

## PACU - January 29, 2024

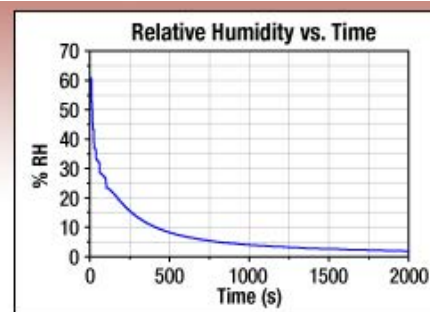
Item # PACU was discontinued on January 29, 2024. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### PACU™ PURE AIR CIRCULATOR UNIT

- ▶ Filters Out Particulates, Volatile Organic Compounds, and Moisture
- ▶ Continuously Variable Flow Rate
- ▶ Rack-Mountable Enclosure



PACU  
Pure Air Circulator Unit



3.0 L Chamber Being Purged  
at Flow Rate of 3.0 L/min



PACU-FTR1  
Desiccant Filter Replacement

[Hide Overview](#)

#### OVERVIEW

##### Features

- Three-Stage Filtration System Removes Moisture, Particulates, and Volatile Organic Compounds (VOC)
- Ideally Suited for Closed-Loop Systems
- Flow Rate Continuously Adjustable
- Optional Rack Mounting
- Replacement Filters and Tubing Also Available

Thorlabs' PACU™ Pure Air Circulator Unit excels at providing an extremely clean, dry atmosphere for closed-loop experimental setups. Consisting of desiccant and particulate filters in series, it can quickly and reliably purge contaminants from inside sealed experimental volumes, generating very-high-purity environmental conditions. This closed-loop laboratory air circulator is an ideal choice for use in infrared spectroscopy measurements, which can be extremely sensitive to water vapor. It is also useful in applications that benefit from a pure and clean atmosphere like the cavities of our Octavius femtosecond lasers. For enclosed SM1 lens tube systems, Thorlabs offers the CPPC(/M) Purge Connector, shown below.



Click to Enlarge  
Flow Rate Knob and  
Meter



Click to Enlarge  
Rear-Mounted Air Intake and  
Exhaust

By simply connecting two hoses (one supply and one return) to the 1/4" Swagelok® compression fittings on the rear of the unit, the user gains a turnkey air filtration system, capable of providing a cleanroom-grade environment for several months without service. For external connections, Thorlabs recommends a low-outgassing tubing such as Chemfluor® 367 fluoropolymer (3/16" ID x 1/4" OD x 3/32" wall), 12' (3.66 m) of which is included with the air circulation system. Additional Chemfluor® 367 fluoropolymer tubing can be purchased below in 12' (3.66 m) and 24' (7.32 m) lengths.



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[APPLIST]  
[APPLIST]

CPPC Purge Connectors make the PACU Pure Air Circulator Unit compatible with enclosed SM1 Lens Tube systems.

The flow rate of the Viton membrane pump is continuously adjustable by a knob on the front panel and is measured by an in-line flow meter immediately before the output. A series of vent holes is provided on top of the housing, which makes it possible for the user to see if saturation has occurred in the desiccant without dismantling the unit. Pink desiccant indicates that the desiccant is saturated and should be replaced. An elapsed time counter on the front indicates how long the unit has been in service. For instructions on how to replace the desiccant filter, please see the circulator's manual.

The rack-mountable air purifier is housed in a 17.0" x 13.0" x 7.0" (431.8 mm x 330 mm x 178 mm) [L x W x H] enclosure. The side-mountable rack adapters that come with the system can be attached to the housing for use in a 19" Rack Cabinet.

This air circulation unit purifies air in three separate stages. First, air is passed through the Desiccant Filter designed to trap airborne water molecules. Next, air is passed through the 15 µm Particulate Filter which removes particulates with better than 95% efficiency. The final filter is the 13X Molecular Sieve, which traps volatile organic compounds. Replacement filters can also be purchased separately below.

[Hide Specs](#)

## S P E C S

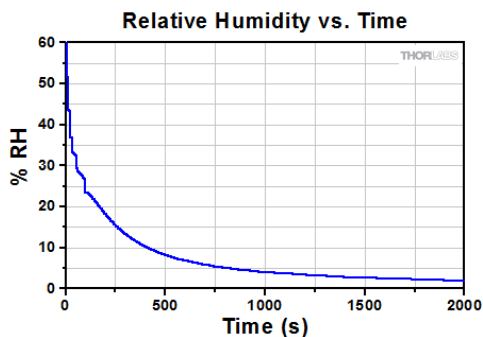
PACU™ Specifications	
<b>Air Flow</b>	
Flow Rate <sup>a</sup>	0.6 to 4.5 L/min
Flow Meter Range	0.6 to 5 L/min
Compatible Air Temperature Range	5 - 40 °C
<b>Filters</b>	
Moisture Trap <sup>b</sup> (Desiccant)	1.25 lbs (0.6 kg) Desiccant
Particulate Filters	15 µm, Sintered Pore Element Filter
	13X Molecular Sieve, 1.1 lbs (0.5 kg)
<b>Other</b>	
Air Pump	Micro-Diaphragm Pump with 4.5 L/min Max Delivery
Internal Tubing	Chemfluor® 367 Fluoropolymer Tubing, 3/16" ID x 1/4" OD x 3/32" Wall, 266 PSI
External Tube Fittings	Type 316 Stainless Steel, Chemical-Resistant PVDF Swagelok® Tube Fittings for 1/4" OD Tubing
Power Compatibility	110 - 230 VAC, 50 - 60 Hz Operation, Location Specific Power Cord Included
Dimensions (L x W x H)	19.0" x 13.0" x 7.0" (483 mm x 330 mm x 178 mm)
Weight	15.0 lbs (6.8 kg)

a. The maximum value of 4.5 L/min occurs when the intake and exhaust are short circuited (directly connected).

b. Moisture trap capacity: 50 g

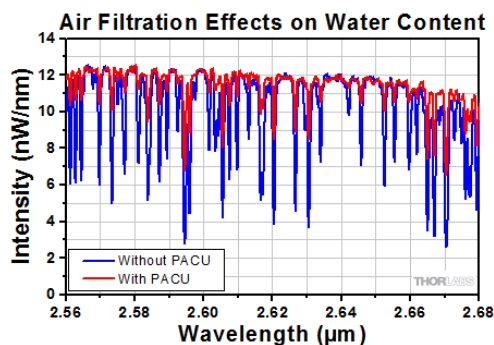
[Hide Performance](#)

## P E R F O R M A N C E



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An enclosure with a 3.0 L volume that contained a hygrometer probe was exposed to ambient conditions, then sealed and purged by the PACU™ at a flow rate of 3.0 L/min. After 33 minutes (2000 seconds), the relative humidity had dropped below the concentration measurable by the hygrometer, demonstrating near-complete removal of airborne water molecules.



Click to Enlarge

The graph above shows the water absorption spectrum of a broadband halogen source coupled to an OSA205C Optical Spectrum Analyzer through free space. The blue trace shows the spectrum without the air purification while the red shows the spectrum with air purification used to purge the OSA205C cavity. The use of the PACU Pure Air Circulator Unit reduces the water absorption inside the OSA.

[Hide PACU Pure Air Circulator Unit](#)

### PACU Pure Air Circulator Unit



- ▶ Three-Stage Filtration System Includes Desiccant Filter, 15 μm Particulate Filter, and 13X Molecular Sieve
- ▶ 19" Rack Mountable
- ▶ Ideal for Applications that Benefit from a Pure and Clean Atmosphere
- ▶ 12' (3.66 m) of Chemfluor® 367 Fluoropolymer Tubing is Included with the Device (Additional Tubing is Available Below)

The PACU Pure Air Circulator Unit is a closed-loop filtration unit that consists of several filters designed to remove moisture and particulates from the air. It is ideal for the continuous filtering and circulation of extremely clean, dry air in an optical cavity. The three filters included with the system are the desiccant filter, 15 μm in-line particulate filter, and a 13X molecular sieve. Filter replacements for this unit can be purchased separately below.

Part Number	Description	Price	Availability
PACU	Pure Air Circulator Unit	\$2,502.15	Today

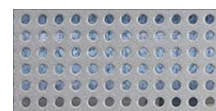
[Hide Desiccant Filter Replacement for PACU Pure Air Circulator Unit](#)

### Desiccant Filter Replacement for PACU Pure Air Circulator Unit



- ▶ Desiccant Air- and Gas-Drying Unit
- ▶ Direct Replacement Filter for the PACU System

The PACU-FTR1 is a desiccant air- and gas-drying replacement filter for the pure air circulator unit system. This filter will change color from blue to pink when saturated with water. As shown to the right, the vent holes on the top of the unit offer a convenient way to check for saturation without having to disassemble the unit. After several months of use the desiccant filter is likely to need replacement. Installation instructions for the desiccant filter can be found in the PACU manual.



Click to Enlarge  
Blue, Unused Desiccant in PACU



Click to Enlarge  
Pink, Water-Saturated Desiccant in PACU

Part Number	Description	Price	Availability
PACU-FTR1	Desiccant Replacement Filter for PACU	\$113.40	Today

[Hide Particulate Filter Replacement Sets for PACU Pure Air Circulator Unit](#)

### Particulate Filter Replacement Sets for PACU Pure Air Circulator Unit

- ▶ Includes a 15 μm In-Line Particle Filter and a 13X Molecular Sieve
- ▶ Direct Replacement Filters for the PACU Pure Air Circulator Unit



The PACU-FTR3 and PACU-FTR2 are fine filter replacement sets for the PACU Pure Air Circulator Unit. The first filter in each set is a 15 µm in-line particle filter, which removes particulates with better than 95% efficiency. The second is a 13X molecular sieve, which traps volatile organic compounds. If the filters are saturated, the airflow will be reduced as indicated by the flow meter. When replacement is needed, both filters should be replaced simultaneously. Step-by-step installation instructions for these filters can be found in the PACU manual.

The 13X molecular sieve comes in two different styles. When the filter set needs to be replaced, it should be replaced with the set that contains the same style of sieve. For PACU systems purchased before September 1, 2015, please purchase the PACU-FTR2 Replacement Filter Set. For PACU systems purchased on or after September 1, 2015, please purchase the PACU-FTR3 Replacement Filter Set.

Part Number	Description	Price	Availability
PACU-FTR3	Particulate Filter Replacement Set for PACU Systems Purchased After 9/1/2015	\$332.85	Today
PACU-FTR2	Particulate Filter Replacement Set for PACU Systems Purchased Prior to 9/1/2015	\$434.70	Today

[Hide Additional Tubing for PACU Pure Air Circulator Unit](#)

### Additional Tubing for PACU Pure Air Circulator Unit



- ▶ Chemfluor® 367 Fluoropolymer Tubing for PACU Pure Air Circulator Unit
- ▶ 3/16" ID x 1/4" OD (4.8 mm ID x 6.4 mm OD) Tubing
- ▶ Continuous Operation Temperature: -25 °F to 175 °F (-32 °C to 79 °C)
- ▶ Available in 12' (3.66 m) and 24' (7.32 m) Lengths

This clear Chemfluor® 367 Fluoropolymer Tubing (12' of which is included with the air circulator unit) is required for supplying and returning air or inert gas (N<sub>2</sub>) to the pure air circulator unit. This tubing meets FDA requirements, is resistant to abrasions and many commonly used chemicals, and has a specific gravity of 2.15. It is available in both 12' (PACU-TG) and 24' (PACU-TG24) lengths. Even though the tubing can handle air temperatures from -25 °F to 175 °F (-32 °C to 79 °C), the PACU unit is rated for air temperatures from 41 °F to 104 °F (5 °C to 40 °C).

Part Number	Description	Price	Availability
PACU-TG	3/16" ID x 1/4" OD (4.8 mm ID x 6.4 mm OD) Tubing, Length = 12'	\$59.85	Today
PACU-TG24	3/16" ID x 1/4" OD (4.8 mm ID x 6.4 mm OD) Tubing, Length = 24'	\$113.40	Today

Visit the [PACU™ Pure Air Circulator Unit](#) page for pricing and availability information: