**Iron VARIO PP****222****0.02 - 3 mg/l Fe⁹****FE1****1,10-Phenanthroline**

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	530 nm	0.02 - 3 mg/l Fe ⁹
SpectroDirect, XD 7000, XD 7500	ø 24 mm	510 nm	0.1 - 3 mg/l Fe ⁹

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Ferro F10	Powder / 100 pc.	530560
VARIO Ferro F10	Powder / 1000 pc.	530563

Application List

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

Preperation

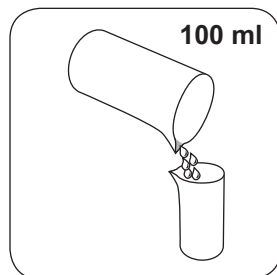
1. Iron oxide requires mild, strong or Digesdahl digestion before the analysis (digestion process with acid).
2. Very strong alkaline or acidic water samples should be adjusted to between pH 3 and pH 5 before the analysis.
3. Water samples containing visible rust should be allowed to react for at least five minutes.

4. 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 100 ml water sample and boiled down to approximately half the volume. After cooling down, the digestion procedure is continued.

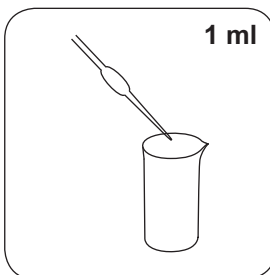
Notes

1. This method is for the determination of all forms of dissolved iron and most forms of undissolved iron.
2. Accuracy is not affected by undissolved powder.

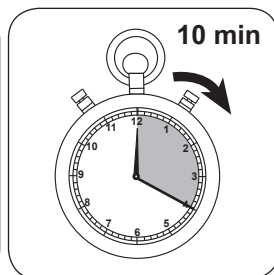
Digestion



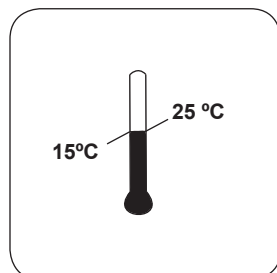
Fill a suitable sample vessel with **100 ml sample**.



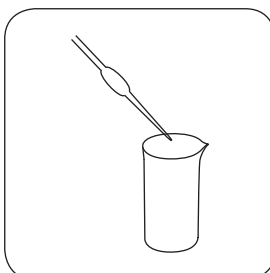
Add **1 ml concentrated sulfuric acid** ($\geq 95\%$).



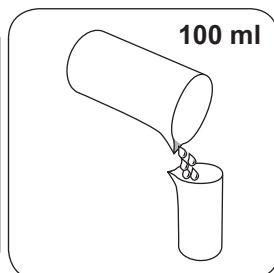
The sample is to be **heated for 10 minutes**, or for as long as it takes for everything to be completely dissolved.



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 (II,III), dissolved with Vario Powder Packs

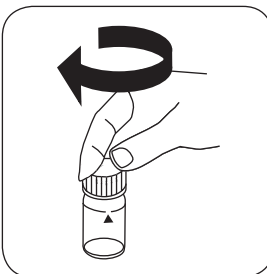
Select the method on the device

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

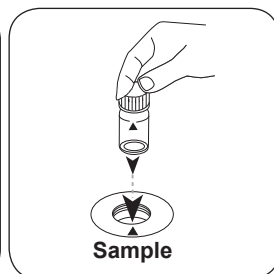
For this method, no ZERO measurements are to be carried out with the following devices: XD 7000, XD 7500



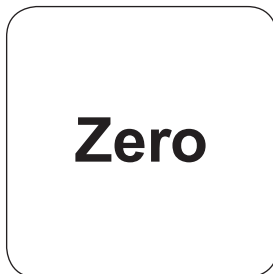
Fill 24 mm vial with **10 ml sample**.



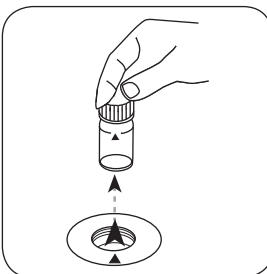
Close vial(s).



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

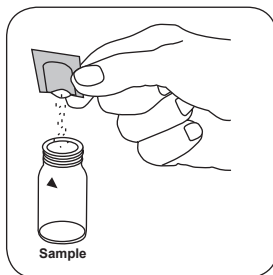


Press the **ZERO** button.

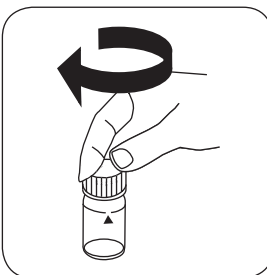


Remove the vial from the sample chamber.

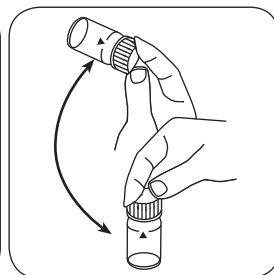
For devices that require **no ZERO measurement**, start here.



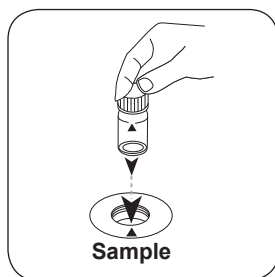
Add **Vario FERRO F10 powder pack**.



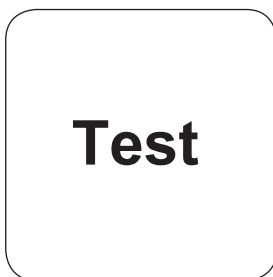
Close vial(s).



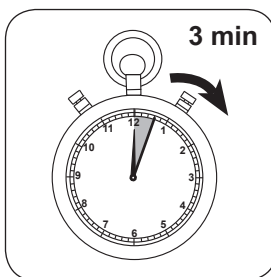
Invert several times to mix the contents.



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



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



Wait for **3 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

1,10-Phenanthroline

Appendix

Interferences

Persistent Interferences

1. Iridium interferes with the test.

According to

DIN 38406-E1

Standard Method 3500-Fe-1997

US EPA 40 CFR 136

^{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 | ^{*} including stirring rod, 10 cm