

# USER-SERVICEABLE PHOTOMETERS MODEL 8177

REDUCE THE COST OF OWNERSHIP  
FOR 8127 AND 8130 FILTER TESTERS

TSI's Automated Filter Tester Models 8127 and 8130 have been used for respiratory filter and filter media testing by leading regulatory authorities and hundreds of manufacturers for over 20 years. These testers are 42 CFR 84, EN 143, ISO 23328-1 & GB2626 compliant.

Cleaning the photometers in these testers used to require sending the assembly to the factory for service. Now, these photometers can be cleaned by the user on site in less than one hour. This minimizes downtime, reduces the cost of ownership and results in more profitable filter testing.



## High-quality filter testing just became more affordable.

For owners of models 8130 and 8127 filter testers, the new upstream and downstream photometers that are housed in the photometer box 8177 can be retrofitted to either filter tester. These photometers feature fast response and purge times and solid-state laser diodes, while maintaining high-quality measurements at a lower cost.

## Applications

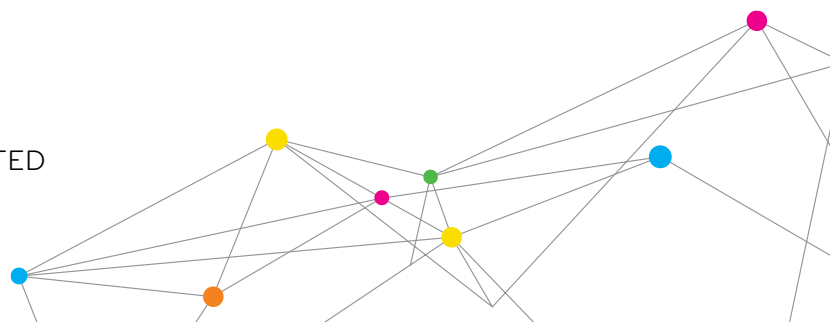
- + HEPA and ULPA respiratory filter testing
- + Filter cartridge testing
- + Filter media testing

## Features and Benefits

- + Lower cost of ownership
- + More uptime
- + Cleaning on-site in less than one hour
- + Suitable for oil and salt test aerosols
- + Very consistent test results
- + High dynamic range, measuring filter efficiencies up to 99.999%
- + Cycle times as low as < 10 seconds



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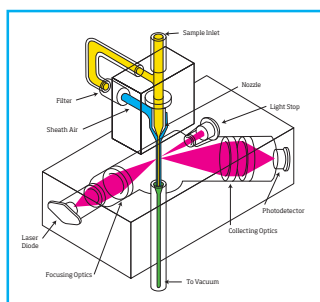
## SPECIFICATIONS

### USER-SERVICEABLE PHOTOMETERS MODEL 8177

## PRINCIPLE OF OPERATION

Filter Tester Models 8127 and 8130 house two light-scattering laser photometers to simultaneously measure the upstream and downstream aerosol concentration levels. The signal from the photometers is a voltage that is proportional to particle concentration. Particle penetration through a filter is determined by dividing the downstream voltage by the upstream voltage. By using two laser photometers instead of one, measurement accuracy and throughput (due to faster testing) is increased.

The laser photometer scattering chamber of the high-resolution photometer is shown at the right. The light from a laser diode is focused with a collimating lens and a series of apertures to create a defined beam diameter at the measuring volume. The air sample then passes through the measuring volume and scatters light relative to the amount of aerosol in the air stream. The scattered light is collected by two aspheric lenses and is focused onto a photodiode detector, allowing the user to obtain the relative concentration measurement.



### TO ORDER

#### Automated Filter Testing

Specify	Description
8177	User-Serviceable Photometer Box - contains upstream & downstream photometers

#### Service and Support

(contact your TSI representative for more details)

- + Field Installation and Training
- + Service Contracts
- + Field Service

## DESIGN FEATURES AND IMPROVEMENTS

The background light level is determined by feeding filtered air into the chamber. The background increases when the surfaces become coated with particles. Eventually, the photometer needs to be cleaned in order to restore the background to previous levels.

- + A **sheath air system** significantly reduces the contamination inside the photometer. It works by isolating the aerosol stream with a surrounding clean air stream. This keeps the sampled aerosol away from the optical components inside the scattering chamber.
- + An effective and optimized **beam stop** terminates the light that passed through the measuring volume.
- + **Light absorbing coating** further minimizes background light scattering in the chamber. This coating can now be cleaned in the field.

## SPECIFICATIONS

### Aerosol Detection

Technique	Dual solid-state laser diodes and photodiode detectors, 45 degree off-axis light collection angle, sheath-air flow design
Dynamic Range	1.0 µg/m <sup>3</sup> to >200 mg/m <sup>3</sup>

### Efficiencies

Operating range measures particle penetrations to 0.001% or efficiencies to 99.999%

### Utility Requirements

Power	Supplied by 8127 or 8130 tester
Compressed Air	Supplied by 8127 or 8130 tester
Dimensions (L x W x H)	46cm x 43.5cm x 12.3cm (18 in. x 17 in. x 6 in.)
Weight	10.2kg (22.5 lb)

### References

- + Keady, Patricia, Measurement Techniques for Determining the Fractional Penetration and MPPS of Air Filter Media. TAPPI Nonwovens Conference, 1995.
- + Johnson, B. R., Herweyer, S. K., Johnson, E., and Agarwal, J. K., A New Automated Filter Tester for Low Efficiency, HEPA Grade, and Above Filter Media and Cartridges. 5th World Filtration Congress, June 1990.
- + Smith, S. D., Predicting the Response of Photometer Based Filter Testers to Submicron Challenge Aerosols. AFS conference, 1999.

Specifications are subject to change without notice.

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