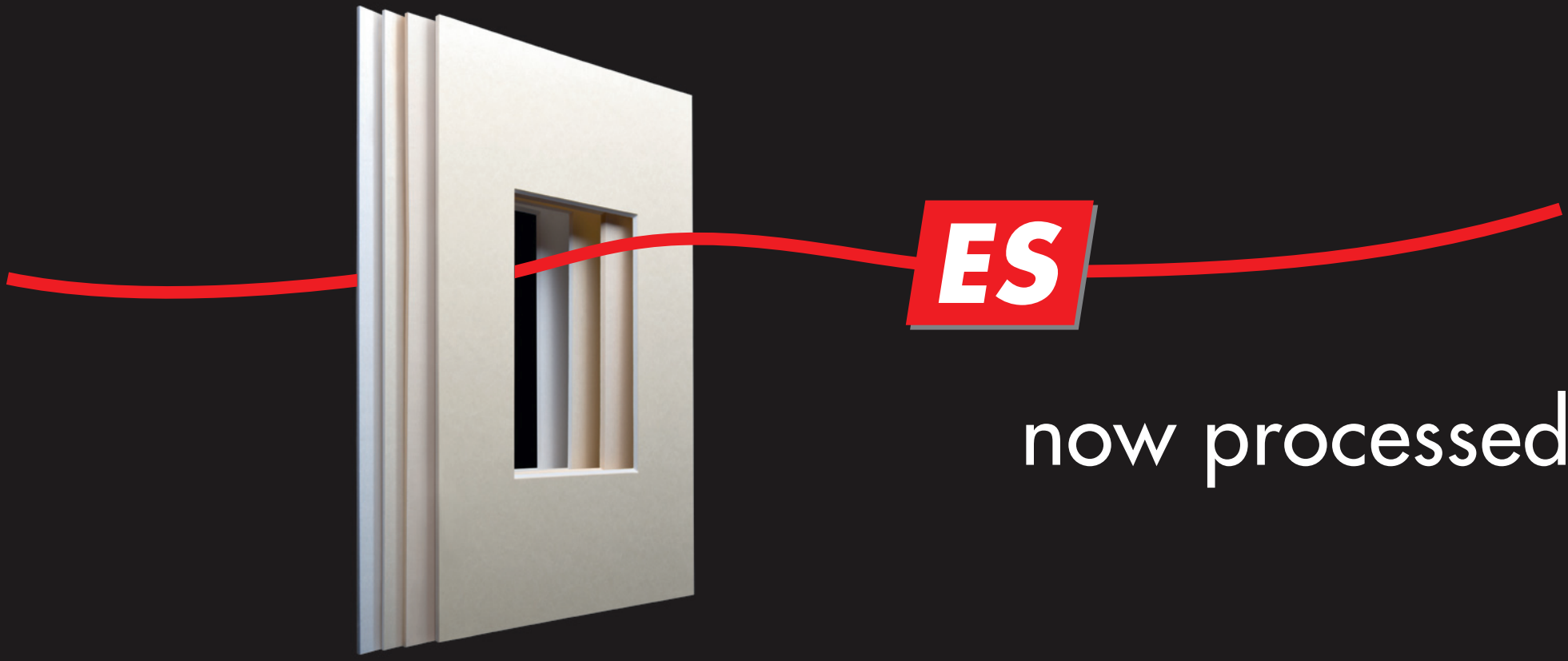
KLUG CONSERVATION

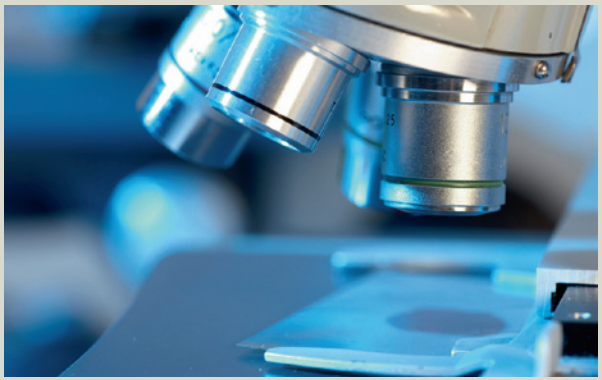


now processed:

The new, emission-free *ES* products are now available

Emission-free, starch-based adhesive processed in all products with ES marking

Across the world, multiple-ply board is laminated using synthetic dispersions that are either ethylene vinyl acetate copolymer (EVAc) or polyvinyl acetate copolymer (PVAc) based. The main aim of KLUG-CONSERVATION was to further improve the already highly complex, unplasticised and pH-neutral dispersion glues being used to manufacture their multiple-ply boards. Empirical experience shows that paper and board manufactured according to historical recipes (used before the industrial revolution) have a very long life span and can still be used after 1,000 years. This was the fundamental idea behind the quality of our board products. In particular, we sought to eliminate the production of VOCs (out-gassing of volatile organic compound[s]) which finally led to the development of this new impeccable, starch-based, emission-free adhesive.
The new KLUG ES boards are now available.



Natural, without plasticizers and emission-free

ES is the abbreviation for „Emission-free Starch-based Adhesive". All KLUG-CONSERVATION products with "ES marking" are manufactured with this ageing-resistant adhesive. The novelty of this remarkable glue lies in the ageing-resistant lamination of two or more plies of paper, board and other kinds of flat material. ES adhesive glue is based on heat-treated starch, is white in colour, cold water soluble and viscosity-stable.

Already, in ancient Egypt the natural organic starch of the papyrus plant was used to bond the fibres in layers thereby creating a material which lasted thousands of years, some lasting even until today.

This new adhesive guarantees indefinite ageing resistance and simultaneously fulfils all requirements for long-term archival storage of cultural artefacts.

KLUG *ES* products release no harmful VOCs. Furthermore they are harmless, tasteless, odourless and plasticizer-free. From an ecological point-of-view they are considered "very good". The production is sustainable, self-sufficient and based on locally grown raw materials (potatoes), thus not dependent on mineral oil.

KLUG *ES* boards are not only emission-free, but also meet all the technological requirements set by the ISO 9706, ISO 16245 standards as well as the ISO 18916 (Photographic Activity Test).

Cultural artefacts packed and stored or on display with KLUG *ES* boards are surrounded by an emission-free, alkaline climate with a pH ranging between 8.0 and 9.5. For delicate photographic material we provide board material without an alkaline reserve, pH buffer of approx. 7.0.

Technological advantages of the starch-based glueing technique KLUG *ES*:

- Adhesive based on heat-treated starch, ageing resistance guarantee without a time limit.
- Use of heat-treated starch, water soluble and bio-degradable starch, environmentally friendly, local and renewable sources.
- Taste- and odourless. (certification of conformity possible)
- Adhesive pH-neutral and plasticizer-free.
- Emission-free, no release of harmful VOCs.
- Self-sufficient, not dependent on mineral oil.
- Cream coloured adhesive layer (bevel cut).
- Improved adhension between bonding of plies, owing to fibre anchoring in the capillary system of the paper fleece.
- Improved flatness (planarity) of the laminated material owing to modified drying performance of the heat-treated starch.
- Increased strength/rigidity (stiffness) of the laminated material.

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