

Safety Data Sheet (SDS)

Prepared in accordance with OSHA HazCom and GHS; compatible with EU REACH Annex II, as amended by (EU) 2020/878, WHMIS, and AU WHS requirements.

RODIN Titan Resin

Section 1. Product and Company Identification

Product Identifier: Photopolymer Resin

Trade Name: RODIN Titan

Synonyms: Dental Ceramic Nanohybrid 3D Printing Resin

Recommended Use: Light-curable ceramic nanohybrid resin intended for fabrication of permanent single-unit restorations (crowns, inlays, onlays, veneers) and temporary multi-unit dental prosthetics including bridges, full-arch provisionals, hybrid dentures, and denture teeth using validated CAD/CAM additive manufacturing systems.

Restrictions on Use: For professional dental/laboratory use only. Not for direct intraoral placement in uncured state.

Manufacturer/Supplier: Pac-Dent, Inc.

670 Endeavor Circle, Brea, CA 92821

Phone: +1-909-839-0888

Email: info@pac-dent.com

Emergency telephone number

CHEMTREC (US): +1-800-424-9300

International: +1-703-527-3887

Section 2. Hazard(s) Identification

GHS Hazard Classification of the Substance or Mixture

Skin Sensitization - Category 1

Eye Irritation - Category 2

Specific Target Organ Toxicity (Single Exposure) - Category 3

Hazardous to the Aquatic Environment, Chronic - Category 3

Signal Word: Warning



GHS08

GHS07

GHS09

Hazard Statements

H317 May cause an allergic skin reaction.

H319 Causes serious eye irritation.

H335 May cause respiratory irritation (uncured material only).

H412 Harmful to aquatic life with long lasting effects (uncured material only).

Precautionary Statements - Prevention

P261 Avoid breathing dust/fume/gas/mist/vapours/spray (uncured material only).

P264 Wash hands and exposed skin thoroughly after handling.

P272 Contaminated work clothing should not be allowed out of the workplace.

P273 Avoid release to the environment.

P280 Wear protective gloves, protective clothing, eye protection and face protection.

Response

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

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

P362 + P364 Take off contaminated clothing and wash it before reuse.

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

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

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

Storage

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

Disposal

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

Other Hazards

Uncured resin may cause irritation to skin, eyes, and respiratory tract. Avoid direct contact with uncured material.

Does not meet criteria for PBT or vPvB based on available data.

Does not contain substances classified as endocrine disruptors above reportable thresholds based on available data.

Section 3. Composition/Information on Ingredients

Product is a mixture

Chemical Name	CAS Number	EC Number	Concentration (% w/w)	Classification
Methacrylate oligomers / multifunctional methacrylate esters	Proprietary	Proprietary	10-20%	Skin Sens. 1 (H317), Eye Irrit. 2 (H319)
Urethane dimethacrylate derivatives / reactive monomers	Proprietary	Proprietary	20-30%	Skin Sens. 1 (H317), STOT SE 3 (H335)
Photoinitiator system	Proprietary	Proprietary	0.5-2%	Eye Irrit. 2 (H319), Aquatic Chronic 3 (H412)
Additives (pigments, stabilizers, inhibitors)	Proprietary	Proprietary	<5%	Not classified

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Section 4. First-Aid Measures

Description of First Aid Measures

General Advice: If medical advice is needed, have product container, label, or Safety Data Sheet available. Ensure medical personnel are aware of the material involved and take precautions to protect themselves.

After Inhalation: Remove person to fresh air and keep comfortable for breathing. If irritation, coughing, or other symptoms develop or persist, seek medical attention.

After Skin Contact: Immediately wash affected skin thoroughly with soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. If irritation, redness, or allergic skin reaction develops, seek medical advice/attention.

After Eye Contact: Immediately rinse cautiously with clean running water for at least 15 minutes, holding eyelids open. Remove contact lenses if present and easy to do. Continue rinsing. Seek medical attention if irritation persists.

After Swallowing: Rinse mouth thoroughly with water. Do not induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person. Seek medical attention if discomfort occurs or if a significant quantity has been swallowed.

Most Important Symptoms and Effects, Both Acute and Delayed

Inhalation: May cause respiratory irritation, coughing, or discomfort from vapors or mist.

Skin Contact: May cause irritation, redness, or allergic skin sensitization after repeated exposure.

Eye Contact: Causes irritation, redness, tearing, and discomfort.

Ingestion: May cause gastrointestinal discomfort, nausea, or irritation.

Immediate Medical Attention / Special Treatment: Treat symptomatically. No specific antidote is known.

Section 5. Fire-Fighting Measures

Extinguishing Media Suitable Extinguishing Media

Use extinguishing media appropriate for the surrounding fire, including:

- Alcohol-resistant foam
- Carbon dioxide (CO₂)
- Dry chemical powder
- Water spray or fog (for cooling exposed containers)

Unsuitable Extinguishing Media

Do not use a direct water jet, as it may spread burning material.

Special Hazards Arising from the Substance or Mixture

The product is not classified as highly flammable; however, combustible organic components may burn under fire conditions. Exposure to heat may cause:

- Thermal decomposition of resin components
- Formation of irritating, toxic, or hazardous fumes
- Pressure build-up in closed containers
- Possible polymerization with release of heat

Hazardous combustion/decomposition products may include:

- Carbon monoxide (CO)
- Carbon dioxide (CO₂)
- Nitrogen oxides (NO_x)
- Acrid organic fumes

Advice for Firefighters

- Wear self-contained breathing apparatus (SCBA) and full protective firefighting gear.
- Cool fire-exposed containers with water spray.
- Fight fire from a safe distance or protected location.

Prevent contaminated firefighting runoff from entering drains, waterways, or soil.

Section 6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures Avoid contact with skin, eyes, and clothing. Ensure adequate ventilation. Wear appropriate personal protective equipment, including:

- Safety glasses or chemical splash goggles
- Protective gloves (e.g., nitrile)
- Protective clothing / laboratory coat as needed

Avoid breathing vapors, mist, or aerosols generated during cleanup.

For non-emergency personnel, isolate the area and avoid unnecessary exposure.

Environmental Precautions

Avoid release to the environment. Prevent material from entering drains, sewers, surface water, or soil.

Contain spill if safe to do so. Notify relevant authorities if required by applicable local, regional, or national regulations.

Methods and Material for Containment and Cleaning Up

Small Spills:

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- Absorb with inert material such as sand, vermiculite, or absorbent pads.
- Transfer collected material into a suitable waste container. Uncured Resin Residue:
- Exposure to sunlight or artificial light may initiate polymerization.
- Resin may be cured under controlled light exposure prior to disposal where appropriate. Large Spills:
- Dike or contain spill area.
- Collect mechanically using non-sparking tools where appropriate.
- Place waste into labeled disposal containers.

After cleanup, wash contaminated surfaces with suitable cleaning agents while preventing environmental release.

Reference to Other Sections

- Section 8 for exposure controls and personal protective equipment
 - Section 13 for disposal considerations
- Section 7 for safe handling and storage information

Section 7. Handling and Storage

Precautions for Safe Handling

Use only in accordance with professional instructions and validated processing procedures.

Avoid contact with skin, eyes, and clothing. Avoid breathing vapors, mist, or aerosols that may be generated during handling, printing, cleaning, or finishing operations.

Wear appropriate personal protective equipment as described in **Section 8**.

Use only in well-ventilated areas. Wash hands thoroughly after handling and before eating, drinking, or smoking. Keep containers tightly closed when not in use.

Avoid contamination of the product with foreign materials.

Do not reuse empty containers. Residual uncured resin may remain hazardous.

Protect material from unintended exposure to sunlight, UV light, or other curing light sources.

Conditions for Safe Storage, Including Any Incompatibilities

Store in the original tightly closed container in a cool, dry, and well-ventilated place.

Recommended storage temperature: 4°C to 25°C (40°F to 75°F)

Protect from:

- Direct sunlight
- UV light / curing light sources
- Excessive heat
- Moisture
- Sources of ignition Do not freeze.

Keep away from incompatible materials such as:

- Strong oxidizing agents
- Strong reducing agents
- Peroxides
- Amines

- Polymerization initiators Store upright to prevent leakage. **Specific End Use(s)**

Light-curable dental resin intended for fabrication of permanent single-unit restorations (crowns, veneers, inlays, onlays) and temporary multi-unit prosthetics including bridges, full-arch provisionals, hybrid dentures, and denture teeth using validated CAD/CAM additive manufacturing systems. For professional dental laboratory or clinical use only.

Section 8. Exposure Controls / Personal Protection

Control Parameters

No specific occupational exposure limits have been established for this mixture as a whole.

Where applicable, occupational exposure limits for individual components should be observed in accordance with local regulations. Use adequate ventilation during handling, printing, cleaning, finishing, or other operations that may generate vapors, aerosols, or dust. Local exhaust ventilation is recommended where airborne exposure may occur.

Exposure Controls

Appropriate Engineering Controls

- Use in a well-ventilated area.
- Provide local exhaust ventilation where vapors, mist, or airborne particulates may be generated.
- Use enclosed or automated processing systems where practical.
- Maintain eyewash stations and hand-washing facilities in work areas.

Individual Protection Measures (Personal Protective Equipment) Eye / Face Protection

Wear safety glasses with side shields or chemical splash goggles where splashing or contact is possible. Face protection may be used for high-exposure operations.

Skin Protection Hand Protection

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Wear chemical-resistant protective gloves (e.g., nitrile gloves). Replace gloves if contaminated or damaged.

Body Protection

Wear suitable protective clothing, laboratory coat, or apron to prevent repeated or prolonged skin contact.

Respiratory Protection

Respiratory protection is not normally required under normal conditions of use with adequate ventilation.

If ventilation is insufficient, or if vapors, aerosols, dust, or mist are generated, use approved respiratory protection in accordance with applicable regulations.

General Hygiene Measures

- Wash hands thoroughly after handling and before breaks, eating, drinking, or smoking.
- Remove contaminated clothing and wash before reuse.
- Avoid contact with skin, eyes, and clothing.
- Do not eat, drink, or smoke while handling the product.

Environmental Exposure Controls

Avoid release to drains, soil, and waterways. Handle waste and residues in accordance with Section 13.

Section 9. Physical and Chemical Properties

Information on Basic Physical and Chemical Properties

Property	Value
Appearance	Pigmented liquid resin
Color	Various shades / intentionally pigmented
Odor	Mild fruity / ester-like odor
Odor Threshold	Not determined
Physical State	Liquid
pH	Not applicable (non-aqueous mixture)
Melting Point / Freezing Point	Not determined
Initial Boiling Point / Boiling Range	Not determined
Flash Point	> 93°C (> 200°F)
Evaporation Rate	Not determined
Flammability	Not classified as flammable
Upper / Lower Explosive Limits	Not determined
Vapor Pressure	Not determined
Vapor Density	Not determined
Relative Density	Approximately 1.10 – 1.13
Density	Approximately 1.10 – 1.18 g/cm ³ at 25°C
Solubility in Water	Practically insoluble / nearly insoluble
Partition Coefficient (n-octanol/water)	Not determined
Auto-Ignition Temperature	Not determined
Decomposition Temperature	Not determined
Viscosity	220 – 250 cP at 25°C (Brookfield)
Explosive Properties	Not explosive
Oxidizing Properties	Not oxidizing

Other Information

Property	Value
Specific Gravity	1.10 – 1.13 at 25°C
VOC Content	Not determined
Polymerization Behavior	Polymerizes upon exposure to curing light

Section 10. Stability and Reactivity

Reactivity

The product is stable under recommended conditions of storage and use.

Uncured resin may undergo polymerization when exposed to heat, UV light, visible curing light, or contamination with reactive substances.

Chemical Stability

Stable when stored in the original sealed container under recommended storage conditions.

Product contains polymerizable components that may gradually react if improperly stored or exposed to light, heat, or contamination.

Possibility of Hazardous Reactions

Hazardous polymerization may occur under certain conditions. Conditions that may initiate uncontrolled polymerization include:

- Exposure to sunlight, UV light, or curing light sources
- Elevated temperatures
- Contamination with peroxides, amines, reducing agents, or other reactive materials

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- Inhibitor depletion over time
- Bulk heating in closed containers

Runaway polymerization may generate heat and pressure and may rupture sealed containers.

Conditions to Avoid

- Heat
- Direct sunlight
- UV / curing light exposure
- Sources of ignition
- Contamination
- Extended storage outside recommended temperature range

Incompatible Materials

Keep away from:

- Strong oxidizing agents
- Strong reducing agents
- Organic peroxides
- Amines
- Polymerization initiators
- Strong acids or bases where reactive incompatibility may occur

Hazardous Decomposition Products

Thermal decomposition or combustion may generate:

- Carbon monoxide (CO)
- Carbon dioxide (CO₂)
- Nitrogen oxides (NO_x)
- Irritating organic fumes
- Acrid smoke

Section 11. Toxicological Information

Information on Hazard Classes as Defined in Applicable GHS / CLP Regulations Acute Toxicity

Based on available data, the mixture is not classified for acute toxicity.

Uncured material may be harmful if swallowed in significant quantities and may cause irritation of the mouth, throat, or gastrointestinal tract.

Skin Corrosion / Irritation

Not classified as corrosive.

Prolonged or repeated skin contact may cause irritation, redness, or dryness.

Serious Eye Damage / Eye Irritation

Classified as Eye Irritation Category 2.

Direct contact with uncured material may cause redness, tearing, pain, and discomfort.

Respiratory Sensitization

Not classified based on available data.

Skin Sensitization

Classified as Skin Sensitization Category 1.

Repeated or prolonged exposure may cause allergic skin reaction in susceptible individuals.

Additional Effects Related to Intended Dental Use

Uncured material may cause irritation to skin, eyes, and mucosal tissues upon contact.

Following proper processing and curing in accordance with validated instructions, the material is intended to be biologically stable and non-reactive for its intended intraoral use, including extended wear of temporary prosthetic restorations.

The material is designed to withstand functional loading conditions typical of full-arch and multi-unit dental applications.

Germ Cell Mutagenicity

Not classified based on available data.

Carcinogenicity

Not classified based on available data.

The components of this product are not intentionally added at reportable concentrations as carcinogens listed by:

- IARC (International Agency for Research on Cancer)
- NTP (National Toxicology Program)
- OSHA

Reproductive Toxicity

Not classified based on available data.

Specific Target Organ Toxicity – Single Exposure

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May cause respiratory irritation if vapors, mist, or aerosols are generated during handling or processing.

Specific Target Organ Toxicity – Repeated Exposure

Not classified based on available data.

Aspiration Hazard

Not classified.

Information on Other Hazards Likely Routes of Exposure

- Skin contact
- Eye contact
- Inhalation of vapors, mist, or dust generated during processing
- Accidental ingestion

Symptoms Related to Physical, Chemical and Toxicological Characteristics

- Eye irritation
- Skin redness or rash
- Allergic skin reaction
- Respiratory discomfort if airborne exposure occurs
- Gastrointestinal discomfort if swallowed

Delayed and Immediate Effects

Repeated skin exposure may result in delayed sensitization.

Section 12. Ecological Information**Toxicity**

Harmful to aquatic life with long lasting effects.

Uncured resin components may present toxicity to aquatic organisms. Avoid release to the environment.

Persistence and Degradability

No specific data are available for the mixture.

Uncured polymerizable resin components are not expected to degrade rapidly under normal environmental conditions. Cured material is expected to be relatively inert.

Bioaccumulative Potential

No specific data are available for the mixture.

Certain organic components may have some potential for bioaccumulation depending on environmental conditions.

Mobility in Soil

No specific data are available.

Liquid uncured material may adsorb to soil or sediment surfaces and may exhibit limited mobility in water due to low water solubility.

Results of PBT and vPvB Assessment

Based on available information, this mixture does not contain components meeting criteria for PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative) at reportable concentrations.

Endocrine Disrupting Properties

No components are known to be present at reportable concentrations that are identified as endocrine disruptors based on available data.

Other Adverse Effects

No additional adverse environmental effects are known.

Prevent uncontrolled release of uncured product to drains, waterways, and soil.

Refer to Section 13 for disposal considerations.

Section 13. Disposal Considerations**Waste Treatment Methods Product Disposal**

Where practical, **cure uncured resin prior to disposal** to reduce hazard.

Dispose of contents in accordance with applicable **local, regional, national, and international regulations**. Do not discharge uncured material into drains, surface water, or soil.

Waste classification should be determined by the waste holder based on composition, contamination, and applicable regulations.

Contaminated Packaging

Containers and packaging may retain hazardous residues of uncured resin. Do not reuse empty containers.

Dispose of contaminated packaging in accordance with applicable regulations. Where appropriate, containers may be drained and allowed to cure before disposal. **Cleaning Materials**

Cleaning agents (e.g., alcohol used for rinsing) and contaminated absorbents should be collected and disposed of in accordance with applicable regulations.

Do not discharge cleaning solutions into drains or the environment.

Additional Disposal Information

Follow all applicable regulatory requirements for hazardous waste handling and disposal in the region of use.

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Section 14. Transport Information

UN Number or ID Number

Not applicable

UN Proper Shipping Name

Not applicable

Transport Hazard Class(es)

Not applicable **Packing Group** Not applicable

Environmental Hazards

Not classified as environmentally hazardous for transport.

Special Precautions for User

No special precautions required under normal conditions of transport.

Transport in tightly closed containers. Avoid exposure to excessive heat, direct sunlight, and conditions that may initiate polymerization.

Maritime Transport in Bulk According to IMO Instruments

Not applicable

Additional Transport Information

This product is not regulated as dangerous goods under:

- US DOT (Department of Transportation)
- IATA (International Air Transport Association)
- IMDG (International Maritime Dangerous Goods Code)

ADR/RID (European road/rail transport)

Section 15. Regulatory Information

Safety, Health and Environmental Regulations / Legislation Specific for the Substance or Mixture

This Safety Data Sheet has been prepared in accordance with applicable international regulations, including:

- OSHA Hazard Communication Standard (29 CFR 1910.1200)
- Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
- Regulation (EC) No 1907/2006 (REACH), as amended
- Commission Regulation (EU) 2020/878 (SDS requirements)
- Regulation (EC) No 1272/2008 (CLP)
- UK REACH Regulations
- Canada WHMIS (Workplace Hazardous Materials Information System)
- Australia Work Health and Safety (WHS) Regulations

CLP Classification

The product is classified and labeled in accordance with the CLP Regulation (EC) No 1272/2008. Refer to Section 2 for full classification, hazard statements, and precautionary statements.

REACH Status

The components of this product are:

- Registered under REACH, or
- Exempt from registration, or
- Present below applicable concentration thresholds

PBT and vPvB Assessment

This mixture does not contain substances meeting the criteria for:

- Persistent, Bioaccumulative and Toxic (PBT), or
- Very Persistent and Very Bioaccumulative (vPvB)

in accordance with REACH Annex XIII, based on available data.

Endocrine Disrupting Properties

No components are known to be present at reportable concentrations that are identified as endocrine disruptors based on available information.

Other Regulatory Information

This product is intended for professional dental use and should be handled in accordance with applicable occupational safety regulations.

Chemical Safety Assessment

A Chemical Safety Assessment has not been carried out for this mixture.

Section 16. Other Information

Abbreviations and Acronyms

GHS – Globally Harmonized System of Classification and Labelling of Chemicals

- CLP – Classification, Labelling and Packaging Regulation (EC) No 1272/2008

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- REACH – Registration, Evaluation, Authorisation and Restriction of Chemicals
- PBT – Persistent, Bioaccumulative and Toxic
- vPvB – Very Persistent and Very Bioaccumulative
- STOT – Specific Target Organ Toxicity
- SCBA – Self-Contained Breathing Apparatus

Key Literature References and Sources for Data

- Supplier Safety Data Sheets for raw materials
- European Chemicals Agency (ECHA) database
- OSHA Hazard Communication Standard (29 CFR 1910.1200)
- Regulation (EC) No 1907/2006 (REACH)
- Regulation (EC) No 1272/2008 (CLP)

Classification Procedure

The classification of this mixture is based on:

- Available data on individual components
- Application of CLP/GHS classification criteria
- Bridging principles and expert judgment

Relevant Hazard Statements (Full Text)

- H317 May cause an allergic skin reaction
- H319 Causes serious eye irritation
- H335 May cause respiratory irritation
- H412 Harmful to aquatic life with long lasting effects

Training Advice

Users should be trained in:

- Safe handling of light-curable resin materials
- Use of appropriate personal protective equipment
- Prevention of skin contact and inhalation exposure
- Proper waste handling and disposal practices

Use only as directed for professional dental or laboratory applications.

Disclaimer

The information provided in this Safety Data Sheet is based on current knowledge and is intended to describe the product for the purposes of health, safety, and environmental requirements only.

It should not be construed as guaranteeing any specific property of the product.

The user is responsible for ensuring compliance with all applicable laws and regulations.