P4900 Micro-Incubator Dosimeter Development System
Technical and Usage Information

Installation Instruction:

The P4900 system is a top loading micro-incubator with 18 dosimeter wells designed specifically to heat treat B3 DoseStix and B3 WINdose dosimeters. The aluminum heating block incubator provides a faster, more uniform heating method of heat treating irradiated dosimeters than a typical air incubator and eliminates the temperature swings experienced while loading and unloading a typical box cavity air incubator.

The system is comprised of a heating base unit that houses the custom 18 well anodized aluminum heating block and a countdown timer that can be affixed to the incubator or used portably. The base unit has an integrated digital temperature display with temperature control and on/off switch. The unit is equipped with back panel jack for connection to an optional traceable digital thermometer for an independent recalibration of the unit's temperature controller (GEX Part# P4901). The anodized aluminum block is packaged separately from the incubator. Place the incubator on a flat, even surface, with unobstructed airflow around the incubator. Insert the aluminum block into the large well in the incubator. Connect the power cord and turn the unit on. After initializing, the set temperature can be readjusted by pressing SET and UP or DOWN arrows together.

Application:

Heat treatment of B3 radiochromic film dosimeters is a practice recommended to complete post irradiation development and stabilize B3 Dosimeters such as B3 DoseStix and WINdose dosimeter products manufactured by GEX. Controlled test results verify that an effective post irradiation heat treatment process will complete any post irradiation color development of B3 dosimeters and render them shelf stable for a period of one year or more when the dosimeters are stored at room temperature.

GEX developed the P4900 Micro Incubator Dosimeter Development System specifically for heat treatment of B3 DoseStix and WINdose dosimeters in their individual product packages. The P4900 system provides highly uniform temperature conditions (±0.5°C) within each package slot in the heat block.

The P4900 Development System can be further expanded by adding the optional P4901 Digital Thermometer to calibrate the system controller temperature and optional P4902 temperature probe to test the temperature in any of the 18 wells of the heating block.

GEX recommends using a time setting 5 of minutes at 58.5°C with all GEX B3 DoseStix and WINdose dosimeter product packages.

The effectiveness of the P4900 heat treatment process in providing complete color development and rendering B3 DoseStix and WINdose dosimeters shelf stable can be verified with a simple test. Irradiate 32 or more B3 dosimeters to a uniform dose anywhere between 5-15 kGy. Heat-treat the irradiated dosimeters for 5 minutes at 58.5°C and record the measurements. Re-measure the dosimeter set at periodic time intervals to evidence their stability over time compared with the results of the initial test.

GEX data suggests properly heat treated B3 DoseStix and WINdose dosimeters will remain stable for one year or longer when stored at room temperature.

If there is a need to verify that the P4900 is equivalent to an existing box air incubator, a second set of dosimeters irradiated to the same dose can be put through the box type incubator for heat treatment under its qualified settings to compare with the P4900 sample data for equivalence.

Calibration:

Individual company standard operating procedures will dictate the frequency of calibration of the components. Typical industry practices are:

- **Incubator** –Use GEX P8003 irreversible thermal labels or equivalent on the B3 dosimeter packages. Alternatively, use the incubator housing back panel connection to attach a calibrated temperature probe.
- **Timer** – Calibrated at periodic intervals, or at replacement.

Warranty:

The film development system is supplied with a one year manufacturer's warranty. User modifications are not warranted and are the sole responsibility of the user. See the manufacturer warranty information for more details. The P4900 is provided to GEX for resale under the Hybex label owned by SciGene, Inc., Sunnyvale, CA. Please contact GEX for after sale warranty and technical support.

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Specifications:

Incubator

Electrical	115V or 220V AC; 250 W
Weight	5.2 lbs (2.4 kg)
Footprint	6” x 12” (14 cm x 30 cm)
Temperature Range	Ambient +5°C to 99°C
Temperature Regulation	±0.2°C
Heat up Time	>5°C/ min
Temperature Controller	Digital PID, single loop
Temperature Display	Actual or Set Temperature LED
Thermometer Output	T-type Thermocouple

Aluminum Heating Block

Mechanical	Anodized Aluminum 18 WINdose or DoseStix capacity 2.5”H x 3”W x 6”L 4.82 lbs (2.2 kg) Demountable Bottom for Cleanup
Temperature Uniformity	Less than or equal to 0.5°C

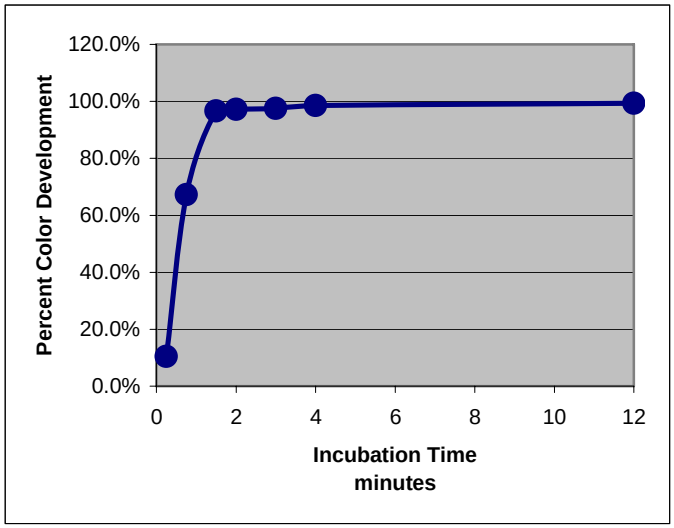
Timer

Size	1.125” x 2.44”
Alarm	Audible
Functions	Count-down, Count-up, Clock, Stopwatch, Memory
Display	1/2 “H, 6-digit LCD
Resolution	1 sec
Range	24 hrs to 1 sec
Accuracy	0.01%
Weight	Less than 1 oz (less than 16 g)

Note: Al holder block shown outside of the incubator is shown as visual aid. The aluminum block is maintained inside the main cavity of the incubator at all times and is only removed for periodic cleaning. Turn the power off when block is removed from the incubator’s cavity.

Heat Treatment Method Comparison

Results are shown of testing of the P4900 Micro-Incubator Dosimeter Development System against a qualified post irradiation heat treatment process using a Fisher Isotemp Model 637D Incubator.



Graph depicts results obtained with the P4900 unit set to temperature of 58.5°C for various time periods plotted as a percent of B3 dosimeter color development compared against the results obtained from a 15 minute 58.5°C Fisher box air incubator cycle.

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