C.I.O.S. I.18

Technical Test Station Oppau Report No.200

Experiments with two samples of Diesel fuel, Nos. 181 and 182 from Dr. Montfort, High Pressure Research, Ludwigshafen

Summary:

The sample of fuel oil No. 181 sent to us by Dr. Montfort may be used in the Diesel engine. The sample was as good and better in some respects than gas oil.

The sample No. 182, on the other hand, cannot in its present state, be used. It had the same properties in the engine as tar oil.

Experimental arrangement and procedure:

A Krupp two-stroke Diesel engine was used in the experiment. The following data were observed:

Starting behaviour
Output
Consumption of fuel under various loads
Type of combustion

A Roumanian gas oil, sample No. 432 was used as a standard of comparison. The results have been summarized in the tables; one experiment with the sample is always taken together with one experiment using the comparison standard. The diagrams have been given as contact points.

Result:

When the fuel sample No. 131 is used the engine immediately starts from the cold. At full load the behaviour of the oil, i.e. the running of the engine was better than it was for gas oil. At half-load the combustion pressure was somewhat high and the combustion was unsteady. At this load the running of the engine was somewhat worse than with gas oil. At no load, however, the oil was as good as gas oil. The consumption of fuel was less at full load but greater at half-load and no-load as compared with gas oil. The exhaust was equally good in both cases.

When sample No. 182 is used the engine does not start when cold so that the engine had first to be warmed by running it on the comparison oil. At full load there was strong knock. At half load there was knocking of the same intensity as for tar oil. Furthermore, engine failures occurred at half-load after 10 minutes run so that the experiment was broken off. It was not possible to run the engine on no load.

TABLE 1

Fuel	Calorific value Kal/kg	Load	Output PSe	Fuel consumption Kg/h	Fuel consumption gr/PSeh	Kal/PSeh	Economic efficiency η_w	Exhaust gas °C	Exhaust gas Colour
Gas oil 432	10,000	4/4	20.2	4.47	221	2,210	28.6	195	white
Sample 181	?	4/4	20.2	4.28	212	?	?	194	white
Gas oil 432	10,000	1/2	10.0	2.69	269	2,690	23.5	117	white
Sample 181	?	1/2	10.0	2.79	279	?	?	125	white
Gas oil 432	10,000	0	0	1.63	-	-	-	78	light blue
Sample 181	?	0	0	1.8	-	-	-	79	light blue

TABLE 2

Fuel	Calorific value Kal/kg	Load	Output PSe	Fuel consumption kg/h	Fuel consumption gr/PSeh	Kal/PSeh	Economic efficiency η_w	Exhaust gas °C	Exhaust gas Colour
Gas oil 432	10,000	4/4	20.2	4.44	220	2,200	28.7	195	white
Sample 182	?	4/4	20.2	4.96	246	?	?	190	white
Gas oil 432	10,000	1/2	10.0	2.7	270	2,700	23.4	120	white
Sample 182	?	1/2	10.1	3.27	324	?	?	137	light blue
Gas oil 432	10,000	0	0	1.66	-	-	-	80	light blue
Sample 182	?	Running on no load not possible					-	-	-