

Printing for Infinity

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Abstract

The long-term stability of inkjet prints is relevant, especially for those prints that enter an archive or become part of a museum collection. In both categories maximum stability is expected, but the requirements on the material – ink and substrate – are quite different. The aim of this paper is to elucidate the range of criteria important to the office user and artist, printing for infinity.

Introduction

Inkjet printing is more and more used in offices, especially when colour printing is required. Some of the reasons for this development are the widespread use of computers for generating text, the ease of printing, and the low cost of purchase of inkjet printers.

With the rapid development of the print quality and the choice of wide format printers, inkjet printing is now widely accepted as an alternative technique for artists, who apply this medium not only for reproduction purposes but also as an artistic technique.

The Problem

It was just a matter of time for either type of inkjet print (documents and artwork) to enter the archives or museum collections. Both archives and museums have the inherent, and in a certain way contradictory task to preserve their collection items as long as possible, while making them also accessible to the public. Therefore, permanence is a very important quality criterion of inkjet prints, both for museums and archives. It is worth mentioning here, that such institutions aim at life expectancies in excess of 50 years for valuable documents – time periods which obviously are beyond current considerations of the rapidly developing inkjet industry.

In order to eliminate a rising problem at its source, this research attempts to determine a set viable criteria concerning the longevity of ink and ink-substrate systems with respect to storage and exhibition. Despite the common desire for permanence, the requirements on the inkjet prints for office use are quite different from the inkjet qualities expected by artists. Therefore – in a first step - the criteria important to artists, museums, office users and archives are determined.

The criteria discussed below are based on personal communication with people confronted with the problem and the author's experience. They are neither claimed to be exhaustive and nor fully objective, however, they are compiled to set a basis for discussion. In a second step, the criteria will be verified, completed and statistically

evaluated through the analysis of questionnaires sent to artists, office users, museums and archives.

Criteria for Office Use

Inkjet prints made in an office are generally of non-photographic quality and contain mainly text. Colour is added when graphs or tables are used or to set off text or headers. In general, a multipurpose paper is used which is suitable for handwriting, electrostatic copying and inkjet printing. The use of specifically coated inkjet paper for general office use is rare. In Switzerland and probably in other countries too, there are regulations by law concerning the use of modern printing technology for the production of official documents like marriage certificates. Inkjet printing with dye based inks or prints on specially coated paper are excluded for such documents, because their permanence cannot be guaranteed.¹

Optical Properties

The resolution of inkjet prints has secondary priority as long as text- and line boundaries are sharp. High resolution prints with photographic appearance are less demanded. Colour matching reproduction or a special gamut is not required. However, the reproducibility of prints is decisive. Gloss and brilliance of inkjet prints in office use are of secondary importance. Most papers used are mat multipurpose papers with optical brighteners.

Permanence

Since a majority of prints produced in offices have document character, a life expectancy of these prints in the range of 5 to 10 years is expected. Long term stability is required as soon as documents are stored in an archive. In many cases it is not predictable if documents will end in an archive or not. Light stability is important but less an issue, because exposure to light is mostly minimal for such documents. However, dark term stability, resistance against pollutants and humidity are of major importance to these inkjet documents. Due to storage conditions, smudge resistance and stability in contact with other material is required. This could be another inkjet print or plastic sheeting that might adhere or cause diffusion of dyes. Even paper with a high alkaline reserve, as is often used for archival purposes, might cause pH problems with dyes.

Administrative Aspects

The costs of inkjet technology plays an important role in office use, since - despite the increasing exchange of electronic documents - a high amount of documents on paper is produced in this environment. The initial cost

of purchase for a printer is, to a certain degree, secondary. More relevant are the running costs for ink and paper.

The paper of choice generally is not a specific inkjet paper because handwriting and stamping must be possible as well. Furthermore, the same batch of paper is used for photocopying. Since paper and ink are resources used on a regular basis, the shelf life before use is of secondary importance. Finally the demand for high printing speed should be mentioned, since it might increase the output efficiency of an office.

Criteria for Artists' Use

Artists may use inkjet printing as an artistic medium and develop demands and material sensitivity, which go far beyond pure technological aspects. They may choose materials or techniques to achieve effects like diffusion of ink or bronzing, otherwise avoided, but in this case intentionally employed, forming an intrinsic part of their artwork.

In other cases, artists may use inkjet printing as reproduction medium in order to imitate other techniques like watercolours or photographs. Here, inkjet technology is challenged in its common way. Sometimes, papers not made for inkjet printing, e.g. watercolour papers are purposely chosen to achieve certain effects. In such cases the special characteristics of the paper are more relevant to the artist than superior printing quality that might be achieved with an inkjet paper.

Optical Properties

The demand for specific optical properties of inkjet prints does vary and depend on the aim of the artist. Therefore, all of the following criteria may be of relevance. High resolution of the inkjet print is desired, when it is used as reproduction medium. When employed as an artistic medium, low resolution may be desirable to acknowledge the technique - an inkjet print.

Colour is a very important factor in inkjet printing for artists. Since artists often tend to dislike technical limitations, a maximum of brilliance and gamut is required. Especially for reproductive printing colour matching and reproducibility are demanded. The optical appearance of the support may vary, depending on the final use and intention of the artist. It may be transparent or opaque, and the surface appearance can vary from glossy to matt, and from smooth to structured. Subjective observations such as "it looks like plastic" may influence the choice of materials.

Tactile Properties

Artists often develop a very sensitive relation to the materials they use for their work. Therefore, properties, which do not directly relate to the optical appearance of the print, may be of equal relevance to them. Physical properties such as thickness, weight, flexibility and tactile surface qualities like hard and soft, smooth and rough, or dry and sticky, do have an influence on the choice of material. Even the smell of the inkjet print, or its property to feel like plastic or paper, may be an important aspect.

Permanence

For most museums and some artists permanence is a very important factor of inkjet art. Other artists regard non-permanence as secondary problem and accept the natural and often fast ageing of their artwork.

Light-fading stability is a main requirement for inkjet print art due to exposure to light during exhibition. Stability against smudge and problems arising from contact with other materials is considered to be less relevant, because artwork is expensive and therefore assumingly handled with care. Problems occurring from humidity are expected to be under control in most museum environments. Inkjet prints vulnerable to atmospheric pollution, or prints developing static charge and thus attracting dust, may cause problems and should therefore be avoided.

Administrative Aspects

The cost of inkjet printing to artists can be quite high, but this is due to the quality, the choice of format and materials demanded by the artists. The prints are usually made by a commercial plotting service. Depending on the materials and formats of preference, a considerable number of supports and inks may be held in stock. In such cases the shelf-life before use can be an important factor.

Printing speed is of secondary importance, since the editions are mostly small. More important is the availability of large formats of printing supports.

The ease of handling, particularly with regard to mechanical stability, water resistance and vulnerability to finger prints, is another decisive factor.

Finally, the inkjet print may be mounted. Therefore solvent stability, heat resistance - when dry-mounted - and the permanence of the adhesive used, are factors to be considered.

Conclusion

Despite the similarity of requirements regarding permanence and preservation of inkjet documents and artwork in museums and archives, the criteria for printing and long term storage of both groups seem to differ to a great extent. The analysis of the above mentioned questionnaire is expected lead to an extended set of guidelines for each end-user group with respect to the optimisation of the longevity of their inkjet prints.

References

1. SR: 211.112.6 - Verordnung vom 31. Mai 1996 über die Zivilstandsformulare und ihre Beschriftung (ZStVF), Anhang 3,4.

Biography

The author studied conservation and restoration at the academy of fine arts in Vienna (A). After some work experience at the Austrian National Library in Vienna he started teaching at the State Academy of Fine Arts in Stuttgart (D). Since 1993, he has been teaching at the University of Applied Sciences in Berne (CH) with main emphasis on the conservation and restoration of art on paper and photography.