

Blast From The Past

Bernoulli Principle Drives Operation Of Innovative New Oil Filter

By Gary Bilski, Chief Engineer with FRAM Filtration

The greatest accomplishment of Daniel Bernoulli, the Dutch-born physicist and mathematician who passed away in 1782 at the ripe old age of 82, is that his work remains incredibly relevant today. His “Bernoulli’s principle” of fluid dynamics, which he developed in 1738, and which states that an increase in the flow rate of a fluid occurs simultaneously with a decrease in the pressure placed on the fluid, remains a foundational element in the operation of many mechanical or hydraulic systems.

The latest manifestation of Bernoulli’s principle can be found in the new Luber-finer line of [Time Release Technology \(TRT\) Oil Filters](#). The innovative TRT filters have been designed to provide a controlled release of a specially formulated, highly concentrated liquid additive into the oil supply, which helps offset the level of acid and oxidation in the oil, especially that which is found in heavy-duty diesel vehicles that have high Exhaust Gas Recirculation (EGR) settings. This is important because over time and over the miles driven by the vehicle the additives—which help control deposits, component wear and acidity—are steadily depleted.

In the end, the TRT technology helps the oil maintain its quality for longer, resulting in increased service life and extended oil-change intervals, and a corresponding decrease in vehicle maintenance and downtime, along with a reduction in the cost of the oil filters and oil themselves.

The TRT’s method of operation, which employs a patent-pending release mechanism, is taken directly from Bernoulli’s principle. The TRT’s oil additive is located in a container that is placed inside the actual oil filter. As slight changes in differential pressure are detected during vehicle operation, the filter knows that it’s time to add the additive, which is introduced to the oil at a minimal rate of several drops per hour.

The rate of addition of the additive is also very important to the filter’s operation because it must be added at the same rate that it is being depleted. Over-additizing can be as harmful to the oil as running out of additive, which is why it is critical that the additive be introduced at a steady rate, rather than being added in bulk at the time of an oil change. The operation of the TRT oil filter, with a helping hand from Daniel Bernoulli and his 275-year-old Bernoulli’s principle,, ensures that the formulation of the oil is at its peak operational level at all times.

A TRT Value Calculator has also been developed to help fleet managers better understand current maintenance costs associated with oil changes and determine their potential fleet savings by effectively using TRT products. For more, go to the [TRT Value Calculator](#).

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