since 1952 safas monaco since 1952

technological leader in spectroscopy and medicine since 1952

After inventing the world's first grating-monochromator UV-Vis spectrophotometer in 1958,
the first spectrofluorometer with grating monochromators in 1959,
the first multidetection microplate reader with grating monochromators and cuvettes in 2000, and in 2015 the first robotized microplate reader with direct pipetting, zero transfer time, preserved sterility and ethernet TCP/IP + web service driven,

SAFAS is proud to introduce a new technological revolution :
its brand new generation of Xenius for CUVETTES and MICROPLATES

A SCALABLE and EVOLUTIONARY instrument with exceptional performance :

fluorescence (steady-state and TRF)
absolute fluorescence
absorbance
bioluminescence
anisotropy
phosphorescence
quantum yield
thermal melt
reflectance

on

10 stirred vertical cuvettes
microplates
microvolumes (1µl and 96x1µl)
solids
powders
integrating sphere
dewar
in situ with fiber optics

(depending on

safas monaco

SUSTAINABLE™ SPECTROSCOPY ...since 1952

SAFAS exclusive concept of SUSTAINABLE SPECTROSCOPY : the end of programmed obsolescence, of regular purchase of instruments getting old-fashioned, not reliable or not serviced any more, which clutter the labs, impair your development and wreck your budgets for replacement

millions of apparatus are wrecked every day in the world due to programmed obsolescence, it is a major environmental disaster. By choosing our concept, you will really act for Sustainable Development and save your own budgets for useful things.

✓ purchase the analytical techniques which you need, only those which you need, and only when you need them, taking advantage each time of the latest technologies available and the highest performance level on the market

✓ choose the most powerful technologies for your initial investment, and thanks to regular upgrades, keep your advantage for years and decades with an instrument always reliable, serviced and up to date

✓ get involved in saving the planet's natural environment: you won't wreck anymore your instruments, but you will modernise them by successive upgrades for years and decades, depending on your needs and budgets

Discover our new scalable technologies, and select your perfect configuration "a la carte"...

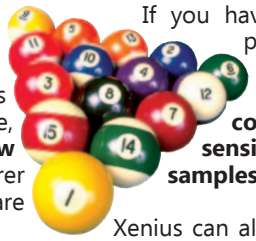
Now, **you can afford an evolutive and multivalent instrument** for all your most important techniques: the new SAFAS flx Xenius. Designed around a nucleus including the highest quality optics, mechanics, electronics and data processing, it will provide you with the best measurements for all your techniques. Moreover, **it is evolutive and can be upgraded as fast as you will receive your successive budgets**.

On one hand, in the laboratories, we see too frequently instruments which were purchased **fitted with options which have never been used**, but were purchased just in case of future need, because the instrument was not scalable or upgradable.

On the other hand, many labs go on achieving their analysis on old fashioned units, just because they are not upgradeable, and because **they cannot afford the purchase of a new unit...** until the next breakdown, when the manufacturer shamelessly annouces that spare parts, service or software upgrades are no more available, or incredibly expensive...

SAFAS Xenius is the solution. You don't need any more to purchase useless options at the beginning, they can be added at any time, when you will need them and when you will have additional budgets for that. Designed for a high reliability even under intensive use, the Xenius will be regularly upgraded to follow up the development of your lab and its analytical needs. Some accessories or options which didn't exist when you purchased your instrument can even be added furtherly.

For example, you can purchase flx Xenius as an outstanding cuvette spectrofluorometer, then add microplate reading accessory for Absorbance and/or Fluorescence, Bioluminescence option with injectors and photon counting photomultiplier, anisotropy, Time Resolved fluorescence with 1 Joule/flash flashlamp, double monochromator UV-Vis spectrophotometry, colorimetry with integrating sphere, Quantum Yield device with integrating sphere, fiber optics probe, full automatic thermal melt for DNA and proteins, and many other options.



If you have a low budget available now, you can also start purchasing Xenius as a simple low-cost Elisa microplate reader, or as a simple Luminometer, then furtherly upgrade it for fluorescence, microplates, etc... nearly **all combinations are possible! You will get the best sensitivity and quality for all techniques & all kinds of samples**.

Xenius can also follow your needs in terms of compliance, like the **FDA 21CFR part11** regarding electronic signature and safety of records, **validations on certified and connected standards -even in fluorescence and bioluminescence, unique on the market-** as well as pharmacopoeia compliance.

Nearly all the basic combinations are possible, as most of the options can be furtherly added, and are simultaneously available without any dismantling or alignment.

Xenius®
the multidetection Genius

EXCELLENCE IN EVERY ANALYTICAL TECHNIQUE
even if you just need one or two analytical tchniques at the moment, you may need more in the future, all the more as the development of the probes and reagents market is extremely fast ; it is thus important to check now what will be the scalability of the instrument and the performances of corresponding options.

fluorescence on cuvettes and microplates

In cuvettes as well as in microplates, spectrofluorescence is a **sensitive but demanding technique.** The users usually look for the highest level of performance, and usually 6 criteria are important : **sensitivity, repeatability, reproducibility, linearity, dynamic range, and immunity to the many interferences;** and the last criterium is essential. In fact, your samples are usually much different from the limpid and pure standards used for the brochures sensitivity tests; the ability of the instruments to get rid of interferences is absolutely essential to your measurements in real conditions, like the pre-filter and post-filter effects, the Rayleigh and Tyndall effects, the heterogeneity and turbidity of the solutions, the temperature and position of the fluorophores, the aggregates in suspension, the cellular suspensions, as well as many other factors. The quality of the measurements will thus be closely linked to the capability of the instrument to get the best criteria AND to efficiently reduce interferences.

The technological needs are much different in cuvettes and in microplates :
-measurements in **cuvettes are much more sensitive and reproducible than measurements in the wells of microplates**, but the **optical geometry must absolutely be at 90°** otherwise all benefits are lost (reading a cuvette laid or with an optical geometry like a well is a nonsense).
-in **microplates, light energy and straylight rate are essential** and dramatically reduce performance, much more than the instrument data processing; that's why the use of fiber optics to bring excitation light from the excitation monochromator to the sample, then from the sample to the emission monochromator, is forbidden on the Xenius, due to the huge loss of sensitivity which such a cheap solution physically involves.

Xenius is the solution to all these technological issues. Fitted with a **100% AIR TECH GUARANTEED WITHOUT FIBER OPTICS** for cuvettes as well as for microplates, it can receive 10 cuvettes with 90° geometry as well as a microplate holder, without any dismantling or alignment. Its optical technology enables to get **ultra-low straylight levels**, which -depending on wavelengths- can even reach orders of magnitude approaching 10^{-10}, much lower than with classical double monochromators. Its **powerful, continuous and ultrastable 150W Xenon source** is 30 to 100 times more stable and 3 to 100 times more energetical than the flashlamps (frequently used because very cheap to use). For this reason, for measuring Time Resolved Fluorescence only, the **Xenius can receive an additional optional flashlamp**, which switches automatically with the continuous lamp and is used exclusively for the TRF, so as to avoid wrecking the steady state measurements quality. The **multialkaline selected photomultiplier has an extended range of 185-950nm in standard**, with voltage continuously adjustable from 1 to 1200V by steps of 1V, for an amazing dynamic **range; a 2nd photon photomultiplier, photon counting, can optionally be added and an auto-switch** will enable at any time to select the best detector.

Xenius is also fitted with other edge technologies. Effectively, in 1959, SAFAS S.A. introduced the world's first cuvette spectrofluorometer with 2 grating monochromators, which optical principles are always used nowadays on spectrofluorometers. But **Xenius is an exception :** based on our revolutionary **DOUBLE OPTICAL PLANE technology,** fruit of our experience of more than half a century in high level spectrofluorescence, it will provide you with a sensitivity, a dynamic range and a reproducibility absolutely unique on the market. Able to work on **microvolumes** without losses of energy, it can also receive our **ultra-fast cuvette holder for 10 stirred samples**, providing the highest productivity. Amazing on pure solutions, SAFAS flx Xenius is **incredibly efficient on the most difficult samples** : traces, high concentrations, turbid and highly scattering solutions, cellular suspensions, solids, powders, etc. The fantastic energy available enables to reduce excitation slits and **prevent sensitive samples from photobleaching**. Whatever could be the problems which you meet with other instruments, SAFAS flx Xenius will certainly tackle your problem.

Please note that the 100% AIR TECH also entitles to scan the well bottoms with a **very thin optical resolution** (down to 0,5mm width) and to measure **microvolumes** (option: 1µl in cuvette and **96x1µl or 5µl** in microplates (disposable, but reusable). The **bandwidths are continuously and independently variable from 1 to 30nm by steps of 0.1nm** at both excitation and emission, and the instrument can draw spectra of excitation, emission, synchronous scans, constant energy scans, absolute fluorescence scans, 3D, kinetics and **time resolved fluorescence decay with a resolution of 2 points per microsecond**.

Fluorescence and optional anisotropy are autocalibrated on built-in standards and can be validated on certified and connected standards.

bioluminescence

The SAFAS flx Xenius can receive **up to 15 automatic injectors (accuracy 0.1µl) fitted each with a heavy duty 6-way valve (stainless steel-ceramic)**, fully PC controlled and driven by our software. **Two stainless steel tefloned needles** are in measurement position, and very esay to remove and insert; a **zero dead volume** procedure is available. **Priming and washing are obviously fully automated**.

Bioluminescence is measured thanks to a **high sensitivity photon counting photomultiplier, with single photon counting and with an amazing dynamic range up to 140 Mcps.** The unique optical and mechanical quality provides a **very low cross-talking (about 10^{-6}** in a 96 well plate)**, and the highest sensitivity**. Obviously, this device is also **100% AIR TECH** without any fiber optics. An optional automatic filter wheel (up to 10 filters) enables to quickly select wavelength ranges with high sensitivity, while the monochromator enables to **draw luminescence spectra**.

The **bioluminescence device can be validated on certified and connected standards**, which is also unique on the market.

absorbance

SAFAS flx Xenius is also an **excellent double monochromator UV-VIS spectrophotometer, providing linearity up to 5A** (depending on conditions) and a very low straylight. Thanks to the powerful 150W Xenon lamp, the large numeric aperture and the sensitivity of its photodetection and signal processing (which were originally designed to detect the lowest levels of fluorescence), the Xenius is a **very high level double monochromator UV-VISIBLE spectrophotometer**, able to compensate the low energy usually available in that kind of instruments, and providing the highest sensitivity and linearity.

In microplates, the measurements are achieved with the same monochromator as fluorescence, so as to avoid any kind of wavelength discrepancy. An additional dedicated detector enables to **measure up to 1000nm**, so as to be able to compensate errors due to pipetting, as well as volume fluctuations during kinetics.

A SIMULTANEOUS DOUBLE WAVELENGTH version is also available (unique in the world).

colorimetry and quantum yields

Two kinds of optional integrating spheres are available. For diffuse reflectance and transmission, a 6 (150mm) integrating sphere provides perfect specular rejection for accurate measurements. Thanks to its fantastic light power and to its ability to detect the smallest fluorescence, SAFAS flx Xenius colorimeter is not affected by the huge energy loss due to the sphere, and provides linear measurements at the highest absorbances (up to 5 or 6A depending on conditions) thanks to its double monochromator. For quantum yields, a very smart integrating sphere avoids the usual time-consuming need to position the sample and the standard in 5 different positions : you just position your sample once. The powders can be directly measured without any window or need to insert a tube inside the sphere, which modifies the sphere behaviour and

fluorescence anisotropy

Fluorescence anisotropy is an **absolute measurement like absorbance.** Some instruments strangely ask to insert a standard before making measurements, which -for a spectroscopist- is as shocking as if you would have to insert an absorbance standard before any absorbance measurement. Well, in reality, much more shocking, because certified and connected anisotropy standards don't exist on the market!

Xenius can optionally receive 2 auto-polarizers. Both can turn in vertical and horizontal positions, as well as any angle from 0 to 90° by steps of 0.1°, including 54,7° magic angle. Used for microplates as well as cuvettes, they have UV quality (**down to 275nm)**, and are automatically withdrawn for unpolarized fluorescence. The **calculation of the G factor can be achieved in real time, thus providing a real absolute anisotropy. An anisotropy standard is built-in for autocalibration and validation.**

(all the features described in this brochure depend on the options fitting

Xenius: technologies designed by real spectroscopists, not by marketing guys...

the light source
its choice is essential for the measurement quality because signal to noise ratio and sensitivity are strongly linked to the luminous energy available as well as to the stability of the source

using a flashlamp, overall a basic one, is very cheap for the manufacturer, that's why cheap photometers are all fitted with flashlamps; but it will be 30 to 100 fold less stable and 3 to 100 fold less powerful than our continuous 150W ultrastable source, which is a critical point for fluorescence

✓ Xenius is fitted with an ultrastable and continuous xenon source which enables to get the highest performance level for all the steady-state fluorescence measurements (it means for all measurements, excepted Time Resolved Fluorescence or TRF). Our source, our power supply and our cooling technology enable to get **exceptional lifetimes** typically much higher than 10.000h in intensive use 24/24 7/7

✓ optional and exclusively reserved to **Time Resolved Fluorescence (TRF), an additional flashlamp** (the most powerful available on the market with **1 Joule/flash**) automatically switches with the continuous lamp which is obviously always used for all steady-state measurements. The TCSPC (Time Correlated Single Photon Counting) provides high quality decay curves, up to 2.000.000 points per second

the photomultiplier
its choice is also critical for the quality of the measurement, in terms of dynamic range as well as regarding the safety, the comfort of use, the sensitivity and the dynamic range

an analog PM fitted with a continuously variable high voltage power supply enables to measure light levels having very different intensities, and when coupled to SAFAS technology, to measure at open sky; on the contrary a photon counting PM will have a limited dynamic range but higher sensitivity

✓ Xenius is fitted in standard with a **high sensitivity analog PM (extended range 190-950nm)**, coupled to a high voltage **power supply adjustable from 1 to 1200V**. **Totally protected (guaranteed 10 years)** by our **OPEN SKY technology**, it can measure with lid opened, eliminates phosphorescence and bioluminescence, and can compare weak & strong signals (fluorescence, abs, scattering)

✓ optional, a **2nd photomultiplier with photon counting, single photon counting and with an exceptional dynamic range up to 140 Mcps** (Millions of photons per second) can be added. According to the method programmed on the computer, the selection is automatic. This PMT is used in TCSPC mode for digital TRF, and is available in 2 versions: UV-Vis or UV-Vis-Near IR.

monochromators
their choice is fundamental, and their aperture, their accuracy, their repeatability, their straylight rate, a technology without fiber optics, and the presence of built-in autocalibration standards are essential

our 100% AIR TECHNOLOGY with high aperture is fundamental, an accuracy <0,3nm is required to avoid issues during validations (pharmacopoeia for example) and a repeatability <0,02nm is mandatory for modern shape analysis techniques (deconvolutions, derivatives, etc...)

✓ Xenius is fitted with monochromators having a **wide aperture, with 100% AIR TECH and only 3 reflexions** at both excitation and emission, which optimizes energy and avoids optical oldening. Our exclusive technology brings **ultra-low straylight rates**, overall at some critical wavelengths where we approach an order of magnitude of 10^{-10}, **much better than classical double monochromators.**

✓ our high accuracy technology with micrometric screw and sine bar, associated to our autocalibration on built-in standards, is providing an **accuracy of 0,2nm** which can be validated on an holmium solution conforming to pharmacopoeia, and a **repeatability of 0.01nm** avoiding unexpected unstabilities during multiwavelength kinetics for example, and allowing modern analytical techniques

Xenius : scientific innovations which really make a difference

the optical geometry
for a given light power, the optical geometry & technology change drastically the fluorescence intensity recovered from samples, as well as the repeatability and the immunity to interferences

the use of fiber optics will strongly reduce the fluorescence intensity reaching the detector, as well as a classical geometry, which will additionally generate internal filter effects, criticity of positioning, turning the microplate height in a critical factor and requiring height adjustments

✓ Xenius is fitted with our revolutionary **DOUBLE OPTICAL PLANE** technology which, among many other advantages, reduces or eliminates internal filter effects, has a 10 fold effect on energy, and turns the microplate height adjustments into outdated technologies. Measurements on cell layers are independent of their thickness, and well-bottoms scans are really resolutive (0.5mm width, 0.1mm steps).

✓ Xenius can be **simultaneously fitted with a fast microplate holder** (20 sec for 96 wells), with an **ultra-fast cuvette holder for 10 vertical, aligned and stirred cuvettes respectful of a 90° geometry** and measured in 5 sec only, as well as with **fiber optics** to achieve measurements **in situ** outside the instrument, with very low distance criticity, and possibility to compensate sample movements.

the open sky measurement technology
not only a very comfortable way to inject manually during measurements, but also an efficient PM protection, and an efficient interference eliminator for phosphorescence or bioluminescence

without this technology, the PM can be damaged easily by opening the compartment during measurements, and it is much expensive to replace! Plastic phosphorescence, as well as bioluminescent moleculas in the sample can wreck the fluorescence measurements

✓ the analog PM of the Xenius is totally protected by the exclusive **OPEN SKY technology**, so as at the present date, it never happened to have this PM damaged on a Xenius, even when used in the worst conditions! **This analog PMT is warranted for 10 years**, and you will be entitled to easily inject reagents during measurements, without altering the fluorescence spectra and curves.

✓ **unwanted bioluminescence** emitted by other moleculas in the sample, as well as external light (for example when measuring in situ with fiber optics) and phosphorescence emitted by the microplate plastics, are physically and efficiently eliminated without any need to add filters. The corresponding dynamic range loss is physically restored in real time, for a perfect analysis even in the worst conditions.

built-in standards and validation
if you are involved in Quality Management, or wish to be able to collaborate with a company having such requirements, then you must be able to prove at any time that your instrument is fully operational

without embedded standards, auto-calibration is impossible, or will not prove the efficiency at switch on, particularly in fluorescence and bioluminescence where there is no light ; additionally you won't find on the market certified and connected standards for these techniques

✓ Xenius is **fitted with autocalibration standards,** which enable the instrument to autocalibrate, to be fully tested even in fluorescence, bioluminescence and anisotropy, and to prove its ability to achieve accurate and reproducible measurements. A specific standard is dedicated to polarizers alignment, and these autocalibrations are also **a part of the secret of the amazing accuracy of the instrument**.

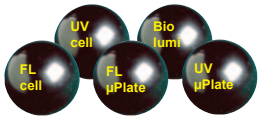
✓ Xenius can also **receive certified and connected standards in sealed cuvettes** (for example according to pharmacopoeia) to be validated in Absorbance; and thanks to innovative technologies, which are also unique on the market, **this is now also possible in fluorescence, in bioluminescence and in anisotropy** : a great relief for all the accredited laboratories, or under QM


vaccines manufacturer

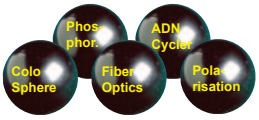

oceanographic vessel

and thanks to its many options, the Xenius brings you much more...

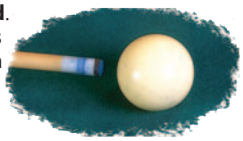
Many other options are available and others are being developed : **temperature control for cuvettes and microplates with PT100 probe** (±0.1°C), possibility of **heating as well as cooling, guaranteed without pulsed air (avoids evaporation and contamination),** as well as **automatic dessiccator to avoid condensation at low temperatures**; **efficient stirring on 10 cuvettes, software driven**, temperature ramping for **thermal melt and denaturation** (Tm, Gc), **simultaneous double wavelength**, **polarization for fluorescence anisotropy (UV down to 275nm, adjustable by steps of 0.1° from 0 to 90°, with magic angle)**, spectropolarimetry, in situ measurements with **fiber optics**, auto-priming & washing **auto-injectors with accuracy 0.1µl and stainless steel/ceramic 6 way valve**, measurement of **oxygen down to picomolar level, robotization with direct injection driven by web service with transfer time zero and sterility preserved, Time Resolved Fluorescence TRF** with the **most powerful flashlamp available (1 Joule/flash) and TCSCP mode, enabling to draw decay curves up to 2 million points per second, quantum yield** with smart integrating sphere, etc... Many other accessories can be **custom designed.**



the highest analytical performance for all techniques



Due to its multivalence, but also to its sensitivity and scalablity, the **SAFAS flx Xenius is an instrument absolutely unique in the world**. Moreover, this multivalence has not been obtained to the detriment of each technique: **for each kind of application, the Xenius features astonishing accuracy, sensitivity, speed and dynamic range**. **Everything has been considered, every detail has been taken care of**, just to let you have the best results for your samples. **The quality which your analysis deserve.**



The sample compartment is totally located on the front of the instrument, with easy access. It is isolated from the back side of the instrument where all the mechanics, optics and electronics are totally protected and out of reach of corrosive vapors, heat, or cold.

The user has a full access at 180° to the sample compartment, and in case of spillage of samples, the whole cover can be withdrawn without tools in a few seconds for an easy cleaning of the whole compartment. Additionally, thanks to the ability of the insrument to measure at open sky, the **PM is totally protected and guaranteed 10 years** : no fear when you need to open the lid, remove the cover, or even if this outstanding research-grade instrument has to be used by students! It is strong and reliable.

The user will open every time the large lid, thanks to an assisted device, and each time he will be able to check that there is no spillage or spray, for example due to a too strong shaking.

Unlike various models of readers, there are no electronic boards inside the compartment and the corrosive vapors coming from samples cannot reach the electronics, optics or sensitive parts of the instrument.

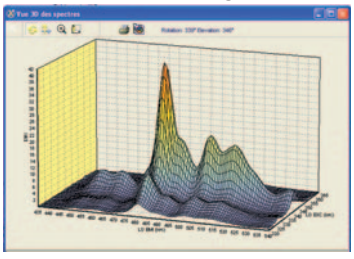
a powerful PC software, well-structured and easy to use, with free updates for the whole instrument's lifetime

Trophées de l'Innovation 2015 LAURÉAT

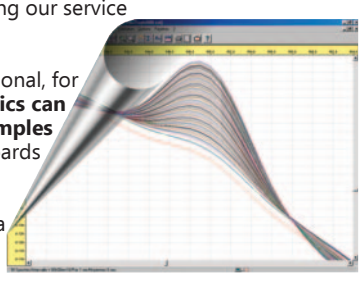
Because **our software is internally developed by SAFAS in partnership with our customers, but also because it is the fruit of more than 30 years of intensive development since we introduced the world's 1st PC controlled spectrophotometer in 1988, it features an unique richness of functions**. We also believe that ease of use is extremely important, that's why most of our functions can be called by a single click or hotkey, without losing time in multiple menus and sub-menus. Most of options can be called by corresponding icon, or with keyboard, with the mouse, or with a **touchscreen.** The user is entitled to select at any moment one of the languages available (obviously including english, german, spanish, french, italian,..).

The Xenius is also avalable in TouchSnake version, **elected winner of the Trophy of Innovation 2015 in Paris** among 76 international innovations which were in competition.

The spectra software enables **fast scans (up to 10.000nm/minute with slew rate of 30.000nm/min) with multi-zoom**, automatic peak and valley search, with multiple data-processing and calculation formulas. You can achieve **Excitation or Emission scans, and also synchronous scans. The pre-scan is full automatic, and a powerful instrumental correction function is available. A powerful optional 3D processing software is also available**. An **instrumental correction** is available as option, to draw **absolute fluorescence spectra** ; an embedded standard enables the user to measure by himself the correction curves without calling our service (also **unique on the market**).



Fast kinetics can be achieved at **up to 20000 points/second*** on one cuvette (optional, for example for **stopped flow applications or bioluminescence**), and **up to 10 kinetics can be followed up on 10 couples of Ex/Em wavelengths on 10 cuvettes, the 10 samples being measured in only 5 seconds** with real time graphic drawing of curves, boards and results. Many data-processing functions, full or half automatic, are available.



The **powerful microplate software** enables to divide your plates in groups, enter several sets of parameters, and apply a lot of full automatic calculation functions. Replicates and well multiple-measurement are available, with auto-averaging. A **maintenance software** enables to check all the internal functions of the instrument, and get self-diagnosis.

And as all our software is developed by SAFAS engineers, we are able to efficiently answer all kind of questions and requests, **develop specific functions and even complete on-purpose software for special applications**.

*software updates are free of charge for instru

smart, efficient and innovative robotics solutions

the robotization of a multidetection reader usually requires the use of an external arm to carry the microplate from the robot to the reader, then bring it back to the robot. Sterility, temperature, moisture and gas control are lost, and the transfer is time-consuming

drivers must be developed by the manufacturer of the reader, or of the robot, involving an important loss of functionalities as well as problems and bugs each time the software of the various instruments have to be upgraded, especially when the OS changes

✓ the front compartment of the Xenius can be inserted inside the robot, while the back compartment containing optics, mechanics and electronics is kept protected from moisture, vapors and sprays; it keeps an easy access for service

✓ the microplate holder has been designed to come just below the robot pipettes, which can proceed to complex injections while fast kinetics measurements can be started immediately, without any delay

✓ the microplates don't have to be extracted any more from the robot, thanks to the direct pipetting. The transfer time, which is usually critical in HTS, is reduced to zero, thus strongly increasing the throughput

✓ the robotized system is driven through TCP/IP ethernet protocol via WEB SERVICE : no drivers to develop any more, no problems when upgrading the sowftware, 100% of functionalities of the various instruments are available

SAFAS QUARTZ GUARANTEE and INSTRUMENT VALIDATION

We hereby certify that the excellent quality of our measurements is exclusively provided by the excellence of our optics, mechanics and signal-processing, and that our measurements undergo absolutely no alteration due to computer processings, like hidden systematic smoothings, hidden dampings, hidden non-linearity correction, hidden artefacts elimination, and as a rule any kind of software "trick". You can use our powerful data processing tools how you want and when you want, but your precious original raw data will never be wrecked by an automatic hidden processing which you don't know and cannot suppress. This is **our transparency commitment, for original data pure like a Crystal**.

For the same reason, **embedded standards are used for autocalibration, including for the optional polarizers for anisotropy, and** Xenius can be **validated on certified and connected standards** even in FLUORESCENCE AND BIOLUMINESCENCE, which to the best of our knowledge is unique on the market. **INSTRUMENTAL CORRECTION is optional, and fitted with a built-in standard enabling the user to measure by himself his corrective curves, so as to get accurate absolute fluorescence spectra, and very accurate quantum yields.**

Optical principle	**Spectrophotometer / spectrofluorometer / luminometer / spectrocolorimeter with 2 high spectral purity grating monochromators***
Spectral range	185 to 1000 nm on both monochromators; limited to 230-1000 at excitation with the standard "ozone-free" source, and for emission 185 to 900 with the standard PMT
Wavelength accuracy	typically **±0,2 nm** on the whole spectral range with autocalibration (**embedded standard**), and possibility of validation on Pharmacopoeia compliant standard (option)
Wavelength repeatability, and minimum step	**±0,01 nm** (essential to modern applications), spectra step adjustable down to 0.1nmselected multialkaline
Photomultiplier(s) and power supply	selected analog PMT with voltage tunable from 1 to 1200V + optional photon counting PM, auto-switching
Bandwidth	fixed (5, 10 or 20nm upon request), optionally **continuously and symmetrically variable on both monochromators from 1 to 30nm by steps of 0.1nm**
Monochromators	With blazed concave grating, aberration corrected, with **very large aperture (f:3)**, high purity
Wavelength drive	**Micrometric screw and sine bar**, with stepper motor
Mirrors	High Quality protected mirrors, UV aluminized, exclusively with metallic holders
Units	Fluorescence*, bioluminescence*, phosphorescence*, Absorbance* (options)
	If Abs option available: Abs, T%, Concentration, Activity (if "kinetics" option)
S/N ratio on water Raman in cuvette	typically 1:12.000 (rms, depending on conditions, measured with photon counting PMT)
Photometric range (with "Abs.on cuvette" option)	from -0.5 to +5A (depending on conditions) and from 0% to 200%
Photometric accuracy (with "Abs.cuvette" option)	±0.003 A at 0.5 A
Dynamic range in Bioluminescence	**>140 Mcps** / 9 decades, linearity validated on certified and connected standards
Typical cross-talking in bioluminescence	about **10^{-6}**, possibility of **complete spectra of bioluminescence and BRET**
Spectra scan speed (Abs, Fluo & bioluminescence)	**up to an equivalent speed of 120.000nm/min** (depending on parameters, for 3D/Delta mode)
Kinetic drawing speed (optional) on 1 cuvette	up to 20000 points/second*
Automatic cuvette holder for 10 cuvettes	standard on microplates (user-selectable speed, radius, time, linear or orbital)
Stirring	optional on 10 cuvettes (inserted and withdrawn in one second)
Computer driven injectors	1 to 15 with 6-way stainless steel/ceramic valves, 2 injection needles in measurement position
	easy to insert, volume adjustable from 0,1µl to 1ml by steps of 0.1µl (min 7µl in µplate)
Automatic cuvette-holder	linear, ultra-fast (**measurement of fluorescence on 10 vertical cuvettes in about 5 sec**.)
Derivatives	high quality up to the 6th order
Kind of microplates	6 to 96 wells (384 optional), thermostatable* as well as **96x1µl or 5µl**
Source(s)	Xenon ultra-stable "ozone-free" 150 Watts (UV version or 300W optional)
	powerful flashlamp is optional for Time Resolved Fluorescence TRF with 2 points/µs
User interface	100% by external PC compatible computer, via USB or **Ethernet TCP/IP**
Operating systems compatible with our software	Windows 7, 8 or 10 ; compatible with TouchScreens
Software update	Free of charge for instrument's life (excepted participation to shipment and copy expenses)
Dimensions and weight	500mm x depth 750mm x h.500mm, about 55Kg (depending on options)
Mains power	220/240 V (or 110/120 V optional), 50/60Hz, 200 Watts

**optional and evolutive. Pictures and features are not contractual. They are subject to change without notice. The standard version of flx Xenius XC spectrofluorometer series is delivered with one holder for one measurement cuvette (if cuvette option or version), and/or one holder for one microplate (if microplate version XM or option), mains and serial cords, and software for spectra, calibration curves and maintenance. The automatic cuvette-holder for 10 cuvettes, the thermostatable cuvette holder, the kinetics software, the validation software with certified standards, the Web Service and the external PC computer and printer ARE NOT INCLUDED AND ARE OPTIONAL. Software updates are free of charge, upon request, but a participation is requested for the CD cost, and the copying, packaging and shipment costs. As this instrument can be built according to your wishes, please carefully check with the descriptive quotation that all the options which you require are included.*

Our factory (right side of the harbour) during the Formula 1 Grand Prix of Monaco. Welcome to Monte-Carlo !

safas monaco

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