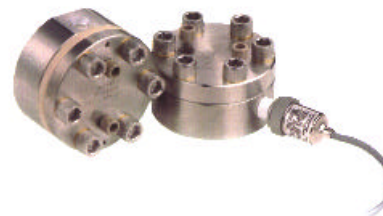


## LO-Pulse® Pulse Damper

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LO-Pulse Pulse Damper



LO-Pulse Kit Version

### Reduce Baseline Noise — Produce Better Chromatograms

The LO-Pulse® pulse damper is a patented, wide dynamic range device that smoothes pulsations and maintains constant flow at system pressures up to 6000 psi. The damper reduces pulsations by compressing a fluid held within a chamber in the unit. This fluid is isolated from the mobile phase by a durable but flexible inert diaphragm. As system pressure increases during the pump delivery stroke, fluid in the chamber is compressed. When the pump begins its refill stroke, the compressed fluid expands, keeping the mobile phase flowing at a nearly constant rate and maintaining system pressure. At its maximum rated pressure of 6000 psi, the

volume of mobile phase in the pulse damper is only 0.9 mL. The flow path is designed to ensure it is completely swept so that solvent “memory effects” are virtually non-existent when changing mobile phases.

The pulse damper is available in a space-saving, low-cost kit form (shown at right above). The kit includes attaching hardware and allows mounting the pulse damper on a bracket or installing feet for benchtop use.

Available in either 316 stainless steel or biocompatible, metal-free PEEK (polyetheretherketone).

# LO-Pulse® Pulse Damper

Constant-displacement reciprocating pumps have intervals in their pumping cycle when flow and pressure momentarily decrease. This “offtime” is the interval when the piston has finished its solvent delivery stroke and is starting to refill. To maintain constant flow, such pumps require a pulse compensator or damper that stores energy during the pump’s delivery stroke and returns an appropriate amount of work to the fluid during the pump’s offtime.

Several types of mechanical or hydraulic pulse dampers are available. Pulse dampers that use a compressible fluid separated from the mobile phase by a flexible inert diaphragm offer several advantages over other types, including facile mobile phase changeover, effectiveness at low system pressure, wide dynamic range, and minimal dead volume.

Figures 1 and 2 show the distortion peak shape, which interferes with quantization, that is possible with large variations in flow. Distortion of peak shape is due to increased solvent flow during the pump’s refill stroke when the eluting component is in the detector cell. Even with the use of internal standards, flow modulation can wreak havoc with quantization, particularly for trace level analyses.

Figure 3 demonstrates the improvement in consistency of peak area measurement that can occur with the use of a LO-Pulse pulse damper. The average peak area relative standard deviation with the LO-Pulse is 0.716%; without the LO-Pulse it is 13.5%

## Ordering information

| Description  | Part No. |
|--|----------|
| LO-Pulse, 316 SS   | 200218   |
| LO-Pulse, PEEK   | 200220   |
| Low-Cost Kit Version, 316 SS   | 120527   |
| Low-Cost Kit Version, PEEK   | 120537   |
| Pulse Damper Refurbishing Kit<br>(includes diaphragm, O-rings, tools,<br>and instructions) | 120139   |

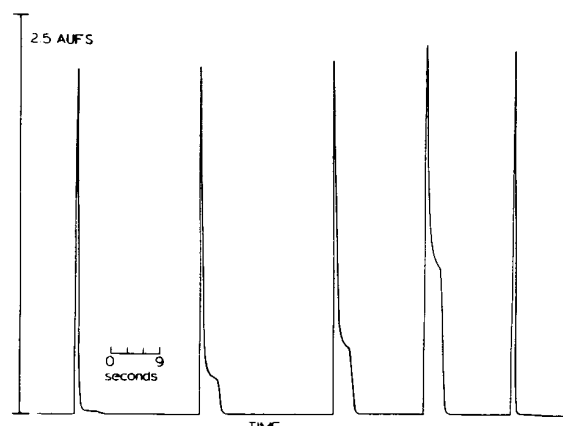


Fig. 1 Effect of flow modulation on replicate 1  $\mu\text{L}$  injections in LC system using high-pressure sinusoidal cam metering pump. See text for conditions.

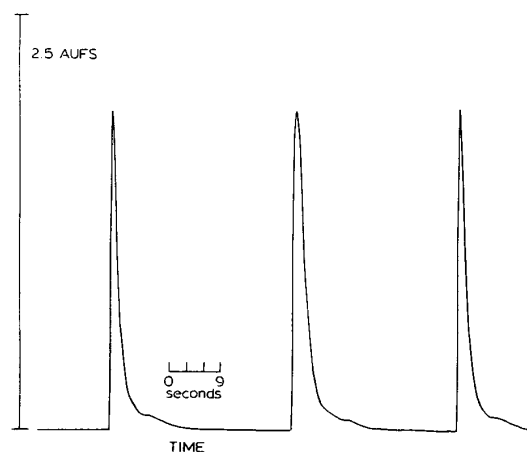


Fig. 2 Effect of flow modulation on replicate 1  $\mu\text{L}$  injections in LC system using single-piston rapid refill pump. See text for conditions.

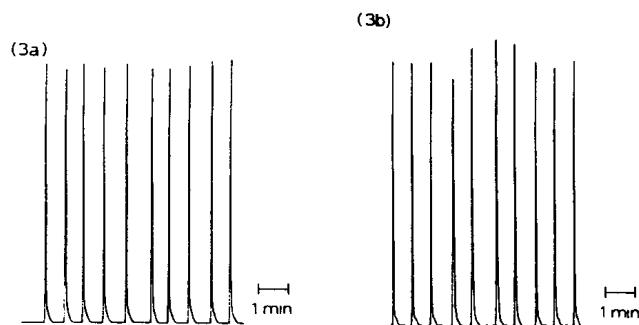


Fig. 3 Effect of flow modulation on replicate 1  $\mu\text{L}$  injections in LC system using single-piston pump with (3a) and without (3b) a LO-Pulse. See text for conditions.