

The Daniel Test

This Test aims to be a general assessment of the software and the reader performance. It should ideally be executed for each major Software update. It measures the performance by grading Noise, SNR, Spikes and anomalies metrics for each mologram and then for the whole chip, which gives a fail/pass note for each mologram and respectively the whole chip.

Note: it is best to use this test with the same chip, dedicated for this test.

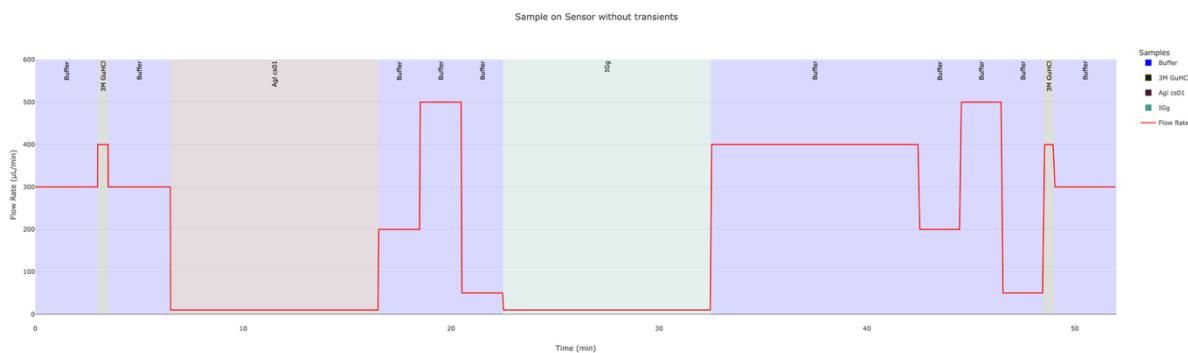
IMPORTANT - The name of the experiment downloaded results csv file must start with:

"YYYY-MM-DD_HH:MM:SS_THE_DANIEL_TEST_{reader name}"

The experiment

Regeneration(GuHCl) → Ligand 1 (protein AGL cs01)X → Analyte (IgG)X → Slow Dissociation → buffer $\frac{400\mu\text{l}}{\text{min}}$ → Regeneration (GuHCl)

X = Flow rate change in the high signal part



Custom Phase

Type	Sample	Vial	Duration	Pickup	Flowrate	
Custom Injections +						
Baseline	Buffer		3 min		300 uL/min	
Regeneration	3M GuHCl	1-A1	0.5 min	200 μL	400 uL/min	
Baseline	Buffer		3 min		300 uL/min	
Association	AGL cs01	1-A2	10 min	100 μL	10 uL/min	
Baseline	Buffer		2 min		200 uL/min	
Baseline	Buffer		2 min		500 uL/min	
Baseline	Buffer		2 min		50 uL/min	
Association	IgG	1-A3	10 min	100 μL	10 uL/min	
Dissociation	Buffer		10 min		400 uL/min	
Baseline	Buffer		2 min		200 uL/min	
Baseline	Buffer		2 min		500 uL/min	
Baseline	Buffer		2 min		50 uL/min	
Regeneration	3M GuHCl	1-A1	0.5 min	200 μL	400 uL/min	
Baseline	Buffer		3 min		300 uL/min	

+ Add Command

Export Settings

Export Fluorescence Images

Every n steps

100

Export Surface Images

Every n steps

100

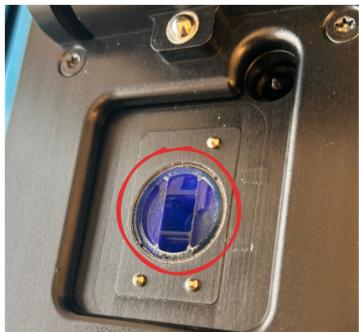
Export Result Images

Every n steps

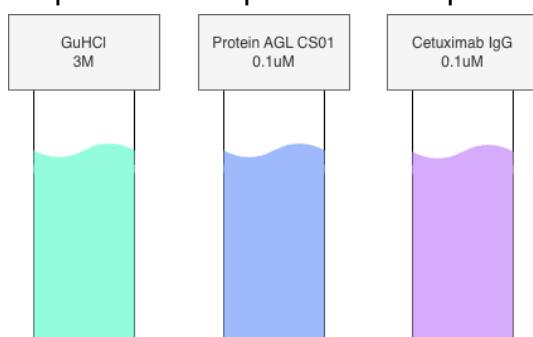
100

Below are the technical steps on how to conduct it:

1. Use a regular chip with molograms 8x8 oligo1-oligo2-PEG
2. Use an assembly holder with multi-channel configuration
3. Screw tight the chip to the holder assembly
4. Clean the glass surface of the reader



5. Fill bottles of buffer and water of autosampler, if are not filled.
6. Prepare the samples for the experiment



7. Fill the vials for this experiment

Well Plates ⓘ ⓘ

Left Dead Volume without dead volume

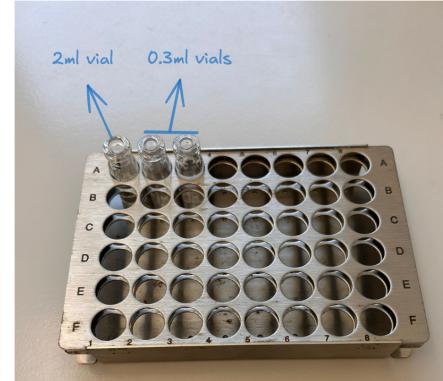
Right Dead Volume without dead volume

Auto Place Vials Remove Unused Vials

Print

	1	2	3	4	5	6	7	8
A	100 μ L	100 μ L	100 μ L					
B								
C								
D								
E								
F								

Checkmarks are present in the first three columns of the first row (A1, A2, A3).



8. Settings – SAVE – Save video from experiments

The screenshot shows the software's settings menu. The left sidebar includes options like Experiment, Instrument, Advanced, System Control, Health, Import / Export, Fit Results, and Settings. The main area is titled 'Settings' and has tabs for EXPERIMENTS, IMAGE, REDUCER, ALGORITHM, EXPORT, and SAVE. The SAVE tab is active. Under 'Save measurements', 'Save Hologram Measurements' and 'Save Liquid Handler commands' are checked. Under 'Save whole images', 'Save video from experiments' is checked. Under 'Save Region of Interest (ROIs)', 'Save ROI Stencil' is checked. Under 'Save others', 'Save Loop Results' and 'Save Field Tiler' are checked. A 'Frequency' input field contains the value '1'. At the bottom are buttons for 'Preview Brickline' and '+ Add Settings'.

9. Fill all the unused channels with the buffer solution, make sure to end this step on the channel for which the entry is the same as the experiment one (usually 4). Below are examples with 3 and 4 channels configurations

The screenshot shows the Liquid Handler interface with the following sections:

- Pump Configuration:** Pump is ready, no error. Flow Rate: 0.0 μ L/min, Remaining Volume: 2500.0 μ L. Buttons: Edit Configuration, Init, Empty Syringe, Fill Syringe, Run Flow Rate, Stop Pump, Flush Fluidics, Clean Fluidic System.
- Autosampler Configuration:** Status: Not running, Valve position: 4, Tray Temperature: 22 °C. Buttons: Edit Configuration, Autosampler Cooling, Inject, Select Flow Channel.
- Pump Actions:** Buttons: Init, Empty Syringe, Fill Syringe, Run Flow Rate, Stop Pump, Flush Fluidics, Clean Fluidic System.
- Autosampler Actions:** Buttons: Init, Reset, Load Sample, Initial Wash, Autosampler Cooling, Inject, Select Flow Channel.

Two pop-up windows for "Select Flow Channel" are shown:

- Three channel flow chamber:** Shows a grid of 6 rows and 4 columns. The first three columns are highlighted in green, and the last column is highlighted in red. A red box highlights the "Flow Chamber" dropdown and the grid.
- Four channel flow chamber:** Shows a grid of 6 rows and 4 columns. The first four columns are highlighted in green, and the last column is highlighted in red. A red box highlights the "Flow Chamber" dropdown and the grid.

Below the pop-ups, the main interface shows the pump and autosampler sections again, with the "Run Flow Rate" button highlighted in red.

Run Flow Rate Dialog:

- Flow rate (μ L/min): 1000
- Duration: 60
- Run indefinitely
- Buttons: Cancel, Run (highlighted in blue), and a "Run" button in the background.

10. Prime pump

Instrument Preparation

Liquid Handler Preparation

- Select Flow Channel
- Prime Pump**
- Prime Autosampler
- Prime Chip
- Autosampler Cooling

Reader Preparation

- Prepare Reader
- Check Coupling
- Check Bubbles
- Configure Environment
- Check Mologram Recognition

Description

1st try for the general software and system test

Start Measurement

11. Prime chip

Instrument Preparation

Liquid Handler Preparation

- Select Flow Channel
- Prime Pump
- Prime Autosampler
- Prime Chip**
- Autosampler Cooling

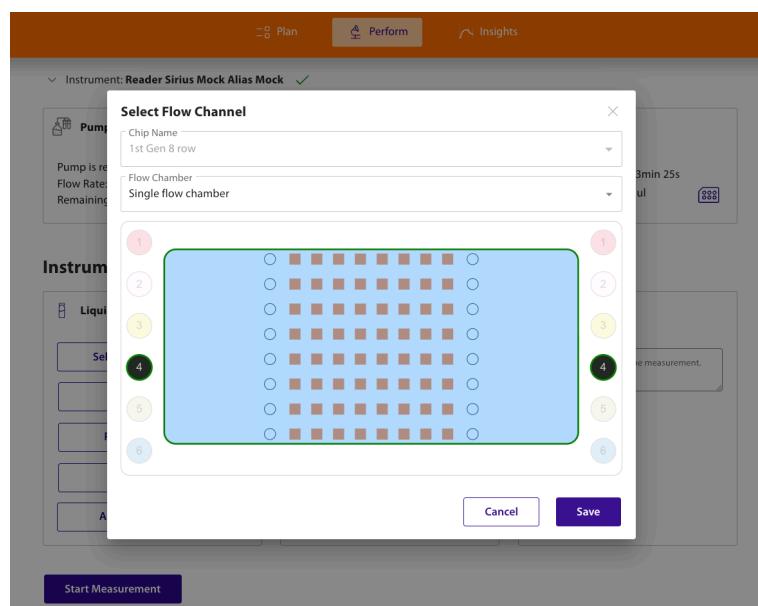
Reader Preparation

- Prepare Reader
- Check Coupling
- Check Bubbles
- Configure Environment
- Check Mologram Recognition

Description

1st try for the general software and system test

Start Measurement



12. Prepare reader – make sure it passes all

Instrument Preparation

Liquid Handler Preparation

- Select Flow Channel
- Prime Pump
- Prime Autosampler
- Prime Chip
- Autosampler Cooling

Reader Preparation

- Prepare Reader**
- Check Coupling
- Check Bubbles
- Configure Environment
- Check Mologram Recognition

Description

1st try for the general software and system test

Start Measurement

13. System controls – verify values and adjust

The screenshot shows the 'System Control' section of a software interface. On the left, a sidebar lists 'Experiment', 'Instrument', 'Advanced', and 'System Control' (which is highlighted with a red box). Below these are 'Health', 'Import / Export', 'Fit Results', and 'Settings'. The main area contains several control panels:

- Molo Laser:** Power (on), Shutter (off), Temperature [°C] 27.8, Temperature Offset [°C] -0.0, Set button, Power [% of 0.080W] 100, Set button.
- Fluorescence Laser:** Power (on), Shutter (off), Temperature [°C] 26.0, Temperature Offset [°C] -0.0, Set button, Power [% of 0.080W] 100, Set button.
- XY Stage:** Chip Name 1st Gen 8 row, Optimize Position, Reset, Horizontal Position 0, Left/Right arrows, Vertical Position 0, Down/Up arrows, Step 1024, Down/Up arrows.
- Molo Mirror:** Chip Name 1st Gen 8 row, Optimize Position, Reset, Range -500000-50..., 0, Down/Up arrows, Step 1024, Down/Up arrows.
- Fluorescence Mirror:** Optimize Position, Reset, Range -500000-50..., 0, Down/Up arrows, Step 1024, Down/Up arrows.
- Focus Lens:** Optimize Position, Reset, Range -500000-50..., 0, Down/Up arrows, Step 1024, Down/Up arrows.

Below these panels is a 'Power Display' section:

Coupling IR:	No data
Coupling RED:	No data
Molo IR:	No data
Surface IR:	No data
Surface RED:	No data

14. Move out of good position for molo (>40k steps), XY (100k steps), focus.

15. Prepare reader again – make sure it passes all

16. Check bubbles – Check that the surface image looks good and that there are no bubbles

17. Check coupling – Check the coupling power profile, intensity and mologram recognition

18. Start the measurement “Daniel General Test”

19. Look at logs and for issues

20. Check metrics from the data: Noise, SNR, Spikes, Anomalies (steps), RMSE to desired model plot (“perfect plot”).

21. Analyze the surface images and the result images

22. Check the video of the experiment by running the following (download it from the reader):

```
scp -r container@READER:/home/container/lino_data/experiment_test_data/YYYY-MM-
```

DD/{name of your experiment}{name of the arrival directory}