

## SCREENING-LEVEL HAZARD CHARACTERIZATION

### Triethylene Glycol Dibenzoate (CASRN 120-56-9)

The High Production Volume (HPV) Challenge Program<sup>1</sup> was conceived as a voluntary initiative aimed at developing and making publicly available screening-level health and environmental effects information on chemicals manufactured in or imported into the United States in quantities greater than one million pounds per year. In the Challenge Program, producers and importers of HPV chemicals voluntarily sponsored chemicals; sponsorship entailed the identification and initial assessment of the adequacy of existing toxicity data/information, conducting new testing if adequate data did not exist, and making both new and existing data and information available to the public. Each complete data submission contains data on 18 internationally agreed to “SIDS” (Screening Information Data Set<sup>1,2</sup>) endpoints that are screening-level indicators of potential hazards (toxicity) for humans or the environment.

The Environmental Protection Agency’s Office of Pollution Prevention and Toxics (OPPT) is evaluating the data submitted in the HPV Challenge Program on approximately 1400 sponsored chemicals by developing hazard characterizations (HCs). These HCs consist of an evaluation of the quality and completeness of the data set provided in the Challenge Program submissions. They are not intended to be definitive statements regarding the possibility of unreasonable risk of injury to health or the environment.

The evaluation is performed according to established EPA guidance<sup>2,3</sup> and is based primarily on hazard data provided by sponsors; however, in preparing the hazard characterization, EPA considered its own comments and public comments on the original submission as well as the sponsor’s responses to comments and revisions made to the submission. In order to determine whether any new hazard information was developed since the time of the HPV submission, a search of the following databases was made from one year prior to the date of the HPV Challenge submission to the present: (ChemID to locate available data sources including Medline/PubMed, Toxline, HSDB, IRIS, NTP, ATSDR, IARC, EXTOXNET, EPA SRS, etc.), STN/CAS online databases (Registry file for locators, ChemAbs for toxicology data, RTECS, Merck, etc.) and Science Direct. OPPT’s focus on these specific sources is based on their being of high quality, highly relevant to hazard characterization, and publicly available.

OPPT does not develop HCs for those HPV chemicals which have already been assessed internationally through the HPV program of the Organization for Economic Cooperation and Development (OECD) and for which Screening Initial Data Set (SIDS) Initial Assessment Reports (SIAR) and SIDS Initial Assessment Profiles (SIAP) are available. These documents are presented in an international forum that involves review and endorsement by governmental authorities around the world. OPPT is an active participant in these meetings and accepts these documents as reliable screening-level hazard assessments.

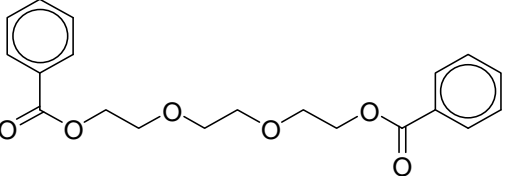
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<sup>1</sup> U.S. EPA. High Production Volume (HPV) Challenge Program; <http://www.epa.gov/chemrtk/index.htm>.

<sup>2</sup> U.S. EPA. HPV Challenge Program – Information Sources; <http://www.epa.gov/chemrtk/pubs/general/guidocs.htm>.

<sup>3</sup> U.S. EPA. Risk Assessment Guidelines; <http://cfpub.epa.gov/ncea/raf/rafguid.cfm>.

These hazard characterizations are technical documents intended to inform subsequent decisions and actions by OPPT. Accordingly, the documents are not written with the goal of informing the general public. However, they do provide a vehicle for public access to a concise assessment of the raw technical data on HPV chemicals and provide information previously not readily available to the public.

<b>Chemical Abstract Service Registry Number (CASRN)</b>	<b>120-56-9</b>
<b>Chemical Abstract Index Name</b>	<b>Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate</b>
<b>Structural Formula</b>	
<p><b>Summary</b></p> <p>CASRN 120-56-9 is a white, solid substance possessing low vapor pressure and moderate water solubility. It is expected to possess moderate mobility in soil. Volatilization is considered low based on its Henry's Law constant. The rate of hydrolysis is slow to negligible. The rate of atmospheric photooxidation is moderate. CASRN 120-56-9 is expected to have low persistence (P1) and low bioaccumulation potential (B1).</p> <p>The acute toxicity of CASRN 120-56-9 is low in rats for the oral and dermal routes. In a 13-week repeated-dose dietary study in rats, decreased body weights were observed at 1576 and 1596 mg/kg-bw/day for males and females, respectively; the NOAEL for systemic toxicity is 987 mg/kg/day. In a screening-level one-generation reproductive toxicity study, dietary administration of CASRN 120-56-9 in rats showed no treatment-related effects; the NOAEL for reproductive toxicity is 1100 mg/kg-bw/day (highest dose tested). In an oral prenatal developmental toxicity study in rats, CASRN 120-56-9 showed no maternal toxicity, but reduced fetal weight and fetal abnormalities were observed at 1000 mg/kg-bw/day; the NOAELs for maternal and developmental toxicity are 1000 mg/kg-bw/day (highest dose tested) and 500 mg/kg-bw/day, respectively. CASRN 120-56-9 did not induce gene mutations in bacteria or chromosomal aberrations in mammalian cells <i>in vitro</i>. CASRN 120-56-9 is not a skin sensitizer in guinea pigs and does not exhibit estrogenic activity in rats.</p> <p>For CASRN 120-56-9, the 96-h LC<sub>50</sub> for fish is &gt; 11.4 mg/L (highest concentration tested), the 48-h EC<sub>50</sub> for aquatic invertebrates is 9.69 mg/L and the 96-h EL<sub>50</sub>s for aquatic plants are 33 mg/L (biomass) and &gt;100 mg/L (growth rate).</p> <p>No data gaps were identified under the HPV Challenge Program.</p>	

The sponsor, Velsicol Chemical Corporation, submitted a Test Plan and Robust Summaries to EPA for triethylene glycol dibenzoate (CASRN 120-56-9; CA Index Name: ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, dibenzoate) on November 16, 2001. EPA posted the submission on the ChemRTK HPV Challenge website on December 17, 2001 (<http://www.epa.gov/chemrtk/pubs/summaries/triglydb/c13309tc.htm>). EPA comments on the original submission were posted to the website on June 19, 2002. Public comments were also received and posted to the website

## 1. Chemical Identity

### 1.1 Identification and Purity

The following description is taken from the 2002 Test Plan and Robust Summary. CASRN 120-56-9 is described as a white solid. The substance tested, named Benzoflex S-358, is a mixture containing 96.9% CASRN 120-56-9.

### 1.2 Physical-Chemical Properties

The physical-chemical properties of ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate are summarized in Table 1. Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate is a white, solid substance possessing low vapor pressure and moderate water solubility.

<b>Table 1. Physical-Chemical Properties of Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate<sup>1</sup></b>	
<b>Property</b>	<b>Value</b>
CASRN	120-56-9
Molecular Weight	358.39
Physical State	White solid
Melting Point	43.5–49.0°C (measured)
Boiling Point	>230°C (decomposes)
Vapor Pressure	1.9 × 10 <sup>-7</sup> mm Hg at 25°C (measured); 1.7 × 10 <sup>-6</sup> mm Hg at 50°C (measured); 6.0 × 10 <sup>-5</sup> mm Hg at 100°C (measured)
Water Solubility	30.4 mg/L at 30°C (measured)
Dissociation Constant (pK <sub>a</sub> )	Not applicable
Henry's Law Constant	3.0 × 10 <sup>-9</sup> atm-m <sup>3</sup> /mol (estimated) <sup>2</sup>
Log K <sub>ow</sub>	3.2 (measured)

<sup>1</sup> Velsicol Chemical Corporation. 2001. Test Plan and Robust Summary for Triethylene glycol dibenzoate.

Available online at <http://www.epa.gov/chemrtk/pubs/summaries/triglydb/c13309tc.htm> as of September 28, 2010.

<sup>2</sup> U.S. EPA. 2010. Estimation Programs Interface Suite™ for Microsoft® Windows, v4.00. U.S. Environmental Protection Agency, Washington, DC, USA. Available online at <http://www.epa.gov/opptintr/exposure/pubs/episuitedl.htm> as of September 28, 2010.

## **2. General Information on Exposure**

### **2.1 Production Volume and Use Pattern**

CASRN 120-56-9 had an aggregated production and/or import volume in the United States between 500,000 pounds and 1 million pounds during calendar year 2005.

Non-confidential information in the IUR indicated that the industrial processing and uses of the chemical include plastics packaging materials and unlaminated film and sheet manufacturing and adhesive manufacturing as “other.” Non-confidential commercial and consumer uses of this chemical include adhesives and sealants; and rubber and plastic products.

### **2.2 Environmental Exposure and Fate**

Table 2 lists the environmental fate properties of CASRN 120-56-9. Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate is expected to possess moderate mobility in soil. Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate achieved 92% of its theoretical CO<sub>2</sub> production using the modified Sturm test (OECD 301B) and is considered readily biodegradable. The rate of volatilization is considered low given its estimated Henry's Law constant. The rate of hydrolysis is considered slow to negligible. Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate is expected to have low persistence (P1) and low bioaccumulation potential (B1).

<b>Table 2. Environmental Fate Characteristics of Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate<sup>1</sup></b>	
<b>Property</b>	<b>Value</b>
Photodegradation Half-life	3.9 hours (estimated) <sup>2</sup>
Hydrolysis Half-life	1.3 years at pH 7 (estimated) <sup>2</sup> ; 48.8 days at pH 8 (estimated) <sup>2</sup> ; 5 days at pH 9 (estimated) <sup>2</sup>
Biodegradation	92% after 28 days (readily biodegradable)
Bioaccumulation Factor	BAF = 6.3 (estimated) <sup>2</sup>
Log K <sub>oc</sub>	2.9 (estimated) <sup>2</sup>
Fugacity (Level III Model) <sup>2</sup>	
Air (%)	0.1
Water (%)	13.3
Soil (%)	86.0
Sediment (%)	0.6
Persistence <sup>3</sup>	P1 (low)
Bioaccumulation <sup>3</sup>	B1 (low)

<sup>1</sup> Velsicol Chemical Corporation. 2001. Test Plan and Robust Summary for Triethylene glycol dibenzoate. Available online at <http://www.epa.gov/chemrtk/pubs/summaries/triglydb/c13309tc.htm> as of September 28, 2010.

<sup>2</sup> U.S. EPA. 2010. Estimation Programs Interface Suite™ for Microsoft® Windows, v4.00. U.S. Environmental Protection Agency, Washington, DC, USA. Available online at <http://www.epa.gov/opptintr/exposure/pubs/episuite.html> as of September 28, 2010.

<sup>3</sup> Federal Register. 1999. Category for Persistent, Bioaccumulative, and Toxic New Chemical Substances. *Federal Register* 64, Number 213 (November 4, 1999) pp. 60194–60204.

**Conclusion:** Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate is a white solid substance possessing low vapor pressure and moderate water solubility. It is expected to possess moderate mobility in soil. Volatilization is considered low based on its Henry's Law constant. The rate of hydrolysis is slow to negligible. The rate of atmospheric photooxidation is moderate. Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-, 1,1'-dibenzoate is expected to have low persistence (P1) and low bioaccumulation potential (B1).

### **3. Human Health Hazard**

A summary of health effects data submitted for SIDS endpoints is provided in Table 3.

#### ***Acute Oral Toxicity***

Male and female Sprague-Dawley rats (number/sex/dose not specified) were administered single oral doses (assumed to be via gavage) of triethylene glycol dibenzoate at dose levels that

included at least 500, 2000, 3200 and 5000 mg/kg-bw and observed for at least up to 13 days following dosing. Mortality was observed at dose levels  $\geq$  3200 mg/kg.

**LD<sub>50</sub> (males) = 4843 mg/kg**

**LD<sub>50</sub> (females) = 3535 mg/kg**

### ***Acute Dermal Toxicity***

Male and female Sprague-Dawley rats (number/sex/dose not specified) were administered triethylene glycol dibenzoate via the dermal route (dose levels not specified) and observed for an unspecified period following dosing. No mortalities were observed.

**LD<sub>50</sub> > 2000 mg/kg**

### ***Repeated-Dose Toxicity***

Crl: CD (BR) rats (10/sex/dose) were administered triethylene glycol dibenzoate in the diet for 13 weeks at concentrations resulting in calculated intakes of test material of 0, 395, 987, 1576 and 2185 mg/kg-bw/day for males and 0, 398, 1015, 1596 and 2189 mg/kg-bw/day for females. Control and high-dose rats (10/sex) were observed during a 4-week recovery period. One unscheduled death due to poor condition was observed, but was not considered to be treatment-related. Clinical signs of toxicity were limited to observations of hair loss in high-dose males and females. Decreased body weight gain (magnitude not specified) was noted in males and females of the two highest dose levels. Hematology revealed decreased white blood cells in males receiving  $\geq$  1576 mg/kg-bw/day. Clinical chemistry evaluation revealed slightly increased ALT and AST in females receiving  $\geq$  1596 mg/kg-bw/day and high-dose males and decreased cholesterol in high-dose females. Gross pathology revealed alopecia in high-dose males and females. Effects on organ weight included increased lung weight in males receiving  $\geq$  1576 mg/kg-bw/day and in high-dose females. Histopathological examination revealed effects on the liver (periportal hepatocyte hypertrophy) and spleen (haemosiderosis) in high-dose males and females. Effects on the spleen were still present during the recovery period.

**LOAEL (males) = 1576 mg/kg-bw/day** (based on decreased body weight)

**NOAEL (males) = 987 mg/kg-bw/day**

**LOAEL (females) = 1596 mg/kg-bw/day** (based on decreased body weight)

**NOAEL (females) = 1015 mg/kg-bw/day**

### ***Reproductive Toxicity***

This study was performed to assess the influence of triethylene glycol dibenzoate in the diet on gonadal function, mating behavior and fertility in sexually mature male and female Sprague-Dawley rats. Assessment of the survival and development to sexual maturity of the F1 generation and the tolerance of selected offspring to exposure at the same dietary concentrations as the parental animals were also determined. In a screening-level one-generation reproductive toxicity study, Sprague-Dawley rats (10/sex/dose) were administered triethylene glycol dibenzoate in the diet for 15 days prior to mating and throughout mating, gestation and lactation (approximately 13 weeks total exposure period) at concentrations of 2500, 5000, 10,000 or 20,000 ppm (~ 137.5, 275, 550 and 1100 mg/kg-bw/day, respectively). Selected F1 rats were administered triethylene glycol dibenzoate in the diet until termination following sexual maturation. Four females were

killed for humane reasons during early lactation and were linked with total litter loss or maternal neglect of the neonates. The litters from these females were also killed when necessary for humane reasons. There were no deaths among the F0 males; death rates among the 2500, 5000, 10,000 and 20,000 ppm F0 females were 1/10, 0/10, 1/10 and 2/10, respectively, but were not considered treatment-related. Among F0 males and females, no treatment-related effects were seen regarding body weight, food consumption, gross pathological assessments, organ weights (information on specific organs not provided) or histopathologic findings for reproductive organs. No treatment-related effects were noted regarding estrous cycles, mating performance, fertility, gestation length, parturition, fecundity, number of implantation sites, litter size, offspring survival, pup sex ratio, pup body weight, gross pathological assessments of pups, timing of vaginal opening or timing of sexual maturation.

**NOAEL (reproductive toxicity) ~ 1100 mg/kg-bw/day** (based on no treatment-related effects at the highest dose tested)

### ***Developmental Toxicity***

In a prenatal developmental toxicity study, Sprague-Dawley rats (22 pregnant females/dose) were administered triethylene glycol dibenzoate via gavage at 0 (corn oil vehicle), 250, 500 or 1000 mg/kg-bw/day on days 6 – 19 of gestation. Dams were sacrificed on gestation day 20 for assessment of uterine contents. Salivation was noted in dosed dams for a short time following dosing and was most prevalent at the highest dose. This effect was not considered to be an adverse effect, but related to the bolus dosing procedure. Increased food intake observed in mid- and high-dose dams was not considered a treatment-related adverse effect. The treated dams were considered to have well-tolerated the test chemical. At the highest dose, reduced fetal weight in both sexes, and increased incidences of fetuses with cervical ribs and incomplete ossification (cranial centers, sacral caudal vertebral arches and pelvic bones) were noted. Increased incidences of incomplete ossification of the 5<sup>th</sup> and 6<sup>th</sup> sternbrae and rudimentary or absent renal papilla and dilated ureter were also noted, but due to the absence of an obvious dose-response relationship, were not considered adverse effects of treatment. No treatment-related effects were seen regarding numbers of corpora lutea, pre- and post- implantation loss, resorptions, live fetuses or pup sex ratio.

**NOAEL (maternal toxicity) = 1000 mg/kg-bw/day** (highest dose tested)

**LOAEL (developmental toxicity) = 1000 mg/kg-bw/day** (based on reduced fetal weight and fetal abnormalities)

**NOAEL (developmental toxicity) = 500 mg/kg-bw/day**

### ***Genetic Toxicity – Gene Mutation***

#### ***In vitro***

*Salmonella typhimurium* strains TA98, TA100, TA1535 and TA1537 and *Escherichia coli* strain CM891 WP2 trp uvrA pKM101 were exposed to triethylene glycol dibenzoate at 5, 15, 50, 150, 500, 1500 or 5000 µg/plate with and without metabolic activation. Positive and negative controls were tested, but their responses were not provided. Slightly cloudy to cloudy solution was observed from 150 to 5000 µg/plate; cytotoxicity was not observed at any test concentration.

**Triethylene glycol dibenzoate was not mutagenic in this assay.**

## ***Genetic Toxicity – Chromosomal Aberrations***

### ***In vitro***

Human lymphocytes were exposed to triethylene glycol dibenzoate at 50, 100, 150, 200, 300, 400, 500 or 600 µg/mL in the absence of metabolic activation and 50, 100, 200, 400, 500, 600, 700 or 800 µg/mL in the presence of metabolic activation. Apparently, two tests were performed, but the robust summary provides test concentration data only for test 2. Positive controls were tested, but their responses were not provided. In test 2, cytotoxicity was noted at 600 µg/mL in the absence of metabolic activation and at 800 µg/mL in the presence of metabolic activation. Precipitation was noted at 600 µg/mL in the absence of metabolic activation and at ≥ 500 µg/mL in the presence of metabolic activation.

**Triethylene glycol dibenzoate did not induce chromosomal aberrations in this assay.**

### ***Additional Information***

#### ***Skin Sensitization***

Triethylene glycol dibenzoate did not produce evidence of skin sensitization (delayed contact hypersensitivity) in any of twenty test animals. Evidence of skin sensitization was produced by hexyl cinnamic aldehyde (HCA) in all ten positive controls thus confirming the sensitivity of the method (Benzoflex S-358. Skin Sensitization to the Guinea Pig. Huntingdon Life Sciences, 1998. OECD TG 406).

**Triethylene glycol dibenzoate was not a skin sensitizer in guinea pigs in this assay.**

#### ***Endocrine Disruption***

Triethylene glycol dibenzoate did not induce vaginal cornification at doses of 250, 700, 1400, 2100 or 2800 mg/kg/day for 7 days by oral gavage in ovariectomized adult Sprague-Dawley (CD) rats. Clinical signs of toxicity were observed in animals dosed at 2800 mg/kg/day, with two deaths prior to the end of treatment. One animal in the 1400 mg/kg/day treatment group died prior to the end of treatment. Benzoflex S-358 did not stimulate a uterine weight increase or an increase in the uterine weight to final body weight ratio at doses of 250, 700, 1400, 2100 or 2800 mg/kg/day for 7 days. Collectively, when compared with the vehicle control and positive controls, these data demonstrated that Benzoflex S-358 did not exhibit estrogenic activity up to and including the maximally tolerated dose (Evaluation of Velsicol Benzoflex S-358 Plasticizer for Estrogenic Activity Using Vaginal Cornification and the Uterotrophic Response in the Ovariectomized Adult Rat as the Endpoints. BIOQUAL, Inc. 1997).

**Triethylene glycol dibenzoate did not exhibit estrogenic activity in this assay.**

**Conclusion:** The acute toxicity of CASRN 120-56-9 is low in rats for the oral and dermal routes. In a 13-week repeated-dose dietary study in rats, decreased body weights were observed at 1576 and 1596 mg/kg-bw/day for males and females, respectively; the NOAEL for systemic toxicity is 987 mg/kg/day. In a screening-level one-generation reproductive toxicity study, dietary administration of CASRN 120-56-9 in rats showed no treatment-related effects; the NOAEL for reproductive toxicity is 1100 mg/kg-bw/day (highest dose tested). In an oral prenatal developmental toxicity study in rats, CASRN 120-56-9 showed no maternal toxicity, but

reduced fetal weight and fetal abnormalities were observed at 1000 mg/kg-bw/day; the NOAELs for maternal and developmental toxicity are 1000 mg/kg-bw/day (highest dose tested) and 500 mg/kg-bw/day, respectively. CASRN 120-56-9 did not induce gene mutations in bacteria or chromosomal aberrations in mammalian cells *in vitro*. CASRN 120-56-9 is not a skin sensitizer in guinea pigs and does not exhibit estrogenic activity in rats.

<b>Table 3. Summary of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program - Human Health Data</b>	
<b>Endpoints</b>	<b>SPONSORED CHEMICAL Triethylene Glycol Dibenzoate (120-56-9)</b>
<b>Acute Oral Toxicity LD<sub>50</sub> (mg/kg)</b>	<b>4843 (males) 3535 (females)</b>
<b>Acute Dermal Toxicity LD<sub>50</sub> (mg/kg)</b>	<b>&gt; 2000</b>
<b>Repeated-Dose Toxicity NOAEL/LOAEL Oral (mg/kg-bw/day)</b>	<b>NOAEL = 987 LOAEL = 1576</b>
<b>Reproductive Toxicity NOAEL/LOAEL Oral (mg/kg-bw/day) Reproductive Toxicity</b>	<b>NOAEL = 1100 (highest dose tested)</b>
<b>Developmental Toxicity NOAEL/LOAEL Oral (mg/kg-bw/day) Maternal Toxicity  Developmental Toxicity</b>	<b>NOAEL = 1000 (highest dose tested)  NOAEL = 500 LOAEL = 1000</b>
<b>Genetic Toxicity – Gene Mutation <i>In vitro</i></b>	<b>Negative</b>
<b>Genetic Toxicity – Chromosomal Aberrations <i>In vitro</i></b>	<b>Negative</b>
<b>Additional Information Skin Sensitization Endocrine Disruption</b>	<b>Negative Negative</b>

#### 4. Hazard to the Environment

A summary of aquatic toxicity data submitted for SIDS endpoints is provided in Table 4. The aquatic toxicity data submitted were generated using the water accommodated fraction method.

##### *Acute Toxicity to Fish*

Fathead minnows (*Pimephales promelas*) were exposed to Benzoflex S-358 (96.9% triethylene glycol dibenzoate; CASRN 120-56-9) at nominal WAF loading rates of 0, 1, 3.2, 10, 32 or 100 mg/L under semi-static conditions (renewal every 24 hours) for 96 hours. Analytical measurements on the WAFs revealed loading rates of 0.639, 2.077, 5.703, 11.615 and 11.396 mg/L initially following introduction of test substance to the test chambers each 24 hours. There was no detectable test substance at the end of each 24-hour exposure period. There was 15% and 25% mortality at the two highest concentrations tested, respectively.

**96-h LC<sub>50</sub> > 11.4 mg/L** (highest concentration tested)

##### *Acute Toxicity to Aquatic Invertebrates*

Water fleas (*Daphna magna*) were exposed to triethylene glycol dibenzoate as water accommodated fractions (WAFs) under static conditions for 48 hours. The nominal loading rates were 4.6, 10, 22, 46 or 100 mg/L. Analytical measurements on the WAFs revealed loading rates of 2.53, 2.6, 8.16, 20.7 and 28 mg/L initially following introduction of test substance to the test chambers. There were 0, 0, 1.54, 13.34 and 20 mg/L of the test substance detected at the end of the 48 hours. Observed immobilization amounted to 2, 2, 3, 8, 19 and 18 at the 0 (controls), 2.53, 2.6, 8.16, 20.7 and 28 mg/L initial measured loading rates, respectively. A 48-hour EC<sub>50</sub> was calculated with the Trimmed Spearman-Kärber Method (v.1.5) using the initial measured loading rate data.

**48-h EC<sub>50</sub> = 9.69 mg/L**

##### *Toxicity to Aquatic Plants*

Green algae (*Pseudokirchneriella subcapitata*) were exposed to triethylene glycol dibenzoate as WAFs under static conditions for 96 hours. The nominal loading rates were 1.0, 2.2, 4.6, 10, 22, 46 and 100 mg/L. Initial measured concentrations of triethylene glycol dibenzoate loading rates were 0.3634, 1.079, 2.148, 4.389, 7.01, 8.85, 13.11, 4.495 mg/L. The 96-hour EL<sub>50</sub> for aquatic invertebrates are 33 mg/L for biomass and > 100 mg/L for growth rate.

**96- h EL<sub>50</sub> (biomass) = 33 mg/L**

**96- h EL<sub>50</sub> (growth rate) > 100 mg/L**

**Conclusion:** For CASRN 120-56-9, the 96-h LC<sub>50</sub> for fish is > 11.4 mg/L (highest concentration tested), the 48-h EC<sub>50</sub> for aquatic invertebrates is 9.69 mg/L and the 96-hour EL<sub>50</sub>s for aquatic plants are 33 mg/L (biomass) and >100 mg/L (growth rate).

<b>Table 4. Summary of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program –Aquatic Toxicity Data</b>	
<b>Endpoints</b>	<b>SPONSORED CHEMICAL Triethylene Glycol Dibenzoate (120-56-9)</b>
<b>Fish</b> <b>96-h LC<sub>50</sub> (mg/L)</b>	<b>&gt; 11.4</b>
<b>Aquatic Invertebrates</b> <b>48-h EC<sub>50</sub> (mg/L)</b>	<b>9.69</b>
<b>Aquatic Plants</b> <b>96-h EL<sub>50</sub> (mg/L)</b> <b>(biomass)</b> <b>(growth rate)</b>	<b>33</b> <b>&gt;100</b>

**Bold = measured data** (i.e., derived from testing)