

Paper permanence

In the late 1950s, it was discovered that paper permanence is primarily a function of the paper's acidity or alkalinity. The life span for alkaline paper measures in hundreds of years, compared to just decades for acid paper.

Originally paper was manufactured in an alkaline system. This was determined by the resources available (cotton), not because paper longevity was a consideration. As the demand for paper increased in the 19th century, a serious shortage of cotton rags quickly developed. Available wood pulps, sized with alum and rosin, replaced cotton in papermaking. Since the new process was acidic, documents and books published in the last century are rapidly deteriorating, while documents over one hundred years old are in good condition.

Paper can be manufactured in either an alkaline or acidic process. The chemistry cannot be interchanged on the same paper machine for different grades. A leader in alkaline paper making, Mohawk Fine Papers has been manufacturing acid-free papers since the late 1960s.

pH

Alkalinity and acidity are measured by pH, the potential for hydrogen. The pH scale runs from 0 to 14, with 7.0 being neutral. A pH level below 7.0 is acidic; a pH level above 7.0 is alkaline. Every whole number increase represents a tenfold change in the scale. Paper with 4.0 pH is ten times more acidic than paper with 5.0 pH. A pH pen, containing chlorophenol, will indicate if a paper is alkaline or acidic. Ink will turn purple on alkaline paper, yellow on acidic paper. More involved laboratory tests can be performed to determine the exact pH level.

Acid-free

Acid-free papers are manufactured in an alkaline environment. This process prevents the internal chemical deterioration of the paper over time. The finished paper is slightly alkaline, ranging from 7.5 to 9.0 pH.

A central component in the alkaline system is calcium carbonate. Calcium carbonate is an alkaline mineral which is like marble dust. Replacing an acidic clay filler, calcium carbonate fills the space between the cellulose fibers to provide opacity and an even formation.

Buffered paper

Additional calcium carbonate will act as a buffer, making the paper resistant to the effects of our naturally acidic environment. Acidic compounds from printing solutions, air, and our hands will react with this alkaline buffer, not with the fibers or chemical bonds of the paper.

continued

FOR MORE

INFORMATION:

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Other benefits of acid-free papers

Besides being alkaline, calcium carbonate provides greater brightness, whiteness, opacity, bulk, and strength than other fillers. Alkaline papers are also known for better ink holdout and printability. An environmental benefit of running an alkaline system involves making recycled paper. The level of acidity or alkalinity varies and is unknown in waste paper. In an alkaline papermaking process, waste paper can be used if it's acidic or alkaline. If the mill is running an acidic system, alkaline waste paper will not work.

Alum-free and rosin-free

Sizing is applied to paper to provide surface strength and water resistance. Alum and rosin are acidic liquids traditionally used as sizing on an acidic system. Alum-free and rosin-free is an indication that the paper is also acid-free.

Cellulose fibers

The purity of the cellulose fiber in the pulp also influences the permanence of paper. In their natural state, wood cellulose fibers are surrounded by lignin. Lignin causes paper to discolor and become brittle. (Newsprint is made with pulp containing lignin.) For fine printing papers, the lignin is chemically removed in the pulping process. Cotton cellulose fiber is naturally lignin free. Cotton fiber is also long, supple and very durable. Papers made with both cotton fiber and acid-free chemistry are of archival quality.

At Mohawk, the use of pure, high-quality wood pulp, cotton fiber and an alkaline manufacturing process results in papers that are known worldwide for stability, strength and permanence.

ANSI/NISO

The American National Standards Institute and National Information Standards Organization adopted a standard (Z39.48-1992) for permanence. It is called Permanence of Paper for Publications and Documents in Libraries and Archives. To meet their standard, acid-free papers must measure a minimum pH of 7.5 and meet an established level of folding endurance and tear resistance. All of the papers manufactured by Mohawk are acid-free, with a minimum 2% alkaline buffer, and in compliance with the standards set by the American National Standards Institute.*

*Mohawk's deepest colors are acid-free but do not have a 2% reserve: Cyan, Navy Blue and Black.

For more information and samples, please call your local merchant or Mohawk at 1 800 the mill. www.mohawkpaper.com