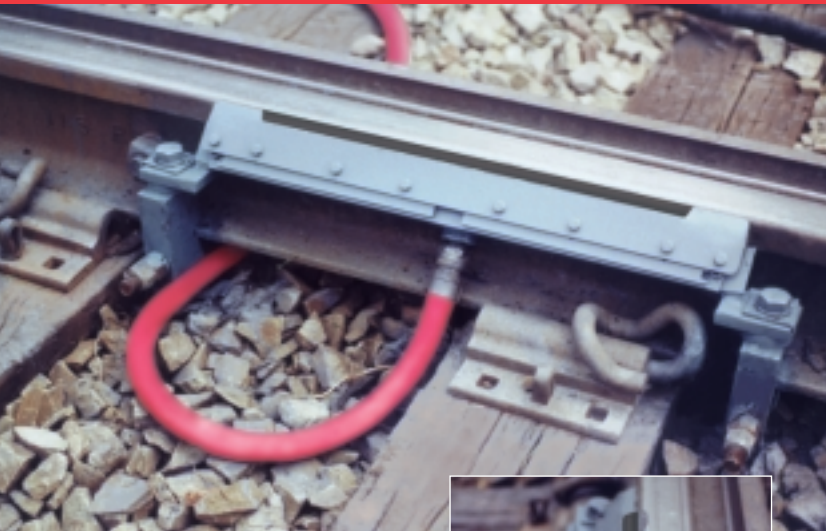


## Top-of-Rail and Gauge Face Applicators- Heart of the system... where the wheel meets the rail.

The only difference between the PROTECTOR® IV TOR *Top-of-Rail* and PROTECTOR® IV GF *Gauge Face* is the choice of applicator. The PROTECTOR® IV TOR features the MC-4TR™ applicators, where the PROTECTOR® IV GF has a choice of three different applicator designs. However, all Portec Rail applicators share a common, basic design. The MC-3®, MC-4™, MC-4XL® and MC-4TR™ applicators provide excellent contact on the rail and balanced distribution and wheel coverage. Individually, each possesses unique design features, but all four types provide outstanding, even flow because they share our field proven, patented balanced port design, patented streamlined channels with patented Teflon® coating and wear-resistant distribution blade with V-grooves. Designed to fit a wide range of rail sizes, each easily mounts to worn rail. Guard rail types also available.



### MC-4TR™

A patent pending design that mounts to the field side of the rail to deliver friction modifier products to the top-of-rail, the MC-4TR™ utilizes a traditional rail base block mounting.

Liquid friction modifier shown is for photographic purposes only. Application rates are considerably less.

The PROTECTOR® IV Trackside™ Friction Management System provides the innovation, sophistication, precision and flexibility required for today's advanced friction modifiers and lubricants in a package that is reliable and simple to operate. Backed by Portec Rail's reputation for innovation, quality and dedication to service, you can expect years of superior performance.

The Friction Force™ team is available for system installation and maintenance as well as friction management needs assessment. Contact your Friction Force™ customer service representative for more information.



The PROTECTOR® IV Trackside™ Friction Management System is part of the Portec Rail Friction Force™ offering of Friction *Assessment, Implementation & Management Solutions.*

Take *AIM* with the Friction Force!

### MC-3®

The MC-3® has 18 ports and a patented elevating screw mounting system with universal rail clamps for fast and simple installation. Designed for rail sizes from 85-140 pounds, with versions available for most guard rail sizes. Not recommended for excessively tread worn rail (for tread worn rail see MC-4)



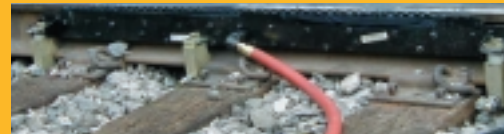
### MC-4™

The MC-4™ applicator is similar to the MC-3® in that it has 18 ports. It mounts to the rail differently than the MC-3® because it uses a more traditional rail base block mounting system utilizing a J-bolt. The MC-4™ mounts to rail sizes 112RE - 140RE and excels in applications with excessively tread-worn rail as well as in certain guard rail applications.

### MC-4XL®

Aluminum construction for weight savings, a 55-inch lubricant distribution blade and 48 lubricant ports are what separate the MC-4XL® from the MC-4™ and MC-3® (22 3/4" distribution blade and 18 lubricant ports). The no-grind design with longer lubricant distribution blade delivers approximately 140% greater coverage than standard applicators. A major railroad field test has found that a four-bar MC-4XL® (two bars per rail) system applied lubricant to the whole circumference of the wheel, which dramatically increased lubricant carry as well as minimizing waste. The MC-4XL® mounts to 112RE - 140RE rail and uses the same rail base block mounting system utilizing a J-bolt that is found on the MC-4™. It's also suited to excessively head-worn rail.

MC-4XL® with center clamp



#### United States:

Portec Rail Products, Inc.  
Railway Maintenance Products Division  
P.O. Box 38250  
Pittsburgh, PA 15238-8250 USA  
412-782-6000  
Fax 412-782-1037  
E-mail: [RMPsales@PortecRail.com](mailto:RMPsales@PortecRail.com)

#### Canada:

Portec, Rail Products Ltd.  
2044 32nd Avenue  
Lachine, Quebec H8T 3H7  
Canada  
1-514-636-5590  
Fax 1-514-636-5747  
E-mail: [CANADAsales@PortecRail.com](mailto:CANADAsales@PortecRail.com)

#### Europe:

Portec Rail Products (UK) Ltd.  
Vauxhall Industrial Estate  
Ruabon, Wrexham  
Clwyd, LL14 6UY, Wales  
United Kingdom  
44-1978-820-820  
Fax 44-1978-821-439  
E-mail: [UKsales@PortecRail.com](mailto:UKsales@PortecRail.com)

#### Other Countries:

Portec Rail Products, Inc.  
International Operations  
122 West 22nd Street  
Oak Brook, IL 60523  
USA  
630-573-4619  
Fax 630-573-4604  
E-mail: [Bpetkus@PortecRail.com](mailto:Bpetkus@PortecRail.com)

**PORTEC**  
RAIL PRODUCTS, INC.

Web site: [www.PortecRail.com](http://www.PortecRail.com)

The wheel/rail interface... a constant need for technological innovation. Once, gauge face lubrication was the answer. However, greasing the gauge face is only part of the solution. Today, top-of-rail friction modification is revolutionizing wheel/rail interface dynamics by reducing lateral forces, rail wear and noise. Advanced Friction Modifiers (not a lubricant) that provide a specific top-of-rail friction range as well as new gauge face lubricants that carry farther and last longer require precise, controllable and reliable application systems. Look to the Portec Rail Friction Force™... the leader in Friction *Assessment, Implementation & Management* products and services for the wheel/rail interface. *Take AIM with the Friction Force!*

**PORTEC**  
RAIL PRODUCTS, INC.



## PROTECTOR® IV Trackside™ Friction Management System



# PROTECTOR® IV Trackside™ Friction Management System - the next step in top-of-rail and gauge face friction control

A new design loaded with INNOVATION, combined with field proven, patented features and components offering the standard of reliability Rail Freight and Rail Transit systems around the world have come to expect from Portec Rail.

The Protector® IV effectively and efficiently:

- Increases rail and wheel life
- Decreases fuel consumption
- Minimizes derailment potential
- Abates noise
- Reduces lateral forces in track

## Three models ... Multiple options

- **PROTECTOR® IV GF - Gauge Face** Friction Management System
- **PROTECTOR® IV TOR - Top-of-Rail** Friction Management System
- **PROTECTOR® IV Two Track** Friction Management System



## The Standard Features and Components

**Solid-state Controls** - The brains of the system. Easy to operate, yet performs exceptionally. Proven in some of the harshest climates on the globe, the control system and wheel sensor provide the flexibility to fine tune the distribution of friction modifiers and lubricants for optimum efficiency and performance. Pump duration time adjustment combined with a choice of pump activation intervals allow you to tailor material distribution to almost any environment or application. A self-test feature, fuse and surge protection as well as a watertight enclosure ensure long-lasting trouble free service.



**Non-Contact Wheel Detector** - Provides long lasting maintenance free service, available with standard bi-directional or as a one-way version to apply lubricant or friction modifier in one direction only.



## Optional Features...Versatility!



### DC Solar or AC Power Source

From the most remote curve, to the busiest subway system, the PROTECTOR® IV Trackside™ Friction Management System is ready. For a completely adaptable system the DC Solar power option with field proven solar panel and non-spillable deep-cycle battery is ideal in even the coldest of climates. The solar panel utilizes premium components for durability, which include vandal resistant Lexan® shielding, and a corrosion proof anodized aluminum backing plate. Heavy-duty mounting hardware keeps it all together in the highest winds. When AC power is close and convenient a universal power-conditioning device allows for voltage input of 100 to 240 volts at 50 to 60 Hz. Both power source



types include non-spillable deep-cycle battery and the AC type provides lightning surge protection with lightning strike indicator and safety breaker. Other power source options are available upon request.

### Reservoir

The new, more space efficient design is available in a range of 25 - 100 gallons (95 - 380 liters), 200 - 800 lbs., all feature a sloping bottom for constant flow to the pump inlet. The reservoir is sealed from the elements with a weatherproof, locking lid that provides access to the reservoir only. The systems controls and other components are now in a separate locking compartment. Other reservoir sizes are available upon request, contact your Portec Rail Friction Force™ representative for more information.



**Pump** - The workhorse of the system. A reliable gear type pump, with patented design, directly coupled to an electric motor. Responsive to the precise commands of the control system and capable of handling a wide range of viscosities, from the stiffest of lubricants to the most fluid friction modifier. Simplicity is what makes this a superior system.

**Separate Clean-hands Component Compartment** - Adjacent to the reservoir, it provides easy access to the solid-state controls, pump, electric motor and battery with the security of a separate lockable sealed lid.



**KELTRACK™ Trackside™ Top-of-Rail Friction Modifier - The TOR "Solution"...**

# **REDUCE Lateral Forces, Noise, Wear and the STRESS on your track!**

■ **KELTRACK™ Trackside Freight** ■ **KELTRACK™ Trackside Transit**

KELTRACK™ is a liquid friction modifier intended for application to the Top of Rail. The material is a water-based suspension of proprietary solids, similar in appearance to a latex paint. It does not contain oil or grease lubricant components. A friction modifier is fundamentally different from a lubricant and performs uniquely.



**Kelsan Technologies KELTRACK™ liquid friction modifier can reduce damaging forces when applied to the railhead. Applied by Portec Rail's PROTECTOR® IV Trackside™ Friction Management System, the patented KELTRACK™ is available in two trackside-applied formulations, Rail Freight and Rail Transit.**

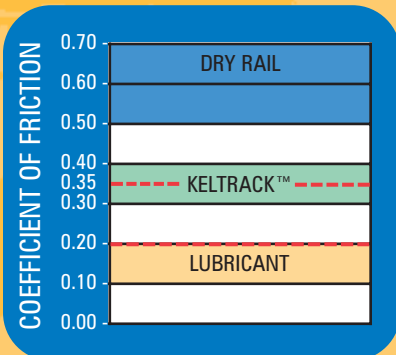
Kelsan's KELTRACK™ Trackside Friction Modifier shown is for photographic purposes only. Application rates are considerably less.

## **It's all about FRICTION CONTROL!**

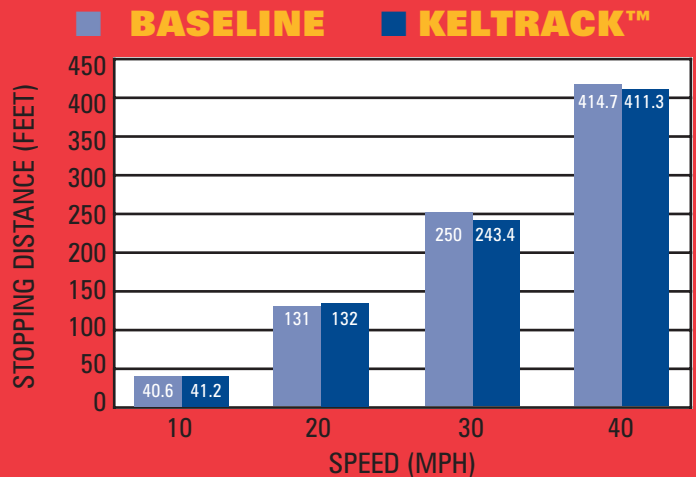
Only KELTRACK™ Trackside can truly offer friction control! Because KELTRACK™ is a water-based suspension of proprietary solids, when applied to the railhead the water component evaporates and the material remains as a thin dry film. This film creates an intermediate coefficient of friction on the railhead of approximately 0.35. A pure lubricant (oil or grease) by contrast will have a coefficient of friction of  $< 0.2$ . This intermediate coefficient of friction means KELTRACK™ will not affect traction or braking. This is an optimum friction level on top of the rail for minimizing wear, energy, noise and lateral forces in a safe and reliable manner. This is the key distinction between a friction modifier and a lubricant. Friction levels with KELTRACK™ are illustrated, in comparison to "dry" rail.

## **...and FRICTION CONTROL is all about SAFETY!**

KELTRACK™ Trackside has been documented to not affect traction or braking. KELTRACK™ is non-flammable (water-based) and has successfully passed both fish toxicity and soil leachate testing. Contact Portec Rail Products for a variety of KELTRACK™ Braking and Environmental Reports.

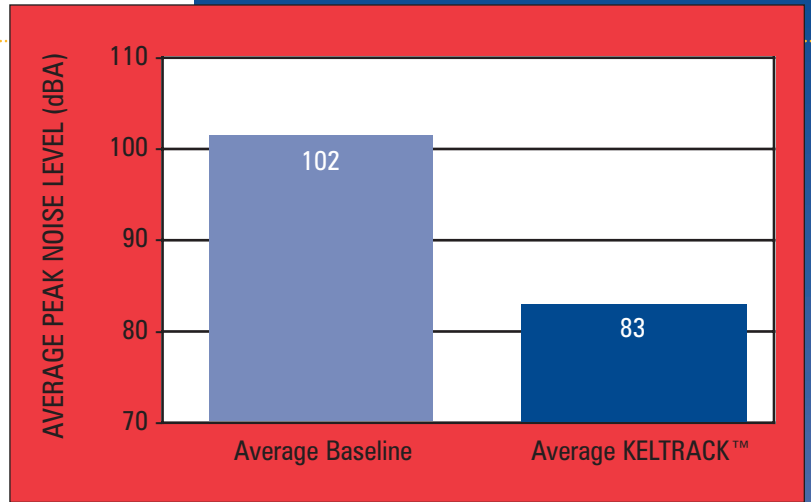


## **Stopping Distance Comparison**



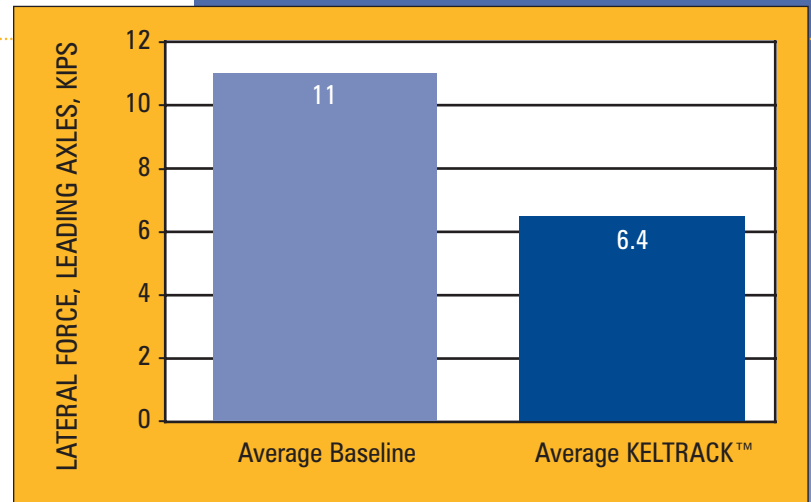
## FRICION CONTROL...it's all about NOISE REDUCTION!

KELTRACK™ Tracksid e provides "positive" friction between the wheel and rail. This characteristic allows KELTRACK™ Tracksid e to dramatically reduce squeal noise as trains negotiate a curve. The positive friction reduces stick-slip frictional instability under curving conditions that is the underlying cause of wheel squeal. The noise abatement properties of KELTRACK™ are almost immediate. A typical example is shown to the right.



## FRICION CONTROL...it's all about LATERAL FORCE REDUCTION!

By controlling the friction on top of the rail at an intermediate level, KELTRACK™ Tracksid e dramatically reduces lateral and flanging forces. These forces are responsible for side of rail wear, track structure degradation, gauge widening, as well as potential of rail rollover derailment. A typical example of lateral force reduction with KELTRACK™ is shown to the right.



## FRICION CONTROL...it's all about APPLICATION OPTIONS!



**Portec Rail ROAD-RUNNER™  
Hi-Rail™ TOR Application System**

KELTRACK™ can be applied top of rail through customized Tracksid e, and Hi-Rail delivery systems. Different forms of KELTRACK™ are tailored for the specific application equipment. All forms contain the same fundamental technology and are capable of providing the same outstanding results.



**PROTECTOR® IV  
Tracksid e™ Friction Management System**



KELSAN TECHNOLOGIES CORP.  
1140 West 15th Street,  
North Vancouver, British Columbia,  
Canada V7P 1M9  
Telephone: 604.984.6100  
Fax: 604.984.6102  
www.kelsan.com



Kelsan Technologies is part of the Portec Rail Friction Force™ Alliance of independent organizations working together to provide innovative solutions for a variety of wheel/rail interface challenges.