



# Eliminating Water Infiltration at Loading Docks

How to prevent product contamination, equipment damage and unsafe working conditions during material handling operations

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## Introduction

Water, snow and ice are common problems for loading docks all across the US. No matter if the loading dock is at a warehouse, distribution center, manufacturing plant or food storage facility, water poses a serious threat to profitability and safety. Although dock seals and shelters provide substantial environmental protection, gaps along the top of the door opening make docks vulnerable to snow, ice and water runoff from trailers. Head curtains and rain guards do not have the rigidity needed to block heavy runoff and still allow water infiltration to occur at the dock.

If water or other precipitation enters during loading or unloading, it can ruin packaging, damage freight contents and contaminate products. Additionally, water on loading dock floors creates hazardous conditions that can cause workplace accidents, like employees slipping and falling or forklifts skidding and damaging equipment or injuring pedestrians.

Fortunately, there is a solution that can protect against ice, snow and water runoff and is engineered to maintain a strong seal on a wide variety of vehicles. Unlike headers that will give way to heavy loads, this new product was designed to meet zero-tolerance policies for water entry at food-grade facilities and redirects water and precipitation away from loading docks, even on declined approaches.

In this white paper, you'll gain a better understanding of how water infiltration can negatively affect the loading dock area, impact the quality of products entering and exiting a facility, and alter employee comfort and safety. We'll also discuss what can happen if water penetration goes unchecked and the dangers it creates for forklifts, foot traffic and cargo.

Then, we'll examine how a best-in-class secondary overhead sealing product can provide the barrier needed to block heavy rain and water runoff from reaching the dock. We'll discuss the design needed to handle the challenge of compensating for declined approaches and provide information on the new product that is setting the standard for water protection in the material handling industry.



*Multi-layer, foam-filled water defense system pivots with trailers as they approach the dock*

## Water Infiltration at Loading Docks

The first step in protecting loading docks against water infiltration is to understand how rain can penetrate through seals and shelters and why supplemental help is needed to combat runoff from trailer tops. Simple headers or rain guards may be sufficient at docks that are on an inclined approach since the trailers are slanted away from the dock and the runoff from the top of the vehicle naturally flows away from the building. However, docks that have either a level or declined approach require additional protection against water that rushes towards the loading area. On a declined approach, the vehicle backs in on a downward angle and slopes towards the building, forcing all of the water on the top of the trailer to rush towards the dock. Even on level approaches, standing water on the top of the vehicle is thrust towards the dock as the trailer's momentum stops abruptly after contacting the dock bumpers.

A brainstorming panel of industry experts on loading dock safety for food manufacturing and handling estimates that the average semi-truck trailer in North America has a 450-square-foot surface, capable of funneling a tremendous amount of water onto the dock and creating a waterfall effect on cargo and dock attendants.<sup>1</sup> Although dock seals and shelters provide environmental protection at the sides of the trailer, gaps are commonly found along the top. These gaps can be present due to vehicle irregularities, the movement caused by trailer float and if the seal or shelter is not equipped to handle various trailer sizes. Blocking these gaps requires pinpointing their location, and an easy way to find them is to conduct a simple daylight inspection. These inspections look to identify areas where light can enter the dock through gaps between the top of the trailer and the seal or shelter. Any gap that allows light to leak in will likewise allow water to penetrate the dock, so sealing daylight gaps is vital to ensure a dry loading area.

Another contributing factor to the presence of gaps and water infiltration can be due to the design, build and condition of the trailer. Some high-end trailers are well designed to shed water, where others are built to be cost-effective solutions in areas where rain is not an issue. Trailers with rear gutter systems allow significantly less water intrusion across loading dock door lanes because the rear portion of the trailer is designed to seal out, funnel and divert water to either side. However, when water-shedding features on trailers are defective or nonexistent, the result can act like a faucet and ultimately direct water across the loading door lane near the seal interface. There are several trailer features and defects that create gaps and contribute to water entering the loading dock area. These defects include dents from hail, rolling creases made when the trailer roof warps or bends and sharp edges created from punctures, damage or during the manufacturing process. Fastening strips that are not sealed properly or have a sharp angle can also channel standing water from the top surface to the rear corners and bypass traditional rain guards.

While head curtains help seal some of the gaps along the tops of trailers, they do not offer the durability needed to block runoff from trailers and water can often breach underneath the curtain and flow onto the dock below. Due to their lightweight and pliable fabric design, head curtains also lack the rigidity needed to stop large snowdrifts and ice chunks that accumulate on trailers. Additionally, trailer float causes vehicles to move up and down during loading and unloading, interrupting the seal along the top of the dock. Head curtains and traditional rain guards are unable to compensate for trailer movement and cannot maintain continuous contact with trailers as they shift vertically. Larger gaps along the trailer top can also occur if the head curtain or rain guard is not sized correctly to accommodate various truck heights.



*Trailer damage and irregularities create gaps where water can enter the dock*

## Physical and Economic Hazards

The presence of water, snow or ice at the loading dock creates threats to employee safety, product integrity and profitability. Any amount of water at the dock creates slippery conditions that can lead to injuries or damaged products and equipment. This is because water on smooth surfaces, like indoor concrete slabs found at loading docks, acts as a highly effective lubricant. What makes matters worse is that water is not immediately visible to pedestrians or forklift drivers.<sup>2</sup> All accidents at the dock, regardless if it involves personnel, freight or forklifts, come with a variety of costs and the combined financial impacts can be detrimental for businesses. The National Safety Council estimates that a total of \$170.8 billion was spent on workplace injuries in 2018.<sup>3</sup> This total includes wage and productivity losses, medical expenses, administrative costs and damage to motorized vehicles. However, the true cost per year is even higher, as this estimate does not include product damage or equipment repairs.

The National Institute for Occupational Safety and Health (NIOSH) found that 27% of all nonfatal work injuries that resulted in days away from work were related to slips, trips, and falls and that a disproportionately high number of incidents were reported at loading docks and warehouses.<sup>4</sup> NIOSH also ranks slips, trips and falls as the second-highest cause for both fatal and non-fatal injuries. OSHA also recognizes the dangers that wet walking surfaces pose to workers and states in standards 1920.22(a)(2) and (a)(3) that floors must be kept clean, dry and free of leaks, spills, snow and ice.<sup>5</sup>

Along with concerns over employee safety and reducing workplace accidents, moisture also threatens product integrity and can further reduce a facility's profitability. Perishable resulting in compromised product integrity. Retailers may question the quality and worth

of containers that arrive wet or be unable to put them on shelves if the retail packaging has visible signs of water damage. This could result in the goods being transported back to the warehouse facility for inspection or needing to be disposed of. Products that are transported at the loading dock are typically packaged in cardboard boxes and stacked on wooden pallets. Wet wood and cardboard can develop mold and fungus, compromising not only the packaging and its contents but also posing serious air quality issues in the building and creating health concerns for employees.<sup>2</sup>

Whether water is causing unsafe conditions at the dock or affecting the quality and integrity of freight, businesses face steep economic consequences when loading docks are not sealed properly against rain and water runoff. Preventing water infiltration to keep loading areas dry and reduce slips and falls should be any facility's top priority to safeguard their personnel, products and profits. However, as we discussed in the last section, this can be challenging at loading docks due to the gap along the tops of trailers caused by variations in vehicle height and the limited protection that head curtains provide at declined docks.

## The Solution

Although seals and shelters protect docks from weather, dust, fumes, pests and temperature fluctuation, they face certain obstacles when blocking water. Sealing the gaps along the top of the trailer with a secondary overhead water mitigation product is the only way to effectively block water runoff, especially at declined approaches. Creating a complete, tight seal along the top of the trailer is essential to maintaining the integrity of products, equipment and operations. Unlike a simple head curtain that can be pushed aside by flowing water, an additional sealing product must be weighted to perpetuate a solid connection with the trailer top.

Weighted trailer top seals establish a dam that forces the flow of water off the sides of the trailer before it can reach the dock door opening.<sup>1</sup> These secondary seals maintain contact with the trailer as it moves up and down during loading and unloading and prevent water infiltration in ways that traditional seals, shelters and head curtains or rain guards cannot. By maintaining a seal with the trailer, any water that rushes towards the building will hit the water barrier and divert away from the loading dock door lane. When selecting which seal is right for your business, look for a product that is versatile, dependable and rugged.

The Rain Deflector (RD) Xtreme from NOVA Technology is setting a new standard for water protection in the material handling industry. It is a multi-layer water defense system that is compatible with existing seals and shelters to block rain and water runoff from entering the loading dock, even at declined approaches. It was designed specifically to meet the needs of food-grade facilities that have a zero-tolerance policy



*NOVA Rain Deflector Xtreme*

for rainwater entry. Its integrated wiper system redirects precipitation away from the facility to keep employees, freight and loading dock floors dry to preserve product integrity and maintain safe working conditions. Instead of rushing into the loading area, water hits the RD Xtreme and flows down the sides of the trailer. Due to its rigid construction, the RD Xtreme even pushes snow and ice buildup back towards the trailer or off the sides for enhanced employee protection in winter.

Designed for versatility, the RD Xtreme is compatible with a wide variety of vehicles and most trailer sizes, covering truck

heights ranging from 12 feet 6 inches to 13 feet 6 inches. The frame is made from pressure-treated, kiln-dried wood with a raked header for water drainage and heavy-duty steel brackets for reinforced snow load support. The unit features a pivoting design and a flexible front pad filled with high-density foam that compresses and moves with the truck as it approaches the dock, conforming to irregularities and creating a positive seal against the top of the trailer. Each unit comes with a standard 20-inch projection beyond the existing seal or shelter for greater coverage and side flaps with added stay pockets for draft protection. This user-friendly product also helps eliminate downtime and reduces overall maintenance and repair costs with a removable face that allows for quick and easy replacements when necessary.

*NOVA Rain Deflector Xtreme Plus Shelter*

## Key Takeaways

Any amount of water infiltration at the loading dock can be detrimental to employee safety, workflow efficiency and product integrity. Wet walking-working surfaces can lead to slip hazards that cause workplace accidents and injuries. These accidents can have costly ramifications in terms of damage to equipment or cargo, employee medical expenses and time away from work. Water that falls onto cargo during loading or unloading can lead to a loss in product profitability if it damages packaging or ruins the contents inside. Protecting your facility against the physical and economic hazards of water infiltration starts with having a reliable secondary overhead sealing system at the loading dock that can block water, ice and snow runoff from trailer tops.

In this white paper, you learned:

- How water infiltrates the loading dock
- Various factors that contribute to gaps along trailer tops
- How to locate gaps at the dock that may not be immediately visible
- Why head curtains and traditional rain guards cannot protect against trailer runoff
- The financial impacts that can occur from slippery loading dock conditions
- Why secondary overhead seals are needed to block water, especially at declined docks
- How the Rain Deflector Xtreme from NOVA Technology provides maximum water protection at the dock and is a best-in-class water defense system

A secondary overhead water mitigation product like the Rain Deflector Xtreme delivers the dependable performance you can count on to block rainwater entry and runoff from trailers from entering your loading dock. By sealing the gaps along the tops of trailers and redirecting water away from the dock, you can better protect your personnel and products against water hazards and damage.

## About NOVA Technology

NOVA Technology is an international manufacturer and distributor of loading dock equipment and accessories. For over 30 years, NOVA has provided the innovation, reliability and resources needed for our customers to handle the continuously evolving needs of the material handling industry. We offer a variety of dock levelers, seals and shelters, vehicle restraints, light communication systems, dock lifts, safety barrier products and a selection of aftermarket parts and accessories. All of our products are designed to maximize safety, productivity, security and environmental control at loading docks and throughout commercial facilities. Call us today at 1-800-236-7325 or send an email to [sales@novalocks.com](mailto:sales@novalocks.com) for more information or to find a dealer in your area.



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