

S1.4.1 INTERNATIONAL SPACE STATION (ISS) BACTERIAL FILTER ELEMENTS (BFES): FILTER EFFICIENCY AND PRESSURE TESTING OF RETURNED UNITS

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The air revitalization system aboard the International Space Station (ISS) provides the vital function of maintaining a clean cabin environment for the crew and the hardware. This becomes a serious challenge in pressurized space compartments since no outside air ventilation is possible, and a larger particulate load is imposed on the filtration system due to lack of sedimentation due to the microgravity environment in Low Earth Orbit (LEO). The ISS Environmental Control and Life Support (ECLS) system architecture in the U.S. Segment uses a distributed particulate filtration approach consisting of traditional High-Efficiency Particulate Adsorption (HEPA) media filters deployed at multiple locations in each U.S. Segment module; these filters are referred to as Bacterial Filter Elements, or BFEs. These filters see a replacement interval, as part of maintenance, of 2-5 years dependent on location in the ISS. In this work, we present particulate removal efficiency, pressure drop, and leak test results for a sample set of 8 BFE's returned from the ISS after filter replacement. The results can potentially be utilized by the ISS Program to ascertain whether the present replacement interval can be maintained or extended to balance the on-ground filter inventory with extension of the lifetime of ISS beyond 2024. These results can also provide meaningful guidance for particulate filter designs under consideration for future deep space exploration missions.