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Product Stewardship Summary
SYNFLUID® PAO dimers category
(Dimer C10, Dimer C12, C10/C12 Dimer blend, PAO 2 cSt, PAO 2.2 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 is available through the applicable Safety Data Sheet (SDS) which should be consulted before use of any chemical. This 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 2.2 cSt are manufactured from a mix of 1-decene and 1-dodecene. PAO 2 cSt and PAO 2.5 cSt are made by hydrogenation of the C10 and C12 Dimers, respectively. PAO 2.2 is manufactured by the dimerization of a mixed feed of 1-decene and 1-dodecene and then undergoes hydrogenation. This category contains six products, 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
68649-11-6 151006-61-0	Synfluid® PAO 2.2 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:
PAO dimers 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) and other industrial uses. The C10 and C12 dimers are also used as feedstock to produce 2, 2.2, 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 except PAO 2.2 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.

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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 PAO dimers and workers who blend the 2, 2.2, 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 potential 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. Consumers should wear protective equipment to prevent exposure.

- *Potential environmental release:* PAO dimers are routinely transported in large quantities over long distances; however, potential exposure to the environment due to release is expected to be very low. Chevron Phillips Chemical 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 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 make product information available to all of our customers, distributors, carriers and users of these products which contain detail about the properties of each product. To that end, a SDS 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.

Before using these products, the user is advised and cautioned to make its own determination and assessment of the safety and suitability of the product for the specific use in question. It is the ultimate responsibility of the user to ensure suitability for use and determine if this information is applicable to the user's specific application. Chevron Phillips Chemical does not make, and expressly disclaims, all warranties, including warranties of merchantability or fitness for a particular purpose, regardless of whether oral or written, express or implied, or allegedly arising from any usage of any trade or from any course of dealing in connection with the use of the information contained herein or any product itself. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein or any product itself.

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 relevant information may be found by consulting the applicable product SDS.

Sources of Additional Information:

- Organization for Economic Cooperation and Development (OECD) - eChemPortal web-based search tool (use applicable CAS No): http://www.echemportal.org/
- European Chemicals Agency (ECHA) – Information on Registered Substances: https://echa.europa.eu/information-on-chemicals/registered-substances
- Our polyalphaolefins website: http://www.cpchem.com/bl/pao/en-us/pages/default.aspx
- Safety Data Sheet: https://www.cpchem.com/resources/safety-data-sheets-sds

Conclusion:

PAO dimers are not acutely toxic by skin or oral contact, but 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, efforts should be taken to minimize eye, dermal and inhalation exposures to this product by adhering to safe handling procedures for designated applications and uses. Also, appropriate personal protective equipment practices and labeling, storage, and transportation procedures should be followed. Further, the relevant product SDS and applicable regulatory guidelines and requirements, including but not limited to OSHA guidelines, must be consulted prior to use or handling of PAO dimers or products which contain a mixture of PAO dimers.

Contact Information:
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