WarmGrip Z1 is an asphalt additive that allows for easier field compaction and stronger adhesion of the asphalt binder to aggregate. It safeguards pavements against destructive forces such as traffic loading, water intrusion and oxidation, leading to reduced pothole formation, cracking and rutting for safer, smoother and longer-lasting roads.

WarmGrip Z1 is smokeless and odorless in hot asphalt, and is used to design mixes that conform to typical specifications including AASHTO T283: Method of Test for Resistance of Compacted Bituminous Mixture to Moisture Induced Damage, AASHTO T324: Method of Test for Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA) and AASHTO R35: Standard Practice for Superpave Volumetric Design.

**APPLICATIONS**
Asphalt Paving

**FEATURES**

**EASIER FIELD COMPACTION**
Enables increased mat density with fewer roller passes, even with high recycled asphalt pavement (RAP) mixes

**RELIABLE ANTI-STRIPPING EFFECTIVENESS**
Passes tensile strength ratio (TSR) and Hamburg Wheel Tracking tests with wide variety of asphalt and aggregate combinations

**NO ODOR AND NO SMOKE**
Improves plant-personnel and paving-crew comfort.
Addresses odor concerns and citizen complaints in communities neighboring terminals and mix plants

**DOES NOT IMPACT PERFORMANCE GRADE OF MODIFIED ASPHALTS**
No reduction in dynamic shear rheometer (DSR) values when used in SBR-modified or PPA-modified asphalts

**BETTER MIX WORKABILITY**
Enables easier hand-work in paving applications

**HEAT STABILITY**
Remains effective several weeks to months in hot asphalt

**NO HEATED STORAGE REQUIRED**
Easy to handle and pump in cold temperatures

**COMPATIBILITY**

**ASPHALT**
Compatible with most asphalts including those modified with styrene-butadiene-styrene (SBS), styrene-butadiene rubber (SBR), ethylene-vinyl acetate (EVA) polymers, polyphosphoric acid (PPA), ground tire rubber (GTR) and recycled asphalt shingles (RAS)

**AGGREGATE**
Compatible with various aggregate types including granite, diabase, diorite, basalt, gabbro, rhyolite, andesite, dacite, chert, quartzite, gneiss, limestone, dolomite, marble, sandstone, natural sand and gravel, slag and RAP
**USAGE RECOMMENDATIONS**

**NEAT AND MODIFIED ASPHALTS:**
- 0.25–0.75% by weight of total asphalt in mix
- Usage rate should be determined by user based on degree of aggregate coating and moisture sensitivity testing at desired production temperature

**OPTIONS FOR ADDING WARMGRIP Z1 TO ASPHALT:**
1. Add to asphalt storage tank and agitate mechanically or through pump circulation
2. Add at asphalt terminal by injecting into asphalt line as transport tanker is being charged
3. Add by in-line injecting into the asphalt line between the asphalt flow meter and the plant injection point, preferably after flowing through an in-line static mixer

**PHYSICAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance, 25 °C</td>
<td>Dark Colored Liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild</td>
</tr>
<tr>
<td>Density, 25 °C</td>
<td>0.9 kg/L</td>
</tr>
<tr>
<td>Viscosity, 25 °C</td>
<td>150 cP</td>
</tr>
<tr>
<td>TSCA Inventory</td>
<td>Listed</td>
</tr>
<tr>
<td>DSL Inventory</td>
<td>Listed</td>
</tr>
<tr>
<td>C.A.S. Number</td>
<td>Proprietary</td>
</tr>
</tbody>
</table>

The density and viscosity data reported are typical and not specifications. Typical ranges for density and viscosity values are ± 2 and ± 20%.

**HANDLING AND STORAGE**

Always handle WarmGrip Z1 in accordance with Safety Data Sheet (SDS) and Road Science Asphalt Additives Handling and Storage Guidelines document. Avoid product contamination with other materials. Do not store product in excess of 60 °C for prolonged periods. Recommended product handling temperature range is 10–50 °C.

**AVAILABILITY**

WarmGrip Z1 is available outside of the US only.

WarmGrip Z1 is available for shipment in bulk by rail car and tank truck. Packaged quantities are available in 1,000 L IBC totes (907.2 kg net weight) and 208 L steel drums (186.0 kg net weight).

**TECHNICAL SUPPORT**

To request additional product information, contact your regional Road Science representative. You can also contact us at 918-960-3800 or customerservice@roadscience.net, or visit our website at www.roadscience.net.