Contemporary Analog and Digital Color Photographic Prints: Dye and Pigment Print Process Descriptors, Naming Conventions, Dating, and Permanence Characteristics

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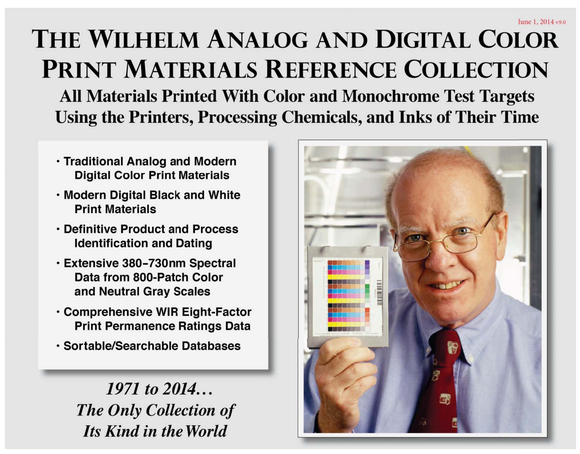


Introduction:

Drawing on the many years of research associated with The Wilhelm Analog and Digital Color Print Materials Reference Collection – 1971 to 2014, this paper describes the wide range of color print processes that comprise the modern era of color photography which began in 1935 with Kodak's introduction of Kodachrome transparency film and the companion Kodak Minicolor print process announced in 1941, both of which utilized images composed of cyan, magenta, and yellow dyes formed by a process known as chromogenic development using external couplers.

These products were followed by a large number of color transparency and color negative film and print systems from Kodak, Agfa, Ansco, GAF, Fuji, Konica, 3M, Ferrania, and others. Photographers, galleries, and museums have variously referred to color prints made by these dye image processes as: Type C Prints; Type R Prints; Chromogenic Prints; Color Coupler Prints; Silver-Halide Prints; Lightjet Prints; Lambda Prints; Digital Type C Prints; Digital C Prints; Digital Chromogenic Prints; Duratrans; Digital Duratrans; and brand-associated names such a Ektacolor Prints; Kodak Prints; Crystal Archive Prints; Fujiflex Prints; Duraflex Prints; Endura Transparency Display Material; and so forth.

In recent years, many of these print materials could be exposed with an enlarger or contact printed in an "analog" fashion, and the same print material could also be digitally imaged with scanning RGB laser or LED light sources (which can also produce monochrome images on color papers), further adding to the confusion about what the prints should properly be called. Face-mounting to acrylic sheet, lamination, and various types of print coatings have further complicated the naming situation.

Likewise, dye image prints made by the silver-dye-bleach process and dye transfer prints have been described using a variety of names, some brand-associated and some with names describing the image formation process.

Digital inkjet processes began entering the photography market in 1991, with dye image prints made on a wide variety of papers by Nash Editions and others using Iris Graphics Printers. A few years later, affordable desktop and large-format inkjet printers were introduced by Epson, Hewlett-Packard, and Canon, which were soon followed by Brother, Kodak, Agfa, HP-Scitex, Mutoh, Mimaki, Roland, EFI-Vutek, Durst, swissQprint, Canon-Oce´, Fuji, Noritsu, and many other manufacturers.

Inkjet printers with improved stability pigment inks came into the market in 1998 and by 2006 most professional and fine art photographic prints were being made with pigment inks, often with printers utilizing six, eight, ten, or even twelve inks. Water-base aqueous pigment inks were later supplemented by solvent-based inks, UV-curable inks, dye-sublimation inks (used with a transfer process for both prints on fabrics and on treated aluminum-base "Metal Prints"), and aqueous Latex inks.

Unlike earlier color print processes, inkjet prints can be made on a very wide variety of substrates, including cotton-fiber fine art papers, RC photo-base papers, plastic supports, and fabrics. UV-curable ink prints can be made with rigid panels, including large sheets of acrylic plastic, aluminum, glass, plywood, and other materials.

In part because the inks and supports used to make inkjet prints are supplied as separate parts of the printmaking process, there are essentially an unlimited number of combinations of inks and supports, which has in turn greatly complicated the description, dating, and naming of these prints.

William Eggleston: "Los Alamos" at Gagosian Beverly Hills, California – 2012. Pigment Inkjet Prints made in 2012 from scans of the original color negatives.

Proposed Naming Conventions for Digital Print Processes (a work in progress.....)

The era of analog silver-based color photography is rapidly drawing to a close. It is believed that on the order of ninty-nine percent of all prints now being produced are being printed with digital technologies.

Whether for wall labels, auction catalogs, captions in magazines and books, or with museum acquisition records, there are a number of important constituencies to consider when determining the name of a print process:

1) What name or names do the manufacturers of the materials use? For example, Kodak's and Fuji's product literature, data sheets, and websites do not use the terms "chromogenic" nor "dye-coupling" to describe their traditional silver-based color papers. Rather, these products are referred to as "silver-halide color paper" or, more often, simply, "silver-halide paper" (it should be noted that Kodak no longer manufactures B&W paper).

2) What do the photographers and print-making labs call their prints? This is where things have become really complicated, and a wide variety of names have been or are being used. As an example, many photographers and printmaking labs refer to prints made with silver-halide color paper (whether exposed digitally or from a color negative with an analog enlarger) as a "Type C" print. This name dates all the way back to "Kodak Color Print Material, Type C" that Kodak introduced in 1955 (this was the first color negative paper that Kodak sold to non-Kodak labs and individual photographers). In 1958, Kodak renamed the product "Kodak Ektacolor Paper." The "Type C" name stuck however, and it is still widely used (or misused) today. It is important to note that genuine "Type C" prints do indeed exist – that is, color prints that were made on the material during the period of 1955 to around 1960.

3) What print process descriptors do dealers, galleries and auction houses use? In the author's experience, dealers, galleries, and auction houses either adopt (carry forward) the process names used by the photographers and/or printmaking labs. Or, in an often inconsistent manner, dealers, galleries, and auction houses replace the photographer's designations with their own terminology.

4) What print process descriptors do collectors, museums, and archives use? This appears to be an inconsistently applied combination of numbers 1 through 3 above.

It is important to have an understanding and a respect for both historical usage and the current practice of all of these different constituencies in attempting to develop a more unified set of process descriptors that will be both understood and widely adopted by the photography field. It is hoped that he proposed descriptors listed below will be a step in that direction.

Elger Esser at the Sonnabend Gallery, New York City – April 2014. Pigment Inkjet Print on Aluminum (UV-Curable Inks)

Inkjet Processes:

- Pigment Inkjet Print on XX (Aqueous Inks)
- Pigment Inkjet Backlit Print on XX (Aqueous Inks)
- Pigment Inkjet Print on XX (Solvent Inks)
- Pigment Inkjet Backlit Print on XX (Solvent Inks)
- Pigment Inkjet Print on XX (UV-Curable Inks)
- Pigment Inkjet Backlit Print on XX (UV-Curable Inks)
- Dye Inkjet Print on XX (Aqueous Inks)
- Dye Inkjet Backlit Print on XX (Aqueous Inks)

Names to avoid:
Giclée Print
Pigment Giclée Print
Pigment Fine Art Print
Digital Fine Art Print
Fine Art Inkjet Print
Archival Inkjet Print
Archival Giclée Print
DirectPrint on Aluminum (UV-Curable Inks printed on aluminum)
Acrylic Print (UV-Curable Inks backprinted on acrylic)
Archival Print on Fine Art Paper
Epson Print

Silver-Halide Dye Processes

Chemically processed silver-halide color prints:
Kodak and Fuji; also supplied by DNP, Lucky, Konica, Agfa, Ilford, 3M, Ferrania, GAF, Ansco, and other manufacturers.

- Silver-Halide Dye Print (Fuji)
- Silver-Halide Dye Backlit Print (Fuji)
- Silver-Halide Dye Print (Kodak)
- Silver-Halide Dye Backlit Print (Kodak)

Note: May be useful to add a note on mounting, such as "Mounted to an Aluminum Composite Panel" or "Face-Mounted to Acrylic".

Names to avoid:
Type C Print
Digital Type C Print
Chromogenic Print (although technically correct)
Digital Chromogenic Print (although technically correct)
Color Coupler Print
Dye Coupler Print
Digital Dye Coupler Print
Diasec Print (adhered to the back of acrylic sheet using the Diasec face-mounting process)
Lightjet Print
Lambda Print

Heat-Set Dye Sublimation Processes:

- Dye Sublimation Print (ChromaLuxe)

(Printed on aluminum with a proprietary gloss or matte white coating.)
(Printed on aluminum with a proprietary gloss or matte clear coating.)

Silver Dye-Bleach Processes:

- Silver Dye-Bleach Print (Ilfochrome)
- Silver Dye-Bleach Backlit Print (Ilfochrome)
- Silver Dye-Bleach Print (Cibachrome)
- Silver Dye-Bleach Backlit Print (Cibachrome)

(Ilfochrome was last manufactured in 2011 but some prints are still being made.)

Names to avoid:
Dye Destruction Print
Dye Bleach Print

Dye Transfer Processes:

- Dye Transfer Print (Kodak)

(Dye Transfer was last manufactured in 1994 but some prints are still being made.)

Names to avoid:
Dye Imbibition Print (although technically correct)
Dye Print

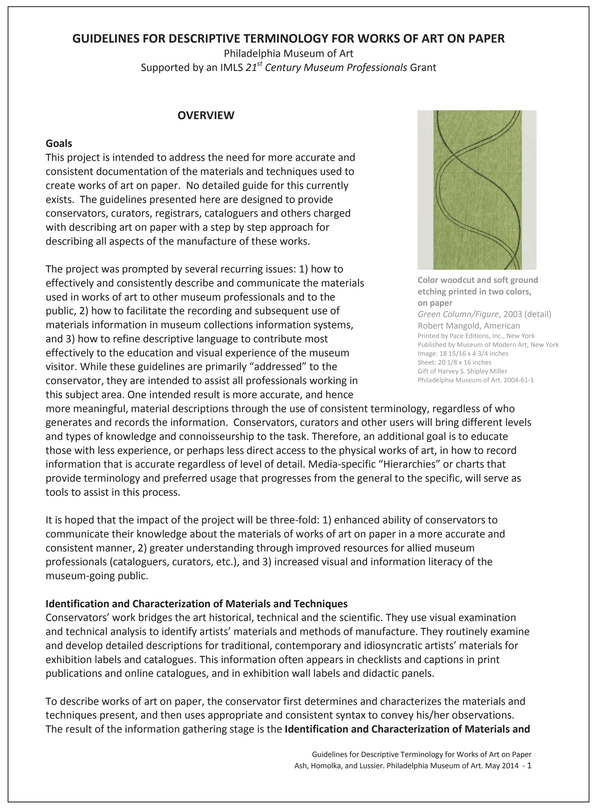
Andreas Gursky at the de Young Museum in San Francisco, California – 2012. (The Exhibition: "Real to Real" from the collection of Trevor Traina.)

Next Steps:

Working in collaboration with others in the field, this list of process descriptors is being expanded, and histories with detailed technical descriptions are being added to each entry (both for the recommended descriptors and for those that should be avoided).

Where possible the entries will be linked to the WIR print permanence database so as to offer guidance on display, storage temperatures, and handling. It is intended to structure the process descriptors in way that will be compatible with the protocols being developed for the "Identification and Characterization of Materials and Techniques" as part of the "Guidelines for Descriptive Terminology for Works of Art on Paper" project at the Philadelphia Museum of Art (see below). Comments and suggestions are welcome!

At the same time, the process naming descriptors presented in outline form here will be used in the forthcoming book by Henry Wilhelm and colleagues: **The Digitally-Printed Photograph: History, Processes, Practice, Identification, Dating, Permanence, and Care** (working title). The book will be made available in updateable eBook and Print-on-Demand (POD) editions to better address this constantly evolving field.


GUIDELINES FOR DESCRIPTIVE TERMINOLOGY FOR WORKS OF ART ON PAPER
Philadelphia Museum of Art
Supported by an IMLS *21st Century Museum Professionals* Grant

OVERVIEW

Goals
This project is intended to address the need for more accurate and consistent documentation of the materials and techniques used to create works of art on paper. No detailed guide for this currently exists. The guidelines presented here are designed to provide conservators, curators, registrars, cataloguers and others charged with describing art on paper with a step by step approach for describing all aspects of the manufacture of these works.

The project was prompted by several recurring issues: 1) how to effectively and consistently describe and communicate the materials used in works of art to other museum professionals and to the public, 2) how to facilitate the recording and subsequent use of materials information in museum collections information systems, and 3) how to refine descriptive language to contribute most effectively to the education and visual experience of the museum visitor. While these guidelines are primarily "addressed" to the conservator, they are intended to assist all professionals working in this subject area. One intended result is more accurate, and hence more meaningful, material descriptions through the use of consistent terminology, regardless of who generates and records the information. Conservators, curators and other users will bring different levels and types of knowledge and connoisseurship to the task. Therefore, an additional goal is to educate those with less experience, or perhaps less direct access to the physical works of art, in how to record information that is accurate regardless of level of detail. Media-specific "Hierarchies" or charts that provide terminology and preferred usage that progresses from the general to the specific, will serve as tools to assist in this process.

It is hoped that the impact of the project will be three-fold: 1) enhanced ability of conservators to communicate their knowledge about the materials of works of art on paper in a more accurate and consistent manner, 2) greater understanding through improved resources for allied museum professionals (cataloguers, curators, etc.), and 3) increased visual and information literacy of the museum-going public.

Identification and Characterization of Materials and Techniques
Conservators' work bridges the art historical, technical and the scientific. They use visual examination and technical analysis to identify artists' materials and methods of manufacture. They routinely examine and develop detailed descriptions for traditional, contemporary and idiosyncratic artists' materials for exhibition labels and catalogues. This information often appears in checklists and captions in print publications and online catalogues, and in exhibition wall labels and didactic panels.

To describe works of art on paper, the conservator first determines and characterizes the materials and techniques present, and then uses appropriate and consistent syntax to convey his/her observations. The result of the information gathering stage is the **Identification and Characterization of Materials and**

Color woodcut and soft ground etching printed in two colors, on paper
Green Column/Figure, 2003 (detail)
Robert Mangold, American
Printed by Pace Editions, Inc., New York
Published by Museum of Modern Art, New York
Image: 18 15/16 x 4 3/4 inches
Sheet: 20 1/8 x 16 inches
Gift of Harvey S. Shipley Miller
Philadelphia Museum of Art. 2004-61-1

Guidelines for Descriptive Terminology for Works of Art on Paper
Ash, Homolka, and Lussier. Philadelphia Museum of Art. May 2014 - 1