Da Vinci
LABORATORY SOLUTIONS

DVLS Pressure Station

Safe & Representative Sampling of (Liquefied) Gases

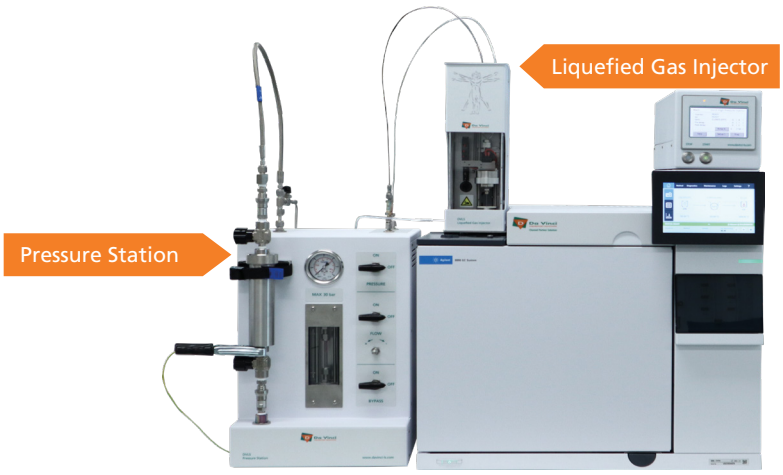
For a repeatable introduction into a GC system the liquefied gas sample must remain in a liquid phase under constant pressure during the GC injection. This is especially required for LPG or other liquefied gases.

The DVLS Pressure Station keeps the sample under pressure by using high pressure Nitrogen, which controls the outlet pressure and flow. Optionally the Pressure Station can also be configured with a vaporizer to control the sample waste. The waste sample is vented to a central waste system to ensure laboratory safety.

Flexible Design

The design of the DVLS Pressure Station offers you a high flexibility. Select from the following configuration options to fully meet your requirements.

- A configuration dedicated to the introduction of liquefied gas samples;
- A model configured for the introduction of gases & liquefied gases;
- A configuration for the introduction of gases;
- Various brands of quick connectors such a Swagelok, Walther and Staubli to enable the use of different cylinder sizes.



The DVLS Liquefied Gas Analyzer with Pressure Station

Proven Technology

The Pressure Station is an essential part of the DVLS Liquefied Gas Injector (LGI), an innovative solution for the fast, safe and accurate analysis of liquefied gases.
The LGI technique is standardized as ASTM D7756 and EN 16423 methods for the analysis of residue in LPG and successfully used by a global installed base of leading oil refineries.

The DVLS Pressure Station

Liquefied Gas Configuration

Application Range

The DVLS Pressure Station in the liquefied gas configuration is designed for the safe handling of liquefied gas samples such as:

- Propane/Propylene
- Butane/Butylene
- Pentane samples

Sampling Operation

The sample cylinder is mounted onto the Pressure Station using quick connectors. For liquefied gas samples the Pressure Station adds high pressure Nitrogen to the sample cylinder, which controls the outlet pressure and flow. The sight glass enables a visual check of the liquid phase of the sample.

The sample is introduced as a liquid using an external injection device such as a Liquefied Gas Injector or a Liquid Sampling Valve. Optionally the Pressure Station can also be configured with a vaporizer to prevent freezing of the sample waste. The waste sample is vented to a central waste system to ensure laboratory safety.

Part	Functionalities
Sample Input Quick Connector (1)	Connection for sample cylinder
Flexible Hose N_2 Supply (2)	Supplies high pressure Nitrogen to the sample cylinder
Depressurize Valve (3)	Releases the Nitrogen pressure from the flexible hose
Liquid Connection with Particle Filter (4)	Connects the sample cylinder to the Liquid Sampling Valve (LSV)
Pressure Valve (5)	Opens the high-pressure Nitrogen supply to the Flexible hose
Flow on/off Valve (6)	Starts/stops the (Liquid) sample flow
Needle Valve (7)	Controls the sample flow. The LPG sample is kept under pressure and remains in the liquid phase up to the needle valve and vaporizer.
Bypass Valve (8)	Bypasses the needle valve and vaporizer to quickly release leftover sample
Sight Glass (9)	Allows a visual inspection of the sample
Vaporizer (10)	Vaporizes the sample in a heated zone. This prevens re-condensation due to heat loss of the evaporation process.
Sample Selection Valve (11)	Manual selection valve to bypass or include the gas analysis application
Flow on/off Valve (12)	Starts/stops the gas sample flow
Gas Flow Meter (13)	Indicates the sample flow of the gas samples
Gas Connection (14)	Connects the sample cylinder to the Gas Sampling Valve (GSV)

DVLS Pressure Station with Vaporizer

DVLS Pressure Station

Gas & Liquefied Gas Configuration

Application Range

The DVLS Pressure Station –Gas & Liquefied Gas configuration is designed for the safe handling of light hydrocarbons, such as:

- Gases
- Liquefied (Vaporized) Gases

The DVLS Pressure Station Gas/Liquid is used in three application modes:

1. **Liquefied gas analysis** using an external injection device such as a Liquefied Gas Injector (LGI) or a Liquid Sampling Valve (LSV).
2. **Liquefied vaporized gas analysis** using an external injection device such as a Vaporizer and a Gas Sampling Valve (GSV).
3. **Gas analysis** using an external injection device such as a Gas Sampling Valve (GSV).

The first two applications require that the DVLS Pressure Station Gas/Liquid keeps the sample with additional pressure as a liquid. Depending on the injection mode, the sample remains either in the liquid phase or is completely evaporated into the gas phase prior filling the external injection device. The third application allows a gas sample to be connected via the DVLS Pressure Station Gas/Liquid directly to an external injection device like a GSV.

Sampling Operation

The sample cylinder is mounted onto the Pressure Station using quick connectors. The Pressure Station adds high pressure Nitrogen to the sample cylinder to pressurize the sample up to the Vaporizer to ensure a liquid state of the sample.

Liquefied Gas Analysis
The sample is introduced as a liquid using an external injection device: Liquid Sampling Valve or Liquefied Gas Injector.

Liquefied Vaporized Gas Analysis
After passing the vaporizer the sample is vaporized to ensure that the sample is in the gas phase at ambient pressure.
The gas sample is introduced using an external Gas Sampling Valve (GSV). After passing the GSV the sample returns to the DVLS Pressure Station Gas/Liquid. The waste sample is vented to a central waste system.

Gas Analysis
Install the bottom part of the sample cylinder on the Pressure Station and connect the top part of the sample cylinder to the Flexible Gas Sample line. The gas sample is injected using an external Gas Sampling Valve (GSV). After passing the GSV the sample returns to the DVLS Pressure Station Gas/Liquid. The waste sample is vented to a central waste system.

Sample Type	Injection	External Injection Device	Additional Sample Pressure
Liquefied Gas	Liquid	• Liquefied Gas Injector • Liquid Sampling Valve	Yes
Liquefied Gas	Gas	• Vaporizer & Gas Sampling Valve	Yes
Gas	Gas	• Gas Sampling Valve	No

Sampling Modes of the Pressure Station

Gas Configuration

Application Range

The DVLS Pressure Station –Gas configuration is designed for the safe handling of vaporized liquefied gas. The liquefied gas is evaporated and depressurized in a controlled manner via a vaporizer. After gasification, the sample is introduced via an external gas sampling valve.

Specifications	Pressure Station
Voltage	120 Volt / 240 Volt
Maximum working pressure	100 bar / 1500 psi
Safety pressure	Overpressure protected
Application Range	• Liquefied Gases • Vaporized Liquefied Gases • Gases
Connectors	• Swagelok • Walther • Staubli
Tubing	SS inert tubing

Sampling Operation

The sample cylinder is mounted onto the Pressure Station using quick connectors. The Pressure Station adds high pressure Nitrogen to the sample cylinder to pressurize the sample up to the Vaporizer and to control the outlet pressure and flow. The flow meter enables a visual inspection of the flow to check is the sample is gasified.

After passing the vaporizer and the needle valve the pressure is reduced in 2 stages to atmospheric pressure. The heated vaporizer prevents sample condensation due to heat loss of evaporation process. The vaporizer can be bypassed by opening the Bypass valve, to quickly release leftover sample.

The waste sample is vented to a central wastesystem to ensure laboratory safety. The Pressure Station—Gas configuration includes a safety pressure relieve valve which opens in case the pressure in the system exceeds the set maximum pressure.

Key Benefits

- ☑ Representative introduction of (liquefied) gases into a GC or LC system;
- ☑ Flexible design allows various configuration options;
- ☑ Safe and easy connection of sample container;
- ☑ Proven technology used in various applications;
- ☑ No sample preparation required.

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