Lovibond® Water Testing

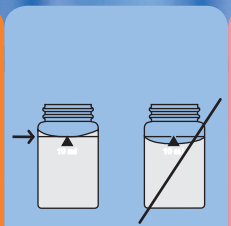
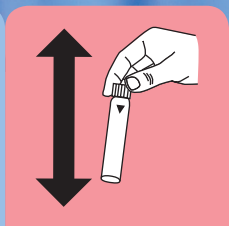
Tintometer® Group

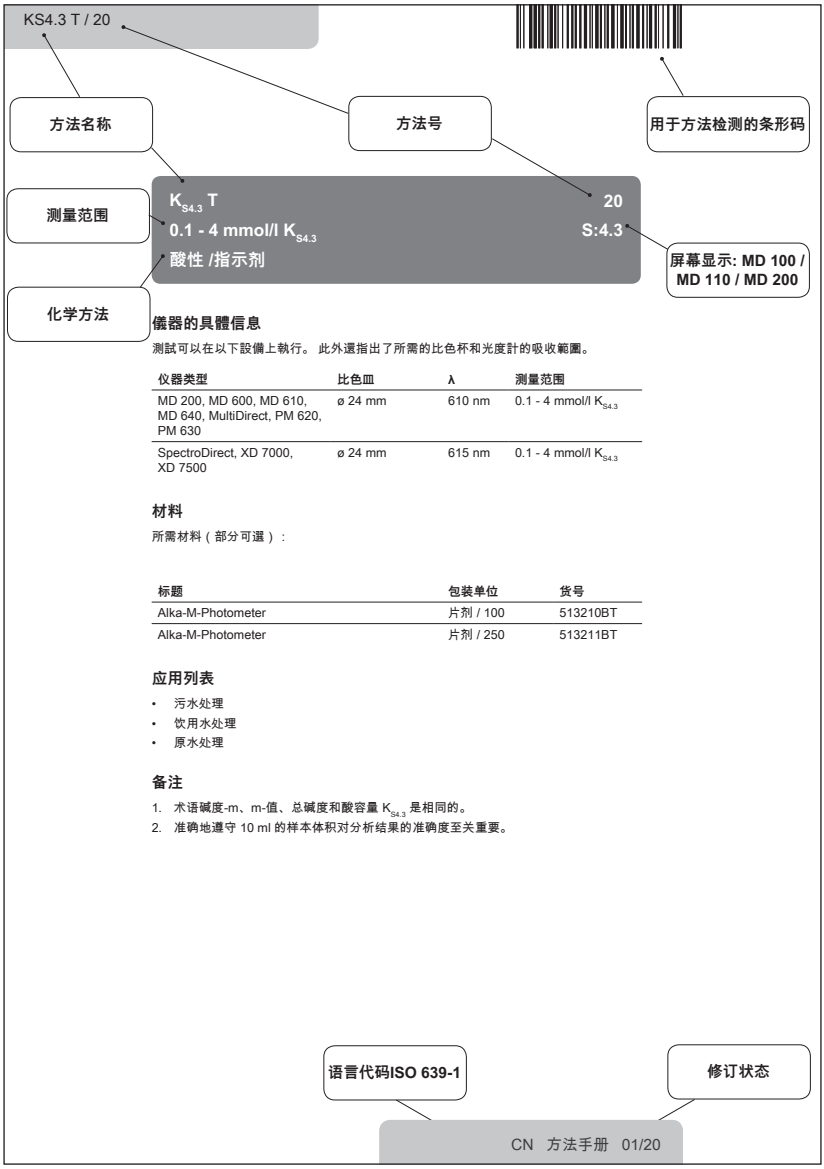
方法手册

测试 水和废水的 分析方法

pH | 尿素 | 氯 | 氰尿酸 | 硬度 | 碱度 m | 铁 | 铜





儀器的具體信息

測試可以在以下設備上執行。 此外還指出了所需的比色杯和光度計的吸收範圍。

仪器类型	比色皿	λ	测量范围
MD 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	610 nm	0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500	ø 24 mm	615 nm	0.1 - 4 mmol/l $K_{S4.3}$

材料

所需材料（部分可選）：

标题	包装单位	货号
Alka-M-Photometer	片剂 / 100	513210BT
Alka-M-Photometer	片剂 / 250	513211BT

应用列表

- 污水处理
- 饮用水处理
- 原水处理

备注

1. 术语碱度-m、m-值、总碱度和酸容量 $K_{S4.3}$ 是相同的。
2. 准确地遵守 10 ml 的样本体积对分析结果的准确度至关重要。

KS4.3 T / 20

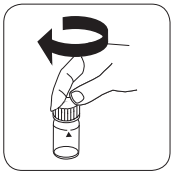
开始测量

进行测定 $K_{S4.3}$ 片剂酸容量

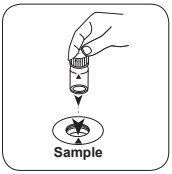
选择设备中的方法。

对于这种方法，在以下设备上不能进行 ZERO 测量：XD 7000, XD 7500

用 **10 ml** 样本填充 24 mm 比色杯。



密封比色杯。



将样本比色杯放入测量轴中。注意定位。

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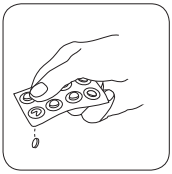
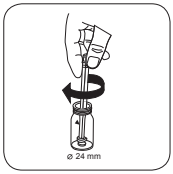


加入 **ALKA-M-PHOTOMETER** 片剂。



用轻微的扭转压碎片剂。

密封比色杯。

CN 方法手册 01/20

T 碱度-m M30

5 - 200 mg/l $CaCO_3$ tA

酸性 /指示剂

ZH

材料

所需材料（部分可選）：

试剂	包装单位	货号
碱度 M 光度计	片剂 / 100	513210BT
碱度 M 光度计	片剂 / 250	513211BT

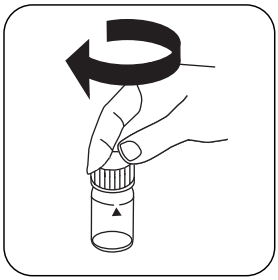
备注

1. 术语碱度-m、m-值、总碱度和酸容量 $K_{S4.3}$ 是相同的。
2. 准确地遵守 10 ml 的样本体积对分析结果的准确度至关重要。

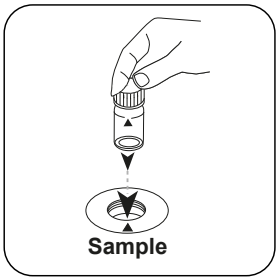
进行测定 总碱度 = 碱度 M = 片剂的 m-值

选择设备中的方法。

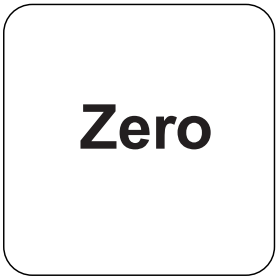
用 **10 ml 样本**填充 24 mm 比色杯。



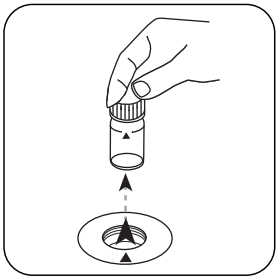
密封比色杯。



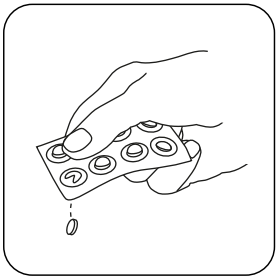
将**样本比色杯**放入测量轴中。注意定位。



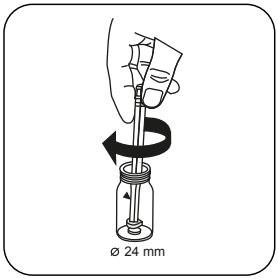
按下 **ZERO** 按钮。



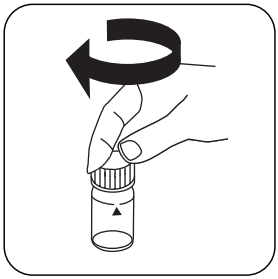
从测量轴上取下比色杯。



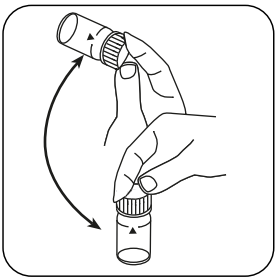
加入 **ALKA-M-PHOTOMETER 片剂**。



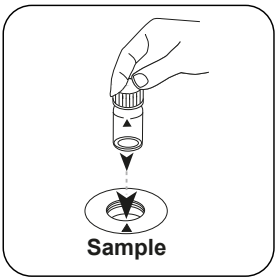
用轻微的扭转压碎片剂。



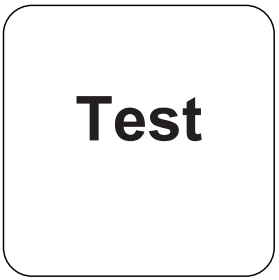
密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 碱度-m。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	$CaCO_3$	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	0.058
	$K_{S4.3}$	0.02

化学方法

酸性 /指示剂

附錄

源于

EN ISO 9963-1

T 氯 M100

0.01 - 6.0 mg/l Cl_2 [a] CL6

DPD

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材料

所需材料（部分可選）：

试剂	包装单位	货号
DPD No.1	片剂 / 100	511050BT
DPD No.1	片剂 / 250	511051BT
DPD No.1	片剂 / 500	511052BT
DPD No.3	片剂 / 100	511080BT
DPD No.3	片剂 / 250	511081BT
DPD No.3	片剂 / 500	511082BT
DPD No.1 高钙 [e]	片剂 / 100	515740BT
DPD No.1 高钙 [e]	片剂 / 250	515741BT
DPD No.1 高钙 [e]	片剂 / 500	515742BT
DPD No.3 高钙 [e]	片剂 / 100	515730BT
DPD No.3 高钙 [e]	片剂 / 250	515731BT
DPD No.3 高钙 [e]	片剂 / 500	515732BT
DPD No.4	片剂 / 100	511220BT
DPD No.4	片剂 / 250	511221BT
DPD No.4	片剂 / 500	511222BT
补充包 Suba II	1 片	525600

現有標準

Title	包装单位	货号
ValidCheck 氯 1.5 mg/l	98.5 + 1.5 毫升	48105510

取样

1. 在样本制备中，通过移液和摇动来避免氯的排气。
2. 取样后必须立即进行分析。

准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以测定的氯结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/l）下存放 1 小时，然后用去离子水（软化水）彻底冲洗。
2. 对于游离氯和总氯的单独测定，使用一套相应单独的比色杯是有意义的（参见 EN ISO 7393-2，第 5.3 段）。
3. DPD 显色发生在 pH 值在 6.2 至 6.5 时。因此该试剂含有用于调节 pH 值的缓冲液。但在分析前（用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

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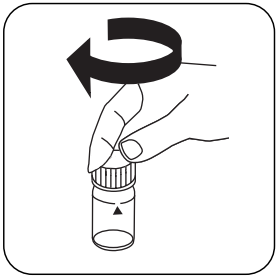
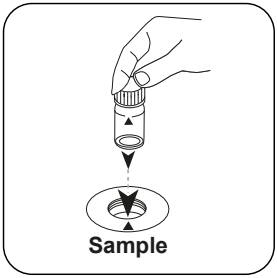
进行测定 余氯 片剂法

选择设备中的方法。
另外选择测定：余氯

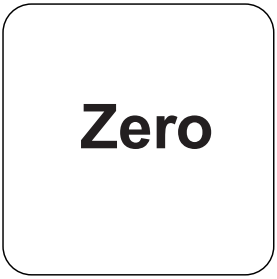
用 **10 ml 样本**填充 24 mm 比色杯。



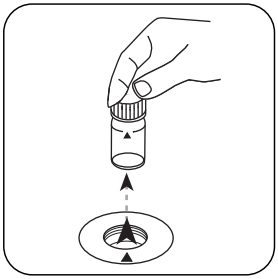
密封比色杯。



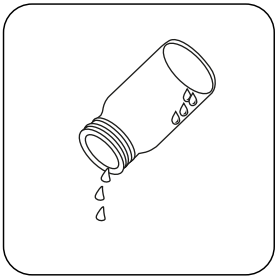
将**样本比色杯**放入测量轴中。注意定位。



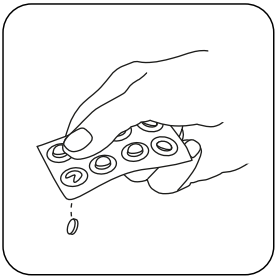
按下 **ZERO** 按钮。



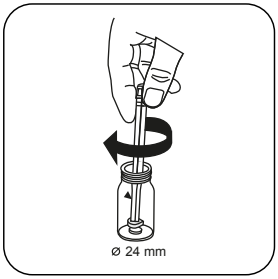
从测量轴上取下比色杯。



将比色杯倒空。

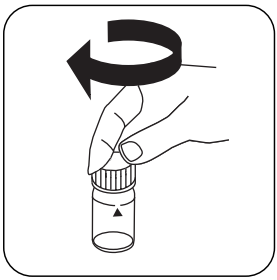


加入 **DPD No. 1 片剂** 。

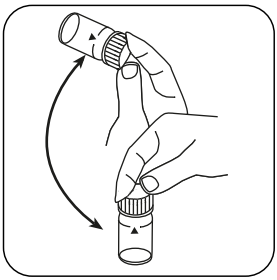


用轻微的扭转压碎片剂。

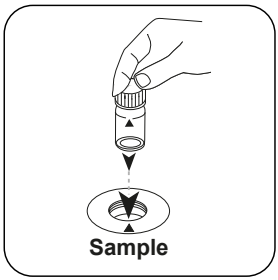
用**样本**将比色杯填充至 **10 ml 刻度**处。



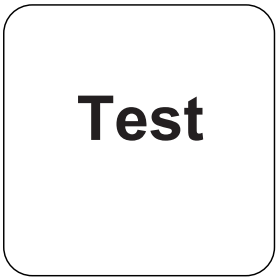
密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

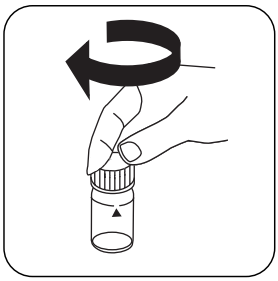


按下 **TEST** (XD: **START**) 按钮。
结果在显示屏上显示为 mg / l 余**氯**。

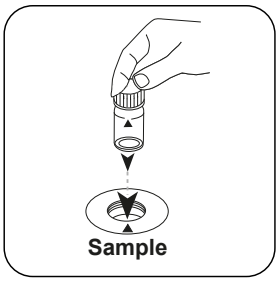
进行测定 总氯 片剂法

选择设备中的方法。
另外选择测定：总氯

用 **10 ml 样本**填充 24 mm 比色杯。



密封比色杯。



将**样本比色杯**放入测量轴中。注意定位。

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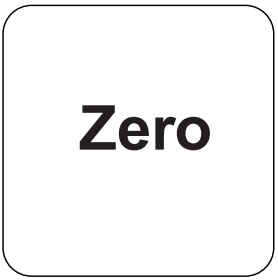
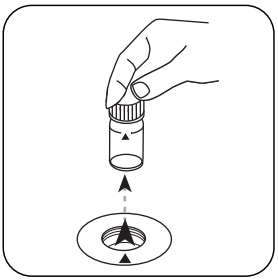
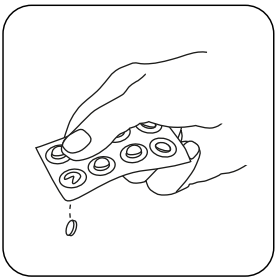


按下 **ZERO** 按钮。

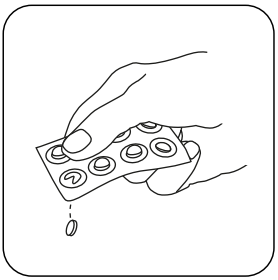


从测量轴上取下比色杯。

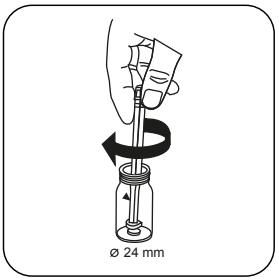
将比色杯倒空。



加入 **DPD No. 1 片剂** 。

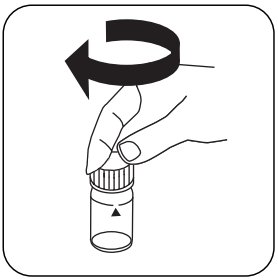


加入 **DPD No. 3 片剂** 。

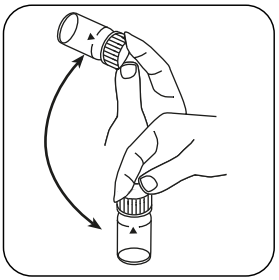


用轻微的扭转压碎片剂。

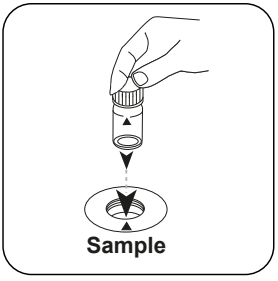
用**样本**将比色杯填充至 **10 ml 刻度**处。



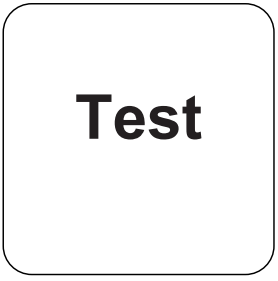
密封比色杯。



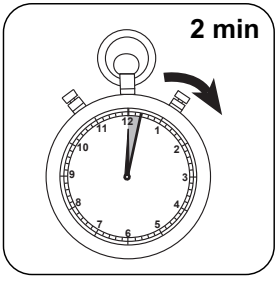
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。
结果在显示屏上显示为 mg / l 总氯。

化学方法

DPD

附錄

干扰说明

持续干扰

- 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。

可消除干扰

- 铜和铁（III）的干扰必须通过 EDTA 消除。
- 对于高钙含量*和/或高电导率*的样本，使用试剂片可能会导致样本浑浊和相关的测量误差。在这种情况下，可选用试剂片 DPD 编号1 高钙和试剂片 DPD 编号3 高钙。
  *不能给出精确值，因为浑浊的形成取决于样本水的类型和组成。
- 在使用片剂时，高于 10 mg/l 氯的浓度可导致测量范围内的结果高达 0 mg/l。氯浓度过高时应用无氯水稀释样本。将 10 ml 稀释的样本与试剂混合并重复测量（可信度测试）。

干擾	從/ [mg/l]
CrO_4^{2-}	0.01
MnO_2	0.01

方法验证

检出限	0.02 mg/l
测定下限	0.06 mg/l
测量上限	6 mg/l
灵敏度	2.05 mg/l / Abs
置信范围	0.04 mg/l
标准偏差	0.019 mg/l
变异系数	0.87 %

一致性

EN ISO 7393-2

[a] 测定余氯，总氯和结合氯 | [e] 替代试剂，取代DPD No.1/No.3试剂，用于由高浓度钙离子和/或高电导率引起的浑浊水样分析

HR T 氯 M103

0.1 - 10 mg/l Cl_2 [a)] CL10

DPD

ZH

材料

所需材料（部分可選）：

试剂	包装单位	货号
DPD No.1 HR	片剂 / 100	511500BT
DPD No.1 HR	片剂 / 250	511501BT
DPD No.1 HR	片剂 / 500	511502BT
DPD No.3 HR	片剂 / 100	511590BT
DPD No.3 HR	片剂 / 250	511591BT
DPD No.3 HR	片剂 / 500	511592BT
套件 DPD No.1 HR/No.3 HR#	各100次	517791BT
套件 DPD No.1 HR/No.3 HR#	各250次	517792BT
DPD No.1 高钙 [e)]	片剂 / 100	515740BT
DPD No.1 高钙 [e)]	片剂 / 250	515741BT
DPD No.1 高钙 [e)]	片剂 / 500	515742BT
DPD No.3 高钙 [e)]	片剂 / 100	515730BT
DPD No.3 高钙 [e)]	片剂 / 250	515731BT
DPD No.3 高钙 [e)]	片剂 / 500	515732BT

取样

1. 在样本制备中，通过移液和摇动来避免氯的排气。
2. 取样后必须立即进行分析。

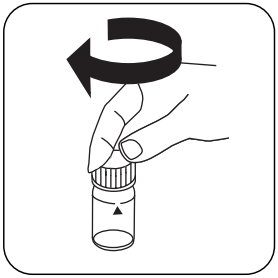
准备

1. 清洗比色杯：
   由于许多家用清洁剂（例如洗碗用洗涤剂）含有还原剂，所以测定的氯结果可能会不足。为了排除这种测量误差，玻璃器皿应无氯。为此，将玻璃器皿在次氯酸钠溶液（0.1 g/l）下存放 1 小时，然后用去离子水（软化水）彻底冲洗。
2. 对于游离氯和总氯的单独测定，使用一套相应单独的比色杯是有意义的（参见 EN ISO 7393-2，第 5.3 段）。
3. DPD 显色发生在 pH 值在 6.2 至 6.5 时。因此该试剂含有用于调节 pH 值的缓冲液。但在分析前（用 0.5 mol/l 硫酸或 1 mol/l 氢氧化钠溶液）必须将强碱性或酸性水的 pH 范围调节到 6 和 7 之间。

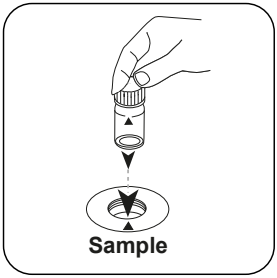
进行测定 余氯 HR 片剂法

选择设备中的方法。
另外选择测定：余铜

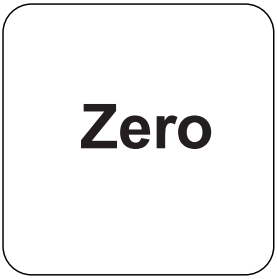
用 **10 ml 样本**填充 24 mm 比色杯。



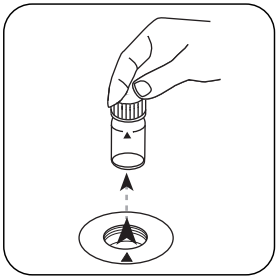
密封比色杯。



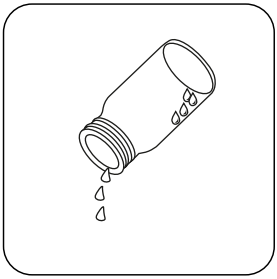
将**样本比色杯**放入测量轴中。注意定位。



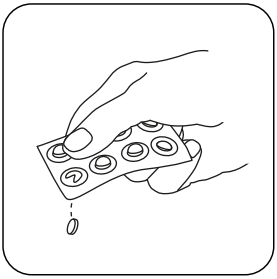
按下 **ZERO** 按钮。



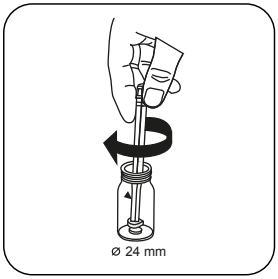
从测量轴上取下比色杯。



将比色杯倒空。

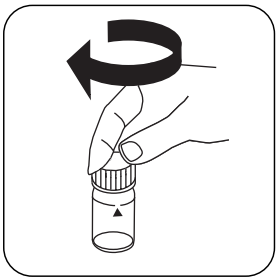


加入 **DPD No. 1 HR 片剂**。

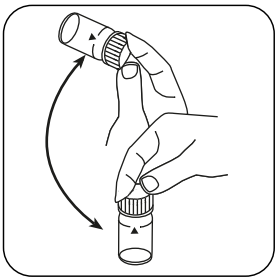


用轻微的扭转压碎片剂。

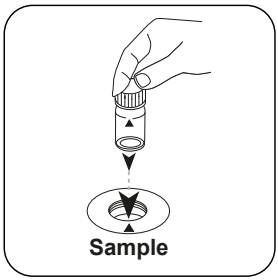
用**样本**将比色杯填充至 **10 ml 刻度**处。



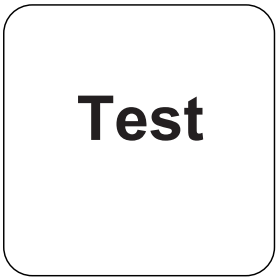
密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

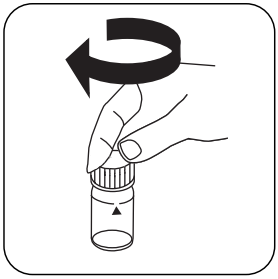


按下 **TEST** (XD: **START**) 按钮。
结果在显示屏上显示为 mg / l 余**氯**。

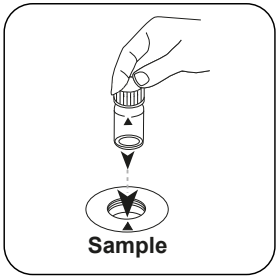
进行测定 总氯 HR 片剂法

选择设备中的方法。
另外选择测定：总铜

用 **10 ml 样本**填充 24 mm 比色杯。



密封比色杯。

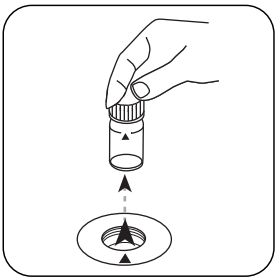


将**样本比色杯**放入测量轴中。注意定位。

ZH

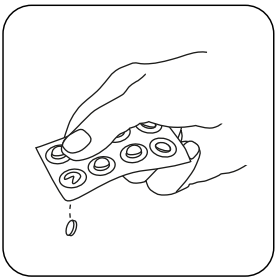
Zero

按下 **ZERO** 按钮。

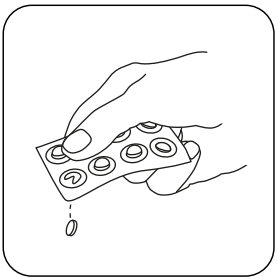


从测量轴上取下比色杯。

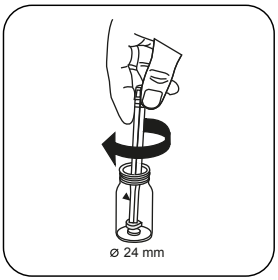
将比色杯倒空。



加入 **DPD No. 1 HR 片剂**。

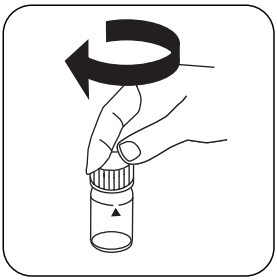


加入 **DPD No. 3 HR 片剂**。

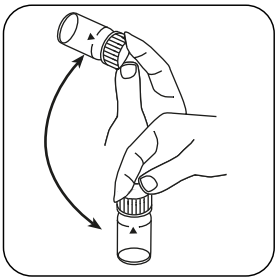


用轻微的扭转压碎片剂。

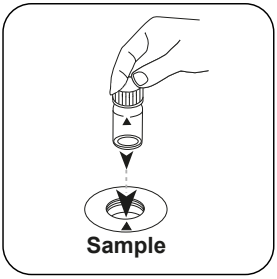
用**样本**将比色杯填充至 **10 ml 刻度**处。



密封比色杯。



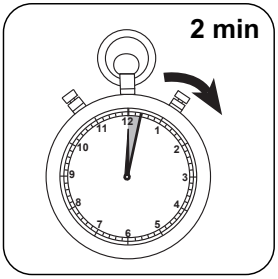
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。
结果在显示屏上显示为 mg / l 总氯。

化学方法

DPD

附錄

干扰说明

持续干扰

- 存在于样本中的所有氧化剂都像氯一样反应，导致多重结果。

可消除干扰

- 铜和铁（III）的干扰必须通过 EDTA 消除。
- 对于高钙含量*和/或高电导率*的样本，使用试剂片可能会导致样本浑浊和相关的测量误差。在这种情况下，可选用试剂片 DPD 编号1 高钙和试剂片 DPD 编号3 高钙。
  *不能给出精确值，因为浑浊的形成取决于样本水的类型和组成。

一致性

EN ISO 7393-2

[a)] 测定余氯，总氯和结合氯 | [e)] 替代试剂，取代DPD No.1/No.3试剂，用于由高浓度钙离子和/或高电导率引起的浑浊水样分析 | [#] i含搅拌棒, 10cm

T 铜 M150

0.05 - 5 mg/l Cu[a)] Cu

双喹啉

ZH

材料

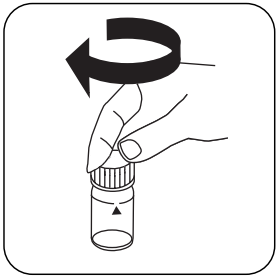
所需材料（部分可選）：

试剂	包装单位	货号
铜 No.1	片剂 / 100	513550BT
铜 No.1	片剂 / 250	513551BT
铜 No.2	片剂 / 100	513560BT
铜 No.2	片剂 / 250	513561BT
套件铜 No.1/No.2#	各100次	517691BT
套件铜 No.1/No.2#	各250次	517692BT

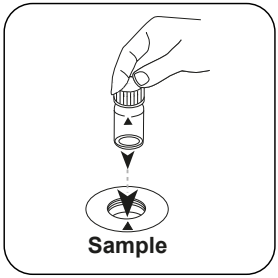
进行测定 余铜 片剂法

选择设备中的方法。
另外选择测定：余铜

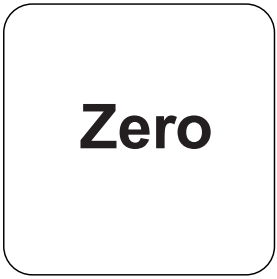
用 **10 ml 样本**填充 24 mm 比色杯。



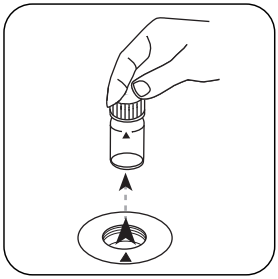
密封比色杯。



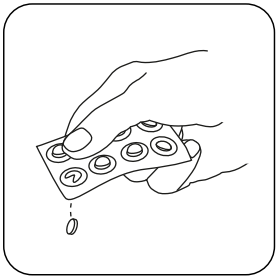
将**样本比色杯**放入测量轴中。注意定位。



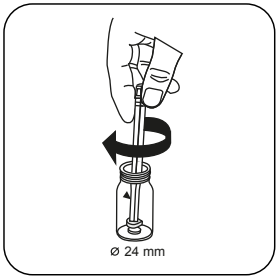
按下 **ZERO** 按钮。



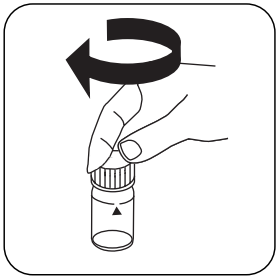
从测量轴上取下比色杯。



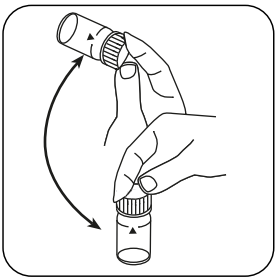
加入 **COPPER No. 1 片剂**。



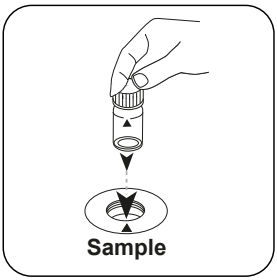
用轻微的扭转压碎片剂。



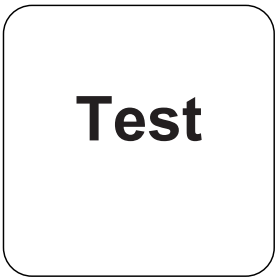
密封比色杯。



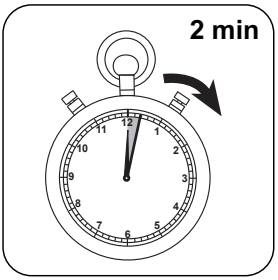
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

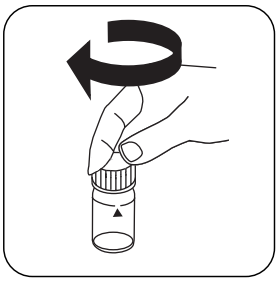


等待 **2 分钟反应时间** 。
反应时间结束后，自动进行测量。
结果在显示屏上显示为 mg / l 余铜。

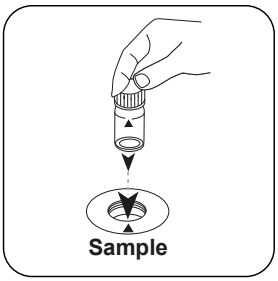
进行测定 总铜 片剂法

选择设备中的方法。
另外选择测定：总铜

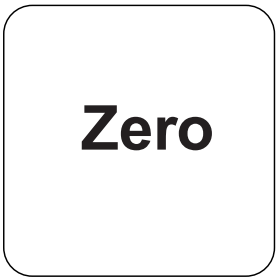
用 **10 ml 样本**填充 24 mm 比色杯。



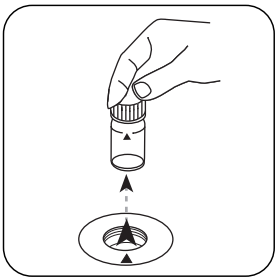
密封比色杯。



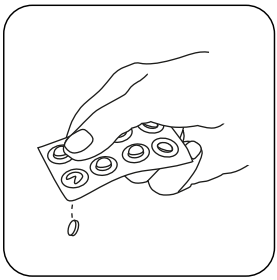
将**样本比色杯**放入测量轴中。注意定位。



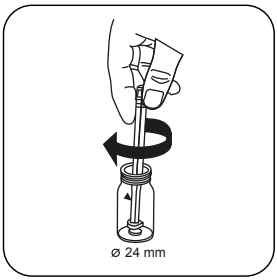
按下 **ZERO** 按钮。



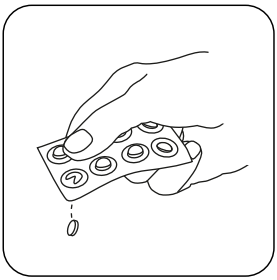
从测量轴上取下比色杯。



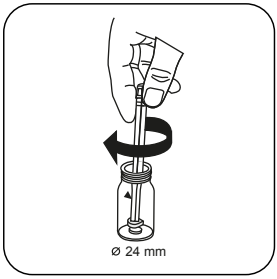
加入 **COPPER No. 1 片剂**。



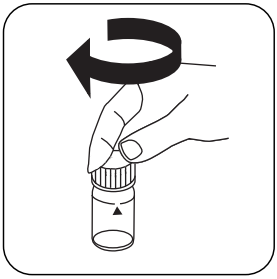
用轻微的扭转压碎片剂并溶解。



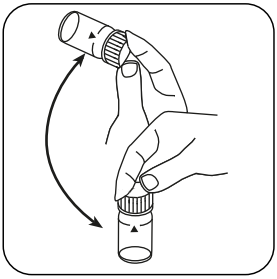
加入 **COPPER No. 2 片剂**。



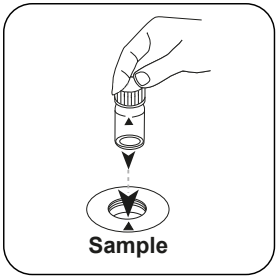
用轻微的扭转压碎片剂。



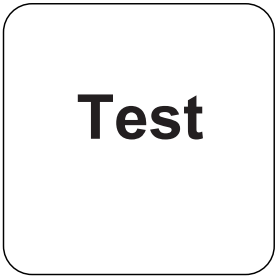
密封比色杯。



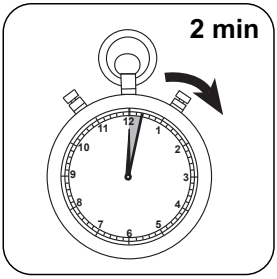
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。
反应时间结束后，自动进行测量。
结果在显示屏上显示为 mg / l 总铜。



按下 **TEST** (XD: **START**) 按钮。



等待 **2 分钟反应时间**。

化学方法

双喹啉

附錄

干扰说明

持续干扰

1. 干扰离子包括 Ag、Cd、Co、Hg、Sb、Sn 和大量的铁以及磷酸盐、亚硫酸盐、草酸盐或所有还原物。

方法验证

检出限	0.05 mg/l
测定下限	0.15 mg/l
测量上限	5 mg/l
灵敏度	3.8 mg/l / Abs
置信范围	0.026 mg/l
标准偏差	0.011 mg/l
变异系数	0.42 %

参考文献

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a] 测定余氯，总氯和结合氯 | # i含搅拌棒, 10cm

CyA HR T M161

10 - 200 mg/l CyA CyAH

三聚氰胺

ZH

材料

所需材料（部分可選）：

试剂	包装单位	货号
CYA HR 测试	片剂 / 100	511430BT
CYA HR 测试	片剂 / 250	511431BT

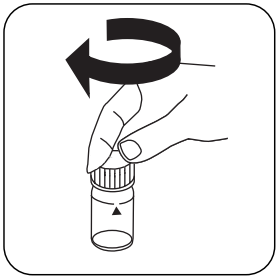
备注

1. 氰尿酸引起非常细微的分散浑浊和乳白色的外观。单个颗粒不是由于氰尿酸的存在造成的。
2. 加入CyA-HR-Test片剂后，两分钟内自动溶解。
3. **加入CyA-HR-测试片后，细胞不得移动。**

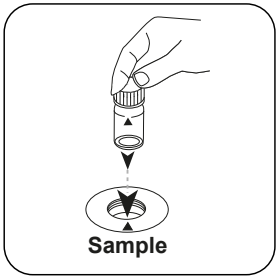
进行测定 用片剂进行氰尿酸测试

选择设备中的方法。

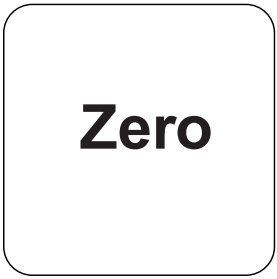
用 **10 ml 样本**填充 24 mm 比色杯。



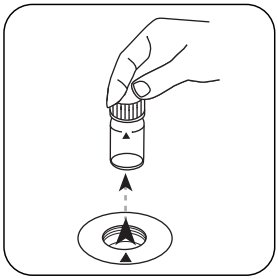
密封比色杯。



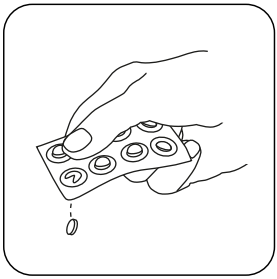
将**样本比色杯**放入测量轴中。注意定位。



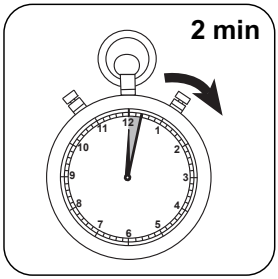
按下 **ZERO** 按钮。



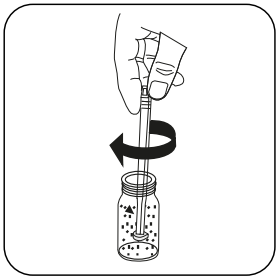
从测量轴上取下比色杯。



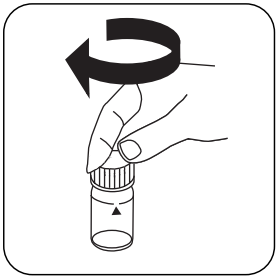
加入 **CyA HR Test 片剂**。



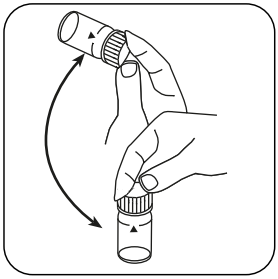
等待 **2 分钟反应时间** 。



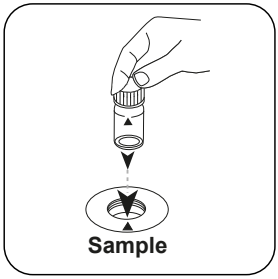
用清洁的搅拌棒搅拌溶解片剂。



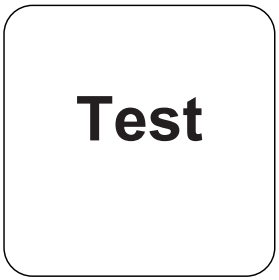
密封比色杯。



通过旋转混合内容物（不要摇晃）。



将**样本比色杯**放入测量轴中。注意定位。



ZH

按下 **TEST** (XD: **START**)
按钮。
结果在显示屏上显示为 mg / l 三聚氰酸。

化学方法

三聚氰胺

干扰说明

持续干扰

1. 未溶解的颗粒可能会导致结果过高。

方法验证

检出限	2.07 mg/l
测定下限	6.2 mg/l
测量上限	200 mg/l
灵敏度	77.47 mg/l / Abs
置信范围	4.6 mg/l
标准偏差	4.78 mg/l
变异系数	4.55 %

2T 钙硬度 M191

20 - 500 mg/l $CaCO_3$ CAH

紫脲酸铵

ZH

材料

所需材料（部分可選）：

试剂	包装单位	货号
套件 Calcio H No.1/No.2#	各100次	517761BT
套件 Calcio H No.1/No.2#	各250次	517762BT

准备

1. 在分析前（用 1 mol/l 盐酸或 1 mol/l 氢氧化钠溶液）应将强碱性或酸性水的 pH 范围调节到 4 和 10 之间。

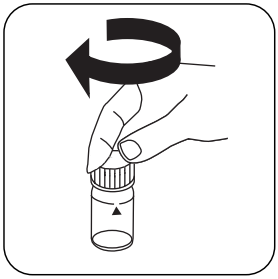
备注

1. 为了优化测量值，可选用于测定批次特定的方法空白值 (参阅光度计说明)。
2. 准确地遵守 10 ml 的样本体积对分析结果的准确度至关重要。
3. 本方法从滴定法发展而来。由于未定义的边界条件，与标准化方法的偏差可能更大。
4. 该方法在较高的测量范围内的公差大于在较低的测量范围内。稀释样本，使其在测量范围的下三分之一处进行测量。

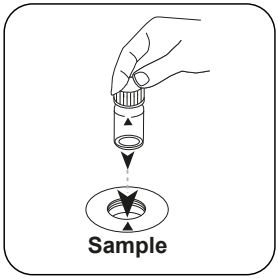
进行测定 2 钙硬度，片剂

选择设备中的方法。

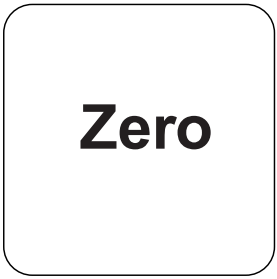
用 **10 ml 样本**填充 24 mm 比色杯。



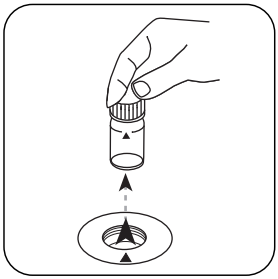
密封比色杯。



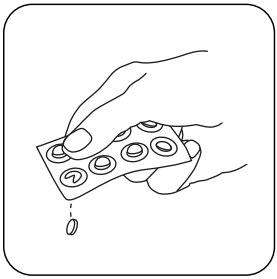
将**样本比色杯**放入测量轴中。注意定位。



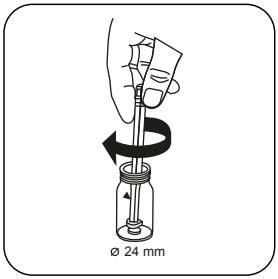
按下 **ZERO** 按钮。



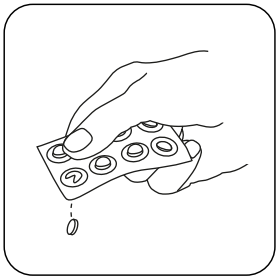
从测量轴上取下比色杯。



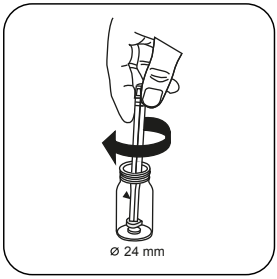
加入 **CALCIO H No.1 片剂**。



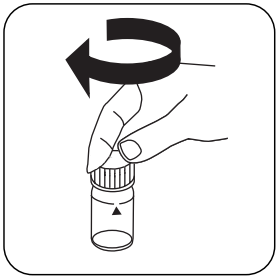
用轻微的扭转压碎片剂并溶解。



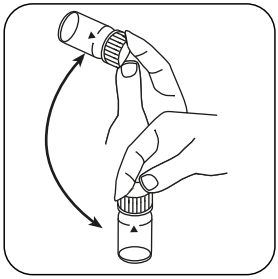
加入 **CALCIO H No.2 片剂**。



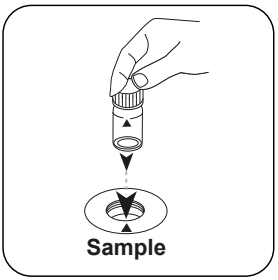
用轻微的扭转压碎片剂。



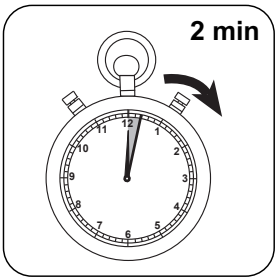
密封比色杯。



通过旋转溶解片剂。



Test



ZH

将**样本比色杯**放入测量轴中。注意定位。

按下 **TEST** (XD: **START**) 按钮。

等待 **2 分钟反应时间** 。

反应时间结束后，自动进行测量。
结果在显示屏上显示为 钙硬度。

分析

下表中输出数据也可转换为其他格式表示.

单位	参考表格	因素
mg/l	$CaCO_3$	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1

化学方法

紫脲酸铵

附錄

干扰说明

持续干扰

1. 银、镉、钴、铜和汞干扰测定。

干擾	從/ [mg/l]
Mg^{2+}	200 ($CaCO_3$)
Fe	10
Zn^{2+}	5

参考文献

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

i含搅拌棒, 10cm

T 铁 M220

0.02 - 1 mg/l Fe FE

Ferrozine/巯乙酸盐

材料

所需材料（部分可選）：

试剂	包装单位	货号
铁 II LR (Fe^{2+})	片剂 / 100	515420BT
铁 II LR (Fe^{2+})	片剂 / 250	515421BT
铁 LR (Fe^{2+} und Fe^{3+})	片剂 / 100	515370BT
铁 LR (Fe^{2+} und Fe^{3+})	片剂 / 250	515371BT

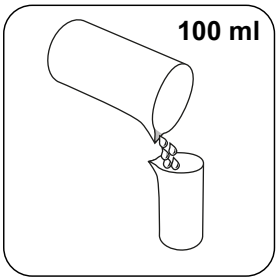
准备

1. 在必要情况下，已用有机化合物作为腐蚀抑制剂处理的水须被氧化，从而破坏铁复合物。为此，将 100 ml 样本与 1 ml 浓硫酸和 1 ml 浓硝酸混合并蒸发至一半。冷却后进行消解。

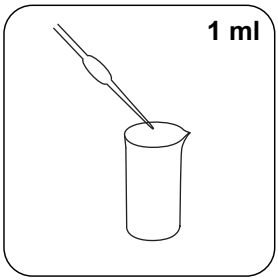
备注

1. 用这种方法测定总溶解的 Fe^{2+} 和 Fe^{3+}。
2. 为了测定 Fe^{2+} ，使用 IRON（II）LR 片剂代替 IRON LR 片剂。

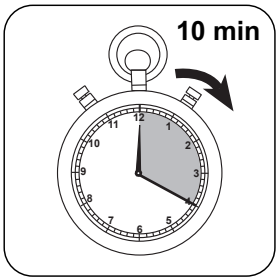
消解



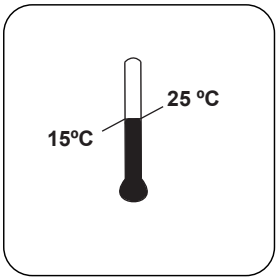
用 **100 ml 样本**填充合适的样本容器。



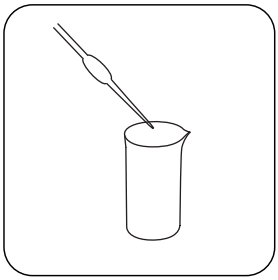
加入 **1 ml 浓硫酸 (≥ 95 %)** 。



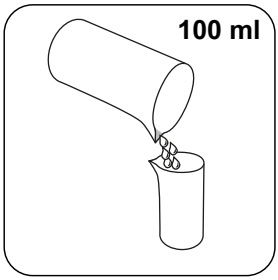
将样本**加热 10 分钟** ，或一直加热直到其完全溶解。



将样本冷却到**室温**。



将样本的 **pH 值**从 **氨溶液 (10-25 %) 调节到 3-5**。



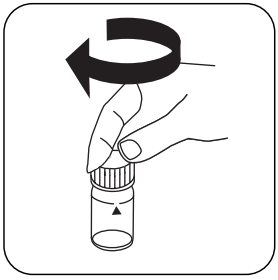
将样本用**去离子水填充至 100 ml** 。

使用该样本来分析 总溶解铁。

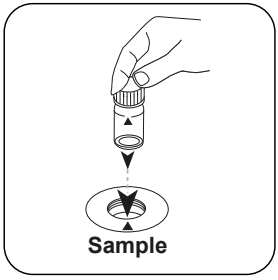
进行测定 铁（II,III），用片剂溶解

选择设备中的方法。
为了测定 **溶解和未溶解铁，进行** 中所述的**消解**。

用 **10 ml 样本**填充 24 mm 比色杯。



密封比色杯。

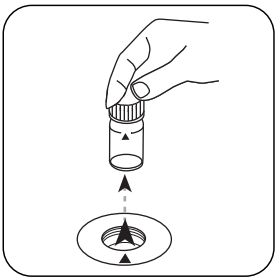


将**样本比色杯**放入测量轴中。注意定位。

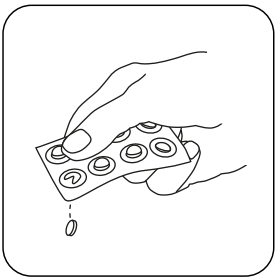
ZH

Zero

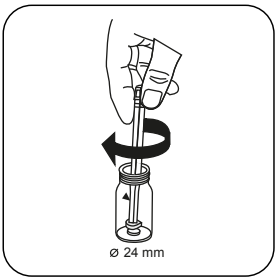
按下 **ZERO** 按钮。



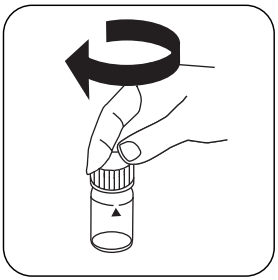
从测量轴上取下比色杯。



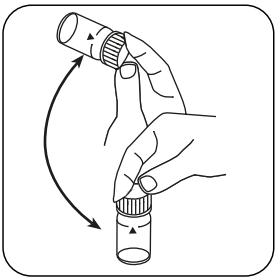
加入 **IRON LR 片剂**。



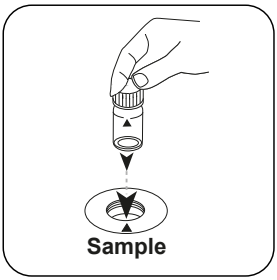
用轻微的扭转压碎片剂。



密封比色杯。



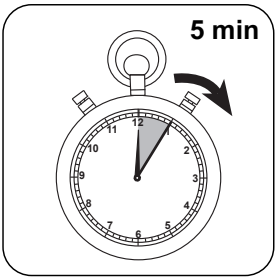
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。

Test

按下 **TEST** (XD: **START**) 按钮。



等待 **5 分钟反应时间** 。
反应时间结束后，自动进行测量。
结果在显示屏上显示为 mg / l 铁。

化学方法

Ferrozine/琉乙酸盐

附錄

干扰说明

可消除干扰

1. 铜的存在使测量结果增加了 10 %。样本中铜浓度为 10 mg/l 时，测量结果增加 1 mg/l 铁。
   干扰可以通过添加硫脲来消除

方法验证

检出限	0.01 mg/l
测定下限	0.016 mg/l
测量上限	1 mg/l
灵敏度	0.92 mg/l / Abs
置信范围	0.013 mg/l
标准偏差	0.005 mg/l
变异系数	1.23 %

参考文献

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

T pH 值 M330

6.5 - 8.4 PH

苯酚红

ZH

材料

所需材料（部分可選）：

试剂	包装单位	货号
酚红光度计	片剂 / 100	511770BT
酚红光度计	片剂 / 250	511771BT
酚红光度计	片剂 / 500	511772BT

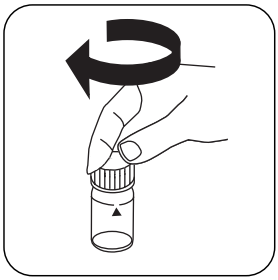
备注

1. 对于光度 pH 值测定，只应使用标有 PHOTOMETER 的带有黑色烫印的 PHENOL RED 片剂。

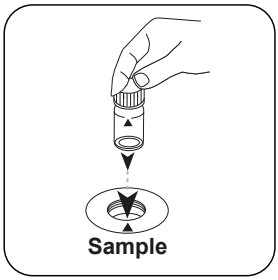
进行测定 pH 值片剂

选择设备中的方法。

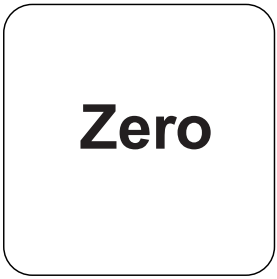
用 **10 ml 样本**填充 24 mm 比色杯。



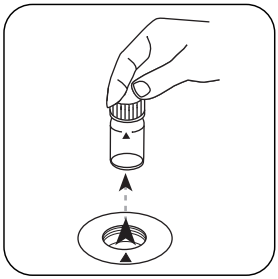
密封比色杯。



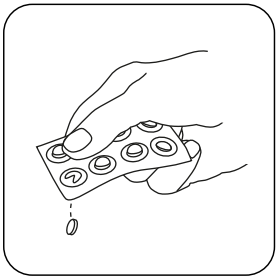
将**样本比色杯**放入测量轴中。注意定位。



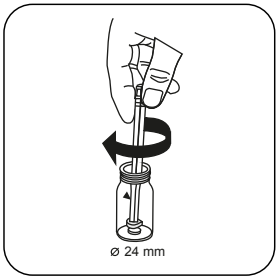
按下 **ZERO** 按钮。



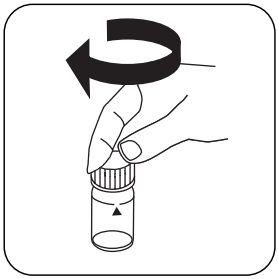
从测量轴上取下比色杯。



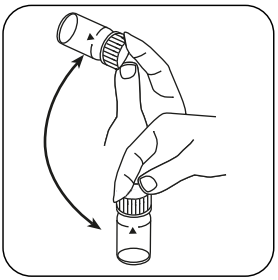
加入 **PHENOL RED PHOTOMETER 片剂**。



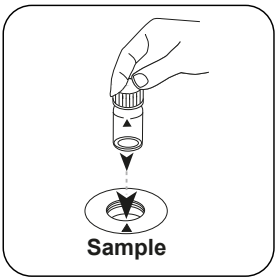
用轻微的扭转压碎片剂。



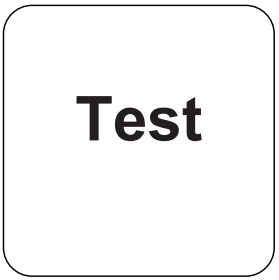
密封比色杯。



通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

结果在显示屏上显示为 pH 值。

化学方法

苯酚红

附錄

干扰说明

持续干扰

1. 碳酸盐硬度*低的水样可能会得出错误的 pH 值。
   *$K_{S4,3}$ < 0,7 mmol/l ≙ 总碱度 < 35 mg/l $CaCO_3$.

可消除干扰

1. pH 值低于 6.5 和高于 8.4 可导致测量范围内的结果。建议使用可信度测试（pH 计）。
2. 盐误差：
   对于盐含量高达 2 g/l，试剂片的盐含量不会引起明显的盐误差。对于较高的盐含量，测量值应进行如下校正：

样本的盐含量以 g/l 为单位	30（海水）	60	120	180
校正	-0,15[1)]	-0,21[2)]	-0,26[2)]	-0,29[2)]

[1)] 根据 Kolthoff (1922)
[2)] 根据 Parson 和 Douglas (1926)

参考文献

Colorimetric Chemical Analytical Methods, 9th Edition, London

T 尿素 M391

0.2 - 5 mg/l Urea[i] Ur2

靛酚/ 尿酸

ZH

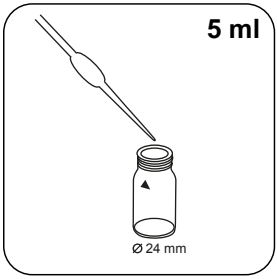
材料

所需材料（部分可選）：

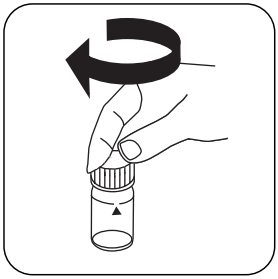
试剂	包装单位	货号
尿素试剂 1	15 毫升	459300
尿素试剂 2	10 毫升	459400
氨 No.1	片剂 / 100	512580BT
氨 No.1	片剂 / 250	512581BT
氨 No.2	片剂 / 100	512590BT
氨 No.2	片剂 / 250	512591BT
套件氨 No.1/No.2#	各100次	517611BT
套件氨 No.1/No.2#	各250次	517612BT
铵调制粉	粉剂 / 15 g	460170
尿素预处理 (compensates for the interference of free Chlorine up to 2 mg/l)	片剂 / 100	516110BT
尿素试剂套件	1 组	517800BT

进行测定 尿素片剂和液剂

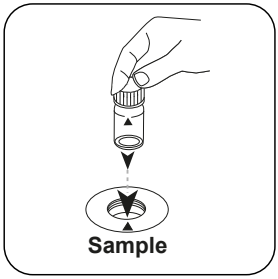
选择设备中的方法。



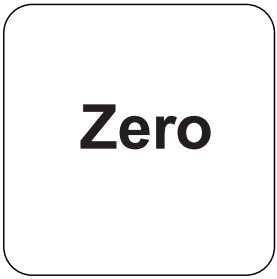
添加 **5 ml 样本**和 **5 ml 去离子水**到样本比色杯中。



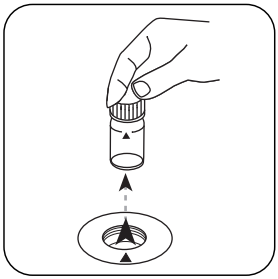
密封比色杯。



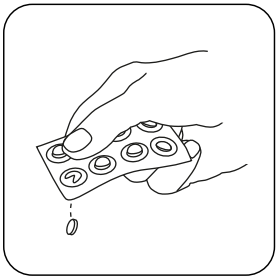
将**样本比色杯**放入测量轴中。注意定位。



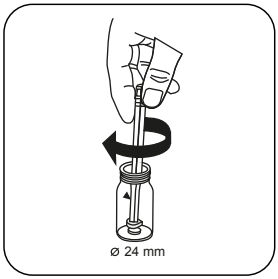
按下 **ZERO** 按钮。



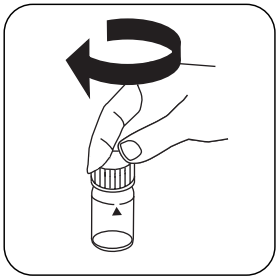
从测量轴上取下比色杯。



在游离氯（HOCl）的存在下，加入**一片 UREA PRETREAT 片剂**。

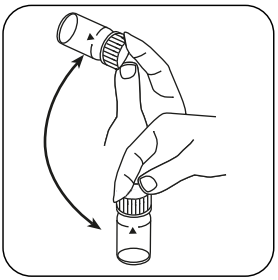


用轻微的扭转压碎片剂。

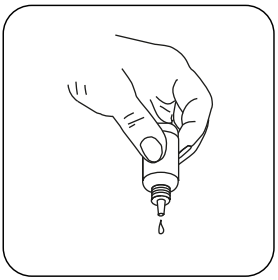


密封比色杯。

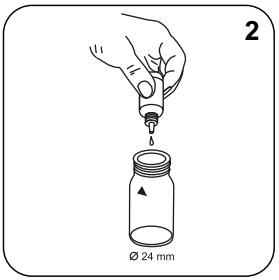
ZH



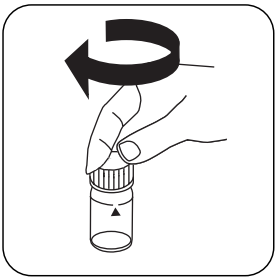
通过旋转溶解片剂。



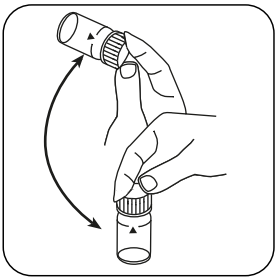
垂直握住滴瓶，慢慢加入相同大小的滴剂。



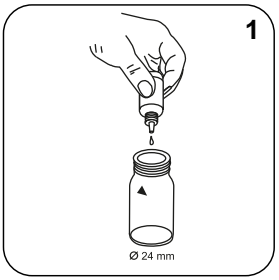
加入 **2 滴 UREA Reagenz 1**。



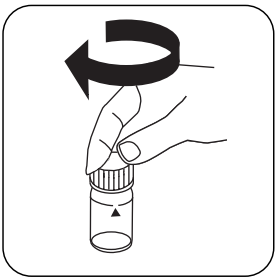
密封比色杯。



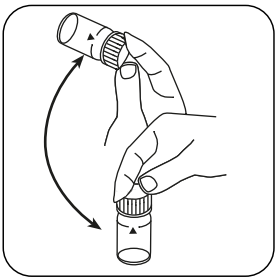
通过旋转混合内容物。



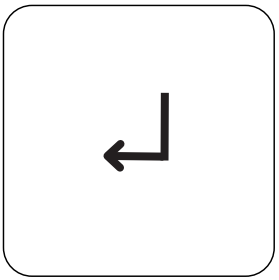
加入 **1 滴 UREA Reagenz 2**。



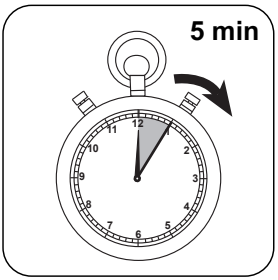
密封比色杯。



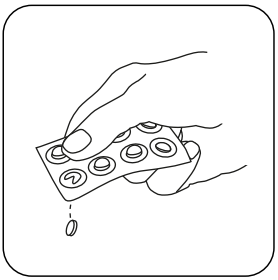
通过旋转混合内容物。



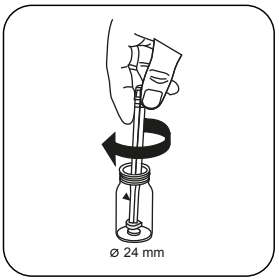
按下 **ENTER** 按钮。



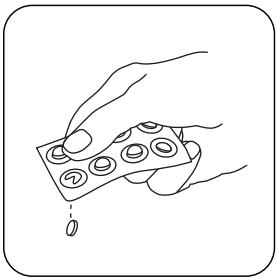
等待 **5 分钟反应时间** 。



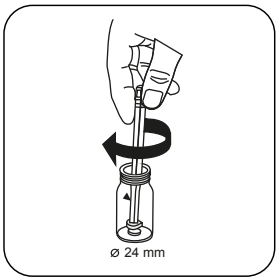
加入 **AMMONIA No. 1 片剂**。



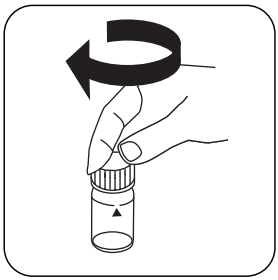
用轻微的扭转压碎片剂。



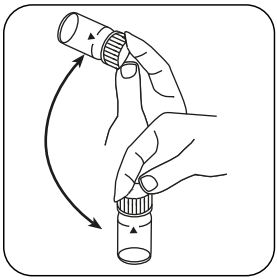
加入 **AMMONIA No. 2 片剂**。



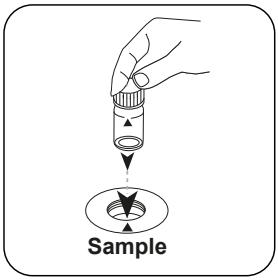
用轻微的扭转压碎片剂。



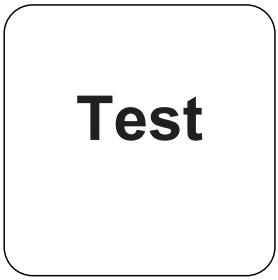
密封比色杯。



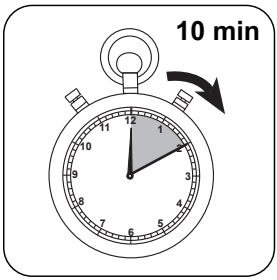
通过旋转溶解片剂。



将**样本比色杯**放入测量轴中。注意定位。



按下 **TEST** (XD: **START**) 按钮。

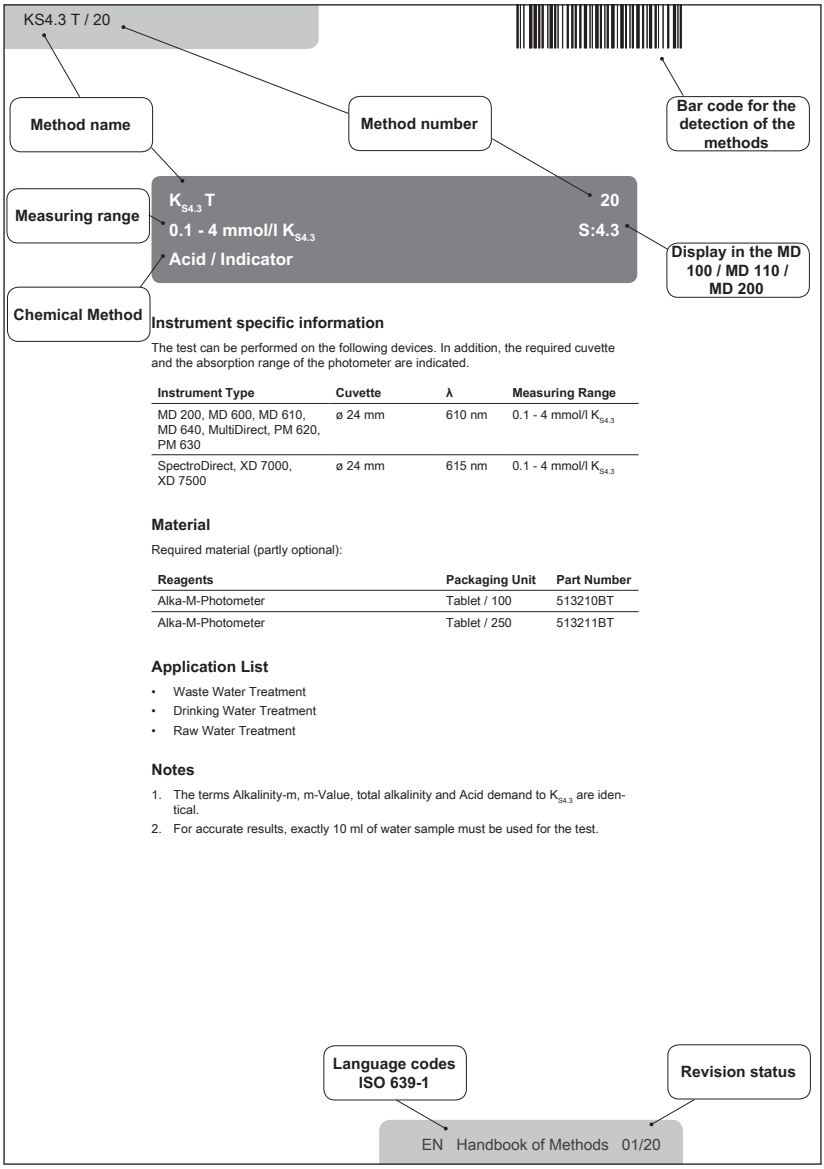


等待 **10 分钟反应时间**。
反应时间结束后，自动进行测量。
结果在显示屏上显示为 mg / l 尿素。

化学方法

靛酚/ 尿酸

[1] 通过稀释进行高量程测定 | # i含搅拌棒, 10cm


KS4.3 T / 20
Method name
Method number
Bar code for the detection of the methods
Measuring range
Chemical Method
Display in the MD 100 / MD 110 / MD 200
$K_{S4.3}$ T
20
0.1 - 4 mmol/l $K_{S4.3}$
S:4.3
Acid / Indicator
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 200, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630 | ø 24 mm | 610 nm | 0.1 - 4 mmol/l $K_{S4.3}$
SpectroDirect, XD 7000, XD 7500 | ø 24 mm | 615 nm | 0.1 - 4 mmol/l $K_{S4.3}$
Material
Required material (partly optional):
Reagents | Packaging Unit | Part Number
Alka-M-Photometer | Tablet / 100 | 513210BT
Alka-M-Photometer | Tablet / 250 | 513211BT
Application List
• Waste Water Treatment
• Drinking Water Treatment
• Raw Water Treatment
Notes
1. The terms Alkalinity-m, m-Value, total alkalinity and Acid demand to $K_{S4.3}$ are identical.
2. For accurate results, exactly 10 ml of water sample must be used for the test.
Language codes ISO 639-1
Revision status
EN Handbook of Methods 01/20

Performing test procedure

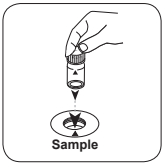
Implementation of the provision Acid capacity $K_{S4.3}$ with Tablet

Select the method on the device

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**.

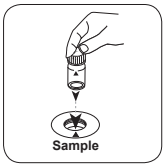
Close vial(s).



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

• • •

Dissolve tablet(s) by inverting.



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

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

The result in Acid Capacity $K_{S4.3}$ appears on the display.

Alkalinity-m T M30

5 - 200 mg/l $CaCO_3$ tA

Acid / Indicator

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Alka-M-Photometer	Tablet / 100	513210BT
Alka-M-Photometer	Tablet / 250	513211BT

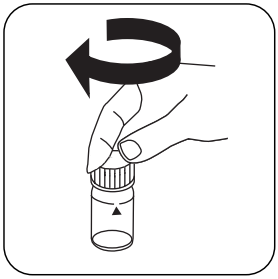
Notes

1. The terms Alkalinity-m, m-Value, total alkalinity and Acid demand to $K_{S4.3}$ are identical.
2. For accurate results, exactly 10 ml of water sample must be used for the test.

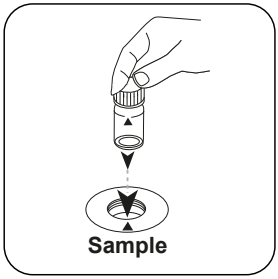
Implementation of the provision Alkalinity, total = Alkalinity-m = m-Value with Tablet

Select the method on the device

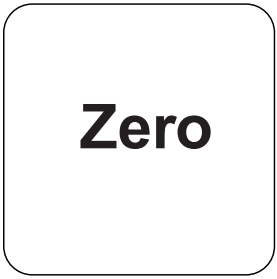
Fill 24 mm vial with **10 ml sample**.



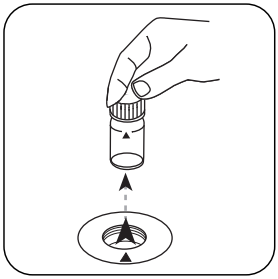
Close vial(s).



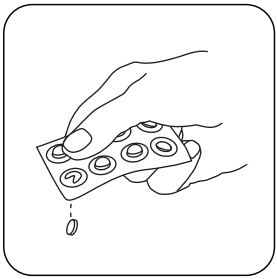
Place **sample vial** in the sample chamber. • Pay attention to the positioning.



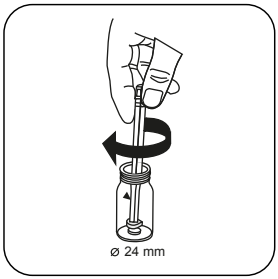
Press the **ZERO** button.



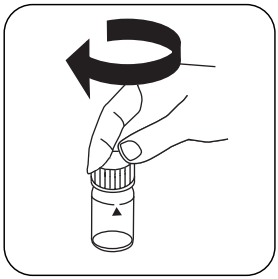
Remove the vial from the sample chamber.



Add **ALKA-M-PHOTOMETER tablet**.

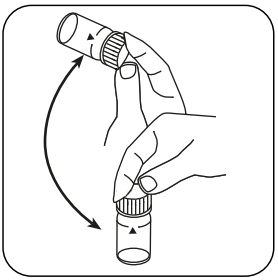


Crush tablet(s) by rotating slightly.

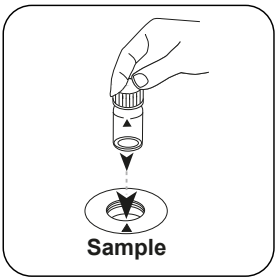


Close vial(s).

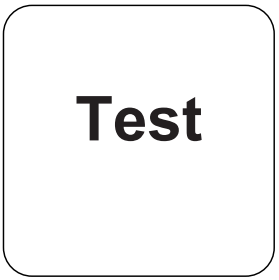
EN



Dissolve tablet(s) by inverting.



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



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

The result in Alkalinity-m 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	$CaCO_3$	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	0.058
	$K_{S4.3}$	0.02

Chemical Method

Acid / Indicator

Appendix

Derived from

EN ISO 9963-1

Chlorine T M100

0.01 - 6.0 mg/l Cl_2 [a] CL6

DPD

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
DPD No. 1	Tablet / 100	511050BT
DPD No. 1	Tablet / 250	511051BT
DPD No. 1	Tablet / 500	511052BT
DPD No. 3	Tablet / 100	511080BT
DPD No. 3	Tablet / 250	511081BT
DPD No. 3	Tablet / 500	511082BT
DPD No. 1 High Calcium [e]	Tablet / 100	515740BT
DPD No. 1 High Calcium [e]	Tablet / 250	515741BT
DPD No. 1 High Calcium [e]	Tablet / 500	515742BT
DPD No. 3 High Calcium [e]	Tablet / 100	515730BT
DPD No. 3 High Calcium [e]	Tablet / 250	515731BT
DPD No. 3 High Calcium [e]	Tablet / 500	515732BT
DPD No. 4	Tablet / 100	511220BT
DPD No. 4	Tablet / 250	511221BT
DPD No. 4	Tablet / 500	511222BT
Refill Pack Scuba II	1 pc.	525600

Available Standards

Title	Packaging Unit	Part Number
ValidCheck Chlorine 1,5 mg/l	98.5 + 1.5 ml	48105510

Sampling

1. When preparing the sample, Chlorine outgassing, e.g. through the pipette or shaking, must be avoided.
2. The analysis must take place immediately after taking the sample.

Preperation

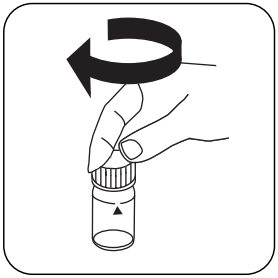
1. Cleaning of vials:
   As many household cleaners (e.g. dishwasher detergent) contain reducing substances, this can lead to lower results with the determination of Chlorine. To avoid measurement errors, the glassware used should be free of chlorine consumption. To achieve this, all glassware should be placed in a sodium hypochlorite solution (0.1 g/l) for one hour and then rinsed thoroughly with deionised water.
2. For individual testing of free and total Chlorine, the use of different sets of glassware is recommended (EN ISO 7393-2, 5.3)
3. The DPD colour development is carried out at a pH value of 6.2 to 6.5. The reagents therefore contain a buffer for the pH adjustment. Strong alkaline or acidic water samples must therefore be adjusted between pH 6 and pH 7 before the analysis (use 0.5 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).

EN

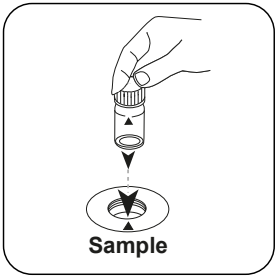
Implementation of the provision free chlorine with tablet

Select the method on the device
In addition, choose the test: free

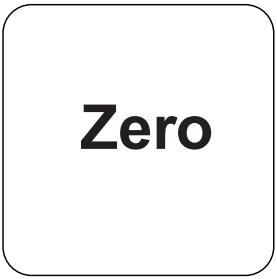
Fill 24 mm vial with **10 ml sample**.



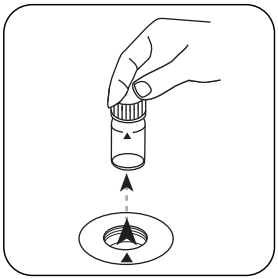
Close vial(s).



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

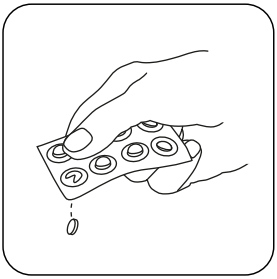


Press the **ZERO** button.

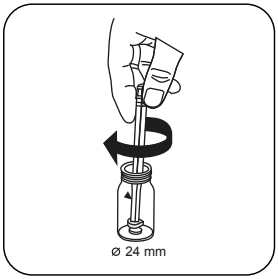


Remove the vial from the sample chamber.

Empty vial except for a few drops.

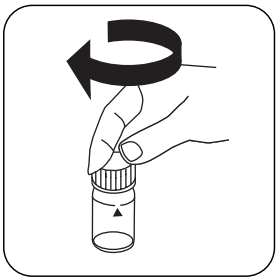


Add **DPD No. 1 tablet** .

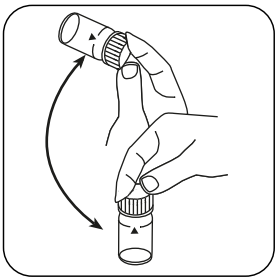


Crush tablet(s) by rotating slightly.

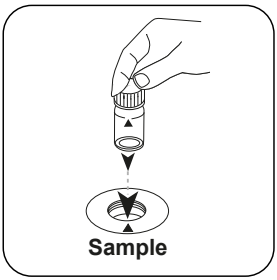
Fill up vial with **sample** to the **10 ml mark**.



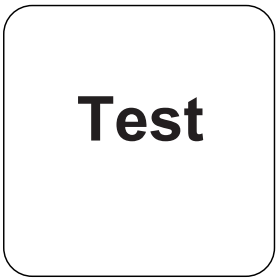
Close vial(s).



Dissolve tablet(s) by inverting.



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

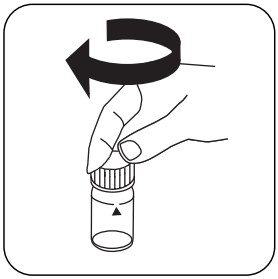


Press the **TEST** (XD: **START**)button.
The result in mg/l free chlorine appears on the display.

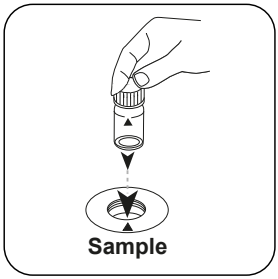
Implementation of the provision total Chlorine with tablet

Select the method on the device
In addition, choose the test: total

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

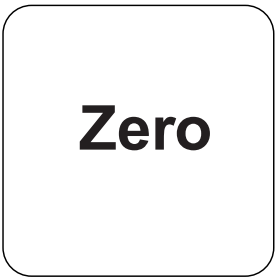


Close vial(s).

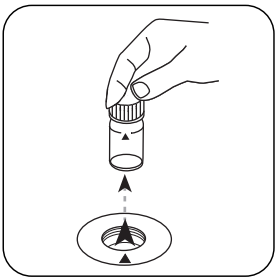


Place **sample vial** in the sample chamber. • Pay attention to the positioning.

EN

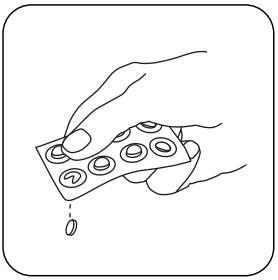


Press the **ZERO** button.

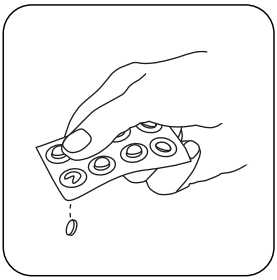


Remove the vial from the sample chamber.

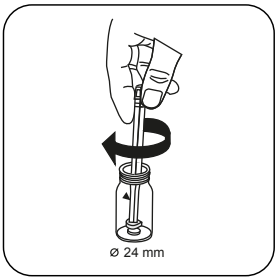
Empty vial except for a few drops.



Add **DPD No. 1 tablet** .

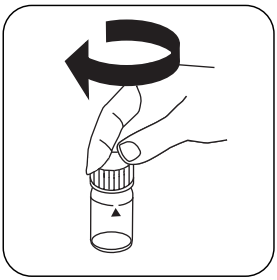


Add **DPD No. 3 tablet** .

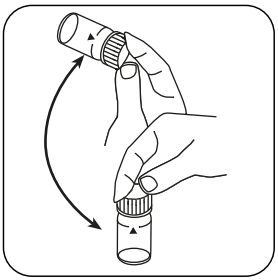


Crush tablet(s) by rotating slightly.

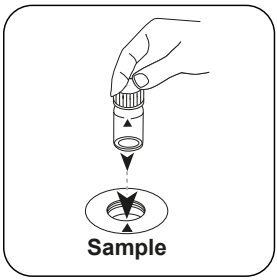
Fill up vial with **sample** to the **10 ml mark**.



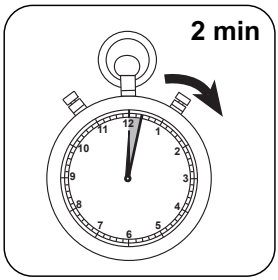
Close vial(s).



Dissolve tablet(s) by inverting.



Test



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 total Chlorine appears on the display.

Chemical Method

DPD

Appendix

EN

Interferences

Persistant Interferences

- All oxidising agents in the samples react like chlorine, which leads to higher results.

Removeable Interferences

- Interference from Copper and Iron (III) are eliminated by the addition of EDTA.
- The use of reagent tablets in samples with high Calcium content* and/or high conductivity* can lead to turbidity of the sample and therefore incorrect measurements. In this case, the alternative reagent tablet DPD No. 1 High Calcium and reagent tablet DPD No. 3 High Calcium should be used.
  *it is not possible to give exact values, because the development of turbidity depends on the composition and nature of the sample.
- Concentrations above 10 mg/l Chlorine, in the event of using fluid reagents, can lead to results within the measuring range of up to 0 mg/l. In the event of a high concentration of Chlorine, the sample must be diluted with chlorine-free water. 10 ml of the diluted sample should be mixed with the reagent and the measurement taken again (plausibility test).

Interference	from / [mg/l]
CrO_4^{2-}	0.01
MnO_2	0.01

Method Validation

Limit of Detection	0.02 mg/l
Limit of Quantification	0.06 mg/l
End of Measuring Range	6 mg/l
Sensitivity	2.05 mg/l / Abs
Confidence Intervall	0.04 mg/l
Standard Deviation	0.019 mg/l
Variation Coefficient	0.87 %

Conformity

EN ISO 7393-2

[a] determination of free, combined and total | [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

Chlorine HR T M103

0.1 - 10 mg/l Cl_2 [a)] CL10

DPD

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
DPD No. 1 HR	Tablet / 100	511500BT
DPD No. 1 HR	Tablet / 250	511501BT
DPD No. 1 HR	Tablet / 500	511502BT
DPD No. 3 HR	Tablet / 100	511590BT
DPD No. 3 HR	Tablet / 250	511591BT
DPD No. 3 HR	Tablet / 500	511592BT
Set DPD No. 1 HR/No. 3 HR 100 Pc. [#]	100 each	517791BT
Set DPD No. 1 HR/No. 3 HR 250 Pc. [#]	250 each	517792BT
DPD No. 1 High Calcium [e)]	Tablet / 100	515740BT
DPD No. 1 High Calcium [e)]	Tablet / 250	515741BT
DPD No. 1 High Calcium [e)]	Tablet / 500	515742BT
DPD No. 3 High Calcium [e)]	Tablet / 100	515730BT
DPD No. 3 High Calcium [e)]	Tablet / 250	515731BT
DPD No. 3 High Calcium [e)]	Tablet / 500	515732BT

Sampling

1. When preparing the sample, Chlorine outgassing, e.g. through the pipette or shaking, must be avoided.
2. The analysis must take place immediately after taking the sample.

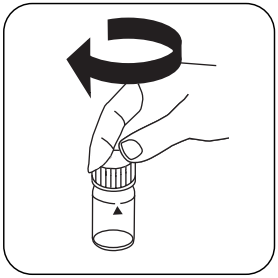
Preperation

1. Cleaning of vials:
   As many household cleaners (e.g. dishwasher detergent) contain reducing substances, this can lead to lower results with the determination of Chlorine. To avoid measurement errors, the glassware used should be free of chlorine consumption. To achieve this, all glassware should be placed in a sodium hypochlorite solution (0.1 g/l) for one hour and then rinsed thoroughly with deionised water.
2. For individual testing of free and total Chlorine, the use of different sets of glassware is recommended (EN ISO 7393-2, 5.3)
3. The DPD colour development is carried out at a pH value of 6.2 to 6.5. The reagents therefore contain a buffer for the pH adjustment. Strong alkaline or acidic water samples must therefore be adjusted between pH 6 and pH 7 before the analysis (use 0.5 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).

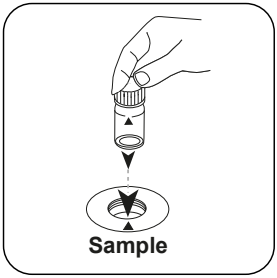
Implementation of the provision free chlorine HR with tablet

Select the method on the device
In addition, choose the test: free

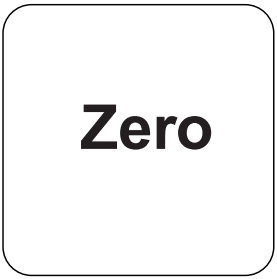
Fill 24 mm vial with **10 ml sample**.



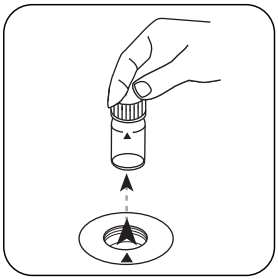
Close vial(s).



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

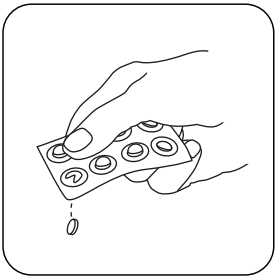


Press the **ZERO** button.

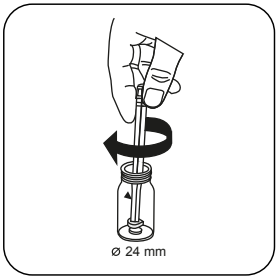


Remove the vial from the sample chamber.

Empty vial except for a few drops.

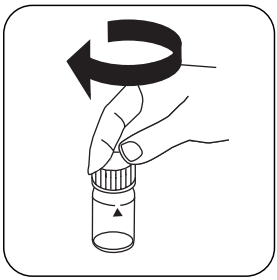


Add **DPD No. 1 HR tablet**.

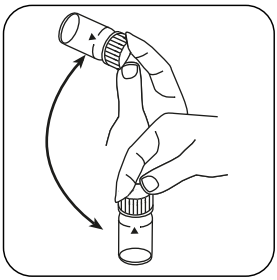


Crush tablet(s) by rotating slightly.

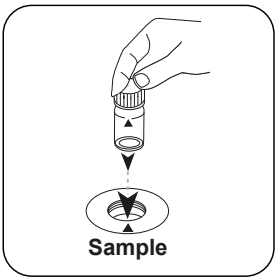
Fill up vial with **sample** to the **10 ml mark**.



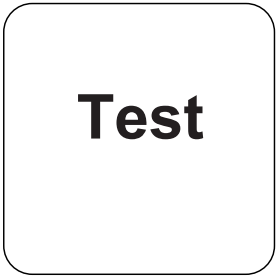
Close vial(s).



Dissolve tablet(s) by inverting.



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

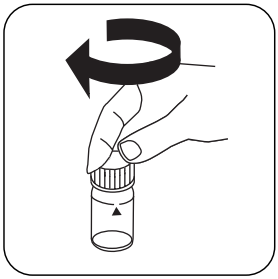


Press the **TEST** (XD: **START**)button.
The result in mg/l free chlorine appears on the display.

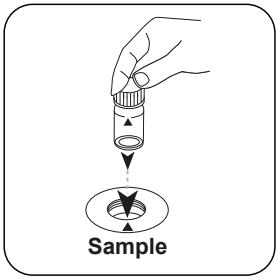
Implementation of the provision totale Chlorine HR with tablet

Select the method on the device
In addition, choose the test: total

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

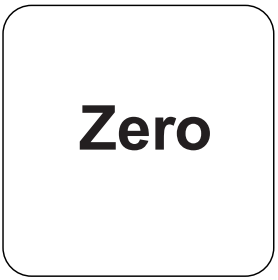


Close vial(s).

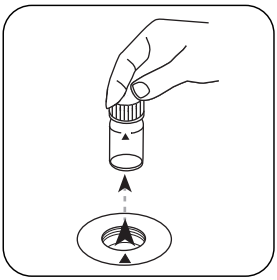


Place **sample vial** in the sample chamber. • Pay attention to the positioning.

EN

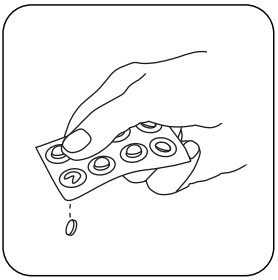


Press the **ZERO** button.

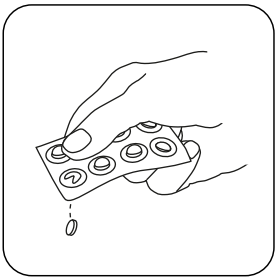


Remove the vial from the sample chamber.

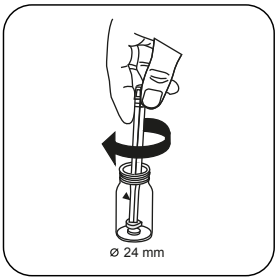
Empty vial except for a few drops.



Add **DPD No. 1 HR tablet**.

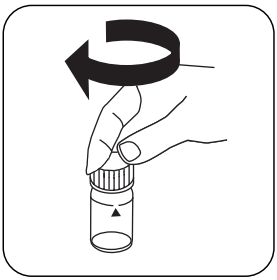


Add **DPD No. 3 HR tablet**.

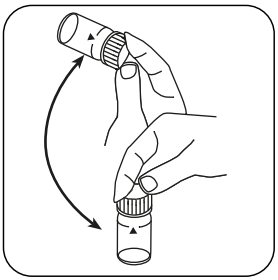


Crush tablet(s) by rotating slightly.

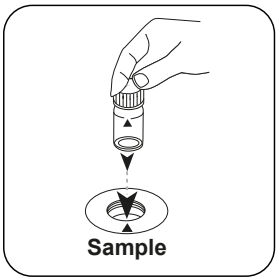
Fill up vial with **sample** to the **10 ml mark**.



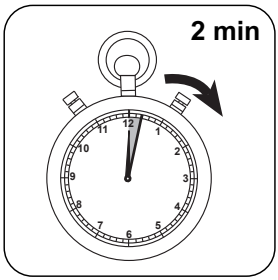
Close vial(s).



Dissolve tablet(s) by inverting.



Test



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 total Chlorine appears on the display.

Chemical Method

DPD

Appendix

EN

Interferences

Persistant Interferences

- All oxidising agents in the samples react like chlorine, which leads to higher results.

Removeable Interferences

- Interference from Copper and Iron (III) are eliminated by the addition of EDTA.
- The use of reagent tablets in samples with high Calcium content* and/or high conductivity* can lead to turbidity of the sample and therefore incorrect measurements. In this case, the alternative reagent tablet DPD No. 1 High Calcium and reagent tablet DPD No. 3 High Calcium should be used.
  *it is not possible to give exact values, because the development of turbidity depends on the composition and nature of the sample.

Conformity

EN ISO 7393-2

[a)] determination of free, combined and total | [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 | [#] including stirring rod, 10 cm

Copper T **M150**

0.05 - 5 mg/l Cu[a)] **Cu**

Biquinoline

EN

Material

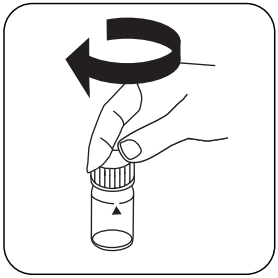
Required material (partly optional):

Reagents	Packaging Unit	Part Number
Copper No. 1	Tablet / 100	513550BT
Copper No. 1	Tablet / 250	513551BT
Copper No. 2	Tablet / 100	513560BT
Copper No. 2	Tablet / 250	513561BT
Set Copper No. 1/No. 2 100 Pc.[#]	100 each	517691BT
Set Copper No. 1/No. 2 250 Pc.[#]	250 each	517692BT

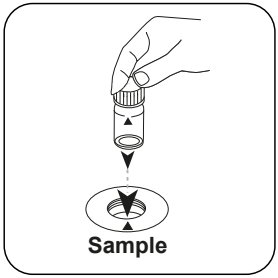
Implementation of the provision Copper, free with tablet

Select the method on the device
In addition, choose the test: free

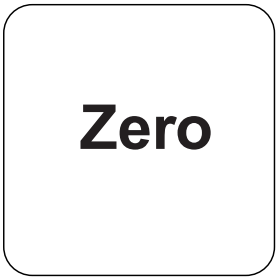
Fill 24 mm vial with **10 ml sample**.



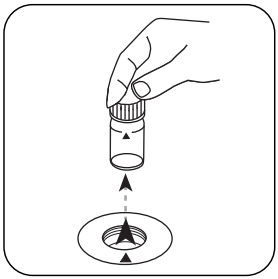
Close vial(s).



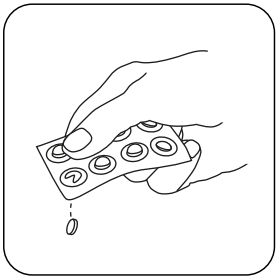
Place **sample vial** in the sample chamber. • Pay attention to the positioning.



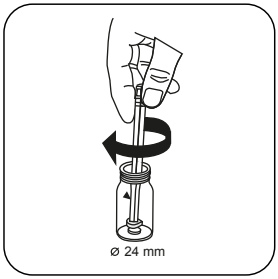
Press the **ZERO** button.



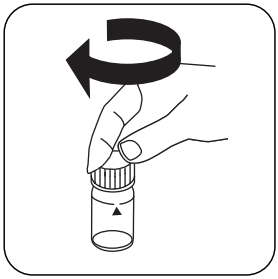
Remove the vial from the sample chamber.



Add **COPPER No. 1 tablet** .

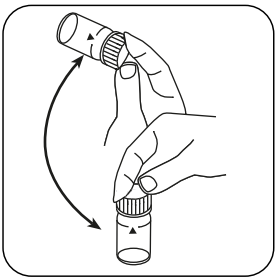


Crush tablet(s) by rotating slightly.

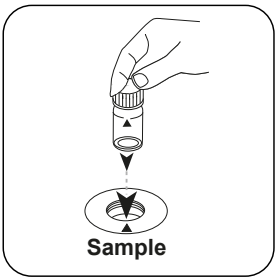


Close vial(s).

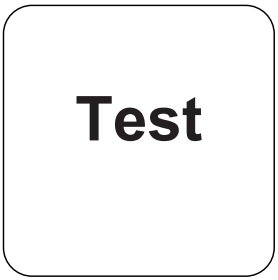
EN



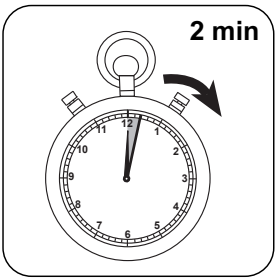
Dissolve tablet(s) by inverting.



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



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

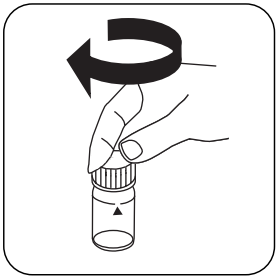


Wait for **2 minute(s) reaction time**.
Once the reaction period is finished, the measurement takes place automatically.
The result in mg/l free Copper appears on the display.

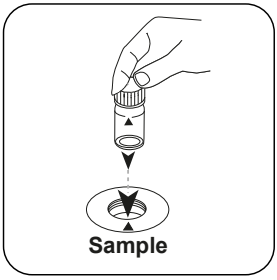
Implementation of the provision Copper, total with tablet

Select the method on the device
In addition, choose the test: total

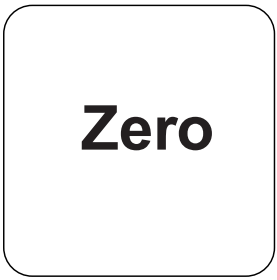
Fill 24 mm vial with **10 ml sample**.



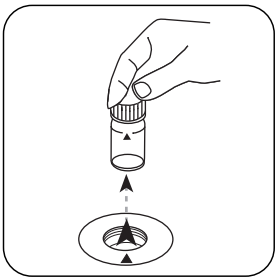
Close vial(s).



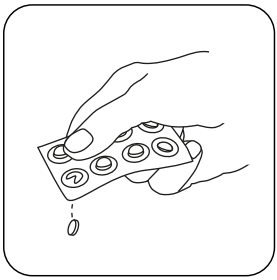
Place **sample vial** in the sample chamber. • Pay attention to the positioning.



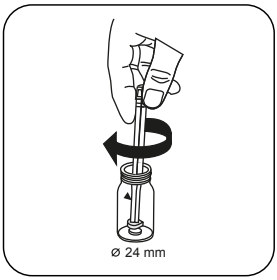
Press the **ZERO** button.



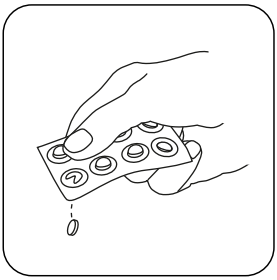
Remove the vial from the sample chamber.



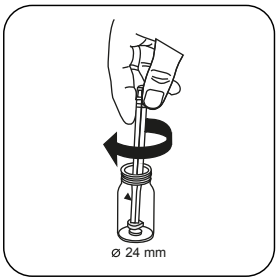
Add **COPPER No. 1 tablet** .



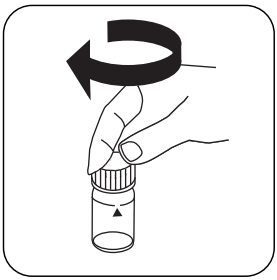
Crush tablet(s) by rotating slightly and dissolve.



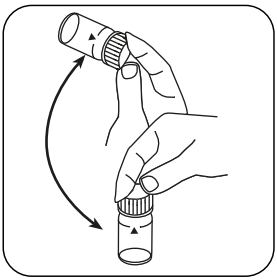
Add **COPPER No. 2 tablet** .



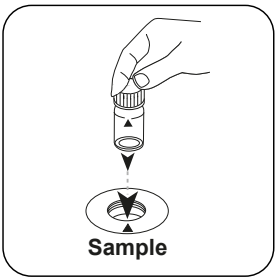
Crush tablet(s) by rotating slightly.

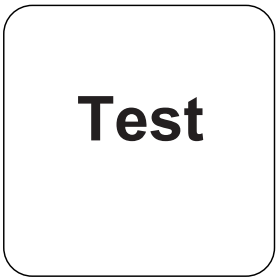


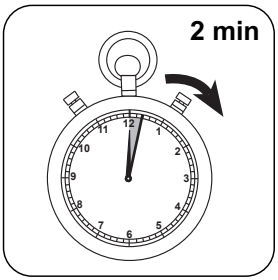
Close vial(s).



Dissolve tablet(s) by inverting.







EN

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 total Copper appears on the display.

Chemical Method

Biquinoline

Appendix

Interferences

Persistant Interferences

1. Ag, Cd, Co, Hg, Sb, Sn, larger quantities of iron, and phosphates, sulphites, oxalate or all-reducing substances are all classed as interfering ions.

Method Validation

Limit of Detection	0.05 mg/l
Limit of Quantification	0.15 mg/l
End of Measuring Range	5 mg/l
Sensitivity	3.8 mg/l / Abs
Confidence Intervall	0.026 mg/l
Standard Deviation	0.011 mg/l
Variation Coefficient	0.42 %

Bibliography

Photometrische Analyse, Lange/Vedjelek, Verlag Chemie 1980

[a)] determination of free, combined and total | [#] including stirring rod, 10 cm

CyA HR T M161

10 - 200 mg/l CyA CyAH

Melamine

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
CyA HR-Test	Tablet / 100	511430BT
CyA HR-Test	Tablet / 250	511431BT

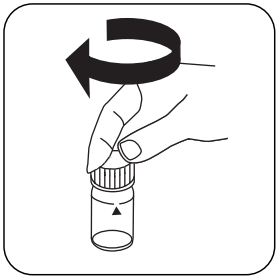
Notes

1. Cyanuric acid causes an extremely fine distributed turbidity with a milky appearance. Individual particles are not attributable to the presence of cyanuric acid.
2. After addition of the CyA-HR-Test tablet, it dissolves automatically within two minutes.
3. **The vial must not be moved after the addition of the CyA-HR-Test tablet.**

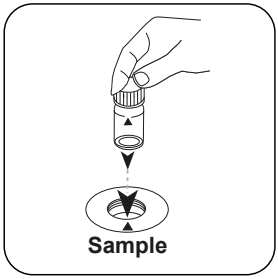
Implementation of the provision Cyanuric Acid Test with Tablet

Select the method on the device

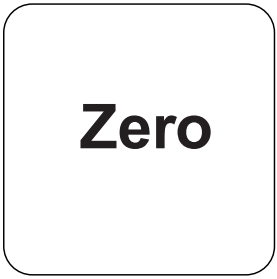
Fill 24 mm vial with **10 ml sample**.



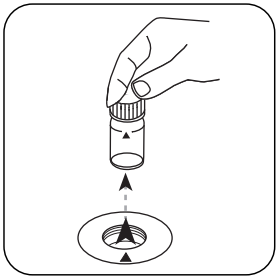
Close vial(s).



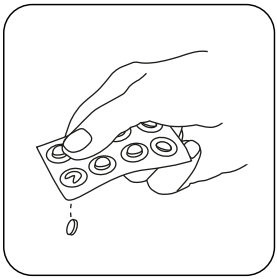
Place **sample vial** in the sample chamber. • Pay attention to the positioning.



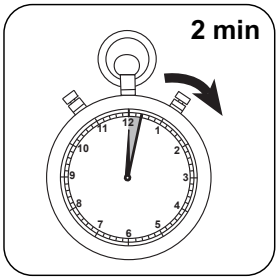
Press the **ZERO** button.



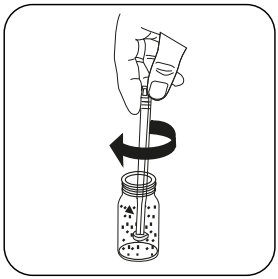
Remove the vial from the sample chamber.



Add **CyA HR Test tablet**.



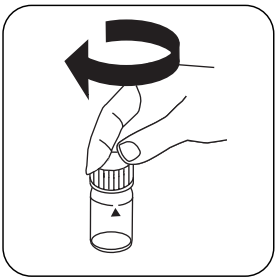
Wait for **2 minute(s) reaction time**.



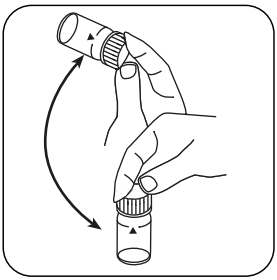
Dissolve the tablets using a clean stirring rod.

EN

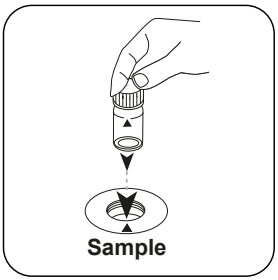
EN



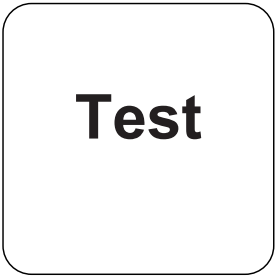
Close vial(s).



Invert several times to mix the contents (do not shake).



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



Press the **TEST** (XD: **START**)button.
The result in mg/l Cyanuric Acid appears on the display.

Chemical Method

Melamine

Interferences

Persistant Interferences

1. Undissolved particles may lead to higher results.

Method Validation

Limit of Detection	2.07 mg/l
Limit of Quantification	6.2 mg/l
End of Measuring Range	200 mg/l
Sensitivity	77.47 mg/l / Abs
Confidence Intervall	4.6 mg/l
Standard Deviation	4.78 mg/l
Variation Coefficient	4.55 %

Hardness Calcium (B) T M191

20 - 500 mg/l $CaCO_3$ CAH

Murexide

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Set Calcio H No. 1/No. 2 100 Pc.#	100 each	517761BT
Set Calcio H No. 1/No. 2 250 Pc.#	250 each	517762BT

Preperation

1. Strong alkaline or acidic water samples should be adjusted between pH 4 and pH 10 before the analysis (use 1 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).

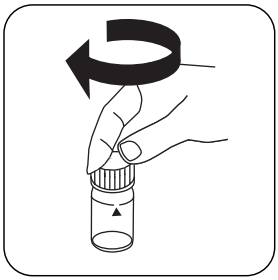
Notes

1. To optimise the readings, an optional batch-specific blind value method can be performed (see photometer description).
2. For accurate results, exactly 10 ml of water sample must be used for the test.
3. This method was developed from a volumetric procedure. Due to undefined boundary conditions, deviations from the standardised method may be greater.
4. The method works in the high measuring range with greater tolerances than in the low measuring range. When diluting samples, always measure in the first third of the range.

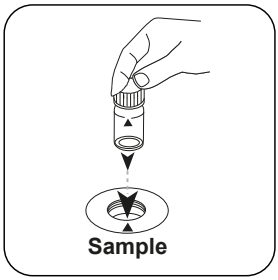
Implementation of the provision Hardness Calcium 2 with Tablet

Select the method on the device

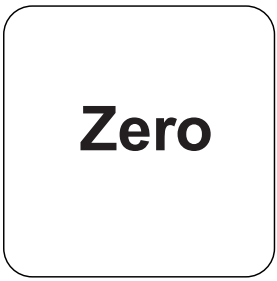
Fill 24 mm vial with **10 ml sample**.



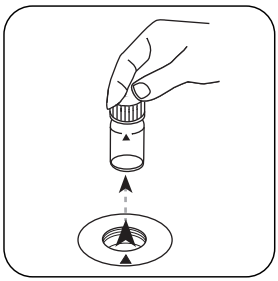
Close vial(s).



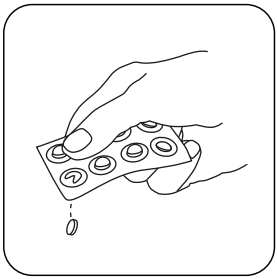
Place **sample vial** in the sample chamber. • Pay attention to the positioning.



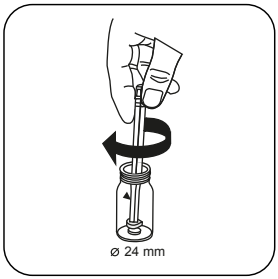
Press the **ZERO** button.



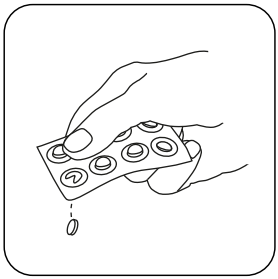
Remove the vial from the sample chamber.



Add **CALCIO H No.1 tablet** .

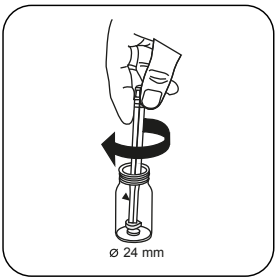


Crush tablet(s) by rotating slightly and dissolve.

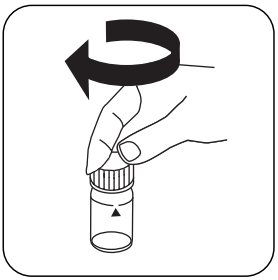


Add **CALCIO H No.2 tablet** .

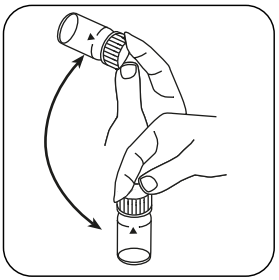
EN



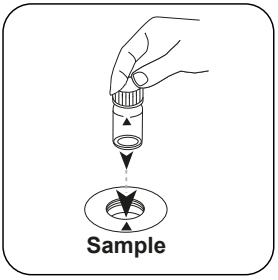
Crush tablet(s) by rotating slightly.



Close vial(s).

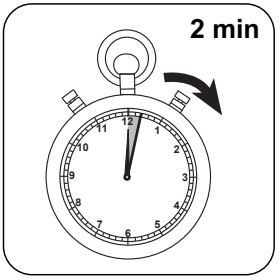


Dissolve tablet(s) by inverting.



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

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



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

Once the reaction period is finished, the measurement takes place automatically. The result in Calcium Hardness 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	$CaCO_3$	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1

Chemical Method

Murexide

Appendix

Interferences

Persistant Interferences

1. Silver, mercury, cadmium, cobalt and copper interfere with the test result.

Interference	from / [mg/l]
Mg^{2+}	200 ($CaCO_3$)
Fe	10
Zn^{2+}	5

Bibliography

Photometrische Analyse, Lange/ Vjedelek, Verlag Chemie 1980

including stirring rod, 10 cm

Iron T M220

0.02 - 1 mg/l Fe FE

Ferrozine / Thioglycolate

EN

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

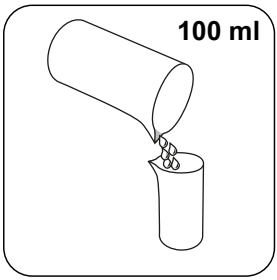
Preperation

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.

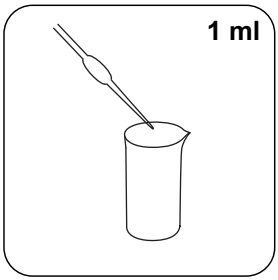
Notes

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.

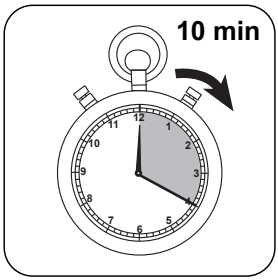
Digestion



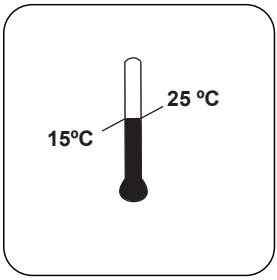
Fill a suitable sample vessel with **100 ml sample** .



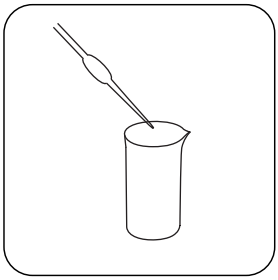
Add **1 ml concentrated sulfuric acid (≥ 95 %)** .



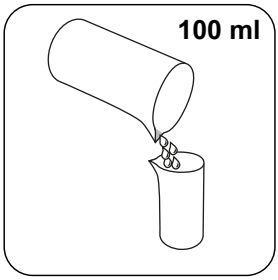
The sample is to be **heated for 10 minutes,** or for as long as it takes for everything to be completely dissolved.



Allow the sample to cool to room temperature.



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



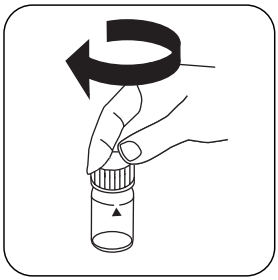
Fill the sample with **deionised water to 100 ml** .

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

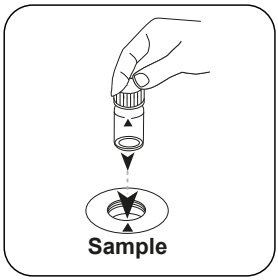
Implementation of the provision Iron (II,III), dissolved with Tablet

Select the method on the device
For testing of **dissolved and undissolved Iron,** carry out the described **digestion**.

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

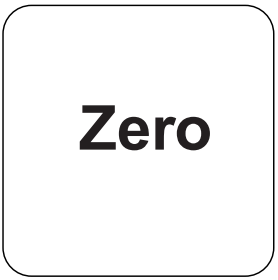


Close vial(s).

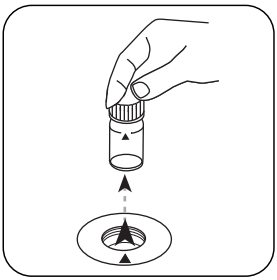


Place **sample vial** in the sample chamber. • Pay attention to the positioning.

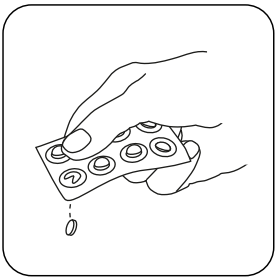
EN



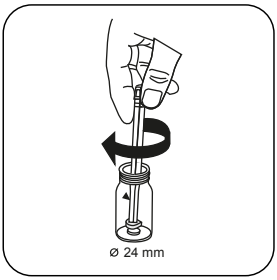
Press the **ZERO** button.



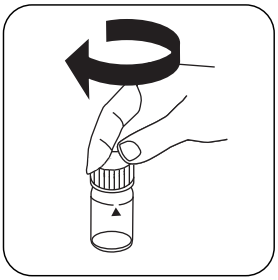
Remove the vial from the sample chamber.



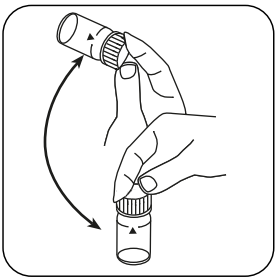
Add **IRON LR tablet**.



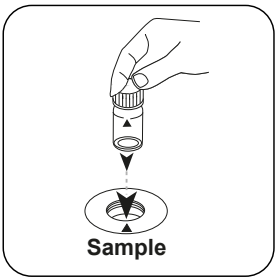
Crush tablet(s) by rotating slightly.



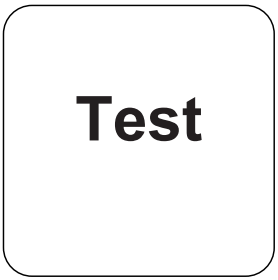
Close vial(s).



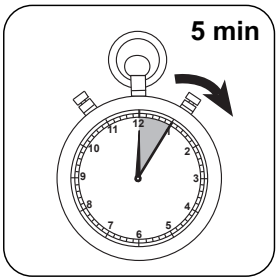
Dissolve tablet(s) by inverting.



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

EN

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

pH-value T **M330**

6.5 - 8.4 **PH**

Phenol Red

EN

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Phenol Red Photometer	Tablet / 100	511770BT
Phenol Red Photometer	Tablet / 250	511771BT
Phenol Red Photometer	Tablet / 500	511772BT

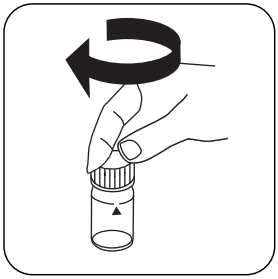
Notes

1. For photometric determination of pH values only use PHENOL RED tablets in black printed foil pack and marked with PHOTOMETER.

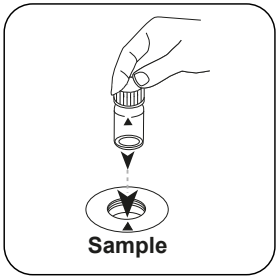
Implementation of the provision pH-value with Tablet

Select the method on the device

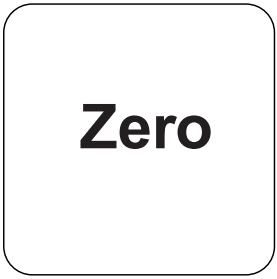
Fill 24 mm vial with **10 ml sample**.



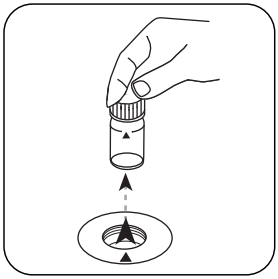
Close vial(s).



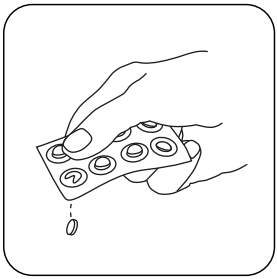
Place **sample vial** in the sample chamber. • Pay attention to the positioning.



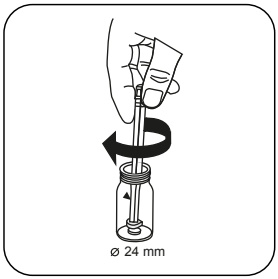
Press the **ZERO** button.



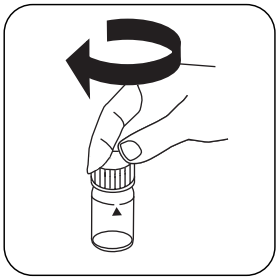
Remove the vial from the sample chamber.



Add **PHENOL RED PHOTOMETER tablet**.

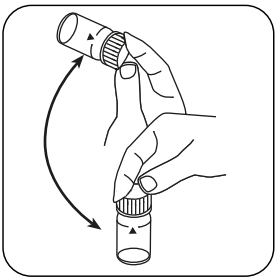


Crush tablet(s) by rotating slightly.

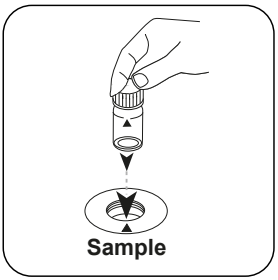


Close vial(s).

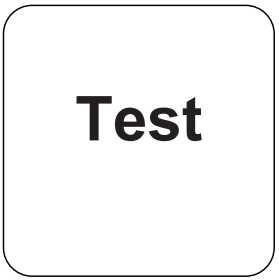
EN



Dissolve tablet(s) by inverting.



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



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

The result in pH value appears on the display.

Chemical Method

Phenol Red

Appendix

Interferences

Persistant Interferences

1. Water samples with little Carbonate hardness* can lead to false pH values.
   *$K_{S4.3}$ < 0.7 mmol/l ≙ total alkalinity < 35 mg/l $CaCO_3$.

Removeable Interferences

1. pH values below 6.5 and above 8.4 can produce results inside the measuring range. A plausibility test (pH-meter) is recommended.
2. Salt error
   For salt concentrations below 2 g/l, no significant error, is expected due to the salt concentration of the reagent tablet. For higher salt concentrations the measurement values
   have to be adjusted as follows:

Salt content per sample in g/l	30 (seawater)	60	120	180
Correction	-0.15[1)]	-0.21[2)]	-0.26[2)]	-0.29[2)]

[1)] according to Kolthoff (1922)
[2)] according to Parson and Douglas (1926)

Bibliography

Colorimetric Chemical Analytical Methods, 9th Edition, London

Urea T M391

0.2 - 5 mg/l Urea[i] Ur2

Indophenol / Urease

EN

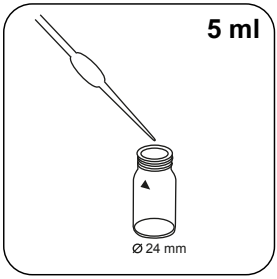
Material

Required material (partly optional):

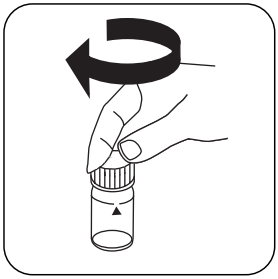
Reagents	Packaging Unit	Part Number
UREA Reagent 1	15 ml	459300
UREA Reagent 2	10 ml	459400
Ammonia No. 1	Tablet / 100	512580BT
Ammonia No. 1	Tablet / 250	512581BT
Ammonia No. 2	Tablet / 100	512590BT
Ammonia No. 2	Tablet / 250	512591BT
Set Ammonia No. 1/No. 2 100 Pc.[#]	100 each	517611BT
Set Ammonia No. 1/No. 2 250 Pc.[#]	250 each	517612BT
Ammonia Conditioning Powder	Powder / 15 g	460170
Urea Pretreat (compensates for the interference of free Chlorine up to 2 mg/l)	Tablet / 100	516110BT
UREA Reagent Set	1 Set	517800BT

Implementation of the provision Urea with Tablet and Liquid Reagent

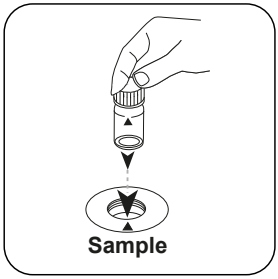
Select the method on the device



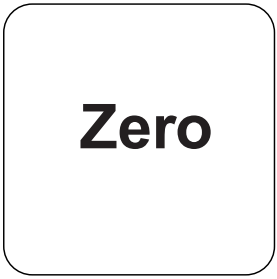
Put **5 ml sample** and **5 ml of deionised water** in the sample vessel.



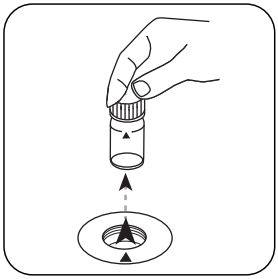
Close vial(s).



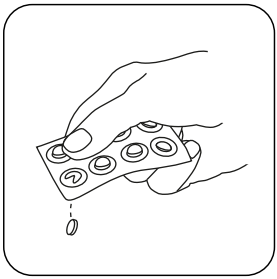
Place **sample vial** in the sample chamber. • Pay attention to the positioning.



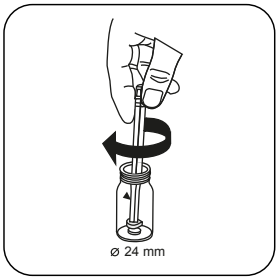
Press the **ZERO** button.



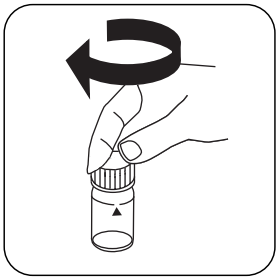
Remove the vial from the sample chamber.



If free chlorine (HOCl) is present, add **a UREA PRETREAT tablet**.

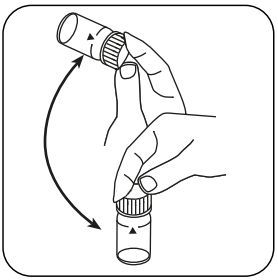


Crush tablet(s) by rotating slightly.

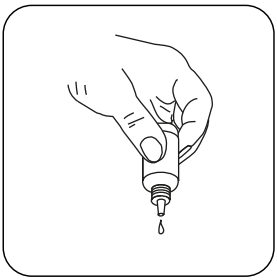


Close vial(s).

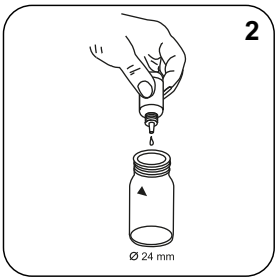
EN



Dissolve tablet(s) by inverting.

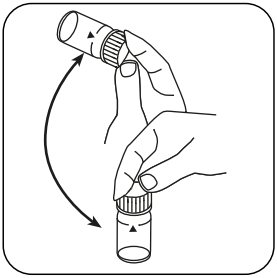


Hold cuvettes vertically and add equal drops by pressing slowly.

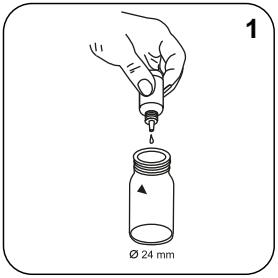


Add **2 drops UREA Reagenz 1**.

Close vial(s).

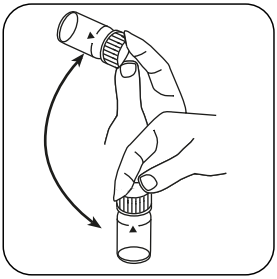


Invert several times to mix the contents.

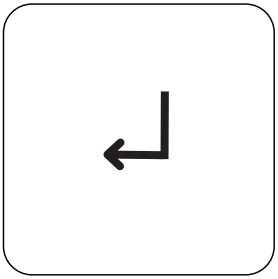


Add **1 drops UREA Reagenz 2**.

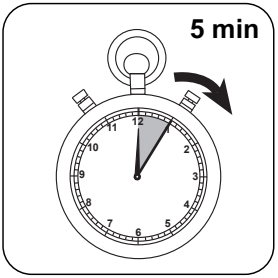
Close vial(s).



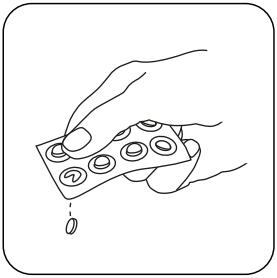
Invert several times to mix the contents.



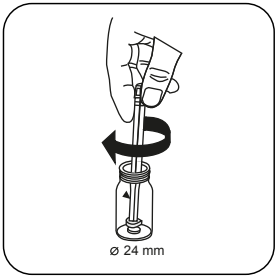
Press the **ENTER** button.



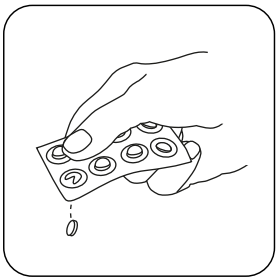
Wait for **5 minute(s) reaction time**.



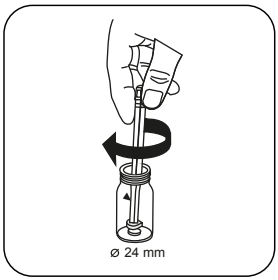
Add **AMMONIA No. 1 tablet** .



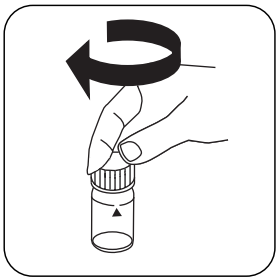
Crush tablet(s) by rotating slightly.



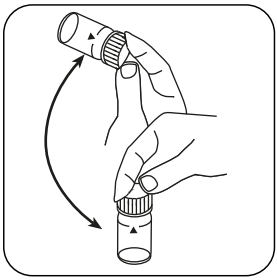
Add **AMMONIA No. 2 tablet** .



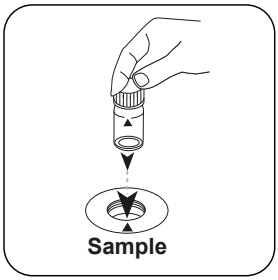
Crush tablet(s) by rotating slightly.



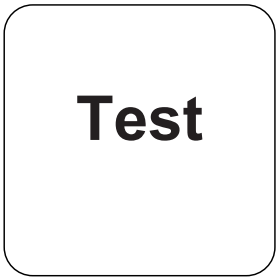
Close vial(s).



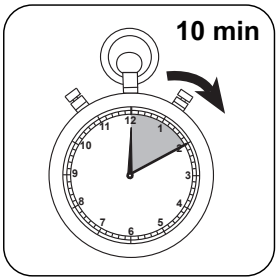
Dissolve tablet(s) by inverting.



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



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



Wait for **10 minute(s) reaction time**.
Once the reaction period is finished, the measurement takes place automatically.
The result in mg/l Urea appears on the display.

Chemical Method

Indophenol / Urease

[1] high range by dilution | [#] including stirring rod, 10 cm

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