulose will linger for decades in the environment. This misunderstanding often stems from the citing of testing under irrelevant conditions or confusing finished products with the materials that go into them.



Side-by-side comparison

Balancing the scales of sustainability

While these biodegradation results are compelling, they only tell part of the story. Biodegradation alone does not capture the depth of sustainability. To truly understand sustainability, we must also examine upstream impacts.

For example, producing paper filters requires **11 times more freshwater and 2.5 times more cellulose* than CDA, often sourcing from virgin pulp, which raises concerns about deforestation.**

In addition, while paper may show lower embodied GHG emissions per kilogram, this advantage shrinks when accounting for the higher volume of paper needed to achieve acceptable performance, often requiring 60% times more material.

This evidence underscores a critical truth. When measuring for sustainability, one must take a more holistic view and consider the entire life cycle of the material, not just the end. Materials perceived as “natural” can carry hidden environmental costs that are not seen or understood by the everyday user. And let us not forget the importance of innovation strategies that seek to improve the world beyond the products we create.

**Eastman estimation based on % of content used in production of both materials*

Environmental impact area	Paper	Cellulose acetate
Cellulose usage		
Freshwater usage		
Greenhouse gas emissions		

Plastic waste — a major problem and a major opportunity

Eastman believes in creating innovative solutions that not only enhance the quality of life but also help solve the world's greatest challenges. And these solutions must be rooted in sound science.

One example is Eastman EcoTow™ CRT, our circular filter tow made with 60% sustainably sourced wood and up to 40% certified recycled content* from hard-to-recycle waste material, which is made possible through our **carbon renewal technology** (CRT).

By using plastic waste as a feedstock, EcoTow CRT not only diverts waste from landfills and removes the need for fossil-based materials but also offers a climate benefit. Eastman completed a life cycle assessment (LCA) showing a reduction above 2% in GHG emissions for EcoTow CRT.

And because we use recycled waste to make the acetic acid in our acetyl stream, Eastman is the only supplier that can offer tow with this type of recycled content — without compromising quality.

We may not be able to control consumer littering behaviors, but we can design materials that reduce the environmental impact when waste does happen.

**Via mass balance accounting*

Contact us

We can’t control every outcome — but we can choose materials that won't persist in the environment. With solutions like Eastman cellulose acetate, we’re proving that performance doesn’t have to come at the planet’s expense.

Research sources:

Initial estimates of the lifetime of unsmoked cellulose diacetate and paper cigarette filters in the coastal ocean – Environmental Science: Advances (RSC Publishing)

Foaming Enables Material-Efficient Bioplastic Products with Minimal Persistence | ACS Sustainable Chemistry & Engineering

WHOI Scientists Discover Fastest Degrading Bioplastic in Seawater – Woods Hole Oceanographic Institution

Rapid Degradation of Cellulose Diacetate by Marine Microbes | Environmental Science & Technology Letters

Distinct microbial communities degrade cellulose diacetate bioplastics in the coastal ocean