



Ultra-sensitive modular CHEMILUMINOMETER UniLum X37.2

Ultra-sensitive modular CHEMILUMINOMETER UniLum X37.2 – is the cost effective instrument, developed by the **iOPTICA** team especially for application for clinical and scientific medicine, and food industry.

At present CHEMILUMINOMETER UniLum X37.2 is under patenting.

Chemiluminescence is the light emission accompanying some chemical reactions. Chemiluminescence accompanies energetic red ox reactions, e.g. interaction of two radicals or reactions where peroxides are involved. Intrinsic (“ultra weak”) chemiluminescence of human and animal cells and tissues is a result of reactions of free radicals, including nitric oxide and radicals of oxygen and lipids; all these substrates are vitally important for the organism life and, under certain conditions, responsible for development of a variety of pathological states

Chemiluminescence investigation methods find an application in **food industry**:

- In estimation of foodstuffs preservation state,
- In oxidizing stabilizers selection,
- In microbe insemination detection in meat, milk and other foodstuffs.
- in sugar syrup detection in honey by express analyses.
- determining antioxidant rates in food products and mechanisms of antioxidant impact.
- carrying out express analyses of food products in a rapid way (10 minutes) using at the same time very small amounts of products tested.

Chemiluminescence investigation methods show themselves to advantage in **agriculture**:

- In selection of plants, resistant to environmental factors pressure, in herbicides impact investigations.
- They are also used in cattle-breeding in diagnostics of diseases, for instance, tuberculosis, brucellosis, etc.

Perspective is application of chemiluminescence investigation methods in **medicine**, pharmacology and particularly in cosmetology for estimation of impact of pharmacological and cosmetic preparations on an organism aging process.

Features

CHEMILUMINOMETER UniLum X37.2 consists of three main modules:

1. Basic module

The basic module contains:

Highly sensitive photometric converter.

It operates in the photon counting mode and has a unique, for this class of devices, auto calibration system.

- The instrument can be equipped with photometric converters of two kinds:
- **Photon Counting Module "PCM 9885"** (www.ioptika.com)

- **Photon Counting Module** on the technology basis of MPPC[®] -(Hamamatsu Photon.)
Power supply unit.

2. Cuvette Compartment.

The Cuvette Compartment contains a temperature and mechanical stirrer controllers. In case of need to carry out particularly precise measurements the instrument can be completed with the **SmartCuvette** Compartment[©] – where the cuvette has the built-in temperature sensor. The temperature range 15 - 45°C (± 0.2°C).

The **SmartCuvette** was developed by our team and at present it is under patenting.

Against a specific order we can deliver the instrument with the roundabout cuvette system adjusted for work with a disposable disc cuvette (12 hemisphere cells, volume of an assay sample: 1.0 ml), with automatic drive rotary actuator.

Luminescence / fluorescence Investigation module.
At present the module is under development

Specifications

The CHEMILUMINOMETER provides exceptional sensitivity for all luminescent assays. Proprietary circuitry and an advanced highly sensitive photometric converter produce unmatched signal-to-noise ratios.

- The detection limit is: Dark Count 30 s⁻¹ (max) – (PCM 9885)

Spectral Response Range:

300-650 nm (PCM 9885); Peak Wavelength: 450 nm.

320-900 nm (MPPC); Peak Wavelength: 440 nm.

With greater than 7 decades of linear dynamic range.

- The extended dynamic range of the **UniLum 37 X2** minimizes the chance of the detector saturation, and allows one to measure brighter samples.

- Flexible Sample Compartment accommodates 5 mL cuvettes (max).

Diameter of the cylindrical cuvette is 10 mm.

Volume of an assay sample: 0, 5 – 3 ml. Addition of reagents during a measuring process.

- Mechanical stirrer. Rotary axis speed :10 - 250 об/min.

- Built-in Light Standard provides a quick and easy way to verify the performance of the **UniLum X37.2**. It allows the user to check the reproducibility, sensitivity, and linearity of the **UniLum X37.2**.

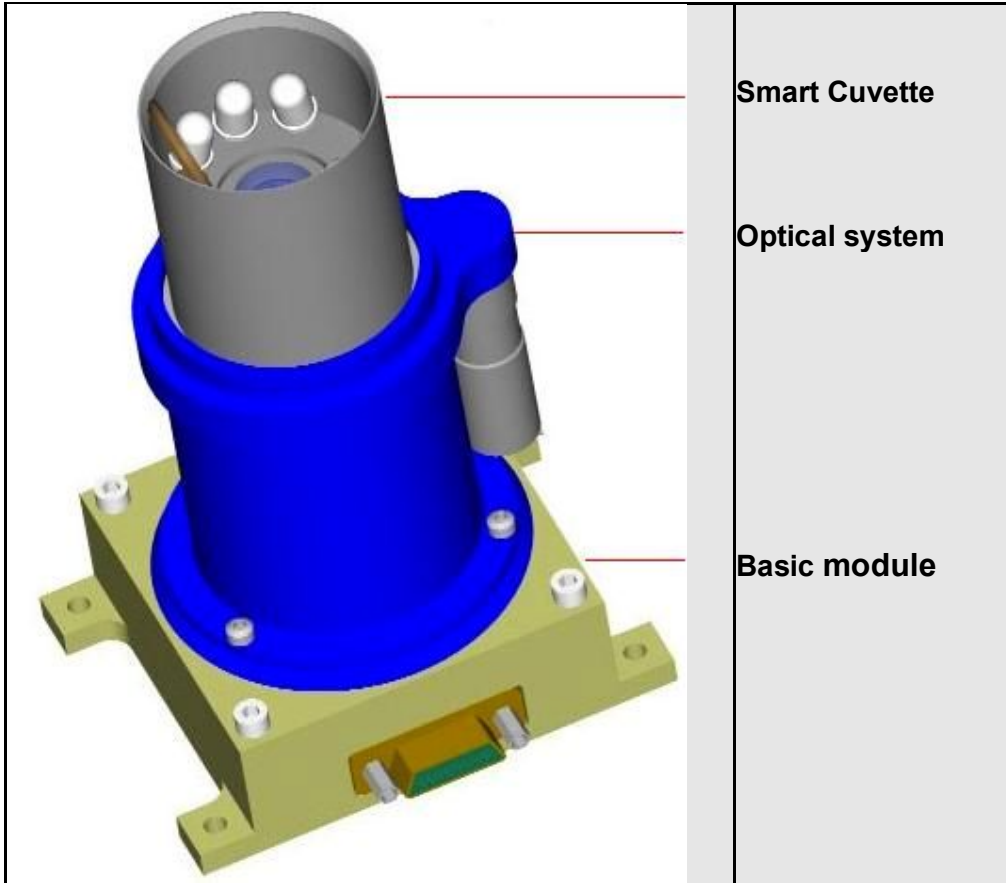
- Interface:USB -2.0.

- Power: 5V, 0.5A .

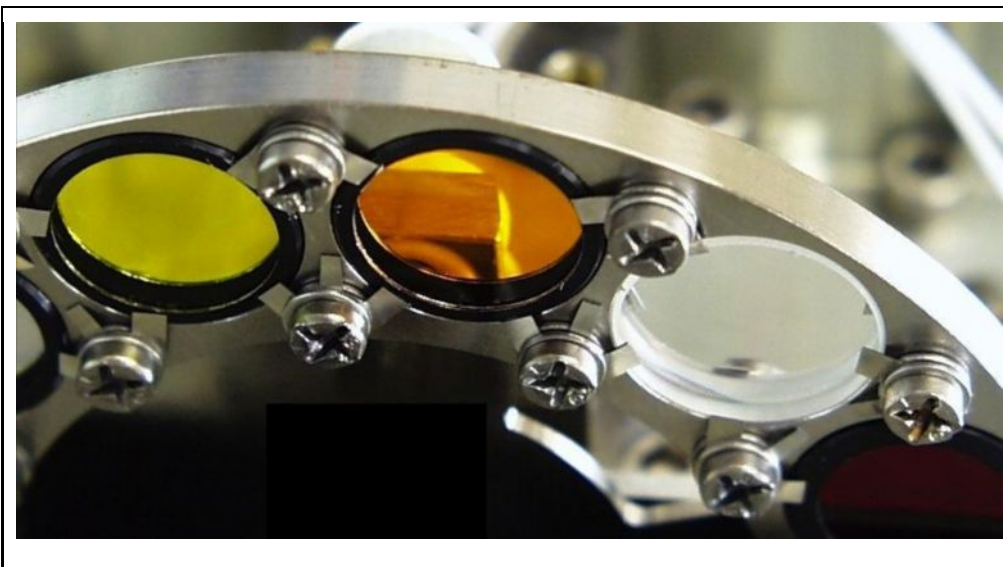
- Dimensions: Cylinder (160 mm D x 270 mm L).

- Weight: not over 1.0 kg.

UniLum X37.2.
Preliminary design

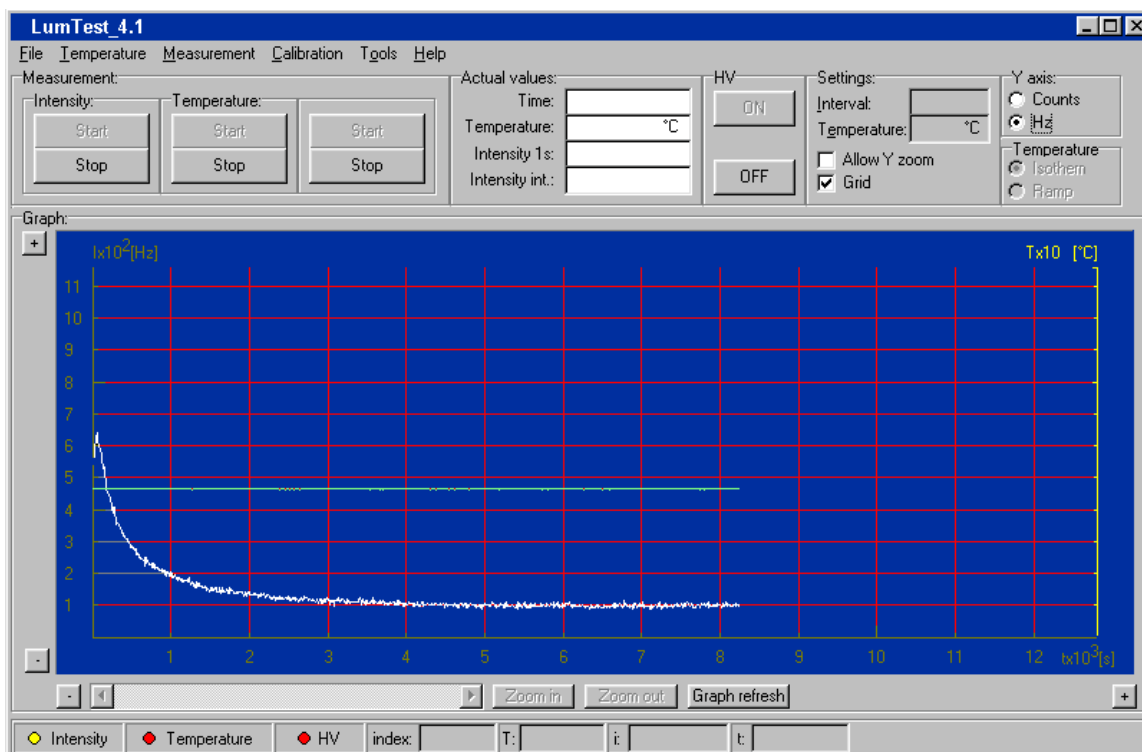


Optical filter unit



LumTest_4.1.1

Control and data acquisition by PC (Windows® XP/Windows® 7)



LumTest_4.1.1

Software for acquisition, processing and analyses of experimental data & Instrument control software.

Software complete set consists of:

- Instrument control software;
- Software for acquisition,
- Processing and analyses of experimental data;
- Practical methods of carrying out measurements and investigations.

In case of configuration of the instrument the **LumTest_4.1.1**. Software resets automatically.

Operational potentialities

Registration and visualization of data in the real time mode.

Adjustment of gain and calibration of the device.

Mathematic data processing, including filtration, data smoothing, statistic analyses, etc.

Specific software for analyses of reaction kinetics.

Data export in graphic and digital formats.

Unification of all these parts into a single whole will allow us to developing the complete product:

Chemiluminometer **UniLum X37.2** – a modern High-Teck hardware/software complete set, intended for registration of ultra weak chemiluminescence, accompanying biochemical reactions, physical and biological processes going on with participation of free radicals. It is purposed for application by a wide range of users.