
**Thermal spraying — Terminology,
classification**

Projection thermique — Terminologie, classification

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*.

This second edition cancels and replaces the first edition (ISO 14917:1999), which has been technically revised.

Introduction

Requests for official interpretations of technical aspects of this document should be directed to the Secretariat of ISO/TC 107, *Metallic and other inorganic coatings*, via your national standards body; a listing of these bodies can be found at www.iso.org.

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Thermal spraying — Terminology, classification

1 Scope

This document defines processes and general terms for thermal spraying. It classifies thermal spraying processes according to type of spray material, to type of operation and to type of energy carrier. It specifies abbreviations for spray processes, sprayed coatings, and manufacturing steps.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method*

ISO 17836, *Thermal spraying — Determination of the deposition efficiency for thermal spraying*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

thermal spraying

TS

process in which surfacing materials are heated to the plastic or molten state, inside or outside of the spraying gun/torch, and then propelled onto a prepared surface

Note 1 to entry: The substrate may undergo some localized surface melting in the particle impact area only.

Note 2 to entry: To obtain specific properties of the deposit, a subsequent thermal, mechanical or sealing treatment may be used.

4 Process variations

4.1 Classification according to the type of spray material

Distinction of the following variations:

- wire spraying;
- rod spraying;
- cord spraying;
- powder spraying;
- suspension spraying.

4.2 Classification according to the operation

4.2.1 Manual spraying

All operations typical of the spraying process are manual.

4.2.2 Mechanized spraying

All operations typical of the spraying process are mechanized.

4.2.3 Automatic spraying

All operations typical of the spraying process are fully mechanized including all handling, e.g. work-piece loading and unloading, and are integrated in a programmed system. Also, monitoring and controlling of the entire spraying process can be included according to the closed loop method.

4.3 Classification and abbreviations for thermal spraying, coatings and their technological properties, post-treatments

4.3.1 Thermal spraying, coatings and properties

See [Table 1](#).

Table 1 — Thermal spraying, coatings and properties (abbreviations in capital letter)

Abbreviation	Item	Specified in section	Specified in a standard
TS	Thermal spraying (in general)	3.1	—
BC	Bond coat	6.4.3	—
TC	Top coat	6.4.4	—
SF	Self-fluxing alloy		ISO 14920/ISO 14232
DE	Deposition efficiency	6.3.16	ISO 17836
R_H	Tensile adhesive strength	6.5.1	ISO 14916

4.3.2 Condition of spray coatings and post-treatments

See [Table 2](#).

Table 2 — Condition of spray coatings and post-treatments (abbreviations in small letters)

Abbreviation	State	Specified in standard resp. described in section
as	as sprayed	6.4.1
f	fused	ISO 14920
sm	finished	ISO 14924
m/c	machined	ISO 14924
s	sealed	ISO 14924

4.3.3 Classification according to the energy carrier and/or to the type of spray material — Abbreviations for spray processes and special surfacing processes by welding

In classification according to the energy carrier, sub-classifications are necessary due to different spray materials. [Figure A.1](#) provides a master chart of the spray processes with sub-classifications. See also [Tables 3](#) and [4](#).

Table 3 — Classification and abbreviations of spray processes (abbreviations in capital letters)

Standard spray processes		Process abbreviations	Process description in section
TS by means of gaseous or liquid fuels	Flame spray processes		5.1
	Wire flame spraying (Combustion wire spray)	WFS	5.1.2
	Cord flame spraying	CFS	5.1.2
	Rod flame spraying	RFS	5.1.2
	Powder flame spraying	PFS	5.1.3
	High velocity flame spraying		5.2
	High velocity oxy-fuel spraying	HVOF	5.2.1
	High velocity air fuel spraying	HVAF	5.2.1
	High velocity flame suspension spraying	HVFSS	5.2.3
	Detonation spraying (Detonation gun spr.)	DGS	5.2.4
TS by means of expansion of highly pressurized gases without combustion	Cold spraying (Cold gas spraying)	CGS	5.3
TS by means of electric arc or gas discharge	Arc spraying (Arc wire spraying)	AS	5.4
	Atmospheric plasma spraying	APS	5.5.1
	Atmospheric plasma suspension spraying	APSS	5.5.2
	Vacuum plasma spraying/ Low pressure plasma spraying	VPS (Europe) LPPST TM (US, Asia) ^a	5.5.3
	Controlled atmosphere plasma spraying	CAPS	
TS by means of electric arc or gas discharge (only few users)	Water-stabilized plasma spraying	WSPS	5.6.1
	Inductively coupled plasma spraying	ICPS	5.6.2
	Plasma transferred wire arc spraying	PTWA	5.6.3
^a LPPST TM is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.			

Table 4 — Classification and abbreviations of special surfacing processes by welding (abbreviations in capital letters)

Special surfacing processes by welding		Process abbreviations	Process description in section
Surfacing by means of a bundled beam of light	Laser cladding	LC	5.7
Surfacing by means of electric arc or gas discharge	Plasma transferred arc surfacing	PTA	5.8

5 Process descriptions

5.1 Flame spraying

5.1.1 General

Flame spraying is a process in which a surfacing material is heated in an oxy-fuel gas flame and then propelled onto a substrate. The material may be initially in the form of powder, rod, cord or wire. The