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

GB/T 43765-2024

**Space functional coatings - Solderable coatings on particle
reinforced metal matrix composites**

航天功能镀覆层 颗粒增强金属基复合材料焊接镀覆层

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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 for standardization documents" Drafting. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is provided by the National Technical Committee on Aerospace Technology and Its Applications (SAC/TC425), the National Technical Committee on Metal and Non-metal Coverings It was proposed and coordinated by the Standardization Technical Committee (SAC/TC57). This document was drafted by: Beijing Satellite Manufacturing Co., Ltd., China Aerospace Standardization Institute, China Machinery Engineering Academy Group Wuhan Materials Protection Research Institute Co., Ltd., Beijing Xingchi Hengdong Technology Development Co., Ltd., the 38th Institute of China Electronics Technology Group Corporation, Aerospace Institute of Materials and Technology, Shanghai Aerospace Equipment Manufacturing Co., Ltd., Institute of Metal Research, Chinese Academy of Sciences, Xi'an Space Radio Technology Research Institute Institute, Beijing Remote Sensing Equipment Research Institute, Xi'an Aerospace Engine Co., Ltd. The main drafters of this document are. Cui Qingxin, Cao Kening, Wang Dong, Bai Jingying, Feng Li, Wang Tiantian, Zhang Dezhong, Yang Xin, Zhao Lianjing, Lu Haiyan, Ye Hui, Zhai Yunfei, Wang Dong, Huang Guangsun, Wang Min, Gu Xuhan, Yang Zhanzhan, Zhang Hang, Zheng Yan, Feng Lei, Zhao Kuo, Yi Juan. Aerospace functional coating layer particle reinforced metal matrix composite Material Welding Coating

1 Scope

GB/T 43765-2024 specifies the solderable coatings applied to particle reinforced metal

matrix composites for spaceflight. Aluminium reinforced with silicon carbide particles is used for satellite electronic packaging because its stiffness is high and its expansion can be matched to the die, but the same particles that give it those properties break up the metal surface and make it effectively unsolderable, so a plated layer has to stand between the composite and the joint - and that layer must survive launch vibration, thermal cycling in vacuum and years without outgassing or growing whiskers. The standard sets the technical requirements and the test methods, the inspection rules, the marking and accompanying documents, and the packaging, transport and storage provisions, with normative annexes giving the high temperature resistance test method, the atmospheric thermal cycling test method and the hydrogen release test method. It took effect on 1 July 2024.

This document specifies the technical requirements, test methods, inspection rules, marking and accompanying Documentation and packaging, transportation and storage. This document is applicable to lead-tin, gold, chemical plating of aluminum-based silicon carbide, copper diamond, aluminum silicon and other particle-reinforced metal-based composite materials for electronic packaging Inspection and acceptance of nickel welding coatings, and reference for inspection and acceptance of other coatings.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 2423.4-2008 Environmental testing for electric and electronic products Part

3 Terms and definitions

The terms and definitions defined in GB/T 3138, GB/T 34522 and GB/T 34558 apply to this document.

4 Technical requirements

4.1 Pre-treatment before plating Before plating, the product should first use solvents such as ethanol or other methods to remove oil stains and then proceed with plating.

4.2 Coating structure The welding coating is generally composed of a bottom coating and a surface coating, and its requirements are as follows: