

**BREWER SCIENCE INC.  
SAFETY DATA SHEET**

This Safety Data Sheet has been prepared to comply with the EC Directive, Canadian WHMIS and the OSHA Hazard Communication Standard.

**SECTION 1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION  
AND THE COMPANY/UNDERTAKING**

**1.1 Product Identifier:**

**Trade Name:** ZoneBOND ® Remover 2112

**1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against:**

**Product Use:** Solution  
**Uses Advised Against:** None

**1.3 Details of the Supplier of the Safety Data Sheet:**

<b>Manufacturer:</b>	Brewer Science, Inc. 2401 Brewer Drive Rolla, MO 65401	<b>Sales Office:</b> Brewer Science, Limited North Mill, 2 <sup>nd</sup> Floor Darley Abbey Mills Derby, England DE22 1DZ
<b>Information Phone Number:</b>	(573) 364-0300	+44 1332 545888
<b>Fax Number:</b>	(573) 368-3318	+44 1332.545878
<b>E-mail:</b>	<a href="mailto:msds@brewerscience.com">msds@brewerscience.com</a>	<a href="mailto:msds@brewerscience.com">msds@brewerscience.com</a>

**1.4 Emergency Telephone Number:**

**Emergency Spill Information:** Chemtrec Domestic North America: (800) 424-9300  
Chemtrec International: (703) 527-3887  
Chemtrec Taiwan: 00801-14-8954  
China Chemical Accident Emergency Rescue Hotline 0532-83889090

**SECTION 2: HAZARDS IDENTIFICATION**

**2.1 Classification of the Substance or Mixture:**

**GHS Classification:**

Aspiration Toxicity Category 1 (H304)  
Flammable Liquid Category 3 (H226)  
Skin Irritation Category 2 (H315)  
Skin Sensitization Category 1(H317)  
Aquatic Acute Toxicity Category 1 (H400)  
Aquatic Chronic Toxicity Category 1 (H410)

**EU Classification:**

Flammable, Harmful (Xn), Dangerous for the Environment (N) R10, R38, R43, R65, R50/53

**2.2 Label Elements:**

Danger!



Contains: D-Limonene

**Hazard Phrases**

H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.

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H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H410	Very toxic to aquatic life with long lasting effects.

#### Precautionary Phrases

P210	Keep away from heat, sparks, open flames, and hot surfaces. – No smoking.
P233	Keep container tightly closed.
P240	Ground or bond container and receiving equipment.
P241	Use explosion-proof electrical, ventilating, or lighting equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist, vapors, or spray.
P264	Wash 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.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P333 + P313	If skin irritation or rash occurs: Get medical attention.
P363	Wash contaminated clothing before reuse.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or physician.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use water fog or spray, universal foam, carbon dioxide or dry chemical for extinction.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents and container in accordance with local and national regulations.

**2.3 Other Hazards:** None known.

### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 Substances:

Chemical Name	CAS#	EINECS#	ENCS/ ISHL	EU Classification (67/548/EEC)	CLP Annex VI Classification	%
D-Limonene (D- <i>parmentha</i> -1,8- <i>diene</i> )	5989-27-5	227-813-5	(3)-2245 / 3-(4)-222, 3-(4)-202	N, Xi, Xn R10, R38, R43, R65, R50/53	Flam. Liq. Cat 3 (H226), Skin Irrit. Cat 2 (H315), Skin Sens. Cat 1 (H317), Asp. Tox. Cat 1 (H304), Aquatic Acute Cat 1 (H400), Aquatic Chronic Cat 1 (H410)	100

See Section 16 for further information on EU and GHS Classification.

### SECTION 4: FIRST AID MEASURES

#### 4.1 Description of First Aid Measures:

**Eye:** Rinse thoroughly with water, while holding the eye lids open to be sure the material is washed out. Get medical attention if irritation occurs and persists.

**Skin:** Remove contaminated clothing. Wash contact area thoroughly with soap and water for several minutes. Get medical

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attention if irritation or rash occurs. Launder clothing before re-use.

**Inhalation:** Remove victim to fresh air. Give artificial respiration if needed. If breathing is difficult, oxygen should be administered by qualified personnel. Get medical attention if symptoms of exposure persist.

**Ingestion:** Aspiration hazard: do NOT induce vomiting. Keep the victim calm and warm. If vomiting occurs spontaneously, keep head below hips to prevent aspiration into the lungs. Get immediate medical attention.

**4.2 Most Important symptoms and effects, both acute and delayed:** May cause eye, skin and respiratory tract irritation. May cause skin sensitization. Inhalation of vapors or mists may cause headache, dizziness, nausea and other symptoms of central nervous system depression. Aspiration hazard: material may enter the lungs if swallowed and cause lung injury. May cause blood abnormalities and central nervous system effects.

**4.3 Indication of any immediate medical attention and special treatment needed:** Immediate medical attention is required for ingestion.

## SECTION 5: FIRE-FIGHTING MEASURES

**5.1 Extinguishing Media:** Use water fog or spray, universal foam, carbon dioxide or dry chemical.

**5.2 Special Hazards Arising from the Substance or Mixture**

**Unusual Fire and Explosion Hazards:** Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Vapors may form explosive mixtures with air in confined areas.

**Combustion Products:** Oxides of carbon.

**5.3 Advice for Fire-Fighters:**

Wear an approved, positive pressure, self-contained breathing apparatus and full protective clothing. Cool fire exposed containers with water. Contain water used in firefighting from entering sewers or natural waterways.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

**6.1 Personal Precautions, Protective Equipment and Emergency Procedures:**

Remove all ignition sources such as open flames, spark producing equipment, pilot lights, etc. Wear appropriate protective clothing to prevent eye and skin contact including impervious gloves, safety goggles and respirator if needed. Ventilate area.

**6.2 Environmental Precautions:**

Avoid releases to the environment. Report spills and releases as required to appropriate authorities.

**6.3 Methods and Material for Containment and Cleaning Up:**

Cover with an inert absorbent material and collect into an appropriate container for disposal

**6.4 Reference to Other Sections:**

Refer to Section 8 for Personal Protective Equipment and Section 13 for Disposal information.

## SECTION 7: HANDLING AND STORAGE

**7.1 Precautions for Safe Handling:** Avoid breathing vapors, aerosols and mists. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Always wear impervious gloves, chemical safety goggles and protective clothing when handling this material. Wash thoroughly after handling. Do not eat, drink or smoke in the work area. Keep product away from heat, sparks, flames and all other sources of ignition. No smoking in storage or use areas. Keep containers closed when not in use.

**7.2 Conditions for Safe Storage, Including any Incompatibilities:** Store in a cool, dry, well-ventilated location away from oxidizers and other incompatible materials. Keep containers closed when not in use.

**7.3 Specific end use(s):** Industrial use only

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**8.1 Control Parameters:**

Chemical Name	Exposure Limits
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D-Limonene	5 ppm TWA, 20 ppm STEL DFG MAK Skin
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## 8.2 Exposure Controls:

**Ventilation:** Use with adequate general or local exhaust ventilation to maintain exposure levels below the occupational exposure limits. Use explosion proof electrical equipment and wiring where required.

### Personal Protective Equipment:

**Respiratory Protection:** If needed, an approved respirator with organic vapor cartridges may be used. For higher exposures, supplied air respirator may be required. Respirator selection and use should be based on contaminant type, form and concentration. Follow applicable regulations and good Industrial Hygiene practice.

**Skin Protection:** Impervious gloves such as neoprene or nitrile gloves are recommended to prevent skin contact. Contact your glove supplier for selection assistance.

**Eye Protection:** Chemical safety glasses or goggles recommended where splashing is possible.

**Other Protective Equipment:** Impervious clothing is required to prevent skin contact and contamination of personal clothing. An eye wash facility and safety shower should be available in the work area.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic Physical and Chemical Properties:

<b>Appearance:</b> Clear, colorless liquid	<b>Vapor Density:</b> 4.7
<b>Odor:</b> Citrus odor	<b>Specific Gravity:</b> No data available
<b>Odor Threshold:</b> No data available	<b>Solubility:</b> Partially Soluble
<b>pH:</b> No data available	<b>Octanol/Water Partition Coefficient:</b> No data available
<b>Melting Point/Freezing Point:</b> No data available	<b>Autoignition Temperature:</b> No data available
<b>Initial Boiling Point/Range:</b> 176-177 °C (348.8-350.6 °F)	<b>Decomposition Temperature:</b> No data available
<b>Flash Point:</b> 43.33-55.56 °C (110-132 °F)	<b>Viscosity:</b> No data available
<b>Evaporation Rate:</b> No data available	<b>Explosive Properties:</b> Not explosive
<b>Flammable Limits:</b> LEL: 0.7 vol% UEL: 6.1 vol%	<b>Oxidizing Properties:</b> Not an oxidizer
<b>Vapor Pressure:</b> 1 mmHg @ 20 °C (68°F)	<b>Relative Density:</b> No data available
<b>Molecular Formula:</b> C <sub>10</sub> H <sub>16</sub>	<b>Flammability (solid, gas):</b> Not applicable
<b>Molecular Weight:</b> 136 g/mol	

9.2 Other Information: None available.

## SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity: Not reactive.

10.2 Chemical Stability: Stable under normal temperatures and pressure.

10.3 Possibility of Hazardous Reactions: Will not occur.

10.4 Conditions to Avoid: Keep away from heat, sparks, flames and other sources of ignition.

10.5 Incompatible Materials: Acids, bases, oxidizers.

10.6 Hazardous Decomposition Products: Combustion will produce oxides of carbon and citrus terpenes.

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1 Information on Toxicological Effects:

#### Potential Health Effects:

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**Eye:** May cause slight eye irritation. Corneal injury is unlikely.

**Skin:** May cause moderate irritation. Prolonged or repeated exposure may cause dermatitis. May cause allergic skin reaction (sensitization).

**Inhalation:** Inhalation of vapors, mists, or aerosols may cause nose and throat irritation with the possibility of central nervous system depression. Symptoms of central nervous system depression include headache, dizziness, drowsiness, nausea and unconsciousness.

**Ingestion:** Swallowing may cause gastrointestinal irritation. Aspiration hazard. May cause lung damage during swallowing or vomiting.

**Chronic Hazards:** Prolonged or repeated skin contact may cause dermatitis and allergic skin reaction (sensitization). Prolonged or repeated contact may cause blood abnormalities and central nervous system effects.

**Acute Toxicity Values:**

D-Limonene: Oral rat LD50- 4,400 mg/kg; Skin rabbit LD50 - >5,000 mg/kg

**Skin corrosion/irritation:** D-Limonene: Irritating to the skin.

**Eye damage/irritation:** D-Limonene: Irritating to the eye.

**Respiratory Irritation:** No data available.

**Respiratory Sensitization:** No data available.

**Skin Sensitization:** D-Limonene: Air oxidized d-limonene is sensitizing in guinea pigs.

**Germ Cell Mutagenicity:** D-Limonene: Negative in Ames and chromosome aberration assays.

**Carcinogenicity:** None of the components of this product are listed as carcinogens by OSHA, IARC, NTP, ACGIH and the EU CLP.

**Reproductive Toxicity:** D-Limonene: No effects on reproduction or development was seen at a dose of 250 mg/kg in rabbits.

**Specific Target Organ Toxicity:**

Single Exposure: No data available

Repeat Exposure: D-Limonene: In a 13 week oral study with rats, kidney effects were observed at 150 mg/kg/day.

<b>SECTION 12: ECOLOGICAL INFORMATION</b>
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**12.1 Toxicity:**

D-Limonene: 48 hr LC50 Daphnia magna- 0.577 mg/L

This product is classified as very toxic to the aquatic environment with long-term adverse effects. Releases to the environment should be avoided.

**12.2 Persistence and Degradability:** D-Limonene: Readily biodegradable – 100% after 28 days

**12.3 Bioaccumulative Potential:** No data available

**12.4 Mobility in Soil:** No data available

**12.5 Results of PBT and vPvB Assessment:** No data available

**12.6 Other Adverse Effects:** Not applicable

<b>SECTION 13: DISPOSAL CONSIDERATIONS</b>
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**13.1 Waste Treatment Methods:**

Dispose in accordance with all local, state and federal regulations.

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**SECTION 14: TRANSPORTATION INFORMATION**

	<b>14.1 UN Number</b>	<b>14.2 UN Proper Shipping Name</b>	<b>14.3 Hazard Class(s)</b>	<b>14.4 Packing Group</b>	<b>14.5 Environmental Hazards</b>
<b>US DOT</b>	UN2319	Terpene Hydrocarbons, n.o.s. (d-Limonene)	3	PG III	Marine Pollutant (dipentene)
<b>Canadian TDG</b>	UN2319	Terpene Hydrocarbons, n.o.s. (d-Limonene)	3	PG III	Marine Pollutant (d-limonene)
<b>EU ADR/RID</b>	UN2319	Terpene Hydrocarbons, n.o.s. (d-Limonene)	3	PG III	Marine Pollutant (d-limonene)
<b>IMDG</b>	UN2319	Terpene Hydrocarbons, n.o.s. (d-Limonene)	3	PG III	Marine Pollutant (d-limonene)
<b>IATA/ICAO</b>	UN2319	Terpene Hydrocarbons, n.o.s. (d-Limonene)	3	PG III	Marine Pollutant (d-limonene)

Note: d-Limonene (Dipentene) is a Marine Pollutant

**14.6 Special Precautions for User:** Not applicable

**14.7 Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code:** Not applicable

**SECTION 15: REGULATORY INFORMATION**

**15.1 Safety, Health and Environment Regulations/Legislation Specific for the Substance or Mixture:**

**U.S. FEDERAL REGULATIONS:**

**CERCLA 103 Reportable Quantity:** This product is not subject to reporting under CERCLA. Some states have more stringent reporting requirements. Report all spills in accordance with local, state, and federal regulations.

**SARA TITLE III:**

**Hazard Category for Section 311/312:** Acute Health, Fire Hazard

**Section 313 Toxic Chemicals:** This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements: None

**Section 302 Extremely Hazardous Substances (TPQ):** None

**EPA Toxic Substances Control Act (TSCA) Status:** All of the components of this product are listed on the TSCA inventory.

**STATE REGULATIONS:**

**California Proposition 65:** This product contains the following substances known to the State of California to cause cancer and/or reproductive harm: None.

**INTERNATIONAL REGULATIONS:**

**EUROPEAN REGULATIONS**

**REACH:** Brewer products comply with REACH regulation as applicable. For more information, contact the Brewer REACH coordinator.

**SVHC:** This product contains the following Substances of Very High Concern (SVHCs): None.

**JAPANESE REGULATIONS**

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**Industrial Safety and Health Law:**

Manufacture Prohibited	Manufacture Allowed	Notification Obligation	Labeling Obligation	MSDS Obligation	Dangerous Substance
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

**Poisonous and Deleterious Substances Control Law (PDSCL):** None of the chemicals are listed.

**Pollutant Release and Transfer Register (PRTP):** None of the chemicals are listed.

**Law Concerning the Protection of the Ozone Layer:** None of the chemicals are listed.

**Fire Service Law:** Class 4 Group 2 oils (Non-water soluble) Hazard rank III

**Ship Safety Act:** Flammable liquid materials

**Aviation Law:** Flammable liquid materials.

**Air Pollution Control Law:** None of the chemicals are listed.

**Water Pollution Control Act:** None of the chemicals are listed.

**Soil Contamination Countermeasures Law:** None of the chemicals are listed.

**Offensive Odor Control Law:** None of the chemicals are listed.

**Act on Prevention of Marine Pollution and Maritime Disaster:** Dipentene Category: Y

**15.2 Chemical Safety Assessment:** No data available

<b>SECTION 16: OTHER INFORMATION</b>
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<b>HMIS Ratings:</b> Health - 2	Flammability - 2	Physical Hazard - 0
<b>NFPA Ratings:</b> Health - 2	Flammability - 2	Instability - 0

**SDS Revision History:**

01/18/12: New SDS  
 9/13/13: Updated format.  
 9/15/14: Updated all sections.

**GHS Classification for Reference (See Sections 2 and 3):**

Aquatic Acute Cat 1 Aquatic Acute Toxicity Category 1  
 Aquatic Chronic Cat 1 Aquatic Chronic Toxicity Category 1  
 Asp. Tox. Cat 1 Aspiration Toxicity Category 1  
 Flam. Liq. Cat 3 Flammable Liquid Category 3  
 Skin Irrit. Cat 2 Skin Irritant Category 2  
 Skin Sens. Cat 1 Skin Sensitization Category 1  
 H226 Flammable liquid and vapour.  
 H304 May be fatal if swallowed and enters airways.  
 H315 Causes skin irritation.  
 H317 May cause an allergic skin reaction.  
 H400 Very toxic to aquatic life.  
 H410 Very toxic to aquatic life with long lasting effects.

**EU Classes and Risk Phrases for Reference (See Sections 2 and 3):**

N Dangerous for the environment.  
 Xi Irritant  
 Xn Harmful  
 R10 Flammable  
 R38 Irritating to skin.

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R43 May cause sensitization by skin contact.

R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in an aquatic environment.

R65 Harmful: May cause lung damage if swallowed.

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This above information is believed to be correct but does not propose to be all inclusive and shall be used only as a guide. Brewer Science, Inc. shall not be held liable for any damage resulting from handling or from contact with the above product.

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