DRAFT INTERNATIONAL STANDARD

ISO/DIS 8502-9

ISO/TC **35**/SC **12** Secretariat: **BSI**

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Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness —

Part 9: Field method for the conductometric determination of water-soluble salts

Préparation des subjectiles d'acier avant application de peintures et de produits assimilés — Essais pour apprécier la propreté d'une surface —

Partie 9: Méthode in situ pour la détermination des sels solubles dans l'eau par conductimétrie

ICS: 25.220.10

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8502-9 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 12, *Preparation of steel substrates before application of paints and related products*.

This second edition cancels and replaces the first edition (ISO 8502-9:1998), which has been editorial and technical revised as follows:

a) normative references are undated;

b) in clause 6.2.4 number of cycles was changed from 10 to read "Repeat until four (4) cycles of injection and sucking have been completed (see ISO 8502-6);

c) clause 6.2.5 was changed to read "At the end of the 4th cycle, retrieve as much as possible of the water from the patch compartment and transfer to the beaker (5.2), thus restoring its content to nearly the original volume in 6.1.1 (see 8502-6);

d) in figure 1 additional lines have been inserted representing V = 2,5 ml and V = 5 ml and a dashed line for V = 3 ml;

e) in clause 7, 2nd paragraph from the end a correction was done in the unit, change from in mg/cm^2 to in µg/cm^2.

f) in clause 9 Test report is added "d) the volume of water used for washing"

ISO 8502 consists of the following parts, under the general title *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness*:

— *Part 1: Field test for soluble iron corrosion products (withdrawn)* [Technical Report]

— *Part 2: Laboratory determination of chloride on cleaned surfaces*

— *Part 3: Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)*

— *Part 4: Guidance on the estimation of the probability of condensation prior to paint application*

— *Part 5: Measurement of chloride on steel surfaces prepared for painting (ion detection tube method)*

— *Part 6: Extraction of soluble contaminants for analysis — The Bresle method*

— *Part 8: Field method for the refractometric determination of moisture (withdrawn)*

— *Part 9: Field method for the conductometric determination of water-soluble salts*

— *Part 10: Field method for the titrimetric determination of water-soluble chloride (withdrawn)*

— *Part 11: Field method for the turbidimetric determination of water-soluble sulfate*

— *Part 12: Field method for the titrimetric determination of water-soluble ferrous ions*

Introduction

The performance of protective coatings of paint and related products applied to steel is significantly affected by the state of the steel surface immediately prior to painting. The principal factors that are known to influence this performance are

a) the presence of rust and mill scale,

b) the presence of surface contaminants, including salts, dust, oils and greases, and

c) the surface profile.

ISO 8501, ISO 8502 and ISO 8503 have been prepared to provide methods of assessing these factors, while ISO 8504 provides guidance on the preparation methods that are available for cleaning steel substrates, indicating the capabilities of each in attaining specified levels of cleanliness.

These International Standards do not contain recommendations for the protective coating systems to be applied to the steel surface. Neither do they contain recommendations for the surface quality requirements for specific situations even though surface quality can have a direct influence on the choice of protective coating to be applied and on its performance. Such recommendations are found in other documents such as national standards and codes of practice. It will be necessary for the users of these International Standards to ensure that the qualities specified are

— compatible and appropriate both for the environmental conditions to which the steel will be exposed and for the protective coating system to be used, and

— within the capability of the cleaning procedure specified.

The four International Standards referred to above deal with the following aspects of preparation of steel substrates before application of paints and related products:

— ISO 8501 on visual assessment of surface cleanliness;

— ISO 8502 on tests for the assessment of surface cleanliness;

— ISO 8503 on surface roughness characteristics of blast-cleaned steel substrates;

— ISO 8504 on surface preparation methods.

Each of these International Standards is in turn divided into separate parts.

This part of ISO 8502 describes a field method for the assessment of the total amount of water soluble salts, the salts being regarded as forming one single contaminant. The more aggressive contaminants causing corrosion and blistering (the ionic species) can easily be dissolved off and determined rapidly by this method. Consequently, the less aggressive and not so easily dissolved minor part of contaminant will remain un- assessed. For additional information on the test method, its potential and its limitations, see BRESLE, Å., Conductometric determination of salts on steel surfaces, *MP (Materials Performance)*, June 1995, Vol. 34, No. 6, pp. 35-37, NACE International, Houston TX, USA.

Rusty steel substrates, particularly those of rust grades C or D (see ISO 8501-1), even when blast-cleaned to preparation grade Sa 3 (see ISO 8501-1 and ISO 8501-2), might still be contaminated by water-soluble salts and corrosion products. These compounds are almost colourless and are localized at the lowest point of the rust pits. If they are not removed prior to painting, chemical reactions can result in blister formation and accumulations of rust that destroy the adhesion between the substrate and the applied protective coating.

Even if the salt is readily soluble in water, it is often impossible to remove it completely from the surface by a simple washing or extracting. The method described does not therefore determine the total amount of soluble materials on the surface but gives an indication of the cleanliness level of the surface. Prolonging the washing or extractions time should remove a larger amount proportion of the salt.

Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 9: Field method for the conductometric determination of water-soluble salts

1 Scope

This part of ISO 8502 describes a field method for the assessment of the total surface density of various water-soluble salts (mostly chlorides and sulfates) on steel surfaces before and/or after surface preparation.

The individual surface densities of chlorides, sulfates, etc., cannot be determined by this method.

This method assesses ionic contaminants only. These represent the greater part of the contamination.

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.

ISO 3696, *Water for analytical laboratory use — Specification and test methods.*

ISO 8502-6, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 6: Extraction of soluble contaminants for analysis — The Bresle method.*

3 Principle

The salts on the given area of the steel surface are dissolved by the Bresle method (see ISO 8502-6), using water as solvent. The conductivity of the solution thus obtained is measured. Finally, the total surface density of the salts in this area is calculated by a simple but sufficiently accurate equation.

4 Solvent

Water of at least grade 3 purity in accordance with ISO 3696.

NOTE Usually, distilled or de-ionized water of conductivity less than 0, 5 mS/m (5 μS/cm) meets this requirement

5 Apparatus and materials

5.1 Conductometer, with temperature compensation and sufficient range, e.g. from 0 mS/m (0 μS/cm) to 200 mS/m (2000 μS/cm).

5.2 Glass beaker, of convenient size and shape for housing the electrode end of the conductometer (5.1) during measurement.

5.3 Standard adhesive patch, as specified in ISO 8502-6, e.g. of size A-1250.