Justification Document for the Selection of a CoRAP Substance

- Update-

Substance Name (public name):	Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
EC Number:	278-355-8
CAS Number:	75980-60-8
Authority:	Swedish Chemicals Agency
Date:	22/03/2016 18/03/2020 (1. update)

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

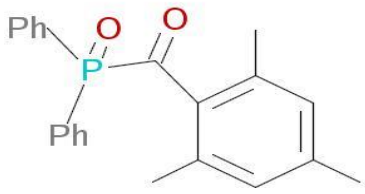
1.1 Other identifiers of the substance

Table: Other Substance identifiers

EC name (public):	Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
IUPAC name (public):	(Diphenylphosphoroso)(2,4,6-trimethylphenyl)methanone
Index number in Annex VI of the CLP Regulation:	015-203-00-X
Molecular formula:	$C_{22}H_{21}O_2P$
Molecular weight or molecular weight range:	348.3747
Synonyms:	-

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

Structural formula:



1.2 Similar substances/grouping possibilities

Not relevant.

2 OVERVIEW OF OTHER PROCESSES / EU LEGISLATION

Table: Completed or ongoing processes

RMOA	☐ Risk Management Option Analysis (RMOA)	
REACH Processes	Evaluation	☒ Compliance check
		☒ Testing proposal
		☐ CoRAP and Substance Evaluation
	Authorisation	☐ Candidate List
		☐ Annex XIV
	Restriction	☐ Annex XVII[1]
CLH	☒ 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 67/548/EEC (NONS)	
	☐ Existing Substances 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	Substance is used in cosmetic products (nail modelling products). It is not regulated under Cosmetics Regulation (EC) No 1223/2009. Due to harmonized Repr. 2 classification, it shall be prohibited as a cosmetic ingredient. However, substance classified in category 2 may be used in cosmetic products where the substance has been evaluated by the SCCS (Scientific Committee on Consumer Safety) and found safe for use in cosmetic products (Art. 15.1 of the Cosmetics Regulation). The SCCS is of the opinion that the substance is safe when used as a nail modelling product at a	

[1] Please specify the relevant entry.

	concentration of maximum 5.0%, although it is considered a moderate skin sensitizer (SCCS 1528/14).

3 HAZARD INFORMATION (INCLUDING CLASSIFICATION)

3.1 Classification

3.1.1 Harmonised Classification in Annex VI of the CLP

Table: Harmonised classification

Index No	International Chemical Identification	EC No	CAS No	Classification		Spec. Conc. Limits, M-factors	Notes
				Hazard Class and Category Code(s)	Hazard statement code(s)		
015-203-00-X	diphenyl(2,4,6-trimethyl-benzoyl)phosphine oxide	278-355-8	75980-60-8	Repr. 2	H361f (causing atrophy of the testes)		

3.1.2 Self classification

- In the registration(s):

  Repr. 1B H360: May damage fertility or the unborn child
  Specific effect: testes atrophy (fertility), bent limb bones (unborn child)

  Skin Sens. 1B H317: May cause an allergic skin reaction

  Aquatic Chronic 2 H411: Toxic to aquatic life with long lasting effects.

- The following hazard classes are in addition notified among the aggregated self classifications in the C&L Inventory:

  Repr. 2 H361f

  Eye Irrit. 2 H319

  Skin Irrit. 2 H315

  Skin Sens. 1 H317

  Aquatic Acute 1 H400

  Aquatic Chronic 1 H410

  Aquatic Chronic 3 H412

  Aquatic Chronic 4 H413

3.1.3 Proposal for Harmonised Classification in Annex VI of the CLP

No new proposal as of July 2019.

4 INFORMATION ON (AGGREGATED) TONNAGE AND USES[2]

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
***the total tonnage band has been calculated by excluding the intermediate uses, for details see the Manual for Dissemination and Confidentiality under REACH Regulation (section 2.6.11): https://echa.europa.eu/documents/10162/22308542/manual_dissemination_en.pdf/7e0b87c2-2681-4380-8389-cd655569d9f0		

4.2 Overview of uses

Table: Uses

Part 1:

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

Part 2:

	Use(s)
Uses as intermediate	None reported in the registration(s)
Formulation	Formulation of preparations Formulation of inks, coatings and adhesives

[2] *Please provide here the date when the dissemination site was accessed.*

Uses at industrial sites	Industrial use, resulting in inclusion into or onto a matrix Industrial use of process regulators for polymerisation processes in production of resins, rubbers and polymers Industrial application of coatings and inks
Uses by professional workers	Wide dispersive outdoor use into or onto a matrix Wide dispersive indoor use of of photoinitiator resulting in inclusion into a matrix, including application in coatings, adhesives and inks
Consumer Uses	Use of ink bottles by consumers
Article service life	Article service of articles produced or treated with ink/coatings used by workers

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[3]	
☐ 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 Insufficient documentation of ecotoxicity studies; lack of long-term aquatic ecotoxicity studies; lack of terrestrial ecotoxicity studies

[3] 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)

Reproductive toxicity and endocrine disruption

The substance has harmonized classification as Repr. 2 (H361f) based on adverse effects in rat testes. In repeated dose toxicity studies (28-day and 90-day) the substance has been shown to cause testicular atrophy in rats at the dose levels lower than 900 mg/kg/day. Microscopic findings in the male reproductive organs was observed in rats also in a recent reproductive toxicity screening study (OECD 421, year: 2019). In a PNDT study in rats (OECD 414, year: 2016) there was "an increase in the number of fetuses with bent limb bones in the highest dose group". In a PNDT study in rabbits (OECD 414, year: 2018) a "treatment related increase in the incidence of malaligned sternabra(e) was observed" at the highest dose group. Based on the testicular atrophy and bent limb bones effects the lead registrant has self-classified the substance as Repr. 1B (H360).

In the ToxCast Model Predictions, the substance is shown to be an androgen antagonist and with a weak potential for estrogen receptor binding (https://comptox.epa.gov/dashboard/dsstoxdb/results?search=75980-60-8#bioactivity-toxcast-models, last accessed on 2019-07-15).

Further assessment/information is needed to clarify the potential endocrine disrupting properties of the substance.

PBT properties

For persistence, one screening level test is available for the substance. This test is an OECD 301F ready biodegradability test and showed 0-10% biodegradation. Therefore, the substance fulfills the screening criteria for P. However, as a result of a compliance check decision a biodegradation simulation test according to OECD guideline 309 has been performed. The test was run for 62 days 12°C. Very little CO_2 was formed but the half-life for primary degradation was ca 15 -17 days. It is noted that the degradation in sterilised samples was almost as fast as in the unsterilized samples indicating that abiotic mechansims are involved in the degradation. The major degradation products was Diphenylphosphinic acid (CAS No 2707-03-5), Diphenylphosphinous acid (CAS No 24630-80-6) and 2,4,6-trimethylbenzoic acid (CAS No 480-63-7). Thus, the registered substance itself does not fulfil the P/vP criteria of REACH Annex XIII. The major degradation products however, are predicted as not ready biodegradable by Episuite (Biowin 4.10). Therefore, overall no firm conclusion can be drawn regarding wether or not the P/vP criteria are fulfilled.

The available information on bioaccumulation shows that the substance does not fulfil the screening criteria for B (log K_{OW} values > 4.5) as the available experimental log K_{OW} value is 3.1 and a QSAR value is 3.87 (K_{OW} = octanol/water partition coefficient). In addition, a fish bioaccumulation study giving a BCF of 72 further indicates that the bioconcentration factor is below the criterion for B. Therefore, the substance does not indicate a concern for aquatic bioaccumulation. The three major degradation products Diphenylphosphinic acid, Diphenylphosphinous acid and 2,4,6-trimethylbenzoic from the OECD 309 study are likely not PBT/vPvB. They all have low log Kow (1.3, 3.7 and 2.4, respectively) and consequently low BCF values (2-3, ca 150 and 3-18, respectively) according to EPIsuite QSARs (KOWWIN v1.68 and BCBAF v3.01).

The substance fulfils the T criterion as it has a harmonized classification for reproductive toxicity category 2.

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

Ecotoxicological properties

There are only acute aquatic ecotoxicity studies for fish, daphnia and algae available for the substance. For all three trophic levels results are > 1 mg/l, and the lowest value was obtained for fish (LC_{50} 1.4 mg/l). No long term studies are available. In addition, no terrestrial toxicity studies have been submitted.

The risk characterization is based on acute aquatic ecotoxicity studies of which the algae study is very briefly described. The EC_{50} is claimed to be based on measured concentrations but the exposure concentrations are not reported. The validity of this study cannot be evaluated based on the available information i.e. the reliability of the study should be currently considered with Klimisch score 4 as 'not assignable'. Consequently it is not possible toassess whether there is a need for long-term fish and aquatic invertebrate studies.

Exposure

The substance is registered within 10 000 – 100 000 tpa and is used by consumers, in articles, by professional workers (widespread uses), in formulation or re-packing and at industrial sites.

Conclusions

It is proposed to investigate the potential endocrine disrupting properties.

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)
Endocrine disruption potential More information is needed to clarify the potential endocrine disrupting properties of the substance.	

5.5. Potential follow-up and link to risk management

☒ Harmonised C&L	☐ Restriction	☒ Authorisation	☐ Other (provide further details)
An update of harmonised C&L for reproductive toxicity from Repr. 2 to Repr. 1B and subsequent identification as an SVHC according to Art. 57(c) and, depending on the outcome of the substance evaluation, also according to Art. 57(f).			