POWER-PLUME®
LABORATORY EXHAUST

vav laboratory
+ power plume
————————
maximum
= efficiency

COOK

The Power-Plume® was designed for critical lab applications where safety and efficiency are the primary concerns.

The Power-Plume® is a powered induction device used to induce large amounts of ambient air and generate plume height regardless of the lab exhaust flow. This device has the unique advantage of maintaining a minimum 50 foot plume height even as the lab exhaust flow is reduced for partial load conditions. Dilution rates at maximum lab exhaust flow exceed 200%. As the lab exhaust is reduced, dilution rates can exceed 1,000%.

The Power-Plume conveys a column of ambient air around the lab exhaust air encapsulating the contaminated lab exhaust. The primary lab exhaust fan is still utilized to exhaust the contaminated lab air. It can now be operated on a VFD for partial load conditions. This saves energy as we no longer need to utilize bypass air during partial load conditions to maintain plume height. Since the primary lab exhaust fan is not required to generate the high discharge velocities for adequate plume height, the power requirements of this fan are significantly reduced.

Power-Plume's
Low Profile Provides
Architectural Flexibility

**Dilution Air Encapsulates
Contaminated Lab Exhaust**

Lab Exhaust Air

Dilution Air

Dilution Air

Dilution Air

Dilution Air

Lab Exhaust Air from Building

Ø57 OD

Top View

58

18

Side View

Ø30 ID

Ø33

Ø18

Ø⁷⁄₁₆ -12 Places

Ø32 B/C
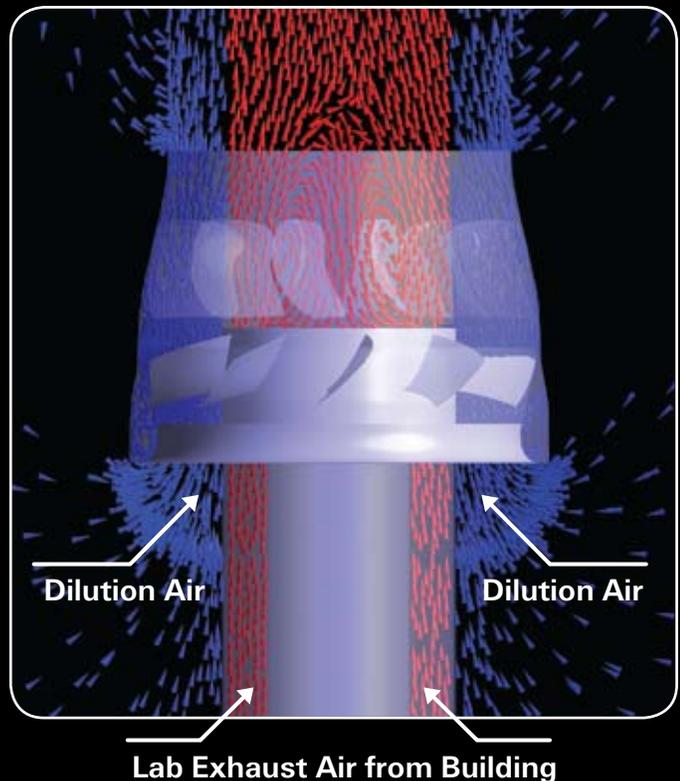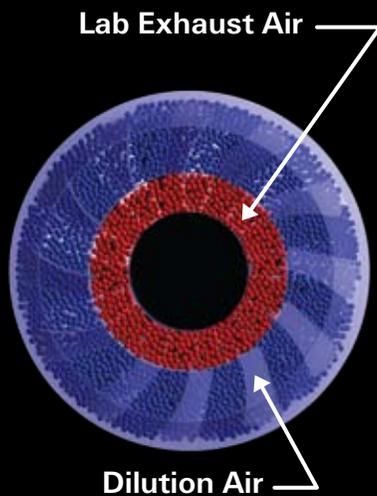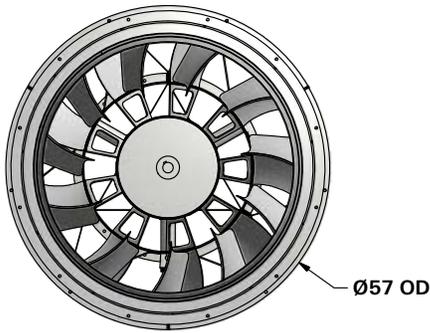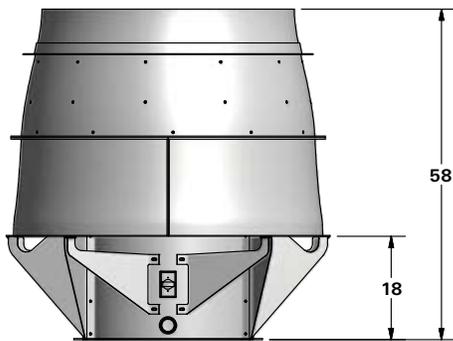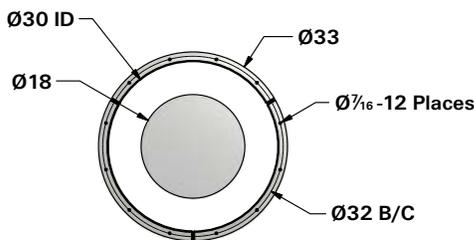
Mounting Detail

All dimensions shown are in inches

Standard Features

- Delivers constant 50 foot minimum plume height in 10 mph wind
- Mixed-flow, non-overloading welded aluminum wheel
- Fiberglass reinforced (FRP) windband with UV protection
- Phenolic epoxy powder with UV protection on steel components
- Integral lifting lugs
- Pre-punched mounting flange
- Motor housing sealed from lab air flow
- Stainless steel hardware
- Stainless steel lube lines
- NEMA 3R disconnect mounted and pre-wired
- Optional integral curb cap available
- Designed to withstand 125 mph wind

c(UL)us

Type Power-Plume is furnished standard with UL 705 and cUL 705 listings (Power Ventilator/ZACT).

amca CERTIFIED RATINGS

SOUND AIR

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

Loren Cook Company certifies that the Power-Plume shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

Performance

Model Number	Free Air CFM	RPM	HP	Outlet Velocity (Ft/Min)	Plume Height* (Ft)	LwA	Motor HP	Weight (lbs)
PP-50	31220	585	8.42	3025	48	96	10	850

Performance certified is for installation Type A: Free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound power ratings shown have been calculated per AMCA Standard 301. Values shown are for outlet LWoA sound power levels for installation Type A: free inlet, free outlet. *Plume Height assumes the Power-Plume is mounted with top of windband 10 feet above roof and a wind speed of 10 MPH. Plume height and performance data on previous page are not AMCA certified.

The airflow, outlet velocity and plume height values shown in the table above are minimum values assuming no lab exhaust airflow. Additional lab exhaust airflow will increase these values. See graphs on previous page for additional information.

Outlet Airflow and Horsepower

Power-Plume Outlet Airflow (CFM): 0 – 50000
Power-Plume Horsepower: 0.00 – 10.00
Laboratory Exhaust Airflow (CFM): 0 – 20000

- Outlet Airflow
- Horsepower
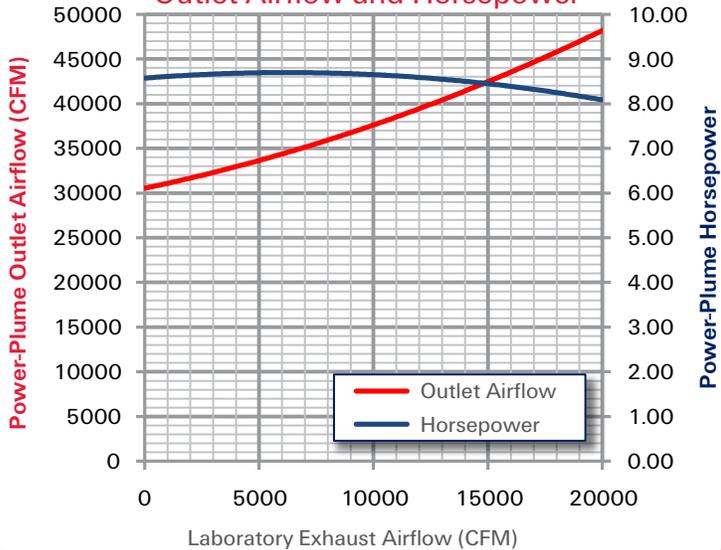
Plume Height and Dilution Ratio

Effective Plume Height (ft): 0 – 90
Dilution Ratio (Outlet Flow / Lab Flow x 100): 0% – 1800%
Laboratory Exhaust Airflow (CFM): 0 – 20000

- Plume Height
- Dilution Ratio
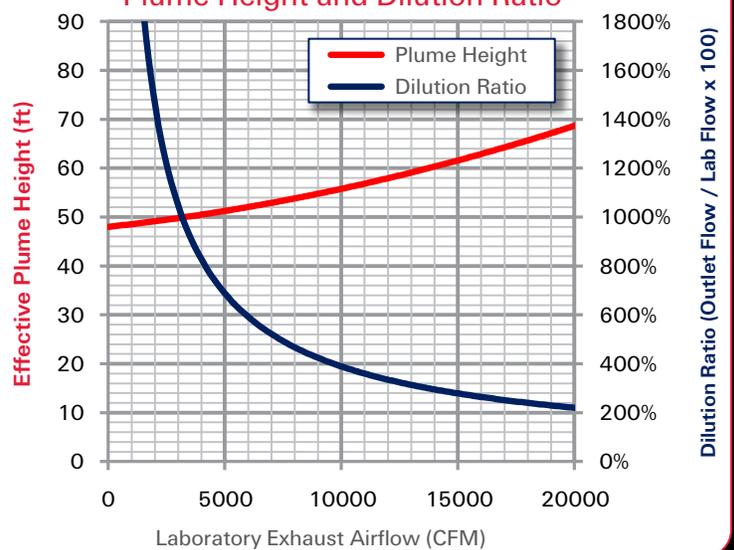
Power-Plume Pressure Loss

Static Pressure Loss (inches w.g.): 0.00 – 5.00
Laboratory Exhaust Airflow (CFM): 0 – 20000

- Mounted on Curb Cap
- Mounted on 270 QMX
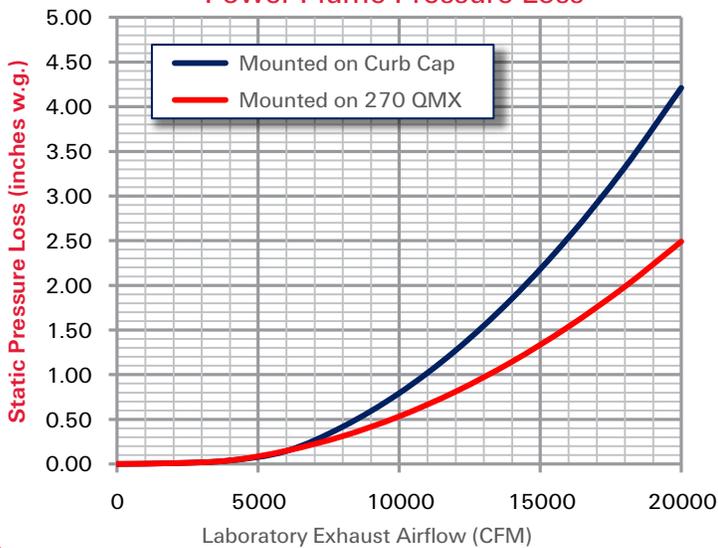
The charts above can be used to help determine the performance of the Power-Plume in your system at various laboratory exhaust airflows.

The pressure required to exhaust air thru the Power-Plume is shown in the chart on the left. The pressure loss varies depending on the mounting on the Power-Plume. Contact the factory for additional information on your specific application.

The tables below illustrate the operating cost of a typical lab exhaust system using bypass air compared to a Power-Plume system.

Operating Cost Comparison For Typical Three Fan System

Typical Lab Exhaust System with Bypass Air

| Laboratory Occupancy	Lab Exhaust Airflow	Bypass Airflow Required	Exhaust Fan HP (3 fans)		Exhaust System HP	Operating Cost
6 hrs @ 100%	45000	0	84.0	-	84.0	$ 40.69
10 hrs @ 50%	22500	22500	84.0	-	84.0	$ 67.82
8 hrs @ 25%	11250	33750	84.0	-	84.0	$ 54.25
						$ 162.76 Cost/Day

Power-Plume System

Laboratory Occupancy	Lab Exhaust Airflow	Bypass Airflow Required	Exhaust Fan HP (3 fans)	Power-Plume HP (3 fans)	Exhaust System HP	Operating Cost
6 hrs @ 100%	45000	0	56.4	25.5	81.9	$ 39.67
10 hrs @ 50%	22500	0	7.1	26.1	33.2	$ 26.76
8 hrs @ 25%	11250	0	0.9	25.8	26.7	$ 17.23
						$ 83.67 Cost/Day
						$ 28,868.93 Annual Savings

Assumptions:
Three fan lab exhaust system (15,000 cfm each), 10 mph wind speed, 50' plume height requirement, $0.10/kwh energy cost.

Cutaway View with Features

Windband

Straightening Vanes

Power-Plume® Wheel

Motor Housing

Ambient Air Inlet

Disconnect Switch

Fiberglass Windband
90lbs

Aluminum Power-Plume Wheel
55lbs

Motor and Motor Plate with Integral Lifting Lugs
405lbs
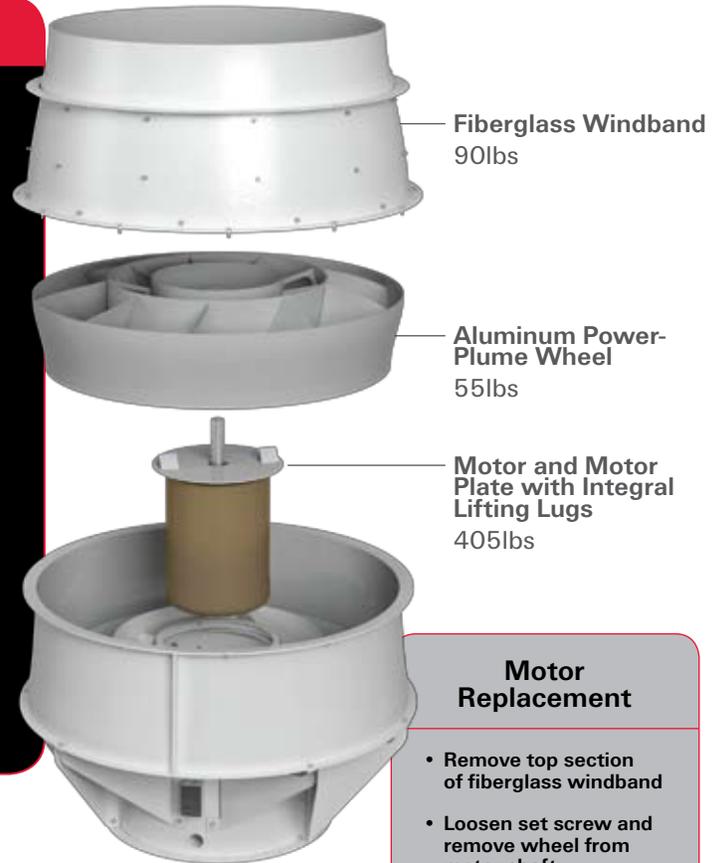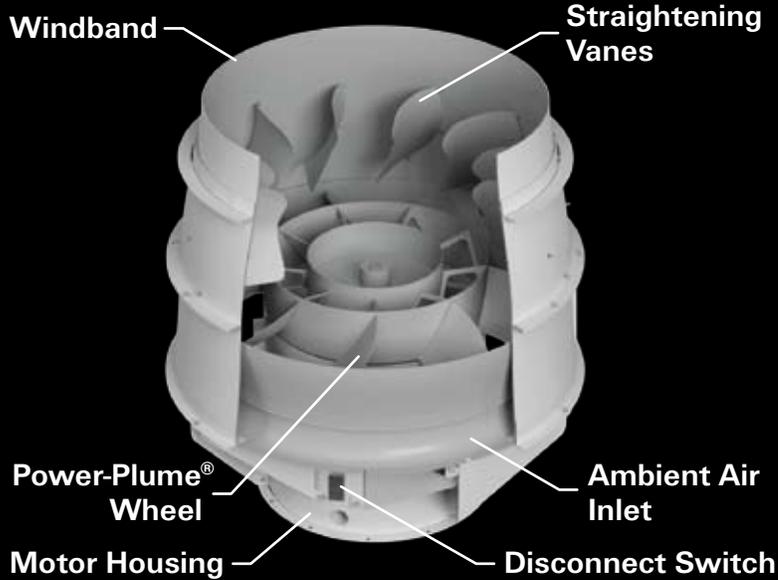
Motor Replacement

- Remove top section of fiberglass windband

- Loosen set screw and remove wheel from motor shaft.

- Remove mounting bolts and lift motor using supplied lifting lugs.

Installation Examples

FAN MOUNTED

Power-Plume is mounted above the primary lab exhaust fan.

STACK MOUNTED

Power-Plume can be curb mounted with an integral stack to achieve a discharge height of ten feet above roof deck per ANSI Z9.5. The primary lab exhaust fan is installed inside the building.

CURB MOUNTED

For low profile requirements, the Power-Plume can be curb mounted with the primary lab exhaust fan installed inside the building. Power Plume can also be installed on top of air handlers or energy recovery systems.

Additional Laboratory Exhaust Products

COOK QMX-VP

US Patent No. 7,484,929

Size: 90-600
CFM: 1,500-94,500
SP: 1.0-6.0"

• Mixed Flow Wheel
• Concentric Dilution Nozzle
• Curb or Plenum Mounted
• Small Footprint

COOK CA-VP

Size: 120-730
CFM: 1,500-143,800
SP: 1.0-12.0"

• Centrifugal Wheel
• Concentric Dilution Nozzle
• Low Profile
• Higher Pressure Capabilities

COOK TCN-LE

Size: 100-490
CFM: 330-49,550
SP: 0.5-4.0"

• Curb or Plenum Mounted
• Small Footprint
• 10 ft. Discharge Standard

COOK CPS-LE

Size: 100-245
CFM: 450-12,550
SP: 0.25-5.0"

• Curb Mounted
• Adjustable Outlet Velocity
• 10 ft. Discharge Available

LOREN COOK COMPANY

2015 E. DALE STREET

SPRINGFIELD, MO 65803-4637

417.869.6474

FAX 417.862.3820

lorencook.com