



Features

- Ultraviolet-blue sensitivity
- Dry process — heat alone
- Extremely high resolving power
- Clear polyester base
- Requires no darkroom
- Image reversing — positives from negatives and negatives from positives
- Title stripe for easy fiche identification
- Not intended for reprinting from itself
- Neutral image tone when viewed in a microfilm reader
- Fast printing speed
- Medium-high contrast

Life expectancy

- 100 years (LE-100) for non-silver duplicating films, diazo, and thermal print films

IMAGELINK Thermal Print Microfilms KF 1353/2353 create reverse-polarity prints for distribution copies in fiche or roll format. They can deliver clear lines with dark background made from positive-appearing, computer output microfilms (COM) or other camera original films.

How Thermal Print films are different

Thermal Print films exposed to actinic radiation (UV/violet) generate nitrogen gas within the plastic sensitized layer. These films are heated to development temperature 125°C (257°F) immediately after exposure, which softens the plastic layer and expands the gas to form vesicles in the exposed areas. When cooled, these vesicles form a usable image.

The unexposed film area should be “cleared” or desensitized after development by re-exposure to actinic radiation, which allows residual gas to escape by diffusion.

Silver or diazo images absorb light to reveal the images, whereas a vesicular image scatters light. The vesicular image of IMAGELINK Thermal Print Films has excellent optical density and visual contrast when viewed or printed with optical systems that have small apertures, such as the f/4.5 apertures typically used with microfilm readers.

Density is much less with diffuse light or when viewing the film on a diffuse illuminator. A projection densitometer should be used to measure the density on vesicular films.

Image structure

Resolving power, based on recommended process:

Film	Test Object Contrast	Lines/mm
1353/2353	1000:1 (ISO-RP)	180

Handling and Storage

- Handle, expose and process under gold fluorescent lights.
- Normal room illumination is suitable for short periods.
- Open the package only when the film is ready to be used, and return the unused film to light-protective storage when duplicating equipment is shut down.
- Store unopened packages of film at 21°C (70°F) at 50% relative humidity or below.
- Follow the expiration date printed on the box label.

Photographic Properties

Expose this film with mercury-arc and xenon-flash lamps (350 to 450 nm range). A typical exposure yields a net density of about 2.0 with recommended processing.

Density is determined in accordance with the method described in ISO 5-2:1991, *Photography — Density Measurements — Part 2: Geometric Conditions for Transmission Density*. Speed and average gradient are measured in accordance with ISO 9378-1993, *Photography — Vesicular Microfilm — Determination of ISO Speed and ISO Range*. This corresponds to conditions in a typical microfilm reader. For optimum print quality, adjust exposures to the following projection densities:

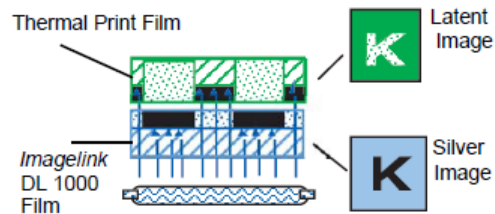
- Background density: 2.20 (approximately)
- Minimum acceptable background density: 1.80

NOTE: Consult the manufacturer of high intensity ultraviolet lamps for safety information pertaining to ultraviolet radiation and ventilation requirements due to ozone generation.

Duplicating Process Overview

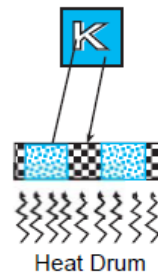
Step 1: Exposure

Vesicular film is brought into intimate contact with the silver master. Ultraviolet light is then exposed through the master. The dark characters block the light. The clear areas transmit the light, exposing the vesicular film.



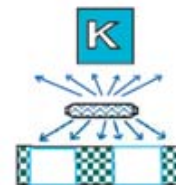
Step 2: Development

The vesicular film is heated to 127°C (260°F) for several seconds. The areas struck by ultraviolet light form vesicles (bubbles).



Step 3: Clearing

The film is re-exposed to ultraviolet light. The areas that were protected by the characters and did not form vesicles are cleared away, forming clear characters.



Our History

Eastman Park Micrographics (EPM) formed in 2011 after the Dallas-based Kofile Inc. purchased Kodak's micrographic business. EPM is headquartered in Dallas, Texas.

We bring extensive experience in all aspects of document imaging to provide unique expertise in micrographics products and solutions.

Our Mission

- To continue to be the leading supplier of Imagelink microfilm products worldwide
- To expand our portfolio of Reference Archive Solutions

Disclaimer

The sensitometric curves and data in this publication represent product tested under the conditions of exposure and processing specified. They are representative of production coatings and, therefore, do not apply directly to a particular box or roll of photographic material. They do not represent standards or specifications which must be met by Eastman Park Micrographics. The company reserves the right to change and improve product characteristics at any time.

Processing

Development

Develop 1353/2353 films with heat within 15 seconds of exposure to minimize image-forming density loss as nitrogen gas dissipates into the atmosphere. It is recommended that thermal films be developed in a temperature range of 121°C (250°F) to 132°C (270°F) for 105mm equipment.

Time/Temperature

Temperature	Time	For Equipment
125°C (257°F)	0.75 to 1.5 seconds	105mm
130°C (266°F)	0.33 to .75 seconds	16mm

Density will not be adversely affected if development varies within the recommended times at a given temperature. To change image density, adjust the exposure. To determine optimum exposure, create an exposure series.

- Significant underdevelopment, particularly at low temperatures, can result in low density and a brownish image.
- Significant over development, particularly at high temperatures, can result in a gray background color and oversized vesicles, causing a grainy appearance in the viewer or pinholes in the image.

Clearing

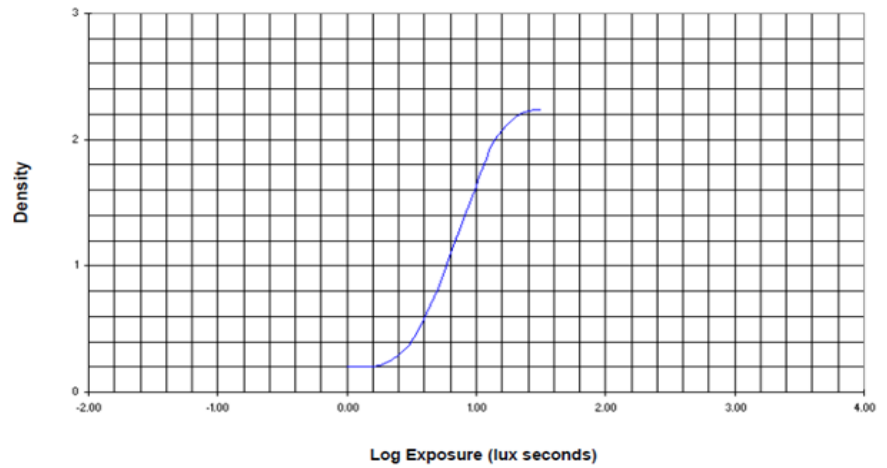
To desensitize the film in previously unexposed areas and release nitrogen gas, re-expose the film after development for one to two times the original exposure time.

The film can be viewed after several seconds without a significant density increase, even before all nitrogen has escaped by diffusion, provided microfilm readers with normal gate temperatures are used.



Characteristic curve

Thermal Print Film KF 1353/2353
Development Conditions: 127°C (260°F)
 Visual Density (f/4.5 projection)



Product Offerings

Code	Mil	Format	Spec	Description	No./Case	Catalog No.
1353	5.0	105 mm x 1000 ft	977	Plain	2	103 8588
		105 mm x 148 mm	-	250 sheets, plain	8	142 1031
2353	4.0	16 mm x 1000 ft	649	Roll	20	830 1814
		35 mm x 2000 ft	684	Plain	324	131 4731
		35 mm x 2000 ft	684	Plain	6	137 5345

Physical Properties

Nominal thickness (mils)

Unprocessed Film	Clear Polyester Base	Total (mils)
1353	4.2	4.4
2353	3.4	3.6

NOTES:

- Film and sizes are subject to change or may be discontinued without notice. For specific sizes and formats, contact your IMAGELINK representative.
- Refer to the latest revision of each ANSI or ISO standard specified.

After-Process Information

Handling

As with all photographic products, exercise care to avoid scratches, abrasions and fingerprints when viewing in a reader.

Viewing

- When properly cleared, these films can be viewed for normal periods in microfilm readers with reader-gate temperatures not exceeding 75°C (167°F).
- Avoid unnecessarily long exposure in readers.

Image Stability and Keeping

The standard ISO 18912:2002, *Imaging Materials — Processed Vesicular Photographic Film — Specifications for Stability*, details processing vesicular film for long-term record keeping. Excellent storage for IMAGELINK Thermal Print Films will be obtained within optimum humidity and temperature limits for vesicular microfilms as specified in ISO 5466:1996, *Photography — Processed Safety Photographic Films — Storage Practices*. This specifies storage at 21°C (70°F) or less and 15 to 50% relative humidity. These films are expected to maintain a usable image for at least 100 years when processed as recommended and handled and stored as specified.

Air purity, including freedom from contact with solvents and with industrial gases such as ammonia, must be maintained. Vesicular films should not be interfiled with or stored in the same containers or vaults with other film types such as silver or diazo. Relative to other types of photo images, IMAGELINK Thermal Print Films generally are excellent for overall resistance to the effects of light and fungi.