De Tech

Detector Technology, Inc.

"The Quad"
Series 2000

Committed to Excellence

"Our Miniaturized Design Offers Increased Life At A Lower Cost"

SERIES 2000 "Multi Element Detector" ***Reduced Size Detector With Improved Stability*** DeTech has the solution for applications that require channel electron multipliers to become smaller at a lower cost with improved performance. Detector Technology has developed the Series 2000, a Multi Element Detector, to solve your size and cost constraints without sacrificing performance. In fact, the Series 2000 is an extended life design based on the same principles as the DeTech Series 1000, "EverLast™" multipliers.

FIGURE 1
Single Channel Multiplier Output

FIGURE 2
Multi Element Channel Multiplier Output

Model Number	General Series 2000
Maximum bake temperature	350°C
Maximum operating temperature	200°C
Mode of operation	Analog / Pulse Counting
Typical gain at 2100 volts	1×10^7
Typical bias current	10.5 Micro Amps
Resistance	50 - 200 MΩ
Maximum linear output current	≤ 10% of Bias Current
Dark current	$\leq 1 \times 10^{-12}$ Amps
Pulse height distribution	≤ 75%
Pulse width	≥ 18 nSec
Rise time	≥ 3 nSec
Maximum count rate	$\leq 10^7$ cps

Theory It has been proven that the surface area of the detector is important in increasing the useful life of a Channel Electron Multiplier (CEM). Micro Channel Plates (MCPs) and Detector Technology's "EverLast" are examples of products with increased surface areas. However, the MCP is difficult to miniaturize. In order to miniaturize a CEM Detector Technology has integrated both the MCP and "EverLast" technologies into one Macro Multi Element CEM, the Series 2000.

The Series 2000 uses extrusion techniques to integrate more than one channel in a detector unit. These channels are then twisted together to form a barber's pole. Most critical CEM characteristics are controlled by the length to inside diameter ratio. The more these channels are twisted the shorter the unit becomes.

The Series 2000 consists of four channels per detector, see Figure 2. When the Series 2000 is in operation the input signal is spread among the four channels. Since the active surface area of the CEM is increased the useful life of the CEM is also increased.

E-MAIL
DTICORP@AOL.COM
Prices & Delivery Quoted via the E-mail

Please contact the Detech Sales Department for specific application information regarding Series 2000 multipliers.

Visit DeTech on the World Wide Web
WWW.DETECHINC.COM

Characteristic Curves

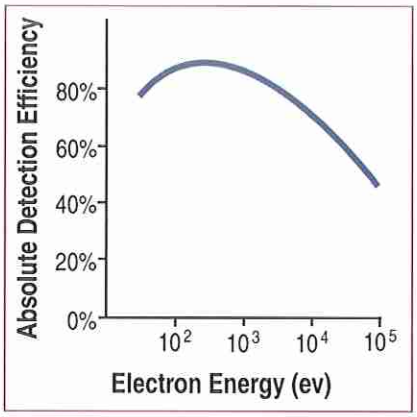

FIGURE 3
Absolute Detection - Efficiency vs Energy

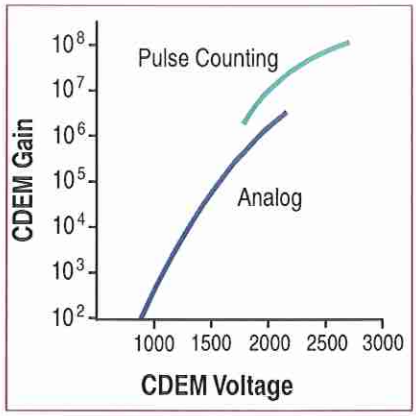

FIGURE 4
Typical Gain Curves

High Pressure Operation

Detector Technology has done various product development and validation testing to manufacture an electron multiplier that can operate at elevated pressures. With the advancements in quadrupole technology, there has been a growing need for a Channel Electron Multiplier (CEM) to have the ability to operate at elevated pressures. Past CEMs were unable to function efficiently at pressures above 10^{-6} Torr, often suffering from instability and short lifetime. **Detector Technology, Inc. has developed "The Quad" CEM which is proven to be operable at 10^{-2} Torr.** The ability to run at such high pressure gives the users greater application flexibility. In addition, cost cutting measures can be taken by eliminating expensive vacuum pumps as well as other vacuum components.

An experiment, testing lifetime and stability, proved that "The Quad" style detector offered two major advantages over the standard multiplier.

- "The Quad" offered a reduction in ion feedback and overall better stability. Since the channels are twisted like a barber's pole, see Figure 5, the mean free path of residual ions was reduced. This prevented the residual ions from building any substantial amount of kinetic energy. Therefore, the majority of the damage to the channel wall was eliminated, see Figure 6.
- Due to "The Quad's" four channel construction, see Figure 7, there was an inherent increase in active surface area. This resulted in an increased lifetime for the user.

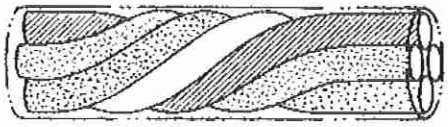

FIGURE 5
Twisted Internal Fibers Help To Prevent Feedback

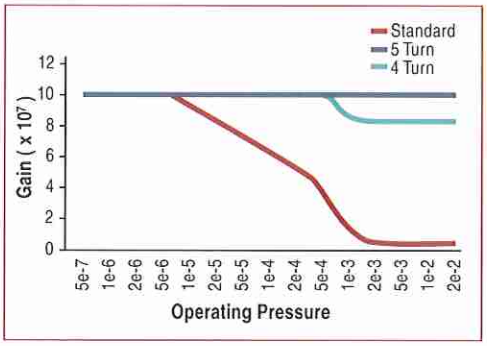

FIGURE 6
Stability Test

This experiment proved that the standard CEM began to lose stability at a pressure of 1 x 10^{-5} Torr. "The Quad" CEM remained stable to a pressure of 2 x 10^{-2} Torr. The stability test was used to check the deviation of the gain of a CEM at various pressures.

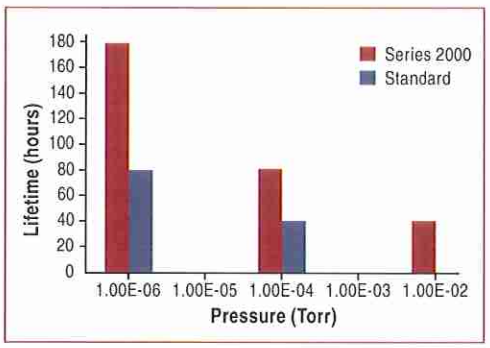

FIGURE 7
Accelerated Life Test

This test proved that the four channel "Quad" device offered a significant lifetime increase over the standard CEM. Overall, "The Quad" CEM proved to have approximately twice the life. "The Quad" also showed good operable lifetime at pressures up to 1 x 10^{-2} Torr, where a standard unit would not operate.

ISO 9002 Certificate No. 10099

De Tech
Detector Technology, Inc.
www.detechinc.com

BS EN ISO 9002 Certificate No. 7606

Palmer Industrial Park • 9 Third Street • Palmer, MA 01069 • Telephone: (413) 284-9975 • Fax: (413) 284-9979 • E-mail: dticorp@aol.com