

**SCREENING-LEVEL HAZARD CHARACTERIZATION
OF HIGH PRODUCTION VOLUME CHEMICALS**

CHEMICAL CATEGORY NAME

Triphenyl Boron

SPONSORED CHEMICALS

Triphenylborane (CAS No. 960-71-4)

[9th CI Name: Borane, triphenyl -]

Triphenyl boron with sodium hydroxide (CAS No. 12113-07-4)

[9th CI Name: Borate (1-), hydroxyphenyl-, sodium(T4) -]

March 2008

INTERIM

Prepared by

High Production Volume Chemicals Branch
Risk Assessment Division
Office of Pollution Prevention and Toxics
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0001

SCREENING-LEVEL HAZARD CHARACTERIZATION OF HIGH PRODUCTION VOLUME CHEMICALS

The High Production Volume (HPV) Challenge Program¹ is 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 sponsor chemicals; sponsorship entails the identification and initial assessment of the adequacy of existing toxicity data/information, conducting new testing if adequate data do 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^{1,2}) 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. OPPT is using a hazard-based screening process to prioritize review of the submissions. The hazard-based screening process consists of two tiers described below briefly and in more detail on the Hazard Characterization website³.

Tier 1 is a computerized sorting process whereby key elements of a submitted data set are compared to established criteria to “bin” chemicals/categories for OPPT review. This is an automated process performed on the data as submitted by the sponsor. It does not include evaluation of the quality or completeness of the data.

In Tier 2, a screening-level hazard characterization is developed by EPA that consists of an objective evaluation of the quality and completeness of the data set provided in the Challenge Program submissions. The evaluation is performed according to established EPA guidance^{2,4} and is based primarily on hazard data provided by sponsors. EPA may also include additional or updated hazard information of which EPA, sponsors or other parties have become aware. The hazard characterization may also identify data gaps that will become the basis for a subsequent data needs assessment where deemed necessary. Under the HPV Challenge Program, chemicals that have similar chemical structures, properties and biological activities may be grouped together and their data shared across the resulting category. This approach often significantly reduces the need for conducting tests for all endpoints for all category members. As part of Tier 2, evaluation of chemical category rationale and composition and data extrapolation(s) among category members is performed in accord with established EPA² and OECD⁵ guidance.

The screening-level hazard characterizations that emerge from Tier 2 are important contributors to OPPT’s existing chemicals review process. These hazard characterizations are technical documents intended to support 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. The public, including sponsors, may offer comments on the hazard characterization documents.

The screening-level hazard characterizations, as the name indicates, do not evaluate the potential risks of a chemical or a chemical category, but will serve as a starting point for such reviews. In 2007, EPA received data on uses of and exposures to high-volume TSCA existing chemicals, submitted in accordance with the requirements of the Inventory Update Reporting (IUR) rule. For the chemicals in the HPV Challenge Program, EPA will review the IUR data to evaluate exposure potential. The resulting exposure information will then be combined with the screening-level hazard characterizations to develop screening-level risk characterizations^{4,6}. The screening-level risk characterizations will inform EPA on the need for further work on individual chemicals or categories. Efforts are currently underway to consider how best to utilize these screening-level risk characterizations as part of a risk-based decision-making process on HPV chemicals which applies the results of the successful U.S. High Production Volume Challenge Program and the IUR to support judgments concerning the need, if any, for further action.

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

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

³ U.S. EPA. HPV Chemicals Hazard Characterization website (<http://www.epa.gov/hpvis/abouthc.html>).

⁴ U.S. EPA. Risk Assessment Guidelines; <http://cfpub.epa.gov/ncea/raf/rafguid.cfm>.

⁵ OECD. Guidance on the Development and Use of Chemical Categories; <http://www.oecd.org/dataoecd/60/47/1947509.pdf>.

⁶ U.S. EPA. Risk Characterization Program; <http://www.epa.gov/osa/spc/2riskchr.htm>.

SCREENING-LEVEL HAZARD CHARACTERIZATION Triphenylboron Category

Introduction

The sponsor, E.I. du Pont de Nemours and Company submitted a Test Plan and Robust Summaries to EPA for the Triphenylboron category on November 21, 2003. EPA posted the submission on the ChemRTK HPV Challenge website on February 19, 2004, (<http://www.epa.gov/chemrtk/pubs/summaries/triphnlb/c14976tc.htm>). EPA comments on the original submission were posted to the website on June 23, 2004. Public comments were also received and posted to the website. The sponsor has not provided revised/updated robust summaries reflecting testing proposed in their original test plan. The triphenylborane category consists of the following chemicals:

Triphenylborane (CAS No. 960-71-4)
[9th CI Name: Borane, triphenyl -]

Triphenyl boron with sodium hydroxide (CAS No. 12113-07-4)
[9th CI Name: Borate (1-), hydroxyphenyl-, sodium(T4) -]

This screening level hazard characterization is based primarily on the review of the test plan and robust summaries of studies submitted by the sponsor(s) under the HPV Challenge Program. 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. A summary table of SIDS endpoint data with the structure(s) of the sponsored chemical(s) is included in the appendix. The screening-level hazard characterization for environmental and human health effects is based largely on SIDS endpoints and is described according to established EPA or OECD effect level definitions and hazard assessment practices.

Category Justification

The triphenylboron category is composed of triphenylborane (TPB) and its hydroxide adduct triphenylboron compound with sodium hydroxide (TBP-NaOH). TBP is a monofunctional Lewis acid which is provided as the sodium hydroxide adduct for shipping purposes. TPB-NaOH is produced as a ~ 8 – 10 % aqueous solution with free sodium hydroxide and is hence, strongly alkaline; however, at pH < 7 TBP-NaOH will dissociate into TPB and NaOH at pH < 7. The grouping of these two chemicals in one category is therefore supported by the fact that TBP-NaOH will become TBP at or near neutral pH.

Summary-Conclusion

The log K_{ow} values of triphenylboron category members indicate that the potential for their bioaccumulation is expected to be high. Measured biodegradation data were not submitted; therefore the potential for triphenylboron category members to persist in the environment cannot be determined. The sponsor suggests that TBP is hydrolytically unstable and provided estimates of log K_{ow} and biodegradation rates for the hydrolysis products that suggest they would not be bioaccumulative or highly persistent. However, neither hydrolysis nor biodegradation test data have been provided to support these assertions.

Evaluation of available toxicity data for aquatic plants indicates that the potential acute hazard of triphenylborane to aquatic invertebrates is high. No data were submitted for to assess hazard to fish and aquatic plants. Furthermore, in comments on the test plan, EPA recommended a chronic daphnia test instead of the proposed acute toxicity to fish for triphenylborane if the proposed stability in water test is not sufficiently rapid. Results of the stability in water (hydrolysis) test have not been submitted and therefore the need for a chronic toxicity test could not be evaluated.

Acute oral toxicity of the triphenylboron category members to rats is moderate and acute inhalation toxicity of triphenylborane to rats is high. The triphenylboron category members are corrosive to rabbit skin and severely irritating to rabbit eyes. Triphenylborane is not a dermal sensitizer in guinea pigs. The triphenylboron category members did not induce gene mutation in bacteria. The potential health hazard of the triphenylboron category members for repeated-dose, reproductive and developmental toxicity and chromosomal aberrations could not be

determined because of data gaps.

Biodegradation, acute toxicity to fish and/or chronic toxicity to daphnia, aquatic toxicity to plants, repeated-dose/reproductive/developmental toxicity and chromosomal aberrations test data were identified as data gaps under the HPV Challenge Program.

1. Physical-Chemical Properties and Environmental Fate

A summary of physical-chemical and environmental fate data submitted is provided in Table 1. For the purpose of the screening-level hazard characterization, the review and summary of these data were limited to the octanol-water partition coefficient and biodegradation endpoints as indicators of bioaccumulation and persistence, respectively.

Octanol-Water Partition Coefficient

Triphenylborane (CAS No. 960-71-4)

Log K_{ow} : 5.52 (estimated)

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

Log K_{ow} : 4.37 (estimated)

Biodegradation

Triphenylborane (CAS No. 960-71-4)

No measured biodegradation data were submitted.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

No measured biodegradation data were submitted.

Conclusion: The log K_{ow} values of triphenylboron category members indicate that the potential for their bioaccumulation is expected to be high. Measured biodegradation data were not submitted; therefore the potential for triphenylboron category members to persist in the environment cannot be determined. The sponsor suggests that TBP is hydrolytically unstable and provided estimates of log K_{ow} and biodegradation rates for the hydrolysis products that suggest they would not be bioaccumulative or highly persistent. However, neither hydrolysis nor biodegradation test data have been provided to support these assertions.

Table 1. Summary of Physical-Chemical Properties and Environmental Fate Data		
Endpoints	Triphenylborane (960-71-4)	Triphenylboron compound with sodium hydroxide (12113-07-4)
Melting Point (°C)	136 (m)	>300 (m)
Boiling Point (°C)	347 (m)	644.67(e)
Density g/cm ³	1.1 (m)	1.35 (m)
Vapor Pressure (hPa at 25°C)	1.5 x 10 ⁻⁵ (e)	1.1 x 10 ⁻¹⁷ (e)
Log K _{ow}	5.52 (e)	4.37 (e)
Water Solubility (mg/L at 25°C)	9.9 x 10 ⁻² (e)	2.882
Stability in Water (Hydrolysis)	—	—
Direct Photodegradation (cm ³ /molecule-sec)	No data	—
Indirect (OH ⁻) Photodegradation Half-life (t _{1/2}) (h)	66	64
Fugacity (Level III Model)	(e)	(e)
Air (%)	0.94	0.0024
Water (%)	6.74	10.3
Soil (%)	47.6	83.9
Sediment (%)	44.8	5.7
Biodegradation	—	—
Bioconcentration	BCF = 3558 (e)	BCF = 2727 (e)

(m) = measured data (i.e. derived from testing); (e) = estimated data (i.e., derived from modeling); — indicates endpoint was not addressed for this chemical

2. Environmental Effects – Aquatic Toxicity

A summary of aquatic toxicity data submitted for SIDS endpoints is provided in Table 2. The table also indicates where data for tested category members are read across (RA) to untested members of the category.

Acute Toxicity to Fish

Triphenylborane (CAS No. 960-71-4)

No data were submitted. Sponsor proposed testing.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

No data were submitted.

Acute Toxicity to Aquatic Invertebrates

Triphenylborane (CAS No. 960-71-4)

Daphnia magna were exposed to triphenylborane at nominal concentrations of 0, 0.00001, 0.0001, 0.001, 0.01, 0.1 and 1 mg/L under static conditions for 48 hours. No additional information on study methods or results were provided.

48-h EC₅₀ = 0.002 mg/L

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

No data were submitted.

Toxicity to Aquatic Plants

Triphenylborane (CAS No. 960-71-4)

No data were submitted. Sponsor proposed testing.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

No data were submitted.

Conclusion: Evaluation of available toxicity data for aquatic plants indicates that the potential acute hazard of triphenylborane to aquatic invertebrates is high. No data were submitted for to assess hazard to fish and aquatic plants. Furthermore, in comments on the test plan, EPA recommended a chronic daphnia test instead of the proposed acute toxicity to fish for triphenylborane if the proposed stability in water test is not sufficiently rapid. Results of the stability in water (hydrolysis) test have not been submitted and therefore the need for a chronic toxicity test could not be evaluated.

Table 2. Summary of Environmental Effects - Aquatic Toxicity Data		
Endpoints	Triphenylborane (960-71-4)	Triphenylboron compound with sodium hydroxide (12113-07-4)
Acute Toxicity to Fish 96 h-LC ₅₀	— Testing proposed	No data
Aquatic Invertebrates 48-h EC ₅₀ (mg/L)	0.002	No data
Toxicity to Aquatic Plants 96-h EC ₅₀ (mg/L)	— Testing proposed	No data
Chronic Toxicity NOEC (mg/L)	— Testing proposed	No data

— indicates endpoint was not addressed for this chemical

3. Human Health Effects

A summary of health effects data submitted for SIDS endpoints is provided in table 3. The table also indicates where data for tested category members are read across (RA) to untested members of the category.

Acute Oral Toxicity

Triphenylborane (CAS No. 960-71-4)

(1) Male ChR-CD rats (10/dose) were administered single doses of triphenylborane (> 90%) in corn oil via gavage at 150, 180, 225 or 250 mg/kg-bw and observed for 14 days. Mortalities were 0/10, 5/10, 8/10 and 8/10 at 150, 180, 225 and 250 mg/kg-bw, respectively. All mortality occurred 1-3 days after dosing. Weight loss was observed 1-3 days after dosing at 150, 180 and 250 mg/kg-bw. Clinical signs observed across all doses included stained face, mouth, nose and perineal area.

LD₅₀ = 196 mg/kg-bw

(2) Male ChR-CD rats (1/dose) were administered single doses of triphenylborane (10% active ingredient) in corn oil via gavage at 450, 670, 1000, 1500, 2250, 5000, 7500 or 11,000 mg/kg-bw (approximately 45, 67, 100, 150, 225, 500, 750 or 1100 when adjusted to active ingredient concentration) and observed for 14 days. Mortality occurred within two days at doses 225 mg/kg-bw and higher. Clinical signs observed at the lethal doses included diarrhea, tremors, weakness, lethargy and weight loss. Clinical signs at non-lethal doses included stained perineal area, ruffled fur, pallor, and lethargy during the first 4 days after dosing at 150 mg/kg; and weight loss for 3 and 2 days at 150 and 100 mg/kg-bw, respectively.

LD₅₀ = 225 mg/kg-bw (active ingredient concentration)

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

(1) Male ChR-CD rats (1/dose) were administered single doses of triphenylboron compound with sodium hydroxide as an aqueous solution via gavage at 26, 40, 60, 90, 130, 200, 300, 450, 670 and 2250 mg/kg-bw and observed for 14. Mortality was observed from 10 minutes to 1 day at and above 200 mg/kg-bw. Clinical signs observed at non-lethal doses included lethargy on the day of dosing and diarrhea for 2 days after dosing at 130 mg/kg-bw; severe

respiratory congestion and weight loss beginning on the 9th day after dosing until sacrifice at 90 mg/kg-bw; and weight loss from 1-3 days after dosing at and above 40 mg/kg-bw. Clinical signs observed at lethal doses included belly-to-cage posture and lethargy at 200 mg/kg-bw; diarrhea at 200 and 300 mg/kg-bw; prostration at and above 300 mg/kg, and pallor at and above 200 mg/kg.

LD₅₀ = 200 mg/kg-bw

(2) Male ChR-CD rats (4/dose) were administered single doses of triphenylboron compound with sodium hydroxide (9% wt in water) via gavage at 200, 1000, 1250 and 1500 mg/kg-bw and observed for 14 days. Mortalities were 0/10, 2/10, 6/10 and 7/10 at 200, 1000, 1250 and 1500 mg/kg-bw respectively. Mortalities occurred within 1-2 days after dosing, with the exception of 1 rat at 1000 mg/kg-bw, which was found dead after 13 days. Sporadic weight loss occurred up to 8 days after dosing at 200 mg/kg-bw, and weight loss occurred up to 3 days after doing at 1000, 1250 and 1500 mg/kg-bw. Clinical signs observed at lethal doses included diarrhea, piloerection, stained nose/mouth/face/perineal area and wet perineum. The test substance was reported as 9% wt in water; however, it is unclear if this represents 9% triphenylboron or 9% of triphenylboron-NaOH which is typically produced as a ~ 8 – 10 % aqueous solution with free sodium hydroxide. The higher LD₅₀ reported in this study, as compared to the study above and those for triphenylboron suggest a 9% solution of the 8-10% TBP-NaOH solution was used.

LD₅₀ = 1236 mg/kg-bw

Acute Inhalation Toxicity

Triphenylborane (CAS No. 960-71-4)

Male ChR-CD rats (6/dose) were exposed head-only to triphenylborane at 0.004, 0.050, 0.073 and 0.474 mg/L for 4 hours and observed for 14 days. Mortality was 0/6, 0/6, 1/6, and 4/6 at 0.004, 0.050, 0.073, and 0.474 mg/L respectively. Clinical observations at non-lethal doses included sporadic chewing motion, red nasal and ocular discharge and mild lethargy during exposure. Body weight loss followed by normal weight gain was observed during recovery. Clinical observations at lethal doses included red nasal and ocular discharge, blinking, chewing motion and sporadic salivation during exposure. All rats showed weight loss to time of death.

LC₅₀ = 0.073 mg/L

Repeated-Dose Toxicity

Triphenylborane (CAS No. 960-71-4)

No data were submitted. Sponsor proposed testing.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

No data were submitted.

Reproductive toxicity

Triphenylborane (CAS No. 960-71-4)

No data were submitted. Sponsor proposed testing.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

No data were submitted.

Developmental Toxicity

Triphenylborane (CAS No. 960-71-4)

No data were submitted. Sponsor proposed testing.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

No data were submitted.

Genetic Toxicity – Gene Mutation

In vitro

Triphenylborane (CAS No. 960-71-4)

Salmonella typhimurium strains TA98, TA100, TA1535, TA1537 and TA1538 were exposed to triphenylborane at 0, 0.8, 1.6, 2.4, 3.2 and 4.0 µg/plate in the presence and absence of metabolic activation. The test substance was extremely toxic to the tester strains. No increases in mutation frequency were reported at any concentration tested, with or without metabolic activation.

Triphenylborane was not mutagenic in this assay.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

(1) *S. typhimurium* strains TA98, TA100, TA1535, TA1537 and TA1538 were exposed to triphenylboron compound with sodium hydroxide at concentrations of 0, 25, 50, 100, 250 and 500 µg/plate in the presence of metabolic activation and 0, 10, 20, 30, 50 and 100 µg/plate in the absence of metabolic activation. Positive and negative (solvent) controls were included for each assay. No increases in mutation frequency were reported at any concentration tested, with or without metabolic activation.

Triphenylboron compound with sodium hydroxide was not mutagenic in this assay.

(2) Chinese Hamster Ovary (CHO) cells were exposed to triphenylboron compound with sodium hydroxide at concentrations ranging from 17.7 – 88.6 µM in the absence of metabolic activation for 18 h or to concentrations ranging from 35.4 – 283.6 µM in the presence of metabolic activation for 5 hours. All assays involved solvent control and positive controls. Toxicity was observed at higher concentrations, but no further details were provided. No increases in mutation frequency were reported at any concentration tested, with or without metabolic activity.

Triphenylboron compound with sodium hydroxide was not mutagenic in this assay.

Genetic Toxicity – Chromosomal Aberrations

Triphenylborane (CAS No. 960-71-4)

No data were submitted. Sponsor proposed testing.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

No data were submitted.

Additional Information

Eye Irritation

Triphenylborane (CAS No. 960-71-4)

In two separate tests, albino rabbits (2/sex not specified) were instilled with undiluted and 20% solution in 3-pentenenitrile. The test eye of 1 rabbit in each test was rinsed with water after 20 seconds, and the test eye of the other rabbit remained unwashed. The test substance was a severe eye irritant in both tests.

Triphenylborane was severely irritating to rabbit eyes in this study.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

Albino rabbits (2/sex not specified) were instilled with 1/10th mL of undiluted triphenylboron compound with sodium hydroxide in the right conjunctival sac. The treated eye of one animal was washed after 20 seconds with tap water for 1 minute and the treated eye of the other animal was left unwashed. The cornea, iris and conjunctiva were observed at 1 and 4 hours and at 1, 2, 3, 7 and 14 days. Triphenylboron compound with sodium hydroxide produced progressive, generalized moderate but penetrating corneal opacity, moderate iritis and severe conjunctivitis with necrosis of the outer lids which progressed to deep injury after 2 days and a distorted cornea after 14 days. At 17 days the cornea showed signs of outward distortion with the lower half hardened. Both the washed and unwashed eyes showed the same symptoms.

Triphenylboron compound with sodium hydroxide was corrosive to rabbit eyes in this study.

Skin Irritation

Triphenylborane (CAS No. 960-71-4)

Albino rabbits (6, sex not stated) were administered undiluted triphenylborane dermally on clipped backs under occluded conditions for 4 hours and assessed at 24 and 48 hours after exposure. The test substance produced skin corrosion in 6 of 6 animals.

Triphenylborane was corrosive to rabbit skin in this study.

Triphenylboron compound with sodium hydroxide (CAS No. 12113-07-4)

Albino rabbits (6/male) were treated with 0.5 mL of undiluted triphenylboron compound with sodium hydroxide on their hairless intact skin under occluded conditions. Patches were removed after 24 hours and reactions observed at 24 and 48 hours. Necrosis with severe to moderate edema was observed in all the rabbits at 24 hours.

Triphenylboron compound with sodium hydroxide was corrosive to rabbit skin in this study.

Skin Sensitization

Triphenylborane (CAS No. 960-71-4)

Albino guinea pigs (10 males) were administered triphenylborane as 1% slurry via a series of 4 sacral intradermal injections. Following a two week rest period, the animals were challenged by applying 0.05 ml of 10% and 1% slurry to shaved intact skin. Ten previously unexposed guinea pigs received similar application during the challenge. Mild irritation was observed from the 10% slurry and no irritation was observed from the 1% slurry. No sensitization was observed at challenge.

Triphenylborane was not a dermal sensitizer in guinea pig in this study.

Conclusion: Acute oral toxicity of the triphenylboron category members to rats is moderate and acute inhalation toxicity of triphenylborane to rats is high. The triphenylboron category members are corrosive to rabbit skin and severely irritating/corrosive to rabbit eyes. Triphenylborane is not a dermal sensitizer in guinea pigs. The triphenylboron category members did not induce gene mutation in bacteria. The potential health hazard of the triphenylboron category members for repeated-dose, reproductive and developmental toxicity and chromosomal aberrations could not be determined because of data gaps.

Table 3. Summary of Health Effects Data		
Endpoints	Triphenylborane (960-71-4)	Triphenylboron compound with sodium hydroxide (12113-07-4)
Acute Oral Toxicity LD ₅₀ (mg/kg-bw)	196	200
Acute Inhalation Toxicity LC ₅₀ (mg/L)	0.073	—
Repeated-Dose Toxicity NOAEL/LOAEL (mg/kg-bw/day)	— Testing proposed	—
Reproductive Toxicity NOAEL/LOAEL (mg/kg-bw/day)	— Testing proposed	—
Developmental Toxicity NOAEL/LOAEL (mg/kg-bw/day)	— Testing proposed	—
Genetic Toxicity – Gene Mutation <i>In vitro</i>	Negative	Negative
Genetic Toxicity – Chromosomal Aberrations	— Testing proposed	—
Other Information – Eye Irritation	Severely irritating	Corrosive
Skin Irritation	Corrosive	Corrosive
Skin Sensitization	Negative	—*

— indicates endpoint was not addressed for this chemical; * indicates endpoint is not included in the base data set under the HPV Challenge Program.

4. Hazard Characterization

The log K_{ow} values of triphenylboron category members indicate that the potential for their bioaccumulation is expected to be high. Measured biodegradation data were not submitted; therefore the potential for triphenylboron category members to persist in the environment cannot be determined. The sponsor suggests that TBP is hydrolytically unstable and provided estimates of log K_{ow} and biodegradation rates for the hydrolysis products that suggest they would not be bioaccumulative or highly persistent. However, neither hydrolysis nor biodegradation test data have been provided to support these assertions.

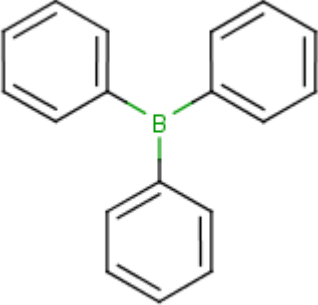
Evaluation of available toxicity data for aquatic plants indicates that the potential acute hazard of triphenylborane to aquatic invertebrates is high. No data were submitted for to assess hazard to fish and aquatic plants. Furthermore, in comments on the test plan, EPA recommended a chronic daphnia test instead of the proposed acute toxicity to fish for triphenylborane if the proposed stability in water test is not sufficiently rapid. Results of the stability in water (hydrolysis) test have not been submitted and therefore the need for a chronic toxicity test could not be evaluated.

Acute oral toxicity of the triphenylboron category members to rats is moderate and acute inhalation toxicity of triphenylborane to rats is high. The triphenylboron category members are corrosive to rabbit skin and severely irritating to rabbit eyes. Triphenylborane is not a dermal sensitizer in guinea pigs. The triphenylboron category members did not induce gene mutation in bacterial cells *in vitro*. The potential health hazard of the triphenylboron category members for repeated-dose, reproductive and developmental toxicity and chromosomal aberrations could not be determined because of data gaps.

5. Data Gaps

Biodegradation, acute toxicity to fish and/or chronic toxicity to daphnia, aquatic toxicity to plants, repeated-dose/reproductive/developmental toxicity and chromosomal aberrations test data were identified as data gaps under the HPV Challenge Program.

Appendix

Triphenylboron Category		
CAS No.	Chemical Name	Structure
960-71-4	Triphenylborane	
12113-07-4	Triphenylboron compound with sodium hydroxide	