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**NATIONAL STANDARD OF THE
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**Thermal spraying - Guidelines for the application of thermal
spraying**

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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:

This document is modified to adopt ISO 12679:2011 "Thermal Spray Thermal Spray Method Recommendations":

The technical differences between this document and ISO 12679:2011 and their reasons are as follows:

---Change the verb "should" to "should" in the full text to comply with the writing rules of the guidelines;

--- ISO 14919 (see 6:2, 14:1:4), GB/T 16744 replaced by GB/T 12608 with normative references

ISO 14920 (see 10:4, Chapter 12), GB/T 18851:1 replaced ISO 3452-1 (see 15:2), GB/T 19352:1 replaced

Replaced ISO 14922-1 (see 14:1:2), GB/T 19352:2 replaced ISO 14922-2 (see 14:1:2), GB/T 19352:3

Replaced ISO 14922-3 (see 14:1:2), GB/T 19352:4 replaced ISO 14922-4 (see 14:1:2), GB/T 19356

Replaced ISO 14232 (see 6:2, 14:1:4), GB/T 19823 replaced ISO 14921 (see 10:3, 11:1),

GB/T 19824 replaced ISO 14918 (see 14:2:3), GB/T 20019 replaced ISO 14231 (see 9:2, 11:2:4,

14:1:3), GB/T 37421 replaced ISO 14923 (see 15:2) to adapt to my country's technical conditions and improve operability:

The following editorial changes have been made to this document:

--- In order to coordinate with existing standards, change the name of the standard to "Thermal Spray Thermal Spray Application Guide":

Please note that some contents of this document may refer to patents: The issuing agency of this document assumes no responsibility for identifying patents:

Introduction

Thermal spraying is a method of preparing coatings or blocks: After the sprayed materials are heated to a plastic or molten state, they are accelerated and impacted to the pretreated surface:

The surface of the workpiece does not melt: In order to achieve specific coating properties, post-treatments such as heat treatment or sealing are performed on the sprayed coating:

Thermal spray coatings can be used to improve surface properties such as wear, corrosion, heat transfer or insulation, electrical conductivity or

Insulation and other properties can also be used for shape and size repair: In some cases, thermal spray coatings can provide a solderable surface:

Thermally sprayed coatings without subsequent heat treatment, the bonding mechanism is the same as welding, brazing, physical vapor deposition (PVD) or chemical vapor deposition

(CVD) is different:

Thermal spraying has the following advantages:

---The temperature rise of the workpiece to be sprayed is small: If it is not subjected to other heat treatment during or after thermal spraying, its base material will not

Appearance of deformation or changes in tissue structure;

---Thermal spraying application is not limited by the size of the workpiece or component, and can be fixed or mobile according to the spraying process;

---With appropriate equipment, even parts with complex geometric structures can be thermally sprayed;

---The paint has high adhesion on the surface of the untreated thermal spray coating;

--- When the thermal spraying process and thermal spraying materials are different, different coating thicknesses can be used, but at present it is considered that the minimum thickness should not be lower than

10 μm :

Thermal spraying has the following disadvantages:

--- If the thermal spray coating is not subjected to subsequent heat treatment, its bonding mechanism is mechanical bonding, so its bonding strength is limited;

---The bonding strength between the coating and the base material will be affected by the difference in thermal expansion coefficient between the two, especially when the workpiece temperature is high

, the impact is more pronounced;

---Thermal spray coating is a microporous structure;

---The thicker the thermal spraying coating, the higher the residual stress of the coating, and the multiaxial stress increases accordingly;

--- If the thermal spray coating is not subjected to subsequent heat treatment, its ability to withstand sharp point, local, line contact loads, and impact forces is limited;

--- The application of thermal spraying is also limited by the geometric size of the workpiece, such as thermal spraying cannot be performed on the inside of a workpiece with too small inner diameter:

Thermal Spray Thermal Spray Application Guide

1 Scope

This document provides a general guideline for the preparation of metal, cermet, oxide ceramic and plastic coatings by thermal spraying on metallic and non-metallic substrates:

General guidelines, appropriate and available thermal spray equipment, proper operation, monitoring, quality assurance, and guidelines for non-destructive or destructive testing of test specimens or workpieces

Recommendations, describing problems that can arise during thermal spraying and ways to avoid them:

This document applies to a variety of general thermal spray applications:

This document does not apply to the evaluation of the allowable coating load and quality level, which are related to the application conditions:

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text: Among them, dated references

For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

this document:

GB/T 12608 Classification and supply technical conditions of wire, rod and core material for thermal spraying flame and arc spraying

(GB/T 12608-2003, ISO 14919:2001, MOD)

GB/T 16744 Thermal spraying self-fluxing alloy spraying and remelting (GB/T 16744-2002, ISO 14920:1999, MOD)

GB/T 18851:1 Nondestructive Testing Penetration Testing Part 1: General Principles (GB/T 18851:1-2012, ISO 3452-1:

2008, IDT)

GB/T 19352:1 Quality Requirements for Thermal Spraying Thermal Spraying Structures Part 1: Guidelines for Selection and Use (GB/T 19352:1-

2003, ISO 14922-1:1999, IDT)

GB/T 19352:2 Quality requirements for thermal sprayed thermal sprayed structures Part 2: Comprehensive quality requirements (GB/T 19352:2-

2003, ISO 14922-2:1999, IDT)

GB/T 19352:3 Quality Requirements for Thermal Spraying Thermal Spraying Structures Part 3: Standard Quality Requirements (GB/T 19352:3-

2003, ISO 14922-3:1999, IDT)

GB/T 19352:4 Quality Requirements for Thermal Spraying Thermal Spraying Structures Part 4: Basic Quality Requirements (GB/T 19352:4-

2003, ISO 14922-4:1999, IDT)

GB/T 19356 Thermal spray powder composition and supply technical conditions (GB/T 19356-2003, ISO 14232:2000,

MOD)

GB/T 19823 Application steps of thermal spray coatings for thermal spray engineering parts (GB/T 19823-2005, ISO 14921: