

## The Dutch Fe-Migration Mending Test

For centuries iron gall ink was used for writing and drawing and therefore book and paper conservators frequently work with originals made with this ink. Iron gall ink presents a notorious problem since it might cause ink corrosion: detrimental ink ingredients affect the paper, causing depolymerisation of the cellulose chains. Local mending of ink-corroded areas with a water-based adhesive bears one serious risk: too much moisture transports invisible, detrimental compounds like iron(II) ions and acids out of the ink lines into surrounding paper areas, spreading ink corrosion. This process becomes perceptible just after years, therefore this risk is often underestimated.

### Description

The Dutch Fe-migration mending test is a filter paper impregnated with a bathophenanthroline solution in ethanol. The Dutch Fe-migration test was developed in cooperation with Birgit Reissland, Frank Ligterink and Han Neevel (Cultural Heritage Agency of the Netherlands, RCE) as well as Bas van Velzen (University of Amsterdam, UVA). The paper is stamped with an iron gall ink.

Bathophenanthroline is a specific indicator for iron (II) ions. It forms an intensely magenta-coloured complex with iron (II) ions. Therefore, papers impregnated with bathophen-

anthroline can be used as an indicator for the presence of iron (II) ions. Where the paper turns magenta, iron (II) ions are present.

The purpose of the Dutch Fe-migration mending test is to make the invisible visible. The test paper shows you directly if there is any migration of iron ions from the ink lines after applying your repair method (adhesive) unto the test paper. This test paper is a migration control tool.

### Uses in Conservation

Repairs on damaged documents or drawings with iron gall ink is a common task that the conservators need to carry out. The potential damage is undetectable during conservation.

The indicator is a useful test of the materials used for repairs, different adhesives and application methods. By using the indicator prior to the application on the original work of art or document, the conservator can observe easily and readily the reaction of the ink to the adhesive and the technique used. The materials (type of adhesive) and the technique (remoistenable tissue or not) can be adjusted and improved to avoid bleeding and future creation of halos in the surrounding to the ink areas (Fig 1). The indicators can be purchased separately in a pack of 5 or as part of a *How-to* package with materials and instructions of how to make remoistenable tissues, recommended for iron gall ink repairs (Fig 2).



1 The Dutch Fe-migration mending test used with different adhesives and techniques during a workshop.



2 The *How-to* package.

In this *How-to* package you will find the following materials:

- > For Making Remoistenable Tissue
  - 1x pink screen (use for 2-8 g·m<sup>-2</sup> Japanese paper)
  - 1x grey screen (use for 9 g·m<sup>-2</sup> paper or higher)
  - 1x squeegee (rubber)
  - 1x 6 grams gelatine
  - 2x ready made remoistenable tissue
  - 1x leaflet 'How to make remoistenable tissue'
- > For doing a repair
  - 2x sponge cloth (10x10 cm 100% cellulose)
  - 4x blotting paper (10x10 cm)
  - 2x blotting paper (10x5 cm)
  - 2x Reemay™ (10x5 cm)
  - 5x 'Dutch Fe-migration mending test'
  - 1x leaflet 'How to do a repair on Iron Gall Ink'

### Remarks

- > The Dutch Fe-migration mending test should be kept in a dark and dry place. It is best to keep it in a sealed plastic bag.
- > The indicators come with an indicated shelf life of 5 years.
- > The filter paper is new, non-sized; the ink is newly made and directly applied. Therefore it is good to keep in mind that this test is extremely sensitive. The adhesives and mending methods you will try on the test paper will give an extreme result in comparison to the original papers and ink you will encounter during conservation work.
- > Most test papers already show pink halos on the back of the paper. This happens because iron ions already migrate from the ink line into the surrounding paper during application.

### Supplier

Practice-in-Conservation, Afrikanerplein 15-2, 1091 PN Amsterdam, The Netherlands, <http://practice-in-conservation.com> (Prices: *How-to* packages: EUR 45.00 excl taxes and sending cost Dutch Fe-migration mending test (per 5): EUR 15.00 excl taxes and sending cost).

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