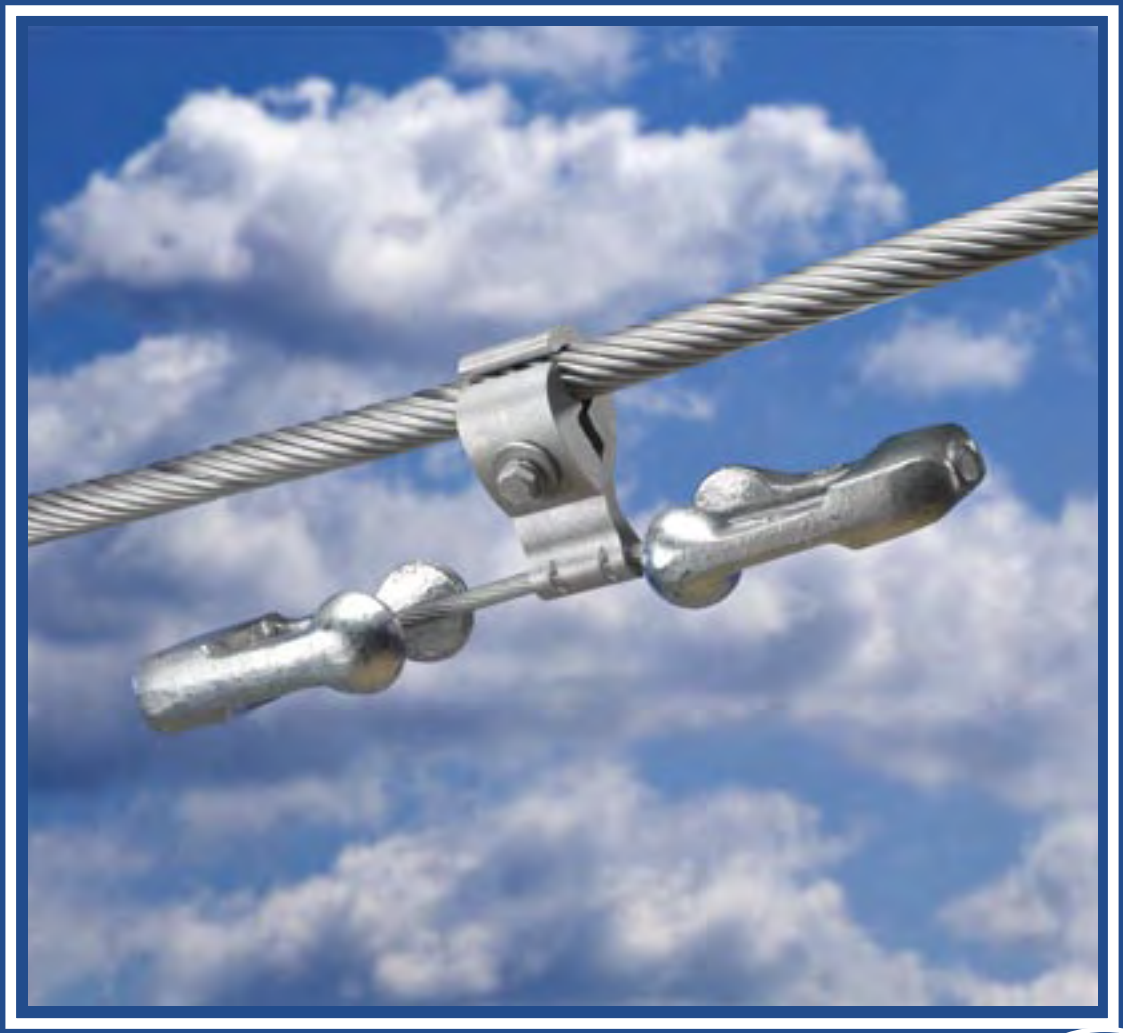
VORTX™ Vibration Damper

for Conductor, Cable, Earth Wires & OPGW



The latest design from PLP's
worldwide portfolio of dampers

VORTX™ Damper

From the Recognized Leader in Conductor Protection

Much of PLP's business has developed from over 50 years of studying and analyzing the effects of wind induced conductor motion. It began in 1947 with the PREFORMED Armor Rod designed to protect power cables from abrasion and fatigue. PLP products are continually tested and evaluated, both in the laboratory and field to insure customers of having the finest product possible whether in support systems, or motion control.

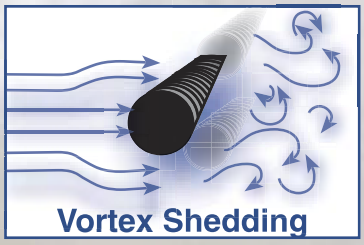
The worldwide group of PLP companies have tested, evaluated and offered a number of motion control designs through their history. Most are unique in design and offer the best cable protection for their specific purpose.

Aeolian Vibration - Its Affect on Conductor

Aeolian vibration is a high frequency low amplitude motion caused by smooth laminar winds passing across the line. When conductors or cables are exposed to this wind a phenomenon known as eddy shedding occurs. Eddy or Vortex shedding creates an alternating pressure imbalance inducing the conductor to move up and down at right angles to the direction of air flow. These vibrations take the form of discrete standing waves that can cause support hardware breakdown, conductor fatigue, abrasion and eventually conductor failure.

The frequency of Aeolian vibration is directly related to the diameter of the wire. Assuming a constant wind velocity, the smaller the diameter of the wire, the higher the frequency of vibration.

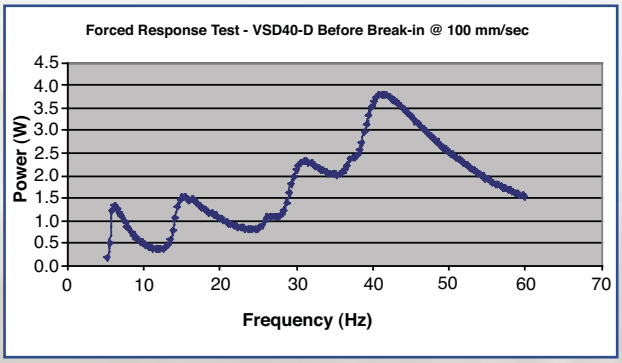
Aeolian vibration can cause wear and fatigue on lines and their supporting hardware. These high frequency, low amplitude standing waves are almost invisible to the naked eye from any distance. Special instruments are required to determine the severity of vibration. One can sometimes feel the vibration by touching the main structure members as vibration can be transmitted to the supporting structure.



VORTX Damper Reduces Aeolian Vibration

The VORTX Damper improves upon the proven theory of the Stockbridge damper invented decades ago. It converts wind induced energy from the conductor into heat generated by weights oscillating on short pieces of messenger cable. The original Stockbridge Dampers were effective at reducing vibration for 2 frequencies of conductor vibration.

The VORTX Damper exceeds the 2 response performance with a multi-response design that effectively reduces vibration over a wider range of imposing frequencies. This is accomplished by a design that has unequal messenger strand lengths enhanced with unequal weights. The weight sizes and messenger strand lengths are matched to specific conductor/cable impedance and line operating conditions that achieve optimum performance.



Features

- Contoured Clamp - Aluminum alloy extrusions offer a more "precision" fit to evenly capture the conductor. As a result, tightening the bolt brings the clamp and keeper together with evenly distributed pressure along the conductor surface.
- Clamp Profile - The clamp profile is configured to hang from the conductor or cable during installation in accordance with IEC standards. Hands are free to wrench tighten and reach proper torque.
- Messenger Strand - Galvanized steel messenger strand absorbs the vibration energy efficiently with optimum manufacturing techniques.
- Weight - Galvanized modular iron weights hug the sides of the messenger strand, not enclosing it. The possibility of corrosion is reduced.
- Weight Attachment: - PLP offers a collet type attachment to secure the weights to the messenger. The attachment meets pull-off strength requirements in accordance with IEC standards without changing properties of the adjoining messenger. On the other hand, heat from casting or welding methods can change the messenger strand properties and reduce performance. Glue compounds are avoided as well due to varying performance with changing temperature - colder climates can significantly increase glue hardness and affect response between weight and messenger.

Contoured Clamp

VORTX™ Damper

Technical Support & Product Recommendations

Preformed Line Products is known worldwide for quality technical support. Our field representatives can help you determine the cause and effect of wind-induced motion and help you minimize the effect.

PLP uses a proprietary computer program to make product recommendations for maximizing damper performance. The program input considers many variables specific to individual lines, their designs, construction, and local operating conditions. The output recommendations include; specific model VORTX Damper, quantity, and their placement location on the span.

For some damper installations (such as cables incorporating fiber optics) customers might install damper over a set of protective Factory formed rods. PLP Protector Rods are offered for this purpose combining structural reinforcement in a relatively compact length.

PLP is no stranger to the field of vibration dampers. We've tested and evaluated many design dampers for over 50 years. Worldwide, PLP companies have offered them to the market for decades. In addition, PLP invented and offers the Spiral Vibration Damper (SVD), an impact type damper that is most effective for distribution size conductors and shield/ground wires.

Aeolian vibration is not the only wind induced motion that causes conductor abrasion and fatigue. "Galloping", a low frequency, high amplitude motion can cause as much, or more conductor or structure damage. PLP offers the Air Flow Spoiler (AFS), a uniquely designed product that is wrapped on conductor or cable to change its "profile" to maintain aerodynamic stability reducing the incidence of galloping.

Technical Support - when you need it!

Installation

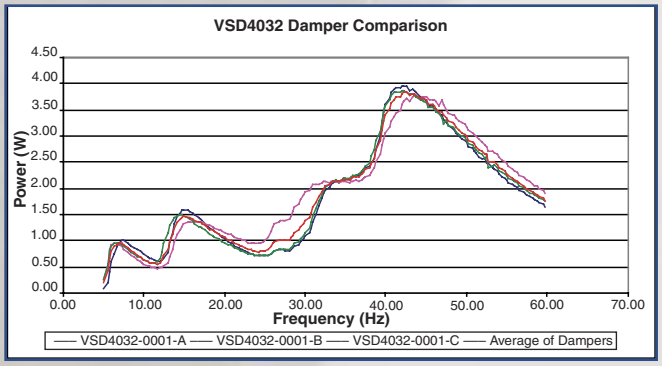
PLP offers technical service to recommend proper dampers, their quantity and placement locations. VORTX Dampers can be installed on either unenergized (cold) or energized (hot) lines, using hot sticks. Application instructions are supplied with each order. They include recommended procedure and bolt tightness.

Technical Assessment

The VORTX Damper was developed and tested at PLP's Engineering Facility, recognized as having one of the foremost cable vibration laboratories in the world.

PLP Laboratory

VORTX Dampers are tested in accordance to IEC 61897 Overhead Lines - Requirements and tests for Stockbridge Type Aeolian Vibration Dampers. This demanding test series includes energy dissipation of the damper along with mechanical, electrical, and fatigue performance. All sizes meet or exceed requirements of the standard. Contact PLP for test reports that cover the results in detail. Testing and field studies continue as a service to our customers and commitment to technical improvement.



Frequency Response Comparison of 3 Dampers

Electrical Corona Testing of VORTX Damper

VORTX™ Damper

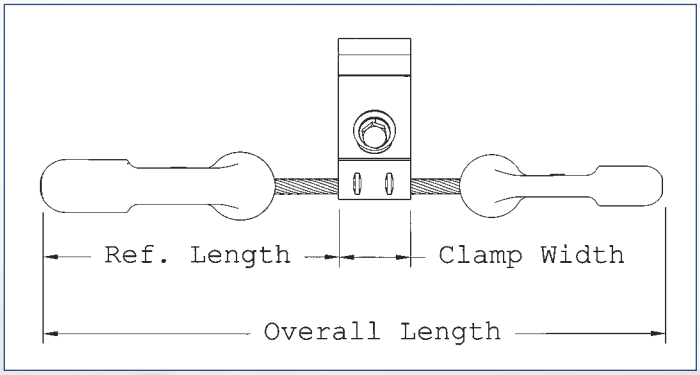
VORTX DAMPER Catalog Number code:

VSD - 40 32

"VSD" – Vortx (Stockbridge) Damper

Weight Combination (10, 20, 30, 40, 50)
Weight selection is based on appropriate impedance for respective conductor or cable

Clamp Code (10, 12, 16, 20, 25, 32, 40, 50, 61)
The clamp code represents the top end of the clamp range or maximum accepted cable diameter in millimeters.



VORTX DAMPER DETAILS FOR CONDUCTOR AND SHIELD WIRE APPLICATIONS

Catalog Number*	Clamp Range Inches		Clamp Range mm		Overall Length Inches (mm)	Ref. Length Inches (mm)	Clamp Width Inches (mm)	Bolt Size (mm)	Install Torque Ft-lb (N-m)	Assembled Weight Pounds (Kilograms)
	Min	Max	Min	Max						
VSD-1012	0.381	0.483	9.7	12.3	14 (356)	5 (127)	1.6 (41)	M10 x 50	30 (41)	3.8 (1.7)
VSD-1020	0.612	0.786	15.5	20.0	14 (356)	5 (127)	2.0 (51)	M10 x 50	30 (41)	3.8 (1.7)
VSD-2016	0.483	0.612	12.3	15.5	18 (457)	6.9 (175)	1.6 (41)	M10 x 50	30 (41)	3.8 (1.7)
VSD-2020	0.612	0.786	15.5	20.0	18 (457)	6.9 (175)	2.0 (50.8)	M10 x 50	30 (41)	3.8 (1.7)
VSD-2025	0.786	0.983	20.0	25.0	18 (457)	6.9 (175)	2.0 (50.8)	M10 x 50	30 (41)	3.9 (1.8)
VSD-2032	0.983	1.261	25.0	32.0	18.2 (462)	6.9 (175)	2.2 (56)	M12 x 70	40 (54)	4.2 (2.0)
VSD-2520	0.612	0.786	15.5	20.0	12.5 (318)	6.5 (165)	2.0 (50.8)	M10 x 50	30 (41)	5.0 (2.3)
VSD-2525	0.786	0.983	20.0	25.0	12.5 (318)	6.5 (165)	2.0 (50.8)	M10 x 50	30 (41)	5.1 (2.3)
VSD-2532	0.983	1.261	25.0	32.0	12.5 (318)	6.5 (165)	2.2 (56)	M12 x 70	40 (54)	5.2 (2.4)
VSD-3525	0.786	0.983	20.0	25.0	15 (381)	7.0 (178)	2.0 (50.8)	M10 x 50	30 (41)	7.2 (3.3)
VSD-3532	0.983	1.261	25.0	32.0	15 (381)	7.0 (178)	2.2 (56)	M12 x 70	40 (54)	7.3 (3.3)
VSD-3540	1.261	1.579	32.0	40.1	15 (381)	7.0 (178)	2.38 (61)	M12 x 70	40 (54)	7.4 (3.4)
VSD-3550	1.579	1.970	40.1	50.0	15 (381)	7.0 (178)	2.5 (63.5)	M12 x 70	40 (54)	7.5 (3.4)
VSD-4032	0.983	1.261	25.0	32.0	25 (635)	10.5 (267)	2.2 (56)	M12 x 70	40 (54)	10.8 (4.9)
VSD-4040	1.261	1.579	32.0	40.1	25 (635)	10.5 (267)	2.38 (61)	M12 x 70	40 (54)	10.9 (4.9)
VSD-4050	1.579	1.970	40.1	50.0	25 (635)	10.5 (267)	2.5 (63.5)	M12 x 70	40 (54)	11.3 (5.1)
VSD-4061	1.970	2.403	50.0	61.0	25.5 (648)	10.5 (267)	3.0 (76)	M12 x 75	40 (54)	11.4 (5.2)
VSD-5040	1.261	1.579	32.0	40.1	28 (711)	11 (279)	2.38 (61)	M12 x 75	40 (54)	12.1 (5.5)
VSD-5050	1.579	1.970	40.1	50.0	28 (711)	11 (279)	2.5 (63.5)	M12 x 75	40 (54)	12.1 (5.5)
VSD-5061	1.970	2.403	50.0	61.0	28 (711)	11 (279)	3.0 (76)	M12 x 75	40 (54)	12.1 (5.5)

Shaded rows represent Dampers that in most cases are directly applied to ACSR, ACAR, ACCR and AAAC conductor without armor rods or other protective rods.
*Verify appropriate weight code for specific conductor in catalog table titled "Weight Combination for Conductor and Shield Wire Sizes" or contact PLP technical support.

PREFORMED LINE PRODUCTS

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