SRA MyVAP

Automated LPG Vaporizer for GC Analyzer

The SRA MyVAP is composed with:

- A heated main vaporization chamber (1.00L)
- A heated liquefied gas inlet with a valve to fast loop vent (liquid purge)
- A restriction needle valve for optimal vaporization time
- A vaporization chamber heated and temperature regulated
- An electronic pressure sensor 0-5 bars
- A vacuum pump
- A relief valve to protect overpressure in the vaporization chamber
- Electro-valves to isolate any part of the sampler for unattended automatic runs
- Automatic self-check at start and target error message for easy maintenance

Fig.1 - The SRA MyVAP is fully controlled by Web software

Reproducible and automated vaporizer to be coupled with gas chromatographic system for compositional determination of liquefied petroleum gas (LPG)

A gas chromatographic system is used for determining the composition of liquefied petroleum gas (LPG) that must be carefully expanded to ensure that a representative sample is analyzed. Many procedures are used to quantitatively expand LPG from a liquid phase to a representative gas phase prior to analysis. Most of them are off-line, not safe for operators and environment, user-sensitive causing lack of reproducibility. SRA Instruments developed an automated and user-independent Gas Vaporizer and Autosampler (GVA) to expand LPG through a heated chamber in a stainless steel cylinder controlled by an electronic pressure sensor and following the UOP 539 method. As described in the method, the cylinder has an open/close valve to check and eliminate water or sediment from the LPG.

The vaporization step could be repeated more time to condition the system, flush the sampling line and the GC gas sampling valve. Before injection, the vapor is delivered to the GC at a selected pressure and the GC is automatically started by the vaporizer via the external start. The system cleaning before and after expansion is automatically operated by a vacuum pump controlled by a micro-processor and pressure sensor. All the operation are fully automated through electrovalves and controlled by a dedicated software operating as stand-alone user interface or integrated in the Agilent Chemstation sequencer. The SRA Vaporizer is manufactured with high-quality components and stainless steel and include safe connections and proper relief valve for safe operation.

Operation

The vaporizer has the following operation steps:

- Step 1. Create a vacuum
  The vacuum pump and related valve are activated (ON) and a vacuum is created into the cylinder until the pressure goes to the low limit set-point.
  The pre-set pressure value is: 0.1 bar.

- Step 2. LPG Sampling and vaporization
  The sample valve is activated (ON) and the LPG sample goes into a heated restriction, vaporize and fill the expansion cylinder in a gas phase. A pressure is created into the cylinder. The pressure is increasing up to the HIGH set-point limit. The pre-set value for the HIGH pressure level is: 1.5 bar.
  Depending on the number of cycles in the software, the device is purging again the cylinder first via the atmospheric pressure valve and then via the vacuum pump, like in the step 1.

- Step 3. Depressurization
  The atmospheric valve is activated (ON) to evacuate the gas sample from the cylinder to a common vent

- Step 4. GC injection
  When the number of cycles is complete, the last purge to GSV will start the GC via the remote contact.

Specifications

Dimensions (mm)	(L) 450 x (H) 430 x (D) 300
Weight	15 Kg
Power supply input	237 VAC, 50 to 60 Hz
Power consumption	Max. 6A / 220VAC
Material	Stainless steel AISI 316
Usage	Indoor
Contacts to GC	External device not ready/Start/GC ready Input
Valves	Nr 3 eletro-valves
Internal Vacuum pump	Before vaporization and to clean the cylinder assembly
Sample	Liquefied Petroleum Gas, C3 and C4 mixtures
Sample pressure	Less than 50 bar.
Repeatability %RSD	Typically better than 0.5% on C3 and C4
Data System	SRA software, stand-alone
Communication to PC	LAN
Operative System	Internet explorer rev10, Chrome rev 28 or higher
Applications	Liquefied Petroleum Gas compositional analysis
Relief Safety Valve	10 psi
Fittings	1/8" Swagelok for inlet; 1/16" to GC gas sampling valve
Vap. temp. range	50ºC -200 ºC (inlet) and 50-100ºC (cylinder)
Pressure sensor range	0 ÷ 5 bar
Mode of operation	Automatic via Software

SRA Vaporizer Repeatability Test

												Un Mol%
Run #	Methane	Ethane	Propane	Propylene	i-Butane	n-Butane	t-2-Butene	1-Butene	i-Butene	i-Pentane	C5=/C6+	Total Row
1	0,02	0,85	40,37	0,03	24,61	31,57	0,03	0,42	0,06	1,93	0,01	100,74
2	0,01	0,93	40,79	0,03	24,43	31,3	0,03	0,41	0,06	1,91	0,01	101,36
3	0,01	0,89	40,8	0,03	24,48	31,37	0,03	0,42	0,06	1,91	0,01	101,46
4	0,01	0,88	40,73	0,03	24,49	31,41	0,03	0,42	0,06	1,91	0,01	101,47
5	0,01	0,88	40,65	0,03	24,53	31,47	0,03	0,42	0,06	1,92	0,01	101,44
6	0,01	0,88	40,56	0,03	24,56	31,53	0,03	0,42	0,06	1,93	0,01	101,43
MEDIA	0,01	0,88	40,65	0,03	24,51	31,44	0,03	0,41	0,06	1,91	0,01	101,37
DEV.ST	0	0,025	0,16	0	0,06	0,10	0	0,00	0	0,009	0	0,28
DEV.ST%	0	2,924	0,40	0	0,26	0,32	0	0,97	0	0,51	0	0,28

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