

# SAFETY DATA SHEET

SDS No. TAZG-14E01 Date: 06.06.2014

ACCORDING TO EC-REGULATIONS 1907/2006  
(REACH), 1272/2008 (CLP) & 453/2010



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## PZT Sol-Gel Solution N-Series

### 1. SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

<b>1.1 Product identifier</b>	
Product Name	PZT Sol-Gel Solution N-Series.
CAS No.	Mixture.
EINECS No.	Mixture.
REACH Registration No.	None assigned.
<b>1.2 Relevant identified uses of the substance or mixture and uses advised against</b>	
Identified Use(s)	Thin film forming for electric devices.
Uses Advised Against	For professional users only.
<b>1.3 Details of the supplier of the safety data sheet</b>	
<b>1.3.1 Manufacturer</b>	MITSUBISHI MATERIALS CORPORATION Sanda Plant 12-6 Techno Park, Sanda-shi Hyogo, Japan 669-1339.
Telephone	+81-79-568-2344
Fax	+81-79-568-2342
E-Mail (competent person)	<a href="mailto:kinouei@mmc.co.jp">kinouei@mmc.co.jp</a>
<b>1.4 Emergency telephone number</b>	
Emergency Phone No.	+81-79-568-2344 [9:00 – 17:00 JST (GMT+9)].

### 2. SECTION 2: HAZARDS IDENTIFICATION

<b>2.1 Classification of the substance or mixture</b>	
<b>2.1.1 Regulation (EC) No. 1272/2008 (CLP)</b>	Flam. Liq. 3; H226 Skin Sens. 1; H317 Eye Dam. 1; H318 Repr. 1A; H360Df STOT RE 2; H373 STOT SE 3; H335 Aquatic Acute 1; H400 Aquatic Chronic 1; H410
<b>2.2.2 Directive 67/548/EEC &amp; Directive 1999/45/EC</b>	R10: Flammable. R43: May cause sensitization by skin contact. Xi; R41: Risk of serious damage to eyes. Repr. Cat 1; R61: May cause harm to the unborn child. Repr. Cat 3; R62: Possible risk of impaired fertility. Xn; R48/20/22: Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed. R67: Vapours may cause drowsiness and dizziness. N; R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
<b>2.2 Label elements</b>	
Product Name	According to Regulation (EC) No. 1272/2008 (CLP) PZT Sol-Gel Solution N-Series.
Contains:	Lead di(acetate), Zirconium tetrabutanolate, butan-1-ol and Titanium tetraisopropanolate
Hazard Pictogram(s)	
Signal Word(s)	DANGER

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Hazard Statement(s)

H226: Flammable liquid and vapour.  
H317: May cause an allergic skin reaction.  
H318: Causes serious eye damage.  
H336: May cause drowsiness or dizziness.  
H360Df: May damage the unborn child. Suspected of damaging fertility.  
H373: May cause damage to organs through prolonged or repeated exposure.  
(Oral/Inhalation: Central nervous system, Reproductive system)  
H400: Very toxic to aquatic life.

Precautionary Statement(s)

H410: Very toxic to aquatic life with long lasting effects.  
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P280: Wear protective gloves/protective clothing/eye protection/face protection.  
P260: Do not breathe mist/vapours/spray.  
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P301+P330+P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.  
P310: Immediately call a POISON CENTER/doctor.  
None known.

## 2.3 Other hazards

## 3. SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1 Substances

Not applicable.

### 3.2 Mixture

EC Classification No. 1272/2008

Hazardous Ingredient(s)	%W/W	CAS No.	EC No.	REACH Registration No.	Hazard Pictogram(s) and Hazard Statement(s)
Lead di(acetate)	10 - 40	301-04-2	206-104-4	None assigned	Repr. 1A; H360Df STOT RE 2; H373 Aquatic Acute 1; H400 Aquatic Chronic 1; H410
Zirconium tetrabutanolate	5 - 20	1071-76-7	213-995-3	None assigned	Flam. Liq. 3; H226 Skin Sens. 1; H317 Eye Irrit. 2; H319
Titanium tetraisopropanolate	5 - 20	546-68-9	208-909-6	None assigned	Flam. Liq. 3; H226 Eye Irrit. 2; H319 STOT SE 3
Ethanol	20 - 50	64-17-5	200-578-6	None assigned	Flam. Liq. 2; H225
Butan-1-ol	1 - 5	71-36-3	200-751-6	None assigned	Flam. Liq. 3; H226 Acute Tox. 4; H302 Skin Irrit. 2; H315 Eye Dam. 1; H318 STOT SE 3; H335 STOT SE 3; H336
Octan-1-ol	1 - 5	111-87-5	203-917-6	None assigned	Eye Irrit. 2; H319 Aquatic Chronic 3; H412
Propylene glycol	5 - 20	57-55-6	200-338-0	None assigned	Not classified

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EC Classification No. 67/548/EEC

Hazardous Ingredient(s)	%W/W	CAS No.	EC No.	REACH Registration No.	EC Classification and Risk Phrases
Lead di(acetate)	10 - 40	301-04-2	206-104-4	None assigned	Repr. Cat 1; R61: May cause harm to the unborn child. Repr. Cat 1; R62: Possible risk of impaired fertility. Xn; R48/22: Harmful: danger of serious damage to health by prolonged exposure if swallowed. R33: Danger of cumulative effects. N; R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Zirconium tetrabutanolate	5 - 20	1071-76-7	213-995-3	None assigned	R10: Flammable. Xi; R43: May cause sensitization by skin contact. Xi; R36: Irritating to eyes.
Titanium tetraisopropanolate	5 - 20	546-68-9	208-909-6	None assigned	R10: Flammable. Xi; R36: Irritating to eyes. R67: Vapours may cause drowsiness and dizziness.
Ethanol	20 - 50	64-17-5	200-578-6	None assigned	R10: Flammable.
Butan-1-ol	1 - 5	71-36-3	200-751-6	None assigned	R10: Flammable. Xn; R22: Harmful if swallowed. Xi; R37/38: Irritating to respiratory system and skin. Xi; R41: Risk of serious damage to eyes. R67: Vapours may cause drowsiness and dizziness.
Octan-1-ol	1 - 5	111-87-5	203-917-6	None assigned	Xi; R36: Irritating to eyes. R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Propylene glycol	5 - 20	57-55-6	200-338-0	None assigned	Not classified

## 4. SECTION 4: FIRST AID MEASURES



### 4.1 Description of first aid measures

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Call a POISON CENTER/doctor if you feel unwell.

Skin Contact

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse. If irritation (redness, rash, blistering) develops, get medical attention.

Eye Contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

Ingestion

IF SWALLOWED: Rinse mouth. Call a POISON CENTER or doctor/physician if you feel unwell. Do not induce vomiting unless instructed to do so by medical personnel.

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

Causes serious eye damage. Irritating to respiratory system. May cause damage to organs through prolonged or repeated exposure: Central nervous



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4.3 Indication of any immediate medical attention and special treatment needed  
system, Reproductive system. May damage the unborn child. Suspected of damaging fertility.  
Treat symptomatically. IF exposed or concerned: Get medical advice/attention.

## 5. SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media  
Suitable Extinguishing Media  
Unsuitable extinguishing Media  
5.2 Special hazards arising from the substance or mixture  
5.3 Advice for fire-fighters  
Foam, CO2 or dry powder, Water spray.  
Do not use water jet. Direct water jet may spread the fire.  
Flammable liquid and vapour. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback. Combustion may cause toxic fumes. (Carbon monoxide, Carbon dioxide, metal oxides).  
Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Do not breathe fumes. Keep containers cool by spraying with water if exposed to fire. Prevent liquid entering sewers, basements and any watercourses.

## 6. SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures  
6.2 Environmental precautions  
6.3 Methods and material for containment and cleaning up  
6.4 Reference to other sections  
6.5 Additional Information  
Eliminate sources of ignition. Ensure adequate ventilation. Wear appropriate personal protective equipment, avoid direct contact.  
Avoid release to the environment. Do not allow to enter drains, sewers or watercourses. Prevent liquid entering sewers, basements and workpits; vapour may create explosive and toxic atmosphere.  
Cover spills with inert absorbent material. Transfer to a container for disposal or recovery. Ventilate the area and wash spill site after material pick-up is complete. Dispose of this material and its container as hazardous waste.  
See Also Section 8 and 13.  
None.

## 7. SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling  
7.2 Conditions for safe storage, including any incompatibilities  
Storage temperature  
Storage life  
Incompatible materials  
Appropriate packaging  
7.3 Specific end use(s)  
Do not handle until all safety precautions have been read and understood.  
Provide adequate ventilation. Use explosion-proof electrical/ventilating/lighting/equipment. Use only non-sparking tools. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Avoid breathing vapours. Avoid contact with skin and eyes. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
Store locked up. Store in a well-ventilated place. Keep container tightly closed.  
Keep cool.  
Stable under normal conditions.  
Strong oxidising agents, Strong Acids, Alkalis.  
Keep only in original container.  
Thin film forming for electric devices.

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## 8. SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control parameters

#### 8.1.1 Occupational Exposure Limits

SUBSTANCE.	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m <sup>3</sup> )	STEL (ppm)	STEL (mg/m <sup>3</sup> )	Note:
Butan-1-ol	71-36-3	-	-	50	154	WEL, Sk - Can be absorbed through skin.
Propane-1,2-diol	57-55-6	150	474	-	-	WEL, Total Vapour and Particulate.
		-	10	-	-	WEL, Particulate.
Ethanol	64-17-5	1000	1920	-	-	WEL

Source: WEL: Workplace Exposure Limit (UK HSE EH40).

#### 8.1.2 Biological limit value

Not established.

#### 8.1.3 PNECs and DNELs

Not established.

### 8.2 Exposure controls

#### 8.2.1 Appropriate engineering controls

Provide adequate ventilation, including appropriate local extraction. A washing facility/water for eye and skin cleaning purposes should be present.

#### 8.2.2 Personal protection equipment

Eye/face protection



Use personal protective equipment as required.

Wear goggles giving complete protection to eyes to protect against liquid splashes (EN166).

Skin protection



Hand protection: Wear impervious gloves (EN374). Recommended: Butyl rubber, Nitrile rubber. Breakthrough time of the glove material: refer to the information provided by the gloves' producer.

Body protection: Wear safety or chemical resistant shoes or boots.

Respiratory protection



Use with ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. A suitable mask with filter type A (EN141 or EN405) may be appropriate.

Thermal hazards

Not applicable.

#### 8.2.3 Environmental Exposure Controls

Avoid release to the environment.

## 9. SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

Appearance	Brown liquid
Odour	Pungent.
Odour Threshold	Not available.
pH	Not available.
Melting Point/Freezing Point	-89.5°C (Butan-1-ol).
Initial boiling point and boiling range	117°C (Butan-1-ol).
Flash point	29°C.
Evaporation rate	Not available.
Flammability (solid, gas)	Flam. Liq. 3; Flammable liquid and vapour.
Upper/lower flammability or explosive limits	1.4-11.2Vol-%.
Vapour pressure	6.7mm Hg @ 25°C.
Vapour density	2.6.
Relative density	Not available.
Solubility(ies)	Water: Slightly soluble.
Partition coefficient: n-octanol/water	Not available.

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Auto-ignition temperature	Not available.
Decomposition Temperature	Not available.
Viscosity	Not available.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.

9.2 Other information No data.

## 10. SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity	Stable under normal conditions.
10.2 Chemical stability	Stable under normal conditions.
10.3 Possibility of hazardous reactions	Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback.
10.4 Conditions to avoid	Keep away from heat and sources of ignition.
10.5 Incompatible materials	Strong oxidising agents, Strong Acids, Alkalis.
10.6 Hazardous decomposition product(s)	Carbon monoxide, Carbon dioxide, metal oxides.

## 11. SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects	
11.1.1 Acute toxicity	
Ingestion	Based upon the available data, the classification criteria are not met.
Inhalation	Based upon the available data, the classification criteria are not met.
Skin Contact	Based upon the available data, the classification criteria are not met.
skin corrosion/irritation	Based upon the available data, the classification criteria are not met.
Serious eye damage/irritation	Eye Dam. 1; Causes serious eye damage. (butan-1-ol)
Respiratory or skin sensitization	Skin Sens. 1; May cause an allergic skin reaction. (Zirconium tetrabutanolate)
Germ cell mutagenicity	Based upon the available data, the classification criteria are not met.
Carcinogenicity	Based upon the available data, the classification criteria are not met.
Reproductive toxicity	Repr. 1A; May damage the unborn child. Suspected of damaging fertility. (Lead di(acetate))
STOT - single exposure	STOT SE 3; May cause drowsiness and dizziness.
STOT - repeated exposure	STOT RE 2; May cause damage to organs through prolonged or repeated exposure: Oral/Inhalation: Central nervous system, Reproductive system (Lead di(acetate))
Aspiration hazard	Based upon the available data, the classification criteria are not met.

## 12. SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity	Aquatic Acute 1; Very toxic to aquatic life. Aquatic Chronic 1; Very toxic to aquatic life with long lasting effects. Estimated LC50 <1 mg/l (Mixture)
12.2 Persistence and degradability	Part of the components are biodegradable. (Ethanol, Butan-1-ol)
12.3 Bioaccumulative potential	The product has low potential for bioaccumulation.
12.4 Mobility in soil	Slightly soluble in: Water. The product is predicted to have low mobility in soil.
12.5 Results of PBT and VPVB assessment	No data (Mixture).
12.6 Other adverse effects	None known.

## 13. SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods	Dispose of contents/container to: Suitable incineration plant.
13.2 Additional Information	This material and its container must be disposed of as hazardous waste (2008/98/EEC). Disposal should be in accordance with local, state or national legislation. Avoid release to the environment.



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## 14. SECTION 14: TRANSPORT INFORMATION

	ADR/RID	IMDG	IATA/ICAO
14.1 UN number	UN1993	UN1993	UN1993
14.2 Proper Shipping Name	FLAMMABLE LIQUID N.O.S. (CONTAINS ETHANOL)	FLAMMABLE LIQUID N.O.S. (CONTAINS ETHANOL)	FLAMMABLE LIQUID N.O.S. (CONTAINS ETHANOL)
14.3 Transport hazard class(es)	3	3	3
14.4 Packing group	III	III	III
14.5 Environmental hazards	Environmentally hazardous substance	Marine Pollutant	Environmentally hazardous substance
14.6 Special precautions for user	None		
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable	Not applicable	Not applicable
14.8 Additional Information	Label elements: 3+9		

## 15. SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture	
15.1.1 EU regulations	Authorisations and/or Restrictions On Use
REACH - Annex XVII (Restrictions)	Lead di(acetate)
RoHS (Restriction of Hazardous Substances) Directive	Lead di(acetate)
REACH - SVHC Candidate List	Lead di(acetate)
RoHS - EEE Substance Inventory	Butan-1-ol, Propylene glycol
15.1.2 National regulations	
Germany	Water hazard class: 3
15.2 Chemical Safety Assessment	Not available.

## 16. SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: 1-16.

References: Existing Safety Data Sheet (SDS) and Existing ECHA registration(s) for Lead di(acetate) (CAS No. 301-04-2), Titanium tetraisopropanolate (CAS No. 546-68-9), Ethanol(CAS No. 64-17-5), Butan-1-ol (CAS No. 71-36-3), Octan-1-ol (CAS No. 111-87-5), Propylene glycol (CAS No. 57-55-6), the Classification and Labelling Inventory for Zirconium tetrabutanolate (CAS No. 1071-76-7).

Classification of the substance or mixture According to Regulation (EC) No. 1272/2008 (CLP)	Classification Procedure
Flam. Liq. 3	Test Result [Closed cup]
Skin Sens. 1	Threshold Calculation
Eye Dam. 1	Threshold Calculation
Repr. 1A	Threshold Calculation
STOT RE 2	Threshold Calculation
STOT SE 3	Threshold Calculation
Aquatic Acute 1	Summation Calculation
Aquatic Chronic 1	Summation Calculation

### LEGEND

LTEL	Long Term Exposure Limit
STEL	Short Term Exposure Limit
DNEL	Derived No Effect Level
PNEC	Predicted No Effect Concentration
PBT	PBT: Persistent, Bioaccumulative and Toxic
vPvB	vPvT: very Persistent and very Toxic
OECD	Organisation for Economic Cooperation and Development

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Training advice: Consideration should be given to the work procedures involved and the potential extent of exposure as they may determine whether a higher level of protection is required.

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## Annex to the extended Safety Data Sheet (eSDS)

Not available.