

EXPERT VAPOR PRESSURE TESTING



www.grabner-instruments.com

MINIVAP VPXpert



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Designed for superior performance

Designed for significantly improved precision, reliability and performance the new MINIVAP VPXpert outperforms current vapor pressure standards and make the instrument customers first choice when testing gasoline, crude oil and solvents.

One measurement provides complete and highly precise results for RVPE, DVPE, ASVP (Ptot), AVP (Pabs) and Pgas. User programmable single point, stepped or ramped temperature profiles and a V/L ratio of 0.02/1 to 4/1 allow for maximum versatility over an extended temperature range (0 – 120°C). Results are available in 5 minutes.

Ergonomically designed, the portable und rugged VPXpert incorporates a maintenance free piston drive and measuring cell. The large, durable display and the 12V car adaptor have been specifically designed to withstand heavy duty environment and to enable safe outdoor operation. The VPXpert incorporates a shaker for crude oil samples and enhanced dual-USB-connectivity. Thanks to an intuitive menu navigation and an advanced report generation the VPXpert is genuinely easy to operate. At the touch of a button, alarms can be set for upper and lower EPA limits, to backup factory and user-programmed setups or to initiate running of a standard.



! WHAT CUSTOMERS SAY ABOUT THE MINIVAP

»Grab a Grabner, it´s worth the value. We have two!«

Masroni Sabini, Laboratory Technologist, Shell Eastern Petroleum (Pte) Ltd., Singapore

Excellence derived from expertise

MINIVAP is the world´s first automatic mini-vapor pressure tester to eliminate operator bias and tiresome sample handling, thus revolutionizing vapor pressure testing. Since 1993 the Grabner method is US EPA reference for highest precision, using only 1ml of sample for vapor pressure determination.

MINIVAP testers are utilized in most major oil and pipeline companies as well as independent test and research laboratories worldwide. Applications include volatility compliance control of gasoline-oxygenate blends, crude oil testing in the laboratory, at the plant and directly in the field. The new MINIVAP VPXpert allows for volatility studies at elevated temperatures, vapor pressure determination of crude oil at very low vapor liquid ratios and the assessment of the V/L-ratio.

Key Features

- Standards: ASTM D5191, D6377 & D6378, EN 13016 1+2, IP 394, 409, 481
- Correlation: ASTM D323, D4953, D5188, D5190, D5482
- US EPA approved Grabner test method for highest accuracy
- No vacuum pump or sample preparation
- Integrated shaker for crude oil samples
- Sampling Pro™ Valve Design
- Smallest sample size (1 ml w/o rinsing)
- Maintenance free, heavy duty measurement cell
- Automatic piston lubrication
- One button - one touch usability
- Enhanced report generation
- Results in 5 minutes
- Ergonomic, portable and rugged design
- Large, durable display, fit for field use
- MINIWIN software for remote control and seamless LIMS-integration
- User access control
- Audit trailing

Your benefits

■ Sampling Pro™ Valve Design

As gasoline producers are adding more and more Ethanol into fuels, the risk of cross contamination between tests of various sample types increases. Testing E85 before testing regular base fuels can severely alter the measurement results of the base fuels, if the instrument is not able to get Ethanol residuals out of the system. Thus the MINIVAP VPXpert incorporates Sampling Pro™ technology, a high quality valve design, which minimizes the risk of cross contamination between different sample types.

■ Automatic piston lubrication.

■ One touch - one button usability

Connect the sample inlet, press run and read the results: It is that simple!

■ ASTM D6378 (Grabner method) - No Vacuum pump, no chilling, no air saturation necessary

The outstanding measuring principle of the MINIVAP was developed by Grabner Instruments and replaces ASTM D5191, D4953 and D323. Official correlation formulas are mentioned in ASTM D6378 and are pre-programmed in the MINIVAP VPXpert. With the Grabner method chilling, air saturation or the use of a vacuum pump is NOT required, and precision is significantly better, as possible operator bias is eliminated.

■ Vapor pressure of Crude Oil – ASTM D6377 (Grabner method)

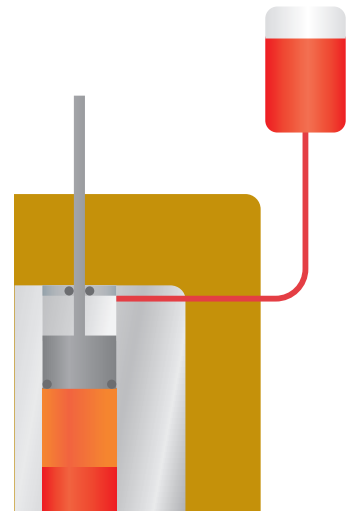
The single expansion method for vapor pressure measurement of Crude Oil was developed by Grabner Instruments. Crude Oil is collected in a pressurized floating piston cylinder (distributed by Grabner Instruments) to keep the volatiles inside the Crude Oil. After sample introduction the crude sample is shaken inside the MINIVAP VPXpert tester, which is necessary in order to get lower measuring times and to get light ends out of the crude to stabilize the pressure. No light end losses occur during the complete test. The precision of this method is significantly better than the conventional ASTM D323 method.

■ DVPE of Gasoline Mini Method – ASTM D5191 + EN 13016-1+2

■ RVPE of Crude Oil – ASTM D323 (old REID method)

■ Vapor/Liquid ratio – ASTM D5188

MINIVAP VPXpert accurately determines the V/L-ratio of non-viscous liquids including hydrocarbons like gasoline, solvents and other highly volatile compounds over a wide temperature range. The instrument performs fully automatic, providing results in minutes. No additional equipment is required.

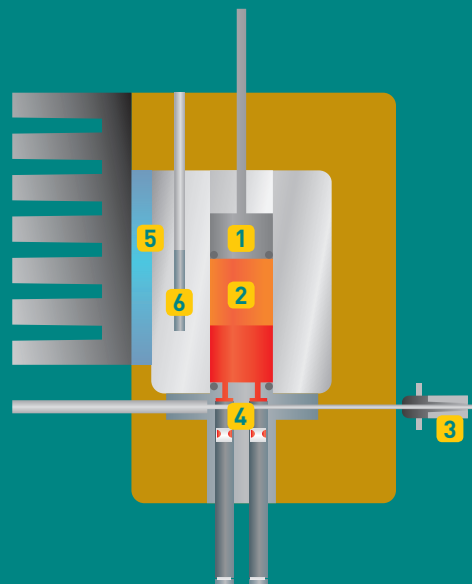


TECHNICAL DETAILS / SPECIFICATIONS

Temperature Range	0 to 120 °C (user programmable)
Temperature Stability	± 0.1°C
Temperature Profiles	Single temperature, stepped or ramped temperature profiles
Pressure Range	0 to 1000 kPa (0 to 145 psi)
Pressure Resolution	0.1 kPa
Precision better than ASTM D6378	Repeatability $r = 0.3 \text{ kPa}$ (37,8°C, 70 kPa) / Reproducibility $R = 0.7 \text{ kPa}$ (37,8°C, 70 kPa)
Vapor/Liquid Ratio	0.02/1 to 4/1, adjustable
Sample Volume	1 ml (10 ml including rinsing)
Interfaces	2 x USB, RS 232 interface for printer, PC, LIMS and external keyboard
Power Requirements	100/110/230 V AC, 50/60Hz, 200W (Switching Power Supply) Field application: Optional DC/AC Power Converter 12V / 200W
Dimensions	W x H x D : 253 x 368 x 277 mm (10 x 14.5 x 10.9 in)
Weight	9 kg (20 lbs)

■ MEASURING PRINCIPLE OF MINIVAP VPXpert

The sample is introduced through the Luer sample inlet (3) and the sample inlet valve (4) into the measuring chamber. The automatic sample introduction and the volume adjustment is accomplished by a piston with an integrated pressure transducer (1). The measuring chamber (2), with a total volume of 5 mL, is rinsed with 3 x 2.5 mL and filled with the appropriate amount of sample. After closing the valve (4), single or triple expansion to 5 mL (with vacuum created by piston withdrawal) is obtained by additional piston strokes. The temperature of the measuring cell is controlled by a high-power thermoelectric module (5) and measured with a precision Pt100 RTD sensor (6).



■ EXPANSION VERSUS VACUUM INJECTION

The conservative method of measuring vapor pressure against vacuum is to inject the sample into an evacuated chamber. The injection has to be done in a way that the sample enters the chamber directly (without any tubing). The easiest way to do this is to use septa. However, this method risks septum leakage. Moreover there is also the disadvantage that the sample must be of low viscosity in order to get it through a septum port. Drawing the sample with a piston into the chamber and making an expansion after closing the inlet valve is a far better solution, equivalent to a perfect evacuation and injection. No vacuum pump is required with this method!

■ TRIPLE EXPANSION FOR ABSOLUTE VAPOR PRESSURE

Based on the assumption that the vapor pressure of liquids remains more or less constant and that all components - like dissolved air - follow the ideal gas equation, an expansion is performed in three steps at constant temperature. Three total pressure values are determined. From these three total pressure values the partial pressure of the air, the solubility factor of the liquid, and the absolute vapor pressure of the liquid are calculated. The Triple Expansion Method makes MINIVAP an unrivalled tester for the determination of the vapor pressure of different kinds of liquids. Due to governmental regulations the measurement of vapor pressure of gasoline is the most prominent application. However, MINIVAP can be used for all kinds of liquids produced by industries where the determination of vapor pressure is required for manufacturers' safety data sheets or for quality control.



Grabner Instruments
Messtechnik GmbH
A-1220 Vienna/Austria
Dr. Otto-Neurath-Gasse 1
Phone +43/1/282 16 27-0
Fax +43/1/280 73 34
info.grabner-instruments@ametec.at
www.grabner-instruments.com

THE NEW GRABNER MINIVAP VPXpert
LOOKS GOOD. PERFORMS BETTER. EXCEEDS EXPECTATIONS.