



青岛创梦仪器有限公司

Qingdao ChuangMeng Instrument Co., Ltd.

动态线性膨胀仪
(多联)

Dynamic Linear Swell Meter



Model:1702

使用手册

Instruction Manual

版本 1.0

Version 1.0

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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.

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一、概述 Introduction

创梦仪器生产的智能页岩膨胀量测定仪主要是用于检测在一定温度范围（常温~93℃）常压条件下泥页岩膨胀变化情况的一套精密测量仪器。

The intelligent shale expansion measuring instrument produced by Chuangmeng Instrument is mainly used as a set of precision measuring instruments to detect the expansion changes of shale under a certain temperature range (normal temperature~93 °C) and normal pressure conditions.

二、型号及规格 Model and specifications

型号	名称	配置
1702	动态线性膨胀仪（多联） Dynamic Linear Swell Meter	四个测试杯





三、仪器的主要技术参数

名称 Name	技术参数
电源 Power	220V \pm 10% 50/60Hz
加热功率 Heating Power	500W
磁力搅拌转速 Magnetic Stirring Speed	100~2000r/min
工作温度 Operation Temperature	$\leq 88^{\circ}\text{C}$ 恒温误差 $\pm 5^{\circ}\text{C}$
测试量程 The Test Range	0~20mm
测量精度 Measuring Accuracy	0.1mm
试样模内径 Sample Die Inner Diameter	$\varnothing 28.6\text{mm}$
仪器工作环境 Instrument Working Environment	$-15^{\circ}\text{C} \sim 40^{\circ}\text{C}$
抗电磁场干扰 Resistance To electromagnetic Interference	在强电磁干扰条件下，有明显记录可加以排除 Under the condition of strong electromagnetic interference, have obvious records can be ruled out

四、结构及工作原理 Structure and principle

（一）组成 Composition

1、传感器组件：测量样品在竖直方向上的膨胀量并将信号传递给计算机。

Sensor module: Measure the expansion of the sample in vertical direction, and pass signals to the computer.

2、杯体组件：是在测试过程中盛装页岩饼。

The cup body components: Dressed up shale cake is in the test process.

3、磁力搅拌加热器：在实验过程中加热样品和搅拌添加剂。

Magnetic stirring heater: Heating the sample during the testing process and mixing stadditive.

4、工控通讯装置：将精密位移传感器获得位移信号转换成电信号。

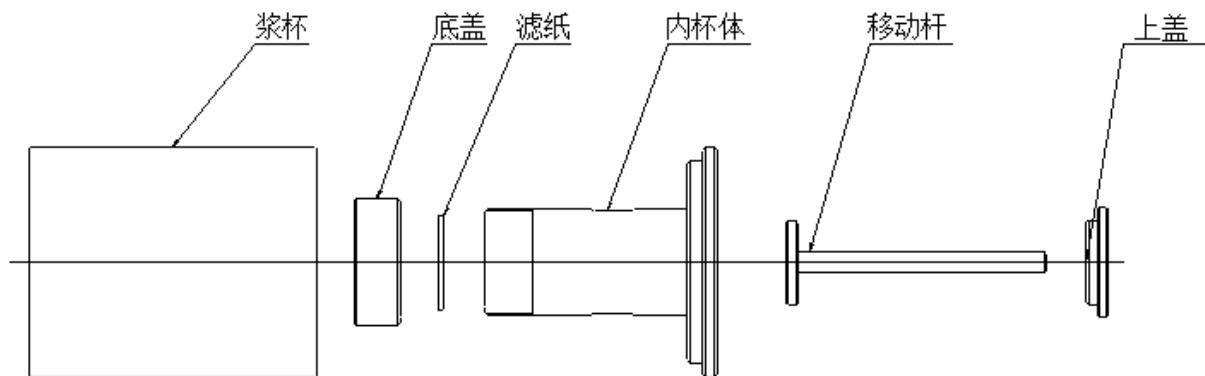
Industrial control communication device: Converting precision displacement sensor for displacement signal into electrical signals.

5、计算机：包括测试软件、主机和显示屏，记录、保存和显示数据结果。

Computer: Including test software host and display, record keeping and display the data results.

6、压模组件：制备测试样品。

Die assembly: Preparation of test samples.

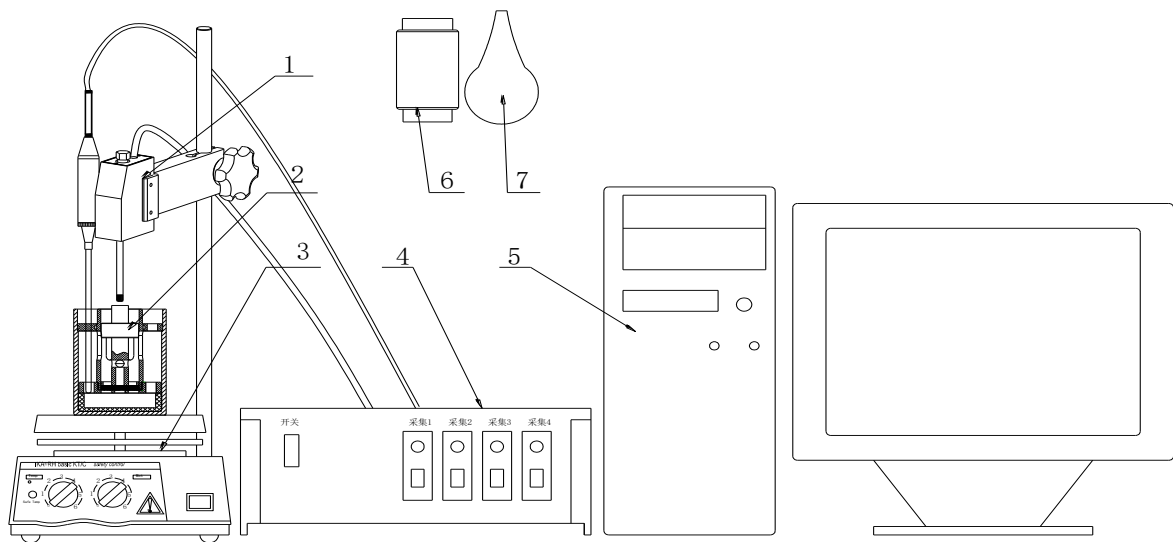


(二) 工作原理 Working principle

该装置是将泥页岩粉在压模中压实成饼，放入杯体中进行测试，将精密位移传感器竖直固定在杯体的移动杆上方，将添加剂注入杯体内，开始加热搅拌添加剂，页岩泥饼吸收液体添加剂后会膨胀，推动精密位移传感器测量探头竖直向上移动，由工控通讯装置将位移量转换成电信号，最后由计算机采集，记录、保存和输出试验结果即为样品的膨胀量。

This device is used to press shale powder into a cake in a

compression mold, place it in a cup for testing, fix a precision displacement sensor vertically above the moving rod of the cup, inject the additive into the cup, start heating and stirring the additive, and the shale cake will expand after absorbing the liquid additive, pushing the precision displacement sensor measuring probe to move vertically upward. The displacement amount is converted into an electrical signal by the industrial control communication device, and finally collected, recorded, saved, and output by the computer, which is the expansion amount of the sample.



序号	名称 Name
1	传感器组件 Sensor assembly
2	样品杯组件 The cupSample assembly
3	磁力搅拌加热器 Magnetic stirring heater
4	通讯装置 IPC communication device
5	计算机 Computer
6	压膜组件 Pressure membrane module



五、仪器的操作 operate

（一）试样制作

1、土样：样土或泥页岩样粉（过 100 目筛网），经 105℃烘干，储于干燥器内备用。

（二）实验方法

1、按(图二)所示将仪器平稳的摆放在台面上。

2、取出杯体组件，手拿移动杆上部取出移动杆，分别将滤网、滤纸、压制好的泥饼放入测试筒内。

3、此时杯体为一整体，将杯体组件按（图二）所示放到磁力加热搅拌器上。

4、将移动杆上端中心对正位移传感器测头，松开缩紧手柄，调整位移传感器上下位置。测头与移动杆上端要有一定的预紧力，使电脑显示初始位移大于 0 小于 10, 拧紧锁紧手柄，保持传感器不动，整机保持平稳。

5、启动膨胀量采集系统软件开始试验（具体操作参见膨胀量采集系统 V1.1 操作说明书）。

6、将添加剂注入盛液杯（装入量至少满过泥饼），最大容量为 200ml，泥饼膨胀情况由计算机直观显示，实验时间用户自定。

7、实验完毕，松开锁紧手柄，将位移传感器提起并固定，将杯体组件取下，依次将移动杆、上固定盘、测试筒等取出清洗干净并擦干，以备下次使用。

8、可从计算机上读取、保存和打印实验结果。

（一）Sample preparation

1、Soil sample: Sample soil or mudstone powder (sieved through a 100 mesh sieve), dried at 105 °C, and stored in a dryer for later use.

（二）Experimental methods



1. Place the instrument steadily on the table as shown in Figure 2.
2. Take out the cup assembly, hold the upper part of the moving rod with your hand, and place the filter screen, filter paper, and pressed mud cake into the testing cylinder.
3. At this point, the cup body is a whole. Place the cup body assembly onto the magnetic heating stirrer as shown in Figure 2.
4. Align the center of the upper end of the moving rod with the displacement sensor probe, release the tightening handle, and adjust the up and down position of the displacement sensor. There should be a certain pre tightening force between the measuring head and the upper end of the moving rod, so that the computer displays an initial displacement greater than 0 and less than 10. Tighten the locking handle, keep the sensor still, and keep the whole machine stable.
5. Start the software of the expansion data acquisition system to begin the experiment (refer to the V1.1 operating manual of the expansion data acquisition system for specific instructions).
6. Inject the additive into the liquid cup (filling at least enough to fill the mud cake), with a maximum capacity of 200ml. The expansion of the mud cake will be displayed intuitively by the computer, and the experimental time will be determined by the user.
7. After the experiment is completed, release the locking handle, lift and fix the displacement sensor, remove the cup assembly, and take out the moving rod, upper fixing plate, testing cylinder, etc. in sequence to clean and dry them for future use.



8. Experimental results can be read, saved, and printed from a computer.

六、维护与保养 Maintenance and upkeep

1、清洗各部件并干燥待用，仪器置于干燥环境中。

2、移动或保养仪器时。要轻拿、轻放，以免造成部件变形影响精度和使用。

1. Clean and dry all components for later use, and place the instrument in a dry environment.

2. When moving or maintaining instruments. Handle with care to avoid deformation of components that may affect accuracy and usability.



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.

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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	编号	名称及规格	单位	数量
1		电脑	台	1
2		磁力搅拌机	台	4
3		传感器	套	4
4		传感器支架	根	4
5		岩芯杯	套	4
6		滤纸	盒	1
7		过滤网	个	4
8		活扳手 150mm	把	1
9		热电偶	个	4
10		数据线	根	1
11		使用说明书	份	1



产品合格证

Product Quality Certificate

出厂编号:

Manufacturing No:

产品名称: Description:	
产品型号: Model:	
检验标准: Standard:	
生产日期: Date of Manufacture:	
产品编号: Product Code:	
<p>结论: Conclusion:</p> <p>经检验, 青岛创梦仪器有限公司生产的产品符合上述标准的要求。准予出厂。 After inspection, Qingdao Chuangmeng Instrument Co., Ltd The products produced meet the requirements of the above standards. Approved for delivery.</p>	
<p>本企业通过: IS0014004 环境管理体系认证; IS09001:2015 质量管理体系认证; IS018000 职业健康安全管理体系认证质检科;</p> <p>QC Department:</p>	