

Cool Roadways Solutions Request for Information

GAF Response

March 17, 2021

INTRODUCTION

GAF is North America's largest roofing and waterproofing manufacturer and a part of Standard Industries, a global company focused on building materials. GAF's products include roofing materials and coatings for both roofing and pavements.

Many of our products are designed to combat Urban Heat Island for both commercial and residential applications. We manufacture solar reflective commercial roofing products including TPO, PVC, and reflective asphaltic cap sheets that can contribute to LEED points. We also manufacture a full line of liquid-applied roof coatings that are often used over metal, asphaltic and EPDM roofs to provide extra protection from leaks as well as make the roof more solar reflective. Our sister company, SGI makes granules that are now used on roofing shingles for steep slope roofs that are solar reflective to help combat Urban Heat Island. With our pavement coatings, GAF manufactures solar reflective coatings in a variety of colors that have been used to cool playgrounds at over 40 Los Angeles Unified School District (LAUSD) schools. Most recently, GAF has successfully installed our DuraShield Solar Gray coating in Los Angeles neighborhoods as part of the LA Cool Streets Pilot Program.

GAF is always working on new and better ways to protect our planet. We are committed to making our products better, stronger, safer and in more sustainable ways. Being part of a global building materials company focused on innovative and sustainable solutions. This puts us in a unique position to pursue cool roadway solutions that can help the Global Cool Cities Alliance achieve the goal of building heat-resilient communities.

CONTACT INFORMATION

Contact Name:	Lee Martucci
Company:	GAF
Email:	lee.martucci@gaf.com
Phone:	480-625-5553
Solution/Product Name:	GAF DuraShield

Describe how the proposed solution addresses the following (250 word maximum for each response):

- 1. What is the expected timeline to develop and commercialize the solution if it is not currently available?**
 - a. GAF DuraShield is commercially available today. It is a two-part epoxy-fortified acrylic pavement coating and uses the same technology that we have been using with our StreetBond Pavement Coatings for over 25 years. Currently we sell directly to our GAF Certified Applicators who then bid the jobs and install the product.*

- 2. What surface and air temperature reductions resulting from the roadway solution, daytime and nighttime, have you identified?**
 - a. GAF DuraShield Solar Gray Pavement Coating has a Solar Reflectance of 34% (SR = .34). Its color is a medium gray and include special pigments that allow it to achieve a high reflectance, while keeping the color dark enough to better hide dirt and tire pick-up and reduce glare. We believe this is the optimal balance of reflectance, glare mitigation, and aesthetics for pavement surfaces.*
 - b. As for temperature reductions, it depends on a lot of factors such as time of day, ambient temperature, amount of sunshine, wind, surface texture, dirt and tire marks. It also matters if you are comparing to new asphalt, old asphalt, or freshly seal coated asphalt. Compare any solar reflective coating to new asphalt or newly seal coated asphalt and the temperature difference will be higher than comparing to aged asphalt.*
 - c. As the ambient temperature increases, the temperature difference between a solar reflective coated asphalt and a non-coated asphalt will increase. For example, at 80°F ambient temperature the difference may only be 8°F - 10°F, while a 90°F ambient temperature the difference could be 15°F- 20°F or more. In hotter ambient temperatures a solar reflective coating provides the most benefit.*
 - d. On an 80°F day in July 2020, the City of LA reported DuraShield temperature reduction as compared to uncoated streets in the same neighborhood to average 8°F.*

- 3. How simply can the solution be integrated into existing roadway management and maintenance operations?**
 - a. DuraShield can be easily integrated into existing roadway management and maintenance operations. It can be applied using standard seal coat equipment.*

- 4. What is the global warming potential associated with manufacturing the roadway solution in production and use phase?**
 - a. DuraShield is a water-based, acrylic based product and low VOC, (less than 50 grams/liter). Production includes transportation, raw materials, installation. Advantages include... DuraShield is applied in a thin film, so not a lot of heavy material to transport. It is durable and long lasting, so it does not need reapplication as frequently as other coatings. Longer lasting equates to less raw materials, production, transportation, and installation impacts.*

2. **What are the safety, slipperiness, and friction characteristics (e.g. typical Surface Coefficient of Friction)?** *Per ASTM E303-93 test, the Dry Friction is >65 and Wet Friction is >35. In addition, the British Pendulum test results are also attached (Attachment D).*
3. **What is the curing time including how quickly the road can open to traffic after installation given average temperatures, partly sunny, and non-humid conditions? How does this compare to existing relevant products?** *Assuming 73°F (23°C) and 37% humidity (ASTM D5895) the product should be dry to touch in 35 minutes. For driving traffic we recommend a minimum of 4 hours in dry sunny climates and 24 hours or more in cool temperate or humid climates.*
4. **Is it sensitive to placement in cool weather, i.e. 50° F and falling?** *DuraShield is installed at 50°F and rising.*
5. **Is it sensitive to placement in high humidity or damp conditions?** *DuraShield can be installed in high humid climates, but it will require longer dry times than dry, arid climates.*
6. **How long does this treatment typically last under average traffic conditions in years?** *Average traffic conditions is subjective, but we have found that DuraShield will last years longer than typical asphalt emulsion products used today. Generally we recommend a typical recoat cycle every 5 -7 years.*
 - a. **How does this compare to similar products?** *Based on testing performed in 2018 by PRI, (a third party construction materials testing lab) DuraShield wore much slower and kept its color much longer than several other competitive pavement coatings that were also tested. In a typical recoat, a full re-application may not be necessary. Instead we recommend two layers in the worn area (typically wheel paths) and then one coat over the entire area.*
7. **Can it be re-applied over itself for renewal?** *Yes. DuraShield bonds well to itself even years later. The surface just needs to be clean, dry and free of contaminants such as grease and oils.*
8. **Is it recommended for heavy traffic conditions like urban arterials?** *Yes, however it will require a thicker initial application and a more frequent recoat cycle. The product wears due to traffic so the more traffic the more wear. Rolling traffic is not as much of a wear concern as is sheer from acceleration, braking and turning.*
9. **Are standard MUTCD compliant white and yellow markings clearly visible?** *Our coating is a medium gray color so white and yellow lines show up better than typical concrete surfaces. That said some customers have painted a black border around the white and yellow lines to make them stand out more.*

ATTACHMENT A: Job Profile Pictures



Solar Reflective DuraShield being installed on Arminta Street in Los Angeles on 10/25/19 in two test colors... (light gray and medium gray)



Solar Reflective DuraShield at Arminta Street Medium Gray (test color)



DuraShield Solar Gray being installed on Kraft Ave, City of LA on 6/25/20



DuraShield Solar Gray on Kraft Ave on 9/16/20, 12 weeks after initial install



DuraShield Asphalt color (non SR) in North Carolina parking lot. The asphalt color is the same product as DuraShield Solar Gray with the exception of color.



DuraShield Asphalt color (non SR) after 6 years. Installed 2012, picture taken 2018 showing little wear.

StreetBond at Western Avenue Elementary School (LAUSD)



Before



After

StreetBond at Fullbright Avenue Elementary School (LAUSD)



StreetBond SR colors at Hooper Avenue Elementary School



StreetBond SR colors at Capistrano Elementary School (LAUSD)



StreetBond SR colors at Northridge Middle School (LAUSD)



StreetBond at Rosemary Elementary (Campbell Union Schools, CA)



St Margaret's Episcopal School (San Juan Capistrano CA)



StreetBond SR colors

Del Amo Fashion Square (Torrance CA)



Almost 5 years old
Picture taken in 2018, coating applied in 2014

Gardena Elementary School (Los Angeles CA)



Over 6 years old
Picture taken in 2019, coating applied in 2013

ATTACHMENT B: Product Data Sheet

ATTACHMENT C: Safety Data Sheets (SDS)

ATTACHMENT D: British Pendulum Test