PHOSPHOROUS ACID, TRIPHENYL ESTER, REACTION PRODUCTS WITH DIPROPYLENE GLYCOL (CAS NO. 116265-68-0): *REVISED* TEST PLAN

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By

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SUMMARY

Chemtura Corporation (Chemtura) has sponsored Phosphorous acid, triphenyl ester, reaction products with dipropylene Glycol (CAS No. 116265-68-0) under the EPA's High Production Volume (HPV) Program. This document provides the Test Plan and summaries of existing data for this substance.

1.0 INTRODUCTION

Chemtura has voluntarily committed to participate in the Environmental Protection Agency's (EPA) high production volume chemicals (HPV) challenge program (program), to assess the health and environmental hazards, including selected physical chemical characteristics of Phosphorous acid, triphenyl ester, reaction products with dipropylene glycol (CAS No. 116265-68-0).

An evaluation of the available data and proposed test plan are included in this document.

The objective of this test plan is to evaluate the available data and determine what additional data, if any, are needed to adequately characterize the physical properties, environmental fate, and human health and environmental hazards of Phosphorous acid, triphenyl ester, reaction products with dipropylene glycol (CAS No. 116265-68-0). Phosphorous acid tri phenyl ester reaction products with dipropylene glycol is intended to cover all the potential products derived from the reaction which would include commercial products Weston DHOP and THOP (which include CAS No. 80584-86-7 Poly (dipropyleneglycol) phenyl phosphate) and Weston PTP (which includes CAS No. 13474-96-9 Heptakis (dipropyleneglycol) triphosphite. Data from these potential products are relevant for the sponsored substance and are considered supporting substances for the purposes of this assessment. It is proposed that additional studies be conducted as shown in Table 1.

Table 1: PROPOSED TESTING FOR PHOSPHOROUS ACID, TRIPHENYL ESTER, REACTION PRODUCTS WITH DIPROPYLENE GLYCOL (CAS NO. 116265-68-0)

Endpoint	Data
Physical Chemical Properties	
Melting Point	NA
Vapor Pressure	Test
Boiling Point	Test
Partition Coefficient	Test
Water Solubility	Test
Environmental Fate	
Hydrolysis	Test
Photodegradation	A/Calc
Biodegradation	Test
Environmental Transport	A/Calc
Ecotoxicity	
Acute Fish	Test
Acute Daphnia	Test
Acute Algae	Test
Mammalian toxicity	
Acute Oral	A
Repeated Dose	Test
Genotoxicity (*in vitro* -bacteria)	Test
Genotoxicity (*in vivo*)	Test
Reproductive/Developmental	Test

NA: not applicable; substance is a liquid
A= Adequate data
Test = Testing proposed

2.0 POTENTIAL USE AND EXPOSURE

The sponsored substance is one of several related phosphite materials used as a secondary antioxidant in polyolefins, ABS, synthetic rubber, PVC, epoxies, polyurethanes, polyesters, adhesives and other polymers to improve color, processing, heat and UV stability. Some typical applications include polyethylene films, refrigerator liners and vinyl flooring. Materials of this type are also used in lubrication additives.

3.0 EVALUATION OF EXISTING DATA AND PROPOSED TESTING

There is no existing data located for the sponsored substance. However, adequate data are available for the supporting substances for some endpoints as described below.

Chemical/Physical Properties:

The physical chemical properties of the substance were not located and modeling could not be used to estimate these endpoints. The physical chemical properties of the supporting substances are provided in Table 2.

Table 2: ESTIMATED PHYSICAL/CHEMICAL PROPERTIES FOR SUPPORTING SUBSTANCES (CAS No.'s 80584-86-7 AND CAS No. 13474-96-9)

Endpoint	CAS No. 80584-86-7	CAS No. 13474-96-9
Melting Point	NA (liquid)	NA (liquid)
Vapor Pressure	0 mm Hg	1.27E-030 mm Hg
Boiling Point	1866 °C at 1013 hPa	942 °C at 1013 hPa
Partition Coefficient	22.2	-3.41
Water Solubility	3.455E-026 mg/L	185 mg/l at 25 °C

A melting point is not applicable as the sponsored substance is a liquid. Due to the range of values predicted for the supporting substances, additional testing of the sponsored substance is proposed.
Recommendation: Melting point (OECD TG 102), boiling point (OECD TG 103), vapor pressure (OECD TG 104), partition coefficient (OECD TG 107) and water solubility tests (OECD 105) are proposed.

Environmental Fate:

Environmental fate data are not available for the sponsored substance. EPIWIN was used to predict the photodegradation and environmental distribution of the supporting substances (Table 3), and this information is expected to be representative of the sponsored substance. Although it is expected that hydrolysis of the sponsored substance will be slow, testing is proposed in order to clarify the hydrolysis rate. Hydrolysis of supporting substance CAS No. 13474-96-9 is expected to be slow. There are no data on the hydrolysis of supporting substance CAS No. 80584-86-7. Biodegradation of the sponsored or supporting substances is not available; a biodegradation study is proposed for the sponsored substance.

Table 3: ESTIMATED ENVIRONMENTAL FATE PROPERTIES FOR SUPPORTING SUBSTANCES (CAS No.'s 80584-86-7 AND CAS No. 13474-96-9)

Endpoint	CAS No. 80584-86-7	CAS No. 13474-96-9
Photodegradation	OVERALL OH Rate Constant = 541.1379 E-12 cm3/molecule-sec; HALF-LIFE = 0.020 Days	OVERALL OH Rate Constant = 583.1637 E-12 cm3/molecule-sec; HALF-LIFE = 0.018 Days
Environmental distribution (%)	Air 0.00404 Water 1.27 Soil 32 Sediment 66.8	Air 5.45e-006 Water 54.4 Soil 45.5 Sediment 0.106

Recommendation: A hydrolysis test (OECD TG 111) and biodegradation study (OECD TG 301) are proposed.

Aquatic Toxicity

Acute aquatic toxicity data are not available for fish, daphnia or algae for the sponsored or supporting substances.

Recommendation: Acute aquatic toxicity studies with fish, daphnia and algae (OECD TG 203, 202, and 201) are proposed.

Acute Mammalian Toxicity

Acute studies have not been conducted with the sponsored substance. Acute oral, inhalation and dermal toxicity studies have been conducted with the supporting substances (Table 4) and these data are expected to be representative of the sponsored substance.

Table 4: ACUTE TOXICITY OF THE SUPPORTING SUBSTANCES (CAS No.'s 80584-86-7 AND CAS No. 13474-96-9)

Endpoint	CAS No. 80584-86-7	CAS No. 13474-96-9
Oral LD50 mg/kg bw (rat)	>5000 >2000	>10,000
Inhalation LC50 mg/L (rat)	>2	No data
Dermal LD50 mg/kg bw (rabbit)	>2000 >200	>200

Recommendation: No additional testing is necessary.

Repeated Dose/ Reproductive/Developmental Toxicity

No data are available regarding the repeated dose toxicity, reproductive toxicity or developmental effects of the sponsored substance or the supporting substances.

Recommendation: A combined repeat dose with developmental and reproductive screen (OECD TG 422) by the oral gavage route of exposure is proposed.

Mutagenicity Assays

No data were located for in vitro or in vivo mutagenicity of the sponsored substance or the supporting substances.

Recommendation: Bacterial (OECD TG 471) and in vitro mammalian mutagenicity (OECD TG 473) studies are proposed.