BS EN 1965-1:2011

BSI Standards Publication

Structural adhesives — Corrosion

Part 1: Determination and classification of corrosion to a copper substrate

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National foreword

This British Standard is the UK implementation of EN 1965-1:2011. It supersedes BS EN 1965-1:2001 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/52, Adhesives.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Strukturklebstoffe - Korrosion - Teil 1: Bestimmung und Klassifikation der Korrosion eines Kupfermaterials

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Foreword

This document (EN 1965-1:2011) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, the secretariat of which is held by AENOR.

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of an identical text or by endorsement, at the latest by November 2011, and conflicting national standards shall be withdrawn at the latest by November 2011.

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1 Scope

This European Standard describes a method to determine the ability of a liquid adhesive to corrode a copper substrate under heat ageing conditions. Temperatures and ageing periods are chosen to ensure the maximum differentiation between the corrosivity of different adhesives and are not intended to represent any particular service condition.

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 923:2005+A1:2008, *Adhesives — Terms and definitions*

ISO 6958, *Wrought copper and copper alloys — Drawn rectangular bars — Dimensions and form tolerances*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 923:2005+A1:2008 and the following apply.

3.1
corrosion
destructive attack on metals which can be chemical or electrochemical in nature

NOTE The described method measures essentially only the chemical attack. The electrochemical contribution is eliminated as far as possible by ensuring that there is no electrolyte and that the copper substrate is, as far as practicable, free from metallic impurities which can result in the formation of a galvanic cell.

4 Principle

An abraded and polished copper substrate is coated with a thin film of the liquid adhesive and then aged for 24 h in dry heat at 50 °C or 100 °C. Following this the surface is examined and the extent of tarnishing and/or corrosion on the basis of discolouration.

5 Products and materials

5.1 Solvent.

Any sulfur free, and water free, hydrocarbon based solvent, which has been shown to cause no discolouration of the abraded copper substrate at 50 °C is suitable. The solvent should be able to dissolve the uncured adhesive

5.2 Copper substrate, plate.

Recommended cross section 12 mm × 2 mm, ISO 6958 E-Cu F30, produced by electrolysis.

5.3 Abrasive cloth or emery paper.

Grade P240[1)] silicon carbide.

5.4 Liquid abrasive.

(Silicon carbide) grade 150[1)].

5.5 Stainless steel tweezers.

5.6 Cotton wool.

6 Procedure

6.1 General

Use a minimum of three copper plates for each evaluation.

6.2 Preparation of the copper substrate

Lay the abrasive cloth or emery paper on a flat surface and wet it with the solvent. Place the copper plate on top on this and cover with the filter paper, to ensure that the copper surface is protected from contamination by fingers. Rub the copper plate in a criss-cross pattern against the abrasive material until a uniform abraded surface is achieved.

It is necessary to abrade all six plane surfaces of the test plate beginning with the edges and finishing with the faces. Following this abrasion, store the copper plate in solvent.

6.3 Determination

Remove the copper plate from the solvent, handling only with the tweezers, and place on a clean glass plate. Coat the copper plate with the liquid abrasive and abrade with a piece of cotton wool which has been moistened with a drop of solvent. Finally, polish vigorously with clean, dry, cotton wool, repeating the polishing with fresh pieces of cotton wool until one remains clean and white following polishing.

On completion of the final abrasion, immediately immerse the copper plate in a shallow dish of the adhesive, again handling with tweezers, and place in a oven at 50 °C or 100 °C for 24 h.

Remove the copper plate from the dish with the tweezers and carefully wash in solvent to remove uncured material, then dry it with the filter paper. It is essential that the test is repeated if, during any of the above procedures or testing, the copper plate:

a) is touched by fingers;

b) comes into contact with water; or

c) comes into contact with any other material;

d) or if the appearance of the edge of the plate is significantly different from that of the face.

1) Grade defined by Fédération Européenne des Fabricants de Produits Abrasifs (FEPA-43).

7 Discolouration/corrosion

The discolouration/corrosion is graded as in Table 1, on examination of the copper surface using normal vision.

Table 1 — Classification of discolouration/corrosion

Corrosion grade	Significance	Description
0	No tarnish or corrosion	Unchanged
1	Light tarnish	Weak/pale orange, hardly changed when compared with a lightly polished copper substrate, can also be dark orange.
2	Moderate tarnish	Wine-red, lavender-blue, a lot of lavender-blue and/or silver with a red-wine covering. Silver. Brass coloured or golden.
3	Heavy tarnish	Magenta with a brass coloured surface. A lot of red and green shimmer (Butterfly) but no grey.
4	Corrosion	Transparent black or dark grey or brown with the "Butterfly" with a slight green shimmer. Graphite black or dull black. Shiny or pitch black.

8 Report

The test report shall include:

a) a reference to this European Standard, i.e. EN 1965-1;

b) type and designation of the product tested;

c) description of the copper plate preparation procedure;

d) description of the type and thickness of the copper plates;

e) corrosion/discolouration grade ranking;

f) details of any operations not specified in this European Standard together with details of any events likely to have had had an effect on the results.

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