

Liquefied Petroleum Gas

Industry: Refining
Product: GD40 and GD402

Introduction

Liquefied Petroleum Gas (LPG), or also known as LP Gas or auto gas, is a mixture of hydrocarbon gases used as a fuel in heating appliances and vehicles, and increasing replacing chlorofluorocarbons as an aerosol propellant and a refrigerant to reduce damage to the ozone layer. These gases are called LPG because they liquefy under moderate pressure, and readily vaporize upon release of pressure. The pressure at which LPG becomes liquid is called its vapor pressure; likewise each vapor pressure varies depending on composition and temperature. The ratio between the volumes of the vaporized gas and the LPG varies depending on composition, pressure and temperature, but typically is around 250:1.

LPG is synthesized by refining petroleum or 'wet' natural gas. LPG has a higher calorific value (94MJ/m^3) than natural gas, methane, (38MJ/m^3), which means it cannot simply be substituted for natural gas. LPG can be mixed with air to produce a synthetic natural gas (or also known as SNG) that can be easily substituted. LPG and air mixing ratios average 60:40 though this is widely variable based on the gases making up the LPG. The method for determine these mixing ratios can be determined by calculating the Wobbe index of the desired mix.

Process

LPG heating value control involves vaporizing LPG and mixing it with air to obtain a gas having the heat value of natural gas. The GD402 can be used to measure the heating value indirectly through its correlation with the density and specific gravity of the mixed gas. The relationship between specific gravity and the SNG mixture is well documented and can be used for process control. Since there will be some variation in the composition of the different SNGs from lot to lot, the SNG density and specific gravity is premeasured and the computational parameter data of the analyzer is set based on that so as to minimize the error due to the composition variation.

Summary

LPG heating value control involves vaporizing LPG and mixing it with air to obtain a gas having the heat value of natural gas. The GD402 can be used to measure the heating value indirectly through its correlation with the density and specific gravity of the mixed gas. The relationship between specific gravity and the SNG mixture is well documented and can be used for process control. Since there will be some variation in the composition of the different SNGs from lot to lot, the SNG density and specific gravity is premeasured and the computational parameter data of the analyzer is set based on that so as to minimize the error due to the composition variation.

What are the Advantages of LPG

The advantages of LPG are as follows

- Because of its relatively fewer components, it is easy to achieve the correct fuel to air mix ratio that allows the complete combustion of the product. This gives LPG its clean burning characteristics.
- Both Propane and Butane are easily liquefied and stored in pressure containers. These properties make the fuel highly portable, and hence, can be easily transported in cylinders or tanks to end-users.
- LPG is a good substitute for petrol in spark ignition engines. Its clean burning properties, in a properly tuned engine, give reduced exhaust emissions, extended lubricant and spark plug life.
- As a replacement for aerosol propellants and refrigerants, LPG provides alternatives to fluorocarbons, which are known to cause deterioration of the earth's ozone layer.

The clean burning properties and portability of LPG provide a substitute for traditional fuels such as wood, coal, and other

organic matter. This provides a solution to de-forestation and the reduction of particulate matter in the atmosphere (haze), caused by burning the traditional fuels.

Product Recommendations

Analyzer: GD402 Gas Density Meter
Sensor: GD40 Gas Density Detector



Notes

* If you need any further assistance please contact the Yokogawa Analytical Marketing Department