THE ORIGINAL fluidampr®

5 THINGS YOU NEED TO KNOW ABOUT PROTECTING YOUR ENGINE.

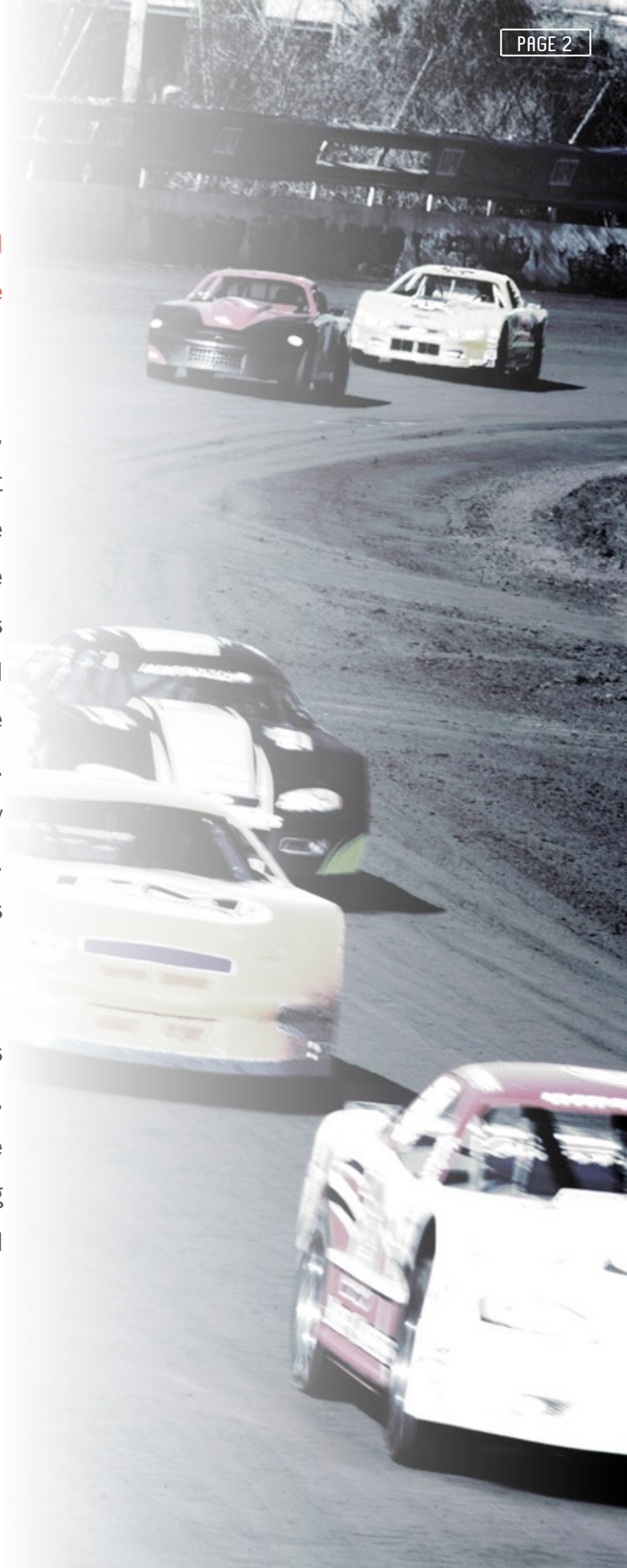
PHOTO COURTESY: GARY PECK

TORSIONAL VIBRATION CAN WEAR AND BREAK CRITICAL ENGINE COMPONENTS.

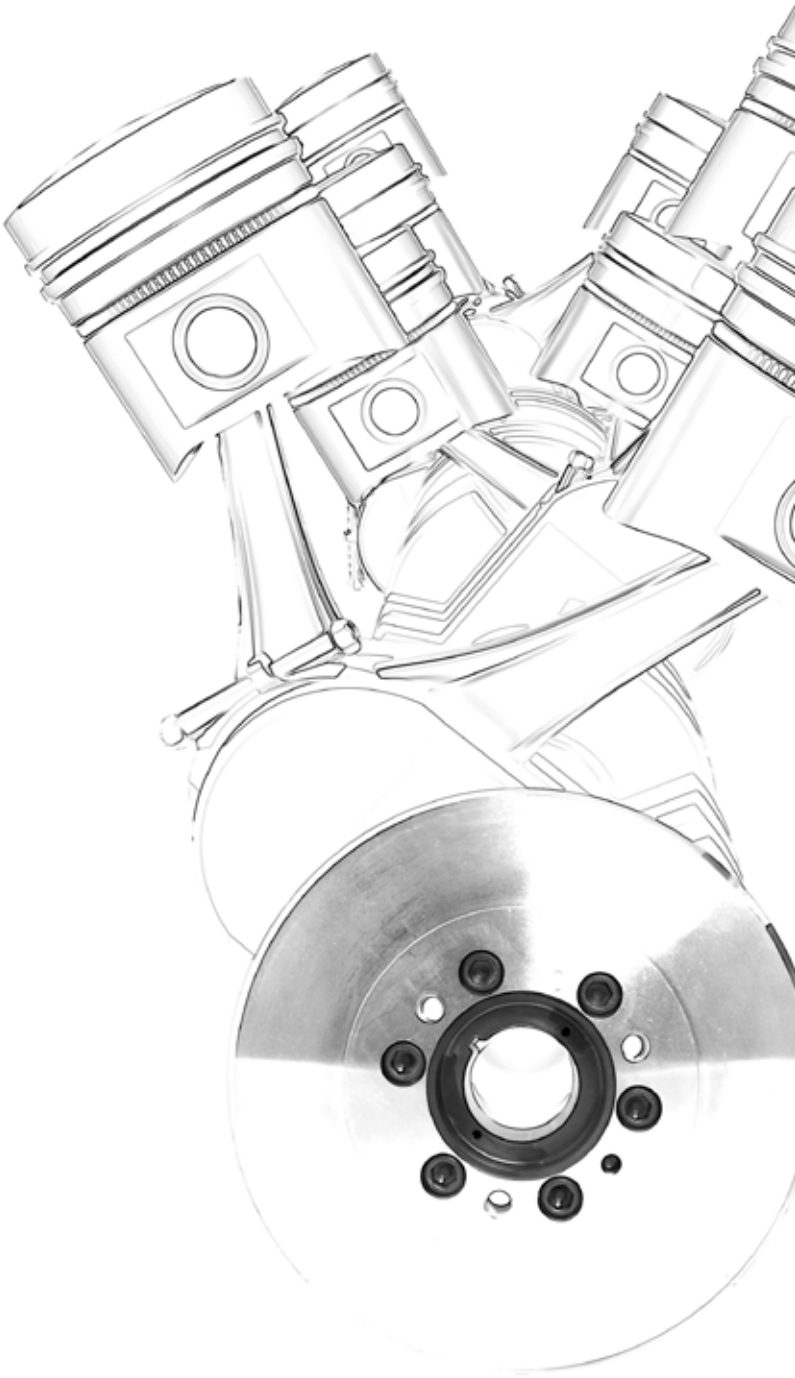
Torsional vibration is the slight twisting and rebounding of the crank generated by the torque of each power stroke.

Modern engines may appear to run smoothly, but slow it way down and try to imagine what is happening in every revolution: The force generated by compressing fuel and air inside each cylinder and the ignition that slams the weight of the piston and connecting rod into the crankshaft is actually flexing the crankshaft ahead of its natural rotation. This causes the crankshaft to remain slightly twisted as it accelerates and rebounds back. Acting like a spring, vibration is released as the crankshaft unwinds.

In mechanical engineering terms this is referred to as torsional vibration. Hot rods, racers and tuners have been calling it engine harmonics for generations and it is a leading cause of internal engine wear, power loss and engine failure.



A HARMONIC BALANCER IS A VITAL ENGINE COMPONENT THAT CONTROLS TORSIONAL VIBRATION.



This often overlooked essential engine component directly affects the operating efficiency and longevity of an engine.

A harmonic balancer, also referred to as a damper or torque damper, is located on the crankshaft opposite the end the flywheel is on. It's job is to absorb torsional vibration created by the engine. If the damper is worn or not tuned correctly, torsional vibration will rebound back through the crankshaft. The vibration is transmitted through everything associated with or driven by the crankshaft. Over time uncontrolled torsional vibration causes wear on the main bearings, oil pump gears, and timing components. Inefficient valve timing also leads to a loss of torque, horsepower and fuel economy.

All engines experience torsional vibration to some degree. The extent of vibration is determined by the amount of force exerted on the crankshaft in conjunction with the mass and composition of the rotating assembly (pistons, rods, crankshaft, flywheel and damper).

Controlling torsional vibration requires a calculated amount of resistance mass. The cost effective solution for OEM mass production and every day driving is to determine where the critical vibration occurs and bond frequency sensitive elastomer (rubber) between a hub and inertia ring. This is referred to as a tuned mass absorber since the harmonic balancer only functions within a narrow predetermined frequency range.

ENGINE MODIFICATIONS INCREASE TORSIONAL VIBRATION LEVELS

The most common performance upgrades are to increase horsepower and lighten components. Previously discussed, stock rubber dampers are frequency sensitive and designed to protect against critical torsional vibration under stock conditions. As soon as performance upgrades are made the stock harmonic balancer begins to lose its effectiveness to protect your engine. This will cause premature engine wear from torsional vibration damage for two reasons:

First, when performance products that increase torque are added it causes the stock harmonic balancer to work harder in the same frequency range. Excessive heat is then generated within the elastomer layer. Rubber is a very poor dissipater of heat. The result is that the rubber rapidly bulges and/or cracks. Eventually the outer ring will start slipping and not function properly when needed. At this point the damper is worn and compromised from adequately protecting the engine from torsional vibration. As the slipping and cracking becomes worse, you risk the danger of the damper coming apart and creating a hazard. This is why stock harmonic balancers are not permitted in many racing events. Age and exposure to oils and solvents will also cause hardening and cracking that will lead to the same outcome.

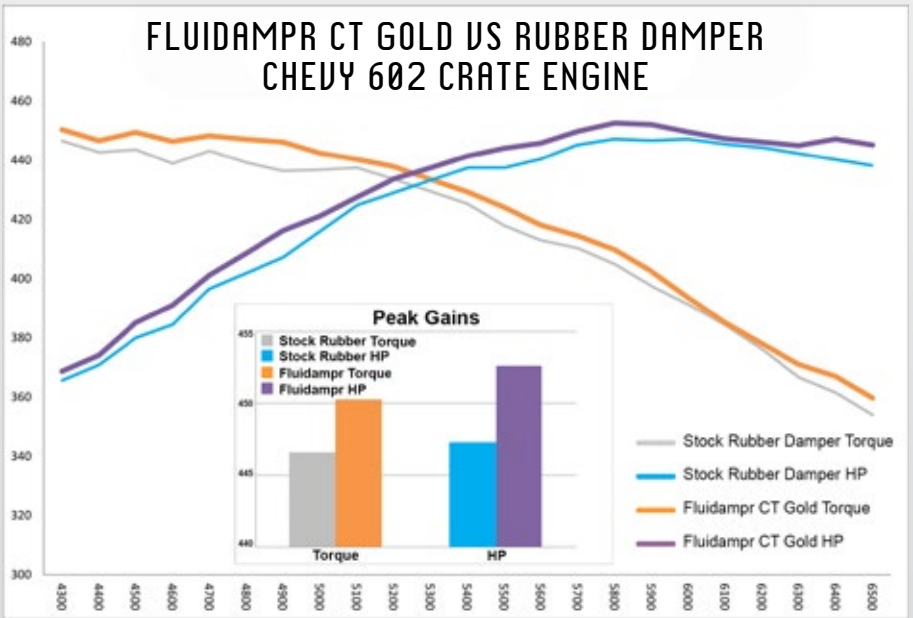
Second, when lightweight components are added, such as eliminating the stock damper for a solid lightweight aluminum pulley or installing a lightweight flywheel, it reduces the counteracting mass needed to damp torsional vibration. More importantly, the change in overall composition of the crankshaft assembly also changes its natural resonant frequency. In addition to accelerating engine wear by inadequate torsional vibration damping, it may greatly increase the risk of snapping the crank.

AS SEEN IN CIRCLE TRACK MAGAZINE:

"We thought the CT Gold damper would help the engine accelerate faster on the racetrack thanks to its reduced weight, but we weren't sure if that would correlate to power numbers on the engine dyno, which works differently. We were impressed by the Fluidampr unit, which produced more horsepower all the way through the pull."
- Jeff Huneycutt, Circle Track Magazine

READ ARTICLE ONLINE

http://www.circletrack.com/enginetech/ctrp_1211_quality_damper_installation_shock_absorber/



THE FACTS ABOUT STOCK RUBBER HARMONIC BALANCERS

- Rubber harmonic balancers are tuned to only offer protection within a specific frequency.
- Overworking, heat and age reduces the ability of a stock harmonic balancer to properly protect the engine.
- The first signs of a worn harmonic balancer are cracked, bulging or missing rubber.
- A lightweight pulley offers little to no torsional vibration protection.

AS SEEN IN ENGINE BUILDER MAGAZINE:

"The problem is, over a period of time, the rubber in the damper tends to wear out for much the same reason the crankshaft has problems in the first place... Heat starts to break down the rubber causing it to harden and crack. Eventually, the damper starts to lose it's effectiveness. So, torsional twist will start taking it's toll on the crankshaft... I believe the best way to dampen harmonics is with a damper that incorporates a heavy silicone gel."
- Bob McDonald, 04/12 Engine Builder Magazine

Cracked rubber on a stock rubber damper showing early signs of wear.

Stock rubber damper with advanced signs of wear.

Elastomer or rubber harmonic balancers are tuned for a specific narrow frequency range.

SFI CERTIFICATION: WHAT IT STANDS FOR

SFI FOUNDATION INC.

While some performance stock style elastomer harmonic balancers are SFI 18.1 rated, it should be noted that the SFI 18.1 standard only regulates material construction grades and rotational speed tests. It does not address damping medium, damping effectiveness or product durability. http://www.sfifoundation.com/wp-content/pdfs/specs/Spec_18.1_061799.pdf

THE FACTS ABOUT FLUIDAMPR PERFORMANCE VISCOUS DAMPERS

- Broad range protection across entire rpm range.
- No tuning or rebuilds, even after performance modifications have been made.
- Safely unleashes lost torque and horsepower
- Made in USA. SFI 18.1 certified

Fluidampr enhances viscous damper technology commonly used in modern commercial, industrial and high end supercar engines. Fluidampr performance dampers are made from three main components: A CNC precision machined and computer balanced internal inertia ring, similarly manufactured outer housing, and a thin layer of viscous silicone injected between the two. When fitted to the crankshaft snout, the free rotating internal inertia ring absorbs vibration in and out phase with engine speed. The corresponding shearing action of the inertia ring through the silicone transforms the vibration to heat. Heat then rapidly dissipates through the housing creating superior damper life compared to elastomer harmonic balancers.

Race proven for over 25 years, Fluidampr is favored by those who prefer the best engine protection on the market.

"Our drag racing school has utilized Fluidampr products since 1997 and have recorded tens of thousands of runs without showing any sign of wear & tear." - Doug Foley, NHRA Top Fuel Driver

Shear Gap

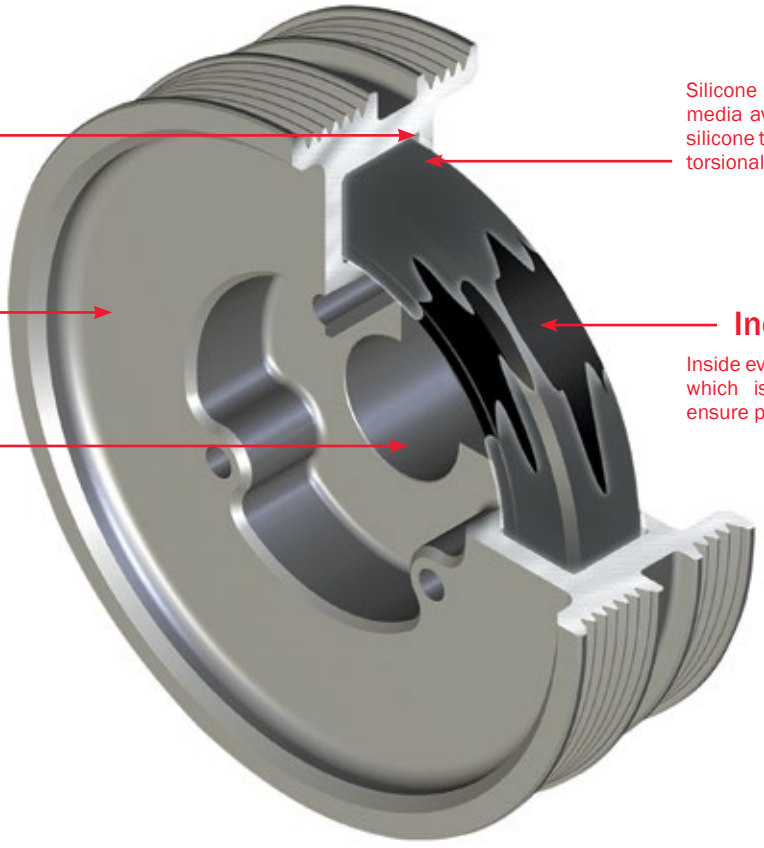
Torsional vibration suspends the internal inertia ring within the shear gap. When suspended and free floating, the crankshaft no longer rotates both damper components at the same rpm, thus reducing parasitic drag and achieving a lower rotating weight.

Damper Housing

Housings are precision machined and balanced.

Bore Size

Fluidampr bore sizes are held to extremely tight tolerances based on OEM specifications.



Silicone Fluid

Silicone fluid is the best dampening media available. Only Fluidampr with its silicone technology can effectively control torsional vibrations at all frequencies.

Inertia Ring, Flywheel

Inside every Fluidampr is a steel flywheel, which is machined and balanced to ensure precision fit and performance.

DID YOU KNOW?

Viscous dampers are used stock on the Lamborghini Gallardo, Audi R8, new 6.7L Dodge Cummins and nearly all high-output diesel engines in trucking, construction, agriculture, locomotives and military.

FLUIDAMPR FACTS CONTINUED...

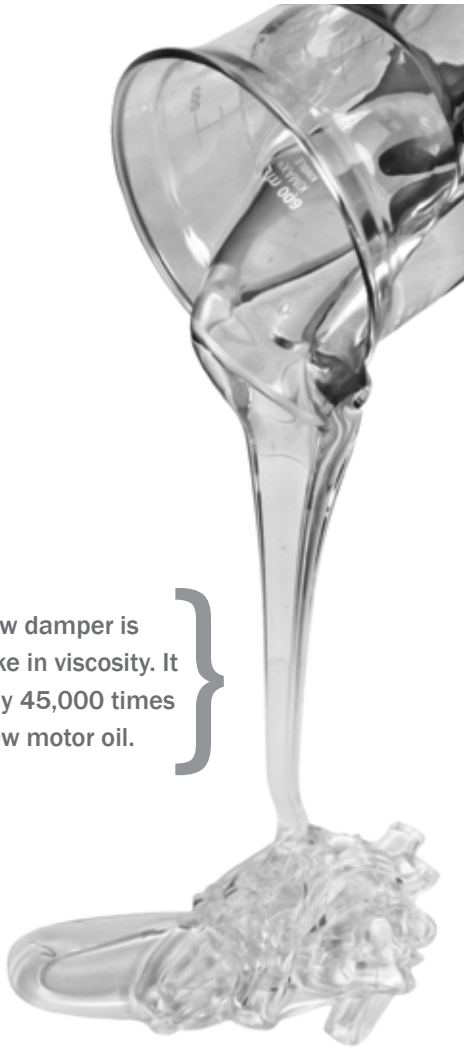
Silicone: A Superior Damping Medium

The engineers at Fluidampr choose a proprietary grade silicone because it is one of the most extremely durable and stable materials under varying temperature changes. Silicone is not as subjective to heat and age deterioration as rubber. Viscous dampers are commonly used on stationary power generators located in Arctic circle oil fields to the blistering heat of over-the-road semi-trucks and locomotives traveling across the desert.

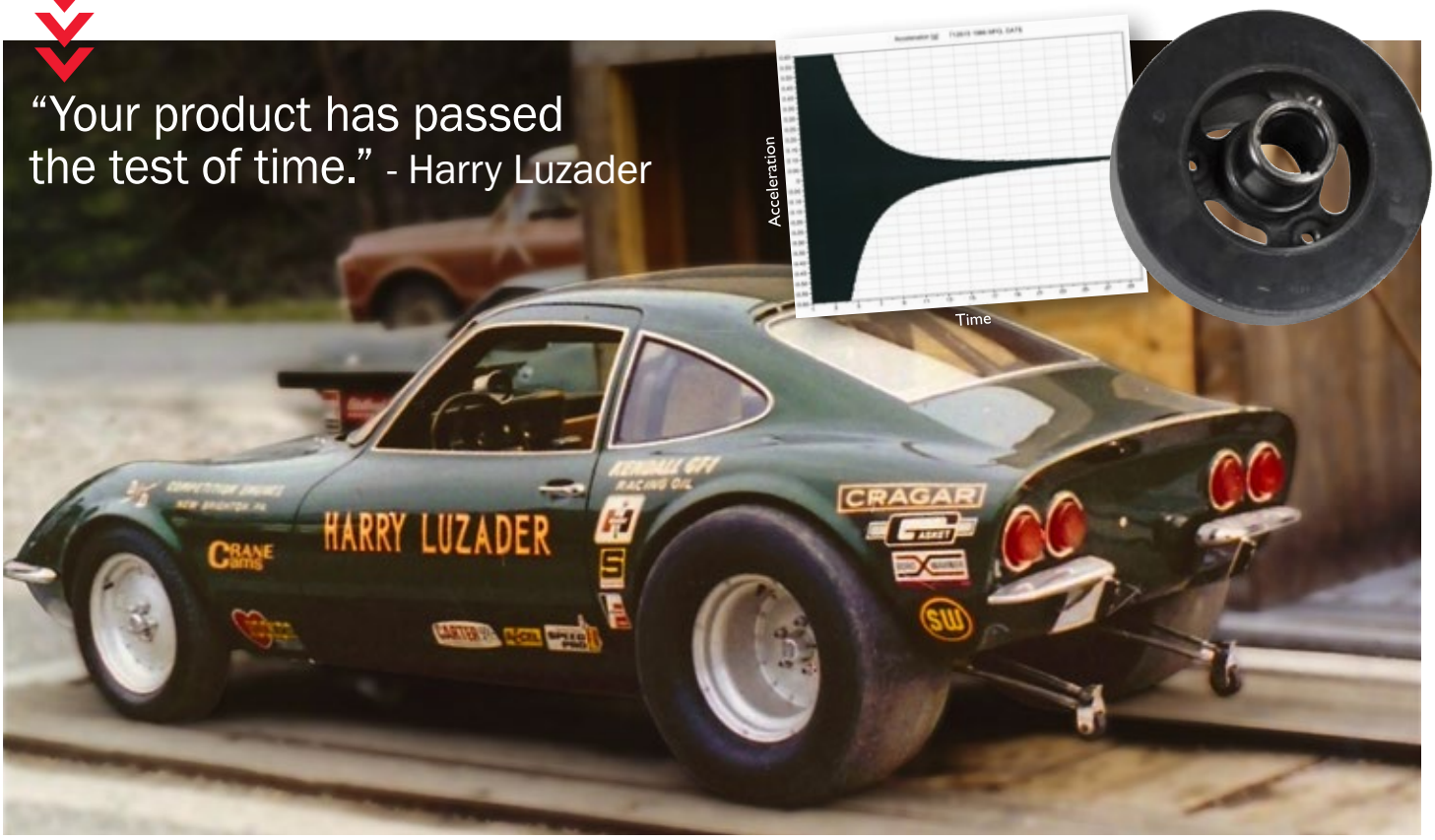
In Summary; For Optimum Protection and Performance Install A Fluidampr When:

- You make any engine performance modifications.
- Your stock elastomer damper shows any signs of wear.
- Competition events require an SFI 18.1 spec damper.

Testing of Harry Luzader's Fluidampr showed a sharp reduction in the vibration amplitudes, giving an accurate damping curve within operating parameters. A date code stamped on the housing cover, and its web hub design, indicates it was one of the first introduced in 1986. The damper is functional after 25 years.



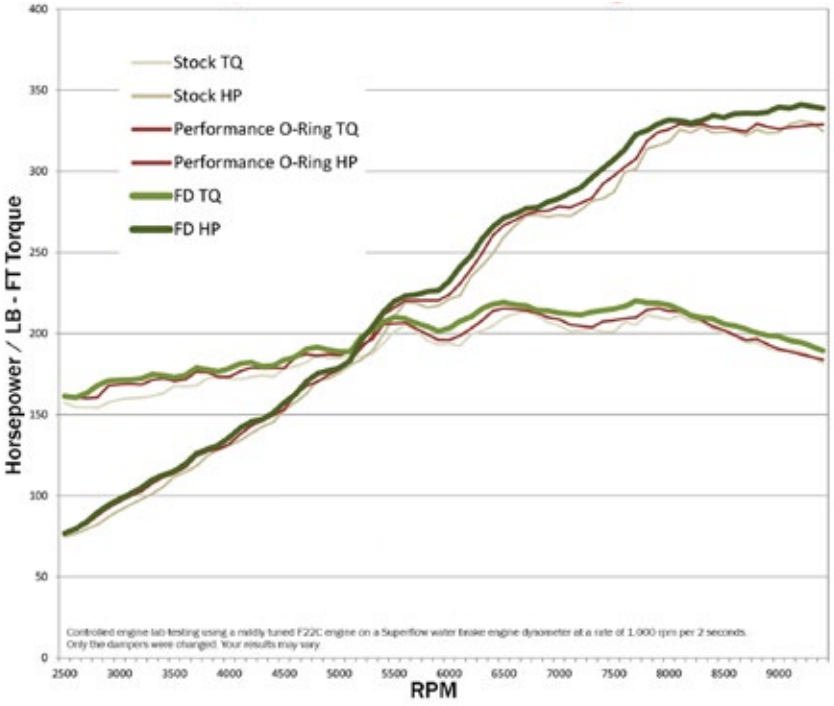
Silicone in a new damper is clear and gel-like in viscosity. It is approximately 45,000 times thicker than 30w motor oil.

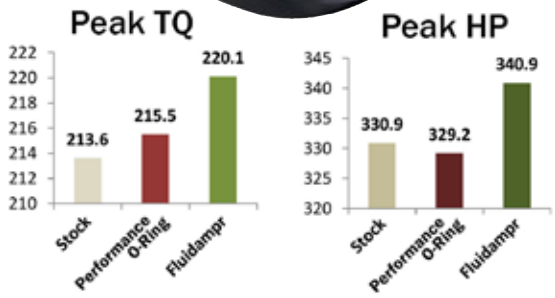


FLUIDAMPR OUT-PERFORMS LEADING COMPETITOR

HONDA F22C ENGINE DYNO TEST RESULTS

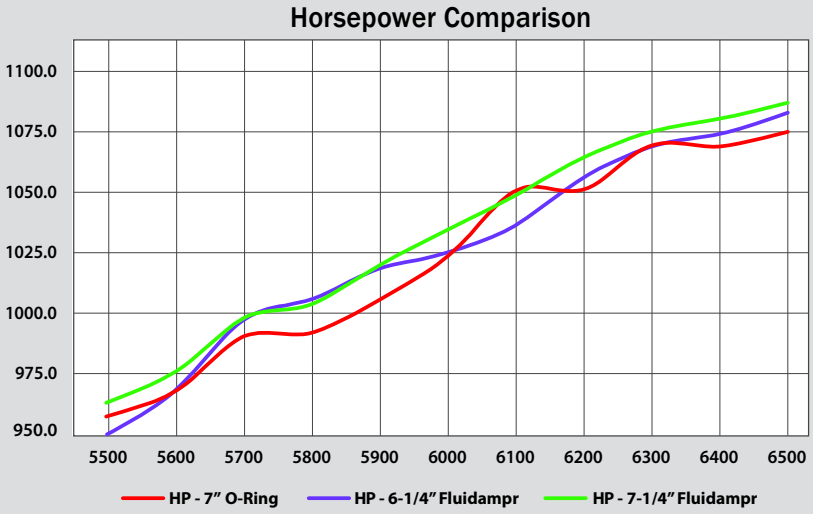
Fluidampr vs Custom Built Performance O-Ring vs Stock

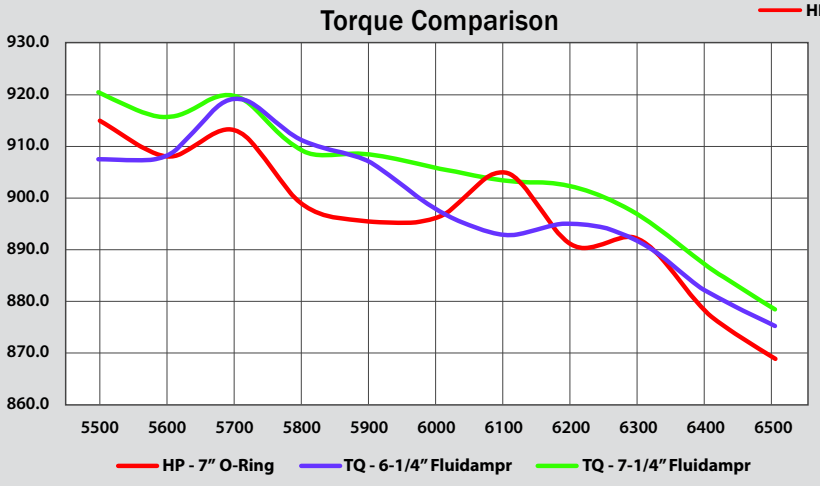




571CI CHEVY BIG BLOCK TEST RESULTS

Independently dyno tested by Stawicki Racing Engines, Medina, NY. Only dampers were changed. Your results may vary.





UNLIKE ELASTOMER, **FLUIDAMPR IS BUILT TO LAST**

THE LIFETIME OF YOUR ENGINE

Fluidampr Silicone	Fluidampr vs Leading Elastomer Damper	Elastomer
✓	THERMALLY STABLE	X
✓	HIGH TENSILE STRENGTH	X
✓	LOW FRICTION	X
✓	SUPERIOR DURABILITY	X
✓	BROAD FREQUENCY COVERAGE	X
✓	NEVER NEEDS TO BE REBUILT	X