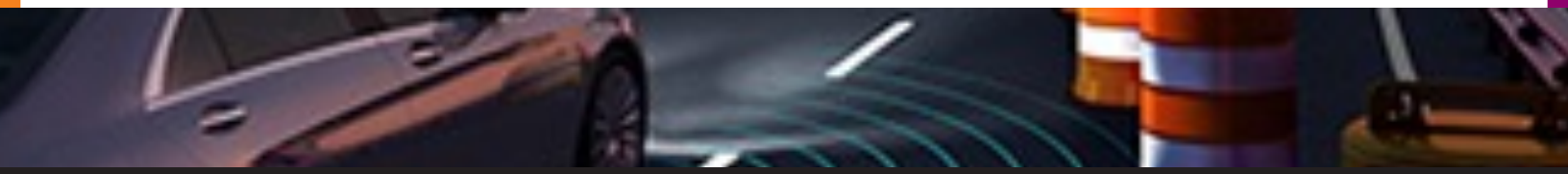


Driving Innovation: Road Infrastructure Solutions for ADAS Readiness.

Introduction

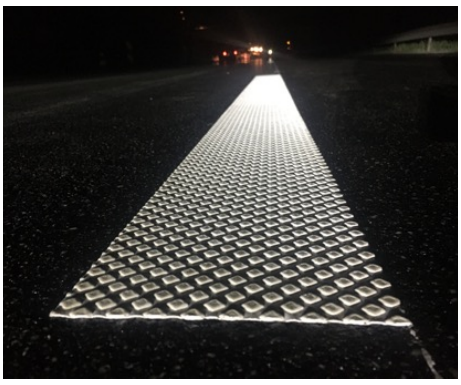
As the world moves towards higher levels of vehicle automation, the importance of road infrastructure, particularly pavement markings, cannot be overstated. Advanced Driver Assistance Systems (ADAS) such as Lane Departure Warning (LDW) and Lane Keep Assist Systems rely heavily on the visibility and quality of pavement markings. This whitepaper explores the suitability of 3M™ Stamark™ All Weather Tape Series 380AW for enhancing the performance of ADAS, helping to ensure safer roads, and supporting the transition to autonomous mobility. The transition to autonomous mobility requires a robust and reliable road infrastructure that can support the advanced technologies used in autonomous vehicles.

Importance of High-Performance Pavement Markings

Modern vehicles equipped with ADAS depend on machine vision to detect lane markings. The performance of these systems is significantly influenced by the quality and visibility of pavement markings, especially under adverse weather conditions. High-performance pavement markings, such as 3M™ Stamark™ All Weather Tape Series 380AW, provide great nighttime visibility in both dry and wet conditions, helping ensure that drivers and automated systems can navigate safely. Higher levels of automation benefit from pavement markings that can be reliably detected by both human drivers and machine vision systems, even in challenging weather conditions.

Key Features and Benefits of 3M™ Stamark™ All Weather Tape Series 380AW

All-Weather Performance: 3M™ Stamark™ All Weather Tape Series 380AW offers excellent nighttime retroreflectivity in both dry and wet conditions. This ensures that lane markings remain detectable even during heavy rain, which is crucial for the effective functioning of ADAS.[1]



3M™ Stamark™ All Weather Tape Series 380AW

- Durability: These pavement markings withstand harsh environmental conditions and heavy traffic. The abrasion-resistant zirconia-enriched optical beads bonded in a highly durable polyurethane topcoat help ensure long-lasting performance.
- Brightness and Long-Distance Visibility: The high brightness and long-distance visibility of 3M™ Stamark™ All Weather Tape Series 380AW provides drivers and ADAS systems with ample time to react to important roadway information, enhancing overall road safety.
- Easy Application: The markings are easy to apply and can be installed using recess or inlay methods for improved durability, especially in regions with winter maintenance activities.
- Extended Season Adhesive: Pre-coated with an extended season pressure-sensitive adhesive, these markings can be applied in temperatures as low as 40°F (4.44°C).

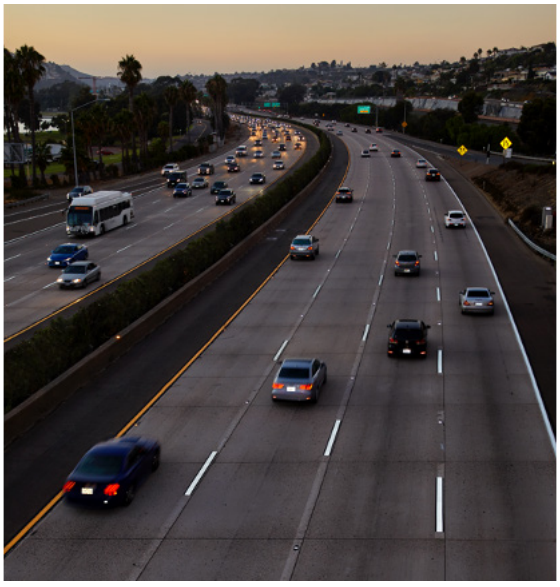
Technical Specifications

3M™ Stamark™ All Weather Tape Series 380AW is engineered for long-term durability and lasting retroreflectivity. Key specifications include:

- Retroreflectivity: Over 500 mcd/m²/lux dry white retroreflectivity, ensuring high visibility in both dry and wet conditions.
- Durability: Standard 4-year continuous retroreflective performance warranty.
- Application: Suitable for permanent and temporary longitudinal pavement marking applications on high-traffic roadways, mid-block crossings and bridge decks.

Case Studies and Real-World Examples

Recent studies have demonstrated the effectiveness of wet retroreflective pavement markings in improving the performance of ADAS and Connected and Automated Vehicles (CAVs). For instance, a study published in the Society of Automotive Engineers explored the effects of wet retroreflectivity on the detection performance of a Mobileye LDW system in continuous nighttime rain conditions. The findings indicated that wet retroreflective markings significantly enhance the visibility of lane markings for machine vision systems, contributing to safer driving conditions. [1]



3M™ Stamark™ All Weather Tape Series 380AW contrast tape

Additional Insights from Intertraffic Summit 2024

At the Intertraffic Summit 2024, several key insights were shared regarding the performance of pavement markings under various environmental conditions:

- Impact of Weather Conditions: Lane markings are 3.3 times more likely to be detected in dry conditions than in wet conditions. Driving towards a light source, such as the sun or oncoming traffic, decreases detection likelihood by 4.5 to 5 times compared to driving away from the sun.[2]
- Machine Vision and Lidar: Both camera and Lidar systems benefit from improved retroreflectivity. Lidar, which is active and not affected by glare, still depends on the wet retroreflectivity of pavement markings for optimal performance.

Conclusion

Investing in high-performance, wet-reflective pavement markings like 3M™ Stamark™ All Weather Tape Series 380AW is a smart choice for road safety and infrastructure development. These markings not only improve the performance of ADAS but also enhance overall road safety by helping to reduce crashes and saving lives.

Reference:

1. Pike, A., Clear, S., Barrette, T., Hedblom, T. et al., "Effects of the Wet Retroreflectivity and Luminance of Pavement Markings on Lane Departure Warning in Nighttime Continuous Rain with and without Glare Sources," SAE Technical Paper 2019-01-1014, 2019.
2. Den Otter, M. (2023). Impact of improved lane marking properties on the performance of Lane Keeping Assistance systems in varying circumstances. Delft University of Technology.

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