



# SAFETY DATA SHEET

**MATERION**

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

<b>Name of the substance</b>	Pure Silver
<b>Identification number</b>	7440-22-4 (CAS number)
<b>Synonyms</b>	None.
<b>Issue date</b>	05-May-2015
<b>Version number</b>	02
<b>Supersedes date</b>	05-May-2015

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

<b>Identified uses</b>	Not available.
<b>Uses advised against</b>	None known.

### 1.3. Details of the supplier of the safety data sheet

#### Supplier

<b>Company name</b>	Materion Advanced Materials Technologies and Services Inc.
<b>Address</b>	5520 Midway Park Place NE United States
<b>Division</b>	
<b>Telephone</b>	Not available.
<b>e-mail</b>	ehs@materion.com
<b>Contact person</b>	Not available.

### 1.4. Emergency telephone number

Not available.

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### Classification according to Directive 67/548/EEC or 1999/45/EC as amended

**Classification** N;R50/53

#### Classification according to Regulation (EC) No 1272/2008 as amended

##### Environmental hazards

Hazardous to the aquatic environment, acute aquatic hazard	Category 1 M-factor = 1000.	H400 - Very toxic to aquatic life.
Hazardous to the aquatic environment, long-term aquatic hazard	Category 1 M-factor = 1000.	H410 - Very toxic to aquatic life with long lasting effects.

#### Hazard summary

<b>Physical hazards</b>	Not classified for physical hazards.
<b>Health hazards</b>	Not classified for health hazards.
<b>Environmental hazards</b>	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
<b>Specific hazards</b>	Not available.

### 2.2. Label elements

#### Label according to Regulation (EC) No. 1272/2008 as amended

<b>Contains:</b>	Silver
<b>Hazard pictograms</b>	None.
<b>Signal word</b>	Warning
<b>Hazard statements</b>	
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

#### Precautionary statements

<b>Prevention</b>	
P273	Avoid release to the environment.
<b>Response</b>	

P391	Collect spillage.
<b>Storage</b>	Not available.
<b>Disposal</b>	
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Supplemental label information</b>	None.
<b>2.3. Other hazards</b>	None known.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

#### General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	INDEX No.	Notes
Silver	99 - 100	7440-22-4 231-131-3	-	-	# M=1000
<b>Classification:</b>	<b>DSD:</b> N;R50/53				
	<b>CLP:</b> Aquatic Acute 1;H400, Aquatic Chronic 1;H410				

## SECTION 4: First aid measures

**General information** Not available.

### 4.1. Description of first aid measures

**Inhalation** Not available.

**Skin contact** Not available.

**Eye contact** Not available.

**Ingestion** Not available.

**4.2. Most important symptoms and effects, both acute and delayed** Not available.

**4.3. Indication of any immediate medical attention and special treatment needed** Not available.

## SECTION 5: Firefighting measures

**General fire hazards** Not available.

### 5.1. Extinguishing media

**Suitable extinguishing media** Not available.

**Unsuitable extinguishing media** Not available.

**5.2. Special hazards arising from the substance or mixture** Not available.

### 5.3. Advice for firefighters

**Special protective equipment for firefighters** Not available.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** Not available.

**For emergency responders** Not available.

**6.2. Environmental precautions** Not available.

**6.3. Methods and material for containment and cleaning up** Not available.

6.4. Reference to other sections Not available.

## SECTION 7: Handling and storage

7.1. Precautions for safe handling Not available.

7.2. Conditions for safe storage, including any incompatibilities Not available.

7.3. Specific end use(s) Not available.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

#### Occupational exposure limits

##### Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001

Material	Type	Value	Form
Pure Silver	MAK	0,1 mg/m <sup>3</sup>	Inhalable fraction.
	STEL	0,1 mg/m <sup>3</sup>	Inhalable fraction.
Components	Type	Value	Form
Silver (CAS 7440-22-4)	MAK	0,1 mg/m <sup>3</sup>	Inhalable fraction.
	STEL	0,1 mg/m <sup>3</sup>	Inhalable fraction.

##### Belgium. Exposure Limit Values.

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
Components	Type	Value
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

##### Bulgaria. OELs. Regulation No 13 on protection of workers against risks of exposure to chemical agents at work

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
Components	Type	Value
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

##### Croatia. Dangerous Substance Exposure Limit Values in the Workplace (ELVs), Annexes 1 and 2, Narodne Novine, 13/09

Material	Type	Value
Pure Silver	MAC	0,1 mg/m <sup>3</sup>
Components	Type	Value
Silver (CAS 7440-22-4)	MAC	0,1 mg/m <sup>3</sup>

##### Czech Republic. OELs. Government Decree 361

Material	Type	Value
Pure Silver	Ceiling	0,3 mg/m <sup>3</sup>
	TWA	0,1 mg/m <sup>3</sup>
Components	Type	Value
Silver (CAS 7440-22-4)	Ceiling	0,3 mg/m <sup>3</sup>
	TWA	0,1 mg/m <sup>3</sup>

##### Denmark. Exposure Limit Values

Material	Type	Value	Form
Pure Silver	TLV	0,01 mg/m <sup>3</sup>	Dust.
Components	Type	Value	Form
Silver (CAS 7440-22-4)	TLV	0,01 mg/m <sup>3</sup>	Dust.

##### Estonia. OELs. Occupational Exposure Limits of Hazardous Substances. (Annex of Regulation No. 293 of 18 September 2001)

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
Components	Type	Value
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

**Finland. Workplace Exposure Limits**

<b>Material</b>	<b>Type</b>	<b>Value</b>
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

**France. Threshold Limit Values (VLEP) for Occupational Exposure to Chemicals in France, INRS ED 984**

<b>Material</b>	<b>Type</b>	<b>Value</b>
Pure Silver	VME	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>
Silver (CAS 7440-22-4)	VME	0,1 mg/m <sup>3</sup>

**Germany. DFG MAK List (advisory OELs). Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area (DFG)**

<b>Material</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Pure Silver	TWA	0,1 mg/m <sup>3</sup>	Inhalable fraction.
<b>Components</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>	Inhalable fraction.

**Germany. TRGS 900, Limit Values in the Ambient Air at the Workplace**

<b>Material</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Pure Silver	AGW	0,1 mg/m <sup>3</sup>	Inhalable fraction.
<b>Components</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Silver (CAS 7440-22-4)	AGW	0,1 mg/m <sup>3</sup>	Inhalable fraction.

**Greece. OELs (Decree No. 90/1999, as amended)**

<b>Material</b>	<b>Type</b>	<b>Value</b>
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

**Hungary. OELs. Joint Decree on Chemical Safety of Workplaces**

<b>Material</b>	<b>Type</b>	<b>Value</b>
Pure Silver	STEL	0,4 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>
	TWA	0,1 mg/m <sup>3</sup>
Silver (CAS 7440-22-4)	STEL	0,4 mg/m <sup>3</sup>
	TWA	0,1 mg/m <sup>3</sup>

**Iceland. OELs. Regulation 154/1999 on occupational exposure limits**

<b>Material</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Pure Silver	TWA	0,01 mg/m <sup>3</sup>	Dust.
<b>Components</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Silver (CAS 7440-22-4)	TWA	0,01 mg/m <sup>3</sup>	Dust.

**Ireland. Occupational Exposure Limits**

<b>Material</b>	<b>Type</b>	<b>Value</b>
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

**Italy. Occupational Exposure Limits**

<b>Material</b>	<b>Type</b>	<b>Value</b>
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

**Latvia. OELs. Occupational exposure limit values of chemical substances in work environment**

<b>Material</b>	<b>Type</b>	<b>Value</b>
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

**Lithuania. OELs. Limit Values for Chemical Substances, General Requirements**

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>

Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>
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**Malta. OELs. Occupational Exposure Limit Values (L.N. 227. of Occupational Health and Safety Authority Act (CAP. 424), Schedules I and V)**

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>

Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>
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**Netherlands. OELs (binding)**

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>

Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>
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**Norway. Administrative Norms for Contaminants in the Workplace**

Material	Type	Value	Form
Pure Silver	TLV	0,1 mg/m <sup>3</sup>	Dust and fume.
<b>Components</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>

Silver (CAS 7440-22-4)	TLV	0,1 mg/m <sup>3</sup>	Dust and fume.
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**Poland. MACs. Minister of Labour and Social Policy Regarding Maximum Allowable Concentrations and Intensities in Working Environment**

Material	Type	Value	Form
Pure Silver	TWA	0,05 mg/m <sup>3</sup>	Dust and fume.
<b>Components</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>

Silver (CAS 7440-22-4)	TWA	0,05 mg/m <sup>3</sup>	Inhalable fraction.
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**Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796)**

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>

Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>
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**Romania. OELs. Protection of workers from exposure to chemical agents at the workplace**

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>

Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>
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**Slovakia. OELs. Regulation No. 300/2007 concerning protection of health in work with chemical agents**

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>

Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>
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**Slovenia. OELs. Regulations concerning protection of workers against risks due to exposure to chemicals while working (Official Gazette of the Republic of Slovenia)**

Material	Type	Value
Pure Silver	TWA	0,01 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>

Silver (CAS 7440-22-4)	TWA	0,01 mg/m <sup>3</sup>
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**Spain. Occupational Exposure Limits**

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>

Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>
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**Sweden. Occupational Exposure Limit Values**

Material	Type	Value	Form
Pure Silver	TWA	0,1 mg/m <sup>3</sup>	Total dust.
<b>Components</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>	Total dust.

**Switzerland. SUVA Grenzwerte am Arbeitsplatz**

Material	Type	Value	Form
Pure Silver	STEL	0,8 mg/m <sup>3</sup>	Inhalable dust.
<b>Components</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>	Inhalable dust.
	STEL	0,8 mg/m <sup>3</sup>	Inhalable dust.
	TWA	0,1 mg/m <sup>3</sup>	Inhalable dust.

**UK. EH40 Workplace Exposure Limits (WELs)**

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

**EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU**

Material	Type	Value
Pure Silver	TWA	0,1 mg/m <sup>3</sup>
<b>Components</b>	<b>Type</b>	<b>Value</b>
Silver (CAS 7440-22-4)	TWA	0,1 mg/m <sup>3</sup>

**Biological limit values** No biological exposure limits noted for the ingredient(s).

**Recommended monitoring procedures** Not available.

**Derived no-effect level (DNEL)** Not available.

**Predicted no effect concentrations (PNECs)** Not available.

**8.2. Exposure controls**

**Appropriate engineering controls** Not available.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection** Not available.

**Skin protection**

- **Hand protection** Not available.

- **Other** Not available.

**Respiratory protection** Not available.

**Thermal hazards** Not available.

**Hygiene measures** Not available.

**Environmental exposure controls** Not available.

**SECTION 9: Physical and chemical properties****9.1. Information on basic physical and chemical properties****Appearance**

**Physical state** Solid.

**Form** Not available.

**Colour** Not available.

**Odour** Not applicable.

**Odour threshold** Not available.

**pH** Not available.

**Melting point/freezing point** 960,5 °C (1760,9 °F)

**Initial boiling point and boiling range** 2000 °C (3632 °F)

<b>Flash point</b>	Not available.
<b>Evaporation rate</b>	Not available.
<b>Flammability (solid, gas)</b>	Not applicable.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Vapour pressure</b>	< 0,0000001 kPa at 25 °C
<b>Vapour density</b>	Not available.
<b>Relative density</b>	Not available.
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	Insoluble
<b>Solubility (other)</b>	Not available.
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	Not available.
<b>Explosive properties</b>	Not available.
<b>Oxidizing properties</b>	Not available.

## 9.2. Other information

<b>Density</b>	10,49 g/cm <sup>3</sup> estimated
<b>Molecular formula</b>	Ag
<b>Molecular weight</b>	107,86 g/mol
<b>Specific gravity</b>	10,49 at 15 °C

## SECTION 10: Stability and reactivity

<b>10.1. Reactivity</b>	Not available.
<b>10.2. Chemical stability</b>	Not available.
<b>10.3. Possibility of hazardous reactions</b>	Not available.
<b>10.4. Conditions to avoid</b>	Not available.
<b>10.5. Incompatible materials</b>	Not available.
<b>10.6. Hazardous decomposition products</b>	Not available.

## SECTION 11: Toxicological information

**General information** Not available.

### Information on likely routes of exposure

<b>Inhalation</b>	Not available.
<b>Skin contact</b>	Not available.
<b>Eye contact</b>	Not available.
<b>Ingestion</b>	Not available.

**Symptoms** Not available.

### 11.1. Information on toxicological effects

Product	Species	Test results
Pure Silver		
<b>Acute</b>		
<b>Dermal</b>		
LD50	Rat	> 2000 mg/kg
<b>Oral</b>		
LD50	Rat	> 5000 mg/kg

Components	Species	Test results
Silver (CAS 7440-22-4)		
<b>Acute</b>		
<b>Dermal</b>		
LD50	Rat	> 2000 mg/kg
<b>Oral</b>		
LD50	Rat	> 5000 mg/kg
<b>Skin corrosion/irritation</b>	Not available.	
<b>Serious eye damage/eye irritation</b>	Not available.	
<b>Respiratory sensitisation</b>	Not available.	
<b>Skin sensitisation</b>	Not available.	
<b>Germ cell mutagenicity</b>	Not available.	
<b>Carcinogenicity</b>	Not available.	
<b>Reproductive toxicity</b>	Not available.	
<b>Specific target organ toxicity - single exposure</b>	Not available.	
<b>Specific target organ toxicity - repeated exposure</b>	Not available.	
<b>Aspiration hazard</b>	Not available.	
<b>Mixture versus substance information</b>	Not available.	
<b>Other information</b>	Not available.	

## SECTION 12: Ecological information

### 12.1. Toxicity

Product	Species	Test results
Pure Silver		
<b>Aquatic</b>		
Crustacea	EC50	Water flea (Daphnia magna) 0,0002 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas) 0,0023 - 0,0033 mg/l, 96 hours

Components	Species	Test results
Silver (CAS 7440-22-4)		
<b>Aquatic</b>		
Crustacea	EC50	Water flea (Daphnia magna) 0,0002 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas) 0,0023 - 0,0033 mg/l, 96 hours
<b>12.2. Persistence and degradability</b>	Not available.	
<b>12.3. Bioaccumulative potential</b>	Not available.	
<b>Partition coefficient n-octanol/water (log Kow)</b>	Not available.	
<b>Bioconcentration factor (BCF)</b>	Not available.	
<b>12.4. Mobility in soil</b>	Not available.	
<b>12.5. Results of PBT and vPvB assessment</b>	Not a PBT or vPvB substance or mixture.	
<b>12.6. Other adverse effects</b>	Not available.	

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

<b>Residual waste</b>	Not available.
<b>Contaminated packaging</b>	Not available.
<b>EU waste code</b>	Not available.



## SECTION 14: Transport information

### ADR

Not regulated as dangerous goods.

### RID

Not regulated as dangerous goods.

### ADN

Not regulated as dangerous goods.

### IATA

Not regulated as dangerous goods.

### IMDG

Not regulated as dangerous goods.

## SECTION 15: Regulatory information

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

#### EU regulations

**Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I, as amended**

Not listed.

**Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex II, as amended**

Not listed.

**Regulation (EC) No. 850/2004 on persistent organic pollutants, Annex I**

Not listed.

**Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1**

Not listed.

**Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2**

Not listed.

**Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3**

Not listed.

**Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V**

Not listed.

**Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended**

Not listed.

**Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA**

Not listed.

#### Authorisations

**Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended**

Not listed.

**Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended**

Not listed.

#### Restrictions on use

**Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use**

Not regulated.

**Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended**

Not listed.

**Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breastfeeding, as amended**

Not listed.

#### Other EU regulations

**Directive 2012/18/EU on major accident hazards involving dangerous substances**

Not listed.

**Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work, as amended**

Not listed.

**Directive 94/33/EC on the protection of young people at work, as amended**

Not listed.

#### National regulations

Not available.

**15.2. Chemical safety assessment** Not available.

**SECTION 16: Other information**

**List of abbreviations** Not available.

**References** Not available.

**Information on evaluation method leading to the classification of mixture** Not available.

**Training information** Not available.