

GB Turbidity Meter

● Operation



Switch the unit on using the ON/OFF switch

t 1

The display shows the following:



Select measuring range using the MODE key:

T1 → T2 → T3 → T4 → T1 → (Scroll)

Measuring range T1: 0 - 2 NTU

Measuring range T2: 2 - 20 NTU

Measuring range T3: 20 - 200 NTU

Measuring range T4: 200 - 2000 NTU

RANGE

The display shows the following:

Rinse and fill a clean and dust-free vial with the water sample up to the mark (pour the sample along the inner wall of the vial to avoid air bubbles, see Note 4). Screw the cap on and align the ▽-mark on the vial with the Δ-mark on the instrument. Close the sample chamber using the sample chamber cover.



Press the ZERO/TEST key.

RANGE

The measuring range symbol flashes for approx. 9 seconds.

RESULT

The display shows the result in formazin NTU turbidity units.

If the ambient temperature of the last calibration does not deviate by more than $\pm 3^{\circ}\text{C}$ from the current ambient temperature, the measurements are accepted by the unit. If the temperature changes are greater than this, the unit must be re-calibrated.

SEt

If re-calibration is necessary, the display shows the following:

Performance of analysis with reduced accuracy:

Press the ZERO/TEST key again.

Re-calibration:

see calibration mode

● User messages

E0I

Light absorption too great. Reason - e.g. dirty optics.

+Err

Measuring range exceeded (E 24: Hardware limitation).

-Err

Result below the lowest limit of the measuring range.

LO BAT

Replace 9 V battery immediately, no further analysis possible.

● Technical data

Optics: LED, ($\lambda = 875 \text{ nm}$)

Battery: 9 V-block battery (Life 600 tests)

Auto-OFF: Automatic switch-off approx. 5 minutes after last keypress

Ambient conditions: 5-40°C
30-90% rel. humidity (non-condensing)

CE: DIN EN 55 022, 61 000-4-2, 61 000-4-8,
50 082-2, 50 081-1, DIN V ENV 50 140, 50 204

Measuring Range: 0-2 NTU 2-20 NTU 20-200 NTU 200-2000 NTU

Resolution: 0,1 NTU 0,1 NTU 1 NTU 1 NTU

Accuracy: $\pm 0,2 \text{ NTU}$ $\pm 1 \text{ NTU}$ $\pm 5 \text{ NTU}$ $\pm 50 \text{ NTU}$

● Notes

- The vial must be clean and dry (free of dust) before starting the analysis. Clean the inside and outside of the vial using a clean fuzz-free cloth. Fingerprints or droplets of water as well as scratches on the sides of the vial can result in errors.
- Once it has been filled to the marking, the vial must be positioned in the sample chamber in such a way that the graduation with the white triangle facing towards the housing mark.
- Tests must be carried out using closed vials. **Always use black vial caps.** Completely cover the sample chamber with the sample chamber cover.
- Bubbles on the inside of the vial may also lead to errors.
- Avoid spillage of water in the sample chamber. If water should leak into the housing of the turbidity meter, it can damage electronic components and cause corrosion.
- Keep sample chamber always closed.
- Contamination of the optical components such as light source and photo sensor in the sample chamber can result in errors.

Check the condition of the optics at regular intervals. For cleaning use a moist cloth and cotton buds.

Re-calibrate the unit each time it has been cleaned.
- Large temperature differentials between the turbidity meter, the sample and the operating environment can lead to incorrect measurement due to, for example, the formation of condensate in the area of the lens or on the vial.
- Vials and caps should be cleaned thoroughly **after each analysis** to prevent errors being carried over. Even minor residues can cause errors in the test results.
- To avoid errors caused by stray-light do not use the instrument in bright sunlight.

● Method notes

Non-dissolved, finely dispersed substances in liquids (media) cause turbidity. An incident light beam is scattered unevenly in all directions by the existing turbidity. The scatter of the incident **infrared** light is measured in standardised manner **at an angle of 90°**.

● Supplied turbidity standards

Measuring range-based turbidity standards are used for calibration of the unit.

The turbidity standards for the measuring ranges

T1	1 NTU
T2	10 NTU
T3	100 NTU
T4	1000 NTU

are supplied in vials. These pre-filled vials with the turbidity standards generally suffice for the purpose of calibration. Changed optical properties of the measuring vials (e.g. extremely fine scratches) have a considerable effect on the measuring results, particularly in the measuring ranges T1 and T2. To ensure that the specific accuracy is achieved, it is therefore necessary to perform measurements in the ranges T1 and T2 using the vial used for calibration of the unit. To this end, the standard for calibration is poured into a clean, dry measuring vial. The measuring vial used for calibration is identified by a black dot on the white triangle. We advise you to retain this method of marking.

In contrast to formazin turbidity standards, these secondary standards are neither toxic nor potentially carcinogenic.

The turbidity standards have a shelf life of one year.

The turbidity standards have been tested and approved by:

- EPA Federal Registry, Vol. 47, No. 42, March 1982
- Standard Methods of Water and Wastewater, APHA-AWWA-WPOC F, 16th and 17th Edition
- Annual Book of ASTM Standards, Standard Test Method for Turbidity of Water, D 1889-88a, June 24, 1989
- Subcommittee Report, American Society of Brewing Chemists, 1986
- Analytica - EBC, 4th Edition, 1987, Brauerei - und Getränke-Rundschau, Zürich

● Calibration Mode (for supplied standards with defined values)



Press MODE key and **keep it depressed**.



Switch unit on using ON/OFF key,
Release MODE key after approx. 1 second.

CAL

Press MODE key to change the measuring range:
CAL T1 → CAL T2 → CAL T3 → CAL T4 → (Scroll)

t1

Position vial (with required standard - see "Supplied turbidity standards") with alignment of ∇ and Δ marks. Close the sample chamber using the sample chamber cover.



Press the ZERO/TEST key.

≡ RANGE ≡

The measuring range symbol flashes for approx. 9 seconds.

: :

The display shows the following:
(confirmation of calibration (adjustment))



Switch the unit off using the ON/OFF key. The new correction factor is stored.

● User messages

E 10 Calibration factor "out of range"

E 71 T1: User calibration incorrect / erase

E 73 T2: User calibration incorrect / erase

E 75 T3: User calibration incorrect / erase

E 77 T4: User calibration incorrect / erase

cAL After calibrating on the interim values there will appear "cAL" when new calibrating as an indication to the former used calibration mode

● Calibration Mode (for interim values)



Press MODE and ZERO/TEST keys and **keep them both depressed**.



Switch unit on using ON/OFF key, release MODE and ZERO/TEST keys after approx. 1 second.

CAL

Press MODE key to change the measuring range:
CAL T1 → CAL T2 → CAL T3 → CAL T4 → (Scroll)

t 1

Rinse and fill a clean and dust-free vial with the standard up to the mark (pour the standard along the inner wall of the vial to avoid air bubbles, see Note 4). Screw the cap on and align the ∇-mark on the vial with the Δ-mark on the instrument. Close the sample chamber using the sample chamber cover.



Press the ZERO/TEST key.

≡ RANGE ≡

The method symbol flashes for approx. 9 seconds.

RESULT

The result is shown in the display, alternating with CAL.

CAL

If the result corresponds with the value of the calibration standard used (within the tolerance quoted), exit calibration mode by pressing the ON/OFF key.



Otherwise, pressing the MODE key once increases the displayed value by 1 digit.



Pressing the ZERO/TEST key once decreases the displayed value by 1 digit.

CAL

Press the relevant key until the displayed value equals the value of the calibration standard.

RESULT + x



By pressing the ON/OFF key, the new correction factor is calculated and stored.

: :

Confirmation of calibration (3 seconds).
The unit then switches itself off.