

SAFETY DATA SHEET

Per EC Regulation 1907/2006

Irresistible Materials

IM-HM-140

Version 2.0

Rev: 24-02-2015

Section 1 Product and Manufacturer Information

1.1 Product Identifiers

<u>Product Name</u>	IM-HM-140
<u>Brand</u>	Irresistible Materials
<u>EC No</u>	N/A – research material
<u>REACH No</u>	N/A – A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
<u>CAS No</u>	N/A – no CAS registration for this mixture, only the components. Individual component CAS numbers in Section 3.

1.2 Relevant identified uses of the substance or mixture and uses advised against

<u>Identified Uses</u>	Semiconductor and Microsystems manufacturing
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1.3 Details of the supplier of the safety data sheet

<u>Manufacturer</u>	Irresistible Materials, Langdon House, Swansea Waterfront, Swansea, SA1 8QY, Wales
<u>Telephone</u>	+44121 414 4641
<u>Email</u>	info@irresistiblematerials.com

1.4 Emergency Telephone Number

Emergency Phone +1 781 407 9417 x233 or x224
Only available during the following hours: 06:00 – 22:00, EST

Section 2 Hazards Identification

2.1 Classification of the substance or mixture

2.1.1 OSHA Hazards

Combustible Liquid, Target Organ Effect, Harmful by ingestion, Irritant
Target Organs: Liver, Kidney, Central nervous system, Lungs

2.1.2 Classification according to Regulation (EC) No 1272/2008 and 29 CFR 1910 (OSH HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318

For the full text of the H-statements mentioned in this section, see Section 16

2.1.3 Classification according to EU Directives 67/548/EEC or 1999/45/EC

R10
Xn Harmful R20/21/22
Xi Irritant R38, R41

For the full text of the R-phrases mentioned in this Section, see Section 16

2.2 GHS Label elements

Labelling according to Regulation (EC) No 1272/2008



Pictogram:

Signal word: **Danger**

Hazard statement(s)

H226 Flammable liquid and vapour.
H302 + H312 + H332 Harmful if swallowed, in contact with skin or if inhaled
H315 Causes skin irritation.
H318 Causes serious eye damage.

Precautionary statement(s)

P261 Avoid breathing vapours/spray/mist/fumes.
P280 Wear protective gloves/ eye protection/ face protection.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Other Hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Section 3 Composition and Information on Ingredients

3.2 Mixtures

Description of the mixture: Poly[(o-cresyl glycidyl ether)-co-formaldehyde] and Multiple-adduct-phenyl-[Mixed fullerene]-butyric acid methyl ester dissolved in cyclohexanone.

Hazardous Ingredients

Name and Registration Numbers	% by weight	Classification according to 67/548/EEC	Classification according to Regulation (EC) No 1278/2008 (CLP).
Cyclohexanone CAS No: 108-94-1 EC-No. 203-631-1 Index-No. 606-010-00-7	> 90%	Xn, R10, R20/21/22, R38, R41	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; H226, H302+H312+H322, H315, H318
Poly[(o-cresyl glycidyl ether)-co-formaldehyde] CAS No: 29690-82-2	≤ 5%	None	Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; H315, H319, H335

For the full text of the H-statements and R-phrases mentioned in this section, see section 16.

Section 4 First Aid Measures

4.1 Description of first aid measures

<u>General advice</u>	Consult a physician. Show this safety data sheet to the doctor in attendance
<u>Ingestion</u>	If swallowed, wash out mouth with water provided person is conscious. Do not induce vomiting. Get medical attention.
<u>Inhalation</u>	Remove to fresh air. If breathing is difficult, get medical advice.
<u>Skin Contact</u>	Flush skin with water. Wash skin with soap and copious amounts of water.
<u>Eye Exposure</u>	Immediately flush eyes with sufficient amounts of water for at least 15 min.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed

No data available.

Section 5 Fire Fighting Measures

5.1 Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

Section 6 Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

Section 7 Handling and Storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition. No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

Section 8 Exposure Controls and Personal Protection

8.1 Components with Workplace Control Parameters

Components	CAS-No.	Value	Control parameters	Basis
Cyclohexanone	108-94-1	TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Eye & Upper Respiratory Tract irritation Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption			
		STEL	50 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Eye & Upper Respiratory Tract irritation Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption			
		TWA	25 ppm 100 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	Skin notation			
		TWA	50 ppm 200 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m ³ is approximate.			
		TWA	25 ppm 100 mg/m ³	USA. NIOSH Recommended Exposure Limits
	Potential for dermal absorption			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of the workday.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. Butyl-rubber gloves with a minimum layer thickness of 0.3 mm may offer full-contact resistance. Natural latex/chloroprene gloves with a minimum layer thickness of 0.6 mm may offer splash contact resistance. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by the end users. It should not be construed as offering an approval for any specific use scenario.

Eye / Face protection

Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Complete suit protecting against chemicals. Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Section 9 Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: clear, liquid Colour: colourless
b) Odor	No data available
c) Odor Threshold	No data available
d) pH	No data available
e) Melting point	47 °C - lit.
f) Boiling point	155 °C - lit.
g) Flash point	44 °C - closed cup
h) Evaporation rate	No data available

i) Flammability	No data available
j) Explosive limits	Upper explosion limit: 9.4 %(V) Lower explosion limit: 1.1 %(V)
k) Vapour pressure	4.5 hPa at 20 °C 13.3 hPa at 38.7 °C
l) Vapour density	3.39 - (Air = 1.0)
m) Relative density	0.947 g/cm ³ at 25 °C
n) Water solubility	86 g/L at 20 °C
o) Partition coefficient n-octanol/water	log Pow: 0.81
p) Auto-ignition temperature	420 °C at 1.013 hPa
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Surface tension	35.05 mN/m at 20 °C
Relative vapour density	3.39 - (Air = 1.0)

Section 10 Stability and Reactivity

10.1 Reactivity

No data available

10.2 Stability

Stable under recommended storage conditions

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks

10.5 Materials to avoid

oxidizing agents, plastics

10.6 Hazardous decomposition products

combustion may produce carbon monoxide and carbon dioxide.

Section 11 Toxicological Information

11.1 Information on toxicological effects

Acute toxicity

Oral LD50

LD50 Oral - rat - 1,534 mg/kg

Inhalation LC50

LC50 Inhalation - rat - 4 h - > 6.2 mg/l

Dermal LD50

LD50 Dermal - rabbit - 794 - 3,160 mg/kg

Skin corrosion/irritation

Skin - rabbit - Irritating to skin. - OECD Test Guideline 404

Serious eye damage/eye irritation

Eyes - rabbit - Risk of serious damage to eyes. - 24 h

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

Genotoxicity in vitro - Ames test - *S. typhimurium* - with and without metabolic activation - negative

Genotoxicity in vitro - Human - fibroblast - with and without metabolic activation - Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Cyclohexanone)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

<u>Inhalation</u>	May be harmful if inhaled. Causes respiratory tract irritation.
<u>Ingestion</u>	Harmful if swallowed.
<u>Skin</u>	Harmful if absorbed through skin. Causes skin irritation.
<u>Eyes</u>	Causes eye irritation.

Signs and Symptoms of Exposure

Prolonged or repeated exposure to skin causes defatting and dermatitis. Cough, Shortness of breath, Headache, Nausea, Vomiting, Central nervous system depression, Incoordination. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects

no data available

Additional Information

RTECS: GW1050000

Section 12 Ecological Information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 820 mg/l - 24 h

12.2 Persistence and degradability

Biodegradability Result: 90 - 100 % - Readily biodegradable.

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

no data available

Section 13 Disposal Considerations

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

Section 14 Transport Information

14.1 UN Number

ADR/RID: 1915 IMDG: 1915 IATA: 1915

14.2 UN proper shipping name

ADR/RID: CYCLOHEXANONE
IMDG: CYCLOHEXANONE
IATA: Cyclohexanone

14.3 Transport hazard class

ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packing Group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: no IMDG: Marine Pollutant No IATA: No

14.6 Special precautions for user

No data available

14.7 DOT (US)

UN number: 1915 Class: 3 Packing group: III

Proper shipping name: Cyclohexanone

Reportable Quantity (RQ): 5000 lbs

Marine pollutant: No

Poison Inhalation Hazard: No

Section 15 Regulatory Information

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

OSHA (US) Hazards

Combustible Liquid, Target Organ Effect, Harmful by ingestion., Irritant

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Cyclohexanone CAS-No.108-94-1 Revision Date: 1993-04-24

Pennsylvania Right To Know Components

Cyclohexanone CAS-No.108-94-1 Revision Date: 1993-04-24

New Jersey Right To Know Components

Cyclohexanone CAS-No.108-94-1 Revision Date: 1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

US Regulatory Information

This substance is distributed solely for processing and use by recipients under the Toxic Substances Control Act (TSCA) R&D Exemption in accordance with the regulations at 40 CFR 720.36. Commercial use is prohibited. This substance is specifically regulated under a TSCA Section 5(e) Consent Order. Substances regulated under TSCA Section 5(e) are subject to TSCA Section 12(b) export notification in accordance with the regulations at 40 CFR 707.60-.75.

15.2 Chemical Safety Assessment

For this product, a chemical safety assessment was not carried out.

Section 16 Other Information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Eye Dam.	Serious eye damage
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapor.
H302	Harmful if swallowed.
H302 + H312 + H332	Harmful if swallowed, in contact with skin or if inhaled
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
Skin Irrit.	Skin irritation.
STOT SE	Specific target organ toxicity – single exposure.

Full text of R-phrases referred to under sections 2 and 3

Xi	Irritant
Xn	Harmful
R10	Flammable
R20/21/22	Harmful by inhalation, in contact with skin, and if swallowed
R38	Irritating to skin
R41	Risk of serious damage to eyes

HMIS Classification

Health hazard: 2
Chronic Health Hazard: *
Flammability: 2
Physical hazards: 0

NFPA Rating

Health hazard: 2

Fire: 2

Reactivity Hazard: 0

Disclaimer: The above information is believed to be accurate and has been prepared based on the best information available to us. Irresistible Materials makes no warranty of this product, express or implied, with respect to such information, and it assumes no liability resulting from its use. Users should make their own investigation to determine the suitability of the information for their particular purpose. In no event shall Irresistible Materials Ltd. be held liable for any damage, claims, losses, or damages resulting from handling or contact with the above product.