# Iron T M220

## 0.02 - 1 mg/L Fe FE

## Ferrozine / Thioglycolate

### 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 | λ | Measuring Range |
|---|---|---|---|
| MD 100, MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 600, PM 620, PM 630 | ø 24 mm | 560 nm | 0.02 - 1 mg/L Fe |
| XD 7000, XD 7500 | ø 24 mm | 562 nm | 0.02 - 1 mg/L Fe |

### Material

Required material (partly optional):

| Reagents | Packaging Unit | Part Number |
|---|---|---|
| Iron II LR ($Fe^{2+}$) | Tablet / 100 | 515420BT |
| Iron II LR ($Fe^{2+}$) | Tablet / 250 | 515421BT |
| Iron LR ($Fe^{2+}$ und $Fe^{3+}$) | Tablet / 100 | 515370BT |
| Iron LR ($Fe^{2+}$ und $Fe^{3+}$) | Tablet / 250 | 515371BT |

### Application List

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

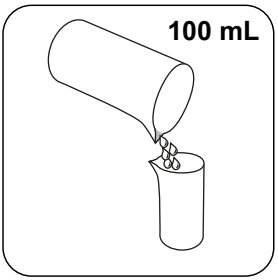
### Preparation

1. Water that has been treated with organic compounds such as corrosion inhibitors, must be oxidised where necessary to break down the iron complex. 1 ml of concentrated Sulphuric acid (≥ 95 %) and 1 ml concentrated Nitric acid (≥ 65 %) is therefore added to to 100 ml water sample and boiled down to approximately half the volume. After cooling down, the digestion procedure is continued.

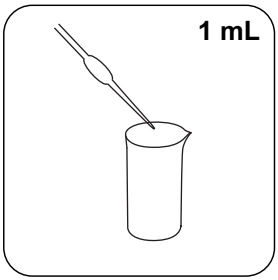
## Notes

1. This method is for the determination of total dissolved $Fe^{2+}$ and $Fe^{3+}$.
2. For the determination of $Fe^{2+}$, the IRON (II) LR Tablet, instead of the IRON LR Tablet is used.

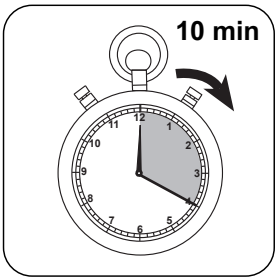
## Digestion



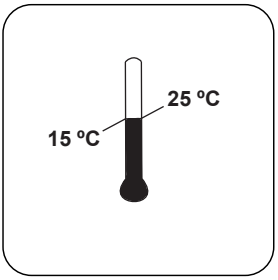

Fill a suitable sample vessel with **100 mL sample** .



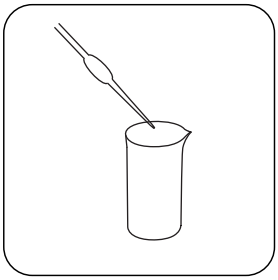

Add **1 mL concentrated sulfuric acid (≥ 95 %)** .



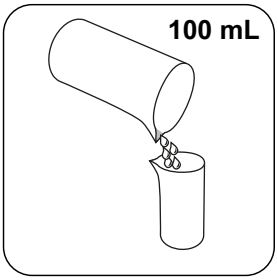

The sample is to be **heated for 10 minutes,** or for as long as it takes for everything to be completely dissolved.




Allow the sample to cool to room temperature.



Adjust **pH-value** of the sample with **ammonia solution (10-25 %) to 3-5**.



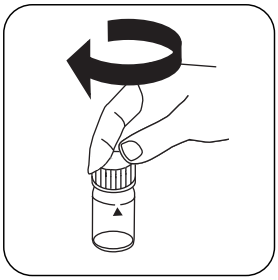

Fill the sample with **deionised water to 100 mL** .

This sample is used for the analysis of total solved and dissolved Iron.

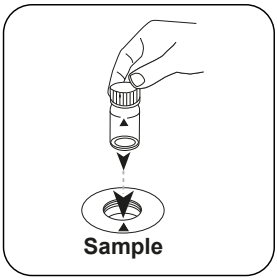
## Determination of Iron (II,III), dissolved with Tablet

Select the method on the device.
For testing of **dissolved and undissolved Iron,** carry out the described **digestion**.
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500

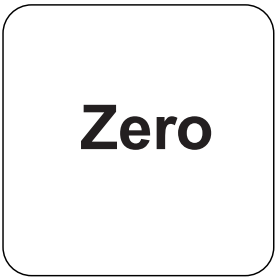

Fill 24 mm vial with **10 mL sample**.



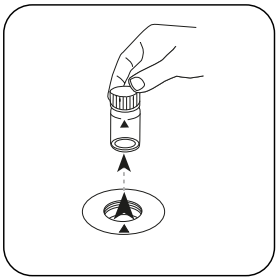
Close vial(s).




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

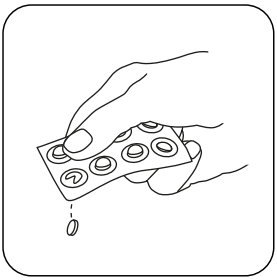



Press the **ZERO** button.

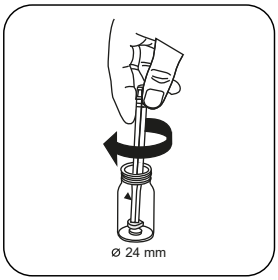


Remove the vial from the sample chamber.

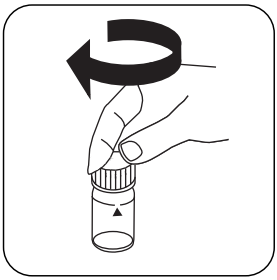
For devices that require **no ZERO measurement** , **start here**.



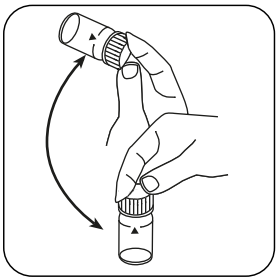
Add **IRON LR tablet**.



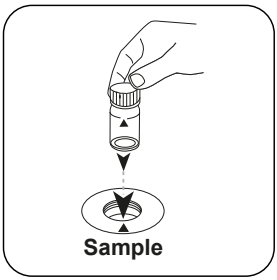

Crush tablet(s) by rotating slightly.



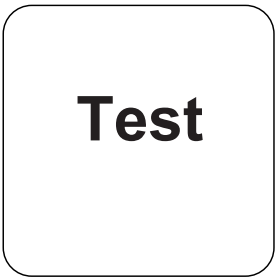
Close vial(s).



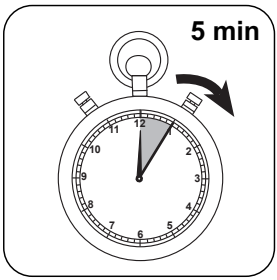
Dissolve tablet(s) by inverting.




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




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




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

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

## Chemical Method

Ferrozine / Thioglycolate

## Appendix

## Calibration function for 3rd-party photometers

Conc. = a + b•Abs + c•Abs$^2$ + d•Abs$^3$ + e•Abs$^4$ + f•Abs$^5$

| | **ø 24 mm** | **□ 10 mm** |
|---|---|---|
| a | -8.94304 • $10^{-3}$ | -8.94304 • $10^{-3}$ |
| b | 9.35824 • $10^{-1}$ | 2.01202 • $10^{+0}$ |
| c | | |
| d | | |
| e | | |
| f | | |

## Interferences

**Removeable Interferences**

1. The presence of copper increases the test result by 10 %. At a concentration of 10 mg/L copper in the sample, the measurement result is increased by 1 mg/L iron. The interference can be eliminated by the addition of thiourea

## Method Validation

| | |
|---|---|
| **Limit of Detection** | 0.01 mg/L |
| **Limit of Quantification** | 0.016 mg/L |
| **End of Measuring Range** | 1 mg/L |
| **Sensitivity** | 0.92 mg/L / Abs |
| **Confidence Intervall** | 0.013 mg/L |
| **Standard Deviation** | 0.005 mg/L |
| **Variation Coefficient** | 1.23 % |

**Bibliography**

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980, p. 102