








Automated nutrient measurements for greenhouse horticulture

CELINE enables full control of water and nutrient management

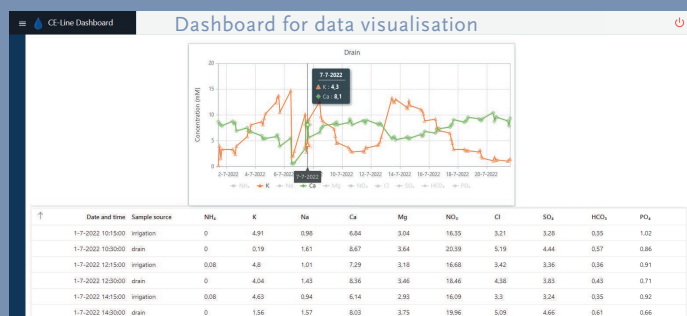
In (hydroponic) greenhouses, irrigation water is prepared by dissolving concentrated solutions of fertilizer in clean (rain) water and distributing it across the growing systems. If excess drain water is collected and reused, it is essential to know the nutrient composition in order to achieve the optimal nutrient composition in the fresh irrigation water.

CELINE measures accurate and calibrated concentrations of all individual nutrients in the irrigation and drain water. This enables optimal dosing and savings on water and nutrients, for the crop, in every growing stage, in every kind of weather, under all circumstances.

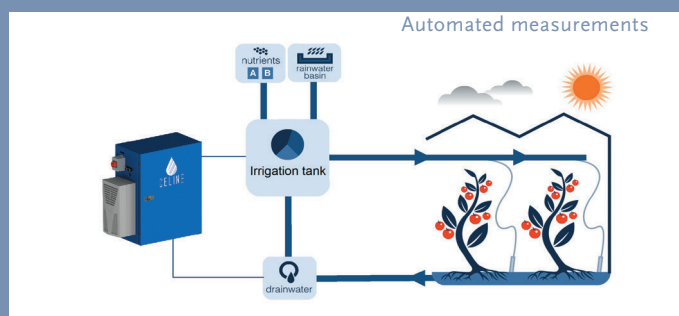
-  • Fully closed watercycle
-  • Zero Liquid discharge growing
-  • Crop demand driven nutrient management
-  • Ultra-high crop yield, reduction of risks
-  • Assured constant quality

CELINE, the plug and play laboratory in your greenhouse, is integrated into the water system of the greenhouse to take samples of the different water streams and to supply accurate data very quickly. The self-calibrating and self-cleaning technology requires no human intervention other than exchanging reagent liquids once a month.

It's like having a laboratory in your greenhouse!



Selection of macronutrients and micronutrients:
 NH₄, K, Na, Mg, Ca, Cl, NO₃, SO₄, HCO₃, PO₄
 Fe, B, Zn, Mn, Mo, Cu



CELINE automatically takes samples from drain and irrigation water and measures all the nutrients.



Technical information

| Technical specifications | |
|-------------------------------|---|
| General information | |
| Dimensions | 970mm x 430mm x 970mm |
| Weight | 90 Kg |
| IP rating | IP54 |
| Measurement information | |
| Measurement Time per Sample | 30 minutes |
| Measurement components | Charged components |
| Unit of concentrations | mM/Mg/L or similar |
| Concentration range | 0,05 mM - 30 mM |
| EC range | 0,1 - 10,0 mS/cm |
| pH range | 4-9 |
| Filtration | 0,1 - 0,5 Micron required, equipment available |
| Data | |
| Data storage | Cloud database |
| Data visualization | Display interface, Cloud portal, transfer via API |
| Accuracy * | >95% |
| Repeatability ** | <5% |
| Reagent set | |
| Capacity | 30 days with 8 measurements per day |
| Refill cycle | Monthly |
| Shelf life | 1-2 Months |
| Installation | Manual replacement |
| Maintenance Cycle | 6 Months |
| Installation information | |
| Method of installation | Hanging (hooks on system) |
| Power rating | 230VAC 600W |
| Communication | Industrial Ethernet |
| Ambient Operating Temperature | 5-45 °C (41 - 113 °F), not in direct sunlight |
| Operating Humidity | 10 - 90% |
| Sample installaton | 40mm ø PVC for bypass filtration |
| | Sample flow of ~20L/min |
| | Pre-pressure of 0.3 - 1 Bar (max. 3 Bar) |

* Compared to reference laboratories, Groen Agro Control & Eurofins (conducted research by WUR)

** Following validation certification NEN-EN-ISO/IEC 17025:2018nl

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