

Toluene VCCEP Tier 1 Submission

September 29, 2006

Appendix B

**Toluene SIDS Dossier
December 2000**

IUCLID

Dataset

Existing Chemical Substance ID: 108-88-3

CAS No. 108-88-3

EINECS Name toluene

EINECS No. 203-625-9

Molecular Formula C7H8

Dataset created by: EUROPEAN COMMISSION - European Chemicals Bureau

This dossier is a compilation based on data reported by the European Chemicals Industry following 'Council Regulation (EEC) No. 793/93 on the Evaluation and Control of the Risks of Existing Substances'. All (non-confidential) information from the single datasets, submitted in the IUCLID/HEDSET format by individual companies, was integrated to create this document.

The data have not undergone any evaluation by the European Commission.

Creation date: 18-FEB-2000

Number of Pages: 118

Chapters: all

Edition: Year 2000 CD-ROM edition

Flags: non-confidential

(C) 2000 EUROPEAN COMMISSION

European Chemicals Bureau.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

1.0.1 OECD and Company Information

Name: 3M Deutschland GmbH

Town: Neuss

Country: Germany

Name: 3M Italy SPA

Town: Segrate, Milano

Country: Italy

Name: 3M United Kingdom PLC

Town: Bracknell

Country: United Kingdom

Name: Aral Aktiengesellschaft

Street: Wittener Straße 45

Town: 44776 Bochum

Country: Germany

Phone: 0234-315-2433

Telefax: 0234-315-3595

Name: ASHLAND ITALIA S.P.A

Street: VIA G. WATT 42

Town: 20143 MILANO

Country: Italy

Phone: 02/8914011

Telefax: 02/89122717

Name: Atochem

Street: 4, Cours Michelet

Town: 92080 Paris la Defense

Country: France

Name: BASF AG
Street: Karl-Bosch-Str
Town: 67056 Ludwigshafen
Country: Germany
Name: BASF Antwerpen N. V.
Town: 2040 Antwerpen 4
Country: Belgium
Name: BASF Vernici e Inchiostri Spa
Street: Via Margherita De Vizzi, 51/a
Town: 20092 Cinisello Balsamo MI
Country: Italy
- 1/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Name: Bitmac Limited
Street: Meridian House, Normanby Road
Town: DN15 8QX Scunthorpe.
Country: United Kingdom
Phone: 44 1724 281555
Telefax: 44 1724 281343
Telex: 527298 BITMAC G
Name: BP Chemicals Ltd.
Street: 76, Buckingham Palace Road
Town: SW1 WOSU London
Country: United Kingdom
Name: Brenntag AG
Street: Humboldttring 15
Town: 45472 Muehlheim a. d. Ruhr
Country: Germany
Name: BRENNTAG Chemiepartner GmbH
Street: Humboldttring 15
Town: 45472 Mülheim
Country: Germany
Phone: 0208/494-0
Name: BRENNTAG SPA
Street: ANNA KULISCIOFF 22
Town: 20152 MILANO
Country: Italy
Phone: 02/48333.0
Telefax: 02/48333.201
Name: CEPESA
Street: AVDA. AMERICA, 32
Town: 28028 MADRID
Country: Spain
Phone: 337-65-77
Telefax: 337-66-54
Name: CHIMEN SRL
Street: KENNEDY, 67
Town: 30027 SAN DONA' DI PIAVE (VE)
Country: Italy
Phone: 0421-41442
Telefax: 0421-43898
Name: Chimica del Friuli
Street: P.le F. Marinotti, 1
Town: 33050 TORVISCOSA (UDINE)
Country: Italy

Phone: 0431/3811
- 2/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Telefax: 0431/381379
Telex: 450026 CHIFR I
Name: Compañía Española de Petroleos CEPSA
Street: Av Partenon 12
Town: 28042 Madrid
Country: Spain
Phone: 34913376000
Telefax: 34913376654

Name: DEA Mineraloel AG
Street: Überseering 40
Town: 22297 Hamburg
Country: Germany

Phone: 040/6375-0
Telefax: 040/6375-3496
Telex: 21151320 tx d
Name: Deutsche Shell Chemie
Street: Koelner Strasse 6
Town: D-65760 Eschborn
Country: Germany

Phone: +49 6196 474 245
Telefax: +49 6196 474 403
Name: Deutsche Shell Chemie GmbH
Street: Koelner Strasse 6
Town: 65760 Eschborn
Country: Germany

Name: Dow Corning Limited
Street: Cardiff Road
Town: CF6 7YL Barry, South Glamorgan
Country: United Kingdom
Phone: 441446732350
Telefax: 441446701252

Name: DSM Resins BV
Street: Ceintuurbaan 5
Town: 8022 AW Zwolle
Country: Netherlands
Phone: 038 4569569
Telefax: 038 4569500

Name: EC Erdölchemie GmbH
Street: Alte Strasse 201
Town: 50769 Köln
Country: Germany
Phone: 0(49)2133557118
Telefax: 0(49)2133557149

- 3/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Telex: 2133302 EC koeln
Name: Enichem S.p.A.
Street: Via Taramelli,26
Town: 20124 Milan
Country: Italy

Name: Enichem Synthesis
Toluene VCCEP Submission
Appendix B: 2000 SIDS Dossier

Street: VIA MEDICI VASCELLO, 40
Town: 20138 Milan
Country: Italy
Name: Exxon Chemical Holland BV
Street: PO Box 5125, Botlekweg 121
Town: 319726 (3197 KA) Botlek
Country: Netherlands
Name: FINA-BOREALIS
Street: Scheldelaan
Town: 2030 Antwerpen
Country: Belgium
Phone: 03/5452011
Telefax: 03/5452470
Telex: 31781
Name: Gebrüder Schmidt GesmbH.
Street: Breitenfurter Straße 164
Town: 1230 Wien
Country: Austria
Phone: 01 / 804 21 49
Telefax: 01 / 804 96 07
Name: Huels AG
Street: Postfach
Town: D-45764 Marl
Country: Germany
Name: ICI Chemicals & Polymers Limited
Street: PO Box 14, The Heath
Town: WA7 4QF Runcorn, Cheshire
Country: United Kingdom
Name: IDAS SRL
Street: VIA ZORUTTI 65
Town: 33030 CAMPOFORMIDO
Country: Italy
Phone: 0432-663366
Telefax: 0432-662338
- 4/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Name: Inter-Chemol Handelsgesellschaft mbH
Street: Leerbachstrasse 115
Town: 60322 Frankfurt am Main
Country: Germany
Phone: 069/1540419
Telefax: 069/1540449
Telex: 414162 icff d
Name: Kuwait Raffinazione e Chimica
Street: Nuova delle Brecce, 205
Town: 80147 Napoli
Country: Italy
Phone: +39817813111
Telefax: +3981283305
Name: Lubrizol Great Britain Limited
Street: P.O.Box 88
Town: DE56 1QN Belper, Derby
Country: United Kingdom
Phone: 332-842211
Telefax: 332-842303

Telex: 37445
Name: MB SVEDA AB
Street: Box 4072
Town: 203 11 Malmö
Country: Sweden
Phone: 0094640352800
Telefax: 0094640125172
Telex: 33188
Name: NED.BENZOL MIJ. B.V.
Street: OEVER 7
Town: 3161 GR RHOON
Country: Netherlands
Phone: 01890-12055
Telefax: 01890-13103
Telex: 20916
Name: Neste Oy
Street: P.O.B 20 Keilaniemi
Town: FIN-02151 Espoo
Country: Finland
Name: NEUBER GES.M.B.H.
Street: BRÜCKENGASSE 1
Town: 1060 WIEN
Country: Austria
Phone: 0222/599950
Telefax: 0222/5970200
- 5/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Name: Nordiska Unipol A.B.
Street: Årstaängsvägen 1A
Town: 100 74 STOCKHOLM
Country: Sweden
Phone: +46 8 7445575
Telefax: +46 8 182219
Telex: 17767
Name: ORLANDI VITTORIO SpA
Street: VIA DELL'INDUSTRIA, 4
Town: 36027 ROSA' - VICENZA
Country: Italy
Phone: 042486811128
Telefax: 042456112380
Telex: -
Cedex: -
Name: PCK Raffinerie GmbH Schwedt
Street: Passower Chaussee
Town: D-16303 Schwedt/Oder
Country: Germany
Phone: (03332)462701
Telefax: (03332)465271
Name: PETROLEOS DE PORTUGAL - PETROGAL, S.A.
Street: RUA DAS FLORES 7
Town: 1200 LISBOA
Country: Portugal
Phone: 3474330
Telefax: 3102910
Telex: NO

Cedex: 2539
Name: PPG Industries
Street: 3, Z.A.E Les Dix Muids B.P.89
Town: F 59583 MARLY Cedex MARLY Cedex
Country: France
Phone: +33 3 27 19 35 00
Telefax: +33 3 2719 3513
Name: PRAOIL S.R.L.
Street: Milanofiori, Strada 2 Palazzo F7
Town: 20094 ASSAGO MI
Country: Italy
Phone: +39-2-5201
Telefax: +39-2-52026986
Telex: 314215
- 6/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Name: REPSOL PETROLEO,S.A.
Street: PASEO DE LA CASTELLANA, 278-280
Town: 28046 MADRID
Country: Spain
Phone: 91-3488000
Telefax: 3489494/3142821
Telex: 49840
Name: Rheinische Olefinwerke GmbH
Town: 50378 Wesseling
Country: Germany
Name: Rhone-Poulenc Chemicals Limited
Town: WD1 1QH Watford, Hertforshire
Country: United Kingdom
Name: Rohm and Haas France S.A.
Street: 371 rue L. van Beethoven
Town: 06565 Valbonne
Country: France
Name: Ruetgers-VfT n.v.
Street: Vredekaai 18
Town: B-9060 Zelzate
Country: Belgium
Phone: +32/(0)9/3458831
Telefax: +32/(0)9/3458533
Telex: 11480 zelohm b
Name: Ruetgerswerke AG
Street: Varziner Str. 49
Town: 47138 Duisburg
Country: Germany
Name: Ruhr Oel GmbH
Street: Alexander-von-Humboldt-Straße
Town: 45896 Gelsenkirchen-Hassel
Country: Germany
Phone: 0209 366-1
Telefax: 0209 366-7820
Telex: 824 881-0 vo d
Name: S.A.I. Societa' Approvv. Industriali Spa
Street: Tulipani n. 1
Town: 20090 Pieve Emanuele (MI)
Country: Italy

Phone: +39/015/2546711
Telefax: +39/015/2546750
- 7/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Name: Shell Company (Hellas) Ltd
Street: ἐφὸς μὲν ἄρ. ὑφ' ἡνάθησιν 2, ἔ σοάζῳ
Town: 176 76 ÇḷḶñ
Country: Greece
Phone: (01) 9295911
Telefax: (01) 9222804
Name: SHELL FRANCE
Street: 89 bld Franklin Roosevelt
Town: 92564 Rueil Malmaison
Country: France
Phone: 33 1 47.14.71.00
Telefax: 33 1 47.14.82.99
Telex: SHELL 615013F
Name: Shell Nederland Chemie B.V.
Street: Vondelingenweg 601
Town: 3196 KK Rotterdam
Country: Netherlands
Name: Shell UK Limited
Street: Shell-Mex House, Strand
Town: WC2R 0DX London
Country: United Kingdom
Phone: +44-171-257-3000
Telefax: +44-171-257-3920
Name: Shell UK Limited,
Street: Shell-Mex House, Stand,
Town: WC2R 0DX London.
Country: United Kingdom
Phone: -44-71-257-3000
Telefax: -44-71-257-3212
Telex: 22585 SHELL G
Name: Solutia Europe SA/NV
Street: Parc Scientifique - Fleming; Rue Laid Burniat 3
Town: B-1348 Louvain-la-Neuve
Country: Belgium
Phone: +32 10 48 1211
Telefax: +32 10 48 1212
Name: SSAB Tunnpplåt AB
Town: 971 88 Luleå
Country: Sweden
Phone: 046 0920/92000
- 8/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Name: Sächsische Olefinwerke GmbH
Street: Werkstraße
Town: 04564 Böhlen
Country: Germany
Phone: (034206)30
Telefax: (034206) 3 6488
Telex: 312 097 sow d
Name: TOTAL

Street: 24, cours Michelet
Town: 92069 PARIS LA DEFENSE
Country: France
Phone: 33 41 35 40 00
Cedex: 47

1.0.2 Location of Production Site

-

1.0.3 Identity of Recipients

-

1.1 General Substance Information

Substance type: organic
Physical status: liquid
Substance type: petroleum product
Physical status: liquid
Substance type:
Physical status:

1.1.1 Spectra

-

1.2 Synonyms

1-Methylbenzene

Source: BASF Antwerpen N. V. Antwerpen 4
BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
Anisen

Source: NEUBER GES.M.B.H. WIEN

- 9/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Antisal 1a

Source: BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
Benzene, methyl- (9CI)

Source: BASF Antwerpen N. V. Antwerpen 4

BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
Benzene,methyl,Toluol

Source: Nordiska Unipol A.B. STOCKHOLM

Benzoen

Source: NEUBER GES.M.B.H. WIEN

Benzylwasserstoff

Source: Sächsische Olefinwerke GmbH Böhlen

Comercial Toluene

Source: PETROLEOS DE PORTUGAL - PETROGAL,S.A. LISBOA
CP 25

Source: BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
CP 25 (solvent)

Source: BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen

Rheinische Olefinwerke GmbH Wesseling
fenylmethaan
Source: NED.BENZOL MIJ. B.V. RHOON
fenylmethane
Source: Shell Nederland Chemie B.V. Rotterdam
methacide
Source: Exxon Chemical Holland BV Botlek
Methacide
Source: BASF Antwerpen N. V. Antwerpen 4
REPSOL PETROLEO,S.A. MADRID
BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
Methylbenzene
Source: REPSOL PETROLEO,S.A. MADRID
- 10/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Methyl benzene
Source: Ruetgers-VfT n.v. Zelzate
MB SVEDA AB Malmö
Ruetgerswerke AG Duisburg
methyl benzene
Source: Rohm and Haas France S.A. Valbonne
TOTAL PARIS LA DEFENSE
Bitmac Limited Scunthorpe.
Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
Methyl Benzene
Source: ICI Chemicals & Polymers Limited Runcorn, Cheshire
METHYL BENZENE
Source: BP Chemicals Ltd. London
Shell UK Limited, London.
Shell UK Limited London
methyl benzol
Source: TOTAL PARIS LA DEFENSE
Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
METHYL BENZOL
Source: Shell UK Limited, London.
Shell UK Limited London
methyl benzole
Source: Bitmac Limited Scunthorpe.
methyl-benzene
Source: PPG Industries MARLY Cedex
methylbenzeen
Source: NED.BENZOL MIJ. B.V. RHOON
Methylbenzen
Source: Sächsische Olefinwerke GmbH Böhlen
methylbenzene
Source: Shell Nederland Chemie B.V. Rotterdam
DSM Resins BV Zwolle
Compañia Española de Petroleos CEPSA Madrid
Huels AG Marl
Methylbenzene
Source: BASF Antwerpen N. V. Antwerpen 4
BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling

METHYLBENZENE

Source: Rhone-Poulenc Chemicals Limited Watford, Hertfordshire
- 11/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Methylbenzene; Toluol; Phenylmethane; Methacide

Source: Atochem Paris la Defense

(1)

Methylbenzol

Source: BASF Antwerpen N. V. Antwerpen 4

Ruetgers-VfT n.v. Zelzate

REPSOL PETROLEO,S.A. MADRID

BASF AG Ludwigshafen

BASF Vernici e Inchiostri Spa Cinisello Balsamo MI

NEUBER GES.M.B.H. WIEN

Gebrüder Schmidt GesmbH. Wien

Huels AG Marl

Ruetgerswerke AG Duisburg

Brenntag AG Muehlheim a. d. Ruhr

BASF AG Ludwigshafen

Rheinische Olefinwerke GmbH Wesseling

Ruhr Oel GmbH Gelsenkirchen-Hassel

EC Erdölchemie GmbH Köln

PCK Raffinerie GmbH Schwedt Schwedt/Oder

Methylbenzol, Anisen, Toluol

Source: DEA Mineraloel AG Hamburg

METIL BENZENE

Source: IDAS SRL CAMPOFORMIDO

CHIMEN SRL SAN DONA'' DI PIAVE (VE)

Metil benzene

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

Metil-Benzene

Source: Chimica del Friuli TORVISCOSA (UDINE)

Phenilmetahne

Source: REPSOL PETROLEO,S.A. MADRID

Phenyl methane

Source: Ruetgers-VfT n.v. Zelzate

Ruetgerswerke AG Duisburg

phenyl methane

Source: TOTAL PARIS LA DEFENSE

Bitmac Limited Scunthorpe.

Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

PHENYL METHANE

Source: Rhone-Poulenc Chemicals Limited Watford, Hertfordshire

Shell UK Limited, London.

Shell UK Limited London

Phenyl methane, methyl benzene, toluol, methyl benzol

Source: Shell Company (Hellas) Ltd Ç;Öñ

- 12/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Phenyl methane; methylbenzol; toluol; methyl benzene

Source: SHELL FRANCE Rueil Malmaison

Phenylmethan

Source: NEUBER GES.M.B.H. WIEN

phenylmethane

Source: Exxon Chemical Holland BV Botlek

Phenylmethane

Source: BASF Antwerpen N. V. Antwerpen 4

BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
Toluen
Source: Sächsische Olefinwerke GmbH Böhlen
toluene
Source: Exxon Chemical Holland BV Botlek
TOLUENE
Source: PRAOIL S.R.L. ASSAGO MI
Toluene (8CI)
Source: BASF Antwerpen N. V. Antwerpen 4
BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
Toluene pure
Source: PETROLEOS DE PORTUGAL - PETROGAL,S.A. LISBOA
Toluene; phenylmethane
Source: Enichem S.p.A. Milan
TOLUENE; PHENYLMETHANE; METHACIDE
Source: Enichem Synthesis Milan
toluol
Source: Shell Nederland Chemie B.V. Rotterdam
NED.BENZOL MIJ. B.V. RHOON
TOTAL PARIS LA DEFENSE
Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
Toluol
Source: BASF Antwerpen N. V. Antwerpen 4
FINA-BOREALIS Antwerpen
Ruetgers-VfT n.v. Zelzate
BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
ICI Chemicals & Polymers Limited Runcorn, Cheshire
Huels AG Marl
Ruetgerswerke AG Duisburg
- 13/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
Sächsische Olefinwerke GmbH Böhlen
Inter-Chemol Handelsgesellschaft mbH Frankfurt am Main
EC Erdölchemie GmbH Köln
TOLUOL
Source: Shell UK Limited, London.
Shell UK Limited London
Toluol, phenyl methane, methyl benzene, Methylbenzol
Source: Aral Aktiengesellschaft Bochum
toluole
Source: Bitmac Limited Scunthorpe.
TOLUOLO
Source: PRAOIL S.R.L. ASSAGO MI
BRENNTAG SPA MILANO
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn

1.3 Impurities

-

1.4 Additives

-

1.5 Quantity

Quantity more than 1 000 000 tonnes

1.6.1 Labelling

Labelling: as in Directive 67/548/EEC

Symbols: F

Xn

other RM: S

Specific limits: yes

R-Phrases: (11) Highly flammable

(20) Harmful by inhalation

S-Phrases: (2) Keep out of reach of children

(16) Keep away from sources of ignition - No smoking

(25) Avoid contact with eyes

(29) Do not empty into drains

(33) Take precautionary measures against static discharges

- 14/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

1.6.2 Classification

Classification: as in Directive 67/548/EEC

Class of danger: corrosive

R-Phrases: (20) Harmful by inhalation

Classification: as in Directive 67/548/EEC

Class of danger: highly flammable

R-Phrases: (11) Highly flammable

1.7 Use Pattern

Type: type

Category: Non dispersive use

Type: type

Category: Use in closed system

Type: type

Category: Wide dispersive use

Type: industrial

Category: Basic industry: basic chemicals

Type: industrial

Category: Chemical industry: used in synthesis

Type: industrial

Category: Fuel industry

Type: industrial

Category: Metal extraction, refining and processing of metals

Type: industrial

Category: Paints, lacquers and varnishes industry

Type: industrial

Category: Paper, pulp and board industry

Type: industrial

Category: Photographic industry

Type: industrial

Category: Polymers industry

Type: industrial

Category: Textile processing industry

Type: use

Category: Adhesive, binding agents

Type: use

Category: Explosives

- 15/118 -.date: 18-FEB-2000

Type: use
Category: Fixing agents
Type: use
Category: Fuel
Type: use
Category: Fuel additives
Type: use
Category: Intermediates
Type: use
Category: Pharmaceuticals
Type: use
Category: Solvents
Type: use
Category: Viscosity adjustors
Type: use
Category: other: Materia prima per sintesi organiche
Type: use
Category: other: pharmaceuticals, saccharin, dyes, paints ...
Type: use
Category: other

1.7.1 Technology Production/Use

Type: Use
Source: 3M Italy SPA Segrate, Milano
3M United Kingdom PLC Bracknell
3M Deutschland GmbH Neuss

1.8 Occupational Exposure Limit Values

Type of limit: BAT (DE)
Limit value: 1700 µg/l
Country: Germany
Remark: To be determined in blood at the end of exposure / shift
Source: Huels AG Marl
Type of limit: BAT (DE)
Limit value: 1700 µg/l
Source: Sächsische Olefinwerke GmbH Böhlen
- 16/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Type of limit: MAC (NL)
Limit value: 100 ml/m³
Remark: With the notation "H" (=skin)
Source: Exxon Chemical Holland BV Botlek
(2)
Type of limit: MAC (NL)
Limit value: 40 mg/m³
Source: NED.BENZOL MIJ. B.V. RHOON
Type of limit: MAK (DE)
Limit value: 50 ml/m³
Source: Exxon Chemical Holland BV Botlek
(3)
Type of limit: MAK (DE)
Limit value: 50 ml/m³
Short term expos.
Limit value: 500 ml/m³

Schedule: 30 minute(s)
Frequency: 2 times
Source: BASF Antwerpen N. V. Antwerpen 4
(4)
Type of limit: MAK (DE)
Limit value: 380 mg/m3
Source: BASF Antwerpen N. V. Antwerpen 4
(4)
Type of limit: MAK (DE)
Limit value: 190 mg/m3
Source: Solutia Europe SA/NV Louvain-la-Neuve
Dow Corning Limited Barry, South Glamorgan
Type of limit: MAK (DE)
Limit value: 375 mg/m3
Source: Enichem Synthesis Milan
Type of limit: MAK (DE)
Limit value: 50 ml/m3
Short term expos.
Limit value: 500 ml/m3
Schedule: 30 minute(s)
Frequency: 2 times
Source: BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
(5)
- 17/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Type of limit: MAK (DE)
Limit value: 380 mg/m3
Source: BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
(5)
Type of limit: MAK (DE)
Limit value:
Remark: fortpflanzungsgefaehrdend Gruppe B
Source: BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
(6)
Type of limit: MAK (DE)
Limit value: 100 ml/m3
Short term expos.
Limit value: 500 ml/m3
Schedule: 30 minute(s)
Frequency: 2 times
Source: BASF AG Ludwigshafen
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
(7)
Type of limit: MAK (DE)
Limit value: 380 mg/m3
Source: BASF AG Ludwigshafen
(7)
Type of limit: MAK (DE)
Limit value: 50 ml/m3
Short term expos.
Limit value: 500 ml/m3

Schedule: 30 minute(s)
Frequency: 2 times
Source: BASF AG Ludwigshafen
(5)
Type of limit: MAK (DE)
Limit value: 380 mg/m3
Source: BASF AG Ludwigshafen
(5)
- 18/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Type of limit: MAK (DE)
Limit value: 50 ml/m3
Short term expos.
Limit value: 200 ml/m3
Schedule: 15 minute(s)
Frequency: 4 times
Country: Germany
Source: Huels AG Marl
Type of limit: MAK (DE)
Limit value: 190 mg/m3
Short term expos.
Limit value: 760 mg/m3
Schedule: 15 minute(s)
Frequency: 4 times
Country: Germany
Source: Huels AG Marl
Type of limit: MAK (DE)
Limit value: 190 mg/m3
Short term expos.
Limit value: 950 mg/m3
Schedule: 30 minute(s)
Frequency: 2 times
Remark: Pregnancy group C
Source: Ruetgerswerke AG Duisburg
(8)
Type of limit: MAK (DE)
Limit value: 50 ml/m3
Remark: Pregnancy group C
Source: Deutsche Shell Chemie GmbH Eschborn
(9)
Type of limit: MAK (DE)
Limit value: 50 ml/m3
Short term expos.
Limit value: 250 ml/m3
Schedule: 30 minute(s)
Frequency: 2 times
Source: Brenntag AG Muehlheim a. d. Ruhr
Type of limit: MAK (DE)
Limit value: 380 mg/m3
Source: BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
(7)
- 19/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Type of limit: MAK (DE)
Limit value: 380 mg/m³
Source: BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
(7)
Type of limit: MAK (DE)
Limit value: 50 ml/m³
Source: Ruhr Oel GmbH Gelsenkirchen-Hassel
Type of limit: MAK (DE)
Limit value: 50 ml/m³
Source: Aral Aktiengesellschaft Bochum
Type of limit: MAK (DE)
Limit value: 100 ml/m³
Short term expos.
Limit value: 500 ml/m³
Schedule: 30 minute(s)
Frequency: 2 times
Source: Sächsische Olefinwerke GmbH Böhlen
(10)
Type of limit: MAK (DE)
Limit value: 380 mg/m³
Short term expos.
Limit value: 1900 mg/m³
Schedule: 30 minute(s)
Frequency: 2 times
Source: Sächsische Olefinwerke GmbH Böhlen
Type of limit: MAK (DE)
Limit value: 100 ml/m³
Short term expos.
Limit value: 500 ml/m³
Schedule: 30 minute(s)
Frequency: 2 times
Remark: MAK-Wert: 100ml/m³; 380 mg/m³.
Source: Inter-Chemol Handelsgesellschaft mbH Frankfurt am Main
Type of limit: MAK (DE)
Limit value: 100 ml/m³
Short term expos.
Limit value: 500 ml/m³
Schedule: 30 minute(s)
Frequency: 2 times
Source: DEA Mineraloel AG Hamburg
- 20/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Type of limit: MAK (DE)
Limit value: 50 ml/m³
Remark: Pregnancy group C
Source: Deutsche Shell Chemie Eschborn
(9)
Type of limit: MAK (DE)
Limit value: 50 ml/m³
Source: EC Erdölchemie GmbH Köln
Type of limit: MAK (DE)
Limit value: 190 mg/m³
Remark: Spitzenbegrenzung Kategorie II,2; Schwangerschaftsgruppe C
Source: EC Erdölchemie GmbH Köln
(11)

Type of limit: MAK (DE)

Limit value: 50 ml/m³

Short term expos.

Limit value: 200 ml/m³

Schedule: 15 minute(s)

Frequency: 4 times

Remark: Die Dauer der erhöhten Exposition darf in einer Schicht 1 Stunde nicht überschreiten. Der Kurzzeitwert gilt für jeweils 15 Minuten (15 Minuten-Mittelwert).

Source: Angaben nach TRGS 900 Grenzwerte in der Luft am Arbeitsplatz "Luftgrenzwerte", BArbBl. Nr. 10/1996 S. 88, Nr. 4/1997

S. 42, Nr 11/1997 S. 27, Nr. 5/1998 S. 58, Nr. 7/1998 S. 71

PCK Raffinerie GmbH Schwedt Schwedt/Oder

Type of limit: MEL (UK)

Limit value: 560 mg/m³

Source: Enichem Synthesis Milan

Type of limit: OES (UK)

Limit value: 50 ml/m³

Short term expos.

Limit value: 150 ml/m³

Source: Exxon Chemical Holland BV Botlek

(12)

Type of limit: OES (UK)

Limit value: 191 mg/m³

Short term expos.

Limit value: 574 mg/m³

Schedule: 15 minute(s)

Source: Solutia Europe SA/NV Louvain-la-Neuve

- 21/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Type of limit: OES (UK)

Limit value: 188 mg/m³

Short term expos.

Limit value: 560 mg/m³

Schedule: 15 minute(s)

Source: ICI Chemicals & Polymers Limited Runcorn, Cheshire Bitmac Limited Scunthorpe.

Type of limit: OES (UK)

Limit value: 50 ml/m³

Short term expos.

Limit value: 150 ml/m³

Remark: UK OES for toluene has a skin annotation. Handling of Benzene containing stream needs to take account of UK MEL for Benzene. (5ml/m³ 8 hour TWA).

Source: BP Chemicals Ltd. London

Type of limit: OES (UK)

Limit value: 188 mg/m³

Short term expos.

Limit value: 560 mg/m³

Schedule: 10 minute(s)

Remark: Note : SK.

Source: Rhone-Poulenc Chemicals Limited Watford, Hertfordshire

Type of limit: OES (UK)

Limit value: 190 mg/m³

Short term expos.

Limit value: 574 mg/m³
Schedule: 15 minute(s)
Remark: OES is 8 hour time weighted average.
Source: Dow Corning Limited Barry, South Glamorgan
Type of limit: OES (UK)

Limit value: 191 mg/m³
Short term expos.
Limit value: 574 ml/m³
Schedule: 15 minute(s)
Remark: Skin notation
Source: Shell UK Limited, London.

(13)

Type of limit: OES (UK)
Limit value: 188 mg/m³
Short term expos.
Limit value: 560 ml/m³
Schedule: 10 minute(s)
Remark: Skin notation
Source: Shell UK Limited London

(14)

- 22/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Type of limit: TLV (US)
Limit value: 188 mg/m³
Source: Shell Company (Hellas) Ltd Ç¿Öñ
TOTAL PARIS LA DEFENSE
PETROLEOS DE PORTUGAL - PETROGAL,S.A. LISBOA
PRAOIL S.R.L. ASSAGO MI
Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn

Type of limit: TLV (US)
Limit value: 50 ml/m³
Remark: With the notation "Skin".
Source: Exxon Chemical Holland BV Botlek

(15)

Type of limit: TLV (US)
Limit value: 377 mg/m³
Short term expos.
Limit value: 565 mg/m³
Schedule: 15 minute(s)
Frequency: 4 times
Source: Atochem Paris la Defense

(16)

Type of limit: TLV (US)
Limit value: 188 mg/m³
Remark: Use local exhaust ventilation.
Hand protection : nitrile gloves.
Eye protection : safety monogoggles.
Body protection : standard issue work clothes.
chemicals resistant safety shoes or boots.
if splashes are likely to occur,
wear : PVC apron.
Source: SHELL FRANCE Rueil Malmaison

Type of limit: TLV (US)
Limit value: 377 mg/m³
Short term expos.
Limit value: 565 mg/m³

Source: REPSOL PETROLEO,S.A. MADRID
Type of limit: TLV (US)
Limit value: 188 mg/m3
Remark: TLV-TWA=50 ppm = 188 mg/m3
Source: Enichem Synthesis Milan
- 23/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Type of limit: TLV (US)
Limit value: 188 mg/m3
Remark: Notation: skin
Source: Enichem S.p.A. Milan
(17)
Type of limit: TLV (US)
Limit value: 188 mg/m3
Remark: Il limite riportato si riferisce all'assorbimento cutaneo.
Source: Chimica del Friuli TORVISCOSA (UDINE)
Type of limit: TLV (US)
Limit value: 377 mg/m3
Remark: Changes for this value are proposed.
Source: BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
(18)
Type of limit: TLV (US)
Limit value:
Remark: Limit value: 100 ppm. Changes for this value are proposed.
Source: BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
(18)
Type of limit: TLV (US)
Limit value: 375 mg/m3
Source: ASHLAND ITALIA S.P.A MILANO
Type of limit: TLV (US)
Limit value: 377 mg/m3
Short term expos.
Limit value: 565 mg/m3
Schedule: 60 minute(s)
Frequency: 1 times
Source: S.A.I. Societa'' Approvv. Industriali Spa Pieve Emanuele
(MI)
Type of limit: TLV (US)
Limit value: 375 mg/m3
Short term expos.
Limit value: 560 mg/m3
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
- 24/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Type of limit: TRK (DE)
Limit value: 380 mg/m3
Source: Atochem Paris la Defense
(16)
Type of limit: other

Limit value: 550 mg/m3
Short term expos.
Limit value: 375 mg/m3
Schedule: 15 minute(s)
Frequency: 4 times
Country: France
Remark: Type of Limit: VME
Source: Atochem Paris la Defense
(19)
Type of limit: other
Limit value: 375 mg/m3
Short term expos.
Limit value: 550 mg/m3
Country: VME France
Source: PPG Industries MARLY Cedex
Type of limit: other
Limit value: .05 mg/g
Source: Compañia Española de Petroleos CEPESA Madrid
Type of limit: other
Limit value: 375 mg/m3
Source: PETROLEOS DE PORTUGAL - PETROGAL,S.A. LISBOA
(20)
Type of limit: other
Limit value: 50 mg/m3
Remark: MAC (ex URSS) 1980-1987.
Source: Enichem Synthesis Milan
Type of limit: other
Limit value: 100 ml/m3
Short term expos.
Limit value: 150 ml/m3
Country: Finland
Remark: ref: HTP-arvot 1993. Työministeriö, turvallsiustiedote 25
- skin notation
Source: Neste Oy Espoo
- 25/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Type of limit: other: MAK (Österreich)
Limit value: 380 mg/m3
Source: NEUBER GES.M.B.H. WIEN
Type of limit: other: REL(NIOSH): Recommended Exposure Limit
Limit value: 100 ml/m3
Short term expos.
Limit value: 150 ml/m3
Remark: NIOSH: National Institute for Occupational safety and Health
Source: REPSOL PETROLEO,S.A. MADRID
Type of limit: other: TLV (B)
Limit value: 377 mg/m3
Short term expos.
Limit value: 565 mg/m3
Source: Ruetgers-VfT n.v. Zelzate
(21)
Type of limit: other: VME (France)
Limit value: 100 ml/m3
Short term expos.
Limit value: 150 ml/m3
Schedule: 15 minute(s)

Source: Exxon Chemical Holland BV Botlek
(22)

Type of limit: other: twa

Limit value: 50 other: ppm

Short term expos.

Limit value: 75 other: ppm

Source: Rohm and Haas France S.A. Valbonne

Type of limit:

Limit value:

Remark: Workplace exposure literature:

Note:

Following literature references have been included for sake of completeness. References report the potential sources of Toluene exposure additional to sources as reported by our company for the Toluene production - and end-use description in this HEDSET.

De Rosa, E., Barolucci, G.B., Perbellini, L., Brugnone, F. and Rausa, G. (1988). Environmental and biological monitoring of exposure to toluene, styrene, and n-hexane. *Appl. Ind Hyg.*, 3,12:332-337.

Hawkins, N.C. and Evans, J.S. (1989). Subjective estimation of toluene exposures: A calibration study of industrial hygienists. *Appl. Ind. Hyg.*, 4,3:61-68.

- 26/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Kalliokoski, p. (1990). Estimating long-term exposure levels in process-type industries using production rates. *Am. Ind. Hyg. Assoc. J.*, 51,6:310-312.

Kumagai, S., Matsunaga, I., Sugimoto, K., Kusaka, Y. and Shirakawa, T. (1989). Assessment of occupational exposures to industrial hazardous substances. III. On the frequency distribution of daily exposure averages (8-h TWA). *Jpn. J. Industr. Health*, 31,4:216-226.

Nicas, M. and Spear, R.C. (1993). A task-based statistical model of a worker's exposure distribution: Part II-Application to sampling strategy. *Am Ind Hyg Assoc J*, 54,5:221-7.

Nicas, M. and Spear. R.C. (1993). A task-based statistical model of a worker's exposure distribution: Part I-Description of the model. *Am Ind Hyg Assoc J* 54,5:211-20.

Periago, F., Luna, A. and Morente A. (1992). Determination of solvents in exhaled air in a population of exposed workers. *Rev. Toxicol.*, 9,3:103-106.

Periago, J.F., Morente, A., Villanueva, M. and Luna, A. (1994). Correlation between concentrations of n-hexane and toluene in exhaled and environmental air in an occupationally exposed population. *J. Appl. Toxicol.*, 14,1:63-67.

Verma, D. K., D. S. Shaw, and J. D. McLean. (1992). An Evaluation of Airbone Concentrations of Selected Hydrocarbons at an Oil Refinery Land Reclamation Operation. *Annals of Occupational Hygiene*, 36,3:307-315.

Angerer, J. (1979). Occupational chronic exposure to organic solvents. VII. Metabolism of toluene in man. *Int. Arch. Occup. Environ. Health*, 43, 63-67.

Angerer, J. (1985). Occupational chronic exposure to organic solvents. XII. o-Cresol excretion after toluene exposure. *Int. Arch. Occup. Environ. Health*, 56, 323-328.

Apol, A.G. (1980). Procraft, Spokane, Washington (Health Hazard Evaluation Determination Report No. 80-43-679), Cincinnati, OH, National Institute for Occupational Safety

and Health.

Baker, D. and Fannick, N. (1983). Leather Craftsman, Lynbrook, New York (Health Hazard Evaluation Report No. 81-060-1367), Cincinnati, OH, National Institute for Occupational Safety and Health.

Campbell, L., Marsh, D.M., and Wilson, H.K. (1987). towards a biological monitoring strategy for toluene. *Ann Occup. Hyg.*, 31, 121-133.

Capellini, A. and Alessio, L. (1971). The urinary excretion - 27/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

of hippuric acid in workers exposed to toluene (Ital.). *Med. Lav.*, 62, 196-201.

Decker, D.W., Clark, C.S., Elia, V.J., Kominsky, J.R., and Trapp, J.H. (1983). Worker exposure to organic vapors at a liquid chemical waste incinerator. *Am. J. Ind. Hyg. J.*, 44, 296-300.

Dement, J., Wallingford, K.M., and Zumwalde, R.D. (1973). Industrial Hygiene Survey of Owens-Corning Fiberglas, Kansas City, Kansas (Report No. IW 35.16), Cincinnati, OH, National Institute for Occupational Safety and Health.

Denkhaus, W., von Steldern, D., Botzenhardt, U., and Konietzko, H. (1986). Lymphocyte subpopulations in solvent-exposed workers. *Int. Arch. Occup. Environ. Health*, 57, 109-115.

De Rosa, E., Brugnone, F., Bartolucci, G.B., Perbellini, L., Bellomo, M.L., Gori, G.P., Sigon, M., and Corona, P.C. (1985). The validity of urinary metabolites as indicators of low exposures to toluene. *Int. Arch. Occup. Environ. Health*, 56, 135-145.

Ikeda, M. and Ohtsuji, H. (1969). Significance of urinary hippuric acid determination as an index of toluene exposure. *Br. J. Ind. Med.*, 26, 244-246.

Kilburn, K.H., Seidman, B.C., and Warshaw, R. (1985). Neurobehavioral and respiratory symptoms of formaldehyde and xylene exposure in histology technicians. *Arch. Environ. Health*, 40, 229-233.

Konietzko, H., Keilbach, J., and Drysch, K. (1980). Cumulative effects of daily toluene exposure. *Int. Arch. Occup. Environ. Health*, 46, 53-58.

Maki-Paakkanen, J., Husgafvel-Pursiainen, K., Kallioma, P.-L., Tuominen, J., and Sorsa, M. (1980). Toluene-exposed workers and chromosome aberrations. *J. Toxicol. Environ. Health*, 6, 775-781.

Matsushita, T., Arimatsu, Y., Ueda, A., Satoh, K., and Nomura, S. (1975). Hematological and neuro-muscular response of workers exposed to low concentration of toluene vapor. *Ind. Health*, 13, 115-121.

Moszczyński, P. and Lisiewicz, J. (1985). Occupational exposure to benzene, toluene, and xylene and the lymphocyte lysosomal N-acetyl-beta-D-glucosaminidase. *Ind. Health*, 23, 47-51.

National Institute for Occupational Safety and Health (1983). National Occupational Hazard Survey 1981-1983, Cincinnati, OH.

Pagnotto, L.D. and Lieberman, L.M. (1967). Urinary hippuric - 28/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

acid excretion as an index of toluene exposure. *Am. Ind. Hyg. Assoc. J.*, 28, 129-134.

Rappaport, S.M. and Fraser, D.A. (1977). Air sampling and analysis in a rubber vulcanization area. *Am. Ind. Hyg. Assoc. J.*, 38, 205-210.

Rivera, R.O. and Rostand, R. (1975). Hillerich and Bradsby Co., Jeffersonville, IN (Health Hazard Evaluation Determination Report No. 74-121-203), Cincinnati, OH, National Institute for Occupational Safety and Health.

Roper, P. (1980). Emory University Pathology Department, Atlanta, GA (Health Hazard Evaluation Determination Report No. 80-31-693), Cincinnati, OH, National Institute for Occupational Safety and Health.

Tahti, H., Karkkainen, S., Pyykko, K., Rintala, E., Kataja, M., and Vapaatalo, H. (1981). Chronic occupational exposure to toluene, *Int. Arch. Occup. Environ. Health*, 48, 61-69.

Tokunaga, R., Takahata, S., Onoda, M., Ishi-i, T., Sato, K., Hayashi, M., and Ikeda, M. (1974). Evaluation of the exposure to organic solvent mixture. Comparative studies on detection tube and gas-liquid chromatographic methods, personal and stationary sampling and urinary metabolite determination. *Int. Arch. Arbeitsmed.*, 33, 257-267.

Veulemans, H., Van Vlem, E., Janssens, H., and Masschelein, R. (1979). Exposure to toluene and urinary hippuric acid excretion in a group of heliorotagravure printing workers. *Int. Arch. Occup. Environ. Health*, 44, 99-107.

Source: Exxon Chemical Holland BV Botlek

1.9 Source of Exposure

Memo: Emissionserklaerung Huels 1992

Remark: Release into the atmosphere on production site in 1992: 13000 kg/a

Source: Huels AG Marl
(23)

Remark: Toluene is found in coal tar, petroleum, gasoline and as a solvent in paints, lacquers, varnishes, resins and adhesives.

Source: Shell Company (Hellas) Ltd Ç;ðñ
Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn

Remark: Toluene is produced by an extraction and fractionation process using gasoline fractions as feedstock. Because of the nature of the process and the dangerous properties of Toluene (flammable), Toluene is produced in a closed system and only opened for maintenance (following strict procedures).

- 29/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

EXXON CHEMICAL Holland has only one Toluene manufacturing site.

Source: Exxon Chemical Holland BV Botlek

Remark: Consumer exposure literature:

Note:

Following literature references have been included for sake of completeness. References report the potential sources of Toluene exposure additional to sources as reported by our company for the Toluene production - and end-use description in this HEDSET.

Hollifield, H.C., Breder, C.V., Dennison, J.L., Roach, J.A.G., and Adams, W.S. (1980). Container-derived contamination of maple syrup with methyl methacrylate, toluene, and styrene as determined by headspace gas-liquid chromatography. *J. Assoc. Off. Anal. Chem.*, 63, 173-177.

Environmental exposure literature:

Note:

Following literature references have been included for sake of completeness. References report the potential sources of Toluene exposure additional to sources as reported by our company for the Toluene production - and end-use description in this HEDSET.

Clement Associates (1977). Toluene, In: Information Dossiers on Substances Designated by TSCA (Toxic Substances Control Act) Interagency Testing Committee (October, 1977) (Contract NSF-C-Env-77-15417), Washington, DC.

DeBortoli, M., Knoppel, H., Pecchio, E., Peil, A., Rogora, L., Schauenburg, H., Schlitt, H., and Vissers, H. (1984). Integrating "real life" measurements of organic pollution in indoor and outdoor air of homes in northern Italy. In: Berglund, B., Lindall, T., and Sundell, J., eds., Indoor Air, Proceedings of the 3rd International Conference on Indoor Air Quality Climatization, Vol. 4, Stockholm, Swedish Council for Building Research, 21-26.

Fishbein, L. (1985). An overview of environmental and toxicological aspects of aromatic hydrocarbons. II. Toluene. *Sci. Total Environ.*, 42, 267-288.

Holzer, G., Shanfield, H., Zlatkis, A., Bertsch, W., Jaurez, P., Mayfield, H., and Liebich, H.M. (1977). Collection and analysis of trace organic emissions from natural sources. *J. Chromatogr.*, 142, 755-764.

International Programme on Chemical Safety (1985). Toluene (Environmental Health Criteria 52), Geneva, World Health Organization.

Krotoszynski, B.K., Bruneau, G.M., and O'Neill, H.J. (1979). Measurement of chemical inhalation exposure in urban population in the presence of endogenous effluents. *J. Anal. - 30/118* - date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Toxicol., 3, 225-234.

Merian, E. (1982). The environmental chemistry of volatile hydrocarbons. *Toxicol. Environ. Chem.*, 5, 167-175.

Merian, E. and Zander, M. (1982). Volatile aromatics. In: Hutzinger, O., ed., *Handbook of Environmental Chemistry*, Vol. 3, Part B. Anthropogenic Compounds, Berlin (West), Springer, 117-161.

Molhave, L. (1979). Indoor air pollution due to building materials. In: Fanger, P.O. and Valbjorn, O., eds., *Indoor Climate, Effect on Human Comfort, Performance and Health in Residential, Commercial and Light Industry Buildings*, Proceedings of the 1st International Indoor Climate Symposium, Copenhagen, University of Aarhus, Institute of Hygiene, 89-110.

Molhave, L. and Moller, J. (1979). The atmospheric environment in modern Danish dwellings - measurements in 39 flats. In: Fanger, P.O. and Valbjorn, O., eds., *Indoor Climate, Effect on Human Comfort, Performance and Health in Residential, Commercial and Light Industry Buildings*, proceedings of the 1st International Indoor Climate Symposium, Copenhagen, University of Aarhus, Institute of Hygiene, 171-186.

Otson, R., Williams, D.T., and Bothwell, P.D. (1982). Volatile organic compounds in water in thirty Canadian potable water treatment facilities. *J. Assoc. Off. Anal. Chem.*, 65, 1370-1374.

Seifert, B. and Abraham, H.-J. (1982). Indoor air concentrations of benzene and some other aromatic hydrocarbons. *Ecotoxicol. Environ. Saf.*, 6, 190-192.

U.S. Environmental Protection Agency (1983). Health Assessment Document for Toluene (Publ. No. PB84-100056), Washington, DC, U.S. Department of Commerce, National Technical Information Service.

Wilson, J.T., Enfield, C.G., Dunlap, W.J., Cosby, R.L., Foster, D.A., and Baskin, L.B. (1981). Transport and fate of selected organic pollutants in a sandy soil. Environ. Qual., 10, 501-506.

Araki, S., Yokoyama, K. and Murata, K. (1993). Assessment of the effects of occupational and environmental factors on all faster and slower large myelinated nerve fibers a study of the distribution of nerve conduction velocities. Environ Res, 62,2:325-332.

Chan, C.-C., Lin, S.-H. and Her, G.-R. (1993). Student's exposure to volatile organic compounds while commuting by motorcycle and bus in Taipei City. J. Air Waste Manage. Assoc., 43,9:1231-1238.

- 31/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Hajimiragha, H., Ewers, U., Brockhaus, A. and Boettger, A. (1989). Levels of benzene and other volatile aromatic compounds in the blood of non-smokers and smokers. Int Arch Occup Environ Health, 61,8:513-8.

Jermann, E., Hajimiragha, H., Brockhaus, A., Freier, I., Ewers, U. and Roscovanu, A. (1989). Exposure of children to benzene and other motor vehicle emissions. Zentralbl Hyg Umweltmed, 189,1:50-61.

Source: Exxon Chemical Holland BV Botlek

Remark: Bronnen van blootstelling zijn sterk verschillend en sterk afhankelijk van de toepassing bij de afnemers. Daar is de blootstelling voornamelijk op de werkplek vandaar is opgave van de bronnen hier niet relevant.¿

Source: NED.BENZOL MIJ. B.V. RHOON

Remark: Toluene is produced from crude benzene by distillation.

Source: Ruetgers-Vft n.v. Zelzate

Source: As the substance reported in this dossier is imported, there is no source of exposure in EU during its manufacture.

Solutia Europe SA/NV Louvain-la-Neuve

Remark: Liquid-liquid extraction. Distapex process.

One production site.

Events : incineration.

Effluent : biological treatment plant.

Source: Atochem Paris la Defense

Remark: Emissions of toluene to the environment were estimated as follows : -use in fuel (exhaust emissions, evaporative losses and emissions due to marketing and distribution) 65 %

-use as a solvent 34 %

-refining and production 2 %

Inhalation or skin contact when loading, unloading, using the product.

In case of accidental release, product may contaminate the environment.

Toluene is found in coal tar, petroleum, gasoline and as solvents in paints, lacquers, varnishes, resins and adhesives.

Toluene is released into the environment as :

- use in fuel (48-74 %)

- use as a solvent (25-52 %)

- refining and production (<2 %)

Source: SHELL FRANCE Rueil Malmaison

(24) (25) (26)

Remark: Emissions from petroleum refining, solvents.

Source: TOTAL PARIS LA DEFENSE

Source: REPSOL PETROLEO,S.A. MADRID

(27)

- 32/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Remark: The commercial Toluene is produced, stored in a closed Tank, and transported by pipe within the refinery to the gasoline blending. So it is a non dispersive use.

Source: PETROLEOS DE PORTUGAL - PETROGAL,S.A. LISBOA

Remark: Catalytic reforming of petroleum steams accounts for 87% of total toluene production. An additional 9% is separated from pyrolysis gasoline produced in steam crackers during manufacture of ethylene and propylene... (re.1)

Artificial sources. Emission from gasoline storage tanks, filling stations... Emissions and waste water from its use as a solvent and thinner for paints, lacquers...

Emissions from its production from petroleum, coal, and as a by-product from styrene production (re.2).

Source: Enichem Synthesis Milan

(28)

Remark: Production process: by extraction from unified cracked gasoline or reformed gasoline

Source: Enichem S.p.A. Milan

(29)

Remark: Utilizzato in sistemi chiusi: esposizione possibile durante il campionamento.

Source: PRAOIL S.R.L. ASSAGO MI

Remark: Il prodotto viene stoccato in cisterne interrato e rivenduto in vari tipi di imballi. Il sistema di imballaggio e' tale da precludere spandimenti del prodotto.

Source: S.A.I. Societa' Approvv. Industriali Spa Pieve Emanuele (MI)

Source: ACGIH-1984-85

American Conference Governmental Industrial Hygienists

ORLANDI VITTORIO SpA ROSA'' - VICENZA

Remark: Release from use of some adhesives

Source: ICI Chemicals & Polymers Limited Runcorn, Cheshire

Remark: Principal raw materials : crude benzole.

Separation by distillation giving toluene.¿

Source: Rhone-Poulenc Chemicals Limited Watford, Hertfordshire

Remark: The substance is used as a component of preparations of substances used in silicone polymer production. As such it is used under conditions of high control. Emissions are unlikely to be more than 1% of the whole. Emission to air will result in rapid photo-oxidation. Direct emission to soil is very unlikely. Any emissions to waste water will pass to waste water treatment, where there will be some, but not complete degradation, with some passing to water and some to sewage sludge. The substance will degrade in the environment, and therefore exposure of the environment to this substance from the present source is not expected to pose a significant risk. Similarly, the exposure of man via

- 33/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

the environment can be considered to be negligible.

Source: Dow Corning Limited Barry, South Glamorgan

Toluene VCCEP Submission

27

September 29, 2006

Appendix B: 2000 SIDS Dossier

Country: United Kingdom

Remark: Emissions of toluene to the environment were estimated as follows:

use in fuel (exhaust emissions,
evaporative losses and emissions
due to marketing and distribution) - 65%
use as a solvent - 34%
refining and production - 2%

Three studies estimating the source of toluene release in the UK gave similar proportions to the IPCS/WHO report:

Use in fuel : 48 to 74%
Use as a solvent : 25 to 52%
Refining and production : <2%

Toluene is found in coal tar, petroleum, gasoline and as a solvent in paints, lacquers, varnishes, resins and adhesives.

Source: Shell UK Limited, London.

(24) (30)

Country: United Kingdom

Remark: Emissions of toluene to the environment were estimated as follows:

use in fuel (exhaust emissions,
evaporative losses and emissions
due to marketing and distribution) - 65%
use as a solvent - 34%
refining and production - 2%

Three studies estimating the source of toluene release in the UK gave similar proportions to the IPCS/WHO report:

Use in fuel : 48 to 74%
Use as a solvent : 25 to 52%
Refining and production : <2%

Toluene is found in coal tar, petroleum, gasoline and as a solvent in paints, lacquers, varnishes, resins and adhesives.

Source: Shell UK Limited London

(24) (31)

Source: Ruetgerswerke AG Duisburg

Remark: Emissions of toluene to the environment were estimated as follows:

use in fuel (exhaust emissions, evaporative losses and
emissions due to marketing and distribution) - 65%
use as a solvent - 34%
refining and production - 2%

Source: Deutsche Shell Chemie GmbH Eschborn

(24)

- 34/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Remark: Three studies estimating sources of toluene release in the UK gave similar proportions to the IPCS/WHO report:

use in fuel 48-74%
use as a solvent 25-52%
refining and production <2%

Source: Deutsche Shell Chemie GmbH Eschborn

(32)

Remark: Expositionsgefahr bei Herstellung, Lagerung, Umschlag, Transport.

Source: DEA Mineraloel AG Hamburg

Remark: Emissions of toluene to the environment were estimated as follows:

use in fuel (exhaust emissions, evaporative losses and

emissions due to marketing and distribution) - 65%
use as a solvent - 34%
refining and production - 2%

Source: Deutsche Shell Chemie Eschborn
(24)

Remark: Three studies estimating sources of toluene release in the UK gave similar proportions to the IPCS/WHO report:

use in fuel 48-74%
use as a solvent 25-52%
refining and production <2%

Source: Deutsche Shell Chemie Eschborn
(32)

Remark: Toluol wird aus einem C6-Schnitt in einer Anlage der Aromatenextraktion mit nachgeschalteter Destillation gewonnen. Die Anlage ist in Freibauweise errichtet, die Pumpen und Behälter stehen in Tassen. Der Transport des Toluols erfolgt in Rohrleitungen.

Das Produkt wird aus der Anlage in das Tanklager in Festdachtanks gepumpt.

Die Verladung erfolgt in Kesselwagen. Während der Beladung werden die Produktdämpfe zur Dämpferückgewinnung gedrückt.

Exposition ist in der Produktion bei der Probenahme, in der Verladung beim Öffnen und Schließen der Domdeckel vorhanden.

Die Messungen der Konzentration beim Probenziehen ergaben keine Überschreitung der Grenzwerte.

Source: PCK Raffinerie GmbH Schwedt Schwedt/Oder

1.10.1 Recommendations/Precautionary Measures

-

1.10.2 Emergency Measures

-

1.11 Packaging

-

- 35/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

1.12 Possib. of Rendering Subst. Harmless

-

1.13 Statements Concerning Waste

-

1.14.1 Water Pollution

Classified by: KBwS (DE)

Labelled by: KBwS (DE)

Class of danger: 2 (water polluting)

Source: BASF Antwerpen N. V. Antwerpen 4

BASF AG Ludwigshafen

BASF Vernici e Inchiostri Spa Cinisello Balsamo MI

BASF AG Ludwigshafen

Rheinische Olefinwerke GmbH Wesseling

Classified by: KBwS (DE)

Labelled by: KBwS (DE)

Class of danger: 2 (water polluting)

Country: Germany

Remark: Katalog Nr. 194

Source: Huels AG Marl

(33)

1.14.2 Major Accident Hazards

Legislation: Stoerfallverordnung (DE)

Toluene VCCEP Submission

29

September 29, 2006

Appendix B: 2000 SIDS Dossier

Substance listed: yes
Remark: Stoerfall-Stoff-Nr. 2 "leicht entzündliche Flüssigkeiten"
Source: BASF Antwerpen N. V. Antwerpen 4
(34)
Legislation: Stoerfallverordnung (DE)
Substance listed: yes
Remark: Stoerfall-Stoff-Nr. 2 "leicht entzündliche Flüssigkeiten"
Source: BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
(35)
Legislation: Stoerfallverordnung (DE)
Substance listed: yes
Remark: Stoerfall-Stoff-Nr. 2 "leicht entzündliche Flüssigkeiten"
Source: BASF AG Ludwigshafen
(35)
- 36/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Legislation: Stoerfallverordnung (DE)
Substance listed: yes
Remark: Stoerfall-Stoff-Nr. 2 "leicht entzündliche Flüssigkeiten"
Source: BASF AG Ludwigshafen
(35)
Legislation: Stoerfallverordnung (DE)
Substance listed: yes
Country: Germany
Remark: im Anhang IV genannt (Kat. 6, leichtentzündliche Flüssigkeiten)
Source: Huels AG Marl
(36) (37)
Legislation: Stoerfallverordnung (DE)
Substance listed: yes
Remark: Stoerfall-Stoff-Nr. 2 "leicht entzündliche Flüssigkeiten"
Source: BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
(35)
Legislation: Stoerfallverordnung (DE)
Substance listed: yes
Remark: Stoerfall-Stoff-Nr. 2 "leicht entzündliche Flüssigkeiten"
Source: BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
(35)

1.14.3 Air Pollution

Classified by: TA-Luft (DE)
Labelled by: TA-Luft (DE)
Number: 3.1.7 (organic substances)
Class of danger: II
Source: BASF Antwerpen N. V. Antwerpen 4
BASF AG Ludwigshafen
BASF Vernici e Inchiostri Spa Cinisello Balsamo MI
BASF AG Ludwigshafen
Rheinische Olefinwerke GmbH Wesseling
Classified by: TA-Luft (DE)
Labelled by: TA-Luft (DE)
Number: 3.1.7 (organic substances)
Class of danger: II
Country: Germany
Remark: Anhang E (Toluol)

Source: Huels AG Marl
(38)
- 37/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

1.15 Additional Remarks

Remark: Disposal options:
Recover or recycle if possible. otherwise: incineration.
Transport Classification:
UN Number: 1294
IMO Class/Packing group: 3.2/II
IMO Symbol: Flammable liquid
Marine pollutant: No
IMO Proper Shipping Name: TOLUENE
ADR/RID Class/Item: 3/3(b)
ADR/RID Symbol: Flammable liquid
ADR/RID Kemler Number: 33/1294
ADR/RID Proper Shipping Name: TOLUENE
Source: Shell Company (Hellas) Ltd Ç¿Öñ
Remark: Disposal Consideration:
Toluene may disposed of by : controled incineration, re-used
as a fuel component or recovered by distillation.
Toluene as reported here is transported only by ship or
vessel.
Transportation information:
By Land (railroad/road, such as RID/ADR):
ADR/RID Class: 3,3b ; Danger number: 3 ; Substance ID:
1294.
By inland waterways (such as ADN/R):
ADN/R Class: IIIa,1.a ; ADN/R Category : K1n
By Sea (IMDG):
UN Number: 1294 ; IMO Class: 3.2 ; Risk Label: 3 ; IMDG
code: 3285 ; MFAG number: II
Source: Exxon Chemical Holland BV Botlek
Remark: Formula: C6H5 CH3
Source: Shell Nederland Chemie B.V. Rotterdam
Remark: Disposal: Recycling or incineration
Source: Ruetgers-VfT n.v. Zelzate
Remark: Company name change : Solutia Europe S.A./N.V. is formerly
the chemical businesses of Monsanto Company in Europe.
Source: Solutia Europe SA/NV Louvain-la-Neuve
Remark: Recover or recycle if possible. Otherwise : incineration.
Avoid electrostatic discharge generation.
Earth all equipment.
Do not use compressed air or oxygen for filling, discharging
or handling.
If positive displacement pumps are used, these must be
fitted with a non-integral pressure relief valve.
Restrict line velocity during pumping.
Do not smoke. Avoid naked flames. Remove ignition sources.
- 38/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

Transport Information
UN number : 1294
Class : 3
Packing Group : II
Proper Shipping Name : Toluene
Sea (IMO)
IMO Class/Packing group : 3.2/II

Marine Pollutant (Y/N) : No
Symbol : Flammable liquid
Rail/Road (ADR/RID)
Class : 3
Item : 3 b)
Symbol : Flammable liquid
Kemler Plate : 33/1294
Air (IATA/IACO)
Class : 3
Symbol : Flammable liquid
Source: SHELL FRANCE Rueil Malmaison
(26)

Remark: INFORMATIONS RELATIVES AU TRANSPORT
Réglementations internationales:
par voies terrestres: classe 3, code matière 1294
par voie maritime: classe 3.2

Source: TOTAL PARIS LA DEFENSE

Remark: DISPOSAL CONSIDERATIONS : Small spills: take up with sand or other noncombustible adsorbent material and place into containers for later disposal. Large spills: avoid dispersion of liquid with barriers or mechanical containment. Incineration or landfilling of surplus.

HANDLING : Wear protective equipment (safety gloves and appropriate impervious clothing in emergency procedures, protective creams to prevent irritation, protective mask with organic vapour cartridge, at vapour concentrations over 1000ppm and self contained breathing apparatus at vapor concentrations over 2000ppm). Do not smoke and eliminate all sources of ignition from areas where the material is stored, handled or used.

STORAGE : Protect containers against physical damage or fire. Outdoor or detached storage is preferred. For indoor storage, use standard combustible liquid storage rooms or cabinets. Containers properly labelled and sealed placed in cool and well ventilated areas.

TRANSPORT :

UN No.: 1294

- 39/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Hazard Identification No.: 33

ADR/RID : 3, ITEM 3b

IMDG Class: 3.2

IATA-DGR: 3, Packing Group: II.

Source: REPSOL PETROLEO, S.A. MADRID

Remark: Transport :

For Toluene pure:

UN number 1294

RPE 3, 3° b)

IMO 3.2

The Commercial Toluene is only transported by pipe within the refinery.;

Source: PETROLEOS DE PORTUGAL - PETROGAL, S.A. LISBOA

Remark: The primary source of human exposure is from inhalation of contaminated ambient air especially in traffic or near filling stations, or in occupational atmosphere where toluene-based solvents are used.

Source: Enichem Synthesis Milan

Remark: Prescrizioni di sicurezza per il trasporto:

ADR/RID: 3.3° b)

UN : 1294

Source: PRAOIL S.R.L. ASSAGO MI

Remark: La produzione della sostanza è terminata nel 1992
Source: Kuwait Raffinazione e Chimica Napoli
Remark: Alcuni dati sono stati ricavati da schede tecniche/sicurezza di altre ditte fornitrici.
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Remark: Toluene is delivered in up to 20 tonnes stainless steel roadtanker off take by pump.
Toluene in 178 kg drums and 205 litre packages are delivered on a flatbed lorry.
UN No 1294.
UK Road : Hazchem code : bye
classification : flammable liquid
packing group II.
RID-ADR : Class 3 Item : 3 (b)
classification highly flammable liq.
- 40/118 -.date: 18-FEB-2000
1. General Information Substance ID: 108-88-3

IMO : class label flammable liq;
IMDG page 3285 pack group II
ICAO : class 3 packing group II
passenger : 305 (S L) Cargo : 307 (60 L).
- Water pollution :

classification : Directive (North Sea List)
hazard category (WGK) : 0
UK legislation : Environmental Pollution Act
1990 (part I) monitored by HMIP
- Major accidents hazards :

not listed in Seveso Directive 82/501/CEE
UK Complies to (CIMA) Control of Industrial Major
Accidents Hazards Regulations.
- Air pollution :

UK Complies to Environmental Pollution Act 1990 (part I)
monitored by HMIP.

Source: Rhone-Poulenc Chemicals Limited Watford, Hertfordshire

Remark: Disposal Options

Recover or recycle if possible. Otherwise incinerate.

Transport Conventions

Proper Shipping Name : Toluene

UN No. : 1294

IMO/IMDG

Class : 3.2

Packing Group : II

Marine Pollutant : No

ADR/RID

Class : 3

Item No. : 3(b)

Hazard Id. No. : 33

Hazchem

Emergency Action Code : 3(Y)E

Transport Information

Transported by : Sea

Frequency : Weekly

Transported by : Road

Frequency : Daily

Source: Shell UK Limited, London.

- 41/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Remark: Disposal Options

Recover or recycle if possible. Otherwise incinerate.

Transport Conventions

IMO/IMDG

Class : 3.2

UN No. : 1294

Packing Group : II

Page No. : 3285

Marine Pollutant : No

ADR/RID

Class : 3

Item No. : 3(b)

Hazard Id. No. : 33

Substance Id. No. : 1294

Hazchem

Emergency Action Code : 3(Y)E

Transport Information

Transported by : Sea

Frequency : Weekly

Transported by : Road

Frequency : Daily

Source: Shell UK Limited London

Remark: Disposal: Recycling or incineration

Source: Ruetgerswerke AG Duisburg

Remark: Disposal options:

Recover or recycle if possible. Otherwise: incineration.

Transport mode:

Transport classification:

UN Number: 1294

IMO Class/Packing group: 3.2/II

IMO Symbol: Flammable liquid

Marine pollutant: No

IMO Proper Shipping Name: TOLUENE

ADR/RID Class/Item: 3/3(b)

ADR/RID Symbol: Flammable liquid

ADR/RID Kemler Number: 33/1294

ADR/RID Proper Shipping Name: TOLUENE

Source: Deutsche Shell Chemie GmbH Eschborn

- 42/118 -.date: 18-FEB-2000

1. General Information Substance ID: 108-88-3

Remark: Wasserschadstoff:

Wassergefährdungsklasse 2

KBwS- Einstufung

Katalognummer 194

Luftschadstoff:

Toluol ist im Anhang II der Störfallverordnung

unter 2-61 sowie unter organische Stoffe der

TA-Luft mit Klasse II zu finden.

Source: Sächsische Olefinwerke GmbH Böhlen

Remark: Entsorgung: Rückgewinnung durch Destillation

Transport: Kl. 3, Ziff. 3b), Kemmlerzahl: 33, UN-Nr. 1294;

Source: DEA Mineraloel AG Hamburg

Remark: Disposal options:

Recover or recycle if possible. Otherwise: incineration.

Transport mode:

Transport classification:

UN Number: 1294

IMO Class/Packing group: 3.2/II

IMO Symbol: Flammable liquid

Toluene VCCEP Submission

34

September 29, 2006

Appendix B: 2000 SIDS Dossier

Marine pollutant: No
IMO Proper Shipping Name: TOLUENE
ADR/RID Class/Item: 3/3(b)
ADR/RID Symbol: Flammable liquid
ADR/RID Kemler Number: 33/1294
ADR/RID Proper Shipping Name: TOLUENE
Source: Deutsche Shell Chemie Eschborn
Remark: Die Beförderung des Produktes zu den Kunden erfolgt in Kesselwagen.
Source: PCK Raffinerie GmbH Schwedt Schwedt/Oder

1.16 Last Literature Search

-

1.17 Reviews

-

1.18 Listings e.g. Chemical Inventories

-

- 43/118 -.date: 18-FEB-2000
2. Physico-chemical Data Substance ID: 108-88-3

2.1 Melting Point

Value: -95 - -95.1 degree C
Decomposition: no
Sublimation: yes
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Value: = -95 degree C
Decomposition: no
Sublimation: no
Method: other: no data
GLP: no data
Source: REPSOL PETROLEO,S.A. MADRID
Value: = -95 degree C
Decomposition: no
Sublimation: no
Method: other: nicht bekannt
GLP: no data
Source: NEUBER GES.M.B.H. WIEN
Value: = -95 degree C
Source: BASF AG Ludwigshafen
Reliability: (2) valid with restrictions
Angaben nachvollziehbar und wissenschaftlich akzeptabel
(39)
Value: = -95 degree C
Decomposition: no
Sublimation: no
Method: other
GLP: no data
Remark: Method not known
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(40)

2.2 Boiling Point

Value: = -110.6 degree C at 1013 hPa
Decomposition: no
Method: other: nicht bekannt
GLP: no data
Source: NEUBER GES.M.B.H. WIEN

Value: = 110 degree C at 1000 hPa
Decomposition: no
Method: other: no data
GLP: no data
Source: REPSOL PETROLEO,S.A. MADRID
- 44/118 -.date: 18-FEB-2000
2. Physico-chemical Data Substance ID: 108-88-3

Value: = 110.4 - 110.8 degree C at 1013 hPa
Decomposition: no
Method: other
GLP: no data
Remark: Method not known
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(41)
Value: 110.4 - 111 degree C at 1013.08 hPa
Method: other
GLP: no data
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Value: = 110.6 degree C
Source: BASF AG Ludwigshafen
Reliability: (2) valid with restrictions
Angaben nachvollziehbar und wissenschaftlich akzeptabel
(39)

2.3 Density

Type: relative density
Value: .867 g/cm³ at 15 degree C
Method: other: no data
GLP: no data
Source: REPSOL PETROLEO,S.A. MADRID
Type: density
Value: = 871 kg/m³ at 15 degree C
Method: other
GLP: no data
Remark: Method not known
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(41)
Type: density
Value: .86 - .87 kg/m³ at 20 degree C
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Type: density
Value: = .8652 g/cm³ at 20 degree C
Method: other: nicht bekannt
GLP: no data
Source: NEUBER GES.M.B.H. WIEN
Type: density
Value: = .871 g/cm³
Source: BASF AG Ludwigshafen
Reliability: (2) valid with restrictions
Angaben nachvollziehbar und wissenschaftlich akzeptabel
(39)
- 45/118 -.date: 18-FEB-2000
2. Physico-chemical Data Substance ID: 108-88-3

2.3.1 Granulometry

-

2.4 Vapour Pressure

Value: = 28.9 hPa at 20 degree C

Method: other (calculated)

GLP: no data

Source: NEUBER GES.M.B.H. WIEN

Value: 29.3 hPa at 20 degree C

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

Value: = 29.3 hPa at 20 degree C

Source: BASF AG Ludwigshafen

Reliability: (1) valid without restriction

anerkanntes Institut

(42)

Value: = 30 hPa at 20 degree C

Source: BASF AG Ludwigshafen

Reliability: (2) valid with restrictions

Angaben nachvollziehbar und wissenschaftlich akzeptabel

(39)

Value: = 30 hPa at 20 degree C

Method: other (measured)

GLP: no data

Remark: Method not known

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(41)

Value: = 120 hPa at 50 degree C

Source: BASF AG Ludwigshafen

Reliability: (2) valid with restrictions

Angaben nachvollziehbar und wissenschaftlich akzeptabel

(39)

Value:

Remark: Vapour pressure: 0.8 atm at 25 C

Source: REPSOL PETROLEO,S.A. MADRID

2.5 Partition Coefficient

log Pow: = 2.65

Method: other (measured)

Year:

GLP: no data

Remark: Method not known

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(41)

- 46/118 -.date: 18-FEB-2000

2. Physico-chemical Data Substance ID: 108-88-3

log Pow: = 2.66

Method: other (calculated): Mittelwert aus vier Literaturangaben

Year:

GLP: no data

Source: NEUBER GES.M.B.H. WIEN

log Pow: = 2.69 at 20 degree C

Method: other (calculated)

Year:

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

log Pow: = 2.7

Method:

Year:

Source: BASF AG Ludwigshafen

Reliability: (2) valid with restrictions

Angaben nachvollziehbar und wissenschaftlich akzeptabel
(39)

log Pow: = 5

Method:

Year:

GLP: no data

Source: REPSOL PETROLEO,S.A. MADRID

2.6.1 Water Solubility

Value: <= .005 vol% at 20 degree C

pH: 0

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

Value: ca. .5 other: % at 20 degree C

Source: BASF AG Ludwigshafen

Reliability: (2) valid with restrictions

Angaben nachvollziehbar und wissenschaftlich akzeptabel
(39)

Value: = 515 mg/l at 20 degree C

Method: other

GLP: no data

Remark: Method not known

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(41)

Value: ca. .55 g/l at 25 degree C

Qualitative: of very low solubility

Method: other: Literaturangabe

GLP: no data

Source: NEUBER GES.M.B.H. WIEN

Value: = .05 vol%

Qualitative: of very low solubility

Source: REPSOL PETROLEO,S.A. MADRID

- 47/118 -.date: 18-FEB-2000

2. Physico-chemical Data Substance ID: 108-88-3

2.6.2 Surface Tension

-

2.7 Flash Point

Value: = 4 degree C

Type: closed cup

Method: other: no data

Year: 1988

GLP: no data

Source: REPSOL PETROLEO,S.A. MADRID

(43)

Value: = 4 degree C

Type: closed cup

Method: other

Year:

GLP: no data

Remark: Method not known

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(41)

Value: >= 4.4 degree C

Toluene VCCEP Submission

38

September 29, 2006

Appendix B: 2000 SIDS Dossier

Type: closed cup
Method: other
Year:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Value: = 6 degree C
Type: closed cup
Method: other: nicht bekannt
Year:
GLP: no data
Source: NEUBER GES.M.B.H. WIEN
Value: = 6 degree C
Type:
Method:
Year:
Source: BASF AG Ludwigshafen
Reliability: (2) valid with restrictions
Angaben nachvollziehbar und wissenschaftlich akzeptabel
(39)
Value: = 7 degree C
Type: other: DIN 53213
Method:
Year: 1979
Source: BASF AG Ludwigshafen
Reliability: (1) valid without restriction
Testdurchfuehrung nach allg. gueltigen und/oder akzeptierten
Methodenvorschriften
(44)
- 48/118 -.date: 18-FEB-2000
2. Physico-chemical Data Substance ID: 108-88-3

2.8 Auto Flammability

Value: = 480 degree C
Method: other: no data
Year: 1988
GLP: no data
Source: REPSOL PETROLEO,S.A. MADRID
(43)
Value: = 480 degree C at 1013.08 hPa
Method: other
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Value: = 535 degree C
Method: other: DIN 51794
Source: BASF AG Ludwigshafen
Reliability: (2) valid with restrictions
Angaben nachvollziehbar und wissenschaftlich akzeptabel
(39)
Value: = 535 degree C
Method: other
GLP: no data
Remark: Method not known
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(41)
Value: = 545 degree C
Year: 1978
Source: BASF AG Ludwigshafen
Reliability: (1) valid without restriction

Testdurchfuehrung nach allg. gueltigen und/oder akzeptierten
Methodenvorschriften

(45)

2.9 Flammability

Result: highly flammable

Method: other: Directive 92/69/EEC, A.9

Year: 1992

GLP: no data

Remark: Lower flammability limit : 1.2%

Upper flammability limit : 7.1

Source: REPSOL PETROLEO,S.A. MADRID

Result: highly flammable

Method: other

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

- 49/118 -.date: 18-FEB-2000

2. Physico-chemical Data Substance ID: 108-88-3

Result: highly flammable

Method: other: DIN 57165

Remark: Zuendgruppe: T 1 (VDE 0165)

Source: BASF AG Ludwigshafen

Reliability: (2) valid with restrictions

Angaben nachvollziehbar und wissenschaftlich akzeptabel

(39)

2.10 Explosive Properties

Result: not explosive

Method: other: Directive 92/69/EEC, A.9

Year: 1992

GLP: no data

Remark: Vapour forms explosive mixtures with air

Source: REPSOL PETROLEO,S.A. MADRID

Result: other

Method: other

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

Result: other

Method: other

GLP: no data

Remark: Explosion limits in air:

Upper 1.2% v/v

Lower 8.0% v/v

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(41)

Result:

Remark: Explosionsgrenzen: untere 1.2 Vol.%, obere 7 Vol.%.

nicht explosionsgefaehrlich aufgrund der chemischen Struktur

Source: BASF AG Ludwigshafen

Reliability: (2) valid with restrictions

Angaben nachvollziehbar und wissenschaftlich akzeptabel

(39)

2.11 Oxidizing Properties

Result: no oxidizing properties

Method: other: Directive 92/69/EEC, A.9

Year: 1992

GLP: no data

Source: REPSOL PETROLEO,S.A. MADRID

Result: no oxidizing properties

Remark: aufgrund der chemischen Struktur
Source: BASF AG Ludwigshafen
- 50/118 -.date: 18-FEB-2000
2. Physico-chemical Data Substance ID: 108-88-3

Result: no oxidizing properties
Method: other
GLP: no data
Remark: Method not known
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(41)
Result: other
Method: other
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

2.12 Additional Remarks

Remark: STABILITY : Flammable and combustible.
CONDITIONS TO AVOID : Sparks, heat or flames.
INCOMPATIBILITIES : Strong Oxidants.
HAZARDOUS DECOMPOSITION/COMBUSTION PRODUCTS : CO and toxic vapours in case of incomplete combustion.
EXTINGUISHING AGENTS : Foams, dry chemicals CO2 and water spray. (WATER SHOULD NEVER BE USED IN DIRECT STREAMS).
SPECIAL HAZARDS : Vapour may travel a substantial distances to remote ignition sources and flash back
Source: REPSOL PETROLEO,S.A. MADRID
Remark: Oberflächenspannung bei 20° C: 28.5 mN/m
(Quelle: Weast,R.C; Astle, M.J.: CRC Handbook of Chemistry and Physics, 59th edition, CRC Press, Palm Beach)
Source: NEUBER GES.M.B.H. WIEN
- 51/118 -.date: 18-FEB-2000
3. Environmental Fate and Pathways Substance ID: 108-88-3

3.1.1 Photodegradation

Type: air
INDIRECT PHOTOLYSIS
Sensitizer: O3
Conc. of sens.: 1000000000000 molecule/cm3
Rate constant: = .0000000000000000015 cm3/(molecule * sec)
Degradation: = 50 % after 30 day
Method: other (measured)
Year: 1992 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: Testmethod as described in reference
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(46)
Type: air
INDIRECT PHOTOLYSIS
Sensitizer: OH
Conc. of sens.: 1000000 molecule/cm3
Rate constant: = .00000000000059974 cm3/(molecule * sec)
Degradation: = 50 % after 1.3 day
Method: OECD Guide-line draft "Photochemical Oxidative Degradation in the Atmosphere"
Year: 1990 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4

Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
Type: air
INDIRECT PHOTOLYSIS
Sensitizer: OH
Conc. of sens.: 1000000 molecule/cm³
Rate constant: = .00000000000631 cm³/(molecule * sec)
Degradation: = 50 % after 1.8 day
Method: other (measured)
Year: 1992 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: Testmethod as described in reference.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(47)
Type: air
Light source: Sun light
INDIRECT PHOTOLYSIS
Sensitizer: OH
Degradation: 50 % after 3 hour(s)
Method: other (calculated)
Year: **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: REPSOL PETROLEO,S.A. MADRID
(48)
- 52/118 -.date: 18-FEB-2000
3. Environmental Fate and Pathways Substance ID: 108-88-3

Type: other
Spectr.of subst.: lambda (max, >295nm): 269 nm
epsilon (max): 254.6
Method:
Year: **GLP:**
Test substance:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

3.1.2 Stability in Water

Type:
Method: other
Year: **GLP:**
Test substance: as prescribed by 1.1 - 1.4
Result: When released into water, toluene will be lost both by volatilization to the atmosphere and biodegradation. The predominant process will depend on water temperature, mixing conditions and the existence of acclimated microorganisms at the site.
Source: REPSOL PETROLEO,S.A. MADRID
(49)

Type:
Method:
Year: **GLP:**
Test substance:
Remark: Toluene is not susceptible to hydrolysis
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(50)

3.1.3 Stability in Soil

Type: Radiolabel:

Concentration:
Cation exch.
capac.
Microbial
biomass:
Method: other
Year: 1982 **GLP:**
Test substance: as prescribed by 1.1 - 1.4
Remark: If toluene is released to soil, it will be lost by evaporation from near surface soil and microbial degradation
Source: REPSOL PETROLEO,S.A. MADRID
(51)
- 53/118 -.date: 18-FEB-2000
3. Environmental Fate and Pathways Substance ID: 108-88-3

Type: Radiolabel:
Concentration:
Cation exch.
capac.
Microbial
biomass:
Method:
Year: GLP:
Test substance:
Remark: It is believed that toluene is biodegraded in soil under aerobic conditions. This aspect is covered in 3.5.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(52)

3.2 Monitoring Data (Environment)

Type of
measurement: background concentration
Medium: air
Result: Dutch Countryside : $2 - 6 * 10^{-6}$ g/m3 (Average Year)
Dutch Urban : $13 - 21 * 10^{-6}$ g/m3 (" ")
The Netherlands : $2 - 4 * 10^{-6}$ g/m3 (" ")
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(53)

Type of
measurement: background concentration
Medium: surface water
Result: Surface Water (The Netherlands, average)
Freshwater : 0.0001 mg/l;
Marine : 0.00002 mg/l.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(54)

Type of
measurement: background concentration
Medium: soil
Result: Soil (The Netherlands, average) : 10^{-6} g/kg.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(53)

Type of
measurement:

Medium:

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

- 54/118 -.date: 18-FEB-2000

3. Environmental Fate and Pathways Substance ID: 108-88-3

3.3.1 Transport between Environmental Compartments

Type: adsorption

Media: water - soil

Method: other: no data

Year: 1977

Result: Adsorption/mobility coefficient :

Wendover silty loam, 37

Grimsby silt loam, 160

Vaudreuil sandy loam, 46

Toluene exhibits a very high to moderate adsorption.

Source: REPSOL PETROLEO,S.A. MADRID

(55)

Type: volatility

Media: soil - air

Method: other

Year: 1981

Remark: Experimentally derived evaporation half-life of Toluene.

Result: The evaporation half life of toluene added to sandy soils is 4.9 hours

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(56)

Type: volatility

Media: water - air

Method: other

Year: 1982

Result: Half-life : 2.9-5.7 hr

Source: REPSOL PETROLEO,S.A. MADRID

Test condition: 1 m of water with moderate mixing conditions

(57)

Type: volatility

Media: water - air

Method: other

Year: 1983

Remark: Method as described in reference.

Result: The evaporation half-life of toluene from 1 m deep water is 5 hours.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(58)

Type: volatility

Media: water - air

Method: other

Year: 1982

Result: According to the methodology described in the reference, the evaporation half-life of toluene from a 1 m deep model river with a current of 1 m/s and a wind velocity of 3 m/s is calculated to be 3.0 hours.

Source: Deutsche Shell Chemie GmbH Eschborn

(59)

- 55/118 -.date: 18-FEB-2000

3. Environmental Fate and Pathways Substance ID: 108-88-3

Type: volatility

Media: water - air

Method: other

Year: 1982

Result: According to the methodology described in the reference, the evaporation half-life of toluene from a 1 m deep model river with a current of 1 m/s and a wind velocity of 3 m/s is calculated to be 3.0 hours.

Source: Deutsche Shell Chemie Eschborn

(59)

3.3.2 Distribution

Media: air - biota - sediment(s) - soil - water

Method: Calculation according Mackay, Level I

Year:

Remark: Bevorzugtes Zielkompartiment: Luft (99%)

Source: BASF AG Ludwigshafen

Reliability: (2) valid with restrictions

Allgemein anerkannte Berechnungsmethode

(60)

Media: air - biota - sediment(s) - soil - water

Method: Calculation according Mackay, Level I

Year: 1981

Method: As in reference.

Result: Air : 99.47 %m;

Water : 0.49 %m;

Soil : 0.02 %m;

Sediment: 0.02 %m;

Biota : 0.00 %m.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(61)

3.4 Mode of Degradation in Actual Use

Remark: From soil or water the principal mode of degradation is by volatilization. If toluene is released to the atmosphere, it will exist predominantly in the vapor phase; it degrades moderately rapidly by indirect photolysis.

Source: REPSOL PETROLEO, S.A. MADRID

Result: In air toluene is degraded by reaction with OH-radicals. Toluene is lost from water bodies by evaporation and biodegradation.

Source: Deutsche Shell Chemie GmbH Eschborn

(62)

Result: In air toluene is degraded by reaction with OH-radicals. Toluene is lost from water bodies by evaporation and biodegradation.

Source: Deutsche Shell Chemie Eschborn

(62)

- 56/118 -.date: 18-FEB-2000

3. Environmental Fate and Pathways Substance ID: 108-88-3

3.5 Biodegradation

Type: aerobic

Inoculum: domestic sewage, adapted

Concentration: 10 mg/l related to Test substance

Degradation: = 86 % after 20 day

Result: readily biodegradable

Kinetic: 5 day = 73 %

10 day = 74 %

15 day = 80 %

20 day = 86 %

Method: other

Year: 1971 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Remark: Method in reference (related APHA - 219)).

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(63)

Type: aerobic

Inoculum: domestic sewage, non-adapted

Concentration: 10 mg/l related to Test substance

Degradation: = 62 % after 10 day

Result: readily biodegradable

Kinetic: 5 day = 53 %

10 day = 62 %

15 day = 70 %

20 day = 80 %

Method: other

Year: 1971 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Remark: Method in reference (related to APHA -219 (1971)).

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(64)

Type: aerobic

Inoculum: predominantly domestic sewage, non-adapted

Concentration: 1.5 mg/l related to Test substance

Degradation: = 69 % after 5 day

Result: readily biodegradable

Method: other

Year: 1971 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Remark: Method: APHA - 219 (1971) at 20°C.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(65)

- 57/118 -.date: 18-FEB-2000

3. Environmental Fate and Pathways Substance ID: 108-88-3

Type: aerobic

Inoculum: other: marine mesocosm

Degradation: = 100 % after 4 day

Result: readily biodegradable

Method: other: no data

Year: 1983 **GLP:** no data

Test substance: no data

Source: REPSOL PETROLEO,S.A. MADRID

(66)

Type: aerobic

Inoculum: other: oil-polluted water

Degradation: 50 % after 30 day

Result: readily biodegradable

Method: other: no data

Year: 1977 **GLP:** no data

Test substance: no data

Toluene VCCEP Submission

46

September 29, 2006

Appendix B: 2000 SIDS Dossier

Source: REPSOL PETROLEO,S.A. MADRID
(67)

3.6 BOD5, COD or BOD5/COD Ratio

B O D 5

Method: other

Year: GLP: no data

BOD5: = 2.15 mgO2/l

C O D

Method: other

Year: GLP: no data

COD: > .7 mg/g substance

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

B O D 5

Method: other: no data

Year: 1979 GLP: no data

BOD5: 2150 mgO2/l

C O D

Method: other

Year: 1979 GLP: no data

COD: 2520 mg/g substance

Source: REPSOL PETROLEO,S.A. MADRID

(68)

- 58/118 -.date: 18-FEB-2000

3. Environmental Fate and Pathways Substance ID: 108-88-3

3.7 Bioaccumulation

Species: Anguilla japonica

Exposure period:

Concentration:

BCF: = 13.2

Elimination: no data

Method: other: no data

Year: 1978 GLP: no data

Test substance: no data

Source: REPSOL PETROLEO,S.A. MADRID

(69)

Species: Leuciscus idus melanotus (Fish, fresh water)

Exposure period: 3 day

Concentration:

BCF: = 90

Elimination: no

Method: other

Year: 1985 GLP: no

Test substance: as prescribed by 1.1 - 1.4

Remark: Testmethod not accurately described, resembles OECD 305 B.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(70)

Species: Leuciscus idus melanotus (Fish, fresh water)

Exposure period: 3 day

Concentration:

BCF: = 90

Elimination:

Method: other: nicht bekannt

Year: 1985 GLP: no data

Test substance: no data

Source: NEUBER GES.M.B.H. WIEN

(71)

Species: Leuciscus idus melanotus (Fish, fresh water)

Exposure period:

Concentration:

BCF: = 90

Elimination: no data

Method: other: no data

Year: 1985 **GLP:** no data

Test substance: no data

Source: REPSOL PETROLEO,S.A. MADRID

(72)

- 59/118 -.date: 18-FEB-2000

3. Environmental Fate and Pathways Substance ID: 108-88-3

Species:

Exposure period:

Concentration:

BCF: = 37.14

Elimination:

Method:

Year: **GLP:**

Test substance:

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

3.8 Additional Remarks

-

- 60/118 -.date: 18-FEB-2000

4. Ecotoxicity Substance ID: 108-88-3

AQUATIC ORGANISMS

4.1 Acute/Prolonged Toxicity to Fish

Type: flow through

Species: Carassius auratus (Fish, fresh water)

Exposure period: 96 hour(s)

Unit: mg/l **Analytical monitoring:** yes

LC50: = 13

Method: other

Year: 1976 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Remark: Method as described in reference.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(73)

Type: flow through

Species: Leuciscus idus melanotus (Fish, fresh water)

Exposure period: 48 hour(s)

Unit: mg/l **Analytical monitoring:** no data

LC0: = 52 - 370

LC50: = 70 - 420

LC100: = 88 - 470

Method: other: DIN 384 12 L-20

Year: **GLP:** no data

Test substance: no data

Source: NEUBER GES.M.B.H. WIEN

(74)

Type: flow through

Toluene VCCEP Submission

48

September 29, 2006

Appendix B: 2000 SIDS Dossier

Species: Oncorhynchus kisutch (Fish, fresh water, marine)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
LC50: = 6.3
Method: other
Year: 1981 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Method not available.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(75)
Type: flow through
Species: Oncorhynchus mykiss (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** yes
LC50: = 24
Method: other
Year: 1986 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Remark: Testmethod is described in Jonson & Finley, 1980.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(76) (77)
- 61/118 -.date: 18-FEB-2000
4. Ecotoxicity Substance ID: 108-88-3

Type: flow through
Species: Pimephales promelas (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** yes
LC50: = 26
Method: other
Year: 1982 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Method as described in reference.
The fish tested were 30 days old
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(78)
Type: flow through
Species: Pimephales promelas (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** yes
LC50: = 28
Method: other
Year: 1982 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Method as described in reference
The fish age reported is "1-day post hatch".
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(79)
Type: flow through
Species: Pimephales promelas (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** yes
LC50: = 66

Method: other
Year: 1982 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Testmethod described in reference.
The tests were performed on fathead minnow embryos.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(80)
Type: other: no data
Species: Carassius auratus (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
LC50: = 57.68
Method: other: no data
Year: 1966 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(81)
- 62/118 -.date: 18-FEB-2000
4. Ecotoxicity Substance ID: 108-88-3

Type: other: no data
Species: Lebistes reticulatus (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
LC50: = 59.3
Method: other: no data
Year: 1966 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(81)
Type: static
Species: Lepomis macrochirus (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** yes
LC50: = 13
Method: other
Year: 1981 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Testmethod: U.S. E.P.A. 1975.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(82)
Type:
Species: Lepomis macrochirus (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:**
LC50: = 13
Method:
Year: **GLP:**
Test substance:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

4.2 Acute Toxicity to Aquatic Invertebrates

Species: Daphnia magna (Crustacea)
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** no
EC50: = 11.5

Method: other
Year: 1983 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Method described in reference.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(83)
- 63/118 -.date: 18-FEB-2000
4. Ecotoxicity Substance ID: 108-88-3

Species: Daphnia magna (Crustacea)
Exposure period: 24 hour(s)
Unit: mg/l **Analytical monitoring:** no data
EC0: = 93
EC50: = 270
EC100: = 500
Method: other: nicht bekannt, Kriterium Schwimmfähigkeit
Year: **GLP:** no data
Test substance: no data
Source: NEUBER GES.M.B.H. WIEN
(84)
Species: Nitocra spinipes (Crustacea)
Exposure period: 24 hour(s)
Unit: mg/l **Analytical monitoring:** no data
LC50 : = 24.2 - 74.2
Method: other: no data
Year: 1975 **GLP:**
Test substance:
Source: REPSOL PETROLEO,S.A. MADRID
(85)
Species: Palaemonetes pugio (Crustacea)
Exposure period: 24 hour(s)
Unit: mg/l **Analytical monitoring:** yes
EC50: = 17.2
Method: other
Year: 1985 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Method as described in reference.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(86)
Species: other aquatic crustacea
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** yes
LC50 : = 18
Method: other
Year: 1991 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Remark: Method as described in reference.
The species tested is the marine crustacean CHAETOGAMMUS
MARINUS.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(87)
Species: other
Exposure period: 56 hour(s)
Unit: mg/l **Analytical monitoring:**

EC50: > 4.33
Method:
Year: GLP:
Test substance:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
- 64/118 -.date: 18-FEB-2000
4. Ecotoxicity Substance ID: 108-88-3

Species: other: Crangon franciscorum
Exposure period: 96 hour(s)
Unit: µg/l **Analytical monitoring:** no data
LC50 : = 4.3
Method: other: no data
Year: 1983 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(88)

4.3 Toxicity to Aquatic Plants e.g. Algae

Species: Chlorella vulgaris (Algae)
Endpoint: growth rate
Exposure period: 24 hour(s)
Unit: mg/l **Analytical monitoring:** yes
EC50: > 245
Method: other
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Testmethod: EPA-600/9-78-018.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(89)
Species: Scenedesmus quadricauda (Algae)
Endpoint: growth rate
Exposure period: 7 day
Unit: mg/l **Analytical monitoring:** yes
NOEC: > 400
Method: other
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Method as described in reference.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(90)
Species: Scenedesmus subspicatus (Algae)
Endpoint: other: Hemmung der Zellvermehrung
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** no data
EC10: = 39 - 50
EC50: = 125 - 160
Method: other: nicht bekannt
Year: **GLP:** no data
Test substance: no data
Source: NEUBER GES.M.B.H. WIEN
(91)
- 65/118 -.date: 18-FEB-2000
4. Ecotoxicity Substance ID: 108-88-3

Species: Selenastrum capricornutum (Algae)
Endpoint: growth rate
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** yes
EC50: > 433
Method: other
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Testmethod: EPA-600/9-78-018.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(92)
Species: Selenastrum capricornutum (Algae)
Endpoint: other
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:**
NOEC: = 400
Method:
Year: **GLP:**
Test substance:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

4.4 Toxicity to Microorganisms e.g. Bacteria

Type: aquatic
Species: Entosiphon sulcatum (Protozoa)
Exposure period: 72 hour(s)
Unit: mg/l **Analytical monitoring:** yes
NOEC : = 456
Method: other
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Testmethod described in reference.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(93)
Type: aquatic
Species: Pseudomonas putida (Bacteria)
Exposure period: 16 hour(s)
Unit: mg/l **Analytical monitoring:** yes
NOEC : = 29
Method: other
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Testmethod in reference.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(94)
- 66/118 -.date: 18-FEB-2000
4. Ecotoxicity Substance ID: 108-88-3

Type: aquatic
Species: Pseudomonas putida (Bacteria)
Exposure period: 16 hour(s)
Unit: mg/l **Analytical monitoring:** no data
EC0: = 29
Method: other: nicht bekannt, Hemmung des Zellwachstums
Year: **GLP:** no data
Test substance: no data
Toluene VCCEP Submission
Appendix B: 2000 SIDS Dossier

Source: NEUBER GES.M.B.H. WIEN
(95)

Type: aquatic

Species: other bacteria: BASF-Belebtschlamm

Exposure period: 30 minute(s)

Unit: mg/l **Analytical monitoring:** no

EC20 : = 950

Method: other: Kurzzeitatmungstest

Year: 1979 **GLP:** no

Test substance:

Remark: Die hoechste getestete Konzentration mit < 20 % Hemmung betrug 750 mg/l.

Source: BASF AG Ludwigshafen

Reliability: (1) valid without restriction

Testdurchfuehrung nach allg. gueltigen und/oder akzeptierten Methodenvorschriften

dokumentierte Testparameter orientieren sich an den jeweils entsprechenden Methodenvorschriften

(96)

4.5 Chronic Toxicity to Aquatic Organisms

4.5.1 Chronic Toxicity to Fish

Species: Pimephales promelas (Fish, fresh water)

Endpoint: weight of young fish

Exposure period: 32 day

Unit: mg/l **Analytical monitoring:** yes

LOEC: = 6

Method: other

Year: 1982 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Remark: Testmethod as described in reference.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(97)

4.5.2 Chronic Toxicity to Aquatic Invertebrates

-

- 67/118 -.date: 18-FEB-2000

4. Ecotoxicity Substance ID: 108-88-3

TERRESTRIAL ORGANISMS

4.6.1 Toxicity to Soil Dwelling Organisms

Type: other: nicht bekannt

Species: Eisenia foetida (Worm (Annelida), soil dwelling)

Endpoint: other: nicht bekannt

Exposure period: 14 day

Unit: other: mg/kg Naß

LC50: > 100

Method: other: nicht bekannt

Year: **GLP:** no data

Test substance: no data

Source: NEUBER GES.M.B.H. WIEN

(98)

4.6.2 Toxicity to Terrestrial Plants

-

4.6.3 Toxicity to other Non-Mamm. Terrestrial Species

-

4.7 Biological Effects Monitoring

Toluene VCCEP Submission

54

September 29, 2006

Appendix B: 2000 SIDS Dossier

-

4.8 Biotransformation and Kinetics

-

4.9 Additional Remarks

-

- 68/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

5.1 Acute Toxicity

5.1.1 Acute Oral Toxicity

Type: LD50

Species: rat

Sex:

Number of

Animals:

Vehicle:

Value: = 636 mg/kg bw

Method: other: no data

Year: 1981 **GLP:** no data

Test substance: no data

Source: REPSOL PETROLEO, S.A. MADRID
(99)

Type: LD50

Species: rat

Sex:

Number of

Animals:

Vehicle:

Value: = 1332 mg/kg bw

Method: other

Year: **GLP:**

Test substance:

Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

Type: LD50

Species: rat

Sex:

Number of

Animals:

Vehicle:

Value: = 5000 mg/kg bw

Method: other: nicht bekannt

Year: 1959 **GLP:** no data

Test substance: no data

Source: NEUBER GES.M.B.H. WIEN
(100)

Type: LD50

Species: rat

Sex:

Number of

Animals:

Vehicle:

Value: > 5580 mg/kg bw

Method: other: BASF-test

Year: **GLP:** no

Test substance: as prescribed by 1.1 - 1.4

Remark: 7-days observation period; original value: LD50 > 6400 ul/kg
Reliability: 2 (reliable with restrictions)
acceptable, well documented study report which meets basic
scientific principles
Source: BASF AG Ludwigshafen
- 69/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

(101)
Type: LD50
Species: rat
Sex:
Number of
Animals:
Vehicle:
Value: = 5300 - 5910 mg/kg bw
Method: other
Year: 1975 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: This was the best conducted and best documented study
performed. It was considered representative of the reported
LD50 values which ranged from 5.5 - 8.0 g/kg. It was however
only performed in males.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn

(102)
Type: LDLo
Species: human
Sex:
Number of
Animals:
Vehicle:
Value: = 50 mg/kg bw
Method: other: no data
Year: 1980 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO, S.A. MADRID

(103)
5.1.2 Acute Inhalation Toxicity

Type: LC50
Species: rat
Sex:
Number of
Animals:
Vehicle:
Exposure time: 1 hour(s)
Value: > 26700 ppm
Method: other: no data
Year: 1981 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO, S.A. MADRID
(99)
- 70/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Type: LC50
Species: rat
Toluene VCCEP Submission
Appendix B: 2000 SIDS Dossier

Sex:
Number of
Animals:
Vehicle:
Exposure time:
Value: = 5320 ppm
Method:
Year: GLP:
Test substance:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Type: LC50
Species: rat
Sex:
Number of
Animals:
Vehicle:
Exposure time: 4 hour(s)
Value: = 28.1 mg/l
Method: other: BASF-test
Year: GLP: no
Test substance: as prescribed by 1.1 - 1.4
Remark: Reliability: 1 (reliable without restriction)
comparable to guideline study
whole body exposure; vapor.
Groups of 10 male and 10 female Sprague-Dawley rats were
exposed to test substance concentrations of 6.08, 20.00,
23.98, 38.87 and 61.80 mg/l for a 4-hour period.
Source: BASF AG Ludwigshafen
(104)
Type: LC50
Species: rat
Sex:
Number of
Animals:
Vehicle:
Exposure time: 6 hour(s)
Value: = 5879 - 6281 ppm
Method: other
Year: 1982 GLP: no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(105)
- 71/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Type: LC50
Species: rat
Sex:
Number of
Animals:
Vehicle:
Exposure time: 4 hour(s)
Value: = 12.5 - 28.8 mg/l
Method: other
Year: 1959 GLP: no
Test substance: as prescribed by 1.1 - 1.4

Remark: Females only.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(106)
Type: other: IRT
Species: rat
Sex:
Number of
Animals:
Vehicle:
Exposure time: 30 minute(s)
Value:
Method: other: BASF-test
Year: **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: No mortality after 8 minutes exposure in an atmosphere saturated or enriched with the testsubstance at 20 degrees centigrade (vapor). Mortality after prolonged exposure (4 out of 12 rats after 15 minutes and 6 out of 6 rats after 30minutes).
Reliability: 2 (reliable with restrictions) acceptable, well documented study report which meets basic scientific principles
Source: BASF AG Ludwigshafen
(101)
Type: other: IRT
Species: rat
Sex:
Number of
Animals:
Vehicle:
Exposure time: 30 minute(s)
Value:
Method: other: Smyth, H.F. et al.: Am. Ind. Hyg. Assoc. J. 23, 95-107
Year: 1962 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: No mortality after 10 minutes exposure in an atmosphere saturated or enriched with the testsubstance at 20 degrees centigrade (vapor). Mortality after prolonged exposure (5 out of 6 rats after 30 minutes). Eye irritation and irritation of the respiratory system were observed.
Reliability: 2 (reliable with restrictions) acceptable, well documented study report which meets basic scientific principles
- 72/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Source: BASF AG Ludwigshafen
(107)
Type: LC50
Species: mouse
Sex:
Number of
Animals:
Vehicle:
Exposure time: 8 hour(s)
Value: = 5320 ppm
Method: other: nicht bekannt

Year: 1943 **GLP:** no data
Test substance: no data
Source: NEUBER GES.M.B.H. WIEN
(108)
Type: LC50
Species: mouse
Sex:
Number of
Animals:
Vehicle:
Exposure time: 6 hour(s)
Value: = 6405 - 7436 ppm
Method: other
Year: 1982 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(109)
Type: other: TCLo
Species: human
Sex:
Number of
Animals:
Vehicle:
Exposure time:
Value: = 200 ppm
Method: other: no data
Year: 1943 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(110)
- 73/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

5.1.3 Acute Dermal Toxicity

Type: LD50
Species: rat
Sex:
Number of
Animals:
Vehicle:
Value: = 12124 mg/kg bw
Method: other: nicht bekannt
Year: 1969 **GLP:** no data
Test substance: no data
Source: NEUBER GES.M.B.H. WIEN
(111)
Type: LD50
Species: rabbit
Sex:
Number of
Animals:
Vehicle:
Value: = 12124 mg/kg bw
Method: other: no data
Year: 1969 **GLP:** no data

Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(112)
Type: LD50
Species: rabbit
Sex:
Number of
Animals:
Vehicle:
Value: = 12124 mg/kg bw
Method: other
Year: GLP:
Test substance:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Type: LD50
Species: rabbit
Sex:
Number of
Animals:
Vehicle:
Value: = 8390 - 18090 mg/kg bw
Method: other
Year: 1969 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(113)
- 74/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

5.1.4 Acute Toxicity, other Routes

Type: LD50
Species: rat
Sex:
Number of
Animals:
Vehicle:
Route of admin.: i.p.
Value: = 1332 mg/kg bw
Method: no data
Year: 1986 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(114)
Type: LD50
Species: mouse
Sex:
Number of
Animals:
Vehicle:
Route of admin.: i.p.
Value: ca. 66 mg/kg bw
Method: other: BASF-test
Year: **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: 7-days observation period; original value: LD50 ca. 76 ul/kg

Reliability: 2 (reliable with restrictions)
acceptable, well documented study report which meets basic
scientific principles

Source: BASF AG Ludwigshafen
(101)

Type: LC50

Species: rat

Sex:

Number of

Animals:

Vehicle:

Route of admin.: i.p.

Value: = 1330 - 1640 mg/kg bw

Method: other

Year: GLP:

Test substance:

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

- 75/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

Type: LD50

Species: rat

Sex:

Number of

Animals:

Vehicle:

Route of admin.: i.v.

Value: = 1960 mg/kg bw

Method: no data

Year: 1963 **GLP:** no data

Test substance: no data

Source: REPSOL PETROLEO, S.A. MADRID

(115)

Type: LD50

Species: rat

Sex:

Number of

Animals:

Vehicle:

Route of admin.: i.v.

Value: = 1960 mg/kg bw

Method: nicht bekannt

Year: 1963 **GLP:** no data

Test substance: no data

Source: NEUBER GES.M.B.H. WIEN

(116)

5.2 Corrosiveness and Irritation

5.2.1 Skin Irritation

Species: rabbit

Concentration:

Exposure:

Exposure Time:

Number of

Animals:

PDII:

Result: moderately irritating
EC classificat.: irritating
Method: other: no data
Year: 1970 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(117)
- 76/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: rabbit
Concentration:
Exposure:
Exposure Time:
Number of
Animals:
PDII:
Result: moderately irritating
EC classificat.: irritating
Method: other: no data
Year: 1982 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(118)
Species: rabbit
Concentration:
Exposure:
Exposure Time:
Number of
Animals:
PDII:
Result: moderately irritating
EC classificat.: not irritating
Method: other
Year: **GLP:**
Test substance:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Species: rabbit
Concentration:
Exposure:
Exposure Time:
Number of
Animals:
PDII:
Result: moderately irritating
EC classificat.: not irritating
Method: Draize Test
Year: 1982 **GLP:** no data
Test substance: no data
Source: NEUBER GES.M.B.H. WIEN
(119)
- 77/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: rabbit
Concentration:

Exposure:
Exposure Time:
Number of
Animals:
PDII:
Result: irritating
EC classificat.:
Method: other: BASF-test
Year: GLP: no
Test substance: as prescribed by 1.1 - 1.4
Remark: Reliability: 2 (reliable with restrictions)
acceptable, well documented study report which meets basic
scientific principles
The undiluted testsubstance was applied for 1, 5 and 15
minutes and for 20 hours on the back of the rabbits.
Scoring was carried out after 24 hours and after 8 days.
Source: BASF AG Ludwigshafen
(101)
Species: rabbit
Concentration:
Exposure:
Exposure Time:
Number of
Animals:
PDII:
Result: irritating
EC classificat.: irritating
Method: OECD Guide-line 404 "Acute Dermal Irritation/Corrosion"
Year: 1982 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: This was a study to compare/contrast three different
methods. The OECD (1979) method has been used for
evaluation.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(120)

5.2.2 Eye Irritation

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of
Animals:
Result: slightly irritating
EC classificat.: irritating
Method: other: no data
Year: 1982 **GLP:** no data
Test substance: no data
- 78/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Source: REPSOL PETROLEO, S.A. MADRID
(118)
Species: rabbit
Concentration:
Dose:

Exposure Time:
Comment:
Number of
Animals:
Result: slightly irritating
EC classificat.: irritating
Method: other: no data
Year: 1970 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(121)
Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of
Animals:
Result: irritating
EC classificat.: not irritating
Method: other
Year: GLP:
Test substance:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA
Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of
Animals:
Result: slightly irritating
EC classificat.: not irritating
Method: Draize Test
Year: 1982 **GLP:** no data
Test substance: no data
Source: NEUBER GES.M.B.H. WIEN
(122)
- 79/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of
Animals:
Result: not irritating
EC classificat.:
Method: other: BASF-test
Year: GLP: no
Test substance: as prescribed by 1.1 - 1.4
Remark: 50 ul of the undiluted testsubstance were applied to the conjunctival sac of the rabbit eye. Scoring was carried out after 1 and 24 hours and after 8 days.
Reliability: 2 (reliable with restrictions)

acceptable, well documented study report which meets basic scientific principles
Source: BASF AG Ludwigshafen
(101)
Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of
Animals:
Result: irritating
EC classificat.: irritating
Method: OECD Guide-line 405 "Acute Eye Irritation/Corrosion"
Year: 1982 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: This study supports older data that indicates some irritation to the eye (Smyth et al, 1969, Wolf et al, 1956).
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(123)
Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of
Animals:
Result: irritating
EC classificat.: irritating
Method: Draize Test
Year: 1990 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(124)
- 80/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

5.3 Sensitization

Type: other
Species: guinea pig
Number of
Animals:
Vehicle:
Result: ambiguous
Classification:
Method: other
Year: **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: No data exists other than an incomplete Russian reference quoted in an HSE Review (1989). No conclusions can be drawn from this Russian reference.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
Type: other
Species: rat

Number of Animals:
Vehicle:
Result: not sensitizing
Classification:
Method:
Year: GLP:
Test substance:
Source: ORLANDI VITTORIO SpA ROSA'' - VICENZA

5.4 Repeated Dose Toxicity

Species: rat **Sex:** male/female
Strain: Fischer 344
Route of admin.: inhalation
Exposure period: 103 days
Frequency of treatment: 6.5 hr/day, 5 day/week
Post. obs. period:
Doses: 0, 600, 1200 ppm
Control Group: yes, concurrent no treatment
Method: other: no data
Year: 1990 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: REPSOL PETROLEO,S.A. MADRID
- 81/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: rat **Sex:** male/female
Strain: Sprague-Dawley
Route of admin.: inhalation
Exposure period: 26 weeks
Frequency of treatment: 6 hr/day, 5 day/week
Post. obs. period: no available
Doses: 0,100,1500 ppm
Control Group: yes, concurrent no treatment
Method: other: no data
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: 13th week : increases in the hematocrit and hemoglobin levels (females, dose:1500 ppm).
26th week : decreased mean blood clotting time and increased mean serum glutamic pyruvic transaminas (females, dose:100 ppm) and decreased in glucosse levels (females, dose: 1500 ppm)
Source: REPSOL PETROLEO,S.A. MADRID
(125)
Species: rat **Sex:** male/female
Strain: Fischer 344
Route of admin.: inhalation
Exposure period: 6.5 hours/day
Frequency of treatment: 5 days/week for 15 weeks.
Post. obs. period: none
Doses: 100, 625, 1250, 2500 and 3000 ppm
Toluene VCCEP Submission
Appendix B: 2000 SIDS Dossier

Control Group: yes
NOAEL: < 100 ppm
LOAEL: = 100 ppm
Method: Directive 87/302/EEC, part B, p. 20 "Sub-chronic inhalation toxicity study: 90-day repeated dose study using rodent species"
Year: 1990 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(126)
- 82/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: rat **Sex:** male/female
Strain: no data
Route of admin.: inhalation
Exposure period: 6 hours/day
Frequency of treatment: 5 days/week for 13 weeks.
Post. obs. period: none
Doses: 30, 100, 300, 1000 ppm
Control Group: yes
NOAEL: = 1000 ppm
Method: Directive 87/302/EEC, part B, p. 20 "Sub-chronic inhalation toxicity study: 90-day repeated dose study using rodent species"
Year: 1978 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(127)
Species: rat **Sex:** male/female
Strain: Sprague-Dawley
Route of admin.: inhalation
Exposure period: 6 hours/day, 5 days/ week for 26 weeks.
Frequency of treatment: daily
Post. obs. period: none
Doses: 100, 1500 ppm (2000 ppm for two weeks).
Control Group: yes
NOAEL: = 100 ppm
LOAEL: = 1500 ppm
Method: other
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: Neurotoxicity investigated - no effect.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(128)
- 83/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: rat **Sex:** male/female
Strain: Fischer 344

Route of admin.: gavage
Exposure period: 13 weeks
Frequency of treatment: daily, 5 days/ week.
Post. obs. period: none
Doses: 312, 625, 1250, 2500, 5000 mg/kg/day
Control Group: yes
NOAEL: = 312 mg/kg bw
LOAEL: = 625 mg/kg bw
Method: Directive 87/302/EEC, part B, p. 8 "Sub-chronic oral toxicity test: 90-day repeated oral dose using rodent species"
Year: 1990 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(126)
Species: mouse **Sex:** male/female
Strain: B6C3F1
Route of admin.: inhalation
Exposure period: 6.5 hours/day
Frequency of treatment: 5 days/week for 14 weeks.
Post. obs. period: none
Doses: 100, 625, 1250, 2500 ppm
Control Group: yes
NOAEL: < 100 ppm
LOAEL: = 100 ppm
Method: Directive 87/302/EEC, part B, p. 20 "Sub-chronic inhalation toxicity study: 90-day repeated dose study using rodent species"
Year: 1990 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(126)
- 84/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: mouse **Sex:** male/female
Strain: B6C3F1
Route of admin.: gavage
Exposure period: 13 weeks
Frequency of treatment: daily, 5 days/week.
Post. obs. period: none
Doses: 312, 625, 1250, 2500, 5000 mg/kg/day
Control Group: yes
NOAEL: < 312 mg/kg bw
LOAEL: = 625 mg/kg bw
Method: Directive 87/302/EEC, part B, p. 8 "Sub-chronic oral toxicity test: 90-day repeated oral dose using rodent species"
Year: 1990 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn
(126)
Species: mouse **Sex:** male/female
Strain: C3H
Route of admin.: dermal
Exposure period: 12 months
Frequency of treatment: 2 times/week
Post. obs. period: none
Doses: 50 ul (44 mg)
Control Group: no
NOAEL: < 50
LOAEL: = 50
Method: other
Year: 1987 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(129)

5.5 Genetic Toxicity 'in Vitro'

Type: Ames test
System of testing: S.typhimurium
Concentration: no data
Metabolic activation: with and without
Result: negative
Method: other: no data
Year: 1981 **GLP:** no data
Test substance: no data
Source: REPSOL PETROLEO,S.A. MADRID
(130)
- 85/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Type: Cytogenetic assay
System of testing: CHO Cells
Concentration: 50-5000 ug/ml (activated) and 16-1600 ug/ml (non-activated).
Metabolic activation: with and without
Result: negative
Method: other
Year: 1990 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(126)
Type: Cytogenetic assay
System of testing: human lymphocytes
Concentration: 15.2-1520 ug/ml for three days.
Metabolic activation: without
Result: negative

Method: other
Year: 1978 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(131)
Type: Escherichia coli reverse mutation assay
System of
testing: Strain WP 2
Concentration: 87-8700 ug/plate
Metabolic
activation: with and without
Result: negative
Method: other
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(132)
Type: Gene mutation in Saccharomyces cerevisiae
System of
testing: Strain D7
Concentration: 4350 ug/plate
Metabolic
activation: with and without
Result: negative
Method: other
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(133)
- 86/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Type: Gene mutation in Saccharomyces cerevisiae
System of
testing: Strain D4
Concentration: 4350 ug/plate
Metabolic
activation: with and without
Result: negative
Method: other
Year: 1978 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(134)
Type: Mouse lymphoma assay
System of
testing: L5178Y TK Cells.
Concentration: 31.25-500 ug/ml (unactivated), 6.25-200 ug/ml
(activated).
Metabolic
activation: with and without
Result: ambiguous
Method: other

Year: 1988 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(135)

Type: Mouse lymphoma assay
System of testing: L5178Y TK+/- cells
Concentration: 43.5-261 ug/ml

Metabolic activation: with and without
Result: negative
Method: other

Year: 1978 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(134)

Type: Mouse lymphoma assay
System of testing: TK locus in cultured L5178Y mouse lymphoma cells.
Concentration: 0.30,0.20,0.15,0.10, and 0.050 ul/ml.

Metabolic activation: with and without
Result: negative
Method: other: no data

Year: 1978 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: REPSOL PETROLEO,S.A. MADRID
(136)

- 87/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Type: Salmonella typhimurium reverse mutation assay
System of testing: Strains TA 98, 100, 1535, 1537, 1538.
Concentration: 87 - 8700 ug/plate.

Metabolic activation: with and without
Result: negative
Method: other

Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(132)

Type: Salmonella typhimurium reverse mutation assay
System of testing: Strains TA 98, 100, 1535, 1537, 1538.
Concentration: 0.87-4300 ug/plate.

Metabolic activation: with and without
Result: negative
Method: other

Year: 1978 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn
(137)

Type: Salmonella typhimurium reverse mutation assay

System of

testing: Strains TA 98, 100, 1535, 1537.

Concentration: 10-1000 ug/plate

Metabolic

activation: with and without

Result: negative

Method: other

Year: 1983 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(138)

Type: Sister chromatid exchange assay

System of

testing: CHO Cells

Concentration: 50-5000 ug/ml (activated) and 16-1600 ug/ml
(unactivated).

Metabolic

activation: with and without

Result: negative

Method: other

Year: 1990 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(139)

- 88/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

Type: Sister chromatid exchange assay

System of

testing: CHO Cells

Concentration: 108-1740 ug/ml (activated) and 117-348 ug/ml
(unactivated).

Metabolic

activation: with and without

Result: negative

Method: other

Year: 1980 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(132)

Type: Sister chromatid exchange assay

System of

testing: human lymphocytes

Concentration: 15.2-1520 ug/ml for three days.

Metabolic

activation: without

Result: negative

Method: other

Year: 1978 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn
(140)

5.6 Genetic Toxicity 'in Vivo'

Type: Cytogenetic assay

Species: rat **Sex:** no data

Strain: no data

Route of admin.: i.p.

Exposure period: single or daily for 5 days

Doses: 21.8, 71.3 or 215 mg/kg

Result:

Method: other

Year: 1978 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Result: No increase in incidence of chromosomal aberrations in the bone marrow.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(141)

- 89/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

Type: Cytogenetic assay

Species: mouse **Sex:** male/female

Strain: CD-1

Route of admin.: gavage

Exposure period: 2 doses separated by 24 hours.

Doses: 1.76 g/kg

Result:

Method: other

Year: 1984 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Result: No increase in incidence of mouse bone marrow cell chromosome aberrations.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(142)

Type: Dominant lethal assay

Species: mouse **Sex:** male

Strain: CD-1

Route of admin.: unspecified

Exposure period: 8 weeks

Doses: 0, 100, 400 ppm

Result:

Method: other: no data

Year: **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Result: Negativ

Source: REPSOL PETROLEO, S.A. MADRID

(143)

Type: Micronucleus assay

Species: mouse **Sex:** male

Strain: Swiss

Route of admin.: i.p.

Exposure period: Two doses given separated by 24 hours.

Doses: 250, 500, 1000 mg/kg

Result:

Method: other

Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: No increase in incidence of micronuclei in vivo.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(144)
- 90/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Type: Micronucleus assay
Species: mouse **Sex:** male/female
Strain: CD-1
Route of admin.: gavage
Exposure period: two doses separated by 24 hours.
Doses: 860, 1760 mg/kg
Result:
Method: other
Year: 1984 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: No increase in incidence of micronuclei in vivo.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(145)

Type: Micronucleus assay
Species: mouse **Sex:** male
Strain: NMRI
Route of admin.: i.p.
Exposure period: two injections separated by 24 hours
Doses: 108, 217, 325, 435 mg/kg
Result:
Method: other

Year: 1985 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: Incidence of micronuclei increased above treatment levels of 217 mg/kg in the NMRI mouse. In the B6C3F1 mouse, 108 mg/kg resulted in increased incidence of micronuclei.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(146)

Type: Micronucleus assay
Species: mouse **Sex:** female
Strain: Swiss
Route of admin.: i.p.
Exposure period: 0 and 24 hr
Doses: 250, 500, 1000 mg/Kg
Result:
Method: other: no data

Year: 1980 **GLP:** no data
Test substance: no data
Result: Positive
Source: REPSOL PETROLEO,S.A. MADRID
(147)
- 91/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Type: Sister chromatid exchange assay
Species: mouse **Sex:** male
Toluene VCCEP Submission
Appendix B: 2000 SIDS Dossier

Strain: DBA
Route of admin.: i.p.
Exposure period: single
Doses: 1700 and 3000 mg/kg
Result:
Method: other
Year: 1981 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: No induction of SCE noted
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(148)
Type: Sister chromatid exchange assay
Species: rat **Sex:** no data
Strain: Wistar
Route of admin.: inhalation
Exposure period: 6 hours/day, 5 days/week for up to 15 weeks.
Doses: 300 ppm
Result:
Method: other
Year: 1981 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: No increase in rat bone marrow chromosomal aberrations and no significant increase in sister chromatid exchange.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(149)

5.7 Carcinogenicity

Species: mouse **Sex:** male
Strain: C3H
Route of admin.: dermal
Exposure period: lifespan.
Frequency of treatment: 2 times weekly.
Post. obs. period: none
Doses: 50 ul (44 mg)
Result:
Control Group: no
Method: other
Year: 1989 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Result: Skin irritation was evident. Males developed a low (8%) incidence of malignant skin tumours at the treatment site, which were attributed to treatment. There was no indication of any systemic effect or any dermal changes at any remote dermal sites.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(150)
- 92/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: rat **Sex:** male/female
Strain: Sprague-Dawley
Route of admin.: gavage
Exposure period: 2 years

Frequency of

treatment: 4-5 times/week

Post. obs.

period: none

Doses: 500 mg/kg

Result:

Control Group: yes

Method: other

Year: 1985 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Result: A generalised comment indicating an increased incidence of malignant tumours was reported. No specific classification of tumour type is available as this was a summary report of 'ongoing' research. Apparently, no definitive final report is available in the literature.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(151)

Species: rat **Sex:** male/female

Strain: no data

Route of admin.: inhalation

Exposure period: 18 moths

Frequency of

treatment: 6 hr/day, 5 day/week

Post. obs.

period: no data

Doses: 0, 30, 100, 300 ppm

Result:

Control Group: yes, concurrent no treatment

Method: other: no data

Year: **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Result: Negativ

Source: REPSOL PETROLEO,S.A. MADRID

(152)

- 93/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

Species: rat **Sex:** male/female

Strain: Fischer 344

Route of admin.: inhalation

Exposure period: 6.5 hours/day, 5 days/week

Frequency of

treatment: 2 years.

Post. obs.

period: none

Doses: 600, 1200 ppm

Result:

Control Group: yes

Method: other

Year: 1990 **GLP:** yes

Test substance: as prescribed by 1.1 - 1.4

Result: No evidence of carcinogenic activity. Non-neoplastic changes seen in the nasal cavity of both groups of treated rats. Nephropathy seen in top dose group rats. A slight increase in fore-stomach lesions seen in male rats.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn
(153)
Species: rat **Sex:** male/female
Strain: Fischer 344
Route of admin.: inhalation
Exposure period: 6 hours/day, 5 days/week
Frequency of treatment: up to 2 years.
Post. obs. period: none
Doses: 30, 100, 300 ppm
Result:
Control Group: yes
Method: Directive 87/302/EEC, part B, p. 37 "Combined chronic toxicity/carcinogenicity test"
Year: 1983 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: No carcinogenic or toxic response noted.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(154)
- 94/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: mouse **Sex:** male/female
Strain: B6C3F1
Route of admin.: inhalation
Exposure period: 6.5 hours/day, 5 days/week.
Frequency of treatment: 2 years.
Post. obs. period: none
Doses: 120, 600, 1200 ppm
Result:
Control Group: yes
Method: Directive 87/302/EEC, part B, p. 32 "Carcinogenicity test"
Year: 1990 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Result: No evidence of carcinogenic action. Increased pigmentation of the spleen was seen in treated males.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(155)
Species: rat **Sex:** male/female
Strain: Fischer 344
Route of admin.: other: no data
Exposure period: 106 weeks
Frequency of treatment: no data
Post. obs. period: no data
Doses: no data
Result:
Control Group: no data specified
Method: other: no data
Year: 1980 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4

Result: Negative
Source: REPSOL PETROLEO,S.A. MADRID
(156)
- 95/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

5.8 Toxicity to Reproduction

Type: Fertility
Species: mouse **Sex:** male
Strain: CD-1
Route of admin.: inhalation
Exposure Period: 6 hours/day, 5 days/week for 8 weeks.
Frequency of treatment: daily
Premating Exposure Period
male: not relevant
female: not relevant
Duration of test: 8 weeks
Doses: 100, 400 ppm
Control Group: yes
NOAEL Parental: = 400 ppm
Method: other
Year: 1981 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Study was a Dominant Lethal study.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(157)

Type: Fertility
Species: rabbit **Sex:** female
Strain: no data
Route of admin.: inhalation
Exposure Period: days 7-20 of gestation
Frequency of treatment:
Duration of test: no data
Doses: TCLo: 1 gm/m3/24 hr.
Control Group: no data specified
Method: other: no data
Year: 1985 **GLP:** no data
Test substance: no data
Result: Abortio
Source: REPSOL PETROLEO,S.A. MADRID
(158)
- 96/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Type: Two generation study
Species: rat **Sex:** male/female
Strain: Sprague-Dawley
Route of admin.: inhalation
Exposure Period: Pre-mating, mating, days 1-20 gestation, days 5-21 lactation.
Frequency of treatment: 6 hours/day, 7 days/week.
Duration of test: To end of organogenesis of F2 generation.

Doses: 100, 500, 2000 ppm
Control Group: yes
NOAEL Parental: = 500 ppm
NOAEL F1 Offspr.: = 500 ppm
NOAEL F2 Offspr.: = 500 ppm
Method: other
Year: 1985 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(159)

5.9 Developmental Toxicity/Teratogenicity

Species: rat **Sex:** female
Strain: CD-1
Route of admin.: inhalation
Exposure period: days 6-15 of gestation
Frequency of treatment: 6 hr/day
Duration of test: until 20th gestation day
Doses: 0,100,400 ppm
Control Group: yes, concurrent no treatment
Method: other: no data
Year: 1978 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: There were no significant differences observed between treated and control animals
Source: REPSOL PETROLEO,S.A. MADRID
(136)
- 97/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: rat **Sex:** female
Strain: Sprague-Dawley
Route of admin.: inhalation
Exposure period: 6 hours/day, days 6-15 of pregnancy.
Frequency of treatment: daily
Duration of test: to weaning
Doses: 250, 750, 1500, 3000 ppm
Control Group: yes
NOAEL Maternalt.: = 750 ppm
NOAEL Teratogen.: = 750 ppm
Method: Directive 87/302/EEC, part B, p. 24 "Teratogenicity test - rodent and non-rodent"
Year: 1992 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(160)
Species: mouse **Sex:** female
Strain: CD-1
Route of admin.: inhalation
Exposure period: Days 7 through 16 of gestation
Frequency of treatment: 7 hr/day
Duration of test: 17 days during gestation
Doses: 0,200, 400 ppm

Control Group: yes, concurrent no treatment
Method: other: no data
Year: 1986 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Result: Musculoskeletal system abnormalities in fetus
Source: REPSOL PETROLEO,S.A. MADRID
(161)
Species: mouse **Sex:** female
Strain: CD-1
Route of admin.: inhalation
Exposure period: 7 hours/day, days 7-16 of gestation.
Frequency of treatment: daily
Duration of test: to parturition
Doses: 750, 1500 mg/m3 (200, 400 ppm)
Control Group: yes
NOAEL Maternalt.: = 400 ppm
NOAEL Teratogen.: = 400 ppm
Method: other
Year: 1986 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(162)
- 98/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

Species: mouse **Sex:** female
Strain: other
Route of admin.: inhalation
Exposure period: 3 x 4 hours/day on days 6-15 gestation, also top dose
24
hours/day on days 7-15.
Frequency of treatment: daily
Duration of test: post-organogenesis.
Doses: 500, 1000, 1500 mg/m3 (131, 261, 392 ppm)
Control Group: yes
NOAEL Maternalt.: = 392 ppm
NOAEL Teratogen.: < 131 ppm
Method: other
Year: 1983 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: The top dose level was lethal to all dams. At the two lower
dose levels, there was no reported maternal toxicity, but
there was a statistically significant increase in pup body
weight and increased incidence of skeletal abnormalities.
This was not noted to follow a dose-related response.
Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(163)
Species: rabbit **Sex:** female
Strain: other: russian, Chbb HM
Route of admin.: inhalation
Exposure period: days 6 through 18 of pregnancy
Frequency of treatment: daily, 6 hours per day

Duration of test: up to day 29 of pregnancy
Doses: 0.113, 0.389, 1.14 mg/l (30, 100, 300 ppm)
Control Group: yes, concurrent vehicle
NOAEL Maternalt.: 1.14 mg/l
NOAEL Teratogen.: 1.14 mg/l
Method: OECD Guide-line 414 "Teratogenicity"
Year: 1981 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Result: Fifteen pregnant rabbits per dose group (14 in the control group) were exposed to various test substance concentrations (0, 30, 100, 300 ppm; whole body exposure system). No substance-related maternal mortality occurred; one dam of the low-dose group was sacrificed on day 28 of pregnancy after abortion on day 27. Another dam of the low-dose group showed purulent discharge (conjunctivitis); this finding was assessed as random. Pathologic examination of the dams showed no substance-related alterations. Uterine weights and conceptional rate of the dosed dams were unchanged compared to the control. The number of dead implantations was marginally increased in all dose groups by an increased number of early resorptions. Correspondingly, the number of postimplantation losses was dose-dependent increased, but these findings were within the range of historical control data and were not of biological relevance. No changes were observed in the number of living fetuses / dam, the number of corpora lutea and the number of preimplantation losses. Fetal weights, placental weights and sex distribution of - 99/118 -.date: 18-FEB-2000
5. Toxicity Substance ID: 108-88-3

fetuses in the test groups were similar to the control. External examination of the fetuses revealed no malformations and no retardations. There were neither soft tissue nor skeletal malformations, variations or retardations of biological relevance. A statistically significant increase in skeletal retardation (ossification of the sternum) was observed in all treatment groups, but was assessed to be random because of no dose-response and because of the historical control data. Based on these results, the NOAEL on the maternal and the fetal organism was 1.14 mg/l (300 ppm); no teratogenic effect was observed.

Source: BASF AG Ludwigshafen
Test substance: Reliability: 1 (reliable without restriction)
OECD guideline study
(164)
Species: rabbit **Sex:** female
Strain: other: russian, Chbb HM
Route of admin.: inhalation
Exposure period: days 6 through 18 of pregnancy
Frequency of treatment: daily, 6 hours per day
Duration of test: up to day 29 of pregnancy
Doses: 0.382, 1.91 mg/d (100, 500 ppm)
Control Group: yes, concurrent vehicle
NOAEL Maternalt.: 1.91 mg/l
NOAEL Teratogen.: 1.91 mg/l
Method: OECD Guide-line 414 "Teratogenicity"
Year: 1981 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4

Result: Twenty pregnant rabbits were used per treatment and control group. No substance-related effects were observed on body weights and body weight gains. No mortality occurred and no symptoms were observed in the test groups. There were no pathological findings; the uterine weights were unchanged. The conceptional rate, the number of corpora lutea, of implantation sites, resorptions, living and dead fetuses, pre- and postimplantation losses were within control ranges. Observed alterations were not statistically significant and not biologically relevant. Sex distribution of fetuses, placenta weights and fetus weights in the test groups were not statistically significant altered. There were no external malformations or variations. The few observed soft tissue and skeletal malformations, variations and retardations were random, within actual and historical control ranges and not substance-related. Based on these results, the NOAEL on the maternal and the fetal organism was 1.91 mg/l (500 ppm). No teratogenic effect was observed.

Source: BASF AG Ludwigshafen

Test substance: Reliability: 1 (reliable without restriction)
OECD guideline study; GLP
(165)

- 100/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

Species: rabbit **Sex:** female

Strain: Himalayan

Route of admin.: inhalation

Exposure period: 6 hours/day, days 6-18 of gestation

Frequency of

treatment: daily

Duration of test: To weaning

Doses: 30, 100, 300, 500 ppm

Control Group: yes

NOAEL Maternalt.: = 500 ppm

NOAEL Teratogen.: = 500 ppm

Method: OECD Guide-line 414 "Teratogenicity"

Year: 1992 **GLP:** yes

Test substance: as prescribed by 1.1 - 1.4

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

(166)

Species: rabbit **Sex:** female

Strain: New Zealand white

Route of admin.: inhalation

Exposure period: 24 hours/day on days 0-20 of gestation.

Frequency of

treatment: continuous

Duration of test: to day 20.

Doses: 500 and 1000 mg/m³ (131 and 261 ppm)

Control Group: yes

NOAEL Maternalt.: = 131 ppm

NOAEL Teratogen.: > 131 ppm

Method: other

Year: 1983 **GLP:** no data

Test substance: as prescribed by 1.1 - 1.4

Remark: At 1000 mg/m³, there was clear maternal toxicity and no

foetal parameters were reported. At 500 mg/m³, there was a slight, but non-statistically significant, reduction in maternal body weight, however there were no foetal effects noted.

Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn
(167)

5.10 Other Relevant Information

Type: Biochemical or cellular interactions

Remark: Toluene has shown weak tumour promoting potential in initiating/promoting experiments with DMBA applied to the ear of Swiss mice.

Ref: Frei, J.V., Kingsley, W.F., J. Nat. Cancer Inst. 41: 1307-1313, 1968.

Ref: Frei, J.V., Stephens, P., Brit. J. Cancer., 22: 83-92, 1968.

Toluene has also been demonstrated as possibly having some
- 101/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

co-carcinogenic potential in conjunction with MCA
(3-methylcholanthrene).

Ref: Mazzucco, K., Oesterreichische Zeit. Onkol. 2: 49-51, 1976.

Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn

Type: Excretion

Remark: Although some absorbed toluene may be reexhaled by lung, major excretory pathway is rapid oxidation of toluene to benzoic acid, which is conjugated with glycine and excreted as hippuric acid in urine within reasonable limits, excretion of hippuric acid in urine is proportional to exposure. An exposure of 200ppm of toluene resulted in excretion of 3.5 g hippuric acid per liter of urine (specific gravity 1.016)

Source: REPSOL PETROLEO,S.A. MADRID
(168)

Type: Immunotoxicity

Remark: Male CD-1 mice received 0, 17, 80 and 405 mg/l toluene in the drinking water for 28 days (equivalent to 0, 5, 22 & 105 mg/kg). The splenocyte lymphoproliferative response was reduced at the top dose only. The ability of splenic lymphocytes to respond to alloantigens was unaffected. The primary antibody response to Sheep red blood cells (SRBC) was also decreased at the highest dose level, but there was no reduction in the serum SRBC antibody. Interleukin 2 synthesis was also adversely affected at the top dose level.

Ref: Hsieh, G.C., Sharma, R.P., Parker, R.D.R., Env. Res., 49: 93-103, 1989.

Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn

Type: Metabolism

Remark: The metabolism of Toluene has been extensively studied and reviewed. The HSE Toxicity Review No. 20, 1989 summarises the metabolism of Toluene as follows:

Toluene is readily absorbed through the respiratory and gastrointestinal tracts, following exposure to liquid and vapour. Toluene is widely distributed through all tissues with the highest concentration in the adipose tissue. Distribution studies in the brain show the brain stem to have higher concentrations than other parts of the brain.

Peak blood levels have been reported within an hour of exposure with half lives of about 30 minutes in rats and mice. Toluene is rapidly excreted in the urine mainly as hippuric acid, other minor urinary components are O- and P-cresol, benzyl glucuronide (30% in mice) and benzylmercapturic acid. Excretion of unchanged toluene in the expired air is a significant route of elimination. Faecal excretion is negligible.

Source: Deutsche Shell Chemie GmbH Eschborn

Deutsche Shell Chemie Eschborn

- 102/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

Type: Neurotoxicity

Remark: Toluene at low concentration, less than 100ppm, may produce disturbances in dopaminergic mechanisms of the basal ganglia probably leading to functional changes in sensory-motor integration

Source: REPSOL PETROLEO,S.A. MADRID
(169)

Type: Neurotoxicity

Remark: The neurotoxic potential of toluene has been extensively reviewed (ECETOC, Report No. 7, 1993; HSE Toxicity Review 20, 1989; ATSDR Toxicology Profile (Draft), 1993; EUCLID dataset, 1994).

A 26 week rat exposure of up to 1500 ppm toluene to investigate neurotoxicity did not reveal any abnormalities (API, Report from Institute of Neurotoxicity, 1980).

Exposure of rats to 500 or 1500 ppm, 6 hours/day, 5 days/week for 26 weeks showed no changes in behaviour or neuropathology, but did show irreversible changes in the regional amine content of the brain (Ladefoged, O., Strange, P., Moller, A., Lam, H.R., Ostergaard, G., Larsen, J-J., Arlein-Soborg, P., Pharmacol. Toxicol. 68(5): 384-390, 1991).

Investigation of effects on developing CNS (postnatal day 1 to 28 at 100 or 500 ppm) showed a reduction in the size of the granule layer of the area dentata. The volume of the hilus and the commissural-associational zone of the dentate molecular layer was also reduced (Slomianka, L., Edelfors, S., Ravn-Jonsen, A., Rungby, J., Danscher, G., West, M.J., Toxicology 62: 189-202, 1990).

Ototoxicity has been demonstrated in rats at levels of 1000 ppm for 14 hours/day for 2 weeks and 2000 ppm for 8 hours/day for 3 days. 700 ppm for 14 hours/day for 16 weeks had no effect (Pyror G.T., Rebert, C.S., Dickinson, J., Feeney, E.M., Neurobehavioural Toxicol, Teratol., 6: 223-238, 1984).

A single oral dose of 5 ml/kg toluene was given to rats and behaviour analysed (API, Medical Research Publication 30-32836, June 1983). Some mortality and general depression was observed, although specific tests (Open field, circadian pattern, learning, memory, neuromuscular function) did not show any specific effect.

HSE Toxicity Review 20 concluded that acute inhalation exposure to toluene at about 1000 ppm increased unconditioned activity. At higher concentrations, 2200 ppm, CNS depression with ataxia, narcosis and anaesthesia were observed.

Source: Deutsche Shell Chemie GmbH Eschborn

- 103/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

Type: Neurotoxicity

Remark: The neurotoxic potential of toluene has been extensively reviewed (ECETOC, Report No. 7, 1993; HSE Toxicity Review 20, 1989; ATSDR Toxicology Profile (Draft), 1993; EUCLID dataset, 1994).

A 26 week rat exposure of up to 1500 ppm toluene to investigate neurotoxicity did not reveal any abnormalities (API, Report from Institute of Neurotoxicity, 1980). Exposure of rats to 500 or 1500 ppm, 6 hours/day, 5 days/week for 26 weeks showed no changes in behaviour or neuropathology, but did show irreversible changes in the regional amine content of the brain (Ladefoged, O., Strange, P., Moller, A., Lam, H.R., Ostergaard, G., Larsen, J-J., Arlein-Soborg, P., Pharmacol. Toxicol. 68(5): 384-390, 1991).

Investigation of effects on developing CNS (postnatal day 1 to 28 at 100 or 500 ppm) showed a reduction in the size of the granule layer of the area dentata. The volume of the hilus and the commissural-associational zone of the dentate molecular layer was also reduced (Slomianka, L., Edelfors, S., Ravn-Jonsen, A., Rungby, J., Danscher, G., West, M.J., Toxicology 62: 189-202, 1990).

Ototoxicity has been demonstrated in rats at levels of 1000 ppm for 14 hours/day for 2 weeks and 2000 ppm for 8 hours/day for 3 days. 700 ppm for 14 hours/day for 16 weeks had no effect (Pyror G.T., Rebert, C.S., Dickinson, J., Feeney, E.M., Neurobehavioural Toxicol, Teratol., 6: 223-238, 1984).

A single oral dose of 5 ml/kg toluene was given to rats and behaviour analysed (API, Medical Research Publication 30-32836, June 1983). Some mortality and general depression was observed, although specific tests (Open field, circadian pattern, learning, memory, neuromuscular function) did not show any specific effect.

HSE Toxicity Review 20 concluded that acute inhalation exposure to toluene at about 1000 ppm increased unconditioned activity. At higher concentrations, 2200 ppm, CNS depression with ataxia, narcosis and anaesthesia were observed.

Source: Deutsche Shell Chemie Eschborn

Type: other

Remark: THERE ARE MANY SCIENTIFIC REFERENCES COVERING THE TOXICOLOGY OF TOLUENE; MORE THAN 700 HAVE BEEN CITED IN WELL ESTABLISHED RECENT REVIEWS AND MANY OF THESE HAVE BEEN APPRAISED DURING THE HEDSET COMPILATION. ONLY REFERENCES WHICH ARE REPRESENTATIVE AND HAVE A HIGHER, SUPPORTABLE, QUALITY HAVE BEEN USED IN THIS HEDSET. KEY REFERENCE DOCUMENTS USED IN THE INITIAL SELECTION WERE:

UK HSE REVIEW, NO.20 (1989)

ECETOC REPORT NO. 7 (1993)

- 104/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

US ATSDR TOXICOLOGY PROFILE (DRAFT, 1993)

BASF EUCLID DATASET (1994)

GERMAN MAK EVALUATION, TOLUOL, (1993).

A LARGE NUMBER OF REFERENCES ARE COVERED IN ALL OF THESE REVIEWS. MORE RECENT INFORMATION WHICH HAS BEEN AVAILABLE UP TO EARLY 1994 HAS BEEN USED TO SUPPLEMENT THESE LENGTHY DOCUMENTS IN THE FINAL SELECTION OF HEDSET DATA.

Source: Deutsche Shell Chemie GmbH Eschborn
Deutsche Shell Chemie Eschborn

5.11 Experience with Human Exposure

Remark: In human volunteers exposed to concn as high as 800 ppm dilation of pupils and impairment of rection in association with fatigue at end of 8 hr, also slight pallor of fundi are noticed

Source: REPSOL PETROLEO,S.A. MADRID
(170)

Remark: Workers in pharmaceutical plant in France exposed to toluene developed leukopenia and neutropenia. Within the following 6 months, those afected showed increment in coagulation time and decrement in prothrombin level

Source: REPSOL PETROLEO,S.A. MADRID
(171)

Remark: Es liegen keine Untersuchungsberichte der BASF vor.

Source: BASF AG Ludwigshafen

Remark: Es liegen keine Untersuchungsberichte der BASF vor.

Source: BASF AG Ludwigshafen

Remark: As a common solvent, there is a plethora of clinical data published regarding toluene. Much of this literature is confused and contradictory. A summary may be considered as follows:

Acute exposure to Toluene has been reported to mainly involve the CNS. Dizziness, headache, fatigue and respiratory tract infection have been noted at 50-100 ppm. Loss of conciousness has been reported at approximately 10,000 ppm. Workers exposed at 7000 ppm have shown paresis, amnesia and stupefaction.

There is little hazard from toluene with regard to irritancy and sensitisation. However, extensive superficial burns have been reported for a worker exposed for 18 hours to liquid and vapourised toluene. A threshold for eye irritation has been determined to be 80 ppm.

Evidence for neurotoxicity is derived from occupational exposure and solvent abuse. Signs consistently reported include headache, dizziness, vertigo, tinnitus, dysarthria, ataxia, memory loss and lack of co-ordination. Some EEG abnormalities have been reported in cases of solvent abuse
- 105/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

where slow wave abnormalities predominate. Hallucinations and schizophreniform have been reported. Peripheral neuropathy has been reported in a large number of solvent abusers.

Controlled studies using exposed populations (printers and rubberised matting workers) have not produced any satisfactory or conclusive information, mainly due to the problems in obtaining accurate exposure data. There was no substantial evidence of chronic CNS dysfunction following exposure to toluene between levels of 50-200 ppm.

Liver damage has also been implemented as a result of tolene toxicity, However, studies suggesting this usually use mixed solvents and later studies effectively dismiss this as a consideration.

Kidney damage has also been noted in individuals exposed to high concentrations of toluene through solvent abuse. There is no epidemiological data to implicate toluene in occupational exposure.

Similarly, haemopoietic effects have been noted following solvent abuse. Once again, there is no data to implicate

toluene in occupational exposure.

Multiple studies in man indicate that toluene alone is not clastogenic.

There is some evidence that solvent abuse may result in growth retardation of the foetus.

(Ref: HSE Toxicity Review 20, Toluene, 1989).

A study of rotogravure workers exposure to an average of 97 ppm toluene over a period of 12-14 years showed increased excretion of hippuric acid. The selected group were closely screened for age, hearing ability, alcohol use etc. It was determined that toluene exposure modified auditory pathways, even in the absence of clinical evidence of hearing impairment.

(ref: Abbate, G., Giorgianni, C., Munao, F., Brecciaroli, R, Int. Arch. Occ. Env. Hlth.,64: 389-392, 1993.)

Source: Deutsche Shell Chemie GmbH Eschborn

Remark: As a common solvent, there is a plethora of clinical data published regarding toluene. Much of this literature is confused and contradictory. A summary may be considered as follows:

Acute exposure to Toluene has been reported to mainly involve the CNS. Dizziness, headache, fatigue and respiratory tract infection have been noted at 50-100 ppm. Loss of consciousness has been reported at approximately 10,000 ppm. Workers exposed at 7000 ppm have shown paresis, amnesia and stupefaction.

- 106/118 -.date: 18-FEB-2000

5. Toxicity Substance ID: 108-88-3

There is little hazard from toluene with regard to irritancy and sensitisation. However, extensive superficial burns have been reported for a worker exposed for 18 hours to liquid and vapourised toluene. A threshold for eye irritation has been determined to be 80 ppm.

Evidence for neurotoxicity is derived from occupational exposure and solvent abuse. Signs consistently reported include headache, dizziness, vertigo, tinnitus, dysarthria, ataxia, memory loss and lack of co-ordination. Some EEG abnormalities have been reported in cases of solvent abuse where slow wave abnormalities predominate. Hallucinations and schizophreniform have been reported. Peripheral neuropathy has been reported in a large number of solvent abusers.

Controlled studies using exposed populations (printers and rubberised matting workers) have not produced any satisfactory or conclusive information, mainly due to the problems in obtaining accurate exposure data. There was no substantial evidence of chronic CNS dysfunction following exposure to toluene between levels of 50-200 ppm.

Liver damage has also been implemented as a result of toluene toxicity, However, studies suggesting this usually use mixed solvents and later studies effectively dismiss this as a consideration.

Kidney damage has also been noted in individuals exposed to high concentrations of toluene through solvent abuse. There is no epidemiological data to implicate toluene in occupational exposure.

Similarly, haemopoietic effects have been noted following solvent abuse. Once again, there is no data to implicate toluene in occupational exposure.

Multiple studies in man indicate that toluene alone is not clastogenic.

There is some evidence that solvent abuse may result in

growth retardation of the foetus.

(Ref: HSE Toxicity Review 20, Toluene, 1989).

A study of rotogravure workers exposure to an average of 97 ppm toluene over a period of 12-14 years showed increased excretion of hippuric acid. The selected group were closely screened for age, hearing ability, alcohol use etc. It was determined that toluene exposure modified auditory pathways, even in the absence of clinical evidence of hearing impairment.

(ref: Abbate, G., Giorgianni, C., Munao, F., Brecciaroli, R, Int. Arch. Occ. Env. Hlth., 64: 389-392, 1993.)

Source: Deutsche Shell Chemie Eschborn

- 107/118 -.date: 18-FEB-2000

6. References Substance ID: 108-88-3

(1) The Merck Index, 10th Ed., 1983

(2) De Nationale MAC-lijst-1994, P145, Ministerie van Sociale Zaken en Werkgelegenheid.

(3) Deutsche Forschungsgemeinschaft MAK- und BAT-Werte-Liste 1993, Senatskommission zur pruefung Gesundheitsschaedlicher Arbeitsstoffe Mitteilung 29, Weinheim.

(4) TRGS 900 von 10/1996 und 905 von 4/1995

(5) TRGS 900 und 905 von 4/1995

(6) TRGS 500 (1993)

(7) TRGS 900 (1993)

(8) Deutsche Forschungsgemeinschaft, MAK- und BAT-Werte-Liste 1993, Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe, Mitteilung 29, VCH Verlagsgesellschaft mbH, Weinheim 1993.

(9) List of German MAK values (1993).

(10) - TRGS 900 Grenzwerte

(11) Deutsche Forschungsgemeinschaft: MAK- und BAT-Werte-Liste 1993. VCH Verlagsgesellschaft, Weinheim (1993)

(12) The UK HSE publication EH 40/93.

(13) Health and Safety Executive Guidance Note EH40/98.

(14) Health and Safety Executive Guidance Note EH40/93

(15) The US, ACGIH, 1993-1994 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices., Cincinnati, OH.

(16) INRS, Valeurs limites d'exposition professionnelle aux substances dangereuses de l'ACGIH et de l'Allemagne, Cah. Notes Doc. 1991, 144, 419-448

(17) ACGIH-Threshold Limit Values (1993-1994).

(18) ACGIH (1991-1992)

(19) INRS, Valeurs limites d'exposition professionnelle aux substances dangereuses en France, Cah. Notes Doc. 1988, 133, 691-706

(20) NP 1796(1988) Portuguese Standard

- 108/118 -.date: 18-FEB-2000

6. References Substance ID: 108-88-3

(21) Bayer AG, Internationale MAK- und TLV-Werte 1991/92, Herausgeber: WV Umweltschutz, Produktsicherheit.

(22) Circulaire du 19 juillet 1982.

(23) Huels AG: Emissionserklaerung 1992 (confidential)

(24) IPCS. Toluene - Environmental Health Criteria. WHO, Geneva 1985.

(25) Nielsen, IR & Howe, P. Environmental hazard assessment; toluene.

Department of the Environment, Building Research Establishment, 1991.

(26) Toluene SDS's, 1993.

(27) CONCAWE report n°. 7/87 "health aspects of toluene and xylene exposures associated with motor gasoline"
(28) (Re.1) DCE/NCI, Monograph on human exposure to chemicals in the workplace, Toluene. P.2-1 (1985)
(Re.2) Graedel TE, P 108 in Chemical Compounds in the Atmosphere, NY, Academic Press (1978)
(29) Manufacturer' s data
(30) Nielsen, I R & Howe, P. Environmental hazard assessment; toluene. UK Department of the Environment, Building Research Establishment, 1991.
(31) Nielsen, I R & Howe, P. Environmental hazard assessment; toluene. UK Department of the Environment, Building Research Establishment, 1991.
(32) Nielsen, I R & Howe, P D. Environmental hazard assessment; toluene. UK Department of the Environment, Building Research Establishment, 1991.
(33) Bundesminister des Innern (1990): Gemeinsames Ministerialblatt Nr. 8 (23.03.1990)
(34) Störfall-Verordnung vom 20.09.1991
(35) Stoerfall-Verordnung vom 20.09.1991
(36) Huels AG: Sicherheitsdatenblatt "Toluol technisch", Version 05, 17 Feb 1997
(37) Stoerfallverordnung vom 20.09.1991
- 109/118 -.date: 18-FEB-2000
6. References Substance ID: 108-88-3

(38) Bundesminister des Innern: Gemeinsames Ministerialblatt, Jahrgang 37, Nr. 7, Februar 1986
(39) BASF AG, Sicherheitsdatenblatt Toluol (13.06.1995)
(40) The Merck Index 10th Edn, Merck Co Inc, Rahway New Jersey, 1983
(41) Shell
(42) BASF AG, Analytisches Labor, unveroeffentlichte Untersuchung, Bericht BRU 87.099 (15.05.1987)
(43) National Fire Protection Assoc. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Assoc., 1986
(44) BASF AG, Sicherheitstechnik, SIK-Nr.: 79/0642 (20.09.1979)
(45) BASF AG, Sicherheitstechnik, SIK-Nr.: 78/0941 (14.11.1978)
(46) Palm, W.-U, & Zetsch, C. OH-Radicale inder Troposhaere; Ihre Konzentration und Auswirkung, Frauenhofer-Institute fuer Toxicologie und Aerosolforschung, Hanover (FRG), 1992.
(47) Palm,W.-U & Zetsch, C., OH-Radicale in der Troposhaere; Ihre Konzentration und Auswirkung, Frauenhofer-Institute fuer Toxicologie und Aerosol forschung, Hanover (FRG),1992
(48) Smith JH, Harper JC; 12 th Conf Environ Toxicol Airforce Aerospace Med Res Lab pp.336-53 (1982)
(49) SC
(50) Howard, P.H., Fate and Exposure Data for Organic Chemicals, Vol. 2, Lewis Publishers, Inc., Chelsea, Michigan (USA), 1990, p 435-444.
(51) Overcash MR et al; Raleigh NC Water Resources Inst p.48-59 Rept N°171 (1982)
(52) Howard, P.H., Fate and Exposure Dat for Organic Chemicals, Vol. 2, Lewis Publishers, Inc. Chelsea, Michigan (USA), 1990, p 435-444.
(53) Slooff, W. & Blokzijl, P.J. Eds., Ontwerp Basisdocument Tolueen, RIVM, Bilthoven (NL), 1987.
(54) Slooff, W. & Blokzijl, P.J. Eds., Ontwerp Basisdocument Tolueen,RIVM, Bilthoven (NL), 1987.
(55) Nathwani JS, Phillips CR; Chemosfere 6: 157-62 (1977)
- 110/118 -.date: 18-FEB-2000
6. References Substance ID: 108-88-3

(56) Wilson, J.T. et al., Transport and Fate of Selected Organic Pollutants in a Sandy Soil, *J. Environ. Qual.*, 10(4), 501 - 506, 1981.

(57) Lyman WJ et al; Handbook of Chemical Property Estimation Methods. *Envir Behavior of Org Chem*, NY:McGraw-Hill p.15-25 (1982)

(58) Mackay, D & Wolkov, A.W., Rate of Evaporation of low-solubility contaminants from water bodies to atmosphere, *Environ. Sci. Techn.*, &(7), 611 - 614, 1973.

(59) Lyman, W.J., Reehl, W.F. & Rosenblatt, D.H., Chemical Property Estimation Methods; Environmental behaviour of organic compounds, McGraw-Hill, Book Company, New York (USA), 1982.

(60) BASF AG, Oekologie und Umweltanalytik, Notiz vom 7.2.96

(61) Mackay, D. & Patersn, S., Calculating Fugacity, *Environ. Sci. Techn.* 15(9), 1006 - 1014.

(62) Howard, P.H. Fate and Exposure Data for Organic Chemicals, Vol 2, Lewis Publishers, Inc., Chelsea, Michigan (USA), 1990, p 435 - 444.

(63) Price, K.S., Waggy, G.T. & Conway, R.A., Brine Shrimp Bioassay and Seawater BOD of Petrochemicals, *J. Water Pollut. Control Fed.*, 46(1), 63 - 77, 1974.

(64) Price, K.S., Waggy, G.T. & Conway, R.A., Brine Shrimp Bioassay and Seawater BOD of Petrochemicals, *J. Water Pollut. Control Fed.* 46(1), 63 - 77, 1974.

(65) Bridié, A.L., Wolff C.J.M. & Winter, M., *Water Research*, 13, 627 - 630, 1974.

(66) Wakeham SG et al; *Environ Sci technol* 17: 611-7 (1983)

(67) Lee RF; 1977 Oil Spill Conf Amer Petrol Inst p.611-6 (1977)

(68) Bridie AL et al; *Water Research* 13: 627 (1979)

(69) Ogata M, Miyake Y; *Water Res* 12: 1041-4 (1978)

(70) Freitag, D. et al., Environmental Hazard Profile of Organic Chemicals, *Chemosphere*, 14(10) 1589 - 1616.

(71) Freitag, D.; Ballhorn, L.; Geyer, H.; Korte, F.: Environmental Hazard Profile of Organic Chemicals. *Chemosphere* 14 (1985) 1589.
- 111/118 -.date: 18-FEB-2000

6. References Substance ID: 108-88-3

(72) Freitag D et al; *Chemosphere* 14: 1589-1616 (1985)

(73) Brenniman, G., Hartung, R. & Weber, W.J., A Continuous Flow Bioassay Method to Evaluate the Effects of Outboard Motor Exhaust and Selected Aromatic Toxicants to Fish, *Water Research*, 10, 165 - 169, 1976.

(74) Juhnke, I.; Lüdemann, D.: Ergebnisse der Untersuchung von 200 chemischen Verbindungen auf akute Fischtoxizität mit dem Goldorfontest. *Z.Wasser-Abwasser-Forschung*, 11 (1978), 161-164

(75) Moles, A. et al., Reduced Growth of Coho Salmon Fry Exposed to Two Petroleum Components, Toluene and Napthalene, in freshwater, *Trans. Am. Fish Soc.*, 110, 430 - 436, 1981.

(76) Johnson, W.W. & Finley, M.T., Handbook of Acute Toxicity of Chemicals to Fish and Aquatic invertebrates, U.S. Dept. Int., Fish & Wildl. Serv., Res. Publ.: 137, 1980.

(77) Mayer, F.L. & Eilersieck, M.R., Manual of Acute Toxicity: Interpretation and Data Base for 410 Chemicals and 66 Species of Freshwater Animals, U.S. Dept. Int., Fish & Wildl. Serv. Res. Publ. 160:460, 1986.

(78) Devlin, E.W., Brammer, J.D. & Puyear, R.L., Acute Toxicity of Toluene to Three Age Groups of Fathead Minnows (*Pimephales promelas*), *Bull. Environm. Contam. Toxicol.*, 29,

12 - 17, 1982 .

(79) Devlin, E.W., Brammer, J.D. & Puyear, R.L. Acute Toxicity of Toluene to Three Age Groups of Fathead Minnows (*Pimephales promelas*), Bull. Environm. Contam. Toxicol., 29, 12 - 17, 1982.

(80) Devlin, E.W., Brammer, J.D. & Puyear, R.L., The Toxicity of Toluene to Three Age Groups of Fathead Minnows (*Pimephales promelas*), Bull. Environm. Contam. Toxicol., 29, 12 - 17, 1982.

(81) Pickering QH, Henderson C; J Water Pollution Control Fed 38: 1419-1429 (1966)

(82) Buccafusco, R.J., Ells, S.J. & Leblanc, G.A., Acute Toxicity of Priority Pollutants to Bluegill (*Lepomis macrochirus*), Buul. Environm. Contam. Toxicol. 26, 446 - 452, 1981.

(83) Bobra, A.M., Shiu, W.Y. & Mackay, D., A Predictive Correlation for the Acute Toxicity of Hydrocarbons and Chlorinated Hydrocarbons to the Waterflea (*Daphnia magna*), Chemosphere, 12(9/10), 1121 - 1129, 1983.

- 112/118 -.date: 18-FEB-2000

6. References Substance ID: 108-88-3

(84) Bringmann, G.; Kühn, R.: Ergebnisse der Schadwirkung wassergefährdender Stoffe gegen *Daphnia magna* in einem weiterentwickelten standardisierten Testverfahren. Z. Wasser-Abwasser-Forschung, 15 (1982), 1-6.

(85) Potera GT; Effects of Bz, To, and Ethylbz on Several Important Members of the Estuarine Ecosystem Ph.D. Dissertation p.1-117 (1975)

(86) Potera, G.T., The Effects of Benzene, Toluene, and Ethylbenzene on Several Members of the Estuarine Ecosystem, Diss. Abstr. B., 36(5):2010, 1975.

(87) Adema, D.M.M., The Acute Toxicity of Alkylbenzenes, T.N.O. Environmental and Energy Research, Delft (NL), 1991

(88) Veerschueren, K. Handbook of Environ Data of Organic Chem. 2nd ed. NY: Van Nostrand Reinhold Co. 1983., 1107

(89) U.S. E.P.A., Exposure Assessment of Priority Pollutants: Toluene. In: "Stored Water Quality Information System". Ed.: Little, A.D., U.S. E.P.A., Washington D.C. (USA), 1980.

(90) Bringmann, G. & Kuehn R., Comparison of the Toxicity Thresholds of Water Pollutants to Bacteria, Algae and Protozoa in the Cell Multiplication Inhibition Test, Water Research, 14, 231 - 241, 1980.

(91) Kühn, R.; Pattard, M.: Results of the Harmful Effects of Water Pollutants to Green Algae (*Scenedesmus subspicatus*) in the Cell Multiplication Inhibition Test. Water Res. 24 (1990) 31-38.

(92) U.S. E.P.A. Exposure Assessment of Priority Pollutants: Toluene. In "Stored Water Quality Information System". Ed.: Little, A.D., U.S. E.P.A., Washington D.C. (USA), 1980.

(93) Bringmann, G. & Kuehn, R., Comparison of the Toxicity Thresholds of Water Pollutants to Bacteria, Algae and Protozoa in the Cell Multiplication Inhibition Test, Water Research, 14, 231 - 241, 1980.

(94) Bringmann, G. & Kuehn, R., Comparison of the Toxicity Thresholds of Water Pollutants to Bacteria, Algae and Protozoa in the Cell Multiplication Inhibition Test, Water Research, 14, 231 - 241, 1980.

(95) Bringmann, G.; Kühn, R.: Comparison of the Toxicity Thresholds of Water Pollutants to Bacteria, Algae, and Protozoa in the Cell Multiplication Inhibition Test. Water Res. 14 (1980) 231-241.

- 113/118 -.date: 18-FEB-2000

6. References Substance ID: 108-88-3

-
- (96) BASF AG, Labor Oekologie, unveroeffentlichte Untersuchung vom 08.01.1979 (Testnr. 6)
- (97) Devlin, E.W., Brammer, J.D. & Puyear, R.L., Acute Toxicity of Toluene to Three Age Groups of Fathead Minnows. (*Pimephales promelas*), Bull. Environm. Contam. Toxicol., 29, 12 - 17, 1982.
- (98) Vonk, J.W.; Adema, D.M.M.; Barug, D.: Comparison of the Effects of Several Chemicals on Microorganisms, Higher Plants and Earthworms.
In: Assink, J.W.; Van den Brink, W.J.: Contaminated Soil. First International TNO Conference on Contaminated Soil, Utrecht; 11.-15.11.1985; S 191-202.
- (99) Neurotoxicology 2, pg.567, (1981).
- (100) Archives of Industrial Health. (Chicago, IL) V 19,403,1959.
- (101) BASF AG: dept. of toxicology, unpublished results (XI/384a), 11-29-61
- (102) Withey, R.J., Hall, J.W., Toxicology, 4: 5 -15, 1975.
- (103) Gekkan Yakuji. vol.22, pg.883, (1980)
- (104) BASF AG: dept. of toxicology, unpublished results (78/645), 01-31-80
- (105) Bonnet, P, Morele, Y., Raoult, G., Zissu, D., Gradiski, D., Arch. Mal. Prof. 43 (4): 261-265, 1982.
- (106) Pozzani, V.C., Weil, C.S., Carpenter, C.P., Ind. Hyg. J., 20: 364-369, 1959.
- (107) BASF AG: dept. of toxicology, unpublished results (78/645), 02-01-80
- (108) Journal of Industrial Hygiene and Toxicology. (Baltimore, MD/New York, NY) V.25,366,1949.
- (109) Bonnet, P., Morele, Y., Raoult, G., Zissu, D., Gradiski, D., Arch. Mal. Prof. 43(4): 261-265, 1982.
- (110) J of The Amer Medical Assoc. 123,1106,1943
- (111) American Industrial Hygiene Association Journal. (AIHA, 475 Wolf Ledges Pkwy., Akron, OH 44311) V.30,470,1969.
- (112) American Industrial Hygiene Association J. 30,470,69
- (113) Smyth, H.F., Carpenter, C.P., Weil, C.S., Pozzani, U.C., Streigel, J.A., Nycum, J.S., Am. Ind. Hyg. Ass. J. 30: 470-476, 1969.
- 114/118 -.date: 18-FEB-2000
6. References Substance ID: 108-88-3

-
- (114) Environ Research. 40,411,86
- (115) Medicina del Lavoro. 54,486,63
- (116) Medicina del Lavoro. Industrial Medicine. (Via S. Barnaba, 8 Milan, Italy) V. 54,486,1963.
- (117) Union Carbide Data Sheet. 7/23/70
- (118) Food and Chemical Toxicology. 20,563,82
- (119) Food and Chemical Toxicology. (Pergamon Press, Headington Hill Hall, Oxford OX3 OBW, England) V.20,563,1982.
- (120) Guillot, J.P. Gonnet, J.F., Clement, C., Caillard, L., Truhaut, R., Fd. Chem. Toxicol., 20: 563-572, 1982.
- (121) Union Carbide Data Sheet. 7/23/1970
- (122) Food and Chemical Toxicology. (Pergamon Press, Headington Hill Hall, Oxford OX3 OBW, England) V.20,573,1982.
- (123) Guillot, J.P., Gonnet, J.F., Clement, C., Caillard, L., Truhaut, R., Fd. Chem. Toxicol., 20: 573-582, 1982.¹
- (124) Sugai, S., Murata, K., Kitagaki, T., Tomita, I, J. Toxic. Sci. 15: 245-262, 1990.
- (125) American Petroleum Institute; 26 Week Inhalation Toxicity Study in the Rat (1980), EPA Doc. No. FYI-AX-1081-0136, Fiche No. 0136-0
- (126) Huff, J., NTP Technical Report No. TR 371, February 1990.

(127) Rhudy, R.L., Lindberg, D.C., Goode, J.W., Sullivan, D.J., Gralla, E.J., *Tox. Appl. Pharm.* 15: 284-285, 1978.
(128) American Petroleum Institute, Reports from Biodynamics Inc. and Institute of Neurotoxicity to API, 1980.
(129) American Petroleum Institute 1987, Report No. 34-32865, Report from Primate Research Institute, 30 January 1989.
(130) Bos RP et al; *Mutat Res* 88: 273 (1981)
(131) Gerner-Smidt, P. Freidrich, U., *Mut. Res.* 58: 313-316, 1978.
(132) EPA 1980, SRI International Project LSU-7558-30, 1980.
(133) EPA 1980, SRI International Report LSU-7558-30, 1980.
(134) American Petroleum Institute, Medical Research Publication 26-60020, 1978.
- 115/118 -.date: 18-FEB-2000
6. References Substance ID: 108-88-3

(135) McGregor, D.B., Brown, A., Cattanach, P., Edwards, I., McBride, D., Riach, C., Caspary, W.J., *Env. Mol. Mut.* 12: 85-154, 1988.
(136) Litton Bionetics, Inc.; Final Report (1978). EPA Doc. No. 87-8210353, fICHE nO. ots0205936
(137) American Petroleum Institute, Medical Research Publication 26-60020, 1978.
(138) Haworth, S., Lawlor, T., Mortelmans, K., Speck, W., Zeigler, E., *Env. Mut. Suppl.*, 1: 39-44, 1983.
(139) Huff, J., NTP Technical Report No. TR 371, Febraury 1990.
(140) Gerner-Smidt, P., Freidrich, U., *Mut. Res.*, 58: 313-316, 1978.
(141) American Petroleum Institute, Medical Research Publication, 26-60020, 1978.
(142) Gad el Karim, M.M., Harper, B.L., Legator, M.S., *Mut. Res.*, 135: 225-243, 1984.
(143) Litton Bionetics, Inc.; Final Report (no data). EPA Doc. No. FYI-AX-1081-0136 Fiche No. OTS0000136-
(144) EPA, SRI International Project LSU-7558-30, 1980.
(145) Gad el Karim, M.M., Harper, B.L., Legator, M.S., *Mut. Res.*, 135, 225-243, 1984.
(146) Mohtashamipur, E., Norpoth, K., Woelke, E., Huber, P., *Arch. Toxicol.*, 58: 106-109, 1985.
Mohtashamipur, E., Strater, H., Treibel, R., Norpoth, K., *Arch. Toxicol.* 60: 460-463, 1987.
(147) USEPA; Ambient Water Quality Criteria Doc: Toluene p.14-6. (1980) EPA 440/5-80-07
(148) Tice, R.R., Vogt, T.F., Costa, D.L., *Env. Sci. Res.*, 25: 257-275, 1981.
(149) Donner, M., Husgavel-Pursiainen, K., Maki-Paakkanen, J., Sorsa, M., Vainio, H., *Mut. Res.*, 85: 293-295, 1981.
(150) American Petroleum Institute. Report from Primate Research Unit, 30 January 1989.
(151) Maltoni, C., Conti, B., Cotti, G., Belpoggi, F., *Am. J. Ind. Med.* 7: 415-446, 1985.
- 116/118 -.date: 18-FEB-2000
6. References Substance ID: 108-88-3

(152) CHEMTOX DATA 1985-199
(153) Huff, J., NTP Technical Report No. TR 371, 1990.
(154) Gibson, J.E., Hardisty J.F., *Fund. Appl. Toxicol.*, 3, 315-319, 1983.
(155) Huff, J., NTP Technical Report No. TR 371, February, 1990.
(156) CIIT, 1980
(157) American Petroleum Institute, 1981.
(158) Archives of Toxicology, Supplement. 8,425,85
(159) American Petroleum Institute, Report from Internation

Research and Development Corp., API Med. Res. Publication
No. 32-32854, July 1985.
(160) American Petroleum Institute, Report to API from Huntingdon
Research Centre, 10 September 1992.
(161) Courtney KD et al; Fundam Appl Toxicol 6:145-54 (1986)
(162) Courtney, K.D., Andrews, J.E., Springer, J., Menache, M.,
Williams, T., Dalley, L., Graham, J.A., Fund. Appl.
Toxicol., 6: 145-154, 1986.
(163) Ungvary, Gy., Tatrai, E., Arch. Toxicol. Suppl. 8: 425-430,
1985.
(164) BASF AG: dept. of toxicology, unpublished results (86/105),
01-06-89
(165) BASF AG: dept. of toxicology, unpublished results (86/105),
12-15-89
(166) Klimisch, H.C., Hellwig, J., Hofmann, A., Arch. Toxicol.,
66: 373-381, 1992.
(167) Ungvary, Gy., Tatrai, Arch. Toxicol. Suppl., 8, 425-430,
1985.
(168) Casarett and Doull's Toxicology. 2nd ed. NY: Macmillan
Publishing Co., 1980. 489
(169) Foxe K et al; Toxicol lett 12 82-39: 115-23 (1982)
(170) Grant, WM. Toxicology of the Eye. 3rd ed. Springfield, IL:
Charles C. Thomas Publisher, 1986. 927
(171) Clayton, GD and FE Clayton (eds.). Patty's Industrial
Hygiene and Toxic: Vol. 2A, 2B, 2C: Toxicology. 3rd ed. NY:
John Wiley Sons, 1981-1982, 3286
- 117/118 -.date: 18-FEB-2000
7. Risk Assessment Substance ID: 108-88-3

7.1 Risk Assessment

-

- 118/118 -