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Mineral Oils as Used Engine Oils

Opinion from the
Scientific Committee on Occupational Exposure Limits

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Scientific Committee on Occupational Exposure Limits
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Directorate-General for Employment, Social Affairs and Inclusion
Directorate B —Employment
Unit B.3 — Health and safety

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OPINION FROM THE SCIENTIFIC COMMITTEE ON OCCUPATIONAL EXPOSURE LIMITS FOR MINERAL OILS AS USED ENGINE OILS

8-hour TWA:	not applicable
STEL:	not applicable
BLV:	not applicable
Additional categorisation:	Carcinogen Group A
Notation:	Skin

The present Opinion was adopted by SCOEL on 2016-06-09.

OPINION EXECUTIVE SUMMARY

1. DEFINTION:

Mineral Oils as Used Engine Oils (also known as used motor oils or used crankcase oils) consist of blends of hydrocarbons (including paraffins, naphthenics, and complex/alkylated polyaromatics and lubricating additives. Mineral oils as Used Engine Oils are oils that have been used before in internal combustion engines to lubricate and cool the moving parts within the engine.

2. COMPOSITION

The chemical compositions of engine oils vary depending on the needs of different engines and operating conditions. They are used primarily in automobile and motorcycle engines, diesel rail engines, marine engines, aeroengines, and are used in the engines in portable machinery including chain saws and lawn mowers. The chemical composition of the engine oil changes over time with engine usage, due to high temperatures and mechanical wear. Nitration, polymer cracking, oxidation and decomposition of organometallic compounds within the oil occurs during use resulting in accumulation of fuel components, water, metals, metal oxides, and combustion products (including PAHs) within the used oil.

In addition, it should be noted that the composition of the virgin engine oils and hence, the composition of used engine oils has been changing over time. This occurred not only to meet the requirements of newer engine designs and performance requirements, but also to comply with EU legislation.

In the past, many mineral oils were only mildly refined and contained significant levels of polycyclic aromatic hydrocarbons (PAH). Initially, acid treatment was used to remove PAH and other impurities and to improve the technical properties of the finished oils. In recent decades, acid treatment has largely been replaced by extensive refining with solvent

extraction and/or hydro-treatment, which has further reduced the level of PAHs and other contaminants. Mineral oils have been produced by means of the severe hydro-treatment procedure since the 1960s (Kane et al., 1984; Mackerer et al., 2003). Since the early 1990s, in the EU, the manufacturing process of lubricating oils is controlled using the IP346 method (IP, 1993). Classification need not apply under EU Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging if it can be shown that the substance contains less than 3 % DMSO extract (m/m) as measured by IP 346.

It should also be noted that "mineral oils, mildly treated or untreated" are specific streams of refinery products, early in the refining process; they are dermal carcinogens due to the PAHs present, which originate from the crudes. As such, they are not used to make lubricating oils as that would be illegal in the EU. All lubricating oils put on the EU market or used in articles put on the EU market are compliant with IP346, which means that they have a low level of PAH (which has been reduced by specific processes such as hydrotreatment).

However, the present Opinion addresses in general Mineral oils as Used Engine Oils are oils that have been used before in internal combustion engines to lubricate and cool the moving parts within the engine and as defined above.

3. CHEMICAL AGENT AND SCOPE OF LEGISLATION

Mineral Oils as Used Engine Oils is a process-generated substance (PGS) that is hazardous chemical agents in accordance with Article 2 (b) of Directive 98/24/EC and because of that falls within the scope of this legislation.

Mineral Oils as Used Engine Oils is a PGS that is carcinogenic and/or mutagenic for humans in accordance with Article 2(a) and (b) of Directive 2004/37/EC.

Mineral Oils as Used Engine Oils as defined are carcinogenic SCOEL Group A with no indication for a mode of action-based threshold. Occupational exposure is to be addressed for the dermal route. A skin notation is strongly recommended and required to emphasize the relevant route of exposure.

4. HEALTH EFFECTS

Mineral oils as Used Engine Oils have been thoroughly described and assessed by the International Agency for Research on Cancer (IARC) in 1984 as part of an overall assessment of the carcinogenicity of mineral oils. IARC concluded that there was sufficient evidence from studies in humans that used mineral oils, containing various additives and impurities, used in several occupations were carcinogenic in humans. This IARC assessment also covers Mineral Oils as Used Engine Oils as defined above. The data from animal studies was equivocal. The final evaluation does not explicitly mention "Mineral oils as Used Engine Oils", but concludes that "Mineral oils, mildly treated or untreated" are carcinogenic to humans (IARC Category 1). These were again reviewed by IARC in 2009 where the categorization was retained in relation to skin cancer (Baan et al, 2009).

Mineral Oils as Used Engine Oils as defined are carcinogenic SCOEL Group A, for which for a mode of action-based threshold cannot be derived. For occupational settings, dermal exposure is considered. A skin notation is therefore strongly recommended and required to emphasize the most relevant route of exposure although no health-based limit value can be derived.

9. REFERENCES

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