

BioLogiQ is creating a sustainable future for the plastics industry by revolutionizing the way plastic products are manufactured. The company makes bioplastic resins from allnatural, 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.

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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're based 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-incompatible 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.





## 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.

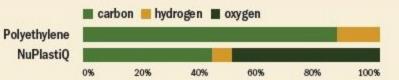
Recycle (mechanical - reuse polymers without need to reassemble):
NuPlastiQ-polyethylene
BioBlends are proven to be compatible with existing recycling infrastructure.
Low concentrations did not require any change in processing conditions.

## 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 CO<sub>2</sub> 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® 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	0.64	190°C@5.0 kg
XP 22250	HDPE	Blown Film	1.20	0.88	190°C@5.0 kg
XP 24150	LDPE	Blown Film	1.16	0.67	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	0.30	190°C@5.0 kg
XP 24850	LLDPE octene	Blown Film	1.16	0.64	190°C@5.0 kg
XP 24875	HDPE/LLDPE	Blown Film	1.17	0.56	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	5.40	190°C@2.16 kg
XD 25150	PP	Injection Molding	1.16	3.5-4.4	190°C@2.16 kg
XD 25250	PP	Injection Molding, Extrusion	1.20	3.00	190°C@2.16 kg
XD 22620	HDPE	Blow Molding	1.04	1.08	190°C@5.0 kg
XD 26150	PS	Injection Molding	1.23	1.90	190°C@5.0 kg

## $NuPlastiQ \hbox{@ BC Biodegradable/Compostable BioPolymers for Packaging \& Films}$

BioBlend Fully formulated	Partner Resin	Typical Use	Density (g/cm³)		MFI (g/10min)
BC 27130	PBAT	Mulch Film	1.30	2.75-4.25	190°C@2.16 kg
BC 27240	PBAT/PLA	Blown film, bags	1.30	3.70	190°C@2.16 kg

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