



青岛创梦仪器有限公司

Qingdao Chuangmeng Instrument Co.,Ltd

亚甲基蓝试剂箱

(搬土含量测试箱)

Methylene Blue Test kit

型号 Model:1910

使用手册

Instruction Manual

版本 1.0

Version 1.0

©版权所有 青岛创梦仪器有限公司

©Copyright owned by Qingdao ChuangMeng Instrument Co., Ltd

请你仔细阅读《使用手册》，正确掌握本产品的安装和使用方法。阅读后请将本《使用手册》妥善保管，以备今后进行检修和维护时使用。

Carefully read this User Manual to learn how to install and use the product correctly. After reading, properly keep the User Manual as a reference for future maintenance and repair.

联系方式 Contact:

邮编 Zip code: 266100

网址 Website: www.qdcmyq.com

电话 Tel: 86-0532-66993768

传真 Fax: 86-0532-66993744

邮箱 E-mail: cmtech@sina.com

公司地址: 中国·青岛市市北区温州路 7 号

生产基地: 青岛市城阳区流亭街道兴海路 3 号

Address: No. 7 Wenzhou Road, City Northern District, Qingdao City, China

Production base: No. 3 Xinghai Road, Liuting Street, Chengyang District, Qingdao

一、介绍 Introduction

1910 型搬土含量测试箱是用亚甲基兰测定 (MBT) 方法测定的活性搬土 (粘土) 含量的仪器箱, 用亚甲基兰容量可估算钻井液中固相的总阳离子交换容量 (CEC)。

The methylene blue test kit is an instrument box for the determination of active soil (clay) content by the methylene blue determination (MBT) method. The total cation exchange capacity (CEC) of the solid phase in the drilling fluid can be estimated with the methylene blue capacity.

二、测试试剂 Test reagents

* 亚甲基兰溶液: 3.2g/l 浓度, 试剂级亚甲基兰 ($C_{16}H_{18}N_3SCl$) ($1cm^3 = 0.01$ 毫克当量)

Methylene blue solution: 3.2g/l concentration, reagent grade methylene blue ($C_{16}H_{18}N_3SCl$) ($1 cm^3 = 0.01$ mg equivalent).

* **注意:** 在每次配置溶液时, 必须测定试剂级亚甲基兰的含水量, 将 1.000g 亚甲基兰在 93°C 干燥至恒重。

Note: when each solution is configured, the moisture content of Reagent Grade Methylene Blue must be determined, and 1.000g methylene blue is dried at 93 C to constant weight.

* 配置溶液时按下式对取样量进行校正:

The amount of sampling is corrected by the press type when the solution is configured:

$$\begin{array}{l} \text{取样重量(克)} = \qquad \qquad \qquad 3.20 \\ \text{Sampling weight} = \qquad \qquad \qquad \frac{\qquad \qquad \qquad}{\qquad \qquad \qquad} \\ \qquad \qquad \qquad \text{(g)} \qquad \qquad \qquad \text{干燥样品重量 Dry sample weight (g)} \end{array}$$

* 过氧化氢: 3%溶液

Hydrogen peroxide: 3% solution

* 稀硫酸: 约 5N

Dilute sulfuric acid: about 5N

三、试验操作 Test operation

1、在已加有 10cm³ 水的锥形瓶中加入 2.0cm³ 钻井液样品, 为保证准确加入 2.0 cm³ 的样品, 采取下列步骤:

a. 使用注射器的容量应大于 2.0 cm³, 使用较大的注射器则可不必要除去进入注射器内的空气。

b. 必须清除混入钻井液样品中的空气或天然气。搅拌钻井液以破坏其凝胶, 并迅速将样品吸入注射器内。保持注射器口浸没在泥浆中, 缓慢地将注射器内的泥浆排出。

c. 再次将钻井液样品吸入注射器内，直至柱塞的顶端到达注射器上的最后刻度线处为止。

d. 旋转注射器定位环定位在 2.0 cm^3 处，推进柱塞从最后刻度处起直至准确地加入锥形瓶中 2.0 cm^3 钻井液样品为止。

2、加入 15 cm^3 33% 过氧化氢溶液和 0.5 cm^3 硫酸 (5N)。缓慢煮沸 10min，但不要蒸干。加水冲稀至约 50 cm^3 。

3、以每次 0.5 cm^3 的量将亚甲基兰逐次加入到锥形瓶中。如果从以前的实验中已大致知道到达终点所需的亚甲基兰溶液的量，则在开始滴定时每次可加入 $1 \sim 2 \text{ cm}^3$ 。每次加入亚甲基兰溶液后，将锥形瓶摇动 30s，在保持固相颗粒悬浮的情况下，用搅棒取一滴悬浮液滴在滤纸上。当滤纸上的固体颗粒周围出现如图一所示的蓝色或绿蓝色环时，已到达滴定终点。

4、当观察到固体颗粒斑点周围的蓝色环后，继续摇动锥形瓶 2min，并再取一滴悬浮液于滤纸上。如果蓝色环仍很明显，则已达到滴定终点。如果不出现蓝色环，则按上述操作方法继续加入亚甲基兰溶液，直至 2min 后所取悬浮液滴显示蓝色环为止。

1、 2.0 cm^3 drilling fluid samples were added to the cone bottles with 10 cm^3 water. To ensure the accurate addition of 2.0 cm^3 samples, the following steps should be taken:

a. The capacity of the syringe should be greater than 2.0 cm^3 , The use of larger syringe does not need to remove the air entering the syringe.

b. We must remove air or natural gas mixed into drilling fluid samples. The drilling fluid is stirred up to destroy its gel and quickly sample the sample into the syringe. Keep the syringe mouth submerged in the mud and slowly discharge the mud in the syringe.

c. Once again suck the drilling fluid sample into the syringe until the top of the plunger reaches the last scale line of the syringe.

d. The positioning ring of the rotary syringe is positioned at 2.0 cm^3 , and the advancing plunger starts from the last scale until it accurately joins the 2.0 cm^3 drilling fluid sample in the cone bottle.

3. Methylene blue was added to cone bottles at a dose of 0.5 cm^3 each time. If we know roughly the amount of methylene blue solution needed to reach the destination, we can add $1 \sim 2 \text{ cm}^3$ at the beginning of titration. After adding methylene blue solution, the conical flask was rocked 30s, and a droplet suspension was placed on filter paper when the solid particles were suspended. When the solid particles around the filter paper appear around the blue or green blue ring shown in Figure 1, the titration endpoint has arrived.

4. After observing the blue ring around the solid particle spots, continue shaking the cone bottle 2min, and get a drop of suspension on the filter paper. If the blue ring is still obvious, it has reached the end point of titration. If there is no blue ring, then continue to join methylene blue solution according to the above operation method until 2min, then take the suspension droplet to show the blue ring.

四、计算 Calculate

钻井液的亚甲基兰容量按下式计算：

Calculation of the methylene blue solubility of the drilling fluid by the press formula:

$$\text{a 钻井液的亚甲基兰容量} = \frac{\text{亚甲基兰溶液耗量 cm}^3}{\text{样品用量 cm}^3}$$

$$(\text{cm}^3 / \text{cm}^3)$$

$$\text{a. Methylene blue capacity of=} \frac{\text{Methylene blue solution consumption cm}^3}{\text{Sample volume cm}^3}$$

$$\text{drilling fluid}$$

$$(\text{cm}^3 / \text{cm}^3)$$

* 另外，亚甲基兰容量还可以用磅/桶搬土当量（搬土的阳离子交换容量以 70meq/100g 计算）来表示，计算如下：

* In addition, the amount of methylene blue can also be expressed in pound / barrel soil equivalent (the cation exchange volume of moving soil is calculated by 70meq/100g).

$$\text{b.搬土当量} = \frac{5 \times (\text{亚甲基兰溶液耗量 cm}^3)}{\text{样品用量 cm}^3}$$

$$(\text{磅/桶})$$

$$\text{b. Moving soil equivalent} = \frac{5 \times (\text{Methylene blue consumption cm}^3)}{\text{Sample volume cm}^3}$$

$$(\text{pounds/barrel})$$

$$\text{c. 搬土当量 (公斤/米}^3) = 2.85 (\text{搬土当量, lb/bbl})$$

$$\text{c. Moving soil equivalent} = 2.85 (\text{Moving soil equivalent, lb/bbl})$$

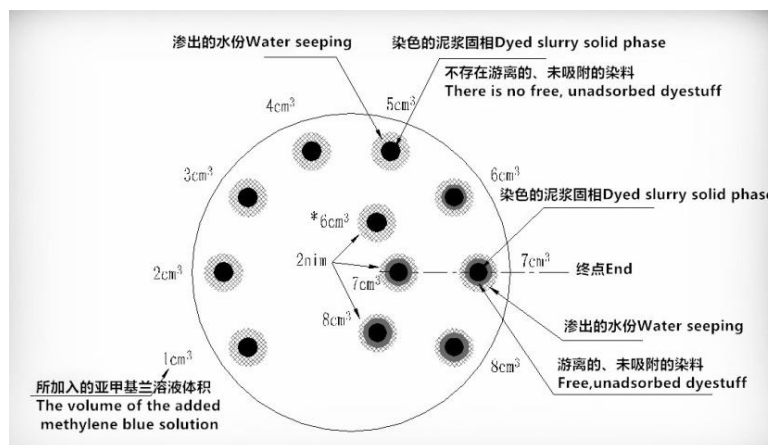
$$(\text{kilo liter/m}^3)$$

注：由公式 b 或 c 得到的磅/桶搬土当量不等于钻井液中的商品搬土含量。和商品搬土一样，钻屑中的活性粘土对此搬土当量值起作用。

Note: Obtain Moving soil equivalent by the formula b or c is not equal to goods moving soil content in drilling fluid. As well as goods moving soil, activated clay in the drilling cuttings plays a part to the moving soil equivalent value.

* 加入 6cm³ 之后立即检测到的游离染料在 2nim 后被吸附掉，证明还没有完全到达终点。（亚甲基兰滴定终点的点滴试验图）

* The free dye immediately detected after 6cm³ entry is adsorbed after 2nim. It has not yet reached the finish point. (The droplet test figure of Methylene blue titrating end point)



五、仪器的维护与保养 Maintenance and maintenance of instrument

- 1、当移动、维修或清洁仪器时，要拔掉电源。如果样品液体或水溅落在仪器上时，应及时擦干净，避免电气受损，发生意外。
- 2、停止工作时，必须将温控旋钮退回到停止位置，不用时拔出电源插头，以确保安全。
- 3、仪器使用时要保证接地可靠。
- 4、玻璃器皿若有破损，严禁用手触拿，以免划伤。皮肤和眼睛避免接触化学药品。
- 5、加热药品时不要离开，不要吸入药品蒸汽。
- 6、要佩戴适当的安全装备，如果接触化学药品至少用清水冲洗 15 分钟。

1. When moving, repairing or cleaning instruments, we must unplug the power. If the sample liquid or water splashed on the instrument, should promptly clean, avoid electrical damage, accident.

2. When we stop working, we must return the temperature control to the stop position, and pull out the power plug when it is not used, so as to ensure safety.

3. Ensure that the ground is reliable when the instrument is used.

4. If glassware is damaged, it is forbidden to touch it with hands, so as not to scratch. Avoid contact with chemicals in the skin and eyes.

5. Do not leave when heating drugs, do not breathe in pharmaceutical steam.

6. To wear appropriate safety equipment, if contact with chemicals, at least rinse with water for 15 minutes.

六、故障的判定与排除 Fault determination and elimination

故障 Fault	原因 Reason	维修方法 Maintenance method
接通电源，加热板不加热 Connect the power supply, the heating plate is not heated	1. 电源插座未插好 The power outlet is not plugged in 2. 加热元件损坏 Heating element damage	1. 重新安装电源插座使其接触良好 Reinstall the power outlet to make it in good contact 2. 更换加热元件 Replace the heating element

青岛创梦仪器有限公司 装箱单

Qingdao Chuangmeng Instrument Co., Ltd. Packing list

生产企业：青岛创梦仪器有限公司

Manufacturing enterprise: Qingdao Chuangmeng Instrument Co. Ltd.

生产地址：青岛市城阳区流亭街道兴海路3号

Production address: No. 3 Xinghai Road, Liuting Street, Chengyang District, Qingdao

主机型号：

Model of the main motor:

出厂编号：

Manufacturing No:

序号 No	编号	名称及规格 Name and specification	数量 Quantity	
1		测试箱 Test box	1	
2		注射器 Syringe (TD) 5ml	1	
3		锥形瓶 Conical bottle 250ml	2	
4		滴定管 Burette 25ml	2	
5		量筒 Graduated Cylinder 50ml	1	
6		塑料瓶 Plastic bottles (白色 white) 500ml	2	
7		滴定瓶 Titrated bottle (棕色 brown) 125ml	2	
8		搅棒 The stirring rod	1	
9		封闭电炉子 Enclosed electric furnace	1	
10		滤纸 Filter paper 103 (定性 Qualitative)	1	
11		立柱 Column	1	
12		蝴蝶夹 Butterfly clip	1	
13		移液管 Pipette 10ml	1	
14		移液管 Pipette 1ml	1	
15		移液气球 Pipette balloon	1	
16		毛刷 Brush	3	
17		呆扳手 Skeleton Spanner 7mm	1	
18		漏斗 Funnel	2	
19		使用手册 Instruction Manual	1	
20		合格证 Certificate	1	