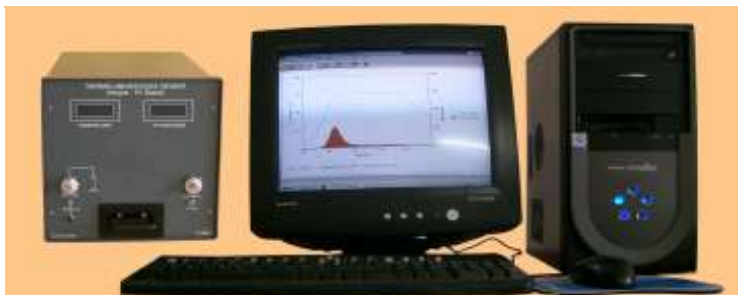


## PC CONTROLLED THERMOLUMINESCENCE READER TYPE : TL 1009I

### Technical Data



#### FEATURES :

- Micro Controller based Integral system and works as a PC controlled TL Reader.
- Built-in serial port facilitates connection to PC
- Heating rates are 1°c/sec to 40°c/sec.
- Max. set temperature 500°c.
- Heating profile : Linear , Linear clamped.
- Software features include glow curve, acquisition, display, filing, printing, processing etc.

Thermoluminescence Reader Type TL1009 designed and offered by NUCLEONIX SYSTEMS is a versatile controller based unit, facilitating the user to subject the TL sample under study to the desired heating profile, to record the digitized TL glow curve. This unit stores both integral value and digitized glow curve into EEPROM memory.

This unit records the data in 200 channels, temp, TL intensity & Run time values.

Entire electronics including PMT, HV bias, Temperature controller circuit, Heater transformer heater strip, sample drawer assembly, data acquisition electronics is all integrated into a single enclosure.

The user interface to the unit is through a powerful software GUI, coded in VB which runs on Windows platform. This system essentially works as a **PC controlled TLD reader** with command buttons and dropdown menus defined for various functions. Built-in small keypad and visual indication through a 20x4 LCD dot-matrix display provide limited functions to the user which essentially serve the purpose of checking the majority of the unit hardware functionality.

Built-in serial port in the unit facilitates the user to connect it to a PC for GUI and to achieve full functionality.

### HARDWARE SPECIFICATIONS

#### PMT housing and TL sample heating assembly :

This unit has a photomultiplier Tube generally of Hamamatsu / ET make, is used. However, assembly facilitates one to go in for other photomultiplier Tubes also with appropriate modification in the PMT socket wiring.

The cylindrical shell containing the Photomultiplier is fitted on to a rectangular base drawer block containing a heater arrangement and thermocouple, heater rods, connected to a power transformer.

#### Heating Arrangement :

Resistive heating method.

#### Heating Element : (Heater Strip )

Kanthal strip (72% Fe, 23% Al and 2% Cr or Nichrome) is used as a heating element. Kanthal Strip has a circular depression of 14mm to hold discs and powder samples.

#### Heating Process :

Programmed heating can be done in two modes:

- i. "PROG MODE" of Temp. controller through personal computer program.
- ii. "ISO MODE" (Internal mode) of Temperature Controller, by varying the ten turn dial.

#### Temperature Sensor :

Thermocouple Sensor (Cr-Al spot-welded to heater strip).

**PMT Cooling :** Thermoelectric cooling arrangement for the PMT is provided.

**High voltage to PMT :** A continuously adjustable HV (0-1500V) @1mA is generated by HV circuits. User can select desired HV from front panel. There is HV socket (test) for checking HV presence on rear panel.

**Auto-Ranging :** Current output from the photomultiplier is taken to I-F converter, to give frequency output proportional to PMT current. This wide dynamic range is achieved for plotting TL intensity on Y-axis

**Temperature range :** From room temperature upto 500°c, in linear, linear clamped mode of heating can be programmed.

**Heating Rates :** Heater strip can be programmed to heat the sample from 1°c/sec upto 40°c/sec and a max set temperature (allowed) is 500°c.

#### Arrangement for Optical Filters :

One Heat absorbing glass / filter (IR cutoff filter) : This is essentially an IR cut-off filter which allows only visible light and cuts-off IR Radiation has been provided just below the PMT window. Additionally filters (Band pass) if required by the user may be positioned above with IR filter.

#### Nitrogen Flushing Nozzle :

Nitrogen gas flushing (sent through a flexible rubber pipe), suppresses spurious luminescence from oxidation effects & combustion phenomena has been provided.

#### Dimensions of Integral unit:

25.5W X 26ht. X 48D

**SOFTWARE FEATURES**

**File handling :**

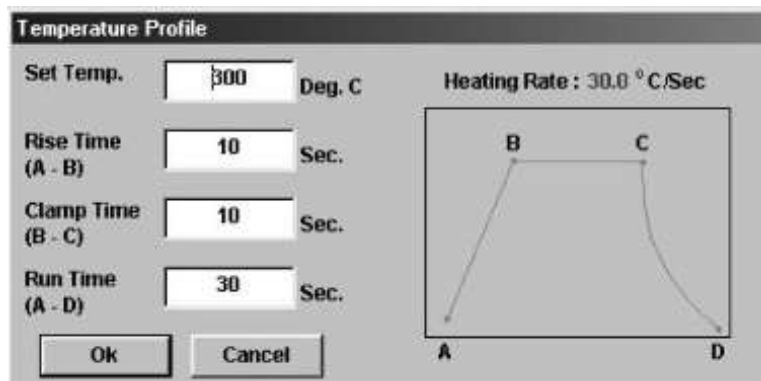
The features include file (Glow curve data) saving, Retrieving, printing & overlapping.

**Configuration :**

This menu facilitates the user to set comport, perform temperature calibration, set temperature profile.

**Data acquisition :**

Data acquisition, display, plotting, download, setting sample type etc are featured under this menu.



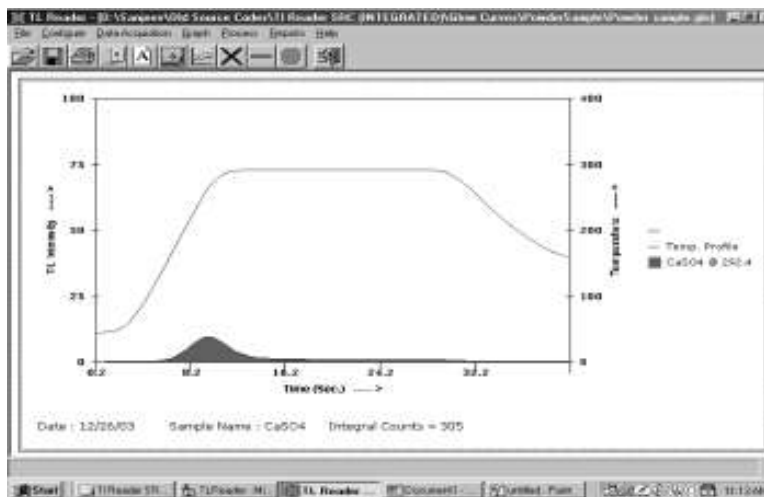
**Fig : Temperature Configuration Menu**

**Graph & Process :**

Setting of Y-scale factor , 3-point smoothening of glow curve, data multiplication and subtraction functions etc are configured under this menu.

**Reports :**

Reports for fixed geometry samples as well as for powder samples are generated through this menu, to give dose equivalent of the sample under study.



**Fig : Typical TL Glow Curve**

**APPLICATIONS**

TL Phosphor Characterization, Medical Dosimetry, Personal Monitoring Research, Archeology dating, Environmental Radiation Monitoring, Medicine, Biology, Neutron Dosimetry, Reactor Engineering, High Level Photon Dosimetry with TL materials, standardization and inter comparison of TL dosimeters used in personnel monitoring etc.

**OPTIONAL ACCESSORIES**

**A. TL Materials & Phosphors**

- (i) TL Phosphor CaSO<sub>4</sub>: Dy Powder
- (ii) TL Discs CaSO<sub>4</sub>: Dy discs with Teflon base 13.5mm dia X 0.8mm thick.

**B. Annealing Oven**

Internal Dimensions 30cm X 30cm X 20cm  
 Temp Range : upto 450°C  
 Temp Indication: Digital