

Concise guide to Compostable Products and Packaging

UK Local Authority Guidance

2011



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Foreword

Progressive landfill costs, the need for diversion of waste to more environmentally sound treatment facilities, negatives of using a fossil based material (finite resource) and the problems with recycling certain items are impacting on the way we design and manufacture packaging and certain product items.

The growing importance of compostable products is a direct reflection on the increasing petrochemical costs and a requirement for manufactured packaging and products to depict environmental credentials. The need for concise understanding of what is compostable has become more of an issue due to the variety of materials now available on the market.

Composting as a waste recovery/processing option along with home composting and anaerobic digestion is developing consistently in the UK and is expected to increase over the next decade. With an improved waste management infrastructure along with technological advancements in compostable products a closed loop scenario for packaging and products is coming to fruition.

The Association for Organics Recycling (AfOR)

As the UK's leading trade organisation for the biodegradable waste industry AfOR is committed to every avenue of the organics sector, with its reach now extending to a wide variety of processes and designations. AfOR works primarily on behalf of its members to raise awareness of the benefits surrounding the recycling of biodegradable resources. It aims to act as an advocate for the wider composting and biological treatment industries whilst representing their views in terms of constructive dialogue with policy makers. The Association envisages an industry in which best practice is shared, standards are maintained and surpassed and which makes a positive contribution to safeguarding the environment.

The state of packaging in the UK

In 2008 the UK disposed of an estimated 10.7 million tonnes of packaging waste¹, 65% of this was recovered. An estimated 4.7m tones (one fifth) of the household waste stream in 2008 was accountable to packaging - around 5% of all waste sent to landfill. The level of packaging recycling has increased substantially over the last decade; with recent 2011/2012 targets been set at 74% recovery and of this 64% must be recycled. When highlighting plastics targets specifically 32% is to be recovered both in 2011 and 2012 leaving a considerable figure for alternative disposal routes including landfill.

Compostable packaging and products have the potential to reduce a proportion of the packaging waste which is currently not recovered or recycled and is deemed in many circumstances for

¹ Defra Packaging:
<http://www.defra.gov.uk/environment/waste/producer/packaging/index.htm>

landfill. AfOR promotes the targeted use of 'compostable packaging', with any such claims backed up by independent certification through a suitable certification body.

Further strategies are in operation to sustainably manage and develop the state of packaging in the UK, they act as another approach to dealing with packaging waste and work alongside compostable packaging. The Courtauld Commitment is one such strategy; it aims to improve the resource efficiency of the grocery retail sector while reducing the carbon and wider environmental impacts of packaging. Having achieved some very positive results in its completed stage 1 phase, the commitment is now also having great success in phase 2 which has moved away from solely weight-based targets explored in phase 1. Phase 2 aims to achieve more sustainable use of resources over the entire lifecycle of products, throughout the whole supply chain.

Further information on the Courtauld Commitment is available from:
http://www.wrap.org.uk/retail/courtauld_commitment/

This guidance document is mainly targeted at Local Authorities and aims to:

- provide clarity on the terms biodegradable, degradable and compostable that are often used incorrectly and in a misleading way, particularly when the media discusses packaging and carrier bags; and
- assist local authorities to identify which products and packaging items are really **compostable**, based on the information printed on the items.

Bio-based materials are derived in part or wholly from biomass, with biomass originating from plants and animals. With sustained growth over the past decade the bio-based market is set to continue this trend into the distant future. The driving forces behind this situation and the progression of compostable products can be attributed to the development of larger manufacturing plants producing bio-based materials that are leading to more comparative costs against fossil based equivalents. In addition there is increased demand for more environmentally sound products from consumers and manufacturers alike.

In the plastics industry the awareness of the current and future oil concerns e.g. price, carbon, and GHG emissions has influenced a 40% growth of bio-based plastics between 2002 and 2007 to 0.36million tonnes. A projection for the capacity of bio-based plastics worldwide (including compostable) is around 2.32 million tonnes by 2013. In Europe alone the capacity is estimated to be in region of 1.65Mt by 2020².

Bio-based plastics and materials should not automatically be assumed to be compostable. Bio-based only refers to the sources of the raw material used to construct the product, it does not automatically mean the product will biodegrade or compost. This is dependent on the molecular structure of the materials themselves. 'Compostability' should always been seen as a functionally property not an inherent one related to bio-based content. When compostable products or packaging items are discussed it specifically refers to

end products which meet the specification for compostability (BS EN 13432). An item based on a renewable source should **not** be assumed to be compostable unless certified; similarly there are synthetically based plastic resins which will meet the EN 13432 standard.



The environmental benefits of compostable packaging centre around the use of renewable feedstocks and the benefits associated with their Life Cycle Assessment. There are also growing legislative/policy drivers for the adoption of compostable and bio-based products/packaging:

- [Packaging & Packaging Waste Directive \(94/62/EC\)](#)
 - Packaging Waste Regulations
 - The Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (as amended)
 - Packaging Recovery Notes (PRN)
- [European Commission – Taking bio-based from promise to market.](#)
- [Making the most of Packaging – A strategy for a low-carbon economy](#)
- [The Landfill Directive](#)

Local Authorities should look to adopt and accommodate compostable products into their collection and disposal remit as the benefits of doing so can be substantial. These materials and products can themselves be diverted away from landfill to

² Shen et al 2010 'Present and future development in plastics from biomass' available from: <http://onlinelibrary.wiley.com/doi/10.1002/bbb.189/pdf>

either industrial and/or home composting systems (if certified correctly). Compostable products have been shown to increase the amount of biodegradable material (food and green waste) which is additionally collected thus improving the ease of comingling food and packaging waste for disposal. With an increasing cost of sending all waste types including biodegradable materials to landfill – currently rising £8 tonne until 2014 where it will reach a baseline of £80. Having an additional means to divert a greater quantity of this material away from landfill should be capitalised on.

more complex packaging structures which are acting as viable alternatives to the conventional fossil based choices.

These structure changes are allowing packaging converters etc to use these materials for existing and new innovations. The once unobtainable compostable certification for multilayer films etc has now being overcome and as a result the properties which are often required from manufactures can be met and exceeded.



2.1 Compostable industry developing

Innovation in the compostable product market is continually developing, new materials which arise from the utilising novel feed stocks are driving R&D at all stages of product design and manufacture. 'Compostable Products' have extended in to

The following definitions are designed to clarify the often confusing terminology associated with end of use packaging designations. The level of industry and public confusion is often compounded by the fact that certain products are being incorrectly marketed without any certified evidence to substantiate their claims. Through the provision of clear guidance to consumers the contamination issues that currently affect both recyclers and composters can be countered leading to a much improved situation.

Compostable – materials which biodegrade in a composting process through the action of naturally occurring micro-organisms and do so to a high extent within a **specified timeframe**. The associated biological processes during composting will yield CO², water, inorganic compounds and biomass which leaves no visible contaminants or toxic residue/substances.

Biodegradable – materials which can be completely biodegraded (bio-assimilated) by micro-organisms such as bacteria, fungi and algae. On its own the term is to a degree obsolete as most materials will biodegrade given time. There are no defined time limits for the term 'biodegradable', thus the use of this word can be potentially confusing to the general public both in terms of where to dispose of it and what happens to it once discarded. Not all biodegradable materials or products will be compostable as the time needed from them to biodegrade may be outside that of industrial or home compostable criteria. This is coupled by the fact that the temperatures often needed to induce biodegradation may not be reached through a non-composting environment. If a packaging or plastic material is described or labelled as simply 'biodegradable', this does not convey

sufficient meaning about suitable ways to recover it after it has become waste.



[Oxo-, Oxy- or Oxobio-] degradable – These materials (plastics) contain an additive (pro-oxidant) which is intended to break the molecular chain within the polymer and makes it (bio)degrade. The material – in an undefined time frame – will fragment into smaller particles when exposed to heat or ultraviolet light. There has been a substantial amount of resistance to the adoption of oxo-degradable plastics due to the length of time required for degradation (partial/complete) and the extent to which very small particles remain in the environment. Oxo's are not suitable inputs into UK composting systems and thus cannot achieve EN 13432 status. This type of material is also unsuitable for recycling due to the additive having a potential detrimental effect on the quality of the end product. WRAP have also indicated that Oxo-degradable / degradable films Oxo-degradable 'are a potential contamination of plastic recycling stream if arising in large quantities.

The EN 13432 standard: 'Requirements for packaging recoverable through composting and biodegradation – test scheme and evaluation criteria for the final acceptance of packaging' has been in place since 2000 and resonates the requirements stated in the Directive on Packaging and Packaging Waste (94/62/EC). For other plastic items such as organic waste bags and agricultural mulch films the equivalent standard is BS EN14995. This standard contains exactly the same criteria as BS EN13432 but is different in scope. If a material is certified to BS EN13432 then it should also be viewed as certified to BS EN14995 and vice-versa. For a product to achieve certification to BS EN 13432 or BS EN14995 all materials have to be biodegradable. The addition of materials which are not biodegradable will deem the product unsuitable for the BS EN 13432 or BS EN14995 criteria. Home compostability is not the same as industrial compostability and should never be seen as an equivalent, this issue is discussed later in the document.



4.1 Special requirements/exemptions

Equivalent form (product family) – A product or packaging item which has already been certified as compostable will also be considered so in another form as long as its composition and mass to surface ratio or wall thickness is the same or less as

originally certified. A product family is designated in this situation whereby only the products dimensions (not exceeding max thickness) are different. The product is still comprised of the exact same materials, constituents and additives as the originally certified product.

Natural materials – A chemically unmodified material of natural origin shall not be required to undertake biodegradation testing as it is automatically considered to be organically recoverable. It is still the requirement that the material be tested by means of disintegration, chemical analysis and compost quality. Natural materials include: wood, natural wool, cotton fibre, paper pulp and jute.

Additive (significant organic compounds) – for each additive which is present in a product that does not exceed 1% by mass only a designation of suitability to a composting process by way of Material Safety Data Sheet (MSDS) and quantitative heavy metal analysis is required. If the amount of additives exceeds 1% by mass then chemical testing, chemical composition and ultimate biodegradability results will be required. If the amount of additives or significant organic compounds exceeds 5% by mass of the final product applicability to composting has to be proven.

The framework outline in EN 13432 allows a product to be defined as compostable if it passes the 4 testing parameters set out. **These are outlined on page 7**

Test Criteria	Overview	Test Method(s)	Test Requirements
Biodegradability	Test is a measure of the extent to which the product is converted to water, carbon dioxide and/or biomass by means of microbial action. Requires that every product component, material or item be biodegradable.	Biodegradability shall be demonstrated through laboratory testing and carried out to the correct methodology i.e. ISO: 14855 - biodegradability under controlled aerobic composting conditions 14851 – aerobic degradability in water (oxygen demand) 14852 – aerobic degradability in water (evolved carbon dioxide)	Test is carried for a maximum of 6 months (dependant on how susceptible the product is to composting conditions) by which time the amount of carbon dioxide release must be at least 90% as much carbon dioxide given off by a reference/control sample.
Disintegration	Test designed to quantify the 'physical falling apart into small fragments of packaging and packaging materials' ³ .	Test is carried out on the end product specification or as close to an end specification as feasible. The use of a pilot-scale test is utilised to recreate an industrial composting system. A sample of the test material is added to an organic waste fraction and is then sustained under relevant pilot-scale testing condition at 58°C for 12 weeks.	The standard requires that at the end of the period at least 90% of material must pass through a 2mm sieve.
Ecotoxicity	The residue from disintegration testing is utilised for ecotoxicity analysis the aim of which is to highlight any potential negative affects on the compost material.	Comparison of samples, one with and one without product material, which have gone through the disintegration tests are used to determine any negative toxicological affects e.g. pH, volatile solids, salinity, magnesium, N,P,K and ammonium nitrogen. The use of two higher plants tests which conform to the requirements of the OCED 208 "Terrestrial Plants, Growth Test".	The number of grown plants and the plant biomass within the sample and control sample are compared. Percentage is provided against the blank compost. The percent should be no less than 90% of the blank sample.
Chemical Analysis	Heavy metal concentrations are used to indicate any potential negative affects of the end compost quality. Especially important to composters going down a quality route i.e. PAS 100 / compost quality protocol.	Disclosure of all chemical element concentrations must be given to the certifying body as a way of disclosing the presence of hazardous substances. Analysis of heavy metals is normally undertaken by manufacturer of each constituent.	The 11 chemicals must be under the stated threshold concentrations shown in the EN 13432 standard.

³ EN 13432 Requirements for packaging recoverable through composting and biodegradation – test scheme and evaluation criteria for the final acceptance of packaging' standard

The UK is primarily certified to EN 13432 by two European certification bodies Din Certco (Germany) and Vinçotte (Belgium). Both organisations operate two individual schemes and have adopted separate logos for recognition of compostability. AfOR has a long running cooperation agreement with Din Certco the aim of which is to assist companies in the acquisition of EN 13432 certification.

Vinçotte – OK Compost

Running for 15 years, Vinçotte’s OK Compost has established itself in Europe as a recognised certification scheme which has now developed into a range of end of waste certification classifications: OK Compost HOME, OK Bio-based, OK biodegradable SOIL and OK biodegradable WATER.



Figure 1.0 – OK compost logo



More information on Vinçotte’s OK Compost can be obtained from: <http://www.okcompost.be/en/home/>

Din Certco:

As a certification organisation it has been operating for more than 30 years. They are licensed to use and supply the ‘Seedling Logo’ from European bioplastics which is internationally recognised and denotes certification to EN 13432.



Figure 2.0 – Seedling logo



Din Certco operate a testing, assessment and surveillance service and can accommodate manufacturers wanting their material, intermediate and/or additive registered and products certified. Din Certco now also operate a Bio-based scheme which indicates the renewable content of a product.

More information on Din Certco can be obtained from: www.dincertco.de/en/products_made_of_compostable_materials.html

Specific codes are used by Din Certco and Vinçotte to differentiate between products, materials, intermediates and additives. Certified compostable ‘products’ will either display a valid **7P (Din Certco)** or **Sxx (Vinçotte)** code, only these two code combinations represent certified final products. The following codes represent **registered** items under the Din Certco scheme – they are not products:

7W.... = Material

7H.... = Intermediate

7Z.... = Additive

A product displaying one of the three above codes has not been certified, only registered. **(Note: Please check that a displayed Sxx code is for a final product by asking to see the manufactures certificate or by checking Vincotte’s online database. Vincotte do not differentiate between base materials and end products.)** Similarly, a product which does not display a valid 7P or Sxx code, but just one of the logos on page 13, has not been certified. The product manufacturer may be utilising individual materials which have been registered as ‘compostable’ but may also be adding materials or additives that are not thus the final product would not meet the requirements of EN 13432., This is often found with additives i.e. coatings and printing inks. Coatings can often inhibit the rate of biodegradation and disintegration of the materials coated. Additionally printing inks can contain PTE’s which may lead to the final product exceeding the ecotoxicity / heavy metal limits set in the EN 13432 standard.

It should always be assumed that a non-certified final product may well have been – potentially significantly – altered from the original certified materials used to manufacture it, thus claims of compostability have not been

substantiated. Therefore it is imperative that both purchasers and end users i.e. composters check that the actual product they are receiving is certified, particularly if the product is destined for a composter who is operating to the PAS 100 specification.

The codes also represent a secondary primary function, that of verification and conformity checks. As a products certification code is held on one of two online data bases the possibility exists to check if the number shown corresponds to the correct product, acting as a register for traceability. Information is held about each individual product by the certification body and so if a non-conformity or product discrepancy is expected by using the code detailed checks can be made to confirm the product is compostable.



Product Certificates – Checking the validity of claims

Requesting to view a manufacturer or supplier’s product certificate is something which is strongly advocated before any further commitment to purchase is taken. A company should provide their valid certificate which in turn will give reassurance through the identification of a 7P or Sxx code that the product in question is certified as ‘compostable’. This will also positively influence the link between supply, use, disposal, collection and recycling (composting). Guaranteeing to both waste collectors and composters that the product has been checked and verified to be compostable will elevate

barriers currently restricting the wider acceptance of these materials. As further reassurance and as part of the certification process, AfOR and its partners undertake annual checks and tests on products actually in the market to ensure they have not been altered since their initial certification.

Composters currently operating down a quality route – PAS 100: 2011 and/or Compost Quality protocol – are directed in the associated specification to only take products certified to EN 13432/14995. *“Biodegradable polymers, bags and packaging or other products made of such material are permitted input materials only if they are independently certified as conforming to the ‘compostable’ criteria within quality standard BS EN 13432, BS EN 14995, DIN V 54900, ASTM D6400 or any variation upon these for ‘home compostable’ packaging or plastics, agreed suitable between the regulator, WRAP and AfOR”.*



PAS 100 and CQP logos for compost specification

Based on the requirements of PAS 100 (and AfOR Certification Scheme for composters), composters shall NOT knowingly accept biodegradable polymers, bags, packaging or other products unless they are CERTIFIED to one of the standards listed.

Hence, it is imperative that both purchasers (e.g. local authorities) and end users i.e. composters check that the actual products they are receiving are certified, particularly if the products are destined for a composter who is

operating to PAS 100. Composters that are taking non certified items may fail to achieve or renew their certification to PAS 100.

Logo Use – What is expected

Use of the European Bioplastics ‘Seedling Logo’ or Vinçotte OK compost / OK Home logo shall adhere to the following requirements. Any misuse should be taken as an illegitimate claim to compostability and further checks should be undertaken to confirm that the product is actually certified as compostable.

1. The logo can only be placed onto products which have been successfully certified to the Din Certco or Vinçotte schemes.
2. The logo shall remain in its original form; if the logo has been altered so that its appearance is no longer in conformance with figures 3.0 to 6.0 the product may not be legitimately certified.
3. Size of the logo should only be changed proportionally in order that the certification code is readable.
4. A product certificate number shall be present in close proximity to the logo. If a product does not show a 7P... or Sxx... code the product itself is NOT certified to EN 13432 and does not hold the right to display the logo. The certificate number can be used with this guide to verify the correct product is labeled.
5. The word ‘Compostable’ must be placed under the seedling logo without exception.
6. The code of another material used to create an end product may not be used.

Home Compostable Certification

Products can also be certified as ‘Home Compostable’ i.e. for direct inclusion in a home composting bin along with other organic waste. There are some significant benefits of being able to home compost certain products and packaging items. With fresh produce the option to dispose of the often contaminated packaging in a safe and flexible composting system will restrict the amount of packaging which would normally be destined for landfill. Certification to ‘Home Compostable’ is achievable through Vinçotte’s ‘OK compost HOME’ and/or AfOR’s UK ‘Home Compostable’ schemes. Logos for both Home schemes are similar to industrial ones and are displayed by figures 3.0 & 4.0.



The clear ‘Home Compostable’ message carried by packaging and plastic products of this kind should encourage householders to home compost them instead of putting these items in their organics, dry-recyclable or residual waste bins for collection at the kerbside. Whilst ‘home compostable’ packaging / plastic waste can be commercially composted, it is anticipated that the certification mark(s) will direct this material into home composting bins, thus helping to reduce

the resources, costs and carbon related impacts associated with kerbside collection, treatment and disposal of household wastes.

Due to industrial composting processes operating at significantly higher (thermophilic) temperatures than the lower (mesophilic) temperatures found in home compost systems

the testing requirements for 'Home Compostable' certification are different.

These differences include:

<u>Home</u>	<u>Industrial</u>
<p>Biodegradability – Undertaken at temperatures between 20-30°C for a maximum of 12 months. The level of biodegradation must reach 90% of the products mass.</p> <p>Disintegration – Undertaken at temperatures between 20-30°C for a maximum of 6 months. The level of disintegration must be above 90%, thus only a maximum of 10% must not pass through a 2mm sieve.</p>	<p>Biodegradability – Undertaken at 58°C (+/- 2°C) for a maximum of 6 months. The level of biodegradation must reach a level 90% of the products mass.</p> <p>Disintegration – Undertaken at 58°C (+/- 2°C) for a maximum of 12 weeks. The level of disintegration must be above 90%, thus only a maximum of 10% must not pass through a 2mm sieve.</p>

The parameters for ecotoxicity and chemical analysis are the same for both the industrial and home schemes. They represent the requirements set out in EN 13432 which includes the test methods for all the testing criteria.

Knowing what can go where

EN 13432 is the overriding standard which dictates the testing parameters for both the industrial and home compostable schemes. If a product has been certified as Home Compostable it will in some circumstances be applicable to both industrial and home composting processes, but please check with AfOR to confirm this.

If a product is only certified as industrially compostable it should not be viewed as 'Home Compostable'. Many industrially compostable products will not biodegrade or disintegrate in the often low temperature found in a home composting bin.



European Compostable Logos

Home Compostable logos



SXxxxx

Figure 3.0 – AfOR's Home Compostable mark

Industrial Compostable logos



7Pxxxx

Figure 5.0 – Din Certco's Seedling logo



SXxxxx

Figure 4.0 – Vincotte's 'OK compost HOME' mark



SXxxxx

Figure 6.0 – Vincotte's 'OK compost' logo

Making the Compostable choice

The scope of compostable products is now relatively limitless, for most packaging items or products made there is or soon will be a viable compostable option. In the event and service arena the technological and commercial advances have placed prominence of the use of compostable products as an alternative to often non renewable, non-environmentally friendly products. Examples include Glastonbury festival who state that they only allow compostable tableware and wooden cutlery to be used on site.

Since there is an increasing demand for compostable products there is inevitably misuse of statements which are detrimental to the industry, compost producers and the receiving environment. The following statements and phrases should not be considered valid unless supported by at least one of the above logos and identifiable by means of a specific certification number:

- **“Made from compostable materials”**
- **“This xxxxx is 100% compostable”**
- **“EN 13432 compliant / conforms to EN 13432”**
- **“Biodegradable and compostable”**
- **“Can be composted”**
- **Suitable for home composting and not showing a home compostable logo**

Green wash on products is becoming more of an issue as the public sees environmental impacts becoming an important prerequisite to many of the everyday decisions they make. Sweeping statements of environmental claims convey misguided information and although sometimes valid are often not valid to the products properties. Environmental spin often conveyed by companies is driven by the view that environmental credentials sell products, but as is often the case the reality is in no way representative of the claims.



No food waste collection? It is high anticipated that with an ever increasing infrastructure in terms of composting and AD facilities there will a viable route for certified compostable products in the future. Home composting does offer an interim position until a time where there are sufficient industrial facilities and collection routes in place to deal with this particular waste stream.

The general public may contact its local authority for suggestions of where it can dispose of compostable products and packaging if no clear disposal route is visible. AfOR would urge all Local Authorities to consider discussing with its collection / disposal authorities the option of taking in EN 13432 items if they are not already doing so.

Steps to Take

There are two online databases which represent all the certified EN 13432 and Home Compostable products available on the market today. AfOR would stress the importance of these two sites as a means to substantiate any claims of compostability.

Din Certco certified (Industrially Compostable Only) – Further product details can be found by clicking on the product you are interested in.

http://www.dincertco.de/en/certificate_holder_compostable_products.html

Vinçotte Certified (Industrial and Home Compostable Only) – All products and details are shown beneath the company and product in question.

<http://www.okcompost.be/en/certified-products/>

If you wish to discuss any aspect of compostable products and packaging please contact AfOR:

Address: 3 Burystead Place
Wellingborough
Northampton
NN8 1AH
UK

Tel: 01933 446 450

Email: David@organics-recycling.org.uk.

Useful Links:

- **National Non Food Crops Centre:**
<http://www.nnfcc.co.uk/metadot/index.pl?id=2197;isa=Category;op=show>
- **European Bio-plastics:**
<http://www.european-bioplastics.org/>
- **Association for Organics Recycling:**
www.organics-recycling.org.uk/
- **Waste and Resources Action Program**

<http://www.wrap.org.uk/retail/materials/biodegradable.html>

- **Biodegradable Products Institute (BPI)**
<http://www.bpiworld.org/>
- **British Plastics Federation (BPF)**
<http://www.bpf.co.uk/>

