True Products Group Ltd

LZ Pattern, Monofilament, Oxo-Biodegradable Christmas Tree Netting

from the high quality Xnet range of Christmas tree netting by True Products.
For use in manual or automatic netting machines.

A new, responsible choice for growers, resellers and retailers, oxo-biodegradable netting will become an essential offering for addressing consumer concerns about the use of single-use plastic within the Christmas tree industry.

What is oxo-biodegradable plastic?

Oxo-biodegradable plastic is ordinary plastic to which small amounts of metal salts (a prodegradant additive) has been added during the manufacturing process. The resulting plastic is then made into products like carrier bags, produce or courier bags, straws and other short-life/single-use items. The big difference between oxo-biodegradable and ordinary plastic is that if oxo-biodegradable plastic escapes collection and ends up in the open environment as litter, it will degrade and biodegrade in a similar way to nature’s waste.

How does it work?

A very small amount of additive is put into the manufacturing process. This breaks the molecular chains in the polymer, and at the end of its useful life the product falls apart. The plastic does not just fragment, but will be consumed by bacteria and fungi after the additive has reduced the molecular weight to a level which permits micro-organisms access to the carbon and hydrogen.

When the material has reached the fragmentation stage it is no longer a plastic, and is "biodegradable" in the same way as nature's wastes such as straw and twigs. The process continues until the material has biodegraded to nothing more than CO2, water, and humus, and it does not leave fragments of petro-polymers in the soil.

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The term ‘oxo-biodegradability’ is a hybridization of two words, oxidation and biodegradability. It defines clearly a two-step process initiated in this case by the additive to degrade the polymer chain (break up) and make it available for biodegradability within the environment when a treated item has finished its useful life.

The phase of oxidation reduces the molecular weight and introduces oxygen into the structure. This process transforms the polymer from long strands to much smaller lengths. By reducing the chain length of the polymer the material loses its physical strength and elongation properties making it brittle and non- ‘plastic’. The biodegradability aspect refers to the conversion of these lower molecular weight species by bacteria into biomass, CO2 and H2O in an aerobic environment, or in the case of an anaerobic environment, CH4.

The oxo-biodegradability option that uses oil or natural gas by-products, provides several advantages over the alternative hydro-biodegradability that uses vegetable products such as starch.

Comparisons between Oxo-Biodegradable and Hydro-Biodegradable Technology

Oxo-Biodegradable	Hydro-Biodegradable
Made from a by-product of oil or natural gas	Usually made from vegetable products such as starch
Can be recycled as part of a normal plastic waste-stream	Damages recyclate unless extracted from feedstock
Can be made from recyclate	Cannot be made from recyclate
Time to degrade can be set at manufacture	Cannot be controlled
Emits CO_2 slowly while degrading	Emits CO_2 rapidly while degrading. As 90% of it must convert to CO_2 within 180 days in order to comply with the Standards for compostable plastic, these plastics contribute to climate change but do not improve the soil.
Inert deep in landfill	Emits methane deep in landfill
Can use same machinery and workforce as for conventional plastic	Needs special machinery and workforce
Suitable for use in high-speed machinery	Usually not suitable
Compostable in-vessel	Compostable (but not for home composting)
Little or no additional cost	Four or five times more expensive than conventional plastic
Same strength as conventional plastic	Weaker than conventional plastic (unless mixed with oil-based plastic)
Same weight as conventional plastic	Thicker and heavier
Leak-proof	Prone to leakage
Degrades anywhere on land or sea	Degrades only in high-microbial environment
No genetically modified ingredients	Possibility of GM ingredients
Safe for food contact	Safe for food contact
No PCB's organo-chlorines, or "heavy metals"	No PCB's organo-chlorines, or "heavy metals"
Can be incinerated with high energy-recovery	Can be incinerated, but lower calorific value
Production uses no fertilisers, pesticides or water	Production uses fertilisers, pesticides and water
No limit on availability of feedstock	Limited availability of feedstock
Demand for oxo-biodegradable plastics does not drive up cost of fuel for vehicles	Demand for hydro-biodegradable plastics drives up price of human and animal foodstuffs

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Plastics incorporating the additive we use will ultimately oxo-degrade, making it accessible to microbial life for bio-digestion into CO2, H2O and biomass when properly discarded. Compared to vegetable based oxo-biodegradable additives currently available on the market, the oil based additives contain a unique two part control package which enhance its performance in the following ways:

1. The additives control package is photo-initiated which means that the oxidative reaction doesn't significantly begin before the product is discarded and exposed to UV light and/or heat.

   Advantage: This therefore gives an enhanced level of confidence versus other oxo-biodegradable additives, which are initiated at the *processing* stage through thermal exposure. This is particularly important with respect to avoiding premature breakdown of products. (*see* **'Shelf Life'** *below*)

2. Uses a unique pro-degradant package to controllably reduce the length of the polymer chains.

   Advantage: The pro-degradant does not contain any heavy or toxic metals. The degradation process does not just cause fragmentation but changes the molecular structure of the plastic making it accessible for bio-digestion by microbial life forms.

3. Has secondary phase bio-digestion promoters that assist the growth of microbial colonies. This speeds up and facilitates the ultimate mineralization of the plastic following its initial oxidation.

Shelf Life

- The level of photo-exposure required, which has to be natural rather than artificial light, is around 24 to 48 hours of outdoor exposure in a typical Northern European climate and should not be regarded as a "bullet" but as a gradual "topping-up" procedure.
- It should be understood that the oxidation reaction will still occur in the absence of any light exposure, but it will take between 18 and 24 months to initiate. This gives extra confidence against premature degradation as without any outdoor light exposure the product will have an 18 to 24 month shelf life before the onset of oxidation.
- The treated product has a dwell time of around 4 months following photo-triggering and then rapid development of embrittlement over the next 8 months.

Other Benefits and Advantages

- Plastics incorporating the additive have not been found to emit any offensive odours during their oxo-biodegradation.
- Additives comply with FDA and EC Food Contact regulations.
- Additives are harmless to humans, animals and plant life and are non-toxic, leaving no known harmful residues in the soil or waste streams.

For more information, please contact:

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