



**SLOVENSKI STANDARD**  
**SIST EN 14863:2006**

**01-marec-2006**

---

GHY`Ughj]b`dcfWUbg\_]Ya U^]Ei [ chUj`Ub^fcVUž\_]dc\_f]j UYa U^]fUbc`^Y`Ybc  
d`c Yj]bcž\_]gYi dcfUV^Udf]dfYbcgb]\_l`hcd`chY

Vitreous and porcelain enamels - Determination of the edge covering on enamelled steel plate to be used in heat exchangers

Emails und Emailierungen - Bestimmung der Kantenabdeckung von emaillierten Stahlblechen für Wärmeaustauscher

Émaux vitrifiés - Détermination du revêtement de l'arete sur une plaque en acier émaillé destinée aux échangeurs de chaleur

**STANDARD PREVIEW**  
**(standards.iteh.ai)**  
<https://standards.iteh.ai/catalog/standards/sist/1add609c-48e3-42e8-be3e-81f543ad53bd/sist-en-14863-2006>

**Ta slovenski standard je istoveten z: EN 14863:2005**

---

**ICS:**

25.220.50      Emailne prevleke      Enamels

**SIST EN 14863:2006**      en

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 14863:2006

<https://standards.iteh.ai/catalog/standards/sist/1add609c-48e3-42e8-be3e-81f543ad53bd/sist-en-14863-2006>

EUROPEAN STANDARD

EN 14863

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2005

ICS 25.220.50

English Version

## Vitreous and porcelain enamels - Determination of the edge covering on enamelled steel plate to be used in heat exchangers

Émaux vitrifiés - Détermination du revêtement de l'arête sur une plaque en acier émaillé destinée aux échangeurs de chaleur

Emails und Emailierungen - Bestimmung der Kantenabdeckung von emailierten Stahlblechen für Wärmeaustauscher

This European Standard was approved by CEN on 4 November 2005.

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.

[SIST EN 14863:2006](https://standards.iteh.ai/catalog/standards/sist/1add609c-48e3-42e8-be3e-81f543ad53bd/sist-en-14863-2006)

<https://standards.iteh.ai/catalog/standards/sist/1add609c-48e3-42e8-be3e-81f543ad53bd/sist-en-14863-2006>



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

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

| <b>Contents</b> |  | <b>Page</b> |
|-----------------|--|-------------|
| Foreword .....  |  | 3           |
| 1               | Scope .....                                | 4           |
| 2               | Normative references .....                 | 4           |
| 3               | Principle.....                             | 4           |
| 4               | Reagents and materials.....                | 4           |
| 5               | Apparatus .....                            | 4           |
| 6               | Test specimens .....                       | 7           |
| 7               | Procedure .....                            | 7           |
| 8               | Calculation and expression of results..... | 7           |
| 9               | Accuracy.....                              | 8           |
| 10              | Test report .....                          | 8           |

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 14863:2006](https://standards.iteh.ai/catalog/standards/sist/1add609c-48e3-42e8-be3e-81f543ad53bd/sist-en-14863-2006)

<https://standards.iteh.ai/catalog/standards/sist/1add609c-48e3-42e8-be3e-81f543ad53bd/sist-en-14863-2006>

## Foreword

This European Standard (EN 14863:2005) has been prepared by Technical Committee CEN/TC 262 “Metallic and other inorganic coatings”, the secretariat of which is held by BSI.

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 June 2006, and conflicting national standards shall be withdrawn at the latest by June 2006.

**WARNING** – The use of this European Standard may involve hazardous materials, operations and equipment. This European Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this European Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 14863:2006

<https://standards.iteh.ai/catalog/standards/sist/1add609c-48e3-42e8-be3e-81f543ad53bd/sist-en-14863-2006>

**EN 14863:2005 (E)****1 Scope**

This European Standard specifies a test method for the determination of the covering of the edge of enamelled steel plate to be used in heat exchangers. This method is applicable to all enamelling processes.

It is applicable to plates with a thickness between 0,5 mm and 1,5 mm.

This method is not applicable where the current flow generated in the test exceeds 3 A.

**2 Normative references**

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3693:1987)*

**3 Principle**

The edge of an enamelled steel plate to be tested is submerged in a fluid electrolyte. An alternating current source and a stabilized voltage are connected to the plate. The recorded current is a measure of the covering at the edge.

ITeH STANDARD PREVIEW  
(standards.iteh.ai)

**4 Reagents and materials**

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and distilled or de-mineralized water or water of equivalent

SIST EN 14863:2006

<https://standards.iteh.ai/catalog/standards/sist/14863-2006/en-14863-2006>

81f543ad53bd/sist-en-14863-2006

**4.1 Pickling fluid**, consisting of sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) solution, (7 ± 0,5) % by mass, with an Fe<sup>2+</sup> concentration of (2 ± 1,5) g/l, at a temperature of (60 ± 2) °C.

**4.2 Test bath electrolyte**, consisting of sodium chloride solution, 5 % NaCl by mass, made with distilled water conforming to grade 3 of EN ISO 3696, at a temperature of (22 ± 3) °C.

**5 Apparatus**

**5.1 Test bath**, consisting of a polypropylene container holding electrolyte solution in which the electrodes and a test plate are placed. Polypropylene plates are used for centring and holding the test plate 10 mm from the bottom of the bath.

The arrangement of the bath and the dimensions of the components are shown in Figures 1, 2 and 3.

Dimensions in millimetres

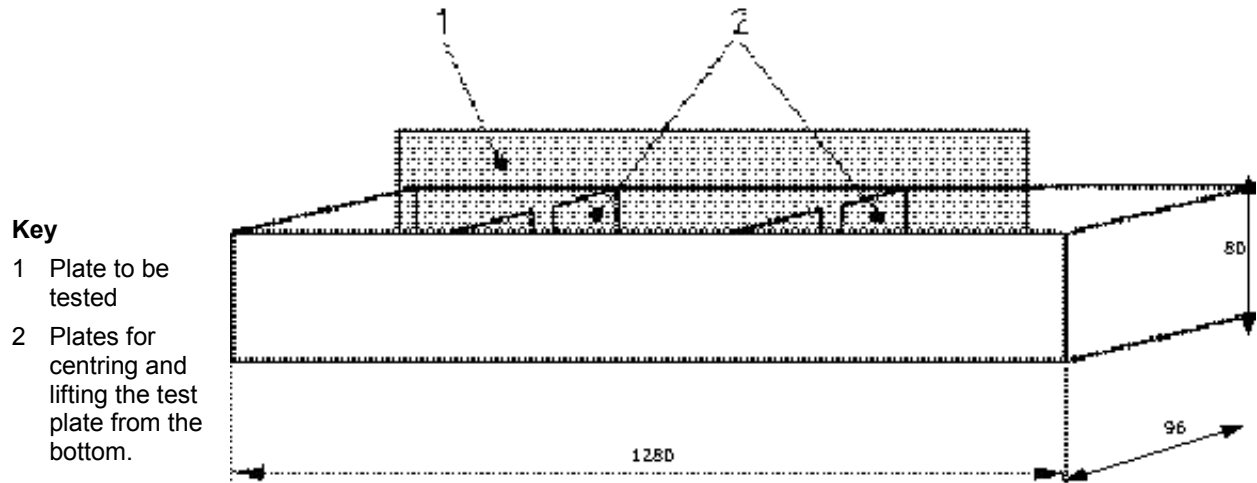


Figure 1 — Dimensions of the test bath

Dimensions in millimetres

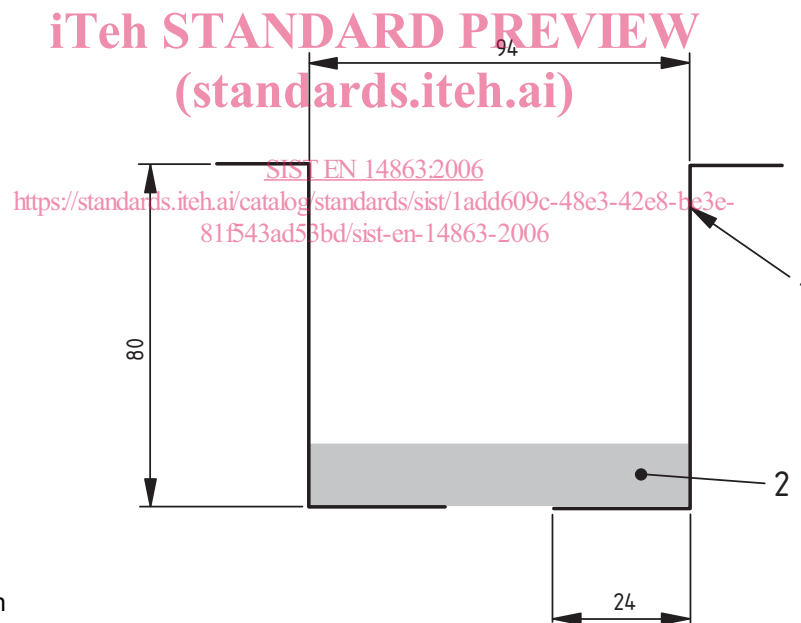


Figure 2 — Dimensions of the two stainless steel electrodes (EN 10088-1 grade 1.4301)

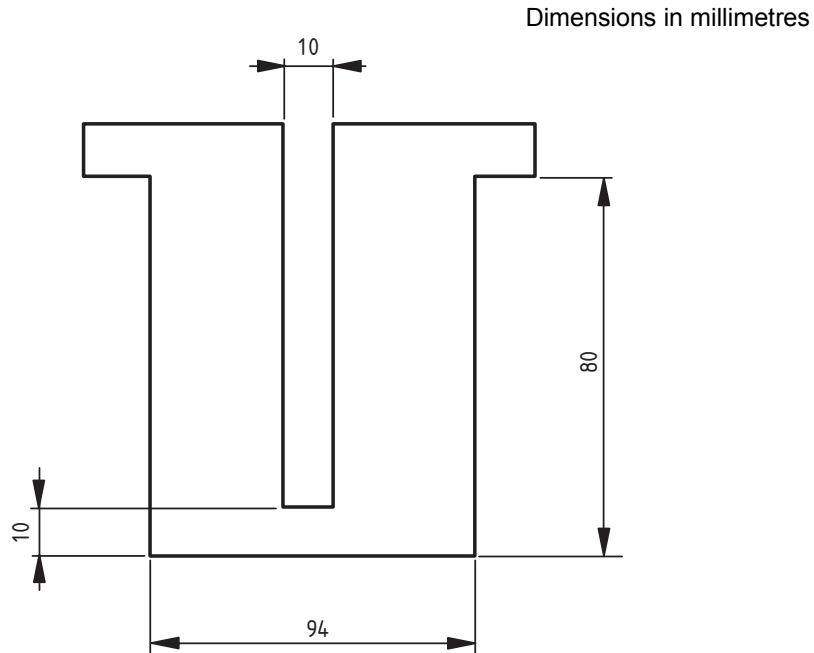


Figure 3 — Dimensions of the two polypropylene centring plates

**5.2 Voltage source**, consisting of a stabilized alternating source of  $(10,0 \pm 0,05)$  V. The electrical diagram is shown in Figure 4.

NOTE This voltage source should be able to maintain these voltage limits throughout the test.

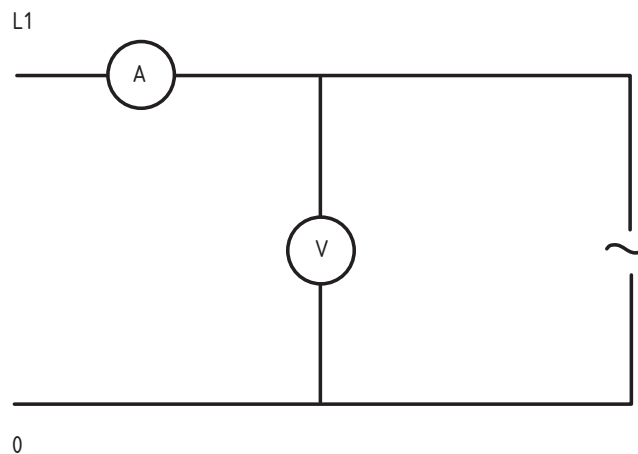


Figure 4 — Electrical diagram

**5.3 Ammeter**, capable of reading to the nearest 0,01 A.



## 6 Test specimens

Select at least one pair of plates, one corrugated and one undulated, of the same length. The minimum length of the edge to be used for the test is 300 mm.

Immerse the plates in the pickling solution (4.1) in a suitable container for a period of 10 min ± 10 s. Rinse the plates well with water and dry them.

## 7 Procedure

Using the design drawing, determine to the nearest 1 mm the total or stretched edge length of the corrugated or undulated test specimen.

NOTE The stretched edge length is the length taking into account the profiling of the corrugation and undulation of the test specimen.

Determine the un-enamelled thickness of the test specimen to the nearest 0,1 mm.

Position a plate in the bath (5.1) in such a way that a maximum of 10 mm of the edge to be measured (one of the edges in the flue gas direction) is immersed in the electrolyte solution (4.2). Do this within one hour after rinsing off the sulfuric acid.

Connect the voltage source (5.2) between the bath electrodes and electrode L1 to the test specimen and, using the ammeter (5.3), record the current automatically (3 ± 0,5) s after switching on the test voltage.

Repeat the test for the other edge of the test specimen and for the second test specimen.

## 8 Calculation and expression of results

For each edge, calculate the uncoated surface area,  $a$  in mm<sup>2</sup>, using the equation:

$$a = 1,222 \cdot I^2 + 12,903 \cdot I \quad (1)$$

where

$I$  is the measured current in A.

Calculate the percentage free surface area  $S$  using the equation:

$$S = \frac{a}{b \times c} 100 \quad (2)$$

where

$a$  is the uncoated surface area in mm<sup>2</sup>, calculated from Equation (1);

$b$  is the stretched edge length plate in mm;

$c$  is the thickness of the un-enamelled plate in mm.

Calculate the percentage edge covering,  $E$ , using the equation:

$$E = 100 - S \quad (3)$$