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

GB/T 34517-2017

**Evaluation method for the outgassing of spacecraft
non-metallic materials in vacuum**

航天器用非金属材料真空出气评价方法

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard proposed by China Aerospace Science and Technology Corporation. This standard by the National Aerospace Technology and Standardization Technical Committee (SAC/TC425) centralized. This standard was drafted. Lanzhou Institute of Space Technology Physics. The main drafters of this standard. Guo Xing, Wang Xianrong, Yangsheng Sheng, Wang Jian, Zhuang Jianhong, Xue Yu Xiong, Yan Zendong, Tian Hai, Qin Xiaogang, Wang Jun, Shi Hong. Spacecraft non-metallic materials with vacuum outlet gas evaluation method

1 Scope

China's national method for evaluating how much gas a non-metallic spacecraft material gives off in vacuum. It specifies the purpose of the evaluation, the test method for outgassing performance and how the data are to be used, and it applies to non-metallic materials used in spacecraft operating in vacuum. Every polymer, adhesive, paint, lubricant and elastomer holds volatile material - solvent, plasticiser, absorbed water, unreacted monomer - and in vacuum it comes out. Two numbers characterise it: total mass loss, which is how much the material sheds, and collected volatile condensable material, which is how much of that lands on a cold surface elsewhere and stays there. The second is the one that ruins missions. A film of condensate a few molecules thick on an optical surface, a solar cell or a radiator degrades it permanently, and the source is often a component metres away chosen without anyone checking. Screening materials against these limits before flight is standard practice worldwide, and this is China's version of that screen.

This standard specifies the purpose of evaluation of the vacuum gas performance of non-metallic spacecraft, gas outlet performance test methods and data should be Use and so on. This standard applies to spacecraft in a vacuum environment, the performance of non-metallic materials out of gas evaluation, other non-metallic vacuum environment Material evaluation can be used by reference.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version applies to this article Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 29085-2012 satellite anti-pollution technology requirements

3 Terms and definitions

GB/T 29085-2012 defined and the following terms and definitions apply to this document.

3.1 Vacuum outgassing vacuumoutgassing Small molecules adsorbed on the surface of the material or dissolved in the material itself evolve to form a gas under a vacuum environment.

3.2 Total mass loss Samples containing volatile condensable materials, under specified conditions of temperature and vacuum, the total mass lost over a given period of time, The initial mass ratio, usually expressed as a percentage. Note rewrite GB/T 29085-2012, the definition of 3.6.

3.3 Volatile volatilecondensablematerial Under high temperature, low pressure, vacuum conditions, components, materials or sources of pollution desorption, separation or decomposition of the condensable gas on the cryogenic surface substance. [GB/T 29085-2012, Definition 3.4]

3.4 Collected volatile materials collectedvolatilecondensablematerial Material Sampling The mass of condensable volatiles collected on a surface over a given temperature and time under specified temperature and vacuum conditions The initial mass ratio to the sample, usually expressed as a percentage. [GB/T 29085-2012, Definition 3.5]

3.5 Water vapor absorption amount watervaporregained After the total mass loss and the collected condensable volatiles test, the sample is exposed again to the specified temperature and humidity conditions for a given time