CleenCOM Electronic Pre-Chamber Check Valve (ePCC)

Reliability and Maintenance Upgrade for Pre Chamber Engines

Combustion stability is key for reliable engine performance. From a lean burn engine perspective, igniting the lean mixture is the main concern.

Pre combustion chambers are a viable approach since the flame propagation into the main combustion chamber provides an order of magnitude higher energy than a spark ignition alone. However, if the mixture in the pre chamber is not adjusted correctly or if it is inconsistent cycle-to-cycle, the result could be

- poor combustion stability
- misfires or even
- detonation

These are common problems associated with mechanical check valves.

An electronically controlled check valve that precisely controls fuel injection avoids these problems. It allows the engine to run consistently smoother and cleaner. Maintenance is significantly reduced and engine uptime is increased when electronically controlled check valves are used.

The Need

Most lean burn engines require pre combustion chambers for igniting the lean mixture. The fueling is controlled via check valves, which perform poorly:

- Frequent clogging / quit working
- Inconsistent fueling; varying Air/Fuel ratio
- Too rich Air/Fuel ratio during startup; fuel slip
- #1 root cause of combustion issues

The Solution

Electronic controlled pre chamber injection - ePCC

- No maintenance issues
- Precise and consistent fueling (cycle-to-cycle)
- Stable combustion—even at very lean mixtures
- Improved startup—smooth and efficient idling

Waukesha 7042GL Results

- Improved combustion stability at rated operating conditions as well as reduced hydrocarbon emissions and slightly improved fuel consumption
- Achieved stable combustion far below 1 g/bHp-hr NOx
- Smooth startup and idling
- Easy “Plug & Play” installation