

MCP-Types

Structure & Features

A micro channel plate (MCP) is a lead glass plate including an array of electron multipliers with diameter of the tube in the range of 4-50 μm in parallel with thousands of other tubes. The length of a multiplier tube correspond to the thickness of the glass plate. The aspect ratio of the MCP is the length/diameter ratio of the channels. The channel axes are biased by a small angle (6° to 12°) to optimize the secondary electron emission in the channels. Under the influence of a supplied high voltage electrons are accelerated in the channels and hit the wall. A single electron is multiplied by a factor of 3-5. An MCP with an aspect ratio of 40:1 amplifies the electrons typical by a factor of more than 10^4 . A single channel can be understood as a dynode continuous structure of a photomultiplier tube. Due to the small channel image applications in high resolution are possible as well as detection applications.

The GIDS-GmbH offers MCPs for different applications in image and detection mode. It is possible to image electrons, positrons, protons, heavy ions, x-rays, XUV, VUV- and UV-radiation and measure position, cluster parameters, TOF and Ion- contribution depending on customers HV and readout system used.



APPLICATIONS

- Amplification in electron tubes
 - image intensifiers and Streak tubes
 - fast PMT for TOF or others
- Particle detection in analytical Systems
 - TOF-Mass Spectrometer
 - ESCA, EBMS, FIM, LEED etc.
- Cosmic Rays and Particle Physics
 - Detection of Plasma ions, electrons, positrons and high energy particles
 - Detection of UV-, VUV-light and X-rays

FEATURES

- high efficiency
- sensitive to electrons, ions, VUV- and UV-light, X-rays and γ -rays
- CsI coating possible to increase the sensitivity
- immunity to magnetic fields
- bake-out up to 400°C possible
- single MCPs and matched double and triple MCP sets available
- High resolution plates available on request



-	MCP 18	MCP 25	MCP 45	MCP 77
Active diameter	>18 mm	>25 mm	45 mm	77 mm
Outer diameter	24,8 \pm 0,04 mm	32,7 \pm 0,04 mm	50,0 \pm 0,1 mm	87,0 \pm 0,5 mm
Thickness	0,38 \pm 0,02 mm	0,48 \pm 0,03 mm	0,50 \pm 0,05 mm	1,1 \pm 0,05 mm
Pitch size	10 μ m	12,5 μ m	15 μ m	27 μ m
Pore size	8 (6*) μ m	10 μ m	12 (21*) μ m	21 (10*) μ m
Bias angle	6 \pm 1 $^\circ$	12 \pm 1 $^\circ$	6 \pm 1 $^\circ$	6 \pm 1 $^\circ$
OAR	min. 60%	min. 60%	min. 60%	min. 60%
Max. Electrode resistance	500 MOhm	300 MOhm	250 MOhm	200 MOhm
Single MCP gain	1x10 ⁴ (min) @ 1kV			
Double MCP gain	5x10 ⁶ (min) @ 2kV			
Triple MCP gain	1x10 ⁸ (min) @ 3kV			
Strip current	2-50 μ A @ 1kV	3-60 μ A @ 1kV	4-100 μ A @ 1kV	5-100 μ A @ 1kV
Dark current @ 1kV	<0,3x10 ⁻¹² A/cm ²			
Max. Voltage	1kV	1kV	1kV	1kV
Quality grade	Image and Detection	Image and Detection	Image and Detection	Image and Detection

Nomenclature

To specify the MCP ore MCP set you require the number of MCP's **X** (1,2 or 3) and the aspect ratio **XX 40** (40:1) is needed in addition to the MCP active diameter **MCP-18-X-XX**. For example the MCP type **MCP-18-3-40** is a matched triple set of MCPs with 18 mm active diameter and aspect ratio of 40:1.

High Voltages

The recommended MCP_{out}-MCP_{in} voltages are for 40:1 (60:1) MCPs as follows

- Single MCP 0,9 kV (1,1 kV)
- Double MCP 1,8 kV (2,2 kV)
- Triple MCP 2,7 kV (3,3 kV)

Export License requirements

Please note that MCPs with a channel diameter of 10 μ m or less together with a channel pitch of 12 μ m or less underlay the export control of the EU. For delivery and use inside the EU no Export license is needed.

How to get a quote

Send an e-mail with your contact data, the part number and additional specific details to info@gids-gmbh.com or call +49 (0)621-4455222.

Precaution

Handle the MCP under clean room conditions. Avoid touching the MCP with bare hands. Use powder free latex or vinyl gloves.

MCPs should be kept under vacuum conditions or in a dry nitrogen atmosphere if long time storage is needed.

The MCP should be operated under vacuum conditions below 1 x 10⁶ Torr (1,3 x 10⁴ Pa).

In case of first operation or after a long term storage degas the MCP's for some hours without High Voltage supply. Switch on only below a vacuum value of 1 x 10⁶ Torr.

Custom specific MCPs available

- Aspect ratio of 60:1 available
- Single, matched double and triple sets
- CsI coating on input MCP possible
- Other pore sizes available see * (data on request)
- High resolution types available (data on request)
- Other bias angle on request

