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Vacuum leak testing system for the propulsion system of large spacecraft

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A gas leak on orbit is a fatal fault for spacecraft, so a series of leak tests are carried out during the process of manufacturing and assembling. Helium leak testing method has much higher sensitivity than other methods. In order to gain high leak testing sensitivity, a spacecraft should undergo a helium leak test in large vacuum chamber. A vacuum leak testing system was built for the measurement of the global leakage of the large spacecraft. The vacuum chamber of the system is a cubic vacuum chamber with 4.5m in length, 4.5m in width, and 6.5m in high. The vacuum system has a DN1250 cryopump and 8 DN320 turbo molecular pumps as high vacuum system and 3 roots-screw pumps units as low vacuum system. The ultimate vacuum of the system is 5×10-4Pa, and the minimum detectable leak rate of the system is 1×10-7Pa.m3/s.

Author: Prof. SUN, Lichen

Co-authors: Prof. MENG, Dgonghui; Mr LI, Bin; Mr WANG, Jian; Ms SHAO, Rongping; Mr YU, Xinfa; Mr ZHANG, Haifeng; Mr ZHAO, Yueshuai

Presenter: Prof. SUN, Lichen

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