

*THE WORLD'S LEADING*  
**VAPOR PRESSURE**  
*COMPANY*



[www.grabner-instruments.com](http://www.grabner-instruments.com)

**MINIVOL LVR**  
**MINIVAP LPG**

# MINIVOL LVR

## The Ultimate Volatility Tester for Gasoline

According to ASTM D4814 the "Standard Specification for Automotive Spark-Ignition Engine Fuel" the V/L ratio for gasoline blended with oxygenates, such as ethanol, must be determined through direct measurement techniques, not through mere estimates. MINIVOL LVR offers one of the most accurate and reliable methods: It performs direct measurements for the V/L ratio per ASTM D 5188, the only mercury-free direct measurement technique accepted for gasoline blends containing ethanol and other oxygenates. The compact MINIVOL LVR can precisely determine the V/L ratio of non-viscous liquids including hydrocarbons like gasoline, solvents and other highly volatile compounds over a wide temperature range (20 to 80 °C or 68 to 176 °F) according to ASTM D5188. It performs even better than the standard: Multiple point measurements at V/L = 100 down to V/L = 4 can be measured automatically. The instrument works fully automatically using only 4 mL of sample, providing results in minutes. All that is required is an external vacuum source.



### Key Features

- ASTM D5188, D2533
- Precision according to ASTM D5188:
  - Repeatability:  $\pm 0.6\text{ }^{\circ}\text{C}$  ( $1.1\text{ }^{\circ}\text{C}$ )
  - Reproducibility:  $\pm 0.9\text{ }^{\circ}\text{C}$  ( $1.6\text{ }^{\circ}\text{F}$ )
- Only 4 mL of sample for complete measurement
- Accurate determination of the V/L ratio
- Measurement is performed fully automatically
- No thermostat required
- Portable
- Wide temperature range of 20 to 80 °C (68 to 176 °F)
- Fast measurement: 3 minutes (single point)
- Automatic multiple point measurement
- Built-in RS 232 interface for printer or computer
- Built-in diagnostic and safety features

# MINIVAP LPG

## Easy, Quick and Reliable Measurement of Liquefied Petroleum Gas

MINIVAP LPG is a stand-alone unit for the automatic vapor pressure determination of liquefied petroleum products. Measurement is done in less than 5 minutes using overall only 15 mL of sample for measurement and rinsing. The instrument offers safe and easy operation and reduces environmental pollution. Automatic sample introduction, built-in Peltier temperature regulation and a pre-programmed rinsing cycle eliminate any manual operation or cleaning. The ease of use of the instrument allows for installation and operation without any special training. The vapor pressure is determined with high precision in a presettable temperature range of 5 to 70 °C (41 to 158 °F). Pressures may be measured up to 2000 kPa (290 psi).



### ASTM D6897 Single Expansion Method

ASTM D6897 revolutionizes the vapor pressure measurement of Liquefied Petroleum Gas (LPG). It replaces the manual bomb method ASTM D1267, presenting results with an excellent correlation, but with a highly improved repeatability and reproducibility. MINIVAP LPG allows fast and fully automated measurement avoiding any operator bias and saving a significant amount of time and money for the users.

### Key Features

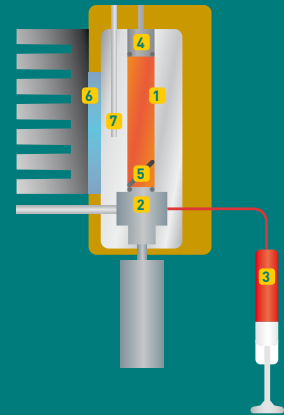
- ASTM D6897, D1267
- Repeatability (ASTM D6897):  $\pm 7.4\text{ kPa}$  (1.1 psi) or better
- Only 15 mL of sample for complete measurement
- Accurate determination of LPG vapor pressure
- Fully automatic Measurement
- No accessories required
- Built-in diagnostic and safety features
- Fast measurement: only 5 minutes
- Automatic multiple point measurement
- Built-in RS 232 Interface for printer or computer
- Wide temperature range of 5 to 70 °C (41 to 158 °F)
- Small and rugged portable tester
- Optional 12V DC battery operation for field use

## TECHNICAL DETAILS MINIVOL LVR

Sample Volume	40 mL	Accuracy of temperature reading	$\pm 0.1\text{ }^{\circ}\text{C}$ ( $\pm 0.2\text{ }^{\circ}\text{F}$ )
V/L-ratio (single point)	20	Pressure range	0 to 1000 kPa (0 to 145 psi)
V/L-ratio (multiple point)	100, 80, 60, 40, 30, 25, 20, 15, 10, 5, 4	Units of pressure	hPa, kPa, psi, at
Precision	Repeatability = $\pm 0.6\text{ }^{\circ}\text{C}$ (1.1 $^{\circ}\text{F}$ ) Reproducibility = $\pm 0.9\text{ }^{\circ}\text{C}$ (1.6 $^{\circ}\text{F}$ )	Power requirements	100/110/230 V AC, 50/60 Hz, 65 W
Temperature range	20 to 80 $^{\circ}\text{C}$ (68 to 176 $^{\circ}\text{F}$ )	Dimensions / Weight	W x H x D: 196 x 315 x 205 (7.7 x 12.4 x 8 inches) / 9.1 kg (20 lbs)

### ■ MEASURING PRINCIPLE MINIVOL LVR

The test chamber (1) has a volume of 15 mL. A motor driven ball valve (2) for injection and evacuation is located below the temperature controlled chamber. The chilled and air saturated sample is drawn into a precision syringe with Luer-lock (3), then the syringe is placed into the automatic injection drive. The pressure in the chamber is monitored with a high precision piezo-resistive pressure transducer (4). A magnetic stirrer (5) is installed inside the chamber to achieve fast equilibrium. Cooling and heating is performed with a thermoelectric module (6). The temperature of the test chamber is measured with a highly stable platinum RTD (7).



## TECHNICAL DETAILS MINIVAP LPG

Temperature range	5 to 70 $^{\circ}\text{C}$ (41 to 158 $^{\circ}\text{F}$ )	Accuracy of temperature reading	$\pm 0.1\text{ }^{\circ}\text{C}$ (0.2 $^{\circ}\text{F}$ )
Pressure range	0 to 2.000 kPa (0 to 290 psi)	Units of pressure	hPa, kPa, psi, at
Power requirements	100/110/230 V AC, 50/60 Hz, 65 W	Field application	12 V/4A DC (vehicle battery)
Dimensions / Weight	W x H x D: 196 x 315 x 175 mm (7.7" x 12.4" x 6.9") / 8 kg (18 lbs)	Repeatability	ASTM D6897 = 7.4 kPa (1.1 psi) or better

### ■ MEASURING PRINCIPLE OF MINIVAP LPG

The sample is contained in a pressurized sample bomb (3) and is attached using a quick-connect fitting (4). Automatic sample introduction and volume adjustment is performed by a piston with an integrated pressure transducer (1). The measuring chamber (2) with a total volume of 5 mL is automatically rinsed and filled with 3.3 or 3 mL. After closing the valve (5), the volume expansion to 5 mL is obtained by a further piston stroke. The temperature of the measuring cell is controlled by a thermoelectric Peltier element (6) and measured with a platinum RTD sensor (7). After the equilibrium time, the test result is displayed and can be printed. If more than one temperature is programmed the next temperature points are adjusted and measured consecutively.

