Justification for the selection of a candidate CoRAP substance

Substance Name (Public Name):	4,4'-methylenediphenyl diisocyanate
Chemical Group:	
EC Number:	202-966-0
CAS Number:	101-68-8
Submitted by:	Health Board, Estonia
Published:	20/03/2013

NOTE

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

Contents

1 IDENTITY OF THE SUBSTANCE

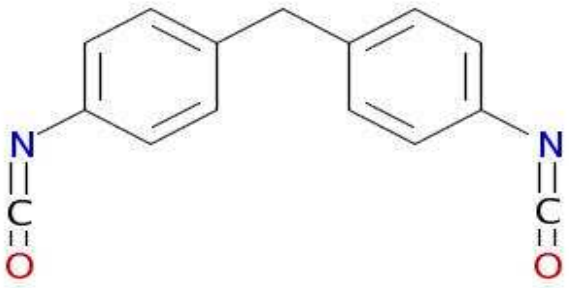
1.1 Name and other identifiers of the substance

Table 1: Substance identity

Public Name:	4,4'-methylenediphenyl diisocyanate
EC number:	202-966-0
EC name:	4,4'-methylenediphenyl diisocyanate
CAS number (in the EC inventory):	101-68-8
CAS number:	101-68-8
CAS name:	Benzene, 1,1'-methylenebis[4-isocyanato-
IUPAC name:	1,1'-methylenebis(4-isocyanatobenzene)
Index number in Annex VI of the CLP Regulation	615-005-00-9
Molecular formula:	C15H10N2O2
Molecular weight or molecular weight range:	250
Synonyms:	4,4'-methylenediphenyl diisocyanate / 1,1'-methylenebis(4-isocyanatobenzene)

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

Structural formula:



2 CLASSIFICATION AND LABELLING

2.1 Harmonised Classification in Annex VI of the CLP

CLP criteria;

Index nr: 615-005-00-9

- Skin Irrit. 2 (H315) Causes skin irritation, C ≥ 5%.
- Skin Sens. 1 (H317) May cause an allergic skin reaction.
- Eye Irrit. 2 (H319) Causes serious eye irritation, C ≥ 5%.
- Acute Tox. 4 * (H332) Harmful if inhaled.
- Resp. Sens. 1 (H334) May cause allergy or asthma symptoms or breathing difficulties if inhaled, C ≥ 0.1%.
- STOT SE 3 (H335) May cause respiratory irritation, C ≥ 5%.
- Carc. 2 (H351) Suspected of causing cancer.
- STOT RE 2 * (H373 **) May cause damage to organs.

DSD criteria;

Xn; R20 Harmful; Harmful by inhalation.

Xn; R48/20 Harmful; Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Xi; R36/37/38 Irritant; Irritating to eyes, respiratory system and skin, C >= 5.0.

R42/43 May cause sensitisation by inhalation and skin contact, C>= 0.1

Carc. Cat. 3; R40 Limited evidence of a carcinogenic effect.

2.2 Proposal for Harmonised Classification in Annex VI of the CLP

N/A

2.3 Self classification

Classifications by the lead registrant are consistent with those classifications stated in harmonised classification.

In addition to the harmonized classification, the following classifications or classification for other endpoint are notified to the Classification and Labelling Inventory, classification according to CLP criteria:

- Acute Tox. 2 (H330) Fatal if inhaled.
- Acute Tox. 3 (H331) Toxic if inhaled.
- Muta. 2 (H341) Suspected of causing genetic defects.
- STOT SE 3 (H370) Causes damage to organs.
- STOT SE 2 (H371) May cause damage to organs.
- STOT RE 1 (H372) Causes damage to organs through prolonged or repeated exposure.
- EUH204: Contains isocyanates. May produce an allergic reaction.

3 JUSTIFICATION FOR THE SELECTION OF THE CANDIDATE CoRAP SUBSTANCE

3.1 Legal basis for the proposal

☒ Article 44(1) (refined prioritisation criteria for substance evaluation)

☐ Article 45(5) (Member State priority)

3.2 Grounds for concern

☒ (Suspected) CMR	☒ Wide dispersive use	☐ Cumulative exposure
☒ (Suspected) Sensitiser	☒ Consumer use	☐ High RCR
☒ (Suspected) PBT	☐ Exposure of sensitive populations	☒ Aggregated tonnage
☐ Suspected endocrine disruptor	☐ Other (provide further details below)	

The substance is claimed to hydrolyze predominantly to solid inert poly-urea and to SVHC 4,4'-methylenedianiline (MDA) in less than 2 hrs. The identified hydrolysis product MDA has a more stringent classification (it is classified for environment and is carcinogenic mutagen meeting possibly vP and T criteria) than the parent compound and it is also used as an intermediate in the manufacturing process of MDI itself. During the hydrolysis, MDA can react with the parent compound producing mono-ureas which can be finally transformed in oligo- and poly-ureas. Based on the hydrolysis data provided by the registrant, it is certain that the hydrolysis of MDI may be fast but it is unclear how fast and what is the ratio of the hydrolysis products. In addition, the initial concentration and the pH in which the hydrolysis takes place can be very relevant for the final ratio of hydrolysis products. The exposure assessment has not considered hydrolysis product MDA.
EU-RAR for MDI claims that as MDA is very toxic to organisms, the possible hazard to aquatic organisms due to MDA formation when MDI enters the water compartment is not to be overlooked. EU-RAR is available both for MDI & MDA.
The PBT & exposure assessment does not address the hydrolysis product(s) even though MDI may hydrolyse in water very quickly and the hydrolysis products are relevant. For all the industrial use scenarios no exposure of MDI is foreseen to wastewater and soil. This absence of exposure is not justified with relevant risk management measures besides the claim that manufacturing is happening in closed systems and only dry processes are used. Exposure assessments for professional and consumer uses foresee environmental releases, therefore hydrolysis product(s) should be also taken into account unless no exposure to environment is supported by relevant RMM's for all ES's.
MDI is a respiratory sensitizer and short-term exposure estimation is very important for this kind of compounds, especially in the case of isocyanates. Additionally, in the CSR the registrant states that "animal studies have shown that some responses relating to respiratory sensitisation can be induced by skin contact with MDI, but it is unclear how this might apply to induction of asthma in humans". However, the dermal exposure was omitted in the risk characterisation for respiratory sensitisation. On top of that, qualitative human exposure assessment and risk characterisation have been performed for skin and ocular exposures but they were omitted for respiratory sensitisation although MDI is a potent respiratory sensitizer.

3.3 Information on aggregated tonnage and uses

☐ 1 – 10 tpa	☐ 10 – 100 tpa	☐ 100 – 1000 tpa
☐ 1000 – 10,000 tpa	☐ 10,000 – 100,000 tpa	☐ 50,000 –
☒ 100,000 – 1000,000 tpa	☐ > 1000,000 tpa	
☐ Confidential		
Please provide further details		

☒ Industrial use	☒ Professional use	☒ Consumer use	☒ Closed System

Industry – rigid foam
Industry-coatings
Industry – adhesives and sealants
Industry elastomers and TPU applications
Industry – composite materials
Industry – other composite materials
Industry – foundry applications
Industrial use – manufacturing
Manufacturing of other substances
Public domain – rigid foam
Public domain – coatings
Public domain – adhesives and coatings
Public domain – other composite materials
Private households – rigid foam
Private households- coatings
Private households- adhesives and sealants

3.4 Other completed/ongoing regulatory processes that may affect suitability for substance evaluation

☐ Compliance check	☐ Dangerous substances Directive 67/548/EEC
☐ Testing proposal	☐ Existing Substances Regulation 793/93/EEC
☒ Annex VI (CLP)	☐ Plant Protection Products Regulation 91/414/EEC
☐ Annex XV (SVHC)	☐ Biocidal Products Directive 98/8/EEC
☐ Annex XIV (Authorisation)	☐ Other (provide further details below)
☐ Annex XVII (Restriction)	
See point 2.1.	

3.5 Information to be requested to clarify the suspected risk

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

Information to be requested:
1. No releases (of MDI&MDA) to water & soil, should be described, additionally the description how contact with water is avoided for all ES separately according to Annex I 5.1.1 is to be submitted. Where relevant, referral to the definition of strictly controlled conditions from Article 18.4 (a) to prove that the substance is rigorously contained by technical means during its whole lifecycle including manufacture, purification, cleaning and maintenance of equipment, sampling, analysis, loading and unloading of equipment or vessels, waste disposal or purification and storage is to be made. Negligible exposure of the parent compound to water, soil and sediment shall be demonstrated and documented to support the waiving of long-term fish study, and studies on sediment and terrestrial toxicity.

If the exposure of the parent compound is not negligible, the fulfillment of the information requirements for long-term fish study, terrestrial and sediment toxicity should consider also the effects of the hydrolysis product MDA.
- Hydrolysis study according to EU C.7 (low concentration and identification of ureas in mono/di-ureas, oligo ureas, and polyureas. Together with quantification to the extent possible those degradation/transformation products that are being generated in individual amounts ≥ 0.1% (w/w). This is in line with the threshold triggering a chemical safety assessment for substances in mixtures meeting PBT or vPvB criteria (Article 14(2)(f)) and Annex XIII of the REACH Regulation.
- Long-term toxicity to fish
- Toxicity to soil arthropods
- Toxicity to soil micro-organisms
- Sediment toxicity
- PBT assessment for hydrolysis product(s)
- Exposure assessment addressing relevant hydrolysis product(s)

2. The correct use of exposure estimates data in short-term exposure assessment for consumers and workers.

3. Thorough exposure assessment for workers considering contribution of dermal exposure in respiratory sensitization together with qualitative risk characterisation arguments.

3.6 Potential follow-up and link to risk management

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

As the hydrolysis product MDA is recognized as SVHC (Annex XIV) and most probably the releases of this substance to environment and exposure to HH cannot be completely avoided, RMM are essential to minimize any contact for workers and emission in environment as far as possible.