



ECOLOGICALLY ACCEPTABLE OIL LIFE TEST

By

SAUER SUNDSTRAND LTD

For

**KUWAIT PETROLEUM
LUBRICANTS LTD**

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REPORT ON COMPATIBILITY TESTS OF KUWAIT HOLBEIN 46 WITH SP2/250 PUMPS**Introduction**

Kuwait Holbein 46 is a synthetic ester-based biodegradable oil which permits higher operating temperatures than with the vegetable based oils. Tests were carried out to determine whether or not the oil was compatible with the standard Swindon gear pump at a fluid temperature of 80° C.

Pump Details

Standard production parts for a SP2/250/16L pump were obtained. The pump was cut-in and calibrated on TU and recalibrated on Kuwait Holbein 46 to TS 00562. Pump serial number = E7265.

Test Conditions

The test was carried out at the following conditions:-

Pump speed	3000 rpm
Pressure	230 bar constant
Temperature	80° C
Drive	In line

Test Procedure

Oil samples were taken at 100, 200, 300, 400 and 500 hours, and sent to Kuwait Oils for analysis. At these same intervals the pump was stripped for examination and flow checks carried out after rebuild.

Test Results

	<u>Start</u>	<u>Finish</u>
Pump E7047 min pressure	45.8	45.2 Litres/Min
230 bar	42.2	42.2

Test Results (cont)

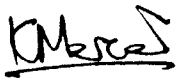
After completion of the test the pump was stripped and the following noted:-

- | | |
|---------------------|--|
| a) Gears | Slight deterioration of driven gear front journal surface finish and under root wear on rear side face. Other journals etc in good condition. At completion of the 500hrs, the journals had become discoloured by the oil. |
| b) Bearings/bushes | Some bronzing of all bushes, with discolouration of the DU, but the bushes were fit for further use. Where bronzing had occurred, the bronzes areas had become blackened. |
| c) Body | Good condition. |
| d) Other components | All in good condition |

The end of test sample analysis by Kuwait Oils reported the oil as being in a satisfactory condition, with viscosity increased from 48 to 52cSt (at 40° C) and increased levels of calcium, phosphorus and zinc.

Conclusion

Examination of the test pump showed that a SP2/250 pump performed satisfactorily on Kuwait Holbein 46 at 230 bar, 3000 rpm and 80° C, with no evidence of any unacceptable incompatibilities between the components and the oil.



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Kuwait Oils (P Davies)