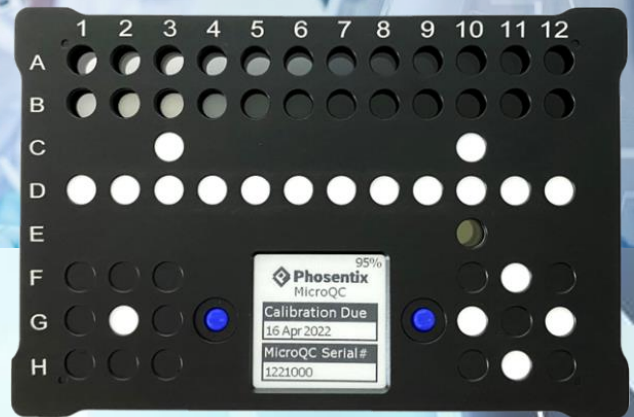


Phosentix MicroQC™ Plate

The Phosentix MicroQC™ plate is an easy-to-use, multi-modal microprocessor controller test plate for verification of your microplate reader key measurement modes and physical characteristics.



ABS

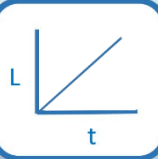
Twelve absorbance standards check linearity, precision, and accuracy.



Verify accuracy of your microplate reader incubation chamber temperature.

FL

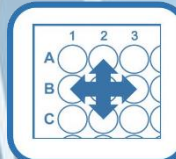
Twelve fluorescence standards with a large dynamic range, test linearity and precision.



Assay simulation mode verifies the kinetic assay performance of your microplate reader.

LUM

Twelve precision-controlled LEDs test luminescence sensitivity and linearity.



Luminescence crosstalk determination can help improve your assays.



Optional Holmium Oxide glass filter to verify absorbance wavelength accuracy.



Independent verification of any microplate reader.



Confidence in your Data

Your microplate reader produces some of the most important data in your laboratory. If you can't verify that it is capable of producing analytically relevant data, you could be spending time pursuing false avenues of discovery. The Phosentix MicroQC™ Plate can help.

The MicroQC Plate is a microprocessor controlled precision analytical tool specifically designed to test microplate readers and to provide a cross-platform industry standard metrology device.

The MicroQC Plate is the most sophisticated tool of its type on the market. It can be used with all three primary microplate reader analytical modes and determine optical and physical characteristics of the microplate reader.

The MicroQC Plate features an ANSI/SLAS dimensioned chassis, solid state fluorescence wells, NIST traceable absorbance wells, and seventeen precision controlled LEDs for luminescence functionality. It has a thermal sensor for incubator verification, and a multi-axis accelerometer for level sensing, all processed by an ARM Cortex microprocessor driving a non-light emitting ePaper display.

Compatibility

The Phosentix MicroQC™ Plate will work with any microplate reader that can accept an ANSI/SLAS standard 96-well microplate such as those from Berthold™, Biotek™, BMG LABTECH™, Molecular Devices™, Perkin Elmer™, Promega™, Tecan™, Thermo™, and others. The MicroQC Plate is a valuable tool which can serve your laboratory for many years, saving you both research time and money while providing the ability to perform independent performance evaluations and quality assurance checks.

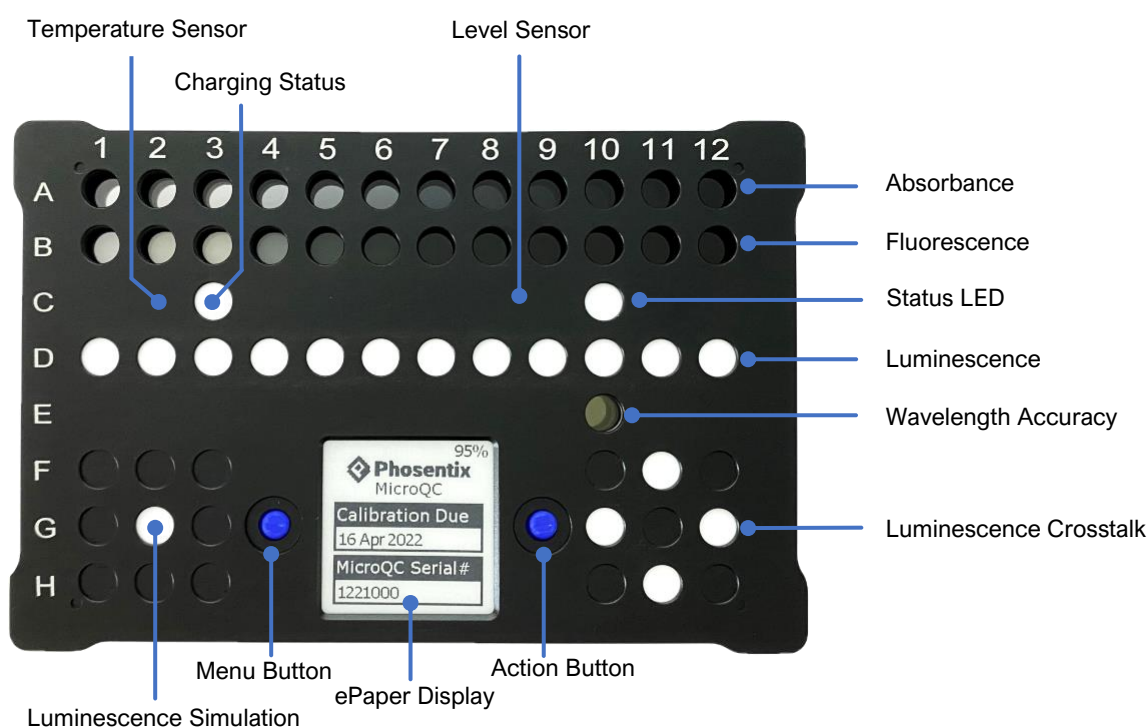
The Phosentix MicroQC™ plate can be used to determine if your reader...

- Has had a failure or degradation in performance
- Is capable of properly reading your assays
- Meets your laboratory operational requirements



Eliminate wet chemistry for reader evaluation

Your microplate reader can be evaluated using the Phosentix MicroQC™ plate without the tedious preparation of wet standards. The Phosentix MicroQC™ plate is a solid-state device that is always ready



Configurability

You can order the Phosentix MicroQC™ plate with all test functions integrated into a single plate or choose a subset of features to personalize the MicroQC Plate to your specific laboratory workflow requirements. The image above shows the complete set of features available from Phosentix.

Simplify periodic microplate reader verification

Microplate readers should be routinely evaluated and verified with an independent reference source. The Phosentix MicroQC™ Plate can be integrated into your standard operating procedures or performance qualification for your microplate reader, providing assurance that your reader is functioning properly.

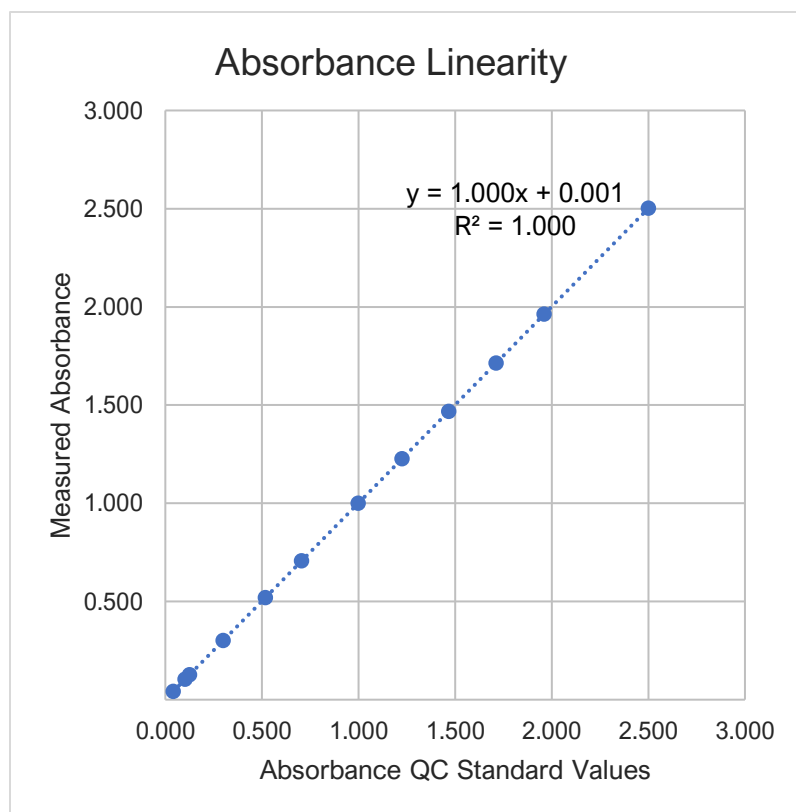
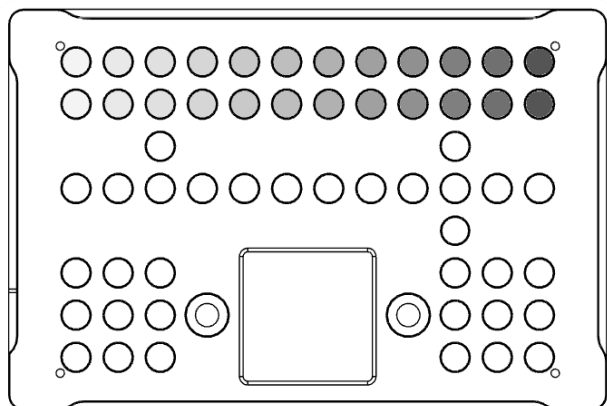


Absorbance Accuracy, Linearity and Precision

- The Phosentix MicroQC™ Plate has superb absorbance performance evaluation capabilities with **twelve** Neutral Density glass absorbance wells, A1 through A12.
- Absorbance values cover the range 0.04 to 2.50Abs with reference values provided at 440, 450, 465, 546, 590, 635nm. Wavelength values specific to your requirements can be provided upon request at time of order.

Comparative Analysis

The values obtained from your microplate reader can be compared against the known values on the MicroQC Plate, thus providing a measure of microplate reader accuracy. Linearity can be assessed by performing a linear regression, and precision can be determined by multiple reads of the MicroQC Plate



Fluorescence Linearity and Precision

FL

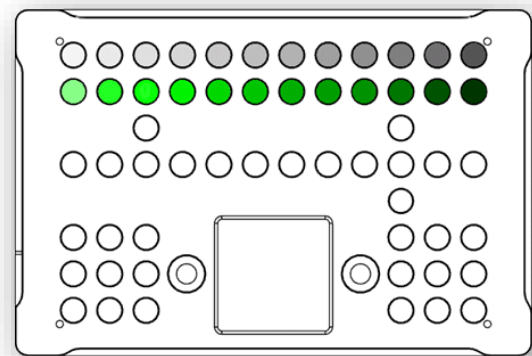
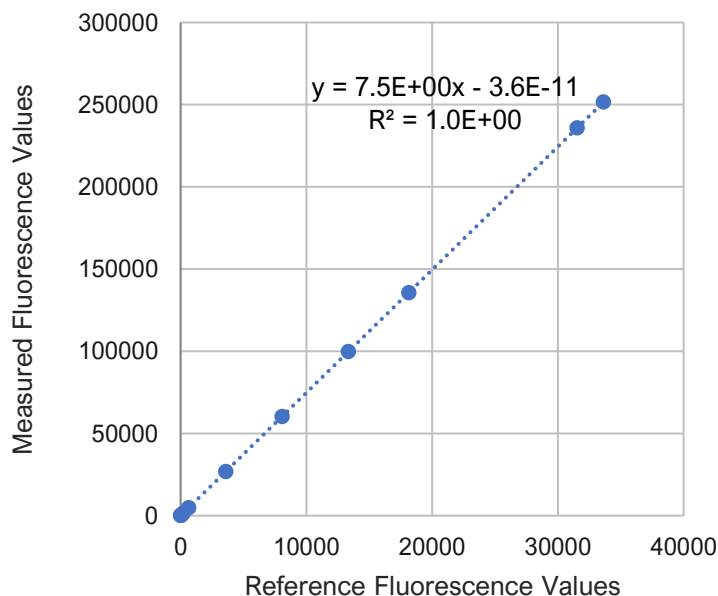
The MicroQC Plate has **twelve** solid state fluorescence wells that are stable and have relative fluorescent outputs located in wells B1 through B12.

The MicroQC Plate fluorescence wells can be read with two common excitation and emission wavelength pairs, fluorescein (485Ex/525Em) and TAMRA (540Ex/590Em), thus providing flexibility for testing.

Microplate reader precision and linearity can easily be tested, yielding analytical data regarding reader performance such as R-Squared and the coefficient of variation for repeated reads. Assessments of dynamic range, signal to blank ratio, and relative fluorescence sensitivity can be made for performance tracking or comparisons between reader platforms.

Many fluorescence based assays are long-term studies and the MicroQC Plate can assist with evaluation of the microplate reader signal stability, including flashlamp testing. The fluorescence intensity of the solid state standards have minimal change over time therefore the MicroQC Plate can be read over several hours or even days to check the fluorescence signal stability of the microplate reader.

Fluorescence Linearity





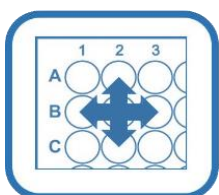
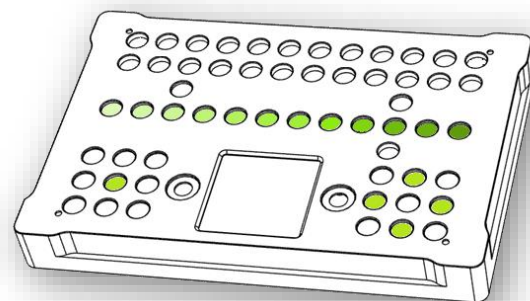
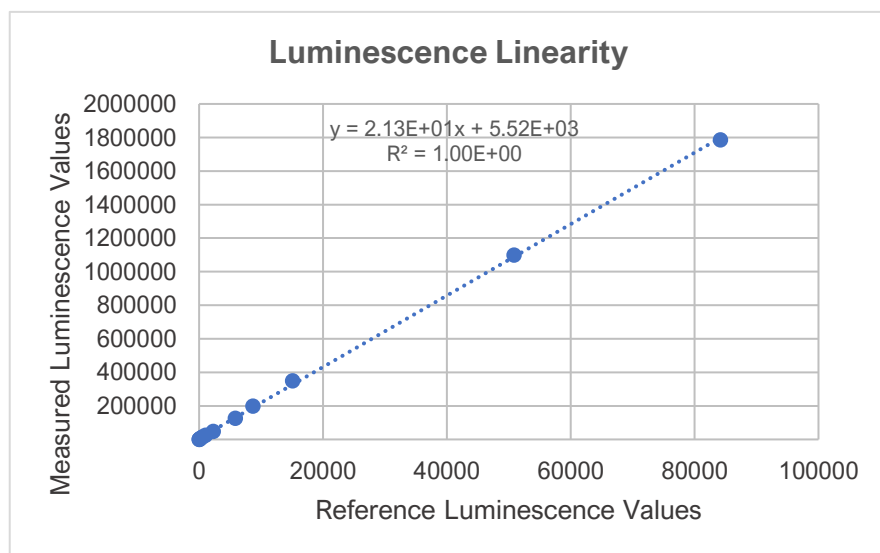
Luminescence

Luminescence has typically been one of the most difficult analytical modes to validate in a microplate reader. Some luminescence assays require a reagent injection to catalyze a light producing reaction and decay quickly, therefore having limited usefulness for assessing the analytical suitability of a microplate reader. Others are glow assays that decay over a longer period but are still always producing a transient signal which can make performance evaluations difficult. With the MicroQC Plate, luminescence performance is easily quantifiable through a variety of measurements.

Luminescence Linearity and Precision

The MicroQC Plate has twelve luminescence wells, D1 through D12, with precision controlled LEDs that produce an array of signals with a dynamic range of approximately 4 decades from the lowest output well to the highest. Each well is held at a defined level of output relative to the other wells. A calibration curve can be read by your microplate reader for a determination of linearity and precision. The lower output luminescence wells can challenge highly sensitive readers while the higher output wells can be used to evaluate less sensitive machines. These wells simulate a steady glowing assay without the inherent problems present with light decay and are insensitive to battery voltage.

MicroQC plates with 7 decade dynamic range are available as a special order.

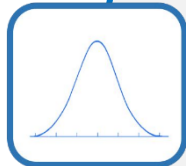
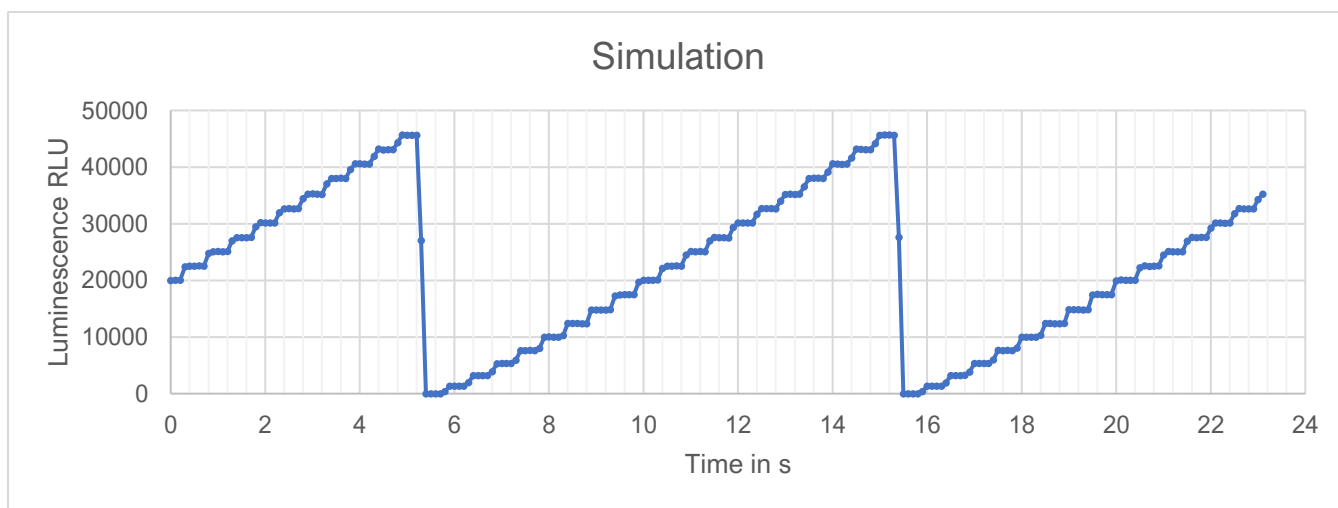
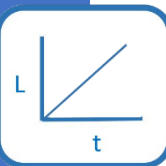


Luminescence crosstalk

Luminescence crosstalk can be easily evaluated with the MicroQC Plate. The lower right quadrant of the MicroQC Plate is used to crosstalk measurement and consists of a blank well surrounded by four precision LED luminescence wells of similar intensity. By measuring the central blank well and comparing it to other blanks on the MicroQC Plate that are not adjacent to signal producing wells, the percentage of the signal that is crosstalk can be determined. This arrangement will provide the maximum crosstalk value that can be generated with a given microplate reader's optical bench. Correction factors can be applied to luminescence assay results to improve signal window and Z' evaluations.

Luminescence Simulation

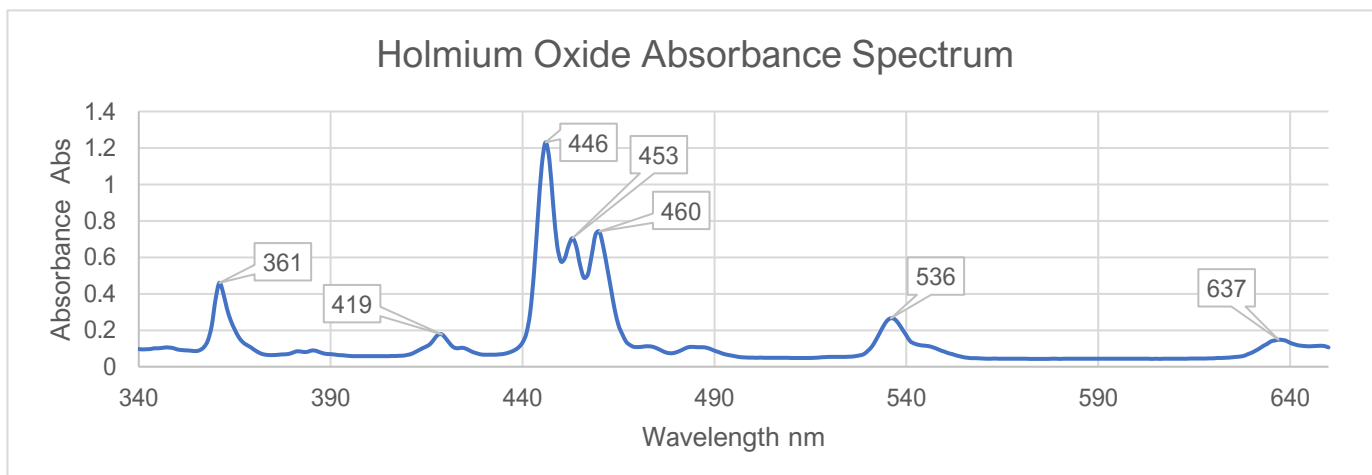
The MicroQC Plate's assay simulation mode is an invaluable feature for assessing luminescence kinetics that compliments the standard luminescence functionality. The onboard microprocessor is used to control the light emission from the precision LED in well G2 over time thereby creating a time dependent luminescence signal that can simulate a luminescent assay.



Wavelength Verification – Holmium Oxide Glass Filter

The optional Phosentix Holmium Oxide Glass Filter is provided in Well E10 and has clearly defined peaks in the range 340nm to 640nm. These peaks can be used for wavelength accuracy testing of spectrometer and monochromator-based instruments.

The filter is a special-order item that can be added to any of the 1221 Series microplates.





Temperature Measurement

The accuracy and uniformity of your microplate reader's incubation chamber is integral to your assay performance, especially if those assays are being used to derive kinetic information. The MicroQC Plate allows you to easily measure the actual temperature inside the chamber. The MicroQC plate is inserted into the chamber and retrieved after allowing time for temperature equilibration. The temperature history of the last 2 minutes is provided on the display so that the plate can be ejected, and the chamber temperature can be manually recorded after the test is complete. The MicroQC Plate is calibrated using NIST traceable probes and is certified to 0.2 °C accuracy and 0.01°C resolution.

Temperature 98%	
Now : 20.3	
History	
30s : 20.4	
60s : 20.4	
90s : 20.4	
120s : 20.4	

Plate Transport Attitude

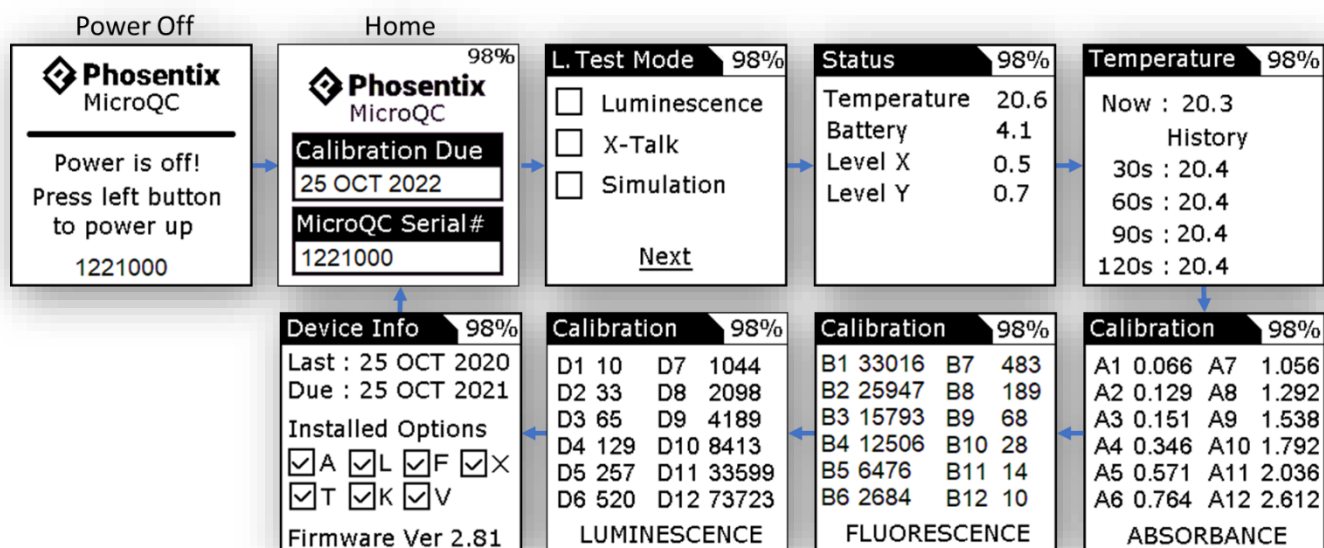
Your assay microplate being level and aligned to the optics inside your microplate reader is critical to assay performance. The MicroQC Plate can assist in checking these parameters using accelerometers and X-Y alignment wells.

The accelerometers provide NIST traceable attitude accuracy of 0.2 degrees so you can verify your microplate transport tray is level. The level readout is viewable on the status screen with X and Y attitude shown independently.

Status 98%	
Temperature	20.6
Battery	4.1
Level X	0.5
Level Y	0.7

MicroQC Plate User Interface

The MicroQC Plate has an intuitive control menu displayed on the ePaper screen that is easily accessible via the two front mounted control buttons which allow you to turn on and off operational modes, access data screens for temperature, level, and battery voltage as well as view calibrated reference values for absorbance, fluorescence, and luminescence. The Device Info screen displays the last calibration and calibration due dates for the device.



Data Analysis

The MicroQC Plate comes with a suite of Excel™ worksheets that will help you analyze data from your plate reader. All you need to do is collect data, cut, paste, and the results are automatically calculated. The worksheets will calculate linearity, precision and accuracy (where appropriate) for each measurement mode with an automatic Pass/Fail assessment of the results. Sheets are provided for each mode, each Abs wavelength and each Fluo wavelength pair. Test tolerances are user modifiable to ensure results are useful within your laboratory environment and applicable to the performance capability of your reader.



MicroQC Plate Analyst Worksheet

S/N: 1221000

MQC Plate Certified: 4-Oct-2021
Luminescence Performance Qualification



Reset Analyst Data

Precision Analysis										
Well	Read 1	Read 2	Read 3	Read 4	Read 5	Average	StDev	%CV Limit	%CV	Cert
D1	68	69	68	69	69	68.5	0.593	2.0%	0.9%	Pass
D2	154	156	154	154	156	155.2	1.245	1.0%	0.8%	Pass
D3	768	782	771	779	770	774.1	6.115	1.0%	0.8%	Pass
D4	2660	2679	2666	2692	2668	2673.1	12.906	1.0%	0.5%	Pass
D5	5944	6035	6049	5996	5951	5995.1	47.371	1.0%	0.8%	Pass
D6	12865	12930	12933	13091	12911	12946.1	85.700	1.0%	0.7%	Pass
D7	30092	30437	30547	30585	30364	30404.6	195.727	1.0%	0.6%	Pass
D8	96512	97980	96567	97061	97534	97130.6	630.285	1.0%	0.6%	Pass
D9	208899	210889	210594	212981	209052	210482.9	1656.698	1.0%	0.8%	Pass
D10	508352	509608	514443	511383	508439	510444.9	2547.987	1.0%	0.5%	Pass
D11	1235460	1250938	1245887	1254160	1252976	1247884.3	7631.822	1.0%	0.6%	Pass
D12	1795291	1805054	1799898	1813322	1815815	1805875.8	8698.818	1.0%	0.5%	Pass

Precision: Pass

Linearity Analysis

Luminescence		
Std	QC Ref	Measured
S1	10	69
S2	23	155
S3	113	774
S4	392	2673
S5	877	5995
S6	1897	12946
S7	4438	30405
S8	14235	97131
S9	30811	210483
S10	74978	510445
S11	182221	1247884
S12	264792	1805876

R-Squared Test Limit: 0.980

R-Squared: 1.000

Slope: 0.146

Intercept: -2.932

Linearity: Pass

Final Results

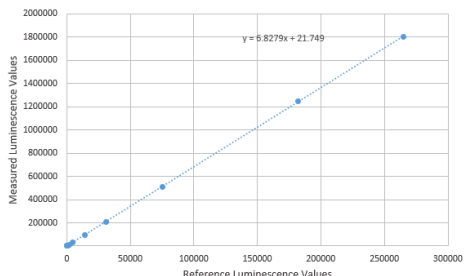
Precision: Pass

Linearity: Pass

Date Certified: 29-Nov-2021

Time Certified: 10:14 AM

Luminescence Linearity



MicroQC Plate Analyst Worksheet

S/N: 1221000

MQC Plate Certified: 12-Nov-2021
Absorbance Performance Qualification - 450nm



Reset Analyst Data

Precision Analysis										
Well	Read 1	Read 2	Read 3	Read 4	Read 5	Average	StDev	%CV Limit	%CV	Certified
A1	0.041	0.042	0.042	0.042	0.043	0.042	0.001	2.5%	1.7%	Pass
A2	0.102	0.105	0.103	0.105	0.104	0.104	0.001	2.0%	1.4%	Pass
A3	0.126	0.128	0.127	0.128	0.126	0.127	0.001	1.0%	0.7%	Pass
A4	0.300	0.304	0.304	0.300	0.302	0.302	0.002	1.0%	0.6%	Pass
A5	0.518	0.519	0.519	0.519	0.521	0.519	0.001	1.0%	0.2%	Pass
A6	0.705	0.707	0.707	0.708	0.708	0.707	0.001	1.0%	0.2%	Pass
A7	0.999	1.001	1.001	1.000	1.000	1.000	0.001	1.0%	0.1%	Pass
A8	1.226	1.228	1.227	1.229	1.228	1.227	0.001	1.0%	0.1%	Pass
A9	1.467	1.467	1.468	1.470	1.468	1.468	0.001	1.0%	0.1%	Pass
A10	1.713	1.716	1.715	1.715	1.715	1.715	0.001	1.0%	0.1%	Pass
A11	1.961	1.965	1.962	1.962	1.965	1.963	0.002	1.0%	0.1%	Pass
A12	2.501	2.502	2.504	2.503	2.502	2.502	0.001	2.0%	0.1%	Pass

Linearity Analysis

Std	QC ABS 450	Meas ABS	Tol %	Tol +/-	Accuracy
S1	0.041	0.042	19.0%	0.008	Pass
S2	0.102	0.104	8.0%	0.008	Pass
S3	0.126	0.127	6.5%	0.008	Pass
S4	0.300	0.302	2.8%	0.008	Pass
S5	0.518	0.519	1.5%	0.008	Pass
S6	0.705	0.707	1.1%	0.008	Pass
S7	0.999	1.000	0.8%	0.008	Pass
S8	1.226	1.227	1.0%	0.012	Pass
S9	1.467	1.468	1.0%	0.015	Pass
S10	1.713	1.715	1.0%	0.017	Pass
S11	1.961	1.963	1.0%	0.020	Pass
S12	2.501	2.502	2.5%	0.063	Pass

R-Squared P/F Limit: 0.980

R-Squared: 1.000

Slope: 1.000

Intercept: -0.001

Linearity: Pass

Final Results

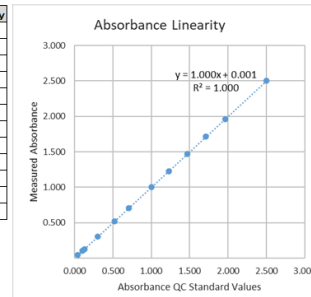
Precision: Pass

Linearity: Pass

Accuracy: Pass

Date Certified: 27-Nov-2021

Time Certified: 11:26 PM



MicroQC Plate Analyst Worksheet

S/N: 1221000

MQC Plate Certified: 4-Oct-2021
Fluorescence Performance Qualification - EX540/EM590



Reset Analyst Data

Precision Analysis										
Well	Read 1	Read 2	Read 3	Read 4	Read 5	Average	StDev	%CV Limit	%CV	Certified
B1	232511	235813.96	232671.1122	236521.27	233712.97	234246	1830.983	1.0%	0.8%	Pass
B2	197634.6	200146.75	201203.887	197807.06	201141.93	199587	1755.386	1.0%	0.9%	Pass
B3	107168.4	107520.36	107781.8986	108559.1	109161.99	108038	810.037	1.0%	0.7%	Pass
B4	82256.8	83614.925	83774.79202	82315.144	83322.658	83057	722.453	1.0%	0.9%	Pass
B5	48572.6	49391.48	49273.61032	48762.538	48901.031	48900	344.610	1.0%	0.7%	Pass
B6	17179.8	17346.547	17303.92973	17359.325	17266.145	17291	72.291	1.0%	0.4%	Pass
B7	3812.8	3839.0851	3830.009239	3848.3757	3823.7789	3831	13.706	1.0%	0.4%	Pass
B8	1160.2	1173.0732	1168.553712	1172.1497	1173.0408	1169	5.320	1.5%	0.5%	Pass
B9	412.4	413.39472	412.6115269	413.28328	416.98698	414	1.867	3.0%	0.5%	Pass
B10	183.8	187.15154	184.8920201	184.44418	186.61342	185	1.438	3.0%	0.8%	Pass
B11	97.6	99.096698	97.90892889	98.592579	99.410249	99	0.767	5.0%	0.8%	Pass
B12	63.4	64.454896	63.54806631	63.729162	64.096938	64	0.429	7.5%	0.7%	Pass

Linearity Analysis

Fluorescence		
Std	QC Ref	Measured
S1	36674	234246
S2	31173	199587
S3	10904	108038
S4	12974	83057
S5	7661	48980
S6	2710	17291
S7	601	3831
S8	183	1169
S9	65	414
S10	29	185
S11	15	99
S12	10	64

R-Squared P/F Limit: 0.980

R-Squared: 1.000

Slope: 0.156

Intercept: -3.704

Linearity: Pass

Final Results

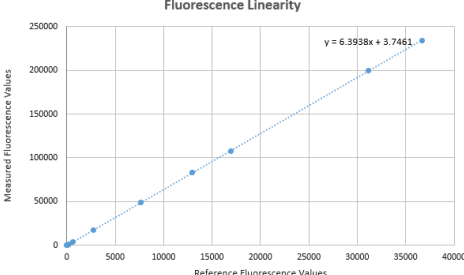
Precision: Pass

Linearity: Pass

Date Certified: 29-Nov-2021

Time Certified: 10:17 AM

Fluorescence Linearity



MicroQC Plate Analyst Worksheet

S/N: 1221000

MQC Plate Certified: 4-Oct-2021
Wavelength Accuracy - Holmium Oxide Glass Filter



Reset Analyst Data

Accuracy Analysis				
Std	QC Wavelength	Measured Wavelength	Tol +/- nm	Accuracy
W1	361	361	1	Pass
W2	419	420	1	Pass
W3	446	446	1	Pass
W4	453	453	1	Pass
W5	460	461	1	Pass
W6	536	536	1	Pass
W7	637	638	1	Pass

R-Squared P/F Limit: 0.990

R-Squared: 1.000

Slope: 0.998

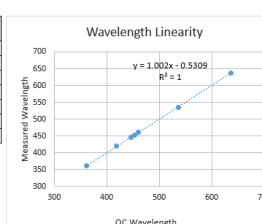
Intercept: 0.545

Final Results

Accuracy: Pass

Date Certified: 29-Nov-2021

Time Certified: 10:21 AM



MicroQC Plate Analyst Worksheet

S/N: 1221193

MQC Plate Certified: 4-Oct-2021

Luminescence Crosstalk



Reset Analyst Data

Well	Type	Luminescence Value
F11	Positive	1819619
G10	Positive	1795140
G11	X-Talk Test	1200
G12	Positive	1796276
H04	Blank	20
H11	Positive	1840317

Final Result

Calculated Crosstalk: 0.06%

Acceptance Limit: 0.15%

Result: Pass

Date Certified: 29-Nov-2021

Time Certified: 10:13 AM

Final Results

Precision: Pass

Linearity: Pass

Date Certified: 29-Nov-2021

Time Certified: 10:13 AM

Specifications



Physical Properties	Measurement	Tolerance
Mass	195g	±5g
Length	127.76mm	±0.1mm [†]
Width	85.48mm	±0.1mm [†]
Height	14.4mm	±0.1mm
Well A1 Location	X: 14.38mm Y:11.24mm	±0.1mm [†]
Center Distance Across 12 Wells	99.00mm	±0.1mm [†]
Column Spacing	9.00mm	±0.1mm [†]
Row Spacing	9.00mm	±0.1mm [†]
Nominal Well Diameter	6.0mm	±0.1mm
*Exceeds ANSI SLAS 1-2004 (R2012) Requirements. Formerly ANSI/SBS 1-2004.		
Analytical Specifications	Physical Component	Specifications
Absorbance Well A1-A12	Neutral Density Glass	12 Wells: Nominal 0.045 to 2.50 OD @ 440nm Abs values provided at wavelengths: 440,450, 465,492,546,590,635,650nm NIST Traceable and custom wavelengths available
Absorbance Wavelength Accuracy Well E10	Holmium Oxide Glass	361,419,446,543,460,536,637nm peaks ±1nm
Fluorescence Well B1-B12	Solid State Fluorescent Matrix	12 Wells: Visible Read EX 540nm / EM 590nm and EX 485nm / EM 525nm Additional wavelength pairs available on request
Luminescence Well D1-D12	Twelve Microprocessor Controlled Precision LEDs	12 Wells: Approximate four-decade RLU dynamic range standard. Seven-decade RLU available as special order Nominal LED emission wavelength: 560nm
Luminescence Crosstalk	Four Microprocessor Controlled Precision LEDs	Four matched wells are used to determine crosstalk levels within your reader.
Luminescence Simulation	Single Microprocessor Controlled Precision LED	>35:1 kinetic range with 10 second periodicity.
Temperature Sensing	Solid state thermal sensor	Range: 5.0 - 50.0°C Resolution: 0.01°C Accuracy: ±0.2°C
Level Sensing X-Y	Accelerometer	Display Range: ± 5.0° Minimum Resolution 0.01° Accuracy: ±0.2° (In range 0.0-1.0°)
Electronic Components	Specifications	Notes
Microprocessor	ARM Cortex M4	32-bit processor clocked at 64 MHz
ePaper White Display	200x200 pixels	Retains display indefinitely, non-emissive
EEPROM	4KB non-volatile memory	Stores calibration values for A,F and L
Battery Info	Specifications	Notes
Type	Lithium-Polymer	Type 503035
Nominal Capacity	500mAH	NA
Nominal Battery Voltage	3.7V	Full charge voltage 4.2V ± 0.1V
Rated Discharge Cycles	500	To 60% of capacity
Operating Life from Full Charge	>36 Hours	All LED functions off
Operating Life from Full Charge	Nine hours	All LED functions on
Connector Format	Mini USB	Cable supplied
External Charger Requirement	500mA Minimum	Any USB port can be used
Typical Charge Time	Three hours	Fully discharged to fully charged
Temperature Specifications	Range	Notes
Normal Operating Range	5 - 50°C	Down to -20°C possible for short periods
Max Charging Temperature	45°C	Battery must remain at or below 50°C
Storage Temperature	-20 - 45°C	NA



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



This device complies with the essential requirements and other relevant provisions of the Radio Equipment Directive (RED) 2014/53/EU

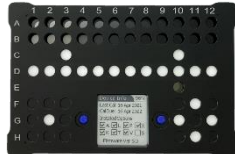
<u>CE RED EMC</u>	<u>CE RED Measurement Equipment Safety</u>
ETSI EN 301 489-1/-3	EN/IEC 61010-1



This device complies with the essential requirements and other relevant provisions of the Reduction of Hazardous Substances Directive (**RoHS 3**) 2015/863/EU

Contact Information

To learn more or to order the MicroQC plate please visit us at: www.phosentix.com



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