BURLE Brings You The Most Advanced 
MCP Technology In The World

BURLE products have led the industry in electro-optics 
and fiber optics for over 35 years. We supply standard 
and custom products and offer expert, personal service 
designed to meet the rigorous demands of radiation 
detection and signal amplification applications. Our 
unrivalled expertise in designing and manufacturing 
Long-Life™ Microchannel Plates and related technology 
ensures the most sensitive and highly-integrated 
systems available.

Our diverse manufacturing capabilities can provide 
solutions for virtually any detection application, no matter 
how unique.

BURLE has one of the largest microchannel plate 
manufacturing facilities in the world. Dedicated solely to 
maintaining components for scientific detector 
products, this 50,000 sq. ft. facility features the most 
advanced equipment in the industry for producing 
microchannel plates and electron multipliers.

BURLE’s Long-Life™ Microchannel Plates use an 
exclusive material which has demonstrated superior 
lifetime characteristics in a wide range of detection 
applications.

Long-Life™ Microchannel Plates are the foundation for a 
new generation of applications including image 
intensification, remote detection, and mass spectrometry. 
These devices offer longer life, higher gain, and lower 
dark current than any other commercially available 
microchannel plate. The Long-Life™ Microchannel 
Plate’s enhanced stability and extended dynamic range 
provide outstanding system performance and reliability 
for even the most demanding applications.

BURLE’s Scientific Detector Products use the 
Company’s expertise in electron multiplication and 
precision manufacturing to create components for 
scientific and analytical instrumentation. BURLE is the 
world leader in ion, electron, and photon detection. 
These products have a proven record of delivering longer 
life, high performance, and sensitivity for a wide range of 
applications including the analysis of chemical 
compositions.
When ordering BURLE Advanced Performance Detectors (APDs), the following table will assist you in selecting exactly the right configuration for your specific application. If you have any questions or need assistance, do not hesitate to contact BURLE Electro-Optics Customer Service at 1-800-648-1800, +1-508-347-4000, or sales@burle-eo.com.

### APD 30 18 12/10/12 FM D EDR 60:1 P20 CsI

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Pitch / Pore Size</th>
<th>Options</th>
<th>Aspect Ratio</th>
<th>Coating</th>
<th>Phosphor Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Chevron</td>
<td>6/5</td>
<td>FM - Flange Mount</td>
<td>40:1</td>
<td>CsI</td>
<td>P-20</td>
</tr>
<tr>
<td>60 CEMA</td>
<td>12/10</td>
<td>PS - Phosphor Screen</td>
<td>60:1</td>
<td>CuI</td>
<td>P-43</td>
</tr>
<tr>
<td>90 Z-Stack</td>
<td>32/25</td>
<td>RAE - Resistive Anode Encoder</td>
<td>None</td>
<td>MgF2</td>
<td>P-47</td>
</tr>
</tbody>
</table>

**Quality Ø (mm)**
- 18
- 25
- 40
- 75
- 120
- 50 x 8
- 100 x 15
- 100 x 80

**Bias Angle (°)**
- 0
- 5
- 8
- 12
- 19

**Extended Dynamic Range**
- EDR
- None

**MCP Quality**
- D - Detection
- I - Imaging
- P - Premium

**BURLE Microchannel Plates are available in three classifications:**

- **Detection Quality** MCPs are designed for a wide range of signal detection applications. These devices are for use as single-point detectors and amplifiers. Detection Quality is typically used in Time-of-Flight mass spectrometry, residual gas analysis and point detectors. Detection Quality MCPs are the best choice and value for non-imaging applications.

- **Image Quality** MCPs are designed for use in imaging or position sensing applications. When used in conjunction with an appropriate readout, these devices provide an intensified high resolution image. Image Quality is found in such applications as 2nd generation and later image intensifier tubes, ultra-fast cathode ray tubes and various analytical techniques such as ESCA, magnetic sector mass spectrometry and VUV spectrometry.

- **Premium Quality** MCPs are designed for use in precision imaging applications requiring superior image quality. These high grade devices are manufactured to the highest quality specifications achievable. Premium Quality is required in such applications as high speed photography, image intensifiers and other electronic imaging applications. Premium Quality MCPs are the preferred choice for space applications where product reliability and performance are critical.
The spatial resolution of microchannel plates varies inversely with their center-to-center spacing (Pitch). BURLE’s Long-Life™ MCPs are available 2, 5, 8, 10 and 25-micron pores. BURLE’s 2-micron pore MCPs are the highest resolution MCPs available. The 2-micron pore Long-Life™ MCP is ideal for applications where image detail or response time is important.

The bias angle of a microchannel plate is the angle of the channel with respect to the surface normal. It can be varied in order to optimize the angular dependency of UV and soft X-ray detection (0-19°). Zero degree bias angles are primarily selected for collimation applications. A 5° bias angle is optimal for high resolution analog detection applications. Chevron and Z-Stack assemblies perform best with 8° or 12° bias angle MCPs.

The dynamic range of an MCP is ultimately limited, at high count rates, by the bias current. In operation, secondary electrons produce a region of charge depletion at the emissive surface. Further multiplication cannot occur until the charge is replenished. The EXTENDED DYNAMIC RANGE™ (EDR) option will typically increase the maximum linear signal detection limit by a factor of ten.

BURLE offers Standard 40:1 Length-to-Diameter (L/D) ratio or Advanced Performance 60:1 L/D ratio MCPs. BURLE’s Standard MCPs have been optimized and demonstrate superior performance for imaging applications. Advanced Performance MCPs are the preferred devices for most detection applications. Advanced Performance MCPs provide higher Gain and narrower Pulse Height Distribution and with their higher length-to-diameter ratio a thicker, more robust microchannel plate. This ensures greater mechanical durability and simplifies handling and assembly operations.
Coatings
Cesium Iodide (CsI), Copper Iodide (CuI), and Magnesium Fluoride (MgF₂) enhance the detection of ultraviolet photons from 200 to 2000 angstroms. MgO improves electron detection efficiency. KBr improves detection efficiency of soft X-rays in the 0.2 to 9 KeV range. Gold electrodes are available for rapid charge replenishment.

MCP Configurations
Matching the bias currents of the MCP sets allows the set to be operated from a single power supply, which eliminates the need for center tabs and voltage dividers, leading to improvements in spatial resolution and Pulse Height Distribution.

- **MS Matched Set** - Two single MCPs with matched resistance suitable for making a Chevron™.
- **TC Tested as a Chevron™** - Two matched MCPs tested in the high gain Chevron™ configuration.
- **MZ Matched Z** - Three single matched resistance MCPs suitable for making a Z-stack.
- **TZ Tested as a Z-Stack** - Three matched MCPs tested in the high gain Z-Stack configuration

### MCP Performance characteristics

<table>
<thead>
<tr>
<th>Configuration</th>
<th>L/D Ratio</th>
<th>Maximum Voltage</th>
<th>Gain</th>
<th>Pulse Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single MCP</td>
<td>40:1</td>
<td>1000</td>
<td>&gt;4x10⁶</td>
<td>Neg. Exp.</td>
</tr>
<tr>
<td></td>
<td>60:1</td>
<td>1200</td>
<td>&gt;1x10⁶</td>
<td>Neg. Exp.</td>
</tr>
<tr>
<td>Chevron</td>
<td>40:1</td>
<td>2000</td>
<td>&gt;4x10⁶</td>
<td>&lt;175%</td>
</tr>
<tr>
<td></td>
<td>60:1</td>
<td>2400</td>
<td>&gt;1x10⁷</td>
<td>&lt;100%</td>
</tr>
<tr>
<td>Z-Stack</td>
<td>40:1</td>
<td>3000</td>
<td>&gt;3x10⁷</td>
<td>&lt;120%</td>
</tr>
<tr>
<td></td>
<td>60:1</td>
<td>3600</td>
<td>&gt;2x10⁷</td>
<td>&lt;60%</td>
</tr>
</tbody>
</table>

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