
PRECIDIUM™ Rail Flooring System
Revolutionary Solution for Transit Flooring

TRANSIT OVERVIEW

New Regulations – Both North American and European markets demand more stringent fire, smoke and toxicity ratings for flooring systems due to increasing time in tunnels and on bridges, plus higher speed trains.

Performance Expectations – Floor systems are expected to perform worldwide and withstand varied conditions including seasonal extremes. Flooring must be flexible to dimensional changes, resistant to graffiti, fungicide growth, corrosion, ice, water, salt, and vandalism, while meeting non-slip requirements and ease of maintenance.

Installation – Speed and cost of installation is a critical factor in choosing a new flooring system. One of the major expenses in flooring systems today is the speed at which they take for installation. To reduce labor costs, panels are being built larger, requiring higher performance properties to support the weight load of passengers, with lower part-weight requirements.

TRANSIT OVERVIEW

Maintenance – With increased ridership and decreased budgets, transit authorities must keep a high percentage of their fleet in service. This places demanding schedules on maintenance crews. Floors must be easy to clean and maintain their aesthetics in high-service applications.

Comfort & Design – Mass transit authorities are becoming increasingly aware of their passengers' comfort and some are hiring independent design consultants to work with flooring suppliers to achieve a high level of rider satisfaction.

Low Weight – As high speed and long distance rail systems come on-line, the overall weight of the car is an important factor in the efficiency of the rail system. The weight will affect everything from energy consumption to car components (e.g. brakes) life expectancy.

TRANSIT OVERVIEW

PRECIDIUM™ Rail Flooring System Addresses Trends

New Regulations

Meets the highest standards for fire, smoke and toxicity protection.

Performance Expectation

Provides 2 times the abrasion resistance as rubber flooring.
Protective top coat technology adds anti-graffiti and stain resistant properties.

Installation

“Fast Set” spray technology allowing for 2-3 day installation for replacing old floors.
“Pre-coated” design for new trains completely removes a station from production line.

Maintenance

Seamless technology is simply cleaner with no joints or cracks to trap dirt and bacteria.
Extremely durable top coat has high chemical resistant properties and allows for graffiti and gum removal without damaging floor.

Comfort & Design

Technology allows for custom coloring to meet the needs of every rail authority. Current pre-manufactured flooring has limited color selection due to production limitations.

Low Weight

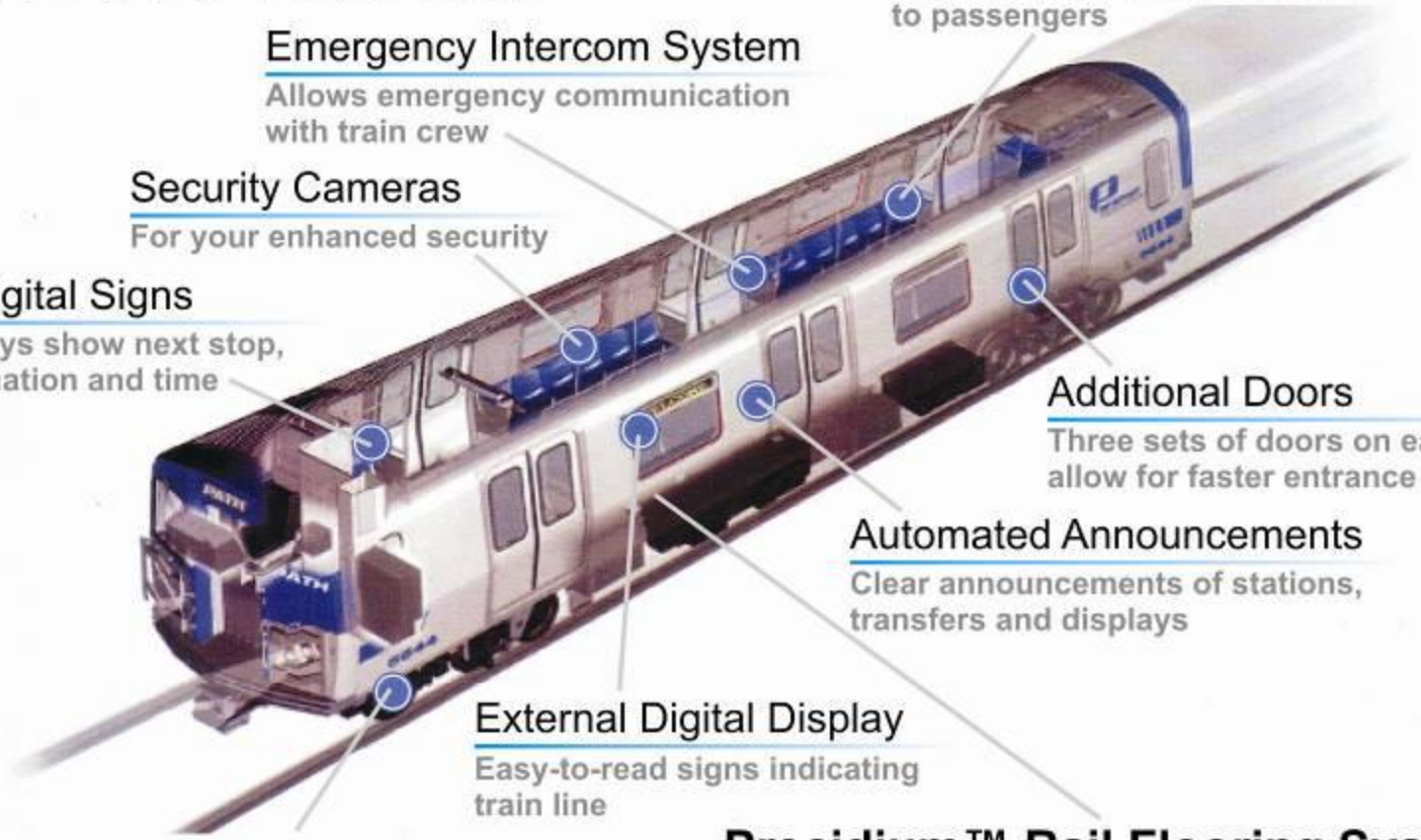
Twenty percent less dense than current rubber floor, plus 50 percent more durable, allowing for thinner applications = significantly lighter floor system.

TOUGH *Beautiful*

PRECIDIUM™ Rail Flooring System

Quality you can stand on.
Quality we stand behind.

PATH PA-5 Rail Car



On-Board Video Displays
Provides news and information to passengers

Emergency Intercom System
Allows emergency communication with train crew

Security Cameras
For your enhanced security

In-Car Digital Signs
LED displays show next stop, final destination and time

Additional Doors
Three sets of doors on each side allow for faster entrance and exit

Automated Announcements
Clear announcements of stations, transfers and displays

External Digital Display
Easy-to-read signs indicating train line

Enhanced Suspension
Provides smoother ride

Precidium™ Rail Flooring System
Tough, beautiful, and design engineered for safety, durability, reduced maintenance, long life, and protection of your substrate

PRECIDIUM™ Rail Flooring System

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PATENT PENDING

A Revolutionary New Flooring

Notable Features

- seamless- spray-applied polymer
- quick installation - cures rapidly
- durable - resistant to damage
- attractive - custom designs/colors
- resilient - easy to clean/maintain
- safe, non-slip floor surface
- exceeds all federal fire safety standards for use in mass transit
  - LR and HR transit vehicles
  - buses
  - stations
- durability and long life greatly reduces life-cycle costs

PRECIDIUM™ Revolutionary Flooring System

Ultra Light • Rapid Installation • Complete Protection • Longevity • Zero VOC

PRECIDIUM™ Spray-On Floor System

Application and Installation:
- Basic installation complete in 48 hours
- Two people can get the job done
- Spray application guarantees a perfect fit
- Spray on cove bases and contours for a seamless finish
- No solvents or Volatile Organic Compounds

Benefits to Transit Authorities
- Weight reduction of 20% to 50% over rubber flooring
- Seamless finish seals and protects the floor panel from water ingress
- High performance stain resistance - including grease and oil
- Wear resistance approximately two times greater than rubber - achieves 0.25 grams weight loss per 1000 cycles (taber abrasion)

Benefits to Transit Car and Bus Manufacturers
- Purposeful custom floors: embedded logos, directions, exits, ads, etc.
- Increased productivity - quick installation, fewer technicians
- Improved quality

Future Benefits
- Floor wear can be repaired to "like-new" status without replacement
- Floor can be refinished to remove scratches without seams or color difference

Typical Rubber Floor System

- Adhesive dry time can be lengthy
- Requires more workers to handle rolls of flooring
- Wastage due to cutting and seaming
- Must be applied to flat surface
- Adhesive may be solvent based; odors linger

- Comparable for equal durability is 50% heavier
- Water seeps into seams, highly visible, adhesive attracts dirt
- Poor stain resistance to grease and oil
- Published wear numbers of ~0.5-0.7 grams weight loss per 1000 cycles (taber abrasion)

- Basic or ribbed surfaces, static and limited colors

- Once wear is obvious, floors must be replaced
- Floors must be replaced or left with noticeable repairs

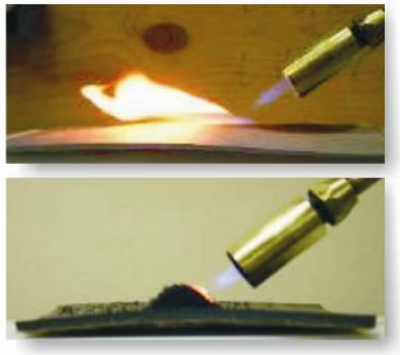
PATENT PENDING

PRECIDIUM™ Revolutionary Flooring System

Regulatory Compliant: Exceeds the following federal safety regulations

Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using Radiant Heat Energy Source
Method: ASTM E-648
Requirement: Critical Radial Flux of more than or equal to 0.50 watts per sq. cm.
PRECIDIUM™ Rail Flooring System is greater than 1 watt per sq. cm.

Standard Method of Test for Surface Flammability of Materials Using a Radiant Heat Energy Source
Method: ASTM E-162
Requirement: Class A (I) 0-25 Flame Spread
PRECIDIUM™ Rail Flooring System average Flame Spread is 22.60.



Standard Test Method for Surface Burning Characteristics of Materials
Method: ASTM E84-05
Requirement: Class A (I) 0-25 Flame Spread Rating
PRECIDIUM™ Rail Flooring System Flame Spread Rating is 20
Smoke Developed Classification is 115

PRECIDIUM™ Revolutionary Flooring System

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Standard Method for Specific Optical Density of Smoke Generated by Solid Materials

Method: ASTM E-662

Requirements in the flaming and non-flaming modes:

- Ds @ 1.5 minutes - maximum: 100
- DS @ 4.0 minutes - maximum: 200
- Dm @ 15.0 minutes - maximum: 300
- Dm @ 20.0 minutes - maximum: 300

	Flaming	Non-Flaming
Precidium™ Rail Floor	7.4	7.0
Precidium™ Rail Floor	38.9	50.8
Precidium™ Rail Floor	197.4	104.3
Precidium™ Rail Floor	206.2	124.0

Cone Calorimeter

Three tests required @ 25, 50, and 75 kW/sq meter using horizontal sample position

Method: ASTM E-1354

Requirements:

- Maximum heat release rate: <150 kW/sq meter
- Av. heat release rate at 3 minutes: <100 kW/sq meter
- Av. heat release ignition to flameout: <50 kW/sq meter

Precidium™ Rail Floor @	25 kW	50 kW	75 kW
	33.84	47.98	83.54
	14.42	25.50	38.11
	15.67	24.15	38.13

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Toxicity

Methods: Bombardier Test Method SMP800 or Boeing Test Method BSS-7239

"**Test Method for Smoke Generation by Materials in Combustion**"

Requirements: Generation of toxic gasses identified below do not exceed the indicated concentration in either the flaming or non-flaming modes

Carbon Monoxide (CO): 3500 ppm	**Precidium™ Rail Flooring System:** 290
Nitrogen Oxides (NO_2): 100 ppm	**Precidium™ Rail Flooring System:** 3.8
Sulphur Dioxide (SO_2): 100 ppm	**Precidium™ Rail Flooring System:** 15
Hydrogen Chloride (HCL): 500 ppm	**Precidium™ Rail Flooring System:** 50
Hydrogen Fluoride (HF): 200 ppm	**Precidium™ Rail Flooring System:** 0
Hydrogen Cyanide (HCN): 150 ppm	**Precidium™ Rail Flooring System:** 11

Slip Resistance. Method: ASTM C-1028

Requirement: Coefficient of friction for both wet and dry conditions shall be 0.6 or greater

Adhesion, Bonding. Bonding strength of the spray coating to the substrate of the floor

Method: ASTM D-4541 Requirement: Pull-off strength, using a 20mm (0.79 inches) diameter plug, shall be 500 psi or greater.

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PATENT PENDING

PHYSICAL PROPERTIES

The finished spray flooring material with a thickness of 100-125 mils meets the following:

Tensile Elongation, ASTM D412: 100%
Tensile Strength, ASTM D412: 600-1000 psi
Shore D Hardness, ASTM A2240: >30
Gel Time/Tack Free: 3 to 10 seconds
Solids by Volume: 100%
Abrasion Resistance ASTM D4060: 250 mg.wt. loss/cycles

Safety on the subway provides peace of mind for passengers.

PRECIDIUM™ Rail Flooring System

Precidium™ Rail Floor Function, Durability and Design

- Precidium™ Primer (6-10 mils)
- Precidium™ Base Coat (70-100 mils)
- Precidium™ Color Coat and Splash Accents (8 mils)
- Precidium™ Clear Non-Slip Topcoat (5 mils)

PRECIDIUM™ Rail Flooring System

Bay Area Rapid Transit District Refurbishment Case Study

HISTORY and PROCEDURE

- Reburbished 202 cars on-site at BART (~6/week)
- Average 48 hours/2 cars - previously 2 weeks/car
- In-service cars generate revenue
- BART employees did pre and post-installation work
  - removed seats, old flooring poles, metal trim, covers and edging
  - trim, covers and edging were sandblasted to eliminate all residues, rust, etc. and immediately primed with anti-corrosive steel wash primer to maintain a rust-free surface

- All wood surfaces were sanded to remove all previous flooring, adhesive, dirt, and residue and all steel panels in the sub floor were shot blasted and/ or hand ground to remove all RUST, etc. and primed with anti-corrosive steel wash primer - there can be zero rust on the substrate for proper floor adherence
- All vertical surfaces to be coated are thoroughly cleaned, and primed with anti-corrosive primer if they are metal
- All cracks, depressions, voids, seams MUST be filled with approved, high quality body filler and sanded flush
- Screw holes are filled prior to reinstallation of trim, etc. (new screws are always used on reinstallation)
- Level the sub floor to remove any high/low areas to 1.8 mm over 1 meter in any horizontal direction
- Rough sand entire sub floor with 60-80 grit sandpaper
- Vacuum entire sub floor to remove all dust, dirt, debris
- At this stage, access is limited and proper tyvek boot covers must be worn

PRECIDIUM™ Rail Flooring System

Bay Area Rapid Transit District Refurbishment Case Study

TAPING, BAGGING, MASKING

- Wire trim placed everywhere the flooring terminates, as per project specifications; degrease areas with Acetone first
- Entire car interior and exterior other than the floor area is sealed with plastic wrap
- Any vertical walls, coves, corners, and floor, will be part of this seamless, water impermeable floor system. There are no joints or cracks to trap dirt and bacteria, making this floor easy to maintain

PRECIDIUM™ Primer Coat

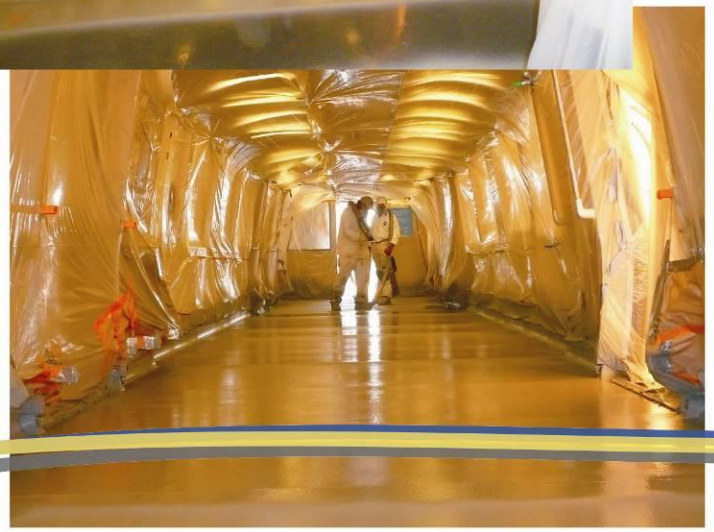
- 24 hours prior to application, solvent wipe the entire floor with Acetone
- **Precidium™ Primer** is mixed 1:1 by volume; has a 1-hour pot life for application and should be recoated in 3-16 hours
- First coat applied at 3-5 mils (brushed, rolled, or sprayed)
- Inspect floor and repair any imperfections.
- Lightly sand and acetone wipe if there are any air bubbles
- Second coat applied at 2-4 mils
- For a typical U2 Light Rail Car, 2-3 gallons of primer will be required for both coats
- Primer is tinted to ensure error-free application
- Primer is anti-corrosive and formulated specifically for for excellent adherence of the floor membrane

PRECIDIUM™ Rail Flooring System

Bay Area Rapid Transit District Refurbishment Case Study

PRECIDIUM™ Base Coat

- Applied with a Plural Component Proportioner by a trained and approved applicator following the instructions of the Quantum Group's Procedures Manual
- For BART the membrane was sprayed at 100 mils to meet the overall 125 mil thickness of the previous rubber flooring (BART is now using 70 mils on panels)
- Initial passes targeted the seams and irregularities
- ~45 gallons of mixed material required at this thickness
- Within 30 seconds, this floor membrane is cured
- To avoid damage, a 30-minute cure is allowed
- A smooth finish is achieved by a qualified applicator.
- Wire trim was removed from all horizontal transitions where the flooring is to be flush to trim pieces - sand if required
- Following 30-minute cure window, the floor is inspected for blisters, bubbles, or imperfections. If any are found, repair according to the Procedures Manual.
- Ensure the floor is smooth and clean of all dust and debris before continuing with the installation.



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Bay Area Rapid Transit District Refurbishment Case Study

PRECIDIUM™ Design Elements

- Every floor is a custom project
- Transit authorities select their own unique base colors, splash accents, etc.
- For BART, the base was dark grey with beige, blue, and charcoal accents, plus a horizontal accented beige stripe
- Excellent solution for both refurbished and new vehicles

PRECIDIUM™ Color Topcoat

- The base color of the floor is achieved with this color coat
- It is UV resistant and will not yellow
- It is extremely durable
- It is mixed 1:1 by volume, has a 30-minute pot life, 1-3 hour tack free time, and is sprayed with a 2.5 gallon pressure pot with a SATAjet® 3000 K 2.0 HVLP gun at ~8 mils
- Requires ~ 2 gallons of mixed product
- Depending on humidity and temperature cure is 1-3 hours
- Splash accent colors can be done when color coat is tack free and inspected for any imperfections
- Applied with a 2-quart pressure pot, and SATAjet® 3000K 1.6 HVLP gun with output varied to give desires finish
- Proper cure time is allowed between accent applications
- Accents are applied from darkest to lightest

PRECIDIUM™ Rail Flooring System

Bay Area Rapid Transit District Refurbishment Case Study

PRECIDIUM™ Clear Non-slip Top Coat

- The final "layer" of the **Precidium™ Floor System** is the durable, non-slip, protective topcoat.
- May be rolled or spray applied
- Provides floor with additional scratch and scuff resistance
- Non-slip can be moderate to very aggressive
- Following years of wear, the top coats and splash accents can be reapplied and renew the entire floor surface for a fraction of the cost of floor replacement
- The clear coat is applied in TWO coats to ensure optimum performance of the non-slip additive
- Wait 1-3 hours or until floor is tack free before second coat
- As with every step of the application, the floor is inspected between coats and following the last coat to ensure the highest quality installation is achieved.
- A cure-time of 16 hours is recommended prior to post-spray cleanup.

Within 48 hours of rolling into the tent, this rail car rolled back out into active duty to the ooohs and awes of BART commuters and BART maintenance and cleaning personnel.

PRECIDIUM™ Revolutionary Flooring System

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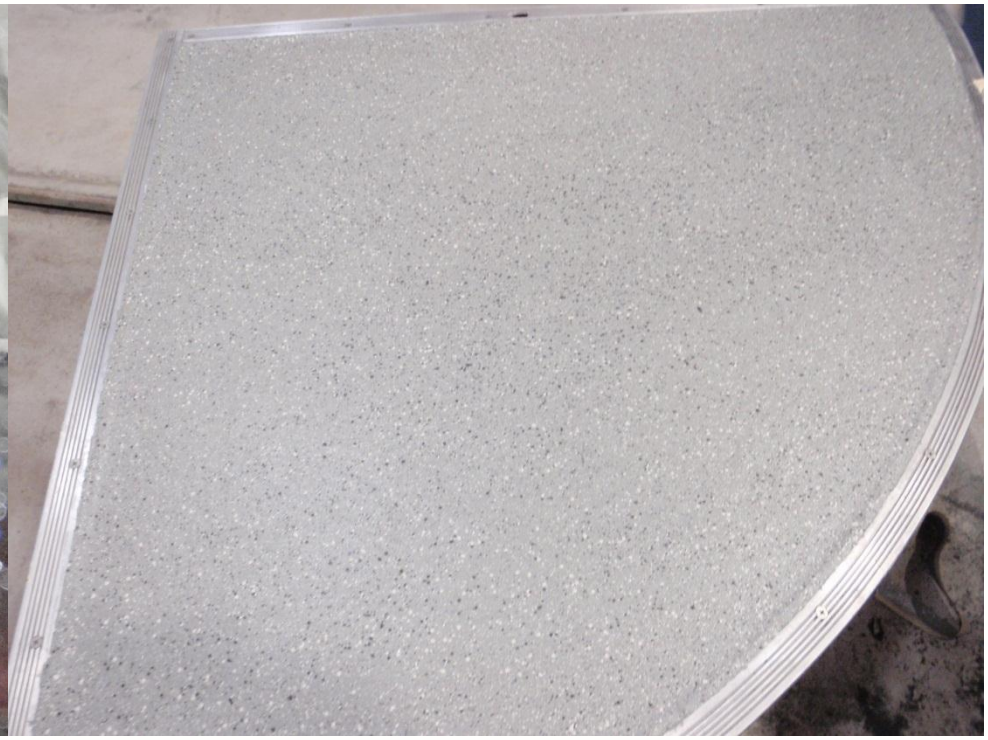

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