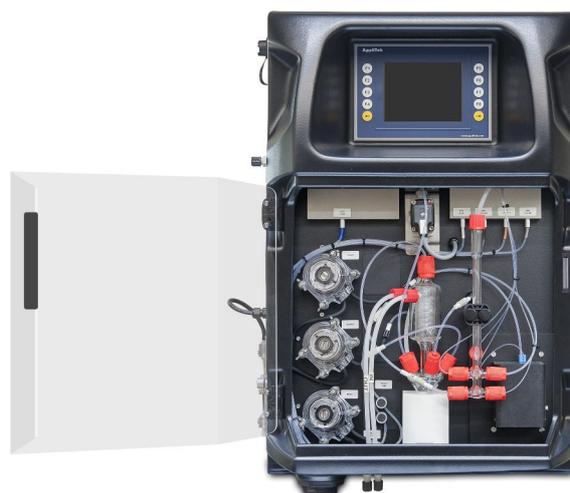


EnviroLyzer® CN

On-line Cyanide Analyzer

On-line, automatic monitoring of cyanide in surface water and industrial waste waters



Advanced features

- On-line, automatic colorimetric measurements
- Minimalistic design: small footprint, less complexity
- Complete separation between electronics and wet part
- Smart features and add-on units reduce down-time and unnecessary checks substantially
- Up to eight (8) sampling points possible
- Incorporated industrial panel PC with AppliTek controller software
- Extended data communication and exchange features

Application fields

On-line monitoring of total cyanide in clean and dirty water types:

- Drinking water monitoring
- Waste water monitoring
- Surface water monitoring

High analytical performance

- Low reagent and sample consumption by batch-wise operation principle
- Smart features: automatic calibration, automatic validation and automatic cleaning
- High sensitivity and selectivity
- Factory configured, tested and calibrated

Introduction

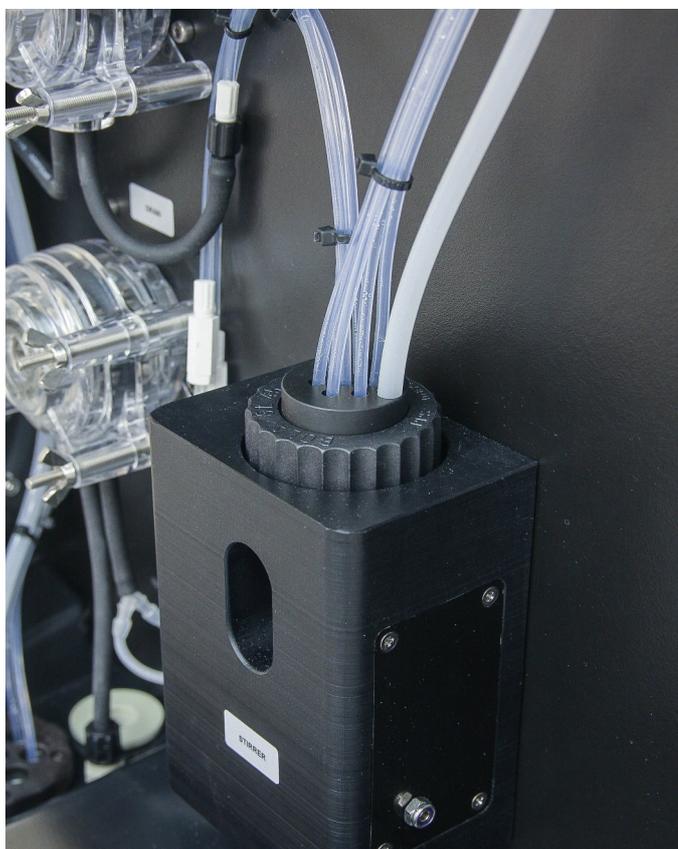
The acute toxicity and wide spread industrial usage of cyanide makes environmental testing critically important. Its chemical composition in environmental samples is affected by factors such as pH, temperature, trace metal content, and the presence of sulfur compounds.

About the EnviroLyzer Series

The **EnviroLyzer®** Series are essentially on-line colorimeters harnessing many features from our industrial, state of the art process analyzers. The flexible analyzer mainframe allows a perfect on-line duplicate of any standard/laboratory wet-chemical method, with an excellent analytical performance:

- Automatic and highly precise colorimetric measurements
- Standard smart automatic features
- Standard 4 - 20 mA signal output with alarm processing;
- Optionally multiple stream analysis

At the heart of the colorimeter there is a compact photometer assembly developed especially for the **EnviroLyzer®** Series. Consumption of reagents is reduced by low volume analysis, yet high sensitivity ($\mu\text{g/L}$ range) is assured by a long optical path length. All hardware, including the precision micro pumps used for addition of reagents, are controlled by AppliTek's controller software running on the industrial panel PC.



Image, left: photometer assembly with additional sample dilution.

Image, right: pinch valves for standard solutions and sample handling, carefully isolated from the inside part of the EnviroLyzer®.

Analysis principle

The **EnviroLyzer® CN** On-line Cyanide Analyzer runs a chemical analysis based on standard method 4500-CN using isonicotinic barbituric acid color solution. The Total CN configuration adds acid digestion and stripping step prior to analysis, conform with USEPA Method 335.4

The sample is mixed with the acid reagent and catalyst and this solution is heated in a compact built-in oven during 40 minutes, converting the cyanide compounds to HCN. This HCN is stripped from the sample with a continuous air flow and then absorbed in a NaOH solution. CN^- is converted to cyanogen chloride, which will form a red-blue color on addition of isonicotinic-barbituric acid. The photometer measures the absorption of this complex at 578 nm which is proportional to the concentration of cyanide in the sample (based on Lambert-Beer law).

Smart features

Smart features are embedded in the controller software of the **EnviroLyzer® CN** and contribute to enhanced analytical performance, minimized down-time and less human intervention.

- Sample lines, oxidation oven and analysis vessel are cleaned with demineralized water in order to eliminate cross interference.
- Automatic calibration-validation cycles with standard solutions to check analyzer functionality. These can also be inactivated and carried out manually with preprogrammed sequences.



Data exchange and supervision

The **EnviroLyzer®** mainframe uses the same incorporated high performance industrial panel PC running AppliTek's proprietary controller-database software **UPAMATIC®** to control all analysis steps, actions and logs. This fully integrated software platform not only acts as the human interface but also features a host of functions specifically designed for industrial monitoring needs. If necessary, the optional **AnaComDa®** Analyzer Communication and Data Transfer Tool can be installed in order to create a secure VPN (Virtual Private Network) connection between the client (the analyzer) and the host (PC, mobile device).

Solid state data logger recording a history of the last 1,000 analysis results

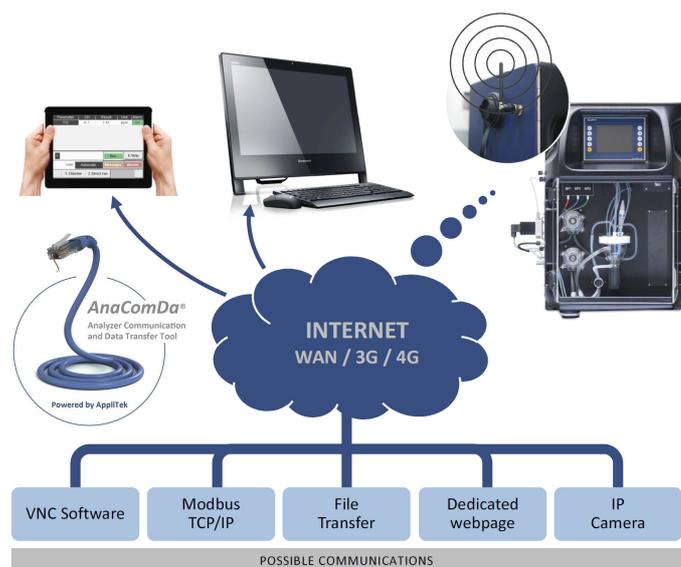
These can be visualized in a chronological data table and equally be exported as Microsoft Excel files through the sealed USB port outside the analyzer cabinet (right image).

Full integration and communication within industrial production sites and corporate networks

AppliTek on-line analyzers come with industrial standard 4-20 mA outputs. Ethernet communication by means of the TCP/IP protocol enables easy and reliable integration into existing corporate networks. MODBUS interfacing is possible to assure full integration and communication with DCS systems.

Remote access to the panel PC minimizing physical operator intervention (through VPN)

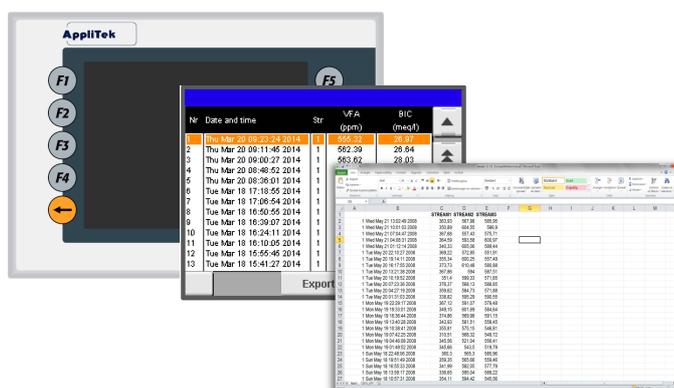
The analyzer screen can remotely be taken over by means of LAN Ethernet software (such as VNC software). Authorized users can carry out all manual operations and settings from a remote PC, such as trouble-shooting before doing any physical intervention.



The **AnaComDa®** tool allows to create a secure VPN connection to mobile networks (3G, 4G) or Wide Area Networks, giving authorized users the possibility to use e.g. Modbus TCP/IP control through a dedicated webpage or via VNC software. The tool also allows extended data logging in the cloud and visualization (connection of an IP camera). With the VPN created, FTP protocols can be used directly from a PC or a mobile device.

Analysis of multiple streams

AppliTek's integrated multiplexing unit **ModuPlex®** consists of extra solenoid valves controlled by a special valve control software. This option enables you to monitor up to 8 streams sequentially, thus reducing the cost per sampling point. Results of each stream can be communicated through individual analogue outputs. On special request we can integrate a valve train of 6 valves, doubling the number of streams that can be monitored by one single on-line analyzer.



Hardware and analyzer enclosures

The **EnviroLyzer®** Series are equipped with a new analyzer enclosure consisting of a solid steel back, combined with an ergonomic ABS hinged part with a transparent door allowing instant visual inspection of the wet-chemical part. Purging with instrument air is possible in case of extreme humidity or risk of accumulation of corrosive gases. If necessary, the analyzer can be integrated in various protective enclosures such as an IP65 rated protective cabinet for outdoor use or any hazardous atmosphere.



Technical specifications

Analytical data

Analysis method

Colorimetric measurement after acid digestion and stripping conform with USEPA Method 335.4 (total CN configuration)

Colorimetric measurement using isonicotinic barbituric acid conform with standard method 4500-CN (free cyanide configuration)

Parameter

Total cyanide

Free cyanide (without oxidation oven)

Standard measuring ranges

One single range, factory set:

0 - 100 µg/L CN

Note: higher ranges available by sample dilution

Cycle time

Free cyanide: 10 minutes

Total cyanide: 70 minutes including oxidation

Calibration

Factory calibrated (2-point)

Cleaning

Automatic, free adjustable sequence

Detection limit

Better than 1 µg/l (range 0 - 100 µg/L)

Precision / Repeatability

Better than 5% full scale for standard solutions

Mechanical data

Protection class

Analyzer cabinet: IP55

Touch screen/Industrial PC: IP65

Cabinet and materials, hinged part

Thermoform ABS

Bottom: leak detection

Door: antistatic plexiglass

Cabinet and materials, wall section

Galvanized steel, powder coated

Dimensions

69 cm (27.2") x 46.5 cm (18.3") x 33 cm (13")

(H X W X D)

Total weight

25 kg (55 lbs.)

Environmental data

Ambient operating conditions

10 °C – 30 °C +/- 4 °C deviation at 5 - 95% relative humidity non-condensing
(50 °F – 86 °F +/- 7.2 °F deviation)

Reagent temperature

Keep between 10 °C - 30 °C (50 °F - 86 °F)

Sample pressure

By external overflow vessel

Sample flow rate

10 - 30 ml per minute

Sample particulates

Maximum size 200 µm, < 0.1 g/l

Turbidity < 50 NTU

Reagents

Reagent containers (included)

Outside cabinet: 5

Containers come with torqueless screw caps.

Reagent solutions

Acid solution ≤ 3 L* / 28 days

NaOH solution ≤ 2 L* / 28 days

Buffer solution ≤ 2 L* / 28 days

Color solution ≤ 2 L* / 28 days

* Based on 1 analysis result/70 min

Calibration / validation solution

Consumption depends on pre-programmed sequence; ≤ 5 L / 28 days

Cleaning solution (recommended)

Demineralized water / specific chemical solution

Utilities

Power

220 - 240 VAC, 2 A, 50 Hz

Max. power consumption: 150 VA

Other voltages available on request

Instrument air

Dry and oil free according to ISA-S7.0.01-1996 quality standard for instrument air

Demineralized water

For rinsing, calibration and/or dilution

Drain

Atmospheric pressure, vented, min. Ø 64 mm

Earth connection

Dry and clean earth pole with low impedance (< 1 ohm) using an earth cable of > 2.5 mm²

Control and communication

User interface / controller

Industrial PC with 5.7" TFT colour user interface, compact flash memory

Backlit touchscreen, brightness adjustable

Data handling, logging and security

- Standard Ethernet 10 M (RJ45) NE 2000
- Communication ports supporting Ethernet connectivity to MODBUS TCP/IP
- Log files with 1,000 values/results are stored
- Easy export to spreadsheet files
- Sealed USB port for data or result graph download and program upload
- User interface with administrator access and menu keys activated/inactivated
- Data retention in case of power failure, initialization program for safe status after restart

Analogue outputs

Maximum 8, active 4 –20 mA

Max. 500 Ohm load

Alarms (digital outputs)

- Malfunctioning alarm (potential free contact)
- Result alarm (potential free contact)

MODBUS TCP/IP, MODBUS-RS232 -RS485

Optional

Options / add-on units

Sample preconditioning I

EZ-Size® self-cleaning filtration unit, various pore sizes available, requiring fast loop

Sample preconditioning II

MicroSize® self-cleaning microfiltration unit, various pore sizes available

Reagent level detection

Installed on reagent containers; alarms are generated by controller software

Multiple streams

ModuPlex® 2 or 3 streams (8 on demand)

Secure VPN connection

AnaComDa® remote access and data transfer

Certification

CE approval

Certified to CE approval

Factory Acceptance Test (FAT)

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Technology for Water and Environment



Siam Pollutek Co., Ltd.