# Material Safety Data Sheet

## Fusio™ Liquid Dentin

### 1. Product and company identification

<table>
<thead>
<tr>
<th>Product name</th>
<th>Fusio™ Liquid Dentin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material uses</td>
<td>Dental product</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Pentron Clinical</td>
</tr>
<tr>
<td>Address</td>
<td>1717 West Collins Avenue</td>
</tr>
<tr>
<td>Telephone no.</td>
<td>1-203-265-7397, Toll Free: 1-800-551-0283</td>
</tr>
<tr>
<td>Preparied by</td>
<td>IHS</td>
</tr>
<tr>
<td>In case of emergency</td>
<td>CHEMTREC® (24 hours) U.S. : 1-800-424-9300  International: +1-703-527-3887</td>
</tr>
</tbody>
</table>

### 2. Hazards identification

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Liquid. [Paste.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Various</td>
</tr>
<tr>
<td>Odor</td>
<td>Fruity./Ester.</td>
</tr>
</tbody>
</table>

#### Emergency overview

- **Signal word**: WARNING!
- **Hazard statements**: CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. REPRODUCTIVE HAZARD.

#### Precautions

Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not get on skin or clothing. Avoid contact with eyes. Avoid exposure during pregnancy. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

#### Routes of entry

- Dermal contact. Eye contact. Inhalation.

#### Potential acute health effects

- **Inhalation**: Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- **Ingestion**: No known significant effects or critical hazards.
- **Skin**: Irritating to skin.
- **Eyes**: Irritating to eyes.

#### Potential chronic health effects

- **Chronic effects**: Contains material that can cause target organ damage.
- **Carcinogenicity**: No known significant effects or critical hazards.
- **Mutagenicity**: No known significant effects or critical hazards.
- **Teratogenicity**: No known significant effects or critical hazards.
- **Developmental effects**: No known significant effects or critical hazards.
- **Fertility effects**: Can impair fertility.
- **Target organs**: Contains material which causes damage to the following organs: upper respiratory tract, skin.
  Contains material which may cause damage to the following organs: eye, lens or cornea.

---

4/16/2014. Canada 1/8
2. Hazards identification

**Inhalation**: Adverse symptoms may include the following:
- Respiratory tract irritation
- Coughing

**Ingestion**: No specific data.

**Skin**: Adverse symptoms may include the following:
- Irritation
- Redness

**Eyes**: Adverse symptoms may include the following:
- Pain or irritation
- Watering
- Redness

**Medical conditions aggravated by over-exposure**: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>glass, oxide, chemicals</td>
<td>65997-17-3</td>
<td>60-100</td>
</tr>
<tr>
<td>2,2'-ethylenedioxydiethyl dimethacrylate</td>
<td>109-16-0</td>
<td>5-10</td>
</tr>
<tr>
<td>2-hydroxyethyl methacrylate</td>
<td>868-77-9</td>
<td>5-10</td>
</tr>
<tr>
<td>diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide</td>
<td>75980-60-8</td>
<td>0.1-1</td>
</tr>
</tbody>
</table>

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

**Eye contact**: No special measures are required. In case of contact with eyes, rinse immediately with plenty of water. Get medical attention if symptoms occur.

**Skin contact**: No special measures required. In case of contact, immediately flush skin with plenty of water. Get medical attention if symptoms occur.

**Inhalation**: No special measures required. If inhaled, remove to fresh air. Get medical attention if symptoms occur.

**Ingestion**: Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Get medical attention if adverse health effects persist or are severe.

**Protection of first-aiders**: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

**Antidote information**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Antidote information</th>
</tr>
</thead>
<tbody>
<tr>
<td>No antidote information known</td>
<td></td>
</tr>
</tbody>
</table>

**Notes to physician**: Treat symptomatically.
Fusio™ Liquid Dentin

5. Fire-fighting measures

Flammability of the product: In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media
Suitable: In case of fire, use water, dry chemical powder or carbon dioxide.
Not suitable: Do not use water jet.
Special exposure hazards: In case of major fire and large quantities: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products: Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
metal oxide/oxides

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions: Low release. For professional use only. Handling of product in very small amounts or in situations where release is highly unlikely.

Environmental precautions: Low release. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up
Small spill: Small Quantity. For professional use only. Absorb with an inert material and place in an appropriate waste disposal container.
Large spill: Small Quantity. For professional use only. Absorb with an inert material and place in an appropriate waste disposal container.

7. Handling and storage

Handling: No special measures are required for small quantities under normal and intended conditions of product use. For professional use only. Put on appropriate personal protective equipment (see Section 8). Handle with care and dispose in a safe manner.

Storage: Store between the following temperatures: 2 to 8°C (35.6 to 46.4°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use.

8. Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>List name</th>
<th>TWA (8 hours)</th>
<th>STEL (15 mins)</th>
<th>Ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>glass, oxide, chemicals</td>
<td>US ACGIH 6/2013</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AB 4/2009</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BC 7/2013</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ON 1/2013</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>QC 12/2012</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Notations:
[a] [b] [c] [d] [e] [f] [g] [h]

4/16/2014.  Canada  3/8
8. Exposure controls/personal protection

Form: [a]Inhalable fraction [b]Respirable fibers: length greater than 5 µm; aspect ratio equal to or greater than 3:1 as determined by the membrane filter method at 400-450X magnification (4-mm objective) phase contrast illumination. [c] Fibres [d]Fibres, total particulate [e]Inhalable [f]Fiber [g]Inhalable fraction: means that size fraction of the airborne particulate deposited anywhere in the respiratory tract and collected during air sampling with a particle size-selective device that, (a) meets the ACGIH particle size-selective sampling criteria for airborne particulate matter; and (b) has the cut point of 100 µm at 50 per cent collection efficiency. [h]Respirable fibres: length > 5µm; aspect ratio ≥3:1, as determined by the membrane filter method at 400-450 times magnification (4-mm objective), using phase-contrast illumination. [i]RESPIRABLE FIBRES (other than respirable asbestos fibres) : Objects, other than respirable asbestos fibres, longer than 5 µm, having a diameter of less than 3 µm and a ratio of length to diameter of more than 3 :1. [j]Total dust.

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Engineering measures: No special measures are required for small quantities under normal and intended conditions of product use.

Hygiene measures: No special measures are required for small quantities under normal and intended conditions of product use.

Personal protection

Respiratory: No special measures are required for small quantities under normal and intended conditions of product use.

Hands: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Eyes: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls: No special measures are required for small quantities under normal and intended conditions of product use.

9. Physical and chemical properties

Physical state: Liquid. [Paste.]
Flash point: Not available.
Auto-ignition temperature: Not available.
Flammable limits: Not available.
Color: Various

4/16/2014. Canada 4/8
9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor</td>
<td>Fruity/Ester</td>
</tr>
<tr>
<td>pH</td>
<td>3 to 4</td>
</tr>
<tr>
<td>Boiling/condensation point</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting/freezing point</td>
<td>Not available</td>
</tr>
<tr>
<td>Relative density</td>
<td>~1.8</td>
</tr>
<tr>
<td>Density</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not available</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility</td>
<td>Very slightly soluble in the following materials: cold water and hot water.</td>
</tr>
<tr>
<td>LogK_{ow}</td>
<td>Not available</td>
</tr>
<tr>
<td>Physical/chemical properties comments</td>
<td>Content (%) (solids): &gt;=65</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

- Chemical stability: The product is stable.
- Conditions to avoid: Protect from sunlight. Initiators. Avoid excessive heat.
- Incompatible materials: Reactive or incompatible with the following materials: oxidizing materials and reducing materials. Peroxide.
- Hazardous decomposition products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Possibility of hazardous reactions: Under normal conditions of storage and use, hazardous reactions will not occur.
  Under normal conditions of storage and use, hazardous polymerization will not occur. Long term: Polymerization.

11. Toxicological information

- Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2'-ethylenedioxydiethyl dimethacrylate</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>10837 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>2-hydroxyethyl methacrylate</td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>4230 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

- Chronic toxicity: Not available.

- Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2'-ethylenedioxydiethyl dimethacrylate</td>
<td>Skin - Moderate irritant</td>
<td>Mouse</td>
<td>-</td>
<td>336 hours 25 Percent Intermittent</td>
<td>-</td>
</tr>
</tbody>
</table>

- Sensitizer

4/16/2014. Canada
11. Toxicological information

Not available.

**Conclusion/Summary**
Not available.

**Skin**
Kligman score: Grade I (weak sensitizer)

**Carcinogenicity**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>EPA</th>
<th>NIOSH</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>glass, oxide, chemicals</td>
<td>A4</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Mutagenicity**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Experiment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusio™ Liquid Dentin</td>
<td>471 Bacterial Reverse Mutation Test</td>
<td>Subject: Bacteria</td>
<td>Negative</td>
</tr>
</tbody>
</table>

**Teratogenicity**
Not available.

**Reproductive toxicity**
Not available.

12. Ecological information

**Ecotoxicity**
No known significant effects or critical hazards.

**Aquatic ecotoxicity**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-hydroxyethyl methacrylate</td>
<td>Acute LC50 227000 µg/l Fresh water</td>
<td>Fish - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling)</td>
<td>96 hours</td>
</tr>
</tbody>
</table>

**Persistence/degradability**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Result</th>
<th>Dose</th>
<th>Inoculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-hydroxyethyl methacrylate</td>
<td>301C Ready Biodegradability - Modified MITI Test (I)</td>
<td>92 to 100 % - 14 days</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Partition coefficient: n-octanol/water**
Not available.

**Bioconcentration factor**
Not available.

**Mobility**
Not available.

**Toxicity of the products of biodegradation**
Not available.

**Other adverse effects**
No known significant effects or critical hazards.
13. Disposal considerations

Waste disposal: This material and its container must be disposed of in a safe way. Disposal should be in accordance with applicable regional, national and local laws and regulations. Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

TDG/IMDG/IATA: Not regulated.

15. Regulatory information

United States inventory (TSCA 8b): Not determined.

WHMIS (Canada): Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists
- Canadian NPRI: None of the components are listed.
- CEPA Toxic substances: None of the components are listed.
- Canada inventory: Not determined.

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

International regulations

International lists: Australia inventory (AICS): Not determined.
- China inventory (IECSC): All components are listed or exempted.
- Japan inventory: Not determined.
- Korea inventory: Not determined.
- Malaysia Inventory (EHS Register): Not determined.
- New Zealand Inventory of Chemicals (NZIoC): Not determined.
- Philippines inventory (PICCS): Not determined.
- Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals: Not listed

Chemical Weapons Convention List Schedule II Chemicals: Not listed

Chemical Weapons Convention List Schedule III Chemicals: Not listed

Australia inventory (AICS): Not determined.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: Not determined.
Korea inventory: Not determined.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): Not determined.
Philippines inventory (PICCS): Not determined.
Taiwan inventory (CSNN): Not determined.

4/16/2014. Canada 7/8
16. Other information

| Label requirements                           | CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. REPRODUCTIVE HAZARD. |
| Hazardous Material Information System (U.S.A.) |                                                                                                                   |

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

Date of issue : 4/16/2014.
Date of previous issue : No previous validation.
Version : 1

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.