

# I U C L I D

# D a t a s e t

Existing Chemical	Substance ID: 7440-23-5
CAS No.	7440-23-5
EINECS Name	sodium
EINECS No.	231-132-9
Molecular Formula	Na

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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**1.0.1 OECD and Company Information**

**Name:** Associated Octel Company Ltd.  
**Street:** P. O. Box 17  
**Town:** L65 4HF S. Wirral  
**Country:** United Kingdom

**Name:** Degussa AG  
**Street:** Weissfrauenstrasse 9  
**Town:** 60287 Frankfurt am Main  
**Country:** Germany

**Name:** Du Pont de Nemours International S.A.  
**Street:** 1, Wilmingtonstraat  
**Town:** 2030 Antwerpen  
**Country:** Belgium  
**Phone:** +32-3-543.1211  
**Telefax:** +32-3-542.0119  
**Telex:** 33 924

**Name:** Finnish Chemicals Oy  
**Street:** P.O. Box 7  
**Town:** 32741 Äetsä  
**Country:** Finland  
**Phone:** +358 32 51391  
**Telefax:** +358 32 5133215

**1.0.2 Location of Production Site**

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**1.0.3 Identity of Recipients**

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**1.1 General Substance Information**

**Substance type:** element  
**Physical status:** solid

**Substance type:** inorganic  
**Physical status:** solid

**1.1.1 Spectra**

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**1.2 Synonyms**

Metallic sodium

**Source:** Degussa AG Frankfurt am Main

Natrium

**Source:** Du Pont de Nemours International S.A. Antwerpen  
Associated Octel Company Ltd. S. Wirral  
Degussa AG Frankfurt am Main

Natriummetall

**Source:** Degussa AG Frankfurt am Main

Sodium

**Source:** Degussa AG Frankfurt am Main

Sodium metal

**Source:** Du Pont de Nemours International S.A. Antwerpen  
Degussa AG Frankfurt am Main

Sodium Metal

**Source:** Associated Octel Company Ltd. S. Wirral

### 1.3 Impurities

-

### 1.4 Additives

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### 1.5 Quantity

Quantity 50 000 - 100 000 tonnes

### 1.6.1 Labelling

**Labelling:** as in Directive 67/548/EEC

**Symbols:** F  
C  
E

**Specific limits:** no data

**R-Phrases:** (14/15) Reacts violently with water, liberating highly flammable gases  
(34) Causes burns

**S-Phrases:** 1/2(8) Keep container dry  
(43) In case of fire, use ...  
(45) In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

### 1.6.2 Classification

**Classification:** as in Directive 67/548/EEC

**Class of danger:** corrosive

**R-Phrases:** (34) Causes burns

**Classification:** as in Directive 67/548/EEC  
**Class of danger:** highly flammable  
**R-Phrases:** (14/15) Reacts violently with water, liberating highly flammable gases

### **1.7 Use Pattern**

**Type:** type  
**Category:** Non dispersive use

**Type:** type  
**Category:** Use in closed system

**Type:** industrial  
**Category:** Basic industry: basic chemicals

**Type:** industrial  
**Category:** Chemical industry: used in synthesis

**Type:** industrial  
**Category:** Electrical/electronic engineering industry

**Type:** industrial  
**Category:** Fuel industry

**Type:** industrial  
**Category:** Metal extraction, refining and processing of metals

**Type:** use  
**Category:** Fuel additives

**Type:** use  
**Category:** Heat transferring agents

**Type:** use  
**Category:** Intermediates

#### **1.7.1 Technology Production/Use**

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#### **1.8 Occupational Exposure Limit Values**

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#### **1.9 Source of Exposure**

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#### **1.10.1 Recommendations/Precautionary Measures**

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#### **1.10.2 Emergency Measures**

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**1.11 Packaging**

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**1.12 Possib. of Rendering Subst. Harmless**

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**1.13 Statements Concerning Waste**

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**1.14.1 Water Pollution**

**Classified by:** KBWS (DE)  
**Labelled by:** KBWS (DE)  
**Class of danger:** 2 (water polluting)  
**Remark:** WGK  
**Source:** Degussa AG Frankfurt am Main

(1)

**1.14.2 Major Accident Hazards**

**Legislation:** Directive 82/502/EEC  
**Substance listed:** no  
**Source:** Degussa AG Frankfurt am Main

**1.14.3 Air Pollution**

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**1.15 Additional Remarks**

**Remark:** Acceptable Modes of Transportation: Air (cargo only - sodium is forbidden for transport on passenger aircraft); road; water.  
Required Labels: Flammable solid and dangerous when wet.  
Storage: No automatic sprinkler system, or water, or steam pipes containing water should be allowed in room.  
Sufficient heat should be provided (without the use of open flames) to prevent condensation of moisture due to changes in atmospheric conditions. Empty sodium drums should be stored in this same area.  
Protect against physical damage. Keep away from water or locations where water may be needed for fire in other storage, or involving building. Avoid high temperature. Store under nitrogen or kerosene. Never store under halogenated hydrocarbons. Detached fire-resistive building recommended for quantity storage.

**Source:** Associated Octel Company Ltd. S. Wirral

(2) (3)

**1.16 Last Literature Search**

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**1.17 Reviews**

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**1.18 Listings e.g. Chemical Inventories**

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**2.1 Melting Point**

**Value:** 97.5 degree C  
**Decomposition:** no  
**Sublimation:** no  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (4)

**Value:** 97.8 degree C  
**Decomposition:** no  
**Sublimation:** no  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (5)

**Value:** 97.8 degree C  
**Decomposition:** no  
**Sublimation:** no  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (6)

**2.2 Boiling Point**

**Value:** 880 degree C at 1013 hPa  
**Decomposition:** no  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (7)

**Value:** 881.4 degree C at 1013 hPa  
**Decomposition:** no  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (8)

**Value:** 882.9 degree C at 1013 hPa  
**Decomposition:** no  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (9)

**Value:** 889 degree C at 1013 hPa  
**Decomposition:** no  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (10)

**2.3 Density**

**Type:** relative density  
**Value:** .968 g/cm<sup>3</sup> at 20 degree C  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (11)

**Type:** relative density  
**Value:** .97 g/cm<sup>3</sup> at 20 degree C  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (12)

**Type:** relative density  
**Value:** .971 g/cm<sup>3</sup> at 20 degree C  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (13)

**2.3.1 Granulometry**

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**2.4 Vapour Pressure**

**Value:** .426 hPa at 360 degree C  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (14)

**Value:** 1.6 hPa at 400 degree C  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (13)

**Value:** 1.33 hPa at 493 degree C  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (15)

**Value:** 133.29 hPa at 701 degree C  
**GLP:** no data  
**Source:** Associated Octel Company Ltd. S. Wirral (16)

**2.5 Partition Coefficient**

**log Pow:**  
**Method:**  
**Year:**  
**Remark:** No data  
**Source:** Associated Octel Company Ltd. S. Wirral

### 2.6.1 Water Solubility

**Remark:** Water reacts violently with solid and liquid sodium to form sodium hydroxide and hydrogen gas, in an exothermic reaction which will ignite the gas liberated. The solution is strongly basic

**Source:** Associated Octel Company Ltd. S. Wirral (17)

### 2.6.2 Surface Tension

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### 2.7 Flash Point

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### 2.8 Auto Flammability

**Value:** > 115 degree C at 1013 hPa

**GLP:** no data

**Remark:** In dry air

**Source:** Associated Octel Company Ltd. S. Wirral (18)

**Value:** 120 - 125 degree C at 1013 hPa

**GLP:** no data

**Source:** Associated Octel Company Ltd. S. Wirral (19)

### 2.9 Flammability

**Result:** contact with water liberates highly flammable gases

**GLP:** no data

**Remark:** Burning sodium may produce irritating or poisonous gases . Heated sodium is spontaneously flammable in air. Sodium may ignite itself if exposed to air, and may re-ignite after the fire has been extinguished.

**Source:** Associated Octel Company Ltd. S. Wirral (20)

### 2.10 Explosive Properties

**Result:** other: dangerous explosion hazard when exposed to moisture in any form

**GLP:** no data

**Remark:** A mixture of sodium & any of the following halide compounds produces a strong explosion on impact: aluminum bromide; aluminum chloride; aluminum fluoride; antimony tribromide; antimony trichloride; antimony triiodide; arsenic trichloride; arsenic triiodide; bismuth tribromide; bismuth trichloride; bismuth triiodide; boron tribromide; cupric chloride; ferrous chloride; iodine monobromide; manganous chloride; mercuric bromide; mercuric chloride; mercuric

fluoride; mercuric iodide; mercurous chloride; silicon tetrachloride; silver fluoride; stannic chloride; stannic iodide (with sulphur); stannous chloride; sulphur dibromide; thallos bromide; vanadium pentachloride; zinc bromide .

A very violent explosion results when a mixture of sodium & any of the following is struck by a hammer: cobaltous bromide; carbon tetrachloride; cobaltous chloride; ferric bromide; ferric chloride; ferrous bromide; ferrous iodide; phosphorous pentachloride; phosphorous tribromide; sulphur dichloride.

Dangerous explosion hazard when exposed to moisture in any form. Dangerous when exposed to heat or flame, or by chemical reaction with moisture, or air or any oxidizing material. Reacts exothermally with halogens, acids & halogenated hydrocarbons (1st Reference).

Sodium explodes on contact with hydrochloric acid. An aqueous solution of hydrofluoric acid reacts with sodium with explosive violence. A dilute aqueous solution of sulphuric acid reacts with sodium with explosive violence . The reaction of sodium & carbon monoxide in liquid ammonia forms sodium carbonyl, which explodes when heated in air .

**Source:** Associated Octel Company Ltd. S. Wirral

(21) (22)

### 2.11 Oxidizing Properties

-

### 2.12 Additional Remarks

**Remark:** Sodium can react vigorously or explosively with oxidising materials (1st Ref).  
Solubility: dissolves in liquid ammonia (forms a blue soln)  
dissolves in mercury (forms sodium amalgam) .

**Source:** Associated Octel Company Ltd. S. Wirral

(22) (17)

**3.1.1 Photodegradation**

-

**3.1.2 Stability in Water**

Type:

Method:

Year:

GLP:

Test substance:

Remark: Sodium is unstable in water, as it violently decomposes water to sodium hydroxide and hydrogen gas.

Source: Associated Octel Company Ltd. S. Wirral

(23)

**3.1.3 Stability in Soil**

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**3.2 Monitoring Data (Environment)**

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**3.3.1 Transport between Environmental Compartments**

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**3.3.2 Distribution**

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**3.4 Mode of Degradation in Actual Use**

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**3.5 Biodegradation**

-

**3.6 BOD5, COD or BOD5/COD Ratio**

Remark: BOD: None.

Source: Associated Octel Company Ltd. S. Wirral

(24)

### **3.7 Bioaccumulation**

**Species:**

**Exposure period:**

**Concentration:**

**BCF:**

**Elimination:**

**Method:**

**Year:**

**GLP:**

**Test substance:**

**Remark:** Food Chain Concentration Potential: None.

**Source:** Associated Octel Company Ltd. S. Wirral

(24)

### **3.8 Additional Remarks**

**Source:** Associated Octel Company Ltd. S. Wirral

(25)

**AQUATIC ORGANISMS****4.1 Acute/Prolonged Toxicity to Fish**

**Type:**  
**Species:** Gasterosteus aculeatus (Fish, estuary, marine)  
**Exposure period:**  
**Unit:** mg/l **Analytical monitoring:** no data  
**Harmless :** < 4720  
**Method:**  
**Year:** **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** see chapter 4.9  
Test carried out in distilled water.  
**Source:** Associated Octel Company Ltd. S. Wirral

(26)

**Type:**  
**Species:** other: marine fish  
**Exposure period:** 48 hour(s)  
**Unit:** mg/l **Analytical monitoring:** no data  
**TLM :** 24000 - 25000  
**Method:**  
**Year:** **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** see chapter 4.9  
Test carried out in sea water.  
**Source:** Associated Octel Company Ltd. S. Wirral

(26)

**4.2 Acute Toxicity to Aquatic Invertebrates**

**Species:**  
**Exposure period:**  
**Unit:** **Analytical monitoring:**  
**Method:**  
**Year:** **GLP:**  
**Test substance:**  
**Remark:** see chapter 4.9  
**Source:** Associated Octel Company Ltd. S. Wirral

**4.3 Toxicity to Aquatic Plants e.g. Algae**

**Species:**  
**Endpoint:**  
**Exposure period:**  
**Unit:** **Analytical monitoring:**  
**Method:**  
**Year:** **GLP:**  
**Test substance:**  
**Remark:** see chapter 4.9  
**Source:** Associated Octel Company Ltd. S. Wirral

#### **4.4 Toxicity to Microorganisms e.g. Bacteria**

Type:  
Species:  
Exposure period:  
Unit: Analytical monitoring:  
Method:  
Year: GLP:  
Test substance:  
Remark: see chapter 4.9  
Source: Associated Octel Company Ltd. S. Wirral

#### **4.5 Chronic Toxicity to Aquatic Organisms**

##### **4.5.1 Chronic Toxicity to Fish**

Species:  
Endpoint:  
Exposure period:  
Unit: Analytical monitoring:  
Method:  
Year: GLP:  
Test substance:  
Remark: see chapter 4.9  
Source: Associated Octel Company Ltd. S. Wirral

##### **4.5.2 Chronic Toxicity to Aquatic Invertebrates**

Species:  
Endpoint:  
Exposure period:  
Unit: Analytical monitoring:  
Method:  
Year: GLP:  
Test substance:  
Remark: see chapter 4.9  
Source: Associated Octel Company Ltd. S. Wirral

**TERRESTRIAL ORGANISMS****4.6.1 Toxicity to Soil Dwelling Organisms**

Type:

Species:

Endpoint:

Exposure period:

Unit:

Method:

Year:

GLP:

Test substance:

Remark: see chapter 4.9

Source: Associated Octel Company Ltd. S. Wirral

**4.6.2 Toxicity to Terrestrial Plants**

Species:

Endpoint:

Expos. period:

Unit:

Method:

Year:

GLP:

Test substance:

Remark: see chapter 4.9

Source: Associated Octel Company Ltd. S. Wirral

**4.6.3 Toxicity to other Non-Mamm. Terrestrial Species**

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**4.7 Biological Effects Monitoring**

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**4.8 Biotransformation and Kinetics**

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**4.9 Additional Remarks**

Remark: Sodium is considered to be non-toxic in the environment .

Source: Associated Octel Company Ltd. S. Wirral

(27)

## **5.1 Acute Toxicity**

### **5.1.1 Acute Oral Toxicity**

-

### **5.1.2 Acute Inhalation Toxicity**

**Type:** other: ED50  
**Species:** rat  
**Sex:**  
**Number of Animals:**  
**Vehicle:**  
**Exposure time:** 2 hour(s)  
**Value:** 510 ppm  
**Method:** other: see remarks  
**Year:** 1979 **GLP:** no  
**Test substance:** other TS: sodium combustion products (mainly NaOH and Na<sub>2</sub>CO<sub>3</sub>)  
**Remark:** Results: ED50 (adult male) 510 mg/m<sup>3</sup>/2h  
ED50 (juvenile) 489 mg/m<sup>3</sup>/2h  
the incidence and the degree of severity of laryngitis was significantly higher in juveniles than in adult rats. A concentration of 3200 mg/m<sup>3</sup>/1.5h caused deaths.

Method: Sodium aerosol was generated by sweeping argon across a molten sodium surface. This aerosol reacted in a burning chamber with air to form primarily sodium peroxide which reacted rapidly with water and carbon dioxide to form NaOH, Na<sub>2</sub>CO<sub>3</sub> and their hydrated forms. These reaction products flowed, after passing an aging chamber to control the chemical form and particle size (MMAD 0.5 - 1.5 um), into a whole-body exposure chamber.

The purpose of the study was to evaluate the potential short-term hazard from an accidental sodium fire.

**Source:** Associated Octel Company Ltd. S. Wirral

(28)

### **5.1.3 Acute Dermal Toxicity**

-

### **5.1.4 Acute Toxicity, other Routes**

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**5.2 Corrosiveness and Irritation****5.2.1 Skin Irritation**

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**5.2.2 Eye Irritation**

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**5.3 Sensitization**

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**5.4 Repeated Dose Toxicity**

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**5.5 Genetic Toxicity 'in Vitro'**

Type:

System of  
testing:

Concentration:

Metabolic  
activation:

Result:

Method:

Year:

GLP:

Test substance:

Remark: There is no evidence of sodium having mutagenic properties .

Source: Associated Octel Company Ltd. S. Wirral

(29)

**5.6 Genetic Toxicity 'in Vivo'**

Type:

Species:

Sex:

Strain:

Route of admin.:

Exposure period:

Doses:

Result:

Method:

Year:

GLP:

Test substance:

Remark: There is no evidence of sodium having mutagenic properties .

Source: Associated Octel Company Ltd. S. Wirral

(29)

**5.7 Carcinogenicity**

Species: Sex:  
Strain:  
Route of admin.:  
Exposure period:  
Frequency of  
treatment:  
Post. obs.  
period:  
Doses:  
Result:  
Control Group:  
Method:  
Year: GLP:  
Test substance:  
Remark: There is no evidence of sodium having carcinogenic  
properties.  
Source: Associated Octel Company Ltd. S. Wirral

(29)

**5.8 Toxicity to Reproduction**

-

**5.9 Developmental Toxicity/Teratogenicity**

Species: Sex:  
Strain:  
Route of admin.:  
Exposure period:  
Frequency of  
treatment:  
Duration of test:  
Doses:  
Control Group:  
Method:  
Year: GLP:  
Test substance:  
Remark: There is no evidence of sodium having teratogenic properties  
.  
Source: Associated Octel Company Ltd. S. Wirral

(29)

**5.10 Other Relevant Information**

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### **5.11 Experience with Human Exposure**

**Remark:**

A cohort mortality study of workers, who worked between 1950 and 1980 in an electrochemical plant producing sodium and cobalt, showed that the mortality was significantly lower among sodium production workers than the mortality in the French population from all causes of death. No exposure data given (6).

Emits toxic fumes when heated in air, which are highly irritating to skin, eyes, and mucous membranes (4).

Hypernatremia reported after medical use. Lowest published toxic dose (effects on blood pressure) is 8200 mg/kg (in total during 23 days) (7).

No chronic toxicity to humans is recognised (5).

Sodium in drinking water may be harmful to persons suffering from cardiac, renal and circulatory diseases, and as much as 200mg of sodium from drinking water may be injurious. A limit of 10 mg/l in drinking water is recommended (5).

Sodium is a severe skin irritant, being extremely caustic to all tissue. In its metallic form, it reacts exothermally with the moisture of body or tissue surfaces, causing 2nd or 3rd degree therma and chemical burns on short contact. It is very injurious to the eyes. Such burns that have been caused by sodium are attributable principally to sodium hydroxide and hydrogen gas (1) (2) (3).

**Source:**

Associated Octel Company Ltd. S. Wirral

(30)

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- (2) 49 CFR 172.01, 10/1/89  
  
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International Maritime Organisation, p 4175, 1988
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7th Edition, van Nostrand Reinhold, New York, Vol III, p  
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Guide on Hazardous Materials. 9th Edition, NFPA, Boston,  
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**7.1 Risk Assessment**

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