

Polar Tech
Industries

THERMO  **CHILL**
BIODEGRADABLE

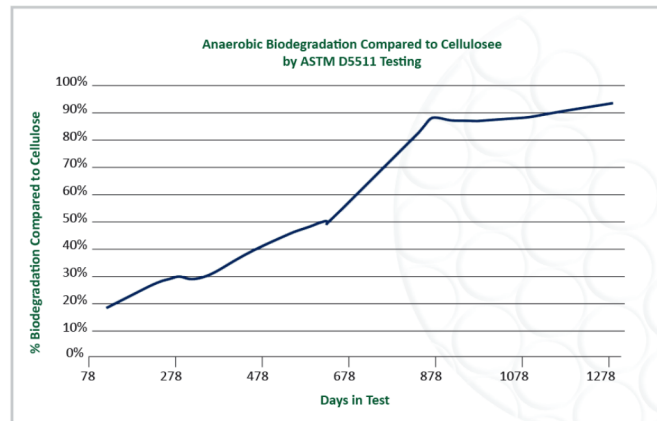
FAQ SHEET



THERMO CHILL BIODEGRADABLE FOAM

SUSTAINABLE INNOVATION FOR PROTECTIVE PACKAGING SYSTEMS

The material our containers are made from is landfill biodegradable*— it anaerobically biodegrades an average of 92% over 4 years.



While all EPS is landfill biodegradable, this material helps attract more living organisms to speed up the process and can be digested in a way that does not produce microplastics.

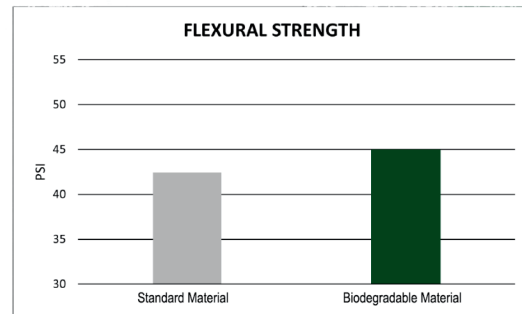
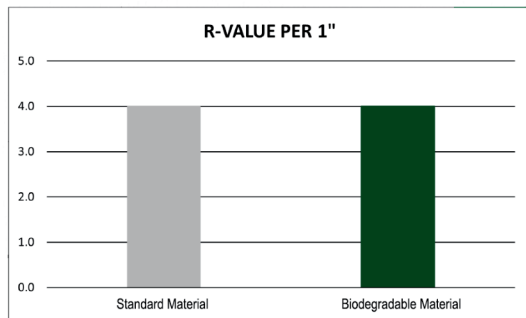
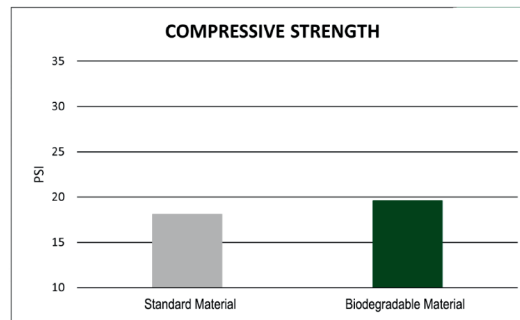
When polymers go through the recycling process, they experience additional heat histories—each heat history a polymer experiences causes deterioration in performance because of loss in molecular weight. Unlike oxo-degradable technology, the material used in our containers does not accelerate the loss of molecular weight in recycling. Because it uses an enzymatic biodegradation process instead of an oxo degradation process, this material does not impact recyclability. Material maintains the exceptional performance characteristics of molded EPS foam: **High Strength, Light Weight, Superior Insulation, Shelf Life Stable.**

It requires no special packaging, there are no changes in resin properties, nor does it biodegrade without a micro-rich environment. The material used leaves the same byproducts as organic material decomposition including carbon dioxide (CO₂), methane (CH₄), and other renewable organic materials. Many landfills capture the methane and burn it for fuel.

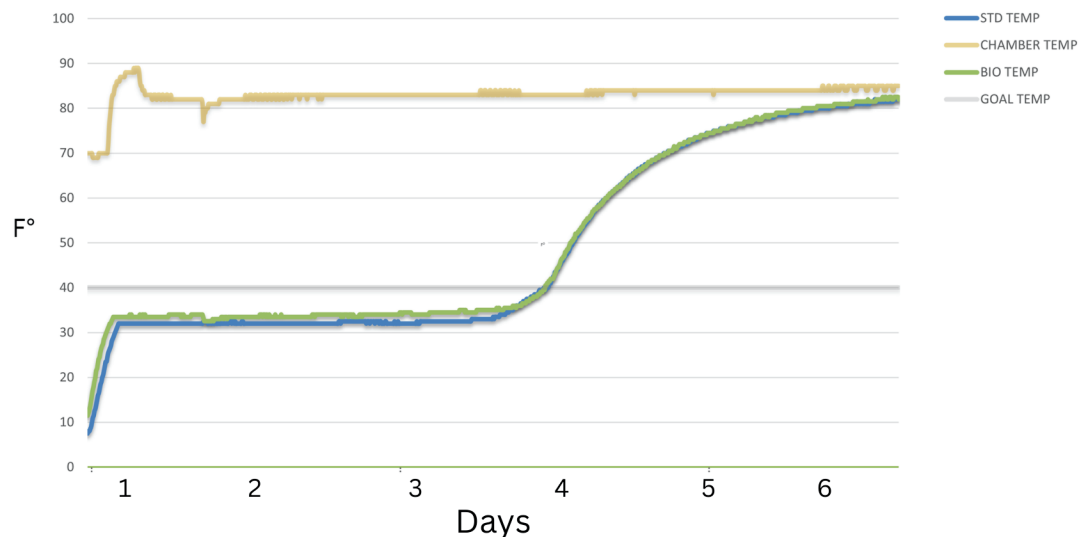
Thermo Chill Biodegradable Foam:

- Does **NOT** Become brittle
- Does **NOT** Affect shelf life
- Does **NOT** Create microplastics
- Does **NOT** Require UV protective packaging
- Does **NOT** Change the base resin properties
- Does **NOT** Biodegrade without a microbe-rich environment

COMPARATIVE TEST RESULTS



BIO VS. STANDARD MATERIAL THERMAL TESTING (REFRIGERATED) - 227C & RB 30



We did a comparative test - our standard 227C against the new biodegradable 227C - and are happy to say that there is **no loss of performance** between the two materials, giving you peace of mind and an easy transition to biodegradable material!

This test was performed by conditioning six (6) 8oz. water bottles to -10°F and packing them inside each 227C with three (3) RB 30 cold packs, preconditioned to -20°F. They were then placed into a temperature-controlled chamber for 6 days while we monitored the internal temperature of the package.

FAQ

WHAT'S DIFFERENT ABOUT THIS MATERIAL?

Our biodegradable containers use proprietary biodegradable expandable polystyrene (EPS). This advanced material looks and performs the same as standard EPS, has the same shelf life, and continues to be recyclable along with all polystyrene.

This technology transforms a standard molded product into a product with a new end-of-life story.

IS THIS MATERIAL BIO-BASED?

No, EPS products are typically 0% bio-based as it is made from polystyrene, a petroleum derivative. (Learn more [here](#).)

WHAT TEST WAS USED TO DETERMINE BIODEGRADABILITY AND WHAT WERE THE RESULTS?

This material was shown to biodegrade 92% over four years under conditions that simulate both wetter and biologically active landfills using the ASTM D5511 test. Wetter or biologically active landfills may not exist in all areas. The stated rate and extent of degradation do not mean the product will continue to degrade.

DOES THE RATE OF BIODEGRADATION CHANGE IN DIFFERENT ENVIRONMENTAL CONDITIONS?

Like organic materials, the material used in these containers has variable decomposition rates based on environmental conditions.

ARE THERE OTHER BENEFITS OF USING A BIODEGRADABLE FOAM?

This material is engineered for anaerobic biodegradation. Since the material does not promote oxo-biodegradation, the resin does not become brittle, and no shelf-life adjustments need to be made. Our biodegradable containers require no special packaging, no changes in resin properties, nor does it biodegrade without a microbe-rich environment.

Note: Biodegradation occurs in landfills and lowers the volume of material in a landfill cell, freeing up landfill space.

WHAT IS LEFT BEHIND AFTER THE MATERIAL BIODEGRADES?

This material leaves the same byproducts as organic material decomposition. These include carbon dioxide (CO₂), methane (CH₄), and other renewable organic materials. This landfill gas is captured and burned for fuel without leaving microplastic contamination behind.

Note: This biodegradation occurs in landfills and lowers the volume of material in a landfill cell, freeing up landfill space.

ARE THERE OTHER TYPES OF BIODEGRADATIONS?

The material we use is engineered for anaerobic biodegradation, meaning biodegradation occurs without air and produces methane. Aerobic biodegradation happens in the air and produces CO₂.

Note: Most landfills are designed for both aerobic and anaerobic biodegradation.

HOW IS BIODEGRADABLE DIFFERENT FROM COMPOSTABLE?

There is just one difference between composting and biodegrading: When compostable materials degrade, they contribute to soil fertilization.

FAQ

WHERE CAN I RECYCLE YOUR CONTAINERS?

Call your local recycling drop-off site to ensure that they accept EPS and in what form. Most accept EPS packing material. There are more than 500 EPS recycling programs across North America.

Polar Tech strongly encourages recycling EPS in-kind whenever possible, creating a circular life cycle.

WHEN CAN I ORDER? WHERE CAN I FIND PRICING?

Currently, biodegradable containers are made to order and may only be available in certain quantities. Contact your Polar Tech sales representative today for more information.

WILL THE CURRENT CONTAINER SIZE I USE HAVE A BIODEGRADABLE OPTION?

Yes! The same molds used for stock sizes may be used with either standard material or biodegradable material. Contact your sales representative for more information.

Definitions:

- **Bio-Based Material:** A material intentionally made from substances derived from living (or once-living) organisms
- **Non-Oxo Biodegradation:** The process of breaking down organic materials, such as polymers, through enzymatic or microbial action without the involvement of oxo-degradable additives. This method relies on natural biological processes to break down materials into simpler compounds, facilitating their decomposition into environmentally benign substances.
- **Oxo Biodegradation:** The process where polymers or plastics are designed to degrade through a combination of oxidation and subsequent biodegradation facilitated by additives known as pro-oxidants. These additives accelerate the fragmentation of the material into smaller molecules, allowing for microbial or enzymatic action to further break down the fragments into simpler compounds that can be assimilated by microorganisms in the environment.
- **Landfill Biodegradable:** Materials that have the capability to decompose or break down into simpler compounds under the anaerobic conditions typically found in landfill environments. These materials undergo microbial degradation in the absence of oxygen, leading to the conversion of complex organic substances into smaller molecules, gases, and residues over time. This process ultimately reduces the volume of waste in landfills and minimizes the environmental impact of disposal.
- **ASTM D5511:** American Society for Testing and Materials ASTM D5511 test, is designed to represent biodegradation potential in biologically active landfills. In addition, the test determines the rate of anaerobic biodegradation of plastic materials in high solids anaerobic conditions in landfills.

*Regulatory Notice: California law prohibits the sale of plastic packaging and plastic products that are labeled with the term 'biodegradable' or any form of this term or imply in any way that the item will break down, biodegrade, or decompose in a landfill or any other environment. These restrictions apply to all sales in or into the State of California. For sales in or into any and all jurisdictions which prohibits such claim by law, rule, or regulation, Polar Tech Industries makes no claims that these products will break down, biodegrade, or decompose in a landfill or any other environment, and reserves all rights without prejudice. Polar Tech reserves the right to change our policy as regulations develop and releases all liability to the end purchaser and end user of the product.