

# **K80000 Softening Point Apparatus (Ring and Ball Method)**



**Operation and Technical Manual**

## Table of Contents

1 Introduction.....	3
1.1 Koehler's Commitment to Our Customers .....	3
1.2 Recommended Resources and Publications .....	4
1.3 Instrument Specifications.....	4
1.4 Features & Benefits.....	4
2 Safety Information and Warnings .....	5
3 Unpacking and Installation.....	6
3.1 Packing List .....	6
3.2 Unpacking.....	6
3.3 Instrument Installation.....	7
4 Operation.....	8
4.1 Testing Procedures.....	8
5 Maintenance.....	8
5.1 Routine Maintenance .....	8
5.2 Replacement Parts.....	8
6 Service.....	9
7 Storage.....	9
8 Warranty.....	10
9 Returned Goods Policy.....	10

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## **1 Introduction**

The K80000 Softening Point Apparatus is used to determine softening point of bitumen by the ring-and-ball method. Bitumens are viscoelastic materials without sharply defined melting points. They gradually become softer and less viscous as the temperature rises. The softening point is useful in the classification of bitumens, as one element in establishing the uniformity of shipments or sources of supply, and is indicative of the tendency of the material to flow at elevated temperatures encountered in service. The test consists of casting the sample of bitumen in shouldered rings and heating at a controlled rate under the weight of a steel ball until the temperature at which the bitumen disks soften and sag downward a distance of 25mm.

This manual provides important information regarding safety, technical reference, installation requirements, operating condition specifications, user facility resource requirements, and operating instructions for the K80000 Softening Point Apparatus (Ring-and-Ball 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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## **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 D36: Softening Point of Bitumen (Ring-and-Ball Apparatus)

2. Energy Institute (aka IP)  
61 New Cavendish Street  
London W1G 7AR, UK  
Tel: +44 (0) 20 7467 7100 • Fax: +44 (0) 20 7255 1472  
<http://www.energyinst.org.uk> • email: [info@energyinst.org.uk](mailto:info@energyinst.org.uk)

### **IP Publication:**

- IP 58: Determination of Softening Point of Bitumen – Ring and Ball Method

## **1.3 Instrument Specifications**

Model:	K80000
Electrical Requirements:	none
Shipping Weight:	4 lbs (1.8 kg)

## **1.4 Features & Benefits**

- Conforms to ASTM D36 and related international test specifications
- Constructed of durable materials

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## **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, 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>.

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### **3 Unpacking and Installation**

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**

##### Main Equipment

K80000 Softening Point Apparatus , consisting of:

- 800mL Pyrex<sup>®</sup> beaker
- Steel Balls, 9.5mm dia (2)
- Shouldered Rings (2)
- Ball Centering Guides (2)
- Ring Holder
- Bottom Plate
- Beaker Cover
- Support Rods (2)

##### Accessories (ordered separately)

K42000 Powertrol Heater, 115V 50/60Hz

K42090 Powertrol Heater, 230V 50/60Hz

K80001 Shouldered Rings, pack of 10

K80002 Steel Balls, pack of 10

K80003 Ball Centering Guide, pack of 10

250-000-15F ASTM 15F Thermometer, range: 30 to 180°F

250-000-15C ASTM 15C Thermometer, range: -2 to 80°C

250-000-16F ASTM 16F Thermometer, range: 85 to 392°F

250-000-16C ASTM 16C Thermometer, range: 30 to 200°C

250-000-113F ASTM 113F Thermometer, range: 30 to 350°F

250-000-113C ASTM 113C Thermometer, range: -1 to 175°C

#### **3.2 Unpacking**

Carefully unpack and place the instrument and accessories in a secure location. Ensure that all parts listed in previous section are present. Inspect the unit and all accessories for damage. If you find any damage, 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.

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### **3.3 Instrument Installation**

1. **Equipment Placement.** Place the apparatus on a firm, level table in an area with adequate ventilation or in a hood. Make sure that the unit is leveled; please note that Koehler does not supply a spirit level with this equipment.
2. **Power.** The K80000 Softening Point Apparatus does not require electric power for proper operation. If the K42000/K42090 Powertrol Heater has been supplied, then connect the line cords to properly fused and grounded receptacles with the correct voltage as indicated on the information panel on the back of the unit. **WARNING:** For safety, disconnect the power when performing any maintenance and/or cleaning.
3. **Equipment Assembly.** Assemble the K80000 Softening Point Apparatus as shown in Figure 1 as well as per the ASTM D36 test method. Ensure that the bottom of the shouldered rings when placed in the ring holder is a distance of 25mm above the upper surface of the bottom plate. Place the desired thermometer through the middle of the beaker cover and ring holder, and allow it to rest on the bottom plate.

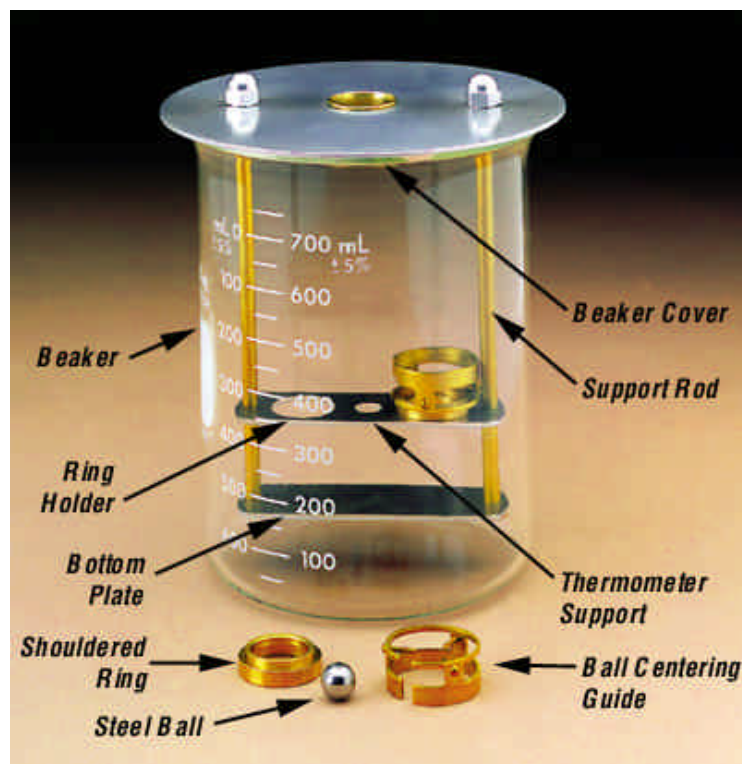


Figure 1. K80000 Softening Point Apparatus Assembly.

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## **4 Operation**

This apparatus is designed for performing softening point determinations of bitumous materials in accordance with ASTM D36 and related test methods. Please be sure to read the safety and hazard warnings, the installation procedure, and any of the standard test methods before operating this instrument.

### **4.1 Testing Procedures**

Please refer to the following standard test methods when conducting tests for the softening point properties of bitumous materials:

ASTM D36, E28; IP 58, IP 198; AASHTO T53; NF T 66-008

## **5 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, then please do not hesitate to contact the Koehler technical service department.

### **5.1 Routine Maintenance**

The K80000 Softening Point Apparatus requires little routine maintenance to provide many years of continuous service.

### **5.2 Replacement Parts**

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).

<b>Koehler Part Number</b>	<b>Description</b>
K80001	Shouldered Ring, brass (pack of 10)
K80002	Steel Ball, 9.5mm dia (pack of 10)
K80003	Ball Centering Guide (pack of 10)

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## **6 Service**

Under normal operating conditions and with routine maintenance, the Softening Point Apparatus should 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: \_\_\_\_\_

## **7 Storage**

This laboratory test instrument may be 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.

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## **8 Warranty**

We, at Koehler, would like to thank you for your equipment purchase, which is protected by the following warranty. If within one 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.

## **9 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.

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