Bundesanstalt für Arbeitsschutz und Arbeitsmedizin
Federal Institute for Occupational Safety and Health

Justification Document for the Selection of a CoRAP Substance

Substance Name (public name):	1,1'-(isopropylidene)bis[3,5-dibromo-4-(2,3-dibromo-2-methylpropoxy) benzene]
EC Number:	306-832-3
CAS Number:	97416-84-7
Authority:	Germany
Date:	21/03/2017

Cover Note

This document has been prepared by the evaluating Member State given in the CoRAP update.

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1 IDENTITY OF THE SUBSTANCE

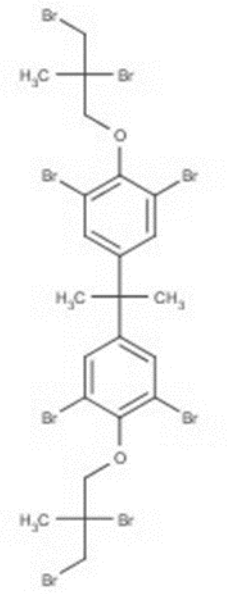
1.1 Other identifiers of the substance

Table: Other Substance identifiers

EC name (public):	1,1'-(isopropylidene)bis[3,5-dibromo-4-(2,3-dibromo-2-methylpropoxy)benzene]
IUPAC name (public):	1,1'-(isopropylidene)bis[3,5-dibromo-4-(2,3-dibromo-2-methylpropoxy)benzene]
Index number in Annex VI of the CLP Regulation:	N/A
Molecular formula:	$C_{23}H_{24}Br_8O_2$
Molecular weight or molecular weight range:	971.667 g/mol
Synonyms:	AP 1300 S

Type of substance ☒ Mono-constituent ☐ Multi-constituent ☐ UVCB

Structural formula:



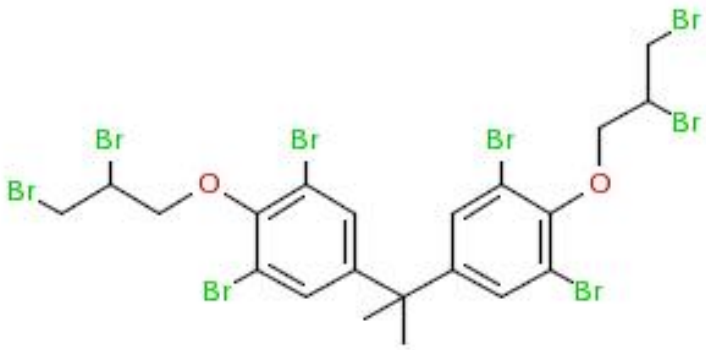
1.2 Similar substances/grouping possibilities

Table: Substance identifiers of similar substance

EC number:	244-617-5
EC name (public):	1,1'-(isopropylidene)bis[3,5-dibromo-4-(2,3-dibromopropoxy)benzene]
CAS number:	21850-44-2
CAS name (public):	
IUPAC name (public):	1,1'-propane-2,2-diylbis[3,5-dibromo-4-(2,3-dibromopropoxy)benzene]
Index number in Annex VI of the CLP Regulation:	
Molecular formula:	$C_{21}H_{20}Br_8O_2$
Molecular weight or molecular weight range:	943.624 g/mol
Synonyms:	TBBPA-DBPE, BDDP, AP 1968, AP 1968G, AP 1968P

Type of substance ☒ Mono-constituent ☐ Multi-constituent ☐ UVCB

Structural formula:



1,1'-(isopropylidene)bis[3,5-dibromo-4-(2,3-dibromopropoxy)benzene] is an existing CoRAP entry scheduled for evaluation in 2017.

2 OVERVIEW OF OTHER PROCESSES / EU LEGISLATION

Table: Completed or ongoing processes

RMOA	☐ Risk Management Option Analysis (RMOA)	
REACH Processes	Evaluation	☐ Compliance check, Final decision
		☐ Testing proposal
		☐ CoRAP and Substance Evaluation
	Authorisation	☐ Candidate List
		☐ Annex XIV
	Restric -tion	☐ Annex XVII
Harmonised C&L	☐ Annex VI (CLP) (see section 3.1)	
Processes under other EU legislation	☐ Plant Protection Products Regulation Regulation (EC) No 1107/2009	
	☐ Biocidal Product Regulation Regulation (EU) 528/2012 and amendments	
Previous legislation	☐ Dangerous substances Directive Directive 67/548/EEC (NONS)	
	☐ Existing Substances Regulation Regulation 793/93/EEC (RAR/RRS)	
(UNEP) Stockholm convention (POPs Protocol)	☐ Assessment	
	☐ In relevant Annex	
Other processes / EU legislation	☐ Other (provide further details below)	
Further details		

3 HAZARD INFORMATION (INCLUDING CLASSIFICATION)

3.1 Classification

3.1.1 Harmonised Classification in Annex VI of the CLP

There is no harmonised Classification for the substance in Annex VI.

3.1.2 Self classification

Not classified in the registration dossier. No additional notifications exist.

3.1.3 Proposal for Harmonised Classification in Annex VI of the CLP

No Proposal for Harmonised Classification and Labeling has been submitted to the Registry of Intentions.

4 INFORMATION ON (AGGREGATED) TONNAGE AND USES[1]

4.1 Tonnage and registration status

Table: Tonnage and registration status

From ECHA dissemination site		
☒ Full registration(s) (Art. 10)	☐ Intermediate registration(s) (Art. 17 and/or 18)	
Tonnage band (as per dissemination site)		
☐ 1 – 10 tpa	☐ 10 – 100 tpa	☒ 100 – 1000 tpa
☐ 1000 – 10,000 tpa	☐ 10,000 – 100,000 tpa	☐ 100,000 – 1,000,000 tpa
☐ 1,000,000 – 10,000,000 tpa	☐ 10,000,000 – 100,000,000 tpa	☐ > 100,000,000 tpa
☐ <1 . . . . . >+ tpa (e.g. 10+ ; 100+ ; 10,000+ tpa)		☐ Confidential
Joint submission.		

[1] *Access to dissemination site: 19.08.2016.*

4.2 Overview of uses

The substance is used as a flame retardant for polymers. It is used in polymers and textile treatment products and dyes.

The substance is used in closed processes during the preparation of polymers. However, since the substance is not covalently bound to the polymer matrix a continous release to man and environment during the article service life is reasonable.

The Article service life description (e.g. use of polymer dispersion for textile treatment, use of extruded polystyrene (XPS) and XPS articles, use of flexable elastomeric foam…) points to wide dispersive outdoor and indoor use of long life plastic articles with low release. However, especially the wide dispersive outdoor use combined with the persistency of the substance raises exposure concern for environmental compartments.

This substance is used in the following areas: formulation of mixtures and/or re-packaging and building & construction work. This substance is used for the manufacture of: plastic products, furniture, textile, leather or fur, rubber products and electrical, electronic and optical equipment.

Release to the environment of this substance is likely to occur from industrial use: formulation of mixtures, in the production of articles and formulation in materials. Other release to the environment of this substance is likely to occur from: wide dispersive outdoor use in long-life materials with low release rate (e.g. metal, wooden and plastic construction and building materials) and wide dispersive indoor use in long-life materials with low release rate (e.g. flooring, furniture, toys, construction materials, curtains, foot-wear, leather products, paper and cardboard products, electronic equipment).

This substance can be found in complex articles, with no release intended: electrical batteries and accumulators. This substance can be found in products with material based on: plastic (e.g. food packaging and storage, toys, mobile phones), fabrics, textiles and apparel (e.g. clothing, mattress, curtains or carpets, textile toys) and rubber (e.g. tyres, shoes, toys).

Table: Uses

Part 1:

☐ Manufacture	☒ Formulation	☒ Industrial use	☐ Professional use	☐ Consumer use	☒ Article service life	☐ Closed system

Part 2:

	Use(s)
Uses as intermediate	
Formulation	ERC 2: Formulation of preparations ERC 3: Formulation in materials
Uses at industrial sites	PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of

	preparations and articles (multistage and/or significant contact) PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation Releas Cat: ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles ERC 5: Industrial use resulting in inclusion into or onto a matrix
Uses by professional workers	Article used by workers: PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 21: Low energy manipulation of substances bound in materials and/or articles PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles
Consumer Uses	Article used by consumers: PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 21: Low energy manipulation of substances bound in materials and/or articles PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles
Article service life	Use of Polymer Dispersion for textile treatment. AC 5: Fabrics, textiles and apparel Use of Extruded Polystyrene (XPS) and XPS articles. AC 3: Electrical batteries and accumulators AC 13: Plastic articles Use of High Impact Polystyrene (HIPS) and HIPS articlesand Manufacture of Masterbatches. AC 3: Electrical batteries and accumulators AC 13: Plastic articles Use of Flexable Elastomeric Foam (FEF). AC 10: Rubber articles AC 13: Plastic articles Additional formulation use (no further information available). AC 13: Plastic articles Use of Expandable Plystyrene (EPS) and EPS articles. AC 13: Plastic articles

5. JUSTIFICATION FOR THE SELECTION OF THE CANDIDATE CoRAP SUBSTANCE

5.1. Legal basis for the proposal

☐ Article 44(2) (refined prioritisation criteria for substance evaluation)

☒ Article 45(5) (Member State priority)

5.2. Selection criteria met (why the substance qualifies for being in CoRAP)

☐ Fulfils criteria as CMR/ Suspected CMR

☐ Fulfils criteria as Sensitiser/ Suspected sensitiser

☒ Fulfils criteria as potential endocrine disrupter

☒ Fulfils criteria as PBT/vPvB / Suspected PBT/vPvB

☐ Fulfils criteria high (aggregated) tonnage (*tpa > 1000*)

☒ Fulfils exposure criteria

☒ Fulfils MS's (national) priorities

5.3. Initial grounds for concern to be clarified under Substance Evaluation

Hazard based concerns		
CMR ☐ C ☐ M ☐ R	Suspected CMR[1] ☐ C ☐ M ☐ R	☒ Potential endocrine disruptor
☐ Sensitiser	☐ Suspected Sensitiser[2]	
☐ PBT/vPvB	☒ Suspected PBT/vPvB[1]	☐ Other (please specify below)
Exposure/risk based concerns		
☐ Wide dispersive use	☐ Consumer use	☐ Exposure of sensitive populations
☒ Exposure of environment	☐ Exposure of workers	☐ Cumulative exposure
☐ High RCR	☐ High (aggregated) tonnage	☐ Other (please specify below)

[2] CMR/Sensitiser: known carcinogenic and/or mutagenic and/or reprotoxic properties/known sensitising properties (according to CLP harmonized or registrant self-classification or CLP Inventory)
Suspected CMR/Suspected sensitiser: suspected carcinogenic and/or mutagenic and/or reprotoxic properties/suspected sensitising properties (not classified according to CLP harmonized or registrant self-classification)
Suspected PBT: Potentially Persistent, Bioaccumulative and Toxic

The substance is fulfilling the screening criteria for PBT/vPvB as definded in Annex XIII, i.e.

P/vP criterion

EC 306-832-3 is not readily biodegradable. Therefore, the substance is considered to fulfil the screening criterion for persistence according to REACH Annex XIII section 3.1.1.(a).

B/vB criterion

EC 306-832-3 has a log P_{OW} > 4.5 (two estimated values of 11.12 and 12.42). No measured data on bioconcentration in fish are available. The registration dossier contains estimated BCF values that are assigned reliability 4 by the registrant. The registrant correctly noted that the substances are out of the application domain due to their high log P_{OW}. Furthermore, the applied QSAR models on BCF have a large standard error and their performance for highly hydrophobic chemicals is doubtful, as even the experimental data used for training might be flawed. The registrant uses a read-across approach to a structurally similar substance (EC 244-617-5), which is on CoRAP as suspected PBT/vPvB and ED. Both the read-across approach and the available data for EC 244-617-5 require further evaluation. EC 306-832-3 is therefore considered to fulfil the screening criterion for bioaccumulation according to REACH Annex XIII section 3.1.2.(a).

T criterion

EC 306-832-3 is not classified by the registrant and there is no harmonised classification. One short-term study on aquatic ecotoxicology to aquatic invertebrates is available. No long-term studies on aquatic ecotoxicology are available. Based on the available data, a definitive conclusion on toxicity cannot be drawn.

PBT/vPvB screening criteria

In summary, the substance fulfils the screening criteria for persistence and bioaccumulation as defined in REACH Annex XIII section 3.1 and is therefore considered to be a potential PBT/vPvB substance.

Potential endocrine disruptor

For the structurally similar substance EC 244-617-5 it could be shown in various *in vitro* assays (Hamers et al., 2006) that it interferes with the transport of the T4 hormone in the circulating blood stream by competitively binding to the T4 plasma transport protein transthyretrin (TTR) and that the substance could interact with the metabolism of E2 by strongly inhibiting the enzyme estradiol sulfotransferase. Furthermore, the tetrabromo bisphenol A (TBBPA) substructure, being part of the TBBPA-DBPE molecule, provides a structural alert pointing to possible endocrine activity of degradation products of the mother compound, since TBBPA and some derivatives are known as weak estrogen agonists.

Exposure of environment

The substance is used as a flame retardant and included in long life plastic articles with low release. However, the substance is not covalently bound to the matrix. Considering the potential persistence of the substance and the wide dispersive outdoor use of the plastic articles, there is a concern for exposure of the

environment.

EC 306-832-3 is similar to EC 244-617-5 which has > 1000 tpa and which is on CoRAP as suspected PBT/vPvB and ED. If solely EC 244-617-5 would be regulated as a result of the substance evaluation, EC 306-832-3 might be used as a substitute for it and hence, exposure of the environment to EC 306-832-3 might rise accordingly.

5.4. Preliminary indication of information that may need to be requested to clarify the concern

☐ Information on toxicological properties	☐ Information on physico-chemical properties
☒ Information on fate and behaviour	☐ Information on exposure
☐ Information on ecotoxicological properties	☐ Information on uses
☒ Information ED potential	☐ Other (provide further details below)

Further evaluation and, if necessary, further testing is required to clarify whether the substance is persistent or very persistent.
Further evaluation and, if necessary, further testing is required to clarify whether the substance is bioaccumulative or very bioaccumulative.
Further evaluation and, if necessary, further testing is required to clarify whether the substance is toxic.
To clarify the ED concern further data on the organism level are necessary to conclude for the environment on apical adverse effects on organisms. As for EC 244-617-5 only *in vitro* data pointing to the interference of TBBPA-DBPE with the thyroidal and estrogenic pathways of hormonal action are available, to obtain these data non standard *in vitro* and *in vivo* assays and/or endpoints (*e.g.* receptor binding studies with S9 mix application), an Amphibian metamorphosis assay (AMA – OECD 231) (Tier 1) or a Larval Amphibian Growth and Development Assay (LAGDA) (Tier 2)) might be necessary.

5.5. Potential follow-up and link to risk management

☐ Harmonised C&L	☐ Restriction	☒ Authorisation	☒ Other (provide further details)

If the substance is to be considered an Endocrine Disruptor according to WHO/IPCS definition and/or as a PBT substance, SVHC identification and candidate listing would be the first step. The need for further risk management measures would be analysed in an risk management option analysis.

References:

Hamers T, Kamstra JH, Sonneveld E, Murk AJ, Kester MH, Andersson PL, Legler J, Brouwer A. (2006): In vitro profiling of the endocrine-disrupting potency of brominated flame retardants. *Toxicol Sci,* **92**(1):157-173.