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**Additive manufacturing - Specification for process of cold
spray**

增材制造 冷喷涂工艺规范

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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 was proposed by the China Machinery Industry Federation.

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Introduction

Cold spray additive manufacturing is a type of metal additive manufacturing process that has been applied in aviation, aerospace, automobiles, molds and other fields.

During the entire additive manufacturing process, both the base material and the deposited material remain in a solid state and can be processed without or with minimal metallurgical changes.

Under the premise of the deposited material on the surface of the base material, the additive manufacturing of the deposited material is realized. Because it does not need to put the base material into a specific forming chamber, it can be realized to realize additive manufacturing on the surface of the component without being limited by the size of the powder bed.

Cold spray additive manufacturing is a solid-state deposition process that has the advantages of high deposition efficiency, low porosity, good bonding strength, and no fire. It has little effect on the properties of the substrate and the deposited material. The deposited body has small residual stress and usually has compressive stress. The powder does not It is prone to oxidation, decomposition, phase change and grain growth of nanostructured materials, and is particularly suitable for oxidation-sensitive, temperature-sensitive and phase-change-sensitive materials.

It is widely used in high-quality coating preparation of materials such as 3D conformal additive manufacturing of complex curved surfaces and connection of insoluble heterogeneous metals.

The metal powder materials used include aluminum alloy, copper alloy, titanium alloy, stainless steel, etc.

This document describes the general requirements, process, product inspection and technical documentation delivery of the cold spray additive manufacturing process.

Provide process control methods, process evaluation and quality inspection basis for related enterprises in the cold spray additive manufacturing process, and improve the quality of cold spray additive manufacturing.

It can improve the quality stability and reliability of products, promote the development of additive manufacturing industry in a more orderly, reasonable and economical direction, and have good economic benefits. and social benefits.

Additive Manufacturing Cold Spray Process Specifications

1 Scope

This document specifies the general requirements, process flow, product inspection and technical documentation deliverables for the cold spray additive manufacturing process.

This document applies to the process activities of cold spray additive manufacturing.

2 Normative references

GB/T 11375-1999

GB 15577

GB/T 18719

GB/T 35351

3 Terms and Definitions

The terms and definitions defined in GB/T 35351 and GB/T 18719 and the following apply to this document.

3.1

An additive manufacturing process that uses compressed gas to accelerate powder to a high speed, impacts the surface of the substrate in solid form, and accumulates the powder layer by layer.

3.2 powder feed rate

The mass of powder delivered from the nozzle per unit time.

Note. The unit is gram per minute (g/min).

3.3 Overlapping rate

The ratio of the overlapping width of two adjacent cold spray deposition layers to the width of a single deposition layer.

3.4 masking

Protective measures taken on areas of the substrate where deposition is not required.

3.5 substrate

Support structures or components used to prepare cold spray deposits.

3.6 deposit

Using the cold spray method, the additively formed parts are deposited layer by layer on the surface of the substrate.

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