

INDUSTRIAL HYGIENE EQUIPMENT PROCEDURES

HNU MODEL PI 101

4/93

OBJECTIVE

To provide instructions on the proper use and limitations of the HNU photoanalyzer.

DISCUSSION

The HNU measures the concentration of trace vapors and gases present in the atmosphere by photoionization. Photoionization occurs when a molecule absorbs a photon of sufficient energy to release an electron and become a positive ion. This will occur when the ionization potential of the molecule in electron volts (eV) is less than the energy of the photon. The source of photons is either a 10.2 or 11.7 eV lamp.

Sample gases enter the inlet into the ion chamber and are exposed to photons emanating from the ultraviolet lamp. Ionization occurs for those molecules having ionization potential near to or less than that of the lamp.

A positive biased polarizing electrode causes these positive ions to travel to a collector electrode in the chamber thus causing an electrical current which is displayed on the meter. This reading is proportional to the concentration of the gas and to the sensitivity of that gas to photoionization. The amount of ionization of a species of gas exposed to photons, its sensitivity, is characteristic of that particular species.

There are two probes. The 10.2 eV lamp probe permits measurement of species having ionization potentials below 10.2 eV. The 11.7 eV probe permits measurement for species having ionization potential below 11.7 eV.

NOTE: This instrument will not identify unknown organics. If there is a mixture of organics, there will be interference among the readings. There are ways around this if all of the organics are known. The HNU can, however, be used to identify the presence of organics.

A chart is taped to the HNU which contains information on the correct probe, SPAN control and factor for the specific chemical being sampled.

EQUIPMENT

- HNU PHOTOIONIZATION METER

- 10.2 eV and 11.7 eV PROBES
- IH SAMPLING NOTES FORM

PROCEDURE

1. Select the probe to be used (see chart on the side of HNU) and connect the probe cable plug to the 12 pin keyed socket on the readout assembly panel. (If the chemical to be sampled is not listed, contact the ES&H Section to calibrate the instrument for the desired chemical.) Carefully match the alignment slot in the plug to the key in the connector. Screw down the probe connector until a distinct snap and lock is felt.
2. Turn the function switch to the BATT (battery check) position. The needle on the meter will go to the green zone if the battery is fully charged. Do not use the HNU if it is not fully charged. Mark on the IH Sampling Notes form if the battery is charged. Allow meter to reach ambient temperature before taking measurements.
3. Set the SPAN control pot to the desired value based on the gas to be used (See chart on the side of HNU).
5. Turn the function switch to the STANDBY position. Turn the ZERO adjustment to zero the meter.
6. Turn the function switch to the desired measurement range. Multiply the reading by the appropriate factor (see chart on the side of HNU). Record the reading on the IH Sampling Notes Form.
7. Use the reading to consult the calibration chart for the chemical sampled. This is maintained by the ES&H Section. This will determine the actual concentration. Record the reading on the IH Sampling Notes Form.