

Influence of dyes and optical brightening substances

on the permanency of paper



Description:

Dyes reflect to the colour of specific wave lengths of light rays. The reflection of all visible light waves is always white. They are added to paper pulp in either a solution form or pigment suspension form to produce the white colouring and for the production of coloured natural papers.

Dye pigments loose in the course of time the strength of their specific reflection properties to different extents. The colour of paper and board changes differently depending upon the colour pigmentation, intensity and duration of light exposure. The lightfastness of dyed material indicates the extent of colour change that occurs and is determined by a factor between 1 (bad) and 8 (very good) in accordance with the wool scale.

Due to exposure to light, dyes more or less can change their colour to various extents, one achieves either a good and poorer quality of lightfastness but no absolute lightfastness can ever be obtained.

Optical brighteners are substances (dye pigments) that reflect invisible ultraviolet rays into visible light, hence the optical whiteness colour effect in paper. Again with time and due to exposure to energy sources, such as sunlight or halogen lights, the whiteness effect of paper fades and reduces. Optical brighteners are instable agents and thus not lightfast.

For many reasons, almost all paper and board qualities are dyed. Even white is a colour, when dyed, that can range from a bluish to a reddish nuance. Nearly all ultra white and coloured papers more or less have the tendency of yellowing (attaining with time a yellowish tinge). The photograph above illustrates a typical example of a yellowed matting board.

So, there is actually no colour-fast or lightfast paper, but qualities that yellow less or more are available on the market. The term "lightfast" is used only in conjunction with the lightfastness factor.

The light fastness of a premium quality mounting or matting board ranges between 4 and 7 in accordance with the wool scale. The reason for yellowing is initially due to the change of the dye properties. In this process neither the paper or board fibres get damaged.

However, if the paper or board quality being used contains harmful substances (pollutants) such as fibres with lignin content, acids (eg. alum), or possess no protection in the form of an alkaline buffer against exterior acid penetration, this will result in damage of the paper fibre. Again, these factors will initially lead to a discolouration (towards a yellow nuance), which is called yellowing. This discolouration is also a significant factor leading to the deterioration in the permanency of paper and board, because the tensile strength of the material gets damaged.

Conclusion:

- Yellowing, the discolouration change that takes place in the pigment dye property, on itself has absolutely no influence on the permanency of paper and board. This also applies to ultra white coloured paper and board that have been whiteend using optical brightening agents.
- If paper or board gets contaminated by pollutants, either from the interior or exterior, then permanency is not prevalent any more. In this case yellowing itself is a secondary phenomenon.
- A mounting or matting board, produced pollutant-free and with the necessary buffering, dyed in light coloured pastel shades with the appropriate dye pigments, is without any restriction permanent (ageing-resistant) and possess a lightfast factor between 3 – 4 in accordance to the wool scale.
- Natural white coloured paper and board qualities manufactured without optical brighteners are essentially more colour-fast in comparison to dyed paper or board that have been whitend using an optical brightening agent.

Further information, such as our „Quality Guarantee“, certificates of independent testing institutions and information regarding application methods and instructions are stated on our website klug-conservation.com.

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