International

ISO 15270-5

Plastics — Guidelines for the recovery and recycling of plastics waste —

Part 5: Organic/biological recycling

Plastiques — Lignes directrices pour la valorisation et le recyclage des déchets plastiques —

Partie 5: Recyclage organique/biologique

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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This first edition of ISO 15270-5, together with ISO 15270-1, ISO 15270-2, ISO 15270-3 and ISO 15270-4, cancels and replaces ISO 15270:2008, which has been technically revised.

The main changes are as follows:

— ISO 15270 has been turned into a series of five parts, where ISO 15270-1 is the succession of the essential part of the second edition (2008) and specific methods and technological description of recycling methods are given as ISO 15270-2, ISO 15270-3, ISO 15270-4 and ISO 15270-5.

A list of all parts in the ISO 15270 series can be found on the ISO website.

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Kitchen waste, food scraps, lawn mowing and pruning branches are generally referred to as bio-waste, since it is composed of biodegradable organic materials. Its intrinsic biodegradability makes it possible for this waste to be recovered through biological processes, in which the breakdown and reorganization of the waste into new substances takes place thanks to the action of microorganisms. In ecology, the term recycling refers to the biogeochemical cycle, in particular to that of carbon. In the carbon cycle, organic compounds formed from atmospheric CO_2 through photosynthesis enter the food chain, are metabolised into different compounds, transferred among different environmental compartments, and eventually oxidised back to CO_2, closing the cycle.

The recycling of bio-waste takes place through processes that, regardless of size, lead to the production of soil improvers under controlled conditions. These processes are aerobic composting or anaerobic digestion preferably followed by aerobic composting of digestate.

NOTE The digestate is preferably aerobically composted after anaerobic digestion to maximise benefits to the soil it is applied to afterwards and minimises some potential agro-environmental issues such as release of ammonia and nitrates.

Currently, the predominant output of organic recycling is compost, a soil improver. The various components of the organic waste are mixed in an appropriate way to favour a bio-reaction that transforms the initial waste into a stable, odourless, and sanitized product i.e. compost, that is used in agriculture and horticulture. However, in some countries the slurry-like digestate is applied to agricultural land before maturation. The closure of the cycle (from bio-waste to soil improver back to the soil) is currently considered very important to return the organic substances necessary to maintain fertility back to the soil.

If the waste treatment gives rise to a final output for which there is no advantageous use (for example because the low quality makes it unsuitable for agriculture), then it cannot be defined as recycling. This concept is taken up by some relevant legislations. For example, in Europe, a material produced by the treatment of bio-waste whose quality is so low that it can only be used for backfilling operations cannot be considered the result of recycling.[1] The recycling of bio-waste is hindered by the presence of incompatible materials and objects. Non-biodegradable objects (e.g. conventional plastics waste) represent a contamination for organic recycling. Biodegradable plastics (e.g. that meet the criteria of ISO 17088), on the other hand, are potentially suitable for organic recycling and can be used to make industrially compostable products and compostable packaging made of compostable plastics. These products can be recovered together with the bio-waste contributing to the formation of compost. Generally, the mixing between biodegradable plastic waste and bio-waste is achieved, for example, when industrially compostable plastic waste is collected with bio-waste (for example bags for separate collection of bio-waste, or tableware in collective catering) or tends to be contaminated with bio-waste (some food packaging).

The term industrially compostable is widely used to indicate waste that has characteristics that make it compatible with the separate collection and subsequent treatment of bio-waste. Therefore, in communication with the consumers regarding the end of life of products, the term "industrially compostable" is not used with a technical meaning, i.e. to refer to a specific waste treatment technology (i.e. aerobic treatment carried out at high temperature) but as an indication on how to operate separate collection with it. In this document, the term industrially compostable will be used in this spirit, i.e. as a synonym for "suitable to be collected with bio-waste and recovered by means of organic recycling".

Industrially compostable products and packaging made of compostable plastics (as defined in the relevant standards, e.g. ISO 17088) contribute to the composting process and the production of compost similarly to cellulose-based compounds, a main feedstock of composting. They are a source of carbon and energy. Therefore, composting of biodegradable plastics is a form of recycling even if the result of this process is very different from the original waste. The idea that recycling can give rise to products of a different nature from that of the original waste is well established both at the standardization level (e.g. in the definition of recycling from ISO 472) and at the legislative level. This concept is widely used in different legal and national contexts. For example, the European Waste Framework Directive[1] states that "recycling means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations". As another example, the legislation in force in the Russian Federation states that “waste

Home composting is different from industrial composting. Home composting is a practice used by private individuals to process at home garden and food waste generated at household level and produce compost for personal gardening use. In spite of the common name, industrial and home composting are two very different activities, the former being a controlled waste treatment process and the latter being a gardening activity. Compost produced by a private individual is for his own use and not for provision to others, free of charge or in return for payment. Thus, strictly speaking home composting cannot be classified as a recycling activity for compostable plastic waste, as the concept of recycling implies the conservation of the economic value still present in the waste and the production of materials/substances to be used in the economy either for the original purpose or for other purposes. This is a concept that has been adopted in some relevant legislation. For example, in the European Directive on Packaging and Packaging waste[3], it is stipulated that only industrial composting processes that are realized under controlled conditions are relevant for calculating organic recycling rates of compostable packaging waste, whereas home composting processes are not taken into account.

Small-scale waste treatment systems can enable recycling if, regardless of size, they are based on controlled processes that result in products (e.g. soil improvers).