

## 1 Identification of the substance/mixture and of the company

- **Product identifier**
- **Trade name:** *XM-C-1202 1200 ohm Carbon Resistive Ink & XM-C-1221 Carbon Resistive Ink- 2500 ohms/sq*
- **Application of the substance / the mixture** *Functional electronic carbon printing 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](mailto: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**



GHS08 Health hazard

Carc. 2      H351 Suspected of causing cancer.



GHS07

Acute Tox. 4 H332 Harmful if inhaled.

Eye Irrit. 2A H319 Causes serious eye irritation.

STOT SE 3 H336 May cause drowsiness or dizziness.

Flam. Liq. 4 H227 Combustible liquid.

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



GHS07    GHS08

- **Signal word** *Warning*
- **Hazard-determining components of labeling:**  
 gamma-Butyrolactone  
 Carbon black
- **Hazard statements**  
 H227 Combustible liquid.  
 H332 Harmful if inhaled.  
 H319 Causes serious eye irritation.

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*H351 Suspected of causing cancer.*

*H336 May cause drowsiness or dizziness.*

**· 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.*

*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.*

*P333+P313 If skin irritation or rash occurs: Get medical advice/attention.*

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

*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.*

*P302+P352 IF ON SKIN: Wash with plenty of soap and water.*

*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)**



Health = 1

Fire = 2

Reactivity = 0

**· HMIS-ratings (scale 0 - 4)**



Health = 1

Fire = 2

Reactivity = 0

**· 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:**

96-48-0	gamma-Butyrolactone	⚠ Acute Tox. 4, H302; Eye Irrit. 2A, H319; STOT SE 3, H336	25-50%
627-93-0	Dimethyl adipate	Aquatic Acute 3, H402	5-15%
106-65-0	Methyl succinate	Flam. Liq. 4, H227	5-15%
1333-86-4	Carbon black	⚠ Carc. 2, H351	1-5%

**· Additional Components:**

	Proprietary binder	25-50%
1119-40-0	Dimethyl glutarate	10-25%

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7782-42-5 Graphite

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5-15%

#### 4 First-aid measures

- **Description of first aid measures**

- **General information:**

Immediately remove any clothing soiled by the product.

Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.

- **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; immediately call a doctor.

- **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**

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).

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-I:**

96-48-0	gamma-Butyrolactone	3.6 mg/m <sup>3</sup>
106-65-0	Methyl succinate	2.5 ppm

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1333-86-4	Carbon black	9 mg/m <sup>3</sup>
<b>· PAC-2:</b>		
96-48-0	gamma-Butyrolactone	39 mg/m <sup>3</sup>
106-65-0	Methyl succinate	28 ppm
1333-86-4	Carbon black	99 mg/m <sup>3</sup>
<b>· PAC-3:</b>		
96-48-0	gamma-Butyrolactone	310 mg/m <sup>3</sup>
106-65-0	Methyl succinate	170 ppm
1333-86-4	Carbon black	590 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.
- **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.

<b>1333-86-4 Carbon black</b>	
PEL	Long-term value: 3.5 mg/m <sup>3</sup>
REL	Long-term value: 3.5* mg/m <sup>3</sup> *0.1 in presence of PAHs; See Pocket Guide Apps.A+C
TLV	Long-term value: 3* mg/m <sup>3</sup> *inhalable fraction

- **Additional information:** The lists that were valid during the creation were used as basis.

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- **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.
  - 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

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

- |  |                              |
|--|------------------------------|
| · <b>Information on basic physical and chemical properties</b> |                              |
| · <b>General Information</b>                                   |                              |
| · <b>Appearance:</b>   |                              |
| Form:  | Liquid                       |
| Color:   | Light grey                   |
| Odor:  | Sweet                        |
| Odor threshold:  | Not determined.              |
| pH-value:  | Not determined.              |
| · <b>Change in condition</b>                                   |                              |
| Melting point/Melting range:                                   | Undetermined.                |
| Boiling point/Boiling range:                                   | 96 °C (205 °F)               |
| Flash point:   | 90 °C (194 °F)               |
| Flammability (solid, gaseous):                                 | Not applicable.              |
| Ignition temperature:  | 445 °C (833 °F)              |
| Decomposition temperature:                                     | Not determined.              |
| Auto igniting:   | Product is not selfigniting. |
| Danger of explosion:   | Not determined.              |
| · <b>Explosion limits:</b>                                     |                              |
| Lower:   | 2.7 Vol %                    |
| Upper:   | 15.6 Vol %                   |

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· <b>Vapor pressure at 20 °C (68 °F):</b>	8.3 hPa (6 mm Hg)
· <b>Density at 20 °C (68 °F):</b>	1.25104 g/cm <sup>3</sup> (10.44 lbs/gal)
· <b>Relative density</b>	Not determined.
· <b>Vapor density</b>	Not determined.
· <b>Evaporation rate</b>	1.6-2.3 (BuAc=1)
· <b>Solubility in / Miscibility with Water:</b>	Water miscible No
· <b>Partition coefficient (n-octanol/water):</b>	Not determined.
· <b>Viscosity:</b>	
<b>Dynamic:</b>	Not determined.
<b>Kinematic:</b>	Not determined.
· <b>Solvent content:</b>	
<b>Organic solvents:</b>	38.4 %
<b>VOC content:</b>	38.4 %
· <b>Solids content:</b>	35 - 40 %
· <b>Other information</b>	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:**

· <b>LD/LC50 values that are relevant for classification:</b>		
<b>96-48-0 gamma-Butyrolactone</b>		
Oral	LD50	1540 mg/kg (Rat)
Dermal	LD50	5000 mg/kg (gui)
Inhalative	LC50/4 h	>5.1 mg/l (Rat)

- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** Irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**  
The product shows the following dangers according to internally approved calculation methods for preparations:  
Harmful  
Irritant

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

96-48-0	gamma-Butyrolactone	3
1333-86-4	Carbon black	2B

**· 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:**
**96-48-0 gamma-Butyrolactone**

LC50/96 h &gt;220 - &lt;460 mg/l (golden orfe)

EC50/48 h &gt;500 mg/l (daphnia magna)

EC50/72 h 360 mg/l (green algae)

EC50/17 h &gt;10000 mg/l (bacterium)

**· 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.

**· 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, ADN, IMDG, IATA**

Not Regulated

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· **UN proper shipping name**  
· **DOT, ADR, ADN, IMDG, IATA** *Not Regulated*

· **Transport hazard class(es)**  
· **DOT, ADR, ADN, 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*

## 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):**  
*None of the ingredients is listed.*

· **TSCA (Toxic Substances Control Act):**  
*All ingredients are listed or comply with TSCA regulations.*

· **Proposition 65**

· **Chemicals known to cause cancer:**  
1333-86-4 Carbon black

· **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)**  
1333-86-4 Carbon black A4

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**  
1333-86-4 Carbon black

· **New Jersey State Right To Know List**  
96-48-0 gamma-Butyrolactone

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1119-40-0	Dimethyl glutarate
627-93-0	Dimethyl adipate
<b>· Pennsylvania Hazardous Substances List</b>	
96-48-0	gamma-Butyrolactone
1119-40-0	Dimethyl glutarate
627-93-0	Dimethyl adipate

- **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 GHS08

- **Signal word** Warning
- **Hazard-determining components of labeling:**  
gamma-Butyrolactone  
Carbon black
- **Hazard statements**  
H227 Combustible liquid.  
H332 Harmful if inhaled.  
H319 Causes serious eye irritation.  
H351 Suspected of causing cancer.  
H336 May cause drowsiness or dizziness.
- **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.  
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.  
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.  
P337+P313 If eye irritation persists: Get medical advice/attention.  
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.  
P302+P352 IF ON SKIN: Wash with plenty of soap and water.  
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 2 2011/65/EU along with EU Directive 2012/19/EU – 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

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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 12/19/2016
- **Date of preparation / last revision /** -2/6/2017 Rev1.

- **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. 4: Flammable liquids – Category 4

Acute Tox. 4: Acute toxicity – Category 4

Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A

Carc. 2: Carcinogenicity – Category 2

Carc. 2: Carcinogenicity – Category 2

STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

Aquatic Acute 3: Hazardous to the aquatic environment - acute aquatic hazard – Category 3