

## MANNICH DETERGENTS FOR HYDROCARBON FUELS

### Abstract

New, highly effective substantially pure Mannich detergents for use in hydrocarbon fuels reduce engine deposits in spark and compression ignition internal combustion engines. The Mannich condensation reaction products are obtainable by reacting: (i) a polyamine having primary amino groups, (ii) a hydrocarbyl-substituted hydroxyaromatic compound, and (iii) an aldehyde, wherein the reaction is conducted at in a molar ratio of (i):(ii):(iii) of approximately 1:2:3. The Mannich detergent compounds may be dispersed in a liquid carrier to provide a fuel additive concentrate for hydrocarbon engine fuels which effectively control engine deposit formation in intake valves, port fuel injectors and combustion chambers.

(No suitable figure)