



Plastic is good
We make it better

BiologiQ

How

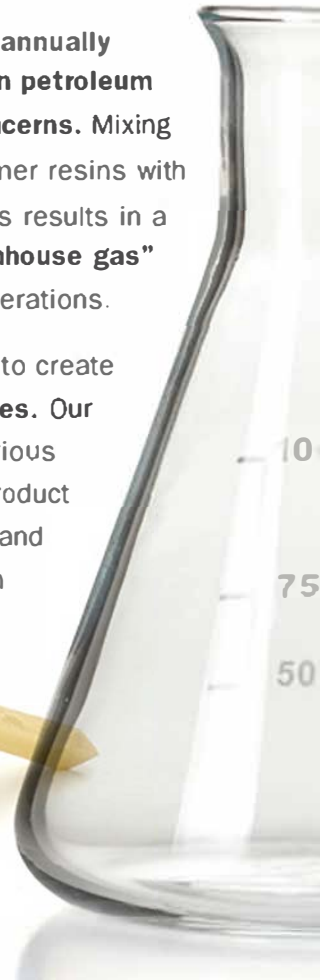
do we make
plastics better?

We incorporate
renewable starch.

BioLogiQ is creating a sustainable future for the plastics industry by revolutionizing the way plastic products are manufactured. The company makes bioplastic resins from all-natural, renewable resources. These resins allow plastics manufacturers to **greatly reduce fossil fuel-based plastic use and greenhouse gas emissions.**

BioLogiQ makes plastic from **annually renewable starch, rather than petroleum to address environmental concerns.** Mixing BioLogiQ's NuPlastiQ BioPolymer resins with petroleum-based plastic resins results in a **dramatic reduction of "greenhouse gas" emissions,** helping future generations.

The company formed in 2011 to create **a useful plastic from potatoes.** Our proprietary process uses various starches, including starch by-product from processing French fries and potato chips. There's a reason we were founded in Idaho.



WITH A **100%** PLANT-BASED BIOPOLYMER CALLED NUPLASTIQ, BIOLOGIQ IS **THE WAY OF THE FUTURE**

NuPlastiQ® BioPolymer is a unique type of thermoplastic resin made with our proprietary process that converts highly crystalline starch powder into a low crystalline (mostly amorphous) plastic resin.

NuPlastiQ is supplied in pellet form. This thermoplastic material, when partnered with mainstream high performance polymers, has many properties which **are desirable for manufacturing a variety of products**, including films and bags, injection molded parts, blow molded bottles, and thermoformed parts.

NuPlastiQ's unique properties allow it to be easily blended with other plastic resins, including both fossil-fuel and bio-based materials. **It is drop-in-compatible with polyolefins (PE, PP, PS) and compostables (PLA, PBAT, PHA).**



Because of its strength, some bags made with 25% NuPlastiQ and 75% PE can be downgauged by 30%. The result is 50% less fossil-based plastics being used to make the bags.



RECYCLING
 BioLogiQ partnered with Licella and Mura to accelerate scale-up of a chemical recycling unit with capacity to process up to 20,000 tons per year of post-consumption plastics that otherwise would be landfilled. 2021 scheduled start-up.

BioLogiQ's approach is inspired by the Ellen MacArthur Foundation's "New Plastics Economy"

130k+
 BARRELS OF OIL NOT EXTRACTED

With current technology, just a fraction of recycled oil will go back to plastic. But recycled oil is a significant step towards future plastics-to-plastics value chains.

OTHER MATERIAL STREAMS

REUSE

USE

AD* AND/OR COMPOSTING

ENERGY RECOVERY

LEAKAGE

*Anaerobic Digestion



Renewable Feedstock
 From responsible sources with a benign LCA profile

- NuPlastiQ BioPolymer is 100% natural, responsibly and renewably sourced.
- Carbon neutral at BioLogiQ's gate

3Rs to Live By
Reduce: NuPlastiQ's great mechanical performance when matched to polyolefins or compostable resins enable high performance, lightweight products and packaging.
Reuse: Polyolefin BioBlends are shelf stable under normal storage conditions.

Recycle (mechanical - reuse polymers without need to reassemble):
 - Mechanical recycling is possible, but might not be drop-in with traditional post-consumer.
 - Chemical Recycling drop-in with post-consumer, and tested compatible with pyrolysis.
 - Successful in Industrial Mechanical recycling.

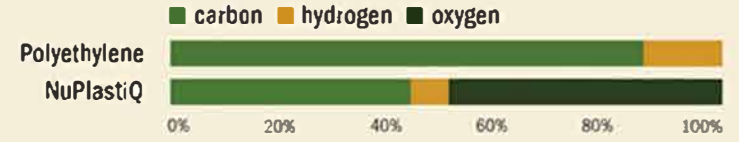
Composting

- NuPlastiQ enhances performance requirements in compostable products.
- **Cost effective solution** for ASTM D6400 compliance.

- **NuPlastiQ Improves marine biodegradation** in case of incomplete compost run off to waterways. One year marine biodegradation achievable under ASTM D6991.

Energy Recovery

1/2 the carbons.
 1/2 the CO₂ from incineration:



Leakage

Less persistent in the unfortunate case of unavoidable environmental leakage.

- **Preventing environmental leakage** will always be the best strategy to ensure healthy soils and oceans for generations to come;
- Some level of environmental leakage is unavoidable;
- While there is no excuse for littering, **engineering mainstream plastics for reduced environmental persistence** is a valuable "insurance policy".



Biodegradability information for B2B discussions and decision making; BioLogiQ doesn't support B2C communication on polyolefin biodegradation.

- BioLogiQ has conclusive evidence that NuPlastiQ **accelerated polyolefin biodegradation** under lab conditions (ASTM D5338 and D5511).
- **The mechanism is not fragmentation.** Polyolefin BioBlends are shelf stable under normal storage conditions.
- Investment of approximately one million dollars has been allocated to projects learning if and how NuPlastiQ-induced biodegradation would reduce environmental impacts of polyolefins that leak into the environment. Results expected in two years.



NuPlastiQ BioPolymers

COST ADVANTAGED, COMPOSTABLE AND MARINE BIODEGRADABLE

COST EFFECTIVE, HIGH PERFORMANCE, RENEWABLE CONTENT



BioBlend BC

- Plastic to CO₂ and H₂O Biodegradation without need for prior fragmentation.
- Cost effective solution for biodegradability (Industrially Compostable).

⚠ Not mechanically recyclable in most streams. Please check local requirements and label accordingly.

BioBlend XP and XD

- Reduced carbon footprint versus fossil-based.
- Drop-in manufacturing.
- Potential for light weighting extruded films and sheets.
- Recyclable with special consideration.
- 5 to 40% renewable content. (In many cases only practical route)



NuPlastiQ® XP High Performance BioPolymers for Packaging & Films

BioBlend 50% NuPlastiQ, 50% partner resin					
	Partner Resin	Typical Use	Density (g/cm³)		MFI (g/10min)
XP 22150	HDPE	Blown Film, Blow Molding, Extrusion	1.17	0.3	190°C@10 kg
XP 22250	HDPE	Blown Film	1.20	0.9	190°C@10kg
XP 24150	LDPE	Blown Film	1.16	0.6	190°C@5.0 kg
XP 24250	mLLDPE	Blown Film	1.16	0.65	190°C@5.0 kg
XP 24550	LLDPE butene	Blown Film	1.16	0.25	190°C@5.0 kg
XP 24850	LLDPE octene	Blown Film	1.16	1.45	190°C@10 kg
XP 24875	HDPE/LLDPE	Blown Film	1.17	0.45	190°C@5.0 kg

NuPlastiQ® XD High Durability BioPolymers for Durable Goods

BioBlend 50% NuPlastiQ, 50% partner resin					
	Partner Resin	Typical Use	Density (g/cm³)		MFI (g/10min)
XD 25050	PP	Injection Molding	1.16	6.2	190°C@2.16 kg
XD 25150	PP	Injection Molding	1.16	5.5	190°C@2.16 kg
XD 25250	PP	Injection Molding, Extrusion	1.15	3.0	190°C@2.16 kg
XD 22620	HDPE	Blow Molding	1.04	1.08	190°C@5.0 kg
XD 26150	PS	Injection Molding	1.20	1.8	190°C@5.0 kg

NuPlastiQ® BC Biodegradable/Compostable BioPolymers for Packaging & Films

BioBlend Fully formulated					
	Partner Resin	Typical Use	Density (g/cm³)		MFI (g/10min)
BC 27130	PBAT	Blown Film	1.30	4.0-7.0	190°C@2.16 kg
BC 27150	PBAT	Blown film	1.30	1.7	190°C@2.16 kg



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