

Fact Sheet: Assessing Risks from Flame Retardants

- [Q1. What is EPA doing to assess the risks from flame retardants, and which flame retardant chemicals are included?](#)
- [Q2. Why is EPA grouping flame retardants in clusters?](#)
- [Q3. What is Problem Formulation?](#)
- [Q4. Why is EPA releasing Problem Formulations and Data Needs Assessments for public comment?](#)
- [Q5. What are EPA's plans for assessing risks for these flame retardant clusters?](#)
- [Q6. Why is EPA concerned about flame retardants?](#)
- [Q7. Where can I find more information and comment on the problem formulations and data needs assessment for these flame retardants?](#)
- [Q8. What is the schedule for completing the flame retardant assessments?](#)

Q1. What is EPA doing to assess the risks from flame retardants, and which flame retardant chemicals are included?

Consistent with its TSCA Work Plan Chemical Assessment process, EPA has completed and is releasing problem formulations for three flame retardant clusters for public comment. The Agency is also releasing for public comment a data needs assessment for one flame retardant cluster to guide the collection of additional data and information to fill critical gaps. [Learn more about problem formulations and data needs assessment.](#)

A. Problem Formulation Chemicals:

1. **Chlorinated Phosphate Esters cluster.** The cluster includes high production volume chemicals that have been used as flame retardants in furniture foams, textiles, paints and coatings. The cluster includes:
 - Ethanol, 2-chloro-, phosphate (3:1) (TCEP, CASRN: 115-96-8);
 - 2-Propanol, 1-chloro-, 2,2',2''-phosphate (TCPP, CASRN: 13674-84-5)
 - 2-Propanol, 1,3-dichloro-, phosphate (3:1) (TDCPP, CASRN: 13674-87-8)
2. **Cyclic Aliphatic Bromides cluster.** The cluster has been used as a flame retardant in extruded and expanded polystyrene foams (EPS/XPS), polystyrene (PS) products, textiles, paints and coatings. The cluster includes:
 - Hexabromocyclododecane (HBCD, CASRN: 25637-99-4)
 - 1,2,5,6,9,10-Hexabromocyclododecane; CASRN: 3194-55-6)
 - 1,2,5,6-Tetrabromocyclooctane (CASRN: 3194-57-8)
3. **Tetrabromobisphenol A cluster.** TBBPA is a compound commonly used as a flame retardant in plastics/printed circuit boards for electronics. The cluster includes:
 - Tetrabromobisphenol A (CASRN: 79-94-7)
 - TBBPA-bis(dibromopropyl ether) (CASRN: 21850-44-2)
 - TBBPA-bis(allyl ether) (CASRN: 25327-89-3)
 - TBBPA-bis(methyl ether) (CASRN: 37853-61-5)

B. Data Needs Assessment Chemical:

- **Brominated Phthalates cluster.** The cluster is a group of seven chemicals at least two of which, TBB and TBPH, are found in commercial flame retardant formulations. The cluster includes:
 - 1,2-Benzenedicarboxylic acid, 3,4,5,6-tetrabromo-, 1,2-bis(2-ethylhexyl) esters (TBPH, CASRN: 26040-51-7)
 - Benzoic acid, 2,3,4,5-tetrabromo-, 2-ethylhexyl esters (TBB, CASRN: 183658-27-7)

- 2-(2-Hydroxyethoxy)ethyl 2-hydroxypropyl 3,4,5,6-tetrabromobenzenedicarboxylate (CASRN: 77098-07-8)
- 3,4,5,6-Tetrabromo-1,2-benzenedicarboxylic acid, mixed esters with diethylene glycol and propylene glycol (CASRN: 20566-35-2)
- 1,2- (2,3-dibromopropyl) benzenedicarboxylate (CASRN: 7415-86-3)
- Two substances in the Brominated Phthalates Cluster Flame Retardants Workplan were identified as Confidential A and Confidential B. Please be advised that these two substances refer to chemicals reported in the TSCA section 5 program as P-96-0965 and P-04-0404.

Q2. Why is EPA grouping flame retardants in clusters?

Grouping and evaluating flame retardants with similar characteristics together, rather than individually, will help EPA to more efficiently evaluate existing data and support more informed decisions about data gaps and needs. Through a literature search and data collection efforts, EPA obtained available information for each of these structurally similar chemical groups. Collected data included physical-chemical properties, environmental fate and transport, aquatic and mammalian toxicity, occurrence in humans and the environment, and use, market, and regulatory information.

Q3. What is Problem Formulation?

As a first step in evaluating TSCA Work Plan Chemicals, EPA conducts Problem Formulations to determine if available data and current assessment approaches and tools will support the assessments. Problem Formulation is the analytical phase of the assessment in which the purpose for the assessment is articulated, the problem defined, and a plan for analyzing and characterizing risk is determined. Problem Formulation draws from regulatory, decision-making and policy context of the assessment, informs the technical approach to be implemented, and systematically identifies the major factors to be considered in risk assessment. Outcomes of a Problem Formulation are:

- **Conceptual Model** – including a visual representation and written description of actual or predicted relationships between chemical exposure and effects on humans and/or wildlife, and
- **Analysis Plan** – describing the intentions regarding the technical aspects of the risk assessment.

Q4. Why is EPA releasing Problem Formulations and Data Needs Assessments for public comment?

EPA believes publically releasing Problem Formulation documents for TSCA Work Plan Assessments will increase transparency about EPA's thinking and analysis process, provide opportunity for the public to comment on EPA's approach, and provide EPA the opportunity to receive additional information/data to supplement or refine the assessment approach prior to EPA conducting detailed risk analysis and risk characterization.

Based on experience in conducting TSCA Work Plan Chemical Assessments to date and public input, EPA will publish a Problem Formulation or a Data Needs Assessment, for each TSCA Work Plan Assessment as a stand-alone document to facilitate public input prior to conducting further risk analysis.

Q5. What are EPA's plans for assessing risks for these flame retardant clusters?

Chlorinated Phosphate Ester cluster - EPA will conduct additional analysis to:

- Assess potential risks to aquatic organisms from TCEP in the environment.
- Assess potential risks to human health from incidental ingestion of TCEP in inhaled dust or via hand-to-mouth transfer of settled dust released from consumer products.
- Assess potential risks to children from incidental ingestion of TCEP from mouthing of consumer products.
- Assess potential risks to human health from consumption of TCEP in drinking water, or fish (recreational and subsistence fishers).
- Evaluate potential risks to human health from aggregate oral exposure to TCEP.

Cyclic Aliphatic Bromides cluster - EPA will conduct additional analysis to:

- Estimate releases to the environment in the US to evaluate the potential exposure of the general population and biota (aquatic, terrestrial and avian) to HBCD.
- Evaluate the applicability of data from published risk assessments to US occupational exposure scenarios (workers) to determine if further assessment is needed.
- Use available or modeled data relevant to US exposure scenarios to estimate consumer and general population exposures using available or modeled data relevant to US exposure scenarios with particular emphasis on sensitive populations.

Tetrabromobisphenol A cluster - EPA will further assess the following risks to:

- Environment
Aquatic, sediment-dwelling or soil-dwelling organisms resulting from two manufacturing facilities that emitted the vast majority of TBBPA to air during a 13-year period (2000-2012) as indicated from Toxics Release Inventory (TRI) data.
- Human Health
Workers at manufacturing and processing facilities who may ingest TBBPA in dust from the air after further developing assessment methods.
Aggregate oral exposure from the following oral exposure pathways:
 - Incidental ingestion of TBBPA in dust from outdoor sources
 - Incidental ingestion of TBBPA in dust from indoor sources
 - Incidental ingestion of TBBPA from mouthing of consumer products
 - Consumption of TBBPA in fish (recreational and subsistence fishers)

Brominated Phthalates cluster – During problem formulation, EPA reviewed previous assessments by the Agency (and other organizations) and additional published studies on the exposure and hazard for chemicals in the Brominated Phthalates cluster. The initial review identified:

- Critical data gaps in toxicity and exposure data.
- Testing was conducted on limited commercial mixtures, but not all constituents of the mixtures.
- Specific attribution of toxicity for commercial mixtures was unclear.

These uncertainties limited EPA's ability to conduct a quantitative risk assessment for any of the chemicals in the Brominated Phthalates cluster. Therefore, EPA is releasing a Data Needs Assessment for this flame retardant cluster to

guide the collection of additional data and information to fill the critical gaps identified during the Problem Formulation.

Q6. Why is EPA concerned about flame retardants?

Americans are often exposed to flame retardant chemicals in their daily lives. The chemicals are widely used in products such as household furniture, textiles, and electronic equipment. Many flame retardant chemicals can persist in the environment, and studies have shown that some may be hazardous to people and animals.

Q7. Where can I find more information and comment on the problem formulations and data needs assessment for these flame retardants?

You can find more information and submit comments on each flame retardant cluster in the following dockets on www.regulations.gov:

- Chlorinated Phosphate Esters cluster – Docket ID Number EPA–HQ–OPPT-2015-0068
- Tetrabromobisphenol A cluster - Docket ID Number EPA–HQ–OPPT– 2014-0730
- Cyclic Aliphatic Bromides cluster – Docket ID Number EPA–HQ–OPPT-2015-0081
- Brominated Phthalates cluster - Docket ID Number EPA–HQ–OPPT– 2014-0491

Q8. What is the schedule for completing the flame retardant assessments?

Following the public comment period, EPA will carefully consider all data, information or comments received, consider whether adjustments need to be made to our proposed analysis plan, and promptly implement the analysis plan to complete the assessments. The time to complete each assessment will vary depending on the nature and scope of the analysis and whether peer review is required, as outlined by Agency peer review policy.
