Surgical Guide Resin

Photopolymer Resin for 3D Printing

MATERIAL SAFETY DATA SHEET

Prepared: 23/03/2015

OSHA Hazard Communication Standard 29 CFR 1910.1200. Prepared to GHS Rev.04

Manufactured by Dentis Co., LTD

Material Safety Data Sheet

DENTIS Co., Ltd

Section 1 – IDENTIFICATION

Material Name: ZMD-1000B

Chemical Family

acrylic compounds

Recommended Use

This product is a cartridge containing ink. Under normal conditions of use, the substance is released from a cartridge only inside an appropriate printing system, and therefore, exposure is limited.

Restrictions on Use

None known.

Manufacture Information

DENTIS Co., Ltd
6 Yuram-Ro, Dong-gu, Daegu

Phone: 82-53-589-3638
Emergency : 82-53-589-3638

Section 2 – HAZARD IDENTIFICATION

Classification in accordance with

Skin Corrosion / Irritation, Category 3*
Eye damage / Irritation, Category 2A
Sensitization – Skin, Category 1

GHS LABEL ELEMENTS

Symbol(s)

Signal word

WARNING

Hazard Statement(s)

Causes skin irritation
Casus serious eye irritation
May cause an allergic skin reaction

Precautionary Statement(s)

Prevention

Avoid breathing vapor or mist. Wash thoroughly after handling. Wear protective gloves/clothing and eye/face Protection. Contaminated work clothing should not be allowed out of the workplace.

Response

IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash before re-use. IF IN EYES: Rinse cautiously with water for several Minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get Medical advice attention.

Storage

Store in accordance with all current regulations and standards.

Disposal

Dispose in accordance with all applicable regulations.

Hazard(s) Not Otherwise Classified

None known.

Section 3 – COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component	Percent
N/A	Methacrylate Oligomer	30 – 80
N/A	Methacrylate Monomer	20 – 60
N/A	Phosphine oxide, phenylbis(2,4,6-trimethylbenzoyl)-	<3

Section 4 – FIRST AID MEASURES

Description of Necessary Measures

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

Skin

IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eyes

IF IN EYES: Rinse cautiously with water for at least 10 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Ingestion

If swallowed get medical attention.

Most Important Symptoms/Effects

Acute

Skin irritation, eye irritation, allergic skin reaction

Delayed

Allergic skin reaction

Indication of Immediate Medical Attention and Special Treatment

If adverse effects occur, treat symptomatically and supportively.

Section 5 – FIRE FIGHTING MEASURES

Suitable Extinguishing Media

Use extinguishing agents appropriate for surrounding fire. Class B fires: Use carbon dioxide (CO2), regular dry chemical (sodium bicarbonate), regular form (Aqueous Film Forming Foam-AFFFF), or water spray to cool containers.

Unsuitable Extinguishing Media

High pressure of water spray

Specific Hazards Arising from the Chemical

Slight fire hazard.

Hazardous Combustion Products

Combustion: oxides of carbon

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Keep unnecessary people away, isolate hazard area and deny entry. Keep out of water supplies and sewers. Avoid inhalation of material or combustion by-products.

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure. Avoid inhalation of material or combustion by-products.

Section 6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Cleaning Up

Collect spilled material with an inert absorbent such as sand or vermiculite. Place in properly labeled closed container. Flush area with water to remove trace residue.

Section 7 – HANDLING AND STORAGE

Precautions for Safe Handling

Avoid breathing vapor or mist. Wear protective gloves/clothing and protection. Wash thoroughly after handling.

Conditions for Safe Storage, including any Incompatibilities

Store in accordance with all current regulations and standards. Store between 0 ℃ and 40 ℃. Shipment temperature (up to 5 weeks) is -20 ℃ to 40 ℃. Store in a combustible storage area away from heat and open flame. Store in a cool, dry place. Avoid direct sunlight. Keep in the dark. Keep separated from incompatible substances.

Incompatibilities Not applicable under normal conditions of use and storage.

Section 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

Glycerin (56-81-5)

Korea : 10 mg/m3 TWA (mist, Serial No. 012)

OSHA (US): 15 mg/m3 TWA (mist, total particulate); 5 mg/m3 TWA (mist, respirable fraction)

Mexico: 10 mg/m3 TWA LMPE-PPT (mist)

Component Analysis

There are no biological limit values for any of this product's components.

Appropriate Engineering Controls

Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment

Eyes/Face Protection

Eye protection not required under normal conditions. Chemical goggles or safety glasses with side shields should be worn when handling a damaged cartridge.

Skin Protection

Protective clothing is not required under normal conditions. Wear neoprene or nitrile impervious gloves when handling damaged cartridge. Wash contaminated clothing before reuse.

Glove Recommendations

Wear neoprene or nitrile impervious gloves when handling damaged cartridge.

Respiratory Protection

Respiratory protection is not generally needed when using this product.

Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid	**Appearance:**	cartridge containing various color liquid
Color:	Various	**Physical Form:**	Liquid
Odor:	Ester Acrylic Acid Natrium	**Odor Threshold:**	Not available
pH:	Not applicable	**Melting Point:**	Not available
Boiling Point:	>100 ℃	**Decomposition:**	Not available
Flash Point:	>100 ℃	**Evaporation Rate:**	Not available
LEL:	Not available	**UEL:**	Not available
Vapor Pressure:	Not available	**Vapor Density (air = 1):**	Not available
Density:	Not available	**Specific Gravity (water = 1):**	Not available
Water Solubility:	Not available	**Coeff. Water/Oil Dist**	Not available
Auto Ignition:	Not available	**Viscosity:**	Not available
Volatility:	Not available		

Section 10 – STABILITY AND REACTIVITY

Reactivity

Heating may cause a fire

Chemical Stability

Store between 0 C and 40 C. Uncured ink will polymerize on exposure to light or heat rendering the product unusable. However, this reaction is not considered hazardous.

Possibility of Hazardous Reactions

Uncured ink will polymerize on exposure to light.

Conditions to Avoid

Avoid exposure to heat or light.

Incompatible Materials

Not applicable under normal conditions of use and storage.

Hazardous Decomposition

Combustion: oxides of carbon

Section 11 – TOXICOLOGICAL INFORMATION

Acute and Chronic Toxicity

No hazard is expected from the normal use of this product. While unlikely, uncured ink may leak from damaged ink cartridges and cause eye irritation, inflammation, or eye damage.

Component Analysis – LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published.

1,2-Propylene glycol (57-55-6)

Dermal LD50 Rabbit 20800 mg/kg; Oral LD50 Rat 20000 mg/kg

Polyethylene glycol (25322-68-3)

Dermal LD50 Rabbit >20 mL/kg

Glycerin (56-81-5)

Dermal LD50 Rabbit 20800 mg/kg; Oral LD50 Rat >570 mg/m3 1 h

Acute Toxicity Level

1,2-Propylene glycol (57-55-6)

Non Toxic: dermal absorption, ingestion

Polyethylene glycol (25322-68-3)

Moderately Toxic: dermal absorption, ingestion
Non Toxic: ingestion

Glycerin (56-81-5)
Slightly Toxic: ingestion

Information on Likely Routes of Exposure

Inhalation
No information on significant adverse effects.

Ingestion
No hazard is expected from the normal use of this product.

Skin Contact
May cause irritation. May cause an allergic skin reaction.

Eye Contact
May cause irritation.

Immediate Effects
skin irritation, eye irritation, allergic skin reaction

Delayed Effects
allergic reactions

Medical Conditions Aggravated by Exposure
None known.

Irritation/Corrosivity Data
Contact with uncured ink may cause eye irritation and skin irritation

Respiratory Sensitization
No data available for the mixture.

Dermal Sensitization
Component data indicate the substance is sensitizing. Uncured ink may cause an allergic response in sensitized individuals.

Carcinogenicity

Component Carcinogenicity
None of this product's components are listed by ACGIH, IARC, NTP, DFC or OSHA.

Mutagenic Data
No data available for the mixture.

Reproductive Effects Data
No data available for the mixture.

Tumorigenic Data
No data available for the mixture.

Additional Data
Uncured ink may polymerize and adhere to tissue.

Specific Target Organ Toxicity – Single Exposure
No target organs identified.

Specific Target Organ Toxicity – Repeated Exposure
No target organs identified.

Aspiration Hazard
No data available for the mixture.

Section 12 – ECOLOGICAL INFORMATION

Component Analysis – Aquatic Toxicity
Data may be available for the product or its components (if applicable, see below).

1,2-Propylene glycol (57-55-6)
Fish: 96 Hr LC50 Oncorhynchus mykiss:: 51600 mg/L: [static]; 96 Hr LC50 Oncorhynchus Mykiss: 41 - 47 mL/L [static]; 96 Hr LC50 Pimephales promelas: 51400 mg/L [static]; 96 Hr LC50 Pimephales promelas: 710 mg/L
Algae: 96 Hr EC50 Pseudokirchneriella subcapitata: 19000 mg/L

Invertebrate: 48 Hr EC50 Daphnia magna: >1000 mg/L [Static]

Glycerin (56-81-5)

Fish: 96 Hr LC50 Oncorhynchus mykiss" 51 – 57 mL/L [static]

Persistence and Degradability

No data available

Bioaccumulative Potential

No data available

Mobility

No data available

Other Ecological Information

No additional information is available.

Section 13 – DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose in accordance with all applicable regulations.

Refer to manufacturer/supplier for information on recovery/recycling. Do not landfill. Avoid discharge into drains or surface water. See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

Section 14 – TRANSPORT INFORMATION

US DOT Information

Not regulated as a hazardous material.

IMDG Information

Not regulated as dangerous goods.

Section 15 – REGULATORY INFORMATION

Component Analysis

U.S. Federal Regulations

None of this products components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 311/312 (40 CFR 370.21), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA 311/312 Hazardous Categories

Acute Health: Yes **Chronic Health:** Yes **Fire:** No **Pressure:** No **Reactive:** No

Not regulated under California Proposition 65

Canada Regulations

This product has been classified in accordance with the criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by CPR.

WHMIS CLASSIFICATION: D2B.

Canadian WHMIS Ingredient Disclosure List (IDL)

Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which fall under WHMIS criteria specified in the Controlled Products Regulations and present above the threshold limits listed on the IDL.

Component Analysis

Component	CAS	TSCA	DSL	ENCS	ECL
Methacrylate Oligomer	----	Yes	Yes	Yes	Yes
Methacrylate Monomer	----	Yes	Yes	Yes	Yes
Phosphine oxide, phenylbis(2,4,6-trimethylbenzoyl)-	----	Yes	Yes	Yes	Yes

Section 16 – OTHER INFORMATION

Summary of Changes

Revision No. : 1.0

NFPA Ratings: Health: 2 **Fire:** 1 **Reactivity:** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Key / Legend

ACGIH – American Conference of Governmental Industrial Hygienists; CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act; DSL – Domestic Substances List; EIN (EINECS) - European Inventory of Existing Commercial Chemical Substances; ELN (ELINCS) – European List of Notified Chemical Substances; EPA – Environmental Protection Agency; IARC – International Agency for Research on Cancer; IMDG - International Maritime Dangerous Goods; Kow - Octanol/water partition coefficient; LEL - Lower Explosive Limit; NFPA – National Fire Protection Agency; NIOSH – National Institute for Occupational Safety and Health; NTP – National Toxicology Program; OSHA – Occupational Safety and Health Administration; SARA – Superfund Amendments and Reauthorization Act; STEL – Short-term Exposure Limit; TDG – Transportation of Dangerous Goods; TSCA – Toxic Substances Control Act; TWA – Time Weighted Average; UEL – Upper Explosive Limit

Other Information

The information in this safety data sheet is based on data and samples provided to a third party SDS author. The sheet was written to the best of our ability and according to the state of knowledge at that time. The safety data sheet only constitutes a guideline for the safe handling, use, consumption, storage, transport and disposal of the substances/preparations/mixtures mentioned in this safety data sheet. New safety data sheets are written from time to time. Only the most recent versions may be used. Unless indicated otherwise word for word on the safety data sheet, the information does not apply to substances/preparations/mixtures in purer form. Mixed with other substances or in processes. The safety data sheet offers no quality specification for the substances/preparations/mixtures in question.

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End of Material Safety Data Sheet