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Declaration of utilization

With this document the *Quimari srl*, the company that produce the **PHX PRIME BBs**, declare to use pigments, elements and plastics not-toxic, following the european Directive 2002/72/CE of the European Commission.

Furthermore, to obtain the biodegradation of the bb we guarantee the use of PDH-Q additive, used in the percentage indicated by the U.S. producer (hwww.willowridgeplastics.com).

PDQ-H

PDQ-H is a non-toxic additive which does not contain regulated heavy metals. PDQ-H is currently being used in food contact applications worldwide.

Using the oxo-biodegradation process, time, ambient heat, and/or UV light, will completely oxidize the plastic. Oxidation reduces the molecular weight of the plastic and allows for oxygen containing functional groups to form within the polymer. This allows microorganisms to further biodegrade the polymer once it has been disposed of.

PDQ-H is a non-starch based additive. This additive uses photo (UV) and oxidative methods to reduce the molecular weight of the plastic. After the molecular weight is reduced to a certain level, the biological process begins. The end product manufactured with this additive will be clear. This additive when used with PP and PE, has been tested and found to be acceptable for food contact applications.

This product is a Masterbatch additive to be used with your PE or PP. UV-H has many of the above capabilities, but utilize ultra violet rays for degradation.

This additive is not made with cornstarch. They are made with proprietary ingredients to disintegrate plastic by oxo-bio degradation oxidation and photodegradation

Toxicity Test

Ceriodaphnia dubia 7-day chronic bio assay Test
Pimephales promelgas 7-day Chronic Bio Assay Test
Fathead Minnow Acute Bio Assay Test

Degradation Test Standards

ASTM D3826-98
ASTM D5510-94
ASTM D5208-01

Biodegradation Test

OECD301B CO2 Evolution Test Ready Biodegradability Test

Loss Of Molecular Weight Test - Report 3801.

Degradation Process

The first stage of degradation results in the film being reduced to a fine powder. This powder is totally inert and physiologically harmless to man, animals, and to plant life. The ongoing and irreversible break-down process follows a path of continuous shortening of the molecular long-chain structure of the polymeric material. Having started with a molecular weight of several hundred thousand the downward path continues until the polymer is ultimately returned to the natural carbon cycle as simple compounds such as water and carbon dioxide.

- • Photodegration
- • Thermooxidation
- • Hydrolysis
- • Microbiological attach

(Degradable Polymers, Principles & Applications, edited by Gerald Scott & Dan Gilead, Chapman & Hall 1995)

Degradation example:

Exposition in South Europe from 140 – 160 Kly/year in summer degradation starts after 90 days.

Without favourable condition to degrade it could take more time.

Food Contact Applications

The active ingredients in PDQ-H are listed in Section B of EC Directive 2002/72/EC permitting its use in Dry food contact applications. PDQ-H has also been tested and found to comply with EC Directive 2002/72/EC for overall migration with data obtained being within the limit. These results permit the use of PDQ-H films in food contact applications. The ingredients in PDQ-H are listed in the "Code of Federal Regulations CFR 21" as safe for various food contact applications.

Heavy Metals

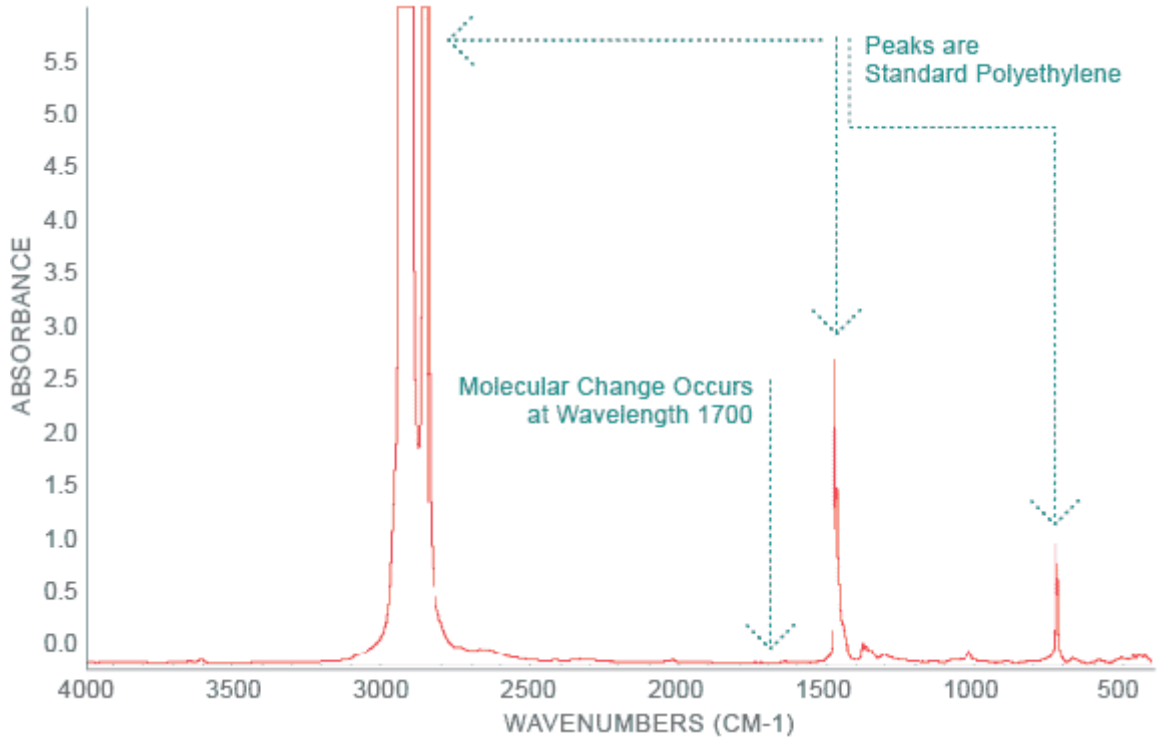
WRP's degradable additives contains no heavy metals.

PRODUCT LIFECYCLE

Phase 1: Manufacturing

Oxo-biodegradable plastics have two active lifecycles. By incorporating our additives into the converters manufacturing of an end product, the first lifecycle starts. Even though the first lifecycle has begun, there is little visual evidence that the oxo-biodegradation process is occurring. Using XRF Spectroscopy, WRP Labs can identify specific tracers in a plastic product to confirm the presence of an additive.

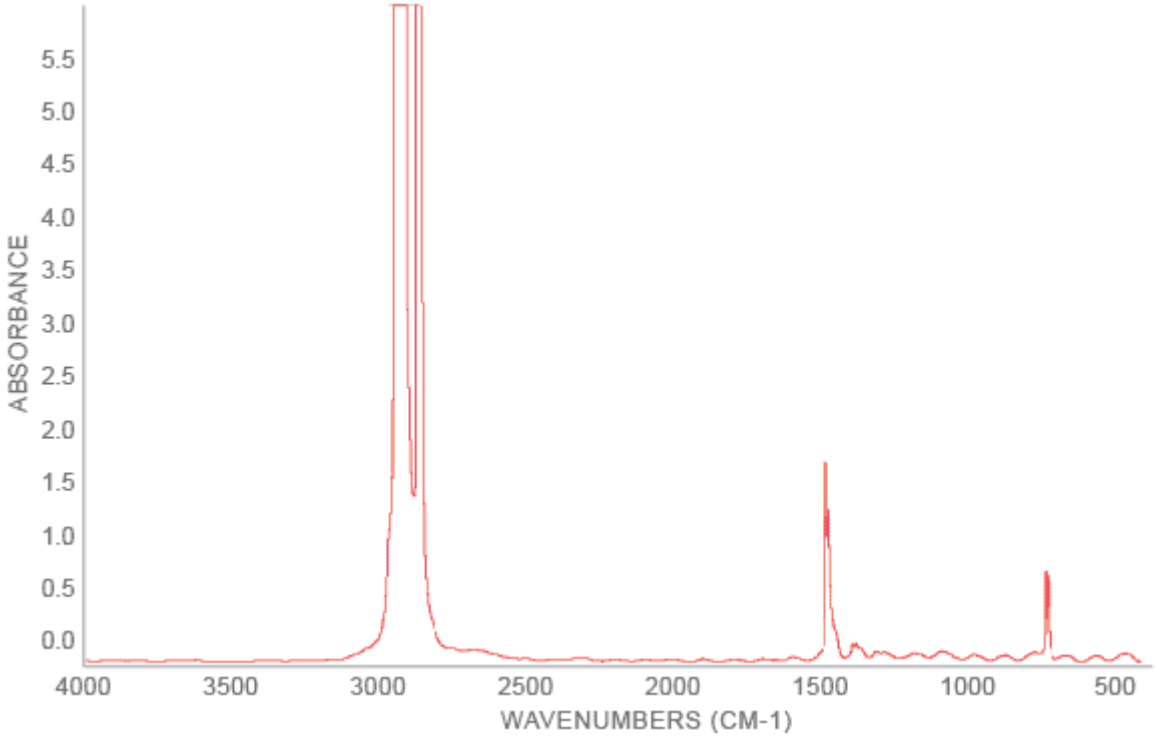
FT-IR spectroscopy can show initially there are no changes in the polymer and molecular structure of the plastic. The graph below displays an FT-IR reading of a plastic product with an inclusion of 3% WRP additive, showing there is no molecular change. This confirms the initial structural integrity of the product from the moment it is produced with WRP additives.



Phase 2: Product Use

Phase two is considered part of the first active lifecycle and includes transportation from manufacturer, storage, shelf life, and engineered life of an end product. The physical properties of the end product has not been compromised in this phase.

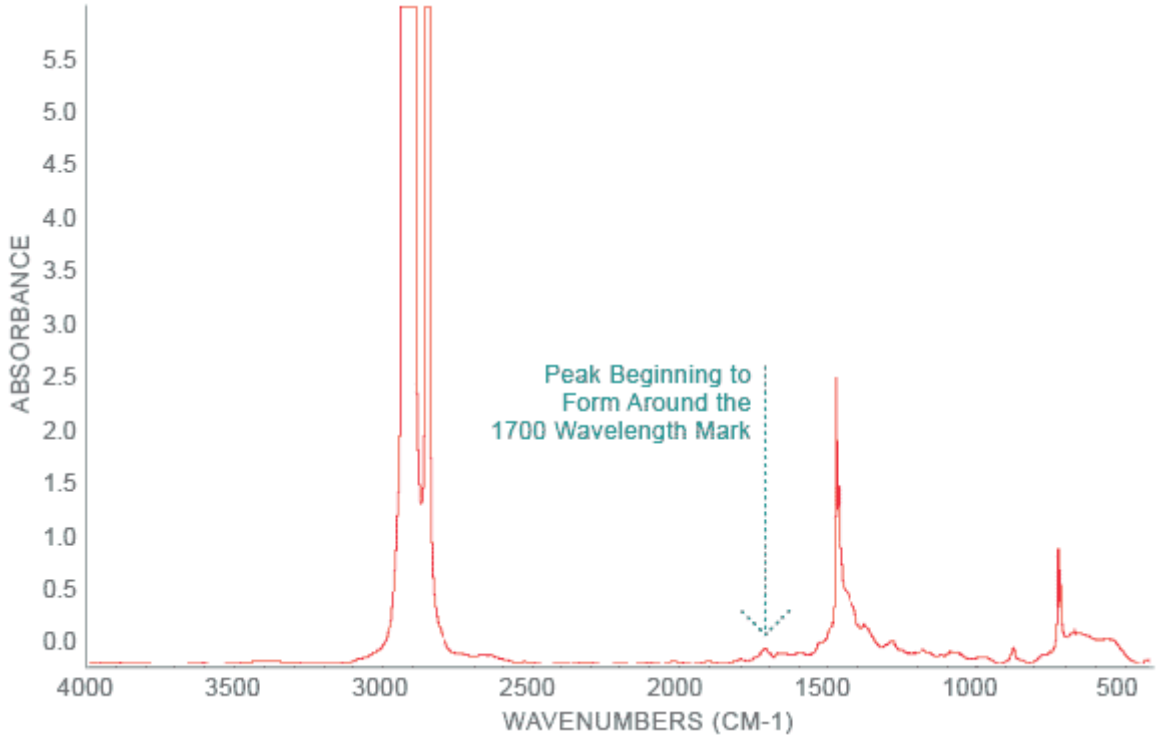
WRP is always available to help engineer an oxo-biodegradable additive that meets the requirement of your end product. By letting us know the duration of your phase 2 lifespan, WRP custom designs one of our additives to meet your specific needs. The FT-IR spectroscopy can confirm that the oxo-biodegradation process is working in phase 2.



Phase 3: Disposal

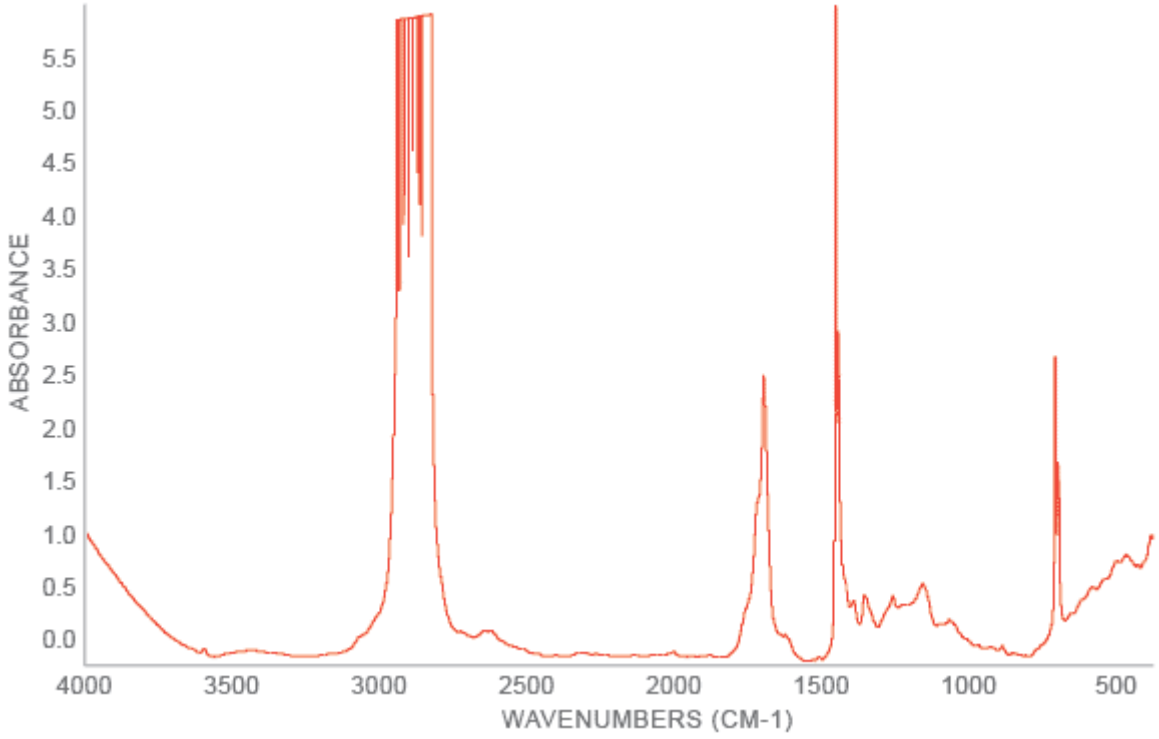
Once phase 2 has been completed and the plastic product disposed of, that signals the start of phase 3 and the end of the first active lifecycle. After disposal, signs of degradation become visible to the naked eye. Signs of degradation are yellowing, embrittlement, and loss of structural integrety. These are the results of oxidation.

FT-IR Spectroscopy picks up the inclusion of Oxygen in the polymer structure. Tensile and elongation testing exhibits the loss of structural integrity of the end product.



Phase 4: Molecular Breakdown

Phase 4 is also the start of the second active lifecycle. Microorganisms attach themselves onto the surface of a plastic product. Without the inclusion of oxygen, this would not be possible and a plastic would stay free of microorganism activity. In phase 4 though, oxygen is highly present in the polymer structure of plastic. With the presence of oxygen, due to the inclusion of WRP oxo-biodegradable additives, these microorganisms can not only attach themselves to the plastic, but can also begin to colonize the surface. The plastic then becomes the fuel source for these organisms to multiply.



Phase 5: Biodegradation

Phase 5 is the culmination of bioactivity and biodegradation. The microbes metabolize using oxygen sites on the changed polymer structures. Once the sites have been consumed, new oxygen sites will form on the shortened polymer chain, and this cycle will repeat for the entire duration of the biodegradation cycle. The expended by-products can be used as food and fuel in other micro-ecosystems.

A CO2 evolution test, in WRP labs, confirms that biodegradation has occurred. This type of testing is set up to simulate multiple disposal methods and by calculating the total quantity of CO2 produced, the amount of biodegradation is determined.