



Aluminium T

M40

0.01 - 0.3 mg/L Al

AL

Eriochrom Cyanine R

## Instrument specific information

The test can be performed on the following devices. In addition, the required cuvette and the absorption range of the photometer are indicated.

| Instrument Type   | Cuvette | $\lambda$ | Measuring Range    |
|---|---------|-----------|--------------------|
| MD 100, MD 600, MD 610,<br>MD 640, MultiDirect, PM 620,<br>PM 630 | ø 24 mm | 530 nm    | 0.01 - 0.3 mg/L Al |
| XD 7000, XD 7500  | ø 24 mm | 535 nm    | 0.01 - 0.3 mg/L Al |

## Material

Required material (partly optional):

| Reagents                           | Packaging Unit | Part Number |
|------------------------------------|----------------|-------------|
| Aluminium No. 1                    | Tablet / 100   | 515460BT    |
| Aluminium No. 1                    | Tablet / 250   | 515461BT    |
| Aluminium No. 2                    | Tablet / 100   | 515470BT    |
| Aluminium No. 2                    | Tablet / 250   | 515471BT    |
| Set Aluminium No. 1/No. 2 100 Pc.# | 100 each       | 517601BT    |
| Set Aluminium No. 1/No. 2 250 Pc.# | 250 each       | 517602BT    |

## Application List

- Drinking Water Treatment
- Waste Water Treatment
- Raw Water Treatment
- Boiler Water
- Cooling Water
- Pool Water Treatment



## Preparation

1. To get accurate results the sample temperature must be between 20 °C and 25 °C.
2. To avoid errors caused by contamination, rinse the vial and the accessories with Hydrochloric acid (approx. 20%) before the analysis. Then rinse them with deionised water.



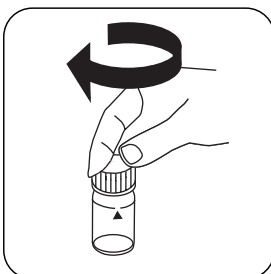
## Determination of Aluminium with Tablet

Select the method on the device.

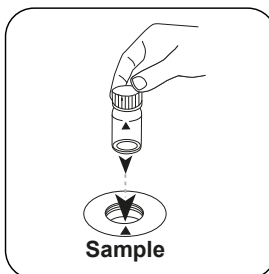
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500



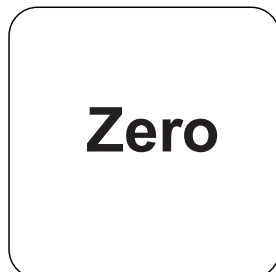
Fill 24 mm vial with **10 mL sample**.



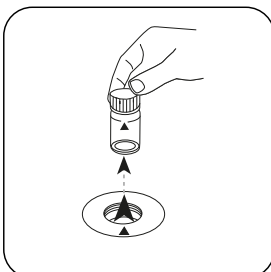
Close vial(s).



Place **sample vial** in the sample chamber. Pay attention to the positioning.

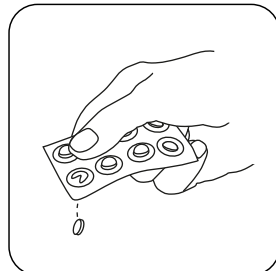


Press the **ZERO** button.

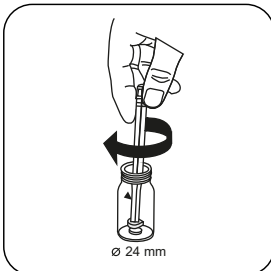


Remove the vial from the sample chamber.

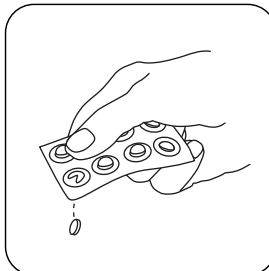
For devices that require **no ZERO measurement**, start here.



Add **ALUMINIUM No. 1 tablet**.



Crush tablet(s) by rotating slightly and dissolve.



Add **ALUMINIUM No. 2 tablet**.



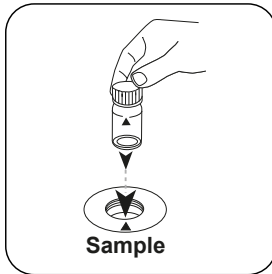
Crush tablet(s) by rotating slightly.



Close vial(s).

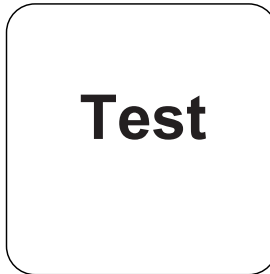


Dissolve tablet(s) by inverting.

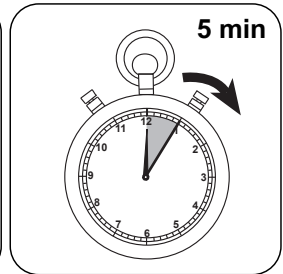


Place **sample vial** in the sample chamber. Pay attention to the positioning.

Once the reaction period is finished, the measurement takes place automatically. The result in mg/L Aluminium appears on the display.



Press the **TEST** (XD: **START**) button.



Wait for **5 minute(s)** reaction time.



## Analyses

The following table identifies the output values can be converted into other citation forms.

| Unit | Cite form                      | Scale Factor |
|------|--------------------------------|--------------|
| mg/l | Al                             | 1            |
| mg/l | Al <sub>2</sub> O <sub>3</sub> | 1.8894       |

## Chemical Method

Eriochrom Cyanine R

## Appendix

### Calibration function for 3rd-party photometers

$$\text{Conc.} = a + b \cdot \text{Abs} + c \cdot \text{Abs}^2 + d \cdot \text{Abs}^3 + e \cdot \text{Abs}^4 + f \cdot \text{Abs}^5$$

|   | ∅ 24 mm                  | □ 10 mm                  |
|---|--------------------------|--------------------------|
| a | $-3.21414 \cdot 10^{-2}$ | $-3.21414 \cdot 10^{-2}$ |
| b | $1.60965 \cdot 10^{-1}$  | $3.46075 \cdot 10^{-1}$  |
| c | $7.15538 \cdot 10^{-2}$  | $3.30757 \cdot 10^{-1}$  |
| d |                          |                          |
| e |                          |                          |
| f |                          |                          |

## Interferences

### Removeable Interferences

- A low test result may be given in the presence of Fluorides and Polyphosphates. The effect of this is generally insignificant unless the water has fluoride added artificially. In this case, the following table should be used to determine the actual concentration of aluminium.
- A special tablet ingredient prevents the measurement being affected as a result of iron and manganese.

| Fluoride<br>[mg/L<br>F] | Displayed value: Aluminium [mg/L] |      |      |      |      |      |
|-------------------------|-----------------------------------|------|------|------|------|------|
|                         | 0.05                              | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 |
| 0.2                     | 0.05                              | 0.11 | 0.16 | 0.21 | 0.27 | 0.32 |
| 0.4                     | 0.06                              | 0.11 | 0.17 | 0.23 | 0.28 | 0.34 |
| 0.6                     | 0.06                              | 0.12 | 0.18 | 0.24 | 0.30 | 0.37 |
| 0.8                     | 0.06                              | 0.13 | 0.20 | 0.26 | 0.32 | 0.40 |
| 1.0                     | 0.07                              | 0.13 | 0.21 | 0.28 | 0.36 | 0.45 |
| 1.5                     | 0.09                              | 0.20 | 0.29 | 0.37 | 0.48 | ---  |

## Method Validation

|                                |                 |
|--------------------------------|-----------------|
| <b>Limit of Detection</b>      | 0.02 mg/L       |
| <b>Limit of Quantification</b> | 0.044 mg/L      |
| <b>End of Measuring Range</b>  | 0.3 mg/L        |
| <b>Sensitivity</b>             | 0.17 mg/L / Abs |
| <b>Confidence Intervall</b>    | 0.014 mg/L      |
| <b>Standard Deviation</b>      | 0.006 mg/L      |
| <b>Variation Coefficient</b>   | 3.71 %          |

### Bibliography

Richter, F. Fresenius, Zeitschrift f. anal. Chemie (1943) 126: 426

### According to

APHA Method 3500-AI B

\* including stirring rod, 10 cm