CSC Conservación de Sustratos Celulósicos S.L.

Mass deacidification with CSC Book Saver®

100 years of cultural heritage are at great risk

Papers which were produced as industrial mass products since the middle of the 19th century create considerable problems. With increasing age, acids are produced which destroy the macro-molecules of the cellulose fibres.

The result: the papers lose their original properties, become brittle and turn yellow until they are completely unusable. The fatal aspect of the whole problem is that the destruction process is auto-catalytic, with increasing quantities of acid being released as the decay process advances.

This acid decay is responsible for up to 90 percent of the destruction of books and documents. Although the symptoms have been observed for more than 100 years, it was only a few decades ago that the phenomenon began to be understood. Since then, acid-free paper is increasingly in use.

Mass deacidification: the efficient rescue from paper decay

The classical methods for stock preservation are tied to manual procedures, and although they produce good results, they are not suitable for dealing with the large quantities involved in libraries and archives. The problem is who decides which books and documents are preserved for future generations, and which are allowed to decay?

Given the fact that there is no reasonable answer to this question, scientists and engineers took up the challenge of developing mass procedures for the deacidification of

large quantities of bound books and also individual sheets in an individually controllable process.

For many years, CSC Book Saver® has been involved in the development and practical implementation of mass deacidification projects, resulting in the expertise and know-how now available at the company.

Today, the CSC Book Saver® process is the procedure offering maximum efficiency and the only one which can be done in the customer archive building.

Process description

The CSC Book Saver® process is currently the most modern liquid phase deacidification process. Carbonated magnesium propylate is dissolved in heptafluoropropane (HFC 227) and used in a non-watery impregnation process. The technological and procedural advantages over other impregnation processes allow for more comprehensive fulfillment of the conservation objectives.

The CSC method is applied in a low temperature range without time-consuming preliminary drying of the objects concerned. This shortens the deacidification process and preserves the original material structure during the treatment process. By dispensing with preliminary drying, there is no more warpage to the book covers, any gluing effects, embrittlement or dimensional change.

The deacidification process results in enhanced stability of nearly all pigments during treatment. Stamps, ink, ink pens, coloured book cover materials, gilt and coloured edging together with foil coatings only very rarely show the usual negative changes such as "bleeding", and no Newton rings have been observed at all. Not eve leather book covers need any special pre- or post treatment.

Pre-selection and control of each original are an integral part of the deacidification treatment, thanks to the small treatment batches (40 kg each) and the short treatment time (only 3 hours). Quality controls are carried out on an in-house level and also in independent external analysis laboratories.

The deacidification results are checked immediately after the treatment, using reference papers inserted in the objects beforehand. This first overview test with indicators is followed by a standard surface pH measurement.

The treatment phrases

- Cooling
- Soaking
- Impregnation
- Solvent recovery
- Show the routinely process of deacidification.

The required treatment results are also achieved with delicate combinations of materials, for example mixed convolutions with modern writing materials, copies of all different kinds, photos or parchment inserts, thus enhancing the efficiency and appeal of mass deacidification technology. In contrast to standard treatment, for difficult stocks the cooling phase is preceded by a reduction of water content to a few per cent in a very gentle process.

The solvent HFC 227 constitutes no toxic risks because it is recovered in a self-contained cycle and reused after distillation. Magnesium propylate evaporates in just two days following the neutralization reactions as propyl alcohol or propanol: the alcohol strain is lower than comparable methods, and well below the statutory OEL limits.

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For further information about the CSC Book Saver® process please contact:

Marta Périz

Sales Manager

CSC Conservación de Sustratos Celulósicos S.L.

C/ Colom 453, nave 50

08223 Terrassa (Barcelona)