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Thermal spraying - Thermally sprayed coatings - Symbolic representation on drawings

Thermisches Spritzen - Thermisch gespritzte Schichten - Symbolische Darstellung in Zeichnungen

Projection thermique - Revêtements appliqués par projection thermique - Représentation symbolique sur les dessins

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Ta slovenski standard je istoveten z: **EN 14665:2004**

SIST EN 14665:2005  
<https://standards.iteh.ai/catalog/standards/sist/7c4881a2-0876-441c-a88c-44b8972ba91b/sist-en-14665-2005>

**ICS:**

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25.220.20	<p>Površinska obdelava</p>	<p>Surface treatment</p>

**SIST EN 14665:2005**

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EUROPEAN STANDARD

EN 14665

NORME EUROPÉENNE

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English version

## Thermal spraying - Thermally sprayed coatings - Symbolic representation on drawings

Projection thermique - Revêtements appliqués par  
projection thermique - Représentation symbolique sur les  
dessins

Thermisches Spritzen - Thermisch gespritzte Schichten -  
Symbolische Darstellung in Zeichnungen

This European Standard was approved by CEN on 13 September 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Contents

	page
Foreword.....	3
1 Scope .....	4
2 Normative references .....	4
3 General.....	4
4 Symbols .....	4
5 Position of the symbols on drawings.....	5
6 Designation of a thermally sprayed coating .....	5
7 Instruction when using a separate parts list .....	7
8 Instructions when the use of spray process is protected by a patent.....	7
9 Representation and dimensioning.....	7
10 Supplementary instructions .....	7
11 Examples .....	8
Bibliography .....	11

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## Foreword

This document (EN 14665:2004) 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 May 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

This document includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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**EN 14665:2004 (E)****1 Scope**

This document specifies how the symbolic representation of thermally sprayed coatings has to be indicated on drawings.

**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 1274:2004, *Thermal spraying — Powders — Composition — Technical supply conditions*.

EN ISO 14919, *Thermal spraying — Wires, rods and cords for flame and arc spraying — Classification — Technical supply conditions (ISO 14919:2001)*.

**3 General**

Coatings may be indicated with the general recommendations for technical drawings. To apply this symbolic representation will make sense in cases, where the thermally sprayed coating is very thin and/or may be built up by several dissimilar coatings one upon another.

The symbolic representation shall give clearly all necessary indications regarding the specific coating to be obtained without over-burdening the drawing with notes or showing an additional view or detail enlargement.

This symbolic representation includes an elementary symbol and one or more supplementary symbols and further complementary indications.

If a large number of instructions for producing the coating have to be mentioned, it is recommended to indicate the specific instructions on the drawing or to define them in a separate parts list, if applicable (see Figures 6 and 7).

**4 Symbols**

The elementary symbol shall indicate, that this process deals with thermal spraying.

The following information shall be given by supplementary symbols:

- type of coating (bond or top coat);
- the spraying process and subsequent treatments.

The following requirements may be defined by further additional instructions:

- the coating thickness needed or the final coating thickness machined, respectively;
- the spray material to be used;
- surface condition;
- post-treatments of coating;
- a technical specification, which defines requirements necessary to complete the coating.

## 5 Position of the symbols on drawings

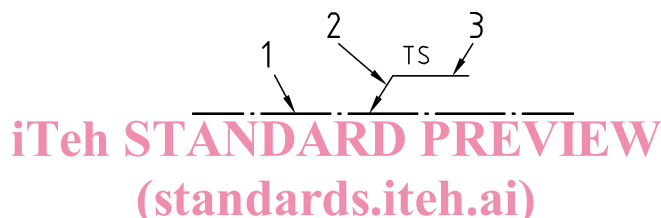
The complete symbol shall contain:

- designation of the coating (outside the outline of component);
- an arrow line;
- a reference line (continuous line) with elementary symbol above;
- instructions to mode of coating, spraying process, coating thickness, spray material, surface condition, post-treatments, if applicable.

Arrow line and reference line form the complete reference mark. A tail (see Figure 2) can be added at the end of the reference line, to make a separate representation of bond and top coat possible.

The reference line shall preferably be drawn parallel to the bottom edge of the drawing, or if impossible, perpendicular.

The symbol for the thermally sprayed coating shall be indicated above the reference line (see Figure 1).



### Key

- 1 Designation of the coating (outside the outline of component)
- 2 Arrow line [SIST EN 14665:2005](https://standards.iteh.ai/catalog/standards/sist/7c488fa2-0876-441c-a88c-24189771b01b/sist-en-14665-2005)
- 3 Reference line <https://standards.iteh.ai/catalog/standards/sist/7c488fa2-0876-441c-a88c-24189771b01b/sist-en-14665-2005>
- TS Thermally sprayed coating (elementary symbol)

**Figure 1 — Mode of representation and elementary symbol**

## 6 Designation of a thermally sprayed coating

Commonly a designation consists of following symbols and additional indications:

**elementary symbol – supplementary symbol – symbol of procedure – spray material – coating thickness – post-treatment**

The following abbreviations or designations, respectively, define the type of coating and specific procedures for post-treatments:

BC	Bond coat
TC	Top coat
ASP	As sprayed
F	Fused
D	Diffusion annealed
S	Sealed
M/C	Machined (roughness tolerances on drawing, see Clause 9)
X	Free choice of spraying process

**EN 14665:2004 (E)**

NOTE The designations and abbreviations for thermal spraying are given in EN 657.

Example of designation 1:

**TS – TC – APS – EN 1274:2004-12.4 – 250 – ASP**

or

**TS – TC – X – EN 1274:2004-12.4 – 250 ± 10 – ASP**

where

TS	is the elementary symbol: thermally sprayed coating;
TC	is the supplementary symbol: top coat;
APS	is the symbol for spraying process: atmospheric-plasma-spraying;
EN 1274:2004-12.4	is the spray material: powder according to EN 1274:2004/code No. 12.4 (Al <sub>2</sub> O <sub>3</sub> -TiO <sub>2</sub> 60 40);
250 ± 10	is the coating thickness: 250 µm (as sprayed according to following indication "– ASP");
ASP	surface remains in the as sprayed condition, no post-treatment indicated;
X	free choice of spraying process.

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Example of designation 2:

**TS – TC – PFS – EN 1274:2004-2.8 – 350 – F+M/C**

<https://standards.iteh.ai/catalog/standards/sist/7c488fa2-0876-441c-a88c-44b8972ba90b/sist-en-14665-2005> or <https://standards.iteh.ai/catalog/standards/sist/7c488fa2-0876-441c-a88c-44b8972ba90b/sist-en-14665-2005>

**TS – TC – X – EN 1274:2004-2.8 – 350 – F+M/C**

where

TS	is the elementary symbol: thermally sprayed coating;
TC	is the supplementary symbol: top coat;
PFS	is the symbol for spraying process: flame-powder-spraying;
EN 1274:2004-2.8	is the spray material: powder according to EN 1274:2004/code No. 2.8 (NiCrBSi 80 11);
350	is the coating thickness: 350 µm (after machining according to following indications "– F+M/C");
F+M/C	fused and machined;
X	free choice of spraying process.



## 7 Instruction when using a separate parts list

If a component is represented by one or more drawings and a separate parts list. In such a case, the coating will be indicated on the drawing only by a position number (see Figure 6). Any instructions regarding the coating such as, spraying process, coating thickness and its acceptable thickness deviation (especially, if coatings consist of bond and top coat), spray material, surface condition, and post-treatments are to be defined in the parts list or by indicating a specific technical instruction (see Figure 6).

## 8 Instructions when the use of spray process is protected by a patent

If a coating process shall be applied, but the use is protected by a patent (spraying procedure, spray material, process parameter, etc.), the trade name of this coating process may be indicated analogous to "Coating per special specification" (see Figure 7) as a supplementary symbol in the symbolic representation or, may be defined via a position number in the pertinent parts list (see Figure 6).

## 9 Representation and dimensioning

The area of a component to be coated shall be indicated by a broad dashed-dot-line outside the outline of the component on the drawing. In case of rotational symmetrical parts, only one line drawn outside the outline is sufficient for indicating. Where necessary, size and position of the range of coating shall be defined by means of dimensions and tolerances on the drawing.

The transition area between coated and uncoated area is definitely located outside the nominal range of coating.

Areas, which are allowed to be coated, (e.g. outside the coating range) are to be indicated by a broad dashed line outside the component's outline.

Areas, which are not accepted to be coated, are not indicated (see Clause 10).

The dimension that locates the coating in relation to the front face of the work piece shall appear on the drawing only.

The dimensions of length and/or width shall appear on the drawing only.

Whenever a post-treatment is applied, the indication of the roughness tolerances shall be mentioned corresponding to the pertinent standard on the drawing close to the dimension.

Instructions regarding coating thickness or thickness of bond and top coat, respectively, are to be indicated together with further instructions in the symbolic representation or in the parts list. The coating thickness shall apply for the indicated condition (e.g. ASP = as sprayed; F = fused, M/C = machined, or in combination: F+M/C = fused and machined).

If no further instructions about acceptable deviations of coating thickness are mentioned, the general tolerances shall apply.

## 10 Supplementary instructions

Supplementary instructions may be necessary to define further particular characteristics by indicating either in the symbolic representation or in a separate parts list.