KING REFRIGERATION
LOW TEMPERATURE LABORATORY INSTRUMENTS

King KV Bath

Kinematic Viscosity Bath

ASTM D445, D2170, and related test methods

Principle

Kinematic Viscosity: The ratio of the dynamic viscosity to the density of a material at the same temperature and pressure. Determining the kinematic viscosity of bitumens and liquid petroleum products, both transparent and opaque, occurs by measuring the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscometer tube, expressed in SI units of mm^2/s or CentiStokes (cSt). Results obtained depend upon the behavior of the sample and apply to primarily Newtonian liquids that exhibit proportional shear stress and shear rates. The procedure also covers residual fuel oils, which under some conditions exhibit non-Newtonian flow behavior.

History

By using gravity as the driving force, capillary viscometers generate kinematic viscosity values based on the relation between viscosity and time. Because of the availability and reliability of gravity, this principle is widely established in many standardized practices. Originally approved in the 1930's, the D445 method measures the kinematic viscosity of petroleum, fuel, and non-petroleum products.

The reliable King KV Bath models measure low, ambient, or high-temperature viscosity of fluids and lubricants over a wide temperature range. Available King models include two low-temperature baths (KV801 & KV802) and one high-temperature bath (KV803). These standard *manual* KV Baths offer self-contained refrigeration systems and accommodate four (4) KV Tubes for low-temperature and six (6) for high-temperature testing.

Features

- Digital microprocessor temperature control for accurate, easy-to-read bath temperature.
- Precise temperature control and stability & a wide range of bath temperature choices.
- Built-in safety features for over temperature and low liquid level conditions.
- Completely self-contained – no additional heating or cooling units needed.
- Large illuminated viewing window.
- Worldwide electrical compatibility.

ASTM D445
Kinematic Viscosity of Transparent and Opaque Liquids

ASTM D2170
Kinematic Viscosity of Asphalts

Additional International Specifications:

IP 71
IP 319
ISO 3105
DIN 51550
JIS K2283

Required test for :

- SAE *J300* Viscosity Classification
- ILSAC GF series & dexos™ Specifications
- API 'SL', 'SM' and 'SN' categories for modern engine oils.
- ASTM D4485, D6074, D6158

KV801 & KV802 Models:

- Hermetic refrigeration system with low vibration fans for quiet operation.
- Air-cooled refrigeration with non-CFC refrigerants - ozone friendly and readily available.

King Kinematic Viscosity Baths offer a wide range of temperature choices:

KV801 Model: +30°C to –40°C (86°F to –40°F)
KV802 Model: +30°C to –70°C (86°F to –94°F)
KV803 Model: +40°C to 150°C (104°F to 302°F)

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Parts & Accessories

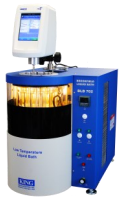
250856: Viscometer Holders, Routine
260026: KV Cross Arm Insert, Rectangular Assembly (4 position)
260075: KV Ubbelohde Assembly (4 position)
350190: Desiccant Assembly
550175: Desiccant Media (0.45 kg)

The King KV803 offers a high-temperature bath for measuring kinematic viscosity from 40°C to 150°C.

Instrument Specifications

Dimensions (W x D x H)	Benchtop: 42 x 53 x 66 cm (16.5 x 21 x 26 inches)
Weight	~ 68 kg | (150 lbs.)
Voltage	208 to 220 VAC, 10 Amp. (KV801 & 802) 115 VAC, 16 Amp. or 220 VAC, 8 Amp. (KV803)
Frequency	50/60 Hz., Single-Phase
Cooling Capacity	600 Watts at 0°C | 300 Watts at –40°C | 100 Watts at –70°C
Heating Capacity	1500 Watts (KV803 model only)
Temperature Sensor	Stainless steel thermistor and RTD (KV803 model only)
Temperature Range	**KV801:** +30°C to –40°C (86°F to –40°F) **KV802:** +30°C to –70°C (86°F to –94°F) **KV803:** +40°C to 150°C (104°F to 302°F)
Temperature Control	**KV801 & KV802:** ± 0.1°C Digital | ± 0.01°C Analog **KV803:** ± 0.1°C Digital | ± 0.02°C Analog
Cooling Rate	**KV801:** 20°C/ hour average **KV802:** 30°C/ hour average
Refrigerant	R410A (KV 801) | R507 HFC / R508B (KV 802)
Compressor	1/3 horsepower (KV801 & KV802)
Viewing Window	~ 41 x 23 cm | 16 x 9 inches
Testing Capacity	Four (4) samples (KV801 & KV802) | Six (6) samples (KV803)
Bath Size	~ 11.5 liters (3 gallons)
Cabinet Material	Powder Coated Aluminum
Safety	High pressure cutout (KV801 & KV802 models only) Low Level Indicator & Very Low Level Safety Shutdown High temperature limit
Shipping Weight	~ 122 - 136 kg | (270 - 300 lbs.)
Shipping Dimensions (W x D x H)	81 x 76 x 104 cm (32 x 30 x 41 inches)

Additional KING REFRIGERATION Precision Laboratory Instruments



Brookfield Liquid Bath (BLB)
- ASTM D2983 | IP 267 | DIN 51398
- Innovative SimAir® Test Cells
- Models: BLB701, BLB702, BLB-DIN

Mini-Rotary Viscometer (MRV TP-1)
- ASTM D3829, D4684, D6821
- Determines borderline pumping temperatures
- Direct Refrigeration Technology

Cloud & Pour Point (CP610)
- ASTM D97, D2500, D5853 | IP 15, 219, 441
- ISO 3015, 3016 | DIN 51597 | JIS K2269
- Low temperature liquid bath