Safety Data Sheet

Document Group:	16-3343-7	**Version Number:**	5.03
Issue Date:	2018/10/07	**Supercedes Date:**	2018/07/23

This Safety Data Sheet has been prepared in accordance with China GB/T 16483 safety data sheet for chemical products content and order of sections and China GB/T 17519 Guidance on the compilation of safety data sheet for chemical products.

IDENTIFICATION

1.1. Product identifier
3M™ Thermally Conductive Adhesive TC-2810

Product Identification Numbers

62-2662-1430-3	62-2662-1435-2	70-0711-4165-2	70-0715-4531-6	XA-0041-4999-4
XA-0067-2390-3	XA-0067-9212-2			

1.2. Recommended use and restrictions on use

Recommended use
Conductive adhesive.

1.3. Supplier's details

Company:	3M Technologies (S) Pte Ltd
Division:	Electronics Materials Solutions Division
ADDRESS:	10 Ang Mo Kio Street 65, Singapore 569059
Phone:	021-22105335
FAX:	021-22105036
E Mail:	Tox.cn@mmm.com
Website:	www.3m.com.cn

1.4. Emergency telephone number
National chemical accident emergency consulting hotline: 0532-83889090 (24hr)

This product is a kit or a multipart product which consists of multiple, independently packaged components. An SDS for each of these components is included. Please do not separate the component SDSs from this cover page. The document numbers of the SDSs for components of this product are:

16-3331-2, 16-3330-4

TRANSPORT INFORMATION

Division:_____

Local Regulations

China transport hazard class: Class 8 Corrosive substances

International Regulations

UN No.:UN3267
UN Proper Shipping Name:CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.
Transport hazard class (IMO):8 Corrosives
Transport hazard class (IATA):8 Corrosives
Packing Group:II
Environmental Hazards:
Marine Pollutant: Yes

Special precautions for user
Not applicable.

Revision information:
Updates to several SDS sections. We encourage you to reread the SDS and review the information.

DISCLAIMER: The information on this Safety Data Sheet is based on our experience and is correct to the best of our knowledge at the date of publication, but we do not accept any liability for any loss, damage or injury resulting from its use (except as required by law). The information may not be valid for any use not referred to in this Data Sheet or use of the product in combination with other materials. For these reasons, it is important that customers carry out their own test to satisfy themselves as to the suitability of the product for their own intended applications.

3M People's Republic of China SDSs are available at www.3m.com.cn

Safety Data Sheet

Document Group:	16-3330-4	**Version Number:**	4.04
Issue Date:	2018/07/23	**Supercedes Date:**	2016/05/18

This Safety Data Sheet has been prepared in accordance with China GB/T 16483 safety data sheet for chemical products content and order of sections and China GB/T 17519 Guidance on the compilation of safety data sheet for chemical products.

SECTION 1: Identification

1.1. Product identifier
3M™ Thermally Conductive Epoxy Adhesive TC-2810 (Part A)

Other means of identification

Product Identification Numbers
XA-0041-6392-0 XA-0041-9328-1

1.2. Recommended use and restrictions on use

Recommended use
Conductive adhesive., 2 PART ADHESIVE

1.3. Supplier's details
Company: 3M China Limited
Division: Electronics Materials Solutions Division
ADDRESS: 222 TianLin Road, Shanghai, 200233
Phone: 021-64853535
FAX: 021-22105036
E Mail: Tox.cn@mmm.com
Website: www.3m.com.cn

1.4. Emergency telephone number
National chemical accident emergency consulting hotline: 0532-83889090 (24hr)

SECTION 2: Hazard identification

Overview of Emergency

LIQUID, white, epoxy odor.
May be harmful in contact with skin. Causes severe skin burns and eye damage. May cause an allergic skin reaction. May

damage fertility or the unborn child.	Toxic to aquatic life. Harmful to aquatic life with long lasting effects.

2.1. Classification of the substance or mixture
Acute Toxicity (dermal): Category 5.
Serious Eye Damage/Irritation: Category 1.
Skin Corrosion/Irritation: Category 1B.
Skin Sensitizer: Category 1B.
Reproductive Toxicity: Category 1B.
Acute Aquatic Toxicity: Category 2.
Chronic Aquatic Toxicity: Category 3.

2.2. Label elements
Symbols
Corrosion | Exclamation mark | Health Hazard |

Pictograms

SIGNAL WORD
Danger

HAZARD STATEMENTS

H313	May be harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H360	May damage fertility or the unborn child.
H401	Toxic to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS

Prevention:

P201	Obtain special instructions before use.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P280D	Wear protective gloves, protective clothing, and eye/face protection.

Response:

P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
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 CENTER or doctor/physician.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.

Storage:

P405	Store locked up.

Disposal:

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

PHYSICAL AND CHEMICAL HAZARDS
No known GHS hazard classified, see additional information in section 9 and section 10.

HEALTH HAZARDS
May be harmful in contact with skin. Causes severe skin burns and eye damage. May cause an allergic skin reaction. May damage fertility or the unborn child.

ENVIRONMENTAL HAZARDS
Toxic to aquatic life. Harmful to aquatic life with long lasting effects.

2.3. Other hazards
May cause chemical gastrointestinal burns.

SECTION 3: Composition/information on ingredients

This material is a mixture.

Ingredient	C.A.S. No.	% by Wt
4,7,10-trioxatridecane-1,13-diamine	4246-51-9	40 - 50
boron nitride	10043-11-5	15 - 30
modified diglycidyl ether of bisphenol a - n.j. trade secret (t.s.) registry #04499600-5431p	68610-41-3	10 - 30
epoxy resin	25068-38-6	5 - 10
2,4,6-tris((dimethylamino)methyl)phenol	90-72-2	1 - 5
silane, trimethoxyoctyl-, hydrolysis products with silica	92797-60-9	1 - 5

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Remove person to fresh air. If you feel unwell, get medical attention.

Skin Contact:
Immediately flush with large amounts of water for at least 15 minutes. Remove contaminated clothing. Get immediate medical attention. Wash clothing before reuse.

Eye Contact:
Immediately flush with large amounts of water for at least 15 minutes. Remove contact lenses if easy to do. Continue rinsing. Immediately get medical attention.

If Swallowed:
Rinse mouth. Do not induce vomiting. Get immediate medical attention.

4.2. Most important symptoms and effects, both acute and delayed
See Section 11.1. Information on toxicological effects.

4.3. Advice to protect the rescuer and special warning to doctors

Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation and personal protective equipment.

4.4. Indication of any immediate medical attention and special treatment required
Not applicable

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media
In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam to extinguish.

5.2. Special hazards arising from the substance or mixture
None inherent in this product.

Hazardous Decomposition or By-Products

Substance	Condition
Aldehydes	During Combustion
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion
Hydrogen Chloride	During Combustion

5.3. Special protective actions for fire-fighters
No special protective actions for fire-fighters are anticipated.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Evacuate area. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions
Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up
Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a metal container approved for use in transportation by appropriate authorities. The container must be lined with polyethylene plastic or contain a plastic drum liner made of polyethylene. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and SDS. Seal the container. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

6.4. Secondary disaster prevention measures
Not applicable.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Avoid breathing of vapors created during cure cycle. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling.

Contaminated work clothing should not be allowed out of the workplace. Avoid release to the environment. Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.)

7.2. Conditions for safe storage including any incompatibilities
Store away from acids. Store away from oxidizing agents.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits
If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
epoxy resin	25068-38-6	Hong Kong OELs	Limit value not established:	

ACGIH : American Conference of Governmental Industrial Hygienists
AIHA : American Industrial Hygiene Association
China OELs : China. Occupational Exposure Limits for Hazardous Agents in the Workplace (GBZ 2.1)
CMRG : Chemical Manufacturer's Recommended Guidelines
Hong Kong OELs : Hong Kong. Occupational Exposure Limits for Chemical Substances in the Work Environment
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
CEIL: Ceiling

Biological limit values
No biological limit values exist for any of the components listed in Section 3 of this safety data sheet.

8.2. Exposure controls

8.2.1. Engineering controls
Provide ventilated enclosure for heat curing. Curing enclosures must be exhausted to outdoors or to a suitable emission control device. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
Full Face Shield
Indirect Vented Goggles

Skin/hand protection
Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing. Note: Nitrile gloves may be worn over polymer laminate gloves to improve dexterity.
Gloves made from the following material(s) are recommended: Polymer laminate

If this product is used in a manner that presents a higher potential for exposure (eg. spraying, high splash potential etc.), then use of protective coveralls may be necessary. Select and use body protection to prevent contact based on the results of an exposure assessment. The following protective clothing material(s) are recommended: Apron - polymer laminate

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:
Half facepiece or full facepiece air-purifying respirator suitable for organic vapors and particulates

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Liquid
Specific Physical Form:	Paste
Appearance/Odor	white, epoxy odor.
Odor threshold	*No Data Available*
pH	*Not Applicable*
Melting point/Freezing point	*No Data Available*
Boiling point/Initial boiling point/Boiling range	>=120 ºC
Flash Point	>=120 ºC [*Test Method:*Estimated]
Evaporation rate	*Not Applicable*
Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	*No Data Available*
Flammable Limits(UEL)	*No Data Available*
Vapor Pressure	<=0.3 Pa [@ 20 ºC]
Vapor Density	Negligible
Density	1.34 g/ml
Relative Density	1.34 [*Ref Std:*WATER=1]
Water solubility	Negligible
Solubility- non-water	*No Data Available*
Partition coefficient: n-octanol/ water	*No Data Available*
Autoignition temperature	*No Data Available*
Decomposition temperature	*No Data Available*
Viscosity	150,000 mPa-s [@ 20 ºC]
Volatile Organic Compounds	0 % weight
Percent volatile	0 % weight
VOC Less H2O & Exempt Solvents	0 %

SECTION 10: Stability and reactivity

10.1. Reactivity
This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

10.2. Chemical stability
Stable.

10.3. Possibility of hazardous reactions
Hazardous polymerization will not occur.

10.4. Conditions to avoid
Heat is generated during cure. Do not cure a mass larger than 50 grams in a confined space to prevent a premature exothermic reaction with production of intense heat and smoke.

10.5. Incompatible materials
Strong acids
Strong oxidizing agents

10.6. Hazardous decomposition products
Substance	Condition
None known.	

Refer to section 5.2 for hazardous decomposition products during combustion.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:
Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Skin Contact:
May be harmful in contact with skin.
Corrosive (Skin Burns): Signs/symptoms may include localized redness, swelling, itching, intense pain, blistering, ulceration, and tissue destruction.

Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Eye Contact:
Corrosive (Eye Burns): Signs/symptoms may include cloudy appearance of the cornea, chemical burns, severe pain, tearing, ulcerations, significantly impaired vision or complete loss of vision.

Ingestion:
Gastrointestinal Corrosion: Signs/symptoms may include severe mouth, throat and abdominal pain; nausea; vomiting; and diarrhea; blood in the feces and/or vomitus may also be seen.

Toxicological Data
If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Dermal		No data available; calculated ATE2,000 - 5,000 mg/kg
Overall product	Ingestion		No data available; calculated ATE >5,000 mg/kg
4,7,10-trioxatridecane-1,13-diamine	Dermal	Rabbit	LD50 2,500 mg/kg

4,7,10-trioxatridecane-1,13-diamine	Ingestion	Rat	LD50 3,160 mg/kg
boron nitride	Dermal	Rabbit	LD50 > 20,000 mg/kg
boron nitride	Ingestion	Rat	LD50 > 50,000 mg/kg
modified diglycidyl ether of bisphenol a - n.j. trade secret (t.s.) registry #04499600-5431p	Dermal	Not available	LD50 3,000 mg/kg
modified diglycidyl ether of bisphenol a - n.j. trade secret (t.s.) registry #04499600-5431p	Ingestion	Not available	LD50 > 34,000 mg/kg
epoxy resin	Dermal	Rat	LD50 > 1,600 mg/kg
epoxy resin	Ingestion	Rat	LD50 > 1,000 mg/kg
silane, trimethoxyoctyl-, hydrolysis products with silica	Dermal		LD50 estimated to be > 5,000 mg/kg
silane, trimethoxyoctyl-, hydrolysis products with silica	Ingestion	Rat	LD50 > 5,340 mg/kg
2,4,6-tris((dimethylamino)methyl)phenol	Dermal	Rat	LD50 1,280 mg/kg
2,4,6-tris((dimethylamino)methyl)phenol	Ingestion	Rat	LD50 1,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
4,7,10-trioxatridecane-1,13-diamine	Rabbit	Corrosive
modified diglycidyl ether of bisphenol a - n.j. trade secret (t.s.) registry #04499600-5431p	similar compounds	Irritant
epoxy resin	Rabbit	Mild irritant
2,4,6-tris((dimethylamino)methyl)phenol	Rabbit	Corrosive

Serious Eye Damage/Irritation

Name	Species	Value
4,7,10-trioxatridecane-1,13-diamine	similar health hazards	Corrosive
modified diglycidyl ether of bisphenol a - n.j. trade secret (t.s.) registry #04499600-5431p	similar compounds	Severe irritant
epoxy resin	Rabbit	Moderate irritant
2,4,6-tris((dimethylamino)methyl)phenol	Rabbit	Corrosive

Skin Sensitization

Name	Species	Value
modified diglycidyl ether of bisphenol a - n.j. trade secret (t.s.) registry #04499600-5431p	similar compounds	Sensitizing
epoxy resin	Human and animal	Sensitizing
2,4,6-tris((dimethylamino)methyl)phenol	Guinea pig	Not classified

Respiratory Sensitization

Name	Species	Value
epoxy resin	Human	Not classified

Germ Cell Mutagenicity

Name	Route	Value
epoxy resin	In vivo	Not mutagenic
epoxy resin	In Vitro	Some positive data exist, but the data are not sufficient for classification
2,4,6-tris((dimethylamino)methyl)phenol	In Vitro	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
epoxy resin	Dermal	Mouse	Some positive data exist, but the data are not sufficient for classification

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
epoxy resin	Ingestion	Not classified for female reproduction	Rat	NOAEL 750 mg/kg/day	2 generation
epoxy resin	Ingestion	Not classified for male reproduction	Rat	NOAEL 750 mg/kg/day	2 generation
epoxy resin	Dermal	Not classified for development	Rabbit	NOAEL 300 mg/kg/day	during organogenesis
epoxy resin	Ingestion	Not classified for development	Rat	NOAEL 750 mg/kg/day	2 generation

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
4,7,10-trioxatridecane-1,13-diamine	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		NOAEL Not available	
2,4,6-tris((dimethylamino)methyl)phenol	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		NOAEL Not available	

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
epoxy resin	Dermal	liver	Not classified	Rat	NOAEL 1,000 mg/kg/day	2 years
epoxy resin	Dermal	nervous system	Not classified	Rat	NOAEL 1,000 mg/kg/day	13 weeks
epoxy resin	Ingestion	auditory system | heart | endocrine system | hematopoietic system | liver | eyes | kidney and/or bladder	Not classified	Rat	NOAEL 1,000 mg/kg/day	28 days
2,4,6-tris((dimethylamino)methyl)phenol	Dermal	skin | liver | nervous system | auditory system | hematopoietic system | eyes	Not classified	Rat	NOAEL 125 mg/kg/day	28 days

Aspiration Hazard

For the component/components, either no data are currently available or the data are not sufficient for classification.

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. Additional information leading to material classification in Section 2 is available upon request. In addition, environmental fate and effects data on ingredients may not be reflected in this section because an ingredient is present below the threshold for labeling, an ingredient is not expected to be available for exposure, or the data is considered not relevant to the material as a whole.

12.1. Toxicity

Acute aquatic hazard:
GHS Acute 2: Toxic to aquatic life.

Chronic aquatic hazard:
GHS Chronic 3: Harmful to aquatic life with long lasting effects

No product test data available

Material	Cas #	Organism	Type	Exposure	Test Endpoint	Test Result
4,7,10-trioxatridecane-1,13-diamine	4246-51-9	Golden Orfe	Experimental	96 hours	Lethal Concentration 50%	>1,000 mg/l
4,7,10-trioxatridecane-1,13-diamine	4246-51-9	Green algae	Experimental	72 hours	Effect Concentration 50%	>500 mg/l
4,7,10-trioxatridecane-1,13-diamine	4246-51-9	Water flea	Experimental	48 hours	Effect Concentration 50%	220 mg/l
4,7,10-trioxatridecane-1,13-diamine	4246-51-9	Green algae	Experimental	72 hours	Effect Concentration 10%	5.4 mg/l
boron nitride	10043-11-5	Rainbow Trout	Experimental		Lethal Concentration 50%	>100 mg/l
boron nitride	10043-11-5	Water flea	Experimental		Effect Concentration 50%	>100 mg/l
modified diglycidyl ether of bisphenol a - n.j. trade secret (t.s.) registry #04499600-5431p	68610-41-3		Data not available or insufficient for classification			
epoxy resin	25068-38-6	Water flea	Estimated	48 hours	Lethal Concentration 50%	0.95 mg/l
epoxy resin	25068-38-6	Green Algae	Experimental	72 hours	Effect Concentration 50%	>11 mg/l
epoxy resin	25068-38-6	Rainbow Trout	Experimental	96 hours	Lethal Concentration 50%	1.2 mg/l
epoxy resin	25068-38-6	Green Algae	Experimental	72 hours	No obs Effect Conc	4.2 mg/l

epoxy resin	25068-38-6	Water flea	Experimental	21 days	No obs Effect Conc	0.3 mg/l
2,4,6-tris((dimethylamino)methyl)phenol	90-72-2	Common Carp	Experimental	96 hours	Lethal Concentration 50%	175 mg/l
2,4,6-tris((dimethylamino)methyl)phenol	90-72-2	Grass Shrimp	Experimental	96 hours	Lethal Concentration 50%	718 mg/l
2,4,6-tris((dimethylamino)methyl)phenol	90-72-2	Green algae	Experimental	72 hours	Effect Concentration 50%	84 mg/l
2,4,6-tris((dimethylamino)methyl)phenol	90-72-2	Green algae	Experimental	72 hours	No obs Effect Conc	6.25 mg/l
silane, trimethoxyoctyl-, hydrolysis products with silica	92797-60-9	Algae	Experimental	72 hours	Effect Concentration 50%	>=10,000 mg/l
silane, trimethoxyoctyl-, hydrolysis products with silica	92797-60-9	Water flea	Experimental	24 hours	No obs Effect Conc	>=10,000 mg/l
silane, trimethoxyoctyl-, hydrolysis products with silica	92797-60-9	Zebra Fish	Experimental	96 hours	No obs Effect Conc	>=10,000 mg/l

12.2. Persistence and degradability

Material	CAS No.	Test Type	Duration	Study Type	Test Result	Protocol
4,7,10-trioxatridecane-1,13-diamine	4246-51-9	Experimental Biodegradation	25 days	Carbon dioxide evolution	-8 % weight	OECD 301B - Mod. Sturm or CO2
boron nitride	10043-11-5	Data not availbl-insufficient			N/A	
modified diglycidyl ether of bisphenol a - n.j. trade secret (t.s.) registry #04499600-5431p	68610-41-3	Data not availbl-insufficient			N/A	
epoxy resin	25068-38-6	Estimated Hydrolysis		Hydrolytic half-life	<2 days (t 1/2)	Other methods
epoxy resin	25068-38-6	Experimental Biodegradation	28 days	Biological Oxygen	0 % BOD/ThBOD	OECD 301C - MITI (I)

				Demand		
2,4,6-tris((dimethylamino)methyl)phenol	90-72-2	Experimental Biodegradation	28 days	Biological Oxygen Demand	4 % weight	OECD 301D - Closed Bottle Test
silane, trimethoxyoctyl-, hydrolysis products with silica	92797-60-9	Data not availbl-insufficient			N/A	

12.3. Bioaccumulative potential

Material	CAS No.	Test Type	Duration	Study Type	Test Result	Protocol
4,7,10-trioxatridecane-1,13-diamine	4246-51-9	Estimated Bioconcentration		Log of Octanol/H2O part. coeff	-1.46	Est: Octanol-water part. coeff
boron nitride	10043-11-5	Data not available or insufficient for classification	N/A	N/A	N/A	N/A
modified diglycidyl ether of bisphenol a - n.j. trade secret (t.s.) registry #04499600-5431p	68610-41-3	Data not available or insufficient for classification	N/A	N/A	N/A	N/A
epoxy resin	25068-38-6	Experimental BCF-Carp	28 days	Bioaccumulation Factor	<=42	OECD 305E-Bioaccum Fl-thru fis
2,4,6-tris((dimethylamino)methyl)phenol	90-72-2	Experimental Bioconcentration		Log of Octanol/H2O part. coeff	-0.66	Other methods
silane, trimethoxyoctyl-, hydrolysis products with silica	92797-60-9	Data not available or insufficient for classification	N/A	N/A	N/A	N/A

12.4. Mobility in soil
Please contact manufacturer for more details

12.5 Other adverse effects
No information available

SECTION 13: Disposal considerations

13.1. Disposal methods
Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of completely cured (or polymerized) material in a permitted industrial waste facility. Proper destruction may require the use of additional fuel during incineration processes. Combustion products will include halogen acid (HCl/HF/HBr).

Facility must be capable of handling halogenated materials. As a disposal alternative, utilize an acceptable permitted waste disposal facility. If no other disposal options are available, waste product that has been completely cured or polymerized may be placed in a landfill properly designed for industrial waste. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

SECTION 14: Transport Information

Local Regulations

China transport hazard class: Class 8 Corrosive substances

International Regulations

UN No.:UN2735
UN Proper Shipping Name:AMINES, LIQUID, CORROSIVE, N.O.S.
Transport hazard class (IMO):8 Corrosives
Transport hazard class (IATA):8 Corrosives
Packing Group:II
Environmental Hazards:
Marine Pollutant: No

Special precautions for user
Not applicable.

SECTION 15: Regulatory information

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

Measures on Environmental Management of New Chemical Substances (MEP Decree No.7 2010)
This product complies with Measures on Environmental Management of New Chemical Substances. All ingredients are listed on or exempt from on China IECSC inventory.

Regulations on the Control over Safety of Dangerous Chemicals (2015 Version)
Catalog of Hazardous Chemicals (2015 version): No Ingredient is listed

GB18218-2009 Identification of Major Hazard Installations of Dangerous Chemicals:
No Ingredient is listed

Regulations on Labor Protection in Workplaces where Toxic Substances are Used (Decree No.352 2002)
Highly Toxic Chemicals: No Ingredient is listed

This safety data sheet is in compliance with the following national standards:
GB/T 17519-2013 Guidance on the compilation of safety data sheet for chemical products;
GB 15258-2009 General rules for preparation of precautionary label for chemicals;
GB 30000.2-2013 - GB30000.29-2103 Rules for classification and labelling for chemicals;
GBZ/T 210.1-2008 Guide for establishing occupational health standards-Part 1: Occupational exposure limits for airborne chemical in the workplace;
GBZ/T 210.2-2008 Guide for establishing occupational health standards-Part 2: Occupational exposure limits for airborne dusts in the workplace;
GBZ/T 210.3-2008 Guide for establishing occupational health standards-Part 3: Occupational exposure Limit for physical agents in workplace;

GB6944-2012 Classification and code of dangerous goods;
GB/T 15098-2008 The principle of transport packaging groups of dangerous goods;
GB 12268-2012 List of Dangerous Goods.

For more information, contact the manufacturer listed in Section 1 of this Safety Data Sheet.

SECTION 16: Other information

References
United Nations 'Recommendations on the Transport of Dangerous Goods - Model Regulations '
United Nations 'Globally Harmonized System of Classification and Labelling of Chemicals (GHS)'.

Revision information:
Updates to several SDS sections. We encourage you to reread the SDS and review the information.

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Safety Data Sheet

Document Group:	16-3331-2	**Version Number:**	3.03
Issue Date:	2018/07/23	**Supercedes Date:**	2016/10/27

This Safety Data Sheet has been prepared in accordance with China GB/T 16483 safety data sheet for chemical products content and order of sections and China GB/T 17519 Guidance on the compilation of safety data sheet for chemical products.

SECTION 1: Identification

1.1. Product identifier
3M™ Thermally Conductive Epoxy Adhesive TC-2810 (Part B)

Other means of identification

Product Identification Numbers
XA-0041-6393-8 XA-0041-9329-9

1.2. Recommended use and restrictions on use

Recommended use
Conductive adhesive., 2 PART ADHESIVE

1.3. Supplier's details
Company: 3M Technologies (S) Pte Ltd
Division: Electronics Materials Solutions Division
ADDRESS: 10 Ang Mo Kio Street 65, Singapore 569059
Phone: 021-22105335
FAX: 021-22105036
E Mail: Tox.cn@mmm.com
Website: www.3m.com.cn

1.4. Emergency telephone number
National chemical accident emergency consulting hotline: 0532-83889090 (24hr)

SECTION 2: Hazard identification

Overview of Emergency

LIQUID, white, epoxy odor.
Causes eye irritation. Causes mild skin irritation. May cause an allergic skin reaction. Very toxic to aquatic life.

Toxic to aquatic life with long lasting effects.

2.1. Classification of the substance or mixture
Serious Eye Damage/Irritation: Category 2B.
Skin Corrosion/Irritation: Category 3.
Skin Sensitizer: Category 1.
Acute Aquatic Toxicity: Category 1.
Chronic Aquatic Toxicity: Category 2.

2.2. Label elements
Symbols
Exclamation mark | Environment |

Pictograms

SIGNAL WORD
Warning

HAZARD STATEMENTS

H320	Causes eye irritation.
H316	Causes mild skin irritation.
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS

Prevention:

P280E	Wear protective gloves.
P273	Avoid release to the environment.

Response:

P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.

Storage:
No special requirements.

Disposal:

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

PHYSICAL AND CHEMICAL HAZARDS
No known GHS hazard classified, see additional information in section 9 and section 10.

HEALTH HAZARDS
Causes eye irritation. Causes mild skin irritation. May cause an allergic skin reaction.

ENVIRONMENTAL HAZARDS
Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.

2.3. Other hazards
None known

SECTION 3: Composition/information on ingredients

This material is a mixture.

Ingredient	C.A.S. No.	% by Wt
epoxy resin	25068-38-6	30 - 70
boron nitride	10043-11-5	20 - 30
methyl methacrylate-butadiene-styrene polymer	Trade Secret	5 - 10

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Remove person to fresh air. If you feel unwell, get medical attention.

Skin Contact:
Immediately wash with soap and water. Remove contaminated clothing and wash before reuse. If signs/symptoms develop, get medical attention.

Eye Contact:
Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, get medical attention.

If Swallowed:
Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed
See Section 11.1. Information on toxicological effects.

4.3. Advice to protect the rescuer and special warning to doctors
Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation and personal protective equipment.

4.4. Indication of any immediate medical attention and special treatment required
Not applicable

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media
In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam to extinguish.

5.2. Special hazards arising from the substance or mixture
None inherent in this product.

Hazardous Decomposition or By-Products

Substance	Condition
Aldehydes	During Combustion

Carbon monoxide	During Combustion
Carbon dioxide	During Combustion
Oxides of Nitrogen	During Combustion

5.3. Special protective actions for fire-fighters
No special protective actions for fire-fighters are anticipated.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Evacuate area. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions
Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up
Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and SDS. Seal the container. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

6.4. Secondary disaster prevention measures
Not applicable.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Avoid breathing of vapors created during cure cycle. Avoid breathing dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment. Wash contaminated clothing before reuse. Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.)

7.2. Conditions for safe storage including any incompatibilities
Store away from acids. Store away from oxidizing agents.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits
If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
epoxy resin	25068-38-6	Hong Kong OELs	Limit value not established:	

ACGIH : American Conference of Governmental Industrial Hygienists
AIHA : American Industrial Hygiene Association

China OELs : China. Occupational Exposure Limits for Hazardous Agents in the Workplace (GBZ 2.1)
CMRG : Chemical Manufacturer's Recommended Guidelines
Hong Kong OELs : Hong Kong. Occupational Exposure Limits for Chemical Substances in the Work Environment
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
CEIL: Ceiling

Biological limit values
No biological limit values exist for any of the components listed in Section 3 of this safety data sheet.

8.2. Exposure controls

8.2.1. Engineering controls
Provide ventilated enclosure for heat curing. Curing enclosures must be exhausted to outdoors or to a suitable emission control device. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
Indirect Vented Goggles

Skin/hand protection
Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing. Note: Nitrile gloves may be worn over polymer laminate gloves to improve dexterity.
Gloves made from the following material(s) are recommended: Polymer laminate

If this product is used in a manner that presents a higher potential for exposure (eg. spraying, high splash potential etc.), then use of protective coveralls may be necessary. Select and use body protection to prevent contact based on the results of an exposure assessment. The following protective clothing material(s) are recommended: Apron - polymer laminate

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:
Half facepiece or full facepiece air-purifying respirator suitable for organic vapors and particulates

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Liquid
Specific Physical Form:	Paste
Appearance/Odor	white, epoxy odor.
Odor threshold	*No Data Available*
pH	*No Data Available*
Melting point/Freezing point	*Not Applicable*

Boiling point/Initial boiling point/Boiling range	> 170 ºC
Flash Point	>=170 ºC [*Test Method:*Estimated]
Evaporation rate	*Not Applicable*
Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	*No Data Available*
Flammable Limits(UEL)	*No Data Available*
Vapor Pressure	<=2.7 Pa [@ 20 ºC]
Vapor Density	Nil
Density	1.44 g/ml
Relative Density	1.44 [*Ref Std:*WATER=1]
Water solubility	Negligible
Solubility- non-water	*No Data Available*
Partition coefficient: n-octanol/ water	*No Data Available*
Autoignition temperature	*No Data Available*
Decomposition temperature	*No Data Available*
Viscosity	150,000 mPa-s [@ 20 ºC]
Volatile Organic Compounds	*No Data Available*
Percent volatile	0 % weight
VOC Less H2O & Exempt Solvents	0 %

SECTION 10: Stability and reactivity

10.1. Reactivity
This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

10.2. Chemical stability
Stable.

10.3. Possibility of hazardous reactions
Hazardous polymerization will not occur.

10.4. Conditions to avoid
Heat is generated during cure. Do not cure a mass larger than 50 grams in a confined space to prevent a premature exothermic reaction with production of intense heat and smoke.

10.5. Incompatible materials
Strong acids
Strong oxidizing agents

10.6. Hazardous decomposition products

Substance	**Condition**
None known.	

Refer to section 5.2 for hazardous decomposition products during combustion.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:
Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Skin Contact:
Mild Skin Irritation: Signs/symptoms may include localized redness, swelling, itching, and dryness. Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Eye Contact:
Moderate Eye Irritation: Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Ingestion:
Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Toxicological Data
If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Dermal		No data available; calculated ATE >5,000 mg/kg
Overall product	Ingestion		No data available; calculated ATE >5,000 mg/kg
epoxy resin	Dermal	Rat	LD50 > 1,600 mg/kg
epoxy resin	Ingestion	Rat	LD50 > 1,000 mg/kg
boron nitride	Dermal	Rabbit	LD50 > 20,000 mg/kg
boron nitride	Ingestion	Rat	LD50 > 50,000 mg/kg
methyl methacrylate-butadiene-styrene polymer	Dermal	Rabbit	LD50 > 5,000 mg/kg
methyl methacrylate-butadiene-styrene polymer	Ingestion	Rat	LD50 > 5,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
epoxy resin	Rabbit	Mild irritant
methyl methacrylate-butadiene-styrene polymer	Professional judgement	Minimal irritation

Serious Eye Damage/Irritation

Name	Species	Value
epoxy resin	Rabbit	Moderate irritant
methyl methacrylate-butadiene-styrene polymer	Professional judgement	Mild irritant

Skin Sensitization

Name	Species	Value

epoxy resin	Human and animal	Sensitizing

Respiratory Sensitization

Name	Species	Value
epoxy resin	Human	Not classified

Germ Cell Mutagenicity

Name	Route	Value
epoxy resin	In vivo	Not mutagenic
epoxy resin	In Vitro	Some positive data exist, but the data are not sufficient for classification

Carcinogenicity

Name	Route	Species	Value
epoxy resin	Dermal	Mouse	Some positive data exist, but the data are not sufficient for classification

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
epoxy resin	Ingestion	Not classified for female reproduction	Rat	NOAEL 750 mg/kg/day	2 generation
epoxy resin	Ingestion	Not classified for male reproduction	Rat	NOAEL 750 mg/kg/day	2 generation
epoxy resin	Dermal	Not classified for development	Rabbit	NOAEL 300 mg/kg/day	during organogenesis
epoxy resin	Ingestion	Not classified for development	Rat	NOAEL 750 mg/kg/day	2 generation

Target Organ(s)

Specific Target Organ Toxicity - single exposure
For the component/components, either no data are currently available or the data are not sufficient for classification.

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
epoxy resin	Dermal	liver	Not classified	Rat	NOAEL 1,000 mg/kg/day	2 years
epoxy resin	Dermal	nervous system	Not classified	Rat	NOAEL 1,000 mg/kg/day	13 weeks
epoxy resin	Ingestion	auditory system | heart | endocrine system | hematopoietic system | liver | eyes | kidney and/or bladder	Not classified	Rat	NOAEL 1,000 mg/kg/day	28 days

Aspiration Hazard
For the component/components, either no data are currently available or the data are not sufficient for classification.

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. Additional information leading to material classification in Section 2 is available upon request. In addition, environmental fate and effects data on ingredients may not be reflected in this section because an ingredient is present below the threshold for labeling, an ingredient is not expected to be available for exposure, or the data is considered not relevant to the material as a whole.

12.1. Toxicity

Acute aquatic hazard:
GHS Acute 1: Very toxic to aquatic life.

Chronic aquatic hazard:
GHS Chronic 2: Toxic to aquatic life with long lasting effects

No product test data available

Material	Cas #	Organism	Type	Exposure	Test Endpoint	Test Result
epoxy resin	25068-38-6	Water flea	Estimated	48 hours	Lethal Concentration 50%	0.95 mg/l
epoxy resin	25068-38-6	Green Algae	Experimental	72 hours	Effect Concentration 50%	>11 mg/l
epoxy resin	25068-38-6	Rainbow Trout	Experimental	96 hours	Lethal Concentration 50%	1.2 mg/l
epoxy resin	25068-38-6	Green Algae	Experimental	72 hours	No obs Effect Conc	4.2 mg/l
epoxy resin	25068-38-6	Water flea	Experimental	21 days	No obs Effect Conc	0.3 mg/l
boron nitride	10043-11-5	Rainbow Trout	Experimental		Lethal Concentration 50%	>100 mg/l
boron nitride	10043-11-5	Water flea	Experimental		Effect Concentration 50%	>100 mg/l
methyl methacrylate-butadiene-styrene polymer	Trade Secret		Data not available or insufficient for classification			

12.2. Persistence and degradability

Material	CAS No.	Test Type	Duration	Study Type	Test Result	Protocol
epoxy resin	25068-38-6	Estimated Hydrolysis		Hydrolytic half-life	<2 days (t 1/2)	Other methods
epoxy resin	25068-38-6	Experimental	28 days	Biological	0 %	OECD 301C - MITI (I)

		Biodegradation		Oxygen Demand	BOD/ThBOD	
boron nitride	10043-11-5	Data not availbl-insufficient			N/A	
methyl methacrylate-butadiene-styrene polymer	Trade Secret	Data not availbl-insufficient			N/A	

12.3. Bioaccumulative potential

Material	CAS No.	Test Type	Duration	Study Type	Test Result	Protocol
epoxy resin	25068-38-6	Experimental BCF-Carp	28 days	Bioaccumulation Factor	<=42	OECD 305E-Bioaccum Fl-thru fis
boron nitride	10043-11-5	Data not available or insufficient for classification	N/A	N/A	N/A	N/A
methyl methacrylate-butadiene-styrene polymer	Trade Secret	Data not available or insufficient for classification	N/A	N/A	N/A	N/A

12.4. Mobility in soil
Please contact manufacturer for more details

12.5 Other adverse effects
No information available

SECTION 13: Disposal considerations

13.1. Disposal methods
Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of completely cured (or polymerized) material in a permitted industrial waste facility. Proper destruction may require the use of additional fuel during incineration processes. Combustion products will include halogen acid (HCl/HF/HBr). Facility must be capable of handling halogenated materials. As a disposal alternative, utilize an acceptable permitted waste disposal facility. If no other disposal options are available, waste product that has been completely cured or polymerized may be placed in a landfill properly designed for industrial waste. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

SECTION 14: Transport Information

Local Regulations

China transport hazard class: Not applicable

International Regulations

UN No.: Not applicable
UN Proper Shipping Name: Not applicable
Transport hazard class (IMO): Not applicable
Transport hazard class (IATA): Not applicable
Packing Group: Not applicable
Environmental Hazards:
Marine Pollutant: No

Special precautions for user
Not applicable.

SECTION 15: Regulatory information

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

Measures on Environmental Management of New Chemical Substances (MEP Decree No.7 2010)
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Catalog of Hazardous Chemicals (2015 version): No Ingredient is listed

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