
**Manganese HR PP**
**M243**
**0.1 - 18 mg/L Mn**
**Mn2**
**Periodate Oxidation**

## 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, MD 640, MultiDirect	ø 24 mm	530 nm	0.1 - 18 mg/L Mn
SpectroDirect, XD 7000, XD 7500	ø 24 mm	525 nm	0.1 - 18 mg/L Mn

## Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
VARIO Manganese HR, Set High Range F10	1 Set	535100

## Application List

- Galvanization
- Drinking Water Treatment
- Raw Water Treatment

## Preparation

1. Strongly buffered water samples or extreme pH values may exceed the buffering capacity of the reagents and pH values to be adjusted.  
If samples were acidified for storing, the pH value must be adjusted between 4 and 5 with 5 mol/l (5 N) Sodium hydroxide before the test. A pH value of 5 must not be exceeded, since this can lead to precipitation of manganese.





## Determination of Manganese HR with Vario Powder Packs

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.

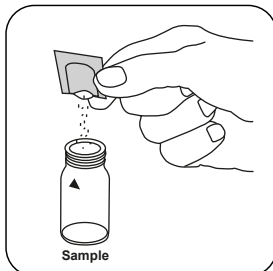


Press the **ZERO** button.

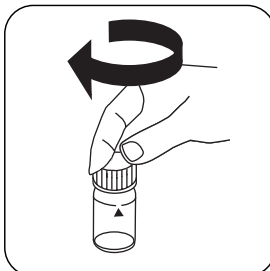


Remove the vial from the sample chamber.

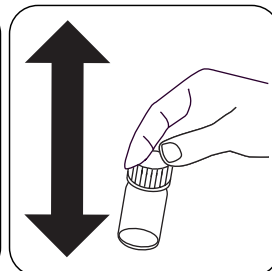
For devices that require **no ZERO measurement**, start here.



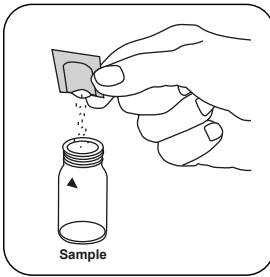
Add **Vario Manganese Citrate Buffer F10 powder pack**.



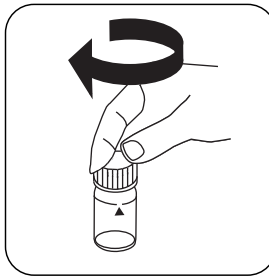
Close vial(s).



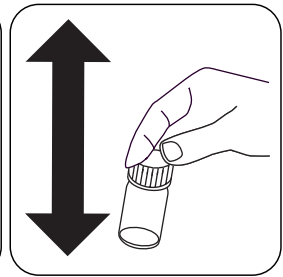
Mix the contents by shaking.



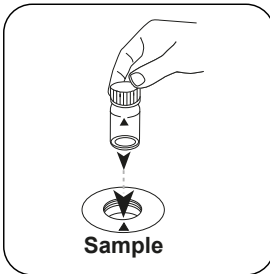
Add **Vario Sodium Periodate F10 powder pack**.



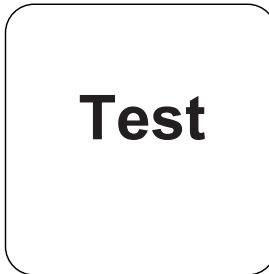
Close vial(s).



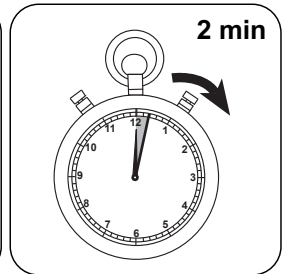
Mix the contents by shaking.



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

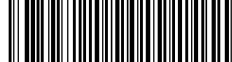


Press the **TEST** (XD: **START**) button.



Wait for **2 minute(s) reaction time**.

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



## Analyses

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

Unit	Cite form	Scale Factor
mg/l	Mn	1
mg/l	MnO <sub>4</sub>	2.17
mg/l	KMnO <sub>4</sub>	2.88

## Chemical Method

Periodate Oxidation

## Appendix

### Interferences

Interference	from / [mg/L]
Ca	700
Cl <sup>-</sup>	70000
Fe	5
Mg	100000

### Method Validation

Limit of Detection	0.16 mg/L
Limit of Quantification	0.49 mg/L
End of Measuring Range	18 mg/L
Sensitivity	13.02 mg/L / Abs
Confidence Intervall	0.28 mg/L
Standard Deviation	0.12 mg/L
Variation Coefficient	1.29 %

### According to

40 CFR 136 (US EPA approved HACH)