

## **IMPACT OF FILTER MEDIA AND PREFILTER SELECTION ON HEPA FILTER LOADING IN AIR HANDLING UNIT APPLICATIONS**

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Oil based test aerosols have historically loaded ePTFE membrane filters faster than conventional glass media filters. This problem has also been encountered with ePTFE media filters that have been installed in air handling units near sources of combustion products, such as automobile and helicopter exhaust. However, ePTFE membrane filters have advantages to end users over conventional glass media HEPA filters due to being less and having a much lower initial resistance, leading to lower maintenance and energy costs. This led us to investigate a test method that would capture this issue for assisting in development of a new filter media that holds up to these challenges and ensures the products are applied properly in the field. It was determined that generating a soot aerosol by combustion of diesel fuel according to test standard ISO 12103-3 would be an appropriate challenge to measure soot holding capacity and test length with a test ending condition of a 1.0 iwg pressure drop rise over initial resistance in a test duct at rated air flow. The test started with comparing wet-laid glass HEPA filter to oil-sensitive ePTFE membrane and oil-tolerant eFRM membrane. This test showed similar test life and soot holding capacity between glass and eFRM, with eFRM media having the advantage of a lower initial resistance. The oil-sensitive ePTFE filter had a much lower test life and soot holding capacity in comparison. The next test investigated eFRM filter life downstream of a MERV 13/F7 pocket prefilter with coarse fiber (electret) filter media vs fine fiber (mechanical) filter media. This test showed longer prefilter life and less loading on the final filter when using the prefilter with a mechanical filter efficiency.