ESRG MEMBERS CODE OF PRACTICE END OF WASTE	ESRG European Solvent Recycler Group

Status: February 2017

EUROPEAN SOLVENT RECYCLER GROUP (ESRG)

CODE OF PRACTICE

ACHIEVING END OF WASTE

Background

European Union (EU) policy and legislation on managing waste has been continuously developed for over 40 years now to reflect the position that much of what has historically gone before us cannot be maintained in terms of resource efficiency. The concept of Sustainability has now been enshrined in new thinking under the title of "The Circular Economy" where the core principle is to see waste as a useful resource and not as a disposal problem.

Recent trends suggest that much further progress on Resource Efficiency is possible and that it can bring major economic, environmental and social benefits. Turning waste into a resource is an essential part of increasing resource efficiency and closing the loop in a circular economy.

The Waste Framework Directive (2008/98EC) [WFD] delivers waste policy into legislative requirements and contains a number of key drivers, including the concept of a waste hierarchy. Here the recoveries of materials for reuse take precedence over other forms of waste treatment and this feature is particularly relevant to solvent recovery.

Legislation

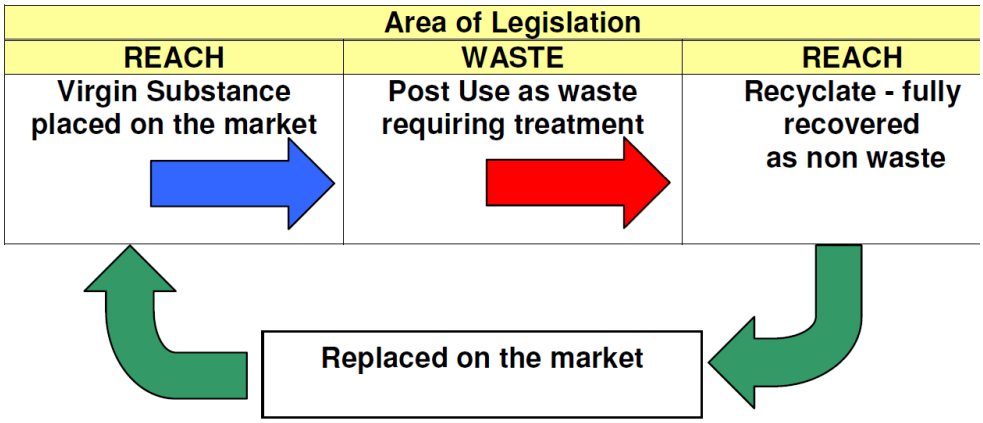
To protect the environment and human health, the WFD sets out to define what waste is and how it must be managed. This has resulted in a plethora of complex legislation with the underlying legal principle that a waste remains a waste until it is fully recovered. Hence in order to re-use a substance for its original purpose, in this case a solvent, it has to cease to be waste.

That concept is popularly termed *End of Waste* (EoW), and EU law sets out the general principles of what has to be achieved to meet that status. For a very few waste streams e.g. certain metals and glass, we have pan EU Quality Standards applicable to ALL Member States. However for most waste streams it is the responsibility of each Member State to determine an EoW position and that practice has inevitably led to a wide range of interpretations. This is unfortunate for the

solvents industry for users of recovered solvents demand high and consistent quality standards and intimate technical knowledge of the chemicals that they rely upon.

It is easier to illustrate the substance (product) to waste to substance life cycle through Figure1:

Figure 1: Recovering Waste to Product Status



this schematic underpins the REACH* and CLP** Regulations that set out the conditions necessary for original chemical placements on the market, while the Waste Framework Directive (2008/98 EC) manages the waste stage before substance status can be regained, when REACH/CLP then reapplies.

To avoid conflicts in law, then waste is generally not considered in the REACH/CLP substance Regulations, while conversely substances are not generally managed in waste law. The important feature is the transition from one status to another.

The ESRG Evaluation

ESRG Members fully recognise the problem of making a proper transition from waste to substance and declare that this process must be open and transparent.

ESRG have therefore developed this Code of Practice in order to support their customers and to give them the assurance that substances (or mixtures) supplied by an ESRG member who is a signatory to this Code, will meet all relevant aspects of EU law and to guarantee that it is being met.

Achieving End of Waste - End-of-waste criteria

What are the end-of-waste criteria, and why are they needed?

End-of-waste criteria specify when certain waste ceases to be waste and obtain a status of a product (or a secondary raw material). The main requirements necessary

to meet End of Waste are at
http://ec.europa.eu/environment/waste/framework/end_of_waste.htm
These requirements are further expanded through more detailed EU official guidance at
http://ec.europa.eu/environment/waste/framework/guidance.htm.

End-of-waste criteria

According to Article 6 (1) and (2) of the Waste Framework Directive 2008/98/EC, certain specified waste shall cease to be waste when it has undergone a recovery (including recycling) operation and complies with specific criteria to be developed in line with certain legal conditions, in particular:

1. *the substance or object is commonly used for specific purposes;*
2. *there is an existing market or demand for the substance or object;*
3. *the use is lawful (substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products);*
4. *the use will not lead to overall adverse environmental or human health impacts.*

In order to ensure that there shall be no doubt that an End of Waste status has been achieved ESRG members **additionally confirm** that the substance requires no further treatment before use by the end user. This is an important distinction in further identifying wastes from non-wastes and clarifying certain misleading claims concerning by-products.

How do ESRG Members demonstrate that EU and Member State Laws are being met and their customers can be assured of that?

The requirements for 1, 2 and 3 above are largely self-evident for the use of a virgin or original status solvent in a particular use will be commonly known by both user and supplier. If not, it can be readily obtained. Simply if a recovered solvent is similarly being used to its virgin counterpart then these conditions are met.

It is requirement 4 that leads to a need for greater transparency and a demonstration that condition is being met. The concern is that by using a recovered substance it might inadvertently introduce into the environment waste derived contaminants that were not present in an original substance, and hence impair the overall quality of the recyclate.

ESRG Members address this particular issue by:

1. Testing of recyclates will be undertaken either in an accredited laboratory or one certified by a national body using approved and recognised test methods and standards.
2. Through chemical analysis that the recovered substance (or mixture) is defined through REACH/CLP definitions to be chemically the same as the substance or mixture originally described and will provide a Certificate of Analysis that must include any relevant impurities.
3. A REACH/CLP compliant Safety Data Sheet (SDS) will be available.
4. Ensuring REACH registration requirements are met and a reference is made to that feature in the SDS.

NB (*Recovered substances or mixtures enjoy certain privileges in terms of Registration in respect of REACH requirements* – see esrg.de/media/PDF/ECHA__Factsheet_on_communication_obligation_en.pdf

What can users of Recycled Solvents supplied by an ESRG Member Company expect?

A signatory to this Code of Practice guarantees that:

- It will have been processed to Best Available Technology defined in Appendix A.
- The substance (product) supplied is not a waste. The product meets all relevant EU and as appropriate Member State requirements for being non waste.
- Supplies will be accompanied by full quality certification demonstrating its quality and it has been properly tested and compliant with REACH legislation.
- Safety data information will be made freely and openly available.

This Code of Practice is approved by the Managing Board of the ESRG and dated June 15th 2016

** REACH is an acronym for Regulation No 1907/2006EC concerning the **R**egistration, **E**valuation and Authorisation of **Ch**emicals*

*** CLP is an acronym for Regulation No 1272/2008 concerning the **C**lassification, **L**abelling and **P**ackaging of chemicals.*

Appendix A

Best Available Techniques for Solvent Recovery:

Process Descriptions

A large number of solvent regeneration techniques exist and matching the best available regeneration technique to a particular waste stream is a specialist key role provided by the commercial solvent regeneration companies. The actual processes carried out will vary according to the waste stream and what is to be achieved, but typically will include one or more of the following processing techniques.

1. Waste solvent regeneration techniques:

1.1 Thin film evaporation

A rotating wiper system distributes the crude product to a film on the inner surface of a heated cylinder. The wiping system speeds up the evaporation process by keeping the product film turbulent so that the heat transfer and mass transfer are optimized. The lower boiling fraction of the raw material evaporates within a short time out of the product film; the residence time of the product at the evaporator wall is very short. The concentrate is continuously discharged out of the bottom part of the evaporator.

1.2 Short path evaporation:

Short path distillation is a subset of thin film distillation technology, at which lower working pressures and therefore lower boiling temperatures can be realized.

Different from the traditional wiped film evaporator design, the condenser is located inside the short path evaporator body. There is no vapour line between evaporator and condenser.

1.3 Single stage flash distillation

A distillation (batch) without separation is a flash distillation for example to remove solids that discolour the product.

1.4 Multi stage distillation:

Distillation (batch or continuous) which is able to separate the mixture into their individual components / pure solvents.

1.5 Pressure swing distillation:

A double distillation undertaken at different pressures that results in a different composition being obtained at each distillation stage. This is due to the fact that the composition of certain azeotropes is pressure dependent and it allows the

elimination of a single component (e.g. water) from the resulting product and to purify the main solvent.

1.6 Azeotropic distillation:

Azeotropic distillation refers to the specific technique of adding another component / solvent to generate a new, lower-boiling azeotrope that is heterogeneous (e.g. producing two, immiscible liquid phases) with the subsequent purification of the main component / solvent. This technique is required to separate materials of similar or even equivalent boiling points via distillation techniques.

1.7 Extractive distillation:

Extractive distillation uses a separation solvent, which is generally non-volatile, has a high boiling point and is miscible with the mixture, but doesn't form an azeotropic mixture. The solvent interacts differently with the components of the mixture thereby causing their relative volatilities to change. This enables the new three-part mixture to be separated by normal distillation.

2. Other Treatment Procedures

The above mentioned methods of treatment are sometimes preceded or followed by other auxiliary techniques, such as: mixing, filtration, decantation, phase separation or discoloration with activate carbon.

These techniques alone cannot be considered as methods of full recycling treatment and such procedures are rarely enough to classify a single solvent or a solvent mixture as an End of Waste product.

Contact:
European Solvent Recycler Group (AISBL)
Esplanade 1 - B 87, B-1020 Brussels

ESRG-Secretariat - via address:
Verband Chemiehandel (VCH)
Grosse Neugasse 6, D-50667 Köln
Tel: ++49 (0)221 / 258 1133
info@esrg-online.eu
www.esrg-online.eu