

# URANUS 3

## Fluorimeter

○ MEASUREMENT OF URANIUM IN THE ENVIRONMENT, INDUSTRY AND HEALTH

### □ APPLICATIONS

- Drinking water quality testing
- Dosage of natural water
- Qualification of mine water discharge
- Analysis of uranium in phosphates, oil shales
- Pollution monitoring
- Expertise



- Device dedicated to the measurement of dissolved Uranium
- Minimal sample preparation after Uranium solution treatment
- Optimised detection process of the Uranyl ions fluorescence for a concentration range of 0.2 ppb to 100 ppm
- Accepts most commonly available fluorescence cell sizes
- Direct measurement or measurement by addition of solutions of known concentrations
- 1 to 10 calibration points
- Portable device, no moving parts, sturdy and impact resistant
- Ergonomic and simple to use, navigation by menus on tactile screen
- Automatic range adjustment
- Display of the measure in progress and current settings
- Data storage capacity : 10 000 time-stamped measures
- PC link via USB.
- Parameter settings and data reading with the *Fluo-Reader* software

Specifications



# URANUS 3

## Fluorimeter

# SPECIFICATIONS

### Operating principle

A liquid sample containing Uranium exposed to UV radiation will emit a fluorescence in the green visible spectrum, which intensity is proportional to the concentration in Uranium.

Measures with solutions of known concentrations allow this phenomenon to become quantitative.  
Fluorescence is improved by the addition of a complexing agent.

### Description

The optical setup is made up of:  
A vial containing the sample to be analysed.  
A UV light emitting diode coupled with a selective optical filter.  
The detection unit is made up of a selective optical filter coupled with a photomultiplier.  
The value measured for each sample is assessed with the results from solutions containing known concentrations of uranium.  
Calculations are carried out electronically.  
Result is the mean value of 1 -2048 measurements

### Excitation

Light emitting diode (LED  $337 \pm 12$  nm/ 400  $\mu$ W) and band pass filter  $340 \pm 10$  nm.

### Detection

Band pass output filter  $515 \pm 22$  nm. Eliminates UV and IR wavelength contributions, improving selectivity.  
Miniature Hamamatsu Photomultiplier 22.5 x 22.5 x 50 mm, adjustable gain.  
The adjustable gain allows an increased range of detection.  
90° emission – reception angle

### Quantity measured: $g/m^3$ (SI units)

**Measure range:** from 0.2 ppb\* to 100 ppm  
(\* measuring conditions: quartz vial, with complexing agent,  $T=15^\circ C$ ).

**Repeatability** better than 1%

**Temperature sensor:** precision  $\pm 1^\circ C$

### System management

16 bit 96 MHz micro Controller on Single Board Computer  
18 bit Analog to Digital Converter.

**Backlit LCD tactile screen** 320x240 pixels.

### PC connection

by USB2  
**SRAM** allowing a storage capacity of 10k/128k measures (Std/on request)

### Operation

Local menu navigation by tactile screen.  
Auto test on powering  
Permanent auto check  
Automatic standby when idle (adjustable)

### Accepted cell sizes:

Rectangular 10x10x40 or 12.5 x22.5 x40  
Cylindrical, dia 8 to 25 mm  
Recommended materials: Quartz or glass

### Operating modes:

**Standard:** comparison with reference values.  
**Addition:** by addition of a solution of known concentration.  
**Uncalibrated:** fluorescence count mode

### Display of:

the result in the selected unit ppm, ppb, mg/l,  $\mu g/l$   
the standard deviation  
the operating parameters

**Power:** External power source 12V 500mA

### PC monitoring allowed via USB

### Housing:

Aluminium  
H\*L\*D: 225\*90\*225 mm  
Weight: 3.5 kg

### Operating conditions:

$+10^\circ C$  to  $+45^\circ C$ , 10-90 % relative humidity.

### URANUS 3 is supplied with :

- Lockable carry case
- USB connecting cable
- Exploitation software *Fluo-Reader*
- Certificate of verification
- User manual

## Fluo-Reader

PC software operating under Microsoft Windows Vista, 7, 8.

Communication with Uranus 3 via USB

The software will allow:

- Reading of the data recorded by the instrument and storage in text format files, Excel compatible.
- Initialisation and operating parameters setting

## References

URANUS3

P-542-100

Consumables : Certified U Standard solution, High purity chemicals for making enhancing solution Fluran type)

10x10 mm cell Adapter