

# GUIDELINES FOR EXHIBITION LIGHT LEVELS FOR PHOTOGRAPHIC MATERIALS

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## Notes

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- These guidelines are based on the experience and opinions of the authors and have not been scientifically established for each type of media.
- Because the light stability of individual items is unpredictable, a conservative approach has been used to assign light level categories. For example, the unknown background of historic materials, including past light exposure, storage conditions, and initial processing, could adversely affect light stability.
- If a particular process is in one light level category but does not meet all of the qualifications, it should be moved to the next, more sensitive category, unless otherwise indicated.
- Cases, mounts, hand coloring, coating, toning, inscriptions, and other manipulation and attachments may increase the light sensitivity of a photograph as a whole.
  
- The categories below give the maximum light exposure an object in that category should receive during one display cycle. A total of 9 months total wall time or less, for the one or more venues within each display cycle is suggested (i.e., 3 venues with 3 months display each per year). Many institutions will not loan for more than one year. Display that exceeds the suggested limits in any category should only be done if the items are instrumentally monitored for color or density changes in the image; if the item changes, display should be halted and substitutes or facsimiles rotated in.
- Although not addressed here, total lifetime exposure is just as important as single display levels/duration and rest periods. Total lifetime exposure is especially crucial with the more light-sensitive categories and with items that are frequently requested for display. Light exposure and the damage it produces are cumulative over the life of the object; the rest period is not regenerative. Faded prints may have the least margin of error for any additional image loss.
  
- Any combination of light level and intensity which gives the maximum exposure or less may be used.  
For example:      3 ft-c x 10 hr/day x 10 mos (300 days) = 9,000 ft-c hrs  
                          5 ft-c x 10 hr/day x 6 mos (180 days) = 9,000 ft-c hrs  
                          10 ft-c x 10 hr/day x 3 mos (90 days) = 9,000 ft-c hrs
- One footcandle (ft-c) equals approximately 11 Lux.
  
- These standards assume that all other environmental conditions meet conservation standards: all UV light and IR radiation has been filtered out; RH at or below 45-50%; air contaminants filtered out; exhibition materials pass the Photographic Activity Test; etc. Sealed frame packages for loaned items recommended to minimize exposure to high or fluctuating RH and gaseous pollutants in transit and/or on display.
- Many fluorescent lamps, including energy-efficient bulbs, emit highly energetic UV radiation, which has the potential to be especially damaging to photographs; use of effective filtration is essential either on the bulb or in the glazing.

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<sup>1</sup> Updated 2007. Originally published as *Guidelines for Exhibition Light Levels for Photographic Materials* **Topics in Photographic Preservation**, Vol. 9, 2001 and by the National Park Service website:  
<http://www.nps.gov/hfc/products/cons/ex-con-technotes.htm>

## **Extraordinarily Light-Sensitive**

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- Only facsimiles should be displayed.

### **Autochromes and Other Early Dye Processes**

#### **Experimental Processes**

E.g., early unfixed salted paper.

#### **Stabilized Gelatin Silver Prints**

Sensitized silver halide may print out.

## **Very Light-Sensitive**

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- Total exposure per year (unless otherwise noted) - 5,000 ft-c hours (50,000 Lux hours); e.g. 3 ft-c for 5 months at 10 hours per day or 5 ft-c for 3 months at 10 hours per day. Rest for 3 years minimum between display cycles.

### **Any Poorly Processed or Deteriorated Prints**

#### **Architectural Plans or Photoreproductions**

E.g. blueprint (cyanotype), diazotypes, brownlines, van dykes, photostats, pellet prints.

3 months at 3 ft-c maximum; consider using facsimile.

#### **Carbon Prints**

With non-earth, colored pigments (not carbon black or earth pigments) or on poor quality papers.

#### **Color Photographic Processes**

Pre-1990 transparencies, pre-1990 prints, and instant prints (Polaroid types). Higher light levels may be necessary to see color well; consider higher light level category for shorter duration.

#### **Computer-Generated Prints (digital ink jets, etc).**

The dye set, printer, and support all influence the fading rate. Assume poor light stability unless light stability ratings are published for the exact combination for the year that the print was generated (see manufacturer websites and [www.wilhelm-research.com](http://www.wilhelm-research.com)). More important is ink jet sensitivity to ozone and humidity which can cause drastic image changes. Sealed packages reduce exposure to ozone and humidity during display. Dry prints thoroughly before sealing -- usually a minimum 2-week period is suggested. Protect from UV light.

#### **Cyanotypes (Blueprints)**

3 months at 3 ft-c maximum; consider using a facsimile.

#### **Gum Bichromate Prints**

With non-earth, colored pigments (not carbon black or earth pigments) or on poor quality papers.

#### **Resin-coated (RC) Supports**

Pre-1980 RC papers (both color and black-and-white) may be prone to cracking; black-and-white silver RC papers may be prone to image oxidation in light, especially UV. These should not be displayed unless toned for preservation (e.g. silver converted to stable compound). Optical brighteners (dyes visible under UV) may be fugitive and are damaged by UV exposure. Optically brightened papers will not appear as white under incandescent light, or when the brightener is faded or exhausted. Use of facsimiles is recommended.

#### **Woodburytypes**

With non-earth, colored pigments (not carbon black or earth pigments) or on poor-quality paper.

#### **Photographs with Tinted Base or Binder**

Baryta layers or binders contain fugitive dyes; often these are pink or blue in historic photographs.

3 months at 3 ft-c maximum; consider using facsimile.

#### **Hand Colored Photographs of All Types**

##### **Cased Objects where the Case is Exposed**

Colorants in case components may be fugitive – e.g. velvet or other cloth in the case interior and dyed leather/leatherette covering.

##### **Colored Paper and Mounts**

E.g. colored construction or dyed papers.

##### **Modern Inks**

E.g. ballpoint, felt tip, purple manuscript inks.

## **Moderately Light-Sensitive**

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- Total exposure per year - 10,000 ft-c hours (100,000 Lux hours); e.g. 3 ft-c for 10 months or 5 ft-c for 6 months at 10 hours per day. Rest for 2 years minimum between display cycles.

### **Albumen Prints**

If concerned about the impact of an unknown processing/toning or coating history, move to the very light-sensitive category.

### **Collodion Printing-Out-Paper Prints (POP)**

#### **Color Photographic Processes**

Dye transfers, Ciba/Ilfo-chromes and post-1990 prints. Higher light levels may be necessary to see color well; consider higher light level category for shorter duration.

### **Gelatin Printing-Out-Paper Prints (POP)**

#### **Platinum (Pt) or Palladium (Pd) Prints**

And combinations of Pt, Pd, and/or silver. No pinkish or yellow staining. Paper support in good condition. However, if signs of image or paper deterioration are present, place in the “very light-sensitive” category.

### **Salted Paper Prints**

If concerned about the impact of an unknown processing/toning or coating history, move to the very light-sensitive category.

### **All Manuscript Inks**

Except black India ink.

## **Less Light-Sensitive**

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- Total exposure per year - 30,000+ ft-c hours (300,000 Lux hours); e.g. 10 ft-c for 9 months at 10 hours per day. Rest for 1 year minimum between display cycles. \*

### **Black-and-White Fiber-based Gelatin Silver Developed-Out Paper Prints (GSDOP)**

Known to be well processed without hand coloring, color toning, or optical brightener; otherwise, place in the “very light sensitive” category.

Post-1980 resin coated (RC) papers that have been toned for preservation (e.g. silver converted to stable compound) may also be included in this category. Optical brighteners (dyes visible under UV) may be fugitive and are damaged by UV exposure. Optically brightened papers will not appear as white under incandescent light, or when the brightener has faded or exhausted.

### **Carbon Prints**

Support paper in good condition and light stable. Colorant known to be carbon or other earth pigment. Otherwise, place in “very light sensitive” category.

### **Cased Photographs (Daguerreotype, Ambrotype, Tintype)**

No hand coloring; no non-metal case components exposed.

### **Gum Bichromate Prints**

Support paper in good condition and light stable. Colorant known to be carbon or other earth pigment. Otherwise, place in “very light-sensitive” category.

### **Photomechanical Prints**

E.g. photogravures, halftones, and collotypes. Coated paper stock and black earth pigment. Paper support of good quality and in good condition. Otherwise, place in “very light-sensitive” category.

### **Woodburytypes**

Support paper in good condition and light stable. Colorant known to be carbon or other earth pigment. Otherwise, place in “very light-sensitive” category.