



MULTI FUNCTION ANALYSERS MFA-FLUORIDE

FOR MEASUREMENT OF FLUORIDE IN WATER

TECHNICAL INFORMATION

The new **MFA** Multi Function Analysers are a modern generation of hardware for measurement and control applications in water treatment processes. This latest development is the result of experience and co-operation within the worldwide **USF Wallace & Tiernan** Group that has produced a powerful electronic system which ensures precise measurement and stable control. Application areas range from simple measurement through to demanding closed-loop control processes for the treatment of swimming pool, drinking and process water as well as waste water. The totally new development of the **MFA** Fluoride module is designed for connection to an **ORION** fluoride electrode model 96-09.



ADVANTAGES

- modular construction
- modern user-friendly microprocessing technology with interactive menu assistance
- isolated signal inputs and outputs
- digital input for automatic monitoring of water sample
- automatic fault detection and monitoring of measuring cell
- luminescent display with adjustable display contrast
- plain-text menu assistance in 5 selectable languages
- user-adjustable limit contacts
- RS485 interface
- CE mark (89-336/EWG)
- diagnostics menu for installation and maintenance support

APPLICATION

The fluoride measurement system is used primarily for monitoring fluoridation in drinking water. Fluoridation is employed in some countries such as the USA and Australia and is a medical procedure for precaution against caries.

Therefore it is important that the content of fluoride ions be kept at a constant level of 1 mg per litre of drinking water. Lower levels are ineffective, and higher levels are considered harmful.

For potable water treatment three different fluoride chemicals are used: Sodium fluoride (NaF), sodium silicofluoride (Na₂SiF₆) and fluosilicic acid (H₂SiF₆). Many water supplies contain natural fluoride. This plus the fluoride added should total about 1 mg/l. Water has no fluoride "demand", it is not used up by elements in the water. Once applied, the established treatment level remains constant. A continuous monitoring system is recommended for all drinking water systems to prevent accidental overfeeding.

Fluoride measurement may also be used in testing natural water and mineral water, in electroplating vat, caustic baths, in the production of plastic, porcelain, fertiliser and pesticides. The fluoride sensitive electrode is also employed in determining fluoride in the pharmaceutical industry, for example the production of tooth paste. Additionally, the electrode can be used to regulate liquid industrial waste and aqueous solutions.

METHOD OF OPERATION

Sample water is taken from the process water flow and fed to the fluoride probe which is housed either in a through-flow assembly or in the **DEPLOX® 4** measuring cell. The probe delivers a millivolt signal proportional to the fluoride content via a coaxial cable to the **MFA** module.

The fluoride sensitive electrode enables fast and easy determination of fluoride in solutions as well as direct measurement of fluoride activity in a broad range of concentration. The remaining ions allow selective measurement of the fluoride, even in larger amounts, without interfering with the concentration of fluoride. The protective glass shaft of the electrode is highly resistant to chemical fluids.

The **MFA** module is used to display the measurement data and to perform functions such as limit-value monitoring and PI control.

Up to four limit values can be monitored. The adjustment of the contact limits as well as all other operating steps can be easily performed using the plain-text menu.

A RS485 interface is integrated into the **MFA** module for data exchange with PLC systems or control rooms. In addition, a special interface module MF485 allows direct output to a printer as line graphics.

USF WALLACE & TIERNAN

a U.S. Filter Company

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TECHNICAL DATA

MFA MODULE FOR MEASUREMENT OF FLUORIDE

Measuring Range:

0.2 ... 20 mg/l in two fixed measurement ranges
 (-70 mV ... +170 mV voltage input)
 Measuring range 1: 0.20 ... 2.00 mg/l
 Measuring range 2: 0.20 ... 20.00 mg/l
 Display flashes if range limits are exceeded or undershot

Accuracy:

≤ 0.5 % FS

Measurement Input:

For ORION fluoride electrode 96-09
 2 point adjustment
 Isolated up to 100 V, with respect to earth

Ambient Temperature:

0 °C ... 50 °C (not condensed)
 Storage -20 °C ... 70 °C

Analogue Output (0/4 ... 20 mA):

Output load ≤ 600 Ω, accuracy ± 0.1 % FS
 Isolated up to 500 V, with respect to earth

Switching Output:

For maximum four limit contacts or two limit contacts plus actuator drive (i.e. positioner, metering pump)
 max. 1250 VA to 250 V AC
 max. 150 W to 220 V DC

Digital Input:

(i.e. for sample water monitoring)
 Optional input 24 V, 115 V, 230 V AC
 or own supply for isolated contacts

Temperature Input (optional):

Temperature display of sample for Pt100, NTC, or AD592 sensors
 Isolated up to 100 V, with respect to earth

Interface:

RS485 asynchronous, complying with EIA RS485, DIN 66259 T4 i.e. ISO 8482, 19200 baud, non-isolated

Power Supply:

115/230 V ± 10 %, 50–60 Hz, 14 VA
 24 V DC complying with EN 61131-2

Module Dimensions (W x H x D):

76 x 129 x 175 mm (incl. contact strip)

Weight (including packing):

1.8 kg

ORION FLUORIDE PROBE (U-95799)

Concentration Range:

Saturated solution up to 10⁻⁶ M (0.02 ppm)

pH Range:

pH 5 up to pH 7 with 10⁻⁶ M (0.01 ppm)

Temperature Range:

0 °C ... + 80 °C

Probe Resistance:

150 to 200 kOhm

Repeat Accuracy:

± 2 %

Minimum Test Volume:

0.5 ml in test tube

Storage:

In calibration solution or distilled water

Probe Dimensions:

electrode length 139 mm
 shaft diameter 12 mm
 cable length 750 mm
 cap diameter 16 mm

MFA HOUSING

Can also be combined with other MFA modules, for example chlorine, pH, redox etc.

Triple wall-mounted housing

Dimensions (W x H x D): 360 x 266 x 235 mm

Weight: 2.8 kg

Enclosure: IP 66

Triple housing for panel mounting

Dimensions (W x H x D): 288 x 144 x 195 mm

Weight: 1.7 kg

Enclosure: IP 41 (IP 65 with cover)

Simple wall-mounted housing

Dimensions (W x H x D): 210 x 266 x 235 mm

Weight: 1.5 kg

Enclosure: IP 66

Simple housing for panel mounting

Dimensions (W x H x D): 144 x 144 x 195 mm

Weight: 1.2 kg

Enclosure: IP 41 (IP 65 with cover)



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