TECAN.

Operating Manual for

GENios, GENios FL, and GENios *Plus*

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WARNING
CAREFULLY READ AND FOLLOW THE INSTRUCTIONS PROVIDED IN THIS MANUAL BEFORE OPERATING THE INSTRUMENT.

Notice

Every effort has been made to avoid errors in text and diagrams, however, TECAN Austria Ges.m.b.H. assumes no responsibility for any errors which may appear in this publication.

It is the policy of TECAN Austria Ges.m.b.H. to improve products as new techniques and components become available. TECAN Austria Ges.m.b.H. therefore reserves the right to change specifications at any time.

We would appreciate any comments on this publication.

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Copyright Information

About this Manual

This manual describes the GENios, GENios FL, and GENios Plus instruments, which are detection devices designed for measuring samples in a microplate. It is intended as a reference and instruction manual for the user.

This manual instructs how to:

- Install the instrument
- Operate the instrument
- Insert and define filter slides
- Perform quality control tests
- Clean and maintain the instrument

Warnings, Cautions and Notes

There are three types of informational notices used in this manual. These notices highlight important information or warn the user of a potentially dangerous situation. The following notices are:

Note:
Gives helpful information.

Caution
Indicates a possibility of instrument damage or data loss if instructions are not followed.

WARNING
INDICATES THE POSSIBILITY OF SEVERE PERSONAL INJURY, LOSS OF LIFE OR EQUIPMENT DAMAGE IF THE INSTRUCTIONS ARE NOT FOLLOWED.

Registration Form

Dear Customer,

Congratulations on purchasing one of TECAN's microplate readers: GENios, GENios FL, or GENios *Plus*. We are sure that the performance of the instrument will show that you have made the right choice.

In order to ensure that you will be satisfied with your instrument for a long time we would like to ask you to fill in the registration form below or send us an email at office.austria@tecan.com with the relevant information. By doing this you are qualified to receive all updates of GENios software *XFLUOR* free of charge as they are released.

We would appreciate any comments or questions you may have regarding the performance of the instrument.

TECAN

Your partner in microplate measurement and handling

Registration Form

GENios

Place postage here

Serial Number:	----------
Company / University:	----------
Department / Institute:	----------
User Name:	----------
Address:	----------
Street:	----------
City / State / Zip code:	----------
Country:	----------
Phone:	----------
Fax:	----------
Applications / Field of use:	----------

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Table of Contents

1. Safety

1.1 Instrument Safety

1. Always follow basic safety precautions when using this product to reduce the risk of injury, fire, or electrical shock.
2. Read and understand all information in the Operating Manual. Failure to read, understand, and follow the instructions in the manual may result in damage to the product, injury to operating personnel or poor instrument performance.
3. Observe all STOP and CAUTION statements in the manual.
4. Never open the instrument while it is plugged into a power source.
5. Never force a microplate or filter slide into the instrument.
6. The GENios, GENios FL, and GENios *Plus* are intended for laboratory research use only. Observe proper laboratory safety precautions, such as wearing protective clothing and using approved laboratory safety procedures.
7. When using GENios, GENios FL, or GENios *Plus* please refer to **5. Instrument Features**.I13737~1.PDF

2. General Description

2.1 Introduction

The GENios instruments are fully automatic, computer controlled microplate readers for measuring samples in a microplate. The instruments fulfill the requirements for numerous fluorescence, absorbance and glow type luminescence applications in research and routine investigations.

Note:
The GENios FL instrument does not have absorbance or glow type luminescence measurement capabilities.

The GENios Reader offers fluorescence, absorbance, and glow type luminescence and can be used with 384, 96, 24, 12 or 6 well microplates.

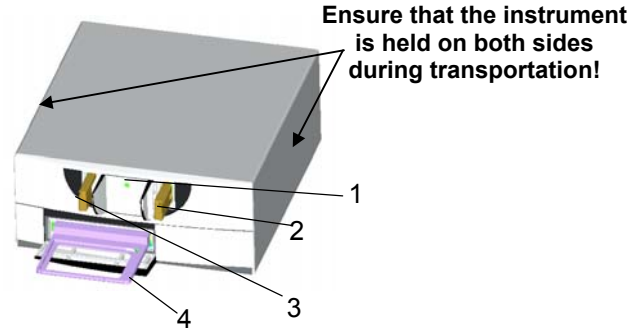
The GENios FL Reader offers fluorescence top measurement with 384, 96, 24, 12 or 6 wells.

The GENios Plus Reader offers glow type luminescence, absorbance and fluorescence with high sensitivity especially in the UV range and the capability of measuring fluorescence in 1536 well plates.

The filters are arranged in filter slides; four excitation filters and four emission filters respectively. The instrument has no on-board software and is exclusively controlled via an external computer using Windows™ format.

2.2 The GENios, GENios FL, and GENios *Plus*

Front View



1 = power LED

2 = emission filter

3 = excitation filter

4 = plate carrier

Caution

If the instructions given in this manual are not correctly performed, the instrument may be damaged or the procedure may not be performed correctly and the safety of the instrument can not be guaranteed.

3. Installation

3.1 Unpacking & Inspection

The delivered packaging includes the following:

- Instrument with absorbance, excitation and emission filter slides
- Operating manual and *XFLUOR* manual
- Fluorescence Microplate Assays catalog
- Fluorescence Probes and Research Chemicals handbook
- Software (disk, CD)
- Cables (interface and mains)
- Transport lock
- Spare fuses
- 2 mm Allen key
- Cover plate for use with luminescence measurements
- Adapter plate for use with cuvettes

Note
Due to its specifications, the GENios FL instrument does not come delivered with absorbance filter slides, cover plate used for luminescence measurements or adapter plate for use with cuvettes.

Visually inspect the container for damage before it is opened.

Report any damage immediately.

Select a location to place the instrument that is flat, level, vibration free, away from direct sunlight and free from dust, solvents and acid vapors. Allow at least 10cm distance between the back of the instrument and the wall or any other equipment. Ensure that the main switch and the mains cable can be reached at all times and are in no way obstructed.

Place the carton in an upright position and open it.

Lift the instrument out of the carton and place it in the selected location. Take care when lifting the instrument and ensure that it is held on both sides.

Visually inspect the instrument for loose, bent or broken parts.

Report any damage immediately.

Compare the serial number on the rear panel of the instrument with the serial number on the packing slip.

Report any discrepancy immediately.

Check the instrument accessories against the packing list.

Save packing materials and transport lock for further transportation purposes.

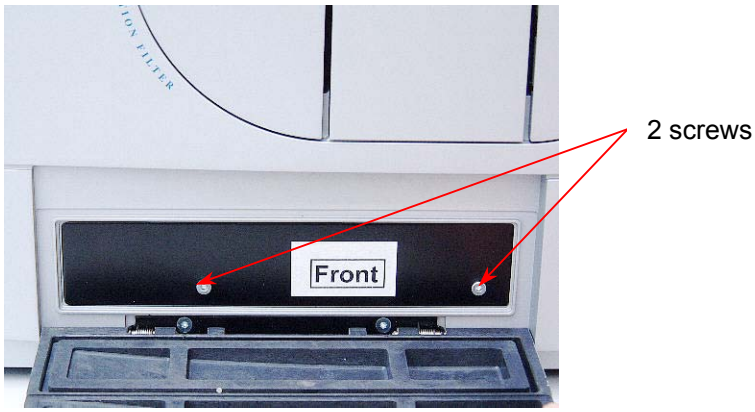
Define and insert the filters

3.2 Removal of the Transport Lock

The instrument is delivered with the plate support locked into place, so that it can not be damaged.

Before the instrument can be used the transport lock must be removed using the following procedure:

1. Ensure that the instrument is disconnected from the mains power supply.
2. Open the plate compartment flap.
3. Using the 2mm Allen key supplied, remove the two screws holding the transport lock in place. (See diagram below).



4. Remove the transport lock.

Note:
The transport lock should be saved for further transportation purposes.

3.3 Power Requirements

The instrument is auto sensing and it is therefore unnecessary to make any changes to the voltage range. Check the voltage specifications on the rear panel of the instrument and ensure that the voltage supplied to the instrument is correct to this specification.

The voltage range is 100-120 / 220-240V.

If the voltage is not correct, please contact your distributor.

Caution
Do not use the instrument if the voltage setting is not correct. If the instrument is switched ON with the incorrect voltage setting it will be damaged.

Ensure that the correct type and rating of fuse is fitted.

Fuse = T 2A / 250 (slow blow)

WARNING
RISK OF FIRE!
REPLACE ONLY WITH THE SAME TYPE AND RATING OF FUSE.

3.4 Switching the Instrument ON

Caution

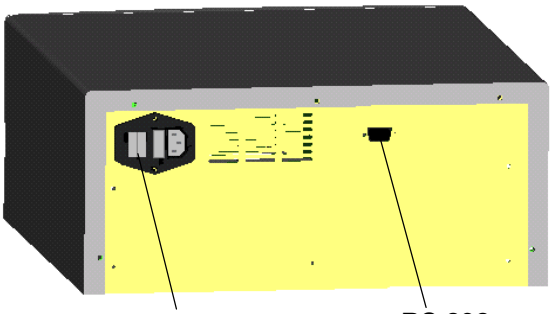
Before the instrument is switched on for the first time after installation, it should be left to stand for at least 3 hours, so there is no possibility of condensation causing a short circuit.

- Ensure the computer is switched OFF and the instrument's mains power switch in the back panel of the instrument is in the OFF position.
- Connect the computer to the instrument with the delivered RS 232 interface cable.
- Insert the power cable into the mains power socket (with protective earth connection) in the back panel of the instrument.
- Connect the connecting cable to the computer and the instrument. All connected devices must be proved and listed with regulations EN 60950, UL 1950 or CSA C22.2 No. 950 for Data Processing Devices
- Switch the instrument ON using the switch in the back panel of the instrument.

Caution

When installing or uninstalling the instrument ensure that the instrument and the computer are both switched off and disconnected from the mains before the RS 232 interface cable is connected or removed.

Rear View



The instrument is now ready to be used with a suitable software program.

If the instructions given in this manual are not correctly performed the instrument may be damaged or procedures may not be correctly performed. Consequently the safety of the instrument can not be guaranteed.

To operate the software, refer to the XFLUOR manual.

4. Inserting and Defining Filter Slides

4.1 About Filters

4.1.1 Fluorescence Filters

The optical filters (bandpass style) in the EX and EM filter slides are specially designed for fluorescence measurements. The spectral rejection and the bandwidth of the fluorescence filters are optimized for achieving excellent sensitivity.

Contact TECAN for filters other than those supplied on the standard filter slides.

4.1.2 Absorbance Filters

Bandpass filters, which are commonly used in microplate readers for absorbance measurements, usually have a bandwidth of 10 nm. Therefore, it is not recommended to use fluorescence filters for absorbance measurements, because the bandwidth (FWHM) is usually larger than 10 nm. This could cause a bright value error or low OD values when measuring dyes with narrow peaks.

4.1.3 Organization of Filters in Filter Slides

Our filter slides allow for eight different codes. The eight filter codes are: A, B, C, D, E, F, G, and H. The fluorescence filter slides (EX and EM) that contain standard filters are coded as **A**.

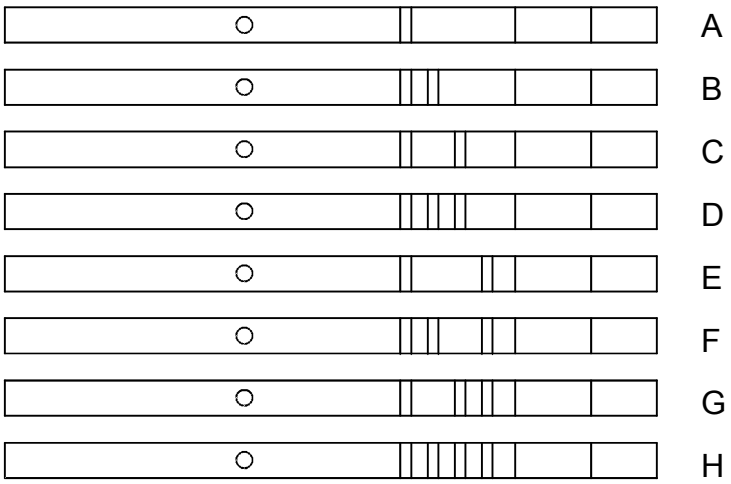
The absorbance filter slides that contain standard filters are coded as **D**.

You can order empty filter slides for: ABS/EX as B 126301 coded as requested *

EM as B 126102 coded as requested *

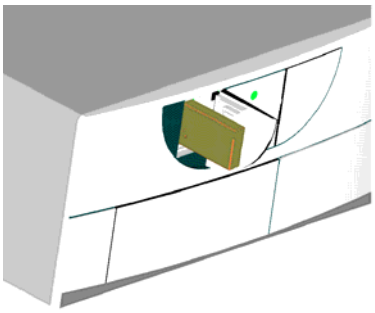
** Without request it is coded as "B".*

The barcodes are labeled as follows:

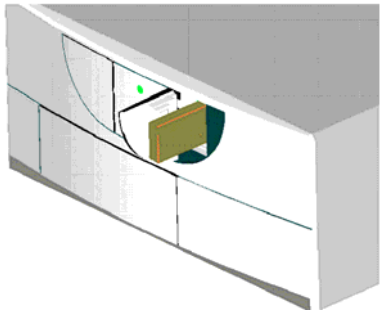


4.2 Inserting the Filter Slides

The filter slides are fitted with up to four interference filters which have a fixed wavelength and are specially designed for fluorescence. Additionally there are filter slides which are specially designed for absorbance measurements. Do not use fluorescence filters for absorbance measurements.



Excitation and Absorbance Filters



Emission Filter

To insert a filter slide, open the filter compartment manually and slot it in so that the filter end of the slide is inserted first. The filter is then inserted automatically if it is equipped with the automatic insertion code.

If the filter slide is not equipped with the automatic insertion code start the *XFLUOR* program and click the **Filter in** button in the **Movements** dialog box. The filter slide is then inserted.
(You may have to push the filter slide gently).

The excitation filter is located on the left and the emission filter on the right side of the instrument.

Ensure that the filter slides are only inserted into their respective compartments and that they do not get mixed up.

Depending on the measurements that are to be performed, the appropriate filter slide containing the required wavelength filters, must be inserted into the instrument. The instrument can store the data for up to eight excitation and eight emission filter slides.

The filter slides have a specific code which enables the instrument to distinguish between the filter slides.

Please note

A	ex. & em.	Fitted with standard filters - see specifications for values.
D	ex.	Fitted with standard absorbance filters.
B, C, E, F, G & H		For free configuration.

When a wavelength is selected, the instrument compares the entered wavelength against the list of entered filter values for this filter carriage.

If the required filter is fitted in the filter slide, the instrument then moves the filter slide so that the required filter is in the light beam.

4.3 How Do I Install the Custom Filter?

Caution

The filters are precision optical components, which should be handled by the edges, and not scratched or stored face down in a drawer and so on. Once the filters are installed in the slide, they are relatively protected, but care should be exercised when handling or storing them.

In order to install a custom filter do the following:

1. If necessary, remove the securing screw (is used with fluorescence filters which have an aluminum housing) from the filter slide using a 1.5 mm Allen key.
2. Remove the inner filter securing ring from the filter slide. The inner filter securing ring is used with absorbance filters, which do not have an aluminum housing.
3. Carefully insert the filter into the opening, taking care not to scratch or get fingerprints on the filter.

Caution

Take care when removing or replacing filters. They are easily scratched. If necessary, use the eraser part of a pencil to aid in removing the filter from the holder. Do this with extreme care as the filters are easily damaged.

4. For filters without aluminum housing, place the filter-securing ring into the filter slide on top of the filter.
5. For filters with aluminum housing, carefully tighten the securing screw to secure the filter.
6. If there are unused openings remaining after filter insertion, filter dummies should be mounted in the holes that are still open. With GENios or GENios *Plus,* the emission filter slide can have one hole opened, which is used for luminescence measurements.
7. Affix the bar code that came with the filter to the back of the filter slide. This is done by first removing the current bar code if one is present, and then affix the new bar code ensuring that the bar code is in position in the deep groove. The hole of the label must be placed on the centering pin of the filter slide.

Do not use the two bar codes currently used for the standard excitation (A) emission (A), and absorbance (D) filter slides for a combination of customized filters.

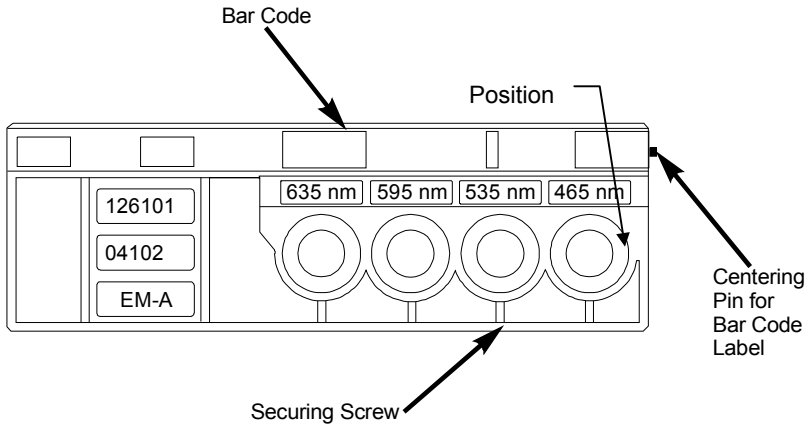


Figure A-1. Location of Securing Screw and Bar Code Label on the Filter Slide (standard).

The EX/ABS and EM filter slide can have the same coding. The filter slide is now ready to be placed into the appropriate filter slide opening and be recognized by the software.

4.3.1 Defining the Filter

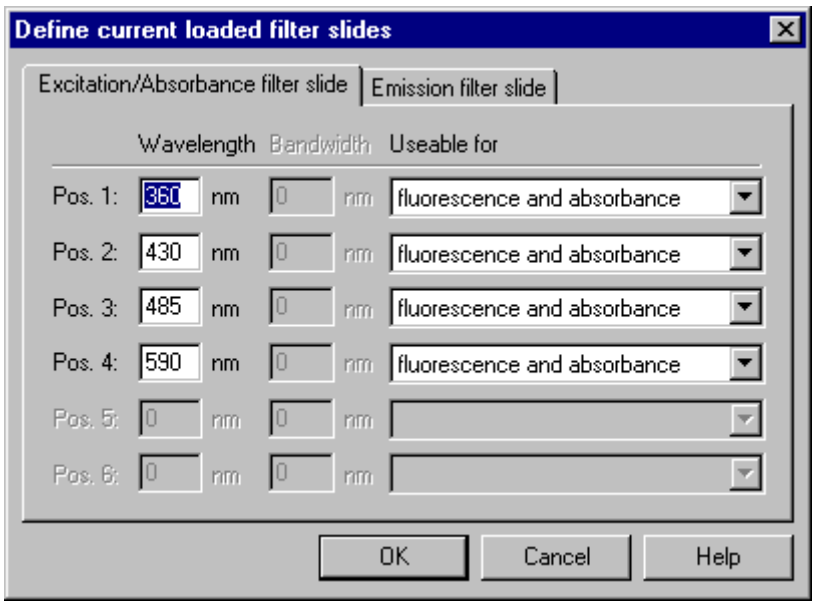
Caution

Any changes to the filters in the filter slide are to be carried out by the service engineer! The instrument is able to recognize predefined filter slides and you should not attempt to change the filter values.

However, if the filters in the filter slide have been changed (by a service engineer) or if a new undefined customized filter slide is to be used, the filter slides need to be defined.

Define a filter as follows:

1. Close *XFLUOR*.
2. Click the **RdrOLE** icon in the **TECAN** group, and the RdrOLE screen is displayed.
3. Select **Connect** from the **Instrument** menu. You are now connected to the GENios.
4. Select **Define Filter** from the **Setup** menu.
5. The following dialog box is displayed showing the filter values for the excitation and the emission filters:



The Define Filter Dialog Box: *You can choose the options from the right column of the dialog box for GENIOS.*

6. Enter the new wavelength for each new filter. Ensure that the wavelength corresponds with the filter position.
7. Accept the new filter values by clicking **OK**. You are now ready to collect data with the new filters.
8. Exit **RdrOLE** by clicking **Exit** in the **File** menu and restart *XFLUOR*.
9. This completes the installation procedure.

5. Instrument Features

5.1 Specifications (GENios)

The following types of measurement are provided with the GENios microplate reader.

Measurement Type	Read Mode	Microplates to be Used
Fluorescence (see 5.1.1)	Standard and time-resolved, top and bottom	6 - 384 wells
Absorbance (see 5.1.2)	Single and dual wavelength	6 - 384 wells
Glow type luminescence (see 5.1.3)		96 wells

The instrument allows for kinetic measurements.

Reading may be restricted to one part of the microplate.

Up to four-measurement parameter sets can be queued using *XFLUOR*.

Use of cuvettes

Please Note:
For cuvette use TECAN provides an adapter plate which fits up to 4 standard 10 mm cuvettes that can be measured simultaneously (compatible with Hellma 10 mm 110-QS cuvettes equipped with PTFE plug).

The cuvettes are positioned horizontally in the 4 designated areas.

The cuvette should be filled completely and closed tightly in order to exclude air from the measurement chamber and ensure reliablity of results.

Select the provided CUV.pdf plate format from the plate definition file before the measurement is started.

The table below lists the technical specifications for the instrument.

Parameters	Characteristics
Measurement	Software controlled
Interface	Serial interface: RS 232
Filter handling	***External filter exchange*** Up to 4 excitation filters and 4 emission filters in separate filter slides. Up to 8 excitation and emission filter slides can be defined when using software.
Plate definition	Via scanning software
Temperature control	From ambient +5°C up to 42°C
Plate shaking	Orbital or linear shaking - both offer 3 speeds

Parameters	Characteristics	
Light source	High energy Xenon flash lamp	
Optics	Quartz / PMMA fibers and lenses	
Detector	Side window, low dark current photomultiplier tube	
Power supply	Auto-sensing:100-120V / 220-240V 50/60 Hz	
Power consumption	200 VA	
Main fuse	T 2A / 250 (slow blow)	
Physical		
Outer dimensions	Width: 380 mm Depth: 415 mm Height: 170 mm	
Weight	18.8 kg	
Environmental		
Ambient temperature		
Operation	15°C - 30°C	59°F - 86°F
Non-operation	-20°C - +60°C	-4°F - +140°F
Relative humidity		
Operation	90% non-condensing	
Overvoltage category	II	
Pollution degree	2	
Usage	Commercial	
Noise level	< 70 dBA	
Method of disposal	Electronic waste (infectious waste)	

5.1.1 Fluorescence

Parameters	Characteristics	
Sensitivity	≤ 3 pg fluorescein / well (200 µl / well) or ≤ 8 fmol / well in a Greiner 96 well black plate using 100 flashes / well	
Wavelength Range	340 - 700 nm	
Standard Filters	***Wavelength***	***Band Width*** ①
Excitation	1. 360nm	35nm
	2. 485nm	20nm
Emission	1. 465nm	35nm
	2. 535nm	25nm
Read Mode	Top and bottom (bottom for transparent plates)	
Integration Time ✧	20 - 2000 µs	
Lag Time ✧	0 - 2000 µs	

Gain setting	Values	Measurement range
Manual	1 - 255	0 - 60,000 RFU
Optimal	Automatic	0 - 60,000 RFU
Extended Dynamic Range	Automatic	0 - 6,000,000 RFU (using XFLUOR)

① Band width for standard filters may have some tolerance ± 10%

✧ Needs to be adjusted for Time Resolved Measurements.
Lag Time is typically ≥ 40 µs.

No. of Flashes / Well	Definition	Characteristic	Meas. Time for 96 Wells
1 - 3	Plate carrier does not stop at the measurement point (on the fly)	max. speed	≤ 30 sec
4 - 255	Plate carrier stops at the meas. point	max. precision	Dependent on the flash parameter setting

5.1.2 Absorbance

The specifications only apply to 96 well plates.

Absorbance can not be measured in 1536 well plates.

Parameters	Characteristics		
Wavelength range	230 - 1000 nm		
Meas. range	0 - 3 OD		
Resolution	0.0001 OD		
Accuracy	0.0 – 2.0 OD	± 1 % and ± 0.010 OD	492 nm
	2.0 - 3.0 OD	± 1.5 % and ± 0.010 OD	492 nm
Precision	0 - 3.0 OD	± 1 % and ± 0.005 OD	492 nm
Linearity	0 - 3.0 OD	± 1.5 % and ± 0.005 OD	492 nm
No. of Flashes / Well	1 - 255		
Standard filters	260 nm / 280 nm / 340 nm / 595 nm		

5.1.3 Glow Type Luminescence

The specifications only apply to 96 well plates.

Luminescence can only be measured in 96 well plates.

Parameters	Characteristics	
Sensitivity	< 0.4 10-6 DEA activity units/well of molecular biology grade alkaline phosphatase (20 µl/well) using CDP-Star (Tropix) chemiluminescent substrate mix with Emerald-II enhancer (100 µl/well) in a Greiner 96 well white plate. Use of the provide cover plate greatly reduces the cross-talk. 0.4 10-6 DEA activity units/well correspond to 200 fg/well of alkaline phosphatase when using a lot of 2000 DEA activity units/mg protein.	
Wavelength range	400 - 700 nm	
Gain	Optimal:	preset value
	Manual:	1 - 255

Integration setting	Integration time	Measurement range
Manual	1 - 5000 ms	0 - 55,000 RLU
Maximum Dynamic Range	automatic (1 - 1000 ms)	0 - 55,000,000 RLU (using *XFLUOR*)

5.2 Specifications (GENios FL)

The following types of measurement are provided with the GENios FL microplate reader.

Measurement Type	Read Mode	Microplates to be Used
Fluorescence (see 5.2.1)	Standard and time-resolved, top measurement	6 - 384 wells

The instrument allows for kinetic measurements.

Reading may be restricted to one part of the microplate.

Up to four-measurement parameter sets can be queued using *XFLUOR*.

The table below lists the technical specifications for the instrument.

Parameters	Characteristics	
Measurement	Software controlled	
Interface	Serial interface: RS 232	
Filter handling	***External filter exchange*** Up to 4 excitation filters and 4 emission filters in separate filter slides. Up to 8 excitation and emission filter slides can be defined when using software.	
Plate definition	Via scanning software	
Plate shaking	Orbital or linear shaking - both offer 3 speeds	
Light source	High energy Xenon flash lamp	
Optics	PMMA fibers and lenses	
Detector	Side window, low dark current photomultiplier tube	
Power supply	Auto-sensing:100-120V / 220-240V 50/60 Hz	
Power consumption	200 VA	
Main fuse	T 2A / 250 (slow blow)	
Physical		
Outer dimensions	Width: 380 mm Depth: 415 mm Height: 170 mm	
Weight	18.8 kg	
Environmental		
Ambient temperature		
Operation	15°C - 30°C	59°F - 86°F
Non-operation	-20°C - +60°C	-4°F - +140°F
Relative humidity		
Operation	90% non-condensing	
Overvoltage category	II	
Pollution degree	2	
Usage	Commercial	
Noise level	< 70 dBA	
Method of disposal	Electronic waste (infectious waste)	

5.2.1 Fluorescence

Parameters	Characteristics	
Sensitivity	≤ 3 pg fluorescein / well (200 µl / well) or ≤ 8 fmol / well in a Greiner 96 well black plate using 100 flashes / well	
Wavelength Range	340 - 700 nm	
Standard Filters	***Wavelength***	***Band Width*** ①
Excitation	1. 360nm	35nm
	2. 485nm	20nm
Emission	1. 465nm	35nm
	2. 535nm	25nm
Read Mode	Top	
Integration Time ✧	20 - 2000 µs	
Lag Time ✧	0 - 2000 µs	

Gain setting	Values	Measurement range
Manual	1 - 255	0 - 60,000 RFU
Optimal	Automatic	0 - 60,000 RFU
Extended Dynamic Range	Automatic	0 - 6,000,000 RFU (using *XFLUOR)*

① Band width for standard filters may have some tolerance ± 10%

✧ Needs to be adjusted for Time Resolved Measurements.
Lag Time is typically ≥ 40 µs.

No. of Flashes / Well	Definition	Characteristic	Meas. Time for 96 Wells
1 - 3	Plate carrier does not stop at the measurement point (**on the fly**)	max. speed	≤ 30 sec
4 - 255	Plate carrier stops at the meas. point	max. precision	Dependent on the flash parameter setting

5.3 Specifications (GENios Plus)

The following types of measurement are provided with the *SPECTRAFLUOR PLUS* microplate reader.

Measurement Type	Read Mode	Microplates to be Used
Fluorescence (see 5.3.1)	Standard and time-resolved, top and bottom	6 - 1536 wells
Absorbance (see 5.3.2)	Single and dual wavelength	≤ 384 wells
Glow type luminescence (see 5.3.3)		96 wells

The instrument allows for kinetic measurements.

Reading may be restricted to one part of the microplate.

Up to four-measurement parameter sets can be queued using *XFLUOR*.

Use of cuvettes

Please Note:
For cuvette use TECAN provides an adapter plate which fits up to 4 standard 10 mm cuvettes that can be measured simultaneously (compatible with Hellma 10 mm 110-QS cuvettes equipped with PTFE plug).

The cuvettes are positioned horizontally in the 4 designated areas.

The cuvette should be filled completely and closed tightly in order to exclude air from the measurement chamber and ensure reliablity of results.

Select the provided CUV.pdf plate format from the plate definition file before the measurement is started.

The table below lists the technical specifications for the instrument.

Parameters	Characteristics
Measurement	Software controlled
Interface	Serial interface: RS 232
Filter handling	***External filter exchange*** 4 excitation filters and 4 emission filters in separate filter slides. Up to 8 excitation and emission filter slides can be defined when using software.
Plate definition	Via scanning software
Temperature control	From ambient +5°C up to 42°C
Plate shaking	Orbital or linear shaking - both offer 3 speeds

Parameters	Characteristics	
Light source	High energy Xenon flash lamp	
Optics	Quartz fibers and lenses	
Detector	Side window, low dark current photomultiplier tube	
Power supply	Auto-sensing:100-120V / 220-240V 50/60 Hz	
Power consumption	200 VA	
Main fuse	T 2A / 250 (slow blow)	
Physical		
Outer dimensions	Width: 380 mm Depth: 415 mm Height: 170 mm	
Weight	18.8 kg	
Environmental		
Ambient temperature		
Operation	15°C - 30°C	59°F - 86°F
Non-operation	-20°C - +60°C	-4°F - +140°F
Relative humidity		
Operation	90% non-condensing	
Overvoltage category	II	
Pollution degree	2	
Usage	Commercial	
Noise level	< 70 dBA	
Method of disposal	Electronic waste (infectious waste)	

5.3.1 Fluorescence

Parameters	Characteristics	
Sensitivity	≤ 1.5 pg fluorescein / well (200 µl / well) or ≤ 4 fmol / well in a Greiner 96 well black plate using 100 flashes / well	
Wavelength Range	230 - 700 nm	
Standard Filters	***Wavelength***	***Band Width*** ①
Excitation	1. 360nm	35nm
	2. 430nm	35nm
	3. 485nm	20nm
	4. 590nm	20nm
Emission	1. 465nm	35nm
	2. 535nm	25nm
	3. 595nm	35nm
	4. 635nm	35nm
Read Mode	Top and bottom (bottom for transparent plates)	
Integration Time ✧	20 - 2000 µs	
Lag Time ✧	0 - 2000 µs	

Gain setting	Values	Measurement range
Manual	1 - 255	0 - 60,000 RFU
Optimal	Automatic	0 - 60,000 RFU
Extended Dynamic Range	Automatic	0 - 6,000,000 RFU (using *XFLUOR)*

① Band width for standard filters may have some tolerance ± 10%

✧ Needs to be adjusted for Time Resolved Measurements. Lag Time is typically ≥ 40 µs.

No. of Flashes / Well	Definition	Characteristic	Meas. Time for 96 Wells
1 - 3	Plate carrier does not stop at the measurement point (**on the fly**)	max. speed	≤ 30 sec
4 - 255	Plate carrier stops at the meas. point	max. precision	Dependent on the flash parameter setting

5.3.2 Absorbance

The specifications only apply to 96 well plates.

Absorbance can not be measured in 1536 well plates.

The absorbance filters are not within the instrument's standard configuration.

Parameters	Characteristics		
Wavelength range	230 - 1000 nm		
Meas. range	0 - 3 OD		
Resolution	0.0001 OD		
Accuracy	0.0 - 2.0 OD	± 1 % and ± 0.010 OD	492 nm
	2.0 – 3.0 OD	± 1.5 % and ± 0.010 OD	492 nm
Precision	0 - 3.0 OD	± 1 % and ± 0.005 OD	492 nm
Linearity	0 - 3.0 OD	± 1.5 % and ± 0.005 OD	492 nm
No. of Flashes / Well	1 - 255		
Standard filters	405 nm / 450 nm / 492 nm / 620 nm (not included in standard delivery)		

5.3.3 Glow Type Luminescence

The specifications only apply to 96 well plates.

Luminescence can only be measured in 96 well plates.

Parameters	Characteristics
Sensitivity	< 0.4 10^{-6} DEA activity units/well of molecular biology grade alkaline phosphatase (20 µl/well) using CDP-Star (Tropix) chemiluminescent substrate mix with Emerald-II enhancer (100 µl/well) in a Greiner 96 well white plate. Use of the cover plate greatly reduces the cross-talk. 0.4 10^{-6} DEA activity units/well correspond to 200 fg/well of alkaline phosphatase when using a lot of 2000 DEA activity units/mg protein.
Wavelength range	400 - 700 nm
Gain	Optimal: preset value Manual: 1 - 255

Integration setting	Integration time	Measurement range
Manual	1 - 5000 ms	0 - 55,000 RLU
Maximum Dynamic Range	Automatic (1 - 1000 ms)	0 - 55,000,000 RLU (using *XFLUOR*)

6. Interface

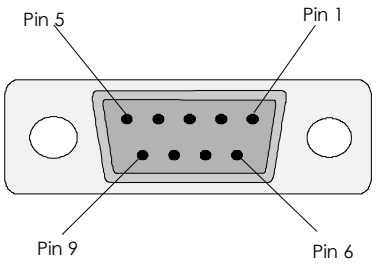
6.1 Hardware Specifications

The instrument is controlled by the computer and the communication between the computer and the instrument is done through an RS-232-C interface.

The interface specifications may be either to the CCITT interface standard or to the EIA RS-232-C interface standard.

6.2 Pin Designation

The illustration below shows the pin assignment of the DB 9 connector fitted to the instrument.



All connected devices must be approved and listed as per EN 60950, UL 1950 or CSA C22.2 No. 950 for Data Processing Devices.

6.3 RS-232-C Interface Lines

The serial interface of the instrument is connected to a start-stop synchronized serial RS-232-C circuit.

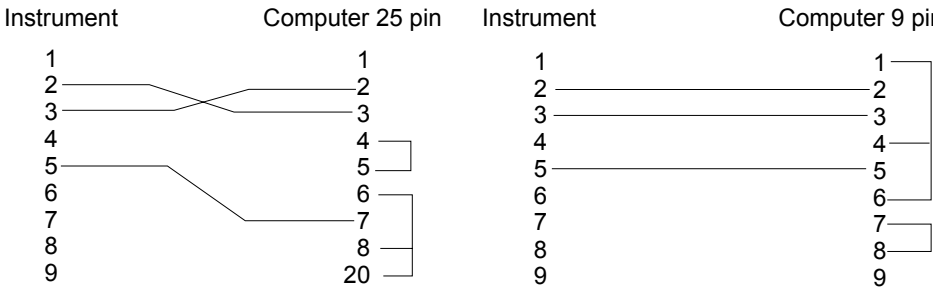
The list below names the interface lines of the 9 pin connector of the instrument.

PIN Number	DESCRIPTION	
1	DTR	Data Terminal Ready
2	TD	Transmit Data
3	RD	Receive Data
4	DCD	Data Carrier Detect
5	GND	Ground
6	No connection	
7	RTS	Request To Send
8	CTS	Clear To Send
9	No connection	

The connecting cable used to connect the instrument to the computer should be wired as given below.

INSTRUMENT	COMPUTER
TD	connected to RD
RD	connected to TD
GND	connected to GND
	RTS connected to CTS
	DSR connected to DCD and DTR

Use the computer handbook to find the correct pin connections.



6.4 Synchronization and Data Format

For the instrument to communicate with the computer correctly, the instrument and the computer must be set for the same communication parameters.

Check that following parameters are set correctly on the computer:

1	Start-stop synchronous system	asynchron
2	Start bit length	1
3	Stop bit length	1
4	Data format	8 databits
5	Parity bit	none
6	Baud Rate	9600

6.5 Signal Levels

The table below lists the voltage levels and their definitions.

VOLTAGE LEVEL	DATA SIGNALS	CONTROL SIGNALS
+3 to +12	SPACE (Logic 0)	ON
-3 to -12	MARK (Logic 1)	OFF
+3 to -3	UNDEFINED RANGE	UNDEFINED RANGE

7. Quality Control

7.1 Periodic Quality Control Tests

Depending on usage and application we recommend a periodic evaluation of the instrument on TECAN site.

The tests described in the following chapters do not replace a full evaluation by the manufacturer or authorized dealers. But the tests maybe performed periodically by the user to check significant aspects of the instrument performance.

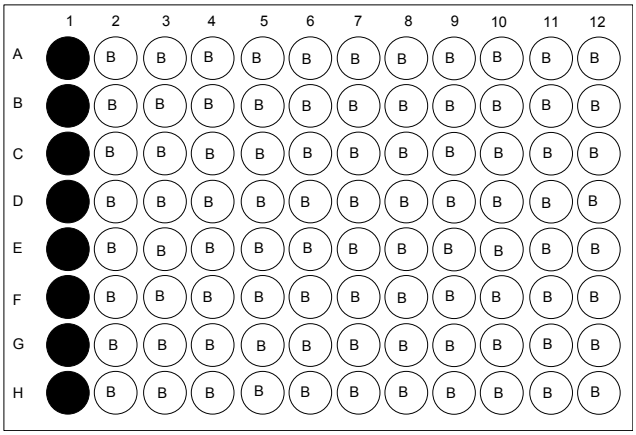
The results are strongly influenced by errors in pipetting and the setting of the parameters in the instrument. Therefore please follow the instructions carefully. The user should determine the appropriate intervals for this testing based on how frequently the instrument is operated.

We recommend adapting these tests and the acceptance criteria to the laboratory's primary application. Ideally these tests must be performed with the laboratory's own plates, fluorophore, buffers, volumes and all the appropriate settings (filters, flashes, delays, top/bottom reading, and so on).

7.2 Fluorescence

7.2.1 Sensitivity Test

- Use a black 96 well plate, for example: Greiner flat bottom, black microplate
- Apply 200 µl of 1 nM Fluorescein in 0.01 M NaOH solution to wells A1 to H1. We recommend SIGMA fluorescein F-6377 (acid yellow 73, FW 376.3)
- All other wells are blank (**B**), for example: 200 µl 0.01 M NaOH solution without fluorescein



- Use 100 flashes and optimal gain function.

For GENios / GENios FL:

The procedure to achieve the sensitivity is as follows:

Divide the standard deviation of the blanks by the blanked average value of column 1.

Arrive at physical units (g/well) by multiplication with the concentration (1 nMol/l), the volume per well (200 µl) and the molecular weight (376 g/Mol).

The sensitivity is expected to be 3pg fluorescein per well.

For GENios Plus:

The procedure to achieve the sensitivity is as follows:

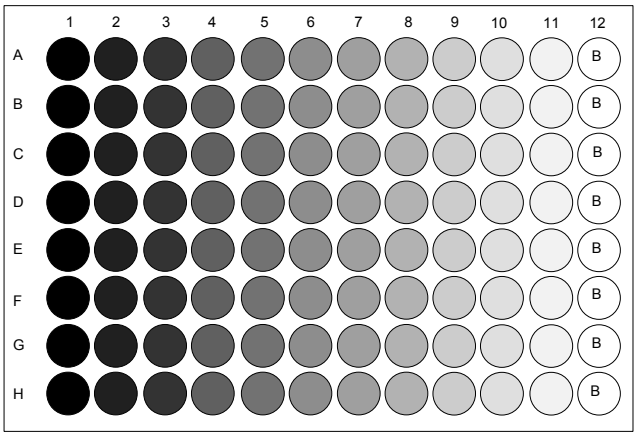
Divide the standard deviation of the blanks by the blanked average value of column 1.

Multiply with a factor 2 to achieve statistical reliability.

Arrive at physical units (g/well) by multiplication with the concentration (1 nMol/l), the volume per well (200 µl) and the molecular weight (376 g/Mol).

The sensitivity is expected to be 1.5pg fluorescein per well.

7.2.2 Linearity Test



- Use a 96 well plate, for example: a Greiner flat bottom, black microplate.
- Prepare a 1:1 dilution series of fluorescein in 0.01 M NaOH solution - each column will take a different concentration (compare figure).
- Highest concentration = 1 µM fluorescein, max. volume per well = 200 µl.
- Provide column 12 as blank (**B**), that is filled with pure NaOH solution.
- Use 10 flashes and optimal gain function.

Calculate the blanked average RFU (Relative Fluorescence Units) for each of the columns 1 to 11. Compute the coefficient of correlation using the blanked average RFUs and the corresponding concentrations. The coefficient of correlation is expected to be ≥ 0.995.

7.2.3 Precision Test

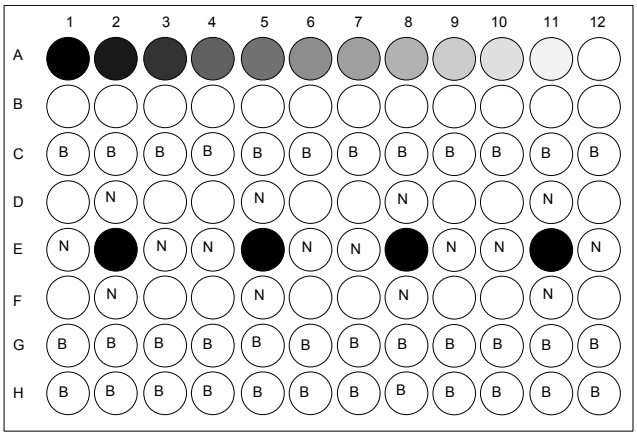
- Use the same plate as mentioned in **7.2.2**.
- Perform 7 measurements with number of flashes set to 10, gain as above.

Compute the CV (Coefficient of Variation) value of each well in column 4.
The CV value should be <=2.5%.

7.2.4 Cross-Talk Test

In fluorescence mode, excitation and emission is performed in the center of each well. The cross-talk test helps to identify when the excitation light hits a neighboring well and leads to a false fluorescence intensity.

- Use a 96 well plate, for example: a Greiner flat bottom, black microplate. Volume per well - 200 µl
- Isolated wells E2, E5, E8, E11 contain 10 µM Fluorescein
- Prepare a 1:1 dilution series in row A from A1 to A12 starting with 1µM Fluorescein
- Fill the wells with buffer that are indicated with the letters **N** and **B**.



- Select extended dynamic range and perform a measurement with 10 flashes

Compute the MVB (Mean Value of Blanks), using the wells indicated with the letter **B** and the SD (Standard Deviation). Use factor 3 to get higher statistical reliability.

Calculate the MVN (Mean Value of the Neighbors), using the wells indicated with the letter **N**.

If MVN is within the interval MVB +/- 3 SD, cross talk cannot be clearly distinguished from the background.

If MVN is higher than MVB +3 SD the cross talk CT (Cross Talk) calculates according to:

CT = (MVN – MVB) / Average RFU (E2, E5, E8, E11).

CT is expected to be $\leq$ 0.0001.

7.3 Glow Type Luminescence

7.3.1 Sensitivity Test

- Use a white Greiner 96 well plate and the black cover plate, which is supplied with the instrument.
- Prepare a 1:1 dilution series of alkaline phosphatase (molecular biology grade source: Boehringer) in assay buffer (20 mM Tris HCl pH 9.8, 1 mM $MgCl_2$; source: Tropix). Highest concentration for measurement of sensitivity may be 10^{-6} DEA activity units / µl.
- Apply 20 µl of pure buffer to wells A1,...,A4;...;D1,...,D4 these will serve as blanks. Continue applying 20 µl of increasing AP dilution to the next columns in replicates of 4.
- Finally add 100 µl of chemiluminescent substrate (CDP-Star with Emerald-II enhancer, source: Tropix) per well and mix thoroughly. Incubate at room temperature for 20 minutes.
- Integrate 2 seconds per well using gain 100. Chemiluminescent signal will change very slowly over the following hour when using the above maximum enzyme concentration.

The procedure to achieve the sensitivity is as follows:

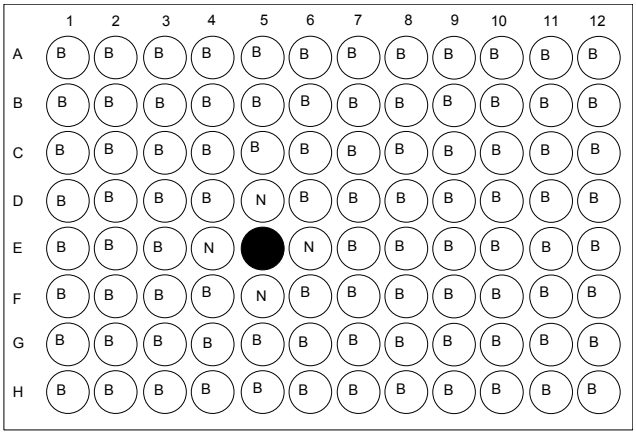
Plot the blanked values of the dilution series against the corresponding activity units and calculate a linear fit. Divide the standard deviation of the blanks by the slope of the fitting curve. Multiply with a factor of 2 to achieve statistical reliability.

The sensitivity is expected to be <0.4 10^{-6} DEA activity units/well

7.3.2 Cross-Talk Test

Cross talk is a measure for increase of blank values (**blank** contains pure buffer and substrate) due to optical leakage from neighboring wells.

- Greiner 96 well plate, flat bottom, white using black cover plate.
- A single well (for example: E5) is supplied with 20µl of 0.3 10^{-3} activity units/µl alkaline phosphatase dilution and with 100µl of substrate
- Fill all other wells with pure buffer and substrate.



- Select maximum dynamic range and adjust gain to get a RLU (Relative Luminescence Units) reading greater than 10^6. Measurement should be performed 10 minutes after preparation but not later than 30 minutes.

Calculation method:

Compute MVB (**B**) from all wells except the nearest neighbor wells (**N**) and the well filled with alkaline phosphatase (for example: E5).

Calculate the SD (Standard Deviation) of MVB. Use factor 3 to get higher statistical reliability.

Calculate the MVN (Mean Value of the Neighbors), using the wells indicated with the letter **N**.

If MVN is within the interval MVB +/- 3 SD, cross talk cannot be clearly distinguished from the background.

If MVN is higher than MVB +3 SD the cross talk CT (Cross Talk) calculates according to:

CT = (MVN – MVB) / RLU reading

CT is expected to be $\leq$ 0.0001

8. Cleaning & Maintenance

8.1 Introduction

Caution

Ensure that the microplate is removed from the instrument before it is prepared for shipment. If a microplate is left in the instrument, fluorescent solutions may spill onto the optical parts and damage the instrument.

The cleaning and maintenance procedures are important in order to prolong the instrument's life and to reduce the need for servicing.

This section contains the following procedures:

See 8.2
- Liquid Spills

See 8.3
- Replacing the Fuse

See 8.4
- Instrument Disinfection

8.2 Liquid Spills

1. Wipe up the spill immediately with absorbent material.
2. Dispose of contaminated material appropriately.
3. Clean the instrument surfaces with mild detergent.
4. For biohazard spills, clean with a 5-10 % solution of bleach in deionized water.
5. Wipe cleaned areas dry.

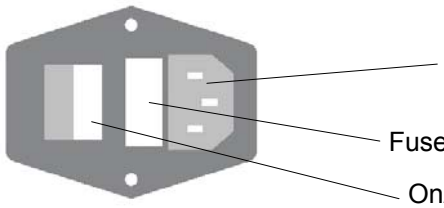
WARNING

ENSURE THAT THE MICROPLATE IS REMOVED FROM THE INSTRUMENT BEFORE IT IS PREPARED FOR SHIPMENT.

IF A MICROPLATE IS LEFT IN THE INSTRUMENT, FLUORESCENT SOLUTIONS MAY SPILL ONTO THE OPTICAL PARTS AND DAMAGE THE INSTRUMENT.

8.3 Replacing the Fuse

- Turn the instrument OFF and unplug the mains cable from the instrument. The fuse is located on the right hand side of the mains cable connection in the rear of the instrument.
- Open the fuse compartment by inserting a screwdriver into the slot in the top of the cover and push the fuse holder out.



- Pull the fuse holder out and replace the defective fuse(s) with the spare fuse(s).
- Ensure that the fuse(s) has/have the correct rating.
- **T 2 / 250V (slow blow)**

Caution
Risk of Fire
For continued protection replace only with the same type and rating of fuse.

- Replace the fuse holder.
- Reconnect the mains cable.
- Turn the instrument on.

If the fuse continues to blow, call for service.

8.4 Maintenance

CAUTION
Ensure that the instrument positioning is checked using the service tool plate once a year.

8.4.1 Daily

No daily maintenance is necessary.

8.4.2 Weekly

Clean the cover and the transport with a mild detergent.

8.4.3 Every Six Months

Clean the filters using an optical cleaning solution (Lens tissue recommended).

8.4.4 Yearly Maintenance

Check the belts tension (between 50 an 60 Hz, tension meter necessary).

Perform a FlouCheck test.

8.5 Instrument Disinfection

All parts of the instrument that come into contact with the patient samples, positive control samples or hazardous material must be treated as potentially infectious areas.

It is very important that the instrument is thoroughly disinfected before it is removed from the laboratory or any servicing is performed on it.

Before the instrument is returned to the distributor for servicing, it must be disinfected and a disinfection certificate completed. If a disinfection certificate is not supplied, the instrument may not be accepted by the servicing center or it may be held by the customs authorities.

8.5.1 Disinfection Solutions

If the laboratory has no specific disinfection procedure, the following procedure should be used to disinfect the instrument.

The instrument should be disinfected using a solution such as:

Lysetol Manufacturer: Schülke & Mayr Ges.m.b.H.

Aseptisol Manufacturer: Bode Chemie Hamburg

If neither of these solutions is available 70% ethanol should be used as an alternative.

Caution

The disinfection procedure should be performed by authorized trained personnel in a well ventilated room wearing disposable gloves and protective glasses and clothing.

Please note that the disinfectant can influence the performance of your instrument if it applied inside the instrument.

8.5.2 Disinfection Procedure

The following procedure should be used to disinfect the outside surfaces of the instrument.

1. Disconnect the instrument from the mains power supply.
2. Disconnect the instrument from any accessories that are used.

   Ensure that you are wearing disposable gloves.
3. Carefully wipe all the outside surfaces of the instrument with a wad of cotton wool that has been soaked in the disinfecting solution.
4. Ensure that the same disinfection procedure is performed with the plate carrier.
5. Repeat the disinfection procedure on any accessories which are also being moved or returned.
6. After the disinfection procedure has been performed, ensure that the disinfection certificate is completed.

See 8.5 for an example of the disinfection certificate that must be completed before the instrument is returned to the distributor for servicing.

8.6 Disinfection Certificate

This disinfection certificate must be completed before the instrument is returned to the distributor for servicing.

The certificate must be attached to the top of the outer package in which the instrument is returned. ***It must be visible from the outside of the shipping container!***

I declare that the instrument in this package has been decontaminated or disinfected to remove or inactivate any biological material that could be dangerous to the service personnel or that it has never been exposed to any hazardous biological material.

Name:.....

Firm: .....

Address: .....

.....

.....

Country:.....

Signature:.....

✂----------

I declare that the instrument in this package has been decontaminated or disinfected to remove or inactivate any biological material that could be dangerous to the service personnel, or that it has never been exposed to any hazardous biological material.

Name:.....

Firm: .....

Address: .....

.....

.....

Country:.....

Signature:.....

9. Application Note for DNA Quantitation

9.1 Introduction

Comparison of two different detection techniques for DNA quantitation: Absorbance vs. Fluorescence

The quantitation of small amounts of dsDNA is important for a variety of biological applications. These include standard molecular biology techniques, such as synthesizing cDNA for library production and purifying DNA fragments for subcloning, as well as diagnostic techniques, such as quantitating DNA amplification products and detecting DNA molecules in drug preparations.

9.1.1 Common techniques for the quantitation of DNA

The most commonly used technique for measuring nucleic acid concentration is the determination of **absorbance at 260 nm (A_{260}).** The major disadvantages of the absorbance method are the relative contribution of nucleotides and single-stranded nucleic acids to the signal, the interference caused by contaminants commonly found in nucleic acid preparations, the inability to distinguish between DNA and RNA and the relative insensitivity of the assay (an A_{260} of 0.1 corresponds to a 5 µg/ml dsDNA solution, referring to 1 cm pathlength for measurements in a cuvette). **Hoechst (bisbenzimide) dyes** are sensitive fluorescent nucleic acid stains. H33258 is selective for dsDNA, but does not show significant fluorescence enhancement in the presence of protein and allows the detection and quantitation of DNA concentrations as low as 10 ng/ml DNA. **Cyanine dyes such as YO-PRO™-1 and YOYO®-1** (cyanine monomers and dimers) from Molecular Probes are also known for the quantitation of nucleic acids - 0.5 ng/ml DNA in solution is the detectable concentration.

A commonly used DNA probe, **PicoGreen™** allows direct quantitation of PCR amplicons without purification from the reaction mixture and makes it possible to detect low levels of DNA contamination in recombinant protein products. In comparison to the Hoechst 33258 dye, which shows significant AT selectivity, the PicoGreen reagent shows little if any AT- or GC-selectivity and is thus accurate for quantitating DNA from almost any source.

We demonstrate here an example for the quantitation of DNA, comparing absorbance (260 nm) with fluorescence detection using **PicoGreen™**. We are able to show the advantage to have instrumentation available for both detection techniques, dependent on the yield of extracted DNA. The DNA samples used for the measurements were plasmid DNA and genomic DNA, extracted with the TECAN *GENESIS* RSP 150.

9.2 Experimental Setup

9.2.1 DNA extraction

- **Plasmid extraction**

Plasmid extraction from *E.coli* (DH5α) with a bluescript vector with a 1.2 kb insert grown in LB or TB media was performed using the QIAprepR 96 Turbo BioRobot Kit from QIAGENR and the QIA_96 Turbo T Gemini script on a *GENESIS* RSP 150 with a **Te-VacS-B** from TECAN.

- **Genomic DNA Extraction**

Genomic DNA was extracted from human blood samples using a Genomic DNA Extraction Kit on a *GENESIS* RSP 150 with a **Te-MagS** from TECAN.

9.2.2 Assay Procedure

The extracted DNA was quantified using UV absorbance at 260 nm and fluorescence measurements with PicoGreen™ (from Molecular Probes Inc.) at 485/535 nm with the TECAN GENios. Absorbance measurements were performed in special UV compatible plates (GREINER UV Star® Nr. 655801), and for fluorescence quantitation, black flat bottom 96 well plates (GREINER; Nr 655076) were used.

For **UV absorbance at 260 nm**, 100 µl of DNA solution per well was used. In addition to the samples, a λ DNA dilution series was pipetted onto the same plate to calculate a calibration curve. The **fluorescence measurements with PicoGreen™** dye were performed refering to the protocol for the PicoGreen dsDNA Quantiation Kit (Molecular Probes, **P-7589**). The solutions were mixed by shaking for 5 sec prior to the measurement. A dilution series of λ DNA was used as calibration standard.

9.3 Typical Results

9.3.1 Detection techniques vs. detection limits

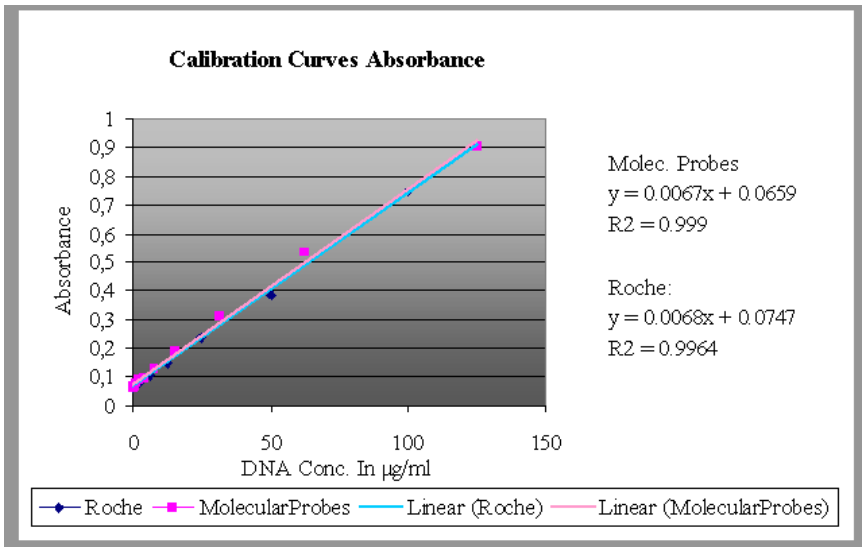


Figure 1 Dilution series of λ-DNA from two different DNA samples (Roche and Molecular Probes) measured with absorbance at 260 nm

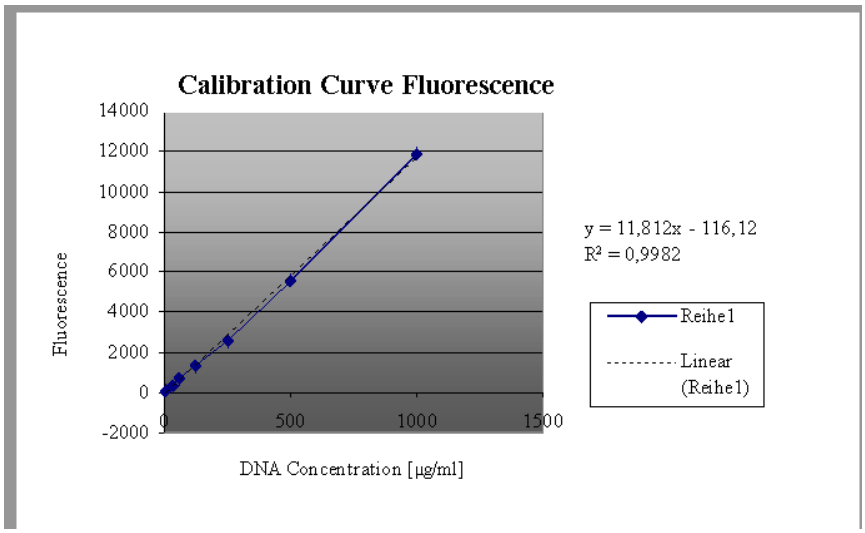


Figure 2 Dilution series of λ-DNA measured with PicoGreen fluorescence at 485 nm (excitation) and 535 nm (emission).

9.3.2 Sensitivities in comparison:

260 nm absorbance:	approximately 50 – 250 ng DNA/ml
PicoGreen fluorescence:	approximately 300 pg DNA /ml

The comparison between absorbance and fluorescence measurements show that fluorescence quantitation is 100 to 1000 times more sensitive. The calibration curves show the linear range of the different methods. It should be emphasized, that the sensitivities are dependent on filling volumes (especially for absorbance), flash numbers, type of diluent and even the type of DNA can influence the final result.

9.3.3 Results from Plasmid and Blood DNA Sample

(a) DNA from Blood

In some cases the amount of blood and DNA is not sufficient for UV quantitation. DNA from human blood was extracted with different treatments. The volume and concentration of the extracted samples did not allow to quantify with absorbance.

1	10 µl blood fresh/EDTA	5	10 µl blood old/EDTA
2	20 µl blood fresh/EDTA	6	20 µl blood old/EDTA
3	10 µl blood fresh/Citrate	7	10 µl blood old/Citrate
4	20 µl blood fresh/Critrate	8	20 µl blood old/Critrate

Treatment	1	2	3	4	5	6	7	8
485/535	1.02	1.06	2.99	4.15	3.88	3.92	1.23	2.27

Table 1 Calculated DNA concentrations in µg/ml stock solution of the same samples with different treatment.

(b) Plasmid DNA

The same samples from a plasmid extraction have been measured with both methods. Since the fluorescence method is a lot more sensitive, the samples were diluted 1:100 before the measurement – both of the detection techniques show comparable results.

485/535 nm	46	44	46	49	59	50	39	48	48	51	43	48	36
Abs 260 nm	44	45	45	65	53	46	36	49	38	46	55	54	34

Table 2 Comparison of the stock concentrations (referring to the calibration curves above) in µg/ml of the samples measured with fluorescence (485/535) and absorbance (260).

9.3.4 DNA Purity at 260/280 nm

260 nm	0.1314	0.1328	0.1327	0.1206	0.1634	0.1614	0.2099	0.1443
280 nm	0.0928	0.0939	0.0931	0.0869	0.1124	0.1133	0.1439	0.1030
Purity 260/280	**1.4159**	**1.4143**	**1.4253**	**1.3878**	**1.4537**	**1.4245**	**1.4587**	**1.4010**

Table 3 Determination of the purity (DNA/protein ratio) of plasmid DNA samples. The high impurity of the samples may be due to the extraction method used

9.4 Conclusion

Depending on origin and further use of the DNA, the concentration and volume of samples may not be sufficient for quantitation using absorbance. In order to obtain comparable accuracy and reduce the amount of DNA required, the use of fluorescence is recommended. From the plasmid extractions, a stock solution volume of 50 µl was obtained with a DNA concentration high enough for absorbance measurements. The DNA extractions from human blood yielded 50 µl of stock solution with concentrations between 1 and 5 µg/ml, so the amount of extracted DNA was not sufficient for quantitation with absorbance.

This application example clearly demonstrates the advantage of having 2 detection techniques in one instrument. Both techniques offer a variety of advantages depending on the method of extraction and amount of available DNA. DNA quantitation by UV absorbance measurement is easy to perform, inexpensive and allows a rapid check of DNA purity (260/280nm ratio) although the extraction method, interference with RNA, ssDNA, or single nucleotides and contaminants (such as phenol or EDTA) may influence the quality of the results. In contrast, fluorescence assays provide the perfect combination of sensitivity and selectivity for dsDNA and extend the detection range significantly.

Acknowledgements

We would like to thank Robert Liebhart for carrying out the practical experiments at ETH Zürich, Inst. for Plant Sciences (Phytopathology), Universitätsstrasse 2, CH-8092 Zürich (Laboratory Dr. Cesare Gessler).

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TECAN.

EC - Conformity explanation

Document No/ Month/Year:	Fb 0413 Rev. 1.4 /10.00
Manufacturer:	TECAN Austria GmbH
Address:	Untersbergstraße 1 A 5082 Grödig / Salzburg AUSTRIA
Product description:	Fluorescence Reader Product number F1290xx. Type : SPECTRA FLUOR , SPECTRA FLUOR ODUV , SPECTRA FLUOR PLUS , POLARION , ULTRA , GENIOS

The described product concurs with the regulations of the following European guidelines:

Number:	1) 73 / 23 / EEC (NspGV 1995, BGBl. No. 51/1995) 2) 89 / 336 / EEC (EMVV 1995, BGBl. No. 52/1995)
Text:	1) Low voltage instrument guidelines 1995 2) Electromagnetic capability guidelines

Additional details regarding the obedience of this guidelines are included in the appendix.

Date of compliance the CE-Labelling 1997.

Issuer: TECAN Austria GmbH

Place, Date: Grödig, 2000-11-08

Legally binding signature:

The appendix is a part of this explanation.
This explanation confirms the agreement of the mentioned guidelines, comprises no assurance of features.
Please follow the safety notices of the included product information.

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TECAN.

Appendix to EC - Conformity explanation

Document No./
Month/Year: Fb 0413 Rev. 1.4/ 10.00

Product description: Fluorescence Reader Product number F1290xx.
Type : SPECTRA FLUOR , SPECTRA FLUOR ODUV ,
SPECTRA FLUOR PLUS , POLARION , ULTRA , GENIOS

The agreement of the described product with the regulations of the guidelines NspGV 1995, BGBl. No. 51/1995 is proofed through to the complete keeping of the following norms:

harmonic European norms:

Reference number	Issuing date
DIN EN 61010-1:1994 + A21996	
Classification VDE 0411 part 1:1994 + A1:1996	
IEC 1010-1:1990 + A1:1992 + A2:1995	

The agreement of the described product with the regulations of the guidelines EMVV 1995, BGBl. No. 52/1995 is proofed through to the complete keeping of the following norms:

harmonic European / International norms:

Reference number		Issuing date
EG-guidelines	89/336/EWG	03.05.1989
incl. changes	91/263/EWG	29.04.1991
	92/31/EWG	28.04.1992
	93/68/EWG	22.07.1993
	93/97/EWG	29.10.1993
EN 60555-2		1987
EN 55022		1994
EN 50081-1		1992
EN 50082-1		1992
CISPR 16		1977
IEC 801-2		1984 / 1991
IEC 801-3		1984
IEC 801-4		1988