



K19404 / K19494 DROPPING POINT APPARATUS

OPERATION AND INSTRUCTION MANUAL

REV A

Koehler Instrument Company, Inc.

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Petroleum Testing & Analysis Instrumentation • Custom Design & Manufacturing


CERTIFICATE OF CONFORMANCE

Dropping Point Apparatus K19404, K19494

This certificate verifies that part number K19404, K19494, Dropping Point Apparatus, was manufactured in conformance with the applicable standards set forth in this certification.

Specifications:	ASTM D566
	ASTM D4950
	IP 132
	ISO 2176
	DIN 51801
	FTM 79-1421
	NF T 60-102

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



EC Declaration of conformity

Koehler Instrument Company, Inc.
of 1595 Sycamore Av., Bohemia, New York USA

We declare that the product listed below meets all basic requirements in accordance with the following Directive(s) by design, type, and version placed upon the market by us.

2004/108/EC The Electromagnetic Compatibility Directive
2006/42/EC The Machinery Directive by way of the Low-Voltage directive 2006/95/EC

And hereby declare that:

Equipment : **Dropping Point Apparatus**
Model Number(s): **K19494**

Qualifications:

This product may only be used in a professional laboratory setting by authorized personnel following the instruction handbook.

and

This product declaration is valid for unmodified equipment when installed and operated by authorized personnel following the instruction handbook.

Conforms to the following standards (as applicable):

Safety	Low-Voltage directive 2006/95/EC
EN 61010-1:2010	Safety Requirements for electrical equipment for measurement, control and laboratory use; by engineering design and risk review and by meeting the requirements of Hi-Pot Test (1500 VAC, 60 sec. per table 5) as detailed in the product's technical documentation.
EMC	Meets the essential requirements of EMC Directive 2004/108/EC by engineering design review and by meeting the requirements of Conducted Emissions Test for Group 1 Class A as detailed in the product's technical documentation.
EN 55011:2007	



James R. Ball
Chief Technology Officer

1595 Sycamore Av.
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July 14, 2014

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631-589-3800

WEEE Directive Compliance Statement

Background

The goal of the WEEE Directive is to encourage design of environment-friendly products that increase reuse, recycling and other forms of recovery to reduce waste streams and applies to listed Electronic and Electrical Equipment (EEE) and Koehler's equipment falls broadly into Appendix 1A; Section 9 Monitoring and Control Equipment: Measuring, weighing or adjusting appliances for household or as laboratory equipment.

Any associated non-embedded equipment such as Lighting (Saybolt Color) and PCs/Printers also fall under WEEE. If provided with an order these ancillary items must be WEEE compliant. For these and other reasons (printer cartridges are regionalized) the equipment must be supplied through a third party supplier in Europe.

The WEEE Directive applies to electrical and electronic equipment falling under the categories set out in Annex IA provided that the equipment concerned is not part of another type of equipment that does not fall within the scope of this Directive. Annex IB contains a list of products which fall under the categories set out in Annex IA.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:037:0024:0038:en:PDF>

We do not qualify for any of the 10 exemption categories.
<http://www.dpa-system.dk/en/WEEE/Products/Exemptions>

Professional use

For equipment defined for 'professional use' local authorities have no role to play. Producers and importers are basically responsible for collection of WEEE recyclables from the professional user and for subsequent management. A separate statement is given cataloging the items that require separation from the equipment along with basic information on subsequent processing or recycling prior to disposal of the equipment.
<http://www.dpa-system.dk/en/WEEE/Products/Private-or-professional-use>

Responsibility for Registration and Annual Reporting:

Koehler will not sell directly to end users in the EU and so has no responsibility to register within each EU state and to make annual reports. Koehler declares that this responsibility is born by the importer who is the first level of the distribution chain and is subject to producer responsibility. We will communicate this in writing to our distributor/importers in the EU stating they are responsible to satisfy WEEE registration and reporting requirements in the EU states where they conduct sales activities.

It is illegal to market electrical and electronic equipment covered by producer responsibility without being registered.

<http://www.dpa-system.dk/en/WEEE/Producers/Whoissubjecttoproducerresponsibility>

Product Design

Koehler's designs allow for complete disassembly to a modular level which usually allows for standard recycling. A qualified refrigeration system technician must be consulted when disassembling and de-commissioning any equipment with refrigeration systems.

Koehler's scientific testing equipment is robustly designed to function over a long service life and are typically repaired many times over the course of years rather than being replaced. We believe that re-use and refurbishment is the very best form of re-cycling.

All batteries must be readily removable not soldered in place.

Recycling instructions

In the event that replacement becomes necessary, we will include instructions, particularized to each instrument that informs the customer of their recycling responsibilities and giving them guidance in doing this. All Koehler equipment has been placed on the market since 13th August 2005 and so Koehler is defined as a "new WEEE producer". As such we must provide information on refurbishment, treatment, and re-use.

Our instrument manual will include this compliance statement and indicate that any collection of materials will be handled by their authorized distributor. In the event that the distributor is unreachable or is no longer a distributor for Koehler Instrument, Co., other arrangements may be made including accepting the materials directly.

Recycling is free of charge. Shipping is the responsibility of the end users. Whether shipping to a distributor or to Koehler directly, safe, properly declared, and labeled packaging and shipping expenses are the sole responsibility of the end user.

WEEE Marking



Since Koehler products are subject to the WEEE Directive we must display the WEEE symbol shown above in accordance with European Standard EN 50419 on the equipment. It must be indelible, at least 5mm in height, and clearly legible. If the equipment is too small the mark must be in the product literature, guarantee certificate, or on the packaging. Rules on marking are established in section 49 of the WEEE Order.

Koehler Instrument Company, Inc.
c/o RECYCLING
1595 Sycamore, Ave.
Bohemia, NY 11716

As a minimum the following substances, preparations and components have to be removed from any separately collected WEEE:

- Mercury containing components, such as switches or backlighting lamps (compact fluorescent lamps, CFL),
- Batteries
- Printed circuit boards if the surface of the printed circuit board is greater than 10 square centimeters (about 4 sq in.),
- Toner cartridges, liquid and pasty, as well as color toner,
- Chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC) or hydrofluorocarbons (HFC), hydrocarbons (HC)
- Liquid crystal displays (together with their casing where appropriate) of a surface greater than 100 square centimeters and all those back-lighted with gas discharge lamps,
- External electric cables
- Components containing refractory ceramic fibers as described in Commission Directive 97/69/EC of 5 December 1997 adapting to technical progress Council Directive 67/548/EEC relating to the classification, packaging and labeling of dangerous substances (2),
- Electrolyte capacitors containing substances of concern (height > 25 mm, diameter > 25 mm or proportionately similar volume)

2. The following components of WEEE that is separately collected have to be treated as indicated:

- Equipment containing gases that are ozone depleting or have a global warming potential (GWP) above 15, such as those contained in foams and refrigeration circuits: the gases must be properly extracted and properly treated. Ozone-depleting gases must be treated in accordance with Regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer (4).

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1 Introduction

The Koehler K194X4 Dropping Point Apparatus is the latest design used for identification and quality control applications, and as an indication of the highest temperature a grease can undergo without complete liquefaction or oil separation according to the ASTM D566 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 Dropping Point Apparatus. 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 providing 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

ASTM Publication:

- ASTM D566: Standard Test Method for Dropping Point of Lubricating Grease
- ASTM D4950: Standard Classification and Specification for Automotive Service Greases

2. International Organization for Standardization (ISO)
1, rue de Varembé
Case postale 56
CH-1211 Geneva 20, Switzerland
Tel: 41 22 749 01 11
Fax: 41 22 733 34 30
<http://www.iso.org>

ISO Publication:

- ISO 2176

3. Energy Institute (IP)
61 New Cavendish Street
London, W1M 8AR, United Kingdom
Tel: 44 (0)20 7467 7100
Fax: 44 (0)20 7255 1472
<http://www.energyinstpubs.org.uk/>

IP Publication:

- IP 132

4. Deutsche International Norm (DIN)
<http://www.din.de>

DIN Publication:

- DIN 51801

5. Federal Test Method (FTM)

FTM Publication:

- FTM 791-1421

1.3 Instrument Specifications

Models:	K19404 K19494
Electrical Requirements:	115V 60Hz 220-240V 50/60Hz
Power:	1250W
Maximum Temperature:	288°C (550°F)
Dimensions (wxdxh,in.(cm)):	10 x 17.5 x 18 (25.4 x 44.5 x 45.72)
Net Weight:	20 lbs (9.1kg)
Gross Weight:	30 lbs (13.6kg)
Altitude:	Rated for use below 2000m
Environmental Conditions:	As per section 1.4.1 of IEC 61010

2 Safety Information and Warnings

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.

Equipment Modifications and Replacement Parts. Any modification or alteration of this equipment from that of factory specifications is **NOT** recommended because it 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 listed in section 1.2 of this manual. 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>.

3 Getting Started

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.

3.1 Packing List

- K194X4 Dropping Point Apparatus
- K194X4-Manual K194X4 Dropping Point Apparatus Operation and Instruction Manual

Included Accessories (See Figure 1 below)

- K19494-0-12 Motor Assembly (1)
- 332-002-005 Borosilicate Glass Beaker, 400mL (2)
- K194EA Grease Cup (3)
- K19492 Test Tube with indentations (4)
- K19499 Cork Ring Guide (5)
- K19493 / K194A-0-7 Thermometer Cork, Qty 2 (6)
- K194E5 Thermometer Depth Gage (7)
- 338-000-001 Clamp Holder (8)
- K194A-0-6 Tube / Thermometer Support (9)
- K194E6 Polished Metal Rod (10)
- 432-111-001 Gage Pin, 2.82mm (0.111") Outer Diameter (11)

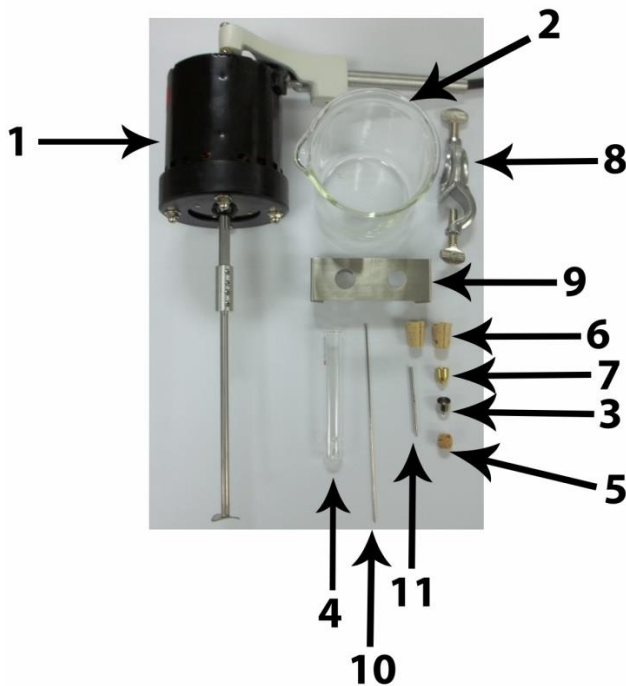


Figure 1: Packing List Components

3.2 Additional Accessories Required for Testing

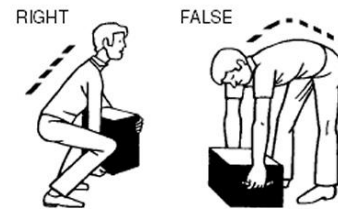
- 250-000-02C ASTM 2C Thermometer
Range: -5 to +300°C
- 250-000-02FASTM 2F Thermometer
Range: 20 to 580°F
- K194E7 Cup Plug Gage
Checks conformity of test cup with specifications

3.3 Unpacking

1. Check Shock Watch Label on Cardboard Box for indication of rough handling and possible damage.
2. Check labeling for correct orientation of instrument. (e.g. This Side Up)
3. Carefully open top of box with box cutter and remove packing foam insert.
4. Extract instrument and place on suitable cart for transportation to work area / lab bench.



WARNING: Be sure two or more individuals are available for extracting and lifting instrument from box to cart and from cart to bench. Individuals must lift in accordance to proper technique. See Figure below.



5. Lift instrument from cart and place on bench.
6. Carefully unpack and place the instrument and accessories in a secure location. 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.

4 Setup

Equipment Placement. Make sure the instrument is placed on a firm, level table in an area with adequate ventilation or in a hood. The unit may be leveled by making minor turning adjustments to the feet located at the base of the unit. Please note that Koehler does not supply a level with this equipment.

Environmental Conditions: The instrument environment must comply with the following conditions for proper setup:

- No / Low Dust
- No direct sunlight
- Not near heating or AC ventilation ducts
- No Vibrations
- Clearance from other instruments
- Temperature Range: 5 to 40°C
- Elevation to 2000 meters
- Relative Humidity: < 80%

Ventilation. A fume hood or exhaust system is required for expending any fumes or vapors that have been generated while operating the unit. Flammable vapors and/or steam are generated during operation and must not be permitted to accumulate. A canopy-style hood may be used if the height from the top of the unit to the canopy is 5 feet or less. The exhaust blower should have a rating of 1000 C.F.M. or greater.

Power. Connect the line cords to properly fused and grounded receptacles with the correct voltage as indicated in section 1.3 or on the back of the unit.



WARNING: For safety, disconnect the power when performing any maintenance and/or cleaning..

1. Main Unit Base will come pre-assembled with the Motor Support Rod affixed to it. At this time be sure the power switch are in the off position.
2. Place Beaker (**Figure 1, Item 2**) on Heating Plate.
3. Fill the Beaker with the specified heat transfer fluid to the prescribed level as stated in the standard test method.
4. Install the Tube and Thermometer Support (**Figure 1, Item 9**) to the Beaker positioned away from the spout of the beaker. This support can be squeezed for a tighter fit on the beaker.
5. Insert the bath thermometer into the larger bath thermometer cork and install into the tube and thermometer support side without the metal guide. The bath thermometer should ultimately be suspended at the same level as the test tube thermometer when installed.



NOTE: Detail on the Test Tube Assembly will be described in the Operation section of the manual.

6. Assemble the stirrer motor (**Figure 1, Item 1**) to the motor support rod using the double rod clamp provided (**Figure 1, Item 8**).
7. Install the stirrer motor into the beaker and orientate it so the stirrer motor enters through the spout of the beaker. Then position the motor at an angle so that the stirrer will not interfere with the test tube or bath thermometer.
8. Plug the stirrer motor line to cord to the receptacle located at the back of the unit (Figure 3, Item 11).

4.1 Assembly Instructions

4.2 Instrument Descriptions

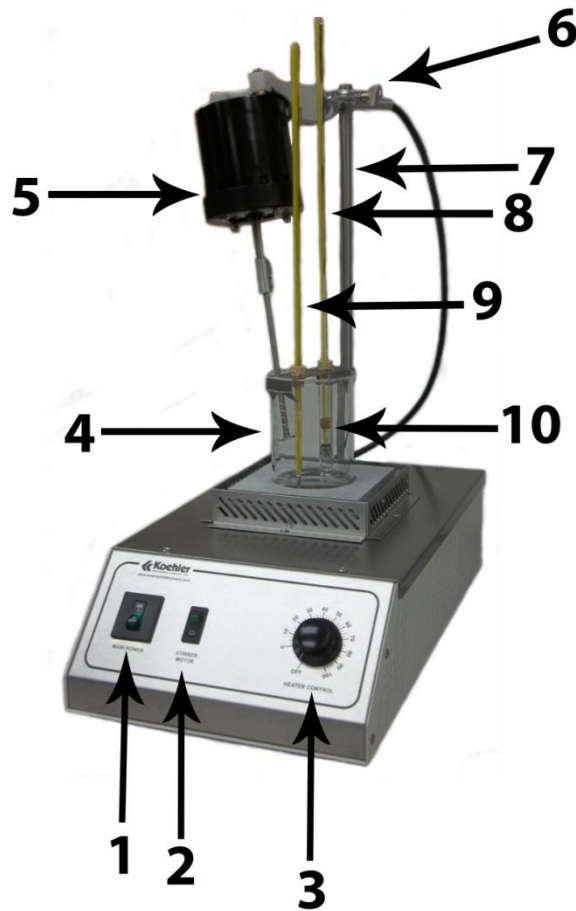


Figure 2: Instrument Descriptions_Front

1. **Power Switch:** Controls power to the entire unit. Pressing the switch to the ON position will energize the instrument. Pressing the switch to the OFF position will de-energize the instrument. Power switch will illuminate when instrument is energized.
2. **Stirrer Motor Switch.** Controls power to the Stirrer Motor. Light turns ON when the unit is energized. Power switch must be on prior to switching on stirrer motor.
3. **Temperature Control Dial.** The analog dial is used to control the heating rate of the unit during the test procedure. This dial is non-linear, therefore, the numbers indicated on the dial plate **DO NOT** refer to specific temperatures or heating rates. The control dial can be switched to an **OFF** position however, please **NOTE** that this **DOES NOT** power off the instrument.



WARNING: Be sure to completely Power Off instrument prior to performing any service of the instrument. This can only be done by switching the Power Switch to the **OFF** position. Turning the heating control dial to the off position **WILL NOT** de-energize the instrument. Only clean instrument or perform maintenance when power indicating light is off.

4. **Test Beaker / Bath:** Contains heat transfer medium to control temperature of apparatus during testing.
5. **Stirrer Motor Assembly:** Agitates bath medium for enhanced bath temperature homogeneity.
6. **Clamp Holder:** Mounts Stirrer Motor Assembly to the Vertical Motor Support Rod,
7. **Motor Support Rod:** Supports Stirrer Motor Assembly. Support Rod comes affixed to the Base Unit.
8. **Test Tube Thermometer:** To measure and monitor the temperature inside the grease cup.
9. **Bath Thermometer:** To measure and monitor the temperature inside the grease cup.
10. **Test Tube Apparatus:** Comprised of Test Tube, Thermometer, Thermometer Holder, Cork Ring Guide and Grease Cup. Site where Dropping Point Test Takes Place. Please refer to **Section 5.2** for further details on the preparation of the Test Tube Assembly.



Figure 3: Instrument Descriptions_Back

11. **Stirrer Motor Receptacle:** For connection of the stirrer motor line cord.
12. **Main Line Cord.** Connect Main Line Cord to properly fused and grounded receptacles with

the correct voltage as indicated on the serial plate on the back of the unit.

- 13. Level Adjustment Knob:** Four adjustment knobs at each corner of the instrument allow the user to ensure that the instrument is level during testing. Please note a wrench or clamp may be necessary to make proper adjustment.

5 Operation

5.1 Procedure to Fill Test Cup

1. Fill the grease test (**Figure 1, Item 3**) with sample by pressing the larger opening into the grease to be tested until the up is filled. Remove excess grease with a spatula.
2. Gently press the cup, held in a vertical position with the smaller opening at the bottom, down over the polished metal rod (**Figure 1, Item 10**) until the latter protrudes about 25mm.
3. Press the rod against the cup in such a manner that the rod makes contact at both upper and lower peripheries of the cup.
4. Maintain this contact, rotating the cup on the rod along the index finger to give a spiral-like motion down the rod to remove a conical section of the grease which adheres along the rod.
5. As the cup approaches the end of the rod, carefully slip the rod out of the cup so that a smooth film, free of air bubbles and of reproducible thickness, remains inside the cup.
6. Refer to Figure 5 below for an illustration of steps 1 thru 5 above.

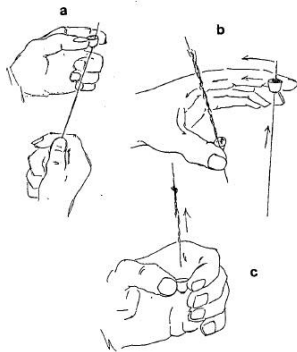


Figure 4: Procedure to Fill Test Cup

5.2 Test Tube Apparatus Assembly

1. Place the smaller of the corks with groove (**Figure 1, Item 6**) and the cork ring guide (**Figure 1, Item 5**) on the thermometer to be used in the test tube.
2. Place the brass thermometer depth gage (**Figure 1, Item 7**) in the test tube.
3. With the thermometer depth gage in position in the test tube, adjust the position of the upper cork on the thermometer so that the thermometer bulb bottoms snugly in the depth gage.
4. Observe the relative position of the top edge of the upper cork to the thermometer stem as well as the relative position of the top edge of the test tube to the cork.



NOTE: Care must be taken to be certain that the thermometer is inserted to the same depth when the apparatus is reassembled with the grease cup in position.

5. Replace the thermometer depth gage with the grease test cup (**Figure 1, Item 3**) so that the thermometer is inserted to the previously gaged depth. When properly inserted, the bulb of the thermometer does not touch either the grease sample or the cup.
6. Please refer to Figure 2 below for an illustration of the fully assembled Beaker and Test Tube Assembly from steps 1 thru 5 above.



Figure 5: Beaker and Test Tube Apparatus Assembly

5.3 Test Procedure

1. Suspend the fully prepared and assembled test tube apparatus in the oil bath through the tube and thermometer support (Figure 1, Item 9) with metal guide.



NOTE: The test tube rim should be at least 6mm above the oil level. Adjust oil level if necessary.

2. Suspend the bath thermometer into the oil bath through the tube and thermometer support without the metal guide. The bulb must be at approximately the same level as the bulb of the test tube thermometer.

3. Power on the unit by pressing the power switch (Figure 2, Item 1) to the ON position.



NOTE: The button has a indicator light built in and will illuminate green when the unit is powered on.

4. Turn on the stirrer motor by pressing the Stirrer Motor Switch (Figure 2, Item 2).



NOTE: The button has a indicator light built in and will illuminate green when the stirrer motor is powered on.



WARNING: Be sure the stirrer motor is not in contact with the bath thermometer, test tube or beaker prior to turning on the stirrer motor.

5. Turn the Temperature Control Dial (Figure 2, Item 3) Clockwise to begin heating the sample.

6. Heat the bath at a rate of 4 to 7°C / min until the bath reaches a temperature of approximately 17°C below the expected dropping point of the grease.

7. At this point reduce the rate of heating so that the temperature difference between the test tube and the oil bath is maintained between 1 and 2°C.



NOTE: This condition is established when the oil bath is heated at a rate of about 1 to 1.5°C.

8. As the temperature increases, material will gradually protrude through the orifice of the grease cup. When a drop of material falls, note the temperatures on the two thermometers and record their average to the nearest degree as the dropping point of grease.

9. After the dropping point occurs, turn the Temperature Control Dial counterclockwise to the off position. Press the stirrer motor switch to the off position. Press the Power Switch to the off position. Unplug the stirrer motor line cord from the back of the unit.

6 Safety Features

The Koehler K194X4 Dropping Point Apparatus is equipped with several safety and protection features, which are described in the following sections.

6.1 Over-Power Protection

The Koehler K194X4 Dropping Point Apparatus is equipped with Over-Power Protection circuitry, which prevents the unit from unsafe electrical conditions. If power to the unit is lost, then turn off the main power and turn it back on again. The main power switch also functions as a circuit breaker.



WARNING: Disconnect power to the unit before servicing and accessing any internal portion of the instrument to avoid exposure to high voltages and/or temperatures which may result in personal injury or death. If you have any questions about maintaining your equipment, then please do not hesitate to contact the Koehler technical service department.

7 Maintenance



WARNING: Disconnect power to the unit before servicing to avoid exposure to high voltages and/or temperatures which may result in personal injury or death. If you have any questions about maintaining your equipment, please do not hesitate to contact the Koehler technical service department.

7.1 Routine Maintenance

The K19494 Dropping Point Apparatus requires little routine maintenance to provide many years of continuous service. However, over the course of time, some instrument parts may need to be replaced. When ordering replacement part(s), please provide the model number, serial number, and product shipment date of your equipment so that we can ensure you will receive the proper replacement part(s).

7.2 Instrument Cleaning

- To clean the instrument's exterior, which includes all painted surfaces, either a solution of soap and water or laboratory grade detergent may be used.

- Apply cleaner to clean wipe or cloth, not to the instrument directly. Wipe surface clean.
- **Do Not** clean bath exterior with organic chemicals such as Acetone, Toluene, Hexane, etc.
- For more difficult cleaning of finished surfaces, a dilute solution of isopropanol in water may be used.
- It is not recommended that more aggressive solvents be used on painted surfaces since paint color will tarnish or be stripped from the instrument.
- Stainless Steel surfaces, such as on the top plate, may be cleaned using a more aggressive solvent such as a stainless steel cleaner.



SHOCK AND BURN HAZARD: Only clean inside the bath when equipment is de-energized and unplugged from the mains power supply. Allow adequate time for heating coils to completely cool before cleaning.

7.3 Replacement Parts

Part Number	Description
225-230-002	Brick Heater, 1000W, 230V
K19494-0-12	Stirrer Motor, 230V 50/60Hz
K19292	Test Tube with Indentations
K19493	Test Tube Thermometer Cork
K194A-0-7	Bath Thermometer Cork
K194A-0-6	Test Tube and Thermometer Support
332-002-005	Borosilicate Glass Beaker, 400mL
K194A-0-11	Beaker Support
K194EA	Grease Cup
K194E6	Polished Metal Rod
K194E5	Thermometer Depth Gage
K19499	Cork Ring Guide
K19490-01000	Stirrer Assembly
338-000-001	Clamp Holder
432-111-001	Gage Pin, 2.82mm (0.111")

8 Troubleshooting



WARNING: Troubleshooting procedures involve working with high voltages and/or temperatures which may result in personal injury or death, and should only be performed by trained personnel. Please do not hesitate to contact Koehler for assistance.

8.1 Unit does not power up

- Establish that the socket outlet is providing proper and adequate voltage.
- Check if Overpower Protection circuitry located directly behind the temperature controller inside the front tray has been activated.
- Check if line switch is in the **ON** position.
- Check fuse on wattstat.
- If problem persists, please call the Koehler technical service department for assistance.

8.2 Unit is on and keeps resetting into start up routine

- For 230V units, make sure that the socket outlet is greater than 215V.
- Check if there is a steady and reliable power source.
- Make sure the connector plug on the rear panel is firmly plugged in.

9 Service

Under normal operating conditions and with routine maintenance, the K19494 Dropping Point Apparatus 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: _____

10 Storage

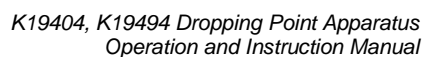
This laboratory test instrument is equipped with electrical components. Storage facilities should be consistent with an indoor laboratory environment. This testing equipment should not be subjected to extremes of temperature and/or moisture. This equipment was shipped from the factory in a corrugated 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.

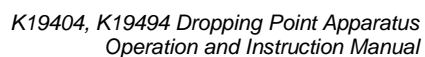
11 Warranty

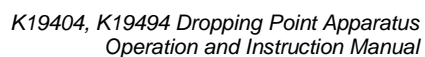
We, at Koehler, would like to thank you for your equipment purchase, which is protected by the following warranty. If within one (1) year from the date of receipt, but no longer than fifteen (15) months from the date of shipment, Koehler equipment fails to perform properly because of defects in materials 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.

12 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 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 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.

[illegible]

[illegible]



This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal black lines across its entire width, providing a guide for handwriting or typing. The paper itself is a clean, off-white color.