



DropSense96 performance test

Introduction

The performance check for the DropSense96 forms part of the diagnostic tools provided by Trinean to check the functional status of the instrument. A full description of these tools can be found in the 'Diagnostics' section of the DropSense96 user manual.

The DropQuant software includes a performance validation procedure to check the photometric accuracy and precision of the DropSense96 in combination with DropPlate consumables. This check is based on the read-out of a gravimetrically prepared solution of NIST traceable potassium dichromate ($K_2Cr_2O_7$) with a verified absorbance at 350nm. It is recommended to perform this check every 4-6 months or after transportation of the DropSense96 to ensure that the instrument is performing within its specifications. When the test report shows results out of specification, a recalibration by your local service engineer will be required.

The potassium dichromate reference is available at Trinean or its distribution partners. For your nearest distributor please check our website at <http://www.trinean.com/purchase>.

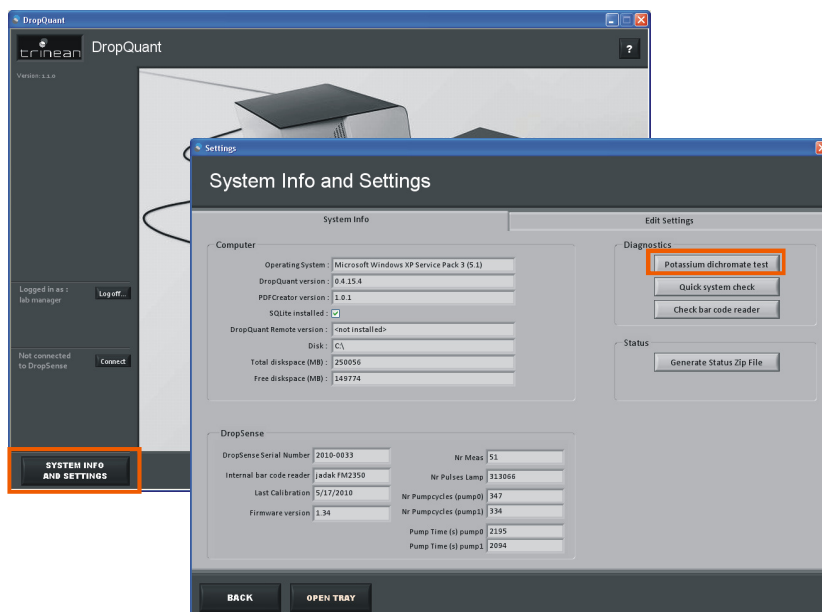
Required materials check list

- DropSense96 droplet plate reader
- DropPlate-D or DropPlate-S consumables
- Trinean potassium dichromate reference
- Manual single channel pipette
- 0.5-10 μ l low retention pipette tips (preferably short rigid tips)
- dH₂O

Adequate pipetting into the DropPlates is required to insure the test is performed correctly. Please read User guide 001 describing this topic.

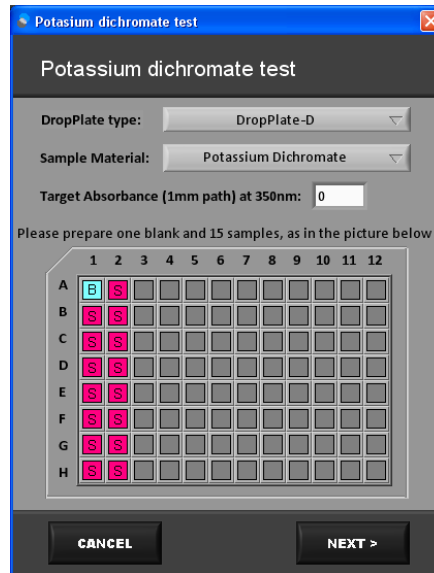
Procedure

- Log-in to the DropQuant software as 'lab manager' to open the 'settings and tools' function on the main



screen. (if this account is used for the first time, the password can be found on the installation CD)

- Select the 'Potassium dichromate test' function in the 'systems info' Tab.
- In the pop-up screen, an overview of the validation experiment and required plate layout is given.



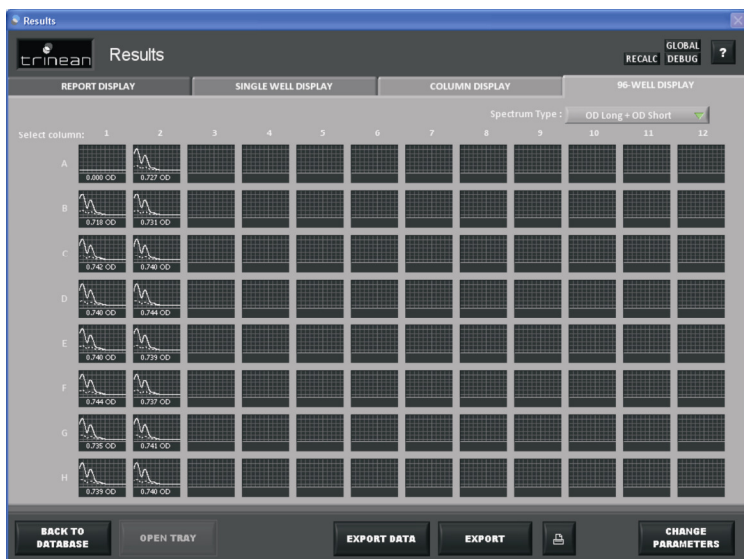
- Select the DropPlate of choice: DropPlate-D or DropPlate-S
- Enter the 'target absorbance' of the reference as indicated on the Trinean reference vial (Abs at 350 nm, 1mm path length). The DropQuant software will automatically calculate the expected OD values for the path lengths used in the selected DropPlate.
- Thoroughly mix the reference fluid by vigorously shaking the vial and then tap the upright vial lightly to ensure all fluid is collected at the bottom.
- To open the vial, carefully break the neck of the vial with a movement away from your body.
- Load the blank on position A1 and potassium dichromate solution on positions B1 to H2 of a DropPlate as indicated on the screen. Use a pure water sample as blank.

During pipetting, ensure that the correct volume is present in the pipette tip and be careful not to introduce air bubbles into the sample. Always replace the pipette tip after each sample loading (see user note 001).

- Then press the 'NEXT' button at the bottom of the screen to start the measurement.
- When requested, place the DropPlate onto the tray of the DropSense96 and press 'OK'
- The DropSense96 will measure all indicated wells
- When the test is completed the tray will open, remove the plate from the tray and press 'OK' (alternatively, the plate carrier will be retracted after 30 seconds).
- The spectral data from the test will be displayed in a thumbnail format showing all the data together.


Pump performance check:

On the thumbnail display (see Figure below) color indications underneath the spectra indicate successful (black color) or partial/failed (orange/red color) measurement of the micro-cuvettes present in the DropPlate. Detailed description of the color legends for the DropPlate-D and DropPlate-S can be found in the DropSense96 user manual. Further information on each spectrum can be obtained using the 'column display' and 'single well display' tabs.




Color legends for measurement cycle of DropPlate-D

Empty measurement




Red: Both measurements failed. Possible reasons are: no sample was loaded, air bubble entrapment influencing both measurements or pumps function out of specification

Small path measurement



Orange: Only the short path length could be used for concentration determination. Reasons: not enough sample volume used, air bubble entrapment influencing the analysis with the long path length or pumps function out of specification

Large path measurement



Black: measurement OK, both path lengths were measured correctly

Troubleshooting:

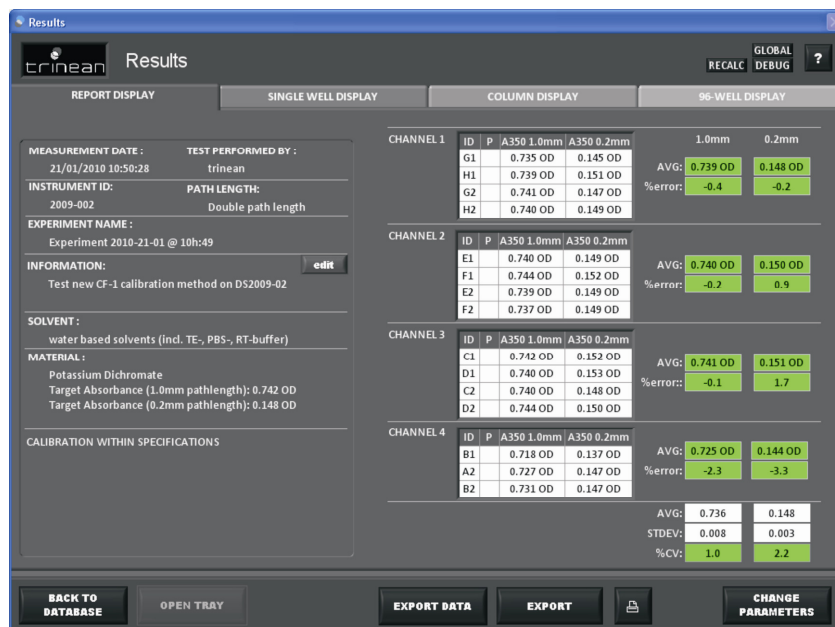
Incorrect measurements can be caused by:

- Air bubbles present in the sample causing obstructions or incorrect filled micro-cuvettes
- Not enough volume of the sample was dispensed
- The pumps performing out of specifications.

When incorrect measurements are shown, repeat the validation test with the opened vial (if repeat can be done within 30 minutes from the test), or with a fresh vial. If the result is consistent with the first test, please contact your local service engineer.

Measurement accuracy check:

The photometric accuracy of the test can be assessed using the 'report display' tab.



The left side provides a description of the experiment, including: Date, DropSense96 serial number, type of DropPlate, reference material and the expected OD value. On the right side is the assessment of the accuracy of the analysis with color indications for a quick overview of the results. A report (.txt, .xls, .pdf) can be created using the 'export' button at the bottom of the screen. This report can be stored as reference for future performance checks.

As the DropSense96 contains five optical channels, four are used for simultaneous measurement of samples and the fifth monitors the performance of the lamp during the analysis. The analysis will group the OD values from the four sample optical channels for all path lengths present in the selected DropPlate. For every optical channel, the average of the measurements is calculated and compared with the expected OD value of the potassium dichromate solution. Furthermore, the variation between the averages of the optical channels is evaluated.

Colored fields provide an indication of the measurement accuracy:

- **green color:** the analysis is within the expected measurement variation. The measurement accuracy of every optical channel and the variation between the four channels is within specifications.
- **Red color:** the measurement does not fall within the expected specifications.

Troubleshooting:

Inaccurate measurements can be caused by:

- The reference vial being open longer than 30 minutes, leading to abnormal high OD values
- Time between dispensing and measuring is longer than 2 hours, leading to evaporation effects
- Insufficient dispensed volume leading to incorrect filled micro-cuvettes
- Inappropriate blank
- Obstruction in the optical path (large particles, finger print, small air bubbles ...) influenced the measurement
- The pumps performing out of specifications (see color indications on the thumbnail view)
- The optical performance of the DropSense96 is out of specifications

When red values are shown, repeat the validation test with the opened vial (if repeat can be done within 30 minutes from the test), or with a fresh vial. If the result is consistent with the first test, please contact your local service engineer.

Recalibration:

When recalibration of the DropSense96 is due, contact the Trinean Technical Support team (support@trinean.com) or your local service engineer. The recalibration service will be done using specific pump and optical calibration plates by the service engineer.