



# Biolubricants

## Placing sustainability requirements on the purchase of biolubricants

Various ecolabels have different requirements pertaining to lubricants. This has resulted in different degrees of eco-friendliness. (Krop H. & D. Theodori).

It is possible to define requirements on two levels, which are shared by ecolabels from the same class. However, in certain parts the criteria of individual labels can be more stringent than is required in their particular class. The various labels can be useful as a means to test the basic and additional requirements during the purchasing process.

### Basic requirements on biodegradability and non-toxicity:

In order to limit the direct environmental impact of the emission of lubricants into the environment, basic demands can be made on the biodegradability and non-toxicity of product. Oils and greases meet these demands when:

- a) Every base oil in the product is readily biodegradable, according to the European Dangerous Substances Directive 67/548/EEC (with the exception of the so-called 10-day criteria) [http://ec.europa.eu/environment/chemicals/dansub/consolidated\\_en.htm](http://ec.europa.eu/environment/chemicals/dansub/consolidated_en.htm). <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31967L0548:EN:NOT>
- b) The acute aquatic toxicity (EC50/LC50) of the product is higher than 100 mg/L, according to OECD 201 as well as OECD 202.
- c) The product contains Health and environmental R-phrases or Hazard statements, in accordance with the Dangerous Preparations Directive and CLP Regulation (for example, the product may not contain one or a combination of the following R-phrases, according to EC directive 1999/45/EG: R 39, R 40, R 42, R 43, R 45, R 46, R 48, R 49, R 60, R 61, R 62, R 63, R 64 and R 68).

The biodegradability is mainly determined by the base oils and the (eco) toxicity is mainly determined by the additives. (Krop, 2002). Consequently, requirement a) mainly ensures biodegradability; requirements b) and c) limit the level of objectionable additives a product may contain.

### Additional durability requirements:

Oils and greases meet the additional durability requirements when:

- They meet the above-mentioned basic requirements with regards to biodegradability and non-toxicity.
- They also contain a minimum percentage of carbon, derived from renewable sources (meaning, derived from vegetable oil or animal fat):
  - a. 50 % (m/m) for hydraulic fluids
  - b. 45 % (m/m) for greases
  - c. 70 % (m/m) for total loss lubricants (such as chainsaw oil and concrete release agents)

Owing to sufficient market availability, these basic and additional requirements may be applied to hydraulic fluids, greases, chainsaw oil and concrete release agents. For other kinds of loss lubrication and two-stroke oil, the supply of labeled products is still rather limited.

## Two classes of environmentally friendly lubricants

On the basis of disparities between different lubricant ecolabels, it is possible to make a division of two classes:

- Class II has basic requirements concerning the eco-friendliness of lubricants. These are core or minimum requirements the lubricant must meet
- Class I makes higher and desirable demands – from an ecological point of view. These may be applied as assessment criteria in a tender process.

Class I contains products that demonstrably (by means of a certified copy) meet the demands of the following labels, and products that have been awarded one or more of the following labels, or products of equal quality:

- The European Ecolabel (EEL; [www.ecolabel.eu](http://www.ecolabel.eu))
- The Swedish Standard SS155470 Class A <http://www.sp.se/en/index/services/Lubricating%20grease/Sidor/default.aspx>
- Nordic Swan (4.4) [www.svanen.se/en/](http://www.svanen.se/en/)

The above-mentioned labels carry out strict inspections on the presence of environmentally objectionable components. In addition, they make demands on the renewability of the product.

Class II contains products that demonstrably (by means of a certified copy) meet the demands of the following labels, and products that have been awarded one or more of the following labels:

- The Swedish Standard SS155470 classes B and C <http://www.sp.se/en/index/services/Lubricating%20grease/Sidor/default.aspx>
- The Blue Angel, RAL-UZ79 or RAL-UZ 64 <http://www.blauer-engel.de/> Naturally, Class I products always meet the requirements of Class II.

The core or minimum requirements could match the requirements formulated for Class II; similarly, the requirements formulated for Class I ecolabels could match the comprehensive, awarding criteria. The criteria match the ecolabels mentioned in the table. The lubricant has been awarded this ecolabel or an independent institute has stated that the substance meets the criteria in question.

Tabel 5.1 Minimum criteria and allotment criteria for eco-friendly lubricants				
Class	Hydraulic fluids	Greases	Chainsaw oil and Concrete release agents	Two-stroke oils
I*	EEL Nordic Swan (4.4)	EEL Nordic Swan (4.4) SS155470-Class A (2004)	EEL Nordic Swan (4.4)	EEL Nordic Swan (4.4)
II**	SS155434 (2003) RAL-UZ 79	SS155470-Class B,C (2004) RAL-UZ 64 (2007)	RAL-UZ 48 RAL-UZ 64 (2007)	
*By the end of 2010, there were no Nordic Swan (4.4) or SS155470-Class A products ** RAL-UZ criteria are used by the Blue Angel.				

Like the European Ecolabel, purchasing policy increasingly aims to stimulate leading environmental innovators. Likewise, the suggested classification is in accordance. There is a certain amount of overlap in the lists of the various Class II ecolabel; some greases with a Class II ecolabel also bear a Class I ecolabel. Furthermore, some products are brought onto the market under different brands, meaning they are mentioned more often. As long as the supply of European Ecolabel products for specific kinds of application remains limited, the purchasing policy of authorities can be geared to Class II requirements.

There are applications that require specific types of lubricant for which no ecolabel exists as yet. This is because the application and practical circumstances lead to such technical specifications and composition of the lubricant that this type of lubricant was not classed under one of the defined categories of the ecolabels. The proposed classification does not apply to it, and with regard to these types of lubricant, it is an unsuitable foundation for sustainable procurement policies. In order to prevent confusion when formulating criteria for lubricants, these particular kinds of utilization and types of lubricant could be explicitly excluded.

In the revision of the European Ecolabel for Lubricants (EEL) in 2010 a number of new types of lubricant were classed with existing categories. At the review of the European Ecolabel for lubricants it was proposed, among other things, that gearbox oil (types of marine lubricant, hydroelectric turbine oil and tractor transmission oil) should also fall under existing Ecolabel definitions.

## **Revision of the EEL document criteria**

The first 2005 European Ecolabel criteria document concerning lubricants was valid for 4 years. In 2008 the European Commission commissioned the Dutch ecolabel organization SMK to prepare a review of the criteria document. The SMK requested the assistance of IVAM UvA BV in preparing the required documents, and preparing for the meetings with all relevant stakeholders in a number of ad hoc working group sessions. This review strived for the following goals:

- a) Streamlining the criteria through new policy regarding chemical substances regulation,
- b) Increasing the compatibility with other lubricant ecolabels,
- c) Expanding the product group's area of application,
- d) Solving the problems that arose during the first period,
- e) Treating specific issues which were currently being discussed on a EU level, and have influence on the EEL.

During the review process, attention was paid to the compatibility with the new regulations such as REACH, CLP (EU-GHS) and the new general ecolabel criteria. Furthermore, the compatibility with other lubricant ecolabels was assessed and improved by, for example, allowing the application of tests for marine circumstances. These are relevant to the evaluations developed by OSPAR and GESAMP (IMO). The proposed reviewed criteria contain low limits with regard to substances of very high concern and for the fraction of substances that have not yet been assessed.

The scope of the EEL was extended with a fifth category of industrial and marine gearbox oils. Different types of lubricant have been added explicitly to the various categories. In addition, an LuSC-list (lubricant substance classification list) as well as a letter of compliance were included in the reviewed criteria document.

Durability and the use of nano-materials in products are prominently featured in EU discussions. Topics such as how to handle the negative image of palm oil production, the product's CO<sub>2</sub>-balance or the use of nano-materials in lubricants were discussed and could lead to changes in the various criteria. The main goal was that the proposed changes should not lead to significant changes in the number of lubricants which had already been awarded an ecolabel. This goal has been upheld.