

# Product Safety and Health Information for Silver Halide Phototooling Films

TECHNICAL BULLETIN TB-0066

Phototooling Films & Chemicals

This technical bulletin is a summary of information relating to the composition, handling, and disposal of DuPont printed circuit phototooling films. To the best of our knowledge these products do not cause any health or safety hazards when used as intended. It may be of interest to note that these products are similar in composition to common amateur and professional camera films available for general use.

Information regarding suitable applications of these films, their sensitometric properties, recommended processing conditions, and dimensional stability characteristics are found in the Technical Data Sheet published for each product. If you have additional questions regarding any of these products, please contact your nearest DuPont Electronic Materials office.

## Product Identification

This information applies to the following black and white silver halide films sold by the DuPont Company into the printed circuit board manufacturing industry:

RPF Red Phototooling Film  
OPF Orthochromatic Phototooling Film  
CPF Contacting Phototooling Film  
DPF Duplicating Phototooling Film

## Product Description

DuPont silver halide phototooling films consist of a 7-mil (0.175 mm) plastic (polyester) sheet coated on both sides with a thin layer of gelatin. The gelatin layer on one side contains a suspension of mixed silver halide compounds in the form of very small crystals. Dyes, matte particles, fillers, wetting agents and other components are added to the gelatin in smaller quantities to provide the desired physical and sensitometric properties.



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## Ingredients

Material	Proportion (Weight%)
Polyethylene terephthalate (PET)	90 – 95
Gelatin	2 – 5
Silver halide compounds	1 – 4
Other	< 1

## Handling and Storage

Unexposed film should be stored below 75°F (24°C) and below 80% relative humidity. Allowing the film to be exposed to high temperature and/or high humidity for extended periods will result in undesirable changes in photographic speed and/or minimum density. When storing films under refrigerated conditions, be sure the film is sealed to prevent moisture intrusion, and allow the film to return completely to ambient conditions before opening the sealed package. Freezing will not harm the film, provided care is taken to insure the film is returned to ambient temperature for at least 24 hours before opening the package. Optimum size holding is obtained when individual sheets of the film are equilibrated to the ambient conditions in the photolab for eight hours prior to use.

## Disposal

Unprocessed silver halide photographic film contains soluble silver salts (halides). Processed silver halide film contains insoluble metallic silver in all areas that appear black. Scrap film (both processed and unprocessed) should be sent to a reputable local dealer for silver recovery in accordance with local regulations.

Toxicity Characteristics Leaching Procedure tests (Appendix II 40CFR261.24) for all metals found in this category (D004-D011 Hazardous Waste) were performed on these films after processing and they were found to be well below the Federal limits for each metal. This would exclude them as Hazardous Wastes under Federal Regulations. Check with local authorities for other applicable restrictions before sending them to a non-hazardous landfill.

## Material Safety Data Sheets (MSDS)

Silver halide photographic films contain no hazardous components and are considered “articles” under the U.S. OSHA Hazard Communication Regulation and the Canadian Workplace Hazardous Materials Information System (WHMIS) regulations. Under these regulations, an article is “a manufactured item...which does not release, or otherwise result in exposure to, a hazardous chemical under normal conditions of use.” [29CFR 1910.1200]. As articles, they are exempt from the reporting requirements of these regulations and the EPA Toxic Substances Control Act (TSCA) [40CFR 704.5]. Therefore, a Material Safety Data Sheet is not required for any of these products.

These films do not contain and are not manufactured with either Class I or Class II Ozone Depleting Substances.

These films will normally be processed after exposure through a series of chemical baths, including photographic developer and fixer. These chemicals will most likely contain hazardous materials. Consult the MSDS for each of these processing chemicals for information on the health and safety concerns associated with their use.

## Shipping Regulations

Photographic films are non-regulated for shipping purposes.

## Flammability

Silver-gelatin photographic films are organic materials that are combustible with difficulty. DuPont phototooling films meet the definition of a safety photographic film as specified in ISO 543 and ANSI IT9.6. These standards require that the film will not ignite in less than 10 minutes when heated to 300°C, and it will take at least 45 seconds to burn a piece of film 35 x 300 mm, once ignited.

Complete combustion results in the formation of carbon dioxide and water. Incomplete combustion can generate a few parts per million of a variety of gases. Depending on the conditions, these gases may include acetic acid, carbon monoxide, toluene, acetaldehyde, etc.

For more information on DuPont™ ImageMaster™ or other Printed Circuit Materials, please contact your local representative.

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