Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

1 Identification of the substance/mixture and of the company

· **Product identifier**

· **Trade name: XM-1228 Thermally Conductive Vapor Barrier**
· **Application of the substance / the mixture** Thermally Conductive Vapor Barrier

· **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:**
Chemtrec USA Emergency : 800-424-9300
Chemtrec International Emergency : 703-527-3887
Applied Ink Solutions : 617-965-5511

2 Hazard(s) identification

· **Classification of the substance or mixture**

GHS02 Flame

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

GHS08 Health hazard

Repr. 1B H360 May damage fertility or the unborn child.

GHS07

Eye Irrit. 2A H319 Causes serious eye irritation.
STOT SE 3 H336 May cause drowsiness or dizziness.

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

GHS02 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
Butanone
· **Hazard statements**
H225 Highly flammable liquid and vapor.
H319 Causes serious eye irritation.

(Contd. on page 2)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 1)

H360 May damage fertility or the unborn child.
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.
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+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)**

Health = 1
Fire = 3
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 1
Fire = 3
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:**		
78-93-3	Butanone Flam. Liq. 2, H225; Eye Irrit. 2A, H319; STOT SE 3, H336	40-60%
872-50-4	N-methyl-2-pyrrolidinone Repr. 1B, H360; Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H335; Flam. Liq. 4, H227	<1%

· **Additional Components:**		
1344-28-1	Aluminium oxide	25-50%
	Proprietary polymer	10-25%

(Contd. on page 3)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 2)

4 First-aid measures

· **Description of first aid measures**
· **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:** 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-1:**		
78-93-3	Butanone	200 ppm
1344-28-1	Aluminium oxide	15 mg/m3
872-50-4	N-methyl-2-pyrrolidinone	30 ppm

(Contd. on page 4)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 3)

7447-41-8	Lithium chloride	2.3 mg/m3

· **PAC-2:**

78-93-3	Butanone	2700* ppm
1344-28-1	Aluminium oxide	170 mg/m3
872-50-4	N-methyl-2-pyrrolidinone	32 ppm
7447-41-8	Lithium chloride	25 mg/m3

· **PAC-3:**

78-93-3	Butanone	4000* ppm
1344-28-1	Aluminium oxide	990 mg/m3
872-50-4	N-methyl-2-pyrrolidinone	190 ppm
7447-41-8	Lithium chloride	150 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:**
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 alkalis (caustic solutions).
Do not store together with oxidizing and acidic materials.
· **Further information about storage conditions:**
Keep container tightly sealed.
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:**

78-93-3 Butanone

PEL	Long-term value: 590 mg/m³, 200 ppm
REL	Short-term value: 885 mg/m³, 300 ppm Long-term value: 590 mg/m³, 200 ppm
TLV	Short-term value: 885 mg/m³, 300 ppm Long-term value: 590 mg/m³, 200 ppm BEI

(Contd. on page 5)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 4)

872-50-4 N-methyl-2-pyrrolidinone	
WEEL	Long-term value: 10 ppm Skin

· **Ingredients with biological limit values:**

78-93-3 Butanone	
BEI	2 mg/L Medium: urine Time: end of shift Parameter: MEK

872-50-4 N-methyl-2-pyrrolidinone	
BEI	100 mg/L Medium: urine Time: end of shift Parameter: 5-Hydroxy-N-methyl-2-pyrrolidone

· **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.
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:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Contact golve manufacturerer for break-through time.
· **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:	Liquid
Color:	Clear to light yellow
· **Odor:**	Sweet
· **Odor threshold:**	Not determined.
· **pH-value:**	Not determined.

(Contd. on page 6)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 5)

· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	79 °C (174 °F)
· **Flash point:**	-4 °C (25 °F)
· **Flammability (solid, gaseous):**	Not applicable.
· **Ignition temperature:**	514 °C (957 °F)
· **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:	1.8 Vol %
Upper:	11.5 Vol %
· **Vapor pressure at 20 °C (68 °F):**	105 hPa (79 mm Hg)
· **Density at 20 °C (68 °F):**	1.78341 g/cm³ (14.883 lbs/gal)
· **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.
· **Solvent content:**	
Organic solvents:	57.4 %
VOC content:	57.4 %
Solids content:	42.6 %
· **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

(Contd. on page 7)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 6)

11 Toxicological information

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

· LD/LC50 values that are relevant for classification:		
78-93-3 Butanone		
Oral	LD50	3300 mg/kg (Rat)
Dermal	LD50	5000 mg/kg (rabbit)

· **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:
Irritant

· **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.
· **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.

(Contd. on page 8)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 7)

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made in accordance with Federal, State, and Local regulations.

14 Transport information

· **UN-Number**	
· **DOT, ADR, IMDG, IATA**	UN1193
· **UN proper shipping name**	
· **DOT, ADR**	Ethyl methyl ketone
· **IMDG, IATA**	ETHYL METHYL KETONE (METHYL ETHYL KETONE)
· **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:**	Not applicable.
· **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

(Contd. on page 9)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 8)

· **IMDG**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **UN "Model Regulation":**	UN 1193 ETHYL METHYL KETONE, 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):**

78-93-3	Butanone
1344-28-1	Aluminium oxide
872-50-4	N-methyl-2-pyrrolidinone

· **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:**

872-50-4	N-methyl-2-pyrrolidinone

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**

78-93-3	Butanone	I

· **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**

78-93-3	Butanone

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

78-93-3	Butanone

· **Pennsylvania Hazardous Substances List**

78-93-3	Butanone

· **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)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 9)

· **Hazard pictograms**

GHS02 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
Butanone

· **Hazard statements**
H225 Highly flammable liquid and vapor.
H319 Causes serious eye irritation.
H360 May damage fertility or the unborn child.
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.
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+P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Other regulations, limitations and prohibitive regulations**
RoHS (EU)2015/863 along with EU Directive 2022/19/EU – 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 contains a substance on the SVHC list: CAS# 872-50-4 1-Methyl-2-pyrrolidone.*

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

(Contd. on page 11)

Applied Ink Solutions
A DIVISION OF MICROCHEM

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/31/2019 *Reviewed on 01/31/2019*

Trade name: XM-1228 Thermally Conductive Vapor Barrier

(Contd. of page 10)

· **Contact:** Mr. Cole

· **Revision History:** Rev 1.
· **Date of preparation / last revision** 10/20/2017 / 01/31/2019
· **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
BEI: Biological Exposure Limit
Flam. Liq. 2: Flammable liquids – Category 2
Flam. Liq. 4: Flammable liquids – Category 4
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
Repr. 1B: Reproductive toxicity – Category 1B
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3