



Online Multi-Wavelength Fluorescence Monitor

MFH-100



MFH-400



MFH-100

Realized continuous on-site
fluorescence measurement
previously done in a laboratory.



MFH-400

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MFH-100

The organic substances emit specific fluorescence when excited by light energy. MFH-100/400 is a reagent-free continuous fluorescence monitor with ultraviolet excitation utilizing the characteristic of organic substances. In our conventional equipment (oil-in-water monitor, BOD monitor, and others) using the ultraviolet fluorescence method, both excitation and fluorescence wavelengths were fixed to one wavelength. However, we have designed a new spectroscopy using the grating and developed a

Features



High sensitivity measurement

Compared to absorption photometry, higher sensitivity measurement is possible. Through significant review of the optical system, the influence of coexistence components has been reduced.



Excellent operability

In addition to measurement values, trend data and spectrum data are shown on the color touch panel display.



Continuous measurement of multiple wavelengths

It is possible to measure multiple wavelengths (components). Up to three fluorescence wavelengths can be set.



Concentration conversion and turbidity correction

Fluorescence intensity is converted into concentration. Additionally, the product can convert scattered light intensity into turbidity and correct fluorescence intensity (concentration).



Spectrum measurement is possible

If there is a change in the installation site, components to be measured, or sample water conditions, it is possible to measure spectrum data and check the fluorescence peak wavelength on-site. *For MFH-400, it is also possible to measure the excitation spectrum.



Automated cleaning/zero-calibration

(optional for MFH-100)

MFH-400



Simple and easy-to-maintain structure



Overflow measurement tank

The overflow tank can be pulled out using the handle from the measuring portion and is easy to maintain.

fluorescence detector that enables voluntary setting of excitation and fluorescence wavelengths as well as spectrum measurement. This has led to the completion of a high-performance continuous fluorescence monitor that can be used with various types of sample water. Because the cell window in the optical portion does not come into contact with sample water, it has higher resistance to staining compared to the flow cell type or batch type optical cell and is ideal for the continuous monitoring of environmental, discharged, and effluent water.

MFH-100



Display

Detector

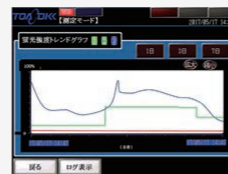
Sampling portion

Operation Screen

The color touch panel LCD has been adopted in the operating portion. It has an intuitive and easy-to-understand menu configuration.



Displaying three levels of fluorescence intensity



Trend graph



Displaying spectrum

Continuous Measurement Monitor

An overflow type measurement tank has been adopted that has many results in the turbidity meters of process analyzers. For MFH-400 and MFH-100, the electric and analysis portions are located in the upper part and the piping portion is in the lower part. The sample water line has a simple and easy-to-follow structure. For ease of maintenance, the overflow tank located in the analysis portion can be pulled out using the handle. (MFH-400 is equipped with automatic cleaning mechanism.) Further, it is possible to correct fluorescence intensity (or concentration) by turbidity based on excitation scattered light.

Measurement Principle

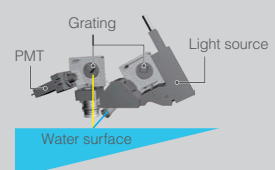
Some organic substances emit fluorescence or phosphorescence when exposed to ultraviolet light. This is a phenomenon that occurs to emit the fluorescence when organic substances return to the ground state from the excited state after the absorption of ultraviolet light energy. There is a constant relationship between absorption and emission, and some organic substances can be identified based on the combination of the wavelength of the excitation and the wavelength of the fluorescence. Utilizing this principle, MFH-400 and MFH-100 continuously monitor the organic substances contained in a sample.

For MFH-400, up to three excitation wavelengths can be set voluntarily from 200 to 700 nm.

For MFH-100, excitation wavelengths can be set to 320 and 360 nm or fixed to one.

For the fluorescence wavelength, up to three wavelengths can be set voluntarily from 200 to 700 nm in both models.

Detector in MFH-400



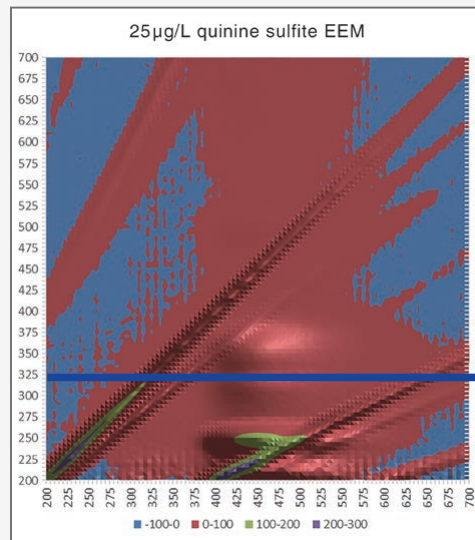
In the detector located at the top of the overflow tank of sample water, excitation light is irradiated onto the surface of sample water and fluorescence is detected with the optical receiver arranged above the excitation light irradiation point. Because the cell window of the optical portion does not come into contact with the sample water, maintenance is easy and this structure is suitable for a long-term continuous operation.



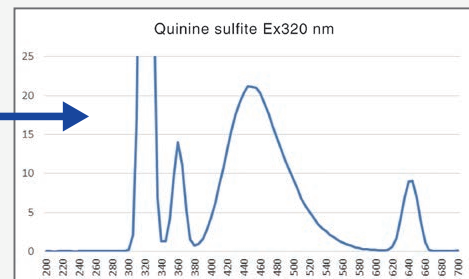
Confirm the measurement availability

To perform measurements with MFH-400 and MFH-100, it is necessary to confirm the measurement availability using laboratory equipment.

With our laboratory equipment, it is possible to examine whether measurements with MFH-400 and MFH-100 are possible using an actual sample provided by the customer. The introduction of MFH-400 and MFH-100 smoothens by confirming the measurement availability. If measurable wavelengths have been confirmed based on past results or customer's laboratory data, confirmation is not required.

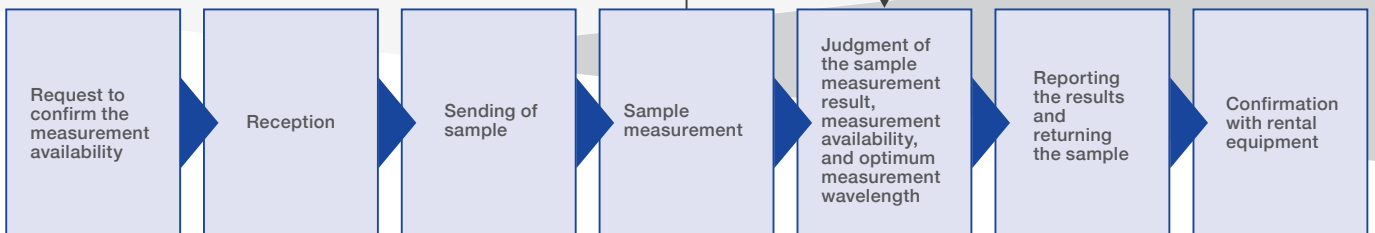


Measure the excitation emission matrix and examine the measurement availability and optimum wavelength.



Selection of optimum wavelength

EEM measurement



To avoid deterioration of a sample, we adjust the time of sending and receiving to facilitate the measurement. We ask for the provision of the components to be measured and the sample water to be used as a base or the provision of multiple samples for a fluctuating sample.

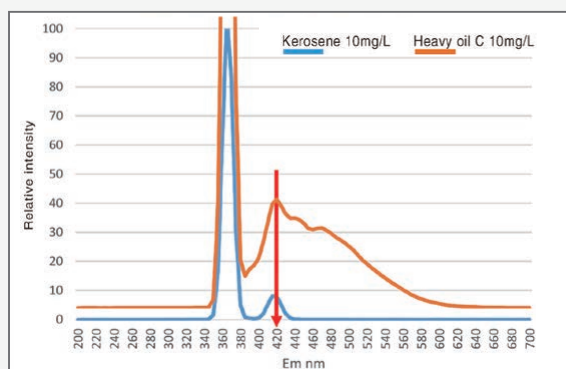
It is possible to actually examine the measurement availability using rental equipment on request.



Application Example Oil-in-water content

In the conventional oil-in-water content meter (OWF-100), measurement wavelengths sufficient for heavy oil were used to obtain the correlation with the official method of n-hexane extracts. Because the fluorescence characteristics of light oil such as kerosene are different from those of heavy oil, accurate measurement was impossible for light oil using those measurement wavelengths. However, because almost no light oil could be collected from n-hexane extracts, there was no problem maintaining the correlation with the official method. Annually there are hundreds of leakage accidents resulting from light oil such as kerosene, and there is an enduring need for light oil measurement. In the conventional single wavelength fluorescence monitor, there was a problem where the correlation with the public method of n-hexane extracts could not be obtained if commercialization was performed according to the wavelength of kerosene. However, in MFH-400 and MFH-100, up to three fluorescence wavelengths can be set. Therefore it is possible to obtain both the measurement values correlated to n-hexane extracts and the measurement values of light oil, such as kerosene, by monitoring each wavelength for heavy oil and light oil.

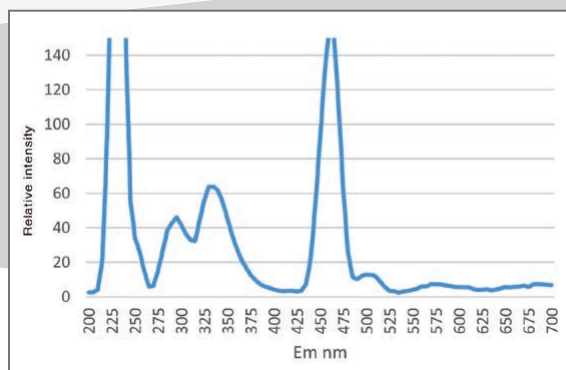
Fluorescence spectrum by OWF100 excitation wavelength



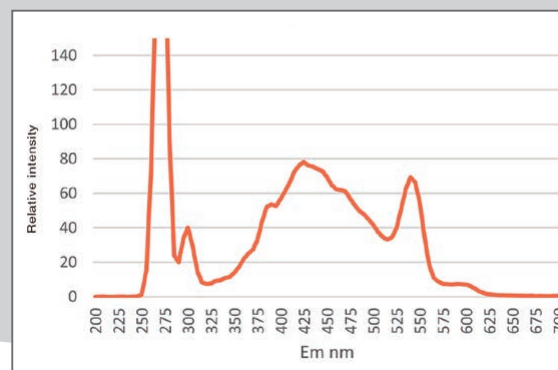
Remaining amount in association with evaporation of hexane

Oil type	Remaining amount (yield) %
Heavy oil A	11.8
Heavy oil B	67.7
Heavy oil C	64.5
Light oil	7
Kerosene	0.2

Kerosene 10 mg/Fluorescence spectrum L



Heavy oil C 10 mg/Fluorescence spectrum L



Other Application Example

The fluorescence monitor is applicable for effluent water and environmental water of BOD and chlorophyll in addition to the above oil. Detection of leakage and systemic leakage by continuous monitoring of a fluorescence reagent added to the substance to be measured.

Specifications

Measurement target: Fluorescence in sample water
Measurement method: Non-contact, reagent-free fluorescence method
Measurement range: Fluorescence intensity; 0 to 1,000 mV, Concentration; 0.0 to 1,000.0
Unit: mg/L, g/L, FTU, degree, no unit
Measurement: Fluorescence intensity and concentration; continuous spectrum; batch
Display: Fluorescence intensity, concentration, fluorescence spectrum, excitation spectrum (only for MFH-400), trend graph
Measurement wavelength: Excitation
 MFH-100 320 nm, 360 nm, or fixed wavelength specified by the user
 MFH-400 200 to 700 nm Fluorescence 200 to 700 nm
 * When the wavelength difference between excitation and fluorescence is 80nm or less, it may be greatly affected by turbidity.
Linearity: Within $\pm 5\%$ FS
Repeatability: Within $\pm 5\%$ FS
Drift: Within $\pm 5\%$ FS
Response time: Within 3 minutes
Warm-up time: About 2 hours
Output signal
Measurement value signal: DC 4 to 20 mA Load resistance 600 or less
 Three-point fluorescence intensity; 1 to 3, Concentration; 1 to 3, Select from sample water temperature.
Contact point output: Contact point capacity 30 VDC 0.1A Resistance load MFH-100; 6 points MFH-400; 9 points During instrument abnormality, sample water shut-off, maintenance Fluorescence intensity upper limit alarm (1 to 3), Concentration upper limit alarm (1 to 3), Select from during automated cleaning, automated zero calibration, and power shut-down.

Input signal:
Contact point input: Contact point capacity 30 VDC 50 mA or more MFH-100; 3 points MFH-400; 4 points Select from cleaning and zero calibration.
Sample water conditions: Flow rate; 2 to 7 L/min (fluctuation range; within 1 L/min) Water pressure; 0.05 to 0.75 MPa Water temperature; 0 to 45 C (shall not freeze)
Tap water conditions: Flow rate; 2 to 5 L/min (fluctuation range; within 1 L/min) Water pressure; 0.2 to 0.7 MPa
Power source: 100 to 240 VAC 50/60 Hz
Power consumption: 120 VA maximum 80 VA on average (100 VAC)
Dimensions: MFH-100; About 450 (W) x 517 (D) x 1,502 (H) mm MFH-400; About 685 (W) x 450 (D) x 1,500 (H) mm
Weight: MFH-100; About 40 kg MFH-400; About 90 kg

MFH-100 packing list

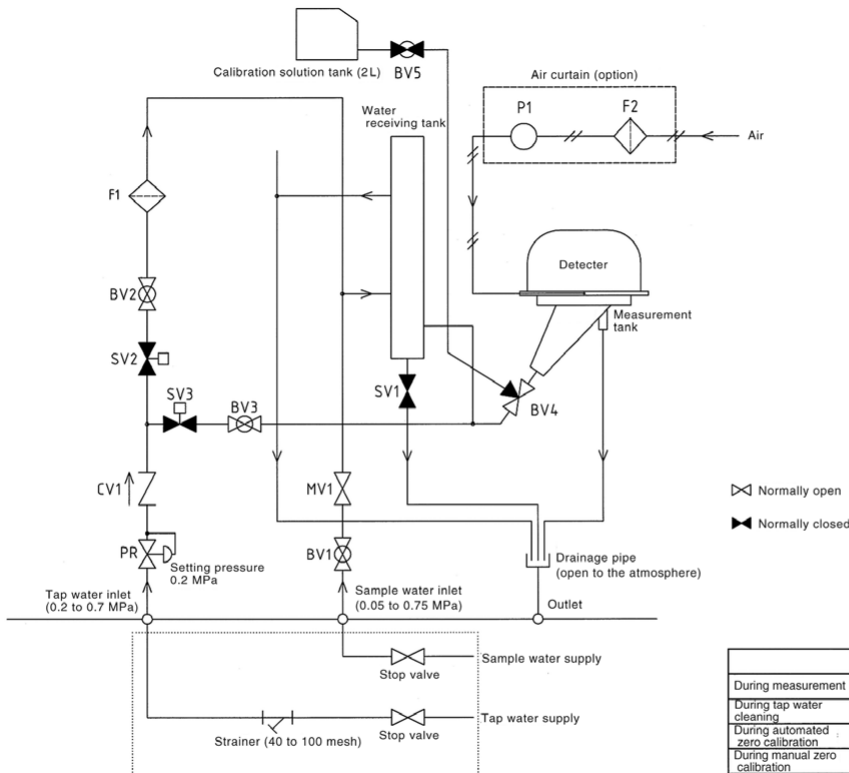
Substance to Be Measured	CH1	CH2	CH3	Excitation wavelength	Note
1 : BOD 0~20mg/L	BOD 0~20mg/L	Spare	Spare	320nm	BWF100 successor (with 150µg/L quinine sulfate solution)
2 : Oil-in water content (n-hexane extract) 0~10mg/L	Oil-in water content 0~10mg/L	Spare	Spare	360nm	OWF100 successor (with 100µg/L uranium solution)
3 : Oil-in water content (light oil)	Oil-in water content	Spare	Spare	Specified	Please specify the measuring wave length, range and standard reference material.
4 : Oil-in water content (steelmaking process)	Oil-in water content	Spare	Spare	Specified	
5 : Oil-in water content (Other)	Oil-in water content	Spare	Spare	Specified	
6 : Algae	Algae	Spare	Spare	Specified	
7 : Chlorophyll	Chlorophyll	Spare	Spare	430~450nm	

Turbidity can be set to CH2 or CH3

*Please contact our sales staff regarding rental equipment.

Measurement Flowchart

MFH-400



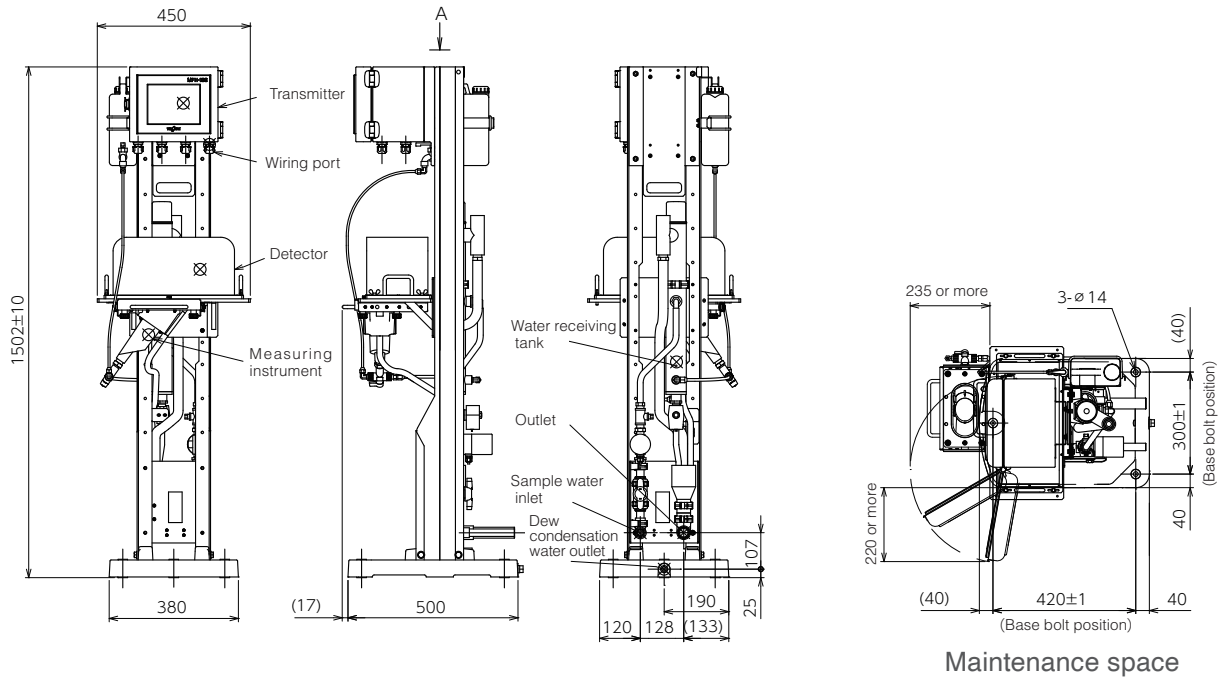
Code	Name	Remarks
BV1	Sample water flow rate regulating valve	2-7L/min
BV2	Zero water flow rate regulating valve	2-5L/min
BV3	Cleaning water flow rate regulating valve	2-5L/min
BV4	Calibration solution supply valve	
BV5	Calibration solution flow rate regulating valve	
PR	Pressure reducing valve	
CV1	Check valve	
SV1	Drainage electromagnetic valve	
SV2	Zero water supply electromagnetic valve	For automated zero calibration
SV3	Cleaning water supply electromagnetic valve	Sample water flow rate regulating valve
MV1	Sample water supply electromagnetic valve	
F1	Zero filter	
F2	Air filter	
P1	Air pump	

◻ Normally open
 ◼ Normally closed

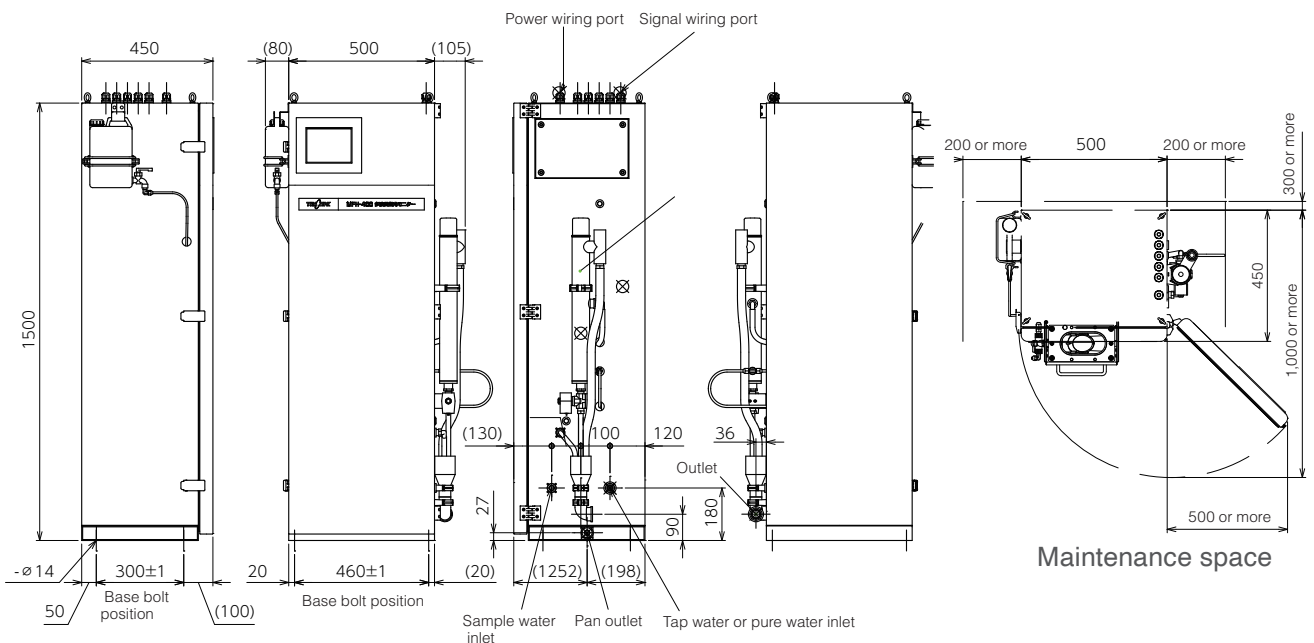
	BV1	BV2	BV4	MV1	SV1	SV2	SV3
During measurement	0	0	0	0	◻	◻	◻
During tap water cleaning	0	0	0	0	◻	◻	◻
During automated zero calibration	0	0	0	◻	◻	◻	◻
During manual zero calibration	0	0	◻	◻	◻	◻	◻

Dimensional Drawing Unit: mm

MFH-100



MFH-400



Related Equipment

Clean water absorption meter COL-1600

- Adopting three-wavelength absorption photometry
- High sensitivity measurement by 100 mm optical cell for water distribution and 50 mm optical cell for raw water
- Equipped with the automated cell cleaning mechanism with cleaning water and ozone
- Including the conversion function based on COD/TOC coefficients as standard equipment

Measurement range

UV: 0 to 0.5 Abs, 0 to 0.05 Abs
(10 mm cell conversion)
Color: 0 to 5/10 degree
Turbidity: 0 to 2/4 degree



Automated process analyzer XAT-300 series

- Analyzer for automating analysis methods such as absorption photometry, titration, and ion electrode
- Full automation is possible including sampling, dilution, measurement, cleaning, concentration calculation, and data transmission.

Measurement range

Level of silica, copper ion, hydrogen peroxide, phenol, alkali
(capacitance method batch titration method) and others.
Measurement based on the customer's specifications.



Portable water quality meter WQC-24

- With three types of sensor modules, simultaneous measurement is possible for up to 11 items: pH, DO, conductivity, turbidity, temperature, salinity, TDS (total dissolved solid quantity), specific gravity of sea water, water depth, ORP, chlorophyll, and ion (F^- , Cl^- , NO_3^- , Ca^{2+} , K^+ , NH_4^+).
- Measurement is possible at a water depth of 100 m.
- Standard sensor module diameter: 45 mm
- Data sampling is possible for one month maximum.



Chlorophyll sensor
module configuration



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CAUTION Please read the operation manual carefully before using products.