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Charging-Vacuum Helium Mass Spectrometer Leak Detection Technology in the Application of Space Products Leak Testing and Error Control

Authors : Jijun Shi, Lichen Sun, Jianchao Zhao, Lizhi Sun, Enjun Liu, Chongwu Guo

Abstract : Because of the consistency of pressure direction, more short cycle, and high sensitivity, Charging-Vacuum helium mass spectrometer leak testing technology is the most popular leak testing technology for the seal testing of the spacecraft parts, especially the small and medium size ones. Usually, auxiliary pump was used, and the minimum detectable leak rate could reach 5E-9Pa•m3/s, even better on certain occasions. Relative error is more important when evaluating the results. How to choose the reference leak, the background level of helium, and record formats would affect the leak rate tested. In the linearity range of leak testing system, it would reduce 10% relative error if the reference leak with larger leak rate was used, and the relative error would reduce obviously if the background of helium was low efficiently, the record format of decimal was used, and the more stable data were recorded.

Keywords : leak testing, spacecraft parts, relative error, error control
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