

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

TECHNICAL BULLETIN

There's been a lot of discussion about increased horsepower from increased airflow. We put Donaldson, Brackett, and Challenger Aviation (K&N) filters to the test to uncover the truth about airflow, engine protection and performance.

FACT: Donaldson has better airflow

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

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



WHY DOES DONALDSON HAVE BETTER AIRFLOW?

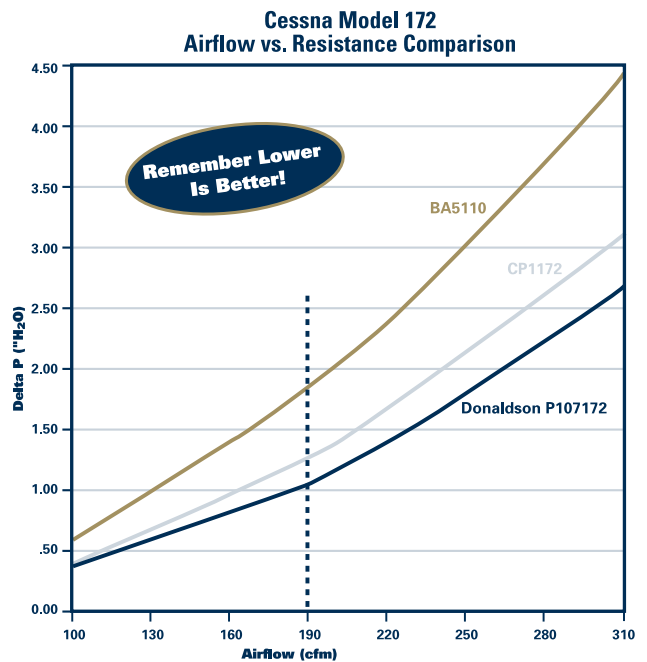
- Our filter media is composed of synthetic fibers
- Evenly distributed uniform size and shape media fibers
- More media area and less frame
- Deeper filter pleats
- No oil

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%.

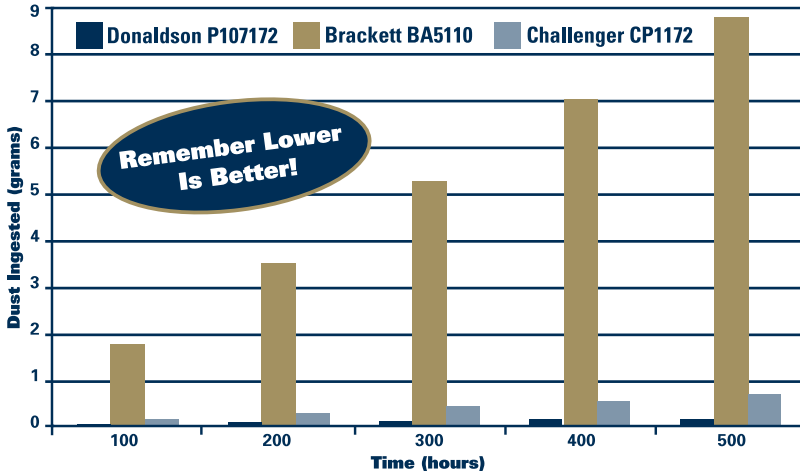
FACT: With Donaldson filters you get as good or better horsepower

The difference in airflow restriction between filters must be significant (at least 4" H₂O) to realize a 1% HP gain (see technical explanation box, bottom). This difference does not exist between the gauze filters tested and Donaldson synthetic media. In fact, since the 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.



Above: Laboratory test results showing airflow and restriction.

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



Remember Lower Is Better!

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

FACT: Donaldson Filters Stop More Dirt

Donaldson filters deliver consistent and reliable performance; they achieve 98.5% or greater filtration efficiency according to ISO5011 fine and coarse dust requirements, greatly exceeding the other filters. Donaldson filters stop more dirt and protect your engine better.

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

– Textron Lycoming publication

Other Donaldson Filter Facts

LONG LASTING

Donaldson filters are rated to last 500 hours, five to 10 times longer than foam filters. Replace your air filter after three years, five cleanings or 500 flight hours; whichever occurs first.

OEM AND FAA-PMA CERTIFIED

Donaldson filters are designed to manufacturer specifications. No STCs required.

THOROUGHLY TESTED

Third party lab tests show Donaldson filters meet or exceed FAA fire safety regulation per FAR 25.853 and FAR 23.1107 Induction system filters.

SELECTION

Donaldson offers over 75 filter models for Cessna, Beech, Maule, Mooney, Piper and others.

EASY TO INSTALL AND MAINTAIN

Donaldson filters are designed for easy installation and maintenance – no removable parts or oil, may be washed with water.

HEAVY-DUTY EXPERIENCE

Donaldson has been designing and manufacturing engine filters since 1925. We are a leading world-wide filter supplier for commercial jets, military vehicles, off-road equipment, trucks, light-duty vehicles, power plants, dust collectors, industrial compressors and more.

Visit www.donaldson.aero/ga for more filter facts



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