



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	BaO-CaO-Al ₂ O ₃
Registration number	-
Document number	2LI
Synonyms	None.
Materion Code	2LI
Issue date	18-September-2019
Revision date	01-November-2019

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	Laura Hamilton

1.4. Emergency telephone number

Supersedes date	18-September-2019
Version number	02

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

Identified uses	Not available.
Uses advised against	None known.

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

Health hazards

Acute toxicity, oral	Category 4	H302 - Harmful if swallowed.
Acute toxicity, inhalation	Category 4	H332 - Harmful if inhaled.
Skin corrosion/irritation	Category 1	H314 - Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Category 1	H318 - Causes serious eye damage.

Hazard summary

Causes severe skin burns and eye damage. Harmful if inhaled. Harmful if swallowed. Occupational exposure to the substance or mixture 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

Contains: Aluminium oxide, Barium Oxide, Calcium oxide

Hazard pictograms



Signal word Danger

Hazard statements

H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H332 Harmful if inhaled.

Precautionary statements

Prevention

P261 Avoid breathing dust.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response

P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTRE/doctor.
P363 Wash contaminated clothing before reuse.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Supplemental label information

33 % of the mixture consists of component(s) of unknown acute oral toxicity. 100 % of the mixture consists of component(s) of unknown acute dermal toxicity. 100 % of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 100 % 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.
Not a PBT or vPvB substance or mixture.

2.3. Other hazards

SECTION 3: Composition/information on ingredients

3.2. Mixtures

General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
Barium Oxide	≤ 67	1304-28-5 215-127-9	-	056-002-00-7	#
Classification:	Acute Tox. 4;H302, Acute Tox. 4;H332				1,A
Aluminium oxide	≤ 18	1344-28-1 215-691-6	-	-	
Classification:	-				
Calcium oxide	≤ 15	1305-78-8 215-138-9	-	-	#
Classification:	Skin Corr. 1;H314, Eye Dam. 1;H318				

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.

Composition comments The full text for all H-statements is displayed in section 16.

SECTION 4: First aid measures

General information Show this safety data sheet to the doctor in attendance.

4.1. Description of first aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Call a poison centre or doctor/physician if you feel unwell.

Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control centre immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control centre immediately.
Ingestion	Call a physician or poison control centre immediately. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
4.2. Most important symptoms and effects, both acute and delayed	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.
4.3. Indication of any immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

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 (CO ₂).
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. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of dust. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. 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 dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Stop the flow of material, if this is without risk. Large Spills: Wet down with water and dike for later disposal. Absorb in vermiculite, dry sand or earth and place into containers. 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. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use.
6.4. Reference to other sections	For personal protection, see section 8. For waste disposal, see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling	Minimise dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Avoid breathing dust. Avoid prolonged exposure. When using, do not eat, drink or smoke. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling.
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7.2. Conditions for safe storage, including any incompatibilities

Store locked up. Store in 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 fume.
		5 mg/m ³	Respirable fraction.
		10 mg/m ³	Inhalable fraction.
	STEL	20 mg/m ³	Inhalable fraction.
		10 mg/m ³	Respirable fraction.
		10 mg/m ³	Respirable fume.
Barium Oxide (CAS 1304-28-5)	MAK	0,5 mg/m ³	Inhalable fraction.
	STEL	2 mg/m ³	Inhalable fraction.
Calcium oxide (CAS 1305-78-8)	Ceiling	4 mg/m ³	Inhalable fraction.
	MAK	2 mg/m ³	Inhalable fraction.

Belgium. Exposure Limit Values.

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	1 mg/m ³	Respirable fraction.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m ³	

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.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	5 mg/m ³	

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.
Barium Oxide (CAS 1304-28-5)	MAC	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	MAC	2 mg/m ³	

Cyprus. OELs. Control of factory atmosphere and dangerous substances in factories regulation, PI 311/73, as amended.

Components	Type	Value
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m ³

Czech Republic. OELs. Government Decree 361 Components

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	0,1 mg/m3	Respirable dust.
Barium Oxide (CAS 1304-28-5)	Ceiling	2,5 mg/m3	
	TWA	0,5 mg/m3	
Calcium oxide (CAS 1305-78-8)	Ceiling	4 mg/m3	
	TWA	2 mg/m3	

Denmark. Exposure Limit Values Components

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TLV	5 mg/m3	Total
		2 mg/m3	Respirable.
Barium Oxide (CAS 1304-28-5)	TLV	0,5 mg/m3	
Calcium oxide (CAS 1305-78-8)	TLV	2 mg/m3	

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/m3	Respirable dust.
		10 mg/m3	Total dust.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m3	
Calcium oxide (CAS 1305-78-8)	STEL	5 mg/m3	
	TWA	2 mg/m3	

Finland. Workplace Exposure Limits Components

Components	Type	Value
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m3
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m3

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

Components	Type	Value
Aluminium oxide (CAS 1344-28-1)	VME	10 mg/m3
Regulatory status: Indicative limit (VL)		
Barium Oxide (CAS 1304-28-5)	VME	0,5 mg/m3
Regulatory status: Regulatory indicative (VRI)		
Calcium oxide (CAS 1305-78-8)	VME	2 mg/m3
Regulatory status: Indicative limit (VL)		

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/m3	Inhalable fraction.
		1,5 mg/m3	Respirable fraction.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m3	Inhalable fraction.
Calcium oxide (CAS 1305-78-8)	TWA	1 mg/m3	Inhalable fraction.

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

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	AGW	10 mg/m ³	Inhalable fraction.
		1,25 mg/m ³	Respirable fraction.
Barium Oxide (CAS 1304-28-5)	AGW	0,5 mg/m ³	Inhalable fraction.
Calcium oxide (CAS 1305-78-8)	AGW	1 mg/m ³	Inhalable fraction.

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

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	5 mg/m ³	Inhalable
		10 mg/m ³	Respirable.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	5 mg/m ³	

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

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	6 mg/m ³	Respirable.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	STEL	5 mg/m ³	
	TWA	5 mg/m ³	

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

Components	Type	Value	
Aluminium oxide (CAS 1344-28-1)	TWA	10 mg/m ³	
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m ³	

Ireland. Occupational Exposure Limits Components

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	4 mg/m ³	Respirable dust.
		10 mg/m ³	Total inhalable dust.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m ³	

Italy. Occupational Exposure Limits Components

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	1 mg/m ³	Respirable fraction.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	STEL	4 mg/m ³	Respirable fraction.
	TWA	1 mg/m ³	Respirable fraction.

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

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	6 mg/m ³	Decomposition aerosol.

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

Components	Type	Value	Form
Barium Oxide (CAS 1304-28-5)	TWA	4 mg/m ³ 0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	5 mg/m ³	

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

Components	Type	Value	Form
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	STEL	5 mg/m ³	
	TWA	2 mg/m ³	

Luxembourg. Binding Occupational exposure limit values (Annex I), Memorial A

Components	Type	Value	Form
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	

Malta. OELs. Occupational Exposure Limit Values (L.N. 227. of Occupational Health and Safety Authority Act (CAP. 424), Schedules I and V)

Components	Type	Value	Form
Calcium oxide (CAS 1305-78-8)	STEL	4 mg/m ³	Respirable fraction.
	TWA	1 mg/m ³	Respirable fraction.

Netherlands. OELs (binding)

Components	Type	Value	Form
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	

Norway. Administrative Norms for Contaminants in the Workplace

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TLV	10 mg/m ³	
Barium Oxide (CAS 1304-28-5)	TLV	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	Ceiling	2 mg/m ³	

Ordinance of the Minister of Labour and Social Policy on 6 June 2014 on the maximum permissible concentrations and intensities of harmful health factors in the work environment, Journal of Laws 2014, item 817

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.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	STEL	6 mg/m ³	Inhalable fraction.
		4 mg/m ³	Respirable fraction.
	TWA	2 mg/m ³	Inhalable fraction.
		1 mg/m ³	Respirable fraction.

Portugal. OELs. Decree-Law n. 290/2001 (Journal of the Republic - 1 Series A, n.266)

Components	Type	Value	Form
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	

Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796)

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	1 mg/m ³	Respirable fraction.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	2 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
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	STEL	5 mg/m ³	
	TWA	2 mg/m ³	

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	
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m ³	

Slovenia. OELs. Regulations concerning protection of workers against risks due to exposure to chemicals while working (Official Gazette of the Republic of Slovenia)

Components	Type	Value	Form
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	5 mg/m ³	Inhalable fraction.

Spain. Occupational Exposure Limits

Components	Type	Value
Aluminium oxide (CAS 1344-28-1)	TWA	10 mg/m ³
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m ³

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

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	5 mg/m ³	Total dust.
		2 mg/m ³	Respirable dust.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	Total dust.
Calcium oxide (CAS 1305-78-8)	Ceiling	4 mg/m ³	Respirable dust.
	TWA	1 mg/m ³	Respirable dust.

Switzerland. SUVA Grenzwerte am Arbeitsplatz

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	STEL	24 mg/m ³	Respirable dust and/or fume.

Switzerland. SUVA Grenzwerte am Arbeitsplatz

Components	Type	Value	Form
	TWA	3 mg/m ³	Respirable dust.
		3 mg/m ³	Respirable dust and/or fume.
Barium Oxide (CAS 1304-28-5)	STEL	4 mg/m ³	Inhalable fraction.
	TWA	0,5 mg/m ³	Inhalable fraction.
Calcium oxide (CAS 1305-78-8)	STEL	2 mg/m ³	Inhalable fraction.
	TWA	2 mg/m ³	Inhalable fraction.

UK. EH40 Workplace Exposure Limits (WELs)

Components	Type	Value	Form
Aluminium oxide (CAS 1344-28-1)	TWA	4 mg/m ³	Respirable dust.
		10 mg/m ³	Inhalable dust.
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m ³	

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

Components	Type	Value	Form
Barium Oxide (CAS 1304-28-5)	TWA	0,5 mg/m ³	
Calcium oxide (CAS 1305-78-8)	STEL	4 mg/m ³	Respirable fraction.
	TWA	1 mg/m ³	Respirable fraction.

Biological limit values**Switzerland. BAT-Werte (Biological Limit Values in the Workplace as per SUVA)**

Components	Value	Determinant	Specimen	Sampling Time
Aluminium oxide (CAS 1344-28-1)	60 µg/g	Aluminium	Creatinine in urine	*

* - For sampling details, please see the source document.

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 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. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

General information Use personal protective equipment as required. 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) and a face shield.

Skin protection

- Hand protection Wear appropriate chemical resistant gloves.

- Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Chemical respirator with organic vapour cartridge.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

Hygiene measures	Wash hands after handling and before eating. Keep away from food and drink.
Environmental exposure 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.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state	Solid.
Form	Solid.
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	2850 °C (5162 °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/cm ³ 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	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Contact with incompatible materials.
10.5. Incompatible materials	Acids. Chlorine. Fluorine.
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	Harmful if inhaled.
Skin contact	Causes severe skin burns.

Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns. Harmful if swallowed.
Symptoms	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

11.1. Information on toxicological effects

Acute toxicity	In high concentrations, vapours are anaesthetic and may cause headache, fatigue, dizziness and central nervous system effects. Harmful if inhaled. Harmful if swallowed.
Skin corrosion/irritation	Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Causes serious eye damage.
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 any ingredients in the mixture.
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.

12.7. Additional information

Estonia Dangerous substances in groundwater Data

Barium Oxide (CAS 1304-28-5)	Barium (Ba) 50 ug/l
	Barium (Ba) 7000 ug/l

Estonia Dangerous substances in soil Data

Barium Oxide (CAS 1304-28-5)	Barium (Ba) 2000 mg/kg
	Barium (Ba) 500 mg/kg
	Barium (Ba) 750 mg/kg

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).
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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. Dispose of contents/container in accordance with local/regional/national/international regulations.
Special precautions	Dispose in accordance with all applicable regulations.

SECTION 14: Transport information

ADR

14.1. UN number	UN3288
14.2. UN proper shipping name	Toxic solid, inorganic, n.o.s. (Barium Oxide)
14.3. Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Label(s)	6.1
Hazard No. (ADR)	60
Tunnel restriction code	E
14.4. Packing group	III
14.5. Environmental hazards	No.
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

RID

14.1. UN number	UN3288
14.2. UN proper shipping name	Toxic solid, inorganic, n.o.s. (Barium Oxide)
14.3. Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Label(s)	6.1
14.4. Packing group	III
14.5. Environmental hazards	No.
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

ADN

14.1. UN number	UN3288
14.2. UN proper shipping name	Toxic solid, inorganic, n.o.s. (Barium Oxide)
14.3. Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Label(s)	6.1
14.4. Packing group	III
14.5. Environmental hazards	No.
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IATA

14.1. UN number	UN2923
14.2. UN proper shipping name	Corrosive solids, toxic, n.o.s. (Barium oxide, calcium oxide)
14.3. Transport hazard class(es)	
Class	8
Subsidiary risk	6.1
14.4. Packing group	III
14.5. Environmental hazards	No.
14.6. Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

- 14.1. UN number** UN2923
14.2. UN proper shipping name Corrosive solids, toxic, n.o.s. (Barium oxide, calcium oxide)
14.3. Transport hazard class(es)
 Class 8
 Subsidiary risk 6.1
14.4. Packing group III
14.5. Environmental hazards
 Marine pollutant No.
EmS F-A, S-B
14.6. Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

ADN; ADR; RID



IATA; IMDG



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

Aluminium oxide (CAS 1344-28-1)

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

Material name: BaO-CaO-Al₂O₃

2LI Version #: 02 Revision date: 01-November-2019 Issue date: 18-September-2019

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

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

National regulations

Young people under 18 years old are not allowed to work with this product according to EU Directive 94/33/EC on the protection of young people at work, as amended. Follow national regulation for work with chemical agents in accordance with Directive 98/24/EC, as amended.

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations

Not available.

References

Not available.

Training information

Follow training instructions when handling this material.

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.