# Sensors and Controllers

# SELECTION TABLE FOR PROBES/INSTRUMENTS

| Parameters | Probe models | Applications | | | | Instruments | |
|---|---|---|---|---|---|---|---|
| | | Water treatment | Depuration | Industry | Swimming pool | **50** SERIES | **42** SERIES |
| pH | **S401** VG | ■ | ■ | ■ | ■ | ■■ | ■ |
| | **S408** MEC | ■ | ■ | ■ | | ■■ | ■ |
| | **S408** POL HT | | ■ | ■ | | ■■ | ■ |
| | **S401** LC | ■ | | ■ | | ■■ | ■ |
| | **S402** PS | | ■ | ■ | | ■■ | ■ |
| | **S401** DIG | ■ | ■ | ■ | | ■ | |
| | **S401** DIFF | | ■ | ■ | | ■ | |
| Redox (ORP) | **S406** VG | ■ | ■ | ■ | ■ | ■■ | ■ |
| | **S406** POL / **S406** OXT | | ■ | ■ | | ■■ | ■ |
| | **S403** PS | | ■ | ■ | | ■■ | ■ |
| | **S406** DIG | ■ | ■ | ■ | | ■ | |
| | **S406** DIFF | | ■ | ■ | | ■ | |
| Conductivity | **S411** / **S411** C | ■ | | ■ | | | ■ |
| | **S411** TEF / **S411** TEF C | ■ | | ■ | | | ■ |
| | **S428** | ■ | | ■ | | | ■ |
| | **S411** U / **S411** P / **S411** 4E | ■ | | ■ | | | ■ |
| | **S411** IND / **S411** IND HT | ■ | ■ | ■ | | ■■ | ■ |
| | **S411** DIG | ■ | | ■ | | ■ | |
| Disinfectants | **S494** $CL_2$ / **S494** $CL_2$ ORG | ■ | ■ | ■ | ■ | ■■ | ■ |
| | **S494** $CLO_2$ | ■ | | ■ | | ■■ | ■ |
| | **S494** PAA | ■ | | ■ | | ■■ | ■ |
| | **S494** $ClO^-_2$ | ■ | | | | ■■ | ■ |
| | **S494** $H_2O_2$ | ■ | | ■ | | ■■ | ■ |
| Oxygen Dissolved | **S423** | ■ | ■ | ■ | | | ■ |
| | **S423** C OPT | ■ | ■ | ■ | | ■ | ■ |
| Turbidity | **S461** N | ■ | ■ | ■ | | ■ | ■ |
| | **S462** PVC / **S462** INOX | ■ | | ■ | ■ | | ■ |
| | **S461** T / **S461** T INS | ■ | ■ | ■ | | ■ | ■ |
| Suspended Solids Sludges | **S461** S / **S461** S INS | ■ | ■ | ■ | | ■ | ■ |
| | **7520** SAV T / **7520** SAV E | | ■ | ■ | | | ■ |
| | **7520** SRH T / **7520** SRH E | | ■ | ■ | | | ■ |
| Nutrients | **S470** $NH_4^+$ | ■ | ■ | ■ | | ■ | |
| | **S470** $N0_3^-$ | ■ | ■ | ■ | | ■ | |
| | **S470** Combined ($N0_3^-$ $NH_4^+$) | ■ | ■ | ■ | | ■ | |

■■ through digitizer

# PLUG & PLAY MULTIPARAMETRIC INSTRUMENT


Complete and flexible system for a wide range of applications in watertreatment with easy to use software and automatic recognition of sensors: **available in two configurations, with up to two (2) and up to four (4) simultaneous measurements, freely selectable.**

Equipped with two RS485 serial ports: one (1) for **sensors with RS485 digital interface and MODBUS RTU protocol** and one (1) opto-isolated for the connection with the communication devices (Setup Computer, Remote Control Terminals etc.) of the local networks.

Incorporates a **Real Time Clock (clock with date)** which allows the software to archive the data chronologically to the flash memories also used for storing LOG files of the events.

## Connectable to

the whole range of Chemitec digital sensors and expandable to the traditional electrodes/probes through digitizers AD Series

## Measures

pH/ORP
Dissolved Oxygen
Conductivity
Turbidity
Suspended Solids
Chlorine
Chlorine Dioxide
Ozone
Chlorites
Hydrogen Peroxide
Peracetic Acid
Nitrates (ISE)
Ammonia (ISE)

# **50**Series

### User Interface (HMI)

**Programming keypad** with 5 bubble-keys with

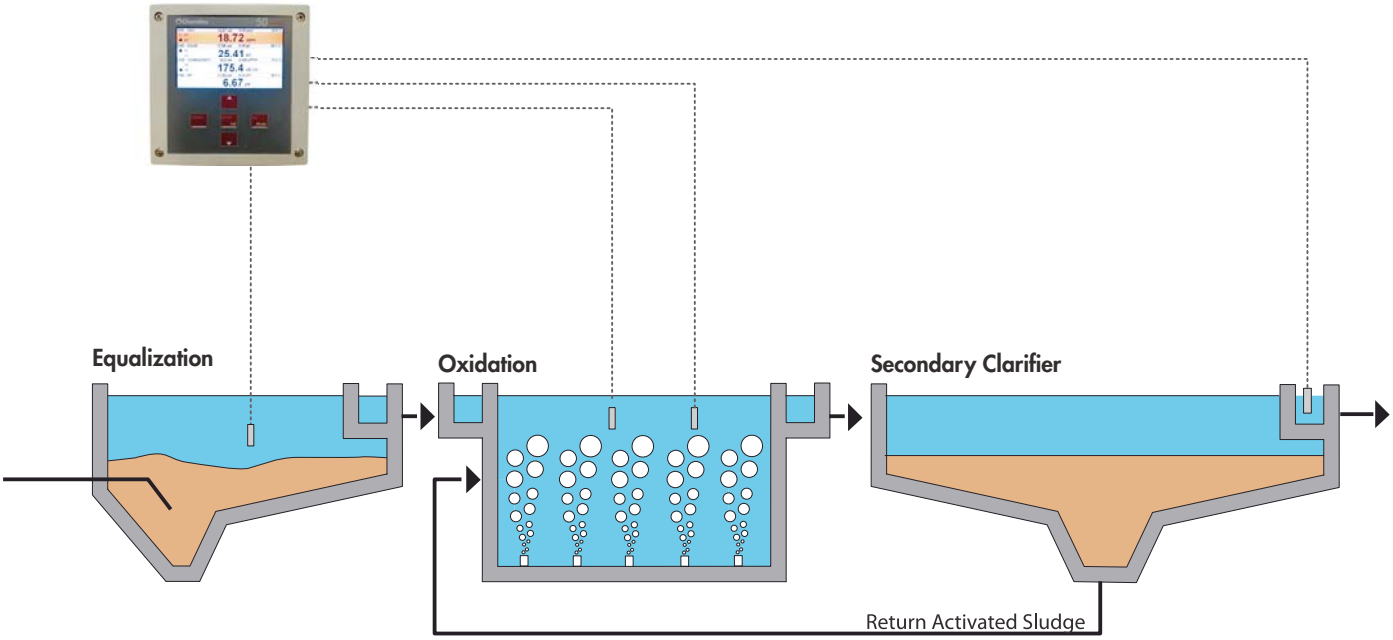
- CAL Key for direct access to the Calibration menu
- GRAPH/USB Key for direct access to the Measure graphs and for data download to USB PENDRIVE
- MODE Key for self-recognition of sensors

**Graphic TFT color LCD resolution 480x272 visible area 95x93** which allows the simultaneous display of digital measurements

### Software & Functions

**Internal Data Logger (flash 64 Mbit)** with possibility to store up to 250.000 records and to display stored data in tabular and graphic form. Data download to USB PENDRIVE or through RS485 and C_NET dedicated SW.

**Programmable Analog Outputs** for repeating the measurements, PID control and temperature; with the first and the second set on the measurement of the same parameter, the third can be set as the average of the other two.




**Digital Output Relays** to adjust the Set Points for the measures, the alarm for instrument anomaly, the probe washing or the Set Point for temperature

**Analog Input** for perturbative functions or engineered display of additional measuring

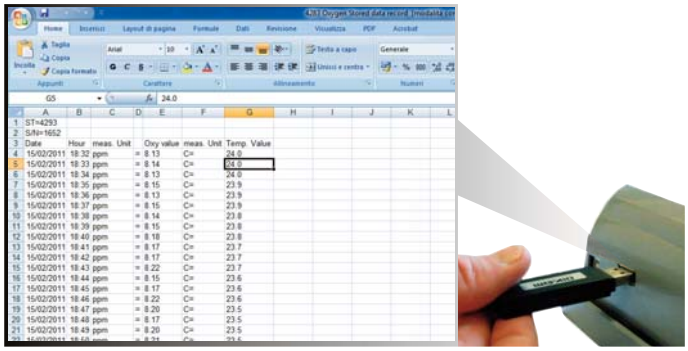
**Digital Input** for disabling of dosage

## Communication protocol

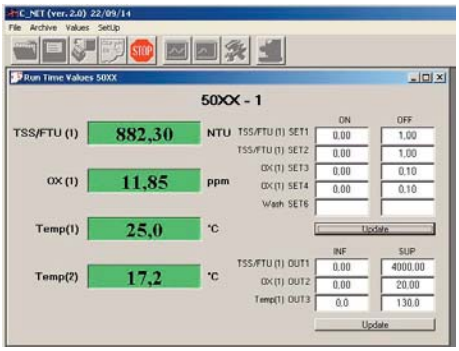
**MODBUS RTU (standard)** for set-up, Real Time data communication or download of the stored data through C_NET dedicated software

**Upon request** PROFIBUS DP ; CANopen; Ethernet; Devicenet; Modbus TCP ; Profinet

## Data Download to USB



## C_NET SW



## Hardware features, software features and functions 50Series

| | |
|---|---|
| **Display** | Graphic TFT color LCD |
| Resolution | 480 X 272 (Visible Area 95x93) |
| Languages | Italian, English, French, German, Spanish, Russian |
| **Keypad** | 5 bubble-keys [▼] [▲] single keys and [GRAPH/USB] [ESC/MODE] [ENTER/CAL] keys with double functions available |
| **Data Logger** | Internal Flash 64Mbit Memory up to 250,000 records with a recording interval of 15 sec up to 120 minutes |
| Recording method | Circular (F.I.F.O.) or Filling |
| Display of stored data | In tabular and graphic form, with indication of maximum, minimum and average values of the selected period. Zoom function. |
| **PID Control** | Settable functions P [Proportional] ; PI [Proportional – Integral] and PID [Proportional – Integral – Derivative] |
| Activation | On analog or digital output |
| Proportional range | 0 ÷ 500% |
| Time | Integral and/or derivative 0:00 ÷ 5:00 min |
| **Analog Outputs** | Four (4) programmable ; 0/4 ÷ 20 mA ; Galvanic separation ; 1KV Optoisolator ; Maximum load 500 Ohm ; Output limits user programmable between measuring ranges |
| Alarm output | NAMUR ; 2.4 mA [with range 4 ÷ 20 mA ] |
| **Digital Outputs** | Six (6) ; Switching Relays usable as NO ; Maximum resistive load 3A at 230Vac |
| Set Point (4) | Working range setting (Hysteresis/direction) ; pause/working time setting 000 ÷ 999 Seconds ; PID Control ; Pulse Frequency or PWM |
| Alarm/Wash (2) | Alarm: Instrument failure, min/max value, set point delay, permanence time (live check) ; Delay time ; Set Point disabling (in case of alarm): Enable/Disable<br>Wash: Programmable interval (minimum 15 minuts) and duration between 00:00 ÷ 24:00 hh:mm; during the washing phase, all digital and analog outputs are frozen |

## Hardware features, software features and functions 50Series

| | |
|---|---|
| **Digital Inputs (2)** | To disable dosing or activate wash cycle |
| Input voltage | 24 Vdc /ac |
| Power consumption | 10mA max |
| **Serial Ports/Outputs** | RS485 programmable for set-up and Real Time data acquisition from remote or download stored data (using dedicated SW) |
| Baud Rate | 1200 ÷ 38400 |
| Communication protocol | MODBUS RTU ; on request PROFIBUS DP SLAVE, CANopen, Ethernet, Devicenet, Modbus TCP, Profinet |
| **Manual controls** | Possibility to simulate all the analogue and digital outputs using the keyboard |
| **Power Supply** | 90÷240 Vac/dc 47– 63 Hz [on request 24Vac/dc] |
| Transformer isolation | 4KV |
| Power consumption | < 6W |
| Electrical protection | EMI / RFI CEI-EN55011 – 05/99 |
| **Mounting** | Wall |
| Housing material | ABS Gray RAL 7045 |
| Dimensions (L x H x P) | 144 x 144 x 122.5 mm |
| Mounting depth | 122.5 mm |
| Mechanical protection | IP 66 |
| Weight | 1 Kg |
| **Operating temperature** | 0 ÷ 50°C |
| Humidity | 10 ÷ 95% non-condensing |
| Storage and transport | -25 ÷ 65°C |



## Measures

pH/ORP
Dissolved Oxygen
Conductivity
Turbidity
Suspended Solids
Chlorine
Chlorine Dioxide
Ozone
Hydrogen Peroxide
Peracetic Acid
Chlorites
Bromine

Developed by Chemitec for industrial applications, it is equipped with an output for proportional control, control functions of the probe conditions and other various outputs. The user has full control of the programming.

# **42***Series*

### User Interface (HMI)

**Programming keypad** with 5 bubble-keys for calibration and instrument configuration with:

– GRAPH key to display the stored data in tabular and graphic form.

**Monochromatic display 128 x 64 pixel** with graphic icons to display the status of the digital output, the recording data, the wash cycle and the alarm. Scrolling output values.

### Software & Functions

**Manual controls** thanks to the intuitive programming menu it is very easy to start and control the dosing system.

**Data Logger** of Circular (F.I.F.O.) or Filling type on an internal flash memory with a recording interval of 1 to 99 min. (about 16000 records).

**RS485 Serial Port** for set-up and remote real time acquisition or for downloading the stored data on a portable or desktop PC (using dedicated software), through MODBUS RTU communication protocol.

**USB Port** to download measurement data directly on a removable PEN DRIVE memory (on request).

**Analog Input** for perturbative functions (interactions between two parameters).

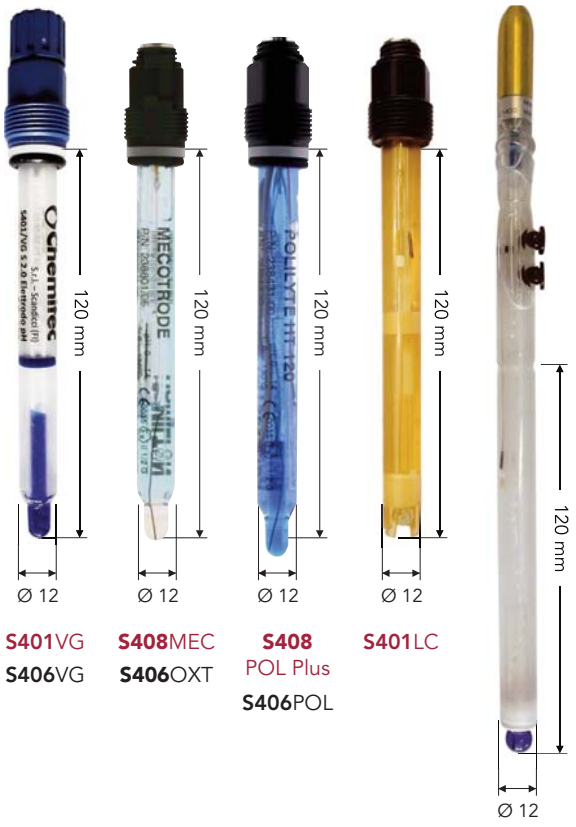
**Digital Input** for disabling of dosage or comand for washing from remote.

**Temperature compensation** through PT100 sensor with 3 or 4 wires, or PT 1000

## Hardware features, software features and functions 42Series

| | |
|---|---|
| **PID Control** | Settable functions P ; PI and PID |
| Activation | On analog or digital output |
| Proportional Range | 0 ÷ 500% |
| Time | Integral and/or derivative 0:00 ÷ 5:00 min |
| **Analog Outputs** | Two (2) programmable ; 4÷20mA galvanically isolated ; Output limits user programmable between measuring ranges |
| Output 1 | programmable for measure |
| Output 2 | programmable for measure / Temperature / PID Control |
| **Digital Outputs** | Four (4) ; Switching Relays usable as NO ; Maximum resistive load 3A at 230Vac |
| Set Point On – Off | Two (2) for each of the two measures ; working range setting (Hysteresis/direction) ; pause/working time setting 000 ÷ 999 Seconds ; PID Control ; Pulse Frequency or PWM |
| Alarm or Set Point for Temperature | One (1) programmable for: minimum/maximum value, set point delay, permanence time (live check) ; delay time 00:00 ÷ 59:99 mm:ss at minimum steps of 15 sec ; permanence time 00:00 ÷ 99:99 hh:mm ; Set Point disabling in case of alarm: Enable/Disable |
| Automatic sensor washing or Set Point for Temperature | One (1) to program the interval (minimum 15 minuts) and the duration from 00:00 ÷ 24:00 hh:mm; during the washing phase, the digital and analog outputs and the temperature are frozen |
| **Power supply** | 100 ÷ 240 Vac/dc 50-60 Hz (optional 24 Vac/dc) |
| Power consumption | < 7W |
| Electrical protection | EMI / RFI CEI-EN55011 – 05/99 |
| **Mounting** | Wall / Panel |
| Housing material | ABS Grey RAL 7045 |
| Dimensions (L x H x P) | 144 x 144 x 122.5 mm with a mounting depth of 122.5 mm |
| Mechanical protection | IP 66 |
| Weight | 1 Kg |
| **Mounting** | Panel |
| Housing material | ABS Black |
| Dimensions (L x H x P) | 96 x 96 x 115.5 mm with a mounting depth of 130 mm |
| Mechanical protection | IP 54 |
| Weight | 0.7 Kg |

# ELECTRODES FOR PH AND ORP MEASUREMENT




**S401**VG
**S406**VG

**S408**MEC
**S406**OXT

**S408**
POL Plus
**S406**POL

**S401**LC

**S402**PS
**S403**PS


**AD** Series

## Digitizer for pH and ORP electrodes

The AD Series Chemitec digitizers convert the signals of the common pH and ORP electrodes into serial signal with standard Modbus RTU protocol, allowing the connection to the **50***Series* plug & play multiparametric instrument


## General features

The electrodes listed below are all of the combined type (Measurement+Reference), without maintenance, and are classified by their construction features, which makes them adaptable to multiple applications.

## Models and Applications

**S401**VG
Combined pH electrode for general use

**S406**VG
Combined ORP electrode for general use

**S408**MEC
Combined pH electrode for high temperature liquids and/or installations under pressure

**S408**POL Plus
Combined pH electrode for harsh chemical applications

**S406**POL
Combined ORP electrode for harsh chemical applications

**S406**OXT
Combined ORP electrode for high temperature liquids and/or installations under pressure

**S401**LC
Combined pH electrode for waters with low electrical conductivity

**S402**PS
pH electrode for applications involving liquids with a high suspended solids content

**S403**PS
ORP electrode for applications involving liquids with a high suspended solids content

## **Technical specifications** Electrodes for pH measurement

| Models | **S401**VG | **S408**MEC | **S408**POL HT | **S401**LC | **S402**PS |
|---|---|---|---|---|---|
| **Measuring range** | 0 ÷ 14 pH | 0 ÷ 14 pH | 0 ÷ 14 pH | 2 ÷ 14 pH | 0 ÷ 14 pH |
| Operating temperature | 0 ÷ 60°C | 0 ÷ 130°C | 0 ÷ 130°C | 0 ÷ 60°C | 0 ÷ 80°C |
| Maximum pressure | 6 bar | 16 bar | 6 bar | 16 bar | 0.2 bar |
| Min. liquid conductivity | 50 µS/cm | 50 µS/cm | 2 µS/cm | 2 µS/cm | 5 µS/cm |
| **Body material** | Glass | Glass | Glass | Epoxy | Glass |
| Electrolyte | GEL | GEL | Polisolve | GEL | KCl - KNO3 |
| Junction | single open hole | 3 ceramic diaphragm | double open hole | single open hole | single annular ceramic |
| **Cable connection** | "S7"screw | "S7"screw | "S7"screw | "S7"screw | fixed |
| Connection to process | Pg 13.5 | Pg 13.5 | Pg 13.5 | Pg 13.5 | standard Ø 12 |
| Cable | 5 mt | 5 mt | 5 mt | 5 mt | integral 5 mt |

## **Technical specifications** Electrodes for ORP measurement

| Models | **S406**VG | **S406**POL | **S406**OXT | **S403**PS |
|---|---|---|---|---|
| **Measuring range** | ±1000 mV | ±2000 mV | ±2000 mV | ±1000 mV |
| Operating temperature | 0 ÷ 60°C | -10 ÷ 60°C | 0 ÷ 130°C | 0 ÷ 80°C |
| Maximum pressure | 6 bar | 6 bar | 16 bar | 0.2 bar |
| Min. liquid conductivity | 50 µS/cm | 2 µS/cm | 50 µS/cm | 5 µS/cm |
| **Body material** | Glass | Glass | Glass | Glass |
| Electrolyte | GEL | Polysolve | GEL | KCl - KNO3 |
| Junction | single open hole | single open hole | 3 ceramic diaphragm | single annular ceramic |
| **Cable connection** | "S7"screw | "S7"screw | "S7"screw | fixed |
| Connection to process | Pg 13.5 | Pg 13.5 | Pg 13.5 | standard Ø 12 |
| Cable | 5 mt | 5 mt | 5 mt | integral 5 mt |

# DIGITAL PH AND ORP ELECTRODES


## General features

The pH electrode **S401**DIG and the ORP electrode **S406**DIG are suitable for the measurement of pH and ORP in various applications.

The porous liquid junction resists fouling and chemical attack. The double junction of the reference electrode increases the operating life in applications containing sulphides (H2S) and metals such as lead, mercury and silver.

The new type of solid reference electrolyte allows a reference potential constant in time and at pressure and temperature variations.

The new capillary temperature sensor design places the Pt100 behind the (pH or ORP) sensitive membrane for accurate temperature compensation and measurement.

The mechanical protection IP68 protects the high impedance signal of the electrodes from moisture that can be generated in immersion applications (condensation).

## Applications

Drinking water, process water, wastewater, samples containing sulphides and metals such as mercury, lead and silver.

## Technical specifications

| Models | **S401**DIG | **S406**DIG |
|---|---|---|
| **Measuring range** | 0 ÷ 14 pH | -1500mV + 1500 mV |
| Measuring method | Potentiostatic | |
| Sensitivity | 0.05 pH | + - 1 mV |
| Repeatability | 98 % | |
| Response time | 10 sec. to reach 95% of the value | |
| Operating temperature | 0 ÷ 80°C in insertion/by-pass – 0 ÷ 50°C in immersion | |
| Maximum pressure | 6.9 bar | |
| **Body material** | Ryton® and PVC | |
| Measuring electrode | hemispherical glass membrane | |
| Other materials | Teflon®, carbon, epoxy | |
| **Mechanical protection** | IP68 Sensor + cable | |
| **Power supply** | 12 ÷ 24Vdc | |
| Power consumption | max. 2W | |
| Cable | 10m integral with the sensor (other on request) | |
| **Signal interface** | Modbus RTU Standard Protocol | |

# DIGITAL DIFFERENTIAL PH AND ORP ELECTRODES


## General features

**S401**DIFF and **S406**DIFF are differential electrodes designed for pH and ORP measurement in heavy duty applications, where the electrodes with traditional reference system would have a life too short.

They consist of a PVC body which houses the glass electrode for pH or ORP measurement, the reference electrode with a salt bridge and a KCL reserve which guarantees a high stability of the reference signal in time and at operating conditions variations. The measuring and reference electrodes are connected to an earth contact for an excellent measurement accuracy even in extreme conditions.

The reference electrode is replaceable.

## Applications

Input, output and biological treatment of waste water. Industrial heavy duty applications.

## Technical specifications

| Models | **S401**DIFF | **S406**DIFF |
|---|---|---|
| **Measuring range** | 0 ÷ 14 pH | -1500mV + 1500 mV |
| Measuring method | potentiostatic differential | |
| Sensitivity | 0.05 pH | + - 1 mV |
| Repeatability | 98 % | |
| Response time | 5 sec. to reach 90% of the value | |
| Operating temperature | -5 ÷ 95°C in insertion/by-pass ; -5 ÷ 50°C in immersion | |
| Maximum pressure | 6.9 Bar | |
| **Body material** | Ryton® and PVC | |
| Measuring electrode | hemispherical glass membrane | |
| Other materials | Teflon®, carbon, epoxy | |
| **Mechanical protection** | IP68 Sensor + cable | |
| **Power supply** | 12 ÷ 24Vdc | |
| Power consumption | max. 2W | |
| Cable | 10m integral with the sensor (other on request) | |
| Equipotential contact | included | |
| **Signal interface** | Modbus RTU Standard Protocol | |

# CONDUCTIVITY MEASURING CELLS

**S411**
**S411**C

**S411TEF**
**S411TEF** C

**S411U**
**S411P**

**AD** Series **Digitizer** to convert the conductivity measurement into serial signal with standard MODBUS RTU protocol

**S4114E**

## General features

Wide range of conductive cells designed both for water treatment and for industrial applications.

Thanks to the combination between the cell costant (k) and the construction materials it is possible to cover a wide spectrum of applications with different measurement ranges.

## Applications

Untreated water, drinking water, ultra pure water, demineralization, reverse osmosis, ion exchanger, water from conditioning systems and boilers, process water.

## Technical specifications

| Models | | **S411** | **S411**C | **S411**TEF | **S411**TEF C |
|---|---|---|---|---|---|
| Constant | K | 1 | 1 | 1 | 1 |
| **Measuring range** | | 0 ÷ 50.000 µS | 0 ÷ 50.000 µS | 0 ÷ 10.000 µS | 0 ÷ 10.000 µS |
| Temp. compensation | | - | yes | - | yes |
| Operating temperature | | 5 ÷ 100°C | 5 ÷ 100°C | 0 ÷ 100°C | 0 ÷ 100°C |
| Maximum pressure | | 5 bar | 5 bar | 2 bar | 4 bar |
| **Body material** | | PP | PP | PTFE | PTFE |
| Electrode material | | Graphite | Graphite | AISI 316 | AISI 316 |
| **Connector** | | | Integral cable | | |
| Connection to process | | 1/2" GAS | 1/2" GAS | 1"GAS | 1"GAS |
| Standard cable | | 5 mt | 5 mt | 5 mt | 5 mt |

## Technical specifications

| Models | | **S411**U | | **S411**P | | **S411**4E |
|---|---|---|---|---|---|---|
| Constant | K | 1 | 10 | 10 | 100 | 0.55 |
| **Measuring range** | | 0 ÷ 50.000 µS | 10 ÷ 200 mS | 0 ÷ 1000 µS | 0.04 ÷ 20 µS | 0 ÷ 1.000 mS |
| Temp. compensation | | yes | yes | yes | yes | yes |
| Operating temperature | | 0 ÷ 120°C | 0 ÷ 120°C | 0 ÷ 130°C | 0 ÷ 130°C | 0 ÷ 70°C |
| Maximum pressure | | 6 bar | 6 bar | 16 bar | 16 bar | 4 bar |
| **Body material** | | PES | PES | AISI 316 | AISI 316 | Epoxy |
| Electrode material | | Graphite | Graphite | AISI 316 | AISI 316 | Graphite & Inox (temp) |
| **Connector** | | | with connector | | | Integral cable |
| Connection to process | | ½" GAS(*) | ½" GAS(*) | ½" NPT(*) | ½" NPT(*) | Pg 13.5 |
| Cable | | | | | | 5 mt |
| **Applications** | | Industrial at middle range | Industrial at high range | Industrial at low range | Industrial at very low range | Industrial with 4 Electrodes for wide range |

(*) ON REQUEST CLAMP CONNECTIONS, FOOD GRADE FLANGES, DIN

# INDUCTIVE CONDUCTIVITY MEASURING CELLS

## General features

The conductivity measuring system using inductive sensors has many advantages over other conventional methods. The absence of electrodes in contact with the fluid to be measured makes the system recalibration and maintenance virtually useless over long periods of time. The **S411**IND sensors have a great tolerance with respect to the coating phenomena, probably the most common problem encountered when measuring with conventional electrodes.

**S411**IND

**S411**IND T

**S411**IND E

**S411**IND T INS

Serie **AD**

## S411IND

The inductive sensor has been engineered to produce a low cost sensor, without sacrificing performance or quality. The result has been obtained by moulding the sensor using polypropylene reinforced with fibreglass. The sensor provides all of the benefits that the method of inductive conductivity measurement provides.

## Applications

Polluted surface waters, process monitoring, means very contaminated or aggressive, influential water of treatment plants and wastewater.

## Models

**S411**IND
sensor only

**S411**IND T
for immersion

**S411**IND E
for insertion with T-fitting

**S411**IND INS
for direct insertion on flat wall

## Digitizer for inductive measuring cells

The AD Series Chemitec digitizers convert the conductivity measurement into serial signal with standard Modbus RTU protocol

## Technical specifications S411IND

| | |
|---|---|
| **Sensore** | |
| Operating temperature | - 5 to 60°C (not freezing) |
| Measuring range | 1000 uS … 1000 mS |
| Temp. compensation | Temperature sensor Pt1000 with 2 wires |
| Cable | Standard 5 meters |
| Operating pressure | Vacuum to 6.5 bar (100 psi) |
| **Mechanical construction** | |
| Material | PVC with Viton® seals |
| Contact materials | Glass-reinforced polypropylene |
| Immersion length | 600 or 1200 mm |
| Mounting | Standard bracket or optional flange |
| Connection | 0.5" BSP male |
| Protection grade | IP68 |

# INDUCTIVE CONDUCTIVITY MEASURING CELLS

**S411**IND HT

**S411**IND HT TP

**S411**IND HT TS

**S411**IND HT60/120

## **S411**IND HT

These sensors are manufactured of PEEK™, a food grade material with excellent aggressive chemical resistance and high temperature performance. The construction allows the sensors to operate at 100°C continuously, withstanding thermal shocks commonly associated with CIP applications. The sensors can be sterilized at up to 135°C.

### Applications

Ideal for food and process applications

Conductivity and concentration measurements

Wide range of process connections

### Models

**S411**IND HT
for insertion

**S411**IND HT60/120
for immersion

**S411**IND HT TP
for By-pass with PVC T-fitting

**S411**IND HT TP
for By-pass with SS T-fitting

### Digitizer for inductive measuring cells

The AD Series Chemitec digitizers convert the conductivity measurement into serial signal with standard Modbus RTU protocol.

### **Technical specifications** S411IND HT

| | |
|---|---|
| **Sensore** | |
| Operating temperature | - 5 to 100°C – up to 135°C for short periods (CIP process) |
| Measuring range | 1000 uS … 1000 mS |
| Temp. compensation | Temperature sensor Pt1000 with 2 wires |
| Cable | Disconnectable Standard 5 meters |
| Operating pressure | Vacuum to 10 bar (150 psi) |
| **Mechanical construction** | |
| Materials | PEEK / AISI |
| Contact materials | Body PEEK – Temperature sensor INOX (PEEK on request) |
| Immersion length | 600 or 1200 mm |
| Mounting | Standard bracket or optional flange |
| Connections | **RJT** 2", 2.5", 3" – **Tri clamp** 2", 3" – **IDF/ISS** 2", 2.5", 3"<br>**DIN** 1185: 50mm, 80mm (oher on request) |
| Protection grade | IP67 |

# DIGITAL CONDUCITIVITY PROBE



## General features

The **S411**DIG probe is used for measuring conductive conductivity in pure and process waters.

- Reliable conductivity measurement using graphite electrodes
- Conductive measuring method with two electrodes and temperature compensation
- PVC sensor body and graphite electrodes
- No mechanically moving parts
- Immediate installation and easy manteinance
- MODBUS RTU serial communication protocol

## Applications

Untreated water, drinking water, demineralization, reverse osmosis, ion exchanger, water from conditioning systems and boilers, artesian wells

## Technical specifications

| | |
|---|---|
| **Measuring range** | 0.00 ÷ 20000uS |
| Measuring method | conductive with two electrodes |
| Sensitivity | 0.1 uS |
| Precision | +/-1uS |
| Response time | 90% of the value in less than 60 seconds |
| Refresh time | 1 second |
| Temp. compensation | facing Stainless Steel sleeve |
| Operating temperature | -10 ÷ 45 °C |
| Maximum pressure | 10 bar |
| **Body material** | PVC |
| Electrode | Graphite |
| | The probe is completely resinate inside |
| **Mechanical protection** | IP68 Sensor + cable |
| **Power supply** | 12 ÷ 24Vdc |
| Power consumption | max. 2W |
| Cable | 10m integral (other on request) – 10m disconnectable cable |
| Equipotential contact | for solution included |
| **Signal interface** | RS 485 Modbus RTU Protocol |

# AMPEROMETRIC SENSORS FOR CHLORINE MEASUREMENT


## General features

The **S494** are amperometric probes with two (2) or three (3) electrodes covered with membrane with integrated temperature sensor for signal compensation.

## Applications

Swimming pool, drinking water, waste water, process water.

## Digitizer for amperometric sensors

The AD Series Chemitec digitizer converts the S494 sensor signals into serial signal with standard Modbus RTU protocol allowing the connection to the **50***Series* plug & play digital instrument.

## Technical specifications

| | | |
|---|---|---|
| **Measuring parameters** | Free Chlorine ; Total Chlorine ; Organic and Inorganic Free Chlorine ; Chlorine Dioxide ; Ozone ; Peracetic Acid ; Hydrogen Peroxide ; Chlorites | |
| Measuring error | ±2 % of the indicated value | |
| Repeatability | ±2 % | |
| Stability | ±1 % of the analytical determination after 4 weeks from the calibration | |
| **Operating conditions** | Sample speed on the membrane 15 cm/sec | |
| | Costant flow rate of the hydraulic supply 30 ÷ 40 l/h | |
| | Acceptable overpressure 1 bar | |
| **Operating temperature** | > 5 up to 45 °C (other on request) | |
| Temp. compensation | automatic through NTC integrated sensor | |
| **Time** | **First polarization** from 1 to 3 h ; **Repolarization** 30 min | |
| Response | 60 sec for 90% f.s. | |
| **Body material** | PVC, silicon, PTFE | |
| Membrane | PTFE (Teflon) semipermeable | |
| Measuring electrode | (Cathode) Gold | |
| Reference electrode | (Anode) Silver/Silver Chloride | |
| **Calibration point** | **Zero** | not necessary |
| | **Work** | according to user requirement, through analytical determination (colorimetric with DPD) |
| **Warnings** | Maintenance interval 2 weeks or more | |
| | Life time of the electrolyte solution approx. 1 year | |

| Measuring parameters | Measuring range | pH operating range |
|---|---|---|
| Free Chlorine | 0.01 ÷ 2.00 ppm; 0.01 ÷ 5.00 ppm; 0.01 ÷ 10.00 ppm; 0.1 ÷ 200.00 ppm | 6 ÷ 8 pH |
| Total Chlorine | 0.01 ÷ 0.50 ppm; 0.01 ÷ 2.00 ppm; 0.01 ÷ 5.00 ppm; 0.01 ÷ 10.00 ppm | 4 ÷ 12 pH |
| Organic and Inorganic Free Chlorine | 0.01 ÷ 2.00 ppm; 0.01 ÷ 5.00 ppm; 0.01 ÷ 10.00 ppm | 4 ÷ 11 pH |
| Chlorine Dioxide | 0.01 ÷ 0.50 ppm; 0.01 ÷ 2.00 ppm; 0.01 ÷ 5.00 ppm; 0.01 ÷ 10.00 ppm | 1 ÷ 11 pH |
| Ozone | 0.01 ÷ 0.50 ppm; 0.01 ÷ 2.00 ppm; 0.01 ÷ 5.00 ppm | 2 ÷ 11 pH |
| Peracetic Acid | 0 ÷ 500 ppm; 0 ÷ 1000 ppm; 0 ÷ 2000 ppm; 0 ÷ 10000 ppm; 0 ÷ 20000 ppm; | 1 ÷ 7 pH |
| Hydrogen Peroxide | 0 ÷ 500 ppm; 0 ÷ 1000 ppm; 0 ÷ 2000 ppm; 0 ÷ 10000 ppm | 2 ÷ 11 pH |
| Chlorites | 0.05 ÷ 2 ppm | 6 ÷ 9 pH |

Mounting in constant flow-through electrode holder for Chlorine, Chlorine Dioxide, Ozone, Chlorites, PAA, $H_2O_2$ and other membrane sensors. **S305PX494**

## Materials

| | |
|---|---|
| Cell and mounting brackets | Plexiglass |
| Connections and valves | PVC |
| Floating system | Stainless Steel |
| O-Ring | NBR |

## Operating conditions

| | |
|---|---|
| Operating temperature | max 60°C (80°C on request) |
| Operating pressure | maximum 4 bar |

# OXYGEN AND TEMPERATURE ELECTRODE


## General features

The oxygen content in liquids is measured with a system called Clark's cells. These cells generate an electrical current proportional to the oxygen partial pressure which can be evaluated with a suitable measurement converter.

In order to prevent interference effects on measuring, the Clark's cells are covered with a gas-permeable membrane. The membranes typically used are made from PTFE but, as this material is mechanically fragile, frequent changing is often necessary, along with the related "demanding" operations (interruption of measurement, electrolyte replacement, regeneration of the electrodes).

The **S423** solves this problem by using an OPTIFLOW™ membrane. This membrane is very mechanically stable, is manufactured as a laminate around a steel mesh and is very resistant to chemically aggressive environments as well as high pressures.

Thanks to the special construction of the measuring electrodes, this system also makes the sensor totally "maintenance free".

## Applications

Surface waters, drinking water, biological treatment of waste water.

## Technical specifications

| | |
|---|---|
| **Measuring range** | 40 ppb ÷ 40 ppm |
| Measuring method | measure of the electric current influenced by the oxygen partial pressure |
| Sensitivity | 40 ÷ 80 nA a 25 °C in air |
| Stabilization time | typical 15 min., max. 1 h |
| Required flow rate | ≥ 0.03 m/s |
| Temperature sensor | NTC 30 kOhm Oxysens W (NTC 22 kOhm Oxysens – optional ) |
| Operating temperature | 0 ÷ 60°C |
| Maximum pressure | 0 ÷ 4 bar |
| **Body material** | Stainless Steel 1.4435, PEEK, Silicon, NBR |
| Electrode material | Silver-Platinum combination |
| Membrane material | OPTIFLOW |
| Reference electrolyte | Alkaline solution |
| **Electrical connector** | Integral cable 5 mt |
| Connection to process | Pg 13.5 threaded |
| Polarisation current | -670 +/- 50 mV |

# OPTICAL OXYGEN AND TEMPERATURE PROBE


## General features

**S423/C/OPT** is an oxygen measuring sensor with integrated temperature probe. The measuring technique is based on the following optical principle: a diode emits a blue light towards a support on which a fluorescent substrate is applied. The substrate reacts by emitting initially a red light (luminescence), then returns to its initial state. The intensity of the produced red light and the return rate to the initial state are related to the present oxygen concentration. This innovative method allows reliable, accurate measurements with no drift over time, so that the system calibration is no longer necessary. No maintenance is required except for the replacement of the luminescent support about every two years. The system does not consume oxygen, therefore it is suitable for the most varied fields of application, including those in which the measuring liquid is almost stationary.


## Applications

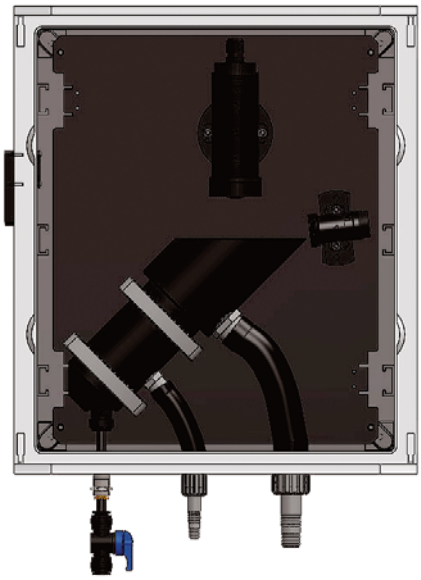
Surface waters, fish farms, drinking water, waste water, sea water

**Available versions** with PVC body, with 4÷20mA outputs

## Technical specifications

| | |
|---|---|
| **Measuring range** | 0.00 to 20.00 mg/L 0-200% |
| Measuring method | Optical measure by luminescence |
| Precision | ±0.1mg/L or ±1 % |
| Response | 90% of the value in less than 60 second |
| Refresh time | < 1 second |
| Temp. compensation | with internal NTC probe |
| Operating temperature | -10 ÷ 60°C (optional -10÷ 80°C ) |
| Maximum pressure | 5 bar |
| **Body material** | AISI 316 (PVC body optional) |
| Electrode material | Special optical glasses |
| O-Rings | NBR and Silicon |
| **Mechanical protection** | IP68 Sensor + cable |
| **Power supply** | 12 ÷ 24Vdc |
| Power consumption | max. 2W |
| Cable | 10m integral with the sensor (other on request) |
| **Signal interface** | RS 485 Modbus RTU Protocol |

# NEPHELOMETRIC TURBIDITY MEASURING CELL



**S461**N Nephelometric cell

## General features

Turbidity measurement without contact with the sample

90° scattering method compliant with ISO 7027 / EN 27027 with visible light beam

Black rigid PVC sensor body

Optional built-in debubbler device applicable externally

No mechanically moving parts

Measurement pre-processed in the sensor which provides high sensitivity in low-signal transmission

Fast calibration using the pre-calibrated calibration plate, supplied with the instrument

## Applications

Measuring turbidity in primary water upstream of treatment plants, industrial or recirculating water

Measuring turbidity in wastewaters leaving the treatment plant, industrial waters with high levels of turbidity, aggressive media, wastewater containing starch, oils and fats

## Technical specifications

| | |
|---|---|
| **Measuring ranges** | 0 ÷ 10. 0 ÷ 100. 0 ÷ 1000 NTU, (optional 0 ÷ 9999 NTU) |
| Measuring method | 90° Scattering |
| Precision | ±3% of the f.s. |
| Repeatability | 95 % |
| Response time | 2 minutes for 90% of the f.s. |
| Maximum flow rate | 300 L/h |
| Operating temperature | 0 ÷ 50°C |
| Maximum pressure | 2 bar |
| **Contact material** | PVC |
| **Power supply** | 12 ÷ 24Vdc |
| Cable | 10 mt |
| Calibration | by known point |

# LOW TURBIDITY MEASURING CELL

**S462**PVC
turbidimetric cell with PVC body

**S462**INOX
turbidimetric cell with AISI body

## General features

The measuring principle is the deviation of light produced by the particles suspended in the liquid.

Thanks to the dual sensor system, turbidity can be measured at low and very low concentrations with high levels of precision and repeatability.

The absence of contact with the measuring liquid and the optical LED technology make the system stable over time and minimize the need for recalibrations.

The cell can be installed directly in-line. The maximum allowable pressure is 6 bar, or on By-pass piping. The flow rate does not affect the measurement.

## Applications

Water treatment plants, on leaving the filtration or decantation sections

Waste water refining plants for agricultural or industrial reuse

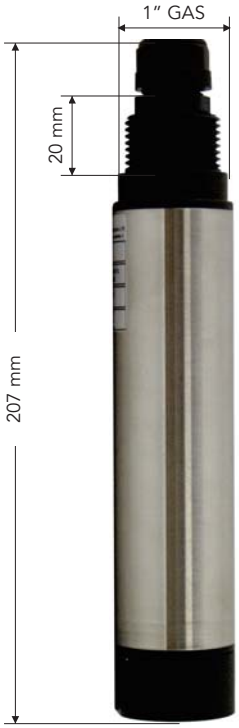
Food industry, in particular in the production of beverages, wine, beer etc.

Swimming pools

## Technical specifications

| Models | **S462**PVC | **S462**INOX |
|---|---|---|
| **Measuring range** | 0 ÷ 100 FTU | 0 ÷ 100 FTU |
| Operating temperature | 0 ÷ 45°C | 0 ÷ 90°C |
| Maximum pressure | 6 bar | 6 bar |
| **Body material** | Black PVC | AISI 316 |
| Connections | threaded 2 ½ " F | threaded 2 ½ " M |
| Inner lining | - | Black PTFE |
| Inspection windows | Trasparent PVC | Tempered glass |
| **Projector and sensors** | positioned at 180° mounted on PVC flanges with connector for electrical connections | positioned at 180° mounted on stainless steel 316 flanges with integral 5 m outgoing cable |

# TURBIDITY PROBE




## General features

Turbidity refers to the scattered component of a light beam which is diverted away from its natural course e by optically denser particles in the medium (e.g. solid matter particles).


The measurement is performed by using a 90° scattered light method compliant with ISO 7027 / EN 27027.

The measuring method is based on the Tyndall effect. The turbidity of the medium is determined by the amount of scattered light.

## Applications

Untreated water and well water, surface water, drinking water, process water, industrial and municipal wastewater seawater

**Available versions** with PVC body, with 4÷20mA outputs

## Technical specifications

| | | |
|---|---|---|
| **Models** | **S461**T – for immersion and bypass (in combination with S305/S461T) | **S461**T INS – for insertion (in combination with S305/INS) |
| **Measuring ranges** | 0 ÷ 4, 0 ÷ 40. 0 ÷ 400. 0 ÷ 1000 NTU (0 ÷ 4000 on request)<br>**Low turbidity version** 0 ÷ 1 NTU on request | |
| Measuring method | 90° Scattering | |
| Precision | ± 2% of the f.s. | |
| Repeatability | 98 % | |
| Response time | 5 sec. to reach the 90% of the value | |
| Operating temperature | 0 ÷ 60°C | |
| Maximum pressure | 4 bar | |
| **Body material** | Black PVC and AISI 316 | |
| O-ring | Viton® | |
| Optics | Special glass | |
| **Mechanical protection** | IP68 Sensor + cable | |
| **Power supply** | 12 ÷ 24Vdc | |
| Power consumption | max. 3W | |
| Cable | 10 mt integral with the sensor | |
| **Signal interface** | Modbus RTU Standard Protocol RS485 (4 ÷ 20mA optional) | |

# PROBE FOR SUSPENDED SOLIDS


## General features

Turbidity is a decrease of water transparency due to the presence of suspended solid, t consist of very fine particles, unable to settle in a reasonably short time.

The particles in suspension determine an absorption of light radiation according to the number and size of the

Comparing the absorption of the test sample with values derived from a known calibration curve, it is possible to determine the turbidity value.

## Applications

Sludges from biological processes, chemical industry paper mills, food, extraction systems: quarries, tunnels, aggregate extraction

**Available versions** with PVC body, with 4÷20mA outputs

## Technical specifications

| Models | **S461**S – for immersion | **S461**S INS – for insertion (in combination with S305/INS) |
|---|---|---|
| **Measuring range** | 0 ÷ 30 g/L | |
| Measuring method | Absorption of light | |
| Precision | ± 3% of the f.s. | |
| Repeatability | 98 % | |
| Response time | 5 sec. to reach the 90% of the value | |
| Operating temperature | 0 ÷ 60°C | |
| Maximum pressure | 4 bar | |
| **Body material** | Black PVC and AISI 316 | |
| O-ring | Viton® | |
| Optics | Special glass | |
| **Mechanical protection** | IP68 Sensor + cable | |
| **Power supply** | 12 ÷ 24Vdc | |
| Power consumption | max. 3W | |
| Cable | 10 mt integral with the sensor | |
| Calibration | by points | |
| **Signal interface** | Modbus RTU Standard Protocol RS485 (4 ÷ 20mA optional) | |

# PROBES FOR SUSPENDED SOLIDS HIGH CONCENTRATIONS - SLUDGES

**7520**SAV T/E

**7540**SRH T/E

## General features

7520SAV and 7540SRH are probes used to determine high and very high concentrations of suspended solids, up to 150g/L.

– Reliable measurement thanks to infrared optical measurements at 880 nm
– Dual pulsed light beam system to compensate for drift from optical components
– Stainless steel sensor body
– No mechanically moving parts
– Digitized signal inside the probe body to reduce the possibility of electrical interference in the signal transmission

## Applications

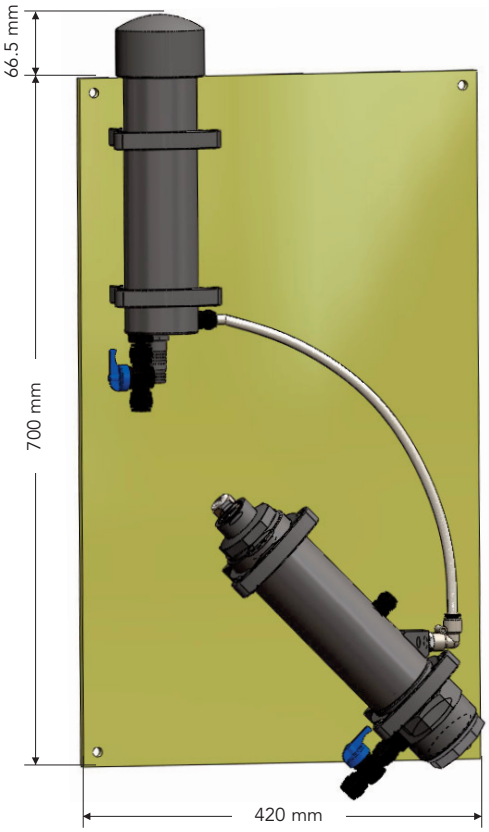
Measuring the concentration of sludges in biological water treatment plants: primary sludges, thickened sludges, recirculation sludges, feeding press belts/centrifuges.

Measuring the concentration of suspended solids in extraction systems: quarries, tunnels, aggregate extraction.

## Technical specifications

| Models | **7520**SAV T for immersion | **7520**SAV E for insertion (in combination with S305/INS) | **7540**SRH T for immersion | **7540**SRH E for insertion (in combination with S305/INS) |
|---|---|---|---|---|
| **Measuring range**(*) | 0 ÷ 70 gr/L | | 10 ÷ 150 gr/L | |
| Measuring method | Absorption of light | | Back radiation | |
| Precision | ± 1% of the f.s. | | | |
| Repeatability | 99.5 % | | | |
| Light measurement | Infrared light at 880 nm (maximum absorption) | | | |
| Optical components | Light source: 2 LEDs, Detectors: 2 photodiodes | | | |
| Operating temperature | 0 ÷ 50°C | | | |
| Maximum pressure | 6 bar | | | |
| Calibration | with Silica as standard | | | |
| **Body material** | AISI 316 Ti | | | |
| O-ring | Viton® | | | |
| Sight glass | Epoxy | | | |
| **Mechanical protection** | IP68 | | | |
| **Cable** | T version | 3m | | |
| | E version | 1m + 10m extension cable | | |

# FLOW-THROUGH AND INSERTION PROBE HOLDER




## General features

The **flow-through S305/461T probe holder** is used to insert the **S461 sensor** for the optical measurement of turbidity in the bypass plant.

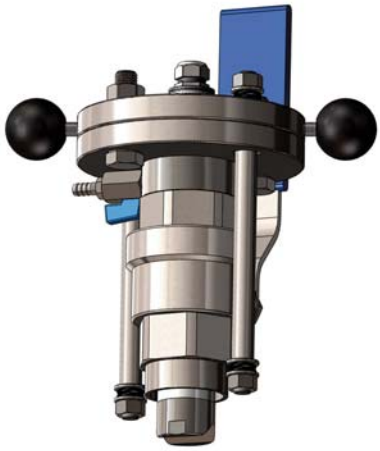
– Reliable concentration measurement thanks to the use of an optical measurement process
– Scattering method with pulsing infrared light beams
– System with degasser to avoid the formation of air bubbles within the measuring chamber
– Gray rigid PVC probe holder body
– No mechanically moving parts
– Measurement pre-processed in the sensor which provides high sensitivity in low-signal transmission
– Washing system

## Applications

Turbidity measurement in drinking water and in water with low turbidity ranges

## Technical specifications

| | |
|---|---|
| Body material | Gray PVC |
| Plate | PP |
| Operating temperature | 0 ÷ 50 °C |
| Maximum pressure | 3 bar |



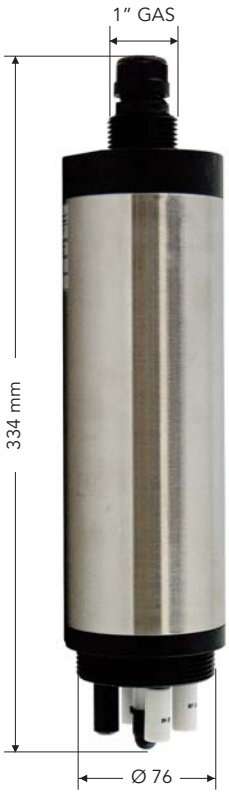
## General features

The **probe holder S305/INS for insertion into the pipe** is used for Turbidity/Suspended Solids sensors.

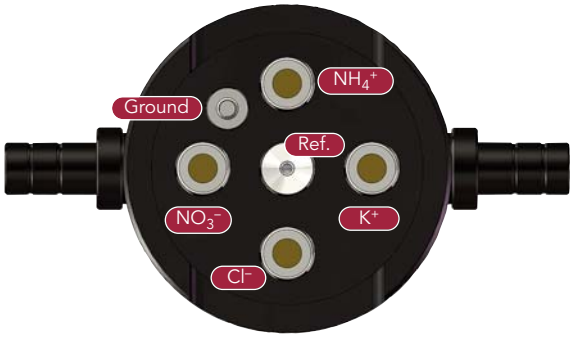
## Technical specifications

| | |
|---|---|
| Body material | STAINLESS STEEL AISI316 |
| Ball valve | DN 40 for extraction of the probe without interruption of the process |
| Connection | welded for mounting on pipe |
| Complete with | fixing brackets of the safety sensor |

# PROCESS ISE PROBE FOR AMMONIA, POTASSIUM, NITRATES, CHLORIDES AND TEMPERATURE MEASURING




**S470** is a complete family of ion-selective **(ISE: Ion-selective electrodes)** probes suitable for monitoring the performance of the ammonium ion (as $NH_4^+$ or $NH_4$-N) and nitrate ion (as $NO_3^-$ or $NO_3$-N) into a liquid matrix.




Particular attention has been paid to identify a set of sensors stable and at the same time sensitive. For this purpose, it has also been introduced a reference electrode with a particularly high performance and a high capacity of compensation of the pollutants.

The used sensors allow a correct reading of the above analytes in the following applications:

– surface waters

– wastewater

– zootechnical and industrial process water

The S470 family consists of 3 elements:

**S470/$NH_4^+$** Sensor for ammonium ion (0÷100ppm) with compensation of the potassium ion (0÷1000ppm)

**S470/$NO_3^-$** Sensor for nitrate ion (0÷100ppm) with compensation of the chloride ion (0÷5000ppm)

**S470 Combined Sensor** for ammonium (0÷100ppm) and nitrate (0÷100ppm) ions with compensation of the potassium (0÷1000ppm) and chloride (0÷5000ppm) ions

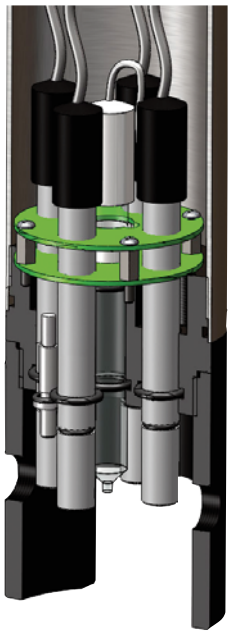
All the specific electrodes are individually replaceable.

The main ISE (ammonium and nitrate) are placed alongside the secondary sensors (potassium and chloride ISE) that have the task of monitoring the most important interferers and allow the instrument to have a correct compensation of the data.

Installation and commissioning are extremely easy to perform, as well as the routine maintenance and the replacement of the finished sensors.

In the protection ring nut of the probe holder there are integrated cleaning nozzles, which can be connected to a line compressed air or water. The cleaning system is controlled directly from the control unit.

The configuration and calibration operations of the sensors on the **50***Series* control unit have been simplified to the maximum in order to ensure an extreme ease of use to all the operators.



The sensor is composed by 3 or 5 (depending on the configuration) ion-selective electrodes housed in an AISI 316/PVC sensor body, realized in order to offer the maximum chemical compatibility with the project environments.

These sensors are individually replaceable and have been constructed in such a way to ensure maximum efficiency and response speed.

Nozzles for automatic cleaning (managed by the control unit) are integrated into the probe.

Communication with the controller is made via digital RS485 Modbus protocol. In this way, the field interferences are virtually void and the sensor can be installated even at considerable distances from the control unit.

## Calibration

The probe is factory pre-calibrated using standard solutions. The curve stored in this way can be customized by entering the analysis values of the customer (the correction of the field allows to take into consideration any peculiarities of the matrix).

It's possible to enter a table of custom values (6 points) and let the probe work on a custom curve. The factory calibration curve, however, remains always available and could be set again as default.

## Technical specifications

| | | | | | |
|---|---|---|---|---|---|
| **Measuring range** | $NH_4^+$<br>0÷100 ppm(*) | $K^+$<br>0÷1000ppm | $NO_3^-$<br>0÷100 ppm(*) | $Cl^-$<br>0÷5000ppm | Temperature<br>0 ÷ 50°C |
| Measuring method | Ion-selective sensors | | | | |
| Precision | ± 1mg/L or ± 1 % | | | | |
| Response | 90% of the value in less than 60 seconds | | | | |
| Refresh time | maximum < 1 second | | | | |
| Operating pH range | 4 ÷ 10 pH | | | | |
| Temp. compensation | with internal NTC probe | | | | |
| Operating temperature | 0 ÷ 50°C | | | | |
| Maximum pressure | 1 bar | | | | |
| **Body material** | AISI 316 | | | | |
| O-ring | NBR | | | | |
| Protection, electrodes' housing and superior cap | Black PVC | | | | |
| **Mechanical protection** | IP68 Sensor+cable | | | | |
| **Power supply** | 12 ÷ 24Vdc | | | | |
| Cable | 10m submersible | | | | |
| **Signal interface** | Modbus RTU Standard Protocol | | | | |

(*) on request 0÷1000ppm

# PLUG & PLAY AUTOMATION
## FOR BIOLOGICAL SEWAGE TREATMENT PLANTS

Proper management of the nitrogen and the carbon cycle is crucial to get the respect of the limits of the law and, at the same time, avoid wasting resources.

The market offers many dedicated solutions, with varying degrees of effectiveness, but mostly targeted -for the kind of the investment- to plants of important dimensions (>10Kae).

Chemitec worked hard to find a performing solution even where it's not possible to apply the usual systems of supervision and control.

## **Oxysmart** *Chemitec*

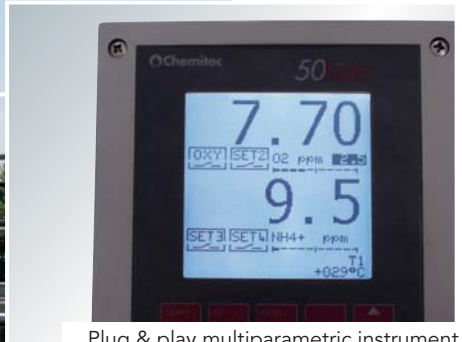
Oxysmart is a control algorithm. It is based on the assumption, verified in a first approximation, that it is possible, in a civil treatment plant, to monitor the incoming load by controlling the concentration of ammonia nitrogen.

Loaded on a 50 Series Controller, this algorithm transforms the control unit into a system capable to manage compressors, inverters and mixers, to optimize the process and adapt it to load variations.

The **50Series** Oxysmart is installed at the poolside and is operative from the start. The logic is adaptable to any plant, regardless of the electromechanical equipment, but, however, optimizing the operation.

The oxygen setpoint is varied in a continuous manner according to the load detected by the ammonia-ion selective probe **Chemitec S470/$NH_4$** and its abatement.

The **Chemitec S423/C/OPT** oxygen probe is responsible for monitoring the achievement of the imposed target.



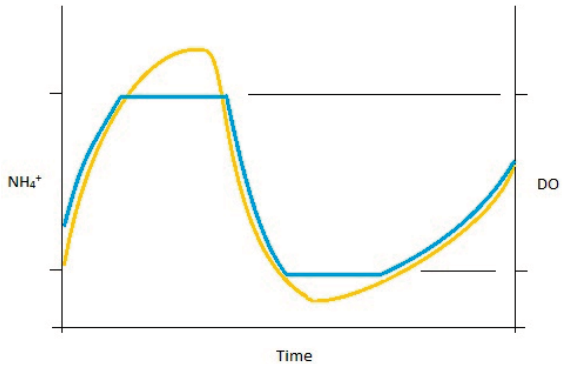
Plug & play multiparametric instrument


Process ISE probe

There are three logics, adaptable to any plant:

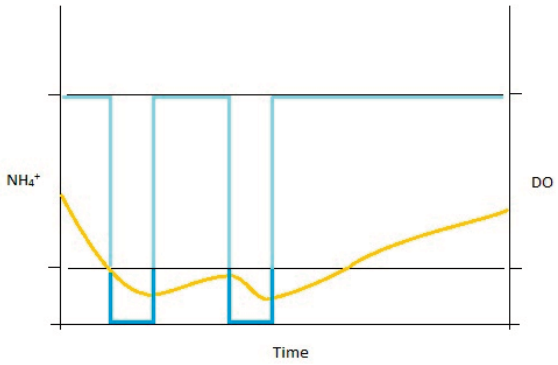
### Smart DO

In conditions of low load, the DO threshold is maintained at low levels, and then it grows when the load increases.



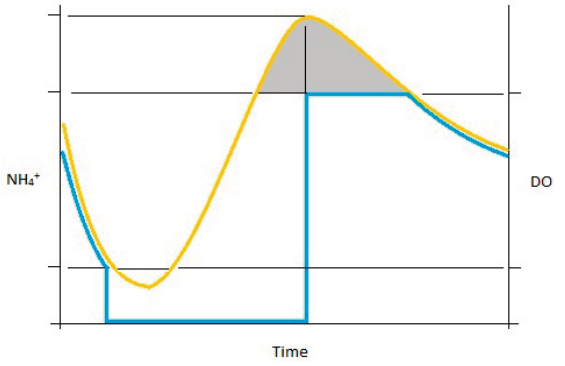

### Smart ON/OFF

In conditions of low load, the system goes in pause/work mode, ready to modulate the oxygen when the load increases.




### Smart N/DN

At the end of an oxidation cycle, the system activates the mixer, turns off the compressors and waits for a peak of ammonia nitrogen; when the peak is reached, the system reactivates oxidation




Oxysmart provides a series of safeties to protect the compressors and inverters, as well as to compensate the failure of the probes. Alarm functions are provided in case of malfunction of some component: the system automatically positions the adjustments of the safety values.

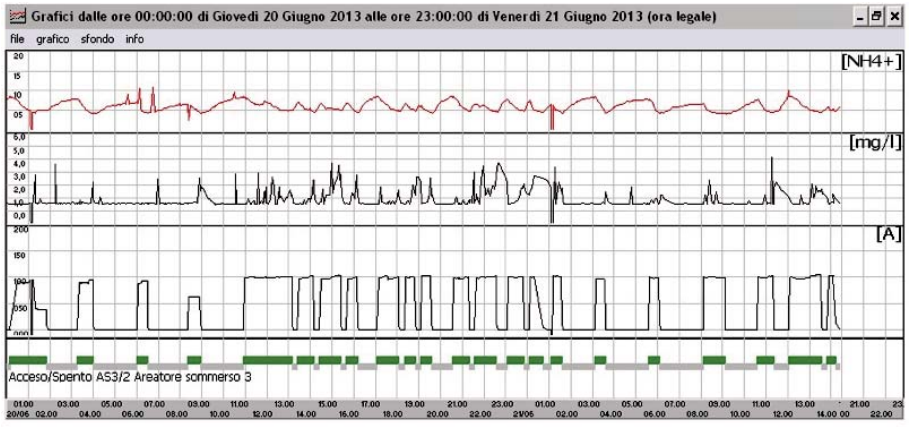
The benefits of Oxysmart system are::

**Economical:** reduced intervention costs

**Technical:** immediate start, ease of installation and management

**Managerial:** energy consumption optimization, stability of the effluent's parameters

*Operating example (Smart N/DN logic, simulation of inverter failure, 4000ae)*




**Panel version**
**(96 x 96 x 65 mm)**

**2537** for pH or ORP measuring

**2522** for conductivity measuring

**DIN Rail version**
**(6 modules)**

**2537D** for pH or ORP measuring

**2522D** for conductivity measuring

# 25 Series

## User Interface (HMI)

**Programming keypad** with 4 bubble-keys for instrument calibration and configuration with single keys [▼][▲] and keys with double functions available [ESC/MODE] [ENTER/CAL]

[ 2537 – 2522 ] **4-digit numeric LCD display** for measurement and temperature visualization

[ 2537D – 2522D ] **2-line 16-character alphanumeric display** for simultaneously display of chemical measure, temperature and alarms

## Software & Functions

Automatic buffer recognition and electrode exhaustion alert

Automatic temperature compensation

Two (2) digital outputs for set point, with programmable hysteresis, or for set point delay alarm

**Analogue output 0/4 ÷ 20mA galvanically isolated**, programmable within the measuring range

[ 2537 – 2522 ] **Mechanical protection** IP45; black ABS housing

**Power supply** 230 Vac/dc 50Hz (Optional 110/24Vac)

[ 2537D – 2522D ] **Mechanical protection** IP40; gray ABS housing

**Power supply** 100÷240 Vac 50/60 Hz and 24 Vac/dc

| Measuring parameters | 2537 | 2522 | 2537D | 2522D |
|---|---|---|---|---|
| **pH** | 0 ÷ 14 pH | | 0 ÷ 14 pH | |
| Resolution | ± 0.01 pH | | ± 0.01 ; ± 0.1 pH | |
| **ORP** | ± 1500 mV | | ± 1500 mV | |
| Resolution | ± 1 mV | | ± 1 mV | |
| **Conductivity** | | 0 ÷ 20 µS<br>0 ÷ 200 µS<br>0 ÷ 2000 µS<br>0 ÷ 20.00 mS | | 1 ÷ 200 µS<br>10 ÷ 2000 µS<br>100 ÷ 20000 µS<br>200 ÷ 50000 µS |
| Resolution | | ± 0.01 µS ; ± 0.1 µS<br>± 1 µS ; ± 0.01 mS | | |
| **Measuring precision** | ± 1% F.S. | | | |
| **Temperature** | 0 ÷ 60 °C | 0 ÷ 100 °C | 0 ÷ 60 °C | 0 ÷ 100 °C |
| Resolution | ± 1°C | | ± 1°C | |
| Temp. compensation | Automatic | | | |

## ph/ORP electrodes

| | **S401**VG | **S406**VG |
|---|---|---|
| **Measuring range** | 0 ÷ 14 pH | ±1000 mV |
| Operating temperature | 0 ÷ 60°C | 0 ÷ 60°C |
| Maximum pressure | 6 bar | 6 bar |
| **Materials** | Glass body; GEL electrolyte | Glass body; GEL electrolyte |
| **Threaded connection** | Pg 13.5 | Pg 13.5 |

## conductivity electrodes

| | **S411** | **S411**TEF | **S411**S |
|---|---|---|---|
| **Measuring range** | 0 ÷ 50.000 µS | 0 ÷ 10.000 µS | 0 ÷ 2000 µS |
| Operating temperature | 5 ÷ 100°C | 0 ÷ 100°C | 0 ÷ 50°C |
| Maximum pressure | 5 bar | 2 bar | 2 bar |
| **Materials** | PP body;<br>Graphite electrode | PTFE body;<br>AISI 316 electrode | PVC body and cap;<br>AISI 316 electrode |
| **Threaded connection** | 1/2" GAS | 1" GAS | 1" GAS |

PORTABLE METER TO MEASURE
# THE BIOMASS RESPIRATORY ACTIVITY

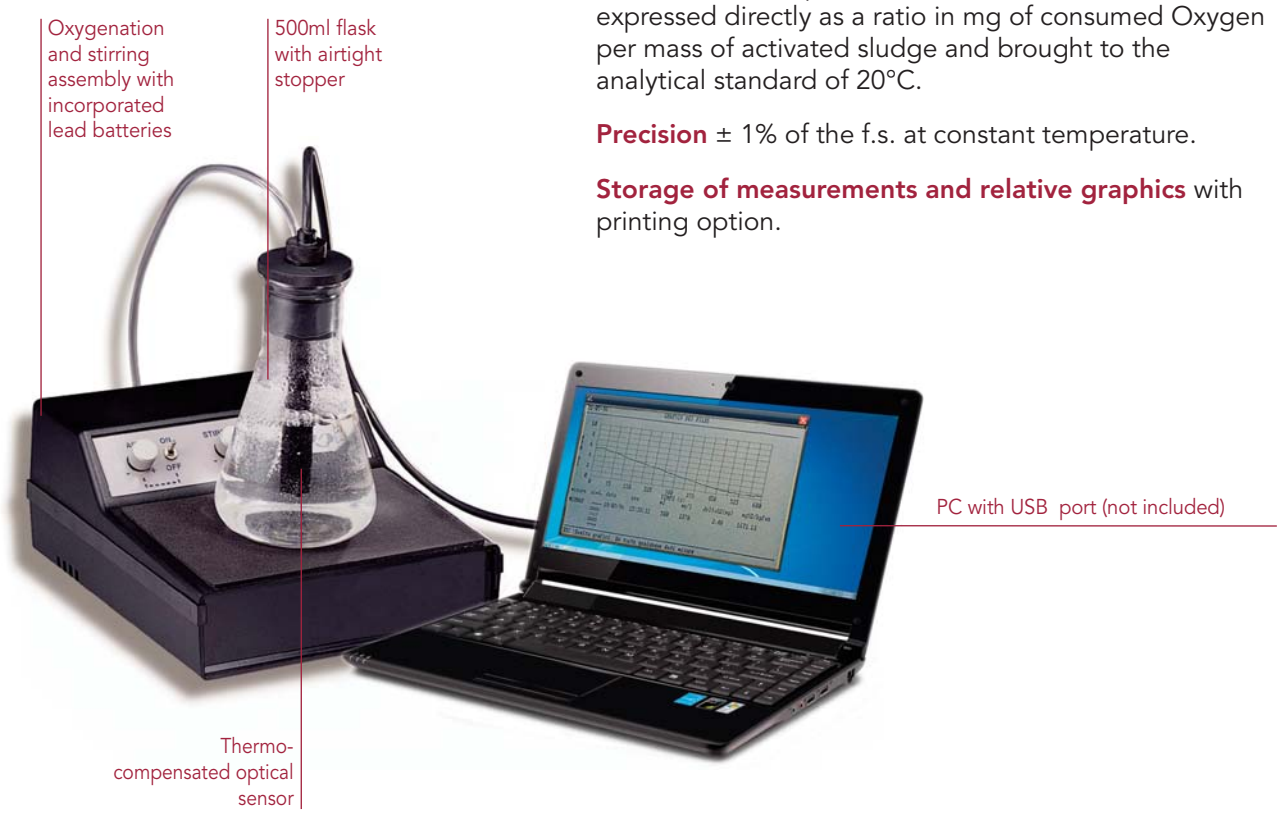
Complete system for taking respirometric measurements with parameter setting via dedicated software.

## S250

**Measurements displayed in graphical and tabular form** ($O_2$ consumption/time) with the final result expressed directly as a ratio in mg of consumed Oxygen per mass of activated sludge and brought to the analytical standard of 20°C.

**Precision** ± 1% of the f.s. at constant temperature.

**Storage of measurements and relative graphics** with printing option.




**Selectable measuring ranges**
0.00 ÷ 3.00/5.00/10.0/20.0 ppm of $O_2$

**Selectable measuring times**
Min 1 minute - max 60 minutes

**Fully-portable system housed** in shock-resistant aluminium case

**Thermo-compensated fluorescent optical sensor**

**500 ml flask** with airtight stopper

**Stirring/oxygenation unit** powered by rechargeable batteries or 220 V mains power

**Display and measurement management software** (for PCs running Windows 98 operating system or higher). The program supplied can be used on PCs, portable or desktops, with an USB port.

# O.U.R. TEST (OXYGEN UPTAKE RATE)

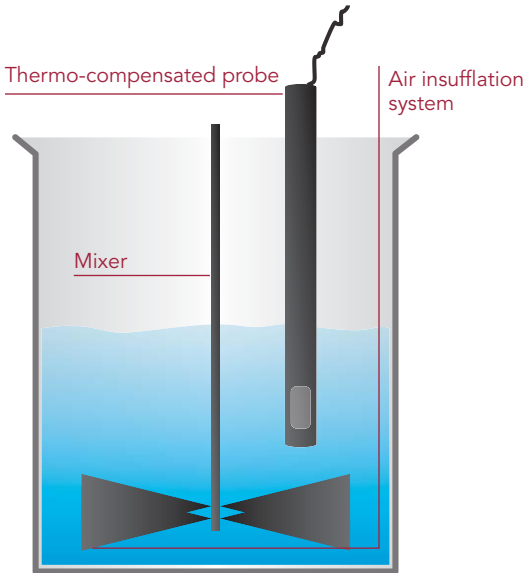



figure 1

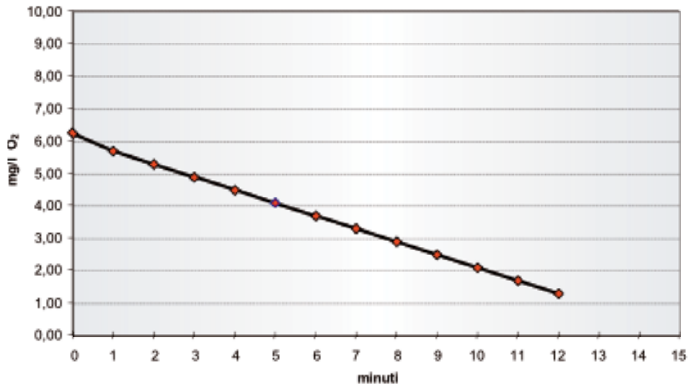



figure 2

*sample graph of an OUR measurement conducted in the laboratory*

## The measurement of OUR

To control the efficiency of a biological activated sludge treatment plant, the test for determining the Oxygen Uptake Rate is performed on a sample taken directly from the oxidation/nitrification basin.

The classic method provides for the registration, at regular time intervals, of the consumption of dissolved oxygen by a sample of activated sludge, with known MLSS concentration and volume, previously brought to a rapid saturation with a forced ventilation system and kept constantly mixing (as schematically shown in figure 1).

The time/concentration of oxygen pairs are then turned into a graph, and a descending, almost straight curve is obtained, whose slope represents the rate of consumption of oxygen by the biomass (see figure 2).

The OUR value obtained in this way is generally expressed as **mg O2/g SSV*h.**

Some typical applications of the OUR test are listed below :

| Test | Use |
|---|---|
| Biological activity test | Checking the degree of activity of the biomass in breaking down a certain organic substrate in relation to the endogenous OUR |
| Assessment of the degree of inhibition | Determining the possible toxic effect of sewage containing potentially inhibitory substances by making use of the OUR test |
| Biodegradability test on special waste water | Testing the behaviour of the activated sludge when fed with a compound, the effect of whose biomass is not known for certain; for example the acceptance of special waste water at the treatment plant |
| Characterisation of organic substrates | Quantification of the organic substrate present in influent waste water, in order to determine the fraction of readily biodegradable COD of waste water for the integration of a carbonaceous substrate in a state of denitrification or biological dephosphating |