Thermo ELECTRON CORPORATION

Orion AQUAfast® II Photometer Ammonia

● Operation

power	Switch the unit on using the "power" switch
A1	This display shows the method range.
mode	Select analysis using the "mode" key: A1 → A2 → other methods → A1 → ..... (Scroll)
METHOD	The display shows the selected method.
	Fill a clean vial with the sample up to the 10 ml mark, screw the cap on, and place in the sample chamber with the ∇ vial mark aligned with the Δ housing mark.
zero test	Press the "zero/test" key.
METHOD	The method symbol flashes for approx. 3 seconds.
0.0.0	Confirms zero calibration.
	After zero calibration is completed, remove the vial from the sample chamber. The characteristic color starts to appear after the addition of the reagent tablet(s) (see "Method Preparation"). Cap the vial again and place in the sample chamber with the ∇ and Δ marks aligned.
zero test	Press the "zero/test" key.
METHOD	The method symbol flashes for approx. 3 seconds.
RESULT	The result appears in the display.
	Repeat the analysis: Press the ZERO/TEST key once again. **New zero calibration:** Press the MODE key until the desired method symbol appears in the display again.

● User messages

EOI	Light absorption too great. Reason - e.g. soiled lens.
÷Err	Measuring range exceeded or excessive turbidity.
-Err	Result below measuring range limit.
LO BAT	Replace 9 V battery immediately; no further analysis are possible.

● Technical data

Optics:	LED: λ = 660 nm
Battery:	9 V block battery (life = approx. 600 tests)
Auto-OFF:	Auto unit switch-off occurs approx. 15 minutes after a key was last pressed.
Ambient conditions:	5-40°C 30-90% 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

● Ammonia A1 0.05 - 1.0 mg/l N Method Preparation

0.0.0	Perform zero calibration (see “Method Operation”). Add one AMMONIA No. 1 tablet straight from the foil to the 10 ml sample, and crush using a clean stir rod. Add one AMMONIA No. 2 tablet straight from the foil to the same sample and crush using a clean stir rod. Allow to dissolve completely, cap the vial, and align with the ∇ and Δ marks. **Wait for a color reaction time of 10 minutes!** [3]
zero test	Press the "zero/test" key.
A1	The method symbol flashes for approx. 3 seconds.
RESULT	The result is shown in the display in mg/l N (ammonia as nitrogen). **Measuring tolerance:** ± 0.05 mg/l N

● Ammonia A2 (0.5 - 10.0 mg/l N)

A2	The display shows the selected method: Pour 1 ml of the sample into a clean vial and fill to the 10 ml mark with deionized water. Cap the vial, and place in the sample chamber with the ∇ and Δ marks aligned.
zero test	Press the "zero/test" key.
METHOD	The method symbol flashes for approx. 3 seconds.
0.0.0	Confirms zero calibration. Add one AMMONIA No. 1 tablet straight from the foil to the prepared vial, and crush using a clean stir rod. Add one AMMONIA No. 2 tablet straight from the foil to the same sample and crush using a clean stir rod. Allow to dissolve completely, cap the vial, and align with the ∇ and Δ marks. **Wait for a color reaction time of 10 minutes!** [3]
zero test	Press the "zero/test" key.
A2	The method symbol flashes for approx. 3 seconds.
RESULT	The result is shown in the display in mg/l N (ammonia as nitrogen). **Measuring tolerance:** ± 0.5 mg/l N

● Calibration Standards

Standards for calibration should be prepared similar to samples.

● Conversions

The displayed result (in the form of N) can be converted as follows:

NH_3 = N x 1.22

NH_4 = N x 1.29

● Notes

1. Always adhere to the sequence of tablet addition.
2. The AMMONIA No. 1 tablet does not fully dissolve until the AMMONIA No. 2 tablet has been added.
3. The temperature of the sample is important for color. At temperatures below 20°C, the **color reaction time is 15 minutes!**

● Method notes

Observe application options, analysis regulations and matrix effects of methods. Reagent tablets 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.

● Calibration mode

mode — Press and hold "mode"key.

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

CAL / A1 — These messages will alternate in the display.
If necessary, press MODE key until the desired method alternates with CAL.

zero test — Perform zero calibration (see "Operation").
Press the "zero/test" key.

METHOD — The method symbol flashes for approx. 3 seconds.

0.0.0 / CAL — These messages will alternate in the display:

zero test — Place the calibration standard to be used in the sample chamber with the Δ and ∇ marks aligned (see "Method Preparation"). Press the "zero/test" key.

METHOD — The method symbol flashes for approx. 3 seconds.

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

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

mode / zero test — 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 / RESULT ÷ x — Press the relevant key until the displayed value equals the value of the calibration standard.

power — By pressing the "power" key twice, the new correction factor is calculated and stored in the user calibration software.

: : — Confirms calibration (3 seconds).

● Note

It is not necessary to make a calibration of the A2-range as the software refer to the calibration of the A1-range.

CAL — Factory calibration active.

cAL — Calibration has been set by the user.

● Recommended calibration values

Ammonia A1: between 0.3 and 0.5 mg/l N

● User calibration : cAL
Factory calibration : CAL

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

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

power — 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 / CAL — The unit is reset to factory settings.
(SEL stands for Select)

or:

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

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

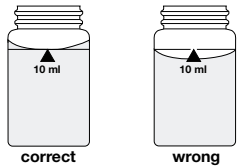
SEL / CAL

power — Switch the unit off using the "power" key.

● User messages

E 10	Calibration factor “out of range”
E 70	Factory calibration incorrect / erased
E 71	User calibration incorrect / erased

● Correct filling of the vial



● Avoiding errors in photometric measurements

1. Thoroughly clean vials, caps and stir rod **after each analysis** in order to prevent carry-over errors. Even minute reagent residues lead to incorrect measurements. Use the supplied brush for cleaning.
2. Ensure that the outer walls of the vials are dry and clean before performing the analysis. Fingerprints or water droplets on the light entry surfaces of the vials lead to incorrect measurements.
3. “Zero calibration” and “Test” must be performed using the same vial, since different vials can possess slightly different tolerances.
4. For “Zero calibration” and “Test”, ensure that the vial is always positioned in the sample chamber in such a way that the graduation with the white triangle points toward the marking on the housing.
5. Always perform “Zero calibration” and “Test” with capped vials.
6. Bubbles on the inside walls of the vial lead to incorrect measurements.

   To prevent this, cap the vial and remove the bubbles by swirling the vial before performing the test.
7. You must prevent water from penetrating into the sample chamber. The entry of water into the housing of the photometer can destroy electronic components and lead to corrosion damage.
8. Soiling of the lens (LED and photosensor) in the sample chamber leads to incorrect measurements.

   Check - and if necessary clean - the light entry surfaces of the sample chamber at regular intervals. Clean using a moist cloth and cotton balls.
9. Always add the reagent tablets to the sample straight from the foil without touching them with your fingers.
10. Major temperature differentials between the photometer and the environment can lead to incorrect measurements - e.g. due to the formation of condensate in the area of the lens or on the vial.

    Specified tolerances at T = 20 °C.
11. For best results pipette samples.

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