

Technical bulletin

GEVAERT

AGFA-GEVAERT

NDT SYSTEMS
HOLOGRAPHY

July 27, 1979

TO: All Holographic Users

FROM: R. Phelan

SUBJECT: TECHNICAL INFORMATION - HOLOGRAPHY
PROCESSING FOR WHITE LIGHT HOLOGRAPHY

Recent research at Agfa-Gevaert in Belgium and Holoco, Inc. in England has led to new advances in the production of White Light Holograms.

This Technical Bulletin deals with these advances. It covers:

- (1) Processing sequence for White Light Reflection Holography.
- (2) Processing sequence for White Light Transmission Holography.
- (3) Formulations for processing solutions.

For best results, the new Agfa-Gevaert 8E56HD or 8E75HD Holographic films and plates are recommended.

RP/ma/5A:60

PROCESSING RECOMMENDATIONS FOR WHITE LIGHT HOLOGRAPHY

Section I: White Light Reflection Holography

A: Processing to obtain a color the same as the laser used:

When the color of the hologram is to approximate as closely as possible the color of the laser light used to produce the hologram.

Processing Sequence:

- 1) Development - 2 minutes at 20°C in GP62
- 2) Intermediate Wash - 1 to 2 minutes
- 3) Bleach - until clear at 20°C \pm 2°C in GP432
- 4) Wash in running water - 5 minutes
- 5) Wash in demineralized water with 1 part of wetting agent to 200 parts of water for 2 minutes at 20°C. After treatment the water must be evenly spread on the surface of the glass plate or film. If there is still formation of water droplets on the emulsion surface, the treatment in wetting agent solution must be prolonged. If demineralized water is not available, washing should be done in a solution of 1 part wetting agent to 100 parts of water.
- 6) Drying should take place with the plate in the upright position in a dust-free room until the emulsion is completely dry. Do not use forced drying and never move the plate during drying. Uneven drying or water droplets which remain on the emulsion will give rise to stains.

B: Processing to obtain a color shift to a longer wavelength:

To obtain an image in which the color is shifted to a wavelength longer than that of the laser light, the procedure of A. may be used.

The following bleach bath should be substituted.

Water	700cc.
Potassium Iodide	30.0g.
Boric Acid	3.0g.
Water to make	1000cc.

Add 2.0g. of p-Benzoquinone just prior to use.

Holograms produced in this way will not be quite as sharp as those produced in procedure A. The color will be shifted to a longer wavelength.

C: Processing to obtain a color shift to a shorter wavelength:

In order to obtain a hologram with a short wavelength than that of the laser light, the procedure outlined above should be followed with the exception that Agfa-Gevaert G3p or REFINAL® developer should be substituted for the GP62. The remainder of the procedure remains the same as outlined in section A.

Section II: White Light Transmission Holograph

A: Processing Sequence:

- 1) Development - 2 minutes at 20°C in GP61
- 2) Wash - 1 to 2 minutes
- 3) Fix - 2 minutes at 20 to 24°C in G-334 fixer diluted 1 + 4 without hardener
- 4) Rinse - 1 to 2 minutes
- 5) Bleach - clearing time +0.5 minutes at 20°C \pm 2°C in GP-431
- 6) Rinse - 5 minutes
- 7) Dry - same as for reflection holography

Section III: Formulations

GP-61 Developer:

Water	700cc.
Metol	6.0g.
Hydroquinone	7.0g.
Phenidone	0.8g.
Sodium Sulfite, Anh.	30.0g.
Sodium Carbonate, Anh.	60.0g.
Potassium Bromide	2.0g.
Sequestrene Agent	1.0g.
Water to make	1000cc.

This is working solution.

GP-62 Developer:

Part A

Water	700cc.
Metol	15.0g.
Pyrogallol	7.0g.
Sodium Sulfite, Anh.	20.0g.
Potassium Bromide	4.0g.
Sequestrene Agent	2.0g.
Water to make	1000cc.

GP-62 Developer:

Part B

Water	700cc.
Sodium Carbonate, Anh.	60.0g.
Water to make	1000cc.

To make working solution:

Mix 1 part of solution A plus 2 parts of water and 1 part of solution B.

Parts A and B are stable in separate solutions. The ready-to-use solution is stable for only 1 to 2 hours, therefore, working solution should be prepared immediately before use.

CAUTION!

Pyrogallol is a hardening developer and may cause skin irritation. Rubber gloves should always be used when working with the developer.

G431 Bleach Bath

Water	600cc.
Ferric Nitrate 9-Hydrate	150.0g.
Potassium Bromide	30.0g.

* Dissolve 300mg. of Phenosafranine in 200cc. of methanol.
Add mixture to bleach solution.

Water to make	1000cc.
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Dilute 1 part bleach with 4 parts water to make working solution.

CAUTION!

Rubber gloves should be used when handling bleach bath.

GP432 Bleach Bath

Water 700cc.

Potassium Bromide 50.0g.

Boric Acid 1.5g.

Water to make 1000cc.

2.0g./l. of p-benzoquinone should be added just before use.

The life of the bleaching bath in the ready-to-use form is 24 to 48 hours.

CAUTION!

Rubber gloves should be used when handling bleach bath.

Note:

Developing agents such as hydroquinone, metol, phenidone and pyrogallol can be purchased from Eastman Organics, Rochester, New York.

The other chemicals are available from local chemical supply companies.