

1 Identification of the substance/mixture and of the company

- **Product identifier**
- **Trade name:** EP-452 Two-Part Thermally Conductive Epoxy - B-SIDE
- **Application of the substance / the mixture** Functional electronic epoxy component
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Applied Ink Solutions
200 Flanders Road
Westborough, MA 01581
USA
- **Information department:**
Product Safety
Email: sales@appliedinksolutions.com
- **Emergency telephone number:**
Applied Ink Solutions : 617-965-5511
Chemtrec USA Emergency : 800-424-9300
Chemtrec International Emergency : 703-527-3887

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS05 Corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.



GHS07

Skin Sens. 1 H317 May cause an allergic skin reaction.

STOT SE 3 H335 May cause respiratory irritation.

Aquatic Chronic 3 H412 Harmful to aquatic life with long lasting effects.

- **Label elements**
- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**



GHS05 GHS07

- **Signal word** Danger
- **Hazard-determining components of labeling:**
Fatty acids, tall-oil, reaction products with tetraethylenepentamine
Tetraethylenepentamine
- **Hazard statements**
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H335 May cause respiratory irritation.
H412 Harmful to aquatic life with long lasting effects.

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· **Precautionary statements**

- P261 Avoid breathing dust/fume/gas/mist/vapors/spray
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301+P310 If swallowed: Immediately call a poison center/doctor.
P302+P352 If on skin: Wash with plenty of soap and water.
P304+P341 If inhaled: If breathing is difficult, 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.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Classification system:**

· **NFPA ratings (scale 0 - 4)**



· **HMIS-ratings (scale 0 - 4)**



· **Other hazards**

· **Results of PBT and vPvB assessment**

- **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**

· **Description:** Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**

68953-36-6	Fatty acids, tall-oil, reaction products with tetraethylenepentamine ⚠ Skin Irrit. 2, H315; Eye Irrit. 2A, H319; Skin Sens. 1, H317; STOT SE 3, H335	10-25%
112-57-2	Tetraethylenepentamine ⚠ Skin Corr. 1B, H314; ⚠ Aquatic Chronic 2, H411; ⚠ Acute Tox. 4, H302; Acute Tox. 4, H312; Skin Sens. 1, H317	5-15%

· **Additional Components:**

1344-28-1	Aluminium oxide	60-80%
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4 First-aid measures

· **Description of first aid measures**

· **After inhalation:**

Inhalation is not an expected route of exposure. If respiratory irritation or distress occurs remove victim to fresh air. Seek medical attention if respiratory irritation or distress continues.

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- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:**
Wash eyes immediately with a large amount of water or normal saline, occasionally lifting upper and lower eye lids until no evidence of chemical remains (about 20 minutes). Remove contact lenses if present and easy to remove. Seek immediate medical attention.
- **After swallowing:**
Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed** Treat symptomatically.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
Alcohol resistant foam
Carbon dioxide
Fire-extinguishing powder
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** Wear SCBA.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Ensure adequate ventilation
Keep away from ignition sources
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:**
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Ensure adequate ventilation.
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
- **Protective Action Criteria for Chemicals**

· PAC-1:

1344-28-1	Aluminium oxide	15 mg/m ³
112-57-2	Tetraethylenepentamine	15 mg/m ³

· PAC-2:

1344-28-1	Aluminium oxide	170 mg/m ³
112-57-2	Tetraethylenepentamine	130 mg/m ³

· PAC-3:

1344-28-1	Aluminium oxide	990 mg/m ³
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112-57-2 Tetraethylenepentamine

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790 mg/m³

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
Ensure good ventilation/exhaust at the workplace.
Prevent formation of aerosols.
- **Information about protection against explosions and fires:**
Protect against electrostatic charges.
Keep ignition sources away - Do not smoke.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and containers:** No special requirements.
- **Information about storage in one common storage facility:**
Do not store together with alkalis (caustic solutions).
Do not store together with oxidizing and acidic materials.
- **Further information about storage conditions:**
Keep container well-sealed in cool, dry location.
Protect from heat and direct sunlight.
Store receptacle in a well ventilated area.
- **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.
- **Control parameters**
- **Components with limit values that require monitoring at the workplace:**
The following constituent is the only constituent of the product which has a PEL, TLV or other recommended exposure limit.
At this time, the remaining constituent has no known exposure limits.

112-57-2 Tetraethylenepentamine

WEEL	Long-term value: 5 mg/m ³
	Skin; DSEN

- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
Keep away from food and beverages.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
- **Respiratory equipment:**
In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
- **Protection of hands:**



Protective gloves

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The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

- **Material of gloves** Nitrile rubber, NBR
- **Penetration time of glove material** Contact glove manufacture for break-through time.
- **Eye protection:**
Safety glasses



Tightly sealed goggles

9 Physical and chemical properties

· Information on basic physical and chemical properties

· General Information

· Appearance:

- | | |
|------------------------|-----------------|
| Form: | Thick liquid |
| Color: | Whitish |
| Odor: | Slightly sweet |
| Odor threshold: | Not determined. |

- | | |
|------------------|-----------------|
| pH-value: | Not determined. |
|------------------|-----------------|

· Change in condition

- | | |
|-------------------------------------|----------------|
| Melting point/Melting range: | Undetermined. |
| Boiling point/Boiling range: | 60 °C (140 °F) |

- | | |
|---------------------|-------------------|
| Flash point: | 163 °C (325.4 °F) |
|---------------------|-------------------|

- | | |
|---------------------------------------|-----------------|
| Flammability (solid, gaseous): | Not applicable. |
|---------------------------------------|-----------------|

· Ignition temperature:

- | | |
|-----------------------------------|-----------------|
| Decomposition temperature: | Not determined. |
|-----------------------------------|-----------------|

- | | |
|-----------------------|------------------------------|
| Auto igniting: | Product is not selfigniting. |
|-----------------------|------------------------------|

- | | |
|-----------------------------|---|
| Danger of explosion: | Product does not present an explosion hazard. |
|-----------------------------|---|

· Explosion limits:

- | | |
|---------------|-----------------|
| Lower: | Not determined. |
| Upper: | Not determined. |

- | | |
|------------------------|-----------------|
| Vapor pressure: | Not determined. |
|------------------------|-----------------|

- | | |
|-----------------|-----------------------|
| Density: | See other information |
|-----------------|-----------------------|

- | | |
|-------------------------|-----------------|
| Relative density | Not determined. |
|-------------------------|-----------------|

- | | |
|----------------------|-----------------|
| Vapor density | Not determined. |
|----------------------|-----------------|

- | | |
|-------------------------|------------------|
| Evaporation rate | 1.6-2.3 (BuAc=1) |
|-------------------------|------------------|

· Solubility in / Miscibility with

- | | |
|---------------|-------------------|
| Water: | Water miscible No |
|---------------|-------------------|

- | | |
|---|-----------------|
| Partition coefficient (n-octanol/water): | Not determined. |
|---|-----------------|

· Viscosity:

- | | |
|-------------------|-----------------|
| Dynamic: | Not determined. |
| Kinematic: | Not determined. |

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· Solvent content:	
· VOC content:	0.00 %
· Solids content:	75 +/- 2 %
· Other information	No further relevant information available.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability** Stable
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid**
 Contact with incompatible materials.
 Heat, flames and sparks. Extremes of temperature and direct sunlight.
- **Incompatible materials:** Strong Oxidizing Agents, Strong Acids, Strong Bases
- **Hazardous decomposition products:**
 Carbon monoxide and carbon dioxide
 No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

· LD/LC50 values that are relevant for classification:

112-57-2 Tetraethylenepentamine

Dermal LD50	660 mg/kg (rabbit)
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- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:** Sensitization possible through skin contact.
- **Additional toxicological information:**
 The product shows the following dangers according to internally approved calculation methods for preparations:
 Irritant

- **Carcinogenic categories**

· IARC (International Agency for Research on Cancer)

None of the ingredients are listed.

· NTP (National Toxicology Program)
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None of the ingredients are listed.

· OSHA-Ca (Occupational Safety & Health Administration)
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None of the ingredients are listed.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.

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- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Ecotoxicological effects:**
- **Remark:** Harmful to fish
- **Additional ecological information:**
- **General notes:**
 Water hazard class 2 (Self-assessment): hazardous for water
 Do not allow product to reach ground water, water course or sewage system.
 Danger to drinking water if even small quantities leak into the ground.
 Harmful to aquatic organisms
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
 Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system.
 Disposal must be made in accordance with Federal, State, and Local regulations.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made in accordance with Federal, State, and Local regulations.

14 Transport information

· UN-Number	
· DOT, ADR, IMDG, IATA	Not Regulated
· UN proper shipping name	
· DOT, ADR, IMDG, IATA	Not Regulated
· Transport hazard class(es)	
· DOT, ADR, IMDG, IATA	
· Class	Not Regulated
· Packing group	
· DOT, ADR, IMDG, IATA	Not Regulated
· Environmental hazards:	Not applicable.
· Special precautions for user	Not applicable.
· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
· UN "Model Regulation":	Not Regulated

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15 Regulatory information

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

· Sara

· Section 355 (extremely hazardous substances):

None of the ingredients are listed.

· Section 313 (Specific toxic chemical listings):

1344-28-1 Aluminium oxide

· TSCA (Toxic Substances Control Act):

All ingredients are listed or comply with TSCA regulations.

· Proposition 65

· Chemicals known to cause cancer:

None of the ingredients are listed.

· Chemicals known to cause reproductive toxicity for females:

None of the ingredients are listed.

· Chemicals known to cause reproductive toxicity for males:

None of the ingredients are listed.

· Chemicals known to cause developmental toxicity:

None of the ingredients are listed.

· Carcinogenic categories

· EPA (Environmental Protection Agency)

None of the ingredients are listed.

· TLV (Threshold Limit Value established by ACGIH)

1344-28-1 Aluminium oxide

A4

· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients are listed.

· Massachusetts State Right To Know List

112-57-2 Tetraethylenepentamine

· New Jersey State Right To Know List

112-57-2 Tetraethylenepentamine

· Pennsylvania Hazardous Substances List

112-57-2 Tetraethylenepentamine

· California SCAQMD Rule 443.1 VOC's: No information available.

· GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms



GHS05 GHS07

· Signal word Danger

· Hazard-determining components of labeling:

Fatty acids, tall-oil, reaction products with tetraethylenepentamine

Tetraethylenepentamine

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· Hazard statements

- H314 Causes severe skin burns and eye damage.
 H317 May cause an allergic skin reaction.
 H335 May cause respiratory irritation.
 H412 Harmful to aquatic life with long lasting effects.

· Precautionary statements

- P261 Avoid breathing dust/fume/gas/mist/vapors/spray
 P273 Avoid release to the environment.
 P280 Wear protective gloves/protective clothing/eye protection/face protection.
 P301+P310 If swallowed: Immediately call a poison center/doctor.
 P302+P352 If on skin: Wash with plenty of soap and water.
 P304+P341 If inhaled: If breathing is difficult, 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.
 P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
 P337+P313 If eye irritation persists: Get medical advice.
 P403+P233 Store in a well-ventilated place. Keep container tightly closed.
 P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· National regulations:
· Other regulations, limitations and prohibitive regulations

RoHS (EU)2015/863 along with EU Directive 2002/95/EC – Waste from Electrical and Electronic Equipment (WEEE):

Applied Ink Solutions products do not exceed the amount of allowable levels concerning: Cadmium (Cd); Mercury (Hg); Lead (Pb); Hexavalent chromium (Cr6+); Polybrominated biphenyls (PBB); Polybrominated diphenyl ethers (PBDE); Bis(2-Ethylhexyl) phthalate (DEHP); Benzyl butyl phthalate (BBP); Dibutyl phthalate (DBP); Diisobutyl phthalate (DIBP); Bis(2-Ethylhexyl) phthalate (DEHP); Benzyl butyl phthalate (BBP); Dibutyl phthalate (DBP); Diisobutyl phthalate (DIBP).

Applied Ink Solutions has confirmed with our precious metal suppliers that they do not use conflict minerals, as outlined in the **Dodd-Frank Wall Street Reform and Consumer Protection Act in Title XV, Section 1502.**

Registration, Evaluation and Authorization of Chemicals (REACH) & Substances of Very High Concern (SVHC): This product does not contain substances on the SVHC list.

· Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· Department issuing SDS: Product safety department

· Contact: Mr. Cole

· Revision History: New SDS

· Date of preparation / last revision 01/19/2018 / -

· Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

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ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
Skin Sens. 1: Skin sensitisation – Category 1
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
Aquatic Chronic 2: Hazardous to the aquatic environment - long-term aquatic hazard – Category 2
Aquatic Chronic 3: Hazardous to the aquatic environment - long-term aquatic hazard – Category 3

- US -