

# Heat your cells and media, not the stage.



## Bioptechs Delta T<sup>®</sup> Controlled Culture Dish System

Finally a culture dish system specifically designed for live-cell microscopy! Now you can have accurate temperature control and high-numeric aperture compatibility in a convenient disposable culture dish system that even works in confocal applications.

- Easily adapted to a variety of specimen types from monolayered adherent cells to brain slice and tissue preps
- Low mass to thermo-regulate as opposed to conventional stage heaters
- Plate, incubate and observe without the need to transfer your cells
- Fast thermal recovery after perfusion (within seconds)
- Compatible with inverted and upright microscope stands
- Coverglass bottom for optimum optical compatibility
- No need for warm air blowers or stage heaters
- Direct first-surface heating to your cells
- Can also be cooled below ambient
- Perfusion available
- No pre-heating

Bioptechs is now introducing the next generation Open Culture Dish Micro-Environmental Control System: the Delta T4. In addition to the improvements to the popular Delta TC3 control algorithm, Bioptechs has incorporated years of customer requests into the Delta T4.

## Features

- Mode indicator (dynamic or imaging)
- TTL interface and footswitch mode activation
- Cold start acceleration
- Temperature output port for recording
- Heat shock activation
- Heated Lid power supply
- Remote setpoint port
- Temperature output (for analog recording)



## Limitations of Traditional Technique

- Stage heaters are inefficient, slow, and inaccurate
- Plastic dishes are poor conductors of heat
- Temperature does not recover quickly during or after perfusion
- Plastic dishes are not suitable for high resolution or polarization microscopy
- Nonuniform temperature distribution
- Unnecessary dead volume
- Usable aperture of dish limited by the opening in heat transfer plate
- Surface evaporation significantly contributes to non-linearity of temperature distribution

## Advantages of the Delta T® Dish System

- Place cells onto coverglass and observe
- Highly accurate temperature control
- Fast thermal recovery
- Superior optical image
- Stage adapters to fit most popular microscopes
- Designed for inverted microscopes but ideal for water immersion objectives on uprights
- Immediate alarm if cell temperature changes
- Rigid mount for X, Y stability
- Uniform temperature distribution
- Cells unaffected by surface evaporation
- Numerous specimen adapters available

The Biopetechs, Inc. Delta T Culture Dish System is designed to simulate host conditions on the stage of your microscope and provide an optimal optical environment for microscopy. This two-step system allows you to plate your cells and observe them without having to transfer them to another structure. The system components are, the Controller, Stage Adapter, and Dishes. Accessories for Tissue Slice, Brain Slice, and other specimens are available.

An intelligent feedback loop passes an electrical current through a thin film coating on the underside surface of the glass substrate on which the cells are grown. Heat is applied directly to the cells without the inefficiencies associated with peripheral heating by traditional culture dish warmers. Biopetechs exclusively offers opaque culture dishes which eliminates the unwanted ambient light background for fluorescence imaging.

The controller features a real-time temperature display and fast learning curve to compensate for cooling due to surface evaporation while responding to temperature changes due to perfusion. There is also an alarmed protection circuit to safeguard the cells and an internal reference for the user adjustable calibration. The standard controller has a temperature range of ambient to 50 degrees C. Extended ranges are available upon request.

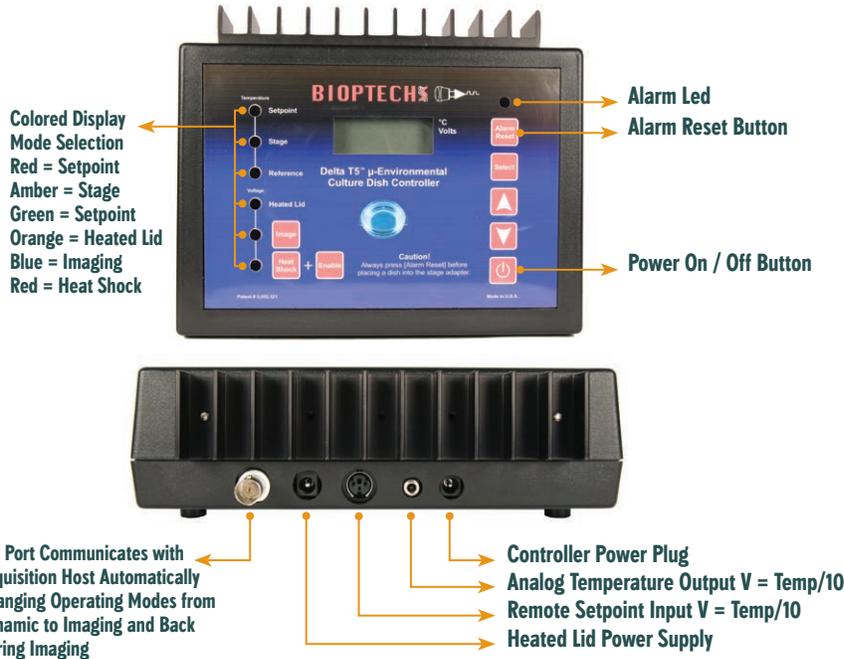
Delta T dishes have 35mm O.D. and a 23mm central aperture. The peripheral region of the dish is tapered to reduce the dead-volume and the height of the dish is 6mm to allow better access for micro-injection and micromanipulation. The dishes are a hybrid of polystyrene plastic and Desag 263 glass. The outer structure of the dish is available in opaque black or clear and come with a clear 0.5mm or no.1.5 glass coverslip bottom bonded to it. The dishes are also available in a plain glass unheated version.

You will find the Delta T® a reliable and indispensable addition to your microscope.



## Delta T Stage Adapters and Accessories

### Controller and Dish Accessories



### Hinged Perfusion Adapter

The Bioptechs Hinged Perfusion Adapter provides Delta T users with a convenient and inexpensive method of supporting perfusion needles in the culture dish. The typical application is to maintain low-volume perfusion over cells during long term-experiments. Perfusion adapters are sold in pairs. One hinge and needle is a supply, the other is a drain. The balance between supply and drain can be maintained continuously with the use of the Micro Perfusion Pump. Additional supports can be added to hold gas jets, pH probes, cooling apparatus, or other items which do not require critical positioning.

Hinged Perfusion Adapter



### Coverglass Lid

The Coverglass Lid is a cover for the Delta T Culture Dish to be used when imaging to create an optical surface onto the liquid in the dish. This eliminates the optical effect of fluid motion at the air to liquid surface above the cells that causes the contrast of the image to change. Therefore, when acquiring a series of images in a transmitted light, contrast enhancing mode of microscopy, all images will have a uniform contrast.

Forming an optically flattened glass to media surface on the top of the cells eliminates this problem. The Coverglass Lid fits loosely on the Delta T Culture Dish and supports a 1 mm x 22 mm coverglass in the center of the field 3mm above the specimen. The Coverglass Lid is reusable and helps the Delta T bridge the gap between an open dish and a closed

Perfusable



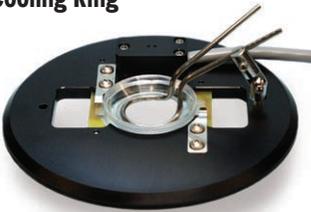
Non-perfusable



**Heated Lid****Heated Lid**

The Biopetechs Delta T Heated Lid is a device which will provide a condensate free optical surface on the top of a Delta T Dish through which specimens can be perfused and trans-illuminated on an inverted microscope. It is reusable and powered by a 2.5 volt source from either a battery or the optional auxiliary power supply in the Delta T Controller. A CO<sub>2</sub> port is included.

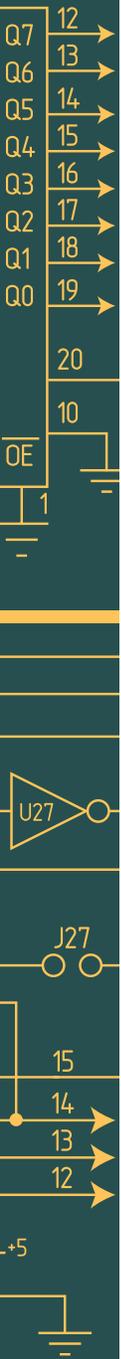
The Biopetechs Delta T Heated Lid w/ Perfusion is a device which will provide a condensate free optical surface on the top of a Delta T Dish through which specimens can be perfused and trans-illuminated on an inverted microscope. Specimens can be perfused by attaching perfusion tubing to the ports provided. It is recommended to use the Biopetechs Micro-Perfusion Pump with the dual perfusion tubing for this purpose.

**Cooling Ring****Delta T Cooling Ring**

The Biopetechs Cooling Ring is an immersion device which absorbs heat from the specimen by providing a thermally conductive physical barrier between chilled fluid passing through the ring and the fluid surrounding the specimen. This cooling ring is made of autoclaveable 304 stainless steel and provides the microscopist with a convenient and inexpensive method of reducing the temperature of specimens in Delta T culture dishes. The cooling ring is supported on the stage adapter and translates along with the dish. It is easily flipped out of the way to enable easy exchange of dishes in the stage adapter.

**Brain Slice Adapter****Brain Slice Adapter**

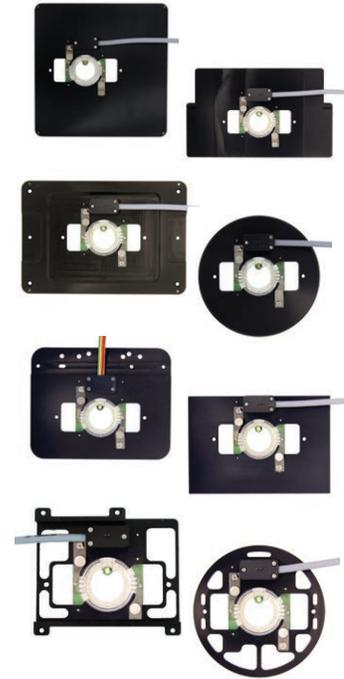
The Biopetechs Brain Slice Adapter is combined with the Delta T® Culture Dish System to provide a convenient method of observing thick cut sections of brain or other tissue in a perfusable, temperature controlled, optical environment on an inverted microscope. Perfusion ports are made of 304 stainless steel and are compatible with 1/16" tubing. As with all Biopetechs Delta T® Culture Dish Adapters, the specimen is adjustable in the Z axis plane to accommodate the working distance of the objective. Custom geometry adapters are available upon special order to accommodate specimens having unique geometry.



## Biotechs Delta T Stage Adapters

The Biotechs Delta T Stage adapter reads the temperature of the Delta T Dishes, provides electrical contacts to power the dishes and supports the dish on the stage for translation. All Delta T systems require a Stage Adapter. These pictures are provided to assist in selecting a stage adapter appropriate for your microscope.

### Stage Adapters



## Ordering Information

Part No.	Delta T
Bi-0420-4-Start	<b>Delta T Starter Kit - Heated Dish Stage</b> Incl: Delta T Controller, 10pk of Delta T Dishes, Coverglass Lid, Heated Lid with CO <sub>2</sub> port, Culture Cylinder Pack and Standard Stage Adapter
Bi-0420-4-03	<b>Delta T4 Culture Dish Controller</b>
Bi-04202003	<b>Delta T Culture Dish Stage Adapters</b> 96-Well Plate Sized
Bi-0420042105C	<b>Delta T Culture Dishes (10/pk)</b> 0.5mm thick glass (clear)
Bi-0420040500	<b>Delta TPG Uncoated (no temperature control) Culture Dishes (10/pk)</b> 0.5mm thick glass
Bi-0420201918	<b>Delta T Tissue Slice Adapter</b>
Bi-0420201919	<b>Delta T Brain Slice Adapter</b>
Bi-0420081601	<b>Delta T Hinged Perfusion Adapter Set (2/set)</b>
Bi-04200318	<b>Delta T Cooling Ring</b>
Bi-0420080316	<b>Delta T Perfusable Heated Lid</b>
Bi-070303-1919	<b>Glass Culture Cylinder Starter Set</b> (2, 4, 6, 8, 10 mm i.d x 5mm high)
Bi-070303-01	<b>Glass Culture Cylinders</b> -several sizes available
Bi-260700	<b>Boekel Warmer</b>
	Complete Biotechs product line available.

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

