

Ecolabeling and recycling of lubes packaging for a greener environment

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Introduction

Lubricant packaging is usually used to maintain the properties of products over a specified period of time and for the safe storage of lubricants during transport, handling and storage [1]. The EU Packaging Directive 94/62/EC which covers packaging and packaging waste was introduced in 1994. The introduction of this directive ensures that packaging and packaging waste is made from materials that are environmentally friendly and of a uniform nature.

The fundamental criteria of this directive, are as follows:

- Unnecessary packaging must be prevented.
- Maximisation of recycling of unavoidable packaging waste.
- Reduction in waste disposal costs.

The directive has defined the standard which binds all manufacturers and retailers, that packaging placed on the market meets the following requirements [1]:

- The lowest possible weight and volume of material.
- Safe and hygienic relevant properties.
- Consumer acceptance.
- The maximum reduction of hazardous substances and components in the packaging material.
- Reusable and recyclable materials.

Lubricants can be packed in several different types of packaging [2]:

- Lubricant oil bottle.
- Drums.
- Pails.
- Containers.

Lubricant packaging [2] is further divided based on materials used for production of packaging into

metals and plastics. Packaging made of metal [2] can be divided into steel, tin and aluminium metal packaging.

Packaging made of plastics [2] can be divided into polyethylene, polyvinyl chloride, polyethylene terephthalate, polypropylene and others.

Main Directive and Regulations

Under Directive 94/62/EC these are the requirements specific to the recoverable nature of packaging:

- Packaging recoverable in the form of material recycling.
- Packaging recoverable in the form of energy recovery.
- Packaging recoverable in the form of composting.
- Biodegradable packaging.

According to Directive 94/62/EC, biodegradable packaging waste must be of such nature that it can undergo physical, chemical, thermal or biological decomposition such that most of the finished compost ultimately decomposes into carbon dioxide, biomass and water.

The most important certification organisations in Europe [3] are DIN CERTCO and Vincotte both relating to bioplastics. Materials made of renewable resources are certificated [3] based on ASTM D6866 standard by both certification bodies. Certificates [3] for biodegradable products are also issued by the Biodegradable Products Institute (BPI) in the United States, BioPlastic Association of Japan as well as by other widely used certification organisations. List of the main certification organisations for bioplastics are given in Table 1.

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ORGANISATION	BIOBASED CONTENT	CERTIF. LABEL
DIN CERTCO: Additional requirement: volatile solids > 50 % (mass)	20 – 50 %	
	50 – 85 %	
	> 85 %	
Vincotte	20 – 40 %	
	40 – 60 %	
	60 – 80 %	
	> 80 %	
U.S. Department of Agriculture	Product is 57% Packaging is 32%	

Table 7: Main certification organisations for bioplastics

Innovation lube oil packaging concept

Innovation-packaging concept Lube Cube[4] was launched by Fuchs in 2012. This innovative packaging is constructed from a strong, durable, splash-proof cardboard outer containing a product filled plastic inner[4]. This product is 100% recyclable. The environmental and costs benefits of Fuchs Lube Cube are shown in Fig. 1.[4].



Figure 1: Environmental and cost benefits of Fuchs Lube Cube [4]

At the beginning of 2021, Valvoline launched innovative packaging called FlexFill (Fig. 1)[5]. This packaging was produced to make changing synthetic gear oil easier while also providing a more flexible, less wasteful automotive do it yourself experience[5].



Figure 2: FlexFill

Labelling of lubricants

Most of the lubricants' products available in the EU are labelled in the following way[6]:

- EU labelling.
- National rules labelling.
- Mandatory labelling.
- Voluntary labelling.
- Environmental, energy, food and cosmetic labelling.

As a general rule, the official language must be used on the labels [6] but multi-language labelling is also allowed through the EU.

Regulation (EC) No 1272/2008[7] or CLP regulation represents mandatory labelling in EU. Any package containing substances or mixtures classified as hazardous must be clearly labelled with the information listed in Article 17 of the CLP Regulation[7].

The CLP regulation also provides conditions for the application, format, readability and location of labels. Packaging that contains hazardous substances and mixtures must [7]:

- Prevent any loss of the contents.
- Be made of resistant materials if they come in contact with contents.
- Be strong, solid and have sealable fastening.

CLP regulation also covers additional packaging requirements that may apply such as child-resistant fastenings and tactile warnings[7].

The EU Ecolabel[6] system represents voluntary labelling that promotes and identifies "green products". Based on EC No. 66/2010[8] of the European Parliament and of the Council of 25th November 2009 the EU Ecolabel can be used on products and services as well as their associated promotional material, exclusively during the validity period of the EU Ecolabel awarded licence.

Current criteria for awarding the EU Ecolabel licence to lubricants is defined by COMMISSION DECISION (EU) 2018/1702 of 8th November 2018. The product group 'lubricants' comprise any lubricant falling within one of the following sub-groups[8]:

- Total Loss Lubricants (TLL).
- Partial Loss Lubricants (PLL).
- Accidental Loss Lubricants (ALL).

Lubricants that are awarded an EU Ecolabel licence can show the EU Ecolabel Logo and licence number. Basic information on how the EU Ecolabel Logo should be used is given in Fig.3. [9].



Figure 3: EU Ecolabel Logo

There are different types of formats that can be applied to correctly reproduce the EU Ecolabel licence number (see Fig. 4)[9].



Figure 4: EU Ecolabel licence number

An optional logo exists which can be used only in the following ways (see Fig. 5)[9].



Figure 5: The use of optional logo

Besides the EU Ecolabel other popular ecolabels are Blue Angel and Nordic Swan.

Nordic Swan was established in 1989 as the official ecolabel of the Nordic countries[10]. The basic rules of how the Nordic Swan logo should be used are given below (Fig.6) [10].



Figure 6: Use of Nordic Swan logo

Blue Angel was introduced in 1978 by Germany and represents the first ecolabel in EU [11]. The Blue Angel logo can be used in following way (Fig.7) [11].



In reasonable exceptions deviations are possible after agreement with RAL gGmbH.



Examples of the use of the logo and text on different backgrounds

Figure 7: Blue Angel Logo

Fully biodegradable engine oil has yet to be developed so there is currently no criteria for awarding ecolabels to biodegradable engine oil.

In addition to the above, product information about engine oil lubricant performance is put on every lubricant label as shown in Fig. 8. [12].



Figure 8: The product label provides information about the lubricant's performance

Recycling of packaging waste

Directive 94/62/EC states that by the end of 2025, at least 65% of all packaging waste must be recycled. The recycling targets per material are [13]:

- 50% of plastic.
- 25% of wood.
- 70% of ferrous metals.
- 50% of aluminum.
- 70% of glass, and
- 75% of paper and cardboard.

The next target, which should be achieved by the end of 2030, is that at least 70% by weight of all packaging should be recycled [13].

In Directive 94/62/EC it can be found that:

"Producer responsibility schemes provide for the financing or financing and organisation of the return and/or collection of used packaging and/or packaging waste and its channelling to the most appropriate waste management option, as well as for reuse or recycling of the collected packaging and packaging waste."

By the end of 2024, EU countries should ensure that producer responsibility schemes are established for all packaging [13]. Established product schemes will need to satisfy minimum requirements defined by Waste Framework Directive 2008/98/EC.

Final Remarks

Producing packaging for lubricants uses considerable amounts of metal and plastics which ends up as waste. Companies that produce packaging tend to lower the amount of packaging waste by using recycled material, which helps. Besides this, lubricant companies should work on developing innovative packaging which decreases the amount of additional waste. Fuchs Lube Cube and Valvoline FlexFill are good examples.

Currently, many lubricants made from mineral oil cannot be replaced by biodegradable oils. But innovative products from companies, including Novvi LLC [14] bring completely new set of biodegradable lubricants [15] which will be able to replace mineral oils. It is clear that lubricant packaging and the lubricants market is on track to introduce new kinds of biodegradable packaging and biodegradable lubricants leading the lubricant market to satisfy strict targets set in European Green Deal.

References

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