



MATERIAL SAFETY DATA SHEET

MATERION

1. Chemical product and company identification

A. Product name Aluminum Oxide

Other means of identification

SDS number G31
CAS number 1302-74-5

B. Recommended use and Limitations on use

Recommended use Manufacture of computer, electronic and optical products, electrical equipment
Scientific research and development
Other: Manufacture of medical and defense equipment

Limitations on use Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Consumer uses: Private households (= general public = consumers)

C. Supplier information

Company name Materion Advanced Materials Germany GmbH
Address Borsigstrasse 10
Alzenau 63755
Germany

Email Materion.Germany@materion.com

Contact person Hermann Schmiing

Emergency telephone number 49.60.23.91.82.0

Importer

Company name See above.

MSDS number G31

2. Hazards identification

A. Hazard category/Classification

Physical hazards Not classified.

Health hazards Serious eye damage/eye irritation Category 2
Specific target organ toxicity, single exposure Category 3 respiratory tract irritation
Specific target organ toxicity, repeated exposure Category 1

Environmental hazards Not classified.

B. Warning label items including precautionary statement

• **Pictogram** None.

• **Signal word** None.

• Hazard statement

H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H372 Causes damage to organs through prolonged or repeated exposure.

• Precautionary statement

Prevention Observe good industrial hygiene practices.

Response

Wash hands after handling.
P308 + P313 If exposed or concerned: Get medical advice/attention.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents/container (in accordance with related regulations).

C. Other hazards not included in the hazard category criteria (e.g. dust explosion hazard) None known.

Supplemental information For further information, please contact the Product Stewardship Department at +1.216.383.4019.

3. Composition/information on ingredients

Chemical identity	Common and alternative names	CAS number	ID number	Content in percent (%)
Aluminum Oxide		1302-74-5	KE-05-0367	100

4. First aid measures

- A. In case of eye contact** Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.
- B. In case of skin contact** Wash off with soap and water. Get medical attention if irritation develops and persists.
- C. In case of inhalation** Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
- D. In case of swallowing** Rinse mouth. Get medical attention if symptoms occur.
- E. Note to physician** Treat symptomatically.
- Most important symptoms/effects, acute and delayed** None known.
- General advice** If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

- A. Suitable (and unsuitable) extinguishing media**
- Suitable extinguishing media** Water fog. Foam. Dry chemical powder. Carbon dioxide (CO₂).
- Unsuitable extinguishing media** None known.
- B. Specific hazards arising from the chemical (example: hazardous combustion products)** None known.
- C. Specific methods of fire-fighting**
- Special protective equipment for firefighters** Wear suitable protective equipment.
- Special fire fighting procedures** Use water spray to cool unopened containers.
- General fire hazards** No unusual fire or explosion hazards noted.
- Specific methods** Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

- A. Personal precautions, protective equipment and emergency measures** Keep unnecessary personnel away.
- B. Environmental precautions** Avoid discharge into drains, water courses or onto the ground.
- C. Methods and materials for containment and cleaning up** Stop the flow of material, if this is without risk.

7. Handling and storage

- A. Precautions for safe handling** Observe good industrial hygiene practices.
- B. Conditions for safe storage (including any incompatibilities)** Keep locked up.

8. Exposure controls/personal protection

A. Exposure limit values, biological limit values, etc

Korea. OELs. Standards for Exposure to Chemical Substances and Physically Hazardous Factors

Material	Type	Value
Aluminum Oxide (CAS 1302-74-5)	TWA	10 mg/m3

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

B. Appropriate engineering controls Good general ventilation 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.

C. Personal protective equipment

- **Respiratory protection** In case of insufficient ventilation, wear suitable respiratory equipment.
- **Eye protection** Wear safety glasses with side shields (or goggles).
- **Hand protection** Wear gloves to prevent metal cuts and skin abrasions during handling.
- **Body protection** Wear suitable protective clothing.

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.

9. Physical and chemical properties

A. Appearance

Physical state	Solid.
Form	Powder.
Color	White.

B. Odor None.

C. Odor threshold Not applicable.

D. pH Not applicable.

E. Melting point/freezing point

Freezing point Not applicable.

F. Boiling point, initial boiling point, and boiling range Not applicable.

G. Flash point Not applicable.

H. Evaporation rate Not applicable.

I. Flammability (solid, gas) None known.

J. Upper/lower limit on flammability or explosive limits

Flammability limit - lower (%) Not applicable.

Flammability limit - lower (%) temperature Not applicable.

Flammability limit - upper (%) Not applicable.

Flammability limit - upper (%) temperature Not applicable.

Explosive limit - lower (%) Not applicable.

Explosive limit - lower (%) temperature Not applicable.

Explosive limit - upper (%) Not applicable.

Explosive limit - upper (%) temperature Not applicable.

K. Vapor pressure Not applicable.

L. Solubility	
Solubility (water)	Insoluble
M. Vapor density	Not applicable.
N. Specific gravity	Not applicable.
O. n-octanol/water partition coefficient	Not applicable.
P. Auto-ignition temperature	Not applicable.
Q. Decomposition temperature	Not applicable.
R. Viscosity	Not applicable.
S. Molecular weight	101.96 g/mol
Other data	
Density	Not applicable.
Explosive properties	Not explosive.
Molecular formula	Al ₂ O ₃
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
A. Stability and hazardous reaction potential	
Stability	Material is stable under normal conditions.
Hazardous reaction potential	No dangerous reaction known under conditions of normal use.
B. Conditions to avoid (e.g. static discharge, shock or vibration, etc)	Contact with incompatible materials.
C. Incompatible materials	Acids. Chlorine.
D. Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

A. Information on likely routes of exposure	
• Respiratory organs	Not likely, due to the form of the product.
• Skin	No adverse effects due to skin contact are expected.
• Eyes	Not relevant, due to the form of the product.
• Mouth	Expected to be a low ingestion hazard.
B. Information on health hazards	
• Acute toxicity (list all possible routes of exposure)	None known.
• Corrosivity or irritation to the skin	Not classified.
• Serious eye damage/eye irritation	May cause eye irritation.
• Respiratory sensitization	Not a respiratory sensitizer.
• Skin sensitization	Not a skin sensitizer.
• Carcinogenic properties /Carcinogenicity	Not classified.
• Mutagenic properties /Mutagenicity	Not classified.
• Reproductive toxicity	Not classified.
• Specific target organ toxicity - single exposure	Respiratory tract irritation.

- **Specific target organ toxicity - repeated exposure** Causes damage to organs through prolonged or repeated exposure.
- **Aspiration hazard** Not an aspiration hazard.

12. Ecological information

- A. Ecotoxicity**
 The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
- Hazardous to the aquatic environment, acute hazard**
 The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
- B. Persistence/degradability**
 No data is available on the degradability of any ingredients in the mixture.
- C. Bioaccumulative potential**
 No data available.
- D. Mobility in soil**
 No data available for this product.
- E. 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.

13. Disposal considerations

- A. Method of disposal**
 Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container (in accordance with related regulations).
- B. Disposal considerations (including disposal of contaminated containers or 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.
- Waste code**
 The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

14. Transport information

IATA

- A. UN number** Not applicable.
- B. UN proper shipping name** Not applicable.
- C. Transport hazard class(es)**
- Class** Not applicable.
- Subsidiary risk** -
- D. Packing group** Not applicable.
- E. Environmental hazards** No.
- F. Special precautions for user** Not applicable.

IMDG

- A. UN number** Not applicable.
- B. UN proper shipping name** Not applicable.
- C. Transport hazard class(es)**
- Class** Not applicable.
- Subsidiary risk** -
- D. Packing group** Not applicable.
- E. Environmental hazards**
- Marine pollutant** No.
- EmS** Not applicable.
- F. Special precautions for user** Not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

- A. Restrictions under the Industrial Safety and Health Law**
- Harmful Substances Prohibited from Manufacturing**
 Not regulated.
- Harmful Substances Requiring Permission for Manufacture or Use**
 Not regulated.

Controlled Hazardous Substances

Not regulated.

Harmful Substances Requiring Special Medical Examination

Not regulated.

Workplace Environmental Monitoring Harmful Materials

Not regulated.

Occupational Exposure Limit

Aluminum Oxide (CAS 1302-74-5)

B. Restrictions under the Chemicals Control Law (Previously Toxic Chemicals Control Law)**Accidental Release Prevention Substances**

Not regulated.

Act on the Registration and Evaluation of Chemicals**Banned Toxic Chemicals**

Not regulated.

Designated Existing Chemicals Subject to Registration (PEC) (MoE No. 2015-92)

Not listed.

Restricted Chemical Substances

Not regulated.

Toxic Chemicals

Not regulated.

C. Restrictions under the Dangerous Substance Safety Management Act**D. Restrictions under the Wastes Control Act****Halogenated Materials in Waste Organic Solvents**

Not regulated.

Hazardous Substances

Not regulated.

E. Restrictions under other foreign or domestic laws**Clean Air Conservation Act****Air Pollutants**

Aluminum Oxide (CAS 1302-74-5)

Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides (Rules on PIC, MoE No. 2014-252, Dec. 31, 2014; Standards for Pesticides, RDA No. 2014-26), as amended

Not listed.

Specific Air Pollutants

Not regulated.

Further information

This material safety data sheet was prepared in accordance with Article 41 of the Industrial Safety and Health Law.

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Korea	Existing Chemicals List (ECL)	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

Bibliography

ACGIH
EPA: AQUIRE database
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents
Korea. Accidental Release Prevention Substances (Presidential Decree of Toxic Chemical Control Law, Executive Order No. 19203)
Korea. Dangerous Substances Threshold Quantity (Presidential Decree of Dangerous Substances Safety Management Act No. 18406, Schedule 1)
Korea. Harmful Substances Prohibited from Manufacturing (Presidential Decree on the Industrial Safety and Health Act (No. 13053), Article 29)
Korea. Harmful Substances Requiring Permission for Manufacture or Use (Presidential Decree on the Industrial Safety and Health Act (No. 13053), Article 30)
Korea. OELs. Regulation for Permitted Concentration of Hazardous Substances (Ministry of Labor (MOL) Public Notice No. 1986-45, as amended)
Korea. Prohibited Chemical Substances (TCCL Article 11)
Korea. Regulated volatile organic compounds (VOCs) (MOE Notice No. 2001-36, March 8, 2001, as amended)
Korea. Restricted Chemical Substances (TCCL Article 11)
Korea. Toxic Chemical Control Law (TCCL), Existing Chemicals Inventory (KECI)
Korea. Toxic Chemical Control Law (TCCL), pre-1997 List
Korea. Toxic Chemicals (TCCL Article 10)
Korea. Toxic Release Inventory (TRI) Chemicals (TCCL Article 14)
Korea. Accidental Release Prevention Substances (Pres. Decree of Toxic Chemical Control Law, Ex. Order No. 19203, Tables 2 & 3, Dec 28, 2005)
Korea. OELs (ISHL Article 42; MOL Public Notice No. 1986-45, as amended through MOEL Notice 2013-38, August 14, 2013)
Korea. Prohibited Chemical Substances (AREC "K-REACH" Article 27; Designation of Toxic, Restricted or Banned Chemicals Appendices 4 and 5)
Korea. Restricted Chemical Substances (AREC "K-REACH" Article 27; Designation of Toxic, Restricted or Banned Chemicals Appendices 2 and 3)
KECI, January 27, 2015, amended through MoE 2016-138, July 13, 2016
Korea. Toxic Chemicals (AREC "K-REACH" Article 20; Designation of Toxic, Restricted or Banned Chemicals Appendix 1)
Korea. Toxic Release Inventory (TRI) Chemicals (MOE Public Notice No. 2002-166, Nov. 8, 2002)

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