

**SYMPHONY -
IN HARMONY WITH THE ENVIRONMENT**

100%

**OXO-BIODEGRADABLE PLASTICS
Additive & Products**

www.degradable.net


**Symphony
environmental**

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This information is based on our present state of knowledge and is intended to provide general information on our products and their uses. It should not, therefore, be construed as guaranteeing specific properties of the products described or their suitability for a particular application which are sold under our general conditions of sale.



**degradable
plastics**



**d₂w[®] IS NOW SOLD
IN MORE THAN 60
COUNTRIES WORLDWIDE**

Plastic is a fundamental part of our busy lives. Not many people know that plastic is made from a by-product of oil which used to be wasted and that it makes good environmental sense to use it. Ordinary plastics can be re-used and recycled – however if they get into the environment they can last for many decades. The solution is to add d₂w[®] additive when the plastic product is being manufactured - making it “oxo-biodegradable” or “oxo-bio” for short.

Oxo-bio plastic will degrade, then biodegrade, to water, CO₂, biomass and trace-elements, on land or sea, in the light or dark, in heat or cold, in whatever timescale is required. It leaves NO fragments NO methane and NO harmful residues. There is little or no extra cost and during its service-life strength and other qualities are the same as ordinary plastic.

d₂w[®] is a low-cost insurance against the accumulation of plastic waste in the environment.

How does it work?

The additive lowers the molecular weight, causing the plastic to degrade, then biodegrade. Stabilisers control the service life. For example, a refuse sack might need an 18-month life before beginning to lose its strength but a bread-bag might only require a few months.

Significantly, d₂w[®] oxo-biodegradable plastics do not need a highly-microbial environment to degrade – this will happen even if the plastic is left in the open air or in the sea! For this reason in particular, ‘oxo-bio’ plastic is preferable to ‘hydro-degradable’ e.g. starch-based plastic, which requires an active bio-environment before degradation will work.

Comprehensively tested and proven

d₂w[®] oxo-biodegradable plastics have been extensively tested by RAPRA Technology, Europe’s leading independent plastics research establishment and by other specialists around the world. They can pass all the tests prescribed by American Standard 6954-04 for “Plastics that Degrade in the Environment by a Combination of Oxidation and Biodegradation.” Product development is on-going and confirmation of degradability of our customers’ products is included in Symphony’s routine quality-control procedures.

Widely used

d₂w[®] products have been available for more than four years and are now used in more than 50 countries by major retailers, hotel groups, food manufacturers etc.

Certified food safe

The additives are suitable for direct food-contact, in compliance with EU Directive 2002/72 as amended and US FDA Code of Federal Regulations Chapter 21. Independent food-contact regularity assessments of d₂w[®] have been undertaken by Smithers/RAPRA. Also, for more than 3 years d₂w[®] products have been used by major retailers for direct food-contact.

Environmentally safe

d₂w[®] oxo-biodegradable additive has been successfully tested in compost by government-accredited laboratories for soil safety and eco-toxicity. These tests demonstrated that the additive did not have any toxic effects and that it is totally soil safe.

Recyclate and recycling

Recycled plastics are OK, but they are not degradable and will still lie around in the environment for decades. However, ordinary plastic and recycled plastic can now be made oxo-biodegradable using d₂w[®] additive. Conversely, d₂w[®] products can be recycled and provided that regard is had to inclusion-rate and stabilisers where necessary, the recycled plastic will not be degradable unless more d₂w[®] is added.

***DO YOU KNOW?
THERE IS A HUGE
AMOUNT OF
PLASTIC WASTE
FLOATING IN THE
OCEANS.
SOLUTION:
d₂w[®]!**

Source: Algalita Marine
Research Foundation;
“The Independent”
5th February 2008



Waste management systems

In landfill d₂w[®] oxo-biodegradable plastic will continue to degrade while oxygen is present. Oxo-bio will not emit methane even under anaerobic conditions (unlike hydro-biodegradable plastic, paper, cotton etc.). This is important because methane is a greenhouse gas 23 times more harmful than CO₂. Oxo-bio can be incinerated for energy-recovery and trials are ongoing to demonstrate compostability of d₂w[®] products in industrial composting systems.

Reduce, reuse, recycle

d₂w[®] oxo-biodegradable products are wholly consistent with these important environmental principles. Also, the nature of the additive allows the very best available plastic technologies to be used to achieve minimisation of raw-material usage. During its service-life the product can be used and reused and will maintain its strength – and d₂w[®] is recyclable as described above.

No Compromise

d₂w[®] oxo-biodegradable plastics are indistinguishable from the non-degradable alternative during the useful life of the product. There is therefore no compromise on product features or performance.

No Additional cost

There is very little additional cost – and in some cases no additional cost. This is because d₂w[®] oxo-biodegradable products can be made with the same machinery and workforce as normal plastic and there is no need to change suppliers. The environmental and marketing benefits more than cover any small on-cost there may be.

Adjustable product life

The useful life of d₂w[®] oxo-biodegradable products is 'programmed' at the time of manufacture according to the customer's requirements and typically includes some margin of flexibility. A number of factors can accelerate degradation such as sunlight, heat and stress (stretching and tearing) and it will be slowed by chilling or freezing. Appropriate, but not special, storage conditions and stock-rotation are all that is needed.

Life cycle cost is low

Oxo-bio plastics are made from a by-product of oil (comprising less than 5% of the oil barrel), which used to be wasted by flare-off. They are also lighter and less bulky than paper, glass, or other alternatives. This makes the life-cycle cost very low especially when compared to the use of fertilisers and machinery to grow crops to make hydro-biodegradable plastic alternatives, or the huge amounts of energy consumed in making and transporting glass and paper. In addition, the use of oxo-bio plastic avoids usage of land and water resources which drives up the cost of food for people and livestock.

Extensive manufacturing capacity

In addition to marketing d₂w[®] additives through a growing network of Distributors and Agents worldwide, Symphony Environmental has agreements with specialised factories in the UK, Europe and around the World to meet the technical and quality requirements of many different degradable applications and therefore to supply additive and finished products. This enables Symphony to maintain extremely competitive terms, to meet all technical demands and to provide unlimited production capacity. Symphony staff based in Singapore provide on the spot support for Asian production.



***DO YOU KNOW?
WE PRODUCE AND USE 20
TIMES MORE PLASTIC TODAY
THAN WE DID 50 YEARS AGO
REALLY!**

**WORLD LEADER
SYMPHONY ENVIRONMENTAL
HAVE DEVELOPED THE LOW-COST
SOLUTION TO THE WORLDWIDE
PROBLEM CAUSED BY MILLIONS
OF TONNES OF FLEXIBLE
AND SEMI-RIGID PLASTICS
ACCUMULATING YEAR AFTER
YEAR IN THE ENVIRONMENT.**

**d₂w[®] PRODUCTS DEGRADE
THEN BIODEGRADE TOTALLY
AND HARMLESSLY – EVEN IF
DISCARDED AS LITTER – LEAVING
NO FRAGMENTS, NO METHANE,
AND NO HARMFUL RESIDUES.**



Les plastiques oxo-biodégradables se dégradent en accord avec la durée d'utilisation prévue puis deviennent naturellement bio-assimilable en se transformant en eau CO₂ et biomasse aussi bien dans le sol, que dans l'eau, tant à la lumière qu' à l'ombre. Ils se dégradent en ne générant AUCUNE émission de méthane, en ne laissant AUCUNS fragments ni AUCUNS résidus toxiques.

Avec un surcoût minime voire inexistant l'ensemble des caractéristiques mécaniques et techniques de la matière restent identiques à celles d'un plastique conventionnel.

d₂w[®] est une assurance contre l'accumulation des déchets de plastique dans l'environnement.

Oxo-bio plastico degradara, despues biodegradara a agua, CO₂, biomasa y elementos basicos, en la tierra o el mar, con o sin la presencia de la luz o calor, y en cualquier tiempo necesario. Al final del proceso no deja fragmentos, metano o residuos perjudiciales.

Durante su vida util la fuerza y otras características son las mismas de los plasticos normales con un poco o nada mas de cuesto.

d₂w[®] es un modo seguro y barato contra la acumulacion de basura plastica en el medio ambiente.

氧化式可生物降解塑料先经由氧化降解,接着生物降解,无论在土地上或海洋中;明亮或阴暗处;温暖或寒冷,在任何需要的时间范围后,最后只剩下水、二氧化碳、生物质与微量元素。且将不会有残留碎片;没有沼气;也不会残留有害物质。使用氧化式生物分解技术仅只增加很少甚至可忽略的成本,并且在产品的保质期内,保持与原来产品相同的强度与特性。

d₂w[®]是一解决环境中积累的塑料废弃物之廉价保险

氧化式可生物降解塑膠先經由氧化降解,接著生物降解,無論在土地上或海洋中;明亮或陰暗處;溫暖或寒冷,在任何需要的時間範圍後,最後只剩下水、二氧化碳、生物質與微量元素。且將不會有殘留碎片;沒有沼氣;也不會殘留有害物質。使用氧化式生物分解技術僅只增加很少甚至可忽略的成本,並且在產品的保質期內,保持與原來產品相同的強度與特性。

d₂w[®]是一解決環境中積累的塑膠廢棄物之廉價保險

Wide range of applications

d₂w[®] can be used in almost all PE and PP flexible and semi-rigid products – blown and cast as well as single or multi-layered, including BOPP. Symphony has an existing portfolio of solutions and new formulations are being constantly developed for new materials and performance criteria.

Major applications to date include:

- Carrier and other bags both for consumer sale and not for sale
- Refuse sacks and bin liners, kerbside collections sacks
- Mailing, polywrap and newwrap films
- Packaging films including bread, freezer and produce bags
- Collation shrink and stretch films
- Agricultural films are currently being tested on farms in nine countries. Nets and fibres are also in development.

Additive range

d₂w[®] is actually a range of specialised additives. Different polymers, different processing conditions and different requirements for shelf-life and service-life, require different formulations. We supply grades of d₂w[®] suitable for inclusion in polyethylene and polypropylene and polystyrene is being developed. Certain grades provide extra high clarity and others are designed for higher processing-temperatures, or additional heat-passes.

More Information

Symphony's products are sold through our worldwide distribution network and can now be found in more than 50 countries. For further information visit www.degradable.net



THE d₂w BRAND THE BRAND THAT YOU CAN TRUST!

Look for the d₂w brand. It represents several million pounds of investment, and years of careful research by some of the world's best scientists and technicians, together with first-class quality-control and after-sales service. The d₂w brand can be found on many different products and household-name goods throughout the world.



Elstree House – Symphony's Global Head Office



Certificate No. FM37939

Symphony is a British public company and is certified under ISO 9001-2000



Symphony is proud to be a member of the Oxo-biodegradable Plastics Association (www.biodeg.org)