



Aerospace

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Airbus

Avionics Cooling



A318/319/320/321

Pall Avionics Cooling Filter Assembly

In modern commercial aircraft, with the increased dependence on electronic systems and fly-by-wire technology, the avionics (E/E) cooling system plays an increasingly important role in the overall system reliability. Therefore it is essential that the avionics cooling filtration system is highly efficient at removing both free water and solid particulates from the cooling air.

For the Airbus A318, 319, 320 and 321 series of aircraft, avionics system cooling air is drawn from 2 areas:

On the ground, air enters through an inlet located on the forward port side of the aircraft, whereas in flight, the avionics air system switches to a closed loop re-circulation system.

Features

- Pall Aerospace depth filter medium offering a low differential pressure with maximum filter service life.
- Demonstrated assembly 100 % water removal efficiency.
- Performance qualified against internationally and Airbus accepted standards.
- Only one disposable element to stock and change.
- Proven performance, installed on over 1500 aircraft worldwide.

Operational characteristics

- **Free water** entering the avionics bay will potentially lead to corrosion of electrical pins, connectors and other electronic components. The presence of free water can also cause immediate electrical/electronic equipment malfunction thus rendering the components inoperable.
- **Free water** is removed by use of a patented centrifugal separation assembly, which provides a one hundred per cent (100 %) free water removal efficiency even under the most adverse testing conditions. As the water removal system uses centrifugal technology there is no potential for blockage, therefore the differential pressure across the centrifuge section of the filter assembly remains constant. Airbus tested the 'Pall' system with both clean and fully blocked filter elements and demonstrated that these had no effect on the water separation efficiency.
- **Clean air** is necessary to ensure particulates do not accumulate on electronics equipment located in the avionics bay. Particulates can act as insulators so any accumulation will result in avionics equipment operating at elevated temperatures, thus the reliability of this equipment will be reduced.
- **Solid particulates** are removed from the avionics bay incoming air by a single disposable filter element.



Questions and Answers

Q1 How does the Pall avionics cooling filtration system differ from alternative systems available?

The Pall system uses a patented centrifugal separation assembly that provides a one hundred per cent continual water separation efficiency even under the most adverse testing conditions. The efficiency remains constant and is not affected by the pressure drop across the filter element.

The Pall system was tested by Airbus, with both clean and fully blocked filter elements installed. The results demonstrated that there was no effect on the water separation efficiency. In comparison, the alternative system uses a mesh as a demister and as this element becomes blocked, the flow velocity through the mesh increases and hence a reduction in the water separation efficiency is likely.

Q2 How was the filtration removal efficiency of the Pall system tested?

During qualification testing witnessed by Airbus the Pall filter element (QB0639) demonstrated the following particulate separation efficiencies.

- 100 % with carbon black (size range 0.1 to 5 micron).
- 85 % with silica dust. (size range 0 to 5 micron).
- 87 % with Airbus test dust.

Q3 How does the Pall system compare to the alternative when comparing maintenance and cleaning?

The Pall system has only one disposable element (QB0639) to replace. The alternative system has two replaceable elements. Therefore the Pall system offers both time and replacement costs savings.

Q4 What happens to the water collected in the Pall system?

After the water has been separated by the Pall system, it is drained from the housing via the trap and non-return valve assembly. This drain system is fitted with a strainer to prevent blockage of the trap with large particulates.

Q5 What operational experience has the Pall system had?

The Pall system has been in service since 1995. Subsequent to this Pall have now tested around 100 used filter elements and accumulated a significant amount of worldwide in service data and experience. The Pall system is fitted on over 1500 in-service aircraft worldwide.

Q6 What is the combined weight of the Pall system?

The Pall system weighs 9.3 Kg. An alternative lighter composite material housing was offered during the original qualification stages but Airbus declined to pursue this option.

Q7 Is the Pall system approved by Airbus?

Yes, for new build production aircraft it is available as a no charge option (Reference 24146).

Yes, for retrofit of in-service aircraft, it is available via Airbus Service Bulletin A320-21-1087 at no charge.

Technical Data

Description

Complete Filter Assembly	QB0452
Filter Housing	QB0555
Filter Element	QB0639
Syphon Tube	QB0553
Particulate removal efficiency	85 % with Silica Dust 100 % with Carbon Black 87 % with Airbus Test Dust
Dirt Holding Capacity	829 g Silica Dust 123 g Carbon Black 270 g Airbus Test Dust
Water Efficiency	100 %
Airbus Service Bulletin	A320-21-1087
Airbus Modification Numbers	24146, 26739, 27038

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