

Bulletin No. 5

June 2005

Filter Monitors

Users of filter monitors should not consider these devices to be "fail-safe"

Following concerns about the water-removal performance of filter monitors in service, a significant amount of testing and research has taken place with the objective of identifying the causes. Research, including the testing of monitor elements removed from service, is continuing but no satisfactory technical solution has been identified.

The Joint Inspection Group is issuing this Bulletin:

- as a timely reminder to enforce existing Quality Control Procedures to remove free water from aviation fuel; and
- to advise users of the availability of monitor elements meeting API/IP 1583 4th edition.

Sampling Procedures on the Apron

The visual examination of fuel samples and chemical water detectors needs to be performed in good lighting conditions.

For fuelling vehicles equipped with filter monitors (all diameters) the following sampling procedures are required as a minimum:

For fuellings by Hydrant Servicer:

- (1) **For the first fuelling of the day**, whilst under hydrant pressure but before any fuel is delivered to the aircraft, a sample shall be taken from the upstream (inlet side) of the monitor vessel for Visual Check. This is an additional precautionary check to confirm that there are no signs of water prior to the first into-plane delivery of the day. (5.2.2(b))
- (2) **During every fuelling**, a sample shall be taken downstream (outlet side) of the filter for Visual Check. This sample should be taken after the fuel contained in the vehicle delivery pipework and filter vessel has been displaced (except where the total delivered litres is less than the pipework & filter capacity).
- (3) **At the end of every fuelling**, a sample shall be taken from the upstream (inlet side) of the monitor vessel for Visual Check.

A chemical water detector test shall be performed as part of the Visual Check on at least one of these samples, (2) & (3). (5.3.2)

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For Fuellings by Mobile Fuellers and other into-plane units:

A sample shall be taken downstream (outlet side) of the filter for Visual Check with chemical water detector. This sampling procedure shall apply as follows:

- (a) the first fuelling of the day,
- (b) the first fuelling after a fueller leaves the depot,
- (c) the first fuelling after loading or topping up a fueller, and
- (d) the first fuelling following exposure to heavy rain or snowfall.

These samples should be taken after the fuel contained in the delivery pipework and filter vessel has been displaced. (5.3.1)

Other Routine Checks

Regular checks shall include the following:

- **Fueller tank tops** to be checked at least quarterly to ensure that drainage channels, for removal of surface water, are not blocked and that manlid gaskets are in good condition,
- **Fueller tank sumps** to be checked for water daily at the start of the morning shift, after loading and after washing or exposure to heavy rain or snowfall,
- **Filter sumps** to be checked for water daily at the start of the morning shift,
- **Low points in depot pipework and strainers**, especially in fueller-loading pipework, to be checked regularly and drained of any water,
- **Hydrant low points to be flushed weekly**, and more frequently during/after hydrant engineering works, such as up-rating of hydrant pumps, that could alter the flow conditions in the hydrant,
- **Equipment used for hydrant flushing** to be checked for the presence of water before and after use.

Filter Differential Pressures

During each pumping/fuelling operation the differential pressure should be observed to ensure that the maximum limit (22 psi for monitors) is not exceeded. It is also recommended that the flow rate and differential pressure (for each vehicle) is recorded on a daily basis to ensure that the dp when corrected to maximum achievable flow rate for the vehicle does not exceed 22 psi.

The corrected dp shall be established by using either a conversion graph or table or a calculator as supplied by filter manufacturer or Into-Plane technical support Company. Weekly graphs of dp corrected to maximum achievable flow rate shall be prepared.

The conversion from observed dp to corrected dp at maximum achievable flow is not accurate when dp readings are taken at low flow rates and is not valid where a reading is taken at less than 50% of maximum flow. For this reason, the dp should be recorded when the filter is operating at, or as close as possible to, maximum flow.

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It is also recommended that if the corrected dp is 5 psi or more below the previous corrected dp reading, then the elements shall be replaced.
(A1.2.2)

Maximum Service Life

Filter monitor elements shall be replaced in accordance with the maximum in-service life recommended by the manufacturers, currently 12 months.

Inspection of used Monitor Elements

Research into the possible reasons for the degradation in monitor performance is continuing and a number of possible causes, including pressure shocks and electrostatic discharges, have been identified. It is recommended that when elements are removed from service they should be inspected carefully and any abnormalities recorded. Used elements should be checked for:

- changes in shape that could be the result of pressure surges
- deposits on the outer layer
- signs of surfactant and microbiological contamination
- signs of charring that could have been caused by an electrostatic discharge
- other damage.

New Monitor Elements – 4th edition of API/IP 1583

The 4th edition of API/IP 1583 has now been published. It includes the requirement for a maximum end to end electrical resistance. The lower end to end resistance monitors are designed to reduce the electrical charge accumulation on the elements during flow that has led to electrostatic damage at a number of locations. As monitor elements complying with 4th edition become available they should be used when existing stocks of monitor elements are exhausted.

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