



SAFETY DATA SHEET

SECTION 1 — IDENTIFICATION

Product Identifier

Product Name AQUA-TOOL-BOND™
Product Code Not applicable

Relevant identified uses of the substance or mixture and uses advised against

Recommended use Water soluble material for bonding molds and cores.

Details of the supplier of the safety data sheet

Manufacturer Advanced Ceramics Manufacturing, LLC.
7800 South Nogales Highway
Tucson, AZ 85756
Telephone (General) 520.547.0850

Emergency Telephone Number

800.554.9964 - Hazardous Materials Support Center
800.424.9300 - CHEMTREC (Spill related emergencies)

SECTION 2 — HAZARD(S) IDENTIFICATION

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 Aqua-Tool-Bond™ has up to 90% Isopropyl Alcohol.
Flammable Liquids 2 - H225
Skin Irritation 2 - H315
The formula is proprietary information and is the property of Advanced Ceramics Manufacturing.

Label Elements

OSHA HCS 2012



Other Dangers

Eye Contact – Direct contact may cause irritation.
Skin Contact – Direct contact may cause irritation.
Inhalation – When machining in the cured state, repeated exposure to dust may cause delayed lung injury.
Ingestion – Direct contact may cause irritation.
Signs & Symptoms of Exposure to Airborne Dust – May result in cough, dyspnea, wheezing, or impaired pulmonary functions.

SECTION 3 — COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Characterization Mixture (water-soluble core material)

Mixtures

Chemical Name:

Water Soluble Binder

Isopropyl Alcohol

| Identifiers | WT% | TLV (mg/m ³) | PEL (mg/m ³) |
|---------------|--------------------|--------------------------|--------------------------|
| | 1%-30% | NE | NE |
| 67-63-0 | 10%-90% | 400 ppm | 1225 |
| (T) - Total | (R) - Respirable | (I) - Inhalable | (NE) - Not Established |

SECTION 4 — FIRST-AID MEASURES

Contact with Eyes

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention

Contact with Skin

Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops. Cold water may be used

Inhalation

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear

Ingestion

Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt, or waistband. Get medical attention if symptoms appear

Most important symptoms and effects, both acute and delayed

Refer to section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Refer to section 4.

SECTION 5 — FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

For a small fire, use dry chemical powder. For a large fire, use water spray, fog, or foam.

Unsuitable Extinguishing Media

Avoid the use of streaming water, as this may spread the fire.

Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards

This product is flammable and may be combustible at high temperatures. Vapor may travel considerable distance to source of ignition and flash back. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME. Hydrogen peroxide sharply reduces the autoignition temperature of isopropyl alcohol. After a delay isopropyl alcohol ignites on contact with dioxgenyl tetrafluorborate, chromium trioxide, and potassium tert-butoxide. When heated to decomposition it emits acrid smoke and fumes. Secondary alcohols are readily autooxidized in contact with oxygen or air, forming ketones and hydrogen peroxide. It can become potentially explosive. It reacts with oxygen to form dangerously unstable peroxides which can concentrate and explode during distillation or evaporation. The presence of 2-butanone increases the reaction rate for peroxide formation. Explosive in the form of vapor when exposed to heat or flame. May form explosive mixtures with air. Isopropyl alcohol + phosgene forms isopropyl chloroformate and hydrogen chloride. In the presence of iron salts, thermal decomposition can occur, which in some cases can become explosive. A homogenous mixture of concentrated peroxides + isopropyl alcohol are capable of detonation by shock or heat. Barium perchlorate + isopropyl alcohol gives the highly explosive alkyl perchlorates. It forms explosive mixtures with trinitromethane and hydrogen peroxide. It produces a violent explosive reaction when heated with aluminum isopropoxide + crotonaldehyde. Mixtures of isopropyl alcohol + nitroform are explosive

Advice for Firefighters

Always wear full fire prevention gear: hardhat with visor, fireproof clothing, work gloves and a respirator.

SECTION 6 — ACCIDENTAL RELEASE MEASURES
Personal precautions, protective equipment and emergency procedures

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| Personal Precautions | Ensure an adequate ventilation |
| Emergency Procedures | Ensure an adequate ventilation |

Environmental Precautions
 No specific requirement

Methods and material for containment and cleaning up

Containment/Clean-up Measures

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of according to local and regional authority requirements. For large spills, keep away from heat and sources of ignition. Stop the leak if there is no risk. Absorb with dry earth, sand, or other non-combustible material. Prevent entry into sewers, basements, or confined areas. Be careful that the product is not present at a concentration level above TLV

SECTION 7 — HANDLING AND STORAGE
Precautions to be taken in Handling and Storing

Handling

Keep away from heat and sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/vapor/spray. Avoid contact with eyes and wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately. Keep away from incompatibles such as oxidizing agents, acids

Conditions for safe storage, including any incompatibilities

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| Storage | Store in tightly closed containers in a dry, cool and well-ventilated place. Keep away from sources of heat, sparks and flame. |
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Specific End Use
 Not indicated.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

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| PNOS | TLV-TWA _{ACGIH} = No exposure limit value known. TLV-TWA _{ACGIH} = No exposure limit value known. |
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Exposure Control

Engineering Measures/Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure eyewash stations and safety showers are proximal to the work-station location.

Personal Protective Equipment Pictograms



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| Respiratory Protection | Use of a Class NIOSH N95 respirator where dust is generated is recommended. |
| Eye Protection | Chemical resistant safety glasses or goggles as a minimum. |
| Skin Protection | Rubber gloves should be worn to prevent excessive or repeated skin contact. |
| Other Clothing & Equipment | Work clothing or coveralls to minimize skin contact. |

General Industrial Hygiene Considerations

Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco. Do not eat, drink or smoke during use. Keep away from food and feedstuffs. Do not breathe dust. Avoid creating dust.

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| Ventilation | Maintain positive ventilation. |
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| Environmental Exposure Controls | Follow best practice for site management and disposal of waste. |
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SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES
Information on Physical and Chemical Properties

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| Appearance: | Clear liquid |
| Smell: | no detectable odor |
| Odor threshold: | not available |
| pH: | not available |
| Melting point / freezing point: | not available |
| Initial boiling point and boiling range: | not available |
| Flash point: | noncombustible |
| Evaporation rate: | not available |
| Flammability (solid, gas): | not available |
| Upper / lower flammability or explosive limits: | not available |

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| Vapor pressure: | not available |
| Vapor density: | not available |
| Relative density: | 0.819 g/cc |
| Solubility: | soluble in water |
| Partition coefficient n-octanol/water: | not available |
| Auto-ignition temperature: | not applicable |
| Decomposition temperature: | not available |
| Viscosity: | not applicable |
| Explosive properties: | not applicable |
| Oxidising properties: | not applicable |

SECTION 10 — STABILITY AND REACTIVITY

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| Reactivity | Reacts violently with hydrogen + palladium combination, nitroform, oleum, COCl ₂ , aluminum triisopropoxide, oxidants. Incompatible with acetaldehyde, chlorine, ethylene oxide, isocyanates, acids, alkaline earth, alkali metals, caustics, amines, crotonaldehyde, phogene, ammonia. Asopropyl alcohol reacts with metallic aluminum at high temperatures. Isopropyl alcohol attacks some plastics, rubber, and coatings. Vigorous reaction with sodium dichromate + sulfuric acid |
| Chemical stability | The product is stable under normal conditions of use and storage. |
| Possibility of hazardous reactions | Refer to Reactivity |
| Conditions to avoid | Refer to reactivity. Hygroscopic; keep container tightly closed |
| Incompatible materials | Refer to Reactivity. |
| Hazardous decomposition products | Not known |
| TSCA Listing | All ingredients are on the TSCA inventory, or exempt. |

SECTION 11 — TOXICOLOGY INFORMATION

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| Information on toxicological effects | Acute potential health effects: Skin: may cause mild skin irritation, and sensitization. Eyes: can cause eye irritation. Inhalation: breathing in small amounts of this material during normal handling is not likely to cause harmful effects. However, breathing large amounts may be harmful and may affect the respiratory system and mucous membranes (irritation), behavior and brain (cns depression - headache, dizziness, drowsiness, stupor, incoordination, unconsciousness, coma and possible death), peripheral nerve and sensation, blood, urinary system, and liver. Ingestion: swallowing small amounts during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. Swallowing large amounts may cause gastrointestinal tract irritation, with nausea, vomiting and diarrhea, abdominal pain. It also may affect the urinary stem, cardiovascular system, sense organs, behavior or cns (sommolence, generally depressed activity, irritability, headaches, dizziness, drowsiness), liver, and respiratory system (breathing difficulty). Chronic potential health effects: may cause defatting of the skin and dermatitis and allergic reaction. May cause adverse reproductive effects based on animal data (studies) |
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SECTION 12 - ECOLOGICAL INFORMATION

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| Toxicity | Isopropyl alcohol Ecotoxicity in water (LC50): 100000 mg/l 96 hours [Fathead Minnow]. 64000 mg/l 96 hours [Fathead Minnow] |
| Persistence and degradability | Information not available. |
| Bioaccumulative potential | Information not available. |
| Mobility in Soil | Information not available. |
| Other adverse effects | Information not available. |
| Other Information | Information not available. |

SECTION 13 - DISPOSAL CONSIDERATIONS

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| Waste treatment methods | Disposal must be made according to national or local law. These provisions shall also apply to contaminated containers. It is therefore recommended to make contact with the authorities in charge or approved specialist companies that can give you guidance on how to prepare for disposal. Appropriate disposal could be combustion, recycling, disposal site. |
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SECTION 14 - TRANSPORT INFORMATION

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| | The product is not classified as dangerous according to the provisions of existing legislation on the transport of dangerous goods by road (ADR) and by Rail (RID), by sea (IMDG Code) and by air (IATA). |
| UN Number | Not applicable. |
| UN Proper shipping name | Not applicable. |
| Transport hazard class(es) | Not applicable. |
| Packing group | Not applicable. |
| Environmental hazards | Not applicable. |
| Special precautions for user | Not applicable. |
| Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code | Not applicable. |

SECTION 15 - REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

- OSHA 29 CFR 1910.1200 HCS - Consolidated Safety at the workplace
- OSHA 29 CFR 1910.120 HCS - Hazardous Waste Operations and Emergency Response

SECTION 16 — OTHER INFORMATION

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| Last Revision Date | 8/2/2016 |
| Preparation Date | 8/2/2016 |
| Key literature references and sources for data: | <ul style="list-style-type: none"> • 29 CFR 1910.1200(f) and Appendix C of 29 CFR 1910.1200 (and subsequent amendments and adjustments) • OSHA GHS (and subsequent amendments and adjustments) • OSHA Hazard Communication Standard (HCS) (and subsequent amendments and adjustments) • 1910 Subpart G - Occupational Health and Environmental Control (and subsequent amendments and adjustments) • Safety data sheet of the supplier of the product |

Acronyms:

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| ACGIH: | American Conference of Governmental Industrial Hygienists |
| ADR: | European Agreement concerning the International Carriage of Dangerous Goods by Road |
| CAS: | Chemical Abstracts Service |
| CLP: | Classification, Labeling and Packaging |
| EINECS: | European Inventory of Existing Chemical Substances |
| IATA: | International Air Transport Association |

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|-----------------------------------|---|
| IMDG Code: | International Maritime Code for Dangerous Goods |
| PBT: | Persistent, Bioaccumulative, Toxic |
| PEL: | Permissible Exposure Limit |
| PNOS: | Particles Not Otherwise Specified |
| RCRA: | Resource Conservation and Recovery Act |
| REACH: | Registration, Evaluation, Authorization and Restriction of Chemicals |
| RID: | Regulation on the Inland transport of Dangerous goods by rail |
| TLV: | Threshold Limit Value |
| TWA: | Time-Weighted Average |
| vPvB: | very Persistent, very Bioaccumulative |
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