## Containerised pilots

There are 5 containers that each contain a water treatment technology. The containers are modular and thus can be operated as a stand-alone unit or connected to each other in a treatment train. A UV disinfection unit can be connected to each of the containers. Also, there is the option to connect the effluent to a final buffer tank (2 m³ on a skid + mixing + sensors), which can regulate the effluent flows to a certain ratio or conductivity.

The experimental setup of the containers allows remote operation and continuous monitoring of critical parameters, including temperature, pH, conductivity, turbidity, and chloride. The robust local PLC-based control level is complemented with an IIoT Edge gateway with a double purpose: it enables secure remote access to all HMIs from a central operating system and makes reliable data acquisition towards the cloud possible.

An overview of the power supply and electrical data that is the same for all the containers is given beneath.

|  |  |
| --- | --- |
| Power supply and electrical data (all containers) | |
| Power supply voltage | 400 Vac |
| Power supply frequency | 50 Hz |
| Power supply phases | 3P + N + PE\* |
| Power supply connection | CEE 5 pin male 32A |
| Power supply net type | TN-S |
| Short circuit current rating | 10 kA |
| Control voltage | 24 Vdc |
| Max power supply cable length (10 mm²) | 60 m |
| Max power supply cable length (16 mm²) | 89 m |

\*3 fasensysteem, neutral draad en beschermende aarde



MMF



UF

In/out

Out/in



dNF

+ cfUF



ACF



RO + CCRO

### (Closed circuit) reverse osmosis (RO-40-1.5)

|  |  |
| --- | --- |
| Power supply and electrical data (specific for RO) | |
| Total installed power | 15.84 kW |
| Full load current | 27.89 A |

##### A machine with pipes and tubes Description automatically generated with medium confidenceDescription

Reverse osmosis water treatment provides the finest level of filtration. Typically, the Polyamide Thin-Film Composite membranes remove well over 90% of ionic contamination, most organic compounds and effectively all particulates. Dissolved gases are not removed. The unit uses 4 inches RO membrane modules and can be operated in **1-stage with recirculation** (50% recovery), **2-stage** (75% recovery) or as a **closed-circuit RO**, which combines principles of simple filtration and the cross flow of traditional reverse osmosis resulting in a superior reverse osmosis performance. Nanofiltration membranes can also be used with compatible membranes.

##### Connections

* Inlet: service water, compressed air, feed water
* Outlet: waste out + RO concentrate out (pressurized), waste out chemical (pressurized), draining feed tank, permeate out 1
* Chemicals:
  + Acid: H2SO4 50%, H3PO4 30% or C6H8O7 50%
  + Base: NaOH 30%
  + Biocide
  + Oxidant
  + Antiscalant

##### Monitoring parameters

* Feed: pH, temperature, tank level, ORP, CIP heater temperature, pressure & flow to RO.
* Filters: HP pump discharge pressure, concentrate pressure, permeate flow, concentrate recirculation flow, recirculation conductivity.
* Permeate: pressure, flow, temperature, conductivity, tank level, transfer pressure, transfer flow.

##### Dimensions and weight

|  |  |
| --- | --- |
| Size container (L x W x H) | 610 x 244 x 289 cm |
| Weight container | 4500 kg |

##### Process data

|  |  |  |  |
| --- | --- | --- | --- |
|  | Unit | Nominal | Maximal |
| Permeate flow rate | m³/h | 0.41 | - |
| Operating Pressure | Bar | - | 41 |
| Feed flow rate | m³/h | - | 3.6 |
| Feed silt density index | SDI | - | 5 |
| Free chlorine tolerance | Ppm | - | 0.1 |