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INDICATE THE GAS LEVEL IN LIQUID PETROLIUM GAS CYLINDER

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ABSTRACT

Liquefied petroleum gases (LPG) are substances such as propane and butane, which are transported and stored in the liquid phase in tanks under sufficiently high pressure. It is generated as a by-product either of oil and gas production or refining. The composition components of LPG are much simpler than that of gasoline. LPG is thought to be a cleaner fuel because it has less impact on air quality. Liquefied petroleum gas or commercially known as LPG is a group of hydrocarbons derived from crude petroleum processes or natural gas, which are gases at normal temperatures and atmospheric pressures but which become liquid with either a moderate drop in temperature or pressure, or both. Most of the users having trouble of finding mass quantity inside the closed metallic cylinder. In this research study we expect to design new electronic technique to implement a gas level indicator by using the physical relationship between the difference of the temperature and the flow rate of the LPG cylinder.

Keywords: *Analog Temperature sensor, Cylinder bank, Gas level indicator, Liquefied petroleum gas (LPG),*

1. INTRODUCTION

High rise building apartments as well as the tourists hotels are not given the permission to use separate cylinders in own apartments. Therefore they need to use pipe laying system for gas distribution along with the usage of cylinder manifold where this manifold regulate an appropriate pressure in a constant level according to the output usage of the gas. Majority of the Liquid Petroleum gas users do not use regular manifold system. Most of the small bakers

(For gas Owens) use one or two cylinders or less than five cylinders manifold. They are facing the issue of not knowing the gas level inside the cylinders until the cylinder get empty and indicate the pressure at 0 PSI. It is a considerable issue for a system or for an Industry which use fuel in LPG cylinder without maintaining maintain an extra manifold. Further with the high usage of LP gas for bakeries the gas flow rates are also high where manifold system can be get empty within a comparatively short period of time. The system of identifying the gas level inside the cylinders will be a good solution for the above problem where the application is going to be introduced to the bakery industry and hotels, where it is not for the domestic usage.

Typically, the manifold is designed to have half the number of cylinders supplying the application, and the other half on standby waiting to replace empty cylinders. The arrangement of the cylinder Room consists of more than 20 industrial cylinders where the number of the cylinders can be varied according to the requirements of the client.

The arrangement of the manifold consists of valves and regulators where a suitable gas pressure is maintained to facilitate the distribution. The manifold pressure is usually constant as the pressure inside the gas cylinder always maintain in a constant level. The higher flow rate showed the faster changes in vapor phase and followed by the lesser flow rate. After the change into vapor phase, the increase in temperature at high flow rates are faster[1]. This is different for low flow rates where the rate of decrease and increase in temperature were almost similar.

2. EXPERIMENTAL

2.1 Measurement of temperature

When flow rate of a liquid is high, physically internal pressure is dropped, then temperature is decreased according to the Boil's and Charll's Theory. Liquid needs heat to convert into the vapor phase. During this process liquid absorbs heat from surrounding area and therefore the temperature get decreased. This temperature difference is used to design the proposed device. LM 35 Analog temperature sensor is used to identify the temperature which is linearly output proportional to the temperature. Mainly two Analog sensors are placed in the gas cylinder surface. One is at top of the cylinder, another one is at bottom of the cylinder.LM35 output is analog voltage which are converted to the temperature in Celsius by using microcontroller. Temperatures were compared between Top and bottom of the cylinder

by using analog sensors. According to the system, if bottom temperature is lower than another liquid level is not passed the analog sensor level. The temperatures are same, gas level has been passed above conditions. It is indicated by an alarm.

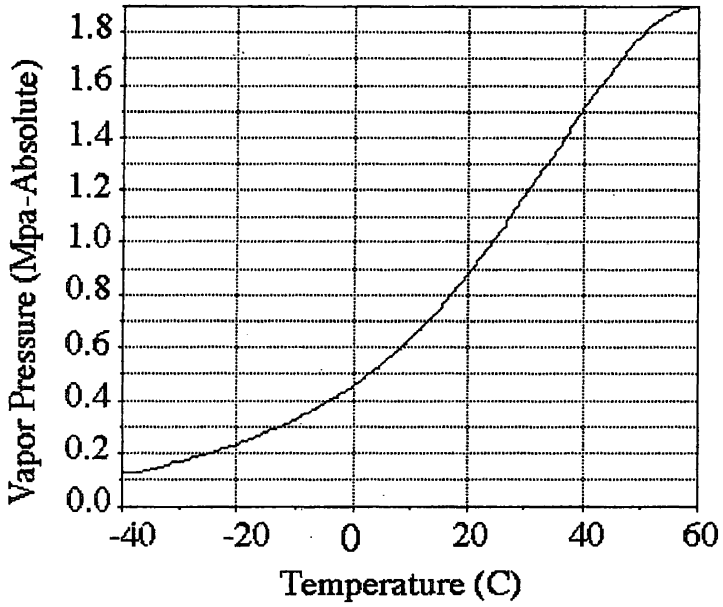

Fig 2.1: Vapor pressure verses temperature[2]

When the flow rate is high the pressure is dropped.in that condition gas vapors try to maintain the pressure, so liquid get heat and evaporate.

3. RESULT AND DISCUSSION

Table 3.1: Temperature of different type usage

Cylinder Type	Place/cooker size	Top temperature©	Bottom Temperature©	Room Temperature©
2.5kg	Domestic	28.6	28.4	29.2
12.5kg	Domestic	26.9	26.5	27.5
12.5kg	High pressure burner	29.9	28.7	30.1
37.5kg	Havelock city	29.1	29	29.3
37.5kg	Nawaloka hospital	31.2	28.7	31.3

According to the above table, high pressure burner in the bakery and the cylinder at the Nawaloka hospital showed a clear temperature difference between top and bottom than cylinders at the other places. That clear temperature difference can be used in the identification of the gas limit.

The gas level of consumer (LPG) at bakers for lager flow rate usage could be identified gas level in the closed cylinder.

3.1. Advantages of the proposed system

The hotel and bakery industry can gain many advantages by using this system.

- Able to know the gas level inside the gas cylinder and after alarm indication can count down the time for total emission of gas with the remaining level to fix the next cylinder on time.
- The system is easy to use.

4. CONCLUSION

This study was carried out in order to design a new, low cost equipment to measure the gas quantity inside the cylinder to be implemented in the industry level. In this stage temperature sensors were used. But the temperature sensors are less accurate due to improper/less efficient contact of the sensor with the gas inside a closed cylinder. These problems can be solved by replacing ultrasonic sensors where it get the more accurate readings in quantifying the gas level correctly. Ultra sonic wave transmit into the cylinder where ultra-sonic waves indicate a time difference for the transmission in liquid and gas phases[2]

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