

DIMETHYL ETHER - ALTERNATIVE FUEL FOR MARINE ENGINES

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ABSTRACT

New transportation fuels are needed to reduce both particulates and gaseous pollution. Environmental protection standards set higher demands for fuels, particularly the content of sulphur. For exhaust gas, standards for the content of aromatic compounds, nitrogen oxides, soot and unreacted hydrocarbons are continuously being reduced.

Currently, the cleanest transportation fuels are liquefied natural gas (LNG) and dimethyl (DME). However, DME has advantages over LNG due to its:

- Superior performance in various fuel applications, e.g. as a 'standalone' substitute for diesel fuel; and
- Lower transportation and distribution costs.

DME can be indirectly produced from methane or natural gas. A number of technologies for the usage and conversion of methane have been developed and implemented. Besides LNG, it is also used in a compressed form, CNG. However, as a fuel it has some disadvantages and limitations. LPG is commonly used. This fuel, in comparison to gasoline, has numerous advantages but cannot be used in compression-ignition (diesel) engines, mainly due to its low cetane number. On the other hand, a gaseous fuel which may be used in diesel engines without limitation is DME. Although fuels from crude-oil processing dominate the market, DME is the subject of extensive research. DME can be used as a transportation fuel on land and at sea. In the marine sector, stringent standards for designated emission control areas (ECAs) mean there is a requirement for cleaner transportation fuels. In the Baltic Sea ECA, for example, vessels operate powered by LNG and by DME produced onboard from methanol. Another need for DME is associated with natural gas production areas where there is low local demand for gas and no access to a gas pipeline. In this case, a mobile system allowing the conversion of methane to DME could be considered. In addition, local voluminous sources of biogas may also serve as a source of methane for DME production. All of this justifies the commencement of work on new technologies for DME production from natural gas.

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