

Cleaning Color Photographs
A project developed at the Kent Workshop
September 24 –26, 1998

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Cleaning Color Photographs

Kent Workshop

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Introduction

Several samples representing the major color photographic processes were tested using a range of methods and materials that could be useful to clean dirt, fingerprints or residual adhesives.

The samples used for testing included:

- Chromogenic Print, Kodak Ektacolor, circa 1998;
- Chromogenic Print, Fuji Fujicolor, circa 1988, flood damaged;
- Chromogenic Print, Kodak Kodacolor, September, 1965;
- Chromogenic Transparency, 8" x 10," Kodak Ektachrome, 1998;
- Chromogenic Transparency 35mm, Kodak Kodachrome, 1972-73;
- Silver Dye Bleach, Ilford Cibachrome, circa 1980, with no previous water damage;
- Silver Dye Bleach, Ilford Cibachrome, circa 1985, with previous water damage;
- Dye Diffusion Transfer, Integral, Polaroid SX-70, circa 1975;
- Dye Diffusion Transfer, Peel Apart, Polaroid, Polacolor, circa 1992;
- Dye Imbibition, Kodak Dye Transfer Process, 1998.

These samples were treated using:

- Water
 1. Distilled Water, pH 4.5, local application;
 2. Tap Water, pH 6, local application;
 3. Distilled Water, pH 4.5, immersion;
 4. Tap Water, pH 6, immersion;
 5. 1:1 in isopropanol, local application;
- Solvents
 1. Pec-12, local application;
 2. Isopropanol, local application;
 3. Naphtha, local application;
 4. Acetone, immersion;
 5. Acetone, local application.
- Drycleaning
 1. Vinyl eraser (Mars Staedtler)
 2. Artgum;
 3. Crepe;
 4. Sponge (Gonzo);
 5. Drycleaning Eraser Pad (Alvin).

Local applications of water and solvent were performed with cotton swabs. Immersion in water lasted for 30 minutes followed by air-drying. Immersion in solvent was for 45 minutes, followed by air-drying. The materials used for dry-cleaning were saved with the treated samples.

Workshop participants were divided into groups and assigned specific tests as follows:

Water:

Valerie Baas;
Toshi Koseki;
Andrew Robb;
Kim Schenck;
Carol Turchan.

Dry Cleaning:

Gary Albright;
Tom Edmondson;
Monique Fischer;
Barb Lemmen;
Sarah Wagner.

PEC 12:

Chris Foster;
Mark Harnley;
Marion Hunter;
Connie McCabe;
Nancy Reinhold;
Maria Fernanada Valverde.

Solvents:

Barbara Brown;
Nora Kennedy;
Paul Messier;
Debbie Hess Norris;
Christine Rottmeier;
Diane Tafilowski.

The individuals listed under the heading for “Solvents” developed this project over several weeks prior to the Kent workshop. Many of the individuals named above donated expendable photographs for this work. Results were compiled and formatted by Paul Messier with assistance from Barbara Brown and Diane Tafilowski. José Orraca hosted the workshop and donated the use of many of his materials.

The samples assembled for this project were labeled and placed into polypropylene sleeves and a 3-ring binder. The samples will be retained indefinitely so long-term effects of treatment can be assessed. Interested parties can examine the samples first hand upon request. Further, results for other tests on different samples would be welcome. Any such additional information would be added to updated versions of this report. Contact Debbie Hess Norris or Paul Messier for access to the samples, guidelines for expanding this work or for additional information.

Chromogenic Print, Kodak Ektacolor, circa 1998

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled, pH 4.5, local	Produced local cockling and tacky surface, no apparent change when dry.	P
2. Tap, pH 6, local	No data.	-
3. Distilled, pH 4.5, immersion	No undesirable effect.	P
4. Tap Water, pH 6, immersion	No data.	-
5. 1:1 in isopropanol, local	No data.	-

SOLVENT

1. Pec-12, local	No change in surface or color, though cleaning was minimal.	P
2. Isopropanol, local	Swollen gelatin matte gelatin, changed the surface. Swelling milkiness noted upon application. Slight alteration (ring and minor milkiness) upon drying.	P
3. Naphtha, local	No increase in tack, no dye on swab. No apparent effect upon drying	P
4. Acetone, immersion	Tideline and possible loss of brighteners on reverse. Dye disruption, blue tidelines.	F
5. Acetone, local	Lots of swelling, milkiness around edge of application. Upon drying no swelling but a ring remains.	F

DRY

1. Vinyl (Mars Staedtler)	Heavily scratched the surface. Smearred residue left behind.	F
2. Artgum	Heavily scratched the surface. Smearred residue left behind.	F
3. Crepe	Scratched the surface. Smearred residue left behind.	F
4. Sponge (Gonzo)	Scratched the surface. Smearred residue left behind.	F
5. Drycleaning Eraser Pad (Alvin)	No data.	-

In an effort to simplify the wide range of qualitative results from the various treatments, each treatment technique was given a Pass / Fail designation as follows:

Pass - Treatment causes no apparent damage or alteration of inherent attributes.

Fail - Treatment alters original attributes or causes damage to coatings and image bearing layers.

The information reported in these charts should be evaluated carefully. Treatments that "Pass" may have negative long-term consequences. Some failed treatments may, in fact, be acceptable in practice if greater care is given to the method of application or if further treatment steps are performed. Further, given the wide range of manufacturer variation within each process, results for materials of one date may not be applicable to the same material from a another date.

Chromogenic Print, Fuji Fujicolor, circa 1988

Note: flood damaged with peat moss residues

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled, pH 4.5, local	No data.	-
2. Tap, pH 6, local	Local cockling, removed some dirt. No undesirable change noted upon drying.	P
3. Distilled, pH 4.5, immersion	No data.	-
4. Tap Water, pH 6, immersion	No undesirable change noted upon drying.	P
5. 1:1 in isopropanol, local	No data.	-

SOLVENT

1. Pec-12, local	Removed moderate amount of surface dirt.	P
2. Isopropanol, local	Removed peat moss.	P
3. Naphtha, local	Removed some peat moss, photograph remains soiled. (saved swab)	P
4. Acetone, immersion	No apparent effect upon drying.	P
5. Acetone, local	Significant cooling through the print. Some removal of peat moss, though the print remains soiled	P

DRY

1. Vinyl (Mars Staedtler)	Heavily scratched the surface. Smearred residue left behind.	F
2. Artgum	Heavily scratched the surface. Smearred residue left behind.	F
3. Crepe	Scratched the surface. Smearred residue left behind.	F
4. Sponge (Gonzo)	Scratched the surface. Smearred residue left behind.	F
5. Drycleaning Eraser Pad (Alvin)	No data.	-

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Chromogenic Print, Kodak Kodacolor, September 1965

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled, pH 4.5, local	Produced tacky surface when wet. Slight reduction of gloss.	F
2. Tap, pH 6, local	No data.	-
3. Distilled, pH 4.5, immersion	Red stamp bleeds on reverse and shows through to the front of the image. Left tideline and altered gloss. Possible color shift.	F
4. Tap, pH 6, immersion	Red stamp bleeds on reverse and shows through to the front of the image. Left tideline and altered gloss. Appears to have produced a color shift through magenta and cyan reduction.	F
5. 1:1 in isopropanol, local	No data.	-

SOLVENT

1. Pec-12, local	No changes were evident.	P
2. Isopropanol, local	Swollen, matte during application. Dried leaving a matte, milky surface with ring.	F
3. Naphtha, local	No swelling, squeaky during application. No apparent change.	P
4. Acetone, immersion	Minor tideline upon drying.	P
5. Acetone, local	Minor swelling at edge. Very faint ring left upon drying. Red Kodachrome stamp appeared unaffected.	P

DRY

1. Vinyl (Mars Staedtler)	Scratched the surface.	F
2. Artgum	No data.	-
3. Crepe	Scratched the surface. Smearred residue left behind.	F
4. Sponge (Gonzo)	No apparent change or residue.	P
5. Drycleaning Eraser Pad (Alvin)	Scratches apparent under low magnification (30X).	F

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Chromogenic Transparency 8" x 10," Kodak Ektachrome, 1998

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled, pH 4.5, local	No data.	-
2. Tap, pH 6, local	No data.	-
3. Distilled, pH 4.5, immersion	No apparent change.	P
4. Tap Water, pH 6, immersion	No apparent change.	P
5. 1:1 in isopropanol, local	Some swelling upon immersion.	P

SOLVENT

1. Pec-12, local	Caused whitish streaking, left residues and scratches.	F
2. Isopropanol, local	Slight ring left on base, swelling upon application., dried and left distinct ring.	F
3. Naphtha, local	No swelling, no tackiness on base and emulsion. Dried without residue.	P
4. Acetone, immersion	Upon drying, white residues. Splitting of layers at the edges. Minor crystalline deposits at edges. Possible shrinkage of film base and/or disruption of subbing layer. Faint tidelines upon drying.	F
5. Acetone, local	No apparent effects on reverse, though slight ring upon drying. Swelling during application. Upon drying there is a whitish, abraded appearance.	F

DRY CLEANING

1. Vinyl (Mars Staedtler)	Scratched surface.	F
2. Artgum	Scratched and smeared surface.	F
3. Crepe	Scratched and smeared surface.	F
4. Sponge (Gonzo)	Scratched (visible under 30 X magnification.	F
5. Drycleaning Eraser Pad (Alvin)	Scratched surface. Using the eraser crumbs alone (without the pad) there was no detectable change.	F

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Chromogenic Transparency 35mm, Kodak Kodachrome, 1972-73

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled Water, pH 4.5 – Local	No data.	-
2. Tap Water, pH 6 – Local	Minor scratches, appears to have caused minute pits on the emulsion side. Green / blue stain emerged on the mount.	F
3. Distilled Water, pH 4.5 – Immersion	No data.	-
4. Tap Water, pH 6 – Immersion	No change detected upon drying.	P
5. 1:1 water and isopropanol – Local	No data.	-

SOLVENT

1. Pec-12, local	Removed yellow dye and removed a green dye combination (saved the swab).	F
2. Isopropanol, local	Tacky surface while damp. Yellow removed from emulsion side (dye or varnish?). Saved swab.	F
3. Naphtha, local	No swelling, nothing noted on swab.	P
4. Acetone, immersion	Mount failed after minutes. Blue dye bleed. Base completely dissolved.	F
5. Acetone, local	Quickly dissolves varnish, leaving white residue on the film side. Definite ring left on emulsion side.	F

DRY

1. Vinyl (Mars Staedtler)	No data.	-
2. Artgum	No data.	-
3. Crepe	No data.	-
4. Sponge (Gonzo)	No data.	-
5. Drycleaning Eraser Pad (Alvin)	No data.	-

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Silver Dye Bleach, Ilford Cibachrome, circa 1980
Sample 1, no previous water damage

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled, pH 4.5, local	Some minor gloss change and buckling upon application, disappears upon drying.	P
2. Tap, pH 6, local	Some minor gloss change and buckling upon application, disappears upon drying.	P
3. Distilled, pH 4.5, immersion	Magenta cast upon removal from water, more noticeable with dark prints. Magenta cast does not persist upon drying.	P
4. Tap, pH 6, immersion	Magenta cast upon removal from water, more noticeable with dark prints. Magenta cast does not persist upon drying.	P
5. 1:1 in isopropanol, local	Some minor gloss change and buckling upon application, disappears upon drying.	p

SOLVENT

1. Pec-12, local	Very little cleaning. No apparent dye disruption. Good solvent for the mounting adhesive. The more liberal the application, the less the application process caused scratching.	P
2. Isopropanol, local	No visible change during application. Upon drying, faint tideline.	F
3. Naphtha, local	No apparent change.	P
4. Acetone, immersion	No data	-
5. Acetone, local	No swelling, no visible effect.	P

DRY

1. Vinyl (Mars Staedtler)	Smearred the surface, though buffing with cotton significantly reduced the smear. Scratches visible under magnification (30X).	F
2. Artgum	No data.	-
3. Crepe	Smearred the surface, buffing did not affect the smear.	F
4. Sponge (Gonzo)	Smearred the surface, buffing reduces the smear. Scratched under magnification (30X).	F
5. Drycleaning Eraser Pad (Alvin)	No data.	-

In an effort to simplify the wide range of qualitative results from the various treatments, each treatment technique was given a Pass / Fail designation as follows:

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Fail - Treatment alters original attributes or causes damage to coatings and image bearing layers.

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Silver Dye Bleach, Ilford Cibachrome, circa 1985
Sample 2, Previous Water Damage

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled, pH 4.5, local	Some minor gloss change and buckling upon application, disappears upon drying.	P
2. Tap, pH 6, local	Some minor gloss change and buckling upon application, disappears upon drying.	P
3. Distilled, pH 4.5, immersion	Magenta cast upon removal from water, more noticeable with dark prints. Magenta cast does not persist upon drying.	P
4. Tap, pH 6, immersion	Magenta cast upon removal from water, more noticeable with dark prints. Magenta cast does not persist upon drying.	P
5. 1:1 in isopropanol	Some minor gloss change and buckling upon application, disappears upon drying.	p

SOLVENT

Pec-12, local	Very little cleaning. No apparent dye disruption. Good solvent for the mounting adhesive. The more liberal the application, the less the application process caused scratching.	P
Isopropanol, local	Some swelling during application. Slight milky loss of gloss. Faint line remaining. No dye loss or disruption.	P
Naphtha, local	No swelling, no dye loss.	P
Acetone, immersion	Curl away from emulsion, reversed previous mounting though left residue. Minor tidelines on surface.	P
Acetone, local	No swelling, though ring remains (appears removable and/or avoidable with more careful application).	P

DRY

1. Vinyl (Mars Staedtler)	Smeared the surface, though buffing with cotton significantly reduced the smear. Scratches visible under magnification (30X).	F
2. Artgum	No data.	-
3. Crepe	Smeared the surface, buffing did not affect the smear.	F
4. Sponge (Gonzo)	Smeared the surface, buffing reduces the smear. Scratched under magnification (30X).	F
5. Drycleaning Eraser Pad (Alvin)	No data.	-

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Dye Diffusion Transfer, Integral, Polaroid SX-70, circa 1975

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled, pH 4.5, local	No data.	-
2. Tap, pH 6, local	Treated area lightens immediately, then reverts to normal color. Leaves minor tideline.	F
3. Distilled, pH 4.5, immersion	No apparent change.	P
4. Tap, pH 6, immersion	Minor delamination of layers at edges.	F
5. 1:1 in isopropanol, local	Tideline upon drying.	F

SOLVENT

1. Pec-12, local	Scratches surface, leaves tidelines, reduces gloss and reduces coating.	F
2. Isopropanol, local	No apparent swelling. Faint iridescent effect.	P
3. Naphtha, local	No dye loss, no residue.	P
4. Acetone, immersion	Complete undermined structure, separating all layer. Powdery white material from inside the back layer dispersed throughout. Tideline at the top from solvent penetration. Slight magenta cast in neutral areas.	F
5. Acetone, local	Iridescence with dull ring.	F

DRY

1. Vinyl (Mars Staedtler)	Scratches visible under magnification (30X), though removed finger prints.	F
2. Artgum	Scratches and smears the surface.	F
3. Crepe	Scratches the surface.	F
4. Sponge (Gonzo)	Scratches visible under magnification (30X).	F
5. Drycleaning Eraser Pad (Alvin)	No data.	-

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Dye Diffusion Transfer, Peel Apart, Polaroid, Polacolor, circa 1992

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled, pH 4.5, local	Quickly picks up cyan dye. Persistent rubbing causes local image loss (swab saved).	F
2. Tap, pH 6, local	No data.	-
3. Distilled, pH 4.5, immersion	Reduced surface gloss. Immediate cyan dye loss.	F
4. Tap, pH 6, immersion	No data.	-
5. 1:1 in isopropanol, local	Picks up cyan dye (swab saved)	F

SOLVENT

1. Pec-12, local	No apparent change.	P
2. Isopropanol, local	Dissolve binder and image (saved swab).	F
3. Naphtha, local	No apparent effect.	P
4. Acetone, immersion		
5. Acetone, local	With continued use, removed supercoat, then dissolved emulsion.	F

DRY

1. Vinyl (Mars Staedtler)	Scratches visible under magnification (30X), though removed finger prints.	F
2. Artgum	Scratches and smears the surface.	F
3. Crepe	Scratches the surface.	F
4. Sponge (Gonzo)	Scratches visible under magnification (30X).	F
5. Drycleaning Eraser Pad (Alvin)	No data.	-

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Dye Imbibition, Kodak Dye Transfer Process, 1998

TEST	EFFECT	PASS / FAIL
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WATER

1. Distilled, pH 4.5, local	Magenta and yellow dye removed on the swab (saved swab).	F
2. Tap, pH 6, local	No data.	-
3. Distilled, pH 4.5, immersion	No apparent change.	P
4. Tap, pH 6, immersion	No data.	-
5. 1:1 in isopropanol, local	Magenta and yellow dye removed on the swab (saved swab).	F

SOLVENT

1. Pec-12, local	Scratches the surface. Initially dulls the surface and leaves a streaky pattern when dried. Dullness can be removed with repeated swab or pad application. Leaves tideline.	F
2. Isopropanol, local	Slight tackiness upon application. Minor ring remains. Pink (magenta dye?) came up on swab (swab saved).	F
3. Naphtha, local	Squeaky during application. No apparent effect.	P
4. Acetone, immersion	Slight iridescence during dry down, disappeared when dry. Minor tideline. Possible reduction of brighteners in paper base. Minor deposit of magenta dye on reverse, possibly dispersed in the bath.	F
5. Acetone, local	Slightly pink (magenta dye) on swab (swab saved). Slight ring.	F

DRY

1. Vinyl (Mars Staedtler)	Scratches visible under magnification (30X). Smears visible, though buffing with cotton reduces them.	F
2. Artgum	Scratches visible. Buffing improves the scratches.	F
3. Crepe	Buffing did not reduce smear left on surface. Scratches visible under magnification (30X).	F
4. Sponge (Gonzo)	Scratching visible under magnification (30X)	F
5. Drycleaning Eraser Pad (Alvin)	Scratching visible under magnification (30X)	F

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