

● **Operation**



Switch the unit on using the "power" switch.

F

The display shows the method. Press the "mode" key until the desired method is displayed.

Use the adapter for the 16 mm vial. Fill a clean vial with 5 ml of the water sample, screw the cap on and place in the adapter/sample chamber with the **I** vial mark aligned with the Δ housing mark.



Press the "zero/test" key.



The method symbol flashes for approx. 3 seconds.

0.0.0

Confirms zero calibration.

After zero calibration is completed, remove the vial from the adapter/sample chamber. Add the appropriate reagent solution (see "Method Preparation"); a color will develop in the sample. Cap the vial again and place in the adapter/sample chamber with the **I** and Δ marks aligned.



Press the "zero/test" key.



The method symbol flashes for approx. 3 seconds.

RESULT

The result appears in the display.

Repeating the analysis:

Press the "zero/test" key again.

New zero calibration:

Press the "mode" key until the desired method symbol appears in the display again.

● **User messages**

E0I

Light absorption too great. Reasons: zero calibration not carried out or, possibly, dirty optics.

±Err

Measuring range exceeded or excessive turbidity.

-Err

Result below the lowest limit of the measuring range.

LO BAT

Replace 9 V battery, no further analysis possible.

● **Technical data**

Light source: LED: $\lambda = 580 \text{ nm}$
 Battery: 9 V-block battery (Life 600 tests).
 Auto-OFF: Automatic switch off occurs approx. 5 minutes after a key was last pressed.
 Ambient conditions: 5-40°C
 rel. humidity (non-condensing).
 Compliance: 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
 FCC Part 15 Class A
 ICES – 003 Issue 2

● **Fluoride 0.05 - 2.0 mg/l F⁻ Method Preparation**
For USEPA regulatory use, valid range 0.1 - 1.4 mg/l F⁻

0.0.0

Perform zero calibration (see "Operation")

Remove the vial from the adapter/sample chamber. Add 1 ml of SPADNS Reagent*. Screw the cap on swirl vial to mix and replace in the sample chamber. Making sure the **I** and Δ marks are aligned.



Press the "zero/test" key.



The method symbol flashes for approx. 3 seconds.

RESULT

The result is shown in the display in mg/l F⁻.

Tolerance: 0.05 – 1.5 mg/l: $\pm 0.10 \text{ mg/l F}^-$
 > 1.5 – 1.75 mg/l: $\pm 0.20 \text{ mg/l F}^-$
 > 1.75 – 2.0 mg/l: $\pm 0.40 \text{ mg/l F}^-$

Test results inbetween 1.4 and 2.0 mg/l can have a much bigger tolerance and should be verified with a diluted sample (1:1).

***Note:** SPADNS Reagent contains sufficient Arsenite to remove up to 10 ppm of residual chlorine contamination. See supplied standards and reagents section for more information.

● **Calibration Standards**

Standards for calibration should be prepared similar to samples.

● **Method notes**

Observe application options, analysis regulations and matrix effects of methods. Reagent solution are designed for use in chemical analysis only and should be kept well out of the reach of children.

If necessary, request material safety data sheets.

Ensure proper disposal of reagent solutions.

● **Avoiding errors in photometric measurements**

1. Vials, caps and stirring rods should be cleaned thoroughly **after each analysis** to prevent carry over errors. Even minor reagent residues can cause errors in the test results. Use the brush provided for cleaning.
2. The outside of the vial must be clean and dry before starting the analysis. Fingerprints or droplets of water on the sides of the vial can result in errors.
3. Zero calibration and test must be carried out with the same vial since there may be slight differences in optical performance between vials.
4. The vials must be positioned in the vial compartment for zero calibration and test with the graduations facing toward the housing mark.
5. Always perform "Zero calibration" and "Test" with capped vials.
6. Bubbles on the inside of the vial may also lead to errors. In this case, cap the vial and remove bubbles by swirling the contents before starting test.
7. Avoid spilling of water into the vial compartment. If water should leak into the photometer housing, it can damage electronic components and cause corrosion.
8. Contamination of the windows over the light source and photo sensor in the vial compartment can result in errors. If this is suspected check the condition of the windows.
9. Large temperature differentials between the photometer 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.
10. For best results, pipette all samples, standard, and reagent volumes. Maintain the same temperature for calibration and sample measurement.
11. Arsenite is a toxic substance, dispose of reagent properly according to local regulations.

● **Supplied standards and reagents**

1. SPADNS Reagent is required in each sample or standard.
2. Additional Arsenite solution may be required for samples/standards containing more than 10 ppm residual chlorine contamination, use Orion AC20A9 Arsenite solution.
3. Best results are obtained if each lot of SPADNS is calibrated with the standards provided. See "Method Preparation" and "Calibration".
4. Reorder: Orion AC2009 - SPADNS Reagent with Fluoride Standards Kit, Orion AC20A9 - Arsenite solution.

● **Calibration Mode (for supplied standards with defined values)**



Press and hold "mode" key.



Switch unit on using "power" key.
Release "mode" key after approx. 1 second.

CAL
F

These messages will alternate in the display.
If necessary, press "mode" key until the desired method alternates with CAL.

Perform zero calibration (see "Operation"). Instead of the sample use only 0 mg/l F standard.



Press the "zero/test" key.



The method symbol flashes for approx. 3 seconds.

0.0.0

Confirms zero calibration.

Pipette 1 ml of SPADNS Reagent to 0 mg/l F standard.
Add 1 drop of Arsenite solution if samples contain residual chlorine. Label as 0 mg/l F W/SPADNS.
Align the of **I** and **Δ** marks.



Press the "zero/test" key.



The method symbol flashes for approx. 3 seconds.

FO

The display confirms the 1st value.

Position vial 1.00 mg/l F-standard - W/SPADNS (prepared similarly to 0 mg/l F W/SPADNS) to align the **I** and **Δ** marks.



Press the "zero/test" key.



The method symbol flashes for approx. 3 seconds.

F1

Confirms calibration.



Switch the unit off using the "power" key. The new calibration is stored.

● **User calibration : cAL**
Factory calibration : CAL

The unit can be reset to the factory calibration as follows:



Press and hold both "mode" and "zero/test" together.



Switch the unit on using the "power" key. Release "mode" and "zero/test" keys after approx. 1 second.

The following messages will alternate in the display.

SEL

The unit is reset to factory settings.

CAL

(SEL stands for Select)

or:

SEL

The unit operates with a calibration performed by the user. (If the user calibration is to be retained, switch the unit off using the "zero/test" key.)

cAL



Factory calibration is activated by pressing the "mode" key. The following messages will alternate in the display:

SEL

CAL



Switch the unit off using the "power" key.

● **User notes**

E 10

Calibration factor "out of range"

E 70

Factory calibration incorrect / erased

E 71

User calibration incorrect / erased

Technical changes without notice
Printed in Germany.