



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	$\lambda$	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
SpectroDirect	ø 24 mm	562 nm	0.1 - 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 <sup>2+</sup> )	Tablet / 100	515420BT
Iron II LR (Fe <sup>2+</sup> )	Tablet / 250	515421BT
Iron LR (Fe <sup>2+</sup> und Fe <sup>3+</sup> )	Tablet / 100	515370BT
Iron LR (Fe <sup>2+</sup> und Fe <sup>3+</sup> )	Tablet / 250	515371BT

## Application List

- Waste Water Treatment
- Cooling Water
- Boiler Water
- Galvanization
- Drinking Water Treatment
- Raw 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 ( $\geq 95\%$ ) and 1 ml concentrated Nitric acid ( $\geq 65\%$ ) is therefore added to a 100 ml water sample and boiled down to approximately half the volume. After cooling down, the digestion procedure is continued.

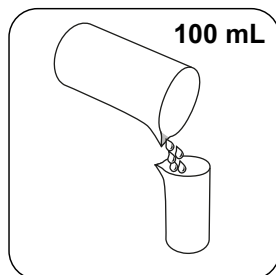


## Notes

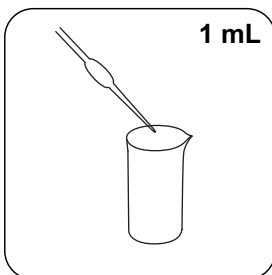
1. This method is for the determination of total dissolved  $\text{Fe}^{2+}$  and  $\text{Fe}^{3+}$ .
2. For the determination of  $\text{Fe}^{2+}$ , the IRON (II) LR Tablet, instead of the IRON LR Tablet is used.



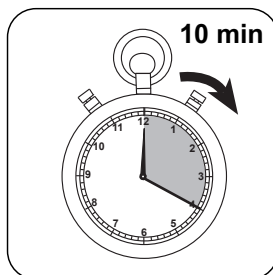
## Digestion



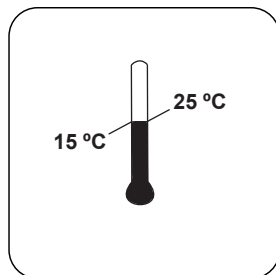
Fill a suitable sample vessel with **100 mL sample** .



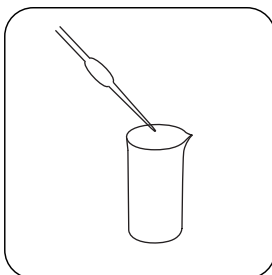
Add **1 mL concentrated sulfuric acid ( $\geq 95\%$ )** .



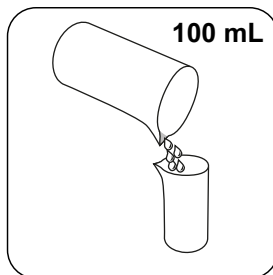
The sample is to be **heated for 10 minutes**, or for as long as it takes for everything to be completely dissolved.



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

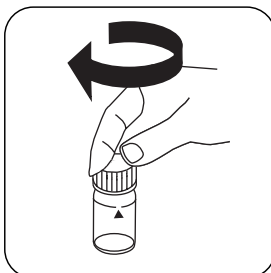
Select the method on the device.

For testing of **dissolved and undissolved Iron**, carry out the described **digestion**.

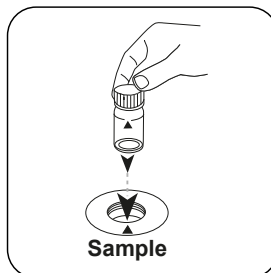
For this method, a ZERO measurement does not have to be carried out every time on the following devices: XD 7000, XD 7500



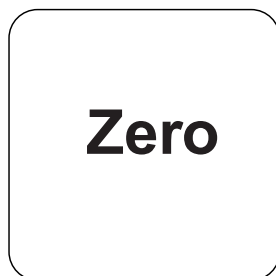
Fill 24 mm vial with **10 mL sample**.



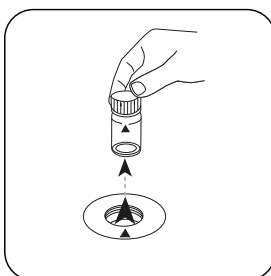
Close vial(s).



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

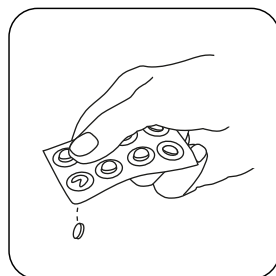


Press the **ZERO** button.

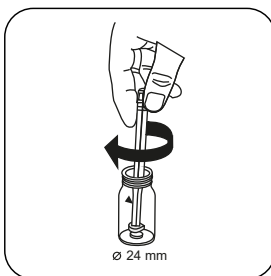


Remove the vial from the sample chamber.

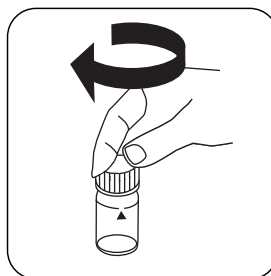
For devices that require **no ZERO measurement**, **start here**.



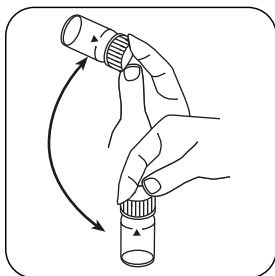
Add **IRON LR tablet**.



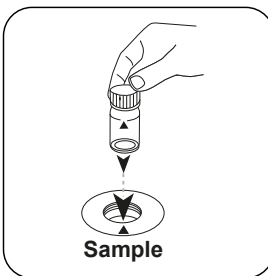
Crush tablet(s) by rotating slightly.



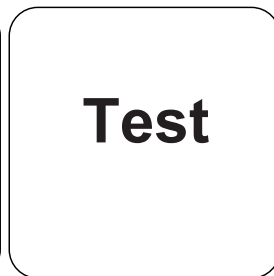
Close vial(s).



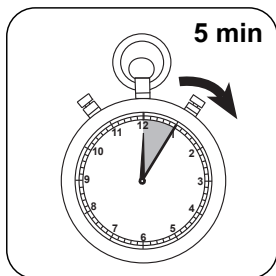
Dissolve tablet(s) by inverting.



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

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

	∅ 24 mm	□ 10 mm
a	$-8.94304 \cdot 10^{-3}$	$-8.94304 \cdot 10^{-3}$
b	$9.35824 \cdot 10^{-1}$	$2.01202 \cdot 10^{+0}$
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