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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 38201-2019

**Performance test methods for spacecraft under ambient
pressure and thermal conditions**

航天器常压热性能试验方法

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard is proposed and managed by the National Aerospace Technology and its Application Standardization Technical Committee (SAC/TC425). This standard was drafted. Beijing Satellite Environmental Engineering Research Institute, Beijing Space Vehicle General Design Department, Shanghai Satellite Equipment Research Institute, North Beijing Space Technology Development and Testing Center. The main drafters of this standard. Wang Jing, Su Xinming, Li Xiyuan, Bi Yanqiang, Liu Chang, Xu Zhaowu, Shang Yonghong, Xie Jihui, Xu Zhongxu, Jia Ruijin, Li Wei, Peng Guangdong, and Jian. Spacecraft normal pressure thermal performance test method

1 Scope

China's national test methods for spacecraft thermal performance under ambient pressure. It specifies the test purpose, the test principle, the test requirements and the test methods. Thermal vacuum testing is the definitive test, and it is expensive: a chamber large enough for a spacecraft, pumped to high vacuum with its walls cooled by liquid nitrogen, occupied for weeks. Not every thermal question needs it. Testing at ambient pressure is far cheaper and faster, and for a good many purposes it answers the question adequately - verifying that heaters and thermostats work, that instrumentation reads correctly, that a thermal control loop is stable, that a subsystem does not overheat under its own dissipation. What it cannot do is reproduce the absence of convection, which is why the standard has to be explicit about which conclusions such a test supports and which it does not.

This standard specifies the test purpose, test principle, test requirements and test methods for spacecraft thermal performance test. This standard is applicable to the atmospheric pressure thermal performance test of spacecraft or its cabins and large components, including the sealed chamber normal pressure comprehensive heat test and atmospheric pressure heat change. Shape test, separation and unfolding test under normal pressure hot environment, other large components thermal performance test can be used as reference.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article. Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 29639 Production and business unit production safety accident emergency plan preparation guidelines

GB/T 34515-2017 Spacecraft heat balance test method

GB/T 34522-2017 Spacecraft thermal vacuum test method

3 Terms and definitions

The following terms and definitions as defined in GB/T 34515-2017 and GB/T 34522-2017 apply to this document.

3.1 Atmospheric thermal performance test

performancetestunderambientpressureandthermalenvironment Simulate on-orbit thermal effects of spacecraft or its cabin sections and large components under normal pressure conditions, and evaluate thermal control, environmental control, machinery, separation and deployment, etc. Performance test.

Note. Generally, it includes the normal heat test of the sealed chamber at normal pressure, the normal pressure hot deformation test, and the separation and unfolding test under normal pressure and heat environment.

3.2 Sealed chamber atmospheric pressure integrated thermal test

integratethermaltestforsealedcabinunderambientpressure Simulate the thermal boundary of the spacecraft's capsule in the normal pressure environment, verify the heat transfer and mass transfer performance inside the spacecraft, and conduct functions and performance tests. Trial test.

3.3 Atmospheric pressure deformation test thermaldeformationtestunderambientpressure

Simulate the deformation of the spacecraft or its cabin sections, large components in the rail temperature range or temperature distribution under normal pressure conditions test.

3.4 Separation and unwinding test under normal pressure thermal environment

separationanddeploymenttestunderambientpressureandther- Malenvironment Simulate the temperature range or temperature distribution of the large components of the spacecraft under normal pressure environment, and verify the separation and deployment performance. test.

4 Test purposes

Set the specified thermal boundary and working mode under normal pressure environment, verify the thermal control, environmental control performance and large components of the spacecraft capsule

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