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GASOLINE SURVEYS FOR SEVEN SUMMERS  
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A study of the gasoline sold in Canada during the summer has been made annually since 1923 at the Fuel Research Bureau of Mines, and reports from the results obtained have been prepared between 1939 and 1946 and including 1938(1). The publication of these reports was discontinued during the war although the Laboratories continued to make periodic surveys of the quality of gasoline being sold.

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between 1939 and 1946

by

P. V. Rosewarne, H. McD. Chantler and P. B. Seely

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A study of the gasoline sold in Canada during the summer has been made annually since 1923 at the Fuel Research Laboratories of the Division of Fuels, Bureau of Mines, and reports from the results obtained have been prepared and published up to, and including 1938(1). The publication of these reports was discontinued during the war although the Laboratories continued to make periodic surveys of the quality of gasoline being sold.

The general practice was to obtain samples from the principal distributing cities in different parts of the country with the assistance of district offices of some government department. For the summer surveys, samples were collected some time during the latter part of July or the first part of August for the respective years. For the four years, 1942 to 1945, a considerable number of samples taken during the summer - summer being understood as the period from May 15 to September 15 in any year - were tested for the Office of the Oil Controller and other government departments. The results of these tests have been included in this report although the samples may not have been taken as close to the first of August as the samples taken in other years. The number of samples taken in the various years has been tabulated for easy reference, as follows:

<u>Year</u>	<u>No. of Samples</u>	<u>No. of Cities</u>
1939	60	9
1940	--	--
1941	92	14
1942	41	--
1943	32	--
1944	61	--
1945	85	--
1946	61	9

It will be noted that no samples are reported for the year 1940 but that a complete coverage for Group 1 gasoline is given for all the other years. Only a partial coverage for Group 2 gasolines is given for these years because there was not a sufficient number of samples obtained in this group to give representative data. The detailed results of the analyses of 432 samples of gasoline sold in Canada

during the summer in the seven years listed above are given in this publication. The support and generous co-operation of the Foods and Drugs Laboratories of the Department of National Health and Welfare and of the Weights and Measures Inspection Service of the Department of Trade and Commerce in the collection of samples is gratefully acknowledged.

### Methods of Analysis

The characteristics of the gasoline were tested in each year, according to the latest revision of the methods<sup>(2)</sup> of testing of the American Society for Testing Materials (A.S.T.M.), except as noted below. The distillation range was determined according to A.S.T.M. method D 86<sup>(2)</sup> and was reported on the "per cent recovered" basis. From the results so obtained a weighted index number was calculated after the method advocated by Gruse<sup>(3)</sup>, except that the temperatures of the distillation range were expressed in degrees Fahrenheit instead of in degrees Centigrade. By this method, the index number is the sum of the 10 per cent, 20 per cent, 50 per cent, 70 per cent, 90 per cent and end point of the distillation range. The "per cent evaporated" at any temperature is the sum of the "per cent recovered" plus the distillation loss. The temperature of the "per cent evaporated" was determined graphically. The knock ratings of the gasoline are expressed in octane numbers, and were determined by the A.S.T.M. method, D 357-40<sup>(2)</sup>. The Reid vapour pressure was determined according to A.S.T.M. method D 323<sup>(2)</sup>. The sulphur content was determined according to A.S.T.M. method D 90-34T<sup>(2)</sup>, except that a modified apparatus<sup>(4)</sup> was used. The gum content was determined by A.S.T.M. method D 381<sup>(2)</sup>. The corrosion test was made according to A.S.T.M. method D 130<sup>(2)</sup>. The specific gravity was determined by means of the hydrometer at room temperature, according to A.S.T.M. method D 287 and the result calculated to 60°F., according to the National Standard Oil Tables<sup>(5)</sup>. The equivalent degrees A.P.I. was obtained from the above tables. The apparent colour of the gasoline was observed. The tetraethyl lead content was determined according to A.S.T.M. method D 526<sup>(2)</sup> using the volumetric molybdate method.

### Results of Laboratory Examination

The results of the laboratory examination of the gasolines tested in the seven summers are shown by cities and by provinces, in Tables 1 to 7. These tables give the A.S.T.M. octane number, distillation characteristics, index No. °F., specific and A.P.I. gravity, Reid vapour pressure, sulphur content, and gum content for all the samples. The tetraethyl lead content of samples for 1946 only is given, and

appropriate average results are shown also. It should be noted that the distillation temperatures are reported on the "per cent recovered" basis for the first six summers, but in summer 1946, the distillation temperatures are reported on the "per cent evaporated" basis.

Table 8 is a summary of the average analyses of the gasoline survey by provinces for summer 1939 and shows the averages of all samples in Group 1, 2, and 3. It also gives the average of all samples tested in that summer. Tables 9 to 14 give similar compilations of the average analyses for the six summers, 1941 through 1946. Again, it should be noted that the distillation temperatures are reported, in the above tables, on the "per cent recovered" basis for the first six summers and on the "per cent evaporated" basis for summer of 1946.

Tables 15 to 21 give the minimum and maximum and average figures for each characteristic of each group of gasoline sold in the seven summers under review.

Table 22 shows the average results obtained by examination of samples of gasoline for the summers of 23 years, from 1923 to 1946 (except 1940), with distillation range reported on the "per cent recovered" basis. The figures for distillation range shown in Table 22 were converted graphically to the "per cent evaporated" basis shown in Table 23.

Table 24 gives the summary of the data of the average of all samples of gasoline in Group 1 and Group 2 for nine summers, 1937 through 1946 (except 1940), with the distillation range calculated graphically to the "per cent evaporated" basis. Figure 1 shows graphically the data given Table 24, except that the gum content is omitted.

A general discussion of the significance of the laboratory tests, together with the relationship between these tests and the actual operation of the fuel in an engine will be found in the report on Gasoline Surveys for 1930 and 1931(6). Intervening changes in the significance of tests on motor fuels were discussed in the Gasoline Surveys for 1935 and 1936(7). For further information on motor fuels, a report (8) entitled "The Significance of Tests of Petroleum Products", which was prepared by A.S.T.M. Committee D-2 of American Society for Testing Materials, the "C.R.C. Handbook" (9), 1946 Edition, compiled by the Coordinating Research Council, Inc., and other reports (10)(11)(12)(13) should be consulted.

During the war from June 28, 1940, to October 1, 1945, the Oil Controller, Department of Munitions and Supply, had jurisdiction over the refining, sale and distribution of all motor gasoline sold in Canada. Orders(14) were issued by the Office of the Oil Controller that permitted only two grades of motor fuel, namely Grade 1 and Grade 2. Specifications

for these graded motor fuels were defined in six orders issued as, Order No. Oil 008A, 008B, 008C, 008D, 008E and 008F. Therefore, all analyses reported in this survey for the four summers, 1942 to 1945, were Grade 1 or Grade 2 gasoline according to the current Oil Controller's Specifications. The Canadian Government Purchasing Standards Committee's Specification (15) for gasoline No. 3-GP-1, was revised at intervals during this period to conform with the orders of the Oil Controller. An abstract of the specifications in these Orders is shown in Appendix A and B.

Although for four summers during the war the gasolines reported in this survey were analyzed to determine whether the sample conformed with the Oil Controller's Specification, or with Specification No. 3-GP-1, the results of analyses are compiled for this survey with a different purpose in view. It is intended as a means whereby information regarding the characteristics of gasoline actually being sold will become available. No effort, therefore, has been made to fit the results into predetermined groups; rather, it was desired that the actual analyses would define as clearly as possible the limits of the different groups of gasoline on the market.

#### Knock Ratings

The knock rating of the samples tested in the seven summers was determined in a Coordinating Fuel Research Engine, known more briefly as the "C.F.R. Engine". The A.S.T.M. "motor" method, D 357-40(2) was used and the results are expressed in A.S.T.M. motor octane numbers.

According to the knock rating only, the samples tested in summers 1939, 1941 and 1946 fell into three groups, and those tested in summers 1942 through 1945 fell into two groups. The range in octane number of each group was as follows:-

<u>Summer</u>	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>
	<u>Octane No.</u>	<u>Octane No.</u>	<u>Octane No.</u>
1939	75 and above	74 to 65	64 and below
1941	77 and above	76 to 70	64 and below
1942	78 to 75	70 to 65	-
1943	78 to 75	-	-
1944	76 to 74	70 to 66	-
1945	74 to 73	70 to 66	-
1946	77 and above	76 to 70	69 and below

The knock rating of individual samples is given in Tables 1 to 7, and the group in which each sample falls is shown. It will be noted that for summer 1943, no analyses of Group 2 gasolines are reported. This was due to the emergency conditions existing during the war, when the testing of motor

fuels was necessarily limited to essential samples. Therefore, although Group 2 gasolines were sold in Canada during the summer of 1943, the number of Group 2 samples tested by these laboratories was too small for the data to be of value for the purpose of this report, and therefore are not included.

#### Maximum and Minimum Knock Ratings

The minimum and maximum knock ratings of the samples sold in the seven summers, are shown in Tables 15 to 21. In summer 1939, the range in knock rating of the Group 1 gasolines was from a high of 80 to a low of 75 octane number, and from 80 to 77 octane number in summer 1941. During the four summers, 1942 through 1945, when only graded motor fuel as specified by the Oil Controller was sold in Canada, the range in knock rating of Group 1 gasoline was from a high of 80 to a low of 71 octane number. The orders of the Oil Controller for graded motor fuel were rescinded on August 15, 1945, and in the following summer, 1946, the range in knock rating of the Group 1 gasoline was from a high of 81 to a low of 75 octane number.

For the Group 2 gasoline samples, the range in knock rating was from a high of 73 to a low of 65 octane number in summer 1939, and from 76 to 70 in summer 1941. During the summers 1942 through 1945, the range in knock rating of Group 2 gasoline was from a high of 70 to a low of 65 octane number. After the cancellation of the Oil Controller's orders, the range in knock rating of the Group 2 gasoline was from a high of 76 to a low of 70 octane number in the summer, 1946.

The range in knock rating of Group 3 gasolines was from a high of 64 to a low of 51 octane number in summer 1930 and from 69 to 51 in summer 1941. From 1942 to 1945 no Grade 3 gasoline was sold in Canada. However, in the summer of 1946 three samples of Group 3 gasoline were tested, which had a range of octane number from a high of 62 to a low of 51 octane number. Generally speaking, the major oil companies tend to sell only Group 1 and Group 2 gasolines at their service stations.

#### Average Knock Rating

The average knock rating of the gasoline sold in Canada in nine summers, 1937 through 1946 (except 1940) are shown in Table 24 and graphically in Figure 1. The results of previous surveys in the summers of 1937 and 1938 are included for comparison. The average knock rating of the samples in Group 1 was 77.6 octane number in summer 1937, 77.8 in summer 1938, 77.4 in summer 1939, 79.0 in summer 1941, 76.9 in summer 1942, 75.7 in summer 1943, 74.8 in summer 1944, 73.5 in summer 1945, and 77.8 in summer 1946.

The average knock rating of the samples in Group 2 was 70.1 octane number in summer 1937, 70.2 in summer 1938, 70.3 in summer 1939, 73.6 in summer 1941, 67.1 in summer 1942, 68.6 in summer 1944, 68.5 in summer 1945, and 73.6 in summer 1946.

The four samples of Group 3 gasoline tested in summer 1939 and the three samples tested in summer 1946 are considered to be insufficient in number to indicate current trends in those years, but are given in this survey for record purposes only. Sixteen samples of Group 3 gasoline tested in summer of 1941 appear to indicate more correctly the characteristics of the Group 3 gasoline sold in that year, and gave an average knock rating of 63.5 octane number.

### Changes in Knock Rating

The above results indicate that for three summers, 1937 through 1939, there was very little change in the knock rating of Group 1 or of Group 2 motor fuels sold in Canada. However, by the summer of 1941, the average knock rating of Group 1 gasoline had risen to 79, a difference of 1.5 octane number, while the average knock rating of Group 2 gasoline had risen to 73.6, a difference of 3 octane number. During the next four summers the average knock rating of Group 1 gasoline decreased progressively from 76.9 in the summer of 1942, to 73.5 in the summer of 1945. In the same interval the average knock rating of Group 2 motor fuel remained fairly constant at about 68 octane number. The decrease in knock rating of Group 1 gasoline was due to the shortage of tetraethyl lead. When more tetraethyl lead became available the average knock rating of Group 1 gasoline rose to 77.8 in summer of 1946, a difference of 4.3 octane number, and at the same time, the average knock rating of Group 2 gasoline rose to 73.6, a difference of 5.1 octane number.

The difference between the knock rating of Group 1 and Group 2 motor fuels was 7 octane number in summer 1939 and 4 octane number in summer of 1946.

In the summer of 1941, the average knock rating of Group 3 motor fuels was 57 octane number in the provinces of Manitoba and Saskatchewan and 66 in the provinces of Quebec and Ontario. In the summer of 1946 the knock rating of Group 1 and Group 2 motor fuels sold in the provinces of Saskatchewan and Alberta was about 2 octane number lower than for similar grades of fuel sold in the other provinces.

### Tetraethyl Lead Content

Tetraethyl lead is used to improve the knock rating of gasolines and during the war was in short supply as indicated above. Determinations of tetraethyl lead content were made

only on the 1946 summer samples. The tetraethyl lead content of the individual samples is shown in Table 7, and Table 14 gives the average tetraethyl lead content of Group 1 and of Group 2 samples in each province. As shown in Table 21, the maximum tetraethyl lead content of Group 1 gasoline was 3.30 millilitres per Imperial gallon; the minimum was 1.50 millilitres, and the average was 2.45 millilitres. In Group 2, the maximum tetraethyl lead content was 2.06 millilitres per Imperial gallon; the minimum was 0.48 millilitres and the average content was 1.40 millilitres for those samples that contained tetraethyl lead. It should be noted that in the summer of 1946 two samples of Group 2 motor fuel from Ontario did not contain tetraethyl lead.

#### Volatility

The volatility of the gasoline is indicated by the distillation range temperatures which are given in Tables 1 to 24 and are shown graphically in Figure 1. The distillation temperatures are given on the "per cent recovered" basis in Tables 1 to 6, 8 to 13, 15 to 20, and in Table 22, but they are reported on the "per cent evaporated" basis in Tables 7, 14, 21, 23, 24 and in Figure 1. It is now accepted practice in the petroleum industry to report the distillation range on the "per cent evaporated" basis because these temperatures indicate more correctly the actual volatility of motor fuel as it occurs in engine operation. The average volatility of gasoline sold in Canada during the summer from 1923 to 1946 is given in Table 22 on the "per cent recovered" basis, and the data from this table was converted for purposes of comparison to the "per cent evaporated" basis, shown in Table 23.

When compared with the average volatility of the gasoline sold in summer 1938, it will be noted that the average volatility varied considerably during the seven summers under discussion, with the highest volatility in 1942 and the lowest volatility in 1944. During the war, the production of aviation fuels, synthetic rubber and solvents - used in the manufacture of explosives and war materials - required an increasing proportion of the more volatile constituents of the gasoline fractions produced from the available crude oil. To meet this critical situation in regard to the supply of volatile hydrocarbons from petroleum, the Oil Controller ordered a reduction in the amount of the more volatile constituents used in the production of motor fuels. This necessary action had the direct effect of lowering the volatility of motor fuels sold in Canada during the summer of 1944. As shown in Table 23, there was an increase in the average volatility in summer 1946 as compared with summer 1945 which was due to a drop of approximately 7°F. in the 10%, 20%, 50%, 70%, 90%, and end point in the average distillation range.

Although this survey contains a fairly complete coverage of the Group 1 motor fuels sold in summers 1939 to 1946, it gives



only a partial coverage for Group 2 motor fuels. Samples of Group 2 gasoline were received only from the province of Ontario in 1942 and 1944, and only from the provinces of Ontario and British Columbia in the summer of 1945. A comparison of the volatility characteristics for the three years 1939, 1941 and 1946 of Group 2 motor fuel shows a higher average volatility in the summer of 1946 than in either of the summers 1939 or 1941.

As shown in tables 8 to 14, the gasoline sold in the maritime provinces of Nova Scotia and New Brunswick during the seven summers 1939 to 1945 was usually lower in average volatility than that sold in the other provinces of Canada at the same time.

#### Vapour Pressure

The Reid vapour pressure for each of the samples tested during the seven summers is shown in Tables 1 to 7. The average vapour pressure of the gasolines sold in the above seven summers was as follows: 8.3 pounds per square inch in 1939; 8.2 pounds in 1941; 9.2 pounds in 1942; 8.1 pounds in 1943; 7.9 pounds in 1944; 7.9 pounds in 1945; and 8.4 pounds in 1946, as shown in Tables 8 to 14 and Table 22. The highest and the lowest vapour pressure respectively, obtained in these seven summers were as follows: 9.7 and 6.2 in 1939, 10.8 and 5.6 in 1941, 12.0 and 7.6 in 1942, 10.4 and 5.7 in 1943, 11.2 and 5.4 in 1944, 11.2 and 5.1 in 1945, and 9.8 and 6.1 in 1946. The number and percentage of the samples of gasoline that had a vapour pressure over 10 pounds in these seven summers were as follows: none in 1939, 4 samples or 4 per cent in 1941, 6 samples or 15 per cent in 1942, 1 sample or 3 per cent in 1943, 2 samples or 3 per cent in 1944, 3 samples or 4 per cent in 1945 and none in 1946.

In the summer, from 1937 to 1939 there was a definite trend towards higher vapour pressures and generally speaking, more uniform vapour pressures for the gasolines being sold. This trend in the vapour pressure characteristics of gasoline is again noticeable in summer 1946.

#### Correlation of Vapour Pressure and Volatility

The change in average vapour pressure follows fairly closely the change in the average temperature of the 10 per cent evaporated point in the distillation range. Usually the lower the vapour pressure the higher is the temperature of the 10 per cent evaporated point. As shown in Table 23, the average 10 per cent evaporated point, for the seven summaries, was 142°F. in 1939; 143°F. in 1941; 135°F. in 1942; 140°F. in 1943, 142°F. in 1944; 144°F. in 1945; and 137°F. in 1946. As indicated by the 7.9 pounds average vapour pressure and the 143°F. average temperature of the 10 per cent evaporated point, motor fuels with poor starting characteristics (10) were of necessity sold in Canada during the summers of 1944 and 1945.

### Sulphur

Sulphur determinations were made on the gasoline samples received in the six summers, 1941 through 1946, but the sulphur content of the samples received in the summer of 1939 was not determined. The average sulphur content of the gasolines tested in the above six summers was as follows: 0.06 per cent in 1941; 0.05 per cent in 1942; 0.08 per cent in 1943; 0.06 per cent in 1944; 0.07 per cent in 1945 and 0.07 per cent in 1946. Thirty-eight samples or 10.2 per cent of the 371 samples tested in these six summers had a sulphur content exceeding 0.10 per cent. The number and yearly percentage of the samples that exceeded a sulphur content of 0.10 per cent was as follows: 6(6.5%) in 1941; 2(4.9%) in 1942; 8(25.8%) in 1943; 2(3.3%) in 1944; 8(9.4%) in 1945; and 12(19.7%) in 1946. Only 7 samples or 1.9 per cent of the 371 samples tested in the six summers, 1941 through 1946, had a sulphur content exceeding 0.15 per cent. One sample of motor fuel received from the province of Ontario in the summer of 1941 had a sulphur content of 0.16 per cent; two samples received from the province of Quebec in summer 1942 had sulphur contents of 0.17 and 0.16 per cent respectively; and four samples received from the province of British Columbia in 1945 had sulphur contents of 0.44, 0.35, 0.29 and 0.25 per cent respectively.

As shown in Table 14, in the summer of 1946 the motor fuels sold in the maritime provinces of Nova Scotia and New Brunswick had a higher average sulphur content than the motor fuels sold in the other provinces of Canada.

### Gum

The gum content of the gasoline was determined only on the samples examined in the last four summers, 1943 through 1946. The gum content for each sample examined in the above four summers is shown in Tables 4 to 7. As noted in Tables 11 to 14, the average gum content of all the samples tested in summer 1943 was 6 milligrams per 100 millilitres of gasoline; in summer 1944 was 4 milligrams; in summer 1945 was 4 milligrams, and in summer 1946 was 4 milligrams. It is now generally accepted (15) that not over 7 milligrams of gum should be present in 100 millilitres of motor fuel. The percentage of the samples, that exceeded the above accepted limit for gum, was 28 per cent in summer 1943, 10 per cent in summer 1944, 10 per cent in summer 1945 and 13 per cent in summer 1946. As shown in Tables 18 to 21, the maximum gum content of a sample was 24 milligrams in summer 1943,

14 milligrams in summer 1944, 21 milligrams in summer 1945 and 18 milligrams per 100 millilitres in summer 1946. In summer 1946, 8 samples of gasoline contained a small amount of oil, which was presumably added as a "top cylinder lubricant". Five of these eight samples were motor fuels received from the cities of Calgary, Alberta, and Vancouver, B.C. and contained from 10 to 20 milligrams of oil per 100 millilitres of motor fuel.

#### Gravity

The specific gravity at 60°F. and gravity in degrees A.P.I. at 60°F. for each sample tested in summers, 1939 through 1946 are shown in Tables 1 to 7. As indicated in Tables 15 to 21, the overall variation in specific gravity of the gasolines examined during these seven summers was from 0.703 to 0.764 or from 69.8 to 53.7 degrees A.P.I. This is equivalent to a variation in weight of 7.03 pounds to 7.64 pounds per Imperial gallon. The average specific gravity for all the samples examined in summer 1939 was 0.740 or 59.7 degrees A.P.I.; in summer 1941 was 0.741 or 59.5 degrees A.P.I.; in summer 1942 was 0.733 or 61.5 degrees A.P.I.; in summer 1943 was 0.741 or 59.5 degrees A.P.I.; in summer 1944 was 0.743 or 58.9 degrees A.P.I.; in summer 1945 was 0.740 or 59.7 degrees A.P.I.; and in summer 1946 was 0.737 or 60.5 degrees A.P.I., as shown in Table 22. In other words, the average specific gravity of the motor fuels varied from a low of 0.733 in summer 1942 to a high of 0.743 in summer 1944, which corresponds to a variation in degrees A.P.I. from 61.5 to 58.9. This is equivalent to a variation in weight of 7.33 pounds to 7.43 pounds per Imperial gallon for summer gasoline.

#### Corrosion

The corrosion test for motor fuels is made by immersing a strip of polished copper for three hours in a sample of the gasoline heated to 122°F. according to A.S.T.M. method D 130-30(2) and observing the tarnish, or corrosion, that takes place. The copper strip should not show more than "extremely slight discolouration". The corrosion test was made on all of the 432 samples tested in the seven summers 1939 through 1946; but in order to conserve space was not reported in any of the tables 1 to 24. None of the 432 samples of gasoline gave a positive test for corrosion according to the above procedure.

#### Colour

The apparent colour of the gasoline was observed in all samples tested in the seven summers 1939 through 1946, but has not been reported in any of the Tables 1 to 24. In summer 1939,

100 per cent of the Group 1 gasolines, 88 per cent of the Group 2 gasolines, and none of the Group 3 gasolines were artificially coloured. In summer 1941, 100 per cent of the samples of gasoline in Group 1 and 2, and 31 per cent of the Group 3 gasolines were artificially coloured. In the five summers 1941 through 1946, all of the samples of gasoline in Group 1 and Group 2 were artificially coloured. None of the Group 3 gasolines examined in summer 1946 were artificially coloured. It was observed that during these seven summers, the majority of Group 1 gasolines were dyed red and since the summer of 1942, the majority of the samples in Group 2 were dyed yellow or green. The general tendency in the petroleum industry is to colour only Group 1 and Group 2 gasolines and to leave colourless or "white", the Group 3 gasolines, which are usually termed "Third Grade".

### Summary and Conclusions

This gasoline survey comprises the analyses of 432 samples of motor fuel received by the Fuel Research Laboratories during the seven summers, 1939 through 1946. No survey was made in summer 1940. In 1939, 1941, and 1946, samples were collected on behalf of the Bureau of Mines, and in the intervening years samples were tested for the Office of the Oil Controller and other government departments. The term, summer, is taken as the period from May 15 to September 15 in any year. Sixty samples were collected from 9 cities in 1939; 92 samples were collected from 14 cities in 1941; 41 samples were tested in 1942; 32 samples in 1943; 61 samples in 1944; 85 in 1945; and 61 samples were collected from 9 cities in 1946.

As all of the above samples were collected from eight provinces, namely Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia, they may be accepted as representative of the motor fuels sold in Canada during these seven summers. For convenience and easy reference, summaries of the data obtained are tabulated and a comparison of gasoline characteristics is shown graphically.

Group 1, Group 2, and Group 3 gasolines were tested in the three summers 1939, 1941 and 1946. In summers 1942 through 1946, only Group 1 and Group 2 gasolines were tested, but this report contains only a partial coverage of the Group 2 gasolines. During the war, Group 1 gasoline was known as "Oil Controller's Grade 1" or "Premium", and Group 2 gasoline was known as "Oil Controller's Grade 2" or "Regular". These three groups differ principally in knock rating.

The average knock rating by A.S.T.M. motor method of Group 1 gasolines sold in the seven summers was as follows: 77.4 octane number in summer 1939; 79.0 in summer 1941; 76.9 in summer 1942; 75.7 in summer 1943; 74.8 in summer 1944; 73.5 in summer 1945; and 77.8 in summer 1946.

The average knock rating of Group 2 gasolines sold in six summers was as follows: 70.3 octane number in summer 1939; 73.6 in summer 1941; 67.1 in summer 1942; (No report for summer 1943); 68.6 in summer 1944; 68.5 in summer 1945; and 73.6 in summer 1946.

The average knock rating of the Group 3 gasolines sold in summer 1941 was 63.5 octane number.

The definite trend to lower knock ratings for the Group 1 and Group 2 motor fuels sold in Canada from summer 1942 to summer 1945 was due principally to the acute world shortage of tetraethyl lead during the war. Orders of the Oil Controller specified the knock ratings that were permitted during this period. Abstracts of the specifications of the Office of the Oil Controller for graded motor fuel are attached as appendices to this report.

The average tetraethyl lead content of the gasolines sold in Canada in summer 1946 was 2.45 millilitres per Imperial gallon for the Group 1 motor fuels and 1.40 millilitres per Imperial gallon for the Group 2 motor fuels.

The average volatility of motor fuels sold in Canada varied considerably during the seven summers 1939 through 1946, with the highest volatility in 1942 and the lowest volatility in 1944. Immediately after the war, in summer 1946, the average volatility of the gasoline rose sharply so that it was greater than in summer 1945. The gasoline sold in the eastern maritime provinces during the seven summers, 1939 through 1946, was usually lower in volatility than in the other provinces of Canada. This lower volatility in the eastern maritime provinces was due mainly to the type of crude oil received at the refineries, and to the necessity of producing greatly increased quantities of fuel oil in that area during the war years.

The average Reid vapour pressure of the motor fuels sold in the seven summers was as follows: 8.3 pounds per square inch in 1939; 8.2 pounds in 1941; 9.2 pounds in 1942; 8.1 pounds in 1943; 7.9 pounds in 1944 and 1945; and 8.4 pounds in 1946. 4 samples of gasoline in 1941, 6 samples in 1942, 1 sample in 1943, 2 samples in 1944 and 3 samples in 1945 had a Reid vapour pressure over 10 pounds. Motor fuels with poor starting qualities were of necessity sold in Canada in the summers of 1944 and 1945.

The average sulphur content of the gasolines sold in Canada in six summers was as follows: 0.06 per cent in summer 1941; 0.05 per cent in 1942; 0.08 per cent in 1943; 0.06 per cent in 1944 and 0.07 per cent in the next two summers 1945 through 1946. One sample sold in province of Ontario in summer 1941, 2 samples in province of Quebec in summer 1942 and 4 samples sold in province of British Columbia in summer 1945

had sulphur contents exceeding 0.15 per cent. The gasoline sold in the eastern maritime provinces in summer 1946 had a higher average sulphur content than the gasoline sold in the other provinces of Canada.

The average gum content of all the gasoline samples tested in summer 1943 was 6 milligrams per 100 millilitres of motor fuel and it was 4 milligrams in the next three summers 1944 through 1946. Twenty eight per cent of the samples in summer 1943, 10 per cent in the next two summers 1944 through 1945, and 13 per cent in summer 1946, exceeded the usually accepted limit of 7 milligrams of gum per 100 millilitres of motor fuel.

The average specific gravity of the gasolines varied from a low of 0.733 in summer 1942 to a high of 0.743 in summer 1944, which corresponds to a variation in degrees A.P.I. from 61.5 to 58.9. The overall variation in specific gravity of the gasolines sold during the seven summers was from 0.703 to 0.764 or from 69.8 to 53.7 degrees A.P.I.

None of the samples tested in the seven summers gave a positive test for corrosion with a copper strip.

Commencing with summer 1941, all of the samples of Group 1 and Group 2 gasolines, tested in the six summers, 1941 through 1946, were artificially coloured. The majority of the Group 1 gasolines were dyed red and the majority of the Group 2 gasolines were dyed yellow or green, and the Group 3 gasolines were usually colourless or "white".

TABLE I

## GASOLINE SURVEY ANALYSES FOR SUMMER 1939 BY CITIES

Sample No.	Group	A.S.T.M. Octane No.	I.B.P.	Distillation Range, °F.					End Pt.	Recovery %	Residue %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Degrees A.P.I.	Reid V.P. psi.
				Per Cent Recovered												
				10	20	50	70	90								
<u>HALIFAX, N. S.</u>																
1	II	69	101	161	198	269	309	363	393	96.5	0.9	2.6	1693	0.749	57.4	8.6
2	I	78	103	162	198	271	309	358	408	97.0	1.0	2.0	1706	0.752	56.7	7.2
3	II	69	98	151	180	257	299	356	403	97.0	0.9	2.1	1646	0.740	59.7	9.0
4	II	72	101	158	191	268	306	363	396	96.5	1.1	2.4	1682	0.746	58.2	9.1
5	II	71	96	147	176	249	290	347	389	96.0	0.9	3.1	1598	0.738	60.2	9.1
Average			100	156	188	263	303	357	398	96.6	1.0	2.4	1665	0.745	58.4	8.6
<u>SAINT JOHN, N. B.</u>																
6	II	70	98	146	175	248	291	346	379	96.5	0.9	2.6	1585	0.734	61.3	8.5
7	II	68	102	153	184	254	294	347	390	97.0	0.8	2.2	1622	0.744	58.7	7.7
8	II	71	98	150	185	267	308	358	402	96.0	1.0	3.0	1670	0.745	58.4	8.8
9	I	79	100	155	189	265	306	354	404	97.0	1.0	2.0	1673	0.746	58.2	8.2
10	II	71	101	148	175	246	287	340	386	98.0	0.8	1.2	1582	0.737	60.5	8.2
Average			100	150	182	256	297	349	392	96.9	0.9	2.2	1626	0.741	59.5	8.3
<u>MONTREAL, QUE.</u>																
11	I	77	98	145	174	248	292	344	380	97.5	0.9	1.6	1583	0.737	60.5	8.7
12	II	71	96	143	171	245	288	342	379	97.0	0.9	2.1	1568	0.735	61.0	8.7
13	II	66	100	152	182	252	293	342	380	97.0	0.7	2.3	1601	0.742	59.2	8.4
14	I	77	102	153	188	265	307	354	405	96.0	1.0	3.0	1672	0.746	58.2	8.6
15	II	71	101	150	179	250	288	339	389	97.0	0.9	2.1	1595	0.734	61.3	8.1
16	II	68	102	155	188	264	303	345	383	98.0	0.6	1.4	1638	0.745	58.4	7.7
17	II	72	101	140	165	246	296	346	390	98.0	0.8	1.2	1583	0.743	58.9	7.9
18	II	72	99	147	180	260	299	350	406	96.5	1.0	2.5	1642	0.740	59.7	8.6
Average			100	148	178	254	296	345	389	97.1	0.9	2.0	1610	0.740	59.7	8.3
<u>OTTAWA, ONT.</u>																
19	I	77	96	145	173	247	292	345	379	97.0	1.0	2.0	1581	0.737	60.5	8.6
20	II	70	98	144	172	245	291	343	380	96.5	0.7	2.8	1575	0.735	61.0	8.1
21	II	71	100	147	175	248	292	343	386	96.5	0.8	2.7	1591	0.735	61.0	8.3
22	II	71	98	145	173	248	292	344	380	97.0	0.7	2.3	1582	0.734	61.3	8.3
23	I	77	98	152	186	262	302	351	403	96.0	1.0	3.0	1656	0.743	58.9	8.5
24	II	71	98	148	177	253	295	347	399	97.0	1.0	2.0	1619	0.738	60.2	8.6
25	II	69	100	151	186	265	305	350	384	96.5	0.8	2.7	1641	0.743	58.9	8.7
26	I	77	101	149	179	255	298	349	386	97.0	0.8	2.2	1616	0.739	60.0	8.7
27	II	66	95	142	169	246	293	341	376	97.0	1.0	2.0	1567	0.737	60.5	8.9
28	II	71	98	145	176	252	299	359	400	97.5	0.9	1.6	1631	0.741	59.5	8.6
29	II	71	94	138	166	259	313	358	395	97.0	0.9	2.1	1629	0.746	58.2	8.8
30	II	71	94	149	184	267	308	355	404	96.0	1.0	3.0	1667	0.742	59.2	8.9
Average			97	146	176	254	298	349	390	96.7	0.9	2.4	1613	0.739	60.0	8.6
<u>TORONTO, ONT.</u>																
31	III	60	102	156	185	250	291	347	389	97.0	0.9	2.1	1618	0.738	60.2	7.8
32	I	77	97	139	167	243	284	336	384	97.0	1.0	2.0	1553	0.729	62.6	8.9
33	II	70	100	151	180	248	288	336	387	97.0	1.0	2.0	1590	0.733	61.5	7.7
34	II	70	96	151	181	250	293	350	389	97.0	0.9	2.1	1614	0.733	61.5	9.7
35	III	64	96	143	173	250	296	352	392	96.5	0.9	2.6	1606	0.736	60.8	9.6
36	I	77	100	143	172	249	294	353	399	97.0	1.0	2.0	1610	0.741	59.5	8.9
37	II	71	98	142	172	251	296	358	399	97.0	0.9	2.1	1618	0.739	60.0	8.5
38	II	71	96	139	169	258	306	358	401	97.0	0.9	2.1	1631	0.746	58.2	8.5
Average			98	146	175	250	293	349	392	97.0	0.9	2.1	1605	0.737	60.5	8.7
<u>WINNIPEG, MAN.</u>																
39	I	75	96	146	176	256	301	346	376	97.0	0.8	2.2	1601	0.738	60.2	8.6
40	II	69	101	150	177	247	290	344	390	97.0	0.9	2.1	1598	0.735	61.0	8.5
41	II	65	101	150	178	250	293	343	379	97.0	0.8	2.2	1593	0.738	60.2	7.9
42	II	70	101	154	181	246	287	336	392	97.0	0.9	2.1	1596	0.733	61.5	8.2
43	II	72	100	147	174	245	290	346	389	97.0	0.9	2.1	1591	0.735	61.0	8.2
44	II	69	107	150	174	239	286	352	393	97.0	0.9	2.1	1594	0.724	63.9	7.8
Average			101	149	177	247	291	345	387	97.0	0.9	2.1	1596	0.734	61.3	8.2
<u>REGINA, SASK.</u>																
45	II	72	97	143	174	258	302	348	380	97.0	0.9	2.1	1605	0.737	60.5	8.6
46	II	70	98	146	178	256	299	347	380	97.0	0.7	2.3	1606	0.737	60.5	8.6
47	III	51	106	162	194	266	312	366	406	97.0	1.0	2.0	1706	0.746	58.2	7.3
48	II	72	99	150	179	254	296	353	397	96.0	1.1	2.9	1629	0.734	61.3	8.9
49	II	70	104	155	186	267	306	355	391	97.5	0.9	1.6	1660	0.744	58.7	7.2
Average			101	151	182	260	303	354	391	96.9	0.9	2.2	1641	0.740	59.7	8.1

TABLE I (Continued)

GASOLINE SURVEY ANALYSES FOR SUMMER 1939 BY CITIES

Sample No.	Group	A.S.T.M. Octane No.	I.B.P.	Distillation Range, °F.					Reco-End Pt.	Resi-very %	Resi-due %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.
				Per Cent Recovered												
				10	20	50	70	90								
<u>CALGARY, ALTA.</u>																
50	II	71	94	143	170	251	298	350	387	97.0	0.9	2.1	1599	0.737	60.5	8.8
51	III	55	106	154	178	247	294	356	436	98.0	1.0	1.0	1665	0.740	59.7	6.2
52	II	71	103	160	190	262	306	361	411	97.5	0.9	1.6	1690	0.743	58.9	6.4
53	II	70	104	158	188	264	308	356	393	98.0	0.9	1.1	1667	0.744	58.7	7.3
54	I	79	104	153	177	233	273	337	384	97.5	1.0	1.5	1557	0.731	62.1	7.1
Average			102	154	181	251	296	352	402	97.6	0.9	1.5	1636	0.739	60.0	7.2
<u>VANCOUVER, B. C.</u>																
55	II	73	97	151	184	256	300	356	407	97.0	1.0	2.0	1654	0.747	57.9	7.8
56	I	76	101	151	182	252	294	348	405	97.5	1.1	1.4	1632	0.746	58.2	7.6
57	II	70	97	147	179	253	302	371	410	97.0	1.0	2.0	1662	0.741	59.5	8.9
58	II	73	96	136	161	244	303	369	405	97.0	0.5	2.5	1618	0.744	58.7	9.2
59	II	71	100	156	183	256	300	354	393	98.0	0.9	1.1	1642	0.751	56.9	7.0
60	I	80	100	152	182	250	292	348	404	97.5	0.9	1.6	1628	0.746	58.2	7.9
Average			98	149	178	252	298	358	404	97.3	0.9	1.8	1639	0.746	58.2	8.1

TABLE II

GASOLINE SURVEY ANALYSES FOR SUMMER 1941 BY CITIES

Sample No.	Group	A.S.T.M. Octane No.	I.B.P.	Distillation Range, °F.					Reco-End Pt.	Resi-very %	Resi-due %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %
				Per Cent Recovered													
				10	20	50	70	90									
<u>HALIFAX, N. S.</u>																	
1	II	76	97	148	185	269	310	364	415	96.5	1.1	2.4	1691	0.746	58.2	9.3	0.10
2	I	80	101	152	183	260	302	352	402	98.0	1.0	1.0	1651	0.747	57.9	7.3	0.12
3	II	76	97	149	181	257	298	350	391	97.5	1.0	1.5	1626	0.742	59.2	8.5	0.09
4	II	75	98	147	179	252	290	336	382	97.0	0.8	2.2	1586	0.740	59.7	8.5	0.03
5	II	76	94	147	182	268	311	363	410	97.0	1.0	2.0	1681	0.746	58.2	9.2	0.10
Average			97	149	182	261	302	353	400	97.2	1.0	1.8	1647	0.744	58.7	8.6	0.09
<u>SAINT JOHN, N. B.</u>																	
6	II	76	97	148	179	251	290	342	386	97.0	1.0	2.0	1596	0.741	59.5	9.2	0.04
7	II	70	103	156	185	251	288	340	385	97.0	1.0	2.0	1605	0.741	59.5	7.4	0.07
8	I	80	98	148	180	257	296	348	405	97.5	0.8	1.7	1634	0.744	58.7	8.1	0.10
9	II	75	98	151	183	252	292	342	387	97.0	0.8	2.2	1607	0.744	58.7	8.3	0.04
10	II	76	100	150	178	249	289	342	393	97.5	0.8	1.7	1601	0.741	59.5	7.6	0.10
Average			99	151	181	252	291	343	391	97.2	0.9	1.9	1609	0.742	59.2	8.1	0.07
<u>QUEBEC, QUE.</u>																	
11	I	79	110	147	166	230	281	338	386	98.0	0.9	1.1	1548	0.736	60.8	6.9	0.02
12	I	79	106	146	166	232	280	342	388	98.0	1.0	1.0	1554	0.738	60.2	6.6	0.02
Average			108	146	166	231	281	340	387	98.0	1.0	1.0	1551	0.737	60.5	6.8	0.02
<u>MONTREAL, QUE.</u>																	
13	I	78	94	145	178	253	291	344	382	96.0	1.0	3.0	1593	0.745	58.4	10.1	0.05
14	II	75	92	142	176	250	289	342	381	97.0	1.0	2.0	1580	0.738	60.2	9.7	0.04
15	III	66	98	154	187	262	300	348	384	97.5	0.8	1.7	1635	0.745	58.4	8.2	0.05
16	I	80	94	139	169	252	296	346	390	96.5	0.8	2.7	1592	0.741	59.5	9.8	0.06
17	II	75	96	144	171	237	279	336	394	97.0	1.0	2.0	1561	0.734	61.3	8.6	0.06
18	III	67	104	164	196	262	298	344	384	97.5	0.8	1.7	1648	0.748	57.7	7.0	0.09
19	II	74	96	138	166	244	297	363	408	97.5	0.8	1.7	1616	0.750	57.2	9.3	0.05
20	II	75	99	147	176	256	296	342	402	98.0	0.8	1.2	1619	0.742	59.2	8.2	0.06
Average			97	147	177	252	293	346	391	97.1	0.9	2.0	1606	0.743	58.9	8.9	0.06
<u>OTTAWA, ONT.</u>																	
21	I	79	102	151	183	258	295	347	381	97.0	0.9	2.1	1615	0.742	59.2	9.2	0.06
22	II	75	100	148	180	254	291	347	383	96.0	0.9	3.1	1603	0.741	59.5	9.8	0.05
23	III	66	102	153	186	266	306	356	386	96.0	0.8	3.2	1653	0.744	58.7	9.0	0.05
24	II	76	104	147	171	236	277	335	393	97.5	1.0	1.5	1559	0.735	61.0	8.3	0.05
25	I	79	105	152	183	259	297	343	393	97.0	1.0	2.0	1627	0.746	58.2	8.1	0.08



TABLE II (Continued)

## GASOLINE SURVEY ANALYSES FOR SUMMER 1941 BY CITIES

Sample No.	Group	A.S.T.M. Octane No.	Distillation Range, °F. I.B.P.	Per Cent Recovered					End Pt.	Recovery %	Residue %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Degrees A.P.I.	Reid V.P. psi.	Sulphur %
				10	20	50	70	90									
<u>OTTAWA, ONT. (Cont'd)</u>																	
26	II	75	98	153	183	255	293	342	401	97.5	1.0	1.5	1627	0.742	59.2	7.7	0.08
27	III	67	105	161	194	260	296	346	381	96.5	0.8	2.7	1638	0.743	58.9	8.3	0.09
28	I	80	100	150	178	254	292	346	386	97.0	1.0	2.0	1606	0.744	58.7	8.4	0.04
29	II	75	98	144	178	254	292	346	381	95.5	0.9	3.6	1595	0.739	60.0	10.5	0.04
30	II	73	100	140	162	230	275	346	400	97.5	1.0	1.5	1553	0.730	62.3	9.0	0.04
31	II	74	100	138	162	236	288	362	413	97.0	1.0	2.0	1599	0.744	58.7	9.4	0.03
32	II	75	102	150	180	262	298	346	400	96.5	1.0	2.5	1636	0.744	58.7	8.3	0.07
Average			101	149	178	252	292	347	391	96.8	0.9	2.3	1609	0.741	59.5	8.8	0.06
<u>TORONTO, ONT.</u>																	
33	II	75	106	156	182	243	295	346	388	97.5	0.7	1.8	1610	0.748	57.7	8.0	0.06
34	II	76	106	160	186	238	284	346	402	97.5	1.1	1.4	1616	0.740	59.7	6.6	0.05
35	I	79	103	150	171	230	272	338	398	97.5	1.1	1.4	1559	0.735	61.0	7.3	0.05
36	III	65	107	153	184	247	290	347	399	97.5	1.0	1.5	1620	0.738	60.2	7.4	0.04
37	II	76	100	148	174	238	278	336	394	97.5	0.9	1.6	1568	0.736	60.8	8.0	0.05
38	III	65	107	152	178	240	278	335	381	97.5	1.0	1.5	1564	0.739	60.0	7.3	0.05
39	II	74	98	144	169	245	291	347	401	97.0	1.0	2.0	1597	0.733	61.5	8.5	0.05
40	I	79	110	156	173	221	279	347	388	97.5	1.0	1.5	1564	0.737	55.4	6.5	0.12
41	II	76	108	156	177	237	293	354	389	96.5	1.1	2.4	1606	0.748	57.7	7.7	0.09
42	III	69	108	169	196	257	301	354	392	97.5	1.0	1.5	1669	0.744	58.7	6.7	0.05
43	I	80	97	150	167	216	277	352	389	97.0	1.0	2.0	1551	0.737	55.4	7.5	0.12
44	II	71	104	167	195	252	304	357	396	97.5	1.1	1.4	1671	0.743	58.9	8.0	0.05
45	II	71	91	127	152	238	292	352	392	96.5	0.8	2.7	1553	0.738	60.2	10.8	0.13
46	II	71	89	127	153	240	293	354	392	96.5	0.8	2.7	1559	0.738	60.2	10.6	0.13
47	II	74	96	135	160	235	289	368	413	96.5	1.0	2.5	1600	0.746	58.2	9.4	0.03
Average			102	150	174	239	288	349	394	97.1	1.0	1.9	1594	0.743	58.9	8.0	0.07
<u>HAMILTON, ONT.</u>																	
48	I	79	97	142	172	255	296	344	390	97.0	1.0	2.0	1599	0.744	58.7	8.7	0.07
49	II	76	105	150	174	238	279	333	378	97.0	1.4	1.6	1552	0.737	60.5	7.8	0.05
50	III	67	104	156	181	245	285	340	385	97.0	1.0	2.0	1592	0.750	57.2	7.2	0.04
Average			102	149	176	246	287	339	384	97.0	1.1	1.9	1581	0.744	58.7	7.9	0.05
<u>ST. CATHARINES, ONT.</u>																	
51	I	77	109	154	169	204	250	329	387	98.0	0.8	1.2	1493	0.763	54.0	6.8	0.16
52	II	72	99	144	169	228	271	339	391	97.5	0.9	1.6	1542	0.739	60.0	8.4	0.05
53	III	64	106	155	180	243	282	335	386	98.0	1.0	1.0	1581	0.741	59.5	7.1	0.06
Average			105	151	173	225	268	334	388	97.8	0.9	1.3	1539	0.748	57.7	7.4	0.09
<u>BRANTFORD, ONT.</u>																	
54	I	79	95	147	177	257	297	344	386	97.5	0.8	1.7	1608	0.748	57.7	8.2	0.09
55	II	75	99	150	175	238	278	334	394	98.0	1.0	1.0	1569	0.737	60.5	7.7	0.06
Average			97	148	176	248	288	339	390	97.8	0.9	1.3	1589	0.743	58.9	8.0	0.08
<u>LONDON, ONT.</u>																	
56	II	71	114	164	186	242	280	330	385	97.5	0.8	1.7	1587	0.748	57.7	5.6	0.06
57	II	72	97	141	166	236	279	334	383	97.5	0.8	1.7	1539	0.733	61.5	8.7	0.05
58	III	65	102	159	192	262	295	341	380	97.5	0.8	1.7	1629	0.747	57.9	7.0	0.05
59	II	76	102	150	175	237	276	335	392	97.5	0.8	1.7	1565	0.735	61.0	7.9	0.05
60	III	64	103	157	186	260	296	347	385	97.5	0.7	1.8	1631	0.746	58.2	7.0	0.05
Average			104	154	181	247	285	338	385	97.5	0.8	1.7	1590	0.742	59.2	7.2	0.05
<u>WINNIPEG, MAN.</u>																	
61	I	79	104	150	171	234	279	338	395	98.0	1.0	1.0	1567	0.736	60.8	7.2	0.06
62	II	76	98	144	172	242	284	342	387	97.0	1.0	2.0	1571	0.743	58.9	8.9	0.05
63	II	72	100	146	168	227	265	326	385	97.5	1.0	1.5	1517	0.731	62.1	7.7	0.04
64	III	60	104	150	168	209	235	286	357	97.5	0.9	1.6	1405	0.718	65.6	7.4	0.03
65	II	72	102	150	174	240	280	336	378	97.5	1.0	1.5	1558	0.737	60.5	7.6	0.05
66	II	73	100	152	178	240	280	326	361	98.0	0.8	1.2	1537	0.737	60.5	7.8	0.06
67	II	76	96	149	180	255	301	352	382	96.5	0.9	2.6	1619	0.742	59.2	9.4	0.07
68	III	61	98	135	150	190	230	312	371	97.0	0.8	2.2	1388	0.727	63.1	9.4	0.05
69	III	51	100	145	166	224	270	334	397	97.0	0.9	2.1	1536	0.720	65.0	8.2	0.02
70	I	79	98	141	165	244	291	344	402	97.5	1.0	1.5	1587	0.738	60.2	8.6	0.06
71	II	72	100	142	168	244	290	347	408	97.5	1.1	1.4	1599	0.736	60.8	8.4	0.05
72	III	63	100	152	181	256	297	352	408	97.5	0.6	1.7	1646	0.740	59.7	8.2	0.04
Average			100	146	170	234	275	333	386	97.4	0.9	1.7	1544	0.734	61.3	8.2	0.05



TABLE III (Continued)

GASOLINE SURVEY ANALYSES FOR SUMMER 1942 BY PROVINCES

Sample No.	Group	A.S.T.M. Octane No.	I.B.P.	Distillation Range, °F.					Reco-End Pt.	Resi-very %	Resi-due %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %
				Per Cent Recovered													
				10	20	50	70	90									
<u>ONTARIO (Cont'd)</u>																	
24	II	65	96	130	152	214	252	309	370	96.5	1.0	2.5	1427	0.705	69.2	12.0	0.07
25	II	65	95	130	152	213	252	310	370	96.5	0.9	2.6	1427	0.705	69.2	11.7	0.07
26	II	65	96	133	152	211	251	310	370	96.0	1.0	3.0	1427	0.704	69.5	11.8	0.06
27	II	65	97	130	151	212	249	310	376	96.5	0.8	2.7	1428	0.703	69.8	12.0	0.06
28	II	70	97	141	168	236	284	352	389	96.5	0.8	2.7	1570	0.736	60.8	8.9	0.04
29	II	68	102	143	170	238	276	331	373	97.0	0.9	2.1	1531	0.734	61.3	8.4	0.03
30	II	70	100	142	163	228	272	328	377	97.5	1.0	1.5	1510	0.728	62.9	8.4	0.04
31	II	68	102	143	173	246	293	343	391	97.0	1.0	2.0	1589	0.738	60.2	8.9	0.05
32	II	68	98	141	166	241	282	339	376	96.5	1.0	2.5	1545	0.736	60.8	8.9	0.04
Average	II	67.1	98	137	161	226	268	326	377	96.7	0.9	2.4	1495	0.721	64.8	10.1	0.05
<u>MANITOBA</u>																	
33	I	76	100	146	175	252	300	358	392	97.0	1.0	2.0	1623	0.741	59.5	8.4	0.07
Average	I	76.0	100	146	175	252	300	358	392	97.0	1.0	2.0	1623	0.741	59.5	8.4	0.07
<u>SASKATCHEWAN</u>																	
34	I	77	95	142	167	235	284	352	398	97.0	1.0	2.0	1578	0.737	60.5	9.7	0.04
Average	I	77.0	95	142	167	235	284	352	398	97.0	1.0	2.0	1578	0.737	60.5	9.7	0.04
<u>ALBERTA</u>																	
35	I	76	96	137	167	253	301	360	403	97.5	0.9	1.6	1621	0.738	60.2	9.0	0.04
36	I	77	99	139	166	255	302	362	399	97.5	1.1	1.4	1623	0.740	59.7	8.5	0.05
Average	I	76.5	97	138	166	254	302	361	401	97.5	1.0	1.5	1622	0.739	60.0	8.8	0.05
<u>BRITISH COLUMBIA</u>																	
37	I	78	103	154	189	260	294	348	396	97.0	1.0	2.0	1641	0.745	58.4	7.6	0.05
38	I	77	96	131	155	223	267	336	384	97.0	1.0	2.0	1496	0.725	63.7	9.7	0.03
39	I	78	98	140	172	247	296	370	406	96.0	1.0	3.0	1631	0.740	59.7	9.8	0.04
40	I	78	102	151	187	258	292	348	394	97.0	1.0	2.0	1630	0.741	59.5	7.9	0.05
41	I	77	94	130	155	221	266	334	382	97.0	1.1	1.9	1488	0.725	63.7	10.4	0.02
Average	I	77.6	99	141	172	242	283	347	392	96.8	1.0	2.2	1577	0.735	61.0	9.1	0.04

TABLE IV

GASOLINE SURVEY ANALYSES FOR SUMMER 1943 BY PROVINCES

Sample No.	Group	A.S.T.M. Octane No.	I.B.P.	Distillation Range, °F.					Reco-End Pt.	Resi-very %	Resi-due %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %	Gum*
				Per Cent Recovered														
				10	20	50	70	90										
<u>NOVA SCOTIA</u>																		
1	I	77	102	140	172	260	302	352	386	96.0	1.0	3.0	1612	0.742	59.2	8.4	0.11	1
2	I	76	96	143	178	270	304	352	391	97.0	1.0	2.0	1638	0.747	57.9	7.8	0.09	3
Average	I	76.5	99	141	175	265	303	352	389	96.5	1.0	2.5	1625	0.744	58.7	8.1	0.10	2
<u>NEW BRUNSWICK</u>																		
3	I	76	98	138	170	260	302	348	386	97.0	1.0	2.0	1604	0.741	59.5	9.3	0.10	2
4	I	77	101	145	179	276	314	361	397	97.0	1.1	1.9	1672	0.747	57.9	7.8	0.11	6
Average	I	76.5	99	141	175	268	308	354	392	97.0	1.0	2.0	1638	0.744	58.7	8.5	0.11	4
<u>QUEBEC</u>																		
5	I	76	98	142	174	257	297	351	422	98.0	1.1	0.9	1643	0.750	57.2	7.7	0.12	5
6	I	76	94	130	160	246	280	332	360	96.0	0.6	3.4	1508	0.737	60.5	10.4	0.09	6
7	I	76	104	143	175	253	293	343	382	96.0	1.0	3.0	1589	0.748	57.7	7.5	0.11	9
8	I	75	95	128	155	244	284	326	356	97.5	1.0	1.5	1493	0.738	60.2	9.3	0.07	2
9	I	77	97	138	169	252	290	342	384	97.0	0.8	2.2	1575	0.744	58.7	9.5	0.11	13
10	I	76	96	145	178	262	304	350	395	98.0	1.0	1.0	1634	0.755	55.9	8.1	0.06	8
Average	I	76.0	97	138	169	252	291	341	383	97.1	0.9	2.0	1574	0.745	58.4	8.7	0.09	7

\*milligrams per 100 millilitres.

TABLE IV (Continued)

GASOLINE SURVEY ANALYSES FOR SUMMER 1943 BY PROVINCES

Sample Group No.	A.S.T.M. Octane No.	I.B.P.	Distillation Range, °F.					Reco-End pt.	Resi- due %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul- phur %	Gum*		
			Per Cent Recovered															
			10	20	50	70	90											
<b>ONTARIO</b>																		
11	I	75	94	130	160	234	276	340	386	97.0	1.0	2.0	1526	0.733	61.5	9.9	0.04	9
12	I	77	94	134	165	250	289	346	385	96.0	0.8	3.2	1569	0.738	60.2	10.0	0.06	8
13	I	75	112	158	181	244	292	348	396	98.0	1.0	1.0	1619	0.739	60.0	6.2	0.09	2
14	I	75	100	138	164	228	268	330	408	97.0	1.0	2.0	1536	0.727	63.1	9.3	0.05	6
15	I	74	102	150	183	260	300	350	398	98.0	1.0	1.0	1641	0.739	60.0	5.7	0.07	9
16	I	75	102	154	182	246	287	340	392	98.5	0.8	0.7	1601	0.737	60.5	6.2	0.07	7
17	I	76	96	136	164	236	280	340	392	97.0	1.0	2.0	1548	0.733	61.5	8.0	0.05	4
18	I	77	94	136	173	250	287	353	384	95.0	1.0	4.0	1583	0.739	60.0	9.6	0.04	2
Average	I	75.5	99	142	171	244	285	343	393	97.1	0.9	2.0	1578	0.736	60.8	8.1	0.06	6
<b>MANITOBA</b>																		
19	I	75	104	142	163	230	270	328	392	98.0	1.0	1.0	1525	0.719	65.3	7.2	0.03	2
20	I	75	94	140	170	246	291	345	386	97.5	0.8	1.7	1578	0.738	60.2	9.0	0.07	2
Average	I	75.0	99	141	167	238	280	337	389	97.8	0.9	1.3	1552	0.728	62.9	8.1	0.05	2
<b>SASKATCHEWAN</b>																		
21	I	75	95	142	172	245	290	352	395	96.0	1.0	3.0	1596	0.732	61.8	9.6	0.06	2
Average	I	75.0	95	142	172	245	290	352	395	96.0	1.0	3.0	1596	0.732	61.8	9.6	0.06	2
<b>ALBERTA</b>																		
22	I	75	100	144	183	271	307	358	392	97.0	1.0	2.0	1655	0.747	57.9	8.8	0.06	4
23	I	73	99	141	172	260	310	365	411	98.0	1.0	1.0	1659	0.746	58.2	8.4	0.12	24
24	I	76	103	139	158	215	258	338	402	99.0	0.8	0.2	1510	0.726	63.4	7.4	0.07	9
25	I	75	96	136	160	246	302	363	398	97.0	1.0	2.0	1605	0.737	60.5	8.0	0.10	18
26	I	75	97	133	155	240	294	356	394	97.5	1.1	1.4	1572	0.732	61.8	9.2	--	3
Average	I	74.8	99	139	166	246	294	356	399	97.7	1.0	1.3	1600	0.738	60.2	8.4	0.09	12
<b>BRITISH COLUMBIA</b>																		
27	I	76	112	165	186	245	284	324	371	98.0	1.0	1.0	1575	0.746	58.2	7.4	0.02	7
28	I	76	113	167	196	247	284	345	403	98.0	1.0	1.0	1642	0.746	58.2	6.5	0.10	1
29	I	76	107	164	193	249	284	348	401	98.0	1.0	1.0	1639	0.747	57.9	7.2	0.12	6
30	I	75	102	158	188	246	288	343	384	97.5	1.0	1.5	1607	0.747	57.9	7.4	0.03	2
31	I	76	108	162	190	254	287	340	383	98.0	1.0	1.0	1616	0.751	56.9	6.7	0.04	4
32	I	77	103	168	196	251	285	348	402	97.5	1.0	1.5	1650	0.748	57.7	7.2	0.11	1
Average	I	76.0	108	164	192	249	285	341	391	97.8	1.0	1.2	1622	0.748	57.7	7.1	0.07	4

TABLE V

GASOLINE SURVEY ANALYSES FOR SUMMER 1944 BY PROVINCES

<b>NOVA SCOTIA</b>																		
1	I	75	94	144	189	284	320	373	404	94.5	1.4	4.1	1714	0.748	57.7	11.2	0.08	1
2	I	75	100	145	186	278	317	368	403	96.0	1.2	2.8	1697	0.747	57.9	9.3	0.09	1
3	I	75	104	159	199	275	316	365	406	97.0	1.3	1.7	1720	0.752	56.7	7.9	0.09	1
Average	I	75.0	99	149	191	279	318	369	404	95.8	1.3	2.9	1710	0.749	57.4	9.5	0.09	1
<b>NEW BRUNSWICK</b>																		
4	I	76	97	150	187	277	316	364	403	97.0	0.8	2.2	1697	0.749	57.4	9.5	0.10	5
5	I	75	100	164	207	284	317	364	408	97.0	1.2	1.8	1744	0.755	55.9	7.1	0.09	4
6	I	75	94	142	186	279	318	368	411	96.0	1.0	3.0	1704	0.747	57.9	10.3	0.09	3
Average	I	75.3	97	152	194	280	317	365	407	96.7	1.0	2.3	1715	0.750	57.2	9.0	0.09	4
<b>QUEBEC</b>																		
7	I	74	99	155	196	276	312	363	407	97.4	1.2	1.4	1709	0.755	55.9	7.2	0.05	4
8	I	74	95	144	177	261	294	343	392	96.5	1.3	2.2	1611	0.746	58.2	9.0	0.07	7
9	I	74	96	142	182	276	318	370	406	96.0	1.2	2.8	1694	0.752	56.7	9.5	0.14	--
Average	I	74.0	97	147	185	271	308	358	402	96.6	1.2	2.2	1671	0.751	56.9	8.6	0.09	5

\*milligrams per 100 millilitres.





TABLE VI (Continued)  
GASOLINE SURVEY ANALYSES FOR SUMMER 1945 BY PROVINCES

Sample No.	Group	A.S.T.M. Octane No.	Tetra Ethyl I.B.P.	Distillation Range, °F.							Reco-End Pt.	Resi- due %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %	Gum*
				Per Cent Recovered															
				10	20	50	70	90											
<b>MANITOBA</b>																			
54	I	72	95	135	168	259	309	368	398	96.0	1.1	2.9	1637	0.739	60.0	10.9	0.06	3	
55	I	74	106	138	156	217	268	340	402	97.5	1.1	1.4	1521	0.711	67.5	7.7	0.02	2	
56	I	71	98	152	183	254	301	355	394	97.0	1.2	1.8	1639	0.742	59.2	7.7	0.03	3	
Average	I	72.3	100	142	169	243	293	354	398	96.8	1.1	2.1	1599	0.731	62.1	8.8	0.04	3	
<b>SASKATCHEWAN</b>																			
57	I	73	98	139	166	240	288	356	401	97.5	1.2	1.3	1590	0.731	62.1	9.4	0.07	5	
58	I	72	101	151	185	268	319	380	428	98.0	1.1	0.9	1731	0.745	58.4	6.5	0.13	4	
Average	I	72.5	100	145	176	254	304	368	414	97.8	1.1	1.1	1661	0.738	60.2	8.0	0.10	5	
<b>ALBERTA</b>																			
59	I	73	98	148	178	256	302	360	400	97.0	1.1	1.9	1644	0.736	60.8	7.9	0.07	2	
60	I	73	113	161	187	266	316	370	404	98.0	1.2	0.8	1704	0.749	57.4	6.7	0.10	3	
61	I	73	108	146	169	237	289	350	395	98.5	1.2	0.3	1586	0.737	60.5	7.2	0.05	6	
62	I	73	105	140	163	230	280	346	393	98.0	1.2	0.8	1552	0.734	61.3	7.6	0.04	4	
63	I	73	96	131	162	250	302	362	404	97.5	1.2	1.3	1611	0.736	60.8	9.3	0.05	2	
Average	I	73.0	104	145	172	248	298	358	399	97.8	1.2	1.0	1620	0.738	60.2	7.7	0.06	3	
<b>BRITISH COLUMBIA</b>																			
64	I	73	108	174	210	271	304	358	404	98.0	0.9	1.1	1721	0.751	56.9	6.9	0.04	1	
65	I	73	116	160	188	250	289	344	398	98.0	1.1	0.9	1629	0.746	58.2	6.1	0.03	2	
66	I	73	110	177	209	267	302	360	413	98.0	1.1	0.9	1728	0.750	57.2	5.1	0.04	1	
67	I	73	100	160	205	276	307	358	403	97.5	1.1	1.4	1709	0.755	55.9	6.1	0.09	1	
68	I	73	108	162	195	266	304	354	399	98.0	1.0	1.0	1680	0.750	57.2	5.6	0.29	4	
69	I	73	108	165	205	276	308	361	410	98.0	1.1	0.9	1725	0.755	55.9	6.2	0.09	8	
70	I	74	102	154	185	260	298	349	387	97.0	1.0	2.0	1633	0.748	57.7	7.0	0.44	9	
71	I	73	110	165	194	260	308	371	409	97.0	1.2	1.8	1707	0.745	58.4	7.1	0.02	0.5	
72	I	74	110	174	200	260	312	368	408	97.5	1.2	1.3	1722	0.748	57.7	6.9	0.08	0.5	
73	I	73	116	180	206	257	289	343	400	98.0	1.0	1.0	1675	0.744	58.7	5.8	0.02	0.5	
74	I	73	130	178	204	257	292	345	402	98.0	1.3	0.7	1678	0.745	58.4	5.6	0.02	1	
75	I	80	114	156	178	248	288	339	390	97.5	1.2	1.3	1599	0.745	58.4	6.2	0.04	0.5	
76	I	79	108	152	180	244	288	344	395	97.0	1.2	1.8	1603	0.747	57.9	8.3	0.03	**	
77	I	80	102	147	174	242	285	345	391	97.0	1.1	1.9	1584	0.744	58.7	8.8	0.03	**	
78	I	74	112	174	204	262	299	366	418	97.0	1.0	2.0	1723	0.764	53.7	7.3	0.25	1	
79	I	74	110	154	183	246	290	344	393	97.0	1.1	1.9	1610	0.748	57.7	7.7	0.03	1	
80	I	80	106	152	176	241	285	340	395	97.5	1.0	1.5	1589	0.744	58.7	8.4	0.03	1	
Average	I	74.8	110	164	194	258	297	352	401	97.5	1.1	1.4	1666	0.749	57.4	6.8	0.09	2	
81	II	68	118	181	210	267	299	355	411	98.0	1.0	1.0	1723	0.749	57.4	5.5	0.02	1	
82	II	66	110	167	206	278	309	357	400	98.0	1.1	0.9	1717	0.755	55.9	6.4	0.07	2	
83	II	70	116	164	199	273	311	364	404	96.5	1.2	2.3	1715	0.756	55.7	6.8	0.03	-	
84	II	68	100	151	184	267	307	370	491	96.0	2.6	1.4	1770	0.750	57.2	8.3	0.35	-	
85	II	70	112	150	177	246	290	344	399	96.5	1.0	2.5	1606	0.744	58.7	8.5	0.03	1	
Average	II	68.4	111	163	195	266	303	358	421	97.0	1.4	1.6	1706	0.751	61.9	7.1	0.10	1	

\*milligrams per 100 millilitres.

\*\*trace.

TABLE VII  
GASOLINE SURVEY ANALYSES FOR SUMMER 1946 BY CITIES

Sample No.	Group	A.S.T.M. Octane No.	Tetra Ethyl Lead*	I.B.P.	Distillation Range, °F.									Reco-End Pt.	Resi- due %	Loss %	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %	Gum*
					Per Cent Evaporated																
					5	10	20	30	50	70	90	95									
<b>HALIFAX, N. S.</b>																					
1	I	78	2.15	102	121	139	170	200	256	304	364	388	421	97.0	1.2	1.8	0.749	57.4	8.8	0.15	10
2	II	74	0.72	102	120	140	174	208	264	314	368	390	419	97.5	1.2	1.3	0.753	56.4	8.7	0.15	2
3	II	75	1.21	102	120	137	169	201	252	299	356	380	415	97.0	1.2	1.8	0.746	58.2	9.6	0.15	8
4	II	74	0.94	98	123	138	162	184	223	264	321	349	393	97.0	1.5	1.5	0.734	61.3	7.9	0.10	13
5	II	74	1.54	96	112	132	165	200	251	296	350	377	406	96.0	1.5	2.5	0.742	59.2	9.5	0.10	10
Average				100	119	137	168	199	249	295	352	377	411	96.9	1.3	1.8	0.745	58.4	8.9	0.13	9

\*milligrams per 100 millilitres.

\*per Imperial gallon, millilitres.





TABLE VII (Continued)

GASOLINE SURVEY ANALYSES FOR SUMMER 1946 BY CITIES

Sam- ple No.	Group	A.S.T.M. Octane No.	Tetra Ethyl Lead**	Distillation Range °F.										Reco- End Pt.	Resi- due %	Loss %	Sp. Gr. 60°F.	Deg- rees A.P.I.	Reid V.P. psi.	Sul- phur %	Gum*
				Per Cent Evaporated																	
				I.B.P.																	
<b>CALGARY, ALTA.</b>																					
51	II	70	0.48	93	111	128	151	174	217	265	329	353	382	97.0	1.1	1.9	0.726	63.4	8.6	0.04	2
52	II	71	1.67	104	121	141	171	198	246	295	356	377	406	96.5	1.2	2.3	0.741	59.5	7.0	0.04	5
53	II	73	1.17	100	120	138	167	199	247	287	338	358	400	97.0	1.1	1.9	0.733	61.5	8.1	0.03	1(1)
54	I(6)	75	1.50	93	104	126	159	191	239	284	336	357	389	96.5	1.2	2.3	0.732	61.8	8.4	0.03	1(2)
55	II	72	1.15	96	115	133	161	188	232	278	334	357	390	97.5	1.3	1.2	0.731	62.1	7.7	0.03	1(3)
Average				97	114	133	162	190	236	282	339	360	393	96.9	1.2	1.9	0.733	61.5	8.0	0.03	2
<b>VANCOUVER, B. C.</b>																					
56	II	75	1.73	100	121	141	173	200	241	285	343	363	389	97.0	1.1	1.9	0.736	60.8	8.1	0.10	0.5
57	I	78	2.39	100	116	136	165	192	238	277	328	352	400	96.5	1.2	2.3	0.737	60.5	9.0	0.06	1(4)
58	II	75	1.28	94	112	133	161	186	229	267	317	346	398	96.5	1.1	2.4	0.736	60.8	9.3	0.05	1(5)
59	II	76	1.57	104	124	149	180	204	242	283	343	371	396	97.0	0.9	2.1	0.744	58.7	8.7	0.02	1
60	I	81	1.53	95	114	130	153	176	220	256	320	341	370	98.0	1.0	1.0	0.734	61.3	9.1	0.03	1
61	II	75	1.25	100	119	142	171	198	246	285	336	356	382	98.0	1.2	0.8	0.743	58.9	6.1	0.11	6
Average				99	118	139	168	193	236	276	331	355	389	97.2	1.1	1.7	0.738	60.2	8.4	0.06	2

\*milligrams per 100 millilitres.  
 (1) Also contains 20 mgs. oil.  
 (2) Also contains 17 mgs. oil.  
 (3) Also contains 19 mgs. oil.

\*\*per Imperial gallon, millilitres.  
 (4) Also contains 10 mgs. oil.  
 (5) Also contains 11 mgs. oil.  
 (6) Placed in Group I for Alberta only.

TABLE VIII

AVERAGE OF GASOLINE SURVEY ANALYSES BY PROVINCES FOR SUMMER 1939

Prov.	No. of Samples	Group	A.S.T.M. Octane No.	Distillation Range, °F.						Reco- End Pt.	Resi- due %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg- rees A.P.I.	Reid V.P. psi.	
				Per Cent Recovered													
				I.B.P.													
N.S.	1	I	78.0	103	162	198	271	309	358	408	97.0	1.0	2.0	1706	0.752	56.7	7.2
N.B.	1	I	79.0	100	155	189	265	306	354	404	97.0	1.0	2.0	1673	0.746	58.2	8.2
Que.	2	I	77.0	100	149	181	257	299	349	392	96.7	1.0	2.3	1627	0.741	59.5	8.6
Ont.	5	I	77.0	98	146	175	251	294	347	390	96.8	1.0	2.2	1603	0.738	60.2	8.7
Man.	1	I	75.0	96	146	176	256	301	346	376	97.0	0.8	2.2	1601	0.738	60.2	8.6
Alta.	1	I	79.0	104	153	177	233	273	337	384	97.5	1.0	1.5	1557	0.731	62.1	7.1
B.C.	2	I	78.0	100	152	182	251	293	348	404	97.5	1.0	1.5	1630	0.746	58.2	7.7
Average (13)		I	77.4	100	150	180	253	296	348	394	97.0	1.0	2.0	1621	0.741	59.5	8.3
N.S.	4	II	70.2	99	154	186	261	301	357	395	96.5	1.0	2.5	1654	0.743	58.9	9.0
N.B.	4	II	70.0	100	149	180	254	295	348	389	96.9	0.9	2.2	1615	0.740	59.7	8.3
Que.	6	II	70.0	100	148	178	252	295	344	388	97.3	0.8	1.9	1605	0.740	59.7	8.2
Ont.	13	II	70.2	97	146	175	253	298	349	391	96.8	0.9	2.3	1612	0.739	60.0	8.6
Man.	5	II	69.0	102	150	177	245	289	344	389	97.0	0.9	2.1	1594	0.733	61.5	8.1
Sask.	4	II	71.0	99	148	179	259	301	351	387	96.9	0.9	2.2	1625	0.738	60.2	8.3
Alta.	3	II	70.7	100	154	182	259	304	356	397	97.5	0.9	1.6	1652	0.741	59.5	7.5
B.C.	4	II	71.8	98	148	177	252	301	362	404	97.2	0.9	1.9	1644	0.746	58.2	8.2
Average (43)		II	70.3	99	149	178	254	297	350	392	97.0	0.9	2.1	1620	0.739	60.0	8.4
Ont.	2	III	62.0	99	149	179	250	293	349	390	96.8	0.9	2.3	1612	0.737	60.5	8.7
Sask.	1	III	51.0	106	162	194	266	312	366	406	97.0	1.0	2.0	1706	0.746	58.2	7.3
Alta.	1	III	55.0	106	154	178	247	294	356	436	98.0	1.0	1.0	1665	0.740	59.7	6.2
Average (4)		III	57.5	103	154	183	253	298	355	406	97.1	1.0	1.9	1649	0.740	59.7	7.7
Average of all (60) Samples		I, II & III	--	99	149	179	254	297	350	393	97.0	0.9	2.1	1622	0.740	59.7	8.3

TABLE IX

AVERAGE OF GASOLINE SURVEY ANALYSES BY PROVINCES FOR SUMMER 1941

Prov.	No. of Samples	Group	A.S.T.M. Octane No.	Distillation Range °F.					Reco-End Pt.	Resi-very %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %		
				I.B.P.	Per Cent Recovered													
					10	20	50	70									90	
N.S.	1	I	80.0	101	152	183	260	302	352	402	98.0	1.0	1.0	1651	0.747	57.9	7.3	0.12
N.B.	1	I	80.0	98	148	180	257	296	348	405	97.5	0.8	1.7	1634	0.744	58.7	8.1	0.10
Que.	4	I	79.0	101	144	170	242	287	342	387	97.1	0.9	2.0	1572	0.740	59.7	8.3	0.04
Ont.	9	I	79.0	102	150	175	240	284	343	388	97.3	0.9	1.8	1580	0.748	57.7	7.9	0.09
Man.	2	I	79.0	101	145	168	239	285	341	399	97.8	1.0	1.2	1577	0.737	60.5	7.9	0.06
Sask.	2	I	78.0	96	140	164	235	277	327	366	97.0	0.9	2.1	1509	0.730	62.3	9.4	0.05
Alta.	2	I	77.5	101	145	171	246	294	353	405	97.3	0.9	1.8	1614	0.740	59.7	8.1	0.05
B.C.	2	I	80.0	101	157	188	253	288	345	400	97.0	1.0	2.0	1631	0.741	59.5	7.9	0.03
Average (23)		I	79.0	101	148	174	243	286	343	391	97.3	0.9	1.8	1585	0.743	58.9	8.1	0.07
N.S.	4	II	75.8	97	148	182	262	302	353	399	97.0	1.0	2.0	1646	0.744	58.7	8.9	0.08
N.B.	4	II	74.3	100	151	181	251	289	342	388	97.1	0.9	2.0	1602	0.742	59.2	8.1	0.06
Que.	4	II	74.8	96	143	172	247	290	346	396	97.4	0.9	1.7	1594	0.741	59.5	9.0	0.05
Ont.	22	II	74.0	101	147	173	241	286	345	394	97.0	1.0	2.0	1586	0.740	59.7	8.5	0.06
Man.	6	II	73.5	99	147	174	241	283	338	384	97.3	1.0	1.7	1567	0.738	60.2	8.3	0.05
Sask.	4	II	72.3	100	153	184	259	305	360	395	96.9	0.9	2.2	1656	0.741	59.5	8.5	0.05
Alta.	5	II	71.0	103	150	181	263	309	362	403	97.2	0.9	1.9	1668	0.744	58.7	7.8	0.05
B.C.	4	II	72.3	102	152	183	252	293	357	406	97.0	0.9	2.1	1643	0.743	58.9	8.1	0.03
Average (53)		II	73.6	100	148	177	248	292	348	395	97.1	1.0	1.9	1608	0.741	59.5	8.4	0.06
Que.	2	III	66.5	101	159	192	262	299	346	384	97.5	0.8	1.7	1642	0.747	57.9	7.6	0.07
Ont.	9	III	65.8	105	158	186	253	292	345	386	97.2	0.9	1.9	1620	0.744	58.7	7.4	0.05
Man.	4	III	58.8	100	146	166	220	258	321	383	97.2	0.9	1.9	1494	0.726	63.4	8.3	0.04
Sask.	1	III	56.0	102	154	183	253	296	347	388	98.0	0.3	1.7	1621	0.740	59.7	8.6	0.09
Average (16)		III	63.5	103	154	182	246	285	339	385	97.3	0.8	1.9	1591	0.739	60.0	7.7	0.05
Average of all (92) Samples		I, II & III	--	101	149	177	247	289	345	392	97.2	0.9	1.9	1599	0.741	59.5	8.2	0.06

TABLE X

AVERAGE OF GASOLINE SURVEY ANALYSES BY PROVINCES FOR SUMMER 1942

N.S.	3	I	76.7	97	141	171	258	301	351	397	97.3	1.0	1.7	1619	0.745	58.4	8.9	0.06
Que.	8	I	76.3	94	136	163	245	293	356	399	96.8	1.0	2.2	1592	0.739	60.0	9.6	0.07
Ont.	12	I	78.7	99	144	168	233	276	343	389	97.2	1.0	1.8	1553	0.733	61.5	8.6	0.04
Man.	1	I	76.0	100	146	175	252	300	358	392	97.0	1.0	2.0	1623	0.741	59.5	8.4	0.07
Sask.	1	I	77.0	95	142	167	235	284	352	398	97.0	1.0	2.0	1578	0.737	60.5	9.7	0.04
Alta.	2	I	76.5	97	138	166	254	302	361	401	97.5	1.0	1.5	1622	0.739	60.0	8.8	0.05
B.C.	5	I	77.6	99	141	172	242	283	347	392	96.8	1.0	2.2	1577	0.735	61.0	9.1	0.04
Average (32)		I	76.9	97	141	168	242	286	349	394	97.0	1.0	2.0	1580	0.736	60.8	9.0	0.05
Ont.	9	II	67.1	98	137	161	226	268	326	377	96.7	0.9	2.4	1495	0.721	64.8	10.1	0.05
Average (9)		II	67.1	98	137	161	226	268	326	377	96.7	0.9	2.4	1495	0.721	64.8	10.1	0.05
Average of all (41) Samples		I & II	--	97	140	166	239	282	344	390	97.0	1.0	2.0	1561	0.733	61.5	9.2	0.05

TABLE XI

AVERAGE OF GASOLINE SURVEY ANALYSES BY PROVINCES FOR SUMMER 1943

Prov.	No. of Samples	Group	A.S.T.M. Octane No.	I.B.P.	Distillation Range °F.					Reco-End Pt.	Resi-very %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %	Gum*	
					Per Cent Recovered														
					10	20	50	70	90										
N.S.	2	I	76.5	99	141	175	265	303	352	389	96.5	1.0	2.5	1625	0.744	58.7	8.1	0.10	2
N.B.	2	I	76.5	99	141	175	268	308	354	392	97.0	1.0	2.0	1638	0.744	58.7	8.5	0.11	4
Que.	6	I	76.0	97	138	169	252	291	341	383	97.1	0.9	2.0	1574	0.745	58.4	8.7	0.09	7
Ont.	8	I	75.5	99	142	171	244	285	343	393	97.1	0.9	2.0	1578	0.736	60.8	8.1	0.06	6
Man.	2	I	75.0	99	141	167	238	280	337	389	97.8	0.9	1.3	1552	0.728	62.9	8.1	0.05	2
Sask.	1	I	75.0	95	142	172	245	290	352	395	96.0	1.0	3.0	1596	0.732	61.8	9.6	0.06	2
Alta.	5	I	74.8	99	139	166	246	294	356	399	97.7	1.0	1.3	1600	0.738	60.2	8.4	0.09	12
B.C.	6	I	76.0	108	164	192	249	285	341	391	97.8	1.0	1.2	1622	0.748	57.7	7.1	0.07	4
Average of all (32) Samples		I	75.7	100	145	174	249	290	345	391	97.3	1.0	1.7	1594	0.741	59.5	8.1	0.08	6

\*milligrams per 100 millilitres.

TABLE XII

AVERAGE OF GASOLINE SURVEY ANALYSES BY PROVINCES FOR SUMMER 1944

Prov.	No. of Samples	Group	A.S.T.M. Octane No.	I.B.P.	Distillation Range °F.					Reco-End Pt.	Resi-due %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %	Gum*	
					Per Cent Recovered														
					10	20	50	70	90										
N.S.	3	I	75.0	99	149	191	279	318	369	404	95.8	1.3	2.9	1710	0.749	57.4	9.5	0.09	1
N.B.	3	I	75.3	97	152	194	280	317	365	407	96.7	1.0	2.3	1715	0.750	57.2	9.0	0.09	4
Que.	3	I	74.0	97	147	185	271	308	358	402	96.6	1.2	2.2	1671	0.751	56.9	8.6	0.09	5
Ont.	22	I	74.9	100	148	179	254	299	359	407	97.2	1.2	1.6	1646	0.749	58.7	7.7	0.06	4
Man.	3	I	74.3	101	144	173	254	302	358	396	96.6	1.2	2.2	1627	0.744	58.7	8.9	0.07	3
Sask.	2	I	74.5	99	139	169	256	302	357	395	97.3	1.2	1.5	1618	0.738	60.2	8.2	0.05	3
Alta.	5	I	74.6	99	141	170	256	302	357	392	97.3	1.0	1.7	1618	0.741	59.5	8.3	0.07	4
B.C.	4	I	74.8	106	166	196	260	298	360	405	97.4	1.2	1.4	1685	0.748	57.7	6.6	0.06	2
Average(45)		I	74.8	100	149	181	259	302	360	403	97.0	1.2	1.8	1654	0.745	58.4	8.0	0.07	4
Ont.	16	II	68.6	101	152	186	261	299	352	397	97.2	1.2	1.6	1647	0.738	60.2	7.4	0.05	4
Average(16)		II	68.6	101	152	186	261	299	352	397	97.2	1.2	1.6	1647	0.738	60.2	7.4	0.05	4
Average of all (61) Samples		I & II	--	100	149	182	260	302	358	401	97.1	1.2	1.7	1652	0.743	58.9	7.9	0.06	4

TABLE XIII

AVERAGE OF GASOLINE SURVEY ANALYSES BY PROVINCES FOR SUMMER 1945

N.S.	6	I	73.2	99	149	187	269	308	363	402	95.8	1.1	3.1	1678	0.743	58.9	9.9	0.10	3
N.B.	1	I	74.0	94	145	183	264	303	356	394	96.0	1.2	2.8	1645	0.742	59.2	10.0	0.08	1
Que.	4	I	73.3	102	155	187	257	294	346	392	97.2	1.2	1.6	1631	0.743	58.9	7.6	0.07	5
Ont.	26	I	73.0	100	144	170	239	283	346	398	97.1	1.2	1.7	1580	0.736	60.8	8.2	0.05	4
Man.	3	I	72.3	100	142	169	243	293	354	398	96.8	1.1	2.1	1599	0.731	62.1	8.8	0.04	3
Sask.	2	I	72.5	100	145	176	254	304	368	414	97.8	1.1	1.1	1661	0.738	60.2	8.0	0.10	5
Alta.	5	I	73.0	104	145	172	248	298	358	399	97.8	1.2	1.0	1620	0.738	60.2	7.7	0.06	3
B.C.	17	I	74.8	110	164	194	258	297	352	401	97.5	1.1	1.4	1660	0.749	57.4	6.8	0.09	2
Average(64)		I	73.5	103	151	180	250	292	351	399	97.1	1.2	1.7	1623	0.741	59.5	7.9	0.07	3
Ont.	16	II	68.5	100	147	177	250	290	349	400	96.9	1.3	1.8	1613	0.736	60.8	8.1	0.05	6
B.C.	5	II	68.4	111	163	195	266	303	358	421	97.0	1.4	1.6	1706	0.751	56.9	7.1	0.10	1
Average(21)		II	68.5	103	151	181	254	293	351	405	96.9	1.4	1.7	1635	0.739	60.0	7.9	0.06	5
Average of all (85) Samples		I & II	--	103	150	180	251	293	351	401	97.1	1.2	1.7	1626	0.740	59.7	7.9	0.07	4

TABLE XIV

AVERAGE OF GASOLINE SURVEY ANALYSES BY PROVINCES FOR SUMMER 1946

Prov.	No. of Samples	Group	A.S.T.M. Octane No.	Tetra Ethyl Lead*	I.B.P.	Distillation Range, °F.					Reco-End Pt.	Resi-due %	Loss %	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %	Gum*	
						Per Cent Evaporated													
						10	20	50	70	90									
N.S.	1	I	78.0	2.15	102	139	170	256	304	364	421	97.0	1.2	1.8	0.749	57.4	8.8	0.15	10
N.B.	1	I	78.0	2.66	99	132	162	253	303	358	404	96.5	1.4	2.1	0.745	58.4	9.5	0.14	7
Que.	2	I	78.0	2.80	95	133	161	237	278	333	415	96.0	1.5	2.5	0.737	60.5	9.0	0.07	5
Ont.	8	I	77.8	2.53	99	135	164	235	276	332	393	96.9	1.2	1.9	0.735	61.0	8.8	0.08	3
Man.	1	I	78.0	2.38	102	136	160	224	270	337	396	97.0	1.4	1.6	0.743	58.9	8.1	0.05	6
Sask.	1	I	77.0	3.19	96	130	156	230	279	329	374	97.0	1.1	1.9	0.730	62.3	8.9	0.06	2
Alta.	1	I	75.0	1.50	93	126	159	239	284	336	389	96.5	1.2	2.3	0.732	61.8	8.4	0.03	1
B.C.	2	I	79.5	1.96	97	133	159	229	266	324	385	97.3	1.1	1.6	0.735	61.0	9.0	0.05	1
Average(17)		I	77.8	2.45	98	134	162	236	279	335	396	96.8	1.3	1.9	0.737	60.5	8.8	0.08	4
N.S.	4	II	74.3	1.10	99	137	168	247	293	349	408	96.9	1.3	1.8	0.744	58.7	8.9	0.12	8
N.B.	3	II	74.0	1.42	94	135	166	254	302	355	409	96.7	1.4	1.9	0.744	58.7	8.6	0.13	5
Que.	5	II	73.6	1.40	99	140	171	241	283	334	391	97.0	1.2	1.8	0.739	60.0	8.0	0.08	6
Ont.	13	II	73.8	1.24	101	138	166	235	279	337	393	97.2	1.2	1.6	0.737	60.5	8.1	0.06	4
Man.	5	II	73.4	1.58	98	135	162	231	277	333	388	96.7	1.1	2.2	0.737	60.5	8.5	0.05	7
Sask.	3	II	71.7	1.55	100	135	163	235	283	338	389	96.5	1.2	2.3	0.727	63.1	8.4	0.04	2
Alta.	4	II	71.5	1.12	98	135	163	236	281	338	395	97.0	1.2	1.8	0.733	61.5	7.9	0.04	2
B.C.	4	II	75.3	1.46	100	142	172	240	280	335	391	97.1	1.1	1.8	0.740	59.7	8.1	0.07	2
Average(41)		II	73.6	1.40	99	137	166	239	283	339	394	97.0	1.2	1.8	0.738	60.2	8.2	0.07	4

\*milligrams per 100 millilitres.

\*per Imperial gallon., millilitres.

TABLE XIV(Continued)

AVERAGE OF GASOLINE SURVEY ANALYSES BY PROVINCES FOR SUMMER 1946

Prov.	No. of Samples	Group	A.S.T.M. Octane No.	Tetra Ethyl Lead*	I.B.P.	Distillation Range, °F.					Reco-End Pt.	Resi- due %	Sp. Gr. 60° F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %	Gum*		
						Per Cent Evaporated													
						10	20	50	70	90									
N.B.	1	III	62.0	n11	104	149	178	241	278	327	381	97.0	1.2	1.8	0.737	60.5	7.9	0.03	1
Que.	1	III	61.0	n11	111	158	188	252	285	332	380	98.0	1.1	0.9	0.743	58.9	6.9	0.02	0.5
Sask.	1	III	51.0	n11	108	154	185	256	302	359	401	97.0	1.1	1.9	0.738	60.2	7.5	0.04	0.5
Average (3)		III	58.0	n11	108	154	184	250	288	339	387	97.4	1.1	1.5	0.739	60.0	7.4	0.03	1
Average of all (61) Samples		I, II & III	--	---	99	137	166	238	282	338	394	97.0	1.2	1.8	0.737	60.5	8.4	0.07	4

TABLE XV

SUMMARY OF DATA OF GASOLINE SURVEY ANALYSES FOR CANADA FOR SUMMER 1939

Test	Group I (Octane No. 75 and above)			Group II (Octane No. 74 to 65)			Group III (Octane No. 64 and below)		
	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Specific Gravity.....	0.729	0.741	0.752	0.724	0.739	0.751	0.736	0.740	0.746
Degrees A.P.I.....	62.6	59.5	56.7	63.9	60.0	56.9	60.8	59.7	58.2
Reid Vapour Pressure, psi..	7.1	8.3	8.9	6.4	8.4	9.7	6.2	7.7	9.6
A.S.T.M. Octane No.....	75	77.4	80	65	70.3	73	51	57.5	64
Distillation Range--									
Initial Boiling Point, °F.	96	100	104	94	99	107	96	103	106
10% Recovered, °F.....	139	150	162	136	149	161	143	154	162
20% Recovered, °F.....	167	180	198	161	178	198	173	183	194
50% Recovered, °F.....	233	253	271	239	254	269	247	253	266
70% Recovered, °F.....	273	296	309	286	297	309	291	298	312
90% Recovered, °F.....	336	348	358	336	350	371	347	355	366
End Point, °F.....	376	394	408	376	392	411	389	406	436
Recovery, Per Cent.....	96.0	97.0	97.5	96.0	97.0	98.0	96.5	97.1	98.0
Residue, Per Cent.....	0.8	1.0	1.1	0.5	0.9	1.1	0.9	1.0	1.0
Loss, Per Cent.....	1.4	2.0	3.0	1.1	2.1	3.1	1.0	1.9	2.6
Index No., °F.....	1553	1621	1706	1567	1620	1693	1606	1649	1706
Number of Samples.....	---	13	---	---	43	---	---	4	---

TABLE XVI

SUMMARY OF DATA OF GASOLINE SURVEY ANALYSES FOR CANADA FOR SUMMER 1941

Test	Group I (Octane No. 77 and above)			Group II (Octane No. 76 to 70)			Group III (Octane No. 69 and below)		
	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Specific Gravity.....	0.735	0.743	0.763	0.730	0.741	0.750	0.718	0.739	0.750
Degrees A.P.I.....	61.0	58.9	54.0	62.3	59.5	57.2	65.6	60.0	57.2
Reid Vapour Pressure, psi..	6.5	8.1	10.1	5.6	8.4	10.8	6.7	7.7	9.4
Sulphur, Per Cent.....	0.02	0.07	0.16	0.01	0.06	0.13	0.02	0.05	0.09
A.S.T.M. Octane Number....	77	79.0	80	70	73.6	76	51	63.5	69
Distillation Range--									
Initial Boiling Point, °F.	94	101	110	89	100	114	98	103	108
10% Recovered, °F.....	133	148	158	127	148	167	135	154	169
20% Recovered, °F.....	158	174	190	152	177	197	150	182	196
50% Recovered, °F.....	204	243	260	227	248	269	190	246	266
70% Recovered, °F.....	250	286	302	265	292	312	230	285	306
90% Recovered, °F.....	325	343	355	326	348	372	286	339	356
End Point, °F.....	365	391	408	361	395	415	357	385	408
Recovery, Per Cent.....	96.0	97.3	98.0	95.5	97.1	98.0	96.0	97.3	98.0
Residue, Per Cent.....	0.6	0.9	1.2	0.7	1.0	1.4	0.3	0.8	1.0
Loss, Per Cent.....	1.0	1.8	3.0	1.2	1.9	3.6	1.0	1.9	3.2
Index No., °F.....	1493	1585	1651	1517	1608	1691	1388	1591	1669
Number of Samples.....	---	23	---	---	53	---	---	16	---

\*milligrams per 100 millilitres.

‡per imperial gallon., millilitres.

TABLE XVII

SUMMARY OF DATA OF GASOLINE SURVEY ANALYSES FOR CANADA FOR SUMMER 1942

Test	Group I (Octane No. 78 to 75)			Group II (Octane No. 70 to 65)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Specific Gravity.....	0.719	0.736	0.761	0.703	0.721	0.738
Degrees A.P.I.....	65.3	60.8	54.4	69.8	64.8	60.2
Reid Vapour Pressure, psi....	7.6	9.0	10.4	8.4	10.1	12.0
Sulphur, Per Cent.....	0.02	0.05	0.17	0.03	0.05	0.07
A.S.T.M. Octane Number.....	75	76.9	79	65	67.1	70
Distillation Range--						
Initial Boiling Point, °F..	86	97	106	95	98	102
10% Recovered, °F.....	125	141	154	130	137	143
20% Recovered, °F.....	151	168	189	151	161	173
50% Recovered, °F.....	211	242	262	211	226	246
70% Recovered, °F.....	244	286	312	249	268	293
90% Recovered, °F.....	306	349	394	309	326	352
End Point, °F.....	360	394	449	370	377	391
Recovery, Per Cent.....	96.0	97.0	98.0	96.0	96.7	97.5
Residue, Per Cent.....	0.8	1.0	1.2	0.8	0.9	1.0
Loss, Per Cent.....	1.3	2.0	3.0	1.5	2.4	3.0
Index No. °F.....	1429	1580	1685	1427	1495	1589
Number of Samples.....	---	32	---	---	9	---

TABLE XVIII

SUMMARY OF DATA OF GASOLINE SURVEY ANALYSES FOR CANADA FOR SUMMER 1943

Test	Group I (Octane No. 78 to 75)		
	Minimum	Average	Maximum
Specific Gravity.....	0.719	0.741	0.755
Degrees A.P.I.....	65.3	59.5	55.9
Reid Vapour Pressure, psi....	5.7	8.1	10.4
Sulphur, Per Cent.....	0.02	0.08	0.12
Gum, milligrams per 100 millilitres....	1	6	24
A.S.T.M. Octane Number.....	73	75.7	77
Distillation Range--			
Initial Boiling Point, °F.....	94	100	113
10% Recovered, °F.....	128	145	168
20% Recovered, °F.....	155	174	196
50% Recovered, °F.....	215	249	276
70% Recovered, °F.....	258	290	314
90% Recovered, °F.....	324	345	365
End Point, °F.....	356	391	422
Recovery, Per Cent.....	95.0	97.3	99.0
Residue, Per Cent.....	0.6	1.0	1.1
Loss, Per Cent.....	0.2	1.7	4.0
Index No. °F.....	1493	1594	1672
Number of Samples.....	---	32	---

TABLE XIX

SUMMARY OF DATA OF GASOLINE SURVEY ANALYSES FOR CANADA FOR SUMMER 1944

Test	Group I (Octane No. 76 to 74)			Group II (Octane No. 70 to 66)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Specific Gravity.....	0.733	0.745	0.757	0.723	0.738	0.741
Degrees A.P.I.....	61.5	58.4	55.4	64.2	60.2	59.5
Reid Vapour Pressure, psi....	5.4	8.0	11.2	5.9	7.4	9.8
Sulphur, Per Cent.....	0.02	0.07	0.14	0.03	0.05	0.07
Gum, milligrams per 100 millilitres.....	1	4	14	trace	4	10
A.S.T.M. Octane Number.....	74	74.8	76	68	68.6	70
Distillation Range--						
Initial Boiling Point, °F..	91	100	110	93	101	106
10% Recovered, °F.....	137	149	175	135	152	167
20% Recovered, °F.....	166	181	207	164	186	208
50% Recovered, °F.....	244	259	284	236	261	279
70% Recovered, °F.....	284	302	320	278	299	318
90% Recovered, °F.....	343	360	392	336	352	362
End Point, °F.....	380	403	460	380	397	405
Recovery, Per Cent.....	94.5	97.0	98.0	95.5	97.2	98.0
Residue, Per Cent.....	0.6	1.2	1.4	1.0	1.2	1.3
Loss, Per Cent.....	0.6	1.8	4.1	0.8	1.6	3.2
Index No. °F.....	1579	1654	1759	1534	1647	1715
Number of Samples.....	---	45	---	---	16	---

TABLE XX

SUMMARY OF DATA OF GASOLINE SURVEY ANALYSES FOR CANADA FOR SUMMER 1945

Test	Group I (Octane No. 74 to 73)			Group II (Octane No. 70 to 66)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Specific Gravity.....	0.711	0.741	0.764	0.728	0.739	0.756
Degrees A.P.I.....	67.5	59.5	53.7	62.9	60.0	55.7
Reid Vapour Pressure, psi....	5.1	7.9	11.2	5.5	7.9	9.7
Sulphur, Per Cent.....	0.02	0.07	0.44	0.02	0.06	0.07
Gum, milligrams per 100 milli- litres.....	trace	3	10	trace	5	21
A.S.T.M. Octane Number.....	71	73.5	80	66	68.5	70
Distillation Range--						
Initial Boiling Point, °F..	92	103	130	92	103	118
10% Recovered, °F.....	131	151	180	134	151	181
20% Recovered, °F.....	156	180	210	158	181	210
50% Recovered, °F.....	217	250	276	234	254	278
70% Recovered, °F.....	268	292	319	280	293	311
90% Recovered, °F.....	327	351	380	340	351	370
End Point, °F.....	383	399	428	384	405	491
Recovery, Per Cent.....	95.5	97.1	98.5	96.0	96.9	98.0
Residue, Per Cent.....	0.9	1.2	1.4	1.0	1.4	2.6
Loss, Per Cent.....	0.3	1.7	3.4	0.8	1.7	2.6
Index No. °F.....	1504	1623	1731	1547	1635	1770
Number of Samples.....	---	64	---	---	21	---

TABLE XXI

SUMMARY OF DATA OF GASOLINE SURVEY ANALYSES FOR CANADA FOR SUMMER 1946

Test	Group I (Octane No. 77 and above)			Group II (Octane No. 76 to 70)			Group III (Octane No. 69 and below)		
	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Specific Gravity.....	0.723	0.737	0.749	0.719	0.738	0.753	0.737	0.739	0.743
Degrees A.P.I.....	64.2	60.5	57.4	65.3	60.2	56.4	60.5	60.0	58.9
Reid Vapour Pressure, psi..	7.2	8.8	9.8	6.1	8.2	9.7	6.9	7.4	7.9
Sulphur, Per Cent.....	0.03	0.08	0.15	0.02	0.07	0.15	0.02	0.03	0.04
Gum, milligrams per 100 millilitres.....	1	4	10	0.5	4	18	0.5	1	1
Tetraethyl Lead per Imp. gal., millilitres...	1.50	2.45	3.30	nil	1.40	2.06	nil	nil	nil
A.S.T.M. Octane Number....	75	77.8	81	70	73.6	76	51	58.0	62
Distillation Range--									
Initial Boiling Point, °F.	92	98	102	91	99	105	104	108	111
5% Evaporated, °F.....	104	116	122	108	118	128	127	133	139
10% Evaporated, °F.....	126	134	140	123	137	149	149	154	158
20% Evaporated, °F.....	153	162	173	149	166	180	178	184	188
30% Evaporated, °F.....	176	189	205	174	193	214	202	209	213
50% Evaporated, °F.....	220	236	256	216	239	264	241	250	256
70% Evaporated, °F.....	256	279	304	253	283	314	278	288	302
90% Evaporated, °F.....	314	335	364	305	339	369	327	339	359
95% Evaporated, °F.....	333	360	388	324	363	396	350	361	378
End Point, °F.....	356	396	432	346	394	424	380	387	401
Recovery, Per Cent.....	95.5	96.8	98.0	96.0	97.0	98.0	97.0	97.4	98.0
Residue, Per Cent.....	1.0	1.3	1.7	0.8	1.2	1.5	1.1	1.1	1.2
Loss, Per Cent.....	1.0	1.9	2.8	0.8	1.8	2.9	0.9	1.5	1.9
Number of Samples.....	---	17	---	---	41	---	---	3	---

TABLE XXII

AVERAGE OF GASOLINE SURVEY ANALYSES IN CANADA FOR SUMMERS, 1923 THROUGH 1946 (EXCEPT 1940)

Year	I.B.P.	Distillation Range, °F.					End Pt.	Recovery %	Residue %	Loss %	Index No. °F.	Sp. Gr. 60°F.	Degrees A.P.I.	Reid V.P. psi.	Sulphur %
		Per Cent Recovered													
		10	20	50	70	90									
1923	120	170	193	255	296	358	423	97.1	1.1*	1.8	1695	0.737	60.5	---	---
1924	113	173	195	249	288	347	410	97.4	1.1*	1.5	1662	0.736	60.8	---	---
1925	116	174	199	258	299	359	412	97.0	1.1*	1.9	1701	0.739	60.0	---	---
1926	110	164	191	256	300	360	410	97.4	1.1*	1.5	1681	0.739	60.0	---	---
1927	107	161	189	259	304	366	416	97.0	1.1*	1.9	1693	0.741	59.5	---	---
1928	107	160	186	255	298	359	409	97.3	1.1*	1.6	1667	0.737	60.5	---	---
1929	102	153	181	255	300	363	411	97.0	1.1*	1.9	1663	0.736	60.8	---	---
1930	101	155	182	254	301	362	406	97.2	1.1	1.7	1660	0.741	59.5	---	0.07
1931	104	157	186	258	304	366	406	96.9	1.3	1.8	1677	0.741	59.5	---	0.05
1932	102	154	183	254	299	361	408	97.9	1.2	0.9	1659	0.742	59.2	7.4	---
1933	101	152	180	252	295	351	396	97.5	1.2	1.3	1626	0.739	60.0	6.9	---
1934	101	149	175	247	291	351	395	97.5	1.2	1.3	1608	0.738	60.2	7.5	---
1935	101	148	174	243	285	343	393	97.4	1.1	1.5	1586	0.735	61.0	7.7	0.06
1936	101	150	176	245	286	340	388	97.6	1.0	1.4	1585	0.736	60.8	7.7	---
1937	98	149	178	252	297	349	391	97.1	1.0	1.9	1616	0.739	60.0	8.0	---
1938	99	150	178	252	295	347	393	97.5	0.9	1.6	1615	0.740	59.7	8.2	---
1939	99	149	179	254	297	350	393	97.0	0.9	2.1	1622	0.740	59.7	8.3	---
1940	No Survey														
1941	101	149	177	247	289	345	392	97.2	0.9	1.9	1599	0.741	59.5	8.2	0.06
1942	97	140	166	239	282	344	390	97.0	1.0	2.0	1561	0.733	61.5	9.2	0.05
1943	100	145	174	249	290	345	391	97.3	1.0	1.7	1594	0.741	59.5	8.1	0.08
1944	100	149	182	260	302	358	401	97.1	1.2	1.7	1652	0.743	58.9	7.9	0.06
1945	103	150	180	251	293	351	401	97.1	1.2	1.7	1626	0.740	59.7	7.9	0.07
1946	99	143	171	242	286	345	394	97.0	1.2	1.8	1582	0.737	60.5	8.4	0.07

\*Estimated.

TABLE XXIII

AVERAGE DISTILLATION RANGE ON PER CENT EVAPORATED BASIS\*\*

OF GASOLINE SURVEY ANALYSES IN CANADA FOR SUMMERS, 1923 THROUGH 1946 (EXCEPT 1940)

Year	I.B.P.	Distillation Range, °F.					End Pt.	Recovery %	Residue %	Loss %
		Per Cent Evaporated								
		10	20	50	70	90				
1923	120	163	189	251	294	351	423	97.1	1.1*	1.8
1924	113	169	192	246	285	341	410	97.4	1.1*	1.5
1925	116	168	195	254	295	352	412	97.0	1.1*	1.9
1926	110	158	187	253	296	354	410	97.4	1.1*	1.5
1927	107	156	184	255	299	359	416	97.0	1.1*	1.9
1928	107	155	182	251	294	353	409	97.3	1.1*	1.6
1929	102	147	176	250	296	355	411	97.0	1.1*	1.9
1930	101	149	178	250	297	356	406	97.2	1.1	1.7
1931	104	151	181	254	299	359	406	96.9	1.3	1.8
1932	102	151	181	251	297	357	408	97.9	1.2	0.9
1933	101	147	176	249	292	345	396	97.5	1.2	1.3
1934	101	144	172	244	287	346	395	97.5	1.2	1.3
1935	101	143	171	240	281	337	393	97.4	1.1	1.5
1936	101	145	173	242	283	335	388	97.6	1.0	1.4
1937	98	143	173	248	293	343	391	97.1	1.0	1.9
1938	99	145	174	248	291	342	393	97.5	0.9	1.6
1939	99	142	173	249	292	343	393	97.0	0.9	2.1
1940	No Survey									
1941	101	143	172	243	285	338	392	97.2	0.9	1.9
1942	97	135	161	234	277	333	390	97.0	1.0	2.0
1943	100	140	170	246	287	339	391	97.3	1.0	1.7
1944	100	142	177	257	298	352	401	97.1	1.2	1.7
1945	103	144	175	247	289	345	401	97.1	1.2	1.7
1946	99	137	166	238	282	338	394	97.0	1.2	1.8

\*Estimated.

\*\*Calculated from Distillation Range on Per Cent Recovered Basis.

TABLE XXIV

SUMMARY OF DATA OF GASOLINE SURVEY ANALYSES BY GROUPS FOR CANADA FOR SUMMERS, 1937 THROUGH 1946 (EXCEPT 1940)

Year	Group	No. of Samples	A.S.T.M. Octane No.	Distillation Range, °F.					Reco-End Pt.	Residue %	Loss %	Sp. Gr. 60°F.	Deg-rees A.P.I.	Reid V.P. psi.	Sul-phur %	Gum*		
				Per Cent Evaporated														
				I.B.P.	10	20	50	70									90	
1937	I (Octane No. 75 & above)	14	77.6	99	144	173	246	291	344	392	97.0	1.1	1.9	0.740	59.7	8.2	----	-
1938	I (Octane No. 75 & above)	14	77.8	100	145	174	246	287	337	391	97.6	0.9	1.5	0.739	60.0	8.2	----	-
1939	I (Octane No. 75 & above)	13	77.4	100	142	175	248	291	342	394	97.0	1.0	2.0	0.741	59.5	8.3	----	-
1941	I (Octane No. 77 & above)	23	79.0	101	143	170	239	281	337	391	97.3	0.9	1.8	0.743	58.9	8.1	0.07	-
1942	I (Octane No. 78 to 75)	32	76.9	97	135	163	237	281	341	394	97.0	1.0	2.0	0.736	60.8	9.0	0.05	-
1943	I (Octane No. 78 to 75)	32	75.7	100	140	170	246	287	339	391	97.3	1.0	1.7	0.741	59.5	8.1	0.08	6
1944	I (Octane No. 76 to 74)	45	74.8	100	143	177	255	298	352	403	97.0	1.2	1.8	0.745	58.4	8.0	0.07	4
1945	I (Octane No. 74 to 73)	64	73.5	103	145	176	247	289	343	399	97.1	1.2	1.7	0.741	59.5	7.9	0.07	3
1946	I (Octane No. 77 & above)	17	77.8	98	134	162	236	279	335	396	96.8	1.3	1.9	0.737	60.5	8.8	0.08	4
1937	II (Octane No. 74 to 65)	39	70.1	98	145	175	251	296	345	391	97.1	1.0	1.9	0.741	59.5	7.9	----	-
1938	II (Octane No. 74 to 65)	41	70.2	100	145	175	251	295	344	395	97.4	1.0	1.6	0.741	59.5	8.2	----	-
1939	II (Octane No. 74 to 65)	43	70.3	99	141	173	249	292	344	392	97.0	0.9	2.1	0.739	60.0	8.4	----	-
1941	II (Octane No. 76 to 70)	53	73.6	100	141	173	244	288	341	395	97.1	1.0	1.9	0.741	59.5	8.4	0.06	-
1942	II (Octane No. 70 to 65)	9	67.1	98	129	155	220	263	317	377	96.7	0.9	2.4	0.721	64.8	10.1	0.05	-
1943	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1944	II (Octane No. 70 to 66)	16	68.6	101	146	181	258	296	345	397	97.2	1.2	1.6	0.738	60.2	7.4	0.05	4
1945	II (Octane No. 70 to 66)	21	68.5	103	145	177	251	290	343	405	96.9	1.4	1.7	0.739	60.0	7.9	0.06	5
1946	II (Octane No. 76 to 70)	41	73.6	99	137	166	239	283	339	394	97.0	1.2	1.8	0.738	60.2	8.2	0.07	4

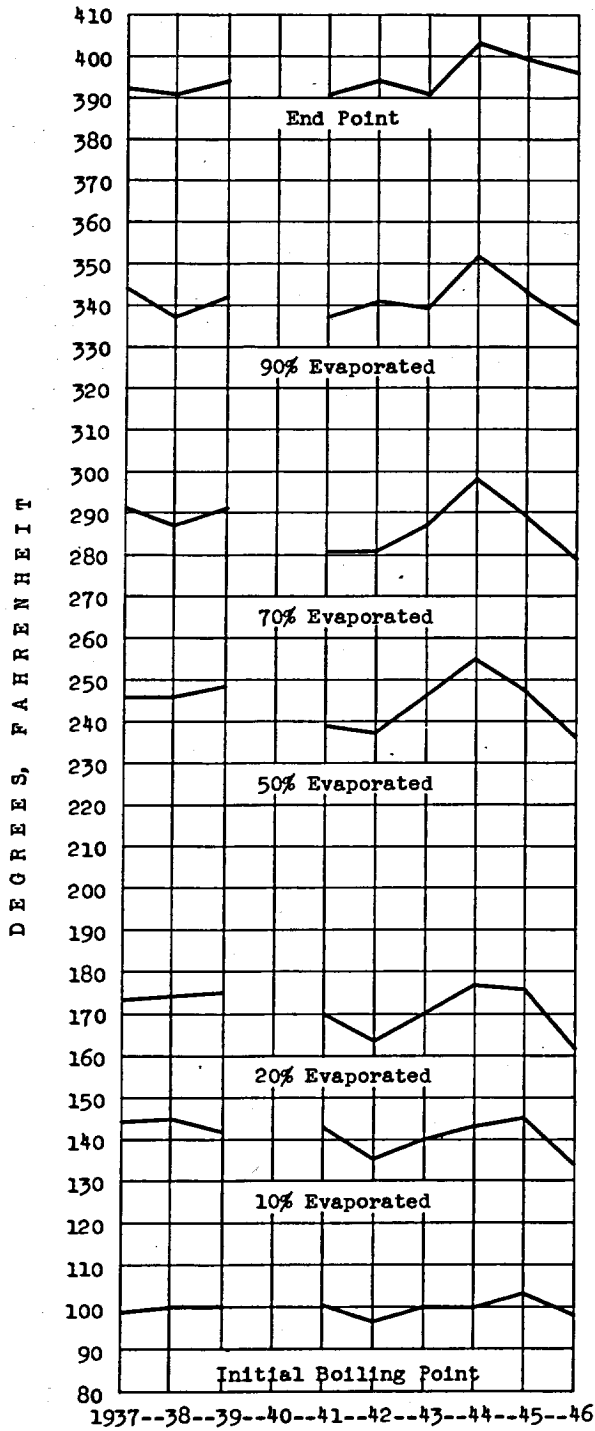
\*milligrams per 100 millilitres.



YEAR-SUMMER

1937--38--39--40--41--42--43--44--45--46

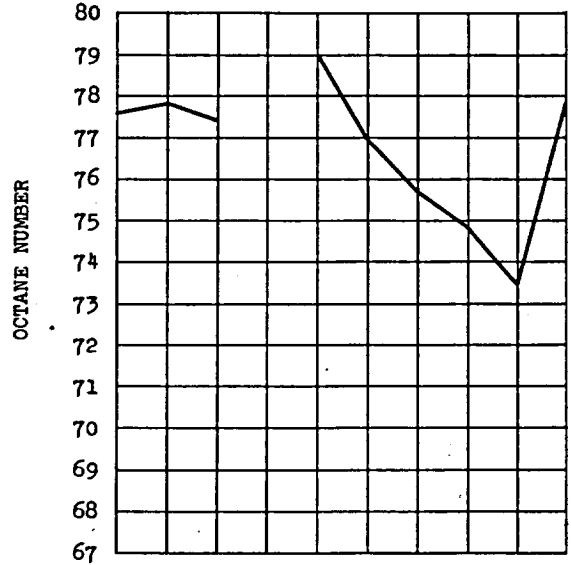
DISTILLATION RANGE



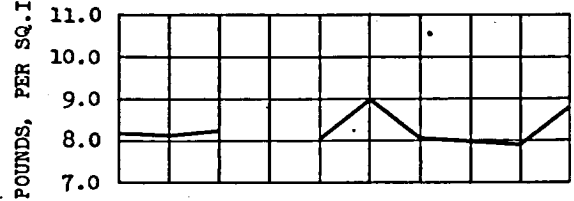
YEAR-SUMMER

1937--38--39--40--41--42--43--44--45--46

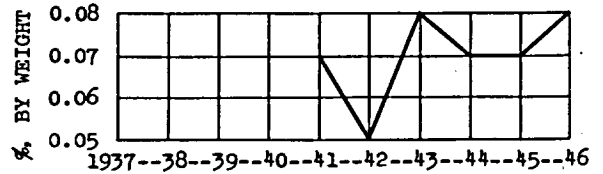
KNOCK RATING



REID VAPOUR PRESSURE



SULPHUR CONTENT

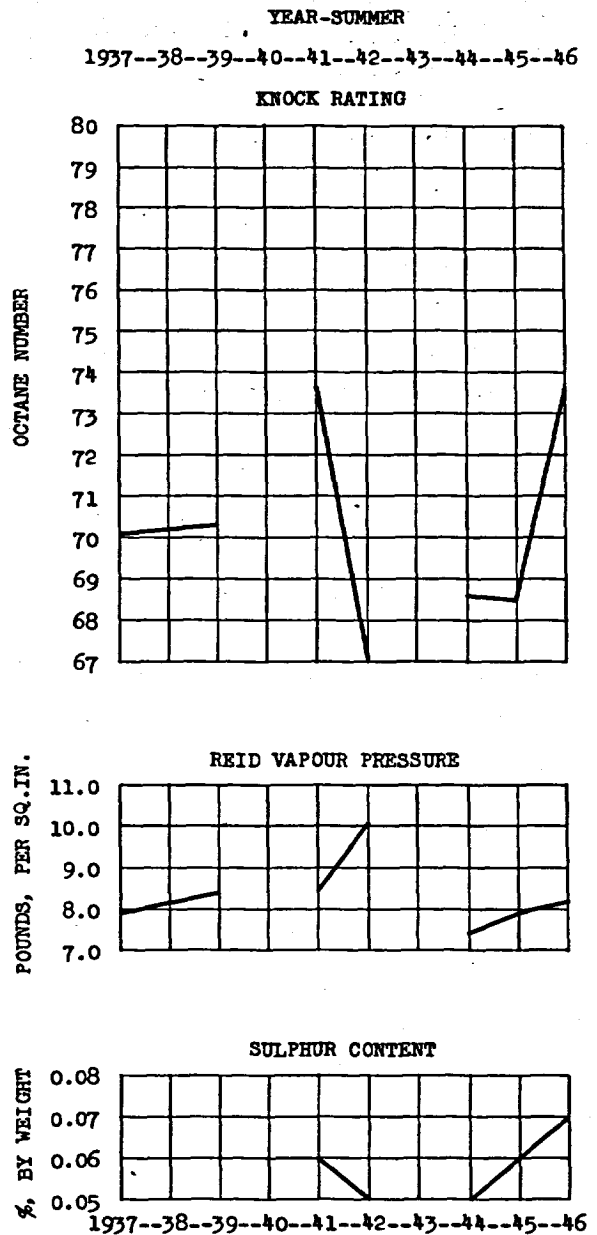
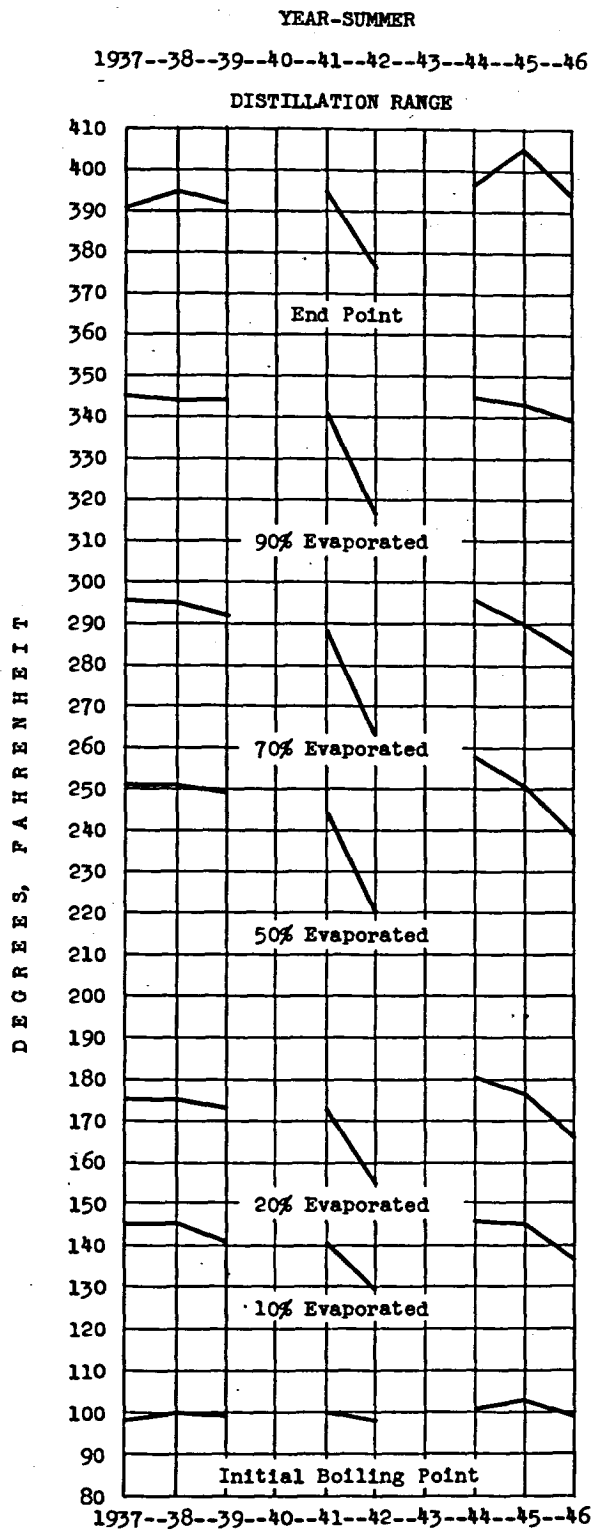


GROUP I GASOLINE

FIGURE I - COMPARISON OF GASOLINE CHARACTERISTICS FROM SUMMER

SURVEYS OF 1937 THROUGH 1946

NOTE: No Survey was made in 1940 for Group I.



**GROUP II GASOLINE**  
**FIGURE II - COMPARISON OF GASOLINE CHARACTERISTICS FROM SUMMER**  
**SURVEYS OF 1937 THROUGH 1946**

**NOTE:** No Survey was made in 1940 and 1943.

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Appendix A

Specification for Graded Motor Fuel

Office of the Oil Controller

Schedule A

(Canada - excepting only Province of British Columbia)

Order No. Oil	008A	008B	008D	008E
Date effective	Oct. 1 1941	Amend. June 1 1943	Amend. Dec. 15 1943	Amend. Sept 23 1944
	Grade 1	Grade 1	Grade 1	Grade 1
Octane No. (A.S.T.M. Motor method)	75 - 78 Grade 2	75 - 78 Grade 2	74 - 76* Grade 2	73 - 74* Grade 2
Octane No. (A.S.T.M. Motor method)	66 - 70	66 - 70	66 - 70	66 - 70
Distillation range °F. (Evaporated)	Summer	Summer	Summer	Summer
Not less than 10% at	155	155	155	155
Not less than 50% at	260	275*	275	275
Not less than 90% at	370	370	370	370
	Winter	Winter	Winter	Winter
Not less than 10% at	140	140	140	140
Not less than 50% at	257	275*	275	275
Not less than 90% at	370	370	370	370
Sulphur, per cent (max.)	0.15	0.15	0.15	0.15
Corrosion, copper strip 3 hours at 122°F.	pass	pass	pass	pass
Freezing point, °F. (Winter)(max.)	-60	-60	-60	-60
Reid vapour pressure, lb. (Summer)(max.)	10	10	10	10
(Winter)(max.)	13	13	13	13
Gum, mg. per 100 c.c.(max.)	10	10	10	10

Summer - May 15 to Sept. 15.

Winter - Sept. 16 to May 14.

Order No. 008A as amended for Graded Motor Fuel was rescinded Aug. 15, 1945 by Order No. 008F.

\* Indicates a change in the specification.

Appendix B

Specification for Graded Motor Fuel

Office of the Oil Controller

Schedule B  
(Province of British Columbia only)

Order No. Oil	008A	008B Amend.	008C Amend.	008D Amend.	008E Amend.
Date effective	Oct.1 1941	June 1 1943	Nov.1 1943	Dec.15 1943	Sept.23 1944
	<u>Grade 1</u>	<u>Grade 1</u>	<u>Grade 1</u>	<u>Grade 1</u>	<u>Grade 1</u>
Octane No. (A.S.T.M. Motor method)	75 - 78 <u>Grade 2</u>	75 - 78 <u>Grade 2</u>	75 - 78 <u>Grade 2</u>	74 - 76* <u>Grade 2</u>	73 - 74* <u>Grade 2</u>
Octane No. (A.S.T.M. Motor method)	66 - 70	66 - 70	66 - 70	66 - 70	66 - 70
Distillation range °F. (Evaporated)	Summer	Summer	Summer	Summer	Summer
Not more than 10% at	-	145*	145	145	145
Not less than 10% at	155	165*	165	165	165
Not less than 50% at	260	280*	280	280	280
Not less than 90% at	370	380*	380	380	380
	Winter	Winter	Winter	Winter	Winter
Not more than 10% at	-	-	145*	145	145
Not less than 10% at	140	140	165*	165	165
Not less than 50% at	257	257	280*	280	280
Not less than 90% at	370	370	380*	380	380
Sulphur, per cent (max.)	0.25	0.25	0.25	0.25	0.25
Corrosion, copper strip 3 hours at 122°F.	pass	pass	pass	pass	pass
Freezing point, °F. (Winter) (max.)	-30	-30	-30	-30	-30
Reid vapour pressure, lb. (Summer) (max.)	10	10	10	10	10
(Winter) (max.)	13	13	13	13	13
Gum, mg. per 100 c.c. (max.)	15	15	15	15	15

Summer - April 1 to Sept. 30.

Winter - Oct. 1 to Mar. 31.

Order No. 008A as amended for graded Motor Fuel was rescinded Aug. 15.

\* Indicates a change in the Specification.