DME/LPG Blending

International DME Association

IDA Fact Sheet No. 1

Introduction

Often described as "synthetic LPG (liquefied petroleum gas), DME's (dimethyl ether) similarity to LPG and ease of production from multiple feedstocks are providing numerous opportunities for the ultra-clean fuel's introduction in new markets worldwide as an LPG substitute. Currently more than 65% of the DME produced globally is blended with LPG.

DME can be blended with LPG and used for domestic cooking and heating – blends containing up to 20% volume DME generally require no modifications to equipment or distribution networks. Growth in DME's use for such domestic applications is increasing sharply as DME blending becomes more widespread within the large, and growing, LPG market – in particular in developing countries where portable (bottled) fuel is providing a safer, cleaner, and more environmentally benign fuel for cooking and heating.

DME's use as an alternative energy source enjoys wide-ranging support in a number of countries, with numerous projects underway or being planned in China, Egypt, India, Indonesia, Japan, Korea, Uzbekistan and Vietnam. In developed economies, the demand for "greener" sources of energy has led to interest in blends using DME produced from renewable feedstock ("BioDME").

Benefits

Numerous technical, economic, and strategic benefits are driving the growth in DME's use in LPG blending.

- **Price:** Rising oil prices (and corresponding increases in the price of propane and butane) created demand for LPG alternatives that have similar properties and are economically viable
- **Economics:** Interest in delivering energy to remote areas without a large capital investment in infrastructure
- **Demand for Clean Fuels:** Combustion of DME/LPG blends demonstrates reductions of 30 – 80% in CO_2 emissions, and reductions of 5 – 15% in NO emissions (compared with combustion of LPG)
- **Energy Security:** Desire to reduce imports of oil and LPG, and to strengthen the balance of payments.

Technical Characteristics

DME has physical properties similar to LPG, but different thermal properties:

Properties		DME	LPG
Vapor Pressure	*kPA*	530	520
Liquid Density	*kg/m³*	667	540
Heating Value	*MJ/kg*	28.8	46
Bottle Fill	*%*	85	80
Mass per Bottle Unit Vol.	*kg/m³*	567	432
Energy per Bottle Unit Vol.	*GJ/m³*	16.3	19.9

Extensive testing of DME as a substitute fuel in domestic appliances commonly fed with LPG have concluded that a blend containing a volume concentration of 15 – 20% DME mixed with LPG is the optimum ratio, and that such a blend brings significant benefits compared with the use of pure DME in such appliances.

Health & Safety

DME has been proven to be stable in the presence of LPG under normal storage conditions. Equipment to store, transport, bottle, dispense and use DME are substantially similar to those required for LPG.

Regulations & Standards

International standards related to the use of DME are anticipated from the International Organization for Standardization (ISO) in 2014.

Progress towards a single standard for LPG and DME blends is being made, with technical research being conducted by companies involved in the production, blending, and distribution of DME in China, in conjunction with the manufacturers of vales, seals and cylinders. Formal regulations regarding the cylinder, handling, and allowable percentages of DME to be used in such blends are a necessary next step towards further market development, and establishment of internationally-recognized safety and handling procedures.

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