



## **KLA-6 AUTOMATIC FILTER PLUGGING TENDENCY ANALYZER (FPT)**

### ***OPERATION AND INSTRUCTION MANUAL***

REV B

***Koehler Instrument Company, Inc.***

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Petroleum Testing & Analysis Instrumentation • Custom Design & Manufacturing



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# **CERTIFICATE OF CONFORMANCE**

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## **Automatic Filter Plugging Tendency Analyzer KLA-6**

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This certificate verifies that part number KLA-6, Automatic Filter Plugging Tendency Analyzer, was manufactured in conformance with the applicable standards set forth in this certification.

Specifications:                      ASTM D2068  
                                                 IP 387

This unit is tested before it leaves the factory, to ensure total functionality and compliance to the above specifications and ASTM standards. Test and inspection records are on file for verification.



**Jesse Kelly**  
**Application Engineer**  
**Koehler Instrument Company**



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## 1. Introduction

The KLA-6 Automatic Filter Plugging Tendency Analyzer (FPT) is designed for use in the laboratory. What sets the KLA range apart from all competitive low temperature instrumentation is the cooling mode of the jacket.

In all other instruments existing on the market, the cooling is done through an external circulating bath. In an external circulating bath, a volume of medium (very often methanol) is cooled down with a coil. The gas running through this coil is compressed by either one or two stage compressors. The temperature of the gas decreases as it expands and the coils cool the medium. This medium is pumped to the analytical cell of the analyzer.

In the case of the KLA, the gas does not cool a medium, but directly cools the jacket (cooling cell). This unique system has several advantages:

- Requires less energy, Saving costs in electrical supply
- Less space taken by the assembled cooling unit / analyzer
- Fast cooling response. It takes approximately 10 minutes to reach the desired temperature from the ambient temperature of +25°C. This allows the instrument to be powered OFF during the night.
- The start-up is very easy and requires only a 115/230V plug. There is no other fitting. This avoids the danger of pumping an inflammable fluid.

The KLA-6 conforms to the ASTM D2068 test method and related test specifications. This manual provides important information regarding safety, technical reference, installation requirements, operating condition specifications, user facility resource requirements, and operating instructions for the Automatic Filter Plugging Tendency Analyzer. This manual should also be used in conjunction with applicable published laboratory procedures. Information on these procedures is given in section 1.2.

### 1.1 Koehler's Commitment to Our Customers

Providing quality testing instrumentation and technical support services for research and testing laboratories has been our specialty for more than 50 years. At Koehler, the primary focus of our business is to provide you with the full support of your laboratory testing needs. Our products are backed by our staff of technically knowledgeable, trained specialists who are experienced in both petroleum products testing and instrument service to better understand your requirements and provide you with the best solutions. You can depend on Koehler for a full range of accurate and reliable instrumentation as well as support for your laboratory testing programs. Please do not hesitate to contact us at any time with your inquiries about equipment, tests, or technical support.

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**<http://www.koehlerinstrument.com>**

### 1.2 Recommended Resources and Publications

#### 1. American Society for Testing and Materials (ASTM)

100 Barr Harbor Drive West Conshohocken,  
Pennsylvania 19428- 2959, USA

Tel: +1 610 832 9500

Fax: +1 610 832 9555

<http://www.astm.org>

email: [service@astm.org](mailto:service@astm.org)

#### **ASTM Publication:**

- ASTM D2068: Standard Test Method for Determining Filter Blocking Tendency

### 1.3 Instrument Specifications

**Models:** KLA-6  
KLA-6(220)

**Electrical Requirements:** 115V  $\pm 10\%$  60Hz  
230V  $\pm 10\%$  50/60Hz

**Testing Temperature Range:**  $+15^{\circ}\text{C}$  to  $+25^{\circ}\text{C}$

**Measurement Temperature Range:**  $0^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$

**Repeatability:** 0.277

**Reproducibility:** 1.405

**Dimensions:** 19.7x15.8x31.5 (50x40x80)  
**lxwxh, in.(cm)**

**Net Weight:** 77.2 lbs (35 kg)

**Consumption:** 600 VA

**Ambient Temperature:**  $5^{\circ}\text{C}$  to  $35^{\circ}\text{C}$

**Admitted Moisture:** 20% to 80 r.h.

#### **1.4 Delivery Condition and Procedure of Instruments**

Koehler Instrument Company, Inc. instrumentation is monitored according to our internal quality control procedures. Each component is tested for its specific function before assembling the instrument.

Once the instrument is assembled, it goes through a general functionality control test, to verify every device works properly in accordance with its expected functions.

Then the measurement devices are electronically calibrated according to the physical parameters that they must quantify and to the measurement scales defined for each application.

Finally, the instrument is tested with a certified reference sample on the desired parameter. These tests are done according to our internal procedure. The test results are included in the manual delivered with the instrument.

The instrument is designed for the normalized methods where the nature of the product to be tested as well as the procedure to follow is clearly defined. The certified reference samples used for the final tests are in accordance with these methods.

We recommend performing the start-up only with one certified reference sample. Any discrepancy on the results found on other products must be done only on the basis of certified reference sample. We kindly ask the customer to send us this sample with its certificate. Koehler Instrument Company, Inc. will immediately undertake an act procedure for the control and, if necessary, the correction.

***Instrumentation is tested in a laboratory where the ambient temperature can vary from  $+15^{\circ}\text{C}$  to  $+25^{\circ}\text{C}$ . The power supply is 115 Volts  $\pm 10\%$ , Hot, Neutral, Ground, uninterrupted, without electrical noise and perturbation, equipped with ground fault intensity devices (30 ma).***

#### **1.5 Assistance**

Koehler Instruments are warranted for 12 months for mechanical parts and 6 months for electronic parts, at the condition that the use and the handling for each instrument are respected.

During this period, assistance is provided free of charge upon our head office in New York or upon our agent, if one is available in your area.

In a case of assistance to a customer site, the customer will be responsible for the call cost and the traveling expenses.

The intervention costs, during the warranty period also, are subordinated to our availability and to the eventual spare parts.

**WARNING: Any changes or modifications made on the instrument without our express authorization will CANCEL the warranty.**

#### **1.6 Packing and Shipment**

The complete instrument is carefully and properly packaged by the staff of Koehler Instrument Company, Inc. The packing procedure conforms to the specific standards of the company. We adhere to the following procedure:

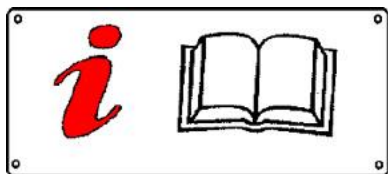
- The glass cell is disassembled and the instrument is packed in a wooden box filled with anti-shock polyethylene-foam.
- The instrument documentation can change from contract to contract; it is inside the box or in an envelope fixed on the box. The documentation includes: packing identification, usual documents, packing numbers, and the whole customer's address.
- The following information is written on the box:
  - Handle with care (FRAGILE).
  - The indication of the UP side of the box for a right handling of the box.
  - Total weight.

**NOTE:** The forwarder must take all the necessary actions to assure the stability of the shipment whatever is his speed, his accelerations, his direction changes and the journey characteristics. The forwarder must respect every note written on the packing.

It is important to ensure proper warehousing of the instrument in order to check if there is any deterioration before start up.

## 2. Safety Information and Warnings

### General Safety Standards



It is essential to thoroughly read this manual in order to correctly and safely use the KLA-6. Observe all safety standards and take note of the devices on the instrument to assure safe and successful use. Be sure only qualified staff use and handle the instrument. Before performing minimal handling or maintenance, then 115V/230V plug MUST be removed. The safety devices on the instrument must never be manipulated.

**NOTE:** In case of incorrect start up or inadequate use and handling, the person's safety will NOT be warranted. Koehler Instrument Company, Inc. declines all responsibilities for any incident or trouble

resulting from operation inconsistent with intended use or in disregard to these instructions.

**Safety Considerations.** The use of this equipment may involve *hazardous* materials and operations. This manual does not purport to address all of the safety problems associated with the use of this equipment. It is the responsibility of any user of this equipment to investigate, research, and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

### Safety Symbols Present on the Instrument



Symbol indicating danger due to electrical power ON.

**Equipment Modifications and Replacement Parts.** Any modification or alteration of this equipment from that of factory specifications is not recommended voids the manufacturer warranty, product safety, performance specifications, and/or certifications whether specified or implied, and may result in personal injury and/or property loss. Replacement parts must be O.E.M. exact replacement equipment.

**Unit Design.** This equipment is specifically designed for use in accordance with the applicable standard test methods. The use of this equipment in accordance with any other test procedures, or for any other purpose, is not recommended and may be extremely hazardous.

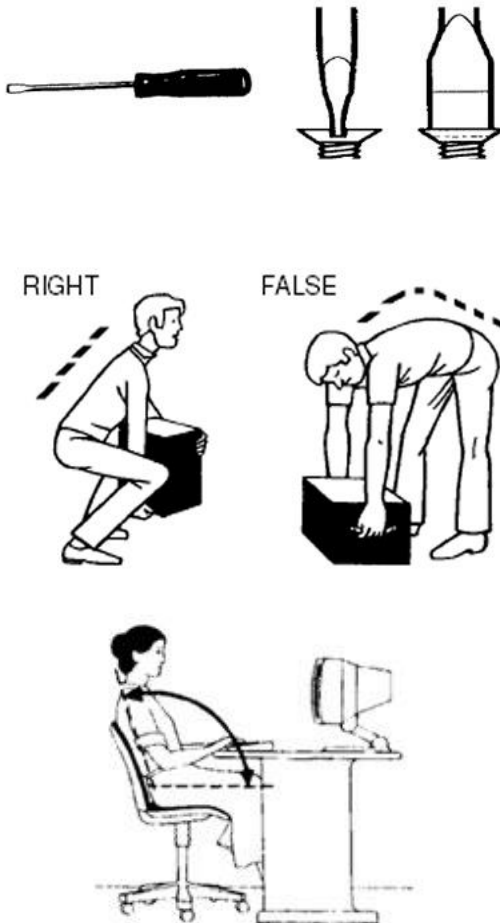
**Chemical Reagents Information.** Chemicals and reagents used in performing the test may exhibit potential hazards. Any user must be familiarized with the possible dangers before use. We also recommend consulting the Material Data and Safety Sheet (MSDS) on each chemical reagent for additional information. MSDS information can be easily located on the internet at <http://siri.uvm.edu> or <http://www.sigma-aldrich.com>.



**Conclusion of the Instrument Cycle.** The instruments that Koehler manufactures do not include dangerous components. During Start-Up ensure that any operation of this instrument is performed by specialized and authorized companies. Claim copies of the prescribed authorization and keep them in appropriate records.

**Assembly.** Safety is very important during assembly and operation of this instrument.

Use only tools in good condition with insulating handles. Be sure there is a clear path when moving the instrument. The instrument must be placed on a strong support. The work position must respect ergonomics.



### 3.1 Packing List

The instructions for preparing the equipment assume that the user is aware of the contents of this document, which lists the warranty conditions and important precautions.

- KLA-6 Automatic Filter Plugging Tendency Analyzer 115V/230V 50/60 Hz
- Touch Screen Panel PC
- Integrated Direct Refrigeration Unit
- Electronically Controlled Low Noise Pump with Fittings
- "Venturi Effect" Damper
- Pressure Regulation Valve
- Piezoelectric pressure meter
- PT 100 Sample Temperature Sensor
- PT100 Bath Temperature Sensor
- 400mL Beaker (2)
- KLA-6-Manual Automatic Filter Plugging Tendency Analyzer Operation and Instruction Manual

### 3.2 Unpacking

Carefully unpack and place the instrument and accessories in a secure location that will maintain an ambient temperature between 5°C and 35°C and relative humidity under 80% with a sufficient power supply.

Ensure that all parts listed on the packing list are present. Inspect the unit and all accessories for damage. If any damage is found, keep all packing materials and immediately report the damage to the carrier. We will assist you with your claim, if requested. When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment. Do not return goods to Koehler without written authorization.

## 3. Getting Started

## 4. Descriptions

### 4.1 Software Features

- User friendly touch screen interface
- Windows® based system
- Analytical progress and results recorded and stored
- Results Journal is accessible during analysis
- Analytical progress can be displayed in both graphical and numeric form.
- Diagnostic panel with access to all inputs/outputs
- Analysis results automatically saved in Excel® compatible format.
- One touch button to save screen shots on USB media
- Stand by mode

#### 4.2 ASTM D2068 Measuring Principle

**Scope.** This test method covers the determination of the filter plugging tendency (FPT) of distillate fuel oils within the viscosity range of 1.50 to 6 mm<sup>2</sup>/s (cSt) at 40°C.

**Significance and Use.** The filter plugging tendency allows for the evaluation of a distillate fuels cleanliness in applications demanding a high throughput through an installed filter.

#### Test Procedure.

1. 300mL of sample is transferred from the beaker in the temperature controlled bath to another beaker by means of an electronic controlled pump delivering a constant rate of 20ml/min, so that the volume of transferred sample, without the filter assembly, is 200ml: in 600 seconds (± 30s).
2. Once the filter has been placed in position at the end of the piping system, the pump begins to pull the sample, maintained from 15°C to 25°C from the reservoir beaker through the damper and the constrain valve. The flow is monitored by a pressure measuring device. The filter attached at the end of the piping delivers the sample into the receiver beaker which is monitored by the ultrasonic level meter.
3. After 20 seconds from the beginning of the analysis, the pressure shall be within 7 to 21kPa. The test will stop if the pressure is not within the mentioned range. However, with samples having an extremely high plugging tendency, the pressure could

increase rapidly, failing to meet the aforementioned pressure range. In this case, the pressure range requirement could be bypassed but the test results will be noted with the statement “high initial pressure”.

4. If the pressure reading reaches 105kPa or the transferred volume is 300mL, the analysis is complete and the result is obtained as follows:
  - a. If the pressure has reached 105kPa, 300 is divided by the volume of the sample transferred. The result is then squared, then the square root of the result +1 allows for normalization in a linear scale through the discontinuity point of 105 kPa/300ml:

$$\sqrt{1 + \left(\frac{300}{V}\right)^2}$$

- b. If transferred volume is 300mL, the maximum pressure observed is divided by 105. The result is then squared, then the square root of the result +1 allows for normalization in a linear scale through the discontinuity point of 105 kPa/300ml:

$$\sqrt{1 + \left(\frac{P}{105}\right)^2}$$

### 4.3 Instrument Controls and Connections

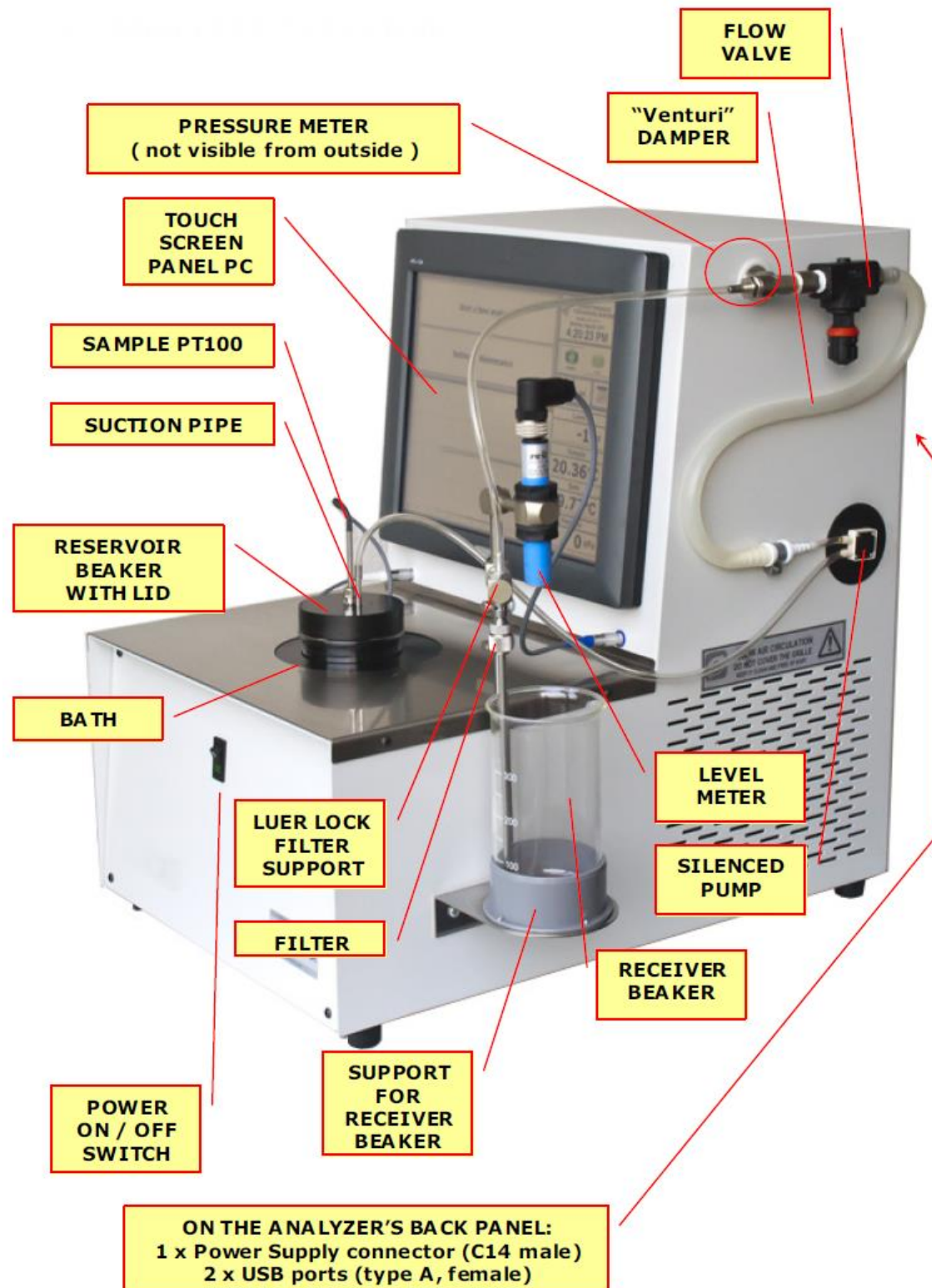


Figure 1: KLA-6 Control Descriptions

## 5. Installation

### 5.1 Installing the Analyzer

1. Connect the cord cable 115/230V from the analyzer to a network in conformity with the specifications.
2. Switch ON the analyzer

### 5.2 Main Software Interface

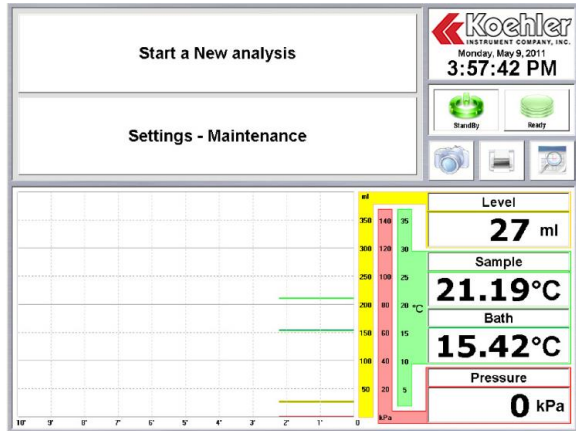


Figure 2: Main Software Screen

The upper part of the interface displays the two buttons to start a new analysis or to access the settings – maintenance panel, on the right, under the clock, the two buttons allow the operator to enable the stand by mode as shown, or by means of the Ready button to enable the controlling of the bath's temperature; by turning on the instrument, the standby mode is selected and no control of the temperature is performed.

By exiting the standby mode when the bath is automatically controlled to the specified temperature (see next pages), the Ready button is animated, it will show a static green button when the temperature is at the set point, it will show a clock while idle (a timeout prevents the cooler to be engaged/disengaged too often to avoid thermal shocks to the sample), a "steamy" animation when the cooling compressor's pressure is relieved (allows a vibration free soft restart of the cooling compressor), a blue animation while cooling and a red one while warming up, however since the bath handling is completely automatic, the operator is required only to know how to put the analyzer in stand by mode (if needed) at the end of the analysis.

The analyzer is set to standby mode by simply touching the Stand by button; if the standby mode cannot be enabled (as example, while the analysis is in progress) the button is disabled and a lock appears.



Figure 3: Stand by Lock Icon

The camera button allows the user to save to a USB device. A JPEG screenshot of the printer button will print the screen to the installed printer. It is disabled if no printer is installed.

The rightmost button allows for access to the results archive even while the analysis is in progress.

The lower area of the main screen will show a scrolling type graph, each signal measured by the analyzer is represented in both graphical form (on the graph) and numerical form (on the right), each signal is represented on the graph by a colored line, the line color is the same color of the probe and it's scale field, as example, by considering the Level, the yellow line is the graphical form, the value is represented by the yellow scale (mL) and the field Level.

The graph is updated every second so that the total visible area will represent the last 10 minutes; note that the graph and the values are updated despite the analysis status, however, during the analysis, each second of the analysis is recorded and saved to the analyzer's internal memory and could be accessed by the above mentioned results archive button which is described in chapter 9: Results Browser.



## 6. Operation

### 6.1 Analysis Parameter Settings

Pressing the Setting – Maintenance button on the main screen brings the user to the Settings and Maintenance panel. Please see Figure 4 below. This panel allows the user to set the bath temperature, regulate the internal clock and engage the pump, along with probe calibration (described in further detail in the next section). Note that by accessing this panel, next to the probe's name, the probe's signal (expressed in Volts) is shown for advances diagnostic purposes.

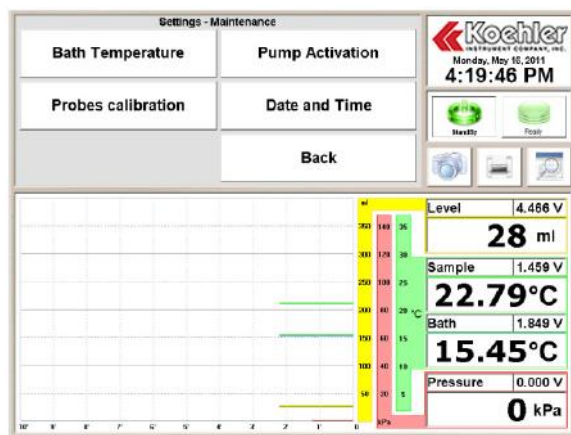


Figure 4: Settings and Maintenance Screen

Pressing the Bath Temperature button, the user can define the bath's set point, the green area defines the suggested zone for the bath's temperature; note that the bath temperature can be set only if the Standby mode is enabled. See Figure 5.

**NOTE:** During the guided analysis setup, the operator is allowed to change (if needed) the bath's set point.

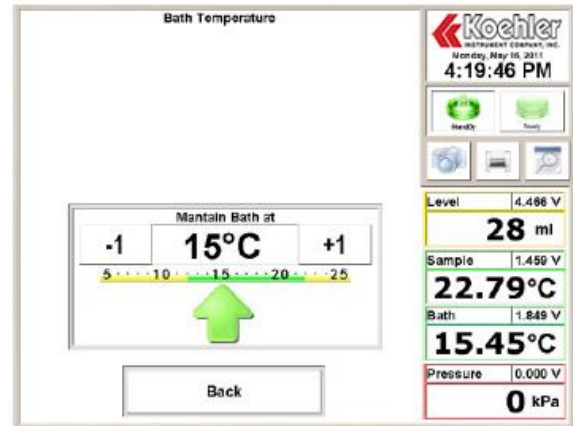


Figure 5: Bath Temperature Setting Screen

The bath temperature can be set only if the Standby mode is enabled. Please see Figure 6 below.

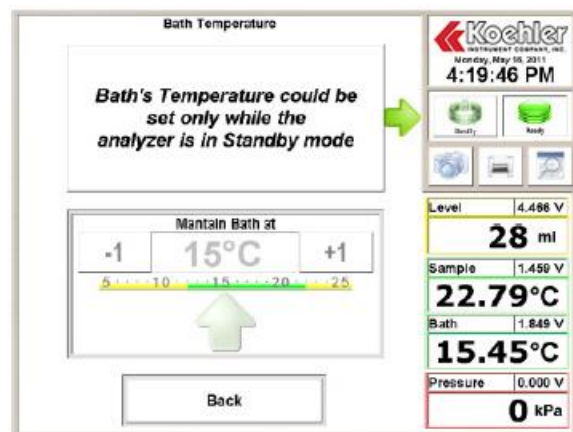


Figure 6: Bath Temperature Standby Screen

The pump activation panel allows the operator to engage the pump in standard power or at full power, as shown, it is required to open the flux valve prior to engage the maximum power (e.g. for cleaning purposes). Please see Figure 7.

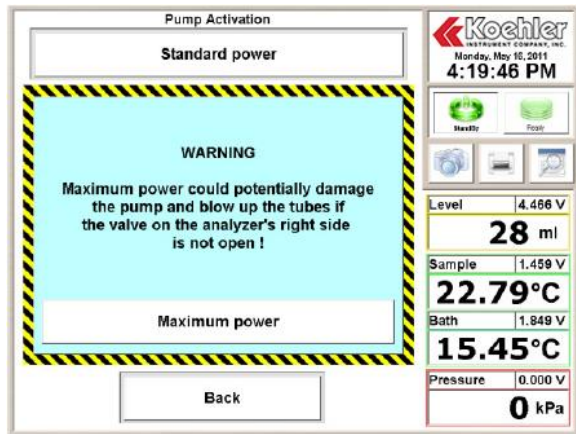


Figure 7: Pump Activation Screen

## 6.2 Start a New Analysis

Pressing the Start a New Analysis button on the main screen brings the user to the Analysis Setup screen. Please see Figure 8.

The Back and Next buttons allow the operator to navigate through each step of the analysis setup wizard, the Next button may be disabled if a required parameter / condition is missing.

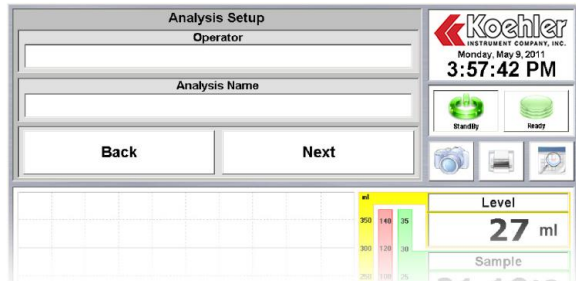


Figure 8: Analysis Setup Screen

The "Start a New Analysis Wizard", will prompt the operator to enter their name (optional) and a name for the analysis, the Analysis Name is required because it will appear as the title in the results browser; so it is suggested to introduce an evocative name for the analysis. Multiple analyses can be run with the exact same name because it will be saved along with date and time of the analysis execution, so it is impossible to overwrite an existing one. By touching the Operator or Analysis Name fields a keyboard will appear on screen: enter the desired text and touch the OK button to confirm.



Figure 9: Analysis Name Keyboard Screen

If the Analysis Name field is left blank a reminder is shown. See Figure 10 below.



Figure 10: Analysis Name Reminder Screen

By touching the Next button the bath's set point is shown, the Change button allows the user to change the bath's set point. See Figure 11 below:

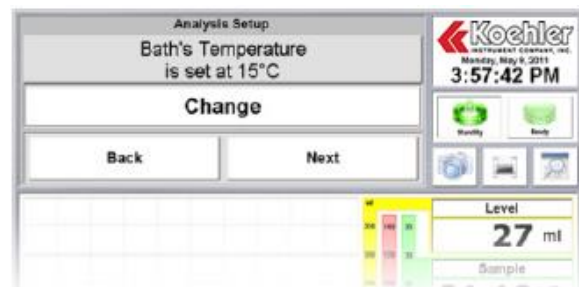


Figure 11: Bath Temperature Set Point Screen

The next step instructs the operator to fill the beaker in the bath and place the suction pipe, as shown in Figure 12, there are two conditions preventing the operator to reach the next step: the receiver beaker is not empty and the sample's temperature out of range; note also

that the bath is automatically put out of the standby mode and a lock prevents the operator to activate it beyond this point.

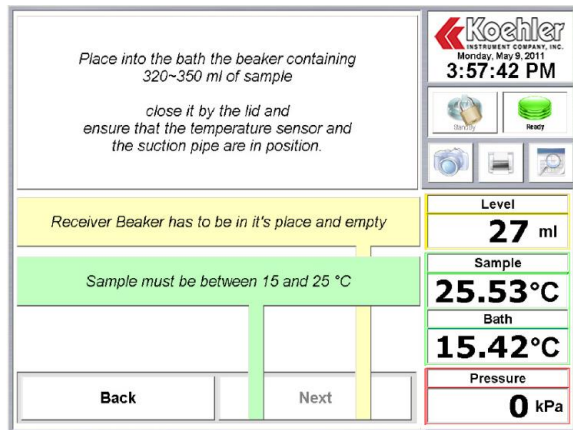


Figure 12: Beaker Placement Warning Screen

Since the bath regulation is now enabled and it's set point is adequate, the sample's temperature will take few minutes to be lowered within the prescribed range; by placing in it's receptacle the empty beaker, the yellow and green blockers disappear, allowing the operator to touch the Next button.

When all the required conditions are met, the blocks over the Next button disappear. Please see Figure 13 below.

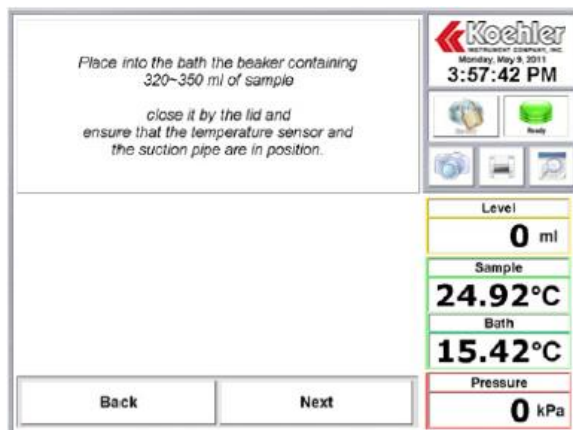


Figure 13: All Conditions Met Screen

Pressing the Next button introduces the pipe filling sequence screen. Please see Figure 14.

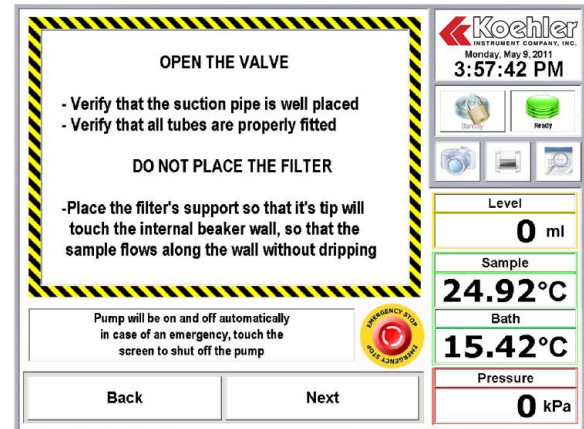


Figure 14: Pipe Filing Sequence Screen

As instructed, the suction pipe should be placed in the reservoir and the pipes should be fitted as shown in section 4.3 of this manual. Verify also that the valve is open. The filter should not be present in this step since the pump will be activated to fill the pipes as requested by the method; verify also that the receiver beaker is in position. Place the filter's support by the mean of the tightening knob so that the Luer Lock's tip is touching the internal border of the beaker. In this position, the sample will flow along the beaker's internal wall as a smooth stream.

As advised, touching the Next button will automatically engaged and disengage the pump. While the pump is filling the pipes, it is still possible to stop the pump by simply touching the screen. (e.g. the operator has not properly filled the pipes and the pump is spraying around the sample. Simply touching the screen will immediately shut off the pump.)

While the analyzer is filling the pipes, a warning screen will be displayed. Touching the screen will immediately shut off the pump. See Figure 15 below.

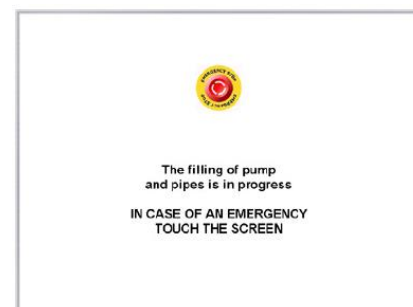


Figure 15: Pipe Filing Warning Screen



Pressing the Next button displays the flow regulation sequence screen. Please see Figure 16 below.

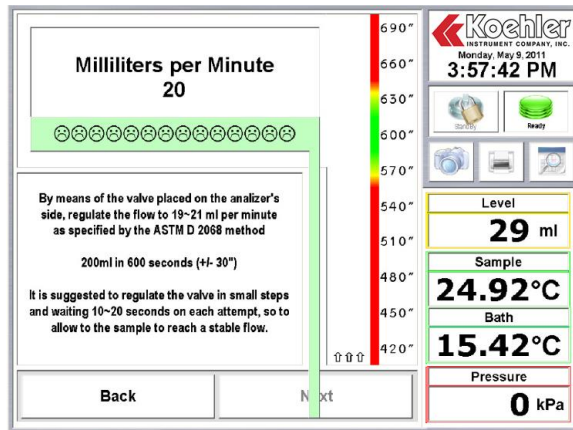


Figure 16: Flow Regulation Sequence Screen

As instructed, by means of the constriction valve, it is required to regulate the flow to 19~21mL per minute, the red-green graduated bar, next to the 420" value, 3 arrows are visible, meaning that the flow being higher than 40mL per second, will need less than 420" to transfer 200mL, so the valve has to be closed slowly to reduce the flow.

When the flow rate is within the specified range, the faces turn smiley. The more stable the signal, the more faces will smile, if the signal is unstable or outside the range, the faces will return to unhappy one by one. See example in Figure 17 below.

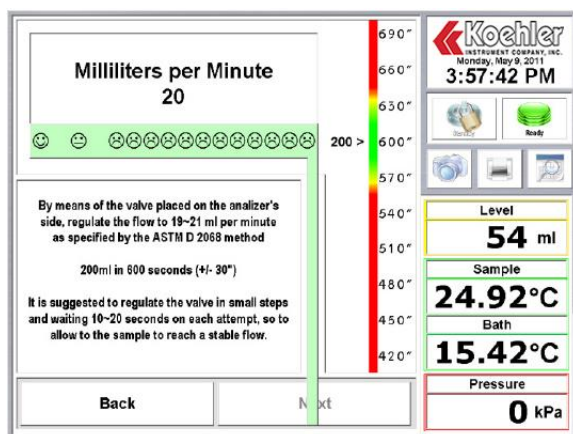


Figure 17: Flow Regulation Status Screen

Once all faces are smiling, as result of a stable and complying flow rate, the pump is stopped

and the operator will be requested to transfer back the sample from the receiver beaker to the reservoir beaker placed within the bath. It is also now required to attach the filter. Connect the filter by means of the Luer lock so that it does not interfere with the level meter. See Figure 18.

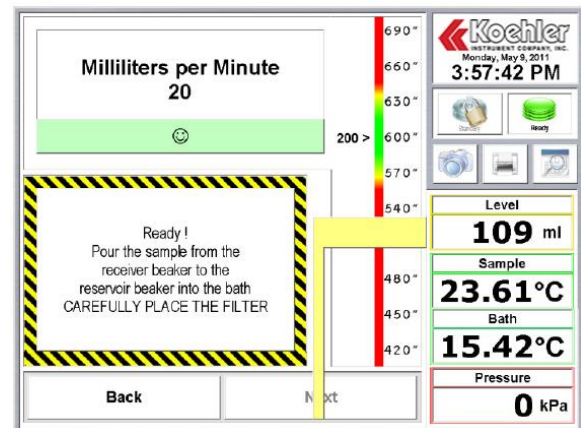


Figure 18: Flow Regulation Ready Screen

Pressing the next button, once the flow rate is ready begins the analysis. The pump is engaged and the analysis progress begins recording. See Figure 19 below.

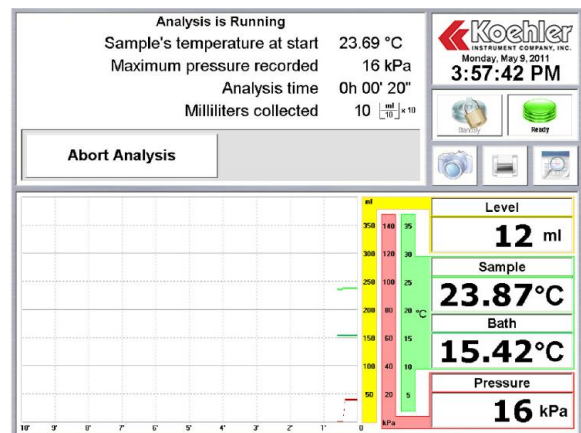


Figure 19: Analysis in Progress Screen

After 20 seconds, the method requires the operator to verify that the pressure reading lies between 7 and 21kPa. Even if the pressure is outside the prescribed limits, the analyzer will not stop the analysis, but it will record and report the sample's temperature at beginning and the pressure observed at 20", appending the words high initial pressure if the pressure is greater than 21kPa and the result is obtained by exceeding the 105kPa limit. The milliliters



collected is reported by rounding off the volume of sample to the nearest tenth as prescribed by method, so if the volume collected is 0 to 5mL, it will be reported as 0, from 6 to 15 is considered 10, 16 to 25 is 20 and so on until 300 ml are collected if the pressure does not exceed 105kPa.

If the pressure reading reaches 105kPa or the transferred volume is 300mL, the analysis is completed and the result is obtained as follows:

<p><b>If pressure has reached 105kPa</b> 300 is divided by the volume of sample transferred</p>	<p><b>If transferred volume is 300mL</b> The maximum pressure observed is divided by 105</p>
-----------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------

the result is then squared, then the square root of the result + 1 allows a normalization in a linear scale through the discontinuity point of 105kPa/300mL.

$$\sqrt{1 + \left(\frac{300}{V}\right)^2} \quad \left| \quad \sqrt{1 + \left(\frac{P}{105}\right)^2}$$

Figure 20: Calculation Formulas

### 6.3 Results Browser

The result browser may be accessed even while the analysis is in progress.

The Results browser allows the user to easily browse and display the performed analysis, in the top area you will see the selected month. By means of the arrow buttons you may select the desired month. If an analysis was performed on a certain day in a month, then the correspondent day will turn from grey to black as shown in Figure 21 below for December 1<sup>st</sup>, 3<sup>rd</sup> and 4<sup>th</sup>.

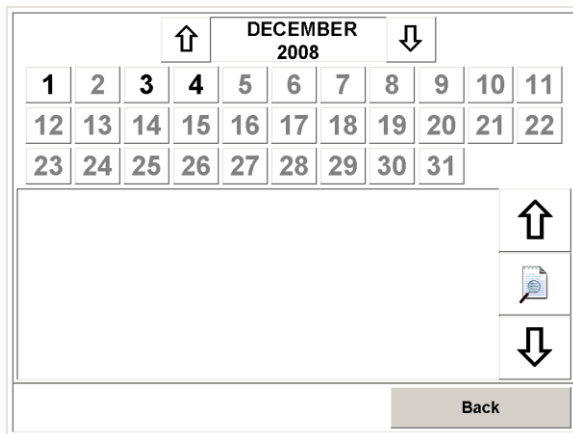


Figure 21: Results Browser Screen

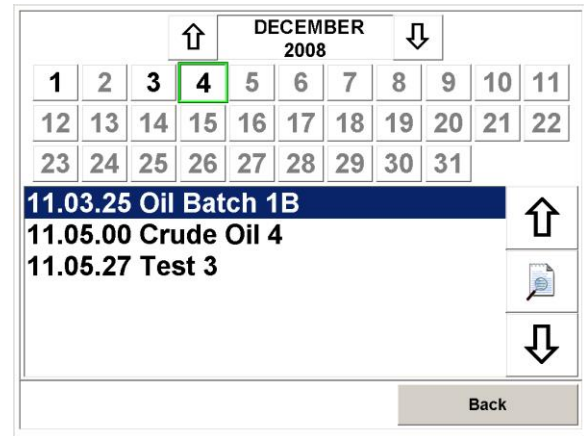


Figure 22: Results Screen 1-Day Result

By selecting a day, the analysis performed during the selected day will appear in the central area. The arrow buttons on the right allow the user to choose the analysis to be displayed. The central button picturing a magnifying glass on a sheet of paper will load the selected analysis.

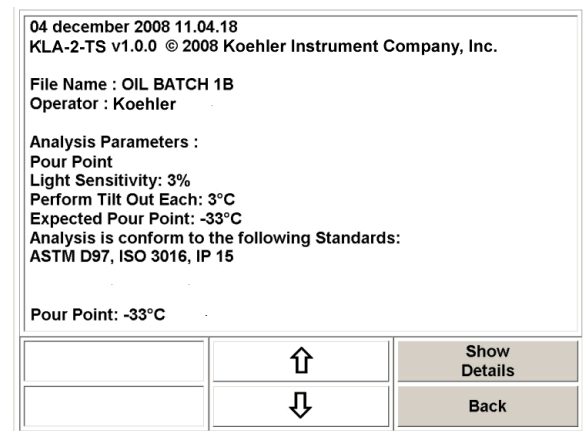


Figure 23: Results Screen - Selecting a File to See Result

A loaded analysis is shown in Figure 23. The arrow buttons allow the user to cycle through the analyses lists from the previous screen. The **Show Details** button will load the entire analysis allowing the user to browse through the entire analysis progress.

If a printer is installed, the **Add to Print Queue** and **Print Queue** buttons will turn from grey to black and be available for use. See Figure 24 below. By inserting an external mass storage device, such as a disk drive or flash drive the **Export to USB** button will be available to use.

See Figure 25 below. The analysis data will be exported in a spreadsheet compatible format.



Figure 24 and 25: Export Data Functions

Figure 26 shows the Detailed Analysis screen. The arrow buttons on the right hand side allow the user to scroll through the analysis data. The single arrows will scroll one row at a time. The double arrows will scroll through the data 11 rows at a time and the arrows pointing to the horizontal line will allow the user to jump to either the first or last row of the data.

Time	Temperature Bath	Sample	Light Reference	Detection
11.03.32	0.11	21.15	96.03	99
11.03.33	0.12	21.1	96.03	99
11.03.34	0.1	20.64	96.03	99
11.03.35	-0.2	20.55	96.03	99
11.03.36	-0.6	20.32	96.03	99
11.03.37	-0.19	20.25	96.03	99
11.03.38	-0.12	20.21	96.03	99
11.03.39	-0.24	20.16	96.03	99
11.03.40	-0.12	20	96.03	99
11.03.41	0.8	20.1	96.03	99
11.03.42	0.21	20	96.03	99

Figure 26: Results Screen - Detailed Data Analysis

## 7. Maintenance and Precautions

### Regular Maintenance

- Regularly clean the beakers and cooling jacket
- Regularly clean the pipes and fittings
- Regularly clean the filter and replace the filter medium

### Maintenance Tools

Article Number	Designation
KLA-PT100-CAL	Calibration box for PT-100
KLA-DB-KIT	Calibration kit (Set of connectors and cables for calibration)

## 8. Service

Under normal operating conditions and with routine maintenance, the KLA-6 Analyzer does not require service. Any service problem can be quickly resolved by contacting Koehler's technical service department either by letter, phone, fax, or email. In order to assure the fastest possible service, please provide us with the following information.

Model Number: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Date of Shipment: \_\_\_\_\_

## 9. Storage

This laboratory test instrument is equipped with electrical components. Storage facilities should be consistent with an indoor laboratory environment. This testing equipment should not be subjected to extremes of temperature and/or moisture. This equipment was shipped from the factory in a corrugated cardboard container. If long term storage is anticipated, re-packing the instrument in a water-resistant container is recommended to ensure equipment safety and longevity.

## 10. Warranty

We, at Koehler, would like to thank you for your equipment purchase, which is protected by the following warranty. If within one (1) year from the date of receipt, but no longer than fifteen (15) months from the date of shipment, Koehler equipment fails to perform properly because of defects in materials or workmanship, Koehler Instrument Company, Inc. will repair or, at its sole discretion, replace the equipment without charge F.O.B. its plant, provided the equipment has been properly installed, operated, and maintained. Koehler Instrument Company must be advised in writing of the malfunction and authorize the return of the product to the factory. The sole responsibility of Koehler Instrument Company and the purchaser's exclusive remedy for any claim arising out of the purchase of any product is the repair or replacement of the product. In no event shall the cost of the purchaser's remedy exceed the purchase price, nor shall Koehler Instrument Company be liable for any special, indirect, incidental, consequential, or exemplary damages. KOEHLER INSTRUMENT COMPANY, INC.

DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. Please save the shipping carton in the event the equipment needs to be returned to the factory for warranty repair. If the carton is discarded, it will be the purchaser's responsibility to provide an appropriate shipping carton.

the return. Some returns cannot be authorized, including certain products purchased from outside vendors for the convenience of the customer, products manufactured on special order, products shipped from the factory past ninety (90) days, and products which have been used or modified in such a way that they cannot be returned to stock for future sale.

## **11. Returned Goods Policy**

To return products for credit or replacement, please contact Koehler Customer Service with your purchase order number, our packing list/invoice number, the item(s) to be returned and the reason for the return. You will be issued a Returned Authorization (RA) number, which must be prominently displayed on the shipping container when you return the material to our plant. Shipping containers without an RA number prominently displayed with will be returned to the sender. Goods must be returned freight prepaid. Returns will be subject to a restocking charge, the application of which will depend upon the circumstances necessitating



[illegible]

