

Before Buying Your Next Air Filter Check The Facts About Airflow, Engine Protection and Performance

TECHNICAL BULLETIN

There's a lot of chatter these days about increased horsepower from increased airflow. We put Donaldson, Brackett and K&N to the test to uncover the truth about airflow, engine protection and performance.

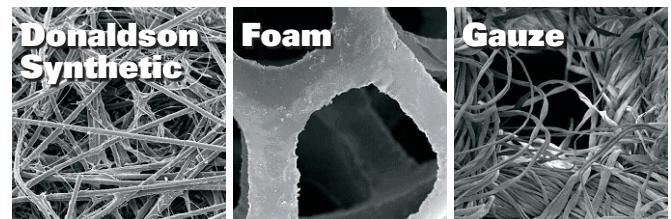
Fact: Donaldson had better airflow

In laboratory airflow tests comparing Donaldson, Brackett and K&N Challenger filters for Cessna 172 aircraft, Donaldson had the lowest restriction (best airflow). Similar results were also found when testing filters for other aircraft models.

Why does Donaldson have better airflow?

- Our filter media is composed of synthetic fibers
- Synthetic media fibers are more evenly distributed
- More media area and less frame
- Deeper filter pleats improve airflow

The scanning electron microscope photos below show the difference (photos at equal magnification). Donaldson filters use a synthetic media; Brackett uses an oiled, open-cell polyurethane foam; and K&N Challenger consists of layers of surgical gauze coated with oil.



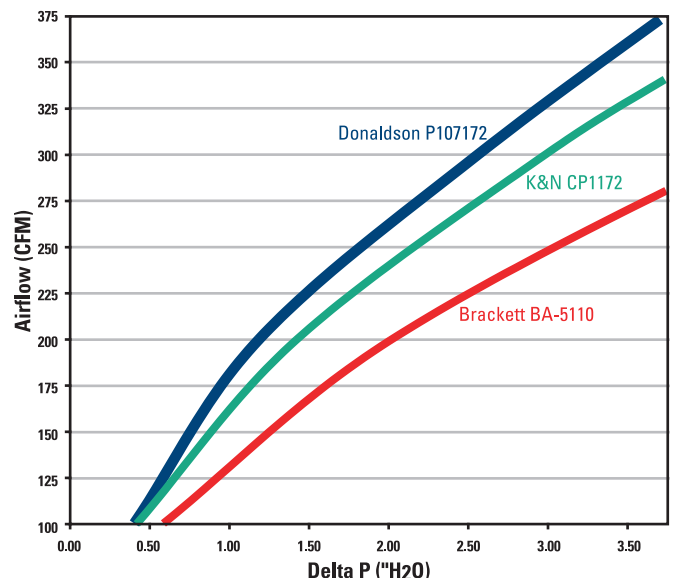
Fact: With Donaldson filters you get as good or better horsepower

The difference in airflow restriction between filters must be significant (at least 4" H₂O) to realize a 1% HP gain (see technical explanation box, left). This difference does not exist between the gauze filters tested and Donaldson synthetic media. In fact, since Donaldson filter restriction is *lower*, it would theoretically provide a fractional *performance advantage*. A significant difference in pressure loss (4" H₂O or greater) was observed versus the foam panel filters. Therefore, both gauze and Donaldson synthetic media filters may provide a performance increase over foam filters.

If a worn or poorly fit air filter allows as much as a **tablespoon** of abrasive **dirt** material into the cylinders, it will cause **wear** to the extent that an **overhaul** will be required.

-- Textron Lycoming publication

Cessna Model 172
Airflow vs. Resistance Comparison

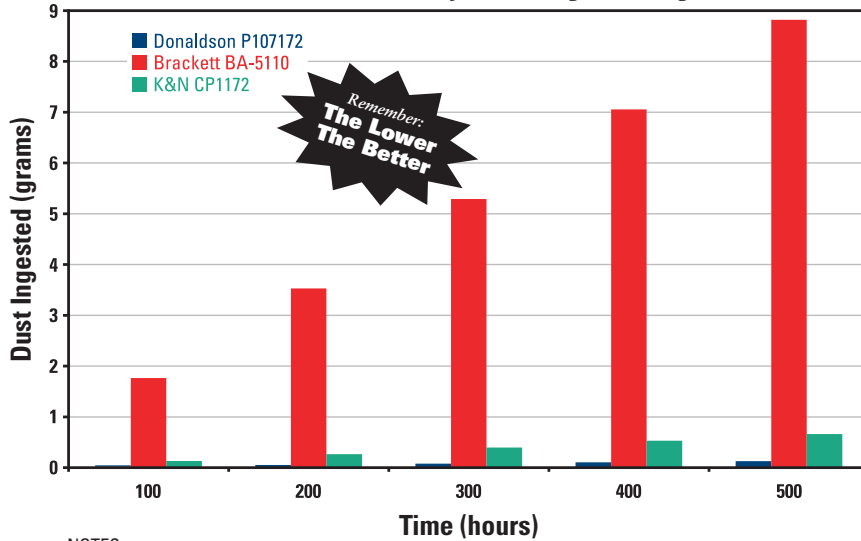


Above: Laboratory test results showing airflow and restriction (differential pressure or Delta P)

Fact: Donaldson filters stop more dirt

Dirt and oil that pass through the filter are ingested by your engine and coat your air induction system. Donaldson filters stop more dirt and protect your engine better.

Cessna Model 172
Dust Ingested By Engine During Filter Service Life
(lower bar means less dust passed through to the engine)



NOTES:
 Phoenix air concentration 65.5 µg/h
 Engine rated airflow 190 cfm
 Based on filter efficiency tested per ISO5011

How can a filter increase horsepower?

A filter that offers less restriction could increase horsepower. At ground level the engine is assumed operating at 100% HP and experiencing atmospheric pressure of 29.92" Hg or 407" H₂O (60°F). Decreasing the restriction by 4" H₂O linearly would increase the engine's performance by 1%. At higher elevations, this performance difference increased slightly. For example, at 10,000 ft. elevation, atmospheric pressure is 20.58" Hg or 280" H₂O (60°F). At that elevation, decreasing the restriction by 4" H₂O would increase the engine's performance by 1.4%.

Other Donaldson filter facts

- *Long Lasting* - Donaldson filters are rated to last 500 hours, five to 10 times longer than foam filters
- *OEM and FAA-PMA Certified* - Donaldson filters are designed to manufacturer specifications
- *Thoroughly Tested* - Independent lab tests show Donaldson filters meet or exceed FAA fire safety regulation per FAR 25,853
- *Heavy-duty Experience* - Donaldson has been designing and manufacturing engine filters since 1925. We're a leading worldwide filter supplier for commercial jets, military vehicles, off-road equipment, trucks, light-duty vehicles, power plants, dust collectors, industrial compressors and more.
- *Selection* - Donaldson offers over 50 filter models for Cessna, Maule, Mooney, Piper and others
- *Easy to Install and Maintain* - Donaldson filters are designed for easy installation and maintenance, with no removable parts or oil



Donaldson

Donaldson Company, Inc.
 Minneapolis, MN
 55440-1299

www.donaldson.com

United States
 952-887-3435

Leuven, Belgium
 32-16-38-3710

Singapore
 65-6546-4400

Brochure No. F112208 (7/05)

© 2005 Printed in the U.S.A.
 Equal Opportunity Employer
 Donaldson Company, Inc. reserves the right to change or discontinue any model or specification at any time and without notice.