

Printing date 01/11/2017

Reviewed on 01/11/2017

1 Identification of the substance/mixture and of the company

· **Product identifier**

· **Trade name:** *XM-RO-1220 High Temperature Radio Opaque Ink*

· **Application of the substance / the mixture** *High Temperature Radio Opaque Ink*

· **Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**

Applied Ink Solutions
17 Hampshire Drive, Unit 8
Hudson, NH 03051
USA

· **Information department:**

Product Safety
Email: sales@appliedinksolutions.com

· **Emergency telephone number:**

Chemtrec USA Emergency : 800-424-9300
Chemtrec International Emergency : 703-527-3887
Applied Ink Solutions : 603-595-6221

2 Hazard(s) identification

· **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.



GHS09 Environment

Aquatic Chronic 2 H411 Toxic to aquatic life with long lasting effects.



GHS07

Eye Irrit. 2A H319 Causes serious eye irritation.

Aquatic Acute 2 H401 Toxic to aquatic life.

· **Label elements**

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

· **Hazard pictograms**



GHS02



GHS07



GHS09

· **Signal word** *Danger*

· **Hazard statements**

H225 Highly flammable liquid and vapor.

H319 Causes serious eye irritation.

H401 Toxic to aquatic life.

H411 Toxic to aquatic life with long lasting effects.

(Contd. on page 2)

Printing date 01/11/2017

Reviewed on 01/11/2017

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 1)

· **Precautionary statements**

- P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261 Avoid breathing dust/fume/gas/mist/vapors/spray
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P273 Avoid release to the environment.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P337+P313 If eye irritation persists: Get medical advice/attention.
P314 Get medical advice/attention if you feel unwell.
P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.
P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.
P370+P378 In case of fire: Use for extinction: Carbon dioxide.
P403+P235 Store in a well-ventilated place. Keep cool.
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	60-80%
	 Flam. Sol. 2, H228; Self-heat. 2, H252	
96-48-0	gamma-Butyrolactone	10-25%
	 Acute Tox. 4, H302; Eye Irrit. 2A, H319; STOT SE 3, H336	
110-82-7	Cyclohexane	5-15%
	 Flam. Liq. 2, H225;  Asp. Tox. 1, H304;  Aquatic Acute 1, H400; Aquatic Chronic 1, H410;  Skin Irrit. 2, H315; STOT SE 3, H336	

· **Additional Components:**

Proprietary resin	1-5%
-------------------	------

(Contd. on page 3)

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 2)

4 First-aid measures

- **Description of first aid measures**
- **General information:** Immediately remove any clothing soiled by the product.
- **After inhalation:**
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
- **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
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:**
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.
Do not flush with water or aqueous cleansing agents
- **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-I:**

7440-33-7 Tungsten

10 mg/m³

(Contd. on page 4)

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 3)

96-48-0	gamma-Butyrolactone	3.6 mg/m ³
110-82-7	Cyclohexane	300 ppm
· PAC-2:		
7440-33-7	Tungsten	330 mg/m ³
96-48-0	gamma-Butyrolactone	39 mg/m ³
110-82-7	Cyclohexane	1700* ppm
· PAC-3:		
7440-33-7	Tungsten	2,000 mg/m ³
96-48-0	gamma-Butyrolactone	310 mg/m ³
110-82-7	Cyclohexane	10000** ppm

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
 Keep away from heat and direct sunlight.
 Prevent formation of aerosols.
 Ensure good ventilation/exhaust at the workplace.
- **Information about protection against explosions and fires:**
 Keep ignition sources away - Do not smoke.
 Protect against electrostatic charges.
 Use explosion-proof apparatus / fittings and spark-proof tools.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and containers:** Store in a cool location.
- **Information about storage in one common storage facility:**
 Do not store together with oxidizing and acidic materials.
 Do not store together with alkalis (caustic solutions).
- **Further information about storage conditions:**
 Protect from heat and direct sunlight.
 Store receptacle in a well ventilated area.
 Keep container well-sealed in cool, dry location.
- **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 constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit.
 At this time, the remaining constituent has no known exposure limits.

7440-33-7 Tungsten	
PEL	and insoluble compounds, as We

(Contd. on page 5)

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 4)

REL	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as W
TLV	Short-term value: (10) mg/m ³ Long-term value: (5) NIC-3* mg/m ³ as W; * respirable fraction
110-82-7 Cyclohexane	
PEL	Long-term value: 1050 mg/m ³ , 300 ppm
REL	Long-term value: 1050 mg/m ³ , 300 ppm
TLV	Long-term value: 344 mg/m ³ , 100 ppm

· **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:** Have NIOSH approved respirator available.

· **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.

· **Eye protection:**



Tightly sealed goggles

9 Physical and chemical properties

· **Information on basic physical and chemical properties**

· **General Information**

· **Appearance:**

Form: Thick 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: 81 °C (178 °F)

· **Flash point:** -18 °C (-0 °F)

· **Flammability (solid, gaseous):** Not applicable.

· **Ignition temperature:** 260 °C (500 °F)

(Contd. on page 6)

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 5)

· Decomposition temperature:	Not determined.
· Auto igniting:	Product is not selfigniting.
· Danger of explosion:	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· Explosion limits:	
Lower:	2.7 Vol %
Upper:	15.6 Vol %
· Vapor pressure at 20 °C (68 °F):	> 1 hPa (> 1 mm Hg)
· Density at 20 °C (68 °F):	4.02 g/cc(33.55lbs/gal)
· Relative density	Not determined.
· Vapor density	Not determined.
· Evaporation rate	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:	18.5 %
VOC content:	18.5 %
Solids content:	81.6 % +/- 2%
· Other information	No further relevant information available.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability** Stable under normal use conditions
- **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:**

LD/LC50 values that are relevant for classification:
110-82-7 Cyclohexane
Oral LD50 12705 mg/kg (Rat)

- **Primary irritant effect:**
- **on the skin:** No irritant effect.

(Contd. on page 7)

Printing date 01/11/2017

Reviewed on 01/11/2017

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 6)

- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
- **Carcinogenic categories**

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

96-48-0 | gamma-Butyrolactone

3

· **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.
- **Ecotoxicological effects:**
- **Remark:** Toxic for 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.
Also poisonous for fish and plankton in water bodies.
Toxic for 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**

UN1210

(Contd. on page 8)

Printing date 01/11/2017

Reviewed on 01/11/2017

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 7)

· UN proper shipping name	Printing ink
· DOT, ADR	PRINTING INK (CYCLOHEXANE), MARINE POLLUTANT
· IMDG	PRINTING INK
· IATA	

· **Transport hazard class(es)**

· **DOT**



· **Class** 3 Flammable liquids

· **Label** 3

· **ADR, IMDG, IATA**



· **Class** 3 Flammable liquids

· **Label** 3

· **Packing group**

· **DOT, ADR, IMDG, IATA** II

· **Environmental hazards:** Product contains environmentally hazardous substances: Cyclohexane

· **Marine pollutant:** Yes (DOT)

· **Special precautions for user** Warning: Flammable liquids

· **Danger code (Kemler):** 33

· **EMS Number:** F-E,S-D

· **Stowage Category** B

· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

· **Transport/Additional information:**

· **DOT**

· **Quantity limitations** On passenger aircraft/rail: 5 L

On cargo aircraft only: 60 L

· **ADR**

· **Excepted quantities (EQ)** Code: E2

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 500 ml

· **IMDG**

· **Limited quantities (LQ)** 5L

· **Excepted quantities (EQ)** Code: E2

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 500 ml

(Contd. on page 9)

Printing date 01/11/2017

Reviewed on 01/11/2017

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 8)

· UN "Model Regulation": UN 1210 PRINTING INK, 3, II

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):

110-82-7 Cyclohexane

· 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)

110-82-7 Cyclohexane

I

· TLV (Threshold Limit Value established by ACGIH)

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

96-48-0 gamma-Butyrolactone

· Pennsylvania Hazardous Substances List

96-48-0 gamma-Butyrolactone

- 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).

(Contd. on page 10)

Printing date 01/11/2017

Reviewed on 01/11/2017

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 9)

· **Hazard pictograms**



· **Signal word** *Danger*

· **Hazard statements**

H225 Highly flammable liquid and vapor.

H319 Causes serious eye irritation.

H401 Toxic to aquatic life.

H411 Toxic to aquatic life with long lasting effects.

· **Precautionary statements**

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

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

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P273 Avoid release to the environment.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P337+P313 If eye irritation persists: Get medical advice/attention.

P314 Get medical advice/attention if you feel unwell.

P370+P378 In case of fire: Use for extinction: Alcohol resistant foam.

P370+P378 In case of fire: Use for extinction: Fire-extinguishing powder.

P370+P378 In case of fire: Use for extinction: Carbon dioxide.

P403+P235 Store in a well-ventilated place. Keep cool.

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

· **National regulations:**

· **Other regulations, limitations and prohibitive regulations**

RoHS 2 2011/65/EU 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); Hexavalent Chromium (CrVI); Mercury (Hg); Lead (Pb); Polybrominated Biphenyls (PBB's) as bromide; Polybrominated Diphenyl Ethers (PBDEs) as bromide, decaBDE.

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 1/11/17

(Contd. on page 11)

Printing date 01/11/2017

Reviewed on 01/11/2017

Trade name: XM-RO-1220 High Temperature Radio Opaque Ink

(Contd. of page 10)

· **Date of preparation / last revision** 01/11/2017 / -· **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
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
Flam. Liq. 2: Flammable liquids – Category 2
Flam. Sol. 2: Flammable solids – Category 2
Self-heat. 2: Self-heating substances and mixtures – Category 2
Acute Tox. 4: Acute toxicity – Category 4
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
Asp. Tox. 1: Aspiration hazard – Category 1
Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
Aquatic Acute 2: Hazardous to the aquatic environment - acute aquatic hazard – Category 2
Aquatic Chronic 1: Hazardous to the aquatic environment - long-term aquatic hazard – Category 1
Aquatic Chronic 2: Hazardous to the aquatic environment - long-term aquatic hazard – Category 2

US