

# Certification of d<sub>2</sub>w<sup>®</sup>

**Symphony**  
environmental

Registered in England no. 3286343  
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Borehamwood, WD6 1LE

This is to certify the following verification of the technical specification and performance of d<sub>2</sub>w<sup>®</sup>:

d<sub>2</sub>w<sup>®</sup> is an additive formulation that renders conventional polyolefins oxo-biodegradable.

"Oxo-biodegradation" is "degradation identified as resulting from oxidative and cell-mediated phenomena, either simultaneously or successively" ("Terminology in the field of degradable and biodegradable Polymers and Plastics" CEN TC 249/ WG 9).

Polyolefin products made with d<sub>2</sub>w<sup>®</sup> additive will abiotically degrade in the presence of oxygen. Degradation has been proved in accordance with the requirements of ASTM 6954-04 by passing ASTM 5510 (RAPRA Report 46095).

The ability of d<sub>2</sub>w<sup>®</sup> products to comply with the biotic (biodegradation) tests of ASTM 6954-04 has been demonstrated by the loss of molecular mass achieved after abiotic thermal degradation, resulting in ultimate biodegradation of the material into CO<sub>2</sub>, water, mineral salts and biomass (RAPRA Report 46303, Pyxis report 30.7.05, and DPPA Chapt. 3, Eco-sigma Report Sept. 2008).

The eco-toxicity sections of EN 13432 and ASTM 6954-04 require that no harmful residues are left – this has been verified for d<sub>2</sub>w<sup>®</sup> additive. (OWS Report MST-4/1-d2wb&d2wc, Eco-Sigma Report Sept. 2008).

d<sub>2</sub>w<sup>®</sup> additive does not contain heavy metals (defined by 92/64/EC Art 11 as lead, mercury, cadmium, or hexavalent chromium).

d<sub>2</sub>w<sup>®</sup> additive is safe for direct food-contact according to the European Union requirements for Direct Food Contact 2002/72/EC and the US FFDC Act and regulations (RAPRA report 46137, and Keller & Heckman certificate 18.2.2009). It is the responsibility of the manufacturers of products intended for food-contact to ensure that all other materials incorporated by them comply with those requirements.

If polymer products are correctly made with d<sub>2</sub>w<sup>®</sup>, the additive will have no effect upon the strength and other performance characteristics of the product during its programmed service-life.

Polymer products correctly made with d<sub>2</sub>w<sup>®</sup> comply with the Essential Requirements of the EU Packaging Waste Directive 92/64/EC Annex II paras. 1,2 and 3(a) (b) and (d).

d<sub>2</sub>w<sup>®</sup> oxo-biodegradable plastics are not currently intended for composting.

If sent to landfill d<sub>2</sub>w<sup>®</sup> oxo-biodegradable plastics will degrade in aerobic conditions. In anaerobic conditions they become inert and will not emit methane.

d<sub>2</sub>w<sup>®</sup> oxo-biodegradable plastics can be recycled together with ordinary oil-based plastics. For long-life products, stabilisers should be added if necessary.



MICHAEL F. STEPHENS  
Technical Director  
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ISO 9001-2000



Oxo-biodegradable  
Plastic Association



London  
Stock Exchange



Society of Plastic  
Engineers (US)



American Society for  
Testing and Materials



Society of the Chemical  
Industry (UK)