Section 1. Identification

Product Name: LBT-100 Water Based Laser Marking Material

Code: LBT-100, Water based Paste or Liquid Laser Bonding Additive

Supplier/Manufacturer: Laser Bonding Technology
5336 Vincent Avenue
Los Angeles, CA 90041

Chemical name: Mixture of Water, Molybdenum Trioxide, Pyrophyllite and Black Pigment

Synonym: Additive/filler ceramics, paint, ink, etc.

Material uses: Laser additive bonding and marking material.

Relative identified uses of the substance or mixture and uses advised against: Not applicable

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Section 2. Hazards identification

OSHA/HCS status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture:
- CARCINOGENICITY (inhalation) - Category 1A
- SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (respiratory tract) (inhalation) - Category 1

GHS label elements:

Hazard pictograms:

Signal words: Danger Warning
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Hazard statements:  May cause cancer if inhaled.
Causes damage to organs through prolonged or repeated exposure if inhaled. (respiratory tract).
Dust or spray may cause eye irritation.

Precautionary Statements:
General:  Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Avoid excessive dust generation. Avoid breathing dust. Use only with adequate ventilation.

Prevention:  Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Do not breathe dust. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Response:  Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention.

Storage:  Store locked up. Store in a dry place.

Disposal:  Dispose of contents and container in accordance with all local, regional, national and international regulations. Prevent exposure to dust of product.

Hazards not otherwise classified:  May cause mechanical eye or skin irritation in high concentrations. Product may become slippery when wet.

Section 3. Composition/information on ingredients

Substance/Mixture:  Mixture
Chemical name:  Laser Additive Marking Material or Ink

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>CAS number</th>
<th>% by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>50 - 55</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>1313-27-5</td>
<td>9 - 11</td>
</tr>
<tr>
<td>Trioxide</td>
<td>Mixture contains</td>
<td>12 – 14</td>
</tr>
<tr>
<td>Hydrated aluminum silicate mineral (Substance):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quartz</td>
<td>14808-60-7</td>
<td>3 - 5</td>
</tr>
<tr>
<td>Pyrophyllite</td>
<td>12269-78-2</td>
<td>5 - 7</td>
</tr>
<tr>
<td>Mica</td>
<td>12001-26-2</td>
<td>3 - 5</td>
</tr>
<tr>
<td>Kaolin clay</td>
<td>1332-58-7</td>
<td>1 – 1.5</td>
</tr>
</tbody>
</table>

Occupational exposure limits, if available, are listed in Section 8.
Section 4. First Aid Measures

Description of necessary first aid measures

Eye contact: Flush with plenty of water for at least 15 minutes, occasionally lifting upper and lower eyelids. If irritation develops and persists, seek medical attention.

Skin contact: Flush skin with plenty of water. Seek medical attention if irritation develops.

Inhalation: Move to fresh air. If respiratory distress develops, seek medical attention.

Ingestion: Unlikely to be toxic by ingestion. Rinse mouth out with water. Do not induce vomiting unless directed to do so by medical personnel. Seek medical attention if significant quantities have been ingested or symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact Molybdenum Trioxide is a potential eye irritant. May cause irritation.

Skin contact No known significant effects or critical hazards.

Inhalation No known significant effects or critical hazards.

Ingestion No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact Molybdenum Trioxide is a potential eye irritant. May cause irritation.

Skin contact No known significant effects or critical hazards.

Inhalation No known significant effects or critical hazards.

Ingestion No known significant effects or critical hazards

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician Treat symptomatically

Specific treatments No specific treatment.

Protection of first-aiders No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes or dust 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. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
Section 5. Fire-fighting measures

**Extinguishing media**

**Suitable extinguishing media**

**Unsuitable extinguishing media:** This product is not combustible.

Use an extinguishing agent suitable for the surrounding fire. No restrictions on extinguishing media for this product.

**Specific hazards arising from the mixture**

No specific fire or explosion hazard. This product is not flammable and does not support fire.

**Hazardous thermal decomposition products**

There are no hazardous decomposition products.

**Special protective actions for firefighters**

Product may become slippery when wet.

**Special protective equipment for firefighters**

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

Section 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions:** Avoid dispersal of large amounts 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 and materials for containment and cleaning up**

Small Spill: Minimize dust generation. Move containers from spill area. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor.
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**Large Spill:** Minimize dust generation. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water ways, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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**Section 7. Handling and storage**

**Precautions for safe handling**

**Protective Measures:** Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

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. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

**Recommended Storage**  
Store away from direct sunlight in dry conditions. Close container after use.

**Advice on general occupational hygiene**

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
### Section 8. Exposure controls/personal protection

**Control parameters**

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molybdenum Trioxide</td>
<td>OSHA PEL (United States). 3 mg Molybdenum Trioxide / m³, equivalent to 2 mg Mo/m³, TWA respirable fraction formula: 13 mg/m³/</td>
</tr>
<tr>
<td>quartz</td>
<td>ACGIH TLV (United States). TWA 0.025 mg/m³ from respirable fraction</td>
</tr>
<tr>
<td>pyrophylilit</td>
<td>OSHA PEL (United States). TWA respirable fraction formula: 10 mg/m³/ % SiO₂ +2</td>
</tr>
<tr>
<td>mica</td>
<td>ACGIH TLV (United States). TWA 0.025 mg/m³ from respirable fraction</td>
</tr>
<tr>
<td>kaolin clay</td>
<td>OSHA PEL (United States). TWA 3 mg/m³ from respirable fraction</td>
</tr>
</tbody>
</table>

**Appropriate engineering controls**

**Environmental exposure controls** If user operations generate dust, fumes, gas, vapor or mist, use process enclosures. Local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

**Individual protection measures**

**Hygiene measures** Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are
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close to the workstation location.

**Eye and face protection**  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, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields. Recommended: splash goggles.

**Skin protection**  Protective gloves should be worn under normal conditions of use.

### Section 9. Physical and Chemical Properties

**Appearance**
- Physical state: Semi-liquid paste or Solid.
- Color: Dark Grey to Black.
- Odor: None
- pH: 6.9 [Conc.(% w/w): 10%]

**Reactivity**
- Non-reactive
- The product is stable

**Chemical stability**
- The product is stable

**Possibility of hazardous reactions**
- Under normal conditions of storage and use, hazardous reactions will not occur.

**Conditions to avoid**
- No specific data

**Incompatible materials**
- No specific data

**Hazardous Decomposition Products**
- Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Section 11: Toxicological information

**Acute toxicity**

**Irritation/Corrosion**
CRystalline silica: Not irritating to the skin or eyes based on OECD 404 and 405 studies, respectively (EUROSIL, 2008).

KAOLIN CLAY: Not irritating to the skin or eyes based on OECD 404 and 405 studies, respectively (European Kaolin and Plastic Clays Association, 2005).

Exposure to high levels of any dust may result in mechanical irritation of the respiratory tract, skin and eyes; not sufficient for classification.

**Sensitization**
Not available.

**Mutagenicity**
Not available.

**Carcinogenicity**

**Conclusion/Summary**
CRystalline silica: Silica dust, crystalline, in the form of quartz is classified by IARC as Group 1 (carcinogenic to humans) based on "sufficient evidence" in occupationally exposed humans and sufficient evidence in animals. Crystalline silica of respirable size is classified by the NTP as a known human carcinogen. In its 2013 Proposed Rule on respirable crystalline silica, “OSHA preliminarily concludes that the human data provides ample evidence that exposure to respirable crystalline silica increases the risk of lung cancer among workers”, while NIOSH identifies various crystalline or fused silicas a potential occupational carcinogens. However, not all epidemiologic and animal studies have demonstrated a cancer association and some uncertainty exists concerning the cancer classification of crystalline silica. For example, in Europe, a recent review concludes that crystalline silica should not be classified as a carcinogen since silicosis of the lung is the key endpoint for classification (Morfeld, 2010).

**Classification**

<table>
<thead>
<tr>
<th>Product/ingredient</th>
<th>OSHA</th>
<th>IARC</th>
<th>NTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>quartz kaolin clay</td>
<td>(a)</td>
<td>1</td>
<td>Known to be a human carcinogen.</td>
</tr>
<tr>
<td>(b)</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

(a) OSHA does not have a set list of carcinogens or potential carcinogens, but defers to the IARC and NTP classifications. For quartz, see OSHA’s qualitative statement in text above. (b) Classified by ACGIH as A4 (not classifiable as a human carcinogen).

**Reproductive toxicity**
Not available.
Teratogenicity


Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

KAOLIN CLAY: Inhalation of respirable kaolin clay dust can cause kaolinosis, a form of pneumoconiosis.

CRYSTALLINE SILICA: Inhalation of respirable crystalline silica dust can cause silicosis, a form of progressive pulmonary fibrosis.

High levels of exposure to any dust may aggravate pre-existing respiratory conditions.

Section 12. Ecological information

Conclusion on the environmental classification and labelling

Molybdenum trioxide is not hazardous to the aquatic environment as:
- The lowest acute reference values for fish, invertebrates and algae are > 100 mg Mo/L.
- The lowest aquatic NOEC for these three trophic levels is > 1 mg Mo/L (i.e., 43.2 mg Mo/L for the rainbow trout).
- There is no evidence for bioaccumulation or bio-magnification in the environment.

Persistence and degradability: Molybdenum disulfide is ubiquitous in the environment and is the naturally occurring base mineral used to produce molybdenum trioxide. Molybdenum trioxide, in turn, transforms to the non-toxic molybdate species under normal environmental conditions.

Bioaccumulation potential: Available BCF/BAF data for the aquatic environment show a distinct inverse relationship with the exposure concentration. This finding demonstrates that molybdenum is homeostatically controlled by these organisms up to the milligram range of exposure. Available information on transfer of molybdenum through the food chain indicates that molybdenum does not biomagnify in aquatic food chains. Although not homeostatically controlled in terrestrial plants and invertebrates, molybdenum is not largely concentrated from soil into plants or soil to invertebrates. There is no significant concentration increase from diet to mammals or birds. It is concluded that biomagnification is not significant in the terrestrial food chain.

Mobility: Molybdate originating from molybdenum trioxide is soluble in water and with its relatively low Kd value, the molybdate ions are leachable through normal soil and are mobile in sediment. Typical log Kd-values of 3.25 and 2.94 have been determined for sediment and soil, respectively.

PBT and vPvB assessment: The PBT and vPvB criteria of “Annex XIII to the Regulation” do not apply to inorganic substances, such as molybdenum trioxide. Therefore a PBT and vPvB assessment is not required.

Other Adverse Effects: Molybdate originating from molybdenum trioxide can contribute to the onset of molybdenosis (which is a molybdenum-induced copper deficiency) in ruminants such as cattle, deer, and sheep. The level and bio-availability of copper in the animal diet are critical factors in the onset of molybdenosis. The recommended minimum dietary Cu : Mo ratio threshold to prevent
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Molybdenosis is 1.30, i.e. there should be 30% more copper than molybdenum in the diet. Cu & Mo content in the diet can be monitored, and if the ratio is < 1.3 then provide Cu supplements such as copper sulphate enriched feeds or copper sulphate enriched salt blocks for ruminants to use ad libitum. If there are ruminants in the vicinity of your site, identify direct and diffuse air emission sources at your site and carry out and record emission minimization measures. Have an animal health check program in place (e.g. blood tests for copper) to verify that the measures are effective. Conversely, a lack of dietary molybdenum in the human population may increase oesophageal and gastrointestinal cancers.

Molybdenum trioxide will not contribute to ozone depletion, ozone formation, global warming or acidification.

Section 13. Disposal Considerations

Note: Data in this section is voluntarily in the U.S.A. but may be required in the EU and/or other countries.

(13.1) Waste Treatment methods: (EU) According to the European Waste Catalogue, waste codes are not product specific but application specific. Waste codes should be assigned by the user based on the application in which the product is used. Legislation addressing waste disposal requirements may differ by country, state and/or territory. Each user must refer to local laws operating in their area.

(13.1.1) Product/Packaging disposal: Containers may still present a chemical hazard or danger when empty. Clean container sufficiently well to ensure that residuals do not remain or reuse container to store the same product, and otherwise puncture containers, to prevent re-use, and bury at an authorized landfill.

(13.1.2) Waste treatment-relevant information: Before disposing, try to reuse or recycling if possible. Where possible retain label warnings and SDS and observe all notices pertaining to the product. User should investigate reduction as a method. Do not allow wash water from cleaning or process equipment to enter drains. It may be necessary to collect all wash water for treatment before disposal. Disposal to a sewer may be subject to local laws and regulations and these should be considered first. Where in doubt contact the responsible authority. Observe all label safeguards until containers are cleaned and destroyed.

Section 14. Transportation Information

UN number: Not Dangerous for Transport
UN proper shipping name: Not Dangerous for Transport
Transport hazard class: Not Dangerous for Transport
Packing group: Not Dangerous for Transport
Environmental hazards: Not Dangerous for Transport
Special precautions for user: Not Dangerous for Transport
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not Dangerous for Transport
Section 15. Regulatory Information

U.S. Federal regulations
United States inventory (TSCA 8b) All components are listed or exempted.

SARA 302/304
No products were found.
Composition/information on ingredients

SARA 311/312
Classification: Delayed (chronic) health hazard

State regulations
The following components are listed: SILICA, CRYSTALLINE, QUARTZ; mica; Kaolin

Massachusetts The following components are listed: SILICA, CRYSTALLINE, QUARTZ; mica; Kaolin
New York None of the components are listed.
New Jersey The following components are listed: SILICA, QUARTZ; QUARTZ (SiO2); mica; KAOLIN
Pennsylvania The following components are listed: QUARTZ (SiO2); Kaolin
California Prop. 65 WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

International regulations
International lists All components are listed or exempted.

Section 16. Other Information

Key to abbreviations
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
UN = United Nations

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