

# Water Determination in Liquefied Petroleum Gas using GC BID and Ionic Liquid Column Watercol™

Shimadzu Application Data Sheet No.18



Water in petrochemical feedstocks can cause problems for processors. Freezing of pipe lines and valves and poisoning of expensive catalysts are just a few examples. Monitoring water in petroleum from an upstream source to

the downstream processing plant is critical to insure uninterrupted operation.

A new determination option by GC can bypass undesirable chemical interference effects from the petroleum to the "Sulfur interaction" that can skew results obtained by traditional water determination techniques. Shimadzu's proprietary Barrier Ionization Discharge (BID) detector and Supelco's water analysis column "Watercol" are combined to separate and measure the water in a formulation of feedstock (**Figure 1**) and provide a sensitive and accurate result (**Table 1**). Measurements can be made down to sub-ppm level of water detection.

## Instrument

Gas chromatograph: Tracera (GC-2010 Plus A + BID-2010 Plus)

Sample injection: Valco Internal Liquid Sample Injector with Splitter Injection Unit

Gas purifier: Supelco High Capacity Gas Purifier (Cat.#29541-U)

## Analysis Conditions

Column: Watercol™ 1910, 60 m x 0.25 mm ID, 0.20 µm

Oven: 35 °C (2.0 min) – 5 °C/min – 150 °C (15 min) Total. 40 min

Carrier gas: Helium 45 cm/sec (Column flow rate 3.78 mL/min)

Inj. volume: 2 µL

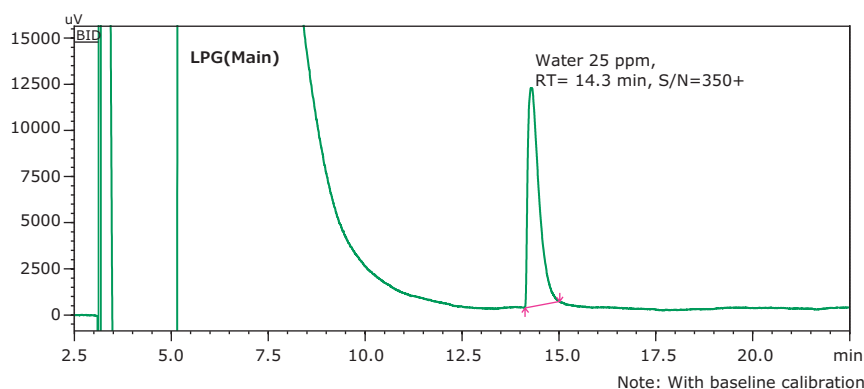
Split: 1:5

Transfer line temp.: 175 °C (After Internal Liquid Sample Injector to GC column Oven)

Detector temp.: 200 °C

Discharge gas vol.: 50 mL/min(He)

**Figure 1.** Chromatogram for water determination (25 ppm) in LPG. Quantification of Limit(S/N=10) and Detection of Limit(S/N=3.3) can be down to 0.66 ppm and 0.22 ppm respectively.



**Table 1: Repeatability of Water analysis(n=5).**

Water	No.1	No.2	No.3	No.4	No.5	Average	Standard Deviation	%RSD
RT(min)	14.285	14.288	14.286	14.296	14.304	14.292	0.008	0.06
Area(mV•s)	244,037	249,854	246,884	242,950	238,428	244,430	4,296	1.76
Height(mV)	12,418	12,600	12,468	12,045	11,851	12,276	315	2.57
Conc.(ppm)	24.96	25.56	25.25	24.85	24.39	25.00	0.44	1.76

This application is also subject of the ASTM Work Item <https://www.astm.org/DATABASE.CART/WORKITEMS/WK59649.htm>

For more information on Watercol™ Columns visit us at [SigmaAldrich.com/watercol](http://SigmaAldrich.com/watercol)

To download the Shimadzu Data Sheet visit [SigmaAldrich.com/shimadzu-ads18](http://SigmaAldrich.com/shimadzu-ads18)

## Related products:

Description	Cat. No.
Watercol™ 1910 Capillary GC Column L x I.D. 30 m x 0.25 mm, df 0.20 µm	<b>29711-U</b>
Watercol™ 1910 Capillary GC Column L x I.D. 30 m x 0.32 mm, df 0.26 µm	<b>29714-U</b>