Product Stewardship Summary SYNFLUID® PAO dimers category (Dimer C10, Dimer C12, C10/C12 Dimer blend, PAO 2 cSt, PAO 2.5 cSt)

The product stewardship summary is intended to give general information about the chemical or categories of chemicals addressed. It is not intended to provide an in-depth discussion of all health and safety information. Additional information on this chemical is available through the applicable Material Safety Data Sheet which must be consulted before using this chemical. The product stewardship summary does not supplant or replace required regulatory and/or legal communication documents.

Chemical identity:
Polyalphaolefins (PAO) dimers are a category of products. PAO dimers are highly branched isoparaffinic polyalphaolefins manufactured by catalytic dimer reaction of 1-decene or 1-dodecene. Dimer C10 and PAO 2 cSt are manufactured from 1-decene. Dimer C12 and PAO 2.5 cSt are manufactured from 1-dodecene. PAO 2 cSt and PAO 2.5 cSt are made by hydrogenation of the C10 and C12 Dimers, respectively. This category contains 5 members, with CAS numbers and names listed below.

CAS Number	Product Name
17438-89-0	Synfluid® Dimer C10
62132-67-6	Synfluid® Dimer C12
17438-89-0 62132-67-6	Synfluid® C10/C12 Dimer blend
68649-11-6	Synfluid® PAO 2 cSt
151006-61-0	Synfluid® PAO 2.5 cSt

Category Justification:
PAO dimers are highly branched, isoparaffinic polyalphaolefins produced by dimer reaction of either 1-decene or 1-dodecene. In addition to the similarity of chemical structures, the physical and health hazard profile of the PAO dimers are also similar.

Product Uses:
The 2 and 2.5 cSt PAOs, C10 and C12 Dimers, and C10/C12 Dimer Blend are used primarily for drilling fluids additives and hydraulic fluids, but they can also be used as blended components for light oil lubricant formulations (such as crankcase oil, gear oil, automatic transmission fluid, compressor oils, 2-cycle engine oil and greases, for example) and other industrial uses. The C10 and C12 Dimers are also used as feedstock to produce 2 and 2.5 cSt PAOs, respectively.

PAO dimers meet the FDA technical white oil specifications and may be used as a component of non-food articles intended for use in contact with food pursuant to the provisions of the technical white mineral oil indirect additive regulations [21 CFR 178.3620(b)(1)]. These PAOs are also qualified for incidental food contact per NSF approval, equivalent to former USDA H1 classification, as lubricants, antirust films, tank closure gasket and seal release agents, in federally inspected meat and poultry establishments.

Physical/chemical properties:
PAO dimers are clear, colorless and odorless liquids at ambient conditions. They are not flammable, combustible, or highly reactive. Bonding and grounding are needed to prevent static hazards which could cause a fire.

Health Information:
PAO dimers are not acutely toxic by the oral and dermal routes of exposure. They are not eye or skin irritants, and do not cause allergic skin reactions. If swallowed, PAO dimers may be aspirated, resulting in inflammation and possible fluid accumulation in the lungs. PAO dimers are classified as harmful by inhalation under acute toxicity hazard category of GHS (globally harmonized system of classification and labeling of chemicals). Prolonged inhalation of high aerosol concentrations of these materials may cause respiratory irritation or other pulmonary effects, therefore, exposure to aerosolized PAO dimers should be avoided. There is no evidence that these products cause adverse chronic, genetic, developmental, reproductive or carcinogenic effects.

Environmental Information:
PAO dimers are not expected to be hazardous to the environment. These products are not harmful to aquatic organisms and are not expected to be harmful to terrestrial mammals or to bioaccumulate. PAO dimers are not considered to be readily biodegradable, but are expected to be inherently biodegradable and will not persist in the environment.

Exposure Potential:

- *Workplace use:* This refers to potential exposure to PAO dimers to persons in a manufacturing facility or through various industrial applications. The potentially exposed populations include (1) workers who manufacture the 2 and 2.5 cSt PAOs, Dimers and the Dimer Blend and workers who blend the 2 and 2.5 cSt products into finished oils; (2) quality assurance workers who sample and analyze the products to ensure that they meet specifications; (3) workers involved in the transfer and transport of these materials or finished oils that contain them; and (4) mechanics who may come into contact with both fresh and used oils while working on equipment. The most likely routes of potential exposure are eye and skin contact.

- *Consumer use:* Depending on the specific products being used and the conditions they are used under, this category of exposure is highly variable. Consumers who add oil to crankcases or change their own oil may be exposed to PAO dimers. The most likely routes of exposure are eye and skin contact.

- *Potential environmental release:* There may be some potential for exposure to the environment from an accidental release of the PAO dimers due to transportation of large quantities over long distances; however, exposure due to release is believed to be very low. Chevron Phillips Chemical Company LP is committed to operating in an environmentally responsible manner and has adopted the American Chemistry Council's Responsible Care® initiative.

Risk Management:
Chevron Phillips Chemical Company LP is committed to Product Stewardship and doing business responsibly. We endeavor to provide sufficient information for the safe use and handling of all our products. We begin by ensuring that all of our customers, distributors, carriers and users of PAO dimers are well informed about the properties of each product. To that end, a Material Safety Data Sheet and a certificate of analysis accompany each shipment from our manufacturing plant. We also provide an in-depth guide to the Safe Handling & Storage of Polyalphaolefins and a Product Integrity Protection Guidelines brochure, which are available on our website.

Regulatory Information:
Regulations exist that govern the manufacture, sale, transportation, use and/or disposal of products of the PAO dimers category. These regulations may vary by city, state, country or geographic region. Please refer to the regulations governing your particular geographic region. Additional helpful information may be found by consulting the relevant product Material Safety Data Sheet.

Sources of Additional Information:
- Organization for Economic Cooperation and Development (OECD) - eChemPortal web-based search tool (use applicable CAS No): http://www.echemportal.org/echemportal/
- U.S. Environmental Protection Agency (US EPA) - High Production Volume Information System (HPVIS): http://www.epa.gov/hpvis/index.html
- European Chemicals Agency (ECHA) – Information on Registered Substances: http://apps.echa.europa.eu/registered/registered-sub.aspx\
- Our polyalphaolefins website: http://www.cpchem.com/enu/pao.asp
- Our Safe Handling and Storage Brochure: http://www.cpchem.com/bl/pao/en-us/Documents/PAO_2008_Rev_0.pdf
- Our Product Integrity Protection Guidelines brochure: http://www.cpchem.com/bl/pao/en-us/Documents/PIP_Guidelines_Rev_12.pdf
- Material Safety Data Sheet: http://www.cpchem.com/enu/pao_p_products.asp

Conclusion:
PAO dimers are not acutely toxic by skin or oral contact. They may be harmful by inhalation and exposure to aerosol should be avoided. They have not been shown to cause adverse health or environmental effects at levels typically found in the workplace or environment, however, prior to use or handling products from the PAO dimers category or products which contain a mixture of PAO dimers products, make sure to consult the

relevant product Material Safety Data Sheet and review applicable regulatory guidelines and requirements, including but not limited to OSHA guidelines.

Contact Information:
http://www.cpchem.com/

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