Koehler
INSTRUMENT COMPANY, INC.

K13009
Saybolt Chromometer

Operation and Instruction Manual

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Petroleum Testing & Analysis Instrumentation • Custom Design & Manufacturing

CERTIFICATE OF CONFORMANCE

Saybolt Chromometer
K13009

This certificate verifies that part number K13009, Saybolt Chromometer, was manufactured in conformance with the applicable standards set forth in this certification.

Specifications:

ASTM D156
DIN 51411
FTM 791-101
NF M 07-003

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 K13009 Saybolt Chromometer is used to determine the color of refined liquid oils such as undyed motor and aviation gasoline, jet propulsion fuels, naphthas and kerosene, and pharmaceutical white oils. Saybolt color is an empirical definition of the color of a clear petroleum liquid based on a scale of –16 (darkest) to +30 (lightest). The number is derived by finding the height of a column of the sample that, when viewed through the length of the column, visually matches the appropriate one of three glass standards. The height of a column of sample is decreased by levels corresponding to color numbers until the color of the sample is unmistakably lighter than that of the standard. The color number above this level is reported, regardless of whether the sample was darker, questionable, or a match at the higher level.

The determination of the color of petroleum products is used mainly for manufacturing control purposes and is an important quality characteristic since color is readily observed by the user of the product. In some cases the color may serve as an indication of the degree of refinement of the material. When the color range of a particular product is known, a variation outside the established range may indicate possible contamination with another product. However, color is not always a reliable guide to product quality and should not be used indiscriminately in product specifications.

This manual provides important information regarding safety, technical reference, installation requirements, operating condition specifications, user facility resource requirements, and operating instructions for the K13009 Saybolt Chromometer. 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

   ASTM Publication:
   - ASTM D156: Saybolt Color of Petroleum Products (Saybolt Chromometer Method)

2. Other Resources

   DIN Publication: DIN 51411; **Federal Publication:** FTM 791-101;
   Afnor Publication: NF M 07-003

1.3 Features and Benefits

- Conforms to ASTM D156 and related international test specifications
- Three-position color standard turret

1.4 Specifications

Model: K13009
Dimensions, lxwxh,in.(cm): $5^1/_2$ x$5^1/_2$x$26^1/_2$ (14x14x67)
Net Weight: $15^1/_2$ lbs (7 kg)
Electrical Specifications: none
Shipping Weight: 31 lbs (14.1 kg) – *weight including accessory lamp*
Shipping Dimensions: 4.0 Cu. ft. – *dimensions including accessory lamp*

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.

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

1. K13009 Saybolt Chromometer (1), consisting of:
    - K13032 Matched Set of Tubes with Turret and Draincock (1 set)
    - K13020 Whole Color Standard (3) – assembled in turret
    - K13029 Half Color Standard (1) – assembled in turret
    - K13013 Engraved Conversion Chart (1)

3.2 Accessories(ordered separately)

1. K13010 Daylight Lamp (1)

2. 279-115-005 Frosted Bulb, 60W, 115V (1)

3. 279-230-002 Frosted Bulb, 60W, 230V (1)

3.3 Unpacking

Carefully unpack and place the equipment in a secure location. Use extra care while unpacking glass pieces. Ensure that all parts and accessories 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.

3.4 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.

3.5 Equipment Assembly

Remove all packing materials and assemble the K13009 Saybolt Chromometer as shown in Figure 1 as well as per the ASTM D156 test method. The K13009 Saybolt Chromometer consists of two glass tubes supported in the vertical position. Place the bottom portion of the glass tubes in the lower bracket and snap the upper portion into the spring clips. The sample tube is placed on the right and can be identified by its volume graduations. The reference tube is not graduated placed on the left. Make sure that the protective tube ends are in place.

Ensure that the face of the frosted glass mirror points to rear of the unit. The correct orientation is opposite to what has been shown in the picture and was done for illustrative purposes. Place the accessory K13010 Daylight Lamp or other suitable light source behind the K13009 Saybolt Chromometer and aim light towards frosted glass mirror in order to aid in sample viewing through the optical prism eyepiece.

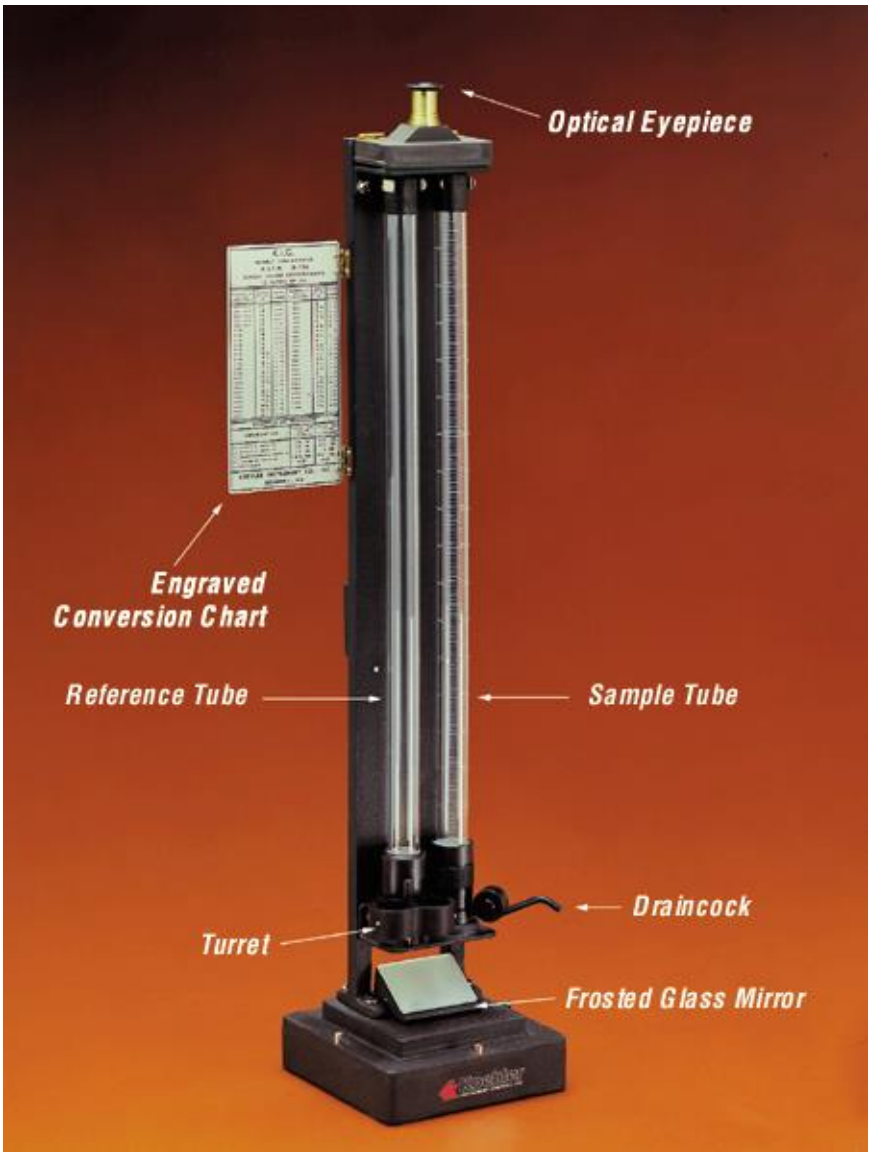


Figure 1. K13009 Saybolt Chromometer Assembly.

3.6 Power

The K13009 Saybolt Chromometer does not require electric power for proper operation. If the K13010 Daylight Lamp 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.

4 Operation

This apparatus is designed for performing color determinations petroleum- and petrochemical-based products in accordance with ASTM D156 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.

The reference tube, which is located on the left, is made of plain glass and has no graduations. It is provided with a three-position turret to hold a combination of two-full, one-full, and one half-full color standards. The color disc standards are already mounted in place on the turret assembly. The difference between the full disc and half disc standards is the thickness. One can identify the thickness simply by looking at each disc.

The sample tube, which is located on the right, is easily identified by its graduations. The tube is provided with a draincock and is closed at the lower end with a plain glass disc. The level of fluid can be regulated by draining off the required amount through the draincock by lowering the draincock spout to the horizontal position. To stop the draining of the sample fluid, raise the draincock spout to the vertical position.

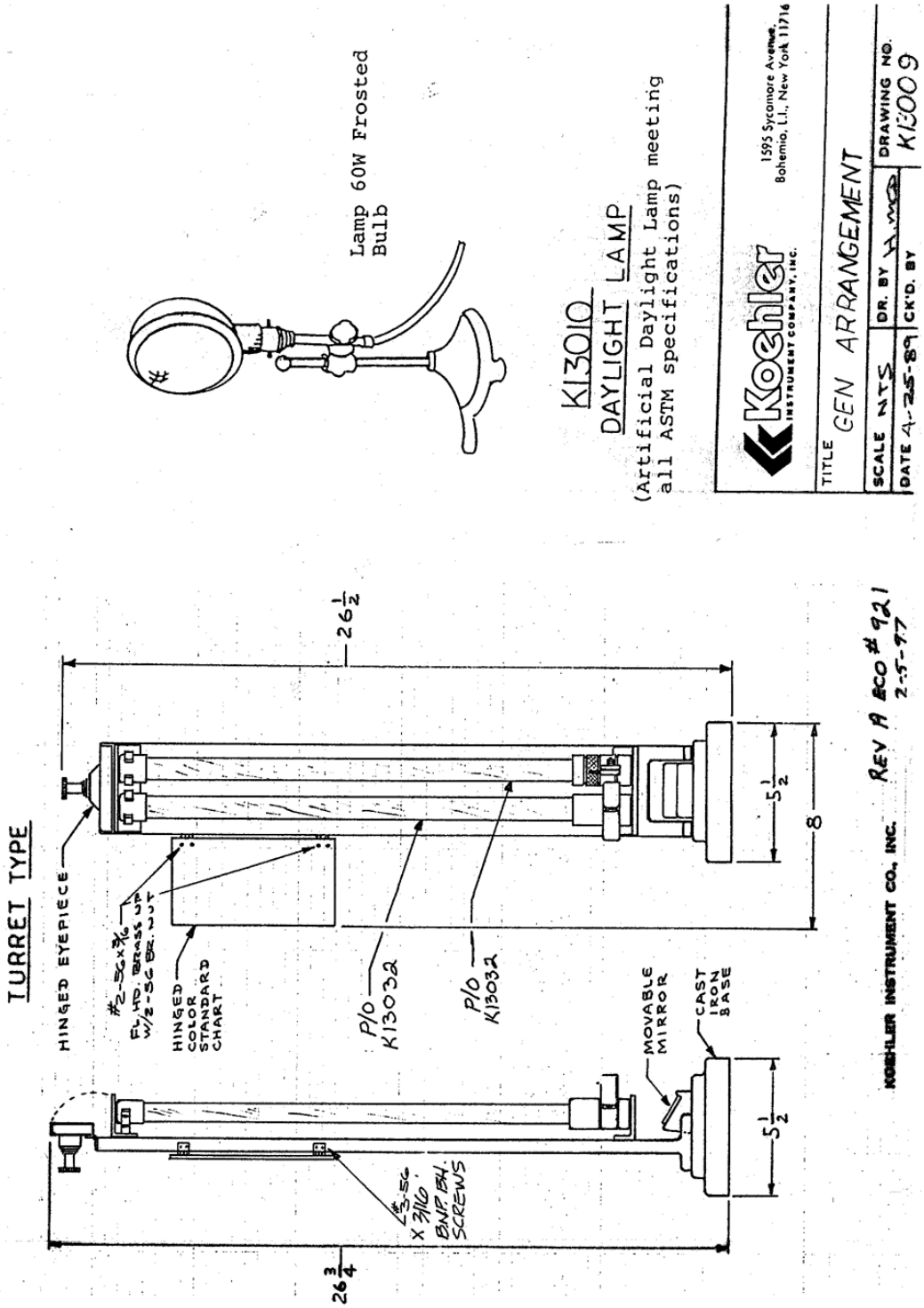
At the top of the chromometer, there is an eyepiece for viewing the sample fluid and comparing it to the reference standard. When viewing through the eyepiece, a field appears as a circle divided into two halves, where one half has the color of the standard disc while the other half as the color of the fluid in the tube.

4.1 Testing Procedures

Please refer to the following standard test methods when conducting tests for the color properties of petroleum and petrochemical products:

ASTM D156; DIN 51411; FTM 791-101; NF M 07-003

4.2 Arrangement Diagram



5 Maintenance

WARNING. Disconnect power to any 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 K13009 Saybolt Chromometer requires little routine maintenance to provide many years of continuous service. Please make sure to clean and rinse the unit with a suitable solvent after use.

5.2 Replacement Parts

When ordering replacement parts, please provide the model number, serial number, and product ship date of your equipment so we can ensure that you will receive the proper replacement part.

Koehler Part #	Description	Quantity
K13020	Color Standard, Full Disc	1
K13029	Color Standard, Half Disc	1
K13057	Drain Assembly	1
K13070	Plain Glass Disc	1
K13080	Frosted Glass Mirror, with base	1
K13090	Frosted Glass Mirror, without base	1
K13011	Optical Eyepiece	1
K13012	Gasket, for graduated sample tube	1
K13018	Gasket, for draincock lenses	1
K13013	Engraved Conversion Chart	1
K13032	Matched Glassed Set, Turret and Draincock	1

6 Service

Under normal operating conditions and with routine maintenance, the K13009 Saybolt Chromometer 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 is not 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.

8 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.

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 with 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.

Notes