

END-OF-WASTE CRITERIA FOR WASTE PLASTIC FOR CONVERSION

QUESTIONS:

Question 1

Comments on the suitability, acceptance and day-to-day use of the term waste plastic would be appreciated from the experts, as there seems to be a wide range of available options. Could the terms plastic crap or plastic recyclate which seem more neutral, be used instead? Are the terms polymer and resin of frequent use in the recycled plastic industry, or are these terms normally reserved for the virgin materials?

Question 2

The information so far collected on the characteristics, presence and fate in recycling of additives is poor.

Experts are kindly requested to provide additional data on:

1. How are additives dealt with in recycling?
2. What is their behaviour/fate under the different recycling processes, including melting?
3. Which are the most ubiquitous additives in plastics? Which are the typical amounts in % in the most widely used plastics? If not coincident: which are the typical amounts in % in the most widely recycled plastics?

Question 3

If available, experts are kindly requested to provide additional or updated data on trade of waste plastic, be it at national or regional level, in order to better estimate the overall flows of plastics in the EU.

Question 4

Experts are kindly requested to provide additional data on flows of pre-consumer waste plastic, be it at national or regional level, in order to better estimate the overall flows of plastics in the EU.

Question 5

Comments on the potential inclusion/exclusion of chemical recycling in the scope of the end-of-waste criteria are welcome. To what extent would the criteria for mechanical recycling align with the chemical recycling?

With the information collected so far, it seems chemical recycling is less stringent on the input quality than mechanical recycling. It also seems that high quality of output could be obtained despite the waste nature of the inputs. At the same time, the non-waste nature of some of the outputs such as synthesis gas is not questioned. Some operations such as in blast furnaces and coke ovens seem clearly out of the scope of EoW.

Question 6:

Experts are kindly requested to provide any estimates of the volumes of the markets of intermediates (flakes, regrind, aggregates, pellets), describing if these materials have stable markets as compared to (a) waste plastic and (b) regranulates, or if they are rather ruled by adhoc supply and demand shortages.

Question 7:

Is there any code or standard for trade for non-baled material, including flakes, aggregates and regranulates?

To what extent is EN 15347 used in international transactions outside the EU? Does it compete with ISRI? Which factors are observed in this coexistence or overlapping?

Question 8:

The quality control recommendations above mentioned stem from current practice with other recyclates. To what extent are followed in current practice of waste plastic quality control?

Is there any important common guideline or code of practice that provides plastic-specific guidance to reprocessors and converters?

Question 9:

Please provide your expert comments on the accuracy of the provided interpretation of REACH to waste plastics. Are there any important practical barriers? Which activities are going on currently in industry to tackle the requirements of REACH once a waste plastic ceases to be waste?

Question 10:

Which is the experience of the impact of Directive 2002/72/EC and Regulation 282/2008/EC on plastics recycling practice? How does it affect the (a) characterisation and (b) market options of recycled material?

Question 11:

Are there any codes of practice in trade in EU Member States which would be appropriate to refer to in the end-of-waste criteria?

Which are the latest developments for waste plastics on the new controls in Asian countries?

Question 12:

This section on environmental and health impacts is to be completed. Experts are kindly requested to provide any valuable input to this section. Are there any important impacts that have not been outlined?

Question 13:

Aside from specific questions highlighted along Chapter 2, Experts are kindly requested to provide additional and/or updated data on any of the sections in this chapter, in view of the second version of the document.

Question 14:

Experts (most notably converters but also reprocessors) are kindly requested to provide information and examples on the following quality material input parameters, for the different polymers:

1.a) average content of non-plastic components (specify if bound and unbound to the polymer matrix)

1.b) tolerable content of non-plastic components (specify if bound and unbound to the polymer matrix)

2.a) average content of non-targeted plastic components (specify if bound and unbound to the polymer matrix)

2. b) tolerable content of non-targeted plastic components (specify if bound and unbound to the polymer matrix)

3.a) average content of additives

3.b) tolerable content of additives

(In both cases, we assume bound to the polymer matrix)

It is important to indicate, to the extent possible, for each of these three groups:

(a) to what shape the contaminant content refers to (washed material with the original form, flakes, pellets, aggregates, regranulates, other).

In relation to criterion 1.1: **Question 15:**

Are there any standardised grades internationally accepted (e.g. CEN, ISRI)? Otherwise, reference will be made generically to a customer specification, or industry specification.

Question 16:

Are the shape and size (bales/bulk, empty clean packaging, scrap, pellets, flakes, regranulates, profiles) of waste plastic a parameters of concern in relation to the fulfilment of the conditions

of Art 6 of the WFD (e.g. if it provides a guarantee of cleanliness)?

If so, is it advisable to refer the quality criteria to a given shape or size (washed material with the original form, flakes, pellets, aggregates, regranulates, other)?

If not, this parameter may better be dealt with through supplier/buyer specifications.

In relation to criterion 1.2: **Question 17:**

In relation to the quantitative characterisation of non-plastic components: is it possible/advisable to make reference to any particular clause of existing standards (e.g. CEN)? Specifically in relation to EN 16010:2009 (Plastics - Recycled plastics - Sampling procedures for testing plastics waste and recyclates): To what extent is the content of this standard followed in practice? Is it advisable to make reference to part or all of its content in the self monitoring requirements (right hand side column of the table)?

Question 18:

It is to be determined if EoW should or not include a maximum limit on the content of “nontargeted plastics” or “plastic detrimental to production”. Would it be advisable that the nontargeted

plastic content be part of the criteria, as proposed? Depending on the polymer type, the technology available, and the output from reprocessing/conversion, different producers may tolerate foreign plastics differently. If the presence of non-targeted plastics is accepted, the material has a value and an end use, and there is no significant health or environmental impact, this parameter may better be dealt with through supplier/buyer specifications. If the treatment of more than one polymer simultaneously is exceptional (e.g. polyolefins PP&PE), then the exclusion of “non-targeted plastics” can be the rule and part of EoW, and the existing exception(s) can be specifically addressed.

Is it a possibility that the non-targeted plastic content be merged with non-plastic content in a single value (which could be rephrased to e.g. contaminant content)?

Question 19:

The current proposal would not distinguish between impurities can be separated by washing/cleaning/dry sorting prior melting, and those that are part of the plastic matrix and can only be separated in a melted/dissolved phase. Is it advisable to distinguish these two types of impurities in the criteria?

In relation to criterion 1.3: Question 20:

Is the proposed formulation for treating hazardousness found appropriate?

In relation to criterion 1.4: Question 21:

Shall the presence of additives, known and unknown, be characterised and be part of the criteria? Experts are kindly asked to provide examples of how the content of additives is currently monitored.

Question 22:

To what extent can the presence of residual oils, solvents, paints, fatty foodstuffs or detergents be adsorbed by the plastic and be detected by odour? Can the presence of these components (oils, solvents, paints, fatty foodstuffs or detergents adsorbed by the plastic) be reduced by any known technology? To what extent can removal take place, e.g. fully, or only to residual adsorbed amounts non removable by further washing?

Is the presence of these components (oils, solvents, paints, fatty foodstuffs or detergents adsorbed by the plastic) an important quality parameter? Can these adsorbed components (oils, solvents, paints, fatty foodstuffs or detergents adsorbed by the plastic) leach from the plastic e.g. if the plastic is used as recycled packaging?

Question 23:

Are there any other properties or characteristics of waste plastics that in your view should be part of the EoW criteria on quality? For instance, should or not EoW criteria refer to the age of waste plastic? Judging its presence in ISRI scrap specification circular (e.g. <1 or <6 months without UV protection) it seems it is a relevant quality parameter, which can affect the value of the material. Is this parameter linked to any relevant environmental concern? In any case, it is to be discussed whether this parameter is in practice controlled, and if it is not better be dealt through supplier/buyer specifications.

Question 24:

Is it appropriate to leave out of EoW the properties that do not relate to an environmental concern, and are tolerated differently by different reprocessors and converters, like moisture, density or mass flow index? Such properties can normally be dealt with through supplier/buyer specifications.

Question 25:

Is it appropriate or disproportionate to exclude WEEE as input? Are there any other sources of plastic that shall clearly be restricted? This has to be seen in the broader context of options of the other criteria, e.g. a quality criterion on additives that specified flame retardants. The question to ask for each case is: which is the most cost-effective means of tackling the given problem? If the presence of flame retardants is not possible by visual inspection, and costly by quantitative measurements, then input requirements are perhaps more suited, if needed with supplementary labelling.

Question 26:

Shall mixed sources of all types of waste, e.g. unsorted municipal solid waste (MSW) suitable input? In other words, is the sorting and cleaning technology mature enough in terms of output quality and economic feasibility to allow such mixed inputs?

Question 27:

Are there any other criteria for the input to plastic material that becomes EoW that in your view should be included?

Question 28:

To what extent is the existence of a wet cleaning phase (washing) critical for the removal of fluid residues (oils, detergents, solvents, paints, glues, etc..)? Can a processing in the absence of such wet phase achieve the same end quality? Please provide evidence on the extent to which the extrusion phase can be used and is used in practice for the removal of impurities of the following types:

- a) adsorbed fluid residues
- b) substances present in the polymer matrix (additives)
- b) in general, residues with a lower melting point than the main polymer
- c) in general, residues with a higher melting point than the main polymer (e.g. metals, glass)

Which is the technology used in each case?

Question 29:

Which is the role of size reduction in relation to the removal of impurities? More specifically of:

- a) non-plastic materials
- b) differentiation of polymers (targeted vs non-targeted)

To what extent does size reduction contribute to the reduction of health and environmental risks? For instance whole used packaging may still contain residuals of its former content, but is the material safer if just shredded? Or is it the subsequent washing / cycloning that removes actually the residuals? What happens if washing is not needed because of the known origin of the material (e.g. 100% post-consumer PET water bottles, free of contamination)?

Question 30:

Are there any other criteria on treatment processes and techniques of plastic waste that becomes EoW that in your view should be included? Are there any crucial unit operation not mentioned besides sorting, separating, cleaning, or grading, and except de-baling?

Question 31:

Is there any traceability system in operation in the plastic chain, similarly to the paper chain? To which extent are the (very generic) recommendations of CEN 15343:2007 used? Would requesting of traceability be advisable? Would it be a concern for e.g. confidentiality reasons?

Question 32:

Would labelling of the intended use be of use in waste plastics? Please provide any supplementary data that can help estimate the risk of use of EoW plastics for non-recycling purposes, given its high value (probably >200EUR/t)?

Question 33:

Are there any other criteria on provision of information of plastic waste that becomes EoW that in your view should be included?

Question 34:

Is there any widely known guideline document addressing quality assurance in the plastic chain?

Question 35:

Are there any other criteria on quality management of plastic waste that becomes EoW that in your view should be included?

Question 36:

Are there any elements regarding the application of the EoW criteria of plastic waste that in your view should be included?

Question 37:

The listing of impacts outlined above presents the issues that will need to be analysed. Please contribute from your expertise or references that you know of to the description of these impacts for waste plastic:

- 1) Environmental and health aspects
- 2) Economic/Market aspects
- 3) Market aspects
- 4) Legislative aspects