



## DuPont Printed Circuit Materials

Phototooling Films & Chemicals

# Cronavue® PDP-7XT

Positive Diazo Photomask—Xtra Tough™ Diazo Phototooling Film

### Description

Cronavue® Positive Diazo Photomask Xtra Tough™ (PDP-7XT) is a slow contact speed, near ultraviolet (UV) sensitive, positive working, diazo film possessing a micro-matte finish. It is designed for producing same-size diazo phototools from good quality silver masters.

Cronavue® XT emulsion provides improved scratch resistance and improved chemical resistance to attack from soldermasks and solvent cleaners. In many cases the need for protective laminates is eliminated.

Cronavue® XT consists of a very thin, light-sensitive layer containing diazo salts, color dye couplers, and an acid stabilizer, coated on a 0.18-mm (7-mil) polyester base. During exposure with ultraviolet radiation, the diazo salt is decomposed. Subsequent development of unexposed areas with hot ammonia vapor neutralizes the acid stabilizer and triggers a reaction with the dye couplers. This results in a transparent, colored image with high UV density.

### Features

- Improved scratch resistance over standard diazo products
- Improved chemical resistance over standard diazo products
- Excellent visual transparency
- High ultraviolet densities
- May be handled under bright yellow fluorescent lamps
- Excellent line edge sharpness

### Applications

PDP-7XT is suited for making high-quality, visually transparent phototools that are scratch- and chemical-resistant for use in exposing liquid and dry film photoresists (including solder mask) employed in the manufacture of printed wiring boards.

### Physical Characteristics

- Stable polyester support
- Excellent dimensional stability
- High UV transmission in non-imaged areas
- Micro matte surface

### Exposure

Cronavue® XT is sensitive to the near UV portion of the spectrum with peak sensitivity in the range of 380–410 nanometers (nm). Metal halide type UV lamps, having a peak output of 410 nm or other additive type light sources are recommended.

### Typical Exposures

Additive metal halide	20–40 sec
Hi-intensity mercury vapor	40–80 sec
Hi-intensity carbon arc	60–120 sec
Hi-intensity pulsed Xenon	80–160 sec

### Safelights

The film can be handled in bright yellow fluorescent lighting or other yellow safelights (100 foot-candles). It can also be handled for shorter periods in subdued room light (about 20 footcandles) typical of that found in stripping or opaqueing areas where indirect illumination is provided by light tables. A test should be conducted to determine safe handling times under actual working conditions.

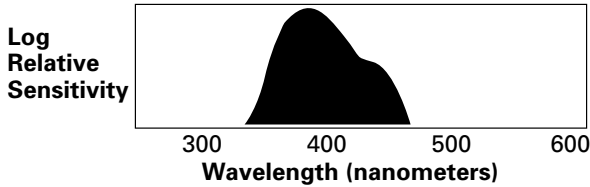
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Yellow (or gold) and red fluorescent lamps to fit standard fixtures are available in various sizes from most manufacturers.

### Spectral Response

Spectral Response is the response of a photographic material to light of different wavelengths (colors).



### Resolving Power

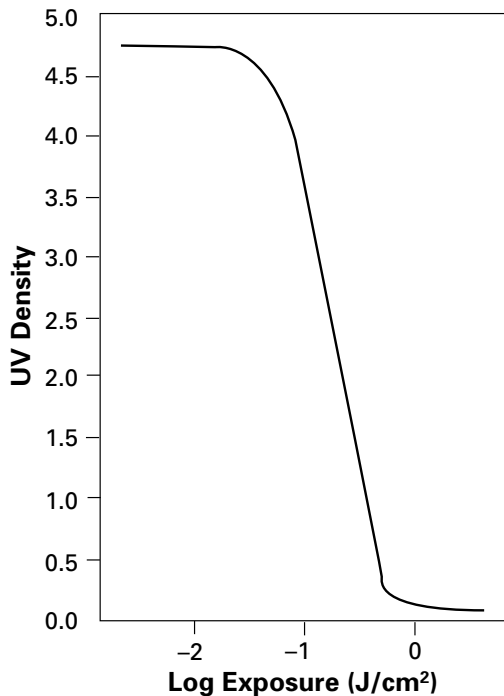
Resolving Power is the ability of a photographic material to record fine detail; larger numbers mean better resolving power.

1000 lines/mm measured from high contrast test target (1000:1)

### Processing

Cronavue® PDP-7XT diazo film can be developed in most diazo processors. An aqueous ammonia solution of 26° Baumé is recommended. Speed should be adjusted to achieve a film plane temperature of 60–70°C (140–160°F). Films should be

Figure 1. PDP-7XT



passed through the processor at least twice to ensure complete development since overdevelopment is not possible. No washing or drying is required.

### Sensitometric Characteristics

Cronavue® diazo film combines outstanding visual transparency with high UV density. UV density must be measured with a densitometer designed specifically to meet the needs of the printed circuit industry for diazo films.

### Dimensional Stability

The thermal coefficients of expansion listed in Table 1 are expressed as percent change in length for each one degree Fahrenheit (1°F) change in temperature. The humidity coefficients in Table 1 are expressed as percent change in length for each one percent (1%) change in relative humidity. Humidity coefficients are the average of rising and falling humidity over the range 35 to 65% at 70°F. All coefficients have a reliability of ±0.0002.

Table 1  
Coefficients of Expansion

	Thermal Coefficient Percent per °F	
	Unprocessed	Processed
Cronavue PDP-7XT	0.0010	0.0010
	Humidity Coefficient Percent per % RH	
	Unprocessed	Processed
Cronavue PDP-7XT	0.0008	0.0008

The formula to be applied is:

Change in length =  $0.01 \times \text{Coefficient} \times \text{Original length} \times \text{Change in temperature or relative humidity}$ .

For example, the 0.0008% relative humidity for processed PDP-7XT means that for each 1% change in relative humidity, the film will change length by 0.000008 in per in, cm per cm, etc. Thus, a 15% increase in relative humidity (from 30 to 45% RH, for example) will cause a 10 inch length to increase by 0.0012 in (0.030 mm) to a final length of 10.0012 in.

The increase in this example is calculated as follows:

$$0.000008 \times 10 \text{ in} \times 15\% \text{ RH} = 0.0012 \text{ in}$$

### ***Effects of Processing Conditions***

The coefficients of expansion are used to predict film size changes due to environmental conditions. They cannot be used to predict size changes due to processing conditions. The after-processing size change of preconditioned film that has been processed under optimum conditions can be too small to measure. However, if the film is not conditioned or has been processed at temperatures in excess of 80°C (175°F), the after-processing size change can be more than 75 µm in 25 cm (3 mil in 10 in).

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Silver halide and diazo photographic films are considered "articles" under the U.S. OSHA Hazard Communication Regulation [29 CFR 1910.1200], and the Canadian Workplace Hazardous Materials Information System (WHMIS) regulations. They are exempt from the reporting requirements of those regulations and the EPA Toxic Substances Control Act (TSCA) [40 CFR 704.5]. Therefore, no Material Safety Data Sheet (MSDS) is required for this product.

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