eralytics

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re-imagined.

eravap

VAPOR PRESSURE TESTING AT ITS BEST

Standards
ASTM D5188, D5191, D6377, D6378, D6897, EN 13016-1, EN 13016-2, EN 13016-3

Fuel specifications
ASTM D910, D1655, D4814, D6227, D1835, EN 228

EPA, CCQTA reference instrument
CARB, NATO, US Military approved

Density
Optional built-in high precision ASTM D4052 density meter

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eravap combines maximum precision with solid durability

Applications

era**vap**'s applications range from vapor pressure testing of gasoline, aviation fuel, crude oil and liquified petroleum gas (LPG) to any other organic or aqueous solvent. It is also the ideal solution for R&D applications due to its versatile configurability and various available add-on modules. era**vap** is used in several hundred laboratories around the world and is field-proven by installations inside mobile laboratories.

Piston Based Measurement

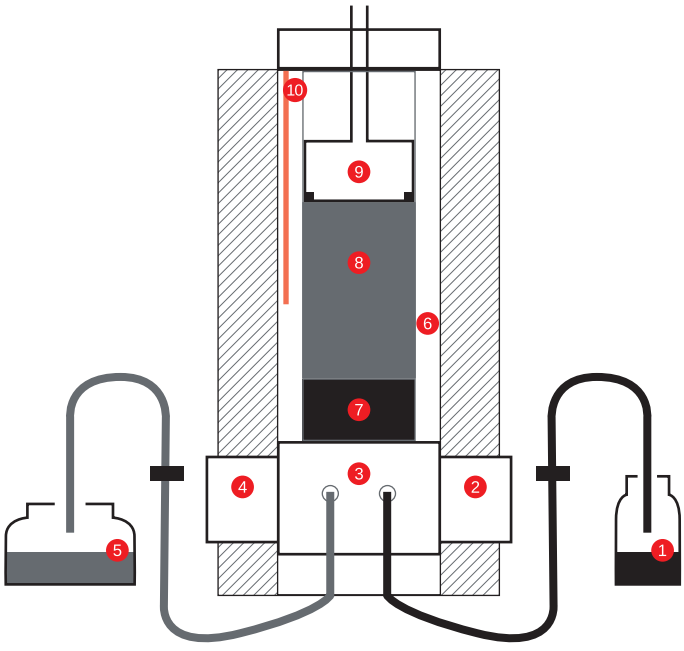
This leading-edge measurement principle in vapor pressure testing makes an external vacuum pump obsolete. The built-in piston draws in the sample at the beginning of the measurement. The piston then creates a vacuum by expanding the headspace above the sample to the predefined vapor to liquid (V/L) ratio. Then the sample is regulated to the measurement temperature and the result is displayed on the large color touchscreen.

Unmatched Performance

Powerful Peltier elements make era**vap** the only vapor pressure tester on the market covering a temperature range from -20 °C to 120 °C (4 °F to 248 °F).

era**vap**'s Pure Sampling™ valve technology minimizes any cross-contaminations. Its high precision pressure sensor allows repeatabilites of r ≤ 0.15 kPa for pure substances clearly outperforming international standard methods.

1. sample
2. inlet valve
3. manifold
4. outlet valve
5. waste container
6. measuring cell
7. liquid phase
8. gas phase
9. piston with pressure sensor
10. temperature sensor



ERAVAP - The First Choice for Fuel Applications

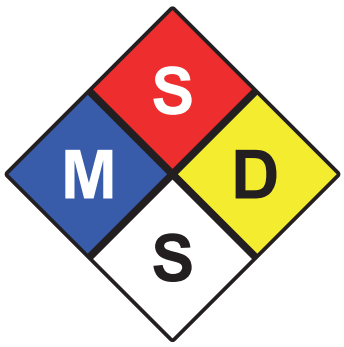
Regardless of the selected measuring method and the analyzed sample: era**vap** covers them all. Starting from the gasoline methods, ASTM D5191 (air saturated total vapor pressure, single expansion method) and ASTM D6378 (absolute vapor pressure, triple expansion method), up to the vapor-liquid ratio temperature determination method ASTM D5188 and the vapor pressure testing of LPG according to ASTM D6897. For maximum sample throughput, era**vap** can be equipped with **era**lytics directly attached 10-position autosampler.

TVS™ - ASTM D5191 Temperature Verification Sensor

era**vap**'s optional TVS™ allows for the fully automated monitoring of the sample temperature directly inside the sample container, featuring an immediate check of the sample preparation even before the actual measurement. In combination with era**vap**'s built-in QC control charts (ASTM D6299) offering the setting of predefined warning levels, the full compliance even with strictest quality control standards is ensured in your lab at any time.

Low Vapor Pressure Module

With **era**lytics optional LowVP Module (r<0.1 kPa) the measurement of low vapor pressure substances, like solvents or chemicals for MSDS purposes (material safety data sheets) or other official regulations (e.g. REACH) is an easy task. This method is based on the triple expansion method ASTM D6378 using era**vap**'s built-in high performance shaker to ensure complete thermodynamic equilibrium at each expansion step, leading to an excellent correlation to the established but manual and time-consuming isoteniscope method ASTM D2879.



Comfortable and Reliable: ERAVAP for Crude Oil Testing

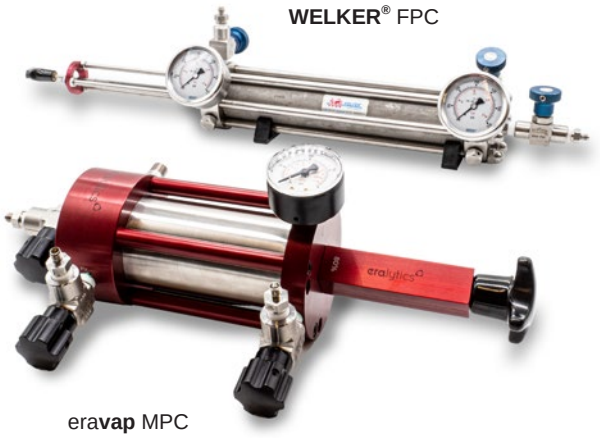
The vapor pressure of crude oil is a key parameter when planning the transportation of crudes through different climate zones. era**vap** fully complies to the most common crude oil methods, such as ASTM D6377, IP 481 and GOST R 52340 and allows measuring at variable V/L ratios between 0.02 – 4.00. Additionally, curve measurement programs at various V/L ratios are available, including the TVP method (True vapor pressure) which calculates the theoretical VPCR at V/L = 0.

ERAVAP Manual Piston Cylinder

Measuring live crudes containing high amounts of volatiles requires the use of a pressurized sampling system, such as floating piston cylinders (FPC) or manual piston cylinders (MPC). If such crudes are measured from an open container the resulting vapor pressure will be biased due to the loss of volatile material.

era**vap** is equipped with a pressure-tight quick fit connection system including an integrated inlet filter for an easy connection to piston cylinders, like **era**lytics uniquely designed era**vap** MPC (ASTM D8009). With its built-in high performance shaker motor era**vap** ensures the fast formation of pressure equilibrium.

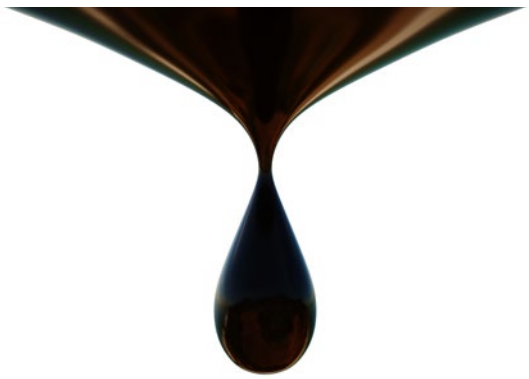
WELKER® FPC



era**vap** MPC

High Viscosity Module

eralytics‘ high viscosity module allows the measurement of even highly viscous samples. By heating the inlet, outlet and all connecting tubes as well as the inlet assembly up to 70°C this optional module makes era**vap** the perfect analyzer for challenging samples such as fuel oil or heavy crudes without risking clogging of the equipment.



ERAVAP: The Benchmark for Standard and Special Applications

Depending on the application era**vap** is available in two versions. The standard model era**vap** measures with a 1000 kPa high precision pressure sensor and is the perfect solution for most applications. For special applications like vapor pressure testing of liquified petroleum gas (propane, and propane/butane mixtures) era**vap** LPG is your instrument of choice featuring an extended pressure range up to 2000 kPa.

2-in-1: Vapor Pressure + Density with One Single Analyzer

The temperature-controlled, ultra-light (< 1 kg) U-tube density meter module DENS4052 (patented) offers density measurements in full compliance with ASTM D4052 & ISO 12185 (r = 0.00001 g/cm³). This makes era**vap** the only vapor pressure tester on the market which allows for simultaneous measurements of two parameters listed in international fuel specifications like ASTM D4814 and EN 228 in a single analyzer, namely the vapor pressure of gasoline according to ASTM D5191 and the density of gasoline, diesel or jet fuel according to ASTM D4052. Its portable and rugged design makes era**vap** the ultimate solution for mobile laboratories, terminals, and field use.

Instrument Models

era**vap (EV10)**

Temperature range: 0 °C – 120 °C (32 °F – 248 °F)

Pressure range: 0 kPa – 1000 kPa (0 psi – 145 psi)

era**vap lpg (EV20)**

Temperature range: 0 °C – 120 °C (32 °F – 248 °F)

Pressure range: 0 kPa – 2000 kPa (0 psi – 290 psi)

Optional Equipment

Density Meter Module for EV10

High precision density meter (r = 0.00001 g/cm³)

Density temperature range: 10 °C – 40 °C (50 °F – 104 °F)

Autosampler

Directly attached optional 10-position autosampler

Temperature Verification Sensor TVS™ for EV10 and EV20

Automated monitoring of sample temperature

Pressurized Sample Containers for EV10 and EV20

Floating piston cylinder (ASTM D3700)

Manual piston cylinder (ASTM D8009)

High Viscosity Module for EV10 and EV20

Heated inlet and outlet for measuring highly viscous samples

Low Temperature Module for EV10

Temperature range extension:
-20 °C – 120 °C (-4 °F – 248 °F)

Low Vapor Pressure Module for EV10

Excellent correlation to Isoteniscope method ASTM D2879

Technical Specifications of eravap

Available Test Methods	ASTM D4052, D5188, D5191, D6377, D6378, D6897, D6299 (QC charts); EN 13016-1, EN 13016-2, EN 13016-3; IP 394, IP 409, IP 481; JIS K2258-2; SH/T 0679, SH/T 0769, SH/T 0794; SN/T 2932; GOST R 52340; GB/T 11059; freely programmable methods; EPA / CARB / CCQTA / US Military and NATO reference methods, TVP measurement, VP-V/L Speed Test™ – Combined T(V/L) and vapor pressure measurement
Correlation to	ASTM D323, D1267, D2533, D4953, D5190, D5482, D2879 (optional low vapor pressure extension)
Fuel Specifications	ASTM D910, D1655, D4814, D6227, D1835; EN 228
Hardware Features	Built-in shaker for crude oil and accelerated V/L measurements Pure Sampling™ valve technology for minimized cross-contaminations
Temperature Range	0 °C – 120 °C (32 °F – 248 °F) with Peltier technology – No external cooling required Optional extension EV01-COOL: -20 °C – 120 °C (-4 °F – 248 °F) – External cooling required Extrapolated range: -100 °C – 300 °C (-148 °F – 572 °F)
Temperature Stability	0.01 °C (0.02 °F)
Pressure Range	EV10 era**vap**: 0 kPa – 1 000 kPa (0 psi – 145 psi) – High precision pressure transducer EV20 era**vap lpg**: 0 kPa – 2 000 kPa (0 psi – 290 psi) – Extended range pressure transducer
Precision	era**vap** (EV10): Repeatability: r ≤ 0.10 kPa (0.015 psi) / n-Pentane at 20°C (ASTM D6378) r ≤ 0.15 kPa (0.022 psi) / Cyclopentane at 37.8°C (ASTM D6378) Reproducibility: R ≤ 0.20 kPa (0.029 psi) / n-Pentane at 20°C (ASTM D6378) R ≤ 0.50 kPa (0.073 psi) / Cyclopentane at 37.8°C (ASTM D6378) era**vap lpg** (EV20): Repeatability: r <= 2.0 kPa (0.29 psi) / Propane at 37.8°C (ASTM D6897) Reproducibility: R <= 4.0 kPa (0.58 psi) / Propane at 37.8°C (ASTM D6897)
Pressure Resolution	0.01 kPa (0.0014 psi)
Vapor / Liquid Ratio	Variable from 0.02/1 – 100/1 (Method dependend)
Sample Introduction	Automated via built-in piston – No external vacuum pump required; 80 µm reusable filter
Sample Volume	1 mL (2.2 mL per rinsing cycle)
Measurement Time	5 minutes for a standard measurement
Interfaces	Built-in PC with Ethernet, front and rear USB and RS232 interfaces; Wifi via USB dongle Direct LIMS connectivity via LAN, output to printer or PC and export as CSV or PDF Optional input by external keyboard, mouse and barcode reader
Remote Control	Remote service capability via Ethernet interface
PC Software	era**soft RCS** – remote control Windows® software for multi-instrument remote control, convenient data transfer and result analysis
Power Requirements	Auto-switching 85 – 264 V AC, 47 – 63 Hz, max. 150 W (multi-voltage power supply) Field application: 12 V DC (vehicle battery) adapter available
Dimensions (W x D x H) / Weight	29.1 x 32.9 x 34.8 cm (11.5 x 12.9 x 13.7 in) / 9.1 kg (20.1 lb)

Due to continuing product development, specifications are subject to change.
All **era**lytics products are manufactured under ISO 9001 regulations and are CE, ROHS and UL/CSA compliant. **www.eralytics.com/eravap**

eralytics instruments are available worldwide.
An international network of over 50 authorized and well-trained distributors is ready to answer your inquiries and to offer local support and service.
www.eralytics.com/distribution

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