



## Annealing Ovens for Thermoluminescence Dosimetry

Choose from three different temperature controller models and two heating chamber dimensions to fit your exact needs. If a single temperature setting is all you need, then choose the Model TL-925 or TL-925-35 with a single setpoint automatic control. If programmability is desired, choose TL-925-80 or TL-925-835, allowing you to select up to four ramps and four dwells, while Models TL-955 and TL-955-35 allow you to select up to eight ramps and eight dwells, plus offering you an RS-232 communication link.

All models offer fast heat with a minimum temperature gradient through the use of open coil heating elements on both sides of the chamber. Maximum heating efficiency is achieved through the use of thermal-efficient ceramic insulation surrounding the chamber. Preventing heat loss around the door has been achieved by using a free-floating ceramic fiber door, including a chamber plug that totally seals when the spring-loaded door is closed. A door safety interlock switch is provided to disconnect power to the heating elements whenever the door is opened to provide increased operator safety. Removal of undesirable contaminants and moisture is made easy by means of the built-in venting system. Injection of special atmospheres or the monitoring of chamber temperature with an independent measuring device is made easy by using the 3/9 in diameter port located at the rear of the chamber.

All controls are equipped with a dual fluorescent display of both the actual and the setpoint temperature values. The top display indicates the actual temperature measured by the thermocouple. The bottom display shows the setpoint temperature selected by the operator.

Programmable temperature controls give the operator the ability to expand the capabilities of a single oven. The operator can program the rate of temperature rise or fall (RAMP), and the period that the temperature holds at a specific level (DWELL), at different temperature levels. RAMP rate is programmable in degrees per minute, and the DWELL periods in increments of 0.1 to 999.9 minutes. Controls also feature a "Holdback" function. If the oven is not able to heat or cool at the rate that has been programmed, the program will stop and wait for the temperature to catch up.

Model	cu. in.	Control type
TL-925	120	automatic, single setpoint temperature control
TL-925	350	
TL-925	120	eight segment programmable temperature control
TL-925	350	
TL-925	120	sixteen segment programmable temperature control, RS-232
TL-925	350	

All models come complete with an on/off switch, thermocouple, and grounded three-wire cord and plug. 220 V 50/60 Hz models are available on special order.

### Features:

- ▶ Temperature display of both setpoint and actual temperature values in °C and °F
- ▶ Over-temperature protection
- ▶ Thermocouple break protection

### Specifications

Temperature range: ..... 100 – 1200°C, 212 – 2192°F  
 Power: ..... 110 VAC, 50/60 Hz, 8.3 A, 1000 W  
 (240 VAC, 50/60 Hz optional)

TL-925, TL-925-80, TL-955

Chamber dimensions: ..... 12.7cm W x 10.2 cm H x 15.2 cm D  
 (5 x 4 x 6 in)

Chamber volume: ..... 1966 cm<sup>3</sup> (120 cu in)

Overall dimensions: ..... 28.5 cm W x 47 cm H x 56 cm D  
 (11.3 x 18.5 x 22 in)

Weight, net/ship: ..... 16.7 kg (37 lbs) / 18.5 kg (41 lbs)

TL-925-35, TL-925-835, TL-955-35

Chamber dimensions: ..... 18 cm W x 13 cm H x 25 cm D  
 (7 x 5 x 10 in)

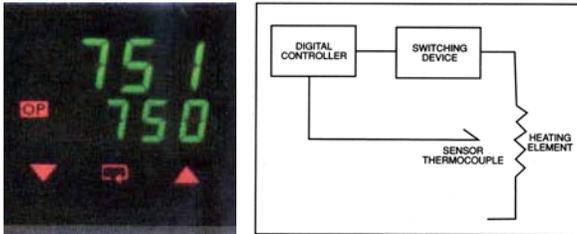
Chamber volume: ..... 5735 cm<sup>3</sup> (350 cu in)

Overall dimensions: ..... 34 cm W x 49 cm H x 68.5 cm D  
 (13.3 x 19 x 27 in)

Weight, net/ship: ..... 25 kg (55 lbs) / 27.2 kg (60 lbs)

## Oven Temperature Controls

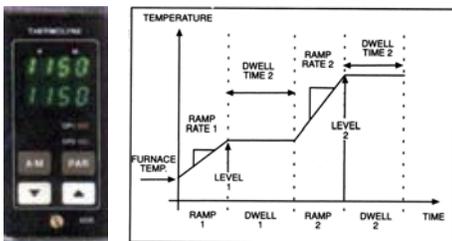
### Automatic Single Setpoint Temp. Control



An automatic or single setpoint type of control is used to precisely control the oven at one selected temperature. The operator sets the control to the desired temperature and the oven heats up to this level automatically. No supervision by the operator is necessary. A fluorescent digital display is provided for easy viewing of the actual setpoint temperature values at all times.

Both automatic and programmable controls are closed loop systems. In a closed loop situation, the temperature sensed by the thermocouple gives a feedback signal directly to the microprocessor control that regulates the power to the heating elements.

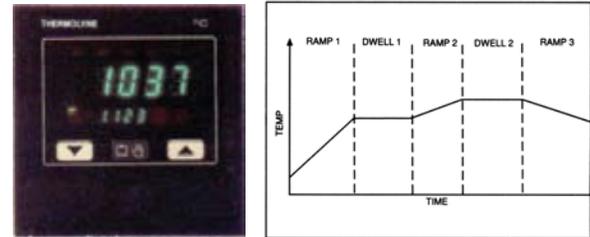
### 8-Segment Programmable Temp. Control



A programmable control allows the operator to program the rate of increase and decrease (RAMP), and the period of time the temperature holds at specific levels (DWELL). The eight segments include four ramp and four dwell segments. A typical temperature profile is shown.

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### 16-Segment Programmable Temp. Control



A programmable control of this type operates very similarly to a four segment control. The main difference is that this control is supplied with sixteen programmable segments, including eight ramp and eight dwell segments. In addition, a bidirectional RS-232 communication port allows the operator to control the oven operation from a computer. A typical temperature profile is shown below.

### Accuracy

Control accuracy is the measurement of overall error that the control device can add to the entire control loop of the heating system. It is not a measurement of the entire thermal system but only of control itself. This measurement is usually expressed as a percentage of the operating span (range) of the control. Other factors of the entire thermal system can add additional error to the overall performance of the oven's ability to maintain set temperature. These factors include:

- ▶ The selected operating temperature
- ▶ Size and density of material being heated
- ▶ Position of the material inside the heating chamber
- ▶ Line voltage variations
- ▶ Thermal lag during the heat up
- ▶ Temperature gradients within the heating chamber

The selected operating temperature is the most important factor in determining the accuracy of the oven operation. It is difficult to design an oven to operate with the same level of accuracy over the entire operating range. Operation below 260°C will require considerable time for any type of control to provide a stable temperature; variations above and below the setpoint may be 20°C or more.



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