



# Trace Analyzer for water

Powered by German Hardware

## GreenMon Online-Analyser

The GreenMon is a fully automatic, wet-chemical multichannel online analyser.

It detects trace concentrations in fluids.

The operating interface is especially user-friendly.

### Features:

- Newly designed Flow-Chart-Method software to program analysis cycles
- New photometer technology with high stability allows trustworthy measurements at low trace levels
- Many functions are included in the standard version, eg. Cyclical self-calibration and dilution processes
- RS-232/RS-485, LAN, CAN-bus
- Intelligent event handling via SMS, Fax or E-Mail
- Communication via TCP/IP over LAN, (optional W-LAN, GSM, GPRS and UMTS)
- Comprehensive software products are offered for archiving (SQL database), programming, visualization and real-time representation
- Administration of operation and analysis data in a MYSQL databank with data interface for integration, interrogation and further analysis of the data
- Use of wet chemical methods (Ionometry, Colorimetry, Titrimetry)
- Connection for a spectrometer
- Fully automatic operation with self-monitoring
- Compact user-friendly construction with minimal maintenance expenditure
- Actuation and control (PID) of metering pumps, metering units, valves analog and digital, PLC functionality
- Implementation of all BlueBox functions e.g. connection of external sensors and calculation of complex parameters
- Remote Control via cable, Intranet, Internet and GPRS or UMTS
- Easy maintenance due clear and easy setup and easy reachable parts.

## GreenMon Analyzer for Chemical Oxygen Demand ( COD )

The Photometer Chemical Oxygen Demand ( COD ) version of the GreenMon system comprises the following equipment:

Analyzer unit, control and measurement electronics made by the German Company GO.

Installation in the Stainless Steel cabinet with a color touch display, the chemical application, design of reagents and programming is done by GreenWorks. . Number of probe channels: 1.

### Procedure :

A sample of the water is mixed with the digestion solution and than for a given time treated in the Digester to oxidize the Organic Carbon in the sample. Digestion time is adjustable to ensure the highest possible recovery.

After the digestion the sample is cooled and then the color is measured in the photometer.

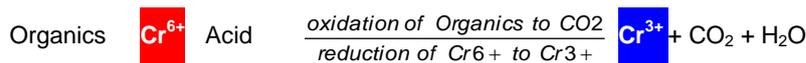
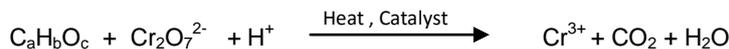
The result is compared with the calibration ( typically done with Potassium hydrogen phthalate ) and the calculated COD value is displayed.

The method follows the ASTM D 1252, USEPA method 410.4 and APHA method 5220 D method which is the mostly accepted and used method in laboratories worldwide and also in Taiwan. Interferences of Chlorides (Cl<sup>-</sup>) up to 1,000 ppm are compensated with a complexing reagent.

The smallest standard measuring range is 0 - 100 ppm and the high standard range is 0 - 500 ppm. Lower or higher ranges are possible as an option. The accuracy of the measurement follows the EPA law of Taiwan or better depending on the sample matrix.

For other ranges or sample conditions GW can adjust the reagents and procedures as an option.

### Chemistry of COD measurement:



There are two approach ways:

1. Measurement of the decrease of Cr<sup>6+</sup> (Hexavalent Chromium) at 440 nm.  
For the low concentration measurement below 500 ppm

2. Measurement of the increase of Cr<sup>3+</sup> (Trivalent Chromium) at 600 nm.  
For the high concentration measurement above 500 ppm

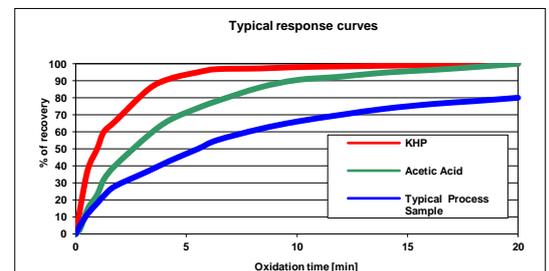
Oxygen is an important essential in the environments. If a water body is carrying excessive amounts of waste materials, the oxygen will be consumed and damage the living species in the water. This is important for the effluent of a waste water treatment plant to protect the environmental waters like rivers and lakes. But it is also important to know the COD value in the inlet of a waste water treatment plant to protect the Biological treatment from being disturbed.

Various accepted methods were issued out for determining the consumption of oxygen, include Biochemistry Oxygen Demand(BOD), Chemical Oxygen Demand(COD) and Total Oxygen Demand(TOD) . The time required for BOD testing normally needs 6 days, which is it's disadvantage.

Chemical Oxygen Demand, COD was introduced as an analytical method in an effort to reduce the inaccuracies of BOD and to provide a wastewater indication in a period of 2 hours or less. The definition is " The quantity of oxygen that certain impurities in water will consume, bases on the reduction of a dichromate solution under specified condition."

30 minutes to 2 hours reaction time make the Dichromate COD a valuable tool for analysis comparing to 5 days of BOD. Dichromate COD is the most popular governmental standard for laboratory tests in the world including Taiwan.

GreenMon Analyzer for Chemical Oxygen Demand is following this standard, operating an automated, continuous and reliable On-line COD analyzer.



Component recovery in %

Component	recovery in %	Component	recovery in %	Component	recovery in %
Aliphatic Compounds		Aromatic Compounds		Nitrogen Compounds	
Acetone	98	Acetophenone	89	Acrylonitrile	48
Acetic Acid	92	Benzaldehyde	80	Adenine	59
Acrolein	62	Benzene	60 - 98	Aniline	80
Butyric Acid	89	Dioctyl Phthalate	98	Butyl Amine	57
Dextrose	95	Diphenyl	81	Pyridine	0
Diethylene Glycol	93	o-cresol	95	Quinoline	87
Ethyl Acetate	95	Toluene	83	Trimethylamine	1
Methyl Ethyl Ketone	98	Potassium Acid Phthalate	100	Tryptophane	87
				Uric Acid	61

(Source : ASTM)