MINES BRANCH

DEPARTMENT OF MINES

OTTAWA, CANADA

GASOLINE SURVEY FOR 1932

Memorandum Series
No. 60
July, 1933.

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By

H. McD. Chantler*

The Division of Fuels and Fuel Testing of the Mines Branch has made at the Fuel Research Laboratories a continuous study of the gasoline sold in Canada for the past eight years, and annual reports[1] have been prepared from the results obtained. This report contains the results in detail of the analyses of 125 samples of gasoline collected[2] from wholesalers or distributors in sixteen cities during July 1932. It also includes the detailed analyses of 134 samples of gasoline collected in seventeen cities during July 1931, which analyses were not shown in the summarized results[3] for the years 1930 and 1931. It was found that the average gasoline sold in Canada was of good quality, and that the variation in quality was practically the same for both years when judged by the volatility. On the basis of their knock-rating the samples collected in 1932 may be divided into 4 grades. These grades would have average octane numbers of 75, 68, 61, and 53 respectively. Only 4 samples had knock-ratings below 57 octane number. The average Reid vapour pressure of the samples collected in 1932 was 7.4 pounds per square inch. The average sulphur content of the samples collected in 1931 was 0.05, which is considerably less than the amount usually accepted as the limit for good gasoline. A marked tendency has been observed during the past six years to market gasoline that has been coloured artificially.

*Chemist, Fuel Research Laboratories, Ottawa, Canada.

Results of Laboratory Examination.

A statement of the methods of analysis used, as well as a general discussion of the significance of the laboratory tests together with the relationship between these tests and actual operation of the fuel in an engine will be found in the report of Gasoline Surveys for 1930 and 1931.[3]

The results of the laboratory examination of the gasoline tested in 1931 and 1932 are shown by cities in Table I and the average analyses are summarized in Tables II and III. The average results obtained by the examination of samples for the ten years from 1923 to 1932 are shown in Table IV, and Figure 1 shows graphically the ranges of average distillation temperatures for the same ten years. In order to determine the variation in quality of the gasolines, the average of the 10% of samples having the highest index numbers and the average of the 10% having the lowest index numbers was calculated for 1931 and 1932 and the results are shown in Table V, VI, VII, and VIII. Table IX shows the difference between the average index numbers of the maximum and minimum 10% of the samples collected in the ten years 1923 to 1932. Table X shows the knock ratings of the samples collected in the city of Ottawa in 1931, and, also the percentage of the five series of hydrocarbons present in gasolince for the same samples. Table XI gives a classification according to average knock ratings of samples in grades in 1932. Table XII shows the average knock rating of the samples of 20 different brands of gasoline sold by 8 oil companies in 1932, arranged according to arbitrary grades. Table XIII gives a classification of the samples collected in 1932 according to results of the Reid vapour pressure determination. Table XIV gives a classifiaction of the samples collected in 1931, according to results of the sulphur determination. Table XV shows the percentage of artificially coloured gasoline in the past six years.

Volatility.

It is interesting to compare the results obtained with those obtained in previous years. In Table IV are given the average results of 88 samples collected in Canada, presumably in 1916 and reported[4] by the laboratories of the Department of Inland Revenue; the average results of the following samples collected[2] in Canada from 1923 to 1932, inclusive. The number of samples collected in the respective years was: 48, 59, 73, 76, 83, 77, 84, 124, 134, and 123. When judged by the distillation range, which has been the ordinarily accepted standard, it will be observed that the gasoline sold in Canada in 1931 shows an average of good quality with a lower volatility than that sold during the three previous years. This decrease in volatility in 1931 is equivalent to approximately 3°F. rise in the average volatility of the 20, 50, 70, and 90 per cent points in the distillation range. The average gasoline sold in Canada in 1932 was of good quality,

having a higher volatility than the average gasoline sold in 1931, and having practically the same volatility as that sold during 1930.

Table IX shows the difference between the average index numbers of the maximum 10% and minimum 10% of the samples collected in Canada in the ten years, 1923 to 1932. The difference between the two averages has been used previously for the purpose of comparison, as a measure of the variation in quality. It will be observed that the variation in quality during 1931 was less than in any previous year and that the variation in quality during 1932 was practically the same as the variation in quality in 1931.

In 1931, the group having the higher volatility has an average volatility less than corresponding groups examined in previous years. The group having the lower volatility has an average volatility higher than corresponding groups examined in previous years, with the exception of the year 1929, when the volatility of these groups was practically the same.

In 1932, the group having the higher volatility has an average volatility higher than the corresponding group examined in 1931. The group having the lower volatility has an average volatility higher than corresponding groups examined in any previous year. This decrease in the difference of the average volatility in the higher and lower groups in 1931 and 1932, indicates a growing tendency towards a more uniform grade of gasoline.

Knock Ratings.

In 1931, knock ratings were determined only for the samples collected in Ottawa. The average found for the 29 samples was 66 octane number, the highest being 75 and the lowest 57 octane number. Three samples, or 10.3% had an octane number of 73 or over; 18 samples, or 62.1%, had octane numbers ranging between 72 and 65; and 8 samples, or 27.6%, had octane numbers ranging between 64 and 57. The majority of the samples of gasoline collected in Ottawa in 1931 had a relatively good knock rating.

In 1932, the knock rating was determined for all the samples collected in Canada. The average knock rating of the 123 samples was 65 octane number, the highest being 77, and the lowest 46 octane number. Fifteen samples, or 12.2%, had an octane number of 75 or over, with an average of 75 octane number; 50 samples, or 40.7%, had octane numbers ranging between 72 and 65, with an average of 68 octane number; 54 samples, or 43.9%, had octane numbers ranging between 64 and 57, with an average of

61 octane number; and only 4 samples, or 3.2%, were below 57, the average being 53 octane number.

It will be observed, therefore, that the samples of gasoline collected in Canada in 1932 may be divided, when classified according to knock rating only, into 4 grades as follows:

Grade I - Gasolines of high knock rating with octane numbers of 73 and over.

Grade II - Gasolines of medium knock rating with octane numbers between 72 and 65.

Grade III - Gasolines of low knock rating with octane numbers between 64 and 57.

Grade IV - Gasolines of very low or poor knock rating with octane numbers of 56 and under.

In Table XII, is given the average knock rating of 20 different brands of gasoline sold in Canada by 8 oil companies in 1932. It will be observed that these brands of gasoline fall into the first three grades defined above, and that the average for Grade I is 75 octane number, for Grade II 68 octane number, and for Grade III is 61 octane number.

Tetra-ethyl lead, which is blended with gasoline to increase the knock rating, was used only in "Ethyl" brands of gasoline in 1931; but in 1932, tetra-ethyl lead was used in other brands of gasoline, as well as in the "Ethyl" brands. 38.2 per cent of the samples collected in 1932 contained tetra-ethyl lead.

Vapour Pressure.

The vapour pressure of a gasoline is a measure of its tendency to vaporize and is usually expressed in units of pressure at a stated temperature and method of determination, e.g., Reid vapour pressure at 100°F. in pounds per square inch. The method of determination generally used is that adopted by the American Society for Testing Materials as tentative method No. D 323 - 31T.

The Reid vapour pressure of a gasoline should be high enough to enable the engine to start easily but not so high that vapour lock occurs in the fuel system. The Reid vapour pressure is used to predict the temperatures at which vapour lock will occur. Two rules[5] govern the vapour lock problem, namely, "keep heat out of fuel system" and "keep propane out of the gasoline". Propane is a hydrocarbon, one per cent of which increases the vapour pressure of the gasoline in which it occurs by more than two pounds per square inch at 100°F. Vapour lock does not occur in all engines under similar conditions with fuels of the same vapour pressure, and on that account, the Reid vapour pressure should not exceed 10 pounds per square inch, in the writer's opinion.

A classification of the samples collected in 1932 according to the results of the Reid vapour pressure determination is shown in Table XIII. This Table shows that the average Reid vapour pressure was 7.4 pounds per square inch and that 17.8 per cent of the samples had Reid vapour pressures of 6 pounds or less per square inch; 55.4 per cent had between 8 and 6.1 pounds per square inch, 22.7 per cent between 10 and 8.1 pounds per square inch, and only 4.1 per cent of the 123 samples had Reid vapour pressures over 10 pounds per square inch.

Sulphur Content.

The average sulphur content of the gasoline samples collected in Canada during 1930 was 0.07 per cent. This result was not reported in Memorandum Series No. 45, containing the results for that year. In 1931, the average sulphur content of the gasoline samples collected in Canada was 0.05 per cent and as indicated in Table XIV, only 6.7 per cent of the 134 samples tested had a sulphur content exceeding 0.1 per cent. In 1931, the average sulphur content of samples from the Western provinces was 0.08 per cent, while the average for the eastern provinces was 0.04 per cent.

Colour.

Since 1927 there has been a gradually increasing tendency to colour artificially the gasolines being put on the market. According to the samples examined in the Annual Survey, the percentage of artificially coloured gasolines sold in Canada during the past six years was as follows: 10% in 1927; 13% in 1928; 18% in 1929; 26% in 1930; 34% in 1931; and 52% in 1932.

Summary and Conclusions

The gasoline surveys for 1931 and 1932 comprized the collection and analyses of 257 samples. The samples for each survey were collected in July, 134 coming from seventeen different cities in 1931, and 123 from sixteen cities in 1932. As these centres are widely separated and are distribution centres throughout the country the samples taken may be accepted as representative of the gasoline sold in Canada at that time.

The analysis of the samples has shown that the average gasoline sold during 1931 and 1932 was of good quality. The average gasoline in 1931 was slightly less volatile than that in the three previous years, and the average 1932 gasoline was more volatile than in 1931 and had practically the same volatility as that of 1930.

The variation in quality of the average gasoline during 1931 and 1932 was practically the same for both of these years, and this variation was less than in any preceeding year. This indicated a tendency towards a more uniform grade of gasoline.

In 1931 only samples from Ottawa were examined for knock rating, but in 1932 all the samples collected in Canada were tested for knock rating. Thirty-eight per cent of the samples of gasoline collected throughout Canada in 1932 contained tetra-ethyl lead added to increase their knock ratings.

According to knock rating only, the 1932 gasoline samples may be divided into four grades, namely, Grade I with an average octane number of 75, Grade II with an average of 68, Grade III with an average of 61, and Grade IV with an average octane number of 53. Only 4 samples, or 3.2 per cent of the samples collected in 1932, had poor knock ratings, or were in Grade IV with knock ratings below 57 octane number.

The average Reid vapour pressure of the 1932 gasoline samples was 7.4 pounds per square inch. Only 4.1 per cent of the samples had Reid vapour pressures exceeding 10 pounds per square inch.

The average sulphur content of the gasoline samples collected in 1931 was 0.05 per cent. This amount is considerably less than the amount usually accepted as the limit for good gasoline, viz. 0.10 per cent. In 1931 the average sulphur content of gasoline obtained in the western provinces was somewhat higher than for samples from the eastern provinces.

A marked tendency is shown during the past six years towards marketing of an increased number of artificially coloured gasolines. Fifty-two per cent of the gasolines collected in 1932 were artificially coloured.

List of References.

1. Reports of Investigations of Fuels and Fuel Testing 1923, 1924, 1925, 1926, 1927, 1928, 1929 and combined 1930 and 1931.
2. The hearty support and co-operation of the Department of Pensions and National Health in taking the samples is gratefully acknowledged.
3. Report of Investigations of Fuels and Fuel Testing 1930 and 1931.
4. Department of Inland Revenue, Bulletin No. 362 ("Gasoline").
5. Bridgeman, O.C., - White, H.S., and Gary, F.B. - Oil and Gas Journal, November 19th, 1931, pages 22 and 101.

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour press.	Colour	Octane No. at 212°F & 600 rpm.
HALIFAX, N. S.																	
1931 - 1	106	158	189	275	324	384	419	97.0	1.2	1.8	1749	0.750	57.2	0.05	--	Blue	--
2	105	157	187	251	287	340	394	97.0	1.2	1.8	1616	0.736	60.8	0.03	--	+28	--
3	110	175	204	262	300	353	395	97.0	1.3	1.7	1689	0.745	58.4	0.02	--	+27	--
4	108	172	200	257	295	348	395	97.0	1.1	1.9	1667	0.743	58.9	0.01	--	Red	--
5	106	167	201	269	310	359	394	97.0	1.0	2.0	1700	0.745	58.4	0.02	--	+20	--
1931 - Aver.	107	166	196	263	303	357	399	97.0	1.2	1.8	1684	0.744	58.7	0.03	--		--
1932 - 1	108	168	190	242	280	336	387	98.5	1.1	0.4	1603	0.742	59.2	--	6.4	+27	64
2	102	161	193	258	296	349	390	98.0	1.0	1.0	1647	0.746	58.2	--	7.1	Green	68
3	100	152	176	250	298	363	410	98.5	0.6	0.9	1649	0.747	57.9	--	6.3	Red	74
4	94	140	168	242	292	358	407	98.0	1.1	0.9	1607	0.738	60.2	--	7.8	Blue	69
5	108	161	194	274	322	385	419	98.0	1.3	0.7	1755	0.759	54.9	--	5.6	Green	66
1932 - Aver.	102	156	184	253	298	358	403	98.2	1.0	0.8	1652	0.746	58.2	--	6.6		68
ST. JOHN, N.B.																	
1931 - 6	114	174	200	264	297	353	396	97.0	1.0	2.0	1684	0.747	57.9	0.04	--	+15	--
7	102	155	185	254	294	350	396	96.5	1.2	2.3	1634	0.737	60.5	0.04	--	+18	--
8	106	165	200	263	302	353	396	97.0	1.2	1.8	1679	0.745	58.4	0.02	--	+19	--
9	98	168	193	270	320	380	418	97.0	1.3	1.7	1749	0.749	57.4	0.04	--	+ 6	--
10	100	150	183	259	302	355	396	97.0	1.2	1.8	1645	0.741	59.5	0.08	--	Yellow	--
1931 - Aver.	104	162	192	262	303	358	401	96.9	1.2	1.9	1678	0.744	58.7	0.04	--		--
1932 - 6	107	163	191	255	292	345	388	98.5	1.2	0.3	1634	0.744	58.7	--	5.7	Red	74
7	110	182	208	263	296	342	393	98.5	1.1	0.4	1684	0.751	56.9	--	5.0	+22	63
8	99	163	195	260	294	347	390	98.0	1.0	1.0	1649	0.745	58.4	--	7.7	+21	64
9	100	147	179	258	303	362	408	98.0	1.2	0.8	1657	0.747	57.9	--	7.4	Blue	69
10	97	146	179	252	296	353	400	97.5	1.2	1.3	1626	0.741	59.5	--	7.3	Yellow	64
1932 - Aver.	103	160	190	258	296	350	396	98.1	1.1	0.8	1650	0.746	58.2	--	6.6		67

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour press.	Colour	Octane No. at 212°F & 600rpm.
										QUEBEC. QUE.							
1931 - 11	113	177	204	263	301	352	397	97.0	1.1	1.9	1694	0.745	58.4	0.03	--	+26	--
12	117	169	193	249	284	342	408	97.0	1.6	1.4	1645	0.729	62.6	0.02	--	+30	--
13	111	159	189	260	302	357	394	96.5	1.2	2.3	1661	0.743	58.9	0.06	--	Red	--
14	115	170	195	257	296	348	395	97.0	1.3	1.7	1661	0.745	58.4	0.02	--	Red	--
15	115	177	205	263	299	352	398	97.0	1.2	1.8	1694	0.745	58.4	0.02	--	+27	--
16	108	148	172	239	284	342	383	97.0	1.2	1.8	1568	0.738	60.2	0.06	--	Red	--
1931 - Aver.	113	167	193	255	294	349	396	96.9	1.3	1.8	1654	0.741	59.5	0.04	--		--
1932 - 11	90	142	172	252	300	360	406	97.0	1.2	1.8	1632	0.741	59.3	--	8.3	Green	66
12	108	172	196	248	278	329	392	98.5	1.2	0.3	1614	0.744	58.7	--	5.8	+28	63
13	94	146	176	246	292	360	420	97.5	1.1	1.4	1640	0.735	61.0	--	9.0	+30	60
14	102	163	192	258	292	346	388	98.0	1.2	0.8	1639	0.748	57.7	--	6.9	Red	76
15	100	160	194	266	301	353	397	98.0	1.2	0.8	1671	0.749	57.4	--	7.3	Green	68
16	102	148	176	246	284	334	374	98.5	1.1	0.4	1562	0.739	60.0	--	7.3	Pink	67
1932 - Aver.	99	155	184	253	291	347	396	97.9	1.2	0.9	1626	0.743	58.9	--	7.4		67

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600rpm.
MONTREAL, QUE.																	
1931 - 17	101	142	168	251	310	388	420	95.5	1.2	3.3	1679	0.733	61.5	0.02	--	Red	--
18	97	135	160	250	307	373	416	96.5	1.2	2.3	1641	0.734	61.3	0.05	--	Green	--
19	109	166	195	272	315	375	414	97.0	1.2	1.8	1737	0.749	57.4	0.05	--	Red	--
20	107	162	192	274	319	379	412	96.0	1.3	2.7	1738	0.747	57.9	0.07	--	+14	--
21	104	155	182	264	315	382	419	96.5	1.4	2.1	1715	0.742	59.2	0.03	--	Blue	--
22	106	159	186	262	314	379	422	97.0	1.2	1.8	1719	0.755	55.9	0.03	--	Orange	--
23	112	158	186	249	290	344	382	97.0	1.1	1.9	1609	0.743	58.9	0.07	--	+29	--
24	108	158	179	239	286	345	382	97.0	1.1	1.9	1589	0.740	59.7	0.01	--	Red	--
25	110	157	191	276	325	385	417	96.0	1.5	2.5	1751	0.754	56.2	0.04	--	Blue	--
26	103	164	195	271	317	372	411	97.5	1.3	1.2	1730	0.753	56.4	0.06	--	+23	--
1931 - Aver.	106	155	183	261	310	372	410	96.6	1.3	2.1	1691	0.745	58.4	0.04	--		--
1932 - 17	94	136	166	249	301	367	407	96.0	1.3	2.7	1626	0.736	60.8	--	10.1	Red	77
18	105	148	180	262	313	376	405	98.0	1.3	0.7	1684	0.743	58.9	--	8.5	Green	66
19	104	162	192	268	318	372	416	98.5	1.2	0.3	1729	0.755	55.9	--	6.0	Red	76
20	100	158	194	273	319	372	408	98.0	1.4	0.6	1724	0.752	56.7	--	6.7	Green	69
21	108	162	192	260	300	356	410	98.0	1.1	0.9	1680	0.746	58.2	--	5.7	+30	61
22	99	150	176	247	294	360	421	97.0	1.4	1.6	1650	0.736	60.8	--	8.7	+30	66
23	104	162	194	272	316	374	412	98.0	1.4	0.6	1732	0.758	55.2	--	7.1	Blue	65
24	107	154	184	271	318	372	407	98.0	1.2	0.8	1706	0.751	56.9	--	7.1	Red	70
25	102	155	189	278	322	374	410	98.5	1.2	0.3	1728	0.754	56.2	--	7.1	Green	68
26	105	162	188	258	292	355	410	98.5	1.0	0.5	1665	0.745	58.4	--	5.9	+30	63
1932 - Aver.	103	155	186	264	309	368	410	97.9	1.2	0.9	1692	0.748	57.7	--	7.3		69

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600 rpm.
OTTAWA, ONT.																	
1931 - 27	113	178	214	281	324	380	416	97.5	1.2	1.3	1793	0.759	54.9	0.03	--	+14	60
28	102	133	153	244	304	372	417	96.5	1.4	2.1	1623	0.731	62.1	0.05	--	green	66
29	103	149	177	259	312	386	420	96.0	1.4	2.6	1703	0.739	60.0	0.04	--	red	69
30	100	138	160	235	284	362	408	96.0	1.0	3.0	1587	0.725	63.7	0.05	--	+26	61
31	103	153	182	268	317	376	415	96.5	1.2	2.3	1711	0.745	58.4	0.05	--	+19	66
32	108	150	178	261	310	375	419	97.0	1.3	1.7	1693	0.742	59.2	0.05	--	red	73
33	102	150	178	262	310	373	418	98.0	0.6	1.4	1691	0.741	59.5	0.06	--	+12	65
34	101	153	185	270	324	390	412	95.5	1.3	3.2	1734	0.737	60.5	0.01	--	+28	57
35	99	140	165	241	290	350	387	96.0	1.2	2.8	1573	0.734	61.3	0.02	--	green	72
36	102	164	194	272	319	375	412	97.0	1.2	1.8	1736	0.749	57.4	0.06	--	+20	65
37	95	132	154	235	287	351	397	96.0	1.2	2.8	1556	0.725	63.7	0.05	--	+21	69
38	100	126	146	235	291	359	393	96.0	0.9	3.1	1550	0.721	64.8	0.05	--	+21	69
39	112	161	196	272	314	370	415	97.0	1.4	1.6	1728	0.749	57.4	0.03	--	red	72
40	97	136	169	265	316	381	416	96.5	0.9	2.6	1683	0.740	59.7	0.05	--	green	67
41	110	158	192	273	320	378	418	97.0	1.0	2.0	1739	0.748	57.7	0.07	--	+14	66
42	117	164	187	257	302	365	412	98.0	1.4	0.6	1687	0.750	57.2	0.04	--	red	74
43	100	146	172	251	305	376	414	96.0	1.3	2.7	1664	0.734	61.3	0.01	--	+11	58
44	113	164	195	276	324	382	420	97.0	1.3	1.7	1761	0.759	54.9	0.05	--	orange	66
45	103	154	186	269	320	383	418	96.5	1.8	1.7	1730	0.748	57.7	0.04	--	blue	63
46	105	154	183	267	316	386	414	97.0	1.3	1.7	1720	0.741	59.5	0.04	--	red	58
47	96	145	172	249	300	370	420	96.5	1.0	2.5	1656	0.736	60.8	0.01	--	+21	58
48	105	147	170	238	283	341	382	97.0	1.0	2.0	1561	0.739	60.0	0.05	--	red	75
49	107	155	186	248	291	348	385	96.5	0.8	2.7	1613	0.741	59.5	0.06	--	+19	65
50	100	158	190	276	326	387	419	95.5	1.4	3.1	1756	0.753	56.4	0.06	--	blue	70
51	96	158	184	269	323	384	413	95.5	0.9	3.6	1731	0.749	57.4	0.05	--	+27	65
52	110	158	182	256	304	374	419	96.5	1.0	2.5	1693	0.741	59.5	0.02	--	+22	63
53	113	165	194	265	314	374	411	97.0	1.4	1.6	1723	0.748	57.7	0.05	--	+13	65
54	116	180	209	280	319	372	414	97.5	1.2	1.3	1774	0.755	55.9	0.03	--	red	71
55	97	132	156	244	294	360	397	96.0	0.7	3.3	1583	0.726	63.4	0.06	--	+13	70
1931 - Aver.	104	152	180	259	308	372	410	96.6	1.2	2.2	1681	0.742	59.2	0.04	--		66

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600 rpm.
TORONTO, ONT.																	
1931 - 56	94	138	162	234	285	357	405	96.5	1.0	2.5	1581	0.727	63.1	0.01	—	+30	—
57	129	188	215	281	330	385	412	98.0	1.4	0.6	1811	0.755	55.9	0.03	—	+27	—
58	96	141	172	260	317	380	406	97.0	1.3	1.7	1676	0.745	58.4	0.04	—	+20	—
59	99	157	191	272	314	371	401	96.5	1.4	2.1	1706	0.742	59.2	0.07	—	green	—
60	103	158	184	253	294	355	396	97.0	1.1	1.9	1640	0.735	61.0	0.04	—	+12	—
61	97	160	192	275	321	377	407	96.5	1.0	2.5	1732	0.744	58.7	0.06	—	+ 7	—
62	104	162	189	254	300	371	413	97.0	1.3	1.7	1689	0.739	60.0	0.01	—	blue	—
63	115	193	239	323	349	374	405	98.0	1.1	0.9	1883	0.759	54.9	0.01	—	+20	—
64	107	168	202	274	317	369	398	97.0	1.2	1.8	1728	0.756	55.7	0.12	—	+28	—
65	92	139	164	236	285	354	407	97.0	1.3	1.7	1585	0.726	63.4	0.01	—	+30	—
1931 - Aver.	104	161	191	266	311	369	405	97.1	1.2	1.7	1703	0.743	58.9	0.04	—		—
1932 - 56	92	144	177	258	307	367	396	97.5	1.2	1.3	1649	0.739	60.0	—	10.2	green	67
57	98	160	194	268	309	366	405	98.0	1.4	0.6	1702	0.743	58.9	—	7.3	+16	60
58	96	141	167	238	283	359	417	98.0	1.2	0.8	1605	0.733	61.5	—	8.9	+13	65
59	96	154	189	264	309	367	405	97.5	1.2	1.3	1688	0.739	60.0	—	9.2	green	68
60	109	163	189	261	308	367	411	98.5	1.2	0.3	1699	0.750	57.2	—	5.6	blue	68
61	96	149	179	260	305	361	397	98.0	1.1	0.9	1651	0.742	59.2	—	9.3	+23	66
62	106	161	197	274	319	376	417	98.0	1.2	0.8	1744	0.758	55.2	—	6.6	blue	68
63	98	154	188	264	307	364	406	98.0	1.2	0.8	1683	0.740	59.7	—	8.4	green	68
64	104	157	187	259	300	359	409	98.0	1.2	0.8	1671	0.738	60.2	—	7.2	red	57
1932 - Aver.	100	154	185	261	305	365	407	97.9	1.2	0.9	1677	0.742	59.2	—	8.1		65

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F. & 600 rpm.
HAMILTON, ONT.																	
1931 - 66	107	165	190	257	305	371	412	97.0	1.2	1.8	1700	0.743	58.9	0.01	--	red	--
67	96	146	177	264	320	384	414	96.0	1.0	3.0	1705	0.738	60.2	0.03	--	green	--
68	105	147	172	241	291	360	407	96.5	1.2	2.3	1618	0.730	62.3	0.02	--	+27	--
69	98	139	166	240	292	353	390	96.5	1.1	2.4	1580	0.734	61.3	0.03	--	green	--
70	104	159	191	268	321	384	413	96.5	1.1	2.4	1736	0.740	59.7	0.03	--	+30	--
71	110	170	199	262	306	364	398	97.0	1.1	1.9	1699	0.731	62.1	0.05	--	+30	--
72	110	166	196	265	308	365	400	97.0	1.3	1.7	1700	0.740	59.7	0.05	--	red	--
73	100	159	193	274	319	374	404	97.0	1.4	1.6	1723	0.745	58.4	0.08	--	+14	--
74	112	164	192	274	325	387	425	96.5	1.5	2.0	1767	0.761	54.4	0.05	--	orange	--
75	101	160	185	254	304	384	418	96.5	1.3	2.2	1705	0.739	60.0	0.03	--	blue	--
1931 - Aver.	104	157	186	260	309	373	408	96.7	1.2	2.1	1693	0.740	59.7	0.04	--		--
1932 - 65	97	142	177	258	305	368	402	97.5	1.2	1.3	1652	0.739	60.0	--	9.2	green	67
66	101	141	165	237	277	331	386	98.0	1.4	0.6	1537	0.734	61.3	--	7.9	green	69
67	103	142	171	242	287	360	413	97.5	1.2	1.3	1615	0.735	61.0	--	8.0	+30	64
68	99	155	189	263	307	365	405	98.0	1.2	0.8	1684	0.739	60.0	--	7.9	green	68
69	98	142	174	256	306	369	401	97.0	1.0	2.0	1648	0.735	61.0	--	10.7	blue	71
70	100	147	179	257	307	368	403	98.0	1.0	1.0	1661	0.739	60.0	--	8.5	+30	61
71	107	155	182	249	291	338	382	98.5	1.0	0.5	1597	0.741	59.5	--	6.3	+16	66
72	112	168	198	274	320	373	418	98.0	1.4	0.6	1751	0.757	55.4	--	6.8	blue	67
73	106	161	194	264	306	361	406	98.5	1.2	0.3	1692	0.743	58.9	--	6.6	green	68
74	106	168	198	268	307	362	406	98.0	1.0	1.0	1709	0.745	58.4	--	6.2	+27	62
1932 - Aver.	103	152	183	257	301	360	402	97.9	1.2	0.9	1655	0.741	59.5	--	7.8		66

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600rpm.
MONTREAL, QUE.																	
1931 - 17	101	142	168	251	310	388	420	95.5	1.2	3.3	1679	0.733	61.5	0.02	--	Red	--
18	97	135	160	250	307	373	416	96.5	1.2	2.3	1641	0.734	61.3	0.05	--	Green	--
19	109	166	195	272	315	375	414	97.0	1.2	1.8	1737	0.749	57.4	0.05	--	Red	--
20	107	162	192	274	319	379	412	96.0	1.3	2.7	1738	0.747	57.9	0.07	--	+14	--
21	104	155	182	264	315	382	419	96.5	1.4	2.1	1715	0.742	59.2	0.03	--	Blue	--
22	106	157	185	262	314	379	422	97.0	1.2	1.8	1719	0.755	55.9	0.03	--	Orange	--
23	112	158	186	249	290	344	382	97.0	1.1	1.9	1609	0.743	58.9	0.07	--	+29	--
24	108	158	179	239	286	345	382	97.0	1.1	1.9	1589	0.740	59.7	0.01	--	Red	--
25	110	157	191	276	325	385	417	96.0	1.5	2.5	1751	0.754	56.2	0.04	--	Blue	--
26	103	164	195	271	317	372	411	97.5	1.3	1.2	1730	0.753	56.4	0.06	--	+23	--
1931 - Aver.	106	155	183	261	310	372	410	96.6	1.3	2.1	1691	0.745	58.4	0.04	--		--
1932 - 17	94	136	166	249	301	367	407	96.0	1.3	2.7	1626	0.736	60.8	--	10.1	Red	77
18	105	148	180	262	313	376	405	98.0	1.3	0.7	1684	0.743	58.9	--	8.5	Green	66
19	104	162	192	268	318	372	416	98.5	1.2	0.3	1729	0.755	55.9	--	6.0	Red	76
20	100	158	194	273	319	372	408	98.0	1.4	0.6	1724	0.752	56.7	--	6.7	Green	69
21	108	162	192	260	300	356	410	98.0	1.1	0.9	1680	0.746	58.2	--	5.7	+30	61
22	99	150	178	247	294	360	421	97.0	1.4	1.6	1650	0.736	60.8	--	8.7	+30	60
23	104	162	194	272	316	374	412	98.0	1.4	0.6	1732	0.758	55.2	--	7.1	Blue	65
24	107	154	184	271	318	372	407	98.0	1.2	0.8	1706	0.751	56.9	--	7.1	Red	72
25	102	155	189	278	322	374	410	98.5	1.2	0.3	1728	0.754	56.2	--	7.1	Green	70
26	105	162	188	258	292	355	410	98.5	1.0	0.5	1665	0.745	58.4	--	5.9	+30	63
1932 - Aver.	103	155	186	264	309	368	410	97.9	1.2	0.9	1692	0.748	57.7	--	7.3		69

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600 rpm.
OTTAWA, ONT.																	
1931 - 27	113	178	214	281	324	380	416	97.5	1.2	1.3	1793	0.759	54.9	0.03	—	+14	60
28	102	133	153	244	304	372	417	96.5	1.4	2.1	1623	0.731	62.1	0.05	—	green	66
29	103	149	177	259	312	386	420	96.0	1.4	2.6	1703	0.739	60.0	0.04	—	red	69
30	100	138	160	235	284	362	408	96.0	1.0	3.0	1587	0.725	63.7	0.05	—	+26	61
31	103	153	182	268	317	376	415	96.5	1.2	2.3	1711	0.745	58.4	0.05	—	+19	66
32	108	150	178	261	310	375	419	97.0	1.3	1.7	1693	0.742	59.2	0.05	—	red	73
33	102	150	178	262	310	373	418	98.0	0.6	1.4	1691	0.741	59.5	0.06	—	+12	65
34	101	153	185	270	324	390	412	95.5	1.3	3.2	1734	0.737	60.5	0.01	—	+28	57
35	99	140	165	241	290	350	387	96.0	1.2	2.8	1573	0.734	61.3	0.02	—	green	72
36	102	164	194	272	319	375	412	97.0	1.2	1.8	1736	0.749	57.4	0.06	—	+20	65
37	95	132	154	235	287	351	397	96.0	1.2	2.8	1556	0.725	63.7	0.05	—	+21	69
38	100	126	146	235	291	359	393	96.0	0.9	3.1	1550	0.721	64.8	0.05	—	+21	69
39	112	161	196	272	314	370	415	97.0	1.4	1.6	1728	0.749	57.4	0.03	—	red	72
40	97	136	169	265	316	381	416	96.5	0.9	2.6	1683	0.740	59.7	0.05	—	green	67
41	110	158	192	273	320	378	418	97.0	1.0	2.0	1739	0.748	57.7	0.07	—	+14	66
42	117	164	187	257	302	365	412	98.0	1.4	0.6	1687	0.750	57.2	0.04	—	red	74
43	100	146	172	251	305	376	414	96.0	1.3	2.7	1664	0.734	61.3	0.01	—	+11	58
44	113	164	195	276	324	382	420	97.0	1.3	1.7	1761	0.759	54.9	0.05	—	orange	66
45	103	154	186	269	320	383	418	96.5	1.8	1.7	1730	0.748	57.7	0.04	—	blue	63
46	105	154	183	267	316	386	414	97.0	1.3	1.7	1720	0.741	59.5	0.04	—	red	58
47	96	145	172	249	300	370	420	96.5	1.0	2.5	1656	0.736	60.8	0.01	—	+21	58
48	105	147	170	238	283	341	382	97.0	1.0	2.0	1561	0.739	60.0	0.05	—	red	75
49	107	155	186	248	291	348	385	96.5	0.8	2.7	1613	0.741	59.5	0.06	—	+19	65
50	100	158	190	276	326	387	419	95.5	1.4	3.1	1756	0.753	56.4	0.06	—	blue	70
51	96	158	184	269	323	384	413	95.5	0.9	3.6	1731	0.749	57.4	0.05	—	+27	65
52	110	158	182	256	304	374	419	96.5	1.0	2.5	1693	0.741	59.5	0.02	—	+22	63
53	113	165	194	265	314	374	411	97.0	1.4	1.6	1723	0.748	57.7	0.05	—	+13	65
54	116	180	209	280	319	372	414	97.5	1.2	1.3	1774	0.755	55.9	0.03	—	red	71
55	97	132	156	244	294	360	397	96.0	0.7	3.3	1583	0.726	63.4	0.06	—	+13	70
1931 - Aver.	104	152	180	259	308	372	410	96.6	1.2	2.2	1681	0.742	59.2	0.04	—		66

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600 rpm.
OTTAWA, ONT. (Cont'd)																	
1932 - 27	95	150	182	260	308	374	403	97.0	1.0	2.0	1677	0.740	59.7	—	8.0	+26	61
28	91	148	177	245	290	353	403	96.5	1.3	2.2	1616	0.731	62.1	—	9.7	+30	61
29	92	136	162	244	294	357	389	97.0	1.1	1.9	1582	0.732	61.8	—	10.3	red	77
30	94	149	177	262	310	370	404	98.0	1.4	0.6	1672	0.746	58.2	—	7.9	green	67
31	102	152	185	259	310	372	404	98.0	1.3	0.7	1682	0.743	58.9	—	7.9	+30	59
32	106	159	188	267	312	369	412	98.5	1.4	0.1	1707	0.752	56.7	—	5.8	red	75
33	110	161	194	259	296	357	404	98.0	1.4	0.6	1671	0.748	57.7	—	5.4	+30	62
34	99	150	184	267	311	367	406	98.5	1.5	0.0	1685	0.751	56.9	—	6.6	green	68
35	91	130	155	229	273	330	383	97.0	1.2	1.8	1500	0.750	57.2	—	9.9	green	71
36	95	140	168	238	284	362	414	97.5	1.2	1.3	1606	0.736	60.8	—	8.6	+27	64
37	112	163	192	270	315	369	412	98.5	1.4	0.1	1721	0.754	56.2	—	5.1	red	76
38	103	155	187	269	314	371	409	98.0	1.2	0.8	1705	0.750	57.2	—	7.0	green	69
39	110	170	198	267	308	365	412	98.0	1.0	1.0	1720	0.749	57.4	—	5.4	+30	61
40	97	142	172	246	296	367	417	97.0	1.4	1.6	1640	0.741	59.5	—	8.6	+22	64
41	101	148	176	253	303	369	409	98.0	1.2	0.8	1652	0.744	58.7	—	7.2	red	73
42	102	152	182	265	316	374	406	97.0	1.4	1.6	1695	0.745	58.4	—	7.8	blue	68
43	100	149	180	247	291	356	418	97.5	1.2	1.3	1641	0.736	60.8	—	8.3	+30	58
44	106	150	180	248	292	354	420	97.5	1.2	1.3	1644	0.738	60.2	—	7.9	red	59
45	106	149	172	246	296	362	417	97.0	1.4	1.6	1642	0.740	59.7	—	7.5	green	64
46	96	143	169	242	290	358	417	98.0	1.4	0.6	1619	0.737	60.5	—	9.1	+28	65
47	110	154	180	246	285	330	373	98.5	1.2	0.3	1568	0.741	59.5	—	6.3	red	74
48	104	150	176	246	284	330	374	98.5	1.0	0.5	1560	0.740	59.7	—	7.1	+30	66
49	107	151	178	240	286	355	416	97.5	1.2	1.3	1626	0.740	59.7	—	7.9	+30	61
50	101	153	176	241	286	353	416	98.0	1.3	0.7	1625	0.740	59.7	—	7.9	+24	60
51	102	158	194	272	318	371	414	98.0	1.2	0.8	1727	0.757	55.4	—	6.9	blue	67
52	111	169	198	269	312	374	439	98.0	1.4	0.6	1761	0.750	57.2	—	5.7	+20	60
53	95	154	188	272	318	372	408	98.0	1.3	0.7	1712	0.750	57.2	—	7.9	red	77
54	98	154	190	276	320	377	408	97.5	1.3	1.2	1725	0.751	56.9	—	7.2	green	70
55	106	162	191	260	298	354	405	98.5	1.2	0.3	1670	0.746	58.2	—	6.0	+23	63
1932 - Aver.	101	152	181	255	301	361	407	97.7	1.3	1.0	1657	0.744	58.7	—	7.5		66

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600 rpm.
TORONTO, ONT.																	
1931 - 56	94	138	162	234	285	357	405	96.5	1.0	2.5	1581	0.727	63.1	0.01	—	+30	—
57	129	188	215	281	330	385	412	98.0	1.4	0.6	1811	0.755	55.9	0.03	—	+27	—
58	96	141	172	260	317	380	406	97.0	1.3	1.7	1676	0.745	58.4	0.04	—	+20	—
59	99	157	191	272	314	371	401	96.5	1.4	2.1	1706	0.742	59.2	0.07	—	green	—
60	103	158	184	253	294	355	396	97.0	1.1	1.9	1640	0.735	61.0	0.04	—	+12	—
61	97	160	192	275	321	377	407	96.5	1.0	2.5	1732	0.744	58.7	0.06	—	+ 7	—
62	104	162	189	254	300	371	413	97.0	1.3	1.7	1689	0.739	60.0	0.01	—	blue	—
63	115	193	239	323	349	374	405	98.0	1.1	0.9	1883	0.759	54.9	0.01	—	+20	—
64	107	168	202	274	317	369	398	97.0	1.2	1.8	1728	0.756	55.7	0.12	—	+28	—
65	92	139	164	236	285	354	407	97.0	1.3	1.7	1585	0.726	63.4	0.01	—	+30	—
1931 - Aver.	104	161	191	266	311	369	405	97.1	1.2	1.7	1703	0.743	58.9	0.04	—		—
1932 - 56	92	144	177	258	307	367	396	97.5	1.2	1.3	1649	0.739	60.0	—	10.2	green	67
57	98	160	194	268	309	366	405	98.0	1.4	0.6	1702	0.743	58.9	—	7.3	+16	60
58	96	141	167	238	283	359	417	98.0	1.2	0.8	1605	0.733	61.5	—	8.9	+13	65
59	96	154	189	264	309	367	405	97.5	1.2	1.3	1688	0.739	60.0	—	9.2	green	68
60	109	163	189	261	308	367	411	98.5	1.2	0.3	1699	0.750	57.2	—	5.6	blue	68
61	96	149	179	260	305	361	397	98.0	1.1	0.9	1651	0.742	59.2	—	9.3	+23	66
62	106	161	197	274	319	376	417	98.0	1.2	0.8	1744	0.758	55.2	—	6.6	blue	68
63	98	154	188	264	307	364	406	98.0	1.2	0.8	1683	0.740	59.7	—	8.4	green	68
64	104	157	187	259	300	359	409	98.0	1.2	0.8	1671	0.738	60.2	—	7.2	red	57
1932 - Aver.	100	154	185	261	305	365	407	97.9	1.2	0.9	1677	0.742	59.2	—	8.1		65

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F. & 600 rpm.
HAMILTON, ONT.																	
1931 - 66	107	165	190	257	305	371	412	97.0	1.2	1.8	1700	0.743	58.9	0.01	—	red	—
67	96	146	177	264	320	384	414	96.0	1.0	3.0	1705	0.738	60.2	0.03	—	green	—
68	105	147	172	241	291	360	407	96.5	1.2	2.3	1618	0.730	62.3	0.02	—	+27	—
69	98	139	166	240	292	353	390	96.5	1.1	2.4	1580	0.734	61.3	0.03	—	green	—
70	104	159	191	260	321	384	413	96.5	1.1	2.4	1736	0.740	59.7	0.03	—	+30	—
71	110	170	199	262	306	364	398	97.0	1.1	1.9	1699	0.731	62.1	0.05	—	+30	—
72	110	166	196	265	308	365	400	97.0	1.3	1.7	1700	0.740	59.7	0.05	—	red	—
73	100	159	193	274	319	374	404	97.0	1.4	1.6	1723	0.745	58.4	0.08	—	+14	—
74	112	164	192	274	325	387	425	96.5	1.5	2.0	1767	0.761	54.4	0.05	—	orange	—
75	101	160	185	254	304	384	418	96.5	1.3	2.2	1705	0.739	60.0	0.03	—	blue	—
1931 - Aver.	104	157	186	260	309	373	408	96.7	1.2	2.1	1693	0.740	59.7	0.04	—		—
1932 - 65	97	142	177	250	305	368	402	97.5	1.2	1.3	1652	0.739	60.0	—	9.2	green	67
66	101	141	165	237	277	331	386	98.0	1.4	0.6	1537	0.734	61.3	—	7.9	green	69
67	103	142	171	242	287	360	413	97.5	1.2	1.3	1615	0.735	61.0	—	8.0	+30	64
68	99	155	189	263	307	365	405	98.0	1.2	0.8	1684	0.739	60.0	—	7.9	green	68
69	98	142	174	256	306	369	401	97.0	1.0	2.0	1640	0.735	61.0	—	10.7	blue	71
70	100	147	179	257	307	368	403	98.0	1.0	1.0	1661	0.739	60.0	—	8.5	+30	61
71	107	155	182	249	291	338	382	98.5	1.0	0.5	1597	0.741	59.5	—	6.3	+16	66
72	112	168	198	274	320	373	418	98.0	1.4	0.6	1751	0.757	55.4	—	6.8	blue	67
73	106	161	194	264	306	361	406	98.5	1.2	0.3	1692	0.743	58.9	—	6.6	green	68
74	106	168	198	268	307	362	406	98.0	1.0	1.0	1709	0.745	58.4	—	6.2	+27	62
1932 - Aver.	103	152	183	257	301	360	402	97.9	1.2	0.9	1655	0.741	59.5	—	7.8		66

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F. & 600 rpm.
LONDON, ONT.																	
1931 - 76	96	144	174	264	319	383	412	96.0	1.2	2.8	1896	0.737	60.5	0.05	—	green	—
77	105	171	206	276	314	366	404	97.0	1.1	1.9	1737	0.742	59.2	0.03	—	+22	—
78	108	174	206	273	312	365	400	97.0	0.9	2.1	1730	0.741	59.5	0.03	—	+27	—
79	98	160	187	256	305	379	417	96.5	1.3	2.2	1704	0.741	59.5	0.02	—	blue	—
80	114	172	203	273	315	370	402	97.5	1.1	1.4	1735	0.748	57.7	0.09	—	red	—
81	101	156	191	276	327	388	420	96.5	1.2	2.3	1758	0.754	56.2	0.07	—	blue	—
82	102	166	201	270	308	362	400	97.0	1.2	1.8	1707	0.740	59.7	0.04	—	+29	—
83	100	174	207	272	310	361	400	97.0	1.0	2.0	1724	0.741	59.5	0.05	—	+30	—
1931 - Aver.	103	164	197	270	314	372	407	96.8	1.1	2.1	1724	0.743	58.9	0.05	—		—
1932 - 75	95	1144	176	252	303	363	399	97.5	0.8	1.7	1637	0.737	60.5	—	9.2	green	68
76	106	160	191	260	305	359	410	98.0	1.3	0.7	1685	0.740	59.7	—	6.6	+14	59
77	96	142	170	243	290	365	420	97.5	1.0	1.5	1630	0.734	61.3	—	8.6	+22	64
78	102	164	195	270	314	366	405	97.5	1.3	1.2	1714	0.744	58.7	—	7.8	green	68
79	108	157	188	262	310	366	410	98.0	1.0	1.0	1693	0.748	57.7	—	6.3	blue	66
80	99	152	180	258	306	362	396	97.5	1.1	1.4	1654	0.745	58.4	—	8.5	+21	66
81	120	183	211	282	325	377	423	98.0	1.1	0.9	1801	0.770	52.3	—	3.6	blue	65
82	104	162	194	269	311	366	412	97.5	1.0	1.5	1714	0.744	58.7	—	7.6	green	66
1932 - Aver.	105	158	188	262	308	366	409	97.7	1.1	1.2	1691	0.745	58.4	—	7.3		65
FORTWILLIAM, ONT.																	
1931 - 84	106	167	201	268	308	360	401	97.0	1.2	1.8	1705	0.740	59.7	0.04	—	+27	—
85	132	196	218	274	312	359	402	98.0	1.2	0.8	1761	0.746	58.2	0.04	—	+28	—
86	107	160	187	250	288	343	386	97.5	1.3	1.2	1614	0.734	61.3	0.03	—	red	—
87	103	168	204	271	311	363	406	97.5	1.3	1.2	1723	0.743	58.9	0.05	—	+26	—
88	95	140	167	233	276	340	387	97.0	1.2	1.8	1543	0.721	64.8	0.03	—	+26	—
1931 - Aver.	109	166	196	259	299	353	396	97.4	1.2	1.4	1669	0.737	60.5	0.04	—		—

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600 rpm.
FORT WILLIAM, ONT.																	
1932 - 83	100	150	186	259	300	360	402	97.5	1.1	1.9	1657	0.738	60.2	—	8.5	+21	59
84	107	158	188	254	300	354	397	98.0	1.4	0.6	1651	0.740	59.7	—	6.9	red	72
85	98	151	181	255	299	364	402	97.5	1.2	1.3	1652	0.735	61.0	—	9.1	green	66
86	104	152	187	259	301	362	402	97.5	1.3	1.2	1663	0.738	60.2	—	7.4	blue	66
87	100	139	169	250	303	367	398	97.0	1.0	2.0	1626	0.734	61.3	—	9.9	+23	63
1932 - Aver.	102	150	182	256	301	361	400	97.4	1.2	1.4	1650	0.737	60.5	—	8.4		65
WINNIPEG, MAN.																	
1931 - 89	102	164	200	269	309	364	400	97.0	1.1	1.9	1706	0.739	60.0	0.04	—	+29	—
90	104	163	198	271	311	364	398	96.5	1.3	2.2	1705	0.740	59.7	0.03	—	+28	—
91	108	168	198	270	311	365	400	97.0	1.1	1.9	1712	0.740	59.7	0.05	—	+27	—
92	103	150	172	238	288	363	418	97.0	1.5	1.5	1629	0.728	62.9	0.07	—	+30	—
93	98	142	168	250	298	360	398	96.0	1.0	3.0	1616	0.727	63.1	0.03	—	+28	—
94	107	146	164	227	280	368	436	97.0	1.4	1.6	1621	0.719	65.3	0.12	—	+27	—
1931 - Aver.	105	150	183	254	300	364	408	96.8	1.2	2.0	1665	0.732	61.8	0.06	—		—
1932 - 88	104	156	188	260	305	359	403	97.5	1.2	1.3	1671	0.738	60.2	—	7.7	+23	60
89	103	154	185	260	303	359	404	97.5	1.0	1.5	1665	0.740	59.7	—	7.2	+20	60
90	97	120	136	202	262	363	409	97.0	1.1	1.9	1492	0.712	67.2	—	11.3	+30	64
91	100	154	186	258	301	362	404	97.5	1.2	1.3	1665	0.739	60.0	—	8.1	green	64
92	98	150	183	256	300	357	404	98.5	1.1	0.4	1650	0.739	60.0	—	7.7	blue	64
93	99	155	189	264	305	365	406	98.0	1.0	1.0	1684	0.742	59.2	—	7.4	+26	60
1932 - Aver.	100	148	178	250	296	361	405	97.7	1.1	1.2	1638	0.735	61.0	—	8.2		62

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600 rpm.
BRANDON, MAN.																	
1931 - 95	91	143	170	234	275	338	387	97.0	1.1	1.9	1547	0.724	63.9	0.04	—	+30	—
96	103	161	197	270	312	364	403	97.0	1.2	1.8	1707	0.740	59.7	0.05	—	+28	—
97	102	160	191	266	309	365	405	97.0	1.1	1.9	1696	0.739	60.0	0.05	—	+17	—
98	95	145	171	237	280	345	399	97.0	1.2	1.8	1577	0.725	63.7	0.03	—	+27	—
99	109	168	201	271	313	363	402	97.5	1.3	1.2	1718	0.742	59.2	0.05	—	+27	—
1931 - Aver.	100	155	186	256	298	355	399	97.1	1.2	1.7	1649	0.734	61.3	0.04	—		—
1932 - 94	100	152	188	260	304	362	412	98.0	1.3	0.7	1678	0.742	59.2	—	7.0	+20	59
95	101	158	188	260	302	360	403	97.5	1.0	1.5	1671	0.740	59.7	—	8.2	+29	58
96	98	154	186	259	301	358	403	97.5	1.1	1.4	1661	0.740	59.7	—	7.4	+27	59
97	95	154	186	260	304	362	404	97.5	1.1	1.4	1670	0.738	60.2	—	7.6	+19	61
98	102	159	193	267	312	371	420	98.0	1.2	0.8	1722	0.745	58.2	—	6.8	+29	58
1932 - Aver.	99	155	188	261	305	363	408	97.7	1.1	1.2	1680	0.741	59.5	—	7.2		59
REGINA, SASK.																	
1931 - 100	98	149	178	260	310	373	421	97.0	1.3	1.7	1691	0.735	61.0	0.07	—	+18	—
101	104	148	170	237	293	377	425	97.5	1.4	1.1	1650	0.731	62.1	0.13	—	+28	—
102	94	144	177	265	316	378	417	97.0	1.2	1.8	1697	0.737	60.5	0.07	—	+14	—
103	100	148	177	267	318	381	419	97.0	1.3	1.7	1710	0.737	60.5	0.06	—	+ 5	—
104	113	166	197	276	322	375	405	97.5	1.3	1.2	1741	0.750	57.2	0.10	—	+28	—
1931 - Aver.	102	151	180	261	312	377	417	97.2	1.3	1.5	1698	0.738	60.2	0.09	—		—
1932 - 99	112	176	199	260	295	350	402	98.0	1.0	1.0	1682	0.743	58.9	—	4.2	+ 8	56
100	112	166	195	258	300	364	424	98.0	1.2	0.8	1707	0.741	59.5	—	4.9	+16	56
101	108	170	197	261	313	386	451	98.0	1.2	0.8	1778	0.744	58.7	—	5.3	+29	46
102	110	168	196	254	290	350	404	98.5	1.2	0.3	1662	0.740	59.7	—	5.3	+16	57
103	93	146	180	270	317	366	409	98.0	1.2	0.8	1688	0.739	60.0	—	7.7	blue	61
1932 - Aver.	107	165	193	261	303	363	418	98.1	1.2	0.7	1703	0.741	59.5	—	5.5		55

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F & 600 rpm.
SASKATOON, SASK.																	
1931 - 105	97	139	170	257	309	378	416	96.5	1.2	2.3	1669	0.732	61.8	0.07	--	+26	--
106	110	170	193	250	288	350	405	97.5	1.3	1.2	1656	0.740	59.7	0.03	--	red	--
107	100	152	179	256	307	372	414	97.0	1.2	1.8	1680	0.734	61.3	0.04	--	+13	--
108	98	146	176	261	310	378	416	97.0	1.4	1.6	1687	0.734	61.3	0.08	--	+18	--
109	100	142	163	224	284	380	424	97.0	1.2	1.8	1617	0.725	63.7	0.13	--	+27	--
110	100	157	187	270	323	376	401	97.5	1.2	1.3	1714	0.742	59.2	0.05	--	red	--
111	105	163	194	276	324	377	407	97.5	1.2	1.3	1741	0.749	57.4	0.09	--	+29	--
1931 - Aver.	101	154	180	256	306	373	412	97.2	1.2	1.6	1681	0.737	60.5	0.07	--		--
CALGARY, ALTA.																	
1931 - 112	91	124	140	184	217	274	375	96.5	1.3	2.2	1314	0.699	70.9	0.16	--	+22	--
113	104	153	179	256	307	363	404	97.5	1.2	1.3	1662	0.744	58.7	0.09	--	+27	--
114	96	141	163	226	283	378	422	96.5	1.3	2.2	1613	0.724	63.9	0.12	--	+29	--
115	112	170	198	277	322	373	406	98.0	1.3	0.7	1746	0.750	57.2	0.10	--	+30	--
116	106	162	192	253	294	360	409	97.5	1.2	1.3	1670	0.749	57.4	0.08	--	+30	--
1931 - Aver.	102	150	174	239	285	350	403	97.2	1.3	1.5	1601	0.733	61.5	0.11	--		--
1932 - 104	110	156	168	204	235	291	387	98.0	1.2	0.8	1441	0.719	65.3	--	5.9	+30	61
105	98	152	178	258	311	370	419	98.0	1.1	0.9	1688	0.744	58.7	--	7.3	+29	60
106	99	147	170	235	293	368	420	98.0	1.0	1.0	1633	0.734	61.3	--	7.6	+30	58
107	98	150	174	233	292	366	420	98.0	1.2	0.8	1640	0.736	60.8	--	6.9	+30	58
108	98	148	168	230	278	358	416	98.0	1.0	1.0	1598	0.726	63.4	--	7.5	+29	54
1932 - Aver.	101	150	172	233	282	351	412	98.0	1.1	0.9	1600	0.732	61.8	--	7.0		58

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific gravity	Degrees A.P.I.	Sulphur	Vapour press.	Colour	Octane No. at 212°F & 600 rpm.
EDMONTON, ALTA.																	
1931 - 117	102	150	173	229	272	347	402	97.0	1.2	1.8	1573	0.726	63.4	0.12	---	+30	---
118	103	157	183	260	309	365	405	97.5	1.2	1.3	1679	0.746	58.2	0.07	---	Red	---
119	100	148	172	231	274	354	404	97.0	1.1	1.9	1583	0.728	62.9	0.11	---	+30	---
120	102	153	179	256	306	363	403	97.5	1.1	1.4	1660	0.744	58.7	0.10	---	+26	---
121	101	155	180	258	306	364	400	97.0	1.2	1.8	1663	0.744	58.7	0.07	---	Red	---
122	94	138	162	225	282	380	425	97.0	1.5	1.5	1612	0.724	63.9	0.12	---	+26	---
123	110	163	193	275	323	374	407	97.5	1.2	1.3	1735	0.749	57.4	0.07	---	+28	---
124	108	165	192	254	294	357	405	97.0	1.0	2.0	1667	0.748	57.7	0.05	---	+27	---
1931 - Aver.	103	154	179	249	296	363	406	97.2	1.2	1.6	1647	0.739	60.0	0.09	---		---
1932 - 109	107	152	166	200	228	281	375	98.0	1.1	0.9	1402	0.718	65.6	---	6.1	+30	60
110	99	148	176	252	290	346	412	98.0	1.1	0.9	1624	0.732	61.8	---	7.8	+30	59
111	93	133	151	225	361	493	531	97.5	1.2	1.3	1894	0.741	59.5	---	9.3	+26	57
112	102	148	172	237	288	371	415	97.5	1.3	1.2	1631	0.734	61.3	---	6.7	+30	59
113	107	151	168	215	254	334	412	98.6	1.3	0.2	1534	0.724	63.9	---	6.9	+30	57
1932 - Aver.	102	146	167	226	284	365	429	97.9	1.2	0.9	1617	0.730	62.3	---	7.4		58
VANCOUVER, B. C.																	
1931 - 125	101	158	193	270	320	388	412	96.0	1.0	3.0	1741	0.755	55.9	0.06	---	Violet	---
126	107	165	193	253	293	362	408	97.0	1.2	1.8	1674	0.748	57.7	0.07	---	+28	---
127	105	162	190	252	294	360	404	97.0	1.0	2.0	1662	0.749	57.4	0.10	---	+26	---
128	104	158	169	252	294	360	396	96.0	1.1	2.9	1649	0.743	58.9	0.05	---	+30	---
129	97	163	191	250	284	329	372	97.0	1.0	2.0	1589	0.745	58.4	0.05	---	Red	---
130	99	163	192	258	297	356	397	97.0	1.0	2.0	1663	0.748	57.7	0.09	---	+29	---
1931 - Aver.	102	162	191	256	297	359	398	96.7	1.0	2.3	1663	0.748	57.7	0.07	---		---
1932 - 114	106	156	186	252	296	368	414	98.5	1.2	0.3	1672	0.749	57.4	---	6.3	Violet	67
115	106	158	185	244	284	356	421	98.5	1.3	0.2	1648	0.746	58.2	---	6.8	+30	65
116	105	160	186	244	280	356	420	98.5	1.2	0.3	1646	0.747	57.9	---	6.0	Red	75
117	100	149	178	256	302	374	416	98.0	1.2	0.8	1675	0.746	58.2	---	8.1	Green	76
118	98	147	178	246	288	356	407	98.0	1.2	0.8	1622	0.745	58.4	---	8.2	Yellow	71
119	102	149	179	252	293	361	409	98.0	1.2	0.8	1643	0.747	57.9	---	6.9	Orange	68
1932 - Aver.	103	153	182	249	291	362	414	98.3	1.2	0.5	1651	0.747	57.9	---	7.1		70

TABLE I - GASOLINE SURVEY ANALYSES FOR 1931 AND 1932 BY CITIES (CONT'D)

Sample No.	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Colour	Octane No. at 212°F. & 600 rpm.
VICTORIA, B. C.																	
1931 - 131	105	162	193	256	296	363	410	97.0	1.1	1.9	1680	0.749	57.4	0.06	—	+30	—
132	104	162	194	253	296	354	396	97.0	1.2	1.8	1655	0.747	57.9	0.09	—	+27	—
133	100	156	188	254	293	362	392	96.5	1.0	2.5	1645	0.745	58.4	0.04	—	+27	—
134	106	160	190	252	292	362	408	97.0	0.9	2.1	1664	0.747	57.9	0.10	—	+30	—
1931 - Aver.	104	160	191	254	294	360	402	96.9	1.0	2.1	1661	0.747	57.9	0.07	—		—
1932 - 120	103	153	186	250	290	368	421	98.0	1.2	0.8	1673	0.749	57.4	—	6.4	+30	66
121	104	149	178	249	289	370	417	98.0	1.4	0.6	1652	0.746	58.2	—	7.8	green	75
122	98	145	176	245	289	358	416	97.5	1.3	1.2	1629	0.745	58.4	—	8.2	yellow	71
123	102	150	180	254	300	368	417	98.5	1.2	0.3	1669	0.748	57.7	—	6.9	orange	68
1932 - Aver.	102	151	180	249	292	366	418	98.0	1.3	0.7	1656	0.747	57.9	—	7.3		70

TABLE II - AVERAGE OF GASOLINE SURVEY ANALYSES FOR 1931

City	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Octane No. at 212°F. & 600 rpm.
Halifax, N.S.	107	166	196	263	303	357	399	97.0	1.2	1.8	1684	0.744	58.7	0.03	—
St. John, N.B.	104	162	192	262	303	358	401	96.9	1.2	1.9	1678	0.744	58.7	0.04	—
Quebec, Que.	113	167	193	255	294	349	396	96.9	1.3	1.8	1654	0.741	59.5	0.04	—
Montreal, Que.	106	155	183	261	310	372	410	96.6	1.3	2.1	1691	0.745	58.4	0.04	—
Ottawa, Ont.	104	152	180	259	308	372	410	96.6	1.2	2.2	1681	0.742	59.2	0.04	65
Toronto, Ont	104	161	191	266	311	369	405	97.1	1.2	1.7	1703	0.743	58.9	0.04	—
Hamilton, Ont.	104	157	186	260	309	373	408	96.7	1.2	2.1	1693	0.740	59.7	0.04	—
London, Ont.	103	164	197	270	314	372	407	96.8	1.1	2.1	1724	0.743	58.9	0.05	—
Fort William, Ont.	109	166	196	259	299	353	396	97.4	1.2	1.4	1669	0.737	60.5	0.04	—
Winnipeg, Man.	105	156	183	254	300	364	408	96.8	1.2	2.0	1665	0.732	61.8	0.06	—
Brandon, Man.	100	155	186	256	298	355	399	97.1	1.2	1.7	1649	0.734	61.3	0.04	—
Regina, Sask.	102	151	180	261	312	377	417	97.2	1.3	1.5	1698	0.738	60.2	0.09	—
Saskatoon, Sask.	101	154	180	256	306	373	412	97.2	1.2	1.6	1681	0.737	60.5	0.07	—
Calgary, Alta.	102	150	174	239	285	350	403	97.2	1.3	1.5	1601	0.733	61.5	0.11	—
Edmonton, Alta.	103	154	179	249	296	363	406	97.2	1.2	1.6	1647	0.739	60.0	0.09	—
Vancouver, B.C.	102	162	191	256	297	359	398	96.7	1.0	2.3	1663	0.748	57.7	0.07	—
Victoria, B.C.	104	160	191	254	294	360	402	96.9	1.0	2.1	1661	0.747	57.9	0.07	—
Average:*(134 samples)	104	157	186	258	304	366	406	96.9	1.3	1.8	1677	0.741	59.5	0.05	—

* This is the average value for all the samples tested.

TABLE III - AVERAGE OF GASOLINE SURVEY ANALYSES FOR CITIES FOR 1932

City	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue	Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Vapour Press.	Octane No. at 212°F & 600 rpm.
Halifax, N.S.	102	156	184	253	298	358	403	98.2	1.2	0.8	1652	0.746	58.2	6.6	68
St. John, N.B.	103	160	190	258	296	350	396	98.1	1.1	0.8	1650	0.746	58.2	6.6	67
Quebec, Que.	99	155	184	253	291	347	396	97.9	1.2	0.9	1626	0.743	58.9	7.4	67
Montreal, Que.	103	155	186	264	309	368	410	97.9	1.2	0.9	1692	0.748	57.7	7.3	69
Ottawa, Ont.	101	152	181	255	301	361	407	97.7	1.3	1.0	1657	0.744	58.7	7.5	66
Toronto, Ont.	100	154	185	261	305	365	407	97.9	1.2	0.9	1677	0.742	59.2	8.1	65
Hamilton, Ont.	103	152	183	257	301	360	402	97.9	1.2	0.9	1655	0.741	59.5	7.8	66
London, Ont.	105	158	188	262	308	366	409	97.7	1.1	1.2	1691	0.745	58.4	7.3	65
Fort William, Ont.	102	150	182	256	301	361	400	97.4	1.2	1.4	1650	0.737	60.5	8.4	65
Winnipeg, Man.	100	148	178	250	296	361	405	97.7	1.1	1.2	1638	0.735	61.0	8.2	62
Brandon, Man.	99	155	188	261	305	363	408	97.7	1.1	1.2	1680	0.741	59.5	7.2	59
Regina, Sask.	107	165	193	261	303	363	418	98.1	1.2	0.7	1703	0.741	59.5	5.5	55
Calgary, Alta.	101	150	172	233	282	351	412	98.0	1.1	0.9	1600	0.732	61.8	7.0	58
Edmonton, Alta.	102	146	167	226	284	365	429	97.9	1.2	0.9	1617	0.730	62.3	7.4	58
Vancouver, B.C.	103	153	182	249	291	362	414	98.3	1.2	0.5	1651	0.747	57.9	7.1	70
Victoria, B.C.	102	151	180	249	292	366	418	98.0	1.3	0.7	1656	0.747	57.9	7.3	70
Average:*(123 samples)	102	154	183	254	299	361	408	97.9	1.2	0.9	1659	0.742	59.2	7.4	65

* This is the average value for all the samples tested.

TABLE IV - ANNUAL AVERAGES OF GASOLINE SURVEY ANALYSES FOR CANADA

Year	1st drop °F.	Distillation Range 10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End point °F.	Recovery	Residue & Distillation loss	Index No. °F.	Specific Gravity	Degrees A.P.I.	Sulphur	Vapour Press.	Octane No. at 212°F. & 600 rpm.
1916	125	170	192	237	270	330	380	---	---	1579	0.732	61.8	0---	---	---
1923	120	170	193	255	296	358	423	97.1	2.9	1695	0.737	60.5	---	---	---
1924	113	173	195	249	288	347	410	97.4	2.6	1662	0.736	60.8	---	---	---
1925	116	174	199	258	299	359	412	97.0	3.0	1701	0.739	60.0	---	---	---
1926	110	164	191	256	300	360	410	97.4	2.6	1681	0.739	60.0	---	---	---
1927	107	161	189	259	304	366	416	97.0	3.0	1693	0.741	59.5	---	---	---
1928	107	160	186	255	298	359	409	97.3	2.7	1667	0.737	60.5	---	---	---
1929	102	153	181	255	300	363	411	97.0	3.0	1663	0.736	60.8	---	---	---
1930	101	155	182	254	301	362	406	97.2	2.8	1660	0.741	59.5	0.07	---	---
1931	104	157	186	258	304	366	406	96.9	3.1	1677	0.741	59.5	0.05	---	---
1932	102	154	183	254	299	361	408	97.9	2.1	1659	0.742	59.2	---	7.4	65

TABLE V

TEN PERCENT OF SAMPLES HAVING MAXIMUM INDEX NUMBERS* IN 1931

Sample No. 1931	Index No. °F.	Distillation range: 1st drop °F.	10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End Pt °F.	Recovery %	Residue %	Distillation loss %
63	1883	115	193	239	323	349	374	405	98.0	1.1	0.9
57	1811	129	188	215	281	330	385	412	98.0	1.4	0.6
27	1793	113	178	214	281	324	380	416	97.5	1.2	1.3
54	1774	116	180	209	280	319	372	414	97.5	1.2	1.3
74	1767	112	164	192	274	325	387	425	96.5	1.5	2.0
85	1761	132	196	218	274	312	359	402	98.0	1.2	0.8
44	1761	113	164	195	276	324	382	420	97.0	1.3	1.7
81	1758	101	156	191	276	327	388	420	96.5	1.2	2.3
50	1756	100	158	190	276	326	387	419	95.5	1.4	3.1
25	1751	110	157	191	276	325	385	417	96.0	1.5	2.5
1	1749	106	158	189	275	324	384	419	97.0	1.2	1.8
9	1749	98	168	193	270	320	380	418	97.0	1.3	1.7
115	1746	112	170	198	277	322	373	406	98.0	1.3	0.7
Aver.	1774	112	171	203	280	325	380	415	97.1	1.3	1.6

TABLE VI

TEN PERCENT OF SAMPLES HAVING MINIMUM INDEX NUMBERS* IN 1931

Sample No. 1931	Index No. °F.	Distillation range: 1st drop °F.	10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End Pt. °F.	Recovery %	Residue %	Distillation loss %
112	1314	91	124	140	184	217	274	375	96.5	1.3	2.2
88	1543	95	140	167	233	276	340	387	97.0	1.2	1.8
95	1547	91	143	170	234	275	338	387	97.0	1.1	1.9
38	1550	100	126	146	235	291	359	393	96.0	0.9	3.1
37	1556	95	132	154	235	287	351	397	96.0	1.2	2.8
48	1561	105	147	170	238	283	341	382	97.0	1.0	2.0
16	1568	108	148	172	239	284	342	383	97.0	1.2	1.8
35	1573	99	140	165	241	290	350	387	96.0	1.2	2.8
117	1573	102	150	173	229	272	347	402	97.0	1.2	1.8
98	1577	95	145	171	237	280	345	399	97.0	1.2	1.8
69	1580	98	139	166	240	292	353	390	96.5	1.1	2.4
56	1581	94	138	162	234	285	357	405	96.5	1.0	2.5
55	1583	97	132	156	244	294	360	397	96.0	0.7	3.3
Aver.	1547	98	139	162	233	279	343	391	96.6	1.1	2.3

* The index number is the sum of the following points in the distillation range: 10%, 20%, 50%, 70%, 90%, and the end point.

T A B L E VII

TEN PERCENT OF SAMPLES HAVING MAXIMUM INDEX NUMBERS* IN 1932

Sample No. 1932	Index No. °F.	Distillation range 1st drop °F.	10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End Pt. °F.	Recovery %	Residue %	Distillation loss %
111	1894	93	133	151	225	361	493	531	97.5	1.2	1.3
81	1801	126	183	211	282	325	377	423	98.0	1.1	0.9
101	1778	108	170	197	261	313	386	451	98.0	1.2	0.8
52	1761	111	169	198	269	312	374	439	98.0	1.4	0.6
5	1755	108	161	194	274	322	385	419	98.0	1.3	0.7
72	1751	112	168	198	274	320	373	418	98.0	1.4	0.6
62	1744	106	161	197	274	319	376	417	98.0	1.2	0.8
23	1732	104	162	194	272	316	374	414	98.0	1.4	0.6
19	1729	104	162	192	275	318	372	410	98.5	1.2	0.3
25	1728	102	155	189	278	322	374	410	98.5	1.2	0.3
51	1727	102	158	194	272	318	371	414	98.0	1.2	0.8
54	1725	98	154	190	276	320	377	408	97.5	1.3	1.2
Aver.	1760	106	161	192	269	322	386	430	98.0	1.3	0.7

T A B L E VIII

TEN PERCENT OF SAMPLES HAVING MINIMUM INDEX NUMBERS* IN 1932

Sample No. 1932	Index No. °F.	Distillation range 1st drop °F.	10% °F.	20% °F.	50% °F.	70% °F.	90% °F.	End Pt. °F.	Recovery %	Residue %	Distillation loss %
109	1402	107	152	166	200	228	281	375	98.0	1.1	0.9
104	1441	110	156	168	204	235	291	387	98.0	1.2	0.8
90	1492	97	120	136	202	262	363	409	97.0	1.1	1.9
35	1500	91	130	155	229	273	330	383	97.0	1.2	1.8
113	1534	107	151	168	215	254	334	412	98.5	1.3	0.2
66	1537	101	141	165	237	277	331	386	98.0	1.4	0.6
48	1560	104	150	176	246	284	330	374	98.5	1.0	0.5
16	1562	102	148	176	246	284	334	374	98.5	1.1	0.4
47	1568	110	154	180	246	285	330	373	98.5	1.2	0.3
29	1582	92	136	162	244	294	357	389	97.0	1.1	1.9
71	1597	107	155	182	249	291	338	382	98.5	1.0	0.5
108	1598	98	148	168	230	278	358	416	98.0	1.0	1.0
Aver.	1531	102	145	167	229	270	332	388	98.0	1.1	0.9

T A B L E IX

DIFFERENCE BETWEEN MAXIMUM AND MINIMUM INDEX NUMBERS*

Year	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
Maximum, 10%	1791	1806	1821	1815	1823	1791	1773	1787	1774	1760
Minimum, 10%	1500	1428	1497	1524	1518	1488	1503	1471	1547	1531
Difference	291	378	324	291	305	303	270	316	227	229

* The index number is the sum of the following points in the distillation range, 10%, 20%, 50%, 70%, 90% and the end point.

TABLE X

KNOCK RATINGS AND CHEMICAL ANALYSES OF SAMPLES FROM OTTAWA IN 1931

Sample No. 1931	Octane No. at 212°F & 600 rpm.	Hydrocarbons: Unsaturates %	Aromatics %	Naphthenes %	Paraffins %	Toluene Value %	Index No. °F.
48	75	6	10	34	50	19.7*	1561
42	74	4	8	32	56	16.8*	1687
32	73	5	6	29	60	14.3*	1693
35	72	21	21	26	32	31.7	1573
39	72	4	8	26	62	15.3*	1728
54	71	4	10	29	57	18.1*	1774
55	70	9	10	24	57	17.8	1583
50	70	11	14	27	48	23.0	1756
29	69	8	11	26	55	19.1*	1703
38	69	8	8	24	60	15.6	1550
37	69	7	7	25	61	14.7	1556
40	67	10	14	26	50	22.5	1683
41	66	8	11	26	55	19.1	1739
28	66	10	7	25	58	15.3	1623
44	66	14	19	25	42	28.1	1761
31	66	7	10	27	56	18.2	1711
33	65	6	9	25	60	16.5	1691
49	65	6	8	33	53	17.5	1613
51	65	6	11	26	57	18.7	1731
36	65	5	11	27	57	18.8	1736
53	65	5	11	28	56	19.0	1723
52	63	9	9	26	56	17.3	1693
45	63	13	15	22	50	23.1	1730
30	61	3	4	30	63	12.1	1587
27	60	9	14	22	55	21.3	1793
46	58	8	9	24	59	16.6	1720
47	58	4	4	28	64	11.8	1656
43	58	4	5	29	62	13.1	1664
34	57	8	8	21	63	14.9	1734
Average	66	8	10	27	55	18.2	1681

* These samples contain tetra-ethyl lead and therefore the toluene value does not indicate the anti-knock value of the fuel.

TABLE XI

CLASSIFICATION OF THE 1932 SAMPLES ACCORDING TO FOUR ARBITRARY OCTANE NUMBER GRADES

City	Grade I 73 and above Octane No.		Grade II 72 to 65 Octane No.		Grade III 64 to 57 Octane No.		Grade IV 56 and below Octane No.		Total
	Number of Samples	Average Octane Number	Number of Samples	Average Octane Number	Number of Samples	Average Octane Number	Number of Samples	Average Octane Number	Number of Samples
Halifax	1	74	3	68	1	64	--	--	5
Saint John	1	74	1	69	3	64	--	--	5
Quebec	1	76	3	67	2	62	--	--	6
Montreal	3	77	4	68	3	61	--	--	10
Ottawa	6	75	9	68	14	61	--	--	29
Toronto	-	--	7	67	2	59	--	--	9
Hamilton	-	--	7	68	3	62	--	--	10
London	-	--	6	67	2	62	--	--	8
Fort William	-	--	3	68	2	61	--	--	5
Winnipeg	-	--	-	--	6	62	--	--	6
Brandon	-	--	-	--	5	59	--	--	5
Regina	-	--	-	--	2	59	3	53	5
Calgary	-	--	-	--	4	59	1	54	5
Edmonton	-	--	-	--	5	58	--	--	5
Vancouver	2	76	4	68	-	--	--	--	6
Victoria	1	75	3	68	-	--	--	--	4
No. of samples in grade	15		50		54		4		123
Percent of total samples	12.2		40.7		43.9		3.2		100
Average Octane No. for grade		75		68		61		53	

Knock rating (Octane No.) average all samples 65

Knock rating (Octane No.) highest samples 77

Knock rating (Octane No.) lowest sample 46

TABLE XII

AVERAGE KNOCK RATINGS OF 20 DIFFERENT BRANDS OF GASOLINE SOLD BY 8 COMPANIES IN 1932 ARRANGED ACCORDING TO ARBITRARY GRADES

Company	Grade I Octane number 73 & above		Grade II Octane Number 72 to 65		Grade III Octane Number 64 to 57	
	No. of Samples of Company's Brand	Average Octane Number	No. of Samples of Company's Brand	Average Octane Number	No. of Samples of Company's Brand	Average Octane Number
A	5	75	11	69	5	60
B	2	74	8	68	3	60
C	2	77	6	67	4	58
D	1	75	1	68	9	61
E	2	77	5	68	3	63
F	1	74	6	67	-	--
G	-	--	2	70	4	64
H	-	--	6	67	-	--
Total No. of Samples Tested	13		45		28	
Average Octane Number		75		68		61

TABLE XIII

CLASSIFICATION OF SAMPLES ACCORDING TO RESULTS OF REID VAPOUR PRESSURE DETERMINATION IN 1932

City	Reid Vapour Pressure, Pounds per Square Inch									Total
	12.0 to 11.1	11.0 to 10.1	10.0 to 9.1	9.0 to 8.1	8.0 to 7.1	7.0 to 6.1	6.0 to 5.1	5.0 to 4.1	4.0 to 3.1	
Halifax	--	--	--	--	2	2	1	--	--	5
Saint John	--	--	--	--	3	--	1	1	--	5
Quebec	--	--	--	2	2	1	1	--	--	6
Montreal	--	1	--	2	3	1	3	--	--	10
Ottawa	--	1	3	3	12	4	6	--	--	29
Toronto	--	1	2	2	2	1	1	--	--	9
Hamilton	--	1	1	1	3	4	--	--	--	10
London	--	--	1	2	2	2	--	--	1	8
Fort William	--	--	2	1	1	1	--	--	--	5
Winnipeg	1	--	--	1	4	--	--	--	--	6
Brandon	--	--	--	1	2	1	1	--	--	5
Regina	--	--	--	--	1	--	2	2	--	5
Calgary	--	--	--	--	3	1	1	--	--	5
Edmonton	--	--	1	--	1	3	--	--	--	5
Vancouver	--	--	--	2	--	3	1	--	--	6
Victoria	--	--	--	1	1	2	--	--	--	4
Total	1	4	10	18	42	26	18	3	1	123
Percent of total	0.8	3.3	8.1	14.6	34.2	21.2	14.6	2.4	0.8	100

Reid Vapor pressure, average all samples 7.4

Reid Vapor pressure, highest sample 11.3

Reid Vapor pressure, lowest sample 3.6

TABLE XIV

CLASSIFICATION OF SAMPLES ACCORDING TO RESULTS OF SULPHUR DETERMINATION IN 1931

City	Sulphur, percent														
	.16	.13	.12	.11	.10	.09	.08	.07	.06	.05	.04	.03	.02	.01	Total
Halifax	-	-	-	-	-	-	-	-	-	1	-	1	2	1	5
Saint John	-	-	-	-	-	-	1	-	-	-	3	-	1	-	5
Quebec	-	-	-	-	-	-	-	-	2	-	-	1	3	-	6
Montreal	-	-	-	-	-	-	-	2	1	2	1	2	1	1	10
Ottawa	-	-	-	-	-	-	-	1	5	11	4	3	2	3	29
Toronto	-	-	1	-	-	-	-	1	1	-	2	1	-	4	10
Hamilton	-	-	-	-	-	-	1	-	-	3	-	4	1	1	10
London	-	-	-	-	-	1	-	1	-	1	2	2	1	-	8
Fort William	-	-	-	-	-	-	-	-	-	1	2	2	-	-	5
Winnipeg	-	-	1	-	-	-	-	1	-	1	1	2	-	-	6
Brandon	-	-	-	-	-	-	-	-	-	3	1	1	-	-	5
Regina	-	1	-	-	1	-	-	2	1	-	-	-	-	-	5
Saskatoon	-	1	-	-	-	1	1	1	-	1	1	1	-	-	7
Calgary	1	-	1	-	1	1	1	-	-	-	-	-	-	-	5
Edmonton	-	-	2	1	1	-	-	3	-	1	-	-	-	-	8
Vancouver	-	-	-	-	1	1	-	1	1	2	-	-	-	-	6
Victoria	-	-	-	-	1	1	-	-	1	-	1	-	-	-	4
Total	1	2	5	1	5	5	4	13	12	27	18	20	11	10	134
Percent of total	0.7	1.5	3.7	0.8	3.7	3.7	3.0	9.7	9.0	20.2	13.4	14.9	8.2	7.5	100

Sulphur, percent, average all samples	0.05
Sulphur, percent, highest sample	0.16
Sulphur, percent, lowest sample	0.01

TABLE XV

PERCENTAGE OF ARTIFICIALLY COLOURED GASOLINES IN DIFFERENT YEARS

Year	Artificially Coloured Gasolines %
1927	10
1928	13
1929	18
1930	26
1931	34
1932	52

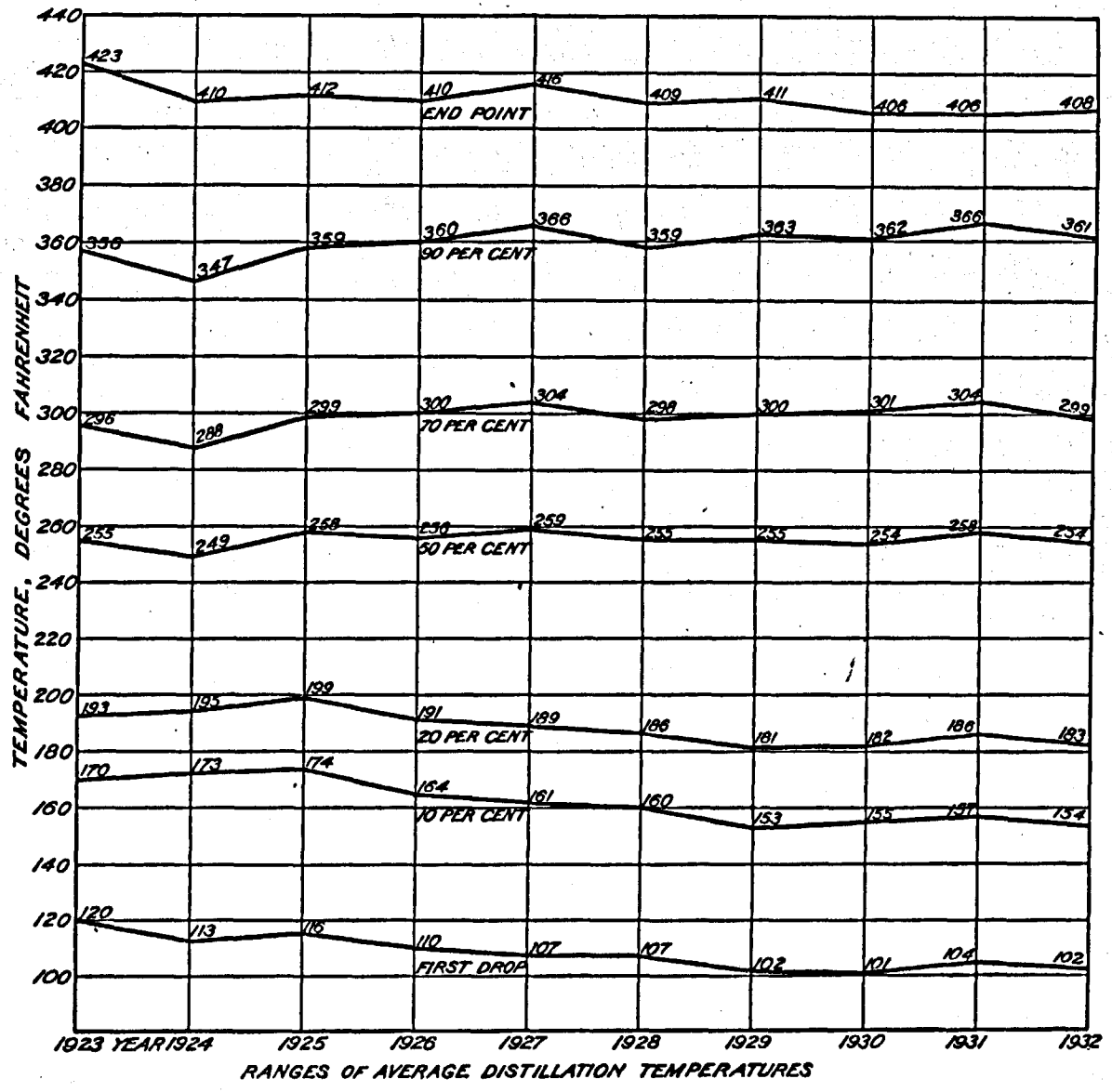
TEMPERATURE, DEGREES FAHRENHEIT
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
END POINT
423 410 412 410 416 409 411 406 406 408
90 PER CENT
356 347 359 360 366 359 363 362 366 361
70 PER CENT
296 288 299 300 304 298 300 301 304 299
50 PER CENT
255 249 258 258 259 255 255 254 258 254
20 PER CENT
193 195 199 191 189 186 181 182 186 183
10 PER CENT
170 173 174 164 161 160 153 155 157 154
FIRST DROP
120 113 116 110 107 107 102 101 104 102
1923 YEAR 1924 1925 1926 1927 1928 1929 1930 1931 1932
RANGES OF AVERAGE DISTILLATION TEMPERATURES

Figure 1