in mind the guidelines and any financial limitations. In many instances it will quickly become clear that a number of different instruments could be satisfactory and non-instrumental criteria may then be important. However, in some specialized cases only one or two instruments will have the necessary features to carry out the assay.

The guidelines are intended to be used as a check list of features to be considered, mostly of the instrument itself, but some also of its service requirements and of the relationship of the user to the manufacturer. Their relative importance will depend on the installation requirements of the instrument as well as the uses to which it will be put. Therefore, to some extent, the selection process will inevitably be subjective, but if all the points have been considered, it should be an informed choice.

In addition, because the sensitivity of a specific fluorescence assay depends so much on the solvent, temperature and operating conditions, it may sometimes be difficult to assess the actual operating performance of a particular feature from the manufacturer's specifications. For some applications it may be necessary to evaluate the performance of the instruments under consideration using a system suitability test sample chosen for a particular application. The purpose of this is to demonstrate the system's ability to give the manufacturers' sensitivity under the recommended instrumental conditions using the manufacturers' recommended test sample. The Committee considers that, in general, fluorescence spectrometers are safe in operational use, but eye protection should be worn when aligning or changing the lamp. Protection from high voltages is required when the unit is open for servicing.

Finally, as many laboratories are now working to quality standards such as GMP/GLP/NAMAS/ISO Gnt iw (thty)Tj01e oComut

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Feature	Definition and/or test procedure and guidance for assessment	Importance	Reason	Score
(*i*) High pressure mercury lamp instruments	Score only if the Hg line spectral output will excite the fluorophores to be analysed.	I	This lamp produces a fine spectral output which can restrict the ability to optimise the analysis.	PS WF ST
(*ii*) High pressure xenon source instruments	Score highest if one needs a high intensity continuum.	I	This is required to excite compounds at any chosen wavelength, but these lamps are very expensive to replace.	PS WF ST
(*iii*) Pulsed xenon source instruments	Score highest if a continuum source is needed and photo-decomposition must be minimised. Time resolved measurements can be made without special accessories.	I	This type of lamp produces short bursts of high energy. These lamps are relatively inexpensive to replace.	PS WF ST
(*iv*) NIR sources LED and laster instruments	Score only if the emission matches the excitation bands of the analyte.	I	Specific wavelength excitation is often used in biochemical studies and food analysis.	PS WF ST
(*b*) Wavelength selection				
(*i*) Using filters	Score maximum for the widest selection of suitable interference filters for routine fixed wavelength analyses.	VI	Routine analyses are performed at fixed wavelength. Simple filter spectrometers provide good sensitivity and selectivity.	PS WF ST
(*ii*) Wavelength selection using a monochromator	Score as appropriate for the resolution and a good signal to noise ratio.	VI	The choice of monochromator will depend upon the spectral characteristics of the compound	PS WF ST
(*c*) Monochromator selection	See Part XI, UV–VIS–NIR Report, for details of the different types of			

Feature	Definition and/or test procedure and guidance for assessment	Importance	Reason	Score
(*b*) Wavelength selection using a monochromator	Select system which provides 'corrected' spectra. Score only if it is important that spectral data will be compatible with published data or spectra recorded in other laboratories.	(VI)	The optical throughput as well as other factors will superimpose distortions on the spectrum of the compound being analysed, which need to be corrected easily.	PS WF ST
(*i*) Array dectors	Score only if a diode array or charge coupled device provides the spectral response suitable for the system under investigation.	(I)	These detectors can have advantages of the species under investigation has changing spectral properties. They may have a slow readout time and low sensitivity.	PS WF ST
4 Sampling accessories	Score highest for the system which provides the most comprehensive selection of easily installed accessories for the analyses to be performed. A higher score should be given if the accessories are software controlled.	I	If liquids and solids are to be studied, suitable accessories are needed to make these measurements. Software controlled accessories allow the system to be reset to the same state for each experiment. Data collection and manipulation can then be combined easily under identical conditions.	PS WF ST
(*i*) Manual single and multiple cell holder for standard, micro- and flow cells	Score highest if the cell holders can be thermostatted. Score additionally if the temperature in the cuvette can be monitored.	VI	Fluorescence intensity varies with temperature. It is essential to accurately control the temperature for kinetic and biochemical studies.	PS WF ST
(*ii*) Sample holder for solids	Score highest if this accessory can accommodate powders, films and if one cuvette can be reproducibly aligned.	I	Reflectance techniques are also used for highly absorbing samples to enable the fluorescence from the surface of the sample to be measured.	PS WF ST
(*iii*) Phosphorescence accessory	Score only if this facility is required and available.	(I)	This accessory is usually not necessary for room temperature measurements if the system uses a pulsed source to gate the excitation and emission cycles.	PS WF ST
(*iv*) Low temperature accessory	Score only if this facility is required and score highest if the accessory can be used at a user defined temperature.	(I)	In many analytical systems phosphorescence is observed only at low temperature.	PS WF ST
(*v*) Single and multiple thermostatted cell holders which can be fitted with a stirrer.	Score highest if the stirrer speed and temperature settings can be software controlled and stored wth the data.	VI	Important if measuring biological cells in suspension or collecting kinetic data.	PS WF ST
(*vi*) Flow cells	Score only if the system supports flow cells and score highest if the cell position is easily and reproducibly aligned.	VI	System can be used for routine assays with a sampler (sipper) or as an HPLC detector using a micro-flow cell.	PS WF ST
(*vii*) Sipper system. Autosampler. Tablet dissolution. Flow injection system	Score only if the equipment is needed for a particular usage. The system must have suitable software for the device.	I/VI	System must be software controlled and support the flow cell with the correct sample volume for the application.	PS WF ST
(*viii*) Polarisation accessory	Score only if this accessory is needed and score highest for software manipulated polarisers and temperature controlled sample holders. If rapid changes in polarisation are being followed, a 'T-format' system might be necessary.	I	M .t (-form1874ssary.)T3 3e a us 1 -1.124 TD (andtrost if perature conch ca 0 -1.126 TD (	

Feature	Definition and/or test procedure and guidance for assessment	Importance	Reason	Score
(*ix*) Plate reader	Score maximum for a system which can scan 96, 48, 24 and 12 well formats plates.	I	Different sized micro-plates are in use so the accessory should be capable of measuring all of them.	PS WF ST
5 Instrument control and data collection				
(*i*) On-board computer	Score highly for a simple low cost effective routine instrument which has on-board software and is controlled from an integral keyboard. Score additionally for the facility to export the data to an external computer (for further data manipulation of this is needed).	VI	Simplifies the operation and ideally should be able to provide simple method storage and limited data manipulation routines, *e.g.*, linear quantitation using standards.	PS WF ST
(*ii*) Data output	For routine analyses score for an instrument that can output data to a printer/plotter or as an ASCII or industry standard file to a computer. A scanning instrument may output an analog signal to a recorder or data logger.	I	A digital output is preferred so that if necessary further data processing can be easily performed. It should also enable all the data collection parameters to be stored with the data.	PS WF ST
(*iii*) External control of instrumental parameters	For non-routine analyses or research, score highest for a comprehensive software package to control the spectrometer and collect the data.	VI	Ensures that the same analyses are always perfomed under identical conditions. This is vital if the system is used in a 'controlled' environment. Manufacturer's software will have been tested. *N.B.* It is rarely cost effective to write one's own software.	PS WF ST
(*iv*) Instrument performance	Score maximum for an instrument which self-calibrates on power up and has a simple validation routine programmed into the software.	VI	As more instruments are used in regulated laboratories it is vital that the system performs an effective calibration routine on switch on. This information must be stored.	PS WF ST
6 Data manipulation				
(*a*) Data collation software	Define the requirements before scoring these items. Most manufacturers offer software packages with routines for setting the instrument parameters and collecting the data. The choice of how the software runs can be a very personal choice. Make sure that the features offered are fully evaluated. The ease with which the data can be acquired and reports generated are of prime importance. Score only for the availability of essential routines.	VI	Control and data collection software options are essential for data integrity and must include all of the required routines. Software packages from the manufacturer are expensive, but the effort it will take to write and validate one's own software would prove to be extremely time-consuming and therefore much more expensive.	PS WF ST
(*i*) Fixed wavelength data collection				

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