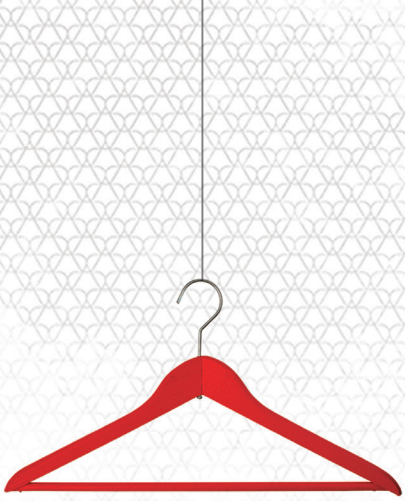

PRIMALOFT® BIO™

Testing Summary

December 27, 2019

Executive Summary

PrimaLoft continues to set sustainability forward with the first-ever biodegradable*, 100% recycled synthetic fiber, for insulation and fabric applications. As the experts in advanced material technology solutions, we believe that there is always a better answer. PrimaLoft® Bio™ is that next Relentlessly Responsible™ step forward.

The journey to create, test and commercialize PrimaLoft® Bio™ has been more than four years in the making. This global, transformational product platform continues to grow and expand, supported by continued scientific and material innovations, staffing expertise, and an amazing portfolio of testing and educational tools.

As of December 27, 2019, the PrimaLoft team has successfully initiated and completed a wide breath of standardized and recognized material testing procedures to concisely define and document the key performance attributes of PrimaLoft® Bio™.

All of this testing work has been done in accordance with recognized global testing standards and at certified testing laboratories, research and commercial facilities around the world.

This extensive body of work has confirmed that at the end of the full biodegradation processes, the only remaining elements to be found around and within the PrimaLoft® Bio™ (spent) inoculum are the natural elements of Water, Carbon Dioxide, Methane, Biomass and Humus.

None of the original PrimaLoft® Bio™ 100% recycled synthetic fibers, or elements of them, remain.

Furthermore, this (spent) inoculum has proven to be able to sustain normalized plant germination and growth patterns of the corn, bean and pea seeds that were planted within it.

PrimaLoft Bio Testing Summary

Material Stability - Pre-Biodegradation

Testing Purpose:

- To confirm that PrimaLoft® Bio™ materials will not degrade nor biodegrade during normal usage, wear and care within the expected usage lifespan of those materials.

Testing Completed:

- UV degradation testing which confirmed the resistance to UV degradation of the PrimaLoft® Bio™ materials.

  Testing per ASTM D5208.

- Oxo-degradability testing which confirmed the non-Oxo degradability of the PrimaLoft® Bio™ materials.

  Testing per ISO 17294-2 and ISO 22036.

Material Chemical Recycling Capabilities - Pre-Biodegradation

Testing Purpose:

- To confirm that PrimaLoft® Bio™ recycled PET materials can be chemically recycled at a high-yield rate at the end of their expected usage lifespan.

Testing Completed:

- Chemical recycling testing which confirmed that PrimaLoft® Bio™ 100% recycled PET materials can be chemically recycled at a 95% yield rate.

  Testing at an established USA Chemical Recycler.

Material Breakdown - Biodegradation

Testing Purpose:

- To confirm that PrimaLoft® Bio™ 100% recycled PET materials will biodegrade over time in either an anaerobic Landfill or aerobic Marine environment.

Testing Completed:

- Anaerobic biodegradation testing which confirmed the Anaerobic Biodegradation of Plastic Materials (PrimaLoft® Bio™) Under High-Solids Anaerobic Digestion Conditions (Landfill Environment).

  Testing per ASTM D5511.

  93.7% Biodegradation in 646 days (completed).

- Aerobic biodegradation testing which confirmed the Aerobic Biodegradation of Plastic Materials (PrimaLoft® Bio™) in the Marine Environment by a defined Microbial Consortium or Natural Sea Water Inoculum (Marine Environment).

  Testing per ASTM D6691.

  65.5% Biodegradation in 639 days (ongoing).

PrimaLoft® Bio™ provides an excellent in-use solution to reduce the impact of micro-plastics in the oceanic environment and which are generated through the normal wear, tear and care/washing of clothing.

Soil Toxicology and Plant Germination - Post-Biodegradation

Testing Purpose:

- To confirm that PrimaLoft® Bio™ materials have fully biodegraded the original 100% recycled PET materials over time in an anaerobic Landfill environment and that the remaining (spent) inoculum will support normalized plant germination and growth.

Testing Completed:

- Soil toxicology analysis which confirmed no presence of the base components of PET, nor any compounds, fragments, monomers, additives consistent with PET within the PrimaLoft® Bio™ post-biodegradation (spent) inoculum.

  PrimaLoft® Bio™ achieved complete biodegradation of the original 100% recycled PET materials.

  Analysis via Pyrolysis Gas Chromatography Mass Spectrometry (PYMS) review.

- Plant Germination testing which confirmed that the PrimaLoft® Bio™ postbiodegradation (spent) inoculum will sustain normalized plant germination and growth patterns for the corn, bean and pea seeds that were planted within it.

  PrimaLoft® Bio™ (spent) inoculum will sustain plant life.

  Testing per ASTM 1963 and ISO18763 5

Further PrimaLoft® Bio™ testing updates and information will be distributed in mid-to-late April 2020.

For More Information Contact

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Definitions

Inoculum: A standardized and representative material used for inoculation; for example, soil or other biomass that can be used as a biodegradation medium for the introduction of living microbes.

Humus: The organic component of soil formed by decomposition of in-soil materials by microorganisms.

Monomers: A chemical compound that can undergo polymerization.

Oxo-degradability: Degradation due to the exposure to oxygen.

PET: Polyethylene terephthalate commonly abbreviated as PET is the most common thermoplastic polymer resin of the polyester family.

PYMS: Pyrolysis Gas Chromatography Mass Spectrometry; pyrolysis: chemical change brought about by the action of heat.

Testing Standards

ASTM D5208: Standard Practice for Fluorescent Ultraviolet (UV) Exposure of Photodegradable Plastics.

ISO 17294-2: Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of selected elements including uranium isotopes.

ISO 22036: Soil quality – Determination of trace elements in extracts of soil by inductively coupled plasma - atomic emission spectrometry (ICP - AES). 6

ASTM D5511: Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions.

ASTM D6691: Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in the Marine Environment by a Defined Microbial Consortium or Natural Sea Water Inoculum.

ASTM 1963: Standard Guide for Conducting Terrestrial Plant Toxicity Tests.

ISO 18763: Soil quality – Determination of the toxic effects of pollutants on germination and early growth of higher plants.

Biodegradable Legal Disclaimer

*93.8% biodegradation in 646 days under ASTM D5511 conditions (landfill environment); 65.5% biodegradation in 639 days under ASTM D6691 conditions (marine/ocean environment). The stated rate and extent of degradation do not mean that the product will continue to degrade.

PRIMALOFT IS

RELENTLESSLY RESPONSIBLE™

How do you choose between what's good for you and what's good for the Earth? Isn't it one in the same? That's why we've created a single focused movement, using performance to drive sustainability. We do this by pushing the limits of material science forward, resulting in the perfect balance between performance and responsibility. Each one elevated. Neither one sacrificed.

PrimaLoft® Bio™ is an elegant, Relentlessly Responsible™ solution to important issues facing our industry. Once again, we are proud that you are joining us on our journey to set sustainability forward.

Thank you for joining the PrimaLoft® Bio™ community. For any questions, please reach out to us!