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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 45135-2024

General specification for superplastic forming and diffusion bonded parts of titanium alloy sheet

钛合金板材超塑成形和扩散连接件 通用技术规范

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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 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 proposed and coordinated by the National Forging Standardization Technical Committee (SAC/TC74). This document was drafted by: China Aviation Manufacturing Technology Research Institute, China Machinery Engineering Institute Group Beijing Electromechanical Research Institute Co., Ltd., Beijing Star Hangji Electrical Equipment Co., Ltd., Northwest Research Institute of Nonferrous Metals, Harbin Institute of Technology, Baoti Group Co., Ltd. The main drafters of this document are. Li Zhiqiang, Han Xiuquan, Xu Huiyuan, Jin Hong, Wang Bin, Xin Shewei, Wang Guofeng, Feng Junning, Han Xiaoning, Qu Haitao, Wang Xichang, Wang Jinglin, Wei Wei, Li Guangli, Ma Zhongxian, Qiang Fei, and Liu Taiying. Superplastic forming and diffusion bonding of titanium alloy sheets General Technical Specifications

1 Scope

GB/T 45135-2024 is the Chinese general specification for titanium alloy parts made by superplastic forming and diffusion bonding. SPF/DB is the process behind hollow, stiffened titanium structures, aero engine fan blades, nacelle panels, exhaust structures, that cannot be made any other way at acceptable weight: the sheet is formed at a temperature and strain rate at which titanium behaves almost like a fluid, and the sheets are bonded to each

other in the solid state in the same operation. The standard sets the requirements on the material and its preparation, on the process, the temperature, pressure and time schedule and its control, on the tooling and the atmosphere, on the geometry, the wall thickness and the dimensional tolerances of the finished part, on the quality of the diffusion bond and the acceptance criteria for it, on the surface condition and the alpha case, on the mechanical properties and the non-destructive and destructive testing used to verify them, and on the identification and records. For an aerospace supplier or a buyer qualifying one in China, this is the governing specification.

This document specifies the structural form, technical requirements, test methods and Methods, inspection rules, marking, packaging, transportation and storage and quality certification documents. This document is applicable to the design, manufacture and acceptance of TA15, TA32 and TC4 titanium alloy plate connectors. Please refer to the connector for use.

2 Normative references

The contents of the following documents constitute 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 191 Pictorial markings for packaging, storage and transportation

GB/T 228.1 Tensile test of metallic materials Part

3 Terms and definitions

The terms and definitions defined in GB/T 8541, GB/T 3375 and GB/T 15757 and the following apply to this document.

3.1 A method of manufacturing parts by combining superplastic forming with diffusion bonding (diffusion welding) technology.

Note. Often referred to as superplastic forming/diffusion bonding.

3.2 Parts manufactured by superplastic forming and diffusion bonding (3.1).

Note. Commonly called superplastic forming/diffusion bonding.