

resinDEK[®]
the panel of expertsSM



◆ ***Performance Engineered Flooring for
AGV & AMR Robotic Traffic***

Cornerstone Specialty Wood Products has been at the forefront of testing and innovating flooring panels for the Material Handling Industry since 1994. In 2007, we began providing ResinDek® panels for robotic applications. Much of our initial research and development occurred with AGVs. In the last decade, we have provided a variety of ResinDek flooring products to numerous Automated Guided Vehicles (AGV) and Autonomous Mobile Robots (AMR) manufacturers for their testing labs. As a result, millions of square feet of ResinDek panels are in service worldwide with robotic traffic in distribution centers, warehouses and retail environments.

We understand that robotic flooring needs can be complex, and there may be a variety of demands within a single project. Therefore, we offer a multitude of ResinDek flooring options that can be customized for load capacities, required finish type, and volume of robotics traffic. The optimization of all these criteria provides an extremely cost-effective solution that is tailored for each project.



ResinDek® Flooring Panels

For robotic traffic, ResinDek flooring panels are available with two different surface finishes: TriGard® and MetaGard®. Both options can be applied to the full range of ResinDek flooring panels; LD, SD, MD, HD, MAX, Xspan® and Xspan FR. The TriGard finish on ResinDek panels utilizes a unique coating technology that is specifically engineered for the rigorous demands of ultra-high rolling traffic associated with robotic applications. ResinDek with MetaGard features a steel surface that encapsulates the ResinDek flooring panel and can withstand millions of repetitive cycles typically found with AGVs, especially in areas where dirt or debris accumulates 24/7 and is not routinely cleaned.

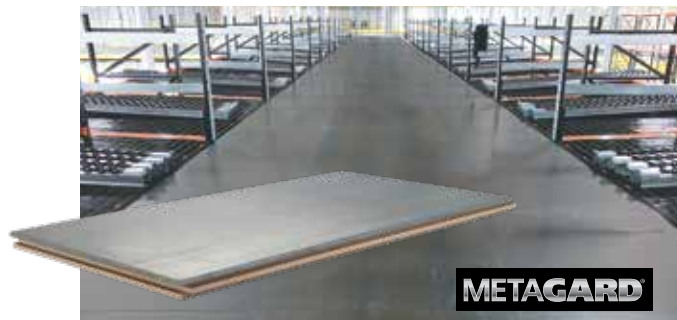
Choosing the Right Flooring Product Ensures Optimal Performance for Robotic Traffic

AGVs follow a fixed path and have robots that read stickers or marks on the floor while carrying payloads in excess of 1,000 lbs. AMRs use horizontal sensors or lasers to determine the best pathway while carrying payloads typically less than 500 lbs. ResinDek® flooring panels are custom manufactured with engineering processes which enhance the functionality, durability and life of the floor. Premium materials and unsurpassed manufacturing methods ensure that every ResinDek floor panel with either the TriGard® or MetaGard® finish will endure the millions of cycles of consistent, repeated travel patterns associated with AGVs and AMRs. ResinDek panels have the proven structural integrity to support live and dead rolling loads ranging from 2,000 to 8,000 lbs.

The durability and condition of the floor are important considerations for the optimal performance of AGVs and AMRs. Worn or uneven surfaces can disrupt the functioning of the vehicle's laser-based navigation sensors, slowing down its rate of travel. ResinDek panels ensure a level flooring surface with just the right amount of surface roughness to avoid the impairment of a robot's navigation or slow its movement.

The finish of the floor is also an important consideration. Gloss, texture and wear can all effect the ability of the robot to run at optimal levels. ResinDek with TriGard and MetaGard have been extensively tested with robotics for coefficient of friction, wear resistance and light reflectivity in accordance with ANSI D1371 (dynamic coefficient of friction), ASTM D4060 (abrasion resistance), and ASTM D523 (specular gloss). In addition, we can customize the finish for any specification required.





ResinDek® with TriGard® Coating Technology

ResinDek with TriGard is engineered specifically to endure the consistent, repeated travel patterns associated with AMRs and the defined travel paths of AGVs. The TriGard coating has a 5x wear resistance over Cornerstone's commonly used Gray Diamond Seal® 2 coating and is designed to withstand 10 years of high-frequency, repeat traffic. The TriGard finish comes standard with electrostatic dissipative (ESD) finish that protects sensitive electronic equipment from damage and complies with ANSI/ESD Association specifications.

ResinDek® with MetaGard® Steel Finish

ResinDek with MetaGard flooring panels combine the structural integrity of a ResinDek panel along with the strength and durability of a steel wearing surface. The MetaGard steel surface is fused to the ResinDek panel with a proprietary bonding agent and features an edge that encapsulates the perimeter of the panel. This creates a floor that will not delaminate, has superior physical properties, is level for rolling loads, and has no sharp edges that could cut or snag objects passing over it.

ResinDek with MetaGard is engineered for extreme wear. In testing, ResinDek with MetaGard has been shown to be 5x more abrasion resistant than concrete in heavily trafficked areas where dirt and debris are not routinely removed, such as 24/7 operations that may be quarantined from employees. ResinDek with MetaGard has been proven to withstand more than 2 million annual pivoting passes generated when AGVs change direction.

Advantages of ResinDek Floor Panels Compared to Elevated Concrete Floors

Cost Savings & Speed of Construction

- ResinDek panels are 85 - 90% lighter than concrete which allows for less steel in the support structure and reduced footings.
- Platforms using ResinDek can be designed with an allowable deflection limit of L/240, whereas concrete's allowable deflection is limited to L/360: this reduces the amount of steel required in the support structure.
- An independent study found that ResinDek flooring is more cost effective than concrete.
- ResinDek is supplied with a factory finish, concrete needs time to cure.

A Low Maintenance, Flat, Level Surface

- ResinDek floors provide a consistent finish in floor flatness, levelness and surface roughness. Unlike concrete, ResinDek does not require large expansion joints.
- ResinDek panels do not produce dust, require sealing or crack like concrete. In addition, individual panels can be removed without having to refinish an entire floors.

10-Year Product Warranty

- All ResinDek panels are backed by a 10-year product warranty. In addition to our standard structural warranty, the MetaGard® finish is also warranted for 10-years.



ResinDek Hybrid Solution

ResinDek with MetaGard is engineered to provide a smooth panel to panel transition when installed next to other ResinDek panels that do not have a steel surface. This creates a cost-efficient flooring solution. For robotic applications it allows for increase wear performance in areas that have 24/7 dirt and debris that is not routinely cleaned.

Success Story: ResinDek® Flooring Saves Time, Money, and Provides a Level Platform

A project located in Manchester, U.K. had a three level mezzanine with 220,000 per sqft level. The flooring system that was selected was 3/4" ResinDek® HD with the TriGard® finish and corrugated steel decking. During the final walk through, the main Contractor made the following comments:

"The ResinDek flooring system offered a substantial savings over elevated concrete platforms, which was the only real alternative for this project. The levelness of this floor (plus or minus 1/8" across a 220,000 sqft continuous surface) is just not something that we can normally produce with concrete."

"The speed of installation was impressive. ResinDek goes down quickly, and the floor, once installed allows for instant structural access for subsequent trades. Concrete, on the other hand, requires 10 days of curing time per bay, along with additional screeding and levelling work. My guess is that we saved a solid 5 weeks of construction time by using ResinDek instead of concrete."

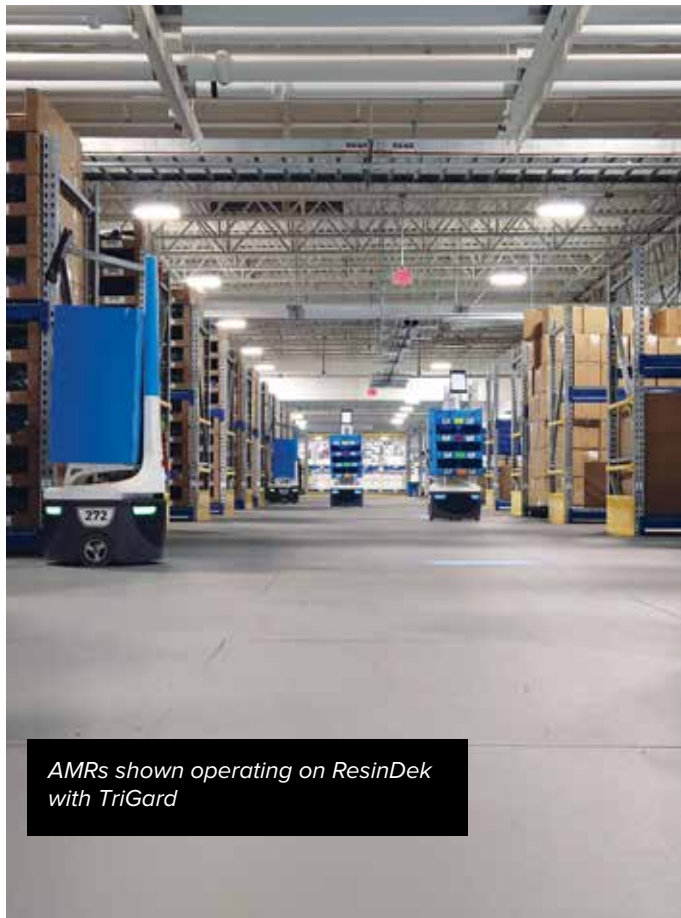
"We are sold on the superiority of the ResinDek Flooring System compared to a traditional concrete floor!"



Corrugated steel shown under ResinDek HD with TriGard



Complete, installed ResinDek HD with TriGard



AMRs shown operating on ResinDek with TriGard

Success Story: Rack & AMR Manufacturer Trusts ResinDek® with TriGard®

When called upon to design and install two separate rack supported work platforms that would deploy a fleet of AMRs for a third-party logistics (3PL) company's two warehouses, Ridg-U-Rak, one of the world's largest pallet rack and storage rack manufacturers, turned to Cornerstone Specialty Wood Products. *"We've partnered with Cornerstone to use their ResinDek flooring in our designs for more than a decade,"* notes Jim Staszewski, a Ridg-U-Rak Senior Designer. *"They're on the leading edge of developing high-density, elevated flooring products that handle high traffic and highly concentrated dynamic loads, like those on pallet jacks and robotic wheels. When you buy their products you know you're getting high-quality flooring. They are the clear leader with an unparalleled combination of design, engineering, and product testing."*

Jeffrey Cody, Director at Locus Robotics, states: *"From my perspective, the whole design was built on dimensionally to optimize the movement of our robots. Although we didn't make any specific recommendations about the flooring, when we learned it would be ResinDek from Cornerstone Specialty Wood Products, we knew our AMRs wouldn't have any problems. As a robotics company, we test a variety of performance parameters — including anti-static, coefficient of friction, stopping with and without full loads, and so on — on different flooring surfaces. Cornerstone Specialty Wood Products has been key in helping us with research and development."*

ResinDek® with TriGard® or MetaGard®

ResinDek tongue and groove configurations promote effective panel to panel wheel load transfers. When required, tongue and groove configurations are available on all 4 sides. ResinDek with TriGard panels are available in sizes up to 4' x 10'. ResinDek panels with MetaGard are available in sizes up to 4' x 8'. ResinDek with MetaGard is available in galvanized and stainless steel. We use a proprietary process to treat the MetaGard stainless-steel finish, resulting in a darker finish with increased coefficient of friction, reduced gloss and reflectivity, and is extremely wear resistant, making it the ideal solution for robotic traffic. Galvanized is not recommended for robots but performs very well for standard material handling applications.

Evaluation Report

ResinDek floor panels have been independently evaluated and approved for use in Types I-V construction and as part of a fire-resistance rated assembly by the IAPMO Uniform Evaluation Services. United States ER Number 467. Canada ER Number UEL 5027.



No Added Formaldehyde

All ResinDek panels are certified to have No Added Formaldehyde. ResinDek panels can contribute towards earning points for LEED® qualified buildings. When required ResinDek panels are available with FSC® Certification. FSC® License Code FSC-C124474.



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Storage Manufacturers Association

