



## FEATURES

Emulsion Film Photomask

20" x 24" x 0.007" (L x W x D)

508mm x 609mm x 0.018mm

## PRODUCTS AVAILABLE

Photomasks

Reticles & Calibration Plates

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Large Format

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CAD-CAM Software

For more information on any of our products or services please visit us on the Web at:

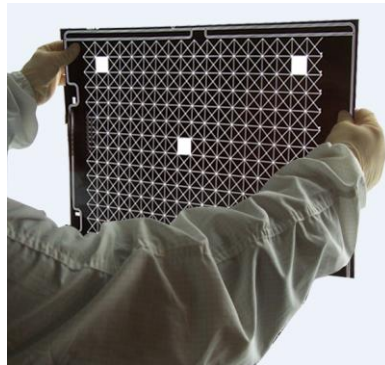
[www.jd-photodata.co.uk](http://www.jd-photodata.co.uk)

## JD Photo Data

Photo Data House,  
Knowl Piece, Hitchin,  
Herts, SG4 0TY  
Great Britain

[sales@jd-photodata.co.uk](mailto:sales@jd-photodata.co.uk)  
+44 1462 428809

# 20" x 24" x 0.007" Film Photomask



A photomask is an opaque plate or film with transparent areas that allow light to shine through in a defined pattern. They are commonly used in photolithography processes, but are also used in many other applications by a wide range of industries and technologies. They are made on Soda Lime glass, on Fused Silica (Quartz) and even on polyester film. The mask acts as a template, and is designed to optically transfer patterns to wafers or other substrates in order to fabricate devices of all types

## Specifications

- **MATERIAL:** PET Polyester Agfa Idealine HPF
- **SIZE:** 508mm x 609mm (+/- 0.5mm)
- **THICKNESS:** 0.18mm (+/- 0.01mm)
- **FLATNESS:** 10  $\mu$ m (+/- 3 $\mu$ m)
- **COATING:** Emulsion silver halide gel
- **REFLECTIVITY:** 10-12% @ 400 - 800nm
- **DENSITY:** > OD4 @ 436 nm g-line
- **MIN CD:** Dependant on imaging Grade chosen
- **RESOLUTION:** Grade 1 - 4
- **POSITIONING:** +/- 1.0mm
- **ACCURACY:** = 5 + (L \* 0.005)  $\mu$ m
- **PACKAGING:** Individual Plastic Sleeve
- **DEFECT SPEC:** Standard in house

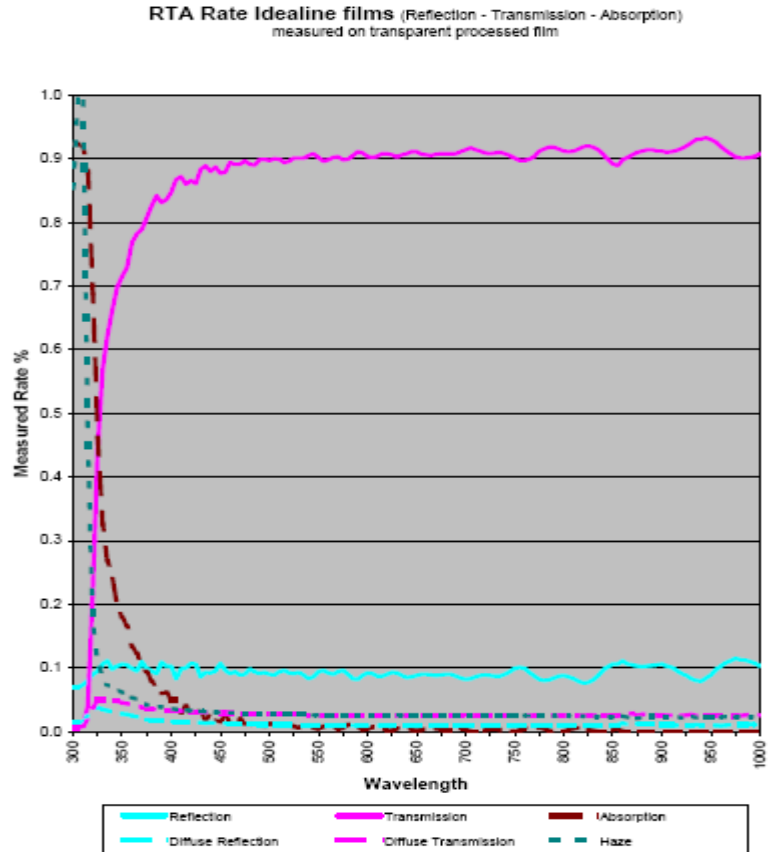
## PRODUCTS OPTIONS

[White Backing](#)  
[Reflective Backing](#)



## TRANSMISSION AND REFLECTION

All of our photomask films are imaged onto Agfa Idealine HPF (High Resolution Plotter Film) 0.18mm thick polyester film which has a photographic emulsion coated onto one side. These are specially manufactured for high resolution and consistent high quality results. They are both imaged, and inspected, in controlled environments which is crucial to their dimensional stability. For the most accurate films possible, please use this films in an environment of 21 deg C and 50% humidity.



## MECHANICAL PROPERTIES

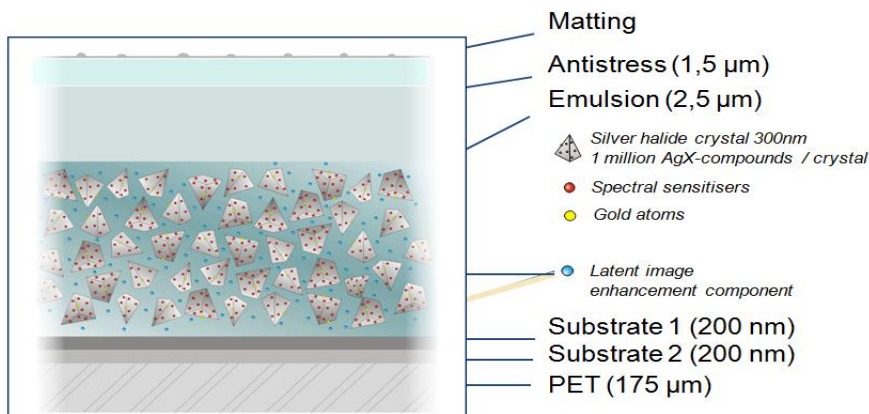
Thermal Coefficient of Expansion (length, width)	0.001% / °F (0.0018% / °C)
Humidity Coefficient of Expansion (length, width)	0.0008% / % RH
Specific Gravity	1.39
Young's Modulus	6.8 x 10 <sup>5</sup> psi
Poisson's Ratio < 1 year at room temperature	0.25
Tensile Strength Yield ASTM D882-67	13,500 psi
Tensile Strength Break ASTM D882-67	25,600 psi
Elongation at Yield ASTM D882-67	5.5%
Elongation at Break ASTM D882-67	115%
Tear Strength Initiation Graves Tear ASTM D1004-06	24 lbs.
Tear Strength Propagation Tongue Tear ASTM D1938-67	0.5 lbs.
Toughness ASTM D882-67	21,500 lb. / cubic inch
Refractive Index at wavelength 589 nm	N = 1.50 Vertical axis through thickness N = 1.64 Width direction in plane of sheet N = 1.66 Length direction in plane of sheet



PHOTO  
DATA

## POLYESTER CONSTRUCTION

### Film Photo-Mask



## RESOLUTIONS

We can write masks at 4 different resolutions, called "grades". The higher the resolution, the better the quality. Please see the section SPECIFICATIONS to see the impact that class resolution has on dimensional accuracy and feature tolerances.

**Grade 1 :** This represents a resolution that is previously known as LOW Resolution. Although this resolution may resolve smaller features, we recommend keeping feature sizes above 50 $\mu\text{m}$  as corner rounding is considerable. Edge sharpness and definition is acceptable for non critical design types, although designs with arcs/circles and lines running off 90 degree grid may show pixilation. NO features such as lines / circles / spots / squares below 30  $\mu\text{m}$  unless on a 'best effort' basis previously agreed with our technicians.

**Grade 2 :** This represents a resolution that is previously known as MEDIUM Resolution. This resolution will usually resolve down to 25 micron lines with decent line edge qualities with only a slight pixilation along edges. Corner rounding is still noticeable under magnification. NO features such as lines / circles / spots / squares below 25 $\mu\text{m}$  unless on a 'best effort' basis previously agreed with our technicians.

**Grade 3 :** This represents our most common resolution, and is previously known as HIGH Resolution. It offers an excellent price / quality balance. This resolution will resolve down to 12 micron lines and has very good line edge qualities with little pixilation along edges, although some circles / squares and spots may have some distortion to them. Corner rounding is usually acceptable at this level.

**Grade 4 :** This represents our highest resolution, and is previously known as both SUPER HIGH and Premier , and is excellent for demanding, high precision photomasks. It is equivalent to our older 128k / 200k dpi films, and is the best quality that we can offer. This resolution will resolve down to 5 micron lines and has good line edge qualities with no pixilation along edges, and corner rounding is only noticeable under very high magnification. Note that where feature sizes are below 10 $\mu\text{m}$ , the design cannot contain mixed negative and positive data..

## DEFECT SPECIFICATIONS

The Customer Defect Specification Form is to be used by customers to inform us of their defect specifications. It may be supplied to cover every order within a given time frame, or on a per order basis. If the form is not submitted, our own internal specifications take over. These specifications will be used by our front end engineers to asses if masks can be written before going into the write phase, and customers will be informed where specifications are deemed to be unachievable.



## FEATURE TOLERANCES

Feature Tolerance refers to one specific feature (also known as CD or Critical Dimension). So, if part of your mask design has a 12um channel and this is a critical feature, you can use the table below to work out possible deviations to the channel width, depending upon which resolution you choose. As a rule, the higher the resolution, then the more accurate the individual feature size will be.

<b>Resolution</b>	<b>Type: FILM</b>	<b>Tolerance</b>
<b>GRADE 1</b>	<i>16k dpi on polyester film</i>	<i>4.8um + 10% host Max 9.6um</i>
<b>GRADE 2</b>	<i>32k dpi on polyester film</i>	<i>2.4um + 10% host Max 4.8um</i>
<b>GRADE 3</b>	<i>64k dpi on polyester film</i>	<i>1.2um + 10% host Max 2.4um</i>
<b>GRADE 4</b>	<i>128k dpi on polyester film</i>	<i>0.6um + 10% host Max 1.2um</i>

*All figures above in Microns.*

## DIMENSIONAL TOLERANCES

Overall dimensional tolerances refer to the tolerances over a distance greater than 5mm – in layman's terms, people ask us 'how accurate will the mask be' and these guidelines should go somewhere towards providing the tolerances in overall dimensions.

<b>FILM MASKS</b>	<b>Microns</b>
	<i>L = measuring length in MM</i>
<b>GRADE 1-4</b>	<i>= 5 + (L * 0.005) um</i>