

## Safety Data Sheet

acc. to OSHA HCS

Printing date 09/15/2022

Reviewed on 09/15/2022

### 1 Identification

- **Product identifier**
- **Trade name:** *RO-948 Radio Opaque Ink*
- **Application of the substance / the mixture** *Functional electronic screen printing ink*
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**  
*Kayaku Advanced Materials, Inc.*  
*200 Flanders Road*  
*Westborough, MA 01581*  
*Tel: (617) 965-5511*  
*Fax: (617) 965-5818*
- **Information department:**  
*Product Safety*  
*Email: productsafety@kayakuAM.com*
- **Emergency telephone number:**  
*Kayaku Advanced Materials : 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**



*Eye Irritation 2A H319 Causes serious eye irritation.*

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



- **Signal word** *Warning*
- **Hazard statements**  
*H319 Causes serious eye irritation.*
- **Precautionary statements**

<i>P261</i> <i>P280</i> <i>P301+P310</i> <i>P302+P352</i> <i>P304+P341</i>  <i>P305+P351+P338</i>  <i>P333+P313</i> <i>P337+P313</i> <i>P403+P233</i>	<i>Avoid breathing dust/fume/gas/mist/vapors/spray</i> <i>Wear protective gloves/protective clothing/eye protection/face protection.</i> <i>If swallowed: Immediately call a poison center/doctor.</i> <i>If on skin: Wash with plenty of soap and water.</i> <i>If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.</i> <i>If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</i> <i>If skin irritation or rash occurs: Get medical advice/attention.</i> <i>If eye irritation persists: Get medical advice/attention.</i> <i>Store in a well-ventilated place. Keep container tightly closed.</i>
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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:**

7440-33-7	Tungsten	75-100%
	Flammable Solids 2, H228; Self-heating substances and mixtures 2, H252	
112-15-2	Diethylene glycol monoethyl ether acetate	10-25%
	Eye Irritation 2A, H319	
	Acrylic Resin	1-5%
	Specific Target Organ Toxicity - Single Exposure 3, H335	

### 4 First-aid measures

· **Description of first aid measures**

· **General information:** Immediately remove any clothing soiled by the product.

· **After inhalation:** Supply fresh air; consult doctor in case of complaints.

· **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.

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### 5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**  
   Alcohol resistant foam  
   Fire-extinguishing powder  
   ABC 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**  
   Wear protective equipment. Keep unprotected persons away.  
   Ensure adequate ventilation  
   Keep away from ignition sources
- **Environmental precautions:** 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).
- **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:

7440-33-7	Tungsten	10 mg/m <sup>3</sup>
112-15-2	Diethylene glycol monoethyl ether acetate	16 mg/m <sup>3</sup>

#### · PAC-2:

7440-33-7	Tungsten	330 mg/m <sup>3</sup>
112-15-2	Diethylene glycol monoethyl ether acetate	170 mg/m <sup>3</sup>

#### · PAC-3:

7440-33-7	Tungsten	2,000 mg/m <sup>3</sup>
112-15-2	Diethylene glycol monoethyl ether acetate	1,000 mg/m <sup>3</sup>

### 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:**  
   Keep ignition sources away - Do not smoke.  
   Protect against electrostatic charges.

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- **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 other constituents have no known exposure limits.

#### 7440-33-7 Tungsten

PEL	and insoluble compounds, as We
REL	Short-term value: 10 mg/m <sup>3</sup>
	Long-term value: 5 mg/m <sup>3</sup>
	as W
TLV	Short-term value: (10) mg/m <sup>3</sup>
	Long-term value: (5) NIC-3* mg/m <sup>3</sup>
	as W; * respirable fraction

- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:** Wash hands before breaks and at the end of work.
- **Respiratory equipment:** Not required.
- **Protection of hands:**



Protective gloves

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.

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· Eye protection:



Tightly sealed goggles

### 9 Physical and chemical properties

· Information on basic physical and chemical properties

· General Information

· Appearance:

Form:	Liquid
Color:	Dark grey
Odor:	Sweet
Odor threshold:	Not determined.

· pH-value: Not determined.

· Change in condition

Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	Undetermined.

· Flash point: 98 °C (208.4 °F)

· Flammability (solid, gaseous): Not applicable.

· 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.

· Solubility in / Miscibility with

Water: Water miscible No

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

· Viscosity:

Dynamic:	Not determined.
Kinematic:	Not determined.

· Solvent content:

Organic solvents: 0.0 %

Solids content: 86 - 90 %

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· **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**  
*Heat, flames and sparks. Extremes of temperature and direct sunlight.*  
*Contact with incompatible materials.*
- **Incompatible materials:** *Strong Oxidizing Agents, Strong Acids, Strong Bases*
- **Hazardous decomposition products:** *Carbon monoxide and carbon dioxide*

### 11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** *No irritant effect.*
- **on the eye:** *Irritating effect.*
- **Sensitization:** *No sensitizing effects known.*
- **Additional toxicological information:**
- **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**

*None of the ingredients are listed.*

· **NTP (National Toxicology Program)**

*None of the ingredients are listed.*

· **OSHA-Ca (Occupational Safety & Health Administration)**

*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.*
- **Behavior in environmental systems:**
- **Bioaccumulative potential** *No further relevant information available.*
- **Mobility in soil** *No further relevant information available.*
- **Additional ecological information:**
- **General notes:**  
*Water hazard class 1 (Self-assessment): slightly hazardous for water*  
*Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.*
- **Results of PBT and vPvB assessment**
- **PBT:** *Not applicable.*
- **vPvB:** *Not applicable.*

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 · **Other adverse effects** No further relevant information available.

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### 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

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

### 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):**  
 112-15-2 | Diethylene glycol monoethyl ether acetate
- **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.

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**· 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)**

None of the ingredients are listed.

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

None of the ingredients are listed.

**· Massachusetts State Right To Know List**

7440-33-7 Tungsten

**· New Jersey State Right To Know List**

7440-33-7 Tungsten

112-15-2 Diethylene glycol monoethyl ether acetate

**· Pennsylvania Hazardous Substances List**

112-15-2 Diethylene glycol monoethyl ether acetate

7440-33-7 Tungsten

**· 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**


GHS07

**· Signal word** Warning

**· Hazard statements**

H319 Causes serious eye irritation.

**· Precautionary statements**

P261 Avoid breathing dust/fume/gas/mist/vapors/spray

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/attention.

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

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P501

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

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*· 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: Tom Cole, EHS Manager (tcole@kayakuAM.com)**· Revision History: The manufacturer's information in Section 1 has been updated.**· Date of preparation / last revision 09/15/2022**· Abbreviations and acronyms:**ADR: Accord relatif au transport international 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**EINECS: European Inventory of Existing Commercial Chemical Substances**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)**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**Flammable Solids 2: Flammable solids – Category 2**Self-heating substances and mixtures 2: Self-heating substances and mixtures – Category 2**Eye Irritation 2A: Serious eye damage/eye irritation – Category 2A**Specific Target Organ Toxicity - Single Exposure 3: Specific target organ toxicity (single exposure) – Category 3*

US