COLD MIX ASPHALT PERFORMANCE-IMPROVING ADDITIVE CHEMISTRY

COLDGRIP™ | AD-HERE® | REVIVE™
CHEMISTRY FOR SUCCESS

Smarter Additives Backed by Industry Leading Support

Road Science manufactures performance-improving additives for exceptional cold mix product quality and performance, enabling you to differentiate yourself from the competition.

We lead the industry in delivering responsive, comprehensive and dependable customer support focused on helping our customers succeed. We specialize in customized chemistry solutions to meet the most challenging customer performance needs.

Through our experienced staff of professionals and world-class AASHTO Materials Reference Laboratory (AMRL) accredited laboratory, we work alongside our customers helping to:

- Optimize product quality
- Improve product performance
- Bring new products to market
- Solve product problems
- Increase profitability and efficiency
CHEMISTRY FOR COLD MIX APPLICATIONS

**ColdGrip™**

Next-generation additives for better cutback coating and adhesion in cold patch and cold paving applications.

**AD-here®**

Additives for better emulsion coating and adhesion in cold patch and cold paving applications.

**Revive™**

Asphalt rejuvenating, low volatile organic compound (VOC) additives for smarter utilization of Recycled Asphalt Pavement (RAP) in cold patch and cold paving applications.
COLD MIX IN PAVEMENT MAINTENANCE

Maintenance is an essential practice in caring for any asphalt pavement. The purpose is to correct deficiencies caused by distresses and to protect the pavement from further deterioration and damage. There are various maintenance techniques and procedures used in the industry today. The proper application technique depends on the type and severity of the pavement distress being repaired.

Potholes result from the rapid disintegration of localized spots in the pavement. They appear more frequently in winter and early spring as harsh weather conditions that involve repeated freezing and thawing and wet weather accelerate pothole development.

Cold mix is predominantly used in cold patch stockpile mix applications for both pothole filling and patching. These techniques improve and repair the structural integrity of the pavement. Pothole filling is done to temporarily eliminate the pothole as a road hazard and safety liability. Patching is a permanent solution to larger area, high-severity pavement distresses such as alligator cracking and other types of severe cracking. Patching is also used to repair cuts made in pavements in order to repair utilities.

Cold patch stockpile mix can be cutback or emulsion-based and is manufactured in stationary plants or using a portable pugmill. The cutback or emulsion is mixed with aggregates according to the job mix formula determined during laboratory materials evaluation.

A critical component to the cutback or emulsion is an anti-stripping or adhesion promoter additive which enables coating of cool and damp aggregates, strengthens the initial adhesion of the cold patch to damp potholes and protects the cold patch from deterioration caused by moisture-induced stripping of the asphalt from the aggregate. Aggregates should consist of higher quality crushed and sized stone and may include RAP or asphalt millings.

Cold patch stockpile mix is usually produced in advance of winter months and formulated so that when transported and stored in a stockpile for many months, it remains workable and pliable for easy pothole filling throughout winter and spring.

Pothole filling is an easy process for which there are a handful of recognized methods. The simplest and least permanent is the ‘throw and go’ method where the cold patch is placed or ‘thrown’ into the pothole without any prior cleaning of the pothole or compaction of the cold patch after placement, and proceeding or ‘going’ on to the next pothole. This method is usually used for emergency pothole filling during inclement weather.

A more permanent method involves removing loose material and water from the pothole and then sawing it to make the sides vertical so that the pothole has a square or rectangular shape. A light application of asphalt emulsion tack coat is then sprayed onto the sides and bottom of the hole and the cold patch is placed into the hole. The cold patch mixture is then compacted using a vibratory plate compactor or a small roller.
THIS IS WHAT BETTER CHEMISTRY LOOKS LIKE.
PRODUCTS AND APPLICATIONS

ColdGrip™

**ColdGrip IQ** – Cutback Anti-Stripping and Adhesion Promoter Additive
- Cold Patch Stockpile Mix
- Cold Mix Paving

**AD-here®**

**AD-here SC-901** – Anionic Medium-Set (MS), Anionic Slow-Set (SS) and High Float Medium-Set (HFMS) Emulsion Anti-Stripping and Adhesion Promoter Additive
- Cold Patch Stockpile Mix
- Cold Mix Paving

**Revive™**

**Revive CM** – Cutback, Anionic Medium-Set (MS), Anionic Slow-Set (SS) and High Float Medium-Set (HFMS) Emulsion Asphalt Rejuvenating Additive
- Cold Patch Stockpile Mix
ColdGrip IQ

ColdGrip IQ is the cutting edge additive for cutback use in cold patch stockpile mix and cold mix paving applications. It chemically transforms cutbacks to easily coat cool, damp and dusty aggregates, eliminating coating headaches, wasted time and added costs. Cutback clings to aggregate with outstanding film thickness protecting stockpiles from rain-induced stockpile stripping, and eliminating reprocessing and wasted materials costs. ColdGrip IQ technology extends cold patch life by up to 150% by ensuring the patch chemically bonds stronger to pothole walls and bottom even in the presence of water, and guarding the patch against moisture damage, stripping and aggregate dislodgement. ColdGrip IQ’s low odor and low viscosity, even in freezing temperatures, allow for easier handling and operational convenience.

<table>
<thead>
<tr>
<th>BENEFITS:</th>
<th>BENEFITS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improves cutback-based cold mix production efficiency by solving coating challenges</td>
<td>• Low viscosity additive provides operational convenience even in below freezing temperatures</td>
</tr>
<tr>
<td>• Reduces mix production costs by eliminating wasted time and material costs</td>
<td>• Significantly increases patch and pavement life</td>
</tr>
<tr>
<td>• Improves stockpile workability</td>
<td>• Improves profitability</td>
</tr>
</tbody>
</table>

AD-here SC-901

AD-here SC-901 has a tried and true 30-year reputation as the premier additive for emulsion-based cold patch stockpile mixes. Emulsions treated with AD-here SC-901 coat cool, damp and dusty aggregates better and with a thicker film, even with the most difficult-to-coat granitic aggregates containing an abundance of quartz. The same outstanding film thickness is safer for stockpiles and protects them from rain-induced stockpile stripping, eliminating reprocessing and wasted materials costs. AD-here SC-901 extends cold patch life by up to 150% by ensuring the patch chemically bonds stronger to pothole walls and bottom even in the presence of water, and guarding the patch against moisture damage, stripping and aggregate dislodgement. The addition of SC-901 to emulsion will not affect emulsion viscosity and stability, enabling predictable and reliable emulsion characteristics.

<table>
<thead>
<tr>
<th>BENEFITS:</th>
<th>BENEFITS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improves emulsion-based cold mix production efficiency by solving coating challenges</td>
<td>• Preserves cold patch mix stockpile workability over an extended period of time</td>
</tr>
<tr>
<td>• Reduces mix production costs by eliminating reprocessing and wasted material costs</td>
<td>• Significantly increases patch and pavement life</td>
</tr>
<tr>
<td></td>
<td>• Improves profitability</td>
</tr>
</tbody>
</table>

Revive CM

Revive CM is the newest addition to the Revive family of asphalt rejuvenator additives. Revive CM is used in place of petroleum-based solvents to make cutbacks and emulsified cutbacks for use in high RAP content cold patch stockpile mixes. Revive CM is designed to chemically extract the highly oxidized asphalt from RAP and reincorporate it into the cold mix, while maintaining the workability and storage shelf life required for stockpile mixes. Cold mixes designed with Revive CM increase profitability by reducing virgin aggregate and asphalt usage, and materials cost basis. Revive CM replacement of petroleum-based solvents is safer for workers andfriendlier to the environment. Revive CM is renewable, with low toxicity, low odor and low VOC, and has a flash point much higher than both naptha and diesel fuel.

<table>
<thead>
<tr>
<th>BENEFITS:</th>
<th>BENEFITS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Enables smarter, more efficient RAP utilization in cold patch stockpile mixes</td>
<td>• Environmentally-friendly alternative to petroleum-based solvents</td>
</tr>
<tr>
<td>• Increases profitability by enabling higher RAP utilization which reduces mix production costs</td>
<td>• Easy to use, low viscosity and low odor provides operational convenience</td>
</tr>
<tr>
<td>• Improves worker safety</td>
<td></td>
</tr>
</tbody>
</table>
CONTACT ROAD SCIENCE

Learn more about our performance-improving additive and emulsifier products and industry-leading support services.

Reach a representative today at +1-918-960-3800 or email customerservice@roadscience.net. You can also visit our website for more information at www.roadscience.net or scan the code below.

Road Science
6502 South Yale Avenue, Suite 100
Tulsa, OK 74136