MATERIAL SAFETY DATA SHEET

OPTIBOND XTR ADHESIVE

1 - IDENTIFICATION

Manufacturer: Kerr Corporation
Address: 1717 West Collins Avenue
City, State, Zip: Orange, CA 92867-5422
Telephone: 1-800-KERR-123
24-Hour Emergency: Chemtrec 1-800-424-9300
Date Reviewed: July 2010

2 - COMPOSITION INFORMATION

Hazardous Ingredients

<table>
<thead>
<tr>
<th>CAS #</th>
<th>PEL</th>
<th>TLV</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl alcohol 64-17-5</td>
<td>1000 ppm</td>
<td>1000 ppm</td>
<td>20-30</td>
</tr>
</tbody>
</table>

Other Ingredients

- Alkyl dimethacrylate resins 47-68
- Barium aluminoborosilicate glass 5-15
- Fumed silica (silicon dioxide) 3-10
- Sodium hexafluorosilicate 0.5-3

3 - PHYSICAL AND CHEMICAL PROPERTIES

- Boiling Point: N/E
- Specific Gravity (H2O = 1): ~ 1.2
- Vapor Pressure (mm Hg): N/E
- Vapor Density (AIR = 1): N/E
- Solubility in Water: Partially soluble for uncured material.
- Appearance and Odor: Pale yellow paste with a fruity odor

4 - FIRE AND EXPLOSION HAZARD DATA

- Flash Point (Method Used): 64 °F/18 °C (Ethanol)
- Flammable Limits: LEL: N/E UEL: N/E
- Extinguishing Media: CO2 and dry chemical foam
- Special Fire Fighting Procedures: None
- Unusual Fire and Explosion Hazards: None

5 - REACTIVITY DATA

- Stability: Stable
- Conditions to Avoid: Heat, sparks and open flame
- Incompatibility (Material to Avoid): Strong oxidizing agents
- Hazardous Decomposition Byproducts: Carbon monoxide, carbon dioxide
- Hazardous Polymerization: Will not occur

6 - HEALTH HAZARD DATA

Routes of Entry:
- Skin: May cause mild irritation.
- Eyes: May cause mild irritation.
- Inhalation: May cause irritation of the throat.
- Ingestion: May be poisonous by ingestion.

Carcinogenicity - NTP: No
IARC Monographs: No
OSHA Regulated Carcinogen: No

7 - EMERGENCY FIRST AID PROCEDURES

Skin: Wash skin thoroughly with soap and water. Use hand cream.
Eyes: Flush with water for 15 minutes. If irritation persists, seek medical attention.
Inhalation: Remove to fresh air. If irritation persists, seek medical attention.
Ingestion: Do not give liquids if person is unconscious. Seek medical attention.

8 - PRECAUTIONS FOR SAFE HANDLING & USE

Steps to be taken in case material is released or spilled: Dilute with water, wipe up with cloth and transfer to a suitable container for disposal.

Waste Disposal Method: Material should not be allowed to drain to sewers. Incinerate liquid in proper equipment. Dispose of in accordance with federal, state and local regulations.

Precautions to be taken in handling and storing: Store in a cool, dry place away from ignition sources.

9 - CONTROL MEASURES

- Respiratory Protection: Not needed
- VENTILATION:
  - Local Exhaust: Recommended to keep exposure under 1000 ppm.
  - Mechanical (General): Usually sufficient
- Protective Gloves: Impervious gloves recommended
- Eye Protection: Safety glasses with side shield
- Work/Hygiene Practices: Handle in accordance with good personal hygiene and safety practices. These practices include avoiding unnecessary exposure to material.

10 - TRANSPORTATION INFORMATION

- Regulated: DOT, IATA and IMO
- Proper Shipping Name: Ethyl Alcohol Solution
- Hazard Class: 3
- Identification Number: UN 1170
- Packing Group: II
- Label: Flammable Liquid
- Note: See 49 CFR 173.4

11 - SPECIAL INFORMATION

HMIS (Hazardous Material Identification System) Rating:
- H0 F3 R0
- [HMIS Hazard Index: 4 – Severe Hazard; 3 – Serious Hazard; 2 – Moderate Hazard; 1 – Slight Hazard; 0 – Minimum Hazard]

Note: Hazard information contained on this MSDS relates only to material in its uncured state. Thorough biocompatibility and toxicity testing of the cured material and its extracts have demonstrated that the material is non-toxic.

Note: This MSDS was prepared in accordance with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and is to be used only for this product. The information contained in this MSDS is, to the best of our knowledge, believed to be accurate.
SECTION 1
Product & Company identification

Product name
OPTIBOND XTR PRIMER

Uses/Application:
Dental adhesive.

Manufacturer:
KERR CORPORATION
1717 West Collins Avenue, Orange, CA 92867-5422
Telephone: 1-800-KERR-123

24-Hour Emergency phone
Chemtrec 1-800-424-9300

Date Prepared: July 2010
Date Revised: N/A

SECTION 2
Hazard identification

2.1 Hazard classification
Highly flammable; Sensitizing; Irritating.

2.2 Other hazard
Uncured material may be harmful if swallowed.

SECTION 3
Composition/Information on Ingredients

3.1 Hazardous ingredients

<table>
<thead>
<tr>
<th>HAZARDOUS INGREDIENTS</th>
<th>CAS N.</th>
<th>PEL</th>
<th>TLV</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>67-64-1</td>
<td>750 ppm</td>
<td>500 ppm</td>
<td>25-35</td>
</tr>
<tr>
<td>Ethyl Alcohol</td>
<td>64-17-5</td>
<td>1000 ppm</td>
<td>1000 ppm</td>
<td>4-15</td>
</tr>
<tr>
<td>HydroxyEthylMethAcrylate (HEMA)</td>
<td>868-77-9</td>
<td>N/A</td>
<td>N/A</td>
<td>30-50</td>
</tr>
</tbody>
</table>

3.2 Other non-hazardous ingredients
None.
### SECTION 4
First aid measures

4.1 Treatment for eye contact: Flush with water for 15 minutes. If irritation persists, seek medical attention.

4.2 Treatment for skin contact: Wash skin thoroughly with soap and water. Use hand cream.

4.3 Treatment for inhalation (breathing): Remove to fresh air. If irritation persists, seek medical attention.

4.4 Treatment for ingestion (swallowing): Do not give liquids if person is unconscious. Seek medical attention.

### SECTION 5
Fire-fighting Measures

5.1 Suitable extinguishing media: Carbon dioxide and dry chemical foam.

5.2 Forbidden extinguishing media: Unknown.

5.3 Special fire fighting measures: None. Wear self-contained breathing apparatus and full protective gear.

5.4 Unusual fire and explosion hazards: Heat can cause polymerization of the product and formation of hazardous vapours.

5.5 Special protection equipment: Sealed overall against liquids and gases.

### SECTION 6
Accidental Release Measures

6.1 Personal Precautions: Adopt the same precautions listed in section 8.

6.2 Environmental Precautions: Keep spilled material out of sewers.

6.3 Reclaiming Methods: Dilute with water, wipe up with cloth and transfer to suitable container for disposal. Dispose of in accordance with local regulations.

### SECTION 7
Handling and Storage

7.1 Handling Precautions: Handle away from sources of ignition. Adopt precautions listed in section 8.

7.2 Precautions in case of Fire and Explosion: Extinguish all ignition sources.

7.3 Storage Conditions: Store in a cool, dry place, away from heat, light and ignition sources.

7.4 Suggested container(s): The original containers provided by manufacturer.

7.5 Indication for Combined Storage: Avoid contact with strong oxidizing agents.

7.6 Environmental precautions: Avoid contamination of sewers with product.

7.7 Other Precautions: Use according to directions and good personal hygiene and safety practices.
## SECTION 8
**Exposure controls/personal protection**

### 8.1 Exposure Limits:

<table>
<thead>
<tr>
<th>TWA/TLV</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>1000 ppm</td>
</tr>
<tr>
<td>Acetone</td>
<td>500 ppm</td>
</tr>
</tbody>
</table>

### 8.2 Exposure control measures

#### 8.2.1 Precautionary Measures:

**Ventilation:**

- **Local Exhaust Ventilation:** Sufficient to keep vapours under exposure limits.
- **Special Ventilation:** None required.
- **Mechanical (General) Ventilation:** Good general ventilation recommended.
- **Other Ventilation:** None required.

**Respiratory Protection:** Avoid breathing of vapours of the material. In case of high vapours concentration, use a mask with a filter against organic vapours.

**Hands Protection:** Nitrile or Vinyl gloves are sufficient for short contact and for small quantity handling. Otherwise, impervious rubber or PVA gloves are recommended.

**Eyes Protection:** Safety glasses may be used.

**Skin Protection:** Handle in accordance with good personal hygiene and safety practices. These practices include avoiding unnecessary exposure to uncured material.

**Other Protective Equipments:** It would be better use a lab coat.

*Measures listed in this paragraph are to be considered as indications and NOT prescriptions*

#### 8.2.2 Environment exposure control measures

Not Applicable.

## SECTION 9
**Physical and Chemical Properties**

### 9.1 General information

**Appearance:** Pale yellow liquid.

**Odour:** Fruity odour.

### 9.2 Information related to health, safety and environment

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>1,6</td>
</tr>
<tr>
<td>Boiling point</td>
<td>N/E</td>
</tr>
<tr>
<td>Flash point</td>
<td>13°C</td>
</tr>
<tr>
<td>Flammability</td>
<td>Flammable.</td>
</tr>
<tr>
<td>Lower Explosivity Limit (L.E.L.)</td>
<td>N/E</td>
</tr>
<tr>
<td>Upper Explosivity Limit (U.E.L.)</td>
<td>N/E</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>None</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>N/E</td>
</tr>
<tr>
<td>Relative density</td>
<td>N/E</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1,0 g/ml</td>
</tr>
<tr>
<td>Solubility</td>
<td>Uncured material is partially soluble.</td>
</tr>
<tr>
<td>Partition coefficient n-octanol/water</td>
<td>N/E</td>
</tr>
<tr>
<td>Viscosity</td>
<td>N/E</td>
</tr>
<tr>
<td>Vapor density (air = 1)</td>
<td>N/E</td>
</tr>
<tr>
<td>Evaporation rate (n-butane = 1)</td>
<td>N/E</td>
</tr>
<tr>
<td>Melting point</td>
<td>N/E</td>
</tr>
</tbody>
</table>

### 9.3 Other information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscibility</td>
<td>Not available</td>
</tr>
<tr>
<td>Conductibility</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility in Lipids</td>
<td>Not available</td>
</tr>
<tr>
<td>Gases Group</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
SECTION 10
Stability and Reactivity

Stability: Stable if stored as directed.

10.1 Conditions to avoid: Heat, sparks and open flame.

10.2 Materials to avoid (incompatibility): Strong oxidizing agents.

10.3 Hazardous decomposition products: Carbon Oxides.

Other precautions:

Hazardous Polymerization Products: Not determined

Safety significance in case of change in physical appearance: Unknown

Stabilizers: The product is stabilized with non-hazardous polymerization inhibitors.

SECTION 11
Toxicological Information

CMR effects (Carcinogenicity, Mutagenicity and toxicity for reproduction):

None.

Effects and hazards of eye contact: May cause irritation and damage if not removed promptly.

Effects and hazards of skin contact: Irritating. May cause sensitization in sensitive individuals.

Effects and hazards of Inhalation (Breathing): May cause irritation to the throat and respiratory tract.

Effects and hazards of Ingestion (Swallowing): May cause severe irritation to the digestive tract, abdominal pain, nausea. Uncured material may be harmful if swallowed.

Effects for prolonged Exposure: Not applicable.

Toxic-kinetic effects: Unknown.

Effects on metabolism: Unknown.

Toxicological data for ingredients:

<table>
<thead>
<tr>
<th>HEMA</th>
<th>LD₅₀ (oral rat)</th>
<th>&gt; 5000 mg/Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LD₅₀ (skin rabbit)</td>
<td>&gt; 3000 mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LC₅₀ (inhalation rat/3 weeks)</td>
<td>&gt; 0.5 mg/Kg</td>
</tr>
<tr>
<td>ACETONE</td>
<td>LD₅₀ (oral rat)</td>
<td>5800 mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD₅₀ (skin rabbit)</td>
<td>20000 mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LC₅₀ (inhalation rat/4 hours)</td>
<td>150 mg/l</td>
</tr>
<tr>
<td>Ethyl Alcohol</td>
<td>LC_{50} (inhalation mouse/4hrs)</td>
<td>39g/m^3</td>
</tr>
<tr>
<td></td>
<td>LC_{50} (inhalation rat/10hrs)</td>
<td>20000ppm</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (intraperitoneal dog)</td>
<td>3000mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (intraperitoneal guinea pig)</td>
<td>3414mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (intraperitoneal hamster)</td>
<td>5068mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (intraperitoneal mammal)</td>
<td>4300mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (intraperitoneal mouse)</td>
<td>933mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (intraperitoneal rat)</td>
<td>3750mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (intraperitoneal rabbit)</td>
<td>963mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (intravenous cat)</td>
<td>3945mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (intravenous chicken)</td>
<td>8216mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (intravenous dog)</td>
<td>1600mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (intravenous mouse)</td>
<td>1973mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (intravenous rat)</td>
<td>1440mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (intravenous rabbit)</td>
<td>2374mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (oral cat)</td>
<td>6000mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (oral child)</td>
<td>2000mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (oral dog)</td>
<td>5500mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (oral guinea pig)</td>
<td>5560mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (oral human)</td>
<td>1400mg/Kg</td>
</tr>
<tr>
<td></td>
<td>TD_{10} (oral man)</td>
<td>700mg/Kg</td>
</tr>
<tr>
<td></td>
<td>TD_{10} (oral man)</td>
<td>50mg/Kg</td>
</tr>
<tr>
<td></td>
<td>TD_{10} (oral man)</td>
<td>1430mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (oral mouse)</td>
<td>7500mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (oral rat)</td>
<td>7060mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{50} (oral rabbit)</td>
<td>6300mg/Kg</td>
</tr>
<tr>
<td></td>
<td>TD_{10} (oral woman)</td>
<td>6300mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (subcutaneous chicken)</td>
<td>5g/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (subcutaneous dog)</td>
<td>6000mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (subcutaneous frog)</td>
<td>7100mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (subcutaneous infant)</td>
<td>19440mg/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (subcutaneous mouse)</td>
<td>4g/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (subcutaneous pigeon)</td>
<td>5g/Kg</td>
</tr>
<tr>
<td></td>
<td>LD_{10} (skin rabbit)</td>
<td>20g/Kg</td>
</tr>
</tbody>
</table>

### SECTION 12

**Ecological Information**

This product has not known ecological hazardous effects.

12.1 Eco-toxicity: Not available

12.2 Mobility: Not available

12.3 Persistence and degradability: Not available

12.4 Bioaccumulative potential: Not available

12.5 Results of PBT (Persistent Bio-Toxicity) assessment: Not available

12.6 Other adverse effects: Not available

Aquatic toxicity data for ingredients:
KERR Material Safety Data Sheet for: OPTIBOND XTR PRIMER

**HEMA**
Easily biodegradable: 84%
(OCSE 301D, closed bottle test, 28 days)

<table>
<thead>
<tr>
<th>Component</th>
<th>LC50 (Fish, Oryzias Latipes)</th>
<th>LC50 (Fish, Oryzias Latipes)</th>
<th>NOEC (Daphnia magna)</th>
<th>EC50 (Daphnia magna)</th>
<th>EC50 (Selenastrum Copricornutum)</th>
<th>EC50 (Pseudomonas fluorescens)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMA</td>
<td>&gt; 100 mg/l (OCSE 203, 96h)</td>
<td>&gt; 100 mg/l (OCSE 204, 14 days)</td>
<td>24.1 mg/l (OCSE 202/2, 21 days)</td>
<td>380 mg/l (OCSE 202/1, 48h)</td>
<td>345 mg/l (OCSE 201, 72h)</td>
<td>&gt; 3000 mg/l (DEV LB, 16h)</td>
</tr>
</tbody>
</table>

**Ethanol**

<table>
<thead>
<tr>
<th>Component</th>
<th>LC50 (Oncorhynchus mykiss):</th>
<th>LC50 (Pimephales promelas):</th>
<th>LC50 (Other fishes):</th>
<th>LC50 (Daphnia magna):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>10400-13000 mg/l (96hrs)</td>
<td>15300 mg/l (96hrs)</td>
<td>10000 mg/l (24hrs)</td>
<td>9,3 mg/l (48hrs)</td>
</tr>
</tbody>
</table>

**SECTION 13**
Disposal considerations
Dispose of in accordance with local regulations.

**SECTION 14**
Transport information

14.1 Sea transportation (IMDG)
UN number: 1993  Class: 3  Packing group: II  EMS-No: F-E, S-E
Stowage/segregation: Category B  Limited Quantity: 1 Lt
Proper shipping name: Flammable liquid, n.o.s.

14.2 Air transportation (ICAO/IATA)
UN number: 1993  Class: 3  Packing group: II  Label: 3
Maximum quantities: 5 Lt (Passenger Aircraft); 60 Lt (Cargo Aircraft only)
Limited Quantity: 1 Lt  Proper shipping name: Flammable liquid, n.o.s. (Acetone, Ethyl Alcohol)

14.3 Transportation by Road/Railway (RID/ADR)
UN number: 1993  Class: 3  Packing group: II  Label: 3
Limited Quantity: LQ4 (3 Lt/30 Kg for combined, 1 Lt/20 Kg for bandaged trays).
Proper shipping name: Flammable liquid, n.o.s.

**SECTION 15**
Other information

15.1 Hazardous Materials Identification System.
HMIS (Hazardous Material Identification System) Rating:
H2 F4 R0
[HMIS Hazard Index: 4 – Severe Hazard; 3 – Serious Hazard;
2 – Moderate Hazard; 1 – Slight Hazard; 0 – Minimum Hazard]
15.2 Sources of key data used to compile the Safety Data Sheet:

A.C.G.I.H. (www.acgih.org)
N.I.O.S.H. (www.cdc.gov/niosh/)
O.S.H.A. (www.osha.gov/)
U.E. (www.europa.eu/index_it.htm)
I.A.R.C. (www.iarc.fr/)
N.T.P. (www.ntp.niehs.nih.gov)
European Chemicals Bureau (ECB – www.ecb.jrc.it)
European chemical Substances Information System (ESIS - www.ecb.jrc.it/esis)

CAUTION: PRODUCT FOR PROFESSIONAL USE

This MSDS was prepared in accordance with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and is to be used only for this product. The information contained in this MSDS is, to the best of our knowledge, believed to be accurate. The information on this Safety Sheet is based on presently available data and to our best knowledge for the correct handling of the product under normal conditions. Any use of this product in any way not indicated on this Sheet or the use of this product together with any other process/procedure will be exclusively under the user’s responsibility. This document does not constitute explicit or implicit warranty of product quality or fitness for a particular purpose.