

percentage of conversion takes place, the percentage of recovered oil decreases, indicating that too large an amount of the original oil has gone to make fixed gases and carbon.

The decrease in gasoline formation at high rates of feed is clearly evidenced by a study of the results for a given temperature and pressure. The tests show that pressure is favorable for the formation of gasoline, an increase of 3 per cent in the yield being obtained at a temperature of 575° C. and a rate of 24 gallons per hour by changing the pressure from 200 to 300 pounds per square inch. The results in general bring out the fact previously mentioned that temperatures of from 500° to 575° C. are most favorable for gasoline production, all factors considered. Table 67 shows the results of the tests.

TABLE 67.—Gasoline formed from cracking a distillate oil^a in a single-tube furnace (tube 8 inches in diameter and 10 feet long), at varying temperatures, pressures, and rates of oil feed.^b

Number of runs.	Temperature, °C.	Pressure, pounds per square inch.	Rate of oil feed, gallons per hour.	Oil recovered.		Gasoline.		
				Per cent.	Specific gravity.	Per cent. age in recovered oil, to 150° C. cut.	Specific gravity.	Per cent. age formed, on basis of original oil, up to 150° C. cut.
1	550	50	11	81	0.820	22.5	0.74	18.3
1	550	100	25	93	.808	16.8	.74	15.7
1	550	150	17	80	.825	29.25	.78	23.4
1	550	150	27	[100] ^c	.810	18.0	.76	18.0
1	575	200	24	79	.820	22.8	.76	18.1
1	550	250	12	81	.805	26.8	.76	21.8
1	550	250	22	[98] ^c	.800	13.8	.74	13.8
1	550	250	23	70	.860	38.5	.75	26.9
1	550	250	55	85	.835	19.8	.75	16.8
1	575	250	13	75	.820	20.5	.76	15.3
1	575	250	20	70	.848	32.5	.76	22.8
1	575	250	26	66	.825	38.0	.76	25.3
1	575	250	36	84	.814	23.3	.75	19.6
1	600	250	28	75	.815	29.25	.76	21.9
1	600	250	57	80	.839	16.5	.76	13.0
1	600	250	68	81	.841	16.3	.74	13.2
4	650	250	24	70	.830	28.0	.74	19.6
2	550	275	26	78	.815	29.0	.74	22.6
1	675	275	48	75	.815	20.8	.75	15.6
1	675	275	52	75	.815	19.0	.74	14.3
1	575	300	24	70	.820	31.3	.75	21.9
1	600	300	24	80	.815	22.0	.75	17.6

^a Boiling point, 250° C. to 350° C.; specific gravity, 0.817 (41.3° B.)

^b Results low, due to insufficient condensation.

^c Obviously experimental error.

TESTS WITH DISTILLATE HAVING BOILING POINT OF 200° TO 300° C.

The results of a series of runs in a 6-inch by 9-foot tube with a different distillate oil are given in Table 68. The average yield of 21.5 per cent is more favorable than was obtained in either of the other series of experiments reported in Tables 66 and 67. The higher temperatures are again shown to be unfavorable for gasoline pro-

duction. A satisfactory degree of conversion at such temperatures is offset by a considerable diminution in quantity of recovered oil, which is sufficient to condemn their use in a commercial plant.

TABLE 68.—Gasoline formed from cracking a distillate oil in a single-tube furnace (tube 6 inches in diameter and 9 feet long) at varying pressures, temperatures, and rates of oil feed.^a

Number of runs.	Pressure, pounds per square inch.	Temperature, °C.	Rate of oil feed, gallons per hour.	Percentage of oil recovered.	Gasoline.		
					Percentage in recovered oil.	Percentage formed, on basis of original oil.	Specific gravity.
1	125	600	18	79	38.0	30.0	0.730
1	125	650	12	36.0746
1	125	700	18	66	42.5	28.0	.735
4	250	550	25	91	11.2	10.2
1	250	550	33	91	15.0	13.7	.734
7	250	600	19	79	30.0	23.7	.748
3	250	600	24	80	26.4	21.1	.736
2	250	625	18	68	36.5	24.8	.752
2	250	625	24	73	27.7	20.2	.738
2	250	650	20	74	29.8	22.0	.731
1	250	650	25	71	31.0	22.0	.745

^a Results low, owing to insufficient condensation.

DISTILLATION ANALYSIS OF ORIGINAL OIL.

[Specific gravity, 0.817; first drop at 170° C.]

Temperature of cut, °C.	Distillation product.		Remarks.
	Proportion of original oil, by volume.	Specific gravity.	
	<i>Per cent.</i>		
200	2.0	Stuck at 290° to 296° C.
250	7.3	0.792	
300	57.0	.818	
350	28.0	.827	
Residue.	5.3	

TESTS WITH FUEL OIL.

The highest average conversion figures were obtained in experiments with a distillate fuel oil, data for which are presented in Table 69. The average yield of gasoline is nearly 3 per cent greater than in any of the other series of runs. It is to be noted, however, that the average percentage of recovered oil is lower. It is evident that in these runs the rate of feed was too low for the most efficient results. The results of the tests, which were made in an 8-inch by 10-foot tube, are given in Table 69.