Substance name: 2-Ethoxyethyl acetate
EC number: 203-839-2
CAS number: 111-15-9

MEMBER STATE COMMITTEE SUPPORT DOCUMENT FOR IDENTIFICATION OF

2-ETHOXYETHYL ACETATE

AS A SUBSTANCE OF VERY HIGH CONCERN BECAUSE OF ITS CMR PROPERTIES

Adopted on 20 May 2011

CONTENTS

TABLES

LIST OF ABBREVIATIONS

CMR	Carcinogenic, Mutagenic or toxic to Reproduction
2-EEA	2-Ethoxyethyl acetate (CAS No.111-15-9)
EGEE	2-Ethoxyethanol (CAS No. 110-80-5)
EGME	2-Methoxyethanol (CAS No. 109-86-4)
PBT	Persistent, Bioaccumulative and Toxic
SVHC	Substance of Very High Concern
vPvB	very Persistent and very Bioaccumulative

Substance Name: 2-Ethoxyethyl acetate (2-EEA)

EC Number(s): 203-839-2

CAS number(s): 111-15-9

- The substance is identified as a substance meeting the criteria of Article 57 (c) of Regulation (EC) 1907/2006 (REACH) owing to its classification as toxic for reproduction 1 B[1] which corresponds to classifications as toxic for reproduction category 2[2].

Summary of how the substance meets the CMR (1A or 1B) criteria

Pursuant to Regulation (EC) No 1272/2008, as amended and adapted to technical and scientific progress by Regulation (EC) No 790/2009, 2-ethoxyethyl acetate is listed by index number 607-037-00-7 and classified in Annex VI, part 3, Table 3.1 (the list of harmonised classification and labelling of hazardous substances) as toxic for reproduction: Repr. 1B (H360FD: "May damage fertility. May damage the unborn child."). The corresponding classification in Annex VI, part 3, Table 3.2 (the list of harmonised classification and labelling of hazardous substances from Annex I to Directive 67/548/EEC) of Regulation (EC) No 1272/2008 is toxic for reproduction, Repr. Cat. 2; R60-61 ("May impair fertility. May cause harm to the unborn child").

Therefore, this classification of the substance in Regulation (EC) No 1272/2008 shows that the substance meets the criteria for classification as toxic for reproduction in accordance with Article 57 (c) of REACH.

Registration dossiers submitted for the substance: No.

[1] Classification in accordance with Regulation (EC) No 1272/2008 Annex VI, part 3, Table 3.1 List of harmonised classification and labelling of hazardous substances as amended and adapted to technical and scientific progress by Commission Regulation (EC) No 790/2009, OJ No L 235, p. 1, 5.9.2009.

[2] Classification in accordance with Regulation (EC) No 1272/2008, Annex VI, part 3, Table 3.2 List of harmonised classification and labelling of hazardous substances (from Annex I to Council Directive 67/548/EEC), as amended and adapted to technical and scientific progress by Commission Regulation (EC) No 790/2009, OJ No L 235, p. 1, 5.9.2009.

JUSTIFICATION

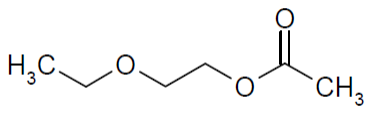
1 IDENTITY OF THE SUBSTANCE AND PHYSICAL AND CHEMICAL PROPERTIES

1.1 Name and other identifiers of the substance

Table 1: Substance identity

EC number:	203-839-2
EC name:	2-Ethoxyethyl acetate
CAS number (in the EC inventory):	111-15-9
CAS number:	111-15-9
CAS name:	Ethanol, 2-ethoxy-, acetate
IUPAC name:	2-Ethoxyethyl acetate
Index number in Annex VI of the CLP Regulation	607-037-00-7
Molecular formula:	$C_6H_{12}O_3$
Molecular weight range:	132.1 g/mol
Synonyms:	Ethylglycol acetate; ethylene glycol mono ethyl ether acetate; 2-EEA; acetic acid, 2-ethoxyethyl ester; ethoxyethanol acetate

Structural formula:



1.2 Composition of the substance

Name: 2-Ethoxyethyl acetate

Description:

Degree of purity: ≥ 99% w/w

Table 2: Constituents

Constituents	Typical concentration	Concentration range	Remarks
2-Ethoxyethyl acetate EC Number: 203-839-2	≥ 99% w/w		

Table 3: Impurities

Impurities	Typical concentration	Concentration range	Remarks
ethylene di(acetate) EC Number: 203-881-1	< 0.5% w/w		
2-ethoxyethanol EC Number: 203-804-1	< 0.5% w/w		
2-ethoxyethyl formate CAS Number: 66736-44-5	< 0.1% w/w		
Water EC Number: 231-791-2	< 0.1% w/w		
2-hydroxyethyl acetate EC Number; 208-821-8	< 0.05% w/w		
2-(2-ethoxyethoxy)ethyl acetate EC Number: 203-940-1	< 0.01% w/w		

Table 4: Additives

Additives	Typical concentration	Concentration range	Remarks
2.6-di-tert-butyl-p-cresol *EC Number: 204-881-4*	0.008-0.012%		Function : inhibition of peroxyde formation

1.3 Physico-chemical properties

Table 5: Overview of physicochemical properties

Property	Value	Remarks
Physical state at 20°C and 101.3 kPa	Colourless liquid	
Melting/freezing point	<-62 °C	Kirk-Othmer (1980)
Boiling point	156 °C	Merck-Index (1989)
Vapour pressure	270 Pa at 20°C	Kirk-Othmer (1980)
Water solubility	229g/l at 20°C	Kirk-Othmer (1980)
Partition coefficient n-octanol/water (log value)	Log Pow 0.24 (experimental) [3]	Hüls AG (1989)
Flammability	Flammable [4]	Chemsafe (1996)
Explosion limits:	Lower explosion limit (LEL): 1,2 vol%, or 65 g/cm³ Upper explosion limit (UEL): 10,7 vol% or 585 g/cm³	Chemsafe (2009)
Flash point	51°C (closed up),	Chemsafe (1996)
Ignition temperature	380°C (DIN 51794)	Chemsafe (1996)
Explosive properties	not explosive [5]	Chemsafe (1996)
Oxidizing properties	No oxidizing properties [6]	Chemsafe (1996)
Henry's law constant	0.16 Pa*m³/mol [7]	

The data included in the tables 1 to 5 were extracted from the Risk Assessment Report for 2-ethoxyethyl acetate (EU RAR, 2008). No re-evaluation of those references was conducted.

3 Determined by shaking method

4 Test A.10 not conducted (substance is a liquid)
Test A.12 and A.13 not conducted because of structural reasons

5 No test conducted because of structural reasons

6 No test conducted because of structural reasons

7 The Henry law constant is based on the Water solubility-Vapour Pressure Method. Johanson Dynesius present an experimental Henry law constant as 0.36 Pa m³/mol (Johanson Dynesius: liquid-air partition coefficient of six commonly used glycol ethers. Br J Ind Med 45 (8): 561-564). The value of 0.16 Pa m³/mol corresponds with a calculated value from the EPI database (0.15 Pa m³/mol) based on water solubility and vapour pressure data and is therefore used for the risk assessment.

2 HARMONISED CLASSIFICATION AND LABELLING

Pursuant to the first ATP to Regulation (EC) No 1272/2008 (Commission Regulation (EC) No 790/20095) as of 1 December 2010, 2-ethoxyethyl acetate is covered by index number 607-037-00-7 in Annex VI, part 3 of Reg. (EC) No 1272/2008 as follows:

Table 6: Classification according to part 3 of Annex VI, Table 3.1 ((list of harmonised classification and labelling of hazardous substances) of Regulation (EC) No 1272/2008

Index No	International Chemical Identification	EC No	CAS No	Classification		Labelling			Spec. Conc. Limits, M-factors	Notes
				Hazard Class and Category Code(s)	Hazard statement code(s)	Pictogram, Signal Word Code(s	Hazard statement code(s)	Suppl. Hazard statement code(s)		
607-037-00-7	2-ethoxyethyl acetate; ethylglycol acetate	203-839-2	111-15-9	Flam. Liq. 3 Repr. 1B Acute Tox. 4 * Acute Tox. 4 * Acute Tox. 4 *	H226 H360FD H332 H312 H302	GHS02 GHS08 GHS07 Dgr	H226 H360FD H332 H312 H302			

Table 7: Classification according to part 3 of Annex VI, Table 3.2 (list of harmonized classification and labelling of hazardous substances from Annex I of Council Directive 67/548/EEC) of Regulation (EC) No 1272/2008

INDEX NO	INTERNATIONAL CHEMICAL IDENTIFICATION	EC NO	CAS NO	CLASSIFICATION	LABELLING	CONCENTRA-TION LIMITS	NOTES
607-037-00-7	2-ethoxyethyl acetate; ethylglycol acetate	203-839-2	111-15-9	R10 Repr. Cat. 2; R60-61 Xn; R20/21/22	T R: 60-61-10-20/21/22 S: 53-45		

3 ENVIRONMENTAL FATE PROPERTIES

Not relevant for this dossier.

4 HUMAN HEALTH HAZARD ASSESSMENT

4.1 Toxicity for reproduction

A summary of reproductive toxicity can be found in the Annex.

5 ENVIRONMENTAL HAZARD ASSESSMENT

Not relevant for this dossier.

6 CONCLUSIONS ON THE SVHC PROPERTIES

6.1 PBT, vPvB assessment

Not relevant for this dossier.

6.2 CMR assessment

Pursuant to Regulation (EC) No 1272/2008 as amended and adapted to technical and scientific progress by Regulation (EC) No 790/2009, 2-ethoxyethyl acetate is listed by index number 607-037-00-7 and classified in Annex VI, part 3, Table 3.1 (the list of harmonised classification and labelling of hazardous substances) as toxic for reproduction: Repr. 1B (H360FD: “May damage fertility. May damage the unborn child.”). The corresponding classification in Annex VI, part 3, Table 3.2 (the list of harmonised and classification and labelling of hazardous substances from Annex I to Directive 67/548/EEC) of Regulation (EC) No 1272/2008 is toxic for reproduction, Repr. Cat. 2; R60-61 (“May impair fertility. May cause harm to the unborn child”).

Therefore, this classification of the substance in Regulation (EC) No 1272/2008 shows that the substance meets the criteria for classification as toxic for reproduction in accordance with Article 57 (c) of REACH.

6.3 Substances of equivalent level of concern assessment.

Not relevant for the identification of the substance as SVHC in accordance with Article 57 (c).

7 OTHER RELEVANT INFORMATION

Two related substances, 2-Methoxyethanol (EGME) (CAS No. 109-86-4) and 2-Ethoxyethanol (EGEE) (CAS No. 110-80-5) are included in the candidate list of Substances of Very High Concern.

REFERENCES

Chemsafe (1996) : National database for safety data of the Physikalisch-technische Bundesanstalt Braunschweig, established by expert judgement.

CHEMSAFE (2009): Database that contains safety characteristic data for fire and explosion prevention, evaluated and recommended by experts at BAM and PTB. CHEMSAFE is a joint project between BAM (Federal Institute for Materials Research and Testing, Berlin), PTB (Physikalisch-Technische Bundesanstalt, Braunschweig) and DECHEMA (Gesellschaft für Chemische Technik und Biotechnologie e.V., Frankfurt am Main)

Doe JE, 1984. Ethylene glycol monoethyl ether and ethylene glycol monoethyl ether acetate teratology studies. Environm. Health Perspect. 57, 33-41.

ECETOC, August 1995. Technical Report No. 64, The toxicology of glycol ethers and its relevance to man.

EU RAR final, 2008 : European Union Risk assessment report, 2-ethoxyethyl acetate: http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/2ethoxyethylacetatereport067.pdf

Hardin BD, Goad PT and Burg JR, 1984. Developmental toxicity of four glycol ethers applied cutaneously to rats. Environ. Hlth. Persp. 57, 69-74.

Hüls AG (1989) : Verteilungskoeffizient n-Octanol – Wasser für „Altstoffe“; Test report from 10.01.1989.

Johansen Dynesius: Liquid-air partition coefficients of six commonly used glycol ethers. Br J Ind Med 45(8):561-564.

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Merck-Index (1989):
Susan Budavari, ed. 1989. The Merck index. 11th edition. Rahway, NJ: Merck & Co., Inc.

Nagano K, Nakayama E, Koyano M, Oobayashi H, Adachi H and Yamada T, 1979. Testicular atrophy of mice induced by ethylene glycol mono alkyl ethers. Jap. J. Ind. Health 21, 29-35.

Nelson BK, Setzer JV, Brightwell WS, Mathinos PR, Kuczuk MH, Weaver TE and Goad PT, 1984. Comparative inhalation teratogenicity of four glycol ether solvents and an amino derivative in rats. Environ. Health Persp. 57, 261-271.

ANNEX

Summary of reproductive toxicity

2-ethoxyethyl acetate has been classified as toxic for the reproduction on the basis of the following elements (Table 8 gives an overview of the, at that time, key studies. No further literature study was carried out):

Fertility
Reduced testis weight, which was dose –dependent, and testicular atrophy were noted at 1000 mg/kg/day or more, administered orally in mice (Nagano *et al*., 1979).

Effects on foetus
Inhalation exposure of rats to 130 ppm or more during pregnancy resulted in teratogenicity and foetotoxicity in the absence of any signs of maternal toxicity. Complete litter resorption occurred at 600 ppm (Nelson *et al*., 1984).
In rabbits, maternal toxicity, teratogenicity and foetotoxicity were seen at 400 ppm. At 100 ppm there were signs of foetotoxicity in the absence of maternal toxicity and 25 ppm was a no-effect level (Doe, 1984).
Dermal application of approximately 6000 mg/kg/day to pregnant rats resulted in significant foetotoxicity, teratogenicity with only slight maternal toxicity (Hardin *et al*., 1984).

Table 8: Key studies* considered for the classification of 2-EEA as toxic for reproduction

	Species (Strain)	Route	Animals per dose level	Time	Exposure conc. or dose	Response	Referen-ce
Repeated dose toxicity study	Mice (ICL-ICR)	oral	5 m/5 f	5 wk	0 mg/kg 500 mg/kg 1000 mg/kg 2000 mg/kg 4000 mg/kg	- No effects. Testicular atrophy. Testicular atrophy. Testicular atrophy.	Nagano *et al*., 1979
Reproduction and Develop-mental studies	Rats (Sprague -Dawley)	Inhala-tion (whole body)	9-20 f	g.d. 7-15 (7h/d)	0 ppm 130 ppm 390 ppm 600 ppm	- ↓foetal weight, skeletal variations. ↓foetal weight, ↑resorptions/litter; skeletal and visceral malformations. 100% resorption.	Nelson *et al.*, 1984
	Rabbits (Dutch)	Inhala-tion	24 f	g.d. 6-18 (6h/d)	0 ppm 25 ppm 100 ppm 400 ppm	- No effects. ↓foetal weight, ↑postimplantation loss, skeletal and visceral variations. ↓foetal weight, ↓litter weight, ↑postimplantation loss, skeletal malformations.	Doe, 1984
	Rats	dermal	18 f	g.d. 7-16	0 mg/kg 5923 mg/kg	- ↑postimplantation loss. ↑cardiovascular and skeletal malformations.	Hardin *et al*., 1984

Conversion factor for 2-EEA (20°C, 101 kPa): 1 ppm = 5.494 mg/m3; 1 mg/m3 = 0.182 ppm

*compiled from Document XI/002/92 of the 13th meeting of specialized experts on 31st of March and 1st of April 1992 and from the ECETOC Technical Report No.64, 1995 (with additional information from the 3 papers : Nelson *et al*., 1984; Doe, 1984 and Hardin *et al*., 1984).