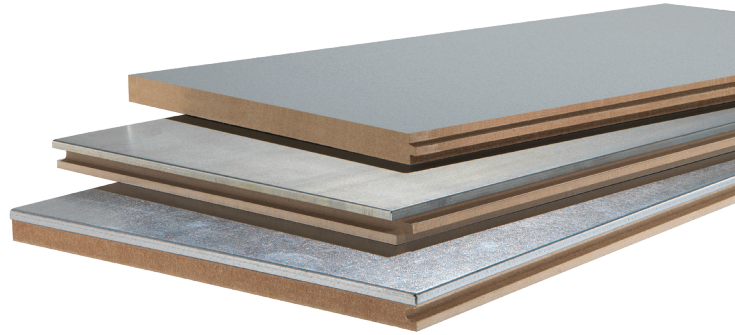


At Cornerstone Specialty Wood Products, LLC® we know that the durability and condition of floors are important for optimal performance of AGV's and AMR's. Coefficient of friction, surface roughness, floor flatness, gloss, and wear can all affect the ability of robots to run at their peak performance. That's why we go to great lengths to extensively test internally and send our products to be evaluated by independent laboratories as well as the robotic manufacturers.



Description	Reference Standard	Test Procedure	Gray Diamond Seal® ESD	RECOMMENDED FOR ROBOTICS		
				TriGard® ESD	TriGard® ESD Ultra	MetaGard® SST
Coefficient of Friction: BOT 3000E	ASTM A326.3	Neolite sensor has material that is 95+/-3 Shore A	Avg Dry: 0.50 Avg Wet: 0.33	Avg Dry: 0.62 Avg Wet: 0.28	Avg Dry: 0.56 Avg Wet: 0.30	Avg Dry: 0.77 Avg Wet: 0.68
Taber Abrasion	ASTM D4060	180 grit aluminum oxide sand paper replaced every 500 cycles with 1 kg of weight	Wear Rating: 2,000 cycles	Wear Rating: 6,000 cycles	Wear Rating: 24,000 cycles	Wear Rating: >50,000 cycles
Gloss, 85 deg	ASTM D523	Tested with glossmeter geometries of 85°	20 GRUs	7 GRUs	7 GRUs	8 GRUs
Robot Navigation Sytem/Travel Path:			N/A	Lidar/Variable Path	Fiducials/Fixed Path	Fiducials/Fixed Path
Suggested Robot Type:			N/A	AMR	AMR, AGV	AGV

COEFFICIENT OF FRICTION BOT 3000

ASTM A326.3

Dynamic Coefficient of Friction Test measurement provided in this standard is an evaluation of a hard surface flooring material under known conditions using a standardized sensor material prepared according to a specific protocol. As such it can provide a useful comparison of surfaces, but it does not predict the likelihood a person will or will not slip on a hard surface flooring material.

GLOSS

ASTM D523

Test method covers the measurement of the specular gloss of nonmetallic specimens for glossmeter of 20°, 60°, and 85°.

TABER ABRASION

ASTM D4060

Test method covers the determination of the resistance of organic coatings to abrasion produced by the Taber abrader on coating applied to a plane, rigid surface, such as a metal panel. Taber abrasion is a method used to determine the ability of a material to withstand wear. Taber abrasion is evaluated using what is known as a Taber abrasion test or Tabor abrader. Taber abrasion uses two abrasive wheels that the material being evaluated is rotated underneath for a given time and under a given load.

RESINDEK® FLOOR PANELS

ResinDek flooring panels are custom manufactured and are formulated in different thicknesses and densities to meet the requirements of varying load capacities. They have the structural integrity that supports dynamic and static mobile robotic rolling loads up to 6,000 lbs. ResinDek with TriGard® ESD and TriGard ESD Ultra are available in sizes up to 1206 mm x 3048 mm and ResinDek with MetaGard® SST maximum size is 1206 mm x 2438 mm. Each ResinDek panel features a tongue-and-groove configuration that effectively promotes panel to panel wheel load transfer. ResinDek panels are backed by comprehensive design engineering services, and a 10-year product warranty.

ResinDek® Flooring Panels for AGVs & AMRs <i>For use with Corrugated B-Deck</i>				
Product Name	Robot & Product Load Limits	Maximum Contact Pressure	Robot Load Type	B-Deck Thickness
ResinDek® LD Panel Thickness: 19 mm	up to 230 kgs	3.4 MPa	AMR	0.9 mm
ResinDek® MD Panel Thickness: 19 mm	up to 910 kgs	5.2 MPa	AMR, AGV	0.9 mm
	up to 1,365 kgs	6.9 MPa	AMR, AGV	1.2 mm
ResinDek® HD Panel Thickness: 19 mm	up to 1,815 kgs	8.3 MPa	AMR, AGV	1.2 mm
ResinDek® MAX Panel Thickness: 38 mm	up to 2,725 kgs	10.3 MPa	AMR, AGV	1.2 mm

NOTES:

- Testing was completed with polyurethane caster wheels and any deviation or alternative wheels such as crowned, steel or plastic could void the warranty. Contact CSWP for more information.
- Contact pressure values are to be used as a guide. Please consult factory for specific robot usage.
- For flooring used with corrugated b-deck: please note load values above are calculated on 914 mm beam spacing, increased spacing will increase deflection and/or decrease capacity.

ResinDek panels have been independently evaluated and approved for use in Types I-V construction and as part of a fire-resistance rated assembly and meets MR50 stringent requirement for moisture resistance. ResinDek panels are certified to have No Added Formaldehyde and can contribute towards earning points for LEED® qualified buildings. When required ResinDek panels are available with FSC® Certification.

ResinDek® Flooring Panels for AGVs & AMRs <i>Single Panel Solution - No Corrugated B-Deck Required</i>					
Product Name	Beam Spacing	400 mm	600 mm	800 mm	1,000 mm
ResinDek® HD Panel Thickness: 19 mm <i>For AMRs only</i>	Uniform Loads	10.9 kN/m ²	6.1 kN/m ²		
	Total Robot & Product Load	345 kgs	230 kgs		
	Contact Pressure	5.2 MPa	3.4 MPa		
ResinDek® Xspan Panel Thickness: 28 mm	Uniform Loads	18.1 kN/m ²	10.9 kN/m ²	6.1 kN/m ²	
	Total Robot & Product Load	1,135 kgs	910 kgs	685 kgs	
	Contact Pressure	6.2 MPa	5.2 MPa	4.1 MPa	
ResinDek® Xspan FR Panel Thickness: 28 mm	Uniform Loads	18.1 kN/m ²	10.9 kN/m ²	6.1 kN/m ²	
	Total Robot & Product Load	1,135 kgs	910 kgs	685 kgs	
	Contact Pressure	6.2 MPa	5.2 MPa	4.1 MPa	

NOTES:

- Testing was completed with polyurethane caster wheels and any deviation or alternative wheels such as crowned, steel or plastic could void the warranty. Contact CSWP for more information.
- Contact pressure values are to be used as a guide. Please consult factory for specific robot usage.
- For flooring solutions with no b-deck: all allowable loads are based on a two span condition. Uniform load values are based on L/240 deflections, any deviation can positively or negatively impact these values. Please contact Cornerstone for other span conditions.

The calculations and load tables to the left have been compiled based on specified calculation methods and assumptions. The loads provided are for the purpose of information for preliminary studies and can not be used as a reference in structural studies. Contact an accredited engineering office or architect to perform a complete stability analysis.



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