

# VALMONT MITIGATOR™ TR1



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## QUESTIONS AND ANSWERS

**Q: What is the Valmont Mitigator™ TR1 and what need does this new product innovation address?**

A: The Mitigator TR-1 is a vibration-mitigation device that reduces unwanted vertical vibration in traffic-pole mast arms and related horizontal pole structures. For years, I have listened to traffic engineers as they expressed their challenges in damping the motion which wind, trucks and other factors can induce on mast arms. This vibration-mitigation device technology addresses these needs, is simple to install, and requires no maintenance. Making it an excellent solution to the current vibration problem.

**Q: Who are the decision makers that need to know about this product innovation?**

A: Generally, DOT transportation engineers, as well as county and municipal traffic managers, will be interested in specifying and purchasing the Mitigator TR-1.

**Q: What are the primary benefits of installing the Mitigator TR-1 on a mast arm?**

A. The most important benefit is improved roadway and public safety. This product is proven to dampen wind-induced vibration by up to 90% on most poles. In doing so, the Mitigator TR-1 extends fatigue life.

**Q: How does this product facilitate roadway safety?**

A. In areas with high winds, frequent winds or regular high-speed truck gusts, mast arms will bounce up and down. When this movement is caused by wind, it is a term commonly referred to as galloping. By significantly damping this vibration-induced motion, pole life is extended because the cyclic stress range of the material is reduced. This reduction in movement also decreases the likelihood of a mast arm failure which creates a safer driving environment.

**Q: How is the TR1 damper different than a sign blank or aerodynamic damper?**

A. The TR1 damper solves the vibration problem by modifying the structure itself – adding high levels of damping such that the structure is no longer susceptible to vibrations. The sign blank (or aerodynamic damper) attempts to protect the structure by lessening the wind load on the structure. In some cases this works, however, if the wind characteristics change (i.e. vortex or truck induced or direction) the sign blank will provide limited or no protection. The TR1 damper works regardless of the type of wind excitation.

Q: Does the product meet AASHTO specifications?

A: According to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals (3), various traffic structures should be designed for fatigue, considering galloping, vortex shedding, natural wind gust and truck induced gust loading. Further, when a structure exhibits vibration in the field, a vibration mitigation device can be considered. For some traffic structures, the AASHTO specifications specify that in lieu of designing for galloping and vortex shedding forces, an effective vibration-mitigation device may be used to reduce vertical deflections when approved by the owner (whether a DOT, a county or municipality). The TR1 vibration damping characteristics have been verified by research results considering a wide range of structures, over 1000 nonlinear dynamic simulations, and full-scale laboratory tests at the University of Connecticut to be considered as an effective vibration mitigation device.

Q: Can the Mitigator TR-1 be installed on existing infrastructure?

A. Yes. In fact, installing the product on existing infrastructure may extend the pole's service life and lower maintenance and repair costs and can reduce the vertical motion of cantilever arms for clearer video imagery for installed cameras.

Q: When should the product be specified on a new installation?

A. As a device that enhances public safety, I recommend traffic engineers consider this vibration damper on any new mast arm installation. The product is most likely to be embraced in areas which experience high winds, frequent wind gusts, or regular truck gusts.

Q: Is the product easy to install?

A. Yes. The Valmont Mitigator TR1 Vibration Damper is attached to the mast arm using specially designed mounting hardware near the tip of the mast arm. The product weighs just under 35 pounds and because the vibration damper is a self-contained vertical tube that is only 4.5-inches in diameter and 43-inches long, it is easy for a traffic maintenance professional to install. This smaller design also allows you to shield the device behind a traffic signal.

Q: With the design being patent-pending, is this vibration-mitigation device a Valmont exclusive?

A. Yes, the product and its patent-pending technologies are a Valmont exclusive. We recognize that DOTs and other entities may choose to attach the Valmont Mitigator product to poles and mast arms supplied by others. Generally speaking, this innovation may be bolted onto most any mast arm, regardless of who manufactured the pole.

Q: How does the technology work?

A. The Valmont Mitigator TR1 Vibration Damper is a self-contained vertical damper unit weighing 35 lbs., which is housed within a 4.5" diameter aluminum tube 43" in length. A reciprocating mass is suspended in the tube with a stainless-steel extension spring. Magnets located on the reciprocation mass moving through the aluminum tube create eddy-currents, which provide damping and are extremely effective in damping low-amplitude motion. Specially designed bearings on the mass provide proper pneumatic damping at larger amplitudes. The patent-pending design ensures effective mitigation for a broad range of pole structures and amplitudes of vibration, quiet operation, and a compact and fully sealed housing. The TR1 damper requires little to no maintenance over the life of the pole structure.

Q: What is meant by fatigue life?

A. Fatigue life is an engineering term. In laymen's terms, fatigue life relates to the number of stress cycles a product may endure, which can determine the product's life expectancy. By dramatically reducing repetitive bouncing motion, the Mitigator TR1 vibration damper will extend a traffic mast arm structure's fatigue life.

Q: This is a new product. How has the technology been tested?

A. The TR1 damper has been tested to over one million cycles with no observable degradation in the unit or the performance of the damper. The technology has also been tested on a variety of different mast arm structures to verify dampening performance.

Q: For those who may be unfamiliar with Valmont, can you tell me a bit about the Valmont Structures business?

A. Valmont Structures designs and manufactures a wide range of engineered products around the world that include outdoor lighting poles and high masts as well as traffic control and mass-transit structures. Other Valmont businesses offer an array of highway safety products in the U.S., Canada and internationally. This new Mitigator TR1 vibration-damper safety product is a natural fit to our existing product offering which we believe many of our customers will be eager to purchase and install on new and existing installations.

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