ciriql™

Glossary of Terms

FROM THE INNOVATORS AT Ortholite®

Glossary of Terms

Bio-based

To be derived at least partially from plant biomass, preferably from renewable sources.

Cirql is a proprietary technology that is 43% bio-based, and is made using responsibly sourced plants which are converted into monomers and combined with other biodegradable monomers through the use of proprietary polymerization technologies.

The remaining 57% of the polymer is also made up of biodegradable and compostable monomers.

Biodegradable

Biodegradation (to be biodegradable) is a naturally-occurring chemical process in which microorganisms convert organic material into water, carbon dioxide, and biomass/compost. If a material is not biodegradable, it will simply disintegrate into smaller bits of its existing structure.

In order for a processed or manmade product to be considered biodegradable, it must thoroughly biodegrade in a specified environment within a reasonable amount of time. For plastics, this must be verified through controlled laboratory testing.

Biodegradation is sped or slowed by certain environmental conditions (i.e. temperature, microbial load, water, pH, availability of oxygen, etc.). When those environmental conditions are actively managed, we call it composting (home or industrial).

It can occur aerobically (i.e. via microorganisms that need oxygen), or anaerobically (via microorganisms that do not require oxygen). Aerobic biodegradation is a significantly faster process.

When a biodegradable item ends up in an anaerobic environment, as in a landfill, it will eventually biodegrade. The downsides to this anaerobic process are that it's extremely slow and methane gas is a byproduct.

This is why biodegradable products should always indicate the environment (e.g. industrial composter) and time frame.

Clarifying Point: All bio-based plastics aren't necessarily biodegradable. Contrary to linguistic intuition, some bio-based plastics will not biodegrade, and some fossil fuel-based plastics will.

In laboratory testing (via test methods ISO 14855 and ASTM D5338), at least 90% of Cirql material biodegrades in six months, which is the lab standard. The exact duration of the entire process depends on the type of composting facility.

Test standards that Cirql will be certified under are EN 13432 and ASTM D6400.

Should Cirql foam end up in a landfill, it will fully biodegrade via anaerobic biodegradation, though this is not the preferred disposal method. Cirql is also considered marine biodegradable in the case of improper or accidental disposal in an aqueous environment.

[See Also: Compostable, Marine Biodegradable]

Bioplastics

Bioplastics are a family of materials with the properties of plastics that are bio-based, biodegradable or both. To be called a bioplastic, the polymer must be made from a minimum of 20% renewable materials.

As R&D in bioplastics grows, governments and organizations are seeking to unify the language and nomenclature for greater clarity. Currently, the term bio-based polymer is preferable to bioplastics.

As of 2021, bio-based polymer production is estimated at 3.8 million metric tons globally. Even if it hits the predicted 3% growth rate each year (through 2024), the total production will still be just 1% of the production of petro-plastic (fossil fuel-based) production.

Cirql is a certified USDA BioPreferred material, made from 43% bio-based, renewable materials. The remaining 57% of the polymer is also made up of biodegradable and compostable monomers.

Cirql is biodegradable via industrial composting and recyclable via depolymerization.

Biopolymers or Bio-Based Polymers

Technically, biopolymers are polymer materials formed in living organisms (i.e. plants). Bio-based polymers are man-made plastics for which at least 20% of the contents are from renewable materials. Though the nomenclature preference is bio-based polymer, the terms biopolymers and bio-based polymers are often used interchangeably in the realm of plastics.

Cirql is a proprietary technology that is 43% bio-based, and is made using responsibly sourced plants which are converted into monomers and combined with other biodegradable monomers through the use of proprietary polymerization technologies. The remaining 57% of the polymer is also made up of biodegradable and compostable monomers.

Certified Compostable Foam

Third party testing confirms compostability of varied foams. Testing is done under aerobic conditions, which is the typical procedure in industrial composting facilities, and therefore, the most comparable to real-world operations.

Testing measures three specifications:

1. Biodegradability (conversion to CO2 by microorganisms)
2. Ecotoxicity (soil health after biodegradation)
3. Disintegration (physical breakdown of material)

Cirql foam has been certified by **Din Certco** as industrially compostable under **ASTM D6400** and **EN13432**.

Certified Free of Genetically Modified Organisms (GMO-Free)

Third-party, GMO-Free certification confirms that no ingredients come from genetically-modified crops.

Key Point: As would be expected, typically GMO-Free certification is designed for food products. Cirql sought this certification to guarantee that our plant-based ingredients are non-food and non-feedstock. Additionally, GMO-Free certifies that our plants are naturally occurring and haven't been genetically modified for specific attributes.

Certification is in process by **CertiQuality**, and Cirql foam is expected to be verified GMO-free in the coming months.

Certified USDA BioPreferred

USDA BioPreferred is a program established to increase the use and purchase of bio-based products in an effort to: reduce reliance on petroleum, increase the use of renewable agricultural resources, and reduce adverse environmental and health impacts. BioPreferred certification identifies and validates bio-based products for consumers.

As stated on the **USDA BioPreferred** website, a USDA Certified Biobased Product label "...assures a consumer that the product contains a verified amount of renewable biological ingredients. Consumers can trust the label because the manufacturer's claims concerning biobased content are third-party certified and strictly monitored by USDA.

At 43% bio-based content, Cirql foam exceeds the bio-based content certification requirement by a factor of over 1.7 times. Meaning, Cirql foam has 72% greater bio-content than is required for this certification. Cirql foam earned USDA Biopreferred certification in March 2021.

Chemical-Free Foaming Process

Supercritical foaming, a.k.a. chemical-free foaming or physical foaming, combines an inert gas such as CO2 or nitrogen with one or more polymers to create a foam. Structurally, a foam can be thought of as a relatively low-density, high porosity material.

The primary benefit of chemical-free foaming is the elimination of toxic or hazardous chemicals typically used in conventional foaming processes, which minimizes environmental harm during production and results in a non-toxic foam product. This allows for a safer, cleaner environment for Cirql employees at the manufacturing facility. Additionally, this process is faster, cleaner, and quieter than other foaming processes.

With Cirql, the industrially compostable and biodegradable biopolymer pellets are melted and mixed with liquid nitrogen (yes...from the air we breathe) under extreme pressure. This molten mass is injected into a dedicated aluminum mold cavity at ballistic speed. Efficient cycle times reduce overall energy consumption and produce a finished foam with no additional curing required.

Cirql utilizes a chemical-free foaming process and is free of hazardous or toxic chemicals typically found in other conventional foams. As a non-crosslinked foam, Cirql can be

depolymerized back to its original monomers for recycling or Cirql can be industrially composted at end of life.

Chemical Structures of Polymers: Linear and Cross-Linked

Ready for a 2-minute PhD in chemistry? All plastics are polymers, and polymers have either linear or cross-linked chemical structures. The structure indicates how the individual monomers are joined in a chain to create the polymer, and determines whether or not it can be deconstructed (a.k.a. depolymerized).

Only linear polymers can be recycled. Further, some linear polymers can compost/biodegrade completely. Because of the complexity of the structure, the vast majority of cross-linked polymers can neither be recycled, nor composted.

Cross-linking is a chemical bond between adjacent polymer chains. In the case of EVA, the bond may be a group of sulfur atoms in a short chain, a single sulfur atom, a carbon-to-carbon bond, a polyvalent organic radical, an ionic cluster, or a polyvalent metal ion. Cross-linked foaming processes can be composed of three major steps: mixture formation, crosslinking and foaming. Once the EVA "mixture" is crosslinked, the polymer chains are forever fused together and cannot be undone. This is one critical weakness of EVA foam. The "mixture" (of 10-15 ingredients) cannot be separated at the end of their usable life as they are polymerically bound forever, and therefore, this greatly limits end-of-life options for EVA foam.

For a linear polymer, visualize a pearl necklace (polymer). If you break the bond holding the pearls together, the individual pearls still function as individual gems (monomers). They lose none of their original qualities. They can be reused or repurposed for other uses.

In cross-linked polymers, a chemical reaction bonds the monomers to each permanently. This is more like a gold chain, wherein the small metal loops (monomers) are either interlocked or

soldered together. You cannot break the bonds without disrupting the integrity or function of the original loops (monomers).

Cirql foam is made from a linear biopolymer. It can be industrially composted, as well as depolymerized and recycled without losing any strength, performance or integrity. For comparison, EVA is a cross-linked polymer that is neither compostable nor recyclable. EVA foam requires 10-18 ingredients (which are rarely discussed) whereas Cirql only requires a single polymer to foam.

[See also: Depolymerization]

Circular Economy/Circular Solution

A circular economy "builds and rebuilds overall system health." Circular economies and circular solutions are defined by three tenets.

- Designing waste and pollution out of the process, not just mitigating them.
- Keeping products and materials in use.
- Regenerating natural systems.

The above definition is courtesy of the **Ellen MacArthur Foundation**, a non-profit organization and a leading advocate for global and micro-level pivots toward a circular economy. The organization does this through original research, education, the engagement of key players, and mobilizing system solutions. Through its work, the Foundation supports the idea and development of circular economies as contributing solutions to climate change and biodiversity loss, among other global, ecological challenges.

Circular economies and solutions aim to move away from nonrenewable resources. They also intend to go beyond a "do no harm" approach, in order to ultimately have a net positive– or regenerative effect on both human and environmental health.

Circular economies (often used interchangeably as circular solutions) require a systemic approach. Every detail is accounted for and vetted through the three tenets.

Cirql achieves the three core principles of Ellen MacArthur Foundation, as listed above. Cirql is a truly circular foam solution as defined by leaders in this space.

The impetus and driving force behind Cirql is developing a circular solution for a more sustainable, less wasteful and less environmentally hazardous end of life for footwear.

- **Cirql designs out waste and pollution** by employing a bio-based polymer, chemical-free foaming, and zero waste production.
- **Cirql keeps products and materials in use** by creating durable, high quality, high performing parts with two viable end of life solutions. One of those solutions is that Cirql foam is depolymerizable and therefore, recyclable. (The other is industrial composting and producing a pure, nutrient rich biomass dirt that can be used as nourishment for growing food for humans.)
- **Cirql regenerates natural systems** because it is 100% compostable at an industrial composting facility, and will biodegrade back into compost that will nourish healthy soils.

Compost

Compost, as a finished product of controlled biodegradation, is not precisely the same as dirt or soil. It's a more nutrient-dense material that can retain as much as 20 times its weight in moisture. In practical terms, compost regulates soil pH and moisture, improves soil texture, and encourages microbes critical in transferring nutrients to plant roots. It is a valuable addition to soils to create more arable land and to prevent flooding. High quality compost is an important way we can sequester carbon in the soil.

Compost contains the full spectrum of plant nutrients, although the exact amounts vary from sample to sample based on source material. Well-rotted compost is rich in all of the three main fertilizer nutrients: nitrogen, phosphorus and potassium. Additionally, compost contains micronutrients and trace minerals, including: sulfur, carbon, magnesium, calcium, boron, copper, iron, iodine, zinc, and manganese.

The most nutritious compost is made from a wide variety of waste materials from the yard and kitchen, with a mixture of brown (carbon-rich) and green (nitrogen-rich) waste. The greater the variety of compost ingredients, the richer the compost.

Why is compost relevant? Cirql midsoles are industrially compostable and will create nutrient-rich soil. It is the only end of life foam solution capable of creating a virgin material (compost) and restarting the cycle.

Compostable

All organic matter eventually decomposes via biodegradation. Composting is a managed process that encourages a more rapid and thorough decomposition by actively moderating temperature, humidity, pressure, and microorganisms.

To achieve "compostable" certification, the material must decompose without any negative effects (e.g. heavy metals) on the composting process and the resultant compost.

Composting is generally a more desirable end-of-life solution than recycling or a landfill because it's a part of the natural carbon cycle. With focus on an end-of-life solution for a product, composting literally returns an item back to its original building blocks: dirt to dirt.

Industrial composting is differentiated from home composting by more precise control and calibration of the factors that drive the biodegradation. See: Industrially Compostable.

[See also: Biodegradable, Industrially Compostable, End of Life Solution]

Cirql is a first-ever EVA plastics free and compostable foam. Industrial testing and trials with a nationally-renowned, U.S.-based composting firm are currently underway to substantiate our claims.

Depolymerization

Depolymerization is a process in which a polymer is converted into its component monomers. For practical purposes and in real-life (i.e. non-lab) applications, only polymers with a linear chemical structure can be depolymerized. It ranges from impossible to impractical to depolymerize cross-linked polymers.

Depolymerization is at the heart of plastics recycling. Plastics with linear structure can be depolymerized and are therefore recyclable. Once converted into component monomers, those monomers can be joined into new polymers.

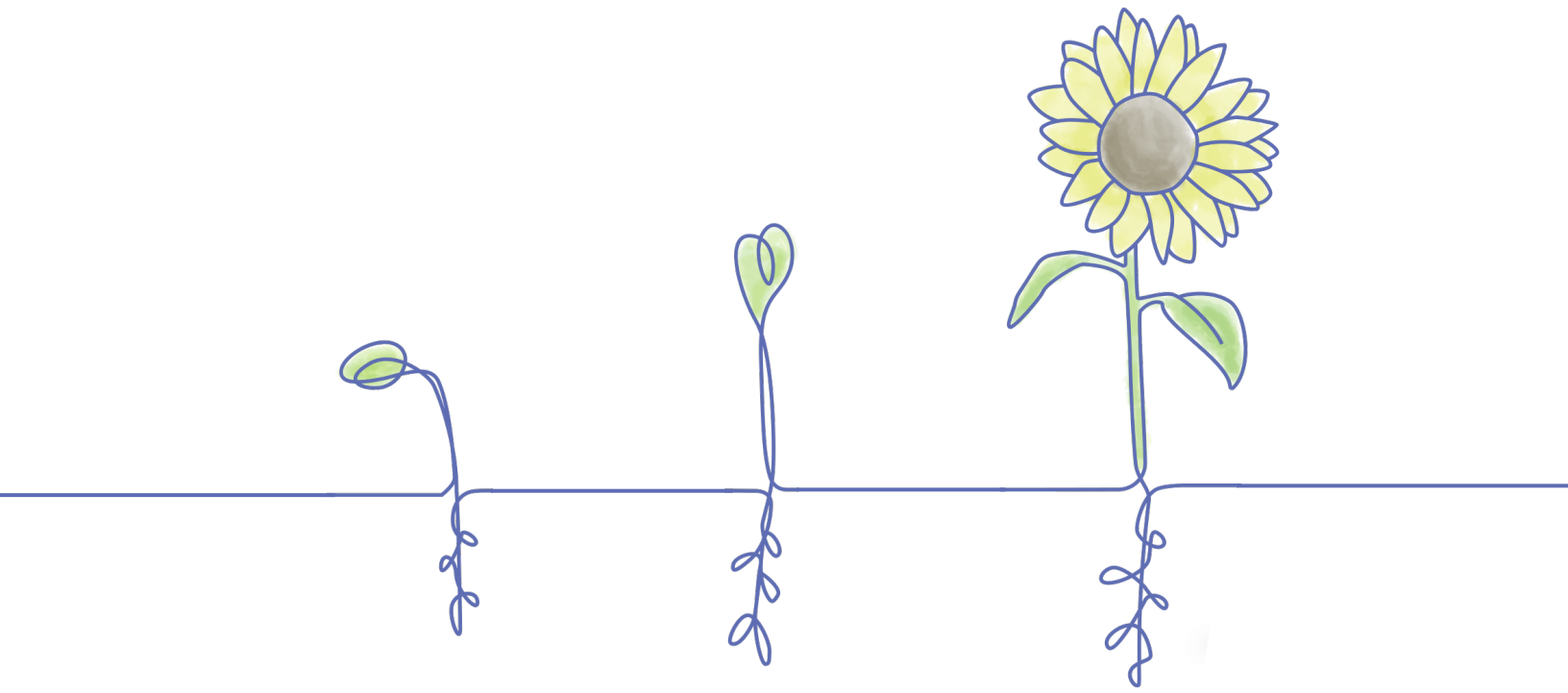
Foamed from a linear biopolymer, Cirql foam can be depolymerized and recycled without losing quality or performance attributes. This means that Cirql has two, viable and effective end of life solutions: industrial composting and recycling via depolymerizing to usable monomers for reuse.

End of Life Solution

An end of life (EOL) solution for a product is central to the concept of a circular economy. It addresses what happens to a product when it reaches the end of its useful lifespan. How is it disposed of? Does it need to be dismantled before the disposable? It's not sufficient to mitigate negative environmental impacts, the ultimate goal is to regenerate natural systems.

End of life solutions reflect that a manufacturer is taking responsibility for the entire life cycle of their products. It should not be confused with "end of life" or "end of service" in the technology sector, when a software company stops issuing updates or support for older program versions.

Cirql provides an environmentally sound, end of life solution for footwear that has never before existed in large-scale production. It is the world's first-ever biodegradable and compostable foam



solution. Footwear components made from Cirql foam are fully compostable -- dirt-to-dirt -- in industrial (aka commercial) composting facilities, and depolymerizable, which allows them to be recycled. Cirql is a "360 degree" solution because it is a bio-based product that is produced without added chemicals, and will decompose completely (when properly composted) without any residue of microplastics or persistent, forever chemicals.

EVA

Ethylene-vinyl acetate (EVA) is the most prominent foam midsole in footwear today. At higher densities, it takes on rubber characteristics and can be used in outsoles. It is lightweight, durable and has reliable performance.

EVA is a cross-linked polymer, derived from fossil-fuel based ingredients.

- EVA cannot be recycled effectively.
- EVA will not biodegrade and cannot be composted.
- The end of life for an EVA shoe component is landfill. Even if it is broken apart, the microplastics will last indefinitely.
- Conventional EVA foam requires the use of 10-18 ingredients to foam successfully for use. These additional ingredients are rarely discussed by industry and consumer-facing marketing.

Cirql is free from EVA plastics and the chemicals traditionally associated with EVA foam.

Foam

In chemistry, a foam is "an object formed by trapping pockets of gas in a liquid or a solid." Foam, as a verb, is to produce a foam.

Cirql is a patented, closed-cell foam technology made from a responsibly-sourced plant-based biopolymer and is expanded using nitrogen gas

during the foaming process, for use in footwear. Cirql is a first-ever EVA plastics free, recyclable and compostable foam.

Forever or Persistent Chemicals

Forever (or persistent) chemicals are a class of man-made compounds called per- and poly-flouroalkyl substances (PFAS). As the name implies, 'forever chemicals' are extremely persistent, lasting thousands of years. Therefore, any chemicals that last a really, really long time in the environment is technically a 'forever chemical.' PFAS happens to be a particularly significant offender.

Found in a staggering number of products and commercial applications, PFAS are adept at repelling oil, water and stains across many media (metal, textiles, foams, paper, paints, and more).

PFAS are considered persistent because they will never break down (i.e. degrade) in the environment. They remain in our bodies for years, with linkage to cancer, and reproductive and immune system health. PFAS have contaminated water, soil and the blood of people and animals in even the most remote regions of the planet.

They are noteworthy in a footwear context because of their frequent use in plastics, resins and rubber.

Key point: There is a class of PFAS, called PFOA and PFOS, that the Environmental Protection Agency phased out of use in U.S. manufacturing. That class is marked by a C8 carbon chain (long chain), and it was replaced in many instances by a PFAS containing six carbon atoms (i.e. "short chain).

There are two big caveats to understand.

1. C8 PFOAs are only banned by the EPA in products made in the United States. Imported products are not held to this same standard.
2. There is ZERO indication that C6 (short chain) PFOAs are safe or safer than C8 PFOAs. To the contrary, C6 chemicals have been linked to cancer in lab animals and studies suggest they may be even more hazardous than C8 chemicals.

The **Environmental Working Group** is one of several global organizations that suggest all PFAS pose dangerous risks to people, animals and the environment, and that the entire class of per- and poly-flouroalkyl chemicals should be regulated.

Cirql does not contain any forever/persistent chemicals and is third-party certified as part of the ecotoxicology portion of the EN 13432 industrially composting test.

Industrially (Commercially) Compostable/Industrial Composting

Industrial composting is differentiated from home composting by the precise control an industrial facility can keep over air/oxygen, water, microorganisms, and occasionally pressure. It is more highly and specifically calibrated. Some facilities may also introduce carbon and nitrogen-rich materials to facilitate the biodegradation of certain materials.

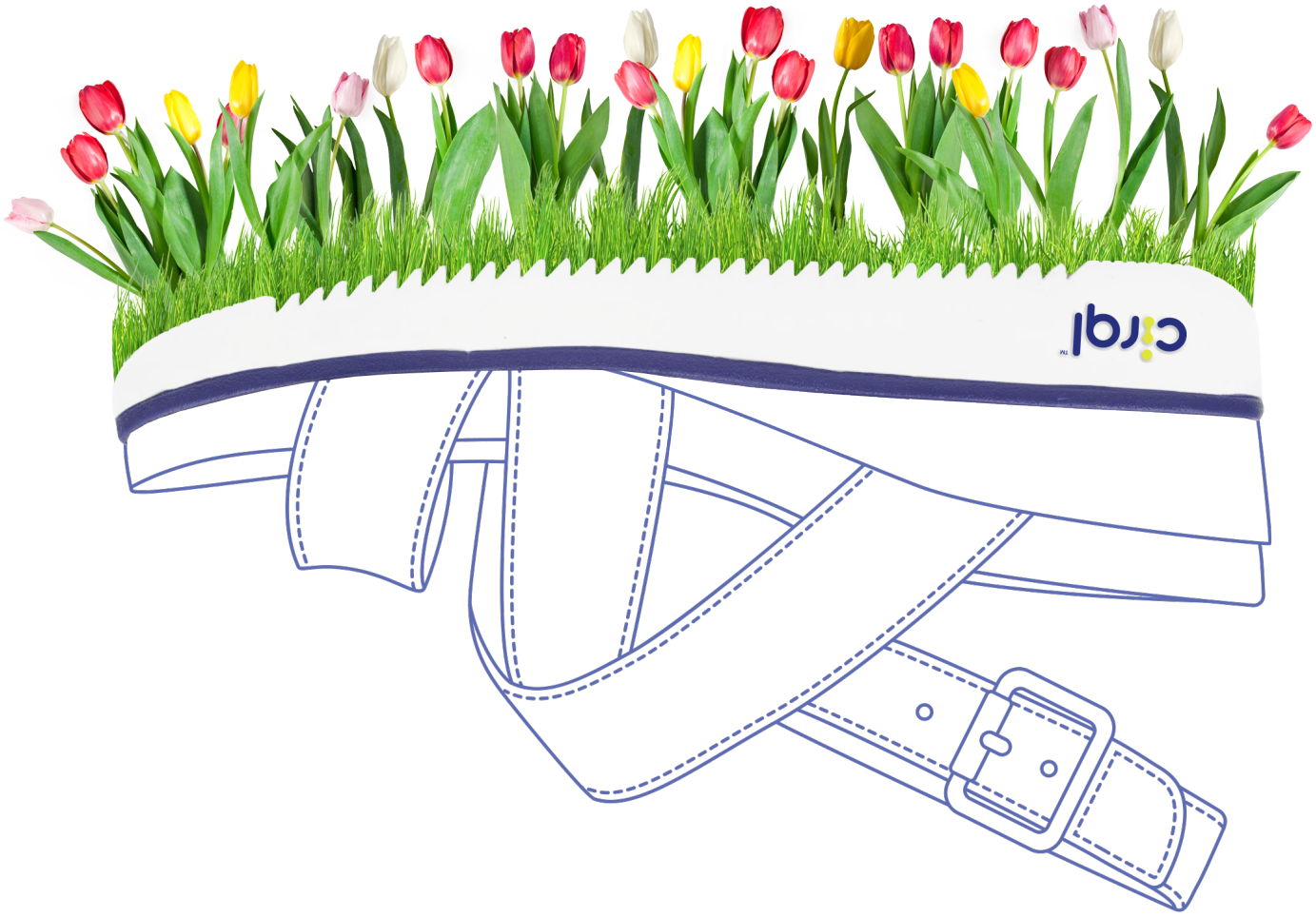
With the sustained high temperatures and specifications at industrial composters, these facilities can effectively and time sensitively compost materials that home composters cannot. These include PLA bioplastics, compostable dinnerware and flatware, and other compostable consumer products.

Just as with home or municipal processes, industrial composting provides a range of environmental benefits, like: reducing greenhouse gas emissions by diverting compostable material away from landfill, recycling nutrients, and improving soil health. To the latter, the resultant material is a nutrient-rich soil amendment (aka compost) that aids in plant growth and water-retention.

Cirql has achieved EN 13432 and ASTM D6400 for industrially-compostable certification utilizing the test methods ISO 14855 and ASTM D5338. Below are the minimum standard requirements for certification, which Cirql has achieved.

This includes:

- **Biodegration:** At least 90% of Cirql material biodegrades in six months, which is the lab standard. The exact duration of the entire process depends on the type of composting facility.
- **Disintegration:** The material has to disintegrate to less than 2mm in less than three months and after the testing is complete (after 6 months),
- **Ecotoxicology:** The soil should have low or no levels of heavy metals, there should be no evidence of negative effects to the soil.



Testing was performed under aerobic conditions which most simulate industrially compostable scenarios, which is the preferred method for Cirql. Although not intended for landfills, Cirql foam will fully biodegrade via anaerobic conditions.

Life Cycle Analysis

A life cycle analysis or assessment (LCA) is a method to understand the full environmental impact of a product. It encompasses the entire eco footprint from raw material to final product, including but not limited to: production, manufacturing, energy usage, water consumption, transportation, and distribution.

The Cirql LCA is in process and being conducted by IVL, the Swedish Environmental Research institute, a global leader in life cycle analysis. Official results will be coming in the next two months.

Marine Biodegradable

A thorough end of life solution addresses intentional disposal (e.g. industrial composting or recycling) and unintentional disposal in soil and marine environments.

Plastic pollution in marine environments is a global problem that impacts water quality, water temperatures, and wildlife. Marine pollution caused by microplastics is massive, as well, and scientists are uncovering the scope of this issue daily.

EVA plastics, and therefore microplastics, will never biodegrade in marine (or soil) environments.

The proprietary formulation of the bio-based polymer in Cirql utilizes the same building blocks

and base chemistry as a bio-based polymer that has been tested and verified on the following marine-based measures.

Intrinsic marine biodegradability:
The polymer achieves high levels of biodegradation, essentially equal to paper, over the test period of one year. Microplastics from this polymer completely biodegrade within 20 to 30 days, and do not release any persistent chemicals.

Disintegration in the marine environment:
When tested in four types of marine soil sediments four months to one year after introduction, the polymer was completely undetectable (i.e. biodegraded completely). For comparison, similarly sized samples of polyethylene (PE) plastics undergoing the same testing were fully intact through the full course of the testing times.

Ecotoxicity released into marine sediment as a result of biodegradation:
Final results indicate no toxic effects in the three model species or sediment exposed in this study. After six months of incubating the sediment injected with the polymer, clear signs of degradation were noted. After 12 months, the polymer had completely disappeared.

While there are no internationally agreed upon standards for certifying marine biodegradability, we can reliably correlate Cirql's marine biodegradability to the results of this study because it is from the same family of Novamont biopolymers, with the same building blocks and base chemistry. This is highly relevant for Cirql microplastic debris that will unintentionally (and unavoidably) end up in lakes, oceans and rivers. Further, Cirql will continue to seek out further environmental testing and further third-party certification work in this area as the methodologies evolve.

Cirql is third-party tested to serve as a viable replacement to conventional foams.

Sustainability Comes Full Circle

Microplastics

Microplastics are the extremely small pieces of plastic debris in the environment resulting from the disposal and breakdown of consumer products and industrial waste. Nearly every plastic product shares responsibility for adding microplastics to our environment.

The origin plastic determines end of life for the microplastic debris. It will either be persistent (never break down), non-persistent (will decompose quickly or in a reasonable amount of time), and/or biodegradable.

The non-persistent microplastic particles from Cirql are not present in both soil and marine environments because of their non persistence, meaning, they will biodegrade naturally and fully over time.

All microplastics that are currently shed in current footwear are persistent.

Non-Persistent Chemicals

Non-persistent chemicals linger in the environment for only short periods of time. They can be harmless or they can be toxic to humans. Unlike persistent chemicals, which demonstrate long-term threat, once a non-persistent chemical--even if toxic--degenerates the threat is eliminated.

The ingredients used in Cirql are industrially compostable at the end of life, where other conventional plastics often contain persistent chemicals that are present for hundreds, if not thousands of years.

IMPORTANT: If the particles of Cirql are small enough, like 'microplastic size' (less than 5mm in diameter), they will naturally biodegrade over time. They are non-persistent. If the parts are the size of shoe parts, then it requires a managed end-of-life for industrial composting.

Patent-Pending

Cirql has multiple worldwide patents granted with an extensive range of additional patents pending.

Plastics

"Plastic" defines the properties of materials that are moldable when soft, and retain their shape when hardened. "Plastics" also represents the entire group of materials with those qualities.

Conventional petroleum plastics include PET, PS, PVC, PP, PE and EVA. The vast majority of these are derived from fossil fuel sources, though some can now also be manufactured from plants and renewable sources.

Regardless of source ingredient, however, it is the chemical structure and properties that ultimately determine the end-of-life options for any type of

plastic. A plant-based conventional plastic (such as plant-based PE or Bio-EVA) has the same chemical structure as a petroleum-based PE or EVA, and cannot be recycled or composted.

This can be confusing for consumers because exchanging renewable sources for petroleum sources seems like a good thing. While the "supply side" solution is a net positive, the end of life solution for these renewably-sourced "conventional" plastics does not change. Some can be recycled. But they will not biodegrade, even with managed composting.

Bio-EVA is a relevant example for footwear. It may be derived partially from renewable materials, but it is made into a cross-linked polymer that cannot biodegrade, be composted or be recycled. What's more, it is typically blended with traditional EVA and a litany of other non-renewable ingredients to achieve desired functionality.

This is why Cirql is both a "supply" side and an end-of-life solution. It is sourced from renewable biomass and biodegradable and compostable organic acids. Those materials are processed into polymers, then foam, whose chemical structure and ingredients allow for biodegradation, industrial compostability and recycling.

Cirql is a first-ever EVA plastics-free, industrially compostable foam.

Polymer

A polymer is a large molecule made up of a chain of simpler, repeating chemical units, called monomers. All plastics are polymers. The structure of the polymer can be linear or cross-linked. This structure determines whether or not it can be deconstructed (depolymerization), which is a primary determinant of whether or not it can be recycled.

Cirql is a bio-based, linear polymer.

[See also: Plastics]

REACH Compliant

Europe is globally recognized as one of the most stringent regulators of chemical usage in manufacturing. REACH is a specific list of chemicals that are either banned in Europe, or are only allowed in infinitesimal amounts. In combination with RSL-compliance, REACH compliance guarantees supply chain purity for brand partners and safe products for consumers.

*Cirql is third-party certified, by **Intertek**, as REACH compliant.*

Recyclable

Able to be treated or processed and made suitable for reuse. Not all plastics, such as EVA, are recyclable.

Cirql foam has a linear chemical structure, which allows it to be depolymerized and therefore, recycled. At present, Cirql foam can be mechanically reground and reused (recycled) at the factory for making more foam parts. Mechanical recycling is an immediate option or reuse.

Restricted Substances List (RSL)

In the ongoing effort to protect consumer and environmental health, manufacturers develop restricted substances list (RSL) with third-party experts. An RSL ensures compliance with governmental regulations, and manages current and future chemical concerns for the supply chain and end of life.

*Cirql worked with **Intertek** to identify and adhere to the Restricted Substances List for footwear. This is the common RSL for footwear. While brand partners cannot add "new" chemicals to Cirql foam, Cirql cannot govern if the partners opt to use non-renewable components to bond to Cirql foam.*

Vegan-Certified

There are several pathways to achieve third-party, vegan-certification. For non-edible products, a third-party verifier conducts a chemical analysis to certify it is completely free of animal by-products, does not use animal-based testing, and that materials and components used in production are from sources with no animal-based derivatives.

Once confirmed vegan, it is a matter of due diligence to maintain responsible production practices that don't allow for cross-contamination in materials or components. Samples are then submitted periodically for confirmatory checks. While we can advise on vegan best practices for our brand partners, we cannot control their processes.

*Cirql is vegan certified, via testing and third party validation by **Intertek**. While we can advise on vegan best practices for our brand partners, we cannot control their processes.*

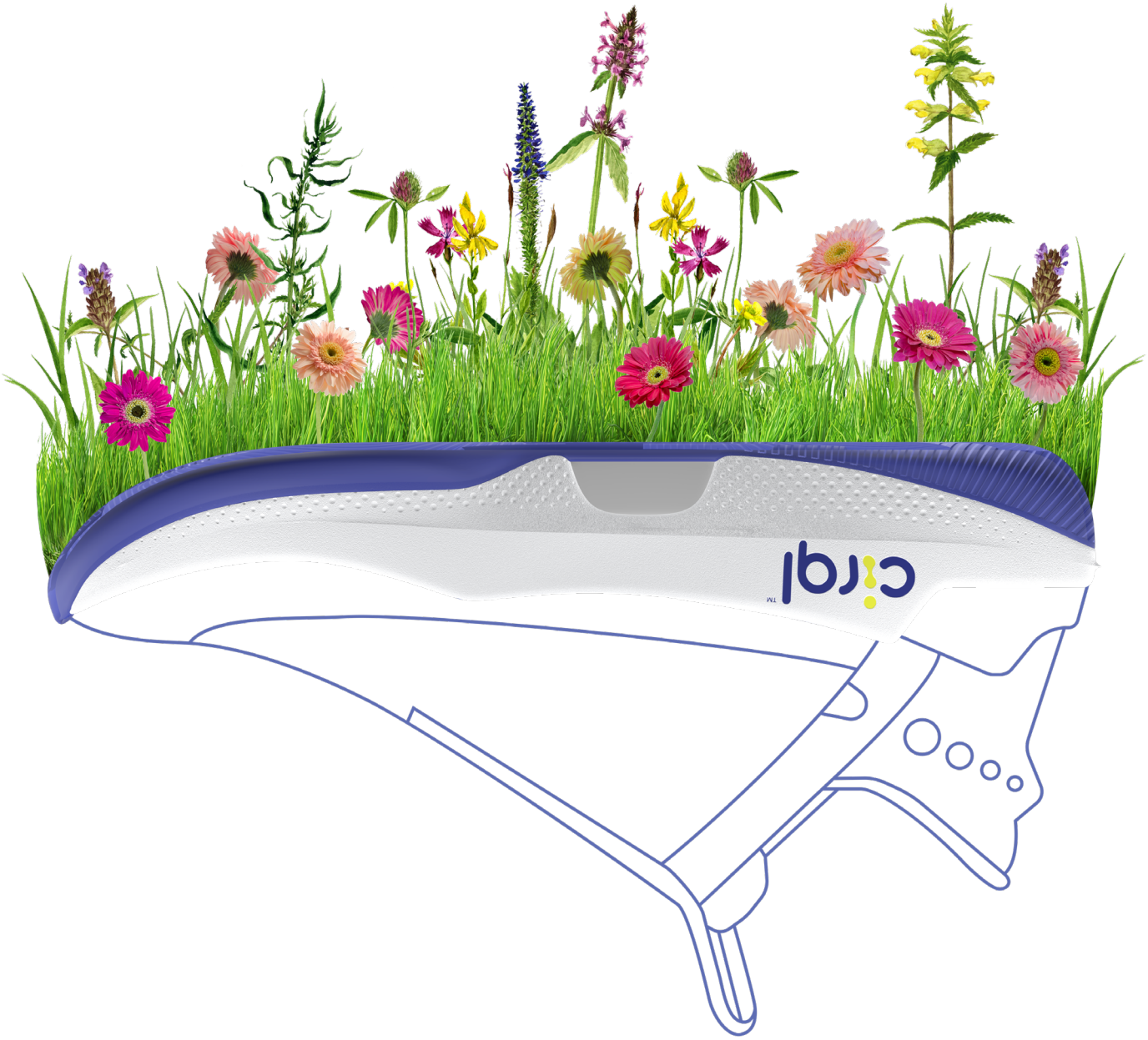
List of Cirql's Third-Party Verifications

- **Life Cycle Analysis, by IVL: results by end 2021**
- **Chemical-free foam process: verified by LCA**
- **Compostability: The testing standard is EN 132432 and ASTM D6400 for industrial certification**
- **Din Certco: results by December**
- **Confirmed, waiting for full composting to be complete in December 2021**
- **Certified Vegan, by Intertek**
- **GMO free, by Certi Quality: results by Feb. 2022**
- **USDA Biopreferred Certified**
- **Certified RSL compliant, by Intertek**
- **Certified REACH compliant, by Intertek**
- **Hypoallergenic, SGS Labs: results by Feb. 2022**

Zero Waste Production

Cirql is a 1:1 injected part with no trimming, cleaning or secondary molding. Any potential quality control waste or sprue waste can be put back into the machine and reused.

The world's first recyclable **and** compostable **midsole.**



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