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ADVANCED APPLIED TECHNOLOGIES

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Nitrogen:

Ammonium · Nitrate · Nitrite

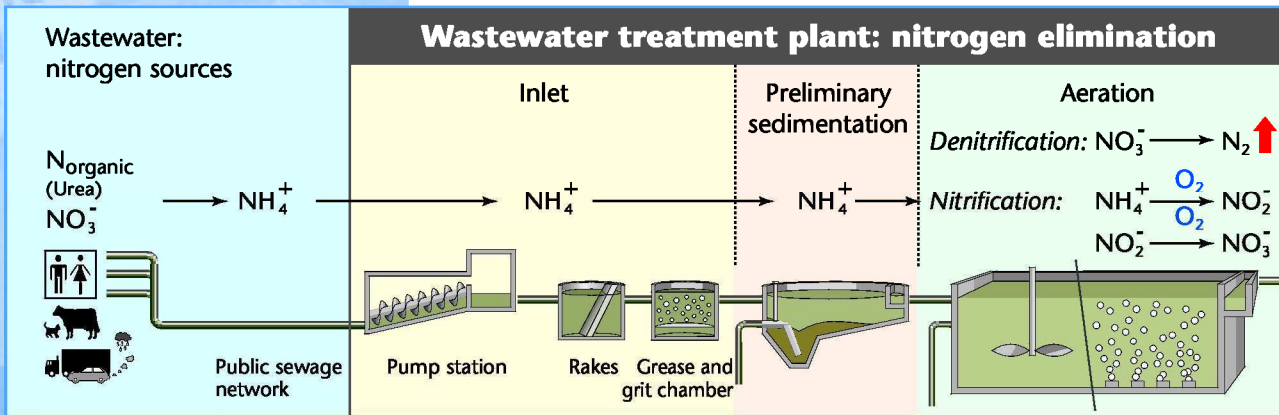
Nitrogen Measurements

Wastewater treatment processes are concerned with controlling the removal of pollutants in the smallest possible space in the shortest possible time.

The efficient control of Nitrogen in wastewater systems is possible by making those measurements directly in the wastewater process. This not only ensures purification but above all guarantees economic operation of the entire plant.

Purification processes for the removal of nitrogen from wastewater

Nitrogen is found in a large variety of compounds and forms and is considered to be the ultimate "quick-change artist". In municipal wastewater it is mainly encountered as a waste product in the form of urea, which is already converted in part to ammonium nitrogen by ammonification.



In the aeration basin, the initial step of nitrification consists in oxidizing the nitrogen present in wastewater via nitrite to nitrate, for which oxygen is required. During subsequent denitrification the nitrate (NO₃⁻) is further converted to elemental nitrogen N₂ under the absence of oxygen. This nitrogen in gas form is harmlessly released into the environment.

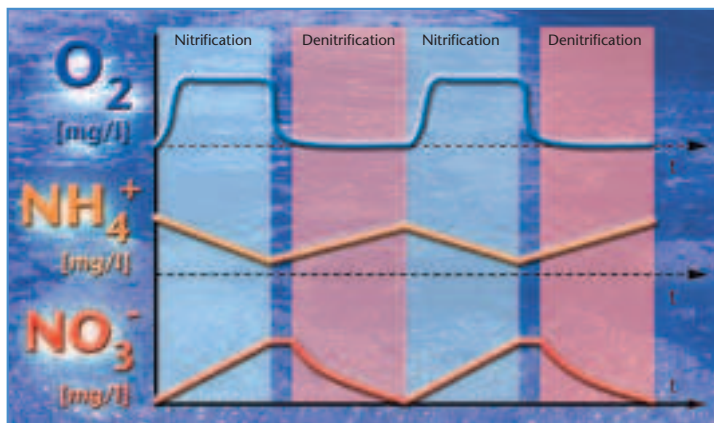
Due to the various framework conditions and different biologically active groups of microorganisms, both methods are conducted in two fundamentally separate processes. The temporal and spatial sequence can be adapted to local conditions.

Measuring method for tracing nitrogen elimination

A common measuring method to date is targeted at oxygen availability. As oxygen is required for nitrification subprocesses, but prevents denitrification, this process parameter is determined online and traced. It is often used for controlling the oxygen input or aerator aggregates.

Redox inflexion point determination has become less significant as an indirect controlled and actuation variable. New direct measuring procedures for the process measuring ammonium and nitrate are far more interesting. The exacting control of the wastewater treatment process is directly optimized. This guarantees efficient wastewater purification – despite the influence of various disturbances. This results in reduced energy costs.

The following example of intermittent procedure illustrates the advantage of direct measurement of selected parameters.



Example: intermittent nitrification/denitrification

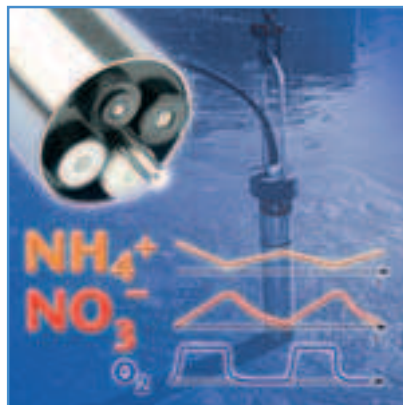
Nitrification and denitrification are conducted in succession in the same basin. In the nitrification phase ammonium is oxidized using oxygen to form nitrate and is consumed in the process. The nitrate content increases accordingly. In the denitrification phase nitrate is reduced to form gaseous nitrogen; ammonium is formed from residual organic nitrogen. Ammonium and nitrate curves display opposite behavior.

Correlation between the individual procedure measurements of dissolved oxygen, ammonium and nitrate

In order to minimize energy consumption in the aeration basin, a preferably efficient and low O_2 input should be targeted for complete nitrogen oxidation. Furthermore, the optimum efficiency of denitrification stages with anaerobic or anoxic conditions must be ensured. For optimum growth of nitric bacteria, higher concentrations of dissolved oxygen are generally required than for the pure decomposition of organic carbon compounds. The online measurement of the selected parameter of ammonium, which provides the possibility of NH_4-N controlled operation, makes the nitrification process transparent and offers significantly higher levels of certainty than in pure O_2 controlled operation. A combined measurement of NH_4-N and O_2 is suitable for plant operation, as this prevents the formation of bulking sludge in the lower range and limits the oxygen input should interferences occur in NH_4-N decomposition (e.g. caused by a disturbed nutrient ratio of carbon : nitrogen : phosphate). This can create significant savings potentials.

Direct measuring procedures for determining ammonium and nitrate

The process to be controlled and the measuring system used for decisive control engineering must be able to respond to changes within the process as they occur.



in-situ ISE sensors

These control engineering demands led to the development of **in-situ ISE (ion-selective) measuring techniques**, which are capable of directly recording the respective selected parameter ammonium and nitrate during the process both quickly and without sample preparation. In terms of accuracy, practical compromises can be made.



in-situ UV/VIS probes

in-situ UV/VIS spectrometric probes represent a precise measuring technique with long-term stability, which permit quasi-continuous recording of the selected parameter in the smallest measuring cycles of minutes. The disturbance variables for optical measuring, such as turbidity/suspended solids, are eliminated by spectral recording.



Analyzers

Depending on measurements and applications, **analyzer systems** require standard and reagent solutions as well as sample preparation. Measuring intervals and automatic cleaning cycles are adjustable. These instruments automatically and recurrently compare measurements against reference standards and deliver high precision measurement values.

See page 37 for various measuring systems and applications.

WTW Measuring Systems for Nitrogen

For information visit www.WTW.com for a customer care center near you or inside US: call WTW 800 645 5999.

| | Ammonium | | Ammonium and Nitrate | Nitrate | | |
|-----------------------------------|---------------------------------|---|---|---------------------------------|---|-------------------------------|
| System | IQ SENSOR NET | TresCon® | IQ SENSOR NET | IQ SENSOR NET | TresCon® | IQ SENSOR NET |
| Sensor/Module | AmmoLyt® 700 IQ | Module OA 110 <i>for mounting in TresCon® system</i> | VARION 700 IQ | NitraLyt® 700 IQ | Modules ON 210/OS 210 <i>for mounting in TresCon® system</i> | NitraVis® 700 IQ |
| Measured variable | NH ₄ | NH ₄ | NH ₄ and NO ₃ | NO ₃ | NO _x | NO ₃ |
| Inlet (determination of load) | ● | ○ | ● | ● | ○ | ● |
| Aeration (regulation and control) | ● | ● | ● | ● | ● | ● |
| Effluent (monitoring) | ○ | ● | ○ | ○ | ● | ● |
| Autom. cleaning | compressed air | cleaning solution | compressed air | compressed air | cleaning solution | compressed air |
| Cleaning cycles | variable | automatic 6/12/24 h | variable | variable | automatic 6/12/24 h | prior to each measurement |
| Measuring | in-situ | after sample preparation | in-situ | in-situ | after sample preparation | in-situ |
| Sample Preparation | none | PurCon®/PurCon® Insitu | none | none | PurCon®/PurCon® Insitu | none |
| Measuring interval | continuous | adjustable | continuous | continuous | adjustable | adjustable |
| Response Time | quick | medium | quick | quick | medium | quick |
| Measuring method | ISE (ion-selective) | gas-sensitive | ISE (ion-selective) | ISE (ion-selective) | photometric | UV/VIS spectrometric |
| Accuracy | medium | high | medium | medium | high | high |
| Cross sensitivity | yes/potassium, compensable | none | yes, with automatic compensation | yes/chloride, compensable | low | autom. compensated (spectrum) |
| Calibration | manual | automatic 6/12/24 h | manual | manual | automatic 6/12/24 h | not necessary |
| Investment costs | low | medium | low | low | medium | medium |
| Additional costs | — | sample preparation/pump may be required | — | — | sample preparation/pump may be required | — |
| Operational costs | medium | medium | medium | medium | low | none |
| Consumables | electrodes calibration standard | calibr. standard/reagent cleaning solution/Wpack | electrodes calibration standard | electrodes calibration standard | calibration standard cleaning solution/Wpack | none |

*Measuring in Aeration

● recommended by WTW ○ conditionally applicable



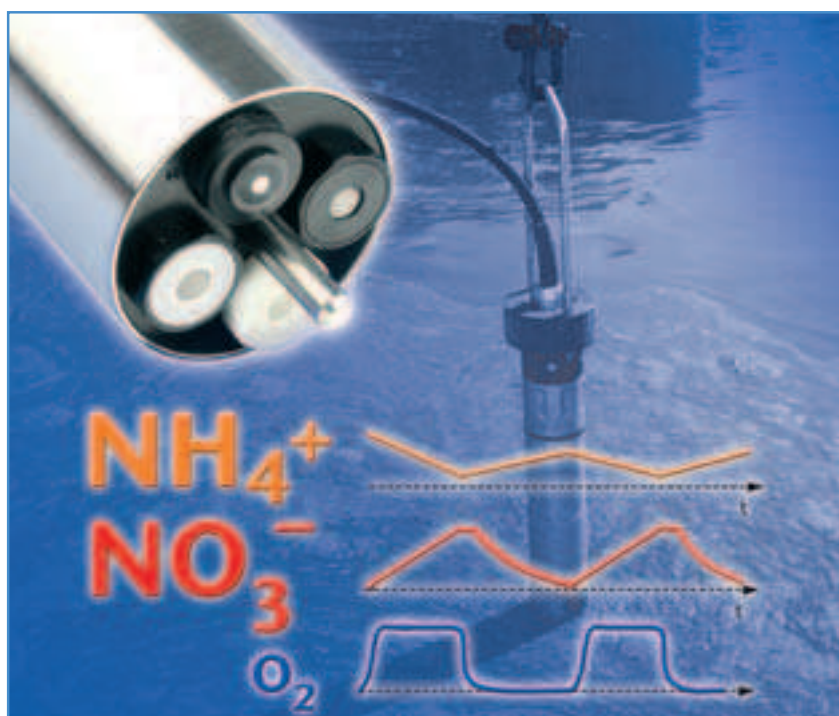
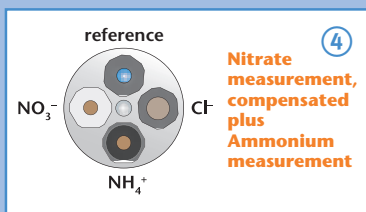
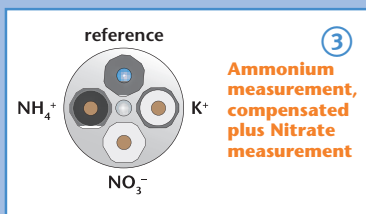
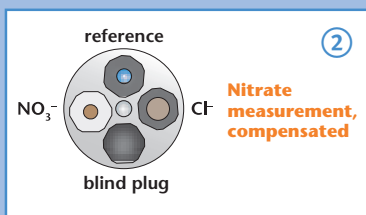
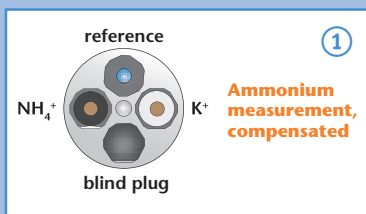
NEW

Nitrogen VARiON System

Ammonium and Nitrate ion-selective with automatic compensation of interferences

- in-situ combination sensor for ammonium and nitrate
- Automatic compensation of interference ions
- Low investment and operating costs

Possible configurations



Ion-selective measurements directly in process – reliable 24 hours a day

The new highly variable ionic sensor VARiON allows:

- The continuous measurement of ammonium – with online compensation of potassium ion interference by using potassium ISE.
- On-line compensation for nitrate – chloride as interference ion.
- The third available slot can be used for an additional measuring electrode – this allows a simultaneous measurement of ammonium and nitrate with only one sensor (2 in 1)

For measurement or compensation, simply insert the suitable electrode into

the sensor, everything else is working automatically. The display shows the already compensated values. These values are available via the 0/4–20 mA analog outputs or via the digital output PROFIBUS or Modbus.

The following VARiON variants are available as ready to start sets:

- ① Ammonium measurement, compensated
- ② Nitrate measurement, compensated
- ③ Ammonium measurement, compensated, with additional nitrate measurement
- ④ Nitrate measurement, compensated, with additional ammonium measurement

Technical Data

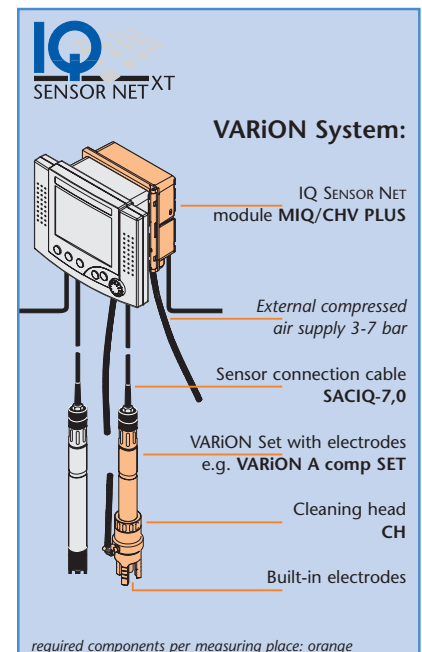
| | | | |
|--|---|---|--|
| Maximum Configuration | Common reference electrode, two measuring electrodes, one compensation electrode | | |
| | Ammonium Measurement | Nitrate Measurement | |
| Integrable Electrodes: | VARiON Ref | | |
| Reference Electrode | | | |
| Measuring Electrode | VARiON NH ₄ | VARiON NO ₃ | |
| Compensation Electrode | VARiON K | VARiON Cl | |
| Measuring Ranges/Resolution | NH ₄ -N: 0.1 ... 1000 mg/l / 1 mg/l; 0.1 ... 100 mg/l / 0.1 mg/l NH ₄ ⁺ : 0.1 ... 1290 mg/l / 1 mg/l; 0.1 ... 129,0 mg/l / 0.1 mg/l | NO ₃ -N: 0.1 ... 1000 mg/l / 1 mg/l; 0.1 ... 100 mg/l / 0.1 mg/l NO ₃ ⁻ : 0.5 ... 4500 mg/l / 5 mg/l; 0.5 ... 450.0 mg/l / 0.5 mg/l | |
| Compensation Ranges | K ⁺ : 1 ... 1000 mg/l / 1 mg/l | Cl ⁻ : 1 ... 1000 mg/l / 1 mg/l | |
| Temperature Measurement | Integrated NTC thermistor, Range 32 °F ... 104 °F (0 °C ... +40 °C), Accuracy ±0.5 K, Resolution 0.1 K | | |
| Temperature Compensation | 32 °F ... 104 °F (0 °C ... +40 °C) | | |
| Calibration Procedures | 2-point-calibration with multiple standard solutions, calibration against any reference value | | |
| Ambient Conditions | Operating temperature: 32 °F ... 104 °F (0 °C ... +40 °C), storing temperature: 32 °F ... 104 °F (0 °C ... +40 °C) | | |
| pH Range | pH 4 ... pH 8.5 | pH 4 ... pH 11 | |
| Measuring Accuracy in laboratory standard solutions | ±5 % of measured value ±0.5 mg/l | | |
| Working Life (typically) | Reference electrode: 6–12 months, ISE electrodes: 4–8 months | | |
| Mechanical | Sensor body: V4A stainless steel 1.4571 Protective cup: POM Temperature sensor: V4A stainless steel 1.4571 Electrode connector: POM Protection rating: IP 68 (0.2 bar, with installed electrodes) | | |
| Max. Pressure | Maximum 0.2 bar (incl. SACIQ sensor connection cable, with installed electrodes) | | |
| Power Consumption | 0.2 Watt | | |
| Dimensions | 14.45 x 1.57 in. (367 x 40 mm, length x diameter), incl. SACIQ sensor connection cable | | |
| Weight | Approx. 1.76 lb (800 g, without electrodes, without SACIQ sensor connection cable) | | |



*on armature

Ordering Information

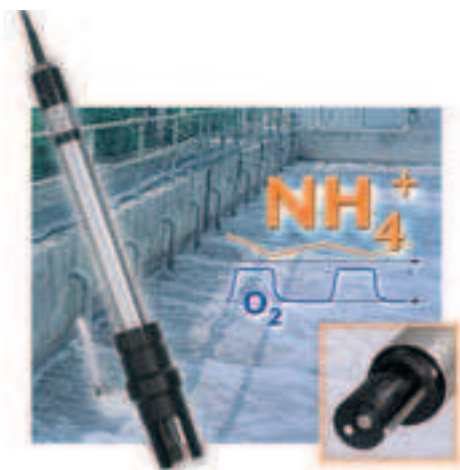
| VARiON SETS | Consisting of probe, reference electrode, measuring and compensation electrodes | Order No. |
|---------------------------|--|-----------|
| VARiON A comp SET | Ammonium measurement, compensated | 107 060 |
| VARiON N comp SET | Nitrate measurement, compensated | 107 062 |
| VARiON AN/A comp SET | Ammonium measurement, compensated, plus nitrate measurement | 107 066 |
| VARiON AN/N comp SET | Nitrate measurement, compensated, plus ammonium measurement | 107 068 |
| Standard Solutions | For calibration of any VARiON | |
| VARiON/ES-1 | Combined standard 1 (low concentration), 1000 ml | 107 050 |
| VARiON/ES-2 | Combined standard 2 (high concentration), 1000 ml | 107 052 |
| Accessories | For automatic cleaning. Recommended for permanent operation. | |
| MIQ/CHV PLUS | Valve module for automatic cleaning by compressed air controlled directly via the IQ SENSOR NET bus | 480 018 |
| DIQ/CHV | Valve module for automatic compressed air cleaning for System 182; accessible by means of an DIQ/S 182 relay | 472 007 |
| CH | Cleaning head | 900 107 |



Nitrogen AmmoLyt® System

Ammonium Measurement directly in the Medium

- in-situ ammonium sensor
- Control of the aeration process
- Automatic air cleaning



– without Sample Preparation

The continuous measuring of O₂ and NH₄ can result in significant savings through:

- energy-optimized operation due to demand-oriented regulation of aerator aggregates,
- adherence to critical values or reduction of wastewater charges.

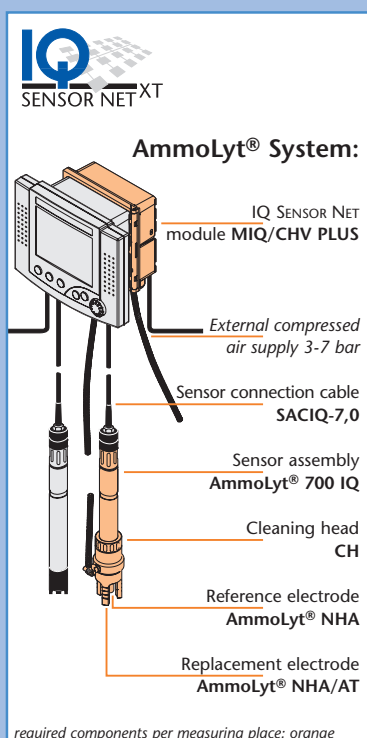
The low investment costs for the system can thus be amortized after a short period.

Technical Data

| | |
|--|--|
| Appropriate Electrode | Reference electrode AmmoLyt® NHA with replacement electrode AmmoLyt® NHA/AT |
| Measuring Ranges/Resolution | NH ₄ -N: 0.1 ... 1000 mg/l / 1 mg/l; 0.1 ... 100 mg/l / 0.1 mg/l NH ₄ ⁺ : 0.1 ... 1290 mg/l / 1 mg/l; 0.1 ... 129.0 mg/l / 0.1 mg/l mV: -2000 ... +2000 mV/1 mV |
| Temp. Measurement and Compensation | Integrated NTC thermistor Range: 32 ... 104 °F (0 °C ... +40 °C) |
| Calibration Procedures | 1-point/2-point calibration with standard solution, known addition, double-known addition, in-situ calibration against reference solution |
| Ambient Conditions | Operating temp.: 32 ... 104 °F (0 ... +40 °C), storing temp.: 32 ... 104 °F (0 ... +40 °C) |
| pH Range | pH 4 ... pH 8.5 |
| Accuracy in laboratory standard solutions | ±5% of measured value ±5 mg/l |
| Working Life (typically) | AmmoLyt® NHA: 6 ... 12 months AmmoLyt® NHA/AT: 3 ... 8 months |
| Mechanical | Sensor body and temperature sensor: V4A stainless steel 1.4571 Protective cup and electrode connector: POM Protection rating: IP 68 (0.2 bar, with installed electrodes) |
| Max. Pressure | Maximum 0.2 bar (incl. SACIQ sensor connection cable, with installed electrodes) |
| Power Consumption | 0.2 Watt |
| Dimensions | 19.76 x 1.57 in. (502 x 40 mm; L X D), incl. SACIQ sensor connection cable |
| Weight | Approx. 2.14 lb (970 g, without electrode, without SACIQ sensor connection cable) |



*on armature



Ordering Information

| AmmonoLyt® System | | Order No. |
|---|--|-----------|
| AmmonoLyt® 700 IQ | Robust digital armature for ion-selective electrodes (AmmonoLyt® NHA/AmmonoLyt® NHA/AT; not included in scope of delivery) | 107 002 |
| AmmonoLyt® NHA | Ammonium reference electrode | 107 004 |
| AmmonoLyt® NHA/AT | Ammonium replacement electrode | 107 006 |
| CH | Cleaning head | 900 107 |
| MIQ/CHV PLUS | Valve module for automatic cleaning by compressed air controlled directly via the IQ SENSOR NET bus | 480 018 |
| DIQ/CHV | Valve module for automatic compressed air cleaning for System 182; accessible by means of an DIQ/S 182 relay | 472 007 |
| Standard Solutions see brochure "Product Details" | | |

TresCon® OA 110

Ammonium Analyzer Module



On-line ammonium measurement

- Continuous ammonium value monitoring in sewage plant effluent
- Analysis of the ammonium-nitrogen pollution in surface waters
- Monitoring water treatment plants

Measuring Principle

The continuous determination of ammonium in the OA 110 module is carried out according to the potentiometric measuring principle with a gas-sensitive NH_3 electrode. Sodium hydroxide is added to the thermostatted sample to convert the ammonium dissolved in the medium into undissociated ammonia gas. The gaseous ammonia alters the pH registered by the measuring electrode; the alteration is a direct measure of the ammonium concentration in the sample.

IP 54



2 Years
Warranty

Technical Data

| | Standard 1 | Standard 2* |
|--|---|---|
| Resolution (Display) | Range: 0.10 ... 10 mg/l: 0.01 mg/l 10.0 ... 100 mg/l: 0.1 mg/l 100 ... 1280 mg/l: 1 mg/l | Range: 0.05 ... 10 mg/l: 0.01 mg/l* |
| Accuracy | ±5% of the measured value ±0.2 mg/l at <1 mg/l $\text{NH}_4\text{-N}$ ±5% of the measured value ±0.1 mg/l at 1.0 ... 100 mg/l $\text{NH}_4\text{-N}$ | ±5% of the measured value ±0.05 mg/l at <1 mg/l $\text{NH}_4\text{-N}$ * ±5% of the measured value ±0.1 mg/l at 1.0 ... 10 mg/l $\text{NH}_4\text{-N}$ * |
| Coefficient of variation for method | Range: 0.10 ... 10 mg/l: 3% 10.0 ... 100 mg/l: 4% 100 ... 1280 mg/l: 5% | (values for calibration with suitable standard solutions) |
| Response Time | < 3 min (after alteration in concentration at module input) | |
| Measuring interval | Continuous Mode and 10, 15, 20, 25, 30 min intervals selectable, AutoAdapt, Interval-Program | |
| Calibration | Automatic 2-point calibration (AutoCal) with two standard solutions | |
| Sample input | Approx. 0.3 l/h, solids content <50 mg/l | |
| Consumption | Reagent, 10 l: 14/30/50 days at measuring intervals cont./20/30 min Standard solutions A/B, 1.5 l: 60 days with 24 h calibration interval Cleaning solution, 1.5 l: 60 days with 24 h cleaning interval | |
| Maintenance interval | Every 6 months | *around calibration standard |

Ordering Information

| | Order No. |
|--|-----------|
| OA 110 | 820 008 |
| TresCon® A 111 | 8A-10030 |
| TCU/A111 | 820 101 |
| Accessories and consumables see brochure "Product Details" | |

TresCon® OA 110

- Wide measuring range of 0.1 ... 1000 mg/l $\text{NH}_4\text{-N}$
- Extreme long-term accuracy due to quartz-controlled pump
- Continuous measurements with automatic calibration
- Short response time
- No filtration required in effluents with low levels of suspended solids

| Measuring Range 1 | | |
|------------------------|-------------|--------------|
| | mg/l | mmol/l |
| $\text{NH}_4\text{-N}$ | 0.1 - 1000 | 0.01 - 71.00 |
| NH_4^+ | 0.1 - 1280 | 0.01 - 71.00 |
| Measuring Range 2* | | |
| | mg/l | mmol/l |
| $\text{NH}_4\text{-N}$ | 0.05 - 10 | 0.005 - 0.71 |
| NH_4^+ | 0.05 - 12.8 | 0.005 - 0.71 |

Nitrogen NitraLyt® System

Nitrogen Elimination Process

- in-situ nitrate sensor
- Control of the aeration process
- Automatic air cleaning

monitored · optimized · cost effective

The optimization of nitrification/denitrification during wastewater treatment is simplified even further by the new NitraLyt® system:



- Nitrate is also directly measurable during the process in addition to oxygen and ammonium.
- Measured values are promptly available and can be used directly to control the process.
- Low investment and maintenance costs (automatic compressed air cleaning system).

Technical Data

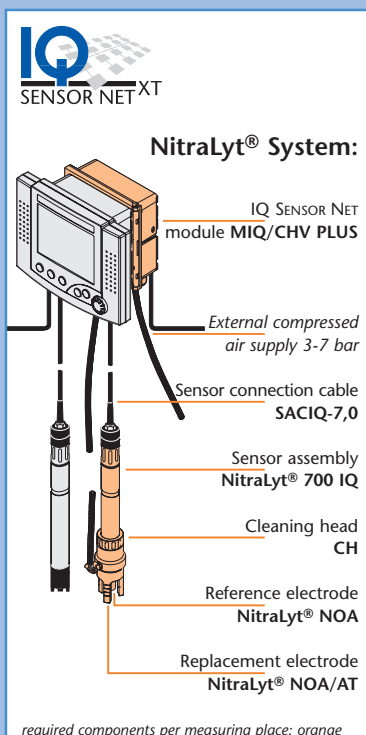
| | |
|---|--|
| Appropriate Electrode | Reference electrode NitraLyt® NOA with replacement electrode NitraLyt® NOA/AT |
| Measuring Ranges/Resolution | NO ₂ -N: 0.1 ... 1000 mg/l / 1 mg/l; 0.1 ... 100 mg/l / 0.1 mg/l NO ₃ ⁻ : 0.5 ... 4500 mg/l / 5 mg/l; 0.5 ... 450.0 mg/l / 0.5 mg/l mV: -2000 ... +2000 mV/1 mV |
| Temp. Measurement and Compensation | Integrated NTC thermistor Range: 32 ... 104 °F (0 °C ... +40 °C) |
| Calibration Procedures | 1-point/2-point calibration with standard solution, known addition, double-known addition, in-situ calibration against reference solution |
| Ambient Conditions | Operating temp.: 32 ... 104 °F (0 ... +40 °C), storing temp.: 32 ... 104 °F (0 ... +40 °C) |
| pH range | pH 4 ... pH 11 |
| Accuracy in laboratory standard solutions | ±5 % of measured value ±5 mg/l |
| Working Life (typically) | AmmoLyt® NHA: 6 ... 12 months AmmoLyt® NHA/AT: 3 ... 8 months |
| Mechanical | Sensor body and temperature sensor: V4A stainless steel 1.4571 Protective cup and electrode connector: POM Protection rating: IP 68 (0.2 bar, with installed electrodes) |
| Max. Pressure | Maximum 0.2 bar (incl. SACIQ sensor connection cable, with installed electrodes) |
| Power Consumption | 0.2 Watt |
| Dimensions | 19.76 x 1.57 in. (502 x 40 mm; L X D), incl. SACIQ sensor connection cable |
| Weight | Approx. 2.14 lb (970 g, without electrode, without SACIQ sensor connection cable) |

Ordering Information

| NitraLyt® System | | Order No. |
|---|--|-----------|
| NitraLyt® 700 IQ | Robust digital armature for ion-selective electrodes (NitraLyt® NOA/NitraLyt® NOA/AT; not included in scope of delivery) | 107 022 |
| NitraLyt® NOA | Nitrate reference electrode | 107 024 |
| NitraLyt® NOA/AT | Nitrate replacement electrode | 107 026 |
| CH | Cleaning head | 900 107 |
| MIQ/CHV PLUS | Valve module for automatic cleaning by compressed air controlled directly via the IQ SENSOR NET bus | 480 018 |
| DIQ/CHV | Valve module for automatic compressed air cleaning for System 182; accessible by means of an DIQ/S 182 relay | 472 007 |
| Standard solutions see brochure "Product Details" | | |



*on armature



Nitrogen

NitraVis® System

in-situ Measurement of Nitrate and Suspended Solids (optional)



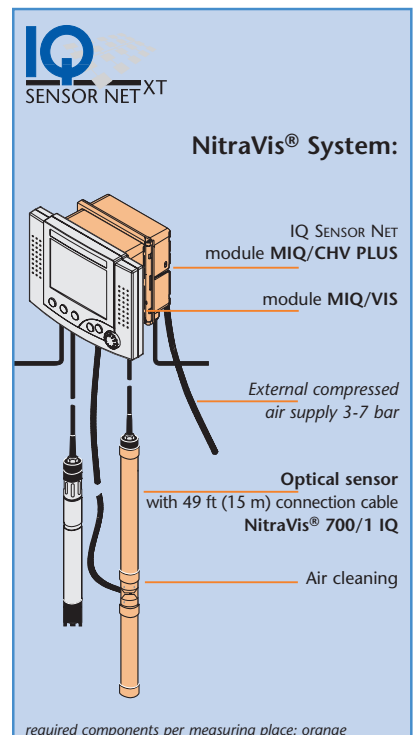
High-precision spectral measurement allows determination of the real nitrate value. Interfering influences caused for example by nitrite or suspended solids are easily detected due to the available spectral information and automatically taken into account or used for compensation.

The investment costs, which are slightly higher than those for the ion-selective measuring method, do not entail operation costs, amortizing the investment after a very short period.

- in-situ nitrate sensor
- Precise optical measurement
- Interference Compensation
- Automatic air cleaning
- No chemicals or consumables

Technical Data

| Measuring Principle | Spectral Measurement in the UV/VIS Range (200 - 750 nm) | | |
|---|--|--|---|
| Measuring Range Nitrate Standard | NO ₃ -N: municipal wastewater: | NitraVis® 700/1 0.1 ... 100 mg/l inlet, aeration | NitraVis® 700/5 0.01 ... 25 mg/l outlet |
| Accuracy | ±3% of measured value ±0.5 mg/l (with Check algorithm, in standard solution) | | |
| Measuring Range Suspended Solids (Option) | TSS: municipal wastewater: | 0 ... 10.00 g/l inlet, aeration | 0 ... 900.0 mg/l outlet |
| Materials | Housing: Window: | Al Mg Si 1, anodized Sapphire glass | |
| Pressure Resistance | ≤1 bar | | |
| Ambient Conditions | Operating temperature: | 32 ... 113 °F (0 °C ... +45 °C) | |
| | Storage temperature: | 14 ... 122 °F (-10 °C ... +50 °C) | |
| Flow velocity | ≤3 m/s | | |
| pH range | pH 4 ... pH 9 | | |
| Salt content of medium | < 5000 mg/l (Chloride) | | |
| Dimensions | 25.59 x 1.73 in. (650 x 44 mm; length x max. diameter) | | |
| Weight | Approx. 2.43 lb (1.1 kg) | | |



Ordering Information

| Every Sensor with 49 ft. (15 m) cable and compressed air tubing | Order No. | |
|---|--|---------|
| NitraVis® 700/1 IQ | Optical Nitrate probe; path length 1 mm | 481 021 |
| NitraVis® 700/1 IQ TS | as NitraVis® 700/1 IQ; with integrated TSS measurement | 481 022 |
| NitraVis® 700/5 IQ | Optical Nitrate probe; path length 5 mm | 481 023 |
| NitraVis® 700/5 IQ TS | as NitraVis® 700/5 IQ; with integrated TSS measurement | 481 024 |
| MIQ/VIS | Connection module for UV/VIS sensor; directly controls the valve module for compressed air cleaning | 481 029 |
| MIQ/CHV PLUS | Valve module for automatic cleaning by compressed air controlled directly via the IQ SENSOR NET bus | 480 018 |
| DIQ/CHV | Valve module for automatic compressed air cleaning for System 182; accessible by means of an DIQ/S 182 relay | 472 007 |

For information visit www.WTW.com for a customer care center near you or inside US: call WTW 800 645 5999.

TresCon® ON 210/OS 210

Nitrate Analyzer Module Nitrate/SAC Analyzer Module

- Reagent-free measuring method
- Insensitive to interfering substances
- 4-beam measuring method for optimal background compensation
- Can be used in weakly polluted water without sample preparation
- Simultaneous nitrate and SAC determination (OS 210)

| Measuring Range | | |
|--------------------|---------------------------|----------|
| | mg/l | µmol/l |
| NO ₃ -N | 0.1 - 60 | 0 - 4000 |
| NO ₃ | 0.1 - 250 | 0 - 4000 |
| SAC | 0.1 - 200 m ⁻¹ | |

Nitrate/SAC measurement

- Regulating nitrate degradation in denitrification
- Continuous monitoring of nitrate effluent values
- Organic pollution SAC (OS 210)

Measuring Principle Nitrate




The ability of nitrate ions to absorb UV light of certain wavelengths is used for measuring the nitrate. The ultraviolet light from a pulsed photoflash lamp passes through a flow-thru measuring cuvette where it is partially absorbed by the nitrate ions present in the sample flow. The intensity of the attenuated light is measured at a measuring wavelength and at a reference wavelength and evaluated electronically. The 4-beam measuring method used ensures a high degree of long-term stability and absolute accuracy; interfering background influences are efficiently compensated.

SAC measuring principle

Absorption measurement of aqueous sample in UV range. The SAC (spectral absorption coefficient) represents the organic water pollution.



Technical Data

| | | |
|-------------------------------------|---|---|
| Resolution (Display) | Nitrate: Range: 0.1 ... 100 mg/l : 0.1 mg/l 100 ... 250 mg/l : 1 mg/l SAC: 0.1 m ⁻¹ (only OS 210) |    |
| Accuracy | ±2% of the measured value ± 0.4 mg/l | |
| Coefficient of variation for method | 2% | |
| Response Time | 30 s (after alteration in concentration at module input) | |
| Measuring interval | Continuous mode and 5, 10, 15, 20, 25, 30 min intervals selectable, AutoAdapt, Interval-Program | |
| Calibration | Automatic zero balance, works calibration | |
| Sample Flow Rate | 0.5 l/hr approx., suspended solids content <50 mg/L | |
| Consumption | Distilled water, 10 l: 130 days with 24 h interval for zero balance Cleaning solution, 1.5 l: 120 days with 24 h cleaning interval | |
| Maintenance Interval | Every 6 months | |

Ordering Information

| | | Order No. |
|--|----------------------------|-----------|
| Separate TresCon® analyzer module for nitrate (+ SAC) for extension of an existing TresCon® system (requires 1 measuring place) | | |
| ON210 | Nitrate | 820 007 |
| OS 210 | Nitrate + SAC | 820 010 |
| TresCon® basic instrument with analysis module ON 210 (nitrate) or OS 210 (nitrate + SAC) (wall mounting, space for 2 further modules) | | |
| TresCon® N 211 | Nitrate | 8A-20030 |
| TresCon® S 211 | Nitrate + SAC | 8A-70030 |
| TresCon® Uno single parameter system nitrate or nitrate + SAC with analysis module ON 210 or OS 210 | | |
| TCU/N211 | TresCon® Uno nitrate | 820 102 |
| TCU/S211 | TresCon® Uno nitrate + SAC | 820 107 |
| Accessories and consumables see brochure "Product Details" | | |

For information visit www.WTW.com for a customer care center near you or inside US: call WTW 800 645 5999.

TresCon® ON 510



Nitrite Analyzer Module



IP 54



2 Years
Warranty

On-line nitrite measurement

- Observation of the nitrification process
- Monitoring nitrite effluent values
- Measurement checks in drinking water treatment
- Monitoring nitrite pollution in natural waters
- Monitoring of critical values in fish farming

Measuring Principle

The measuring principle of the NO₂ analyzer module is based on the azo dye method. A reagent reacts with nitrite to color the sample solution pink. The intensity of the pink color is proportional to the nitrite concentration in the sample and is measured by a double-beam reference photometer. An additional manual correction facility allows the system to be adapted to plant-specific characteristics so that a high degree of measuring accuracy can be achieved even with strongly colored samples.

- Continuous background compensation
- Reliable and Accurate – 2-beam reference photometer
- Selectable measuring intervals: 10, 15 or 20 min
- Can be used in weakly polluted water without sample preparation

| | Measuring Range | |
|------------------------------|-----------------|-----------|
| | mg/l | µmol/l |
| NO ₂ -N | 0.005 - 1.200 | 0.40 - 90 |
| NO ₂ ⁻ | 0.020 - 4.000 | 0.40 - 90 |

Technical Data

| | |
|-------------------------------------|---|
| Resolution (Display) | Range: 0.005 ... 1.200 mg/l : 0.001 mg/l 0.020 ... 4.000 mg/l : 0.001 mg/l 0.40 ... 90.00 µmol/l : 0.1 µmol/l |
| Accuracy | ±2% of the measured value ±0.05 mg/l NO ₂ -N |
| Coefficient of variation for method | 1% |
| Response Time | < 5 min to measured value (after alteration in concentration at module input) |
| Measuring interval | 5, 10, 15, and 20 min intervals selectable, AutoAdapt, Interval-Program |
| Calibration | Automatic 2-point calibration, time and interval selectable |
| Background Correction | Continuous background compensation based on new WTW algorithm |
| Sample input | Approx. 0.06 l/h, solid content < 50 mg/l |
| Consumption | Reagent, 1 l: 20/40/80 days with 5/10/20 min measuring interval Standard B, 1 l: 80 days with 24 h calibration interval Cleaning solution, 1.5 l: 45 days with 24 h cleaning interval |
| Maintenance Interval | Every 6 months |

Ordering Information

| | | Order No. |
|--|---|-----------|
| ON 510 | Separate TresCon® analyzer module for nitrite for extension of an existing TresCon® system (requires 1 measuring place) | 820 009 |
| TresCon® N 511 | TresCon® basic instrument with analysis module ON 510 for nitrite (wall mounting, space for 2 further modules) | 8A-30030 |
| TCU/N511 | TresCon® Uno single parameter system nitrite with analysis module ON 510 | 820 103 |
| Accessories and consumables see brochure "Product Details" | | |