

Technical Bulletin

sciPURATOR - Eliminates troubles with bubbles

Introduction:

The sciFLEXARRAYER systems dispense through orifices which are between 40 µm and 110 µm. Thus, the purity and particle freeness of the system liquid is crucial for the proper functionality and non-clogging of the whole system. Beside particles, dissolved gasses in a fluidic system can often become an issue. When the pressure or the temperature changes, the dissolved gasses can form bubbles which affect the accuracy, precision and performance of your equipment. Degassing is a very efficient way to remove dissolved gasses from the liquid and prevent bubble formation.

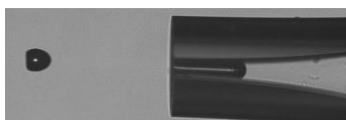


Figure 1. Dispenser with degassed system liquid. The drop (280 pl) is ejected in a stable manner.

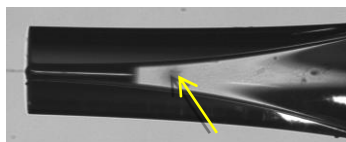


Figure 2. Dispenser with air bubble / particle. Drop is instable (only instable jet shown in picture).

Preventing bubble formation and removing particles from the system does improve dispense precision and overall performance. A thoroughly degassed and filtered system liquid solution is the key to precise droplet deposition and is typically comparable with the effect of detergents, salts, and sterilizing agents.

Setup:

The sciPURATOR utilizes a very efficient and secure off-line degassing technique consisting of an ultrasonic bath and a vacuum pump. The system fluid is filtered into the system liquid bottle using a filtering funnel. The filled bottle is placed in an ultrasonic bath, where it is additionally connected to a vacuum pump. Applying both ultrasonication and vacuum, for 15 minutes, reduces the dissolved gases to an extent that prevents formation of bubbles in the sciFLEXARRAYER systems.

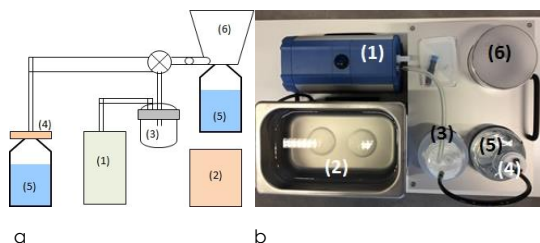


Figure 3. a) Schematic setup, b) Top view of the sciPURATOR system; (1) Vacuum pump (2) Ultrasonic bath (3) Trap bottle (4) PTFE Adaptor (5) System Liquid bottle (6) 0.22µm filter unit

Mode of action:

A 0.22µm filtering funnel is twisted onto a clean 1000 mL borosilicate bottle. 200 mL deionized water is filled into the funnel and the filter unit is connected to the vacuum pump. The vacuum pump is switched on, until the water is filtered into the bottle which is then rinsed with DI water. This step is repeated twice.

Following the funnel is filled with an adequate amount of DI water, typically one liter, and filtered into the bottle.

After the water has been filtered into the bottle, vacuum is switched off and the bottle is detached from the funnel. Then the bottle is placed in the heatable sonication bath and vacuum is applied for 15 minutes. The obtained liquid is then recommended as system liquid.



Figure 5. sciPURATOR system

Degassing efficiency measured by O₂ content

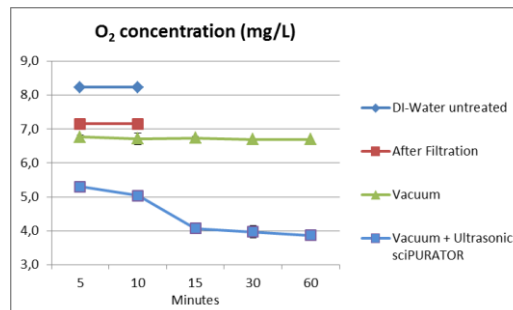


Figure 6. Oxygen concentration in DI water measured directly after filtration and two degassing methods. Best results are achieved when using the sciPURATOR for 15 minutes.

Product Features:

- Ultra-high degassing efficiency
- Compatible with every sciFLEXARRAYER system
- Long life expectancy over 5 years
- Low maintenance
- Extremely quiet and constant vacuum
- Excellent chemical compatibility
- Short and biocompatible flow path
- CE & RoHS compliant
- Available for 110 and 220 VAC

Conclusion:

The sciPURATOR helps you getting the best performance out of your sciFLEXARRAYER instrumentation. The beneficial use of this simple, small and inexpensive station has been tested for all water based system liquids, including microarraying, biosensor loading and line printing.