# DELAVAN PRECISION OIL BURNER NOZZLES

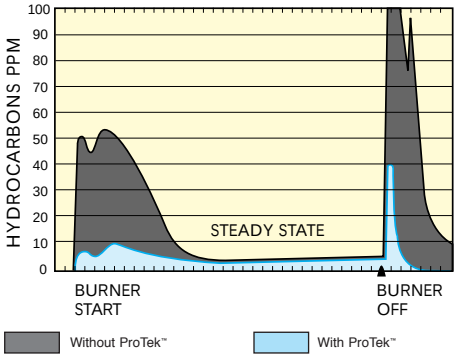
DELAVAN ProTek™ NOZZLE SYSTEM

## SMART VALVE DESIGN REDUCES COMBUSTION POLLUTION FOR CLEANER HEATING


The all-new Delavan ProTek™ Nozzle System provides the first step into the future of Clean Air Technology™. This unique, patented System from Delavan provides significant reductions in combustion pollutants for cleaner air. The ProTek Nozzle System includes a factory-installed, one-piece Valve Component which reduces smoke and oil smell in the off cycle by preventing oil after-drip from the nozzle. Also, the reduction of smoke (carbon and soot) helps maintain burner set up efficiency longer and extend the time period between appliance clean ups.

Installation is fast and easy; there's no need to increase pump supply pressure at installation because there's no pressure drop. Plus, ProTek Nozzle Systems maintain the same flow pattern and flow rating characteristics of comparably rated Delavan nozzles.

The dramatic benefits of the ProTek Nozzle System are available in either a factory-installed, complete system or as the ProTek Valve Component sold separately to replace the standard filter on a Delavan nozzle.




Hydrocarbon emissions are greatly reduced when the Delavan ProTek™ Nozzle System is used. Hydrocarbons are typically elevated at start-up and shut-down of the nozzle firing, as both of these graphs show. When the ProTek Nozzle System is installed, the dramatic benefits are seen in these charts which show comparative results with and without the ProTek™ valve. Results will vary by application.

## TEK TALK

The Delavan ProTek™ Nozzle System has been thoroughly tested. In the tests, approximately seven years of "on/off" cycle operation simulation in the laboratory with no failures. A total of 107,000 cycles were recorded. After the first 11,350 cycles, the cut-on pressures shifted upward an average of 3.0 PSI. The cut off pressure shifted up an average of 7.75 PSI. After this initial seating process, there was very little change of either "on" or "off" pressures. Very little change in nozzle flow was noted after 107,000 cycles, either. Additional testing has included pressure tests up to 500 PSI (34,5 BAR), as well as combustion tests and tests with various fuels such as kerosene, #2, and heavier oils. Detailed test results are available from Delavan Technical Services.

## Operating Pressures

### Minimum Operating Pressures

| Valve Part # | Supply Pump PSI (BAR) | Valve Open PSI (BAR) | Valve Close PSI (BAR) |
|---|---|---|---|
| 60030-1 | 135.0 (9,3) | 125.0 (8,6) | 65.0 (4,5) |
| 60030-2 | 100.0 (7,0) | 60.0 (4,1) | 45.0 (3,1) |

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# Clean Air Technology

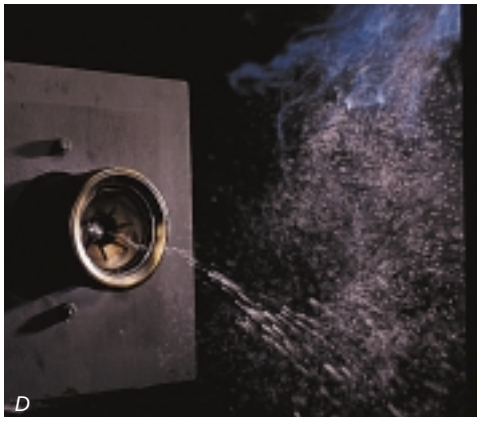
TECHNICAL UPDATE


A


B

*ProTek Nozzle Systems give visibly cleaner shut off at burner shut down. With ProTek there's no costly fuel dripping and drizzling, as these photos show (A & B).*


C


D

*Standard nozzles drip and drizzle at shut-down, shown here in stop-action photography (C & D) timed to match ProTek photographs A & B.*


E


F

*Afterburn shows in these side-by-side photos (E & F). ProTek Nozzle Systems eliminate afterburn (E). Standard nozzles can't prevent afterburn (F). Afterburn causes soot and coking, often resulting in more frequent cleanings and callbacks.*


Delavan

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**SHOP TALK**

# Fuel Shut-off Problems

*By Gary Weldnet*

**Q:** ***Our shop recently serviced an oil fired pressure washer. We had to return it to the customer with a minor problem unsolved. Whenever you are running this machine and let go of the trigger gun, white smoke comes out of the stack for just a short while. What's wrong?***

**A:** You are probably already aware that the white smoke is unburned fuel. Let's dispense with one thing right away: some machine designs (European-style down-fired vertical burners are a prime example) tend to produce plumes at trigger gun shutoff from the time of a cold startup until they are warmed up, then don't do it. I assume that your machine always does this.

If the strainer at the rear of a nozzle becomes partially plugged with fine dirt, that can interfere with proper cutoff. Presumably, you've installed a new fuel nozzle. You will need to verify that the fuel solenoid valve is shutting off sharply and not leaking. If this machine is not equipped with a fuel solenoid valve, then you need to be sure that the automatic cutoff in the fuel pump is working properly.

This is the recommended procedure for checking the fuel pump cutoff: Screw a pressure gauge directly into the nozzle outlet port of the fuel pump. Run the fuel pump for about a minute, then shut it off. The pressure reading will fall to some value, but it must not fall to zero, and it must hold steady and not decay. If the pressure falls to zero or decays, the fuel pump cutoff is bad.

Air in the nozzle line is another source of poor cutoff. An air bubble in the nozzle line is compressed by the operating fuel pressure. When the fuel pressure is cut off, the air bubble expands, pushing undesired fuel out through the nozzle. This undesired fuel often squirts out of the nozzle as a solid stream.

How does air get into the nozzle line? It can be trapped in the nozzle line when the line is opened for service, but that air usually gets swept on through by the normal fuel flow. A more subtle source of such air would be a small leak in the fuel suction plumbing. We're talking about a very small leak here, not big enough to interfere with the fuel suction. The result is a steady stream of tiny bubbles in the fuel stream

Here's an important question to answer: Did the machine start at some time to exhibit this plume-at-shutoff behavior, or did it always behave this way? If it started the pluming at some time, but didn't do it before, then you should be able to find and repair the cause. If it always behaved this way, you may be on a wild goose chase.

In any event, if you're totally stumped (did you check with the machine's manufacturer?), the Delavan fuel nozzle people have a new product that might fix your pluming with very little effort or expense. You may be aware that the mesh or sintered filter section at the back end of a fuel nozzle is screwed in place. Delavan has developed a tiny "valve component" that screws into the nozzle head in place of the standard filter. The valve component is recessed within the same type of sintered filter material, so the assembled nozzle with valve is indistinguishable from a regular nozzle.

Delavan calls this device the ProTek™ valve component. It is a spring loaded valve that works much like a pressure relief valve. It will not allow fuel to come out of the nozzle unless a minimum pressure is exceeded. I tested one of these nozzles in a common burner gun with a typical fuel pump and solenoid vane. Talk about fast, sharp cutoff! Comparing the amount of fuel spitting out of a standard nozzle after solenoid shutoff with the same nozzle equipped with the valve component, the difference was like night and day. Pressure loss through the valve component at typical pressure washer flow rates (1 to 3 gph) is negligible. The ProTek™ valve component (Delavan part number 60030-1 or -2) and further information on it should be available at your local oil burner supply house.

Send your questions to Shop Talk c/o Cleaner Times Magazine, 17319 Crystal Valley Rd., Little Rock, AR 72210. Or fax to (501) 455-2479