DELAVAN

Oil Burner Nozzles and Accessories

for residential and industrial combustion applications

Collins Aerospace

Delavan Precision Oil Burner Nozzles

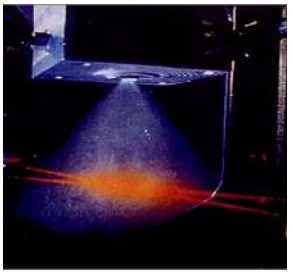
Delavan has been designing and manufacturing nozzles for the oil heating industry for over 60 years. Quality assurance was important to us way back then and still is today. Since those early days, Delavan has grown and expanded into other markets such as nozzles and accessories for gas turbines, agricultural spray nozzles, industrial spraying, and automotive industry.

Delavan is an established leader in designing and manufacturing nozzles for special industrial combustion applications, and can provide spray solutions that meet the most demanding customer requirements. We specialize in assisting original equipment manufacturers in designing and specifying the best nozzles to fit the unique applications required for emissions and efficiency. Performance development is conducted using a wide array of tools such as spray pattern analysis, particle analysis, and laser imaging to assure our nozzles follow operating parameters for which they are designed.

Delavan nozzles are built according to precise spray controls and to high quality fabrication standards. Delavan nozzles are 100% tested for flow rate, spray angle and spray quality using our proprietary "DelaVision" system that combines digital consistency with the precision of the laser to produce the highest quality, most reliable and consistent nozzles available.

Delavan is a leader in the oil heating industry because we have developed training materials and conducted programs to educate the oil heating service technician. Due to these efforts, our nozzles are the most widely distributed in the US and Canada and also can be found in many global markets.

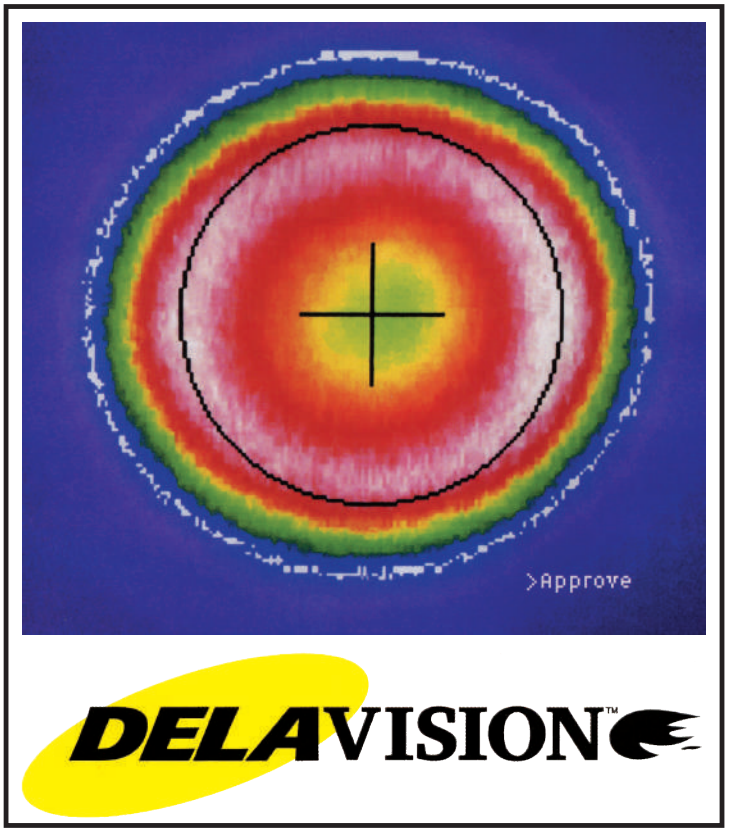
Whether you are an engineer designing oil burning appliances, a service technician performing annual service, or have a unique application, remember Delavan for assured quality and call on our knowledge and experience whenever you have a nozzle application problem.



Particle Analysis

Laser Imaging

Spray Pattern Analysis



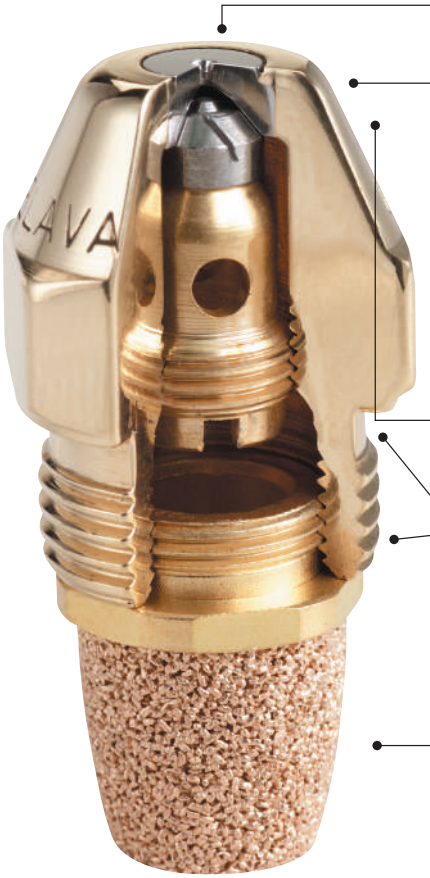
DELAVAN

4334 Main Highway
Bamberg • South Carolina 29003
www.delavan.com
email: delavansales@collins.com

Delavan Precision Oil Burner Nozzles

Why is Delavan so different?

- Unique inside anti plug construction



Precise spray angles and optimal spray uniformity through new machining process

Reduced distributor size with shorter tangential slots to avoid plugging

Aerodynamic body configuration

Rolled threads to avoid metal chips and burrs

Sintered filter (*) for maximum protection; sized depending on flow (*) Mesh strainer supplied on 2.25 GPH and higher flow rates

100% Tested

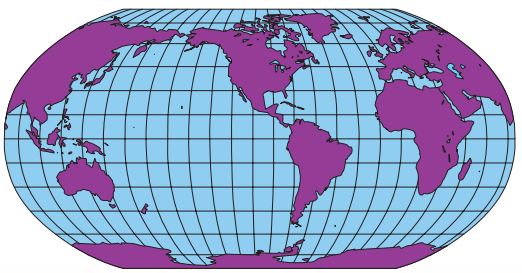
Every nozzle is tested. Then we go one step further and remove the test oil from the nozzle to avoid plugging.

Meet the challenge

- World leader in spray technology
- State of the art manufacturing equipment
- High technology research, design and quality assurance methods
- ISO 9001 Registered

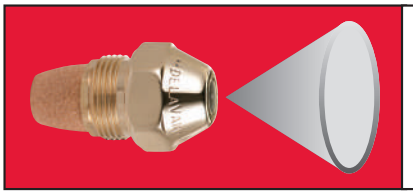
The world dimension

- Manufacturing with R and D in the USA.
- Manufacturing and marketing facility in the UK.
- Marketing and technical services in France.
- Intercontinental distribution network



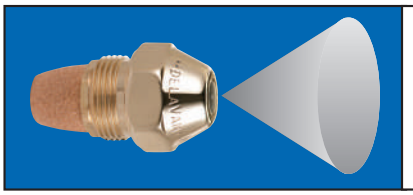
Delavan Precision Oil Burner Nozzles

A VARIETY OF NOZZLES THAT SUITS EVERY APPLICATION



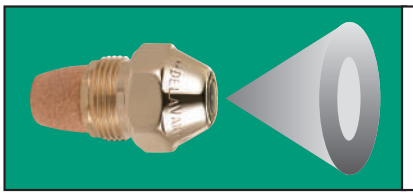
A
Red Vial

HOLLOW-CONE Type A®-nozzles are mainly used on burners with a hollow cone air pattern and for through puts up to 2.00 GPH. The droplet distribution is concentrated on the outside of the cone and results in good ignition and low-noise combustion.



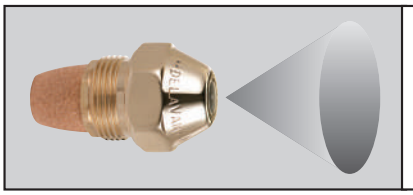
B
Blue Vial

SOLID-CONE Type B®-nozzles produce a spray that distributes droplets fairly uniformly throughout the complete pattern. The spray pattern becomes progressively more hollow at higher flow rates, particularly above 8.00 GPH. Provides smooth ignition and efficient combustion, particularly in larger burners.



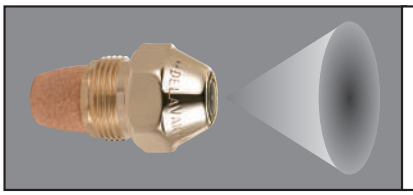
W
Green Vial

Type W " ALL PURPOSE "®-nozzles are neither truly hollow nor solid. These nozzles frequently can be used in place of either solid or hollow cone nozzles between 0.40 and 8.00 GPH, regardless of the burner's air pattern. The lower flow rates tend to be more hollow.



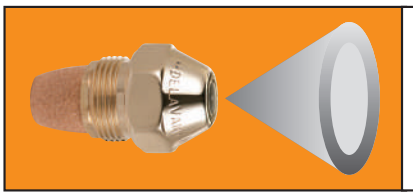
AR-D
Light Grey Vial

Type AR-D Nozzles are of a "solid cone" type similar to Type B but with a slightly lower concentration of the droplets in the center of the cone. They are high performance in burners of low up to medium capacity (up to flows of 2.00 GPH).



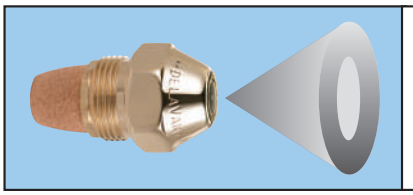
R-D
Dark Grey Vial

Type R-D Nozzles have a high concentration of droplets in the center of the spray cone. They are particularly recommened for burners with a highly concentrated solid air pattern. The average droplet size is slightly coarser than on the Standard Solid Cone Type B (up to flows of 2.00 GPH).



MH
Orange Vial

Type .579 MH Mobile Home Nozzles are low-capacity nozzles designed for mobile home use. This design will minimize the usual plugging problems associated with low flow rates.



SS
Powder Blue Vial

Semi-Solid nozzle (.50-2.00) 60˚, 70˚ and 80˚ spray angles; interchanges with other SS nozzles.

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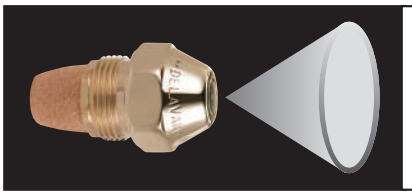
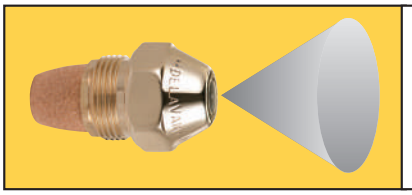
Delavan Precision Oil Burner Nozzles



A
Black Vial



B
Yellow Vial

Del-O-Flo® nozzles are low-capacity nozzles designed to minimize the plugging problems associated with very low flow rates. The special interior design of the Del-O-Flo® flushes contaminants through, limitingbuild-up. These nozzles will satisfactorily interchange with other hollow and solid cone nozzles. The Del-O-Flo® is available in 0.40 GPH up to 0.85 GPH.

Delavan Uses Technology to Dramatically Reduce Plugging in Low Flow Applications

Low flow appliances represent a growing segment of the oil heating market as manufacturers work to develop more efficient systems. While the future looks good for low flow appliances, the present is rife with headaches for contractors and service personnel. "Particulates in the oil tend to be more of a problem in the low flow applications," says Jeff Stembridge, Delavan Design Engineer. "Because of the reduced flow rates, particulates can easily plug a nozzle either reducing or prohibiting flow." The result can be increased sooting, inefficient operation or a total shut down of the heating system. Some companies have resorted to monthly nozzle changes, increased filtration, or both.

Del-O-Flo® Nozzle Offers an Alternative

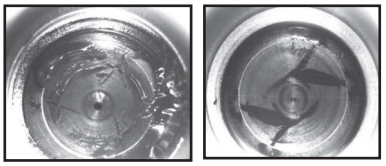
Historically, extra filtration has been the only remedy available for low gallonage applications. The Del-O-Flo nozzle reduces plugging with patented technology that forces particulates and other contaminants through and out the nozzle. "The Del-O-Flo contains an extra-fine filter that stops larger particles that cause the problems in low flow situations," says Delavan's Stembridge. "The patented Del-O-Flo design keeps these particles in suspension and forces them out without plugging."

It's All in the Design

With Del-O-Flo Nozzle, fluid flows through the filter into the slots and is metered prior to exiting. The slots are designed to force fluid into a swirling motion where particles are kept in suspension. The nozzle contains short slot openings that are perpendicular to fluid flow. "These short slots keep the fluid from slowing and maintain turbulence, which keeps particulates from collecting, settling, or clogging the nozzle," says Stembridge.

The Del-O-Flo Passes the Test

In a test by Delavan engineers, both a standard hollow cone nozzle and an identical Del-O-Flo hollow cone nozzle were run continuously for 23 hours in a double adapter using the same oil supply. Clean oil was contaminated with a controlled amount of iron oxide (rust) and sand. Both nozzles had filters prohibiting particles over 40 microns so the contaminants utilized were under 40 microns. At the end of the test, the nozzles were disassembled. The photographs below demonstrate the dramatic difference. Contamination buildup on the standard nozzle was substantial while the Del-O-Flo nozzle remained contaminant-free and clean burning.



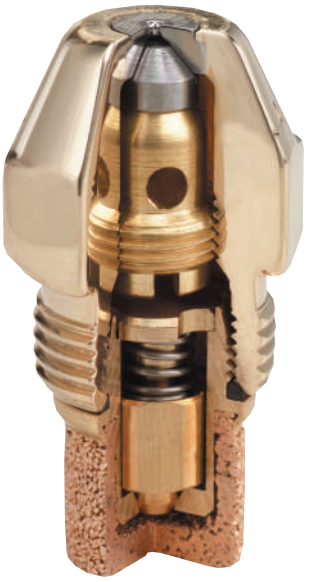
STANDARD HOLLOW CONE | DELAVAN DEL-O-FLO®

Under identical test situations the standard nozzle produced contamination build up which causes plugging, while the Del-O-Flo remained contaminant-free.

Delavan Precision Oil Burner Nozzles

DELAVAN ProTek® NOZZLE SYSTEM

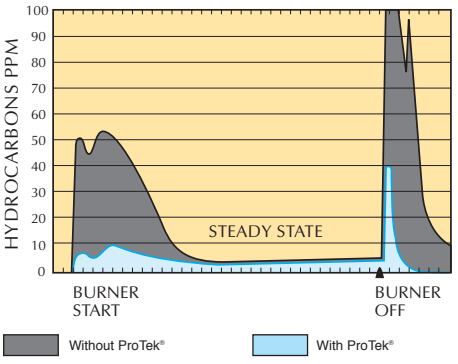
SMART VALVE DESIGN REDUCES COMBUSTION POLLUTION FOR CLEANER HEATING



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)
60030-001	135.0 (9,3)	125.0 (8,6)	65.0 (4,5)
60030-002	100.0 (7,0)	60.0 (4,1)	45.0 (3,1)

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Delavan Precision Oil Burner Nozzles

Oil Burner Nozzles For Residential Applications
AVAILABLE NOZZLE SIZES

Types A and B						
GPH	30°	45°	60°	70°	80°	90°
.40						
.50						
.55						
.60						
.65						
.70						
.75						
.80						
.85						
.90						
1.00						
1.10						
1.20						
1.25						
1.35						
1.50						
1.65						
1.75						
2.00						
2.25						
2.50						
2.75						
3.00						
3.25						
3.50						
3.75						
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19.00						
20.00						
22.00						
24.00						
26.00						
28.00						
30.00						
32.00						
35.00						
40.00						
45.00						
50.00						

Type W						
GPH	30°	45°	60°	70°	80°	90°
.40						
.50						
.55						
.60						
.65						
.70						
.75						
.80						
.85						
.90						
1.00						
1.10						
1.20						
1.25						
1.35						
1.50						
1.65						
1.75						
2.00						
2.50						
2.75						
3.00						
3.25						
3.50						
3.75						
4.00						
4.50						
5.00						
5.50						
6.00						
6.50						
7.00						
7.50						
8.00						

.579 MH Mobile Home Nozzle	
	Normally Stocked
	Limited Inventory
	Special Order
	Not Available

Del-O-Flo Type A and B					
GPH	45°	60°	70°	80°	90°
.40					
.50					
.55					
.60					
.65					
.75					
.80					
.85					

Type SS			
GPH	60°	70°	80°
.50			
.60			
.65			
.75			
.85			
1.00			
1.10			
1.20			
1.25			
1.35			
1.50			
1.65			
1.75			
1.75			
2.00			

Types R-D and AR-D				
GPH	45°	60°	70°	80°
.50				
.60				
.65				
.75				
.85				
1.00				
1.10				
1.20				
1.25				
1.35				
1.50				
1.65				
1.75				
1.75				
2.00				

Delavan Precision Oil Burner Nozzles

NOZZLE INTERCHANGE

Replacing a nozzle of one make with another sometimes presents problems. This is partly due to unique design differences among the various makes, plus the fact that the nozzle manufacturers use different methods for evaluating spray angles, patterns and spray quality.

In many cases, nozzles with similar patterns and spray angles are directly interchangeable. However, there are other cases where nozzles that would seem to be equivalent really are not. When this happens it is best to ask the burner manufacturer for a recommendation. Otherwise, it is a matter of trial and error: (1) Trying nozzles with slightly higher or lower flow rates, (2) wider or narrower angles and (3) more solid or more hollow patterns, to see which one performs best.

Nozzle Interchange Chart

Spray Angles 30º through 90º

HAGO	DELAVAN
H	A
SS (up to 2.0)	SS
SS (over 2.0)	A or W
ES/P	B*
B	B*
MONARCH	**DELAVAN**
NS/PL	A
R/AR (up to 2.0)	R-D/AR-D
R/AR (over 2.0)	A/A or W
PLP	B*
DANFOSS	**DELAVAN**
AS	W or B
AH	A

***The original B Nozzle**

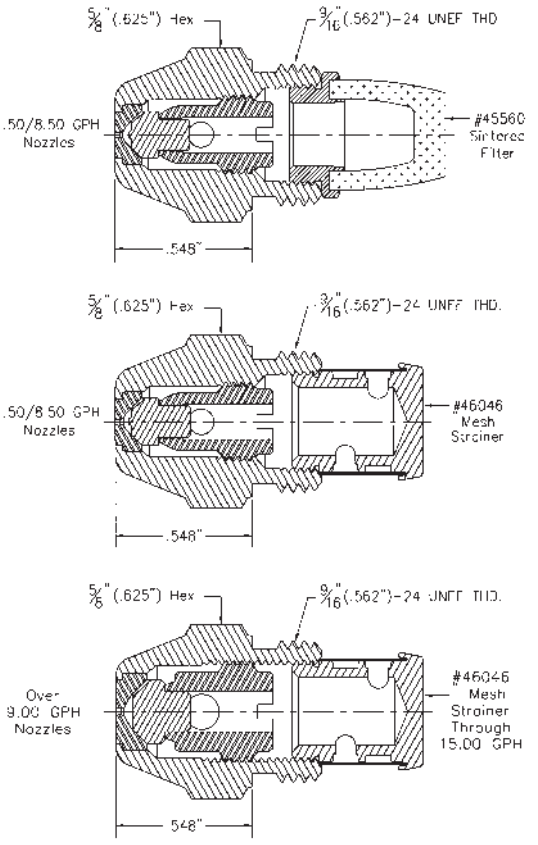
WARNING: Improper modification to combustion units may create a fire hazard resulting in possible injury. Contact the original equipment manufacturer before modifying the combustion unit.

P.O. Box 969 • Bamberg, SC 29003
www.delavan.com
1-800-982-6943

NOZZLE RATINGS AND TESTING

Every nozzle is spray tested for flow rate, spray angle and spray quality. Our nozzles are flow rated at 100 psi. Test conditions include: fuel gravity within a total spread of 1-1/20 API . . . viscosity within ± .04 centistoke (.03 SSU) . . . pressure at 100 psi . . . fuel temperature at 80˚F, ± 2˚F . . . an air-conditioned test area maintained at a temperature spread of 40F or less . . . and regularly calibrated pressure gauges and flow meters.

NOZZLE DIMENSIONS



ORDERING INSTRUCTIONS

WHEN ORDERING OIL BURNER NOZZLES, be sure to specify the following:
(1) Quantity
(2) Capacity rating in gallons per hour (gph)
(3) Spray angle
(4) Spray pattern or type:
Hollow cone--Type A, Del-O-Flo Type A
Solid cone--Type B, Del-O-Flo Type B, Type W
(5) Filter or strainer--See selection chart on page 7 for sintered filters and mesh strainers furnished with each nozzle. Optional mesh sizes may be substituted when ordering nozzles. Order by part number and description.

WHEN ORDERING ACCESSORIES, be sure to specify part number and brief description.

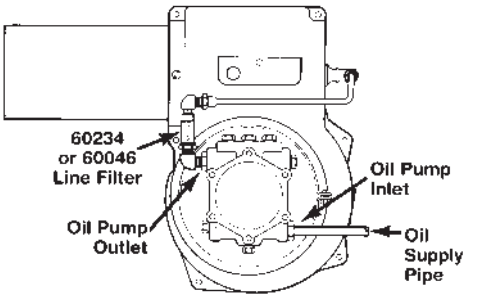
Delavan Spray, LLC.
P.O. Box 969 • Bamberg • South Carolina 29003

Refer to each product section for specific instructions on information to include when ordering. Contact your Delavan representative or the factory for the current price list and for any assistance in finding the right nozzle for your application.

Delavan Precision Oil Burner Nozzles

LINE FILTER

Use Delavan's line filter for extra filtration in burner applications of 2.00 GPH or less. These offer four times the filtering area of a standard nozzle stainer and twice the protection. A plugged line filter can cause a pressure drop. Check the pressure on the outlet side of the filter while the unit is flowing to see that it is the same as the pump pressure. If less, replace filter.



- 60046 1/8″ NPT inlet and outlet threads
- 60234 1/8″ SAE 45° Flare inlet and outlet threads

Easy installation (see drawing)

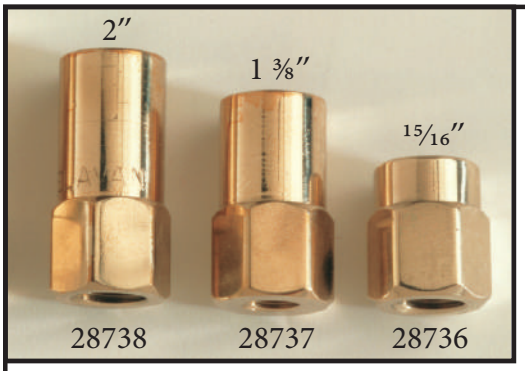
NOTE: Replace the line filter during the annual service check for an economical way to maintain clear lines.

SINTERED FILTERS & STRAINERS

Nozzles up to 2.00 GPH have as standard a sintered filter. From 2.25 up to 15.00, monel filters are provided. Nozzles with through-put of 16.00 GPH and higher have no filter attached.

Type	Part #	Media/Mesh size
Sintered Filter	45560-004	25 Micron
Sintered Filter	45560-001	40 Micron
Mesh Strainer	46046-001	74 micron/200M
Mesh Strainer	46046-002	125 Micron/120M

It is recommended to use sintered filters on nozzles with low throughput.



NOZZLE ADAPTERS

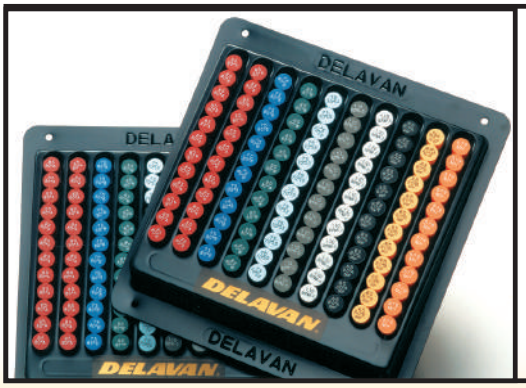
All nozzle adapters are made of brass, with precision machined mating surfaces for proper sealing.

IMPORTANT specify 1/8″ or 1/4″ pipe thread size

All nozzle adapters 9/16-24 UNEF internal thread

	Thd Size	Part Number
Long (Female)	1/8″ 1/4″	28738-001 28738-003
Standard (Female)	1/8″ 1/4″	28737-001 28737-003
Short (Female)	1/8″ 1/4″	28736-001 28736-003
Male	3/8″	28741-001

NOTE: Nozzle adapters are available in stainless steel. Contact customer service or your sales representative for more information.

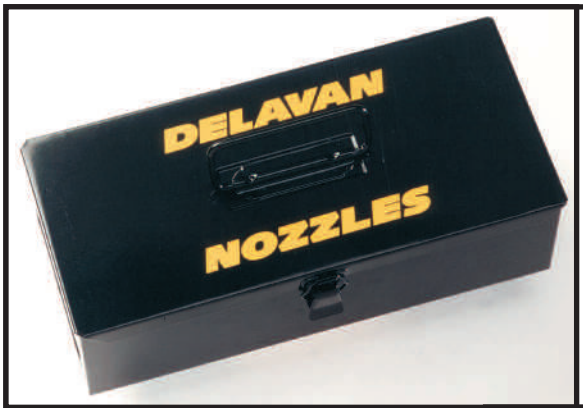


DISPLAY STORAGE RACKS

An attractive black plastic display and storage rack is available and will hold up 120 nozzles (12 vials in 10 slots). It is inexpensive, lightweight and easy to mount on the wall. Holes are drilled in the rack for easy mounting. This rack is packaged two to a carton; order in multiples of two.

Part number #47749

Delavan Precision Oil Burner Nozzles



NOZZLE BOXES

Delavan nozzle boxes handle all brands of nozzle vials. Our 110-nozzle and 55-nozzle boxes are made up of heavy-gauge steel with rugged hinges and snap-latch construction... finished in baked-on jet black enamel.

#26846-4 -- 110 Nozzle Box -- (5″ x 3 5/8″ x 11 15/16″)

Visit our website at www.delavan.com for more details about our products and services.

#26846-5 -- 55 Nozzle Box -- (5″ x 1 3/4″ x 11 15/16″)

Delavan Precision Oil Burner Nozzles

Type WDA & WDB
Pressure Atomizing Nozzles for humidifying

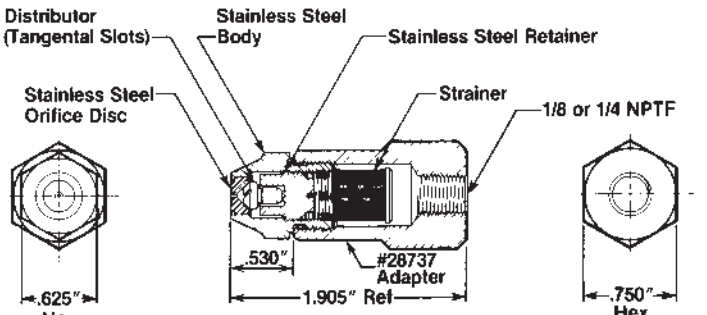
Spray Characteristics
- Finely atomized cone spray pattern for humidifying
- WDA has a hollow cone pattern
- WDB has a solid cone pattern
- Available spray angles - 30 , 45 , 60 , 70 , 80 and 90

Ordering Instructions
WHEN ORDERING TYPE WDA & WDB NOZZLES, be sure to specify the following :
1) Nozzle number per capacity chart
2) Spray angle
3) Material (brass with stainless steel metering parts will be furnished if material is not specified).
Order adapters separately, see selection chart.

Materials
Nozzle bodies are available in brass or stainless steel with a stainless steel orifice disc. Distributors are stainless steel and retainers are available in brass or stainless steel. Strainers are furnished up through WDA/WDB15 (15.0 GPH @ 125 PSIG) with each nozzle.

Adapter Selection Chart

Pipe Size	Adapter P/N		Length	
	Brass	S.S.	Adapter only	Adapter plus nozzle
1/8 NPTF 1/4 NPTF	28737-001 28737-003	28737-002 28737-004	1.375″ 1.375″	1.905″ 1.905″
3/8 NPTM	28741-001	———	1.375″	1.905″



WDA & WDB Nozzle with stainless steel body & retainer

WDA-WDB CAPACITY CHART

NOZZLE NO. = CAPACITY AT 125 PSIG

NOZZLE NUMBER			App. Orif. Dia.	CAPACITY — GPH AT PSIG PRESSURE —based on water							
WDA	WDB	No.		30 PSIG	40 PSIG	75 PSIG	100 PSIG	125 PSIG	150 PSIG	300 PSIG	500 PSIG
WDA	WDB	*.50	.0083	—	—	.39	.45	.50	.55	.77	1.0
WDA	WDB	*.75	.0092	—	—	.58	.67	.75	.82	1.16	1.5
WDA	WDB	1.0	.011	—	—	.77	.89	1.00	1.10	1.55	2.0
WDA	WDB	1.5	.013	—	—	1.16	1.34	1.50	1.65	2.32	3.0
WDA	WDB	2.0	.015	—	—	1.55	1.79	2.00	2.20	3.10	4.0
WDA	WDB	2.5	.016	—	—	1.93	2.24	2.50	2.74	3.88	5.0
WDA	WDB	3.0	.018	—	—	2.32	2.68	3.00	3.30	4.65	6.0
WDA	WDB	4.0	.025	—	2.2	3.1	3.6	4.0	4.4	6.2	8.0
WDA	WDB	5.0	.025	—	2.8	3.9	4.5	5.0	5.5	7.7	10.0
WDA	WDB	6.0	.029	—	3.6	4.7	5.4	6.0	6.6	9.3	12.0
WDA	WDB	8.0	.032	—	4.5	6.2	7.2	8.0	8.9	12.4	16.0
WDA	WDB	10.0	.035	4.8	5.6	7.7	8.9	10.0	11.0	15.5	20.0
WDA	WDB	12.0	.040	5.8	6.8	9.3	10.7	12.0	13.2	18.6	24.0
WDA	WDB	14.0	.040	6.8	7.9	10.8	12.5	14.0	15.3	21.7	28.0
WDA	WDB	16.0	.046	7.8	9.0	12.4	14.3	16.0	17.5	24.8	32.0
WDA	WDB	18.0	.052	8.8	10.1	13.9	16.1	18.0	19.7	27.9	36.0
WDA	WDB	20.0	.055	9.8	11.3	15.5	17.9	20.0	21.9	31.0	40.0
WDA	WDB	24.0	.060	12.3	13.5	18.6	21.5	24.0	26.3	37.2	48.0
WDA	WDB	30.0	.067	14.6	16.9	23.2	26.8	30.0	32.9	46.5	60.0
WDA	WDB	35.0	.070	17.2	19.8	27.2	31.4	35.0	38.4	54.3	70.0

*NOT AVAILABLE IN 30° WDA-WDB Nozzles above 16.0 GPH are furnished without strainers. Max. Design Pressure: 500 psig