



FUNCTIONAL. SENSIBLE. SUSTAINABLE.

# Biodegradable Technology To Complement Circularity

Alastair Drew

INTRINSIC  
ADVANCED  
MATERIALS™

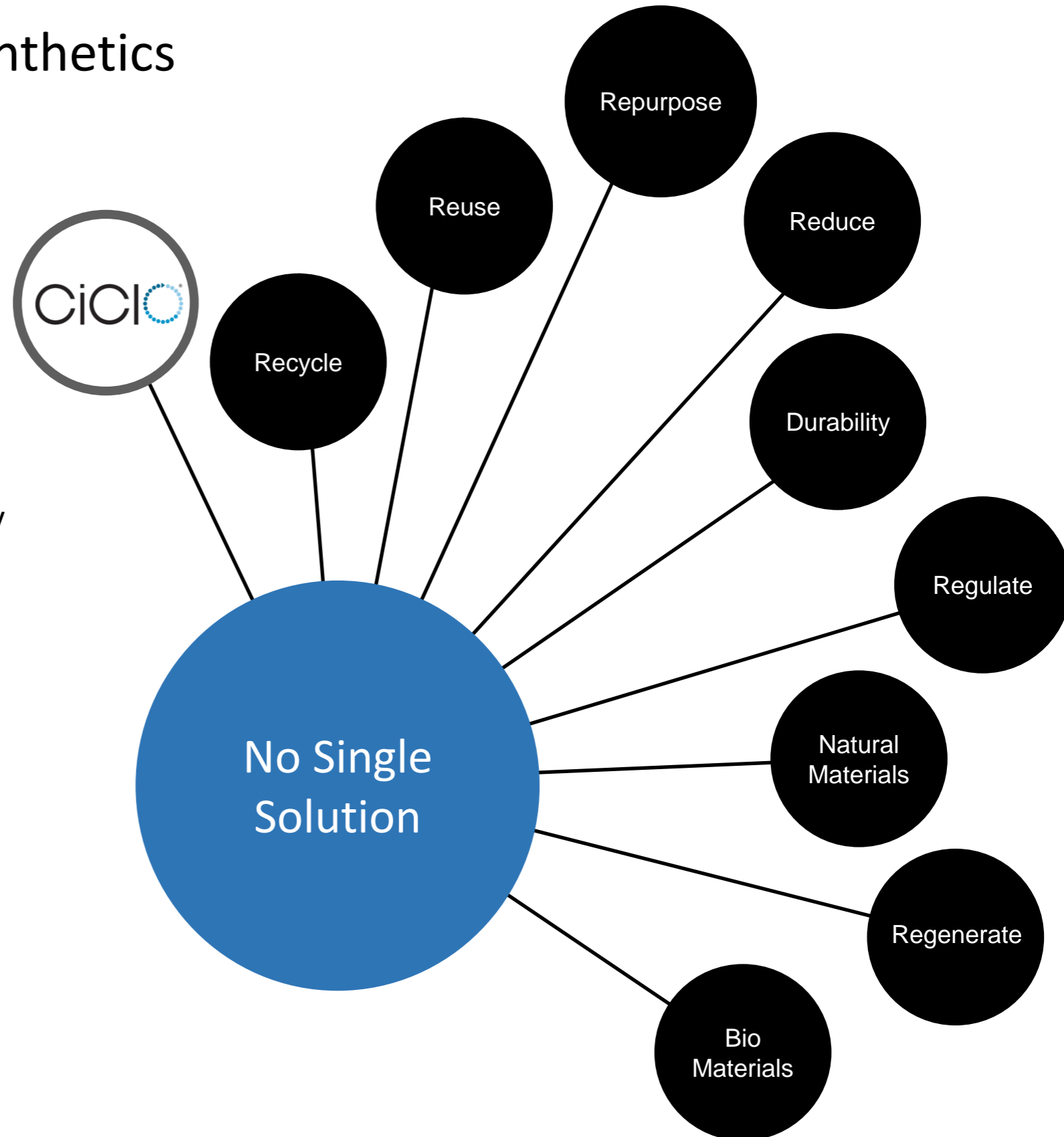
An Intrinsic Textiles Group &  
Parkdale Advanced Materials  
Joint Venture


Oct 2021

# An Arrow in the Quiver

## Our Vision for Responsible Synthetics

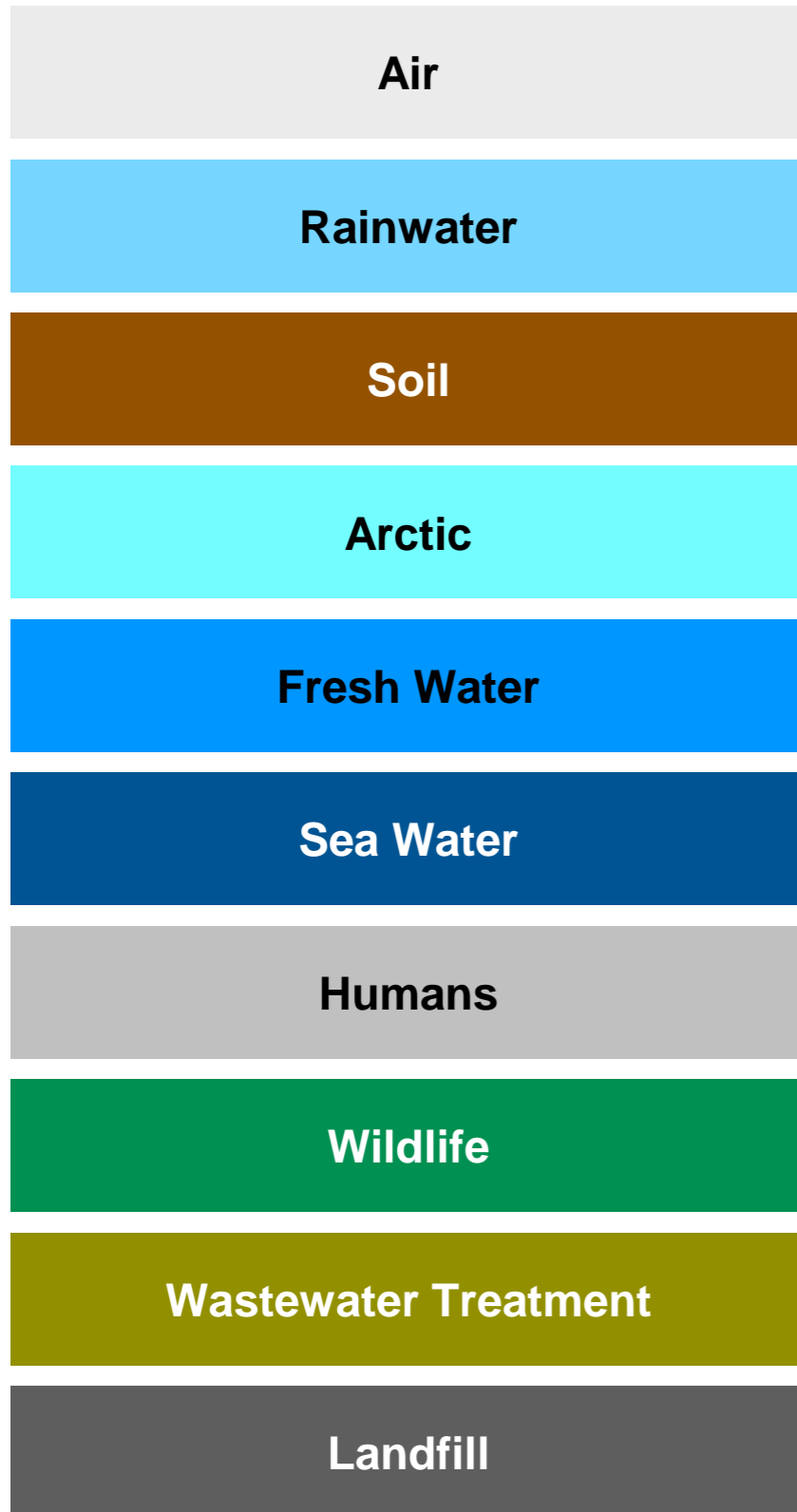
- Biodegradability is beneficial when:
  - the option to recover material is limited
  - collection and recycling is not available and therefore not customary end of life (recyclable ≠ recycled)
  - integration of material into recycling stream is prevented
- Use synthetics where high durability, availability and performance characteristics are required
- Design for longevity, easy care and eventual recycling, where applicable
- Support prevention of plastic pollution, biodegradability is backup insurance
- Biodegradable synthetics should not be designed to intentionally end up in nature
- Reduce unnecessary synthetics use, considering the very best material for every design application



A microscopic image showing a dense field of textile fibers. A prominent, thick, bright blue fiber runs diagonally from the left side towards the bottom center. The background is filled with numerous smaller, thinner fibers, some appearing as short, bright blue segments and others as faint, wispy structures. The overall appearance is that of a complex, tangled network of fibers.

**Microfibers are short pieces of textile fibers that have broken from the main textile construction.**

# Microfibers are EVERYWHERE



# 5.6 Mt

synthetic microfibers emitted globally from apparel washing, 1950 - 2016

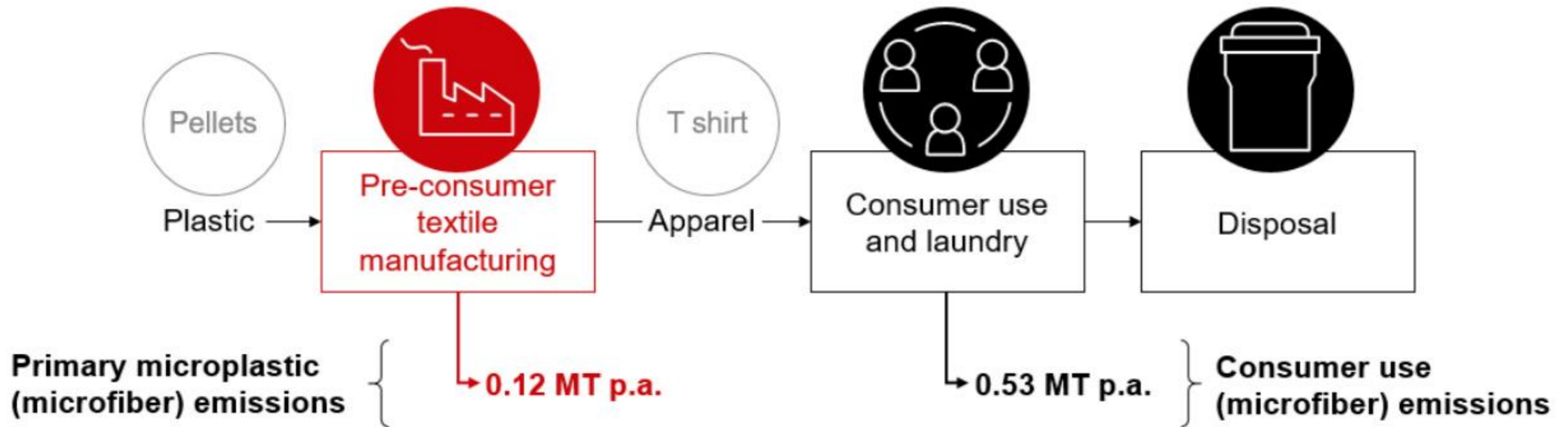
(Gavigan et al., 2020)

An average household generates  
**20 kg of dust a year,**  
**6 kg consist of microplastics**  
from synthetic clothing, carpets  
and furniture.

Sourcing Journal. Researchers Uncover Disturbing Link Between Fashion and Covid-19, by Jasmin Malik Chua MARCH 15, 2021



# Pre-Consumer & Consumer Microfiber Emissions Rates



**For every 500 shirts manufactured,  
one is lost as microfiber pollution.**

<https://www.nature.org/en-us/newsroom/ca-microfiber-emissions/>

**Annual estimates of plastic microfiber pollution entering the oceans is equivalent in weight to over **50 billion** plastic bottles.**



# UN Sustainable Development Goals



Relevant UN Sustainable Development Goal for apparel & textiles:

- SGD 12.8 specifically seeks to *...ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.* [CiCLO biomimetic technology is designed to create synthetic fibers that behave like natural fibers].
- SGD 14.1 By 2025, prevent and significantly reduce **marine pollution** of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.



# G7 Fashion Pact – Biarritz 2019



## FASHION PACT



ADIDAS - ALDO GROUP - AUCHAN RETAIL - BALLY - BESTSELLER - BONAVERI - BURBERRY - CALZEDONIA GROUP -  
CAPRI HOLDINGS LIMITED - CARREFOUR - CHANEL - CELIO - DAMARTEX GROUP - DCM JENNYFER - DECATHLON -  
DIESEL - EL CORTE INGLES - ERALDA - ERMENEGILDO ZEGNA - EVERYBODY & EVERYONE - FARFETCH - FASHION3 -  
FIGARET - FUNG GROUP - GANT - GALERIES LAFAYETTE - GAP INC. - GEOX - GROUPE BEAUMANOIR -  
GROUPE ERAM - GROUPE ETAM - GROUPE IDKIDS - GROUPE ROSSIGNOL - GRUPPO ARMANI - GTS GROUP -  
H&M GROUP - HERMES - HERNÓ - HOUSE OF BAUKJEN - INDITEX - KARL LAGERFELD - KERING - KIABI -  
LA REDOUTE - LADY LAWYER FASHION ARCHIVE - MANGO - MATCHESFASHION.COM - MONCLER - MONOPRIX -  
NANA JUDY - NIKE - NOABRANDS - NORDSTROM - PAUL & JOE - PRADA S.P.A. - PROMOD - PUMA -  
PVH CORP. - RALPH LAUREN - RUYI - SALVATORE FERRAGAMO - SELFRIDGES GROUP - SPARTOO-ANDRÉ -  
STELLA MCCARTNEY - TAPE À L'OEIL - TAPESTRY - TENDAM

Aim for representation of at least 20% of the global fashion industry. The focus is on the three pillars: A. Climate, B. Biodiversity and C. Oceans.

Global Commitments include:

- Biodiversity #3. Supporting material and process innovations that have no negative impact on key species and ecosystems.
- Oceans #2. Supporting innovation to **eliminate micro-fibre pollution** from the washing of synthetic materials.

# What Is CiCLO?



- A master batch additive available from Intrinsic Advanced Materials
- Successfully adapted for Polyester & Nylon.
- Nontoxic, safe, biophilic polymer formulation
- Mainly organic macromolecules, similar structure & properties to the base synthetic fiber
- Added during melt extrusion
- Permanently and uniformly embedded in matrix of the plastic
- Creates countless biodegradable spots where microbes can build functional entities that biodegrade the material

# bi·o·de·grad·a·ble

/ˌbɪoʊdɛˈɡrɑːdəb(ə)l/

The ability of a substance to be broken down physically and/or chemically by naturally occurring microorganisms, resulting in the production of basic natural elements including carbon dioxide, methane, water, minerals, and new microbial cellular constituents (biomass).



Conditions for Biodegradation

**No activation during garment use or care**



# Biodegradation Test Methods

MICROFIBRES



WWTP Sludge

ASTM D5210

88%  
Biodegradation  
847 days

Vs. 0% for comparable untreated fiber.



Soil

ASTM D5988

88%  
Biodegradation  
742 days

Vs. 0% for comparable untreated fiber.



Sea Water

ASTM D6691

92%  
Biodegradation  
844 days

Vs. 5% for comparable untreated fiber.

FABRIC



Landfill

ASTM D5511

91%  
Biodegradation  
1278 days

Vs. 6% for comparable untreated fiber.

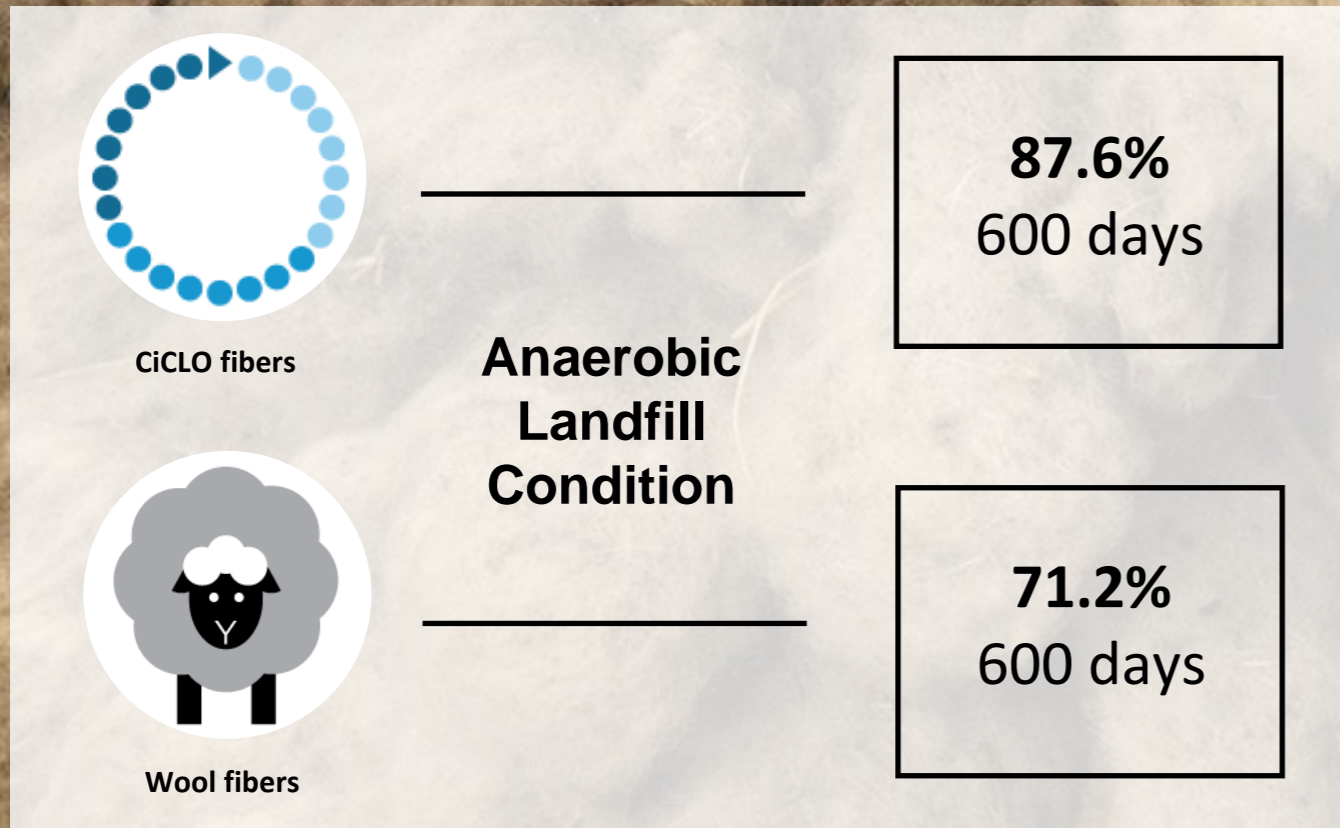
- Data shows biodegradation rate and extent of CiCLO vs non-CiCLO polyester microfibers or fabric in four environments where textiles are prolific pollutants.
- Remaining few percent attributed to carbon converted into biomass.
- Negative control and non-CiCLO polyester samples do not show significant biodegradation in the long-term tests.
- Third party Microtox testing confirms biodegradation process is non-toxic to marine life.

Biodegradation studies are conducted and validated by an independent 3rd party laboratory using internationally recognized ASTM test methods. Laboratory studies represent optimal conditions. As with all materials, the actual rate and extent of biodegradation of CiCLO fibers are dependent upon individual conditions in actual environments. 91% biodegradation in 1,278 days under ASTM D5511 conditions (accelerated landfill environment); 92% biodegradation in 844 days under ASTM D6691 conditions (accelerated marine/ocean environment); 88% biodegradation in 742 days under ASTM D5988 conditions (soil); 88% biodegradation in 847 days under ASTM D5210 conditions (Wastewater treatment plant sludge). The stated rate and extent of degradation do not mean that the product will continue to degrade. IMPORTANT CALIFORNIA NOTICE: California law prohibits the sale of plastic packaging and plastic products that are labeled with the terms 'biodegradable,' 'degradable,' or 'decomposable,' or any form of those terms, or that imply in any way that the item will break down, biodegrade or decompose in a landfill or other environment. These restrictions apply to all sales in or into the State of California, including such sales over the internet.



# Pace Of Nature

Long term studies show that CiCLO polyester fibers biodegrade at rates similar to natural fibers such as wool.

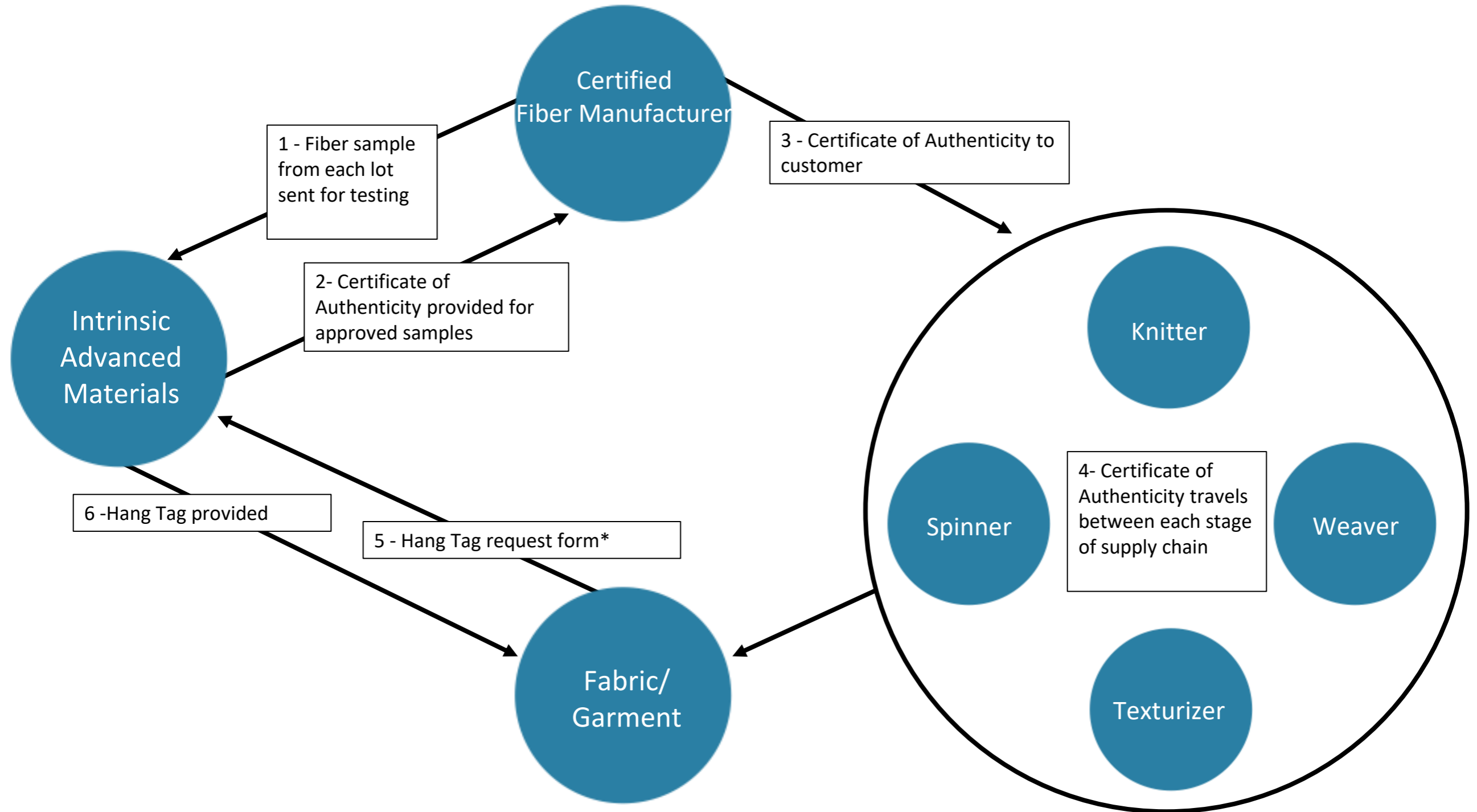


Results are from a report from the ASTM D5511 Test Method, Anaerobic Landfill Condition after one-year anaerobic biodegradation of 100% Recycled CiCLO Polyester compared to wool and virgin Polyester (2.4% after 600 days). This data represents one point in time. Test performed by 3rd party. These materials will remain in testing until they are completely biodegraded.



# Traceability

The CiCLO Certificate of Authenticity provides traceable proof that the fiber contains CiCLO technology at the correct percentage.



\* Email form & PDF copy of CiCLO® Certificate of Authenticity to: [marketing@intrinsictextiles.com](mailto:marketing@intrinsictextiles.com) Ship fabric swatch (minimum amount 6 inches x 6 inches) or sample finished product to: Intrinsic Advanced Materials c/o US Cotton/Receiving Department 510 Laser Rd NE, Rio Rancho, NM 87124



# Hang Tag Program

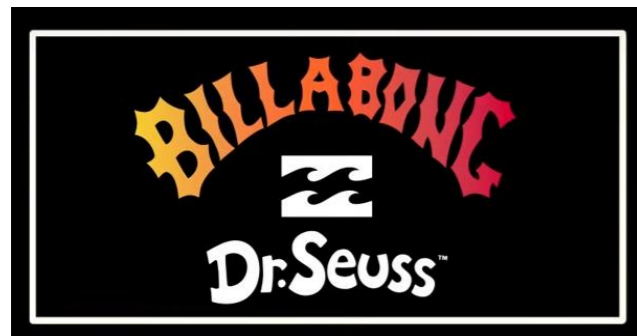


## Responsible Marketing Guidance Considerations

- United States Federal Trade Commission & State of CA
- NGOs
- Consumer confidence & behaviour
- Truth

# CiCLO Adopters

- CiCLO fibres have been adopted in boardshorts, active wear, home textiles, denim & bags.
- Sewing threads and zippers made with CiCLO fibres are also available.



**ciCLO** 

**FUNCTIONAL. SENSIBLE. SUSTAINABLE.**

