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Protecting People, Products, and Critical Infrastructure

Laskin Nozzle Generators TDA-4B and TDA-4Blite

Operation and Maintenance Manual

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Generator Description

ATI manufactures portable Laskin nozzle aerosol generators which produce a sub-micron poly-dispersed oil mist aerosol in concentrations from 10 to 100 micrograms per liter (µg/l) at air flows from 50 to 8,100 cfm.

Aerosol generators and photometers are used to integrity test or locate leaks in high efficiency air filtration systems. Filter manufacturers use this equipment to scan ULPA and HEPA filters to verify they are free from manufacturing defects. Filter certifiers use this equipment to insure that filters were not damaged in shipping and have been installed properly, eliminating any leakage.

With the proper generator and photometer combination, filter deficiencies such as pinholes, thin spots, gasket leaks, frame leaks or seal problems can be quickly and quantifiably pinpointed and corrected thus protecting product and personnel.

The TDA-4B and TDA-4Blite feature several improvements over preceding units including rugged stainless steel construction, larger fill ports, individual nozzle control, and a 3" standard sanitary flange outlet. An optional hose adapter, part number 9300100, is available for introducing the aerosol into positive pressure systems.

CAUTION

DO NOT EXCEED 100 psig INPUT PRESSURE

WARNING!

UNDER NO CIRCUMSTANCES SHOULD THE AEROSOL OUTLET BE COMPLETELY BLOCKED DURING OPERATION. BLOCKAGE OF THE OUTLET WILL CAUSE SEVERE DAMAGE TO THE UNIT AND POSSIBLE INJURY TO PERSONNEL!

NOTE

THE ORIENTATION OF THE NOZZLE CONTROL VALVE HANDLES IS THE PRIMARY INDICATOR OF VALVES OFF/ON STATUS. VALVE HANDLES IN THE HORIZONTAL POSITION INDICATE A CLOSED OR OFF POSITION. VALVE HANDLES IN THE VERTICAL POSITION INDICATE AN OPEN OR ON POSITION.

TDA-4B Features

The TDA-4B is the latest design in rugged, lightweight Laskin nozzle generators from ATI. The TDA-4B is a small, compact aerosol generator that requires only a supply of clean, compressed air to create poly-dispersed sub-micron oil aerosol.

The TDA-4B has 6 Laskin nozzles. When its total output at 20 psig is diluted by 810 cfm of air, the aerosol concentration is approximately 100-ug/liter. Three valves permit the unit to be operated with 1 to 6 nozzles, providing a wide range of aerosol concentrations.

The TDA-4B is recommended for testing systems with airflows of 8,100 cfm and lower. It is ideal for workstations, Negative Pressure Filtration Units, bio-safety cabinets, ceiling modules, small or portable cleanrooms, or HEPA filter units in installations where an adequate supply of clean, compressed air is readily available.

OPERATING INSTRUCTIONS
TDA-4B AEROSOL GENERATOR (6 Laskin nozzle)

1. Unscrew LIQUID FILL cap located on top of cabinet and fill sight gauge to 3/4 full with desired liquid aerosol agent. Do not overfill. Refill when the level falls to the halfway point on the sight gauge.

2. Attach a source of clean, dry, compressed air to the filter/regulator air inlet. A shut-off valve (ball-type) is recommended to turn the air to the unit on and off.

3. Turn air on and adjust the filter/regulator control knob, accordingly. To lock this adjustment in, simply push down on control knob.

4. Varying aerosol output concentration.

1 Nozzle	Valve #1 ON Valve #2 OFF Valve #3 OFF
2 Nozzle	Valve #1 OFF Valve #2 ON Valve #3 OFF
3 Nozzle	Valve #1 OFF Valve #2 OFF Valve #3 ON
4 Nozzle	Valve #1 ON Valve #2 OFF Valve #3 ON
5 Nozzle	Valve #1 OFF Valve #2 ON Valve #3 ON
6 Nozzle	Valve #1 ON Valve #2 ON Valve #3 ON

NOTE: If more than 20 psig is used, the output concentration will increase and, conversely, if less than 20 psig is used, the output concentration will decrease. If using more than two (2) nozzles, upstream concentrations should be measured.

TDA-4Blite Features

The TDA-4Blite is a smaller, lower capacity version of the TDA-4B that still retains all the improved features. The TDA-4Blite was specifically designed for use in bio-safety cabinets. Its small size and low cost make it the ideal generator for bio-safety cabinet testing and HEPA filter vacuums.

The TDA-4Blite has 3 Laskin nozzles. Two valves permit the unit to operate with 1 to 3 nozzles to provide a wide range of aerosol concentrations.

OPERATING INSTRUCTIONS
TDA-4Blite AEROSOL GENERATOR (3 Laskin nozzle)

1. Unscrew LIQUID FILL cap located on top of cabinet and fill sight gauge to 3/4 full with desired liquid aerosol agent. Do not overfill. Refill when the level falls to the halfway point on the sight gauge.

2. Attach a source of clean, dry, compressed air to the filter/regulator air inlet. A shut-off valve (ball-type) is recommended to turn the air to the unit on and off.

3. Turn air on and adjust the filter/regulator control knob, accordingly. To lock this adjustment in, simply push down on control knob.

4. Varying aerosol output concentration.

1 Nozzle	**Valve #1 ON** **Valve #2 OFF**
2 Nozzle	**Valve #1 OFF** **Valve #2 ON**
3 Nozzle	**Valve #1 ON** **Valve # 2 ON**

NOTE: If more than 20 psig is used, the output concentration will increase and, conversely, if less than 20 psig is used, the output concentration will decrease. **If using more than two (2) nozzles, upstream concentrations should be measured.**

TDA-4B Specifications

Aerosol Output Range: 50-8,100 cfm
Aerosol Concentration 100 µg/1@ *810 cfm
Aerosol Concentration 10 µg/1@ *8,100 cfm
Generator Type: 1 to 6 Laskin nozzles
Source Air: min 2.65 cfm/nozzle @ 20/23 psig

Aerosol Type: Polydispersed (Cold)
Size: 10" L × 11" W × 9" H
(25cm L × 28cm W × 23cm H)
Weight-Pounds (lbs): 16 lbs.
Weight-Kilograms (kg): 7.3 kg
Electrical: (Not Required)

TDA-4Blite Specifications

Aerosol Output Range: 50-4,050 cfm
Aerosol Concentration 100 µg/1@ 405 cfm
Aerosol Concentration 10 µg/1@ 4,050 cfm
Generator Type: 1 to 3 Laskin nozzles
Source Air: min. 2.65 cfm/nozzle @ 20/23 psig

Aerosol Type: Poly-dispersed (Cold)
Size: 10" L × 8" W × 9" H
(25cm L × 20cm W × 23cm H)
Weight-Pounds (lbs): 12 lbs.
Weight-Kilograms (kg): 5.5 kg
Electrical: (Not Required)

* Increased pressure results in increased aerosol concentration.
* If using more than two (2) nozzles, upstream concentrations should be measured.

Laskin Nozzle Aerosol Output Calculation

These models allow selection of either 1-3 or 1-6 Laskin nozzles using the "Nozzle Control" valves. The aerosol concentration produced is dependent upon the nozzle pressure, the chosen aerosol reagent and the volume of air used to dilute the raw aerosol produced.

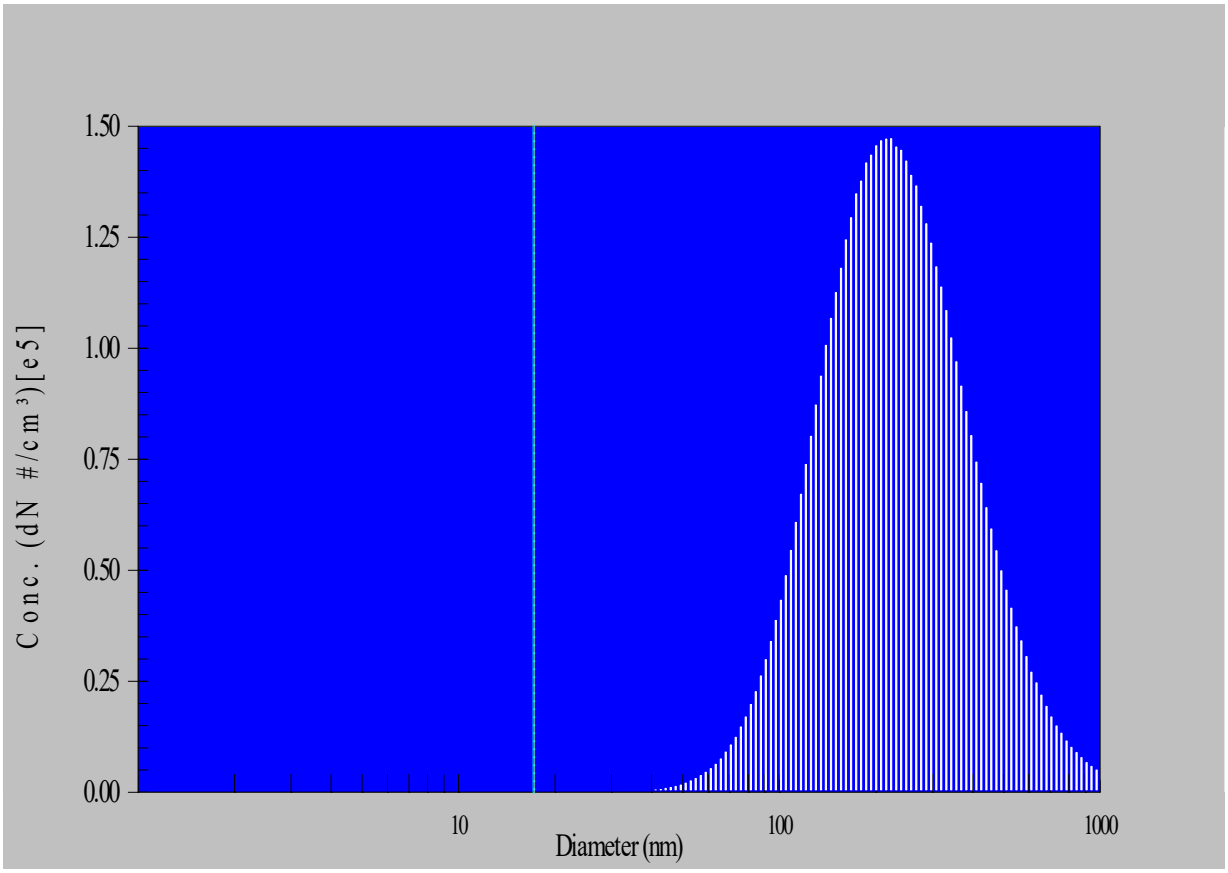
The equation below is intended for calculating the aerosol concentration when required and assumes a nozzle pressure of either 20 psi for DOP (DEHP) or 23 psi for PAO-4.
The results may be expressed as either micrograms per liter (**µ**g/l) or milligrams per meter^3 (mg/m^3). Other aerosol reagents, and the required nozzle pressures, are listed in the table below.

$$\frac{\text{13,500 times the \# of nozzles in use (1 through 6)}}{\text{Total airflow (CFM)}}$$

Note: Adjustment of the nozzle pressure to accommodate the reagent in use is independent of the photometer internal reference reagent setting.

Aerosol Reagent	Nozzle Pressure (PSI)
DOS/DEHS (CAS 122-62-3)	24.4
white mineral oil (CAS 8042-47-5)	22
polyethylene glycol (CAS 24322-68-3)	26.6
paraffin oil (CAS 8012-95-1)	24.2
corn oil (CAS 8001-30-7)	23.4

Type III-A Laskin Nozzle Aerosol Distribution @ 23 PSI Using PAO-4 Oil



	Number	Surface	Mass	
	Particle Size	Particle Size	Particle Size	Particle Size
median (nm)	227	401	518	518
mean (nm)	263	441	539	539
geo. Mean (nm)	229	392	492	492
mode (nm)	225	429	573	573
geo. St. dev.	1.68	1.65	1.57	1.57

MAINTENANCE

5. If clean, dry, compressed air is used with this unit, little maintenance should be required.

2. Drain the compressed air filter/regulator daily, or more often, if required.

6. Yearly, under daily operation, drain all liquid and flush with a solvent to remove any residue from the unit.

Note

BEFORE SHIPPING UNIT

7. Drain all liquid from unit.

2. Verify that the LIQUID FILL cap is tight.

8. Stuff aerosol outlet flange with liquid-absorbing cloth or paper to prevent residue from damaging shipping container.

9. Tape or plug the compressed air inlet on air filter/regulator to prevent internal damage by foreign material.

10. Package the unit in a triple wall carton with a minimum of 3 inches of loose packing fill on all sides.

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ACCESSORIES

ADAPTER KIT

Converts the 3”-sanitary outlet flange of all generators to ¾”-FNPT thread. No hose terminations are supplied due to the high level of variability in requirements. ATI’s technical support personnel are always willing and capable of sourcing or configuring hose termination connections to suit a specific application.

The **9300100**-adapter kit consists of the following:

1 piece	3” to ¾”-FNPT adapter plate
1 piece	sanitary adapter clamp
1 piece	sanitary adapter gasket
1 piece	compression fitting, ¾” liquid tight conduit to ¾” MNPT

Liquid tight conduit is also available for purchase by the foot using part # **5200106**.

AEROSOL REAGENTS

T100-0625	**(5 gallon container)**	DOP / DEHP (Di-2-ethylhexyl-phthalate)
T000-0795	**(5 gallon container)**	PAO-4 (4 cSt Polyalphaolefin)

Please contact ATI’s customer service department for current pricing and delivery.

Manual Revision History

The following is a revision history of the
TDA-4B & TDA-4Blite Laskin Nozzle Aerosol Generator
Operation and Maintenance Manual, P/N 1800188

Revision History:			
Rev #	**Description and Rationale**	**Ref #**	**Date**
K	Removed references to 6C	ERN2562	April 4, 2012
L	Clarify pressure requirements for calculating aerosol output. Misc. updates		April 8, 2014
M	ATI Branding update		April 29, 2016

Notes

Notes

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