DEPARTMENT OF THE ARMY SUPPLY BULLETIN

Care and Storage of Photographic Chemicals, Films, and Papers

Headquarters, Department of the Army, Washington, D.C.

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SECTION I

INTRODUCTION

1. Purpose. This bulletin prescribes procedures for the care, storage, and handling of photographic chemicals and photosensitized materials. This guidance is required to minimize deterioration and contamination of these products from the adverse effects of high temperature, high humidity, harmful gases, and radiation.

2. Scope. This bulletin applies to all activities engaged in the receipt, storage, issue, and use of photo-graphic chemicals, film, and paper. (Photomechanical films and paper, microfilms, and X-ray materials are excepted.)

3. Definitions. *a. Emulsion.* A light-sensitive layer of silver salts suspended in gelatin, which is spread over a permanent support, such as film, glass, or paper.

b. Emulsion Number. An identification number assigned by the manufacturer to a blend of emulsion batches used in a specific run.

c. Emulsion Sensitivity. The response of a photo-sensitized material to light.

d. Expiration Date. The date stamped on a package of photosensitized material by the manufacturer which gives the life expectancy under normal nonrefrigerated storage conditions.

e. Exposure. The product of time and intensity of illumination, acting upon a photo-sensitized material.

f. Film Speed. An indication of the amount of light required to produce a satisfactory negative with a given emulsion.

g. Fogging. Dark patches or streaks on a negative which can be caused by a light leak, careless handling, use of outdated film, poor storage conditions, or from harmful gases.

h. Photosensitized Material. Materials containing silver or silver salts commonly used by photographic activities to produce an image.

i. Silica GeL A desiccating or dehydrating agent,

which absorbs from the air almost half its own weight in moisture, without appearing visibly wet.

4. General. It is the Army's objective to attain and maintain a constant material readiness status for material in storage. This bulletin supplements TM 743-200 by providing a procedure for care and storage of photosensitized material. It also establishes the basis for identifying material requiring segregation or specialized handling.

5. Reporting of Equipment Publication Improvements. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to: Commander, US Army Electronics Command, ATTN: AMSEL- MA-S, Fort Monmouth, NJ 07703.

SECTION II

CARE, STORAGE, AND SPECIAL INSTRUCTIONS

6. General Considerations. Photosensitized materials are perishable, and deteriorate with age. Unexposed film and paper can be damaged by heat, moisture, certain gases, X-rays, and radioactive materials, as well as from poor handling procedures. Improper storage can cause many defects which include fogging, inferior tone reproduction, loss of emulsion sensitivity, distortion, and brittleness. Color films are more seriously affected than black and white films because heat and moisture will affect the three emulsion layers to different degrees. This causes a change in overall film speed and contrast. Poor storage conditions are more harmful to exposed but unprocessed film than they are to unexposed film. However, proper storage is important both before and after exposure and, whenever possible, film should be used before the expiration date.

7. Photographic Chemicals. *a. Precautions.* Although most chemicals are not hazardous materials, a certain amount of care is required in storing, hand- ling, packing, and shipping. Certain chemicals re- quire special treatment in storage and handling be- cause of flammability, poisonous qualities, corrosive nature, or because they have a tendency to decompose. In packing, all chemicals should be placed in containers that will prevent breakage during transit. Be- fore making shipment of any chemicals, the sending activity should consult regulations to determine whether special requirements are necessary.

b. Storage. Unless otherwise specified, photographic chemicals will be stored in a temperature-con- trolled environment, which is not less than 320 F. or more than 90° F. Glacial acetic acid will not be stored at a temperature below 680 F. Powdered chemicals will be stored under controlled humidity conditions, not to exceed 50%c relative humidity. All chemicals will be stored by federal stock number, condition code, manufacturer, and date of manufacture.

8. Unexposed Film and Paper. *a. General Care.* Since all photographic films and papers are adversely affected by high temperatures and high relative humidities, certain precautions are necessary in their storage. High relative humidities alone are usually more harmful than high temperatures alone. Most' films are supplied in sealed foil envelopes, gasketed screw-cap cans, or taped cans, to protect against moisture. When film or paper is sealed in vapor- tight packages, no further protection against high relative humidity is necessary. However, packages should not be opened until they are ready to be used.

b. Protection From Moist Air. Do not store opened packages of film or paper in damp storerooms, ice- boxes, refrigerators, or other places where the relative humidity is high. The ideal relative humidity for storing film and paper (without vapor tight package) is between 40 and 60%, preferably nearer 40%. When humid conditions cannot be avoided or the use of a refrigerator is necessary for cooling, place opened , packages of film in a sealed can or jar which can be tightly sealed. If the relative humidity is over 60%, the unpackaged film or paper should be dried with a desiccating agent, such as activated silica gel, before it is stored in a sealed container.

c. Protection From Heat. Regardless of the type of packaging, film and paper should not be left near a source of heat. Film should be kept cool in refrigerated storage, provided it is in a vapor tight package or in a sealed container. Film intended for normal use and kept for several months should be stored at 50° F., or lower, in a mechanical refrigerator. Storage at a temperature above 70° F. for more than 4 weeks may lead to changes in speed and color balance. Films intended for critical use, that require uniform results, should be stored at 0° to -10° in a freezing unit.

NOTE

Regardless of the low temperature while in storage, adverse conditions between the time the film is removed from refrigeration, exposed, and processed, may cause unsatisfactory results.

When film that has been refrigerated is opened, moisture from outside the package may condense on the cold film surface. To avoid this condition, pack- ages that are removed from cold storage should be allowed to reach room temperature before they are opened. See Table 1 for approximate warmup times.

Table 1. Approximate Warmup Time.

Type of film package	*Warmup time in hours For 25 F. Rise*	*For 100 F. rise*
Roll film	½	1
135 magazines and 126 cartridges	1	1½
10-sheet box	1	1½
50-sheetbox	2	3
16-mm, any length	1	1½'
35-mm, any length	3	5

d. Protection From Contamination. Industrial gases, motor exhausts, and vapors of formaldehyde, solvents, cleaners, and mildew or fungus preventives, are harmful to photographic sensitized materials. Films packaged in sealed foil envelopes or screw-cap cans are protected from these gases. Those that are sealed with adhesive tape are not protected from all harmful gases, and they should be sealed in friction type cans. All films and paper, regardless of the type of packaging, must be protected from X-rays, radium, and other radioactive materials.

e. Depot Storage Conditions.

(1) All sensitized material (film, film plates, pa- per, and film leaders) shall be stored in refrigerated, humidity-controlled environment (optimum 50% relative humidity and under 500 F.).

(2) All films and paper, up to 70-mm wide, on cores will be stored on end, as shown in figure 1.

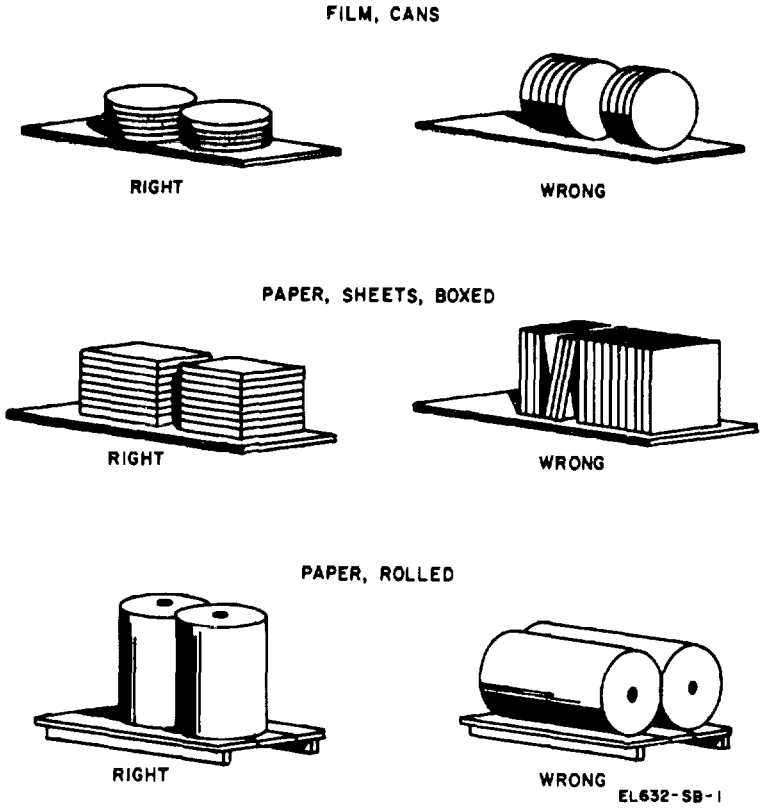

Figure 1. Proper storage positions for film and paper.

(3) All sheet film and paper will be stored in such a manner that the sheets are in a horizontal position. This may require placing the shipping container on end, since many manufacturers place the boxes on end in the outer container.

(4) Stocks of sensitized material will be segregated in storage by federal stock number, manufacturer, condition code, and emulsion number within the expiration date.

(5) Photographic supplies will be shipped on a first-in-first-out basis, and stock will be limited to a single emulsion number, or as few as possible in consecutive order. This policy will be adhered to except when modified by management information codes.

f. Hand ling of Photographic Material.

(1) From depot to user levels, specialized handling is required for photographic supplies due to the inherent deteriorative characteristics of sensitized materials.

(2) At the depot, photographic supplies will be inspected for physical or heat damage, correctness of markings, and expiration dates. This inspection will be performed on material received on a new procurement or material received for redistribution.

(3) Movements of photographic sensitized material should utilize refrigerated means to the extent possible and practical to preserve them.

(4) In all cases, movements should be under conditions offering cool ventilated areas. While in transit, conditions should be as near to temperature and humidity requirements as circumstances permit.

(5) Layovers in transit, receipt, and issue handling, should be kept as short as possible to minimize potential deterioration of perishable photographic materials. When material of this type is shipped, it should contain a label marked PERISHABLE COMMODITY, KEEP COOL AND DO NOT DELAY.

(6) All depot inspection reports, shipments, and handling of photosensitive supplies will be in accordance with provisions of TB 740-10, appendix G.

g. Storage in the Field.

(1) In locations where proper storage facilities are absolutely unavailable, care and ingenuity in the storage of photographic materials will help to preserve their qualities of sensitivity.

(2) Avoid any direct exposure of the sensitized material to the sun or any other source of heat. Keep photographic stocks in the shade or under blankets or other light colored material that possess good insulation qualities.

h. Turnover of Photosensitive Materials.

(1) All packages of photosensitized materials are stamped by the manufacturer with an expiration date which gives the life expectancy under normal non- refrigerated storage conditions. These materials will be issued according to this date so that the earliest expiration date is used first.

(2) Sensitized material that is stored under optimum conditions will be issued for a period of time after the stamped expiration date, as outlined in table 2.

Table 2. Issue Time Period Extension.

Materials	Domestic	Overseas
Black and white	12 months	6 months
Graded paper	12 months	6 months
Variable contrast paper	12 months	6 months
Color camouflage detection and infrared film	6 months	0 months
Polaroid type material	No extension	

(3) Materials which have not been used within this time period or are suspected of damage in storage or handling, will be tested as outlined in TM 743-200. Often, only partial impairment of speed and contrast will have taken place, and the material can be used for a noncritical mission.

9. Processed Film And Paper. *a. Storage Conditions.* To insure maximum life, processed film and paper will be stored where it is dry, dark, and cool. A relative humidity of 25 to 50% and a temperature of 70° F or less are best.

b. Contamination. Small amounts of acidic gases such as hydrogen sulfide and sulfur dioxide may cause contaminations to both black and white and color films. These fumes are sometimes present in the air in industrial regions, and film should be protected from them.

c. Motion Picture Film. Handling, care, and protection from physical damage of processed motion picture film will be in accordance with guidance contained in FM 11-41.

APPENDIX

REFERENCES

FM 11-41 Audio-Visual Support Center Operations
TM 11-401 Elements of Signal Photography
TM 11-401-1 Army Pictorial Techniques, Equipment, and Systems: Pictorial Fundamentals.
TB 740-10 Quality Control Depot Serviceability Standards
TM 743-200 Storage and Materials Handling

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Sig Dep (10)
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ATS (1)
USAERDAA (2)
USAERDAW (5)
USACRREL (2)
MAAG (1)
USARMIS (1)
USAPA (5)
AV Comm Cen (1)
Units org under fol TOE
11-500 (AA-AC) (1).

NG: State AG (3)
USAR None
For explanation of abbreviations used, see AR 310-50.

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