

SIMPSON

A Norican Technology

Operating Instructions

Methylene Blue Clay Tester

Model PMK



Type:

Methylene Blue Clay Tester

Model:

PMK

Part No:

592-800-650

Serial No:

Name and address of manufacturer:

Simpson Technologies GmbH
Thomas-Eßer-Str. 86
D - 53879 Euskirchen,
Germany

For other Simpson Technologies offices around the world and for our contact information please visit us on the internet at [simpsongroup.com](https://www.simpsongroup.com) on the Contacts page.

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1 Introduction

Congratulations, you have just purchased an extremely reliable sand testing instrument that is backed by the professional technical support and years of proven sand technology experience of Simpson Technologies .

This laboratory equipment is constructed of quality materials and is the result of unsurpassed craftsmanship. The Methylene Blue Clay Tester PMK should be operated only when it is in perfect condition, in accordance with its designed purpose and being aware of possible hazards. Observe the safety instructions in Section 2 and operating instructions in Section 5.

1.1 Application and Designated Use

The Methylene Blue Clay Tester PMK is intended exclusively for measuring the amount of active bentonite present in foundry molding sands by determining the absorption exchange capacity of the bentonite. Usage of other materials may be possible upon consultation with the Service department of Simpson Technologies (service@simpsongroup.com).

Any other application outside the intended usage will be regarded as use not in accordance with its purpose, and, therefore, the manufacturer/supplier will not be held liable for any damage that might arise thereunder. The risk in this case will be exclusively that of the user.

1 Introduction

1.2 Organizational Measures

The operating instructions should be readily available at the place of operation. In addition to the operating instructions, the general legal regulations or other mandatory rules for prevention of accidents and environmental protection should be made known and be observed!

The personnel instructed to use this apparatus, before beginning work, should have studied and fully understood these Operating Instructions, in particular the “Safety” chapter.

No modifications, extensions or changes of design of the device that would impact safety requirements should be put into effect without prior consent of the supplier! Spare parts must conform to the technical specifications defined by the manufacturer. This is always guaranteed when using original spares.

2 Safety

NOTICE *The following Safety Instructions must be studied by the responsible personnel before commissioning and adhered to when operating the machine.*

2.1 Safety Alert Symbols

This Manual does not imply any guarantee, but just has the intention of conveying technical information. We reserve the right to modify the contents of these Operating Instructions.

To facilitate quick comprehension and secure handling the symbols used in the publication are shown below.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. OBEY all safety messages that follow this symbol to avoid possible injury or death.



DANGER! *Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.*



The safety alert symbol used without a signal word to call attention to safety messages indicates a potentially hazardous situation which, if not avoided, could or may result in death or minor injury.

NOTICE

NOTICE indicates information used to address practices not related to personal injuries but may result in property damage.



This symbol indicates information containing important instructions concerning the use of the machine or directions for further procedures. Ignoring this information can lead to malfunction of the machine.

2 Safety



Use only the battery specified for the tester (solar unit).

Always safely dispose of the battery according to local regulations.



Never expose battery to direct heat or dispose of it by incineration!

Improperly using the battery can cause it to leak and damage nearby items and may cause the risk of fire or personal injury.

We reserve the right to all modifications which do not affect the technical content of these Operating Instructions.

3 Short Description & Specifications

3.1 Application

For the quick and exact determination of the active clay content in sand systems, and for the checking of systems with thermal durability.

3.2 Description

Fold out to Section 7 of the present apparatus layout.

The illustration on Section 7 shows the PMK with the denominations of its main components, together with the special accessories.

3.3 Specifications and Dimensions

In order to determine the proportion of bondable bentonite in a mold material, use is made of the affinity of bentonite for absorbing methylene blue. The consumption of methylene blue is a measure for the bondable bentonite content.

The halo method is a form of titration/chromatography. The methylene blue solution is added gradually to a suspension of molding sand of unknown bentonite content. After every addition, a drop of this suspension is dripped on a filter paper with a glass rod (hence the term "drop analysis"), whereupon a watery halo spreads out around a solid material center point on the paper. As soon as the concentration reaches saturation point for the suspended bentonite, the color of the halo changes due to the non-absorbed methylene blue. Depending on the degree of overdose, the halo stains light to dark blue.

The consumption of methylene blue to reach saturation is measured in milliliters. In order to deduce the live bentonite content in the inspected molding sand from the methylene blue consumption, it is necessary to test a known quantity of a reference bentonite - i.e., of the bentonite used in the foundry sand being employed - in the same manner.

3 Short Description & Specifications

NOTICE

Before starting any chemical that is required for this test, Simpson Technologies recommends reading the Safety Data Sheet (SDS) correspondent to one of each of the chemicals.

4 Unpacking and Installation

4.1 Unpacking

NOTICE

Your new equipment has been closely inspected before being shipped to your plant. However, damage can occur in route, so it is wise to inspect all equipment on arrival. Notify both the carrier and Simpson Technologies of any damage at once. Damage should be noted on the shipper's receipt before signing for receipt of the shipment.

The Methylene Blue Clay Tester PMK is shipped as a one piece set and is intended to be used as received; further assembly/disassembly is required. No lifting equipment is required for handling. The Methylene Blue Clay Tester PMK weighs only 5.6 kg (12.35 lbs.).

4 Unpacking and Installation

4.2 Components

Included in your new Methylene Blue Clay Tester PMK are the following:

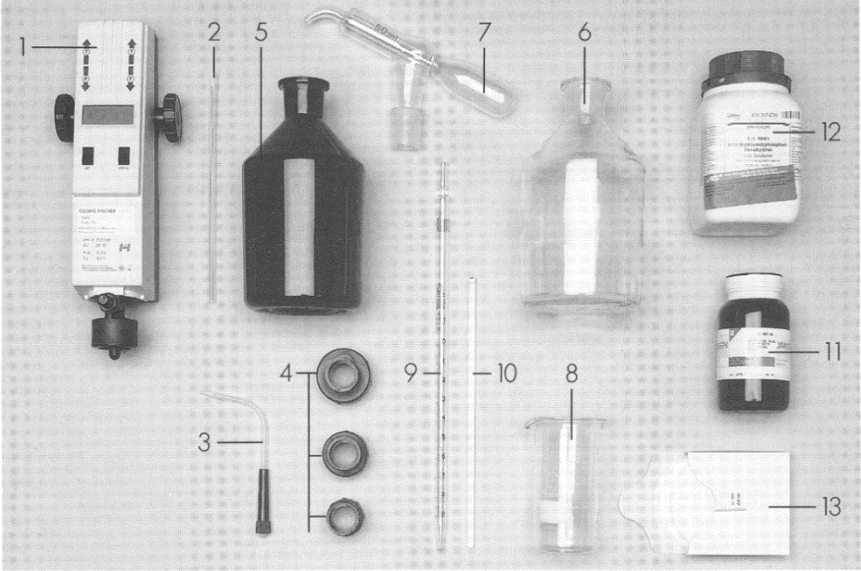


Figure 4.2

Item	Part No.	Description
1	596-292-059	Burette Solarus 50 ml
2	Part of Item 1	Suction Tube (Plastic)
3	Part of Item 1	Expulsion Channels
4	596-292-049-	Normal schliiff Adapter Ns29
5	596-292-046	Burette Bottle 1000 ml Brown Glass
6	596-292-045	Burette Bottle 1000 ml Transparent
7	596-292-031	Automatic Tilter 50 ml Ns29
8	596-292-043	Beaker Glass 250 ml
9	596-292-041	Pipette 10 ml
10	596-292-042-	Stirring Staff (Rod)
11	596-292-014	Methylene Blue (100 g)
12	596-292-015	Natrium Pyrophosphate
13	596-292-016	Filters Paper

If any of the above components are missing, contact your local Simpson Technologies office. See Section 7 for apparatus layout and components.

NOTICE

Do not store the device in the open and unprotected from atmospheric conditions. If this instruction is not followed, claims under guarantee will no longer be considered.

4 Unpacking and Installation

4.3 Installation

The installation of the apparatus will have to be prepared and carried out by the Client.

This location shall prevent the transmission of vibrations onto the apparatus.

The working height should allow ease of operation.

The work bench must be horizontal.

4.4 Airborne Noise Emission

Regarding airborne noise emission by the Methylene Blue Clay Tester PMK, there is no motor or other noise emitted by this equipment. As such, the equivalent continuous A-weighted sound pressure level at the workstation does not exceed 70dB(A).

5 Operating Instructions

5.1 Preparation of the Methylene Blue Solution

5 g of methylene blue (Merck No. 6040) are dissolved in abt. 750 ml of distilled water by shaking in a 1000 ml volumetric flask at 60 °C.

After allowing to cool down to 20 °C, the solution is topped up to 1000 ml with distilled water and left standing overnight.

Afterwards the solution is filtered through a paper filter (tin strip) to re- move residue. The solution should be preserved well closed in a brown bottle.

It is best to prepare a stock of 5 liters.

Methylene blue is obtainable in powder form in bottles of 100g from the company E. Merck, Darmstadt, Germany, or from its foreign agencies.



Read the correspondent Safety Data Sheet (SDS) - Methylene Blue.

5.2 Determining the Consumption of Methylene

5.2.1 Reference Bentonite

The bentonite used in the foundry serves as reference.

- Dry abt. 10 g of bentonite at 110 °C until the weight is constant.
- Put 0.5 ± 0.01 g of this in the glass beaker (8) (see photo on the last page).
- Add 50 ml of distilled water and 5 ml of saturated sodium phosphate solution ($\text{Na}_4\text{P}_2\text{O}_7$) (Using the white burette flask (6) with attached automatic tilter (7) and the gagging pipette (9)).
- Gently boil and continuously stir the beaker and its contents on the heated magnetic stirrer.

5 Operating Instructions

- After cooling down to room temperature, add 10ml of 1 n-sulphuric acid (H_2SO_4) and shake for about 30 seconds.
- Place the beaker under the outlet (3) of the gagging burette (1) and add 15 ml of methylene blue solution. (If the approximate end point is known, a start can be made with an accordingly greater amount of methylene blue).
- Stir for 5 min cold and, with the stirring rod (10), put a drop of the suspension on a filter paper. The liquid spreads out radially in the filter paper, while the blue colored solid material adheres to the paper in the center of the spot. Throughout the gradual addition of the methylene blue solution, the color of the fluid circle (halo) in the paper alters as follows:

Colorless

As long as the reference bentonite is not saturated with methylene blue.



Read the correspondent Safety Data Sheet (SDS) - Bentonite.

Light Blue

When the reference bentonite is just saturated: end point.

Blue

When excess methylene blue is present in the suspension.

Up to the attainment of the end point, methylene blue is added 1 ml at a time, stirring the suspension for 30 seconds and checking the staining of the spot after every addition. Order the drops clearly on the filter paper, and mark them with the relevant number of milliliters of methylene blue solution

When the end point is almost attained, the suspension is stirred for an additional 30 seconds to assure that the methylene blue has been fully absorbed by the bentonite.

Place another drop of the suspension on the filter paper; if the light blue halo persists, the end point has been attained. If it disappears, add an additional milliliter of methylene blue solution. Wait for the filter paper to dry before ultimately assessing the light blue halo and the consumption of methylene blue solution.

5.2.2 Bentonite-Bonded Mold Material

Weigh 500 grams of molding sand and dry to constant weight at 105 °C. Test as described for the reference bentonite above.

5.3 Calculation of Live Clay Content in Foundry Molding Sands

The consumption of methylene blue solution by 0.5 g reference bentonite corresponds to a content of 10 % bondable bentonite for a 5.0 g sand sample (comprising 0.5 g bentonite and 4.5 g sand). This supplies a simple formula for determining the bondable bentonite A in molding sand:

Consumption of methylene blue solution by

0.5 g reference bentonite = x ml

Consumption of methylene blue solution by

5.0 g molding sand = y ml

Live clay content in the molding sand: $A=10*Y/X$ (%)

6 Maintenance

6 Maintenance



For more information on how to use and care for your Simpson Analytics equipment and accessories visit our Simpson Technologies channel on YouTube and search our library of videos. Subscribe to our channel to keep updated on new releases.

Despite its robust construction, the Methylene Blue Clay Tester PMK, is a precise mechanical measurement device and needs appropriate care.

6.1 Daily Maintenance

- Keep the Methylene Blue Clay Tester PMK surface clean so that buildup of Methylene Blue does not occur. Store it at a place where it is protected from weather influence.

7 Apparatus Layout



8 Parts List / Ordering Parts / Returns

8.1 Spare Parts List

Item	Description	Part No.
1	Burette Solarus 50 ml	596-292-059
2	Burette Bottle 1000 ml Brown Glass	596-292-046
3	Burette Bottle 1000 ml Transparent	596-292-045
4	Automatic Tilter 50 ml Ns29	596-292-031
5	Glass beaker 250 ml	596-292-043
6	Pipette 10 ml	596-292-041
7	Filters Papers	596-292-016
8	Methylene blue bottle (100g)	See Item 11, Figure 4.2
9	Natrium Pyrophosphate	See Item 12, Figure 4.2

8.2 Ordering Replacement / Spare Parts

The source of replacement parts for your Simpson Analytics equipment is just as important as the make of the equipment you purchase. ALWAYS order parts for your Simpson Analytics equipment directly from Simpson Technologies. To find the Simpson office closest to you please visit us on the internet at simpsongroup.com on the “Contact” page.

Contact our sales department to obtain a quotation on replacement parts or service please always include the equipment serial number, the description of the part and the part number. Your Simpson Technologies sales team representative will provide you with a quote on the items with current price and delivery times. When ordering, please always refer to the quote number on your order.

To arrange for calibration support or repair assistance please contact our customer service department at service@simpsongroup.com:

8.3 Return Goods Policy

Simpson Technologies strives to provide their customers with maximum follow up support and, in order to offer the most practical flexibility, the following conditions apply to returned goods. Adherence to these procedures will assure the most prompt and efficient service.

RETURNS WILL BE CONSIDERED IN THE FOLLOWING SITUATIONS:

- Products ordered in error by customer (subject to a restocking charge).
- Incorrect or defective products shipped to customer.
- The return of existing products for factory repair or upgrade.
- Products ordered correctly but which are unwanted or unsuitable (subject to a restocking charge).

- A Safety Data Sheet (SDS) must accompany material that is sent to Simpson Technologies for testing purposes. Simpson Technologies will NOT authorize the return of hazardous materials.

RETURN PROCEDURE:

- **The customer must obtain a Return Material Authorization Number (RMA#) from Simpson Technologies prior to returning the goods.**
- To obtain an RMA#, the customer should contact the Customer Service department by phone, fax, e-mail to service@simpsongroup.com. The material being returned must be identified and the reason for its return clearly specified. Once approved for return, Simpson Technologies will issue the customer an RMA form to be included with the shipment and with instructions on where and how to ship the goods.
- All returned goods are to be shipped with transportation charges PREPAID, unless otherwise agreed when the RMA# is assigned. If it has been predetermined that return goods are to be shipped COLLECT, Simpson Technologies will specify the desired routing.
- All returned shipments will be subject to inspection upon arrival at Simpson Technologies.
- Material returned without an RMA# may be refused and returned at customer's expense.

9 Decommissioning

Prior to a longer interruption of operation, clean the apparatus and slightly oil its blackened and bright parts. Then store it at a place where it is protected from weather influence.



Before doing any work, review the Safety Procedures in Section 2.

Failure to follow safety procedures could result in serious injury

Use qualified personnel and follow safety procedures, applicable local policies and regulations in decommissioning the Methylene Blue Clay Tester PMK Model.

WASTE DISPOSAL

The Machinery and Controls Consists of:

- Iron
- Used oil
- Methylene Blue
- Sodium Pyrophosphate
- Plastic
- Electronic Components and Circuit Boards

Dispose of the parts in accordance with the applicable regulations.



In North America

Simpson Technologies

2135 City Gate Lane Suite 500

Naperville, IL 60563

USA

Tel: +1 (630) 978 0044

sandtesting@simpsongroup.com



In Europe

Simpson Technologies GmbH

Thomas-Eßer-Str. 86

D - 53879 Euskirchen,

Germany

Tel: +49 (0) 2251 9460 12

sandtesting@simpsongroup.com

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