

I U C L I D

D a t a s e t

Existing Chemical	Substance ID: 106-97-8
CAS No.	106-97-8
EINECS Name	butane, pure
EINECS No.	203-448-7
Molecular Formula	C4H10

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.

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European Chemicals Bureau

5.1 Acute Toxicity**5.1.1 Acute Oral Toxicity**

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5.1.2 Acute Inhalation Toxicity

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 15 minute(s)
Value: > 800000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of propane in air for 15 minutes. Where deaths occurred, they were during, not after, exposure and were associated with depressant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Elf Aquitaine Lacq
 OK Raffinaderi AB Göteborg
 Skandinaviska Raffinaderi AB Lysekil
Test substance: Propane, CAS No. 74-98-6

(93)

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 15 minute(s)
Value: 570000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of isobutane in air for 15 minutes. Where deaths occurred, they were during, not after, exposure and were associated with stimulant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Elf Aquitaine Lacq
 OK Raffinaderi AB Göteborg
 Skandinaviska Raffinaderi AB Lysekil
Test substance: Isobutane, CAS No. 75-28-5

(93)

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 4 hour(s)
Value: 658 mg/l
Method: other: procedure as detailed in paper by Shugaev (see Reference).
Year: 1969 **GLP:** no data
Test substance: other TS
Remark: Rats were exposed to a range of butane concentrations in air for 4 hours. Following exposure, hydrocarbon accumulation in several organs was determined.

n-Butane is partially absorbed by rat tissue and partly transferred to brain, kidney, liver and perinephric adipose tissue.

Source: Elf Aquitaine Lacq
 OK Raffinaderi AB Göteborg
 Skandinaviska Raffinaderi AB Lysekil
Test substance: n-Butane, CAS No. 106-97-8

(94)

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 15 minute(s)
Value: > 800000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of propane in air for 15 minutes. Where deaths occurred, they were during, not after, exposure and were associated with depressant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.

Source: Compañia Española de Petroleos CEPSA Madrid
Test substance: Propane, CAS No. 74-98-6

(95)

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 15 minute(s)
Value: 570000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of isobutane in air for 15 minutes. Where deaths occurred, they were during, not after, exposure and were associated with stimulant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Compañía Española de Petroleos CEPSA Madrid
Test substance: Isobutane, CAS No. 75-28-5

(95)

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 4 hour(s)
Value: 658 mg/l
Method: other: procedure as detailed in paper by Shugaev (see Reference).
Year: 1969 **GLP:** no data
Test substance: other TS
Remark: Rats were exposed to a range of butane concentrations in air for 4 hours. Following exposure, hydrocarbon accumulation in several organs was determined.*

 n-Butane is partially absorbed by rat tissue and partly transferred to brain, kidney, liver and perinephric adipose tissue.
Source: Compañía Española de Petroleos CEPSA Madrid
Test substance: n-Butane, CAS No. 106-97-8

(96)

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 15 minute(s)
Value: > 800000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of propane in air for 15 minutes. Where deaths occurred, they were during, not after, exposure and were associated with depressant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Phillips Petroleum Company Norway Tananger
Test substance: Propane, CAS No. 74-98-6

(97)

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 15 minute(s)
Value: 570000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of isobutane in air for 15 minutes. Where deaths occurred, they were during, not after, exposure and were associated with stimulant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Phillips Petroleum Company Norway Tananger
Test substance: Isobutane, CAS No. 75-28-5

(97)

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 4 hour(s)
Value: 658 mg/l
Method: other: procedure as detailed in paper by Shugaev (see Reference).
Year: 1969 **GLP:** no data
Test substance: other TS
Remark: Rats were exposed to a range of butane concentrations in air for 4 hours. Following exposure, hydrocarbon accumulation in several organs was determined.

n-Butane is partially absorbed by rat tissue and partly transferred to brain, kidney, liver and perinephric adipose tissue.
Source: Phillips Petroleum Company Norway Tananger
Test substance: n-Butane, CAS No. 106-97-8

(98)

Type: LC50
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 4 hour(s)
Value: 658 mg/l
Method: other: procedure as detailed in paper by Shugaev (see Reference).
Year: 1969 **GLP:** no data
Test substance: other TS
Remark: Rats were exposed to a range of butane concentrations in air for 4 hours. Following exposure, hydrocarbon accumulation in several organs was determined.

n-Butane is partially absorbed by rat tissue and partly transferred to brain, kidney, liver, and perinephric adipose tissue.
Source: CONCAWE Brussel
Huels AG Marl
Test substance: n-Butane, CAS No. 106-97-8

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5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: other: EC50 (CNS)
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 10 minute(s)
Value: 280000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: EC50(CNS) is the effective concentration causing either stimulation or depression of the central nervous system (CNS) in half the animals tested. Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of propane in air for 10 minutes. Where deaths occurred, they were during, not after, exposure and were associated with depressant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Elf Aquitaine Lacq
 OK Raffinaderi AB Göteborg
 Skandinaviska Raffinaderi AB Lysekil
Test substance: Propane, CAS No. 74-98-6

(93)

Type: other: EC50 (CNS)
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 10 minute(s)
Value: 200000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: EC50(CNS) is the effective concentration causing either stimulation or depression of the central nervous system (CNS) in half the animals tested. Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of isobutane in air for 10 minutes. Where deaths occurred, they were during, not after, exposure and were associated with stimulant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Elf Aquitaine Lacq
 OK Raffinaderi AB Göteborg
 Skandinaviska Raffinaderi AB Lysekil
Test substance: Isobutane, CAS No. 75-28-5

(93)

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: other: EC50 (CNS)
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 10 minute(s)
Value: 280000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: EC50 (CNS) is the effective concentration causing either stimulation or depression of the central nervous system (CNS) in half the animals tested. Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of propane in air for 10 minutes. Where deaths occurred, they were during, not after, exposure and were associated with depressant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Compañía Española de Petroleos CEPSA Madrid
Test substance: Propane, CAS No. 74-98-6

(95)

Type: other: EC50 (CNS)
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 10 minute(s)
Value: 200000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: EC50 (CNS) is the effective concentration causing either stimulation or depression of the central nervous system (CNS) in half the animals tested. Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of isobutane in air for 10 minutes. Where deaths occurred, they were during, not after, exposure and were associated with stimulant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Compañía Española de Petroleos CEPSA Madrid
Test substance: Isobutane, CAS No. 75-28-5

(95)

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: other: EC50 (CNS)
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 10 minute(s)
Value: 280000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: EC50(CNS) is the effective concentration causing either stimulation or depression of the central nervous system (CNS) in half the animals tested. Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of propane in air for 10 minutes. Where deaths occurred, they were during, not after, exposure and were associated with depressant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Phillips Petroleum Company Norway Tananger
Test substance: Propane, CAS No. 74-98-6

(97)

Type: other: EC50 (CNS)
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 10 minute(s)
Value: 200000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: EC50(CNS) is the effective concentration causing either stimulation or depression of the central nervous system (CNS) in half the animals tested. Groups of 6 male or 6 female specific pathogen-free (SPS) Alderley Park rats were exposed to various concentrations of isobutane in air for 10 minutes. Where deaths occurred, they were during, not after, exposure and were associated with stimulant effects on the central nervous system (CNS). Recovery from non-lethal exposure was rapid, and affected animals appeared normal within 10 minutes.
Source: Phillips Petroleum Company Norway Tananger
Test substance: Isobutane, CAS No. 75-28-5

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5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: other: pulmonary compliance
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time:
Value:
Method: other: procedure as detailed in paper by Friedman, Cammarato and Aviado (see Reference).
Year: 1973 **GLP:** no data
Test substance: other TS
Remark: Isobutane produced a decrease in pulmonary compliance and in the tidal volume of the rat.
Source: Elf Aquitaine Lacq
OK Raffinaderi AB Göteborg
Skandinaviska Raffinaderi AB Lysekil
Test substance: Isobutane, CAS No. 75-28-5 (100)

Type: other: pulmonary compliance
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time:
Value:
Method: other: procedure as detailed in paper by Friedman, Cammarato and Aviado (see Reference).
Year: 1973 **GLP:** no data
Test substance: other TS
Remark: Isobutane produced a decrease in pulmonary compliance and in the tidal volume of the rat.
Source: Compañia Española de Petroleos CEPSA Madrid
Test substance: Isobutane, CAS No. 75-28-5 (101)

Type: other: pulmonary compliance
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time:
Value:
Method: other: procedure as detailed in paper by Friedman, Cammarato and Aviado (see Reference).
Year: 1973 **GLP:** no data
Test substance: other TS
Remark: Isobutane produced a decrease in pulmonary compliance and in the tidal volume of the rat.
Source: Phillips Petroleum Company Norway Tananger
Test substance: Isobutane, CAS No. 75-28-5 (102)

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: LC50
Species: mouse
Sex:
Number of Animals:
Vehicle:
Exposure time: 2 hour(s)
Value: 680 mg/l
Method: other: procedure as detailed in paper by Shugaev (see Reference).
Year: 1969 **GLP:** no data
Test substance: other TS
Remark: Mice were exposed to a range of butane concentrations in air for 2 hours. Following exposure, hydrocarbon accumulation in the animals' brains was determined.

 The n-butane concentration found in mouse brain was very close to that found in rat brain.
Source: Elf Aquitaine Lacq
 OK Raffinaderi AB Göteborg
 Skandinaviska Raffinaderi AB Lysekil
Test substance: n-Butane, CAS No. 106-97-8 (94)

Type: LC50
Species: mouse
Sex:
Number of Animals:
Vehicle:
Exposure time: 2 hour(s)
Value: 680 mg/l
Method: other: procedure as detailed in paper by Shugaev (see Reference).
Year: 1969 **GLP:** no data
Test substance: other TS
Remark: Mice were exposed to a range of butane concentrations in air for 2 hours. Following exposure, hydrocarbon accumulation in the animals' brains was determined.

 The n-butane concentration found in mouse brain was very close to that found in rat brain.
Source: Compañía Española de Petroleos CEPSA Madrid
Test substance: n-Butane, CAS No. 106-97-8 (96)

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: LC50
Species: mouse
Sex:
Number of Animals:
Vehicle:
Exposure time: 2 hour(s)
Value: 680 mg/l
Method: other: procedure as detailed in paper by Shugaev (see Reference).
Year: 1969 **GLP:** no data
Test substance: other TS
Remark: Mice were exposed to a range of butane concentrations in air for 2 hours. Following exposure, hydrocarbon accumulation in the animals' brains was determined.

The n-butane concentration found in mouse brain was very close to that found in rat brain.
Source: Phillips Petroleum Company Norway Tananger
Test substance: n-Butane, CAS No. 106-97-8 (98)

Type: LC50
Species: mouse
Sex:
Number of Animals:
Vehicle:
Exposure time: 2 hour(s)
Value: 680 mg/l
Method: other: procedure as detailed in paper by Shugaev (see Reference).
Year: 1969 **GLP:** no data
Test substance: other TS
Remark: Mice were exposed to a range of butane concentrations in air for 2 hours. Following exposure, hydrocarbon accumulation in the animals' brains was determined.
The n-butane concentration found in mouse brain was very close to that found in rat brain.
Source: CONCAWE Brussel
Huels AG Marl
Test substance: n-Butane, CAS No. 106-97-8 (99)

Type: other: EC50(cardiac sensitization to adrenaline)
Species: dog
Sex:
Number of Animals:
Vehicle:
Exposure time: 5 minute(s)
Value: 180000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Dogs were exposed to hydrocarbon/air mixtures for five

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

minutes for the determination of EC50(CS).
EC50(cardiac sensitization to adrenaline) is the effective concentration causing cardiac sensitization to adrenaline in half the animals tested.

Source: Elf Aquitaine Lacq
OK Raffinaderi AB Göteborg
Skandinaviska Raffinaderi AB Lysekil

Test substance: Propane, CAS No. 74-98-6 (93)

Type: other: EC50(cardiac sensitization to adrenaline)
Species: dog
Sex:
Number of Animals:
Vehicle:
Exposure time: 5 minute(s)
Value: 70000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data

Test substance: other TS
Remark: Dogs were exposed to hydrocarbon/air mixtures for five minutes for the determination of EC50(CS).
EC50(cardiac sensitization to adrenaline) is the effective concentration causing cardiac sensitization to adrenaline in half the animals tested.

Source: Elf Aquitaine Lacq
OK Raffinaderi AB Göteborg
Skandinaviska Raffinaderi AB Lysekil

Test substance: Isobutane, CAS No. 75-28-5 (93)

Type: other: EC50(cardiac sensitization to adrenaline)
Species: dog
Sex:
Number of Animals:
Vehicle:
Exposure time: 5 minute(s)
Value: 180000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data

Test substance: other TS
Remark: Dogs were exposed to hydrocarbon/air mixtures for five minutes for the determination of EC50(CS).
EC50(cardiac sensitization to adrenaline) is the effective concentration causing cardiac sensitization to adrenaline in half the animals tested.

Source: Compañia Española de Petroleos CEPESA Madrid

Test substance: Propane, CAS No. 74-98-6 (95)

5. Toxicity

date: 18-FEB-2000
Substance ID: 106-97-8

Type: other: EC50(cardiac sensitization to adrenaline)
Species: dog
Sex:
Number of Animals:
Vehicle:
Exposure time: 5 minute(s)
Value: 70000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Dogs were exposed to hydrocarbon/air mixtures for five minutes for the determination of EC50(CS). EC50(cardiac sensitization to adrenaline) is the effective concentration causing cardiac sensitization to adrenaline in half the animals tested.
Source: Compañia Española de Petroleos CEPSA Madrid
Test substance: Isobutane, CAS No. 75-28-5

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Type: other: EC50(cardiac sensitization to adrenaline)
Species: dog
Sex:
Number of Animals:
Vehicle:
Exposure time: 5 minute(s)
Value: 180000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Dogs were exposed to hydrocarbon/air mixtures for five minutes for the determination of EC50(CS). EC50(cardiac sensitization to adrenaline) is the effective concentration causing cardiac sensitization to adrenaline in half the animals tested.
Source: Phillips Petroleum Company Norway Tananger
Test substance: Propane, CAS No. 74-98-6

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Type: other: EC50(cardiac sensitization to adrenaline)
Species: dog
Sex:
Number of Animals:
Vehicle:
Exposure time: 5 minute(s)
Value: 70000 ppm
Method: other: procedure as detailed in paper by Clark and Tinston (see Reference).
Year: 1982 **GLP:** no data
Test substance: other TS
Remark: Dogs were exposed to hydrocarbon/air mixtures for five minutes for the determination of EC50(CS). EC50(cardiac sensitization to adrenaline) is the effective

concentration causing cardiac sensitization to adrenaline in half the animals tested.

Source: Phillips Petroleum Company Norway Tananger

Test substance: Isobutane, CAS No. 75-28-5

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Type: other: cardiac sensitization to epinephrine

Species: dog

Sex:

Number of Animals:

Vehicle:

Exposure time: 10 minute(s)

Value:

Method: other: procedure as detailed in paper by Krantz, Carr and Vitcha (see Reference).

Year: 1948 **GLP:** no data

Test substance: other TS

Remark: Test Method

Dogs in groups of 2 to 12 were exposed to individual liquid or gaseous hydrocarbons in air at concentrations of 10% to 90%, following intravenous injection with epinephrine. Cardiac sensitization was determined from electrocardiogram recordings of anaesthetized animals.

Test Results

All hydrocarbons tested, except ethylene, caused cardiac sensitization.

None of the twelve dogs exposed to ethylene demonstrated cardiac sensitization. Two of the four dogs exposed to ethane were sensitized. Most of the dogs exposed to the other hydrocarbons were sensitized.

Source: Elf Aquitaine Lacq
OK Raffinaderi AB Göteborg
Skandinaviska Raffinaderi AB Lysekil

Test substance: Test Substances - test substances used were: ethane, propane, propylene, butane, isobutane, 2-butene, cyclobutane, cyclobutene, cyclopentane, isopentane and 2,2-dimethyl butane.

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Type: other: cardiac sensitization to epinephrine

Species: dog

Sex:

Number of Animals:

Vehicle:

Exposure time: 10 minute(s)

Value:

Method: other: procedure as detailed in paper by Krantz, Carr and Vitcha (see Reference).

Year: 1948 **GLP:** no data

Test substance: other TS

Remark: Test Method

Dogs in groups of 2 to 12 were exposed to individual liquid or gaseous hydrocarbons in air at concentrations of 10% to 90%, following intravenous injection with epinephrine. Cardiac sensitization was determined from electrocardiogram recordings of anaesthetized animals.

Test Results

All hydrocarbons tested, except ethylene, caused cardiac sensitization.

None of the twelve dogs exposed to ethylene demonstrated cardiac sensitization. Two of the four dogs exposed to ethane were sensitized. Most of the dogs exposed to the other hydrocarbons were sensitized.

Source: Compañía Española de Petroleos CEPSA Madrid
Test substance: Test Substances - test substances used were: ethane, propane, propylene, butane, isobutane, 2-butene, cyclobutane, cyclobutene, cyclopentane, isopentane and 2,2-dimethyl butane.

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Type: other: cardiac sensitization to epinephrine
Species: dog
Sex:
Number of Animals:
Vehicle:
Exposure time: 10 minute(s)
Value:
Method: other: procedure as detailed in paper by Krantz, Carr and Vitcha (see Reference).
Year: 1948 **GLP:** no data
Test substance: other TS
Remark: Test Method

Dogs in groups of 2 to 12 were exposed to individual liquid or gaseous hydrocarbons in air at concentrations of 10% to 90%, following intravenous injection with epinephrine. Cardiac sensitization was determined from electrocardiogram recordings of anaesthetized animals.

Test Results

All hydrocarbons tested, except ethylene, caused cardiac sensitization.

None of the twelve dogs exposed to ethylene demonstrated cardiac sensitization. Two of the four dogs exposed to ethane were sensitized. Most of the dogs exposed to the other hydrocarbons were sensitized.

Source: Phillips Petroleum Company Norway Tananger
Test substance: Test Substances - test substances used were: ethane, propane, propylene, butane, isobutane, 2-butene, cyclobutane, cyclobutene, cyclopentane, isopentane and 2,2-dimethyl butane.

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Type: other: cardiac sensitization to epinephrine
Species: dog
Sex:
Number of Animals:
Vehicle:
Exposure time: 10 minute(s)
Value:
Method: other: procedure as detailed in paper by Krantz, Carr and Vitcha (see Reference).
Year: 1948 **GLP:** no
Test substance: other TS
Remark: Test Method:
Dogs in groups of 2 to 12 were exposed to individual liquid or gaseous hydrocarbons in air at concentrations of 10 % to 90 %, following intravenous injection with epinephrine. Cardiac sensitization was determined from electrocardiogram recordings of anaesthetized animals.
Test Results:
All hydrocarbons tested, except ethylene, caused cardiac sensitization.
None of the twelve dogs exposed to ethylene demonstrated cardiac sensitization. Two of the four dogs exposed to ethane were sensitized. Most of the dogs exposed to the other hydrocarbons were sensitized.
Source: CONCAWE Brussel
Huels AG Marl
Test substance: Test substances used were:
ethane, propane, propylene, butane, isobutane, 2-butene, cyclobutane, cyclobutene, cyclopentane, isopentane and 2,2-dimethyl butane.

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5.1.3 Acute Dermal Toxicity

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5.1.4 Acute Toxicity, other Routes

-

5.2 Corrosiveness and Irritation**5.2.1 Skin Irritation**

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5.2.2 Eye Irritation

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: not irritating
EC classificat.: not irritating
Method: other: procedure as detailed in book by Grant (see Reference).
Year: GLP: no data
Test substance: other TS
Remark: Injection of liquid butane into the anterior eye chamber of rabbits did not cause disturbance, and all effects disappeared in 2-4 days.
Source: Elf Aquitaine Lacq
 OK Raffinaderi AB Göteborg
 Skandinaviska Raffinaderi AB Lysekil
Test substance: n-Butane, CAS No. 106-97-8

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Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: not irritating
EC classificat.: not irritating
Method: other: procedure as detailed in book by Grant (see Reference).
Year: GLP: no data
Test substance: other TS
Remark: Injection of liquid butane into the anterior eye chamber of rabbits did not cause disturbance, and all effects disappeared in 2-4 days.
Source: Compañía Española de Petroleos CEPSA Madrid
Test substance: n-Butane, CAS No. 106-97-8

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Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: not irritating
EC classificat.: not irritating
Method: other: procedure as detailed in book by Grant (see Reference).
Year: GLP: no data
Test substance: other TS
Remark: Injection of liquid butane into the anterior eye chamber of rabbits did not cause disturbance, and all effects disappeared in 2-4 days.

5. Toxicity

Source: Phillips Petroleum Company Norway Tananger
 Test substance: n-Butane, CAS No. 106-97-8 (109)

Species: rabbit
 Concentration:
 Dose:
 Exposure Time:
 Comment:
 Number of
 Animals:
 Result: not irritating
 EC classificat.: not irritating
 Method: other: procedure as detailed in book by Grant (see Reference).
 Year: GLP: no data
 Test substance: other TS
 Remark: Injection of liquid butane into the anterior eye chamber of
 rabbits did not cause disturbance, and all effects
 disappeared in 2-4 days.
 Source: CONCAWE Brussel
 Huels AG Marl
 Test substance: n-Butane, CAS No. 106-97-8 (110)

5.3 Sensitization

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5.4 Repeated Dose Toxicity

Species: rat Sex: male/female
 Strain: Fischer 344
 Route of admin.: inhalation
 Exposure period: 90 days
 Frequency of
 treatment: 6 hours per day, 5 days per week
 Post. obs.
 period:
 Doses: 2 Test groups: 1017 ppm and 4489 ppm (20 male/10 female per
 group). Negative control group: no treatment (40 male/20
 female animals).
 Control Group: yes, concurrent no treatment
 NOAEL: 4489 ppm
 Method: other: procedure as detailed in paper by Aranyi (see
 Reference).
 Year: 1986 GLP: no data
 Test substance: other TS
 Remark: Atmospheric concentrations were monitored during the study.
 The main objective of the study was to establish the renal
 effects of gaseous hydrocarbons.
 Result: There were NO DEATHS, and NO OTHER SIGNIFICANT TOXICOLOGICAL
 EFFECTS were found.
 Serial sacrifices of 10 male and 5 female animals were made
 after 28 days. The male animals in these groups showed mild
 but significant effects characteristic of light hydrocarbon

nephropathy. However, at 90 days the animals showed no evidence of kidney effects.

Clinical signs included HUNCHED POSTURE, LETHARGY and INTERMITTENT TREMOR. No effects were evident from bodyweights, haematological and biochemical parameters, or from histopathology.

Source: Elf Aquitaine Lacq
OK Raffinaderi AB Göteborg
Skandinaviska Raffinaderi AB Lysekil

Test substance: Tests were carried out on two gas mixtures comprising:
50% n-butane and 50% n-pentane, and
50% iso-butane and 50% iso-pentane. (111)

Species: rat **Sex:** male/female
Strain: Sprague-Dawley
Route of admin.: inhalation
Exposure period: 21 days
Frequency of treatment: 6 hours per day, 5 days per week
Post. obs. period:
Doses: 3 Test groups: 0.12 mg/l, 1.15 mg/l and 11.80 mg/l (10 male/10 female per group). Negative control group: no treatment (10 male/10 female animals).
Control Group: yes, concurrent no treatment
NOAEL: 11.8 mg/l
Method: other: procedure as detailed in paper by Halder et al. (see Reference).
Year: 1986 **GLP:** no data
Test substance: other TS
Remark: Atmospheric concentrations were monitored during the study. The main objective of the study was to establish if typical C4 and C5 hydrocarbons could cause kidney damage in male rats.
Result: NO SIGNIFICANT TOXICOLOGICAL EFFECTS were found.

Animals showed no clinical signs of distress.

Haematological and biochemical parameters were not significantly different from the negative control group. Bodyweight gains were not abnormal. In particular, there was no evidence of treatment-related pathological lesions, especially the kidney lesions found in male rats exposed to unleaded gasoline vapour.

Source: Elf Aquitaine Lacq
OK Raffinaderi AB Göteborg
Skandinaviska Raffinaderi AB Lysekil

Test substance: Tests were carried out on a gas mixture containing 25% by weight of each of the hydrocarbon constituents n-butane, isobutane, n-pentane and isopentane. (112)