

KEY CONCLUSIONS ON THE BIODEGRADABLE TOPIC

Consider how much of the glove will biodegrade?

All gloves contain some level of inorganic material that will not biodegrade. These materials are necessary in current production processes and help ensure a quality product for optimum worker safety.

Glove disposal – this makes all the difference.

When looking at biodegradable gloves, it's important to know how the gloves are processed after use; a landfill, digester or incinerator. Many applications involve the glove being contaminated and do not fulfill biodegradable criteria. These contaminated gloves do not reach a landfill/digester and therefore never have the opportunity to biodegrade.

What industries/applications would benefit most by using a biodegradable glove?

The most ideal applications are ones in which the gloves will not be contaminated with harsh chemicals, bloodborne pathogens or bodily fluids. Some example settings include retail, food, janitorial and some laboratory applications.

What is Ansell's stance on biodegradable gloves?

At Ansell, we are committed to reducing our environmental footprint by addressing all inputs from cradle to grave. We recognize there is a growing need for a product offering to allow end user customers to bolster their green credentials. As a short term solution, we will launch a dedicated Chemical & Household glove in addition to evolving one or two established MICROFLEX® disposable gloves by adding a biodegradable additive. It is our intent to launch sometime in calendar 2020. In addition, our longer term solution is to develop a proprietary, 100% bio-polymer.

Biodegradability is just one aspect of sustainability.

Carbon emissions can be offset further with bulk packaging, reduced container shipping, and low energy production. Biodegradability is just the last step in the broader life cycle of sustainable gloves.

What actions is Ansell taking to increase sustainability?

Ansell is working on a number of sustainability initiatives like energy savings, water conservation, recycled packaging, and more to reduce our overall impact on the environment. Visit Ansell's CSR report (<https://www.ansell.com/us/en/about-us/sustainability>) for more details on our sustainability commitments.

Can gloves and apparel be recycled?

Yes, some PPE, including gloves and apparel, can be recycled if it isn't contaminated with hazardous wastes or biological contamination sources such as bloodborne pathogens or bodily fluids. TerraCycle has created a zero-waste solution for gloves and protective apparel. You can find out more about how to recycle in your facility by visiting www.terracycle.com.



ANSELL'S COMMITMENT TO THE ENVIRONMENT

ENVIRONMENT

As a leader in its industry, Ansell recognizes the obligation to operate more efficiently, protecting resources and communities through strategic environmental management. We understand that companies that fail to adequately manage environmental risk issues – from climate change and energy, to fresh water management, pollution and waste – may face increasing pressure on not only their social licence to operate, but their ability to continue to generate strong financial returns.

We understand that the bar of leading practice in environmental sustainability management in general – and climate change risk management and disclosure in particular – continues to rise. We will continue to work to raise our own ambition accordingly, and to ensure our ambition for business growth goes hand in hand with improvement in environmental performance.

In FY18, Ansell set environmental commitments and targets to advance its sustainability vision. These goals are:

GOALS



GHG Emissions

25% intensity reduction of Scope 1 and Scope 2 emissions, in tonnes of CO₂ – equivalent/\$M production value, below FY16 baseline by the end of FY25.



Water

15% intensity reduction in water usage, measured in m₃/\$M production value, below the FY16 baseline by the end of FY25.



Energy

Continuous improvement to identify and implement energy reduction and efficiency opportunities to support and augment our GHG Emissions reductions target.



Waste

Zero waste to landfill from all manufacturing facilities by the end of FY23

THE DIFFERENCE BETWEEN BIODEGRADABLE AND COMPOSTABLE

DIFFERENCES BETWEEN BIODEGRADABLE AND COMPOSTABLE



BIODEGRADABLE



COMPOSTABLE

What's the difference?	In a favorable environment, biodegradable products break down entirely and return to nature with help from naturally occurring microorganisms like bacteria, algae, and fungi.	Compostable products break down in the same way as biodegradable ones but the process also produces nutrients that help enrich the soil for future plant growth.
Timeline	Longer, undefined timeline.	Relatively short, dependent on the materials.
Requires Sunlight for Decomposition	Not necessary	Sunlight helps the decomposition
Temperature Requirements	Warmer air is helpful	Ideal decomposition in 70-80°
Airflow Requirements	Does not always need oxygen	Ideal oxygen level is 20%
Byproducts of Decomposition	Water, carbon dioxide, methane	Water, carbon dioxide, inorganic compounds, biomass
End Results	Completely disappears into the environment without negative effects, if the CO2 and Methane is captured and reused.	Completely disappears into the environment and provides nutrients for the soil.
Conclusion	Products marketed as biodegradable generally need specific conditions to biodegrade. Check to see how their biodegradability is measured to ensure your waste disposal is appropriate to assist.	

CAUTION: Be mindful of disposal guidelines for PPE products that have come in contact with hazardous chemicals or biological contamination sources such as bloodborne pathogens or bodily fluids. These products must be treated as hazardous materials and disposed of in accordance with local guidelines.

Is there a biodegradable testing standard specific for gloves?

While there are no official standards for gloves, the industry relies on and tests against ASTM D5526 and ASTM 5511. These tests are designed to measure the biodegradable nature of plastics in different landfill conditions.

	ASTM D5526	ASTM 5511
Designed to replicate	Municipal Landfill	Anerobic Digester
Heat	Low	High
Pressure	High	High
Oxygen	Limited	Limited
Light	None	None
Moisture	Low	High



KEY TAKEAWAYS ABOUT BIODEGRADABILITY & COMPOSTABILITY

What is Biodegradability?

Biodegradability is the ability of materials to be broken down through a result of interaction with enzymes from microorganisms.

If this process is complete, the initial organic substances convert into simple inorganic molecules.

Everything will eventually biodegrade, even plastics, but the time it takes can extend from years to decades.

What is Compostability and how does this differ?

Compostability is the ability to breakdown to its natural elements under compostable conditions, .i.e. under normal temperatures and moisture of the average garden and over a short period, typically 6-8 weeks.

Biodegradable nitrile gloves cannot be disposed of in the same way as compostable products as this will inhibit its ability to biodegrade and render the products as standard waste.

How do nitrile gloves become biodegradable?

Production processes need to be adapted to allow for the inclusion of special additives within the glove formulation. These additives remain inert until the glove comes into contact with a specific set of conditions centered around heat and moisture.

The additives then accelerate the biodegradability process by allowing the microorganisms to interact with the glove material and increase the rate at which it is broken down.

Even with this additive, please know that roughly 5% of a finished nitrile glove is made from inorganic materials that may not fully biodegrade for many decades.

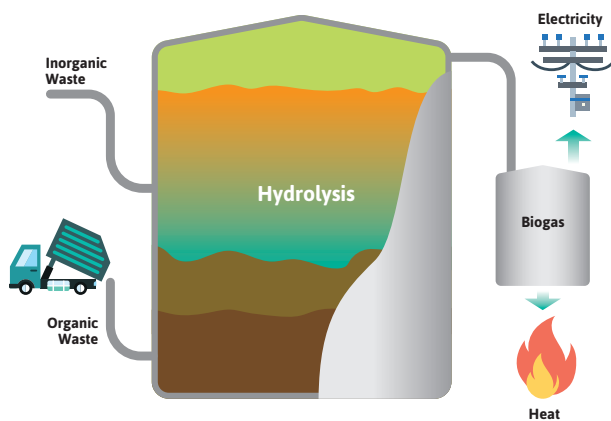
MODERN LANDFILLS AND WASTE DISPOSAL

UNDERSTANDING LANDFILLS

Modern landfills are designed to safely dispose of waste in a way that prevents it from contaminating the ground and water. Landfills are essentially large holes with layers of lining below, around and on top

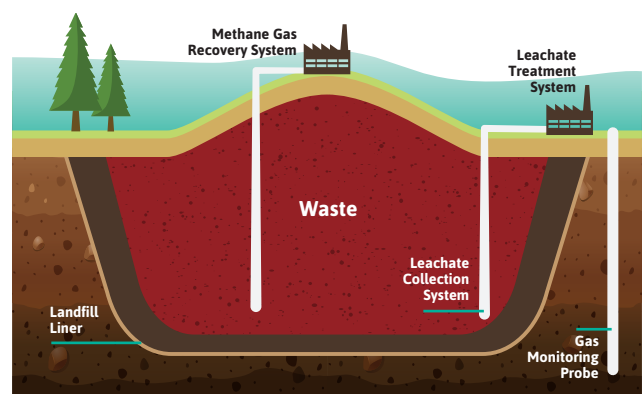
of the waste. From here, they deviate into two main types, anaerobic digesters and municipal landfills, with the main difference being the environment in which they operate.

ANAEROBIC DIGESTERS



- Less common form of landfill
- While encapsulated, it is designed to aid in the process of biodegradability
- It captures the biogas and uses it to produce heat and electricity
- Smaller negative impact for the environment

MUNICIPAL LANDFILLS



- The most common form of landfill
- Completely encapsulated and inhibits biodegradability and compostability
- Capture and reuse of gases produced in landfills through bio-degradation will depend on the landfill type. Understanding where the glove goes after disposal is key
- Greater negative impact for the environment

Not All PPE is Appropriate for Landfills

If the PPE has been contaminated by harsh chemicals or biological contamination sources such as bloodborne pathogens or bodily fluids, then it is

considered hazardous waste and not appropriate for landfills. Typically, these items are collected in a central location and incinerated.

THE ECO-FRIENDLY IMPACT OF EACH POLYMER

Are some polymers more eco-friendly than others?

Nearly all polymers are synthetic, human made products to ensure high performance, and do not contain any of the naturally occurring proteins or fats which are required to facilitate biodegradability through microbial interaction. The exception to this rule is Natural Rubber Latex (NRL), a naturally occurring product extracted from trees containing the required ingredients allowing it to biodegrade within a relatively quick period. Below is a high-level overview of each polymer's biodegradable credentials:



Natural Rubber Latex (NRL)

- Natural: made from the extract of sustainable rubber trees.
- Relatively clean production process.
- Effectively degrades within an efficient amount of time. The quickest of all materials.



Nitrile Butadiene Rubber (NBR)

- Synthetic: made from acrylonitrile and butadiene.
- Relatively clean production process.
- Needs an additive to assist with degradation. Without the additive it takes decades.



Neoprene

- Synthetic: made from oil and a product of mining or drilling.
- Relatively clean production process.
- Typically takes 50-80 years to degrade in ideal conditions.



Poly Vinyl Chloride (PVC)

- Synthetic: made from oil and synthetic materials like phthalates, DINP and plasticizers. Contains plastics.
- Very dirty production process.
- Do not biodegrade because of the plastic content. Burning them releases large amounts of toxic emissions.



Ansell believes there is an opportunity to innovate in polymer design with the use of entirely organic materials.