

# SERVICE TOPICS

Engine Series  
All

File No. 5-135  
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Subject: THROWAWAY FUEL FILTER  
OPERATING FUEL LEVELS

It has been brought to our attention that numerous customers have discontinued the use of Cummins-Fleetguard throwaway fuel filters (FF-105, FF-104, FF-4 and FF-5) and have adapted the use of certain competitive filters of inferior structure and efficiency because they have observed that:

1. The Cummins-Fleetguard filters are only partially filled with fuel when removed from engines where the supply tank is below the filter.

The source of the vapor is the fuel itself. Like water, fuel contains a certain amount of dissolved air depending upon the fuel temperature, pressure on the fuel, specific gravity and the amount of aeration to which the fuel has been subjected. Reducing the pressure on the fuel or increasing the temperature of the fuel releases the air. The amount released depends upon the degree of fuel saturation with air and the magnitude of pressure reduction or temperature increase.

## Characteristics of air or vapor void information.

Assume that we have installed a new filter filled with fuel. When we begin cranking the engine, the gear pump begins evacuating air from the fuel plumbing. Air evacuated from the tank to filter plumbing passes through the paper at the extreme top. The filter remains full of fuel. Fuel rises from the supply tank as the vacuum increases. Fuel begins entering the filter and begins passing through the paper. At this point, the filter is full of fuel on both sides of the paper. When fuel begins passing through the paper at the top where air was formerly passing, the phenomenon of resistance to air-vapor flow becomes evident. Air-vapor which is released from the fuel due to vacuum are prevented from passing through the paper. As this vapor accumulated, it displaces fuel on the dirty side of the paper and the fuel level drops slowly. While the vapor cavity is increasing in volume, more fuel is being discharged from the filter than is entering. The fuel level on the dirty side drops until the equilibrium point is reached where the pressure differential across the paper is equal to the wetted paper resistance to air passage. For instance, in actual operation the absolute pressures in the filter would be as illustrated in Figure 4.

When the equilibrium point is reached, any further air or vapor released from the fuel or brought in with the fuel through an air leak passes through the paper immediately at the extreme top.