

# FUNCTIONAL MATERIAL

# CAPILLARY PLATE

**Glass plate with holes a few micrometers in size arrayed two-dimensionally at regular intervals**

## OVERVIEW

Capillary plates are essentially circular or rectangular glass plates on which tiny glass capillaries or tubes are arrayed in two-dimensions at regular spaced intervals.

The capillaries are produced in different hole diameters and lengths (thickness) as well as outer dimensions according to the application. Capillaries have superb linearity and high accuracy. Standard open area ratios of capillary plates are as large as 55 % or more.

Material in standard capillary products uses lead glass containing 40 % to 50 % lead.

Hamamatsu accepts special orders for capillaries with super-tiny holes diameters ranging from one to several hundred micrometers.

Hamamatsu also offers capillary plates that were anti-statically treated on the plate front, rear and inner wall surfaces.

## APPLICATIONS

- Liquid and gas filters
- Differential pumping window material
- Orifices for mass spectrometry
- Optical and X-ray collimators

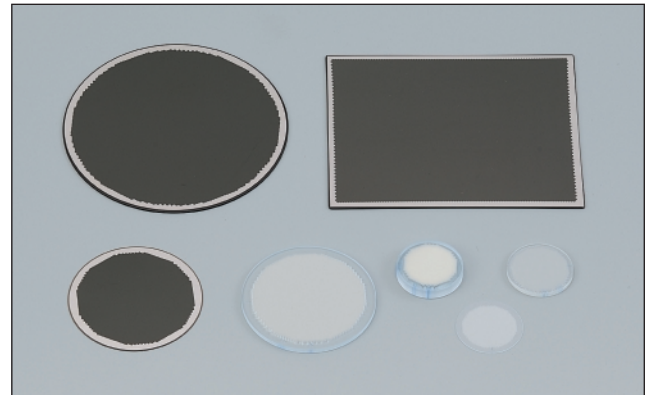
## SIZE VARIATIONS

| Type No. | Outer Dimension (mm) <sup>(A)</sup> | Effective Area (mm) <sup>(B)</sup> | Hole Diameter (μm) | Length (Thickness) (mm) <sup>(L)</sup> |
|----------|-------------------------------------|------------------------------------|--------------------|--|
| J5022-01 | φ5                                  | φ0.8                               | 12                 | 1.0                                    |
| J5022-09 | φ25                                 | φ20                                | 6                  | 1.0                                    |
| J5022-11 | φ25                                 | φ20                                | 10                 | 0.4                                    |
| J5022-16 | φ33                                 | φ27                                | 10                 | 1.0                                    |
| J5022-21 | φ87                                 | φ77                                | 25                 | 1.0                                    |
| J5022-19 | 60 × 60                             | 53 × 53                            | 20                 | 1.0                                    |

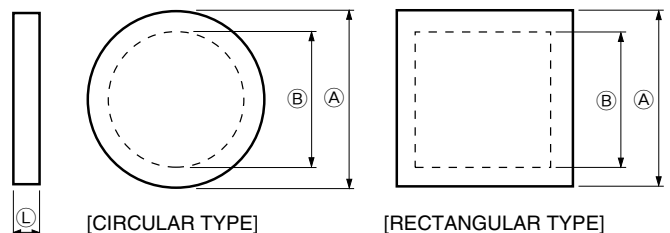
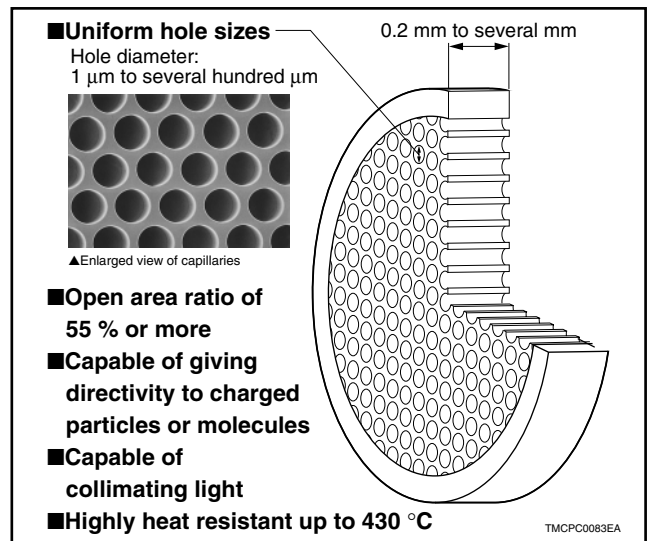
**Note:** The above J5022 series does not have anti-static treatment. The J5112 series is an anti-statically treated type.

For other information such as dimensional tolerances, please contact us.

**Feel free to consult with us if you require special order products.**



## FEATURES AND CUTAWAY VIEW



TMCPA0039EA

# APPLICATION DESCRIPTION

| Application                                 | Application Description   | Features  | Application example   |
|---|---|---|---|
| <b>Suction Conveying</b>                    | <p>OBJECT TO MOVE<br/>CONVEY<br/>CAPILLARY PLATE<br/>SUCTION</p> <p>TMCP0087EA</p>            | <ul style="list-style-type: none"> <li>• Smooth surface allows stable conveying of object</li> <li>• Capillaries are arrayed at a fine uniform pitch and so can suck flat objects at a uniform force</li> </ul>   | <ul style="list-style-type: none"> <li>• Conveying small products and thin profile items such as semiconductor wafers</li> </ul>            |
| <b>Filters</b>                              | <p>CAPILLARY PLATE<br/>SUBSTANCES SMALLER THAN HOLE DIAMETER</p> <p>TMCP0084EA</p>            | <ul style="list-style-type: none"> <li>• Induces laminar flow of fluid</li> <li>• Particle selection capability</li> </ul>  | <ul style="list-style-type: none"> <li>• Filters</li> <li>• Flow rate meters</li> </ul>   |
| <b>Differential Pumping Window Material</b> | <p>AIR<br/>VACUUM<br/>CAPILLARY PLATE</p> <p>TMCP0085EA</p>                                   | <ul style="list-style-type: none"> <li>• Capillary plate having tiny diameter holes and adequate thickness (high aspect ratio) doesn't easily allow gas to pass but lets light and X-rays pass through freely. So this can be utilized as window material between air and vacuum.</li> <li>• Capable of withstanding temperatures to a maximum of 430 °C</li> </ul> | <ul style="list-style-type: none"> <li>• Window material for vacuum UV light sources and soft X-ray sources</li> </ul>                      |
| <b>Collimators</b>                          | <p>POINT BEAM SOURCE<br/>CAPILLARY PLATE<br/>SLIT<br/>PLANE BEAM SOURCE</p> <p>TMCP0086EA</p> | <ul style="list-style-type: none"> <li>• Capillary plate passes just light input in parallel to the capillaries.</li> <li>• Capable of orienting the direction of beams of various types including atoms, molecules, charged particles, and X-rays</li> </ul>   | <ul style="list-style-type: none"> <li>• Ion energy analyzers</li> <li>• Spectrometers</li> <li>• 2D imaging X-ray spectrometers</li> </ul> |
| <b>Others</b>                               |   | <ul style="list-style-type: none"> <li>• Capable of maintaining a constant ultra-slow leak state</li> </ul>   | <ul style="list-style-type: none"> <li>• Ultra-slow leak valves</li> <li>• Semiconductor film forming devices</li> </ul>                    |

# CUSTOM-DESIGN PRODUCTS

- **Blacking treatment** (Cuts light passing through hole wall surfaces)
- **Deposition of electrode material onto front and rear of plate**
- **Soda lime glass as lead free products**
- **Original dimensions, effective area, and no rims**

## Guide to combinations of capillary hole diameter, plate thickness, and outer dimension combinations

| Capillary hole diameter (μm) | Plate thickness (mm) | Outer plate diameter φ (mm) |
|------------------------------|----------------------|-----------------------------|
| 1                            | 0.2 to 1             | 5 to 50                     |
| 4                            | 0.2 to 2             |                             |
| 6                            | 0.2 to 3             |                             |
| 10                           | 0.2 to 3             | 5 to 114                    |
| 25                           | 0.2 to 3             |                             |
| 50                           | 0.2 to 5             |                             |
| 100                          | 0.2 to 5             |                             |

Note: We may be unable to meet customer specifications due to aspect ratios for a particular hole thickness and diameter, so consult with us beforehand on product feasibility.

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