



SAFETY DATA SHEET

MATERION

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

1.1. Product identifier

Trade name or designation of the mixture Aluminum oxide-scandium
Synonyms None.
Document number MKE-0281
Issue date 17-October-2017
Version number 01

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

Identified uses Not available.
Uses advised against None known.

1.3. Details of the supplier of the safety data sheet

Supplier

Company name Materion Advanced Chemicals Inc.
Address 407 N. 13th Street
1316 W. St. Paul Avenue
Milwaukee, WI 53233
United States
Division Milwaukee
Telephone 414.212.0257
e-mail advancedmaterials@materion.com
Contact person Noreen Atkinson

1.4. Emergency telephone number

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The mixture has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

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

This mixture does not meet the criteria for classification according to Regulation (EC) 1272/2008 as amended.

Hazard summary Exposure to powder or dusts may be irritating to eyes, nose and throat. Not classified for health hazards. However, occupational exposure to the mixture or substance(s) may cause adverse health effects. The material as sold in solid form is generally not considered hazardous. However, if the process involves grinding, melting, cutting or any other process that causes a release of dust or fumes, hazardous levels of airborne particulate could be generated.

2.2. Label elements

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

Hazard pictograms None.
Signal word None.
Hazard statements The mixture does not meet the criteria for classification.

Precautionary statements

Prevention Observe good industrial hygiene practices.
Response Wash hands after handling.
Storage Store away from incompatible materials.
Disposal Dispose of waste and residues in accordance with local authority requirements.

Supplemental label information

85 % of the mixture consists of component(s) of unknown acute oral toxicity. 85 % of the mixture consists of component(s) of unknown acute dermal toxicity. 85 % of the mixture consists of component(s) of unknown acute inhalation toxicity. 85 % of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 85 % of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.
For further information, please contact the Product Stewardship Department at +1.800.862.4118.

2.3. Other hazards

Not a PBT or vPvB substance or mixture.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

The components are not hazardous or are below required disclosure limits.

List of abbreviations and symbols that may be used above

#: This substance has been assigned Union workplace exposure limit(s).

M: M-factor

PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

General information

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

4.1. Description of first aid measures

Inhalation

Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact

Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact

Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.

Ingestion

Rinse mouth. Get medical attention if symptoms occur.

4.2. Most important symptoms and effects, both acute and delayed

Dusts may irritate the respiratory tract, skin and eyes.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

General fire hazards

No unusual fire or explosion hazards noted.

5.1. Extinguishing media

Suitable extinguishing media

Water fog. Foam. Dry chemical powder. Carbon dioxide (CO₂).

Unsuitable extinguishing media

Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

During fire, gases hazardous to health may be formed.

5.3. Advice for firefighters

Special protective equipment for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Special firefighting procedures

Move containers from fire area if you can do so without risk.

Specific methods

Use standard firefighting procedures and consider the hazards of other involved materials.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. For personal protection, see section 8 of the SDS.

For emergency responders

Keep unnecessary personnel away. Use personal protection recommended in Section 8 of the SDS.

6.2. Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up

Avoid the generation of dusts during clean-up. Collect dust using a vacuum cleaner equipped with HEPA filter. Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal.

6.4. Reference to other sections

For personal protection, see section 8 of the SDS. For waste disposal, see section 13 of the SDS.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Minimise dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust is formed. Avoid prolonged exposure. Practice good housekeeping.

7.2. Conditions for safe storage, including any incompatibilities

Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

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

| Components | Type | Value | Form |
|---------------------------------|------|----------------------|----------------------|
| Aluminium oxide (CAS 1344-28-1) | MAK | 5 mg/m ³ | Respirable fraction. |
| | | 5 mg/m ³ | Respirable fume. |
| | STEL | 10 mg/m ³ | Inhalable fraction. |
| | | 20 mg/m ³ | Inhalable fraction. |
| | | 10 mg/m ³ | Respirable fume. |
| | | 10 mg/m ³ | Respirable fraction. |

Belgium. Exposure Limit Values.

| Components | Type | Value | Form |
|---------------------------------|------|---------------------|----------------------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 1 mg/m ³ | Respirable fraction. |

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

| Components | Type | Value | Form |
|---------------------------------|------|-----------------------|----------------------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 3,5 mg/m ³ | Respirable fraction. |

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

| Components | Type | Value | Form |
|---------------------------------|------|----------------------|------------------|
| Aluminium oxide (CAS 1344-28-1) | MAC | 4 mg/m ³ | Respirable dust. |
| | | 10 mg/m ³ | Total dust. |

Czech Republic. OELs. Government Decree 361

| Components | Type | Value | Form |
|---------------------------------|------|-----------------------|------------------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 0,1 mg/m ³ | Respirable dust. |

Denmark. Exposure Limit Values

| Components | Type | Value | Form |
|---------------------------------|------|---------------------|-------------|
| Aluminium oxide (CAS 1344-28-1) | TLV | 5 mg/m ³ | Total |
| | | 2 mg/m ³ | Respirable. |

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

| Components | Type | Value | Form |
|---------------------------------|------|----------------------|------------------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 4 mg/m ³ | Respirable dust. |
| | | 10 mg/m ³ | Total dust. |

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

| Components | Type | Value |
|---------------------------------|------|----------------------|
| Aluminium oxide (CAS 1344-28-1) | VME | 10 mg/m ³ |

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

| Components | Type | Value | Form |
|---------------------------------|------|---------------------|---------------------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 4 mg/m ³ | Inhalable fraction. |

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

| Components | Type | Value | Form |
|--|-------------|------------------------|------------------------|
| | | 1,5 mg/m ³ | Respirable fraction. |
| Germany. TRGS 900, Limit Values in the Ambient Air at the Workplace | | | |
| Components | Type | Value | Form |
| Aluminium oxide (CAS 1344-28-1) | AGW | 10 mg/m ³ | Inhalable fraction. |
| | | 1,25 mg/m ³ | Respirable fraction. |
| Greece. OELs (Decree No. 90/1999, as amended) | | | |
| Components | Type | Value | Form |
| Aluminium oxide (CAS 1344-28-1) | TWA | 5 mg/m ³ | Inhalable |
| | | 10 mg/m ³ | Respirable. |
| Hungary. OELs. Joint Decree on Chemical Safety of Workplaces | | | |
| Components | Type | Value | Form |
| Aluminium oxide (CAS 1344-28-1) | TWA | 6 mg/m ³ | Respirable. |
| Iceland. OELs. Regulation 154/1999 on occupational exposure limits | | | |
| Components | Type | Value | |
| Aluminium oxide (CAS 1344-28-1) | TWA | 10 mg/m ³ | |
| Ireland. Occupational Exposure Limits | | | |
| Components | Type | Value | Form |
| Aluminium oxide (CAS 1344-28-1) | TWA | 4 mg/m ³ | Respirable dust. |
| | | 10 mg/m ³ | Total inhalable dust. |
| Italy. Occupational Exposure Limits | | | |
| Components | Type | Value | Form |
| Aluminium oxide (CAS 1344-28-1) | TWA | 1 mg/m ³ | Respirable fraction. |
| Latvia. OELs. Occupational exposure limit values of chemical substances in work environment | | | |
| Components | Type | Value | Form |
| Aluminium oxide (CAS 1344-28-1) | TWA | 6 mg/m ³ | Decomposition aerosol. |
| | | 4 mg/m ³ | |
| Norway. Administrative Norms for Contaminants in the Workplace | | | |
| Components | Type | Value | |
| Aluminium oxide (CAS 1344-28-1) | TLV | 10 mg/m ³ | |
| Poland. MACs. Regulation regarding maximum permissible concentrations and intensities of harmful factors in the work environment, Annex 1 | | | |
| Components | Type | Value | Form |
| Aluminium oxide (CAS 1344-28-1) | TWA | 2,5 mg/m ³ | Inhalable fraction. |
| | | 1,2 mg/m ³ | Respirable fraction. |
| Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796) | | | |
| Components | Type | Value | |
| Aluminium oxide (CAS 1344-28-1) | TWA | 10 mg/m ³ | |
| Romania. OELs. Protection of workers from exposure to chemical agents at the workplace | | | |
| Components | Type | Value | Form |
| Aluminium oxide (CAS 1344-28-1) | STEL | 5 mg/m ³ | Aerosol |
| | TWA | 2 mg/m ³ | Aerosol |

Slovakia. OELs. Regulation No. 300/2007 concerning protection of health in work with chemical agents

| Components | Type | Value | Form |
|---------------------------------|------|-----------------------|----------------------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 4 mg/m ³ | Inhalable fraction. |
| | | 1,5 mg/m ³ | Respirable fraction. |
| | | 0,1 mg/m ³ | |

Spain. Occupational Exposure Limits Components

| Components | Type | Value | Form |
|---------------------------------|------|----------------------|------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 10 mg/m ³ | |

Sweden. OELs. Work Environment Authority (AV), Occupational Exposure Limit Values (AFS 2015:7) Components

| Components | Type | Value | Form |
|---------------------------------|------|---------------------|------------------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 5 mg/m ³ | Total dust. |
| | | 2 mg/m ³ | Respirable dust. |

Switzerland. SUVA Grenzwerte am Arbeitsplatz Components

| Components | Type | Value | Form |
|---------------------------------|------|----------------------|---------------------------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 24 mg/m ³ | Fume and respirable dust. |
| | | 3 mg/m ³ | Respirable dust. |
| | | 3 mg/m ³ | Fume and respirable dust. |

UK. EH40 Workplace Exposure Limits (WELs) Components

| Components | Type | Value | Form |
|---------------------------------|------|----------------------|------------------|
| Aluminium oxide (CAS 1344-28-1) | TWA | 4 mg/m ³ | Respirable dust. |
| | | 10 mg/m ³ | Inhalable dust. |

Biological limit values

No biological exposure limits noted for the ingredient(s).

Recommended monitoring procedures

Follow standard monitoring procedures.

Derived no effect levels (DNELs)

Not available.

Predicted no effect concentrations (PNECs)

Not available.

8.2. Exposure controls**Appropriate engineering controls**

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If engineering measures are not sufficient to maintain concentrations of dust particulates below the OEL (occupational exposure limit), suitable respiratory protection must be worn. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits.

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

Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.

Eye/face protection

Wear safety glasses with side shields (or goggles).

Skin protection**- Hand protection**

Wear appropriate chemical resistant gloves.

- Other

Wear suitable protective clothing.

Respiratory protection

Wear respirator with dust filter.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

Hygiene measures

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Environmental exposure controls

Environmental manager must be informed of all major releases.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

| | |
|---|-----------------------------|
| Physical state | Solid. |
| Form | Powder. |
| Colour | Not available. |
| Odour | Not available. |
| Odour threshold | Not available. |
| pH | Not available. |
| Melting point/freezing point | 2000 °C (3632 °F) estimated |
| Initial boiling point and boiling range | 2980 °C (5396 °F) estimated |
| Flash point | Not available. |
| Evaporation rate | Not available. |
| Flammability (solid, gas) | Not available. |
| Upper/lower flammability or explosive limits | |
| Flammability limit - lower (%) | Not available. |
| Flammability limit - upper (%) | Not available. |
| Vapour pressure | 0,00001 hPa estimated |
| Vapour density | Not available. |
| Relative density | Not available. |
| Solubility(ies) | |
| Solubility (water) | Not available. |
| Partition coefficient (n-octanol/water) | Not available. |
| Auto-ignition temperature | Not available. |
| Decomposition temperature | Not available. |
| Viscosity | Not available. |
| Explosive properties | Not explosive. |
| Oxidising properties | Not oxidising. |

9.2. Other information

| | |
|-------------------------|----------------------|
| Density | 4,00 g/cm3 estimated |
| Specific gravity | 4 estimated |

SECTION 10: Stability and reactivity

| | |
|---|---|
| 10.1. Reactivity | The product is stable and non-reactive under normal conditions of use, storage and transport. |
| 10.2. Chemical stability | Material is stable under normal conditions. |
| 10.3. Possibility of hazardous reactions | No dangerous reaction known under conditions of normal use. |
| 10.4. Conditions to avoid | Contact with incompatible materials. |
| 10.5. Incompatible materials | Acids. Chlorine. |
| 10.6. Hazardous decomposition products | No hazardous decomposition products are known. |

SECTION 11: Toxicological information

General information Occupational exposure to the substance or mixture may cause adverse effects.

Information on likely routes of exposure

| | |
|---------------------|---|
| Inhalation | Dust may irritate respiratory system. Prolonged inhalation may be harmful. |
| Skin contact | Dust or powder may irritate the skin. |
| Eye contact | Dust may irritate the eyes. |
| Ingestion | May cause discomfort if swallowed. However, ingestion is not likely to be a primary route of occupational exposure. |

Symptoms Dusts may irritate the respiratory tract, skin and eyes.

11.1. Information on toxicological effects

| | |
|--|---|
| Acute toxicity | Not known. |
| Skin corrosion/irritation | Due to partial or complete lack of data the classification is not possible. |
| Serious eye damage/eye irritation | Due to partial or complete lack of data the classification is not possible. |
| Respiratory sensitisation | Due to partial or complete lack of data the classification is not possible. |
| Skin sensitisation | Due to partial or complete lack of data the classification is not possible. |
| Germ cell mutagenicity | Due to partial or complete lack of data the classification is not possible. |
| Carcinogenicity | Due to partial or complete lack of data the classification is not possible. |

Hungary. 26/2000 EüM Ordinance on protection against and preventing risk relating to exposure to carcinogens at work (as amended)

Not listed.

| | |
|---|---|
| Reproductive toxicity | Due to partial or complete lack of data the classification is not possible. |
| Specific target organ toxicity - single exposure | Due to partial or complete lack of data the classification is not possible. |
| Specific target organ toxicity - repeated exposure | Due to partial or complete lack of data the classification is not possible. |
| Aspiration hazard | Due to partial or complete lack of data the classification is not possible. |
| Mixture versus substance information | No information available. |
| Other information | Not available. |

SECTION 12: Ecological information

| | |
|--|---|
| 12.1. Toxicity | Due to partial or complete lack of data the classification for hazardous to the aquatic environment, is not possible. |
| 12.2. Persistence and degradability | No data is available on the degradability of this product. |
| 12.3. Bioaccumulative potential | No data available. |
| Partition coefficient n-octanol/water (log Kow) | Not available. |
| Bioconcentration factor (BCF) | Not available. |
| 12.4. Mobility in soil | No data available. |
| 12.5. Results of PBT and vPvB assessment | Not a PBT or vPvB substance or mixture. |
| 12.6. Other adverse effects | No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component. |

SECTION 13: Disposal considerations

13.1. Waste treatment methods

| | |
|-------------------------------------|--|
| Residual waste | Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). |
| Contaminated packaging | Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal. |
| EU waste code | The Waste code should be assigned in discussion between the user, the producer and the waste disposal company. |
| Disposal methods/information | Collect and reclaim or dispose in sealed containers at licensed waste disposal site. |
| Special precautions | Dispose in accordance with all applicable regulations. |

SECTION 14: Transport information

ADR

14.1. - 14.6.: Not regulated as dangerous goods.

RID

14.1. - 14.6.: Not regulated as dangerous goods.

ADN

14.1. - 14.6.: Not regulated as dangerous goods.

IATA

14.1. - 14.6.: Not regulated as dangerous goods.

IMDG

14.1. - 14.6.: 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 and II, as amended

Not listed.

Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

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.

Restrictions on use

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

Not listed.

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.

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

Not listed.

Other regulations

This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006, as amended. The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended. Additional information is given in the Safety Data Sheet.

National regulations

Follow national regulation for work with chemical agents.

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations

Not available.

Information on evaluation method leading to the classification of mixture

The classification for health and environmental hazards is derived by a combination of calculator methods and test data, if available.

Disclaimer

Materion Advanced Chemicals Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. This document has been prepared using data from sources considered to be technically reliable and the information is believed to be correct. Materion makes no warranties, expressed or implied, as to the accuracy of the information contained herein. Materion cannot anticipate all conditions under which this information and its products may be used and the actual conditions of use are beyond its control. The user is responsible to evaluate all available information when using this product for any particular use and to comply with all Federal, State, Provincial and Local laws, statutes and regulations.