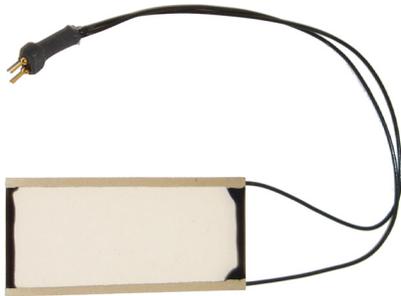




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Equipment for cellular & electrophysiology research

Transparent ITO heaters

HI-25p



CAB-HX



<200µm thick



- **Transparent glass heaters** for microscopy and/or patch clamping
- Suitable for **fluorescence** measurements (see fig)
- **Thin (HI-24p 180µm typ.; HI-24Tp 120µm typ. thick)** for short working distance objectives
- **Thicker (HI-22Dp, HI-25Dp, HI55Dp, HI57Dp 0.6mm typ.; HI-711p 1.1mm typ. thick)** for long working distance objectives
- **Uniform temperatures** inside 2mm edge
- Not damaged by **high** temperatures
- **Low resistance** (typ. 10Ω)

DESCRIPTION

The **HI-24p/HI-24Tp** and **HI-xxDp** Transparent Indium Tin Oxide (ITO) heaters are intended for microscopy and/or patch clamping applications. ITO is a transparent surface coating that is highly electrically conductive. The coating is on the non-tissue side of the glass. The heaters can be used for studies of acutely isolated cells or for cultured cells where slides can be placed in a chamber where the heater forms the bottom. The **HI-24p/HI-24Tp** heaters are very thin but with an epoxy “frame” edge cracking is much reduced and strength is significantly increased.

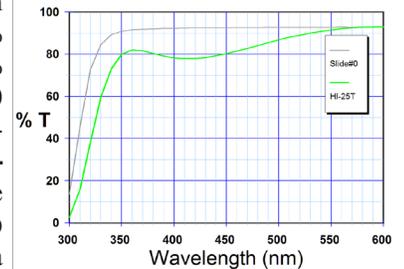
Application notes

In a typical application an ITO heater is used to form the bottom of a tissue chamber (eg. **BT-1-xx**). Where flowing solutions are used the **HPRE2** Pre-heater can be used to pre-warm solutions entering the chamber.

Although there is no reason deeper solutions can't be used over the ITO heaters, shallow solutions levels (<2mm) are typically employed. For these low fluid levels a miniature temperature probe (eg. **TH-10Km**) must be used to accurately measure the temperature in the tissue chamber.

Fluorescence microscopy

The **HI-24Tp** is suitable for fluorescence applications and where a short working distance lens is employed. The plot below shows that for wavelengths greater than 350nm transmission is greater than ≈80% compared to 92% with an uncoated #0 cover slide. Transmission for the **HI-25p/HI-24p** is a little less than the **HI-24Tp** because of the extra glass thickness.



Specifications-thin heaters

Construction: transparent indium tin oxide coated heater
Size: HI-25p: 50x22x≈0.18 Heated area ≈45x18mm
Size: HI-24p / HI-24Tp: 40x22x≈0.18 / 0.12mm thick. Heated area≈35x18mm
Size: HI-22p: 25x22x≈0.25 Heated area≈20x18mm
Resistance: HI-25p nom. 10Ω; **HI-24p** nom. 12.5Ω
Max. operating temp.: 70°C
Compatibility: Use with **TC2BIP** and **mTCII** with **CAB-HX**. Can be used with other controllers accepting 7-18Ω heaters.

Thick ITO heaters

Application: heating 30mm culture dishes, Nunc Lab-Tek chambers. Heater forms a platform for dishes/chambers.



HI-25Dp



HI-711Dp

Application notes

These are much thicker heaters (and stronger) than the heaters above which allows them to be used as a platform for culture dishes like the Nunc Lab Tek chamber and BD Supercell chambers. To allow for the lip on culture dishes a round 25mm #2 cover slide can be placed beneath the dish to improve heat transfer. Because of the larger volume of glass, solutions in the culture dishes (especially ones with plastic bottoms) will get to their operating temperature more slowly (over minutes). Glass bottomed chambers (eg. Nunc, BD) will be much faster (<30sec).

Specifications--thick heaters

Construction: transparent indium tin oxide coated heater
Size: HI-22Dp: 25x22x≈0.6mm thick
Size: HI-25Dp: 50x25x≈0.6mm thick
Size: HI-55Dp: 50x50x≈0.6mm thick
Size: HI-57Dp: 50x70x≈0.6mm thick
Size: HI-711Dp: 70x110x≈1.1mm thick
Resistance: nom. 7-15Ω
Max. operating temp.: 70°C
Compatibility: Use with **TC2BIP** and **mTCII** with **CAB-HX**. Can be used with other controllers accepting 7-18Ω heaters.