Earthbind™ 100 is a quality, versatile and environmentally-friendly modified biopolymer dust control agent. Earthbind™ 100 was developed to meet the need for a quality and environmentally-friendly product that can be safely stored and easily applied. Earthbind™ 100 is applied to successfully combat fugitive dust and stabilize the road surface on many different types of unpaved, low-volume roads, parking lots, railroad yards, etc., throughout industrial, mining, military, private and public market sectors.

Earthbind™ 100 is formulated with environmentally-friendly, biopolymers, and surfactants. As a dust palliative and soil stabilizer Earthbind™ 100 works by binding loose soil or aggregate particles together, strengthening the soil/aggregate matrix and preventing even the smallest particles from becoming airborne as fugitive dust. In addition, Earthbind™ 100 will add water resistance to the treated soil particles and will not re-solubilize in rainwater and wash off the road after curing. This is especially important in areas where the mitigation of sediment runoff from unpaved roads into streams is imperative.

Earthbind™ 100 is sold and transported in a concentrate and is diluted in water prior to application. In addition to suppressing dust, Earthbind™ can also be used as an environmentally-friendly base stabilizer.

**As a dust palliative Earthbind™ 100 provides:**
- Superior dust cohesion and suppression
- Efficient dust control under a variety of conditions
- Excellent penetration of a road surface without pre-watering
- Applies quickly without road closures using a water truck or pressurized distributor truck
- Easily washes off of equipment and vehicles before curing

**All components of Earthbind™ are considered:**
- Free of hazardous solvents
- Non-flammable
- Non-corrosive to metal
- Non-hazardous waste
- Not considered to be harmful to aquatic and mammal life
- Not considered to be carcinogenic
**RECOMMENDED EARTHBIND™ APPLICATION PROCEDURE FOR STABILIZATION**

Earthbind™ is sold and shipped in concentrate and diluted with water prior to application. For a typical unpaved municipal, county, or state road, Earthbind™ is diluted to make a 4:1 solution (20%). However, depending upon environmental conditions, Earthbind™ can be diluted from a 1:1 (water: product concentrate) to 6:1 solution. When the soil material is near optimum moisture, a 1:1 or 2:1 dilution can be used.

The amount of Earthbind™ Stabilizer concentrate that is required to effectively stabilize an unpaved road varies based on the:

- Type of road aggregate material
- Climatic conditions
- Type, number, and velocity of vehicles
- Road geometry
- Road surface conditions

Following are the recommended amounts of concentrate for stabilization:

- For a 4” stabilization, 0.25-gallons of concentrate per square yard of road;
- For a 6” stabilization, 0.35-gallons of concentrate per square yard;
- For a 8” stabilization, 0.45-gallons of concentrate per square yard;
- For a 10” stabilization, 0.55-gallons of concentrate per square yard;
- For a 12” stabilization, 0.65-gallons of concentrate per square yard.

**TYPICAL STABILIZATION PROCEDURE**

There are several procedures for in-depth stabilization depending upon the available equipment and depth of stabilization. Using a road grader, the road is initially graded to a 4” depth. Afterwards, 0.5-gallons of a 4:1 solution (20% by volume) of Earthbind™ is then applied to the road surface. This solution is then bladed into the soil and windrowed back and forth several passes to mix. Afterwards, another 0.5-gallon of a 4:1 solution is applied and windrowed to mix. Next, the treated road is profiled with the motor grader, compacted with a roller, and top shot with 0.25-gallons of a 4:1 Earthbind™ solution.

When stabilizing a road 6” to 12” in-depth an asphalt reclaimer/stabilizer with a liquid injection system is required. The diluted Earthbind™ Stabilizer is injected onto the road aggregate and tilled into the road bed simultaneously. Afterwards, the stabilized road is profiled with a motor grader and compacted with a drum roller. Next, the road surface is top shot with a 0.25-gallon solution of Earthbind™. This top shot will put a final touch on the road by binding any material on the surface of the road and preventing dust generation. This top shot can serve as a prime coat prior to paving with asphalt.

**RECOMMENDED EQUIPMENT**

- Computerized asphalt reclaimer/stabilizer with product injection system or motor grader
- Motor grader to profile road after product application;
- Drum roller with mist system to compact road after stabilization process;
- Storage tank(s) with enough capacity to store product;
- Storage tank equipped with a circulation system (to mix product and pump product into distributor truck); and
- Computerized distributor truck or water truck that can accurately apply 0.25-gallons of solution per square yard for final top shot.
Earthbind™ is sold in a concentrated form that is diluted with water prior to application. It can be used at water-to-product concentrations of 3:1 to 12:1 depending on the soil type, traffic flow and other environmental factors. Some soil types require only a one-time heavy application while others require several light applications. Our experts can recommend the appropriate concentration given your situation.

For maximum results, Earthbind™ is best applied with a CRC spreader bar, but can also be applied with a water truck. The thickness of the application and depth of its penetration into soil can be controlled by varying the concentration levels and the total volume of product used.

Earthbind™ is appropriate for use on soils, roads, parking lots, mining areas and other environments where dust needs to be controlled. It can also be used as a soil compacting agent.

**RECOMMENDED EQUIPMENT FOR DUST CONTROL APPLICATIONS**

The size and scope of your dust control project will determine which equipment is right for you. We recommend a computerized distributor or water truck for large jobs. Smaller jobs can be completed with any delivery system that has the capability to saturate the surface with Earthbind™ solution.
With trends continuing towards strict health, safety and environmental regulations, Earthbind™ is an efficient and effective method to reduce dust-related environmental and health concerns. Plus, it aids in complying with clean air and water requirements by reducing airborne dust and preventing erosion.

Traditional dust control products are made of potentially carcinogenic petroleum oils and are diluted in highly volatile and flammable solvents. Others contain chemicals that are reported to be corrosive to metal, vehicles or other equipment that may come into contact with the treated areas. Some contain soluble anions that are harmful to aquatic organisms or become absorbed by plant roots. Once absorbed, anions are transported to leaves and twigs where they eventually accumulate to toxic levels. Anions can also raise the osmotic concentration of the soil, thereby diminishing the availability of water to plant roots and retarding metabolic functions, photosynthesis and growth.

Other dust control products are water-soluble. Rainfall can cause the product to wash-off into surface waters. When the product reaches these waterways, it reduces light penetration and can lead to the reduction of photosynthesis by phytoplankton, lowering the oxygen balance and interfering with aquatic life.

Earthbind™ is a safe, long-lasting and economical solution for base stabilization, dust and erosion control. The individual components of Earthbind™ are not considered to be carcinogenic. When recommended application and handling procedures are followed, Earthbind™ is considered to be safe to humans and the environment. Once applied and with adequate time to cure, Earthbind™ is resistant to water and does not re-emulsify when it rains.

**When used properly, Earthbind™ is:**

- Non-flammable
- Non-corrosive to metal
- Non-hazardous waste
- Not considered to be harmful to aquatic and mammal life
- Not considered to be carcinogenic
# SUMMARY OF SAMPLE/TEST INFORMATION FOR EARTHBIND™ 100 FISH TOXICITY

**Client Name:** EnviRoad LLC  
**Test Material:** Earthbind™ 100  
**EPA Test Number:** EPA-821-R-02-012  
**Test Species:** Oncorhynchus mykiss (rainbow trout)

<table>
<thead>
<tr>
<th>TEST CONCENTRATION (PPM)</th>
<th>48-HOUR SURVIVAL RATE BY PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>100</td>
</tr>
<tr>
<td>0.1</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1,000</td>
<td>100</td>
</tr>
<tr>
<td>5,000</td>
<td>100</td>
</tr>
</tbody>
</table>

48-Hour LC₅₀ as ppm product >5,000

**Client Name:** EnviRoad LLC  
**Test Material:** Earthbind™ 100  
**EPA Test Number:** EPA-821-R-02-012  
**Test Species:** Pimephales promelas (fathead minnow)

<table>
<thead>
<tr>
<th>TEST CONCENTRATION (PPM)</th>
<th>48-HOUR SURVIVAL RATE BY PERCENT</th>
</tr>
</thead>
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<td>100</td>
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<td>100</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1,000</td>
<td>95</td>
</tr>
<tr>
<td>5,000</td>
<td>&gt;5,000</td>
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</tbody>
</table>

48-hour LC₅₀ as ppm product >5,000
MATERIAL SAFETY DATA SHEET EARTHBIND™ PRODUCTS

Quick Identifier: Modified Biopolymer Emulsion
Address: 2606 N. Newark St.
           Portland, Oregon 97217

IDENTITY - SECTION I

Trade Name and CAS Number: Mixture
Chemical Name: N/A

NFPA Hazardous Identification

<table>
<thead>
<tr>
<th></th>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

COMPOSITION INFORMATION ON INGREDIENTS - SECTION II

<table>
<thead>
<tr>
<th>INGREDIENTS</th>
<th>%</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitumen</td>
<td>Proprietary</td>
<td>10-60</td>
<td>NR</td>
</tr>
<tr>
<td>Stabilizer</td>
<td>Proprietary</td>
<td>5-30</td>
<td>NR</td>
</tr>
<tr>
<td>Emulsifier</td>
<td>Proprietary</td>
<td>&lt;6.0</td>
<td>NR</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Balance</td>
<td>NR</td>
</tr>
</tbody>
</table>

Additional Comments: Though further detail on contents may be confidential, all pertinent hazards are addressed in this MSDS.

PHYSICAL & CHEMICAL CHARACTERISTICS - SECTION III

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point</td>
<td>&gt;100 C</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg)</td>
<td>NA</td>
</tr>
<tr>
<td>Percent Volatile by Volume</td>
<td>NA</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Complete</td>
</tr>
<tr>
<td>Specific Gravity (H2O=1.00)</td>
<td>1.01 to 1.05</td>
</tr>
<tr>
<td>Vapor Density (air@1)</td>
<td>NA</td>
</tr>
<tr>
<td>Evaporation Rate (H2O = 1)</td>
<td>NA</td>
</tr>
<tr>
<td>Reactivity in Water</td>
<td>None</td>
</tr>
<tr>
<td>Viscosity @ 77°F SFS</td>
<td>20-450</td>
</tr>
<tr>
<td>Appearance and Odor</td>
<td>Dark Brown Liquid; Bitumen and molasses odor</td>
</tr>
<tr>
<td>Additional Comments</td>
<td>Material is a bitumen/water emulsion and will not combust until water is driven off.</td>
</tr>
</tbody>
</table>

Legend: NE = None Established
        ND = No Data Available
        NA = Not Applicable
FIRE AND EXPLOSION HAZARD DATA - SECTION IV

Flash Point: NA
Flammable Limits in Air (% by Volume): (bitumen/water emulsion)
Extinguisher Media: Dry Chemical, CO2, Halon, Water Spray, or standard foam
Fire Fighting Procedures: Move containers from fire area if possible. Cool fire-exposed containers with water from side until well after fire is out. Stay away from storage tank end for massive fire in storage area. Use unmanned hose holder or monitor. Use flooding amounts of water as a fog, as solid streams may be ineffective. Withdraw immediately in case of rising sound from venting safety device or any discoloration of storage vessel due to fire. Extinguish only if flow can be stopped. Water or foam may cause frothing. Avoid breathing toxic vapors and keep upwind.

Additional Comments: Material is a bitumen/water emulsion and will not ignite until water is driven off.

REACTIVITY DATA - SECTION V

Stability/Conditions to Avoid: Material is stable under normal temperature and pressure. Do not expose to prolonged heating above 100C.
Incompatibility/Materials to Avoid: None
Hazardous Polymerization/Conditions to Avoid: None
Hazardous Byproducts of Decomposition: Thermal decomposition may release hazardous gases.

HEALTH HAZARD DATA - SECTION VI

Route of Entry Inhalation: Legend: A: Health Effect; B: Personal Protection; C: Emergency First Aid Procedures
A. Avoid prolonged inhalation of vapors or mist. Product has a low vapor pressure and is not expected to present an inhalation hazard at ambient conditions.
B. Provide exhaust ventilation system to meet published exposure limits.
C. Remove victim from exposure to fresh air immediately. If breathing has stopped, give artificial respiration. Keep victim warm and at rest. Treat symptomatically and supportively. Administration of oxygen should be performed by qualified personnel. Get medical attention immediately.
HEALTH HAZARD DATA - SECTION VI - (CONTINUED)

Skin  
A. Direct contact with hot fumes may cause slight skin irritation. Repeated or prolonged exposure to fumes may cause irritation, dermatitis, and acne-like lesions.
B. Employee must wear appropriate protective impervious clothing, gloves, and equipment to prevent repeated or prolonged skin contact.
C. If contact is not with hot materials, remove contaminated clothing and shoes. Wash affected area with soap or mild detergent, and large amounts of water until no evidence of material remains. Burns from contact with hot material should be treated like thermal burns.

Ingestion  
A. May cause nausea, gastro-intestinal irritation, and vomiting.
B. Do not induce vomiting.
C. Treat symptomatically and supportively. Get medical attention immediately. If vomiting occurs, lower heat to prevent aspiration.

Eyes  
A. Contact with eyes may cause redness and irritation. Repeated or prolonged exposure to fumes may cause conjunctivitis.
B. Employee must wear splash-proof or dust-resistant safety goggles or face shield.
C. Wash eyes immediately with large amounts of water. Lift upper and lower lids until no evidence of material remains (15 to 20 minutes). Cover with sterile bandages. Get medical attention immediately.

Medical Conditions Aggravated by Exposure
No adverse reactions expected at concentrations normally encountered.

SAFE USAGE INFORMATION - SECTION VII

Handling, Storage & Other Precautions
This product is not classified as hazardous under DOT reg. Keep away from heat, sparks, and oxidizing agents. Keep container closed when not in use. Observe all Federal, State and Local regulations when handling, storing or disposing of this material.

Action to be Taken in Case of Spill or Release (Including Disposal)
Shut off area ignition sources. Stop leak if it can be done without risk. Use water spray to reduce vapors. For small spills, use absorbent material and place into container. Dike ahead of large spill for later disposal. Prohibit smoking in affected area. Isolate area and restrict entry.
CONTROL MEASURES - SECTION VIII

Ventilation Requirements  Provide exhaust ventilation system to meet published exposure limits.

Work Hygiene Practices

Respirator  Selection of respiratory protection must be based upon the airborne level of suspected contaminant. Levels found in the work place must not exceed the working limit of the respirator utilized.

Dermal  Workers must wear appropriate protective clothing, gloves, and equipment to prevent repeated or prolonged contact with skin.

Eyes  Proper eye/face protection must be utilized to protect against splashes and vapors.

Carcinogenicity  Not listed as a carcinogen by IARC, TSCA, NTP, OSHA or ACGIH

TRANSPORTATION - SECTION IX

D.O.T. Proper Shipping Name (49 CFR 172.101)  Non-hazardous Emulsion
D.O.T. Hazard Class (49 CFR 172.101)  NA
UN / NA Code (49 172.101)  NA
Packaging Group (49 172.101)  NA
Bill Of Lading Description (49 172.101)  Non-hazardous Emulsion
D.O.T. Labels Required (49 172.101)  NA
D.O.T. Placards Required (49 172.101)  NA

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.
EarthBind-100, EB-S Application Rates and Procedures for Topical, Shallow and Deep Stabilization, Recycled Asphalt Products, Prime Coat (RAP), Mining Haul Roads.

The following application procedures are for general information purposes and specific application rates and methods may change depending on soil type and end use conditions. Please consult your Global Stabilization representative for specific installation information based on your soil conditions. All applications are applied at the 4:1 dilution rate. Do not apply EarthBind on a wet surface. Do not apply if rain is forecast for 48 hours after application.

**Topical Application for Dust Control:**

- Apply EarthBind-100 at the rate of 0.15 gallon/ sq. yard (0.75 liters/M²) in three equal 0.05 gallon/ sq. yd. (250 ml/M²) applications. Application #1 and #2 can be one right after the other. The last should be at the end of the day or the following day.

- The surface of the road should be graded, compacted and rolled with either a vibratory or pneumatic roller.

- The use of water for compaction is a common and acceptable practice.

- DO NOT apply EarthBind on a road surface that is NOT dry to ½ inch (13 mm) depth.

- The first application of EarthBind is the most critical. It must penetrate into the road surface, all other applications are building a wear surface.

- DO NOT apply EarthBind-100 if rain is forecast for 48 hours after application.

- DO NOT apply or mix EarthBind if the air temperatures/product are less than 32° F (0- C.)
• The use of a roller after applications of EarthBind-100 are dry is recommended.

• Traffic may drive on the surface as soon as it is dry, generally 30 to 60 minutes at 70° F (21° C) temperatures. We encourage traffic on the road to help compact the EarthBind into the surface.

**Shallow and Deep Stabilization; 2” to 8” (25 mm to 100 mm) depth.**

• Apply EarthBind-Stabilizer at the rate of 0.10 gallon per sq. yard (500 ml/M2) *per inch (13 mm)* of soil depth.

• Road moisture must be at 12% after application.

• 9% moisture plus the water that is in the 4:1 dilution rate generally brings up the finish moisture to the recommended 12% moisture.

• As soon as the road is stabilized, begin the grading and compacting to finish.

• DO NOT allow the surface to dry before beginning the grading and compacting process.

• We recommend a 0.10 gallon per sq. yard (500 ml/M2) topical finish when stabilization is complete to provide a wear surface for the stabilization.

**Prime Coat Application:**

• Apply EarthBind-Stabilizer at the rate of 1 gallon for 20 sq. yards (1 liter/4M2) at the 4:1 dilution rate. **DO NOT** apply neat (without diluting with water first).

• EarthBind-Stabilizer provides a moisture barrier to significantly reduce moisture from integrating the asphalt pavement from the aggregate thereby reducing failure.

**Recycled Asphalt Products, (RAP):**

• EarthBind-Stabilizer and RAP are an excellent combination by emulsifying the materials together.

• Use 0.05 gallon/ sq. yard (250 ml/M2) *per inch (13 mm)* of depth.

• EarthBind-Stabilizer can be injected into the reclaiming machine for in place recycling, “Cold in Place Recycling”, (CIP).
Grind the old asphalt road in place with EarthBind-Stabilizer, blade smooth and roll for a smooth finish.

EarthBind-Stabilizer does not require heat.

Finish with a 0.05 gallon/ sq. yard topical application for a wear surface if desired.

**Extreme Duty Mining Haul Roads**

- Dilution is variable with EarthBind-100.
- Use onsite water trucks with application spray bar.
- Slight modification to existing spray system is required.
- Base course can be applied during mining operations.
- Rate will be complete after several applications obtaining 0.10-0.15 gallon per square yard.
- Maintenance applications must be applied as a proactive solution for long term road protection.

Phone-1-707-287-6111  www.globalstabilization.com  info@globalstabilization.com