Abstract

THE PHYSICAL-CHEMICAL PROPERTIES OF ALCOHOL-GASOLINE BLENDS

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It has been proposed to utilize surplus farm crops by converting them to anhydrous ethyl alcohol to be used as a motor fuel in the form of blends with gasoline. In considering the technical aspects of such a program it is first desirable to investigate the physical-chemical properties of the blends to determine whether or not they can be used in present day gasoline engines and what if any changes must be made in engine adjustments to permit use of such fuels in an economical manner.

Anhydrous ethanol and gasoline are miscible in all proportions and the physical-chemical properties of such blends are not a linear function of composition. Within the range of 0 to 25 per cent of alcohol by volume, the blends differ from the gasoline base to about the same degree that commercial gasolines vary. It is thus indicated that such blends may be used interchangeably with gasoline in present day engines.

Ethanol has a very high antiknock hygroscopic, contrary to general opinion, and alcohol-gasoline blends show no tendency to absorb water under conditions easily maintained in commercial distribution and use of motor fuels.

Ethanol hasa very high antiknock value and in blends with gasoline it shows an apparent octane blending value of 100 to 200 octane. Blended with gasolines of 55 to 65 octane rating, its average blending value is about 150.

Power and economy tests in the laboratory show that with air-fuel ratios between the points of maximum economy and maximum power, blends containing 10 per cent of ethanol yield greater power and lower specific fuel consumption than does gasoline. Only with higher air-fuel ratios than that for maximum economy is the blend inferior to gasoline as regards power developed or fuel economy.

Since most commercial engines are operated with air-fuel ratios lower than that for maximum economy, it is to be expected that blends should yield greater power output and lower fuel consumption than does gasoline, and this is the result observed in carefully controlled road tests.

Thus both theoretical considerations and actual bench and road tests show that blends containing up to about 25 per cent of anhydrous ethyl alcohol can be used interchangeably with gasoline of equal antiknock rating, and when used in this way the blended fuel is in most respects the better fuel.

Abstract

GLACIATION IN THE METHOW VALLEY, WASHINGTON*

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During a glacial maximum, ice from the Methow drainage joined with ice of the Okanogan lobe to form an almost continuous blanket covering all but the highest peaks of the northern Okanogan Mountains and the eastern Cascade Range. Much of the Methow ice was contributed southward through the present north-flowing middle and west forks of the Pasayten River. A true valley glacier occupied the Methow during a late stage of the glaciation, building moraines as far south as Libby Creek, but it apparently did not join the Okanogan ice at the mouth of the Methow.

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