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

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Specification for silicone grease thermal filler for spacecraft

航天器用导热硅脂规范

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part

1. Structure and Drafting Rules of Standardization Documents" Drafting. Please note that some of the contents of this document may involve patents. The issuing agency of this document is not responsible for identifying patents. This document was proposed and managed by the National Aerospace Technology and Application Standardization Technical Committee (SAC/TC425). Drafting organizations of this document. Beijing Space Vehicle General Design Department, China Aerospace Standardization Institute. The main drafters of this document. Miao Jianyin, Li Wenjun, Ren Xiaozhi, Wang Lu, Liu Chang, Li Guoguang, Mi Min, Wu Qi, Xu Dongyan, Ren Chi, Li Hangyu, Lin Haibo, Zhang Xingchao, Zhou Jingyi, Zheng Wei. Specification for thermal conductive grease for spacecraft

1 Scope

China's national specification for the silicone grease thermal filler used on spacecraft. It specifies the technical requirements, the inspection methods and the inspection rules. A thermal filler sits in the joint between a heat-generating component and the structure that removes its heat, and it exists because two nominally flat surfaces touch only at a few points - the rest of the interface is a gap, and in vacuum a gap conducts nothing at all. Filling it with a thermally conductive grease can improve the joint's conductance by an order of magnitude, which is often the difference between a component that stays within its temperature limits and one that does not. What makes a spacecraft filler different from a terrestrial one is outgassing: an ordinary silicone grease releases volatile material in vacuum, and that material condenses on optics and radiators elsewhere on the spacecraft. So the specification is as much about what the grease must not release as about what it must conduct.

This document specifies the technical requirements, inspection methods, inspection rules, packaging and marking, transportation and storage of thermally conductive silicone grease for spacecraft. This document is applicable to the inspection, delivery and use of thermally

conductive silicone grease for spacecraft (hereinafter referred to as thermally conductive silicone grease).

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations Only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to This document.

GB/T 269 Method for measuring the penetration of lubricating grease and petroleum grease

GB/T 8928 Solid and semi-solid petroleum pitch density determination method

GB/T 34517 Evaluation method for vacuum outgassing of non-metallic materials for spacecraft

HG/T 2502 5201 silicone grease SH/T 0324 Lubricating Grease Steel Mesh Oil Separation Method (Static Method)

3 Terms and definitions

The following terms and definitions defined in GB/T 269 and GB/T 34517 apply to this document.

3.1 Contact heat transfer coefficient thermalcontactconductancecoefficient The heat transfer per unit area, unit temperature difference, and unit time between two contact surfaces, the unit is $W/(m^2 \cdot K)$.

3.2 Collected volatilecondensable material content; CVCM The material sampling is under the specified temperature and vacuum conditions, after a given temperature and time, the volatile matter that can be condensed on the surface is collected The ratio of mass to the initial mass of the sample, usually expressed as a percentage.

Note. The English abbreviation CVCM for the content of condensable volatile matter is the general domestic use rule.

3.3 Total mass loss rate; TML For the sampling of materials containing condensable volatiles, the total mass lost in a given time under the specified temperature and vacuum conditions is the same as that of the sample. The ratio of initial mass, usually expressed as a percentage.

Note. The English abbreviation TML for total mass loss rate is the general domestic use rule.

4 Technical requirements

4.1 Composition Thermally conductive silicone grease is a combination of organic silicon material compounds and inorganic fillers such as zinc oxide.

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