

THE BRITISH COAL UTILISATION RESEARCH ASSOCIATIONInformation Circular No. 75The Effect of Metal Oxide Smokes on the SO<sub>3</sub> Content  
of Combustion Gases from Fuel Oils

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SUMMARY

Tests were carried out with the B.C.U.R.A. internal dewpoint meter on three relatively small oil-fired appliances. Two of the appliances were sectional boilers but the third, on which most of the work was done, was a small refractory furnace.

Five oils similar to those used in previous tests on an oil-fired water-tube boiler were burned in the refractory furnace. The combustion products from all the oils had dewpoints ranging from 250 - 300°F, a range similar to that obtained on the boiler.

Other measurements were made on the gases from oil No. IV (3.5% sulphur) which had been treated with three additives, a soda residue (AS), a calcium residue (AC), and a commercial zinc naphthenate (AZ). Of these AZ alone was successful in eliminating acid dewpoints. Under good combustion conditions, with a concentration of 0.14% zinc in the oil there was no acid dewpoint; even with 0.07% zinc the amount of acid present was almost negligible, giving rise to a dewpoint of only 160°F.

(1) Introduction

A recent paper by Corbett<sup>1</sup> has described the reasons for and the results of an investigation, carried out on an oil-fired water-tube boiler at a refinery, into the effects of fuel and operating conditions on the formation of SO<sub>3</sub> during oil firing. Measurements were made with the dewpoint meter and chemical methods of analysis when five different oils, of varied sulphur contents, were burned under a wide range of operating conditions. Four of the fuels used were residual oils with sulphur contents ranging from 2.08 to 3.55% and the fifth was a gas oil containing 0.75% sulphur. In every case dewpoints in the region of 270°F were obtained, the percentage