Quantum Chemical

PRECIDIUM™ MASS TRANSIT Innovation
It's all in the Chemistry!

PRECIDIUM™ MTI Rail and Bus Floor System Durability

The **PRECIDIUM™ MTI Floor Systems** specific to the transit industry has been used on rail transit cars since 2008. Within the transit industry it can be problematic to introduce a product without at least a 30-year track record. Due diligence is expected, particularly when the question of durability and warranty of flooring is addressed. Thus, a brief history of the **PRECDIIUM™ MTI Floor System** can provide transit authorities and rail car manufacturers with the assurance that this product not only meets, but exceeds existing floor products and even more importantly, the technology behind this product is already standing the test of time.

In 2007 the Bay Area Rapid Transit District (BART) was replacing its existing carpet floors in their C2 cars with the standard rubber floor widely accepted in the industry. However, the floor presented time constraint issues for installation and water ingress and maintenance issues with seams. The idea of a seamless, spray-on floor began.

Quantum Chemical was contacted due to the vast research and development already done in the area of fire retardant paints and coatings, including a fast-set fire retardant polyurea. Quantum and BART began their work on formulating a product that would not only pass the highest standards in the US for fire, smoke and toxicity, but BART's strict aesthetic requirements as well. The ideal was a transition from the present rubber, to a replicable, seamless, spray-on floor.

To reiterate an important previous point, the **PRECIDIUM™ MTI Floor System** has been successfully used for nine+ years, however, over the past ~40 years, chemists have been formulating innovative polyurea resins. Today's modern coatings, including polyurethane and polyurea, are among the most advanced resins developed. Polyureas, more than any other polymer coating, stand out in their versatility, strength and longevity. Their fast reactivity and relative insensitivity to moisture make them useful coatings for large surface area projects, such as secondary containment, manhole and tunnel coatings, tank liners, and floor coatings. Also, excellent adhesion to most substrates is obtained.

The **PRECIDIUM™ MTI Rail Floor System** is a layered polyurea coating system with added UV protection, aesthetic accents and non-slip features in the topcoat layers. The **PRECIDIUM™ MTI Bus Floor System** is a one-layer polyurea system with embedded accents and excellent co-efficient of friction.

OEM manufacturers, contractors, engineers and fabricators all needed fast-cure, moisture-insensitive coating systems. These applications require a variety of physical properties, excellent adhesion, smooth surface flow out, superior tensile strength and high abrasion resistance. Polyurea systems fit these descriptions. Plus, fast reaction time is a great advantage of polyurea. In the case of facility maintenance or rejuvenation, owners want to regain usage of the facility (or transit cars) as soon

as possible. The time constraints faced by BART were eliminated with this technology because a fast-reacting polyurea fully cures within a few hours.

Polyurea is frequently used to protect the exterior of iron pipe. The polyurea cures quickly and the pipe can be almost immediately reburied without cracking. Many pipelines around the world, including the Trans-Alaska pipeline, have used this technology to speed production and keep maintenance costs to a minimum.

In highly abrasive environments, polyureas perform extremely well. In the rail and barge industry, polyureas are used because of their superior elongation and high impact resistance. The area in and around rail cars is one of the most unforgiving places for any coating with iron and steel impacting each other, damaging coatings and starting the cycle of corrosion. Also the constant loading and unloading of cars filled with coal, lumber, steel and grain creates a highly abrasive environment that only the toughest coatings can withstand.

In highly abrasive situations, elastomeric polyureas are outperforming traditional paints and epoxy coatings in physical properties and economics. As the cost of repairing and maintaining rail cars continue to rise, rail car owners and transit authorities are turning to high performance protective coatings to keep their rail cars in operation as long as possible.

In a world of increasing environmental awareness, polyurea proves to be an effective and economical choice for governments and businesses for their elastomeric and structural needs. Polyureas are used by the military for blast mitigation. They are used to contain radiation and many areas where reliable containment is essential. For example, a Quantum Chemical **PRECIDIUM™** coating was used to create a radon free room for a university clean room at the University of Alberta.

Exposed polyurea is widely used in applications such as concrete or roofing where severe environmental conditions are the norm, or geotextile coatings for secondary containment applications. Polyureas' fast cure times allow it to be rapidly applied to a prepared substrate with minimal downtime for the facility. This has made polyurea the choice of facility managers for walls around, and floors under chemical storage of diluted acids, alkali, salt solution, organic solvents and oils. Polyurea provides a strong barrier to prevent spills from reaching the environment. In this type of application, polyurea readily conforms to footings, pipes and protrusions to form a complete seal. A topcoat can be added for protection in environments that are too highly corrosive for a standard polyurea. They can also be added for aesthetic purposes such as in the **PRECIDIUM™ MTI Floor Systems**.

Since 1995, Quantum has been involved in formulating solutions in many of the industries and applications cited above. As an example, one of our **PRECIDIUM™** polyureas was specified on a primary containment project for ESSO. Why? Ten years previous, it was used in several crude oil tanks. Because of its continued excellent performance, it was specified for additional tanks. When comparing the cost of

replacing tanks or coating them and achieving at least another 10 years of service, the **PRECIDIUM™** coating made fiscal sense.

Formulating a product for mass transit was a natural progression for Quantum Chemical's Research and Development team. Quantum took polyureas to a new level. Taking our patented fire-resistant "polyurea" from work horse to "show horse" was a challenging and innovative project, and with BART's vision and confidence in this technology, a revolutionary floor system has been developed for mass transit.

The project manager with Bombardier in Bath, New York had this to say when the Greater Cleveland Transit Authority asked about their experience installing the **PRECIDIUM™ MTI Floor System** over a two-year OEM project:

> "*We used this product on a 3-year refurbish Edmonton Transit project. I have been in rail for thirty-five years and I think that this is one of the best products that has come along in a long time. There are no seams at all, it is easy to repair if ever required and so far it is wearing very well. It was first used at BART on the C2 cars and they also love it and I understand it is holding up very well."* W. Clark
> Bombardier Program Manager, 2010-13

For some transit authorities, high levels of foot traffic may be considered extreme abrasive situations. Without question, over time, all flooring wears. But, besides the limitless aesthetic choices available with the **PRECIDIUM™ MTI Floor Systems**, the real beauty is the opportunity for an economical and environmentally green "refurbish" of the **PRECIDIUM™ MTI Rail Floor**. This involves refinishing the aesthetic top coat layers (in the current colors or an entirely new color palette) which can provide an additional 10-15 years to a floor that Quantum is confident will already provide 10-15 years of service before this aesthetic refurbish may be desired. The purpose of a refurbish at this juncture would be aesthetic, as the membrane would still be providing durable protection to the floor substrate. This confidence is based on the technology of the coating system plus the combined 60+ years coating experience of the Quantum chemists who formulated the **PRECIDIUM™ MTI Floor Systems.**