Bulletin No. 52

June 2012

Filter Monitor Vessels
Flow Rates and Differential Pressure Monitoring

Introduction

Filter Monitor (FM) vessels should be appropriately sized to match the flow rates required for their operation and shall not be operated at flow rates that exceed the rated flow of the vessel as configured (Element rated flow x Number of elements installed). Also, at low flow rates, water can be poorly distributed in FM vessels with the possibility of localised Super Absorbent Polymer (SAP) activation resulting in the threat of water transmission and SAP migration. Appropriate sizing is not always easy to achieve when the same vessels are required for different applications that demand different flow rates. There are several considerations to enable this flexibility without compromising the performance of the filter vessel.

Filter Monitor Flow Rates

Fuelling equipment shall be operated to ensure that FMs are regularly used above 50% of their qualified rated flow and that this condition is met at least weekly. If this condition cannot be met the FM vessel shall be de-rated by the use of blanks. The blanks may take the form of dummy elements that will not allow flow or fixed inserts/plates fitted to the element mounting orifices. Careful consideration should be given to the selection of positions to blank off in order to ensure the fuel flow in the vessel is evenly distributed.

Differential Pressure (dP) monitoring

The monitoring of the differential pressure (pressure change across a filter vessel) and dP correction is particularly important to ensure the filter does not exceed its recommended change-out pressure. FM failure in the form of Super Absorbent Polymer (SAP) migration may result if monitors are subjected to prolonged elevated differential pressures (above the maximum change-out dP). dP is a function of flow rate and will change according to the operational flow rates in a vessel.

It is also important to recognise that if a sudden drop in dP is observed during operation, without any obvious cause being found, especially for the same flow rate conditions, the operation shall be stopped and the elements changed.

ACTIONS FOR JIG JOINT VENTURES

Filter Monitor flow rates and de-rating

- Ensure the Filter Monitor (FM) vessel, as configured is operated regularly above 50% of its rated flow. If this condition cannot be met at least weekly for the filter vessel then it shall be de-rated. This will involve the use of blanks to de-rate the unit;
- De-rating options shall also be discussed with the manufacturer if the rated flow is significantly greater than the maximum achievable flow rate;
- FM vessels should have a rated flow of approximately 10% above their maximum achievable flow rate to allow for surge;
- A de-rated vessel shall be marked with a new label, provided by the filter manufacturer or representative, reflecting the modifications including the new rated flow for that vessel;
- It is important to ensure that once a vessel is modified it shall not exceed the new rated flow, which shall always be higher than the maximum achievable flow rate through the vessel. This may also require adjustments or modifications to be made to the fuelling system to regulate and reduce flow rate to the filter vessel to prevent such a situation (e.g. controlling inlet hydrant pressure on a hydrant servicer. When considering any adjustments to vehicles, advice should be sought from the vehicle manufacturer, or other competent authority in the event that the original OEM is no longer trading);
- The filter vessel records shall be updated to show the date and details of the modifications made to the vessel and details of the current configuration (number of elements, blanks, layout, etc);
- Consideration shall be given to the vessel interlock system (if fitted) when de-rating the vessel by means of blanks.

Differential Pressure monitoring

- Locations shall have a procedure in place for correcting the observed dP to the dP at maximum achievable flow rate for each filter vessel and ensure that staff are aware of the consequence for dP when operating a filter vessel at different flow rates;
- In addition to the minimum conditions that shall be in place when using filter monitors as stated in JIG bulletin 49 “EI 1583 6th Edition Filter monitor Elements”, JIG requires that all filter monitor elements used for aircraft fuelling shall be changed on a yearly basis or if the differential pressure reaches 1.5 bar (22psi) at (or corrected to) the maximum achievable flow rate through the filter vessel as currently configured.