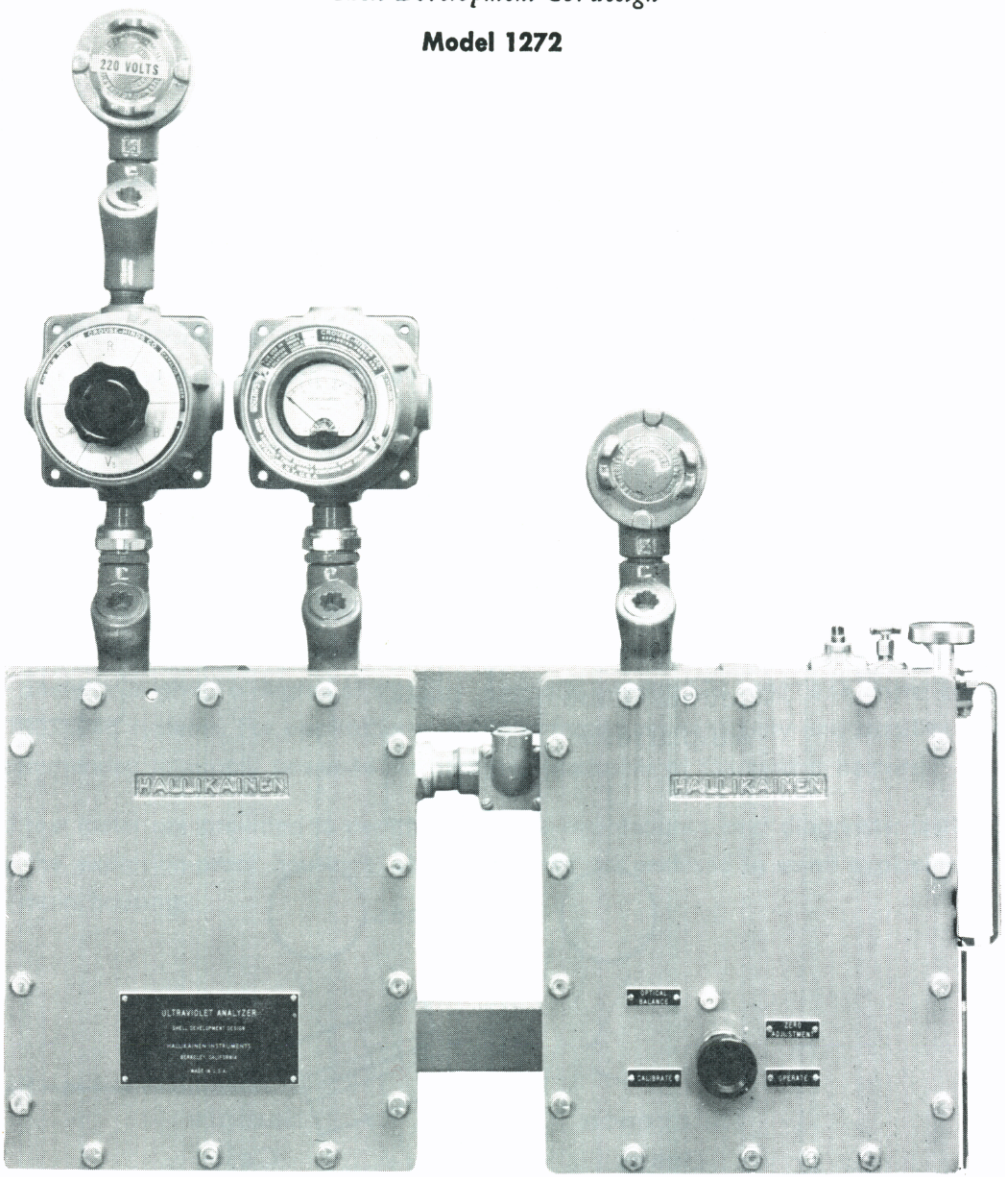
HALLIKAINEN *Instruments*
INDUSTRIAL and SCIENTIFIC
750 NATIONAL COURT, RICHMOND, CALIFORNIA, 94804

# ULTRAVIOLET ANALYZER

*Shell Development Co. design*

**Model 1272**




**FEATURES**

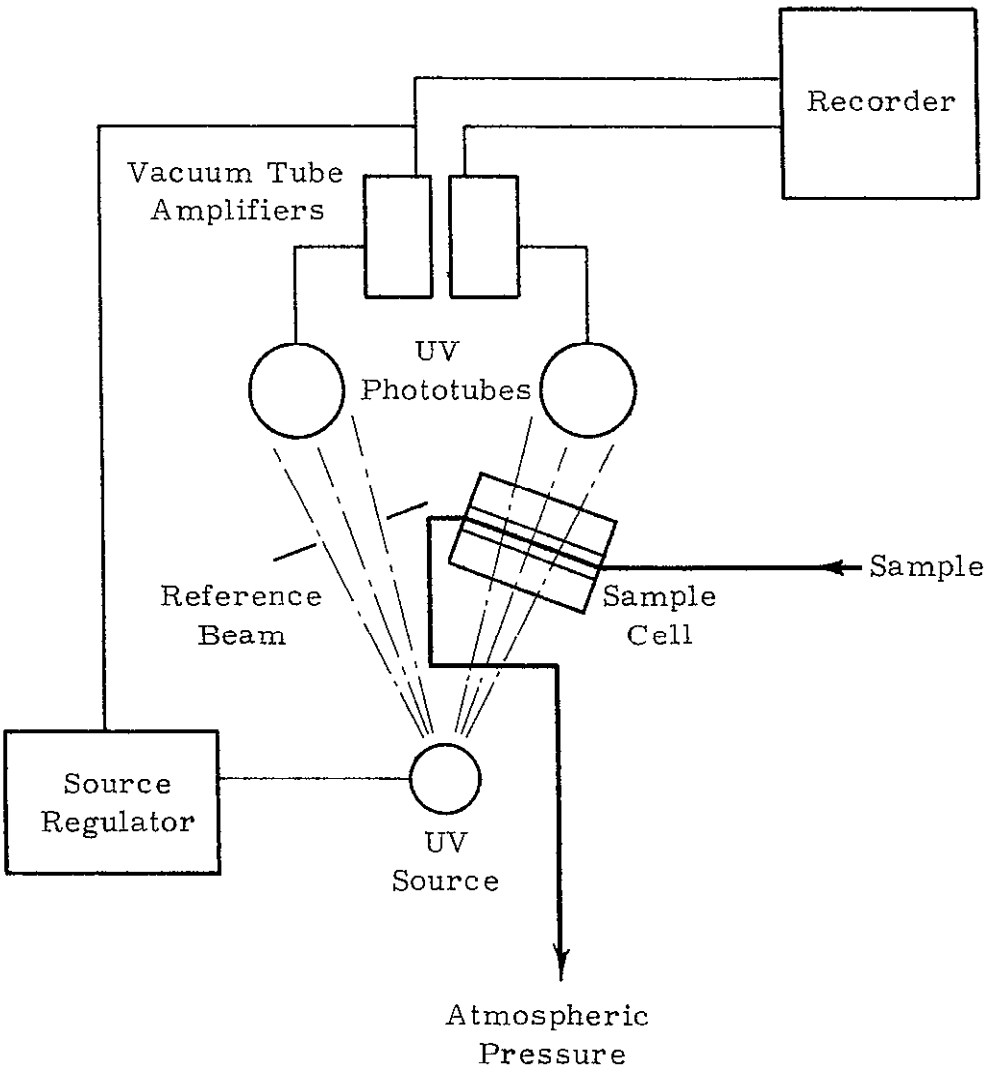
- True Continuous Analysis for Aromatics, Diolefins, Mercury Vapor, etc.
- Fast Response — less than one second.
- Simple Differential Photometer — No prisms, lenses or mirrors; no chopper.
- Electronic Source Current Regulation.
- Built-in Shutter for Zeroing and Calibrating.
- Built-in Test Circuits and Meter for Preventive Maintenance and Diagnostic Testing.
- Explosion-proof Construction.

## PROCESS STREAM ANALYSIS BY ULTRAVIOLET ABSORPTION

The Hallikainen Model 1272 Ultraviolet Analyzer (Shell Development Design) is a simple, rugged analyzer for the continuous measurement of a wide variety of ultraviolet-absorbing components in process plant streams. The analyzer is available for either gas or liquid analysis. Organic compounds such as aromatics, diolefins, ketones, and aldehydes may be determined from a few parts per million, in some cases, to high percentages. Inorganic gases and vapors such as ozone, chlorine, and mercury vapor may also be measured.

## GENERAL DESCRIPTION

The two major components of the analyzer are the optical unit and the electronic unit. In addition to these main units there are the test switch, test meter, and a constant voltage transformer (transformer used in applications requiring high sensitivity not supplied as standard equipment). All components are enclosed in explosion-proof housings as shown above. (Test switch and meter not shown). Any standard millivolt recorder (0-10 mv.) (not included as standard equipment) may be used with the analyzer. The recorder may be installed remotely up to 500 feet from the analyzer. Zero and span adjusting potentiometers are supplied for mounting in recorder.



## OPTICAL UNIT

For utmost simplicity and reliability a simple differential photometer is used in the analyzer (see block diagram). Ultraviolet radiation from a single source is divided into a measuring beam and a reference beam. The measuring beam passes through the sample cell and falls on one phototube, and the reference beam passes through a similar aperture (and collimating tube in gas analysis applications) and falls on a second phototube. When the concentration of an ultraviolet-absorbing compound in the sample cell changes, the UV transmission through the cell changes, resulting in a corresponding change in current in the measuring phototube. The difference between the two phototube currents is displayed on the recorder, which is coupled to the phototubes through a simple differential cathode follower amplifier.

The standard source is a mercury vapor lamp radiating primarily at 2537 angstrom. This source is useful in most applications, but other sources are available on special order. The phototubes are conventional ultraviolet-sensitive vacuum phototubes.

A unique cylindrical shutter, surrounding the source and operable from a knob on the lid of the optical unit, facilitates the checking and adjustment of zero and span in plant service. The cylinder is electrically heated and thermostated to provide a constant temperature environment for the source to ensure stability.

## ELECTRONIC UNIT

The electronic unit contains an electronic current regulator for the ultraviolet source. This regulator controls the source current to maintain constant output from the reference phototube despite line voltage variations, source aging, etc. By this means the analyzer is given a degree of stability normally obtainable only with more complicated and more expensive ratio recording systems. For applications requiring maximum sensitivity and stability a constant voltage transformer is recommended to supply power to the analyzer (exclusive of thermostat heaters).

A test switch and test meter are provided to permit preventive maintenance and diagnostic testing in the plant area without opening the explosion-proof housings. These test units are enclosed in small explosion-proof condulet boxes attached to the main housings.

## SPECIFICATIONS

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|---|---|
| Source: | Mercury vapor lamp (2537 angstrom radiation) standard. Other sources available on special order. |
| Sample Cell: | Liquid or gas cell available in lengths from 0.1 mm. to 10 cm. Longer cell available on special order. Provisions made for heating sample cell when necessary. |
| Detectors: | Ultraviolet-sensitive type 935 vacuum phototubes. |
| Power Requirements: | 115 Volts, 50 cycle AC, 1 amp. |
| Recorder: | Any standard millivolt recorder (0-10 mv.) may be used. Zero and span adjusting potentiometers required for mounting in recorder. |
| Overall Dimensions: | 30″ wide x 25″ high x 11″ deep. (approximate). |

## APPLICATIONS

Some examples of analyses that can be made with the Model 1272 Ultraviolet Analyzer are:

Benzene in raffinate from aromatics concentration unit.

Toluene in hydrocarbons

Xylenes in hydrocarbons

Aromatic vapors in air

Diolefin vapors in air

Isoprene in hydrocarbon solvents

Butadiene in hydrocarbon vapors

Benzene in ethyl alcohol

Phenol in water

Chlorine in air

Ozone in air

Mercury vapor in air.

**Note:** In general only one ultraviolet-absorbing compound may be measured in a non-absorbing background. Two or more UV-absorbing compounds normally cannot be distinguished from one another.