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GB/T 46654-2025

Radiographic testing for titanium alloy castings - Defect levels

钛合金铸件射线照相检测 缺陷分级

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents". Drafting. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed and is under the jurisdiction of the National Technical Committee on Foundry Standardization (SAC/TC54). This document was drafted by: Shenyang Foundry Research Institute Co., Ltd. of China Academy of Machinery Science and Technology, Luoyang Shuangrui Precision Casting Titanium Industry Co., Ltd., and Jiangxi... Hebei Provincial Fujian Titanium Technology Co., Ltd., Baoji Titanium Group Co., Ltd., Aero Engine Corporation of China, Hebei Provincial Special Equipment Supervision and Inspection Institute, Ningbo Branch of China Ordnance Science Research Institute, Mechanical Industry Molding Materials Important Casting Products Quality Inspection Institute (Shenyang) Co., Ltd., Chongqing Rilian Technology Co., Ltd., Shandong Juncheng Metal Technology Co., Ltd., Chongqing Sanhang New Materials Technology Research Institute Co., Ltd., Zhejiang Suijin Special Products Co., Ltd. Casting Co., Ltd., Huazhong University of Science and Technology, Shanghai Jiao Tong University, Shenyang University of Technology, Chipping Xinfa Aluminum Products Co., Ltd., Jingzhou Jinglong Aerospace Technology Co., Ltd., Baotou Branch of Inner Mongolia Special Equipment Inspection and Research Institute, Jinyun County Kelier Testing Equipment Co., Ltd., Henan Hua Tan Testing Technology Co., Ltd., Suzhou Paddens Instrument Equipment Co., Ltd., Shanghai Yongchuang Testing Technology Co., Ltd., Changsha Dika Technology Co., Ltd. The company, Meike (Guangzhou) New Materials Co., Ltd., Chengdu Mait Aviation Manufacturing Co., Ltd., Chongqing Tiweishi Elevator Engineering Co., Ltd. China Railway Baoqiao Group Co., Ltd., CITIC Dicastal Co., Ltd., Baoji Chushi Metal Testing Co., Ltd., and Lai'an County Kelaixing Industrial Co., Ltd. Baoji Fuste Titanium Industry Co., Ltd., Baoji Taicheng Metal Composite Materials Co., Ltd., Ruimao Optics (Shenzhen) Co., Ltd., Baoji Fuste Titanium Industry Co., Ltd. (Group) Co., Ltd., Nanjing Longchao Metal Manufacturing Technology Co., Ltd. The main drafters of this document are. Zhang Zhaoqian, Bao Chunling, Zhang Yanfei, Liu Hongyu, Shen Lubo, Ji Xiaoyuan, Wang Weichao, Xin Tianning,

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1 Scope

GB/T 46654-2025 is the Chinese national standard covering grading what the radiograph shows in a titanium casting - the porosity, shrinkage, inclusions and cold shuts, their size and concentration, and the acceptance levels that decide whether the part flies or is scrapped. First edition, in force from 1 May 2026. Issued on 31 October 2025, it has been in force since 1 May 2026.

This document specifies the basic requirements for radiographic testing of titanium and titanium alloy castings (hereinafter referred to as "castings"), and describes the defect classification and grade. The corresponding methods for grade assessment. This document applies to radiographic inspection of defects such as porosity, inclusions, and shrinkage in titanium alloy castings with a thickness not exceeding

50.8 mm. For castings with a thickness greater than

50.8 mm, the classification should be followed accordingly. This document is not applicable to the classification of defects such as cracks, segregation, cold shuts, and incomplete penetration and fusion caused by weld repairs.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 5611 Casting Terminology

GB/T 5677 Radiographic Inspection of Castings

GB/T 12604.2 Nondestructive Testing Terminology. Radiographic Testing

3 Terms and Definitions

The terms and definitions defined in GB/T 5611 and GB/T 12604.2, as well as the following

terms and definitions, apply to this document.

3.1 single gashole The casting contains isolated, non-interacting pores formed by gas inside.

3.2 Scattered gasholes The casting contains a sparsely distributed, weakly interconnected pore structure formed by gas.

3.3 Clustered gasholes The casting contains a densely distributed group of strongly interacting pores formed by gas.

3.4 Low-density inclusions Foreign matter present inside the casting that has a lower density than the matrix and causes less attenuation of radiation.

3.5 High-density inclusions Foreign matter present inside the casting that is denser than the matrix and has a greater attenuation effect on radiation.

3.6 During the solidification process of a casting, a dispersed, non-dense area is formed by multiple point-like and strip-like micropores due to cooling and shrinkage.