**Total iron VARIO PP****223****0.02 - 1.8 mg/l Fe****FE2****TPTZ**

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 600, MD 610, MD 640, MultiDirect	ø 24 mm	580 nm	0.02 - 1.8 mg/l Fe
SpectroDirect, XD 7000, XD 7500	ø 24 mm	590 nm	0.1 - 1.8 mg/l Fe

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Iron TPTZ F10	Powder / 100 pc.	530550

Application List

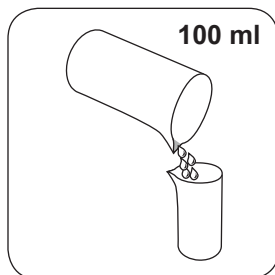
- Waste Water Treatment
- Cooling Water
- Boiler Water
- Galvanization
- Drinking Water Treatment
- Raw Water Treatment
- Pool Water Treatment

Preperation

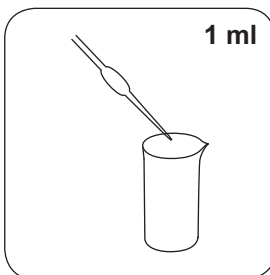
1. Digestion is required for the determination of total Iron. The TPTZ reagent recovers most iron oxides without digestion.
2. All glassware must first be rinsed with diluted 1:1 Hydrochloric acid solution before the analysis and then rinsed with deionised water to remove iron deposits that can cause slightly high results.
3. Strong alkaline or acidic water samples should be adjusted between pH 3 and pH 8 before the analysis (use 0.5 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).
4. Water that has been treated with organic compounds such as corrosion inhibi-

tors, 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 100 ml water sample and boiled down to approximately half the volume. After cooling down, the digestion procedure is continued.

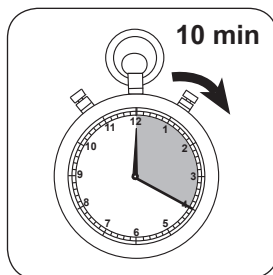
Digestion



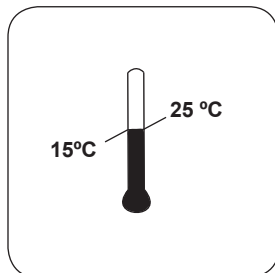
Fill a suitable sample vessel with **100 ml sample**.



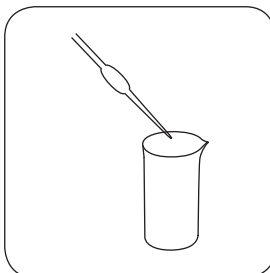
Add **1 ml concentrated sulfuric acid** ($\geq 95\%$).



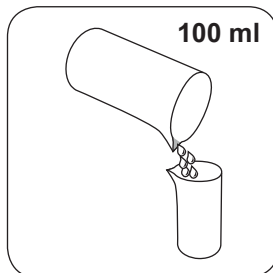
The sample is to be **heated for 10 minutes**, or for as long as it takes for everything to be completely dissolved.



Allow the sample to cool to room temperature.



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



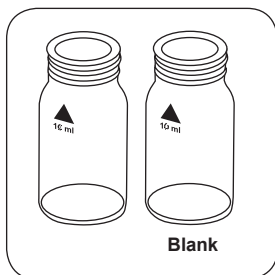
Fill the sample with **deionised water** to **100 ml**.

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

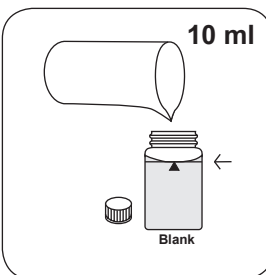
Implementation of the provision Iron, total with Vario Powder Pack

Select the method on the device

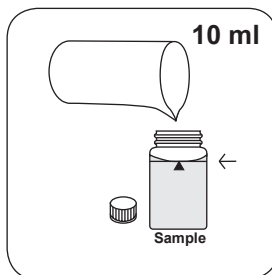
For testing of **total Iron**, carry out the described **digestion**.



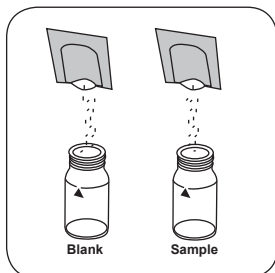
Prepare two clean 24 mm vials. Mark one as a blank.



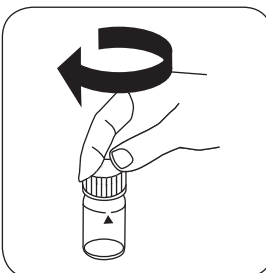
Put **10 ml deionised water** in the blank.



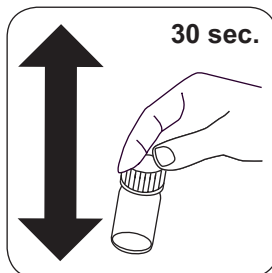
Put **10 ml sample** in the sample vial.



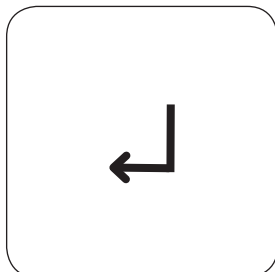
Add a **Vario IRON TPTZ F10 powder pack** in each vial.



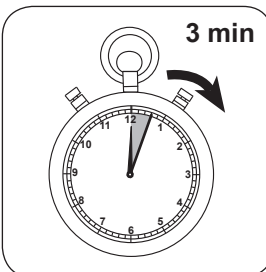
Close vial(s).



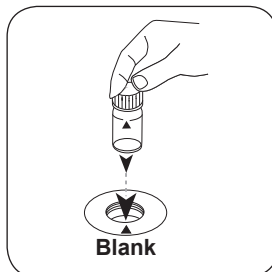
Mix the contents by shaking. (30 sec.).



Press the **ENTER** button.



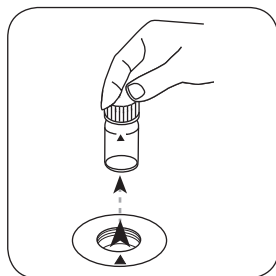
Wait for **3 minute(s) reaction time**.



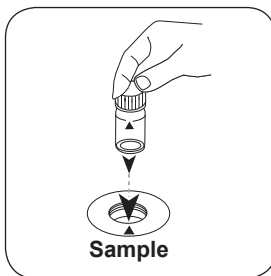
Place **blank** in the sample chamber. • Pay attention to the positioning.

Zero

Press the **ZERO** button.



Remove the vial from the sample chamber.



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

Test

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

The result in mg/l Iron appears on the display.

Chemical Method

TPTZ

Appendix

Interferences

Persistent Interferences

When interferences occur, colour development is inhibited or a precipitate is formed. The values refer to a standard with an iron concentration of 0.5 mg/l.

Interference	from / [mg/l]
Ca	4
Cr ³⁺	0,25
Cr ⁴⁺	1,2
Co	0,05
Cu	0,6
CN ⁻	2,8
Mn	50
Hg	0.4
Mo	4
Ni	1
NO ²⁻	0,8

Bibliography

G. Frederic Smith Chemical Co., The Iron Reagents, 3rd ed. (1980)

^{a)} determination of free, combined and total | ^{b)} Reactor is necessary for COD (150 °C), TOC (120 °C) and total -chromium, - phosphate, -nitrogen, (100 °C) | ^{c)} MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75) | ^{d)} Spectroquant® is a Merck KGaA Trademark | ^{e)} alternative reagent, used instead of DPD No.1/No.3 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity | ^{f)} additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine | ^{g)} Reagent recovers most insoluble iron oxides without digestion | ^{h)} additionally required for samples with hardness values above 300 mg/l CaCO₃ | ⁱ⁾ high range by dilution | ^{j)} including stirring rod, 10 cm