Thermo ELECTRON CORPORATION — Orion AQUAfast® II Photometer Copper LR

● Operation

power — Switch the unit on using the "power" switch

Cu — This display shows the method. Press the "mode" key until the desired method is displayed.

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

EOl	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 = 580 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

● Copper LR 0.02 - 1.0 mg/l Method Preparation

0.0.0 — Perform zero calibration (see "Operation").
Add one COPPER / ZINC LR-tablet straight from the foil to the 10 ml sample, and crush using a clean stir rod, allow to dissolve completely, cap the vial.

Wait for a color reaction time of 5 minutes!

Add one EDTA-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 the ∇ and Δ marks.

zero test — Press the "zero/test" key.

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

RESULT — The result is shown in the display in mg/l Cu^{2+}

Measuring tolerance: ± 0.05 mg/l Cu^{2+}

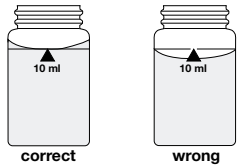
● Calibration Standards

Standards for calibration should be prepared similar to samples.

● Notes

1. The tablets must be added in the correct sequence.
2. If the sample is zinc-free, it is not necessary to add a EDTA-tablet.

● Correct filling of the vial



● 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.

● Avoiding errors in photometric measurements

1. Thoroughly clean vials, caps and stir rods **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 can 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.

● Calibration mode

mode — Press and hold "mode" key.

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

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

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

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

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

If the result corresponds to the value of the standard used (within the allowed tolerance), exit calibration mode by pressing the "power" key.

mode — Pressing the "mode" key once increases the displayed result by 1 digit.

zero test — Pressing the "zero/test" key once decreases the displayed result by 1 digit.

CAL — Continue pressing the keys until the displayed result
RESULT ÷ x corresponds to the value of the standard used.

power — If you press the "power" key twice, the new correction factor is calculated and stored in the user calibration level.

: : — Confirms calibration (3 seconds).

● Note

CAL	Factory calibration active.
cAL	Calibration has been set by the user.

● Recommended calibration value

Copper: between 0.2 and 0.4 mg/l Cu^{2+}

● 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 notes

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

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