SLOVENSKI STANDARD
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Vroļe brizganje - Preskuġanje postopkov, povezano s komponentami

Thermal spraying - Component related procedure qualification

Thermisches Spritzen - Bauteilbezogene Verfahrensprüfung

Projection thermique - Epreuve de qualification d'un mode opératoire relative a élément

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Thermal spraying - Component related procedure qualification

Projection thermique - Epreuve de qualification d'un mode opératoire relative à élément

Thermisches Spritzen - Bauteilbezogene Verfahrensprüfung

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 15648:2009) has been prepared by Technical Committee CEN/TC 240 “Thermal spraying and thermally sprayed coatings”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2009, and conflicting national standards shall be withdrawn at the latest by July 2009.

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Introduction

Due to quality assurance requirements, a qualification of a spray procedure specification may be required. This standard describes how to do such a qualification. Due to specific conditions of the complete thermal spraying manufacturing process, the procedure qualification can be applicable to component related only.

This qualification procedure covers the manufacturing of new parts, as well as repairs, and may be applied if the component is to be coated entirely or partially with a thermal sprayed coating. The coating may consist of material classes, e.g. metals, metal-ceramic, oxide-ceramic, plastics and different thermal sprayed coatings may be applied on the same component.

This standard will assist the contracting parties if the customer requires a qualification, but it can also be used for the manufacturer's internal quality strategy.

1 Scope

This European Standard defines the requirements for a qualification of a spray procedure specification. It indicates the conditions for applying the procedure qualification and the qualification for a range of components. These components should be similar to the tested component in shape, physical and chemical behaviour, and in properties. This is especially valid in the case of a client's requirement for a qualification. Likewise, it could also be applied in the case of a company's internal quality requirements.

This European Standard is also applicable to the manufacture of new parts and repairs of components made of metallic and non-metallic materials.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 473, *Non-destructive testing — Qualification and certification of NDT personnel — General principles*

EN 657:2005, *Thermal spraying — Terminology, classification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 657:2005 and the following apply.

3.1
component
complete structural part or section of the surface of a structural part to be coated

3.2
preliminary thermal spray procedure specification (pTSPS)
document containing the required variables of the spray procedure which has to be qualified

3.3
thermal spray procedure specification (TSPS)
document that has been qualified by a qualification test and provides the required variables of the thermal spray procedure to ensure repeatability

NOTE The thermal spray procedure specification should be documented unequivocally by a sufficient designation with a number and the state of revision.

3.4
qualification record
report from the qualification test comprising all necessary data needed for qualification of the component related to thermal spray procedure specification, which includes the range of qualification

4 Presuppositions for carrying out a component related procedure qualification

4.1 General requirements

The manufacturer of the thermal sprayed coating for a component shall fulfil all conditions required for the procedure qualification, which are specified in the coating specification, shall possess a quality system, shall

employ qualified personnel, and is responsible to keep the spraying equipment in proper condition. The instructions of EN 15311 are valid. Therefore, the following documents may be helpful:

a) **Qualified personnel**:

   i. Spraying coordinator: tested, instructed, or provided with knowledge according to EN 13214;

   ii. Thermal sprayer: in the case of manual manufacturing tested according to EN ISO 14918;

   iii. Sprayer as an operator: in the case of mechanised manufacturing apprenticed or with knowledge according to EN ISO 14918;

   iv. Inspector: for non-destructive testing qualified according to EN 473;

b) **Spraying equipment**: unobjectionable and unchanged function of the spraying equipment checked according to the relevant part of EN 1395 or qualified by test reports, or coating results.

The spraying procedure applied for the procedure qualification should be described as in e.g. EN 657 and shall be qualified by the manufacturer for his applications.

The spraying material should fulfil the conditions according to EN 1274 in the case of powder. In the case of wire, rod, or cord, it should fulfil the conditions according to EN ISO 14919.

4.2 Preparation of the spray procedure specification

The manufacturer of the spray coating is responsible for preparing and the following of the spray procedure specification. It shall respect the coating specification and the component's instructions, like a list of the parts, material instructions of parent metal and spray material, drawings, test instructions and shall be presented in written form.

The customer should require the spray procedure specification to be granted or qualified. This can be realised by a component related procedure qualification according to this standard.

5 Quality tests and scope of tests

The manufacturer is responsible to ensure by inspections that all presuppositions for the regular performance of the procedure qualification are fulfilled. The order flow described in Annex A should be helpful for applying the procedure qualification.

The inspector is authorised to check that the presuppositions have been achieved and to follow up the particular steps of testing. The inspector or inspectors of the manufacturer shall be qualified according to the requirements in EN 473 and inspectors of test bodies should also be certified.

The procedure qualification shall contain all tests and scopes of tests which are required in the coating specification or in the component's instructions. If no tests are required in the coating specification, testing should be carried out according to the supply conditions in EN 15311.

Further tests like corrosion, wear, or thermal cycling tests shall be agreed upon between contracting parties, if applicable.

6 Admissible imperfections

The limit between admissible imperfections and failure shall be agreed between the contracting parties.

The admissible limit of imperfections may not be exceeded in the procedure qualification for each quality characteristic as described in EN ISO 14923. If imperfections exceed the limit values in the materialographic

examination, an additional test specimen shall be taken from the same area of the test component for the materialographic examination. This test specimen shall fulfil all quality characteristics required; otherwise the procedure qualification has failed.

7 Qualification of the spray procedure specification and range of qualification

The qualification of the thermal spray procedure specification by a procedure qualification is defined by a qualification record, where the following conditions shall be documented:

a) parameter applied in the procedure qualification for the whole process;

b) or indication of procedure number and revision status for the spraying motion programme;

c) results of the particular test steps;

d) admissible tolerance values for a manufacturing according to this procedure qualification.

The parameters of the spray procedure specification used are considered to be fixed. Moreover, the admissible tolerances for a manufacturing according to this procedure qualification shall be specified. This commitment shall apply for the spraying equipment used and for equipment equal in design.

The procedure qualification loses its validity when changing the parameter outside the admissible tolerances or when applying spraying equipment not equal in design.

When agreed upon between contracting parties or with the inspection body, respectively, the range of qualification may be defined for similar components, when the substrate material is comparable in technological, metallurgical, physical, and chemical properties.