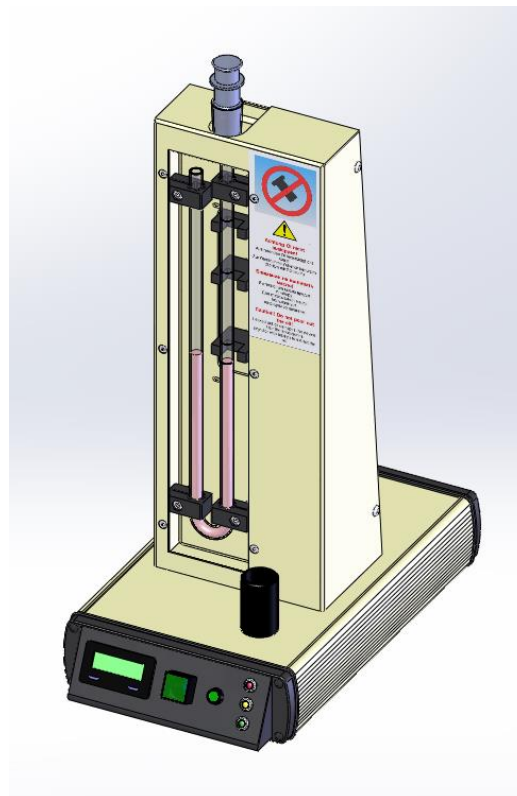


# Operating Manual

## Electronic Blaine Air-Permeability Apparatus for determining the fineness of cement



**Importance of this Operating Manual:**

**Warning:** It is expected that Users and Operators read and understand this entire Operating Manual before putting the system into operation. Reading and understanding this entire Operating Manual is absolutely necessary before operating the system.

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Attachments:

Declaration of conformity

Record of measurement and testing at the manufacturer's plant

Safety Data Sheet

## 1. General information

### 1.1 Manufacturer's designation

Manufacturer's designation:	Blaine Apparatus (please see the cover page of this Operating Manual)
Designation of the model itself:	Please see the nameplate (rating plate) on the unit. It provides all the characteristics and the electrical rating data.


### 1.2 Purpose for which this system has been designed

This Operating Manual contains the information required for operation of the products described here, for the purpose for which they have been designed. This Operating Manual is intended to be used only by technically qualified staff.

“Technically qualified staff” is defined as those persons who – as a result of their training; their experience; the instructions which they have received; as well as their knowledge of the relevant standards, regulations, accident-prevention regulations, and conditions of product operation in the company – have been authorized by the person responsible for the safety of the company facilities to carry out the activities and actions required for operation of the equipment described below, and who can recognize and prevent any possible dangers arising from such operation (this definition of technically qualified staff has been provided in IEC 364).

The User must by all means observe the requirements and limit values, as well as all safety instructions, given in this Operating Manual. Any use of this device not in conformity with these stipulations shall be considered to be in violation of the use for which this system was intended. If this device must be operated under special conditions, or with special modes of operation, then this shall be authorized only after consultation with the Manufacturer, and after obtaining his prior and express approval.

The fineness of grind can be determined according to the Blaine technique and is indicated as the specific surface (Blaine value). The semiautomatic apparatus serves exclusively for determination of the specific surface of powders, and for fast analysis of characteristic operational values. The Blaine value is not a measure of granulometric distribution. The Blaine value can therefore be used only to a limited degree to evaluate the suitability of a type of test material for a certain use.




<p>Caution</p> 	<p>The instructions given in this Operating Manual apply only for the correct application of the apparatus. In order to correctly conduct tests, the User and Operator must observe the specific standards that apply for the testing being conducted.</p>
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Please take the time to read this Operating Manual carefully. It describes how you safely operate the machine.

Please keep this Operating Manual to hand at all times, during the entire life cycle of this apparatus. Please refer to it whenever you have a question on the operation of this apparatus.

The Manufacturer cannot accept any responsibility for any damages that occur owing to false use of this apparatus.

This operating manual contains safety instructions that are to be observed in order to exclude any risk of fatalities, injuries, damage to the equipment or improper operation. Safety markings are as follows:

Caution 	This warning refers to dangers that could cause material damage.
Danger 	This warning refers to dangers that could cause severe injuries or even fatalities.
Note 	Provides practical advice on operation

### 1.3 Conditions under which this system may NOT be used

This Blaine Apparatus was not intended for use under the following conditions or with the following actions being taken. It may therefore NOT be used under such conditions or in connection with the following actions:

- Do not disassemble this system. Do not try to repair it or to modify it.
- Operate this product only with a mains electrical system which satisfies the ratings for voltage and current as given in this Operating Manual.
- The apparatus may not be operated in locations which are subject to the following conditions or substances: Ice formation, Heat radiation, Formation of condensation water, Dust, Corrosive gases, Vibrations, Severe physical impact (jolts), High relative humidity, Excessive temperature fluctuations
- Do not tamper with the liquid in the manometer. As recommended in the relevant standard. This liquid can cause serious health.

### 1.4 Guarantee

Our **General Terms of Sales and Delivery** apply in all cases.

The Manufacturer guarantees that this Operating Manual has been prepared in conformity with the technical and functional parameters of the Blaine Apparatus as delivered. The Manufacturer reserves the right to add supplementary information to this Operating Manual as required.

The guarantee provided by the Manufacturer is the legal guarantee. This guarantee does not cover wear-and-tear parts.

The Manufacturer guarantees trouble-free operation only if the User observes the instructions in this Operating Manual, and only if the User employs the Blaine Apparatus for the purpose for which it is intended.

The Manufacturer cannot be held liable for damages that may occur if the Blaine Apparatus is used for purposes for which it is not intended, or if the User does not observe the instructions and rules for operation as set forth in this Operating Manual.

No claims for damages may be lodged against the Manufacturer if the Blaine Apparatus is modified in its structural or constructional characteristics without the prior written consent of the Manufacturer, or if its functional characteristics are modified without such consent.

Any person acting in violation of the above stipulations may be prosecuted before a court of law.

## **1.5 Basic safety instructions**

Only those persons may be permitted to operate the Electronic Blaine Air-Permeability Apparatus alone (i.e., without supervision) who have met all of the following criteria:

- Persons who are at least eighteen (18) years of age, and
- Persons who have been instructed in the operation of the Blaine Apparatus, and

In the operation of the Blaine Apparatus, the person operating the instrument must take every precaution to ensure that he/she does not injure himself / herself or any other persons. Only those persons may be permitted to operate the Blaine Apparatus who have been instructed in its proper use.


If any malfunction, damage, or other trouble is determined on the Blaine Apparatus, and if its faulty condition endangers its operational safety, then the apparatus must be immediately taken out of operation. It may be put back into operation only after all sources of danger have been eliminated.

Check to make sure that the ratings given on the nameplate (rating plate) on the unit match those of the actual voltage supplied by the mains power.

The Blaine Apparatus may be used only for the purposes described here. Any use of the apparatus in a manner not intended or described here will result in loss of guarantee protection.

This Blaine Apparatus has been designed and built in accordance with the state of the engineering art and with the accepted rules of good engineering practice. The use of this Blaine Apparatus, however, can result in danger to life and limb of the Users and third parties, and can cause damage to mechanical-engineering parts and other items of property.

If there are any malfunctions or other trouble that could cause dangerous situations to arise in work with the Blaine Apparatus, these difficulties must be immediately corrected before working with the machine.

<p>Danger</p> 	<p>The mixing of cement with water causes the release of alkaline substances. In working with concrete, it is essential to take all necessary precautions to prevent dry cement from entering the eyes, mouth, or nose. Use protective clothing to prevent skin contact with wet cement or concrete. If cement or concrete enters the eyes, immediately and carefully wash out the eyes with clean water. Seek medical help without delay. If moist concrete comes into contact with the skin, wash it off immediately.</p>
	<p>The liquid in the manometer is, as recommended in the relevant standard. This liquid can cause serious health. Please read the attachments for further information.</p>

The manufacturer strongly recommends to carefully observe the following: all instructions and procedure descriptions given in this Operating Manual; all applicable safety directives, guidelines, and regulations; and all general rules for workplace environments.

The Operator must ensure that the personnel wear the respectively required protective clothing, such as:

- Safety boots
- Suitable clothing
- Protective gloves

Working clothing must be appropriate and not hinder the operatives in their work.  
If need respiratory protection

## 1.6 Acceptance of the product and transport

### 1.6.1 Acceptance of the product

When accepting delivery of the product, first inspect it for its outer, visible condition. If this inspection is satisfactory, the machine may be accepted from the freight forwarder (package service, courier, or other forwarding business).

If there are no shortcomings, and if there are no transport damages, then use the bill of delivery to make sure that the consignment is complete, and that all parts have been delivered.

If you assume or suspect transport damage, or if transport damage becomes apparent only after you have accepted the delivery, immediately make an exact report of the conditions and any damage as they exist. Send us this report immediately by fax or e-mail.  
**Important:** Absolutely do not make any changes to the delivered goods.

After we have studied your report, we can make a decision whether we can correct the difficulties by one of the following options:

- Deliver spare parts to you, or
- Send a specialized fitter/installer to your plant, or
- Ask that you return the system to us for repair.

## 1.6.2 Transport

This device will be delivered in the appropriate cardboard boxes. In order to prevent transport damage, the remaining hollow spaces in the interior of the boxes will be filled with bulk material.

This system can be moved by hand to the point at which it is to be operated. Its weight is approx. 4 kg.

After you have unpacked the device, make a visual inspection to determine whether it was damaged during transport. In cases of doubt, in which you believe the machine may have been damaged, do not connect it, and get in touch with your dealer or sales person.


## 1.7 Scope of delivery

1 ea.	Air Permeability Tester, including power cable, measuring cell with piston, and sieve plates
1 ea.	Brush
1 ea.	Funnel
50 ml	Filling oil for manometer
1 ea.	Cone grease
1 ea.	Injection unit with hose for filling
1 unit	Round filter, $\varnothing$ 12.8 mm
1 ea.	Digital thermometer
1 ea.	Cone rubber stopper
	Official calibration (only model 1.0290E)



### Optional:

1 bottle	Calibration sand, coarse
1 bottle	Calibration sand, fine
	Official calibration



<p>Note</p> 	<p>When the Electronic Blaine Air-Permeability Apparatus is delivered, it is NOT calibrated.</p> <p>If the customer requires, we can deliver the instrument with official calibration: as an option, for an additional price.</p> <p><b>Important:</b> do not place the Electronic Blaine Air-Permeability Apparatus into operation before it has been properly calibrated.</p>
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## 1.8 Instructions for electrical connection

<p>Danger</p> 	<p>The electrical connections must be made by properly qualified electricians.</p> <p>Before making the power connections, make sure that your power supply is in accordance with the required power and frequency ratings given in these instructions and on the equipment rating plate.</p> <p>The power plug must have a safety device (an overcurrent trip) that protects the system against overcurrent. This device must match the machine voltage, and must be in accordance with the valid regulations. The technical characteristics of this safety device must satisfy the regulations of the standards that apply in the country in which the machine is being installed.</p>
<p>Caution</p> 	<p>The Manufacturer cannot be held liable for any damage that takes place because the above instructions are not followed.</p>

### Electrical tolerances:

Actual voltage:  $\pm 10\%$  of the rated voltage

Frequency:  $\pm 1\%$  of the rated frequency, on a continual basis;  $\pm 2\%$  of the rated frequency, on a short-term basis

The power supply may not be interrupted for longer than 3 ms, and may not be set to zero. Not more than 1 s may lapse between two power outages (cuts).

The power outages (cuts) may not exceed 20% of the voltage peak for more than one cycle. Not more than 1 s may elapse between two power cuts.

The manufacturer cannot be held liable for damages to persons or property that arise because the above instructions have not been observed.



## 2. Characteristics of the apparatus

### 2.1 Basic structural design

The measuring apparatus is mounted on a stable metal plate. A sturdy metal enclosure on the left side of the apparatus contains the U-shaped manometer tube. The User can observe the level of the manometer fluid through a window.

You can stop the testing procedure at any time by turning off the mains power switch. The power connection is provided by a separate power cable with a two-pole and earthing-pin plug.

The Manufacturer tests the function and liquid tightness of the apparatus before delivery.

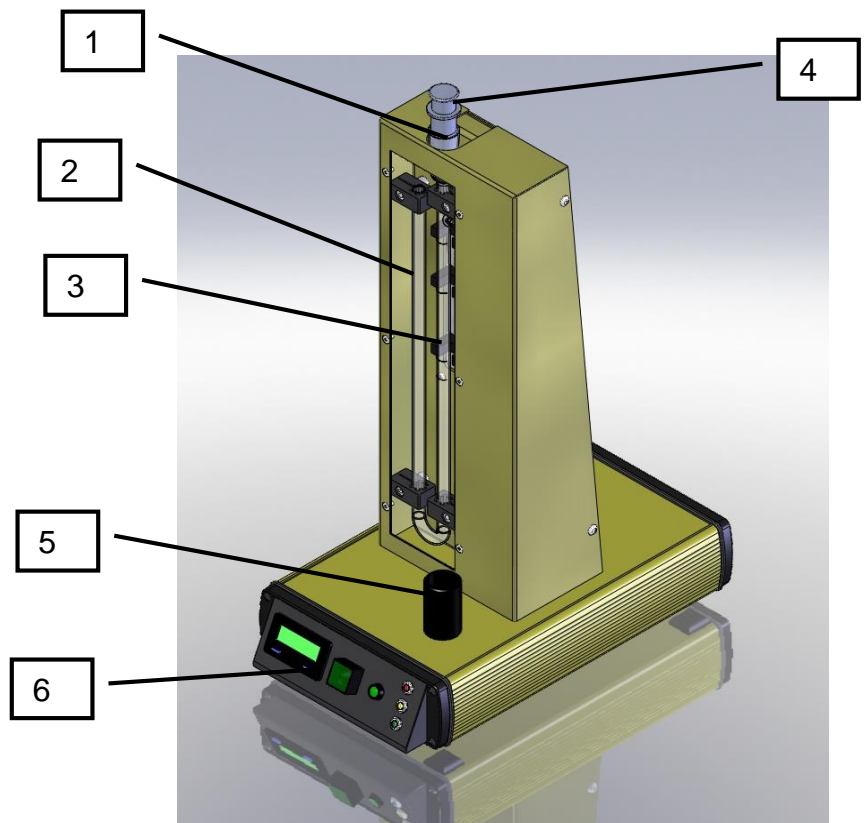
### 2.2 Technical data

Power rating:	110-230 V / 50-60 Hz
Dimensions of the Apparatus:	175 mm wide x 300 mm deep x 450 mm high
Weight:	4 kg
Precision of the time measurement:	0.1 s
Class of enclosure protection:	IP-55

Cell size according EN 196-6  
 $V \approx 1900 \text{ mm}^3$   
 $\varnothing = 12,7 \text{ mm} \pm 1$   
 $H = 15 \text{ mm} \pm 1$

- 1- Opening to fill the manometer liquid
- 2- U- shaped tube
- 3- Measuring section with photoelectric barrier
- 4- Measuring cell with piston and sieve plates
- 5- Connection support
- 6- operators interface

Rear side:  
Power switch



### 3. Placing the Apparatus into operation


Set up the Blaine Apparatus on a surface that is level, that is not subject to vibrations, and that can sufficiently support the weight of the apparatus. The permissible ambient conditions are in accordance with standard laboratory conditions as set forth in EN 196


Use the injection with hose, supplied by the Manufacturer, to pour the filling oil into the U-shaped tube. Before filling the tube, make sure that it is clean and dry.

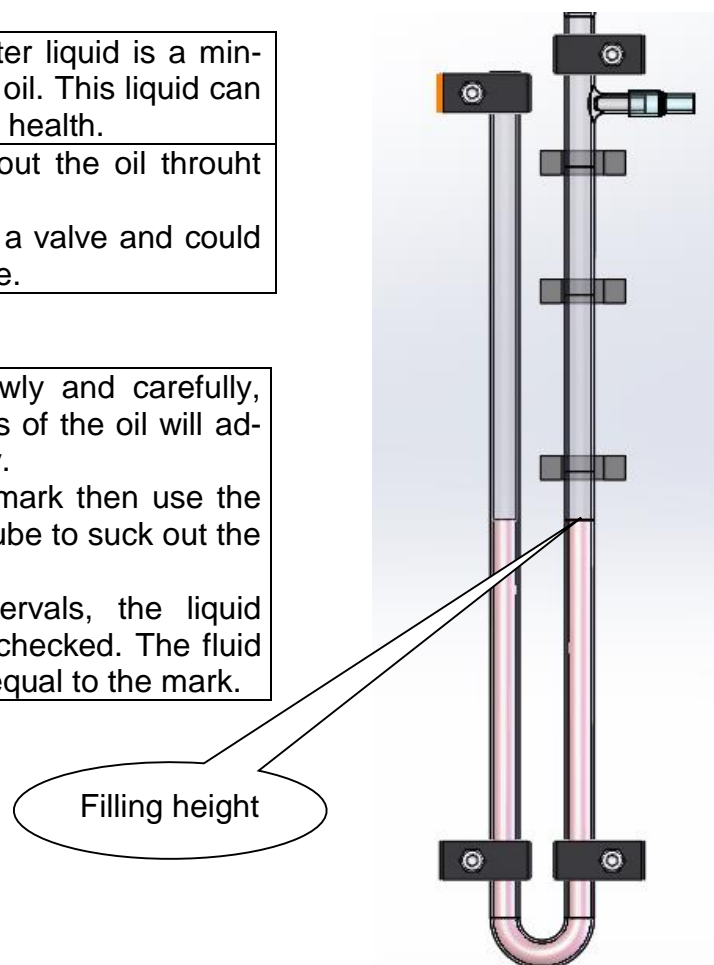
Use the injection unit to remove liquid from the bottle in which it is delivered. Insert the end of the injector hose into the U-shaped tube. Make sure that you can see the hose in the U-shaped tube, and also make sure that the manometer liquid actually flows into the tube. Fill the liquid up to the lowest mark.

If the liquid is filled above the proper filling height, use the injector unit to remove the surplus oil.

Grease the cone slightly with the delivered grease.

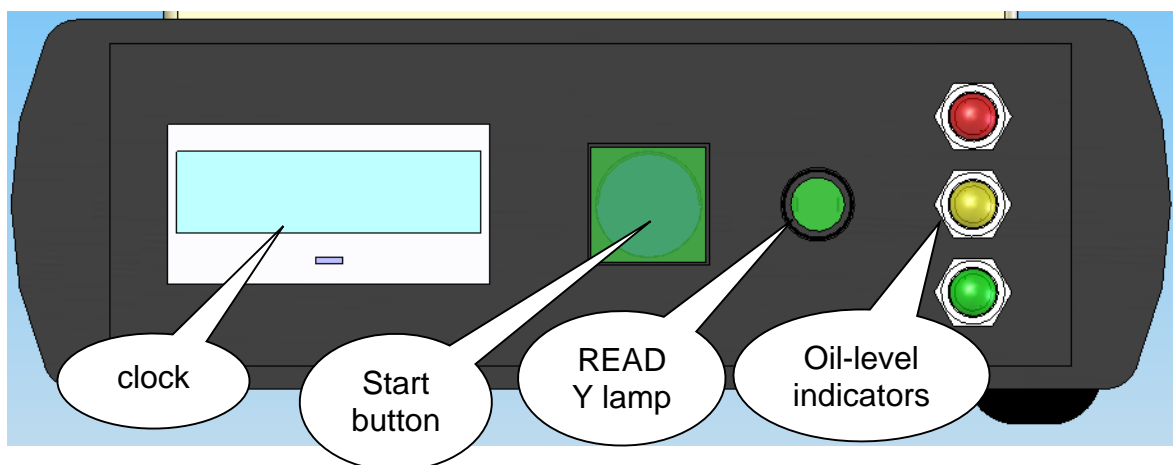
	Caution	The manometer liquid is a mineral hydraulic oil. This liquid can cause serious health.
		Do not pour out the oil through the cone. It could go to a valve and could cause damage.

	Note	Fill the oil slowly and carefully, since the levels of the oil will adjust very slowly.
		If exceed the mark then use the injection with tube to suck out the surplus oil. At regular intervals, the liquid level must be checked. The fluid level must be equal to the mark.



## 4. How to conduct the test

- 1 Prepare the powder bed in accordance with the instructions given in DIN 196-6.
- 2 Place a thin coat of cone grease on the cone. Then insert the measuring cell into the opening of the U-shaped tube that is provided for the cell.
- 3 Be careful not to disturb the powder bed in your work.
- 4 Switch the device on by using the power switch on the rear side. The green READY lamp will now show.
- 5 Now briefly press the START button. (do not hold)



- 6 The system will now pull in the oil.
  - The lamps of the oil-level indicators will now show consecutively: green, amber, and red.
  - The READY lamp will now go off.
  - The red lamp will now show, which means that the digital counter is set to zero.
  - The pump stops, and the solenoid valve closes.
  - The oil level now falls slowly.
  - As soon as the amber lamp goes off, the time measurement will begin.
  - When the green oil-level lamp goes off, the time measurement will stop.
  - The READY lamp will then go back on.
  - The clock will show the measured time, which is given in one-hundredths 1/100 of a second.

Make a note of this time and of the room temperature, with a precision of  $\pm 1^\circ\text{C}$  for the temperature.

Now repeat the above procedure, in accordance with Section 4.6.2 of the standard EN 196-6


## 5. Checking and maintenance

In case of special maintenance work (e.g., repairs, exchange of parts, and all other work that is not described in this Operating Manual), please get directly in touch with the manufacturer.

The Blaine Apparatus requires practically no maintenance. After long service, we recommend a thorough cleaning and refilling of the U-shaped tube with the required liquid.

If the apparatus has been used for a long time, or if the ambient conditions make an external cleaning of the apparatus necessary, please proceed as follows:

- Switch off the main power switch on the reverse of the apparatus.
- Disconnect the apparatus from the power supply.
- Use a brush or vacuum cleaner to remove loose dust on the apparatus. If necessary, the apparatus can then be cleaned with a moist cloth. Use a normal household cleaning agent for this purpose.

<p>Caution</p> 	<p>Do <b>NOT</b> try to clean the apparatus with pressurized water, water or other liquid spray, spray water that results in puddles, dripping sponges, or any other unsuitable cleaning methods. If any of these methods are used, the water or other liquid that results can enter the control system and lead to permanent damages to the mechanical, electrical, and/or electronic components of the apparatus.</p>
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All maintenance work involving components of the apparatus and/or the electrical system must be conducted by qualified specialists.

At regular intervals, the liquid level must be checked. The fluid level must be equal to the mark.

The glass cone should be lightly greased.

## 6. Troubleshooting

This section describes a number of simple problems tht can be easily solved during work.

<p>Caution</p> 	<p>All maintenance, inspection, testing, and repair work on apparatus components or on the electrical system may be performed <b>ONLY</b> by sufficiently qualified personnel.</p>	
PROBLEM	CAUSE	SOLUTION
<p>The system will not start.</p>	<p>There is no power to the system.</p>	<p>Operate the main power switch correctly, check the power cable, fuse on the main switch and exchange it if necessary.</p>
	<p>The pump or the electrical system is defective.</p> <p>The U-shaped tube is covered with condensation or dirt.</p>	<p>Get in touch with the Supplier.</p> <p>Clean the U-shaped tube.</p>
<p>The manometer fluid is not pulled in correctly.</p>	<p>pump, valve is defective</p> <p>The pneumatic lines are loose or have leaks.</p> <p>The U-shaped tube is covered with condensation or dirt.</p>	<p>Get in touch with the Supplier.</p> <p>Clean the U-shaped tube.</p>
<p>The measured values are not correct.</p>	<p>The constant for the apparatus is not correct.</p>	<p>Correctly determine the constant for the system.</p>
	<p>The calibration substance does not properly match the cement type.</p>	<p>Choose the proper calibration substance to correctly match the cement type.</p>
	<p>The time metering is not correct.</p> <p>The photoelectric barrier does not function.</p>	<p>Regulate the photoelectric barriers on the potentiometer.</p> <p>Check the time metering. Clean the U-shaped tube.</p>
	<p>The measuring cell has not been properly attached, or it has not been turned correctly. There is a leak in the connection between the fittings.</p>	<p>Check the glass cone</p>
<p>Note</p> 	<p>If the device is to be sent for repair, the manometer liquid must be sucked off in order to avoid further damages to the device.</p>	

In case of any malfunction, be sure to disconnect the Electronic Blaine Air-Permeability Apparatus from the electric power supply.

### **Trouble**

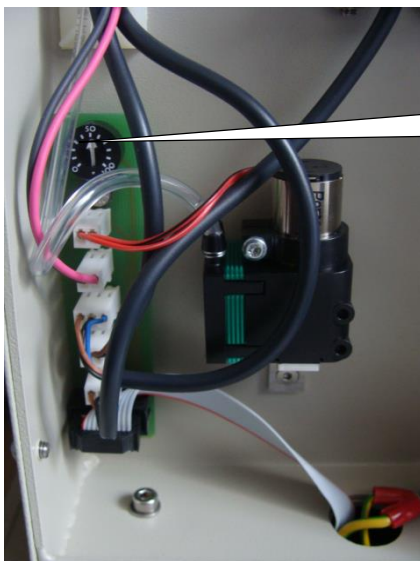
The READY lamp does not burn after the Electronic Blaine Air-Permeability Apparatus is switched on.

The apparatus pulls in the filling oil too fast, or too slow.

### **Solution to the problem**

Check the fuse on the mains switch.

Open the rear cover of the manometer column and adjust the throttle valve (please see the diagram below).



Potentiometer  
to set the suck  
velocity

## **7. Shutting down the system for lengthy periods**

If the Blaine Apparatus is scheduled to remain out of operation for a lengthy period of time, please follow these steps:

- Disconnect the apparatus from the power supply.
- Perform all required maintenance work.
- Remove the liquid from the U-shaped tube.
- Then cover the apparatus to protect it from dust

## **8. Scrapping**

If the apparatus will not be used again, we recommend the following steps for scrapping:

- Disconnect the power cable from the power supply.
- Cover all sharp, protruding, or otherwise dangerous parts.
- Disassemble the apparatus and scrap it in accordance with currently valid regulations.

## 9. Spare parts and services

A great deal of care has been taken to ensure that this Operating Manual is correct. We cannot, however, guarantee that it is without mistakes or errors, or that all information contained herein will continue to remain valid in the event of technical changes.

### 9.1 Date of issue of this Operating Manual:

Version no. 11  
Oct. 2016

### 9.2 Copyright

The copyright to this Operating Manual is held by the following company:

**TESTING** Bluhm & Feuerherdt GmbH

This Operating Manual is provided only for the using company, and the staff of this company. The information in this Operating Manual may not be:

- Reproduced, or
- Distributed, or
- Provided to any other persons.

Any person acting in violation of the above stipulations may be prosecuted before a court of law.

### 9.3 Address for technical support and spare-parts ordering

If you have any technical questions, or if you require spare parts, please get directly in touch with the following address:

**TESTING Bluhm & Feuerherdt GmbH**  
Motzener Str. 26b  
DE – 12277 Berlin  
Germany  
Tel.: +49 30 (0) 7109645-0  
Fax: +49 30 (0) 7109645-98  
E-mail: [info@testing.de](mailto:info@testing.de)  
[www.testing.de](http://www.testing.de)