SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier
Trade name/designation:
FK1572

Other means of identification:
AgPt Dickschichtpaste für AlN FK1572

Article No.:
10046

1.2. Relevant identified uses of the substance or mixture and uses advised against
Use of the substance/mixture:
thick film ink

1.3. Details of the supplier of the safety data sheet
Supplier (manufacturer/importer/only representative/downstream user/distributor):
Fraunhofer IKTS-DD, TFC, RS
Hybride Mikrosysteme
Winterbergstraße 28
01277 Dresden
Germany
Telephone: +49-351-2553-7916
Telefax: +49-351-2554-236
E-mail: service@ikts-tfc.de
Website: www.ikts.fraunhofer.de
E-mail (competent person): service@ikts-tfc.de

1.4. Emergency telephone number
Richard Schmidt, +49-351-2553-7916/-7518 (Only available during office hours.)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008 [CLP]:

<table>
<thead>
<tr>
<th>Hazard classes and hazard categories</th>
<th>Hazard statements</th>
<th>Classification procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin corrosion/irritation (Skin Irrit. 2)</td>
<td>H315: Causes skin irritation.</td>
<td></td>
</tr>
<tr>
<td>Serious eye damage/eye irritation (Eye Irrit. 2)</td>
<td>H319: Causes serious eye irritation.</td>
<td></td>
</tr>
<tr>
<td>Hazardous to the aquatic environment (Aquatic Acute 1)</td>
<td>H400: Very toxic to aquatic life.</td>
<td></td>
</tr>
<tr>
<td>Hazardous to the aquatic environment (Aquatic Chronic 1)</td>
<td>H410: Very toxic to aquatic life with long lasting effects.</td>
<td></td>
</tr>
</tbody>
</table>

2.2. Label elements
Labelling according to Regulation (EC) No. 1272/2008 [CLP]
Hazard pictograms:

- GHS07 Exclamation mark
- GHS09 Environment

Signal word: Warning
**Hazard components for labelling:**

**zinc fluoride**

### Hazard statements for health hazards

<table>
<thead>
<tr>
<th>Code</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>H315</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation.</td>
</tr>
</tbody>
</table>

### Hazard statements for environmental hazards

<table>
<thead>
<tr>
<th>Code</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>H400</td>
<td>Very toxic to aquatic life.</td>
</tr>
<tr>
<td>H410</td>
<td>Very toxic to aquatic life with long lasting effects.</td>
</tr>
</tbody>
</table>

### Supplemental Hazard information (EU):

**Precautionary statements Prevention**

<table>
<thead>
<tr>
<th>Code</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>P280</td>
<td>Wear protective gloves/protective clothing/eye protection/face protection.</td>
</tr>
</tbody>
</table>

**Precautionary statements Response**

<table>
<thead>
<tr>
<th>Code</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>P302 + P352</td>
<td>IF ON SKIN: Wash with plenty of water/Soap.</td>
</tr>
<tr>
<td>P305 + P351 + P338</td>
<td>IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</td>
</tr>
<tr>
<td>P332 + P313</td>
<td>If skin irritation occurs: Get medical advice/attention.</td>
</tr>
<tr>
<td>P337 + P313</td>
<td>If eye irritation persists: Get medical advice/attention.</td>
</tr>
</tbody>
</table>

**Special rules for supplemental label elements for certain mixtures:**

- 78.1 % percent of the mixture consists of ingredient(s) of unknown acute toxicity (oral).
- 100.0 % percent of the mixture consists of ingredient(s) of unknown acute toxicity (dermal).
- 100.0 % percent of the mixture consists of ingredient(s) of unknown acute toxicity (inhalative).

### 2.3. Other hazards

No data available

### SECTION 3: Composition / information on ingredients

#### 3.2. Mixtures

**Description:**

Precious metals, glass and inorganic additives embedded in an organic vehicle.

**Hazardous ingredients / Hazardous impurities / Stabilisers:**

<table>
<thead>
<tr>
<th>CAS No.:</th>
<th>EC No.:</th>
<th>Substance name</th>
<th>Classification according to Regulation (EC) No 1272/2008 [CLP]</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-22-4</td>
<td>231-131-3</td>
<td>silver</td>
<td>Aquatic Acute 1, Aquatic Chronic 1</td>
<td>40 – ≤ 72 Wt %</td>
</tr>
<tr>
<td>8000-41-7</td>
<td>232-268-1</td>
<td>Terpineol</td>
<td>Skin Irrit. 2, Eye Irrit. 2</td>
<td>13 – ≤ 25 Wt %</td>
</tr>
<tr>
<td>7783-49-5</td>
<td>232-001-9</td>
<td>zinc fluoride</td>
<td>STOT SE 3, Skin Irrit. 2, Eye Irrit. 2</td>
<td>0 – ≤ 1.75 Wt %</td>
</tr>
</tbody>
</table>

Full text of H- and EUH-phrases: see section 16.

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

**General information:**

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). Remove victim out of the danger area. Remove contaminated, saturated clothing. If unconscious place in recovery position and seek medical advice. Do not leave affected person unattended.

**Following inhalation:**

Provide fresh air. In case of respiratory tract irritation, consult a physician.
FK1572

In case of skin contact:
After contact with skin, wash immediately with plenty of water and soap. If skin irritation or rash occurs: Get medical advice/attention.

After eye contact:
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

After ingestion:
Rinse mouth. Let water be drunken in little sips (dilution effect). Get medical advice/attention if you feel unwell.

Self-protection of the first aider:
Use personal protection equipment.

4.2. Most important symptoms and effects, both acute and delayed
Skin corrosion/irritation Serious eye damage/eye irritation

4.3. Indication of any immediate medical attention and special treatment needed
Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media:
Water spray jet, alcohol resistant foam, Extinguishing powder, Carbon dioxide (CO2). Co-ordinate firefighting measures to the fire surroundings.

Unsuitable extinguishing media:
Full water jet

5.2. Special hazards arising from the substance or mixture
In case of fire may be liberated: CO, CO2

Hazardous combustion products:
In case of fire: Gases/vapours, toxic

5.3. Advice for firefighters
Wear a self-contained breathing apparatus and chemical protective clothing.

5.4. Additional information
Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel
Personal precautions:
Remove persons to safety.

Protective equipment:
Wear protective gloves/protective clothing/eye protection/face protection.

6.1.2. For emergency responders
Personal protection equipment:
Personal protection equipment: see section 8

6.2. Environmental precautions
Do not allow to enter into surface water or drains.

6.3. Methods and material for containment and cleaning up
For containment:
Collect spillage. Measures to prevent aerosol and dust generation Wet clean or vacuum up solids.

For cleaning up:
Water (with cleaning agent)

6.4. Reference to other sections
Safe handling: see section 7 Personal protection equipment: see section 8 Disposal: see section 13
6.5. Additional information
Use appropriate container to avoid environmental contamination.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Protective measures
Advises on safe handling:
Wear personal protection equipment (refer to section 8).

Fire prevent measures:
The formation of combustible vapours is possible at temperatures above: 91 °C

Measures to prevent aerosol and dust generation:
Dust should be exhausted directly at the point of origin.

Environmental precautions:
Do not allow to enter into surface water or drains.

Advises on general occupational hygiene
When using do not eat, drink or smoke. Avoid contact with eyes and skin.

7.2. Conditions for safe storage, including any incompatibilities
Technical measures and storage conditions:
Keep container tightly closed in a cool, well-ventilated place.

Packaging materials:
Keep/Store only in original container.

Requirements for storage rooms and vessels:
Keep container tightly closed.

Hints on storage assembly:
Prohibition on mixed storage has to be followed

Storage class: 10 – Combustible liquids that cannot be assigned to any of the above storage classes

Further information on storage conditions:
Keep in a cool, well-ventilated place.

7.3. Specific end use(s)
Recommendation:
Observe technical data sheet.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
8.1.1. Occupational exposure limit values
No data available

8.1.2. Biological limit values
No data available

8.1.3. DNEL-/PNEC-values

<table>
<thead>
<tr>
<th>Substance name</th>
<th>DNEL value</th>
<th>① DNEL type</th>
<th>② Exposure route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terpineol</td>
<td>5.8 mg/m³</td>
<td>① DNEL worker</td>
<td>② DNEL acute inhalative (systemic)</td>
</tr>
</tbody>
</table>

8.2. Exposure controls
8.2.1. Appropriate engineering controls
Technical measures and the application of suitable work processes have priority over personal protection equipment.
### 8.2.2. Personal protection equipment

**Eye/face protection:**
Eye glasses with side protection DIN EN 166

**Skin protection:**
Tested protective gloves must be worn DIN EN 374 Suitable material: NBR (Nitrile rubber) 0,4 mm
Breakthrough time (maximum wearing time) 480 min. In the case of wanting to use the gloves again, clean them before taking off and air them well.

**Respiratory protection:**
If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn. Particle filter device (DIN EN 143)

### 8.2.3. Environmental exposure controls
See section 7. No additional measures necessary.

### 8.3. Additional information
No data available

---

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

**Appearance**
- **Physical state:** solid
- **Colour:** dark grey

**Safety relevant basis data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>at °C</th>
<th>Method</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>not determined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melting point</td>
<td>18 °C</td>
<td></td>
<td>Overtaken from organic solvent of the paste (CAS#8000-41-7)</td>
</tr>
<tr>
<td>Freezing point</td>
<td>not determined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>≥ 214 – ≤ 217 °C</td>
<td>Overtaken from organic solvent of the paste (CAS#8000-41-7)</td>
<td></td>
</tr>
<tr>
<td>Decomposition temperature (°C):</td>
<td>not determined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>88 °C</td>
<td>closed cup</td>
<td>Overtaken from organic solvent of the paste (CAS#8000-41-7)</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>not determined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ignition temperature in °C</td>
<td>264 °C</td>
<td></td>
<td>Overtaken from organic solvent of the paste (CAS#8000-41-7)</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td>not determined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>0.24 hPa</td>
<td>20 °C</td>
<td>Overtaken from organic solvent of the paste (CAS#8000-41-7)</td>
</tr>
<tr>
<td>Vapour density</td>
<td>not determined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative density</td>
<td>3 g/cm³</td>
<td>25 °C</td>
<td>calculated from ingredients</td>
</tr>
<tr>
<td>Bulk density</td>
<td>not determined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water solubility (g/L)</td>
<td>2.42 g/l</td>
<td>20 °C</td>
<td>Overtaken from organic solvent of the paste (CAS#8000-41-7)</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>2.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic viscosity</td>
<td>≥ 140 – ≤ 220 Pa*s</td>
<td>25 °C</td>
<td>Brookfield SC4-14/-6R // n=10 U/min</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>not determined</td>
<td>40 °C</td>
<td></td>
</tr>
</tbody>
</table>

#### 9.2. Other information
No data available
SECTION 10: Stability and reactivity

10.1. Reactivity
Moisture-sensitive. Risk of explosion if heated under confinement.

10.2. Chemical stability
The product is chemically stable under recommended conditions of storage, use and temperature.

10.3. Possibility of hazardous reactions
No known hazardous reactions.

10.4. Conditions to avoid
Do not store at temperatures above 30°C

10.5. Incompatible materials
Acid, Alkali (lye), Oxidising agent, strong

10.6. Hazardous decomposition products
No known hazardous decomposition products. In case of fire: Gases/vapours, toxic (CO, CO2)

SECTION 11: Toxicological information

11.1. Information on toxicological effects

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Substance name</th>
<th>Toxicological information</th>
</tr>
</thead>
<tbody>
<tr>
<td>8000-41-7</td>
<td>Terpineol</td>
<td>LD₅₀ oral: &gt;4,300 mg/kg (Ratte)</td>
</tr>
</tbody>
</table>

Acute oral toxicity:
The classification criteria for this hazard class are not met by definition.

Acute dermal toxicity:
The classification criteria for this hazard class are not met by definition.

Acute inhalation toxicity:
The classification criteria for this hazard class are not met by definition.

Skin corrosion/irritation:
Causes burns.

Serious eye damage/irritation:
Causes serious eye irritation.

Respiratory or skin sensitisation:
The classification criteria for this hazard class are not met by definition.

Germ cell mutagenicity:
The classification criteria for this hazard class are not met by definition.

Carcinogenicity:
The classification criteria for this hazard class are not met by definition.

Reproductive toxicity:
The classification criteria for this hazard class are not met by definition.

STOT-single exposure:
The classification criteria for this hazard class are not met by definition.

STOT-repeated exposure:
The classification criteria for this hazard class are not met by definition.

Aspiration hazard:
The classification criteria for this hazard class are not met by definition.

Additional information:
No data available

SECTION 12: Ecological information

12.1. Toxicity

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Substance name</th>
<th>Toxicological information</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-22-4</td>
<td>silver</td>
<td>LC₅₀: =0.0102 mg/l 4 d (anguilla anguilla) Partikelgröße &lt; 1 µm</td>
</tr>
</tbody>
</table>

en / DE
FK1572

Aquatic toxicity:  
Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

12.2. Persistence and degradability

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Substance name</th>
<th>Biodegradation</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>8000-41-7</td>
<td>Terpineol</td>
<td>not determined</td>
<td>Classification according to VwVwS, Annex 3.</td>
</tr>
<tr>
<td>7783-49-5</td>
<td>zinc fluoride</td>
<td>not determined</td>
<td>SDB Zincfluorid, Alfa-Aesar vom 07.07.2009</td>
</tr>
</tbody>
</table>

12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Substance name</th>
<th>Log K&lt;sub&gt;OC&lt;/sub&gt;</th>
<th>Bioconcentration factor (BCF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8000-41-7</td>
<td>Terpineol</td>
<td>2.6</td>
<td></td>
</tr>
</tbody>
</table>

Partition coefficient: n-octanol/water:  
= 2.6; Remark: Overtaken from organic solvent of the paste (CAS#8000-41-7)

12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Substance name</th>
<th>Results of PBT and vPvB assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-22-4</td>
<td>silver</td>
<td>—</td>
</tr>
<tr>
<td>8000-41-7</td>
<td>Terpineol</td>
<td>—</td>
</tr>
<tr>
<td>7783-49-5</td>
<td>zinc fluoride</td>
<td>—</td>
</tr>
</tbody>
</table>

12.6. Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Handle contaminated packages in the same way as the substance itself.

13.1.1. Product/Packaging disposal

Waste codes/waste designations according to EWC/AVV

Waste code product:

16 05 06 *  laboratory chemicals, consisting of or containing hazardous substances, including mixtures of laboratory chemicals

*: Evidence for disposal must be provided.

Waste treatment options

Appropriate disposal / Product:  
Dispose of waste according to applicable legislation. Consult the appropriate local waste disposal expert about waste disposal.

Appropriate disposal / Package:  
Completely emptied packages can be recycled.

13.2. Additional information

No data available

SECTION 14: Transport information

No dangerous good in sense of these transport regulations.

14.1. UN-No.

not relevant

14.2. UN proper shipping name

not relevant
14.3. Transport hazard class(es)  
not relevant

14.4. Packing group  
not relevant

14.5. Environmental hazards  
not relevant

14.6. Special precautions for user  
not relevant

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code  
not relevant

SECTION 15: Regulatory information

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

15.1.1. EU legislation  
No data available

15.1.2. National regulations  
[DE] National regulations

Restrictions of occupation  
5 MuSchRiV. 22 JArbSchG.

Water hazard class (WGK)  
WGK:  
2 - deutlich wassergefährdend  
Source:  
Documentation of self-classification carried out according to VwVwS, 3a.

15.2. Chemical Safety Assessment  
For this substance a chemical safety assessment has not been carried out.

15.3. Additional information  
No data available

SECTION 16: Other information

16.1. Indication of changes  
Classification of the substance or mixture

16.2. Abbreviations and acronyms  
No data available

16.3. Key literature references and sources for data  
GESTIS material database of German "IFA", accessed on 12.05.2015

16.4. Classification for mixtures and used evaluation method according to regulation (EC) No 1272/2008 [CLP]  
Classification according to Regulation (EC) No 1272/2008 [CLP]:

<table>
<thead>
<tr>
<th>Hazard classes and hazard categories</th>
<th>Hazard statements</th>
<th>Classification procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin corrosion/irritation (Skin Irrit. 2)</td>
<td>H315: Causes skin irritation.</td>
<td></td>
</tr>
<tr>
<td>Serious eye damage/eye irritation (Eye Irrit. 2)</td>
<td>H319: Causes serious eye irritation.</td>
<td></td>
</tr>
<tr>
<td>Hazardous to the aquatic environment (Aquatic Acute 1)</td>
<td>H400: Very toxic to aquatic life.</td>
<td></td>
</tr>
</tbody>
</table>
16.5. Relevant R-, H- and EUH-phrases (Number and full text)

<table>
<thead>
<tr>
<th>Hazard classes and hazard categories</th>
<th>Hazard statements</th>
<th>Classification procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous to the aquatic environment (Aquatic Chronic 1)</td>
<td>H410: Very toxic to aquatic life with long lasting effects.</td>
<td></td>
</tr>
</tbody>
</table>

16.6. Training advice

No data available

16.7. Additional information

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.