

# **EFFECT OF RH CHANGE ON PRESSURE DROP OF LOADED CELLULOSE FILTER MEDIA WITH HYGROSCOPIC DEPOSITS**

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Current air intake filter test methods load test filter with non-hygroscopic blends, thus the testing RH is not a big concern. However, hygroscopic particles, mainly salts, are important portion of the ambient air pollutant. It is worthwhile to study the hygroscopic particle loading properties. Our previous research found that the loading RH has an impact on the test filter holding capacities when the hygroscopic particles were loaded. However, those research loaded the test filter media at the constant RH, which is not real in applications. The RH may change rapidly in some scenarios, such as thunderstorms in hot summer would increase the RH from a certain percentage to 100%. For the loaded filter media, this kind of RH change would not only affect how pressure drop increases during the high RH period, but also have impact on the loaded hygroscopic deposits. In this study, we studied the impact of RH change on the loaded hygroscopic deposits. We used potassium chloride, ammonium sulfate, ammonium nitrate to load the test filter media separately. We first loaded the test filter media to 4 inch of water at X% RH, and stopped the atomizer while keeping the test filter face velocity constant. Then we changed the RH to Y% and stopped the test until the instantaneous pressure drop change rate was less than 0.1 inch water/hr. The pressure drop was recorded during the test. The selected X% and Y% RH covers from below the salts' efflorescence RH to above their deliquescence RH, thus salts may experience the transition from dry state to wet state or the reverse transition. The final pressures were compared as a function of the X%, Y% RH and salt kinds.