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MICROWAVE SPECTRA OF SOME VOLATILE ORGANIC COMPOUNDS

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16. Abstract

A computer-controlled microwave (MRR) spectrometer was used to catalog reference spectra for chemical analysis. Tables of absorption frequency, peak absorption intensity, and integrated intensity are included for 26 volatile organic compounds, all but one of which contain oxygen. The spectra of some sulfur and nitrogen compounds were previously published.

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SUMMARY

The Langley Research Center has been engaged in the measurement and tabulation of microwave (MRR) absorption spectra suitable for chemical analysis. The measurements have been made by a computer-controlled, Stark modulated spectrometer in the frequency range 26 500 to 40 000 MHz. In addition, some spectra were run in the range 18 000 to 26 500 MHz. Measurements of absorption frequency, peak intensity, and integrated intensity are included along with experimental conditions, such as Stark field intensity, sample temperature and pressure, and microwave power level.

Data on sulfur and nitrogen compounds have been previously published in NASA TN D-7450, where the apparatus and procedures were described. This report contains tables of spectral data for the following compounds: acetaldehyde; 2-butenal; 2,5-dihydrofuran; 2(3H)-dihydrofuranone; epoxybutane; ethanol; formaldehyde; formic acid, methyl ester; furan; 2-furancarboxaldehyde; methanol; 2-methylfuran; methyloxirane; oxetane; oxirane; 2-oxo-propanal; oxybismethane; propanal; 1-propanol; 2-propanol; 2-propanone; 2-propenal; 2-propen-1-ol; propyne; 2-propyn-1-ol; and tetrahydrofuran.

INTRODUCTION

The potential of microwave spectroscopy as a method of chemical analysis has long been recognized. However, for many years the technique was not feasible because of the lack of suitable instrumentation and reference data. At present the major obstacle to the routine use of microwave analytical techniques is the lack of reference-data catalogs similar to those available in other wavelength regions. The Langley Research Center has been engaged for several years in the measurement and tabulation of such a reference-data catalog, and this report is the second to present some of the results. The spectra of 28 sulfur and nitrogen compounds have been previously published (ref. 1).

This report includes spectral data for 26 volatile organic compounds of which all but one contain oxygen. The spectra were all measured by a computer-controlled microwave (MRR) spectrometer, and all data handling and processing was performed automatically to improve accuracy and reliability. Reference 1 contains a description of the apparatus, software, and experimental procedures. Therefore, the discussion in this

report is limited to improvements in the system which were made after the initial report was written.

SYMBOLS

E_S	intensity of Stark modulation square-wave electric field, kV/cm
MRR	molecular rotational resonance
P	microwave power at crystal detector, dBm
p	sample pressure, millitorr (1 torr = 133.3 N/m^2)
T	sample cell temperature, K
U	frequency measurement uncertainty, MHz
γ	Beer's law absorption intensity coefficient, cm^{-1}
$\Delta\nu$	half-width of absorption line at half-maximum-intensity point, kHz
ν_o	frequency of absorption line at peak intensity, MHz

APPARATUS

All the data in this report were measured on the automated Hewlett-Packard model 8460A spectrometer described in references 1 and 2. Four hardware modifications have been made to improve the reliability of the system and decrease the amount of operator attention required. The wiring diagram for the first of these is included in reference 2. The modifications are

(1) A small reversible dc motor and drive wheel have been added to operate the cell input-power attenuator. This allows continuously variable computer control of the power level in the sample cell.

(2) The high-voltage supply for the backward-wave-oscillator helix is turned on and off by the computer. This allows microwave power to be removed completely in order to check the zero readings of all meters.

(3) The diode modulation voltage of the calibration arm is under computer control. This allows periodic checks of system sensitivity without operator action.

(4) The vacuum and sample-handling systems have been rebuilt. All the valves which used Kel-F seats were replaced by all-metal high-vacuum valves, and the lines between the cell and valves were shortened. In addition, the original O-ring seals on the high-voltage feedthroughs of the Stark electrodes were replaced by teflon seals. The sample is now exposed only to metal, teflon, and the mica windows.

SOFTWARE

The software used is essentially the same as that described in reference 1, with some additions to make use of the hardware modifications described in the preceding section. A complete listing of the programs, including a routine to adjust the power level, is given in reference 2. This routine keeps the detector crystal current at a preselected value within 0.25 μA. Additions to the software include

(1) At the beginning of a spectral search, and once each hour thereafter, the system gain is checked with a signal corresponding to $-10 \log \gamma \approx 55$. The calibration data are modified as necessary to compensate for any short- or long-term drift in spectrometer sensitivity from the original absolute calibration.

(2) At every calibration period, and when each line is measured, the microwave power is turned off and the zero readings of the power meters, crystal current meter, and synchronous detector output are taken. These values are applied as corrections to the observed power, crystal current, and signal values.

(3) To make use of previous measurements which were available on magnetic tape, a modified version of the program was developed. Instead of searching the entire spectral range, only a narrow band about each reported line is scanned. The program runs normally up to the point where the frequency has been set at the approximate line center. If the intensity is below a programed threshold value, the frequency measurement is not further refined and the Stark voltage is not varied. The peak intensity is measured and the next line is sought. For the stronger lines, complete measurements are made just as in the normal version of the program.

The modified program was used on several compounds for which data had been measured manually or taken during the early development stages of the automated system and on those compounds for which data had been obtained from other sources. In such cases the discussions preceding tables state that lines above a certain intensity were remeasured. For these compounds, it is possible that a few lines may have been missed because they were near the threshold intensity on the original run, since sensitivity did vary somewhat with frequency on the manual spectrometers and the early version of the automated system.

EXPERIMENTAL PROCEDURES

The procedures were described in reference 1 and have changed only to the extent required by the hardware and software modifications mentioned earlier. Since the calibration is automated, it is no longer necessary for the operator to run the system checkout program daily. The system is capable of operating 24 hours daily. Fresh samples are admitted to the cell at the beginning and end of each working day. Other than periodic inspections of the data printout and observation of line shapes on the XY display, no other attention is required. Data are transferred from the disc to magnetic tape for further processing about once weekly. The tapes are sent to the main computer center, where the card decks are produced which are used to print the spectral data tables.

EXPLANATION OF THE TABLES

Names

Spectral data are tabulated alphabetically by molecule name in the section entitled "Spectral Tables." The naming system is that used by Chemical Abstracts, volume 76, 1972. When a molecule is commonly known by another name or names, these are also listed and a cross reference is inserted in the index to the tables. In addition to the name or names, the discussion before each table also includes the formula and the Chemical Abstracts Service (CAS) Registry number for further identification.

A second molecule identification number is given for the sake of completeness. This number is part of an internal system developed by the National Bureau of Standards for computer handling of spectral data to be published in supplements to Monograph 70 (ref. 3). It is also used for computer handling of data at the Langley Research Center.

Sample and Remarks

The discussion preceding each table gives the sample source and the results of a chromatographic purity check along with details of any further purification done. Also given are pertinent remarks on experimental conditions or results, including the availability of other experimental or theoretical data to verify the sample identity.

Frequency Data

The first two columns of each table give the peak frequency, listed in increasing order, and the measurement uncertainty, both in MHz. The spectrometer frequency is standardized at the carbon oxide sulfide frequency of 36 488.812 MHz, as discussed in reference 1.

The measurements made by the automated system are given to 0.001 MHz unless the calculated uncertainty is 0.1 MHz or greater, in which case they are rounded to the nearest 0.01 MHz. The uncertainties are usually much larger than the actual experimental errors. The value calculated by the computer is based on line width, the frequency step size used, asymmetry of the line if any, intensity of the line, and the sensitivity of the Stark effect. The tabulated uncertainty is the first value equal to or greater than the calculated uncertainty from the sequence 0.01, 0.02, 0.05, 0.1, 0.2 MHz.

Intensity Data

The third column gives the peak relative intensity in the form $-10 \log(\gamma_1/\gamma_2)$. For convenience the reference value γ_2 is chosen to be unity so that the tabulated intensities are numerically equal to -10 times the logarithm of the absolute intensities. In the column headings the notation is shortened to $-10 \log \gamma$.

Intensity calibrations are described in reference 1. In the frequency range above 26 500 MHz the intensities are based on an absolute sensitivity calibration, but below that frequency a molecular standard was used and the intensity data are considered to be less reliable.

The fourth column of the tables gives the integrated intensity per unit of pressure. As in the case of the peak intensity, this is a relative value and the reference value is chosen as unity so that the form of the quantity is $-10 \log(\gamma \Delta\nu/p)$.

Most of the peak and integrated intensities are rounded to the nearest decibel. Some are given to 0.1 dB. These measurements are made on the stronger symmetric lines in the spectrum. The long-term repeatability of these measurements is of the order of 0.3 dB or better. The short-term repeatability on different samples is usually better than 0.1 dB, although the absolute accuracy may be somewhat less. The reasons for rounding off intensities to the nearest decibel include line strengths which are low enough to be subject to errors due to noise or stray pickup; a sensitive Stark effect, which could result in weakening and/or broadening of the lines if the modulator zero basing is imperfect; and overlaps or unresolved fine structure which will distort the line shape and cause the observed frequency and/or intensity to vary with pressure.

Asymmetric lines in particular should not be used for quantitative work unless an individual calibration curve of intensity against pressure is measured, since it is likely that the integrated intensity will not be linear with pressure. Note also that in many cases only one of the half-widths was measured for an asymmetric line, and the value of $\gamma \Delta\nu$ will not be the same as it would for the case where $\Delta\nu$ was taken as one-half of the total width.

Line-Type Classification Code

For all lines where some information is missing or is rounded off, a code number is given in the column entitled "Line-type code" to indicate the reason. The code is defined in table 1. For many lines more than one of the code numbers is applicable, and in that case the lower number is usually used.

TABLE 1.- DEFINITION OF LINE-TYPE CODE

Code	Meaning
1	No line width data available; line is unusually broad (e.g., the center line of a partially resolved triplet), or data were taken prior to the time when line width measurements began to be taken routinely
2	Only upper half-width measured; lower half-width is greater and did not fall inside data array; the frequency and/or intensity may be pressure dependent
3	Only lower half-width measured; upper half-width is greater; same significance as type 2
4	Asymmetric line; both widths measured but they differ by at least 5 percent; same significance as types 2 and 3
5	Low intensity: $-10 \log \gamma$ is more than 60.5
6	Sensitive Stark effect; modulator zero field errors may cause broadening, weakening, or frequency shift
7	Incomplete or lower quality data; often refers to other than intensity data

The following procedures were used to find the integrated intensity: For any line where both half-widths were measured, the average of the two was used. For type 2 lines, the integrated intensity is based on only the upper half-width; for type 3 lines, the lower half-width. Note that the main difference between these lines and a type 4 line is that the step size was large enough to cover both half-maximum-intensity points for type 4, but not for the others. This does not necessarily imply greater asymmetry for all types 2 and 3 lines, since the classification sometimes depends only on the circumstantial relationship between line width and the initial frequency step size used. The software does not provide for remeasuring a type 2 or 3 line merely to get the other half-width when the step size was too small to cover the entire line.

Stark Field

The tabulated intensity of the Stark modulation field is the value at which the measurements were made and is usually the value which gave the best signal. Allowable values of voltage were 800 to 1800 V in 200-V increments. Any significant undermodulation or interference was readily detected, since signal-strength variations of 0.5 percent or greater are considered.

Each line is tested for sensitivity of Stark effect by offsetting the zero field voltage from ground potential by about 0.5 V. If a signal loss of 1 percent or more is noted, the line is classified as sensitive, and the field value is followed by S in the tables.

Power

The power P given in the seventh column is that measured at the detector. The input power to the cell is greater by about 1 to 2 dB, depending on the frequency.

Temperature

The absolute temperature of the sample cell as measured by a thermistor-type gage is given in the eighth column. All the measurements were made at room temperature, and the resulting maximum temperature variation was about 8 K.

Pressure

The ninth column gives the sample pressure. Tabulated values are the absolute measurements made with a capacitance manometer. In most cases the pressure was also measured by a thermocouple gage, and this information is given in the discussions preceding the tables. Depending on the sample composition, the thermocouple gage measurements may be as much as 300 to 400 percent greater than those of the capacitance manometer.

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Acetaldehyde

Formula: CH_3CHO
CAS Registry number: 75-07-0
Synonym: ethanal
NBS identification number: 155.00
Frequency range: 18 000 to 40 000 MHz

Sample.- The sample source was Eastman T468. From its viscosity and boiling point, the sample appeared to be largely paraldehyde. Gas chromatography could not be used because of decomposition of the sample in the column. However, vacuum distillation provided stable and repeatable samples.

Remarks.- The lines are broader than average, with broadening parameters of the order of 35 to 45 kHz/mtorr. Many of the lines have sensitive Stark effects which were not indicated in the original data. However, all lines with a frequency above 26 500 MHz and with $-10 \log \gamma$ of 62 or less have been remeasured, and these data do include information on Stark sensitivity. Power measurements were not made below 26 500 MHz, and the intensities in the lower frequency range may be less accurate because of the lack of an absolute sensitivity calibration.

The sample pressure of 10 millitorr was registered by a thermocouple gage as 24 millitorr.

Sample identity was confirmed by matching 7 lines in the region below 26 500 MHz and 15 lines above that frequency with calculated transition frequencies (ref. 3).

NAME: ACETALDEHYDE								ID NO. 155.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
19225.573	.05	67	50	4	2.1		299	8
19262.164	.05	64	47	5	2.1		299	8
19265.150	.05	64	47	5	2.1		299	8
19268.170	.05	67	50	5	2.1		299	8
19589.03	.10	68	51	4	2.6		299	8
22087.134	.05	68	51	5	3.4		299	8
22208.569	.05	66	50	5	2.1		299	8
22234.39	.20	68	51	4	1.7		299	8
22313.530	.05	69	53	4	3.0		299	8
22326.18	.10	67	52	4	1.7		299	8
22345.94	.20	65	49	3	2.6		299	8
22346.47	.10	65		1	2.6		299	8
22986.52	.10	69	53	4	1.7		299	8
23170.90	.10	72	55	4	2.1		299	8
23263.418	.05	70	54	5	2.1		299	8
23364.768	.05	70	54	5	2.1		299	8
23742.383	.05	71	55	4	2.1		299	8
23999.84	.10	71	55	4	1.7		299	8
24141.32	.10	71	55	4	1.7		299	8
24520.479	.05	69	53	4	3.0		299	8
24609.272	.05	69	53	4	3.8		299	8
24661.80	.10	71	55	4	2.1		297	8
24802.204	.05	67	51	4	2.1		298	8
24993.59	.20	71	55	2	2.1		298	8
25008.614	.05	69	53	5	2.6		298	8
25508.47	.10	70	52	4	2.1		298	8
25592.11	.10	71	54	5	2.1		298	8
25657.99	.10	71	54	4	2.1		298	8
25665.286	.05	69	53	4	2.1		298	8
25781.55	.10	71	54	4	2.1		298	8
25810.154	.05	68	51	5	2.6		298	8
25927.571	.05	71	54	5	3.0		299	8
25935.41	.20	72	55	4	2.6		299	8
26029.49	.10	70	53	5	1.7		299	8
26126.56	.10	71	55	4	1.7		299	8
26233.05	.10	65	49	5	3.0		299	8
26280.65	.20	70	54	4	2.1		299	8
26282.51	.10	71	55	5	2.6		299	8
26287.46	.10	70	54	4	2.1		299	8
26573.105	.05	60	43	6	2.1S	-18	294	10
26823.14	.10	68		1	2.1	-17	294	10
27143.69	.10	66		1	2.1	-17	294	10
27173.86	.10	65		1	2.1	-17	294	10
27346.03	.10	68		1	2.1	-16	294	10
27482.11	.10	68		1	2.1	-16	294	10
28175.73	.10	64	48	4	2.6	-17	300	10
28199.96	.10	68		1	2.1	-16	294	10
28330.763	.02	64	47	5	1.7	-16	300	10
28787.97	.20	64	48	3	3.8	-17	300	10
28789.03	.20	64	47	2	2.1	-17	300	10

NAME: ACETALDEHYDE		CONTINUED						ID NO. 155.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
28797.998	.05	63	48	5	2.1	-18	300	10
28920.473	.02	63	46	5	2.1	-18	300	10
29077.873	.02	65	49	5	2.1	-17	300	10
29091.393	.02	66	49	5	3.0	-17	300	10
29123.28	.10	68		1	2.1	-16	294	10
29396.807	.02	64	48	5	2.1	-17	300	10
29466.99	.10	67		1	2.1	-16	294	10
29468.09	.20	65	49	2	1.7	-17	300	10
29473.254	.02	65	49	5	1.7	-17	300	10
29718.448	.02	63	48	5	1.7	-17	300	10
29728.58	.10	67		1	2.1	-16	294	10
29773.719	.02	63	48	5	1.7	-18	300	10
29833.854	.05	66	49	5	1.7	-17	300	10
29913.08	.10	67		1	2.1	-16	294	10
29931.19	.10	66		1	2.1	-16	294	10
30050.784	.05	65	49	5	2.1	-17	300	10
30358.50	.10	68		1	2.1	-15	294	10
30663.301	.05	65	49	4	1.7	-17	300	10
30670.68	.10	67		1	2.1	-15	294	10
30734.002	.02	66	50	5	3.0	-16	299	10
30750.223	.05	67	51	5	2.1	-16	299	10
30829.969	.02	66	50	5	3.8	-17	299	10
30876.426	.02	66	50	5	2.6	-17	300	10
30910.912	.05	67	50	4	2.1	-16	300	10
30917.224	.05	66	50	5	1.7	-16	300	10
30941.367	.02	63	47	5	1.7	-16	300	10
31132.837	.05	63	46	4	2.1	-16	300	10
31139.231	.02	67	51	5	1.7	-16	300	10
31356.680	.05	69	53	5	2.6	-16	300	10
31382.920	.05	67	51	5	2.1	-16	300	10
31731.529	.05	70	54	4	1.7	-15	300	10
31749.746	.05	68	52	5	2.1	-15	300	10
31857.885	.02	65	49	5	2.1	-15	300	10
31939.29	.10	70	53	4	2.1	-15	300	10
31948.739	.05	70	54	4	2.1	-15	300	10
32087.10	.10	71	54	4	2.1	-15	300	10
32105.47	.10	71	54	4	2.1	-15	300	10
32116.579	.05	65	48	4	1.7	-15	300	10
32125.824	.05	67	50	4	2.1	-15	300	10
32129.939	.05	68	52	5	1.7	-15	300	10
32155.660	.05	67	51	4	2.1	-15	300	10
32206.977	.05	67	50	4	1.7	-15	300	10
32212.300	.05	69	52	4	2.1	-15	300	10
32267.471	.05	68	52	4	2.1	-15	300	10
32411.12	.10	71	55	4	2.1	-15	300	10
32471.756	.05	66	50	5	2.1	-15	300	10
32486.093	.05	64	48	5	2.1	-15	300	10
32546.295	.02	63	47	5	2.1	-15	300	10
32709.220	.02	62	46	4	2.1	-17	294	10
32725.110	.05	70	53	4	2.1	-15	300	10

NAME: ACETALDEHYDE		CONTINUED						ID NO. 155.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
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32768.96	.10	67	51	4	1.7S	-15	300	10
32810.82	.10	67	51	4	2.1	-15	300	10
32845.179	.05	69	53	5	2.1	-15	300	10
32852.199	.02	68	52	5	1.7	-15	300	10
32867.844	.02	68	51	5	1.7	-15	300	10
32900.601	.05	67	51	5	2.1	-16	299	10
32996.139	.05	65	48	5	1.7	-16	300	10
33143.620	.05	67	50	4	1.7	-16	299	10
33236.478	.05	62	46	5	3.0S	-17	294	10
33428.297	.02	66	50	5	3.0	-16	300	10
33473.128	.05	66	50	5	1.7	-16	300	10
33760.233	.02	63	47	5	2.1	-16	300	10
33824.185	.02	65	49	5	3.8	-16	300	10
33827.360	.05	67	51	4	2.1	-16	300	10
34029.152	.05	65	48	5	2.6	-16	300	10
34105.082	.02	66	50	4	2.6	-16	300	10
34274.56	.20	68	51	3	2.1	-15	300	10
34283.177	.05	65	50	5	2.1	-15	300	10
34440.266	.02	65	49	5	1.7	-15	300	10
34717.43	.20	66	50	3	2.1	-15	300	10
34718.60	.20	67	51	2	2.1	-15	300	10
34750.265	.05	67	50	4	2.1	-15	300	10
34762.435	.05	65	48	5	2.1	-15	300	10
34793.925	.05	66	50	5	1.7	-15	300	10
34818.654	.02	65	49	5	2.1	-15	300	10
34873.339	.02	65	50	5	3.0	-15	300	10
34878.783	.02	65	49	5	2.6	-15	300	10
34959.774	.02	68	52	5	2.1	-15	300	10
34970.598	.02	67	50	5	1.7	-15	300	10
35091.94	.20	67	51	3	1.7	-15	300	10
35363.751	.05	63	47	4	1.7	-15	300	10
35385.584	.02	63	46	5	2.1	-15	300	10
35452.293	.05	66	50	5	2.1	-15	300	10
35529.218	.02	62	46	5	2.1	-17	294	10
35573.180	.05	67	51	4	1.7	-15	300	10
35637.171	.02	65	49	5	1.7	-15	300	10
35829.915	.05	68	52	4	3.0	-15	300	10
35837.341	.05	67	50	4	2.1S	-15	299	10
36233.777	.02	64	48	5	3.0	-16	299	10
36254.573	.05	66	49	5	2.1	-16	299	10
36297.356	.02	64	48	4	3.4	-16	299	10
36313.510	.05	65	48	4	2.1	-16	300	10
36489.395	.02	61	45	5	3.4	-15	294	10
36548.175	.02	66	50	5	3.0	-16	300	10
36602.071	.02	61	45	5	1.7	-15	294	10
36613.186	.02	63	47	4	1.7	-16	300	10
37016.70	.10	66		1	2.1	-16	294	10
37051.64	.10	68		1	2.1	-16	294	10
37207.559	.05	65	49	5	2.1	-17	300	10

NAME: ACETALDEHYDE		CONTINUED						ID NO. 155.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
37422.985	.05	65	48	4	2.1	-16	300	10
37448.656	.05	66	51	5	1.7	-16	300	10
37464.213	.02	54.4	37.4		2.1	-16	294	10
37515.319	.05	58	40	4	1.7	-16	294	10
37686.96	.10	55	38	4	2.6S	-16	294	10
37702.28	.10	66		1	2.1	-16	294	10
37708.555	.02	60.4	43.5		3.8	-16	294	10
37821.196	.05	65	49	5	2.1	-16	300	10
37849.469	.02	62	45	5	2.1	-16	294	10
37851.43	.10	67		1	2.1	-16	294	10
37856.821	.05	65	49	4	2.1	-16	300	10
37914.647	.05	66	51	5	2.1	-16	300	10
38036.33	.10	67		1	2.1	-16	294	10
38045.98	.10	68		1	2.1	-16	294	10
38057.663	.02	65	50	4	2.1	-15	300	10
38073.31	.10	66	50	4	2.1	-15	300	10
38151.004	.01	62	46	5	2.1	-16	294	10
38240.823	.02	62	46	5	3.4	-16	295	10
38339.78	.10	61		1	3.0S	-16	295	10
38367.946	.05	63	46	5	2.1	-15	300	10
38432.605	.02	55.8	39.2		3.8	-16	280	10
38476.228	.05	60	43	6	3.0S	-16	299	10
38483.778	.02	64	47	5	3.4	-15	300	10
38506.036	.02	53	37	4	3.4	-16	295	10
38512.102	.02	52.7	36.1		3.8	-16	295	10
38522.760	.02	55.7	39.1		3.8	-16	295	10
38629.531	.05	57	40	6	2.1S	-16	295	10
38653.415	.05	57	40	6	2.1S	-16	295	10
38656.510	.05	65	48	4	3.0	-15	300	10
38680.533	.02	64	48	5	2.1S	-15	300	10
38838.76	.20	65	49	3	2.6	-14	300	10
38839.85	.20	66	51	2	2.1	-14	300	10
38864.692	.02	62	45	5	2.6	-15	294	10
38900.352	.01	58.0	41.4		2.1	-15	294	10
38962.85	.20	67	51	2	2.1	-14	300	10
38977.496	.05	66	49	4	2.1	-14	300	10
38988.922	.02	64	47	5	2.1	-14	300	10
39025.21	.10	68		1	2.1	-15	294	10
39054.89	.10	63	46	4	2.6S	-15	299	10
39075.051	.05	65	49	5	2.1S	-15	300	10
39136.21	.10	68		1	2.1	-14	295	10
39146.030	.02	66	50	4	2.1	-15	300	10
39153.836	.02	62	45	5	3.8	-15	295	10
39172.07	.10	66		1	2.1	-15	295	10
39180.857	.05	62	44	4	3.0S	-15	295	10
39195.191	.02	59	42	4	3.4	-15	295	10
39207.16	.10	67		1	2.1	-15	295	10
39210.105	.02	61	44	5	3.4	-15	295	10
39225.94	.10	67		1	2.1	-15	295	10
39244.33	.10	68		1	2.1	-15	295	10

NAME: ACETALDEHYDE			CONTINUED					ID NO. 155.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
39284.64	.10	68		1	2.1	-15	295	10
39287.267	.05	65	48	4	2.1	-15	300	10
39300.866	.02	66	50	5	2.1	-15	300	10
39362.559	.05	54	37	6	2.1S	-14	295	10
39374.764	.02	66	50	5	1.7	-15	300	10
39454.742	.02	57.0	39.9		2.1	-14	295	10
39465.378	.05	64	47	4	1.7	-15	300	10
39568.620	.02	65	49	5	2.6	-15	300	10
39582.821	.02	65	48	4	3.4	-15	300	10
39587.438	.05	65	48	4	2.1	-15	300	10
39594.299	.02	54.0	37.0		2.1	-14	295	10
39746.012	.02	63	46	5	2.1	-16	299	10
39815.48	.10	66		1	2.1	-14	295	10

2-Butenal

Formula: $CH_3CH{:}CHCHO$
CAS Registry number: 4170-30-3
Synonym: crotonaldehyde
NBS identification number: 777.00
Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Eastman 1878. Gas chromatography with a Chromosorb 102 column showed 0.7 percent water and one unidentified impurity of 0.4 percent.

Remarks.- The lines are broader than average, with half-widths of the order of 300 kHz at a pressure of 5 millitorr. Most of the lines are grouped into three regions of the frequency range, each covering less than 1 GHz. Even at a pressure of 5 millitorr, some clusters of lines were so close that individual lines were only partially resolved peaks on a broad band. Most of the intensities and frequencies are therefore pressure dependent.

The sample was strongly adsorbed, and the pressure dropped twice to somewhat less than 4.5 millitorr during overnight runs. A few of the stronger lines which appeared less affected by overlap were rerun at 5 millitorr.

The sample pressure of 5 millitorr was registered by a thermocouple gage as 23 millitorr.

Sample identity was confirmed by matching four lines with the calculated frequencies (ref. 4).

NAME: 2-BUTENAL								ID NO. 777.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
29407.337	.01	60.3	41.5		2.1	-18	296	5
29414.237	.02	65	46	4	1.7	-18	296	5
29419.889	.05	68	49	5	1.7S	-18	296	4
29425.295	.02	67	48	5	1.7	-18	296	4
29473.222	.02	66	48	5	3.0	-18	296	4
29475.382	.02	66	47	4	1.7	-18	296	5
29779.691	.01	58.8	39.1		3.4	-17	296	4
29786.68	.20	66	47	3	3.8S	-18	296	4
29788.45	.20	64	43	3	3.8S	-18	296	4
29789.06	.20	64	44	2	3.8	-18	296	4
29794.20	.20	63	43	3	2.6	-18	296	4
29795.18	.20	64		1	3.4	-18	296	4
29796.27	.20	67		1	3.4	-18	296	4
29798.40	.20	56	36	3	2.6S	-18	296	4
29799.07	.20	57	37	2	3.8S	-18	296	4
29800.05	.20	62	42	2	3.8S	-18	296	4
29801.21	.20	66		1	2.1	-18	295	4
29803.48	.20	65	43	3	3.0	-17	295	4
29804.92	.20	61	40	3	3.8	-18	295	4
29805.60	.20	61		1	2.1S	-18	295	4
29808.42	.10	60	38	4	2.1S	-18	295	4
29810.85	.20	63	40	2	3.0	-18	295	4
29813.83	.20	61	41	3	2.1S	-17	295	4
29814.51	.20	62		1	3.4	-17	295	4
29818.03	.20	63	41	3	2.6S	-17	295	4
29819.38	.20	63		1	3.8S	-17	295	4
29820.53	.20	63	42	2	3.8S	-18	295	4
29822.52	.20	67		1	3.0S	-18	295	4
29824.22	.20	64		1	3.4S	-17	295	4
29825.40	.20	66		1	3.8S	-17	295	4
29826.11	.20	66		1	3.0	-17	295	4
29826.65	.20	66		1	3.8	-17	295	4
29828.24	.20	65		1	3.8	-17	295	4
29828.99	.20	66		1	3.8S	-17	295	4
29835.17	.20	67		1	3.8	-17	295	4
29836.18	.20	68		1	3.4S	-17	295	4
29836.72	.20	67		1	3.8S	-17	295	4
29838.627	.05	62	41	4	3.4	-17	295	4
29839.78	.20	67		1	3.4S	-17	295	4
29840.90	.20	67		1	2.6S	-17	295	4
29847.24	.20	66	45	3	3.8	-17	295	4
29848.50	.20	67		1	3.8S	-18	295	4
29850.00	.20	66	44	2	3.8S	-17	295	4
29851.98	.20	66	44	3	3.0S	-17	295	4
29853.08	.20	65	44	2	3.4	-17	295	4
29854.70	.20	64	44	3	2.6S	-17	295	4
29855.26	.20	66		1	3.0	-17	295	4
29857.41	.20	59	39	3	2.1S	-17	295	4
29858.02	.20	60	39	2	3.0	-17	295	4
29861.24	.20	64		1	3.4S	-17	295	4

NAME: 2-BUTENAL		CONTINUED						ID NO. 777.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
29861.94	.20	65		1	3.4	-17	295	4
29862.50	.20	66	45	2	3.4S	-17	296	4
29866.470	.05	62	40	5	3.8S	-17	295	4
29869.77	.20	64	41	2	3.0	-17	295	4
29873.27	.20	64	43	3	3.4S	-18	295	4
29874.01	.20	65		1	3.4S	-17	295	4
29874.80	.20	66	44	2	3.4S	-17	295	4
29877.68	.20	66	45	2	3.8	-17	295	4
29883.27	.20	66		1	3.4S	-17	295	4
29896.867	.02	66	45	5	3.8	-17	295	4
29915.55	.20	61	42	3	3.0S	-17	295	4
29919.60	.20	66	45	2	3.8S	-17	295	4
29924.42	.20	67	45	2	3.4S	-17	295	4
29971.10	.20	66	44	3	3.8S	-18	295	4
29971.71	.20	66	46	2	3.8S	-18	295	4
30177.611	.01	61	42	5	2.1	-17	295	4
30188.857	.05	65	46	4	2.1	-17	295	4
30190.469	.02	67	49	4	2.1	-17	295	4
30227.727	.05	67	48	4	3.0	-17	295	4
30229.460	.05	67	48	4	2.6S	-17	295	4
33606.823	.01	58.2	39.6		1.7	-17	295	5
33614.744	.02	64	45	4	3.0	-17	295	5
33621.194	.02	66	49	4	3.8	-17	295	5
33627.370	.02	65	47	5	3.4	-17	295	5
33669.124	.02	66	48	5	1.7	-17	295	5
33682.140	.05	64	46	4	1.7	-17	295	5
33683.595	.05	64	46	4	2.1	-17	295	5
34027.891	.01	58.0	39.7		3.8	-17	295	5
34032.74	.20	65	43	3	3.8S	-17	295	5
34034.40	.20	63	41	4	3.8S	-17	295	5
34035.88	.20	64	43	2	3.8	-17	295	5
34037.91	.20	64	45	3	3.4	-18	295	5
34038.83	.10	63	44	2	3.8	-17	295	5
34045.671	.05	64	44	4	3.8	-17	295	5
34049.44	.20	61	40	3	3.4	-17	295	5
34055.53	.20	53	33	4	2.1S	-17	295	5
34056.79	.20	55	35	2	3.4S	-18	295	5
34059.94	.20	64	43	3	3.8	-18	295	5
34061.24	.20	63	42	3	3.4S	-18	295	5
34061.71	.20	63		1	3.4S	-17	295	5
34063.70	.20	59	37	3	2.6	-17	294	5
34064.93	.20	60		1	3.4	-17	295	5
34067.38	.20	56	34	2	3.8	-17	295	5
34070.55	.20	63	42	2	3.4	-17	295	5
34073.15	.20	58	36	3	2.1S	-17	295	5
34074.44	.20	57	36	2	3.4	-17	295	5
34078.19	.20	62		1	2.1	-17	295	5
34079.52	.20	63		1	3.0	-17	295	5
34080.47	.20	61		1	3.8S	-17	295	5
34082.36	.20	61	39	3	2.6S	-17	296	5

NAME: 2-BUTENAL		CONTINUED						ID NO. 777.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
34084.02	.20	62		1	3.0	-17	296	5
34084.87	.20	62		1	3.8S	-17	296	5
34085.55	.20	62		1	3.8	-17	295	5
34088.50	.20	66		1	3.8	-17	295	5
34089.62	.20	63	41	3	3.4S	-17	295	5
34090.69	.20	63		1	3.8S	-17	295	5
34091.76	.20	64		1	3.8	-17	295	5
34092.54	.20	64		1	3.8	-17	295	5
34093.40	.20	65		1	3.4S	-17	295	5
34095.265	.02	61	40	5	3.0	-17	295	5
34096.59	.20	63		1	3.8S	-17	295	5
34097.74	.20	65		1	3.8	-17	295	5
34098.96	.20	66	46	2	2.1S	-17	295	5
34100.70	.20	63	43	3	3.0S	-17	295	5
34101.85	.20	64		1	3.8	-17	295	5
34103.16	.20	65		1	3.8S	-17	295	5
34105.10	.20	63	42	2	3.8	-17	295	5
34106.38	.20	67		1	3.4S	-17	295	5
34113.70	.20	63		1	3.4	-17	295	5
34116.65	.10	61	41	4	3.4S	-17	295	5
34119.92	.20	63	41	3	2.1S	-17	295	5
34122.973	.05	56	36	4	2.1S	-17	295	5
34124.16	.20	58	37	2	3.8S	-17	295	5
34126.61	.20	62	41	2	3.8S	-17	295	5
34128.327	.05	63	42	4	3.8S	-17	295	5
34130.54	.10	63	42	4	3.8S	-17	295	5
34133.19	.20	62	41	3	2.1S	-17	295	5
34133.74	.20	61		1	3.8S	-17	295	5
34134.93	.20	64		1	3.0S	-17	295	5
34141.09	.20	62		1	3.4S	-17	295	5
34141.74	.20	62		1	3.8	-17	295	5
34142.49	.20	61		1	3.8	-17	295	5
34145.01	.20	64	43	2	3.8	-17	295	5
34152.33	.20	64	42	3	3.8S	-17	295	5
34153.07	.20	65		1	3.8S	-17	295	5
34159.25	.20	65		1	3.4S	-17	295	5
34161.71	.10	63	43	4	3.8S	-17	295	5
34170.30	.20	66	47	3	3.8S	-17	295	5
34189.41	.10	59	39	4	2.1S	-17	295	5
34190.70	.20	61	41	2	3.8S	-17	295	5
34199.12	.20	64	44	3	3.8S	-17	295	5
34200.51	.20	66		1	3.8S	-17	295	5
34202.86	.20	67		1	3.4S	-17	295	5
34208.336	.02	65	46	4	3.8	-17	295	5
34253.00	.20	63	41	3	3.8S	-17	295	5
34253.67	.20	65		1	3.8S	-17	295	5
34254.09	.20	65	44	2	3.8	-17	295	5
34487.108	.01	58.6	40.2		2.1	-17	295	5
34488.650	.05	66	48	4	1.7	-17	295	4
34500.011	.05	63	45	4	2.1	-17	295	4

NAME: 2-BUTENAL			CONTINUED					ID NO. 777.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
34501.799	.02	65	46	5	1.7	-17	295	5
34545.344	.02	64	44	4	2.6	-17	295	5
34546.34	.10	64	46	2	3.0	-17	295	5
34599.557	.02	66	48	5	1.7	-17	295	5
34605.586	.05	67	49	4	1.7S	-17	295	5
37777.417	.02	67	49	4	2.6	-16	295	5
37805.727	.02	57	39	4	3.0	-17	295	5
37814.702	.01	62	43	5	3.4	-17	295	5
37821.886	.02	65	48	4	2.1	-16	295	5
37828.840	.02	64	46	4	1.7	-17	295	5
37857.893	.05	64	46	4	2.1	-17	295	5
37863.126	.05	67	48	4	3.8	-16	295	5
37890.449	.05	63	44	4	3.4	-17	295	5
37891.469	.05	63	45	4	3.8	-17	295	5
37977.979	.02	66	49	5	1.7S	-16	295	5
38273.689	.01	57.0	39.0		3.8	-16	295	5
38286.265	.02	61	41	5	3.4	-16	295	5
38287.15	.20	65	45	2	3.4S	-16	295	5
38289.06	.20	61	42	4	3.8S	-16	295	5
38293.768	.02	64	47	5	3.8	-16	295	5
38304.226	.01	59.8	41.1		3.8	-16	295	5
38306.79	.20	65	46	2	3.8	-16	295	5
38310.77	.20	59	40	3	3.4S	-16	295	5
38312.63	.20	51	32	3	2.1S	-16	295	5
38314.759	.05	54	35	4	3.4S	-16	295	5
38318.87	.20	62	43	3	3.4S	-16	295	5
38319.67	.20	62		1	3.4S	-16	295	5
38321.73	.20	58		1	2.1S	-16	295	5
38323.87	.20	58	37	3	3.0	-16	295	5
38325.67	.20	56	36	3	3.4S	-16	295	5
38326.59	.20	56	35	2	3.0S	-16	295	5
38329.15	.20	62	43	2	2.6S	-16	295	5
38332.66	.20	56	34	3	2.1S	-16	295	5
38334.44	.20	58	36	2	2.6	-16	295	5
38339.24	.20	59		1	3.8S	-16	295	5
38339.91	.20	58		1	3.8	-16	295	5
38343.07	.20	62		1	3.8S	-16	295	5
38344.65	.20	62		1	3.8	-16	295	5
38345.77	.20	62		1	3.8S	-16	295	5
38346.94	.20	61	41	2	3.0S	-16	295	5
38349.393	.02	58.7	37.2		3.4	-16	295	5
38350.67	.20	61		1	3.8	-16	295	5
38351.16	.20	61		1	3.4S	-16	295	5
38352.45	.20	61		1	3.4S	-16	295	5
38354.95	.20	63	41	3	3.8S	-16	295	5
38355.75	.20	63	41	2	3.8	-16	294	5
38359.52	.20	61	41	3	3.4	-16	294	5
38361.50	.20	61	42	2	3.0S	-16	294	5
38364.54	.20	62		1	3.8	-16	294	5
38370.40	.20	63	44	3	3.4	-16	294	5

NAME: 2-BUTENAL			CONTINUED					ID NO. 777.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
38372.83	.20	63	41	2	3.8S	-16	294	5
38376.80	.20	64	45	3	3.0S	-16	294	5
38378.23	.20	61		1	3.8S	-16	294	5
38379.88	.20	61	41	2	3.8	-16	294	5
38381.56	.20	62		1	3.8S	-16	294	5
38382.67	.20	63	43	2	3.0S	-16	294	5
38385.28	.20	62	42	3	3.0S	-16	294	5
38388.54	.20	54	33	4	2.1S	-16	294	5
38390.580	.05	56	36	4	3.4	-16	294	5
38392.30	.20	63		1	3.4S	-16	294	5
38392.99	.20	63		1	3.8S	-16	294	5
38395.335	.05	62	43	4	3.4S	-16	294	5
38400.40	.20	58	37	3	3.4S	-16	294	5
38402.69	.20	65	42	2	3.4S	-16	294	5
38405.46	.20	66	47	3	2.6S	-16	294	5
38408.75	.20	63	44	3	1.7S	-16	294	5
38409.21	.20	63	43	2	2.6S	-16	294	5
38411.03	.10	60	39	4	3.4	-16	294	5
38415.65	.10	63	45	2	3.4	-16	294	5
38421.63	.20	63		1	3.8	-16	294	5
38423.29	.20	63		1	3.8	-16	294	5
38424.24	.20	62		1	3.8	-16	294	5
38425.46	.20	65	45	2	3.0	-16	294	5
38429.40	.20	64	44	4	3.4S	-16	294	5
38454.91	.20	64	44	4	3.8S	-16	294	5
38463.389	.02	56.9	35.7		2.6	-16	294	5
38465.39	.10	60	41	2	3.4	-16	294	5
38471.427	.05	65	45	4	3.8	-16	295	5
38474.07	.20	62	43	3	3.4S	-16	295	5
38474.66	.20	63		1	3.4	-16	295	5
38475.66	.20	63	43	2	3.4S	-16	295	5
38476.97	.20	65	46	2	3.4S	-16	295	5
38535.21	.10	62		1	3.8S	-16	295	5
38536.53	.20	62	43	2	3.8S	-16	295	5
38548.38	.10	64	45	4	3.4S	-16	295	5
38605.64	.20	65	46	3	2.6S	-16	295	5
38606.62	.20	67	47	2	1.7S	-15	295	5
38766.076	.02	64	46	5	1.7	-15	295	5
38795.947	.01	57.0	38.5		2.1	-15	295	5
38797.678	.02	63	44	5	1.7	-15	295	5
38810.525	.05	61	43	4	2.6	-15	295	5
38812.485	.02	63	45	5	1.7	-15	295	5
38862.50	.10	62	43	2	2.6	-15	295	5
38874.826	.05	66	48	4	2.1	-15	294	5
38879.521	.05	67	48	4	2.1	-15	294	5
38924.713	.02	66	48	5	1.7	-15	294	5
38929.220	.02	66	48	4	1.7	-15	295	5

2,5-Dihydrofuran

Formula: $\underbrace{OCH_2CHCHCH_2}$

CAS Registry number: 1708-29-8

NBS identification number: 340.00

Frequency range : 26 500 to 40 000 MHz

Sample.- The sample source was Eastman P8701. Gas chromatography with Chromosorb 102 columns showed impurity peaks of 0.72, 0.02, 0.67, 0.9, and 0.26 percent. The sample was therefore purified on Chromosorb 102 before use.

Remarks.- The spectrum is rich in lines and there are many asymmetric lines due to overlaps. In some cases interference from the Stark lobes of adjacent lines appeared to prevent measurement at the optimum Stark voltage and thus caused some lines to be undermodulated.

The sample pressure of 15 millitorr was registered by a thermocouple gage as 53 millitorr.

NAME: 2,5-DIHYDROFURAN								ID NO. 340.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26516.068	.02	66	53	5	1.7	-17	297	15
26531.559	.02	65	52	4	2.6	-17	297	15
26553.527	.01	61	47	5	2.1	-17	296	15
26560.958	.02	63	50	5	1.7	-17	296	15
26583.713	.02	61	49	4	3.0	-17	296	15
26591.851	.01	57.0	43.5		3.0	-17	296	15
26727.222	.02	65	52	5	2.6	-17	295	15
26791.912	.01	58	45	4	2.6	-17	295	15
26812.293	.01	59.4	46.0		2.1	-17	295	15
26833.276	.05	67	53	4	2.1	-17	295	15
26837.459	.05	65	52	4	1.7	-17	295	15
26886.149	.02	62	49	5	2.1	-17	295	15
26898.400	.02	61	48	5	2.1	-17	295	15
27031.053	.02	65	52	5	3.4	-17	295	15
27061.739	.01	57.0	43.5		2.1	-17	295	15
27169.903	.02	61	47	4	2.1	-17	295	15
27328.171	.01	66	53	5	2.1	-17	295	15
27338.359	.02	66	53	4	3.8	-17	295	15
27340.191	.02	63	50	4	2.1	-17	295	15
27388.794	.02	62	49	4	3.4	-17	295	15
27400.312	.02	66	53	5	3.4	-17	295	15
27415.950	.02	59	45	4	2.1	-17	295	15
27434.069	.02	64	52	5	2.6	-17	295	15
27476.010	.01	57.8	44.7		2.1	-17	295	15
27550.970	.02	68	54	5	2.1	-17	295	15
27648.765	.01	59.5	45.9		3.4	-17	295	15
27667.422	.02	60.5	47.2		3.0	-17	295	15
27772.313	.02	65	52	5	1.7	-17	295	15
27798.973	.05	66	53	5	1.7S	-17	295	15
27823.892	.02	65	52	5	3.4	-17	295	15
27829.563	.02	63	49	5	3.8	-17	294	15
27830.91	.10	66	53	2	3.8	-17	294	15
27851.073	.01	60.2	46.8		3.4	-16	294	15
27860.750	.02	63	50	5	3.8	-16	294	15
27870.487	.01	57.4	44.0		3.0	-16	294	15
27898.023	.02	67	54	4	2.1	-16	293	15
27938.576	.02	67	55	5	3.0	-16	293	15
27952.847	.02	62	49	4	3.4	-16	293	15
28024.480	.02	65	52	5	2.1	-17	293	15
28165.144	.02	62	50	5	2.1	-17	293	15
28260.701	.02	66	54	4	2.6	-17	293	15
28272.944	.02	61	47	4	3.8	-17	293	15
28442.206	.01	58.4	44.9		2.1	-17	293	15
28445.228	.01	58.3	45.1		2.1	-17	293	15
28529.506	.05	65		1	3.4S	-17	293	15
28530.110	.02	61	47	4	2.1	-17	293	15
28544.240	.01	62	49	5	3.0	-17	293	15
28719.479	.01	58.8	45.5		3.0	-18	293	15
28755.761	.02	62	49	5	3.0	-18	293	15
28799.060	.02	66	53	4	1.7	-18	293	15

NAME: 2,5-DIHYDROFURAN CONTINUED								ID NO. 340.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
28876.249	.01	58.6	45.5		3.8	-18	293	15
28878.70	.10	59	46	2	3.8	-17	293	15
28934.200	.02	66	53	4	2.1	-18	293	15
28957.003	.02	62	49	5	1.7	-18	292	15
28961.089	.01	61	48	5	2.6	-18	292	15
28999.549	.02	64	51	5	3.4	-17	292	15
29016.847	.02	64	51	4	2.1	-17	292	15
29022.509	.02	65	52	5	3.8	-17	292	15
29067.619	.02	60	46	4	3.0	-17	292	15
29068.58	.10	66	52	2	2.6	-17	292	15
29148.494	.01	57.5	44.1		2.1	-17	292	15
29285.511	.02	66	54	5	2.1	-18	292	15
29311.880	.01	56.7	43.4		3.4	-17	292	15
29545.783	.02	61	48	5	3.0	-17	292	15
29555.856	.01	61	48	5	3.8	-17	292	15
29592.254	.02	65	53	5	1.7	-17	292	15
29593.860	.02	67	53	4	2.1	-17	292	15
29596.972	.01	63	50	5	3.0	-17	292	15
29639.960	.01	59.6	46.2		2.1	-17	293	15
29653.245	.02	65	52	5	1.7S	-17	293	15
29668.182	.02	60.1	47.5		1.7	-18	294	15
29780.798	.01	62	49	5	2.6	-17	294	15
29828.564	.02	67	53	5	1.7	-17	294	15
29830.327	.02	64	50	5	2.1	-17	294	15
29890.453	.02	67	54	5	1.7	-17	294	15
29973.387	.02	65	51	5	3.4	-17	294	15
30006.554	.01	58.9	45.4		3.0	-17	294	15
30057.615	.02	61	48	5	3.0	-17	294	15
30075.247	.01	57.5	44.2		3.0	-17	294	15
30105.691	.02	65	52	5	2.1	-17	294	15
30173.245	.02	64	51	4	2.1	-17	294	15
30240.412	.02	65	52	5	3.0	-17	294	15
30272.301	.02	66	52	4	2.1	-17	294	15
30352.548	.05	62	48	4	3.4	-17	294	15
30394.398	.02	60.1	46.7		3.0	-17	294	15
30429.881	.01	58.2	44.8		3.0	-17	294	15
30660.453	.02	66	53	5	3.0	-17	294	15
30737.681	.01	56.1	42.7		3.0	-17	294	15
30778.319	.02	63	50	4	3.0	-17	294	15
30965.956	.02	67	55	5	2.1	-17	294	15
31027.216	.02	64	51	5	3.4	-17	294	15
31032.587	.01	58.0	44.6		3.8	-18	294	15
31057.977	.02	64	50	5	2.1S	-18	294	15
31079.970	.01	60.0	47.1		2.1	-17	292	15
31081.12	.10	65	51	2	3.8	-17	293	15
31093.172	.02	64	50	5	3.8	-18	293	15
31095.089	.01	59.0	45.5		3.8	-18	293	15
31097.602	.02	60.4	47.0		3.8	-18	293	15
31136.031	.02	61	48	4	2.1	-18	293	15
31209.37	.10	66	52	4	2.1S	-18	293	15

NAME: 2,5-DIHYDROFURAN		CONTINUED					ID NO. 340.00	
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
31266.065	.01	60.0	46.5		2.1	-18	293	15
31286.147	.02	63	50	5	1.7	-18	294	15
31304.306	.01	56.8	43.4		3.4	-18	294	15
31345.751	.02	67	54	5	2.6	-18	294	15
31427.657	.02	64	51	5	3.4	-18	294	15
31559.114	.02	65	51	4	3.4	-18	294	15
31573.728	.02	66	53	4	2.6	-18	294	15
31635.827	.05	67	53	4	3.4	-18	294	15
31645.391	.02	58	44	4	3.0	-18	294	15
31668.390	.01	61	48	5	3.0	-18	294	15
31673.821	.02	63	51	5	1.7	-18	294	15
31766.752	.02	65	52	5	1.7	-18	294	15
31782.454	.01	55.6	42.3		3.4	-18	294	15
31879.661	.02	66	53	5	3.4	-18	294	15
31940.089	.02	63	50	5	3.0	-18	294	15
31999.956	.02	64	50	5	3.8	-18	294	15
32019.452	.02	64	52	4	2.1	-18	294	15
32073.281	.02	63	49	5	1.7	-18	294	15
32082.726	.02	66	52	5	3.4	-18	294	15
32093.394	.01	58.5	45.1		3.0	-18	294	15
32123.155	.01	59.9	46.5		3.4	-18	294	15
32181.002	.01	56.4	42.9		3.4	-18	294	15
32240.909	.01	59.3	45.9		2.1	-18	294	15
32266.862	.05	66	54	5	2.1S	-18	294	15
32287.002	.02	67	54	4	3.8	-18	294	15
32336.914	.02	64	50	5	3.8	-18	294	15
32360.753	.02	64	51	5	2.6	-18	294	15
32363.104	.02	61	48	5	3.8	-18	294	15
32389.864	.01	58.4	45.8		2.1	-18	294	15
32437.422	.02	67	54	4	3.4	-18	294	15
32443.294	.02	65	53	5	1.7	-18	295	15
32452.977	.01	57	44	4	3.8	-18	295	15
32479.780	.01	61	48	5	3.8	-18	295	15
32509.579	.01	55.1	41.6		3.8	-18	295	15
32586.131	.01	59.7	46.9		2.1	-17	295	15
32612.925	.02	63	49	5	2.1	-18	295	15
32639.511	.02	63	50	5	3.8	-17	295	15
32652.835	.01	63	50	5	3.8	-17	295	15
32712.065	.02	61	48	4	3.0	-17	295	15
32715.490	.02	66	52	5	3.8	-12	295	15
32728.013	.02	65	52	5	2.1	-17	295	15
32738.190	.01	58.4	45.0		3.8	-17	295	15
32755.822	.02	60	47	4	3.8	-17	295	15
32777.972	.01	56	43	4	3.8	-17	295	15
32821.153	.02	61	48	4	2.6	-17	295	15
32830.714	.02	67	56	4	1.7	-17	294	15
32867.473	.02	64	51	5	3.8	-17	294	15
32887.192	.05	64	49	4	3.4	-17	294	15
32956.03	.10	64	51	3	3.4	-17	294	15
32956.42	.10	64	50	2	3.4	-17	294	15

NAME: 2,5-DIHYDROFURAN			CONTINUED					ID NO. 340.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
32962.217	.02	57	44	4	3.8	-17	294	15
32967.274	.02	62	49	4	3.0	-17	294	15
32995.422	.02	55	42	4	3.8	-17	294	15
33029.324	.02	64	50	5	1.7	-17	294	15
33045.733	.02	63	50	4	3.4	-17	294	15
33051.425	.02	63	49	5	2.1	-17	293	15
33058.65	.10	65	52	2	2.6	-17	293	15
33073.759	.02	63	50	4	3.4	-17	293	15
33085.979	.02	64	50	4	3.0	-17	293	15
33119.348	.02	66	53	4	3.8	-17	293	15
33127.949	.05	62	51	4	3.8	-17	293	15
33129.504	.05	61	47	4	2.1	-17	293	15
33130.46	.10	63	49	2	1.7	-17	293	15
33136.861	.02	59	47	4	3.8	-17	293	15
33138.915	.02	63	50	4	2.6	-17	293	15
33140.826	.01	60.0	46.6		2.1	-17	293	15
33149.270	.01	59.9	46.7		2.1	-17	293	15
33158.758	.02	63	49	5	2.6	-17	293	15
33163.779	.05	66	55	3	3.0	-17	293	15
33170.514	.02	56	43	4	3.8	-13	293	15
33177.474	.05	67	55	4	2.1S	-17	293	15
33188.557	.02	61	48	4	3.4	-17	293	15
33193.211	.02	64	52	4	3.8	-17	293	15
33196.294	.02	64	50	4	3.0	-17	293	15
33197.768	.02	61	48	4	2.1	-17	293	15
33213.70	.10	66	52	2	2.6	-17	293	15
33221.448	.05	66	54	4	2.6	-17	294	15
33236.454	.01	57	44	4	3.8	-17	294	15
33238.405	.02	60	47	4	2.1	-17	294	15
33245.623	.01	58.6	45.4		3.4	-17	294	15
33252.472	.02	64	51	5	2.6	-17	294	15
33257.391	.05	58	44	4	2.6	-17	294	15
33266.167	.02	67	53	5	1.7	-17	294	15
33275.000	.02	57	44	4	3.4	-17	294	15
33276.568	.02	60	46	4	3.0	-17	294	15
33289.243	.05	63	50	4	1.7	-17	294	15
33292.091	.02	60	47	4	3.0	-17	294	15
33296.843	.02	65	52	4	1.7	-17	294	15
33303.837	.05	66	54	4	1.7	-17	294	15
33305.751	.02	64	51	4	1.7	-17	294	15
33310.737	.02	56	43	4	3.8	-17	294	15
33316.697	.02	58	44	4	3.4	-17	294	15
33318.097	.05	60	46	4	3.0	-17	294	15
33320.505	.01	57.6	44.2		1.7	-17	294	15
33324.598	.02	65	52	4	3.8	-17	294	15
33330.634	.02	63	50	4	3.0	-17	294	15
33334.328	.02	64	51	4	2.1	-17	294	15
33340.55	.10	61	50	3	2.6	-17	294	15
33344.999	.02	60.3	47.3		2.6	-17	294	15
33348.28	.10	63	50	3	2.6	-17	294	15

NAME: 2,5-DIHYDROFURAN		CONTINUED						ID NO. 340.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
33364.625	.05	57	44	4	3.8	-17	294	15
33366.302	.01	54.8	41.1		3.8	-17	294	15
33370.887	.02	56	43	4	2.1	-17	294	15
33372.38	.10	64	51	2	1.7	-17	294	15
33373.962	.05	62	50	4	1.7	-17	294	15
33376.509	.02	60	49	4	3.4	-17	294	15
33385.930	.02	56	43	4	1.7	-17	294	15
33392.678	.02	55	41	4	3.4	-17	294	15
33393.84	.10	60	47	2	2.6	-17	294	15
33408.65	.10	63	51	3	2.6	-17	294	15
33409.34	.20	65	52	2	2.15	-17	294	15
33414.173	.02	58	45	4	2.1	-17	294	15
33417.788	.02	64	51	5	2.1	-17	294	15
33425.904	.01	56.0	42.6		3.8	-17	294	15
33436.96	.10	60	45	3	3.8	-17	294	15
33438.121	.02	55.4	41.7		3.8	-17	294	15
33440.259	.02	59	45	4	1.7	-17	294	15
33452.13	.10	66	52	2	2.6	-17	294	15
33456.584	.02	59	47	4	2.6	-17	294	15
33459.142	.01	62	51	5	2.1	-17	293	15
33462.131	.02	58	45	4	3.8	-17	293	15
33465.925	.01	54.8	41.4		3.0	-17	293	15
33473.327	.02	62	49	5	3.4	-17	293	15
33493.334	.02	64	51	4	2.1	-17	293	15
33496.318	.02	62	50	4	3.0	-17	293	15
33502.946	.02	62	50	5	2.1	-17	293	15
33506.342	.02	59	46	4	3.8	-17	293	15
33509.098	.02	56	42	4	3.4	-17	293	15
33511.496	.05	56	43	4	3.8	-17	293	15
33517.723	.01	59.0	46.3		3.8	-17	293	15
33523.097	.02	59	45	4	3.8	-17	293	15
33532.716	.01	56.6	43.3		2.1	-17	293	15
33545.440	.02	58	45	4	3.0	-17	293	15
33547.619	.02	64	51	5	2.1	-16	293	15
33552.655	.01	54.9	41.7		3.0	-17	293	15
33556.18	.10	60	46	2	3.8	-16	293	15
33564.20	.10	57	44	3	3.8	-17	294	15
33570.429	.02	65	53	5	2.1	-17	294	15
33572.909	.02	65	51	5	3.0	-17	294	15
33578.887	.02	60	47	4	3.0	-17	294	15
33581.876	.02	57	44	4	3.8	-17	295	15
33583.546	.02	63	50	4	3.8	-17	295	15
33589.913	.01	59.0	46.5		2.1	-17	295	15
33594.566	.01	56.0	42.7		3.4	-17	295	15
33599.249	.02	58	45	4	3.8	-17	295	15
33606.561	.01	58	45	4	3.8	-17	295	15
33625.334	.02	59	46	4	2.6	-17	295	15
33628.759	.02	60	48	4	2.6	-17	295	15
33633.497	.02	54	40	4	3.0	-17	295	15
33637.427	.02	55	42	4	3.8	-17	295	15

NAME: 2,5-DIHYDROFURAN CONTINUED								ID NO. 340.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
33640.582	.05	64	51	4	2.6	-17	295	15
33641.37	.10	67		1	2.1	-17	295	15
33643.055	.05	59	47	4	1.7	-17	295	15
33645.974	.01	58.7	45.2		3.8	-17	295	15
33654.343	.01	63	51	5	1.7	-17	295	15
33658.35	.20	59	44	3	3.8	-17	295	15
33658.83	.10	60	46	2	3.8	-17	295	15
33668.356	.05	55	40	4	3.8	-17	295	15
33674.543	.01	59.9	47.3		3.0	-17	295	15
33678.740	.02	61	49	4	2.1	-17	295	15
33681.068	.01	53.2	39.9		3.8	-17	295	15
33691.83	.10	66	53	2	3.0	-17	295	15
33699.059	.01	55	42	4	3.8	-17	295	15
33701.525	.05	63	49	4	3.8	-17	295	15
33708.610	.02	64	51	4	2.6	-17	295	15
33715.226	.02	55	42	4	3.8	-17	295	15
33716.56	.20	65	50	2	3.8	-17	295	15
33725.211	.01	56.4	43.1		3.8	-17	295	15
33741.720	.02	57	44	4	3.0	-17	295	15
33746.994	.01	55.5	42.3		3.8	-17	295	15
33762.080	.01	56	44	4	3.8	-17	295	15
33764.710	.01	56.8	43.4		3.8	-17	295	15
33777.537	.05	58	44	4	3.8	-17	295	15
33778.747	.01	56.1	42.7		3.8	-17	296	15
33782.431	.02	62	50	4	2.1	-17	296	15
33789.08	.10	56	43	3	3.8	-17	296	15
33789.49	.10	57	43	2	3.8	-17	296	15
33797.575	.01	55.2	41.6		3.4	-17	296	15
33803.452	.01	56	43	4	3.0	-17	296	15
33807.521	.01	57.5	45.0		2.6	-17	296	15
33810.179	.01	59	46	4	3.4	-17	296	15
33819.744	.02	66	53	4	2.6	-17	296	15
33823.556	.02	67	53	4	3.0	-17	296	15
33837.187	.02	61	47	5	2.1	-17	296	15
33895.43	.10	59	45	3	3.8	-17	296	15
33896.05	.10	57	43	2	3.0	-17	296	15
33920.135	.01	59.2	46.0		1.7	-17	296	15
33942.981	.02	64	51	5	3.4	-17	296	15
33959.024	.02	63	50	4	3.0	-17	297	15
33962.761	.02	66	53	5	2.6	-17	297	15
34174.802	.02	64	51	5	3.4S	-17	297	15
34189.579	.02	62	49	4	3.8	-17	297	15
34192.217	.01	56.2	42.9		3.8	-17	296	15
34288.731	.01	62	48	5	3.8	-17	296	15
34306.728	.02	66	53	4	3.4	-17	296	15
34321.811	.01	58.2	44.9		2.1	-17	296	15
34338.170	.02	67	53	4	3.4	-17	296	15
34412.192	.02	60	47	4	2.1	-17	297	15
34464.586	.02	64	51	5	2.1	-17	297	15
34517.732	.02	64	51	4	2.6	-17	297	15

NAME: 2,5-DIHYDROFURAN CONTINUED								ID NO. 340.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
34537.461	.02	64	51	5	2.1	-17	297	15
34550.837	.02	64	51	5	1.7	-17	296	15
34556.328	.02	63	49	5	1.7	-17	296	15
34585.480	.01	57.6	44.3		2.1	-17	297	15
34627.354	.02	66	54	5	1.7S	-17	296	15
34656.805	.02	65	52	5	3.4	-17	297	15
34675.265	.01	57.6	44.7		3.8	-17	297	15
34788.284	.02	65	52	5	2.1	-17	297	15
34810.713	.02	67	53	4	1.7	-17	297	15
34862.796	.02	60	46	4	1.7	-17	297	15
34908.589	.01	61	47	5	2.1	-17	296	15
35058.144	.01	58.3	45.3		3.8	-17	296	15
35093.021	.02	57	44	4	2.1	-17	296	15
35200.800	.02	67	55	5	2.1	-17	297	15
35247.223	.01	59.7	46.4		2.1	-17	295	15
35329.047	.01	64	50	5	2.1	-17	295	15
35379.395	.02	65	53	5	3.4	-17	295	16
35386.162	.01	60.4	47.3		3.0	-17	295	15
35408.225	.02	66	53	5	1.7	-17	295	15
35427.386	.02	64	51	5	2.1	-17	295	15
35447.177	.02	63	51	5	2.1	-17	295	15
35502.162	.05	67	53	4	1.7	-17	295	15
35512.258	.02	62	49	5	3.8	-17	295	15
35568.802	.01	58.5	45.3		2.1	-17	295	15
35591.947	.02	65	52	5	1.7	-17	295	15
35602.651	.02	67	53	4	2.1	-17	295	15
35615.983	.02	68	54	5	1.7	-17	295	15
35644.421	.01	57.9	45.1		3.8	-17	295	15
35660.858	.02	66	53	4	2.1	-16	295	15
35729.707	.02	62	48	5	3.0	-16	295	15
35732.921	.01	58.0	44.8		2.1	-16	295	15
35758.191	.02	66	53	5	3.8	-16	295	15
35969.154	.02	66	53	4	2.1	-16	295	15
36074.256	.01	59.0	45.9		3.0	-16	295	15
36156.341	.02	67	54	5	3.8	-15	295	15
36187.813	.02	65	52	5	3.8	-15	295	15
36191.034	.02	67	54	5	3.0	-15	295	15
36224.488	.02	60	46	4	3.0	-16	295	15
36225.57	.10	65	51	2	3.0	-16	295	15
36228.63	.10	63	49	3	3.4	-16	295	15
36229.32	.10	61	47	2	3.0	-15	295	15
36373.43	.10	61	48	3	2.1	-15	295	15
36413.080	.02	61	48	4	2.1	-15	295	15
36438.601	.02	63	51	5	3.4	-15	295	15
36466.265	.01	59.8	46.6		1.7	-16	295	15
36489.224	.02	62	49	4	3.8	-15	295	15
36499.206	.01	56.4	43.5		3.8	-16	294	15
36523.537	.01	57.0	43.9		2.1	-16	294	15
36539.517	.02	64	52	4	3.8	-15	295	15
36547.695	.01	59.0	45.8		1.7	-15	295	15

NAME: 2,5-DIHYDROFURAN		CONTINUED				ID NO. 340.00		
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
36623.680	.02	63	50	5	2.1	-15	295	15
36641.179	.02	62	48	4	2.1	-16	295	15
36708.852	.02	63	50	5	1.7	-15	295	15
36766.069	.05	67	54	4	3.0S	-15	295	15
36785.478	.01	61	48	5	2.1	-15	295	15
36923.965	.01	61	47	5	2.1	-15	293	15
36948.726	.01	57.4	44.3		3.0	-15	293	15
36968.103	.02	66	53	5	3.0S	-15	294	15
37001.164	.01	61	48	5	3.0	-15	294	15
37028.101	.02	66	52	5	3.8	-15	295	15
37057.702	.01	59	46	4	2.1	-15	280	15
37084.308	.02	66	54	5	3.8	-15	296	15
37148.097	.02	67	54	4	1.7	-15	296	15
37229.852	.01	61	48	5	3.8	-16	294	15
37244.462	.01	56.8	43.6		3.8	-16	295	15
37250.853	.01	52.3	39.1		3.8	-16	295	15
37261.178	.05	61	47	4	3.8	-16	294	15
37279.297	.01	59.4	46.1		3.4	-16	294	15
37298.745	.02	65	52	5	3.0	-16	295	15
37323.056	.02	65	52	4	2.1	-16	295	15
37364.372	.01	54.9	41.7		3.8	-16	295	15
37372.215	.05	61	46	4	3.8	-16	295	15
37420.236	.02	67	54	4	3.4	-16	295	15
37449.117	.01	57.3	44.0		3.8	-16	295	15
37466.711	.02	65	53	5	2.1	-16	295	15
37482.901	.02	59	45	4	1.7	-16	295	15
37484.78	.20	65	52	2	1.7S	-16	295	15
37522.879	.02	60.4	47.1		3.8	-16	295	15
37538.591	.02	66	53	5	3.4	-16	295	15
37580.918	.01	59.1	45.9		2.1	-16	295	15
37588.765	.02	64	50	5	3.8	-16	295	15
37690.962	.01	57.9	44.6		3.8	-16	295	15
37711.492	.02	63	49	4	3.8	-17	295	15
37781.276	.02	65	52	5	3.8	-16	295	15
37887.497	.01	55.5	42.3		3.8	-17	295	15
37947.480	.02	63	50	4	3.8	-17	295	15
37984.39	.10	67	53	3	3.4	-17	295	15
37998.959	.01	59.7	45.7		3.8	-17	295	15
38094.186	.02	62	49	5	3.8S	-16	295	15
38107.641	.02	63	49	5	1.7	-16	295	15
38144.999	.10	66	52	2	1.7	-16	295	15
38186.692	.05	61	48	4	2.1	-16	295	15
38308.973	.02	66	52	5	2.1	-16	296	15
38313.478	.01	56.9	43.8		3.0	-16	295	15
38432.766	.05	66	52	4	2.1S	-16	296	15
38434.827	.01	61	49	5	3.0	-16	296	15
38437.354	.01	56.4	43.5		3.8	-16	296	15
38496.503	.02	64	51	4	1.7	-16	296	15
38588.44	.20	67	53	3	2.1S	-16	295	15
38589.500	.02	59	46	4	2.1	-16	295	15

NAME: 2,5-DIHYDROFURAN CONTINUED								ID NO. 340.00
ν_o, MHz	U, MHz	$-10 \log \gamma$	$-10 \log \frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
38598.706	.02	61	48	4	2.1	-16	295	15
38627.835	.01	57.8	44.8		2.1	-15	295	15
38677.043	.01	63	49	5	3.8	-15	295	15
38690.096	.02	65	52	5	3.8	-15	295	15
38794.214	.01	60.1	47.8		1.7	-15	295	15
38830.595	.01	57.7	44.4		3.8	-15	295	15
38856.653	.05	67	54	4	2.6S	-15	295	15
38904.069	.01	55.0	41.9		3.8	-15	295	15
38936.306	.02	60.4	47.3		2.1	-15	295	15
38948.709	.02	65	52	4	3.0	-15	295	15
38957.634	.02	63	50	5	3.0	-15	295	15
39063.410	.02	63	50	5	3.8	-15	295	15
39069.571	.01	59.9	46.5		3.8	-15	295	15
39074.823	.01	61	48	5	2.1	-15	295	15
39092.011	.02	64	51	5	1.7	-15	295	15
39136.518	.02	66	53	5	3.4	-15	295	15
39143.144	.02	61	48	4	3.0	-15	295	15
39161.445	.02	67	54	5	2.1	-15	295	15
39217.147	.02	67	54	4	2.1	-14	294	15
39257.077	.01	56.2	42.9		3.8	-15	295	15
39297.958	.01	55.5	42.4		3.8	-14	294	15
39314.74	.10	67	55	2	3.0	-14	294	15
39342.697	.02	64	51	4	3.4	-14	294	15
39354.319	.02	66	54	4	3.0	-14	294	15
39376.137	.02	66	53	5	1.7S	-14	294	15
39395.704	.02	64	52	5	2.6	-14	295	15
39401.32	.20	65	53	2	3.8S	-14	295	15
39429.47	.10	67	54	3	3.0	-14	295	15
39455.595	.02	62	48	5	3.0	-14	295	15
39457.390	.02	59	45	4	3.8	-14	295	15
39464.170	.02	66	54	4	1.7	-14	295	15
39500.204	.02	65	52	4	2.6	-14	295	15
39513.729	.02	62	49	5	3.8	-14	295	15
39603.827	.02	65	53	5	2.1	-14	295	15
39607.124	.01	57.3	44.0		3.8	-14	295	15
39626.92	.20	66	52	3	3.8S	-14	295	15
39629.040	.01	54.1	40.8		3.8	-14	295	15
39663.034	.02	62	49	4	3.8	-14	295	15
39672.170	.05	65	52	4	3.4S	-14	295	15
39705.249	.02	64	50	5	3.4	-14	295	15
39723.950	.02	62	48	5	1.7	-14	295	15
39733.886	.01	62	49	5	3.8	-14	295	15
39738.800	.02	64	51	5	2.1	-14	295	15
39742.022	.01	59.1	46.7		3.8	-14	295	15
39749.966	.02	62	50	4	1.7	-14	295	15
39769.667	.01	59.8	46.8		3.8	-14	295	15
39795.619	.05	65	52	4	3.8	-14	295	15
39807.676	.02	62	50	4	3.8	-14	295	15
39813.292	.05	65	52	4	2.1	-14	295	15
39823.209	.01	62	49	5	3.8	-14	295	15

NAME: 2,5-DIHYDROFURAN CONTINUED								ID NO. 340.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
39829.586	.02	61	47	4	3.8	-14	293	15
39851.339	.02	65	52	4	1.7	-14	293	15
39866.942	.02	61	48	5	3.8	-14	293	15
39893.686	.02	56	43	4	3.8	-14	293	15
39906.632	.01	55.1	41.8		3.8	-14	278	15
39911.938	.02	65	52	5	2.6	-14	294	15
39928.990	.02	64	52	4	3.8	-14	294	15
39939.172	.01	59	46	4	2.1	-14	294	15
39943.609	.02	62	49	5	2.6	-14	294	15
39958.923	.02	65	53	4	3.8	-14	294	15
39962.148	.01	60.5	47.4		3.8	-14	294	15
39965.849	.05	60	45	4	3.8	-14	294	15
39969.03	.10	66	52	4	2.6S	-14	294	15
39972.945	.01	59.7	46.5		2.6	-14	294	15
39991.339	.02	65	52	4	2.6	-14	294	15

2(3H)-Dihydrofuranone

Formula: $\underbrace{CH_2CH_2CH_2COO}$

CAS Registry number: 96-48-0

Synonyms: 4-butyrolactone, 4-hydroxybutanoic acid lactone, γ-hydroxybutyric acid lactone

NBS identification number: 785.00

Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Eastman 6922. Gas chromatography with a Chromosorb 102 column showed impurity peaks of 0.08, 0.07, and 1.24 percent. The sample was purified by vacuum distillation.

Remarks.- The sample was strongly adsorbed in the cell, so that considerable time was required to achieve a stable pressure.

The lines are unusually broad, and most of them are distorted by unresolved or partially resolved overlaps. The narrowest lines, which were symmetrical, had half-widths between 400 and 500 kHz at a pressure of 5 millitorr.

The sample pressure of 5 millitorr was registered by a thermocouple gage as 20 millitorr.

NAME: 2(3H)-DIHYDROFURANONE ID NO. 785.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
27014.19	.10	67	46	4	3.8	-17	297	5
27508.251	.05	65	44	4	3.8	-17	296	5
27563.010	.02	60.4	40.5		3.0	-17	296	5
27574.377	.02	63	44	5	3.4	-17	296	5
28036.461	.02	65	44	5	3.4	-17	296	5
28093.747	.02	60.0	40.3		3.4	-17	296	5
28100.48	.20	63	43	3	2.1	-17	296	5
28445.878	.02	67	48	5	2.1	-17	296	5
28513.37	.20	67	46	3	3.4S	-17	296	5
28523.650	.02	66	46	4	3.0	-17	296	5
28757.008	.02	67	47	4	2.1	-18	296	5
28792.94	.20	67		1	1.7	-18	296	5
28793.30	.20	67	47	2	1.7	-18	296	5
29959.665	.05	67	47	4	2.6	-17	293	5
30180.18	.20	66	46	2	3.0	-17	294	5
30274.58	.10	68	46	4	3.0	-17	294	5
30330.503	.05	60	40	4	3.8	-17	294	5
30342.833	.05	66	43	4	3.4	-17	294	5
30394.082	.02	64	45	5	3.8	-17	295	5
30478.544	.02	64	45	5	3.8	-17	295	5
30888.654	.05	67	48	4	2.1	-17	295	5
31143.145	.05	68	45	5	2.1	-18	295	5
31148.38	.20	64	42	3	2.6S	-18	295	5
31159.66	.10	68		1	3.8	-18	295	5
31164.07	.20	64	41	3	1.7S	-18	295	5
31183.320	.02	62	41	5	2.1	-18	295	5
31211.34	.20	66	45	3	3.4	-18	295	5
31212.15	.20	66	46	2	3.4	-18	295	5
31598.002	.02	62	41	5	2.1	-18	295	5
31611.30	.20	66	46	3	3.4	-18	295	5
31612.81	.20	66	45	2	3.4	-18	295	5
31617.835	.05	67	47	4	3.4	-18	295	5
31871.900	.05	66	45	4	3.0	-18	295	5
31889.277	.02	65	45	5	3.4	-18	295	5
31920.66	.20	66	45	3	3.4	-18	295	5
31921.58	.10	66		1	3.4	-18	295	5
31984.127	.02	67	48	5	1.7	-18	295	5
32099.86	.20	67	47	3	2.6S	-18	295	5
32101.36	.20	67	47	2	2.6	-18	295	5
32214.346	.05	66	46	4	3.8	-18	295	5
32217.217	.02	67	47	5	3.8	-18	295	5
32262.170	.02	59	39	4	3.8	-18	295	5
32270.821	.05	62	41	4	3.4	-18	295	5
32336.88	.20	66	45	3	1.7	-18	295	5
32337.91	.20	66	46	2	1.7	-18	295	5
32400.35	.20	66	46	3	2.1	-18	295	5
32401.72	.20	66	46	2	2.1	-18	295	5
32436.359	.02	64	45	5	3.4	-18	295	5
32487.93	.20	67	47	3	3.8	-18	295	5
32489.19	.10	65		1	3.8	-18	294	5

NAME: 2(3H)-DIHYDROFURANONE CONTINUED								ID NO. 785.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
32605.510	.02	64	44	5	1.7	-17	294	5
32747.510	.02	62	42	5	3.4	-17	294	5
32814.254	.02	57.6	38.1		3.0	-17	294	5
32827.403	.05	61	42	4	3.0	-17	294	5
32832.99	.20	66	47	3	3.8S	-17	294	5
32834.53	.20	66	46	2	3.8	-17	294	5
32901.83	.20	66	47	3	3.0	-17	294	5
32923.01	.20	66	46	2	3.8	-17	294	5
32935.752	.05	67	46	5	2.6S	-17	294	5
32960.313	.05	60	40	4	3.0	-17	294	5
32965.62	.10	68	47	4	2.1	-17	294	5
32980.02	.20	63	41	3	2.6	-17	294	5
33048.33	.10	63	41	4	3.4	-17	294	5
33117.471	.02	57.3	37.5		3.8	-17	294	5
33126.915	.02	61	41	4	3.8	-17	294	5
33128.88	.20	66	46	2	2.1	-17	294	5
34178.567	.05	65	45	4	2.6	-17	294	5
34430.939	.02	65	45	5	2.1	-17	294	5
34716.55	.20	65	46	3	3.8	-17	294	5
34834.975	.02	63	43	5	3.4	-17	294	5
34956.056	.05	65	46	4	2.1	-17	294	5
35081.03	.20	66	48	3	2.1	-17	294	5
35153.842	.05	66	47	4	2.6	-17	294	5
35322.549	.05	63	44	4	1.7	-17	294	5
35723.205	.02	66	46	5	3.8	-16	294	5
35949.79	.20	65	46	3	3.8	-16	294	5
35990.444	.05	67	47	4	3.0	-16	295	5
36016.06	.20	64	44	3	3.0	-16	295	5
36017.36	.20	64	44	2	2.6	-16	295	5
36075.194	.02	57.4	37.3		3.4	-15	295	5
36077.67	.20	67	46	2	3.0	-15	296	5
36088.562	.02	61	40	5	3.8	-15	296	5
36288.451	.02	64	43	5	3.4	-15	296	5
36320.621	.02	62	42	5	1.7	-15	296	5
37016.417	.02	66	45	5	3.8	-15	296	5
37097.46	.20	65	45	3	3.4	-15	296	5
37097.98	.20	65	45	2	3.4	-15	296	5
37216.304	.05	67	46	4	3.8	-15	296	5
37337.79	.10	65		1	3.8S	-16	296	5
37345.660	.05	64	43	4	3.8	-16	295	5
37352.37	.10	67		1	2.1	-16	295	5
37355.47	.10	60		1	3.8	-16	295	5
37367.29	.20	66	44	2	3.8	-16	295	5
37373.01	.20	64	42	3	3.8	-16	295	5
37375.19	.10	62		1	3.8	-16	295	5
37380.89	.20	67	46	2	1.7	-16	295	5
37385.99	.20	68	46	3	3.8S	-16	295	5
37394.05	.20	66	45	2	1.7	-16	295	5
37402.71	.20	67	45	3	3.8	-16	296	5
37411.73	.10	62	41	4	3.8	-16	296	5

NAME: 2(3H)-DIHYDROFURANONE CONTINUED								ID NO. 785.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
37420.69	.10	67		1	3.8	-16	296	5
37421.85	.10	66		1	3.8	-16	296	5
37424.052	.05	59	38	4	2.6	-16	296	5
37434.754	.02	64	42	5	3.0	-16	296	5
37443.32	.20	64	42	3	3.8	-16	295	5
37445.84	.20	64	42	2	3.8S	-16	295	5
37453.91	.20	66	45	3	3.4	-16	295	5
37455.20	.20	64	43	2	3.8	-16	295	5
37459.715	.05	66	45	4	3.8	-16	295	5
37493.092	.05	60	38	6	3.0S	-16	295	5
37512.40	.20	65	43	3	3.4S	-16	295	5
37513.61	.10	64		1	3.8S	-16	295	5
37514.29	.20	65	42	2	2.1	-16	295	5
37516.64	.20	66	45	2	2.6	-16	295	5
37562.83	.20	61	39	4	3.4S	-16	295	5
37584.13	.10	64		1	3.8S	-16	295	5
37584.80	.20	64	42	2	3.8S	-16	295	5
37738.994	.02	66	47	5	2.1	-16	295	5
37881.20	.20	63	43	3	3.0	-16	295	5
37882.13	.10	65		1	2.1	-16	295	5
37883.42	.10	64	44	4	2.1	-17	296	5
37902.11	.20	66	46	2	3.8	-17	295	5
37930.88	.20	61	40	3	3.8	-17	296	5
37943.298	.02	56.2	36.3		3.8	-17	296	5
37947.59	.10	63		1	3.4	-17	296	5
37949.12	.10	60		1	3.8	-17	296	5
37978.248	.02	65	46	5	1.7	-17	296	5
38009.714	.02	55.1	35.5		3.4	-16	295	5
38024.744	.02	59	40	4	2.6	-16	296	5
38033.017	.05	65	47	4	3.8	-16	296	5
38085.05	.20	62	43	3	3.8	-16	296	5
38085.73	.10	62		1	3.0	-16	296	5
38121.527	.05	67	48	4	2.1	-16	296	5
38165.722	.01	56.0	36.3		1.7	-16	296	5
38178.355	.02	59	39	4	3.4	-16	295	5
38182.013	.05	66	48	4	3.8	-16	296	5
38184.609	.05	65	47	4	1.7	-16	296	5
38302.259	.02	66	47	4	2.1	-16	296	5
38312.102	.05	68	48	4	1.7	-16	296	5
38346.795	.02	66	45	5	1.7	-16	297	5
38380.63	.10	67	45	4	3.8	-16	296	5
38385.70	.10	65	43	4	3.8	-16	296	5
38389.933	.02	65	44	5	3.8	-16	296	5
38414.66	.10	67	44	4	1.7S	-16	296	5
38426.18	.20	67	45	3	1.7	-16	296	5
38430.166	.02	58.0	36.9		2.1	-16	295	5
38457.103	.02	64	43	5	1.7	-16	296	5
38465.918	.02	64	44	5	1.7	-16	296	5
38475.134	.05	67	45	4	1.7	-16	296	5
38534.924	.02	67	47	4	1.7	-16	296	5

NAME: 2(3H)-DIHYDROFURANONE CONTINUED								ID NO. 785.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
38724.083	.05	65	46	4	2.6	-15	296	5
38969.708	.05	64	43	4	1.7	-15	296	5
39052.80	.20	66	46	3	3.0	-15	296	5
39053.52	.20	64	44	2	3.0	-15	296	5
39062.380	.02	66	45	5	3.4	-15	296	5
39268.190	.02	62	42	5	3.0	-15	296	5
39424.579	.02	65	46	5	3.0	-14	296	5
39721.683	.05	66	46	4	3.4	-14	296	5
39725.475	.05	67	46	4	3.8S	-14	296	5
39727.837	.05	63	43	4	3.4	-14	296	5
39732.691	.05	64	43	4	3.0	-14	296	5
39775.202	.02	56.3	35.7		2.1	-14	295	5
39788.19	.20	63	43	2	3.8	-14	296	5
39795.01	.20	62	41	3	3.0	-14	296	5
39796.17	.20	63	42	2	3.0	-14	296	5
39804.602	.05	67	47	4	3.0	-14	296	5
39860.876	.05	63	42	4	3.0	-14	296	5

Epoxybutane

Formula: $\underset{\llcorner\!\!\_\!\!\lrcorner}{OCH_2}CHCH_2CH_3$

CAS Registry number: 26249-20-7

Synonym: 1,2-epoxybutane

NBS identification number: 966.00

Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was 1,2-epoxybutane, Aldrich 10,997-5, with a stated minimum purity of 99 percent. The sample was analyzed by the manufacturer using gas chromatography and infrared spectroscopy. Gas chromatography with a Chromosorb 102 column showed only 0.04 percent water as an impurity.

Remarks.- Many of the lines are distorted by unresolved overlaps.

The sample pressure of 10 millitorr was registered by a thermocouple gage as 46 millitorr.

NAME: EPOXYBUTANE								ID NO. 966.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26831.185	.02	67	52	4	3.0	-17	296	10
27209.602	.02	66	51	5	2.1	-17	296	10
27283.647	.02	65	51	4	3.0	-17	296	10
27428.000	.02	63	48	5	1.7	-17	296	10
27709.82	.20	68	53	2	1.7S	-17	296	10
27786.279	.05	67	52	4	2.1S	-17	296	10
28724.160	.02	65	50	5	2.1	-18	296	10
28747.902	.05	67	52	5	3.4S	-18	296	10
28915.924	.02	62	48	5	2.6	-18	296	10
29055.16	.10	66	51	2	2.6	-18	296	10
29936.750	.05	66	51	5	2.6S	-17	296	10
30246.530	.02	67	53	4	3.0	-17	296	10
30371.132	.02	66	52	5	1.7	-17	296	10
30543.307	.02	64	49	4	2.1	-17	296	10
30562.109	.02	64	50	4	3.4	-17	296	10
30652.616	.02	67	52	4	2.1	-17	296	10
30788.870	.02	62	47	5	1.7	-17	296	10
31120.266	.02	66	51	4	2.1	-18	296	10
31449.078	.02	68	53	4	3.8	-18	296	10
32312.296	.02	67	52	4	3.0	-18	296	10
32365.16	.20	68	52	2	2.1	-18	296	10
32399.707	.02	68	54	5	3.0	-18	296	10
32541.620	.02	66	51	5	2.6	-18	296	10
32588.431	.02	66	52	4	1.7	-18	296	10
32682.677	.05	67	53	4	2.1S	-17	295	10
32709.616	.02	67	53	4	1.7	-17	295	10
32750.415	.05	63	48	4	2.1	-17	295	10
33055.482	.02	61	46	5	2.6	-17	295	10
33218.62	.10	67	51	3	1.7	-17	295	10
33278.948	.02	67	52	5	2.1S	-17	295	10
33405.931	.02	67	52	5	3.8	-17	295	10
33814.70	.20	65	50	3	2.1S	-17	295	10
33904.76	.20	66	51	3	2.1S	-17	295	10
34176.643	.02	64	49	5	3.0	-17	295	10
34446.083	.02	66	52	4	1.7	-17	295	10
34505.384	.02	66	52	4	3.0	-17	295	10
34866.204	.02	66	51	4	1.7	-17	295	10
35097.080	.02	66	51	5	1.7	-17	295	10
35100.090	.02	67	53	5	3.4S	-17	295	10
35117.274	.02	66	51	5	3.0S	-17	295	10
35345.707	.01	63	49	5	3.0	-17	295	10
35611.667	.02	67	52	4	2.1	-16	295	10
35714.793	.01	61	46	5	2.6	-16	295	10
35786.51	.10	64	49	3	3.8	-16	295	10
35888.324	.02	67	51	5	3.8	-16	295	10
35960.291	.02	67	52	5	3.0S	-16	295	10
36006.838	.05	67	52	4	3.8S	-16	295	10
36143.85	.10	67	52	3	3.8	-15	296	10
36198.33	.10	67	53	2	2.1	-16	296	10
36212.812	.02	67	52	5	2.1	-16	296	10

NAME: EPOXYBUTANE		CONTINUED						ID NO. 966.00
ν_o, MHz	U, MHz	$-10 \log \gamma$	$-10 \log \frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
36282.846	.02	65	50	4	1.7	-15	296	10
36322.820	.05	64	49	4	2.1	-15	296	10
36435.751	.05	67	51	4	1.7	-15	296	10
36725.734	.02	66	51	4	3.8	-15	296	10
36779.397	.02	67	52	5	1.7	-15	296	10
37177.507	.02	67	52	5	3.4	-16	296	10
37302.102	.02	64	48	4	3.8	-16	296	10
37329.783	.05	68	52	4	3.4	-16	296	10
37352.14	.20	67	51	2	2.1	-16	296	10
37481.946	.02	65	51	4	1.7	-16	296	10
37521.059	.02	67	52	5	2.1	-16	296	10
37524.976	.02	65	49	4	1.7	-16	297	10
37602.109	.02	66	51	4	3.8	-16	297	10
37643.90	.20	65	48	3	3.8	-17	297	10
37736.537	.02	66	51	5	1.7	-16	296	10
37779.716	.05	66	52	4	3.8S	-16	296	10
37797.42	.10	63	48	2	2.1	-17	296	10
37804.25	.10	66	50	3	3.8	-17	296	10
37848.480	.02	66	52	5	2.6	-16	296	10
37863.076	.02	62	47	4	3.8	-17	296	10
37870.554	.02	67	53	4	3.8	-17	296	10
37896.778	.02	64	50	5	2.1	-17	296	10
37909.469	.01	59.3	44.4		3.8	-17	296	10
37926.68	.10	63	48	3	3.8	-16	296	10
37937.420	.02	62	47	5	1.7	-17	297	10
37939.806	.02	61	46	4	1.7	-17	297	10
37944.112	.02	65	50	4	3.8	-17	297	10
38009.239	.02	63	47	4	3.4	-17	297	10
38027.660	.02	65	50	5	2.1	-16	297	10
38047.852	.05	63	48	4	3.8	-16	297	10
38117.368	.02	65	49	4	1.7	-17	297	10
38144.416	.02	61	45	4	1.7	-16	296	10
38150.964	.02	65	50	4	1.7	-16	296	10
38193.106	.02	66	51	4	1.7	-16	296	10
38207.727	.05	67	52	4	1.7S	-16	296	10
38208.665	.05	67	52	4	1.7	-16	296	10
38244.353	.01	59.2	44.4		2.1	-16	296	10
38291.57	.10	67	52	3	2.1	-16	296	10
38292.42	.10	67	52	2	2.1	-16	296	10
38296.493	.01	59.6	44.7		2.6	-16	295	10
38306.883	.02	63	47	4	3.0	-16	296	10
38318.464	.02	63	49	5	1.7	-16	296	10
38328.466	.02	62	48	4	2.1	-16	296	10
38331.07	.10	68	54	2	2.1S	-16	296	10
38339.35	.10	66	51	3	2.6	-16	296	10
38364.720	.02	67	52	5	2.1	-16	297	10
38450.46	.10	65	50	3	1.7	-16	297	10
38512.015	.02	65	50	5	2.1	-16	297	10
38525.668	.02	66	51	5	1.7	-16	297	10
38565.20	.10	67	51	4	2.6S	-16	297	10

NAME: EPOXYBUTANE		CONTINUED						ID NO. 966.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
38608.58	.10	65	50	2	1.7	-16	297	10
38639.587	.02	68	53	5	2.1	-16	297	10
38640.87	.10	68	53	3	2.1	-16	296	10
38680.229	.02	64	49	4	3.4	-15	296	10
38749.705	.05	67	50	4	3.0	-15	296	10
38754.544	.01	60.2	45.3		2.1	-15	295	10
38788.461	.02	65	51	4	1.7	-15	296	10
38813.639	.01	61	47	5	1.7	-15	296	10
38919.38	.20	67	52	3	2.1S	-15	296	10
38924.15	.10	66	51	4	2.1S	-15	296	10
38925.179	.02	66	50	4	2.1	-15	296	10
38933.506	.01	59.9	45.1		2.1	-15	295	10
38935.33	.20	65	48	2	3.0	-15	296	10
38949.237	.05	66	52	4	1.7	-15	296	10
38976.274	.01	59.2	44.6		1.7	-15	295	10
38981.741	.02	65	51	4	2.6	-15	295	10
38990.251	.02	63	48	5	3.8	-15	295	10
38991.441	.02	64	50	4	3.8	-15	295	10
39009.271	.02	64	49	4	1.7	-15	295	10
39022.427	.02	64	50	5	1.7	-15	295	10
39028.751	.02	64	49	4	2.1	-15	295	10
39030.765	.05	66	51	4	2.1	-15	295	10
39153.24	.10	67	52	3	3.4	-15	295	10
39154.28	.20	65	50	2	3.4S	-15	295	10
39182.057	.02	65	50	5	2.1	-15	295	10
39233.838	.02	66	51	5	3.4	-14	295	10
39253.18	.20	65	49	3	2.1	-14	295	10
39254.13	.10	65	51	2	2.1	-14	295	10
39285.090	.02	63	48	5	1.7	-15	295	10
39313.965	.05	66	51	4	2.1	-14	295	10
39354.805	.02	64	49	4	1.7	-14	295	10
39354.803	.02	64	49	4	1.7	-14	295	10
39507.106	.02	65	50	4	2.1	-14	295	10
39699.802	.02	65	50	5	3.0	-14	295	10
39720.171	.02	63	48	5	3.8	-14	295	10
39751.005	.02	68	53	5	1.7	-14	295	10
39758.634	.02	67	52	5	3.8	-14	295	10
39796.57	.20	66	50	3	3.8	-14	295	10
39798.089	.05	60	44	4	3.8	-14	295	10
39814.528	.02	64	49	4	2.1	-14	295	10
39869.35	.10	64	49	3	3.8	-14	295	10
39870.287	.02	62	47	4	3.0	-14	295	10
39896.14	.10	60	45	3	3.4	-14	295	10
39898.642	.02	66	51	5	3.8	-14	295	10
39948.504	.02	66	50	4	2.6	-14	295	10
38970.275	.01	59.1	44.3		1.7	-15	295	10

Ethanol

Formula: CH_3CH_2OH

CAS Registry number: 64-17-5

Synonym: ethyl alcohol

NBS identification number: 145.00

Frequency range: 18 000 to 40 000 MHz

Sample.- The sample was U.S.I. Reagent grade U.S.P.-N.F. ethyl alcohol. Chromatography on a Porapak N column showed only about 0.5 percent water as an impurity.

Remarks.- There are a number of doublets in this spectrum which are not resolved at the pressure used. In order to observe both components, it is necessary to use sample pressures below 10 millitorr.

No information on power level or Stark sensitivity is given below 26 500 MHz. In addition, the original data above that frequency did not include Stark sensitivity, but all lines in the higher range with $-10 \log \gamma$ of 63 or less have been rerun and no sensitive Stark effects were seen.

The sample pressure of 15 millitorr was registered by a thermocouple gage as 48 millitorr.

Sample identity was confirmed by matching six lines above 26 500 MHz with calculated transition frequencies (ref. 5).

NAME: ETHANOL								ID NO. 145.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
18540.599	.02	69	57	5	2.1		298	11
18749.240	.02	65	52	5	2.1		298	11
18936.825	.02	66	53	5	2.1		298	11
19238.695	.02	68	56	5	1.7		298	11
19288.437	.02	68	56	5	2.1		298	11
19931.828	.02	70	56	5	2.1		298	11
19959.728	.02	69	56	5	3.8		298	11
20111.097	.05	69	56	4	1.7		298	11
20495.586	.05	69	56	4	3.0		298	11
20547.343	.02	68	55	5	2.1		299	11
20645.99	.20	69	54	3	2.1		299	11
20646.60	.20	69	54	2	3.4		299	11
20834.53	.10	70	56	4	1.7		299	11
21048.507	.02	69	56	5	2.6		299	11
21281.588	.05	68	54	4	2.6		299	11
21285.934	.05	68	54	4	3.8		299	11
21311.874	.05	71	58	5	2.1		299	11
21606.398	.02	64	51	5	2.1		299	11
21896.381	.05	67	54	4	2.6		299	11
21899.531	.02	68	55	5	3.4		299	11
21910.237	.02	68	56	5	2.1		299	11
21990.206	.02	65	51	5	2.1		299	11
22474.405	.02	69	56	5	2.1		299	11
22520.84	.20	68	54	2	2.6		299	11
22531.899	.05	67	54	4	2.1		299	11
22811.789	.02	69	56	4	2.1		299	11
23127.71	.20	70	57	3	1.7		299	11
23128.22	.20	69	55	2	2.6		299	11
23130.19	.20	68	55	3	3.4		299	11
23177.564	.02	67	54	5	2.6		299	11
23222.56	.10	69	56	5	2.1		298	11
23263.47	.20	70	56	4	2.6		298	11
23428.782	.02	66	53	5	2.6		298	11
23493.47	.20	71	58	3	1.7		298	11
23493.77	.20	71	59	2	1.7		298	11
23596.41	.10	70	56	4	1.7		298	11
23665.04	.20	69	56	3	3.4		298	11
23665.53	.20	69	56	2	2.1		298	11
23876.934	.05	67	53	4	2.1		297	11
23947.56	.20	69	56	3	2.1		297	11
23947.96	.20	69	56	2	3.4		298	11
24124.208	.02	69	56	5	2.1		298	11
24126.999	.05	69	56	5	2.1		298	11
24288.613	.02	69	55	5	1.7		298	11
24383.265	.02	65	51	5	2.1		298	11
24789.50	.20	69	56	2	2.1		298	11
25063.94	.10	69	55	4	1.7		298	11
25170.971	.02	69	57	5	3.0		299	11
25624.751	.02	67	54	4	2.1		299	11
26064.160	.02	71	58	5	2.6		299	11

NAME: ETHANOL			CONTINUED					ID NO. 145.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
26085.118	.02	69	57	4	1.7		299	11
26148.261	.02	66	52	5	2.1		299	11
26225.97	.10	69	55	4	3.0		299	11
26251.71	.10	70	56	5	2.1		299	11
26283.687	.02	63	50	5	2.1		299	11
26294.539	.05	69	56	5	3.8		299	11
26409.51	.20	71	56	3	1.7		299	11
26409.77	.20	71	57	2	2.1		299	11
26436.90	.20	70	57	3	3.8		299	11
26437.45	.20	70	58	2	3.4		299	11
26501.80	.02	64		1	2.1	-18	293	15
26510.76	.02	62		1	2.1	-18	293	15
26756.345	.02	61	48	5	1.7	-17	293	15
26883.79	.05	65		1	2.1	-18	293	15
27144.19	.05	63		1	2.1	-18	293	15
27359.81	.02	63		1	2.1	-18	293	15
27434.56	.05	64		1	2.1	-18	293	15
27273.7	.10	70		1	2.1	-18	293	15
27646.42	.05	65		1	2.1	-18	293	15
27674.3	.10	65		1	2.1	-18	293	15
27686.0	.10	65		1	2.1	-18	293	15
27745.3	.10	67		1	2.1	-18	293	15
27749.0	.10	67		1	2.1	-18	293	15
27752.4	.10	69		1	2.1	-17	293	15
27768.1	.10	66		1	2.1	-17	293	15
27783.5	.10	68		1	2.1	-17	293	15
27790.5	.10	66		1	2.1	-17	293	15
27919.739	.02	62	49	5	2.1	-17	293	15
28014.166	.01	58	44	4	2.1	-17	293	15
28015.507	.02	59	46	4	3.4	-17	293	15
28075.3	.10	63		1	2.1	-17	293	15
28120.3	.10	65		1	2.1	-17	293	15
28198.8	.10	65		1	2.1	-17	293	15
28361.1	.10	66		1	2.1	-17	293	15
28396.285	.02	61	48	5	2.6	-17	293	15
28612.54	.05	65		1	2.1	-17	293	15
28722.5	.10	69		1	2.1	-17	293	15
28758.8	.10	76		1	2.1	-17	293	15
28768.1	.10	72		1	2.1	-17	293	15
28775.9	.10	67		1	2.1	-17	293	15
28872.84	.05	65		1	2.1	-17	293	15
28875.05	.05	65		1	2.1	-17	293	15
28905.3	.10	66		1	2.1	-17	293	15
28957.099	.02	59.3	45.8		2.6	-17	293	15
29067.91	.05	65		1	2.1	-18	293	15
29107.2	.10	70		1	2.1	-18	293	15
29118.6	.10	67		1	2.1	-18	293	15
29194.2	.10	68		1	2.1	-18	293	15
29255.84	.02	62		1	2.1	-18	293	15
29266.9	.10	64		1	2.1	-18	293	15

NAME: ETHANOL	CONTINUED							ID NO. 145.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
29323.4	.10	67		1	2.1	-18	293	15
29345.4	.10	63		1	2.1	-18	293	15
29359.1	.10	68		1	2.1	-18	293	15
29406.9	.10	64		1	2.1	-18	293	15
29677.0	.10	68		1	2.1	-18	293	15
29804.56	.05	62		1	2.1	-18	293	15
29979.384	.01	56.8	43.6		3.0	-18	294	15
30044.83	.05	62		1	2.1	-18	293	15
30340.2	.10	66		1	2.1	-17	293	15
30521.586	.02	61	48	5	2.1	-17	294	15
30670.17	.05	63		1	2.1	-17	293	15
30774.7	.10	65		1	2.1	-17	293	15
30785.7	.10	66		1	2.1	-18	293	15
30976.969	.02	61	48	5	3.8	-17	293	15
31132.9	.10	70		1	2.1	-18	293	15
31257.94	.10	62	48	3	3.0	-18	294	15
31264.7	.10	66		1	2.1	-18	293	15
31269.9	.10	66		1	2.1	-18	293	15
31276.51	.10	62	47	3	2.1	-18	294	15
31508.99	.05	63		1	2.1	-18	293	15
31592.272	.02	61	47	4	1.7	-18	294	15
31616.972	.01	61	48	5	3.0	-18	293	15
31662.8	.10	65		1	2.1	-18	294	15
31686.700	.01	61	48	5	3.8	-18	293	15
31760.9	.10	64		1	2.1	-18	293	15
31918.013	.02	61	48	5	3.0	-18	293	15
31990.75	.05	64		1	2.1	-18	293	15
31999.17	.05	64		1	2.1	-18	293	15
32067.3	.10	67		1	2.1	-18	293	15
32072.3	.10	68		1	2.1	-18	293	15
32185.621	.01	61	48	5	3.0	-18	293	15
32203.360	.02	61	48	5	3.4	-18	293	15
32297.06	.05	64		1	2.1	-18	293	15
32483.73	.10	62	48	3	2.1	-18	293	15
32509.2	.10	63		1	2.1	-18	293	15
32570.90	.10	60	47	2	3.8	-18	293	15
32712.180	.02	62	49	4	2.1	-18	293	15
32713.844	.02	62	50	4	3.8	-18	293	15
32742.823	.01	55.3	42.0		2.1	-17	293	15
32769.0	.10	66		1	2.1	-18	293	15
32773.3	.10	65		1	2.1	-18	293	15
32864.2	.10	63		1	2.1	-18	293	15
32871.38	.05	63		1	2.1	-18	293	15
33063.03	.05	63		1	2.1	-18	293	15
33095.6	.10	70		1	2.1	-17	293	15
33097.5	.10	69		1	2.1	-17	293	15
33122.5	.10	64		1	2.1	-17	293	15
33135.540	.02	60.3	46.8		2.1	-17	293	15
33208.334	.02	61	48	5	3.4	-17	293	15
33214.0	.10	68		1	2.1	-17	293	15

NAME: ETHANOL			CONTINUED					ID NO. 145.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
33246.42	.05	63		1	2.1	-17	293	15
33260.79	.10	61	47	2	2.1	-17	293	15
33487.520	.02	62	48	5	1.7	-17	293	15
33508.445	.02	62	48	5	1.7	-17	293	15
33638.1	.10	66		1	2.1	-17	293	15
33694.8	.10	68		1	2.1	-17	293	15
33712.1	.10	66		1	2.1	-17	293	15
33721.5	.10	64		1	2.1	-17	293	15
33760.1	.10	68		1	2.1	-17	293	15
33828.04	.05	62		1	2.1	-17	293	15
33836.54	.05	63		1	2.1	-17	293	15
33947.76	.10	62	49	3	2.1	-18	293	15
33948.39	.10	62	49	2	2.1	-18	293	15
34031.92	.05	63		1	2.1	-17	293	15
34039.2	.10	65		1	2.1	-17	293	15
34046.8	.10	64		1	2.1	-17	293	15
34156.1	.10	67		1	2.1	-17	293	15
34220.9	.10	65		1	2.1	-17	293	15
34264.1	.10	63		1	2.1	-17	293	15
34284.2	.10	64		1	2.1	-17	293	15
34312.863	.02	61	49	5	3.0	-17	293	15
34340.442	.01	58.3	44.7		2.1	-17	293	15
34541.525	.02	60.3	46.9		2.1	-17	293	15
34555.165	.02	61	48	5	1.7	-17	293	15
34601.7	.10	64		1	2.1	-17	293	15
34603.9	.10	64		1	2.1	-17	293	15
34611.1	.10	64		1	2.1	-17	293	15
34632.785	.02	61	48	5	3.0	-17	293	15
34680.413	.02	62	49	5	2.6	-17	293	15
34686.687	.02	62	49	5	2.1	-17	293	15
34820.8	.10	64		1	2.1	-17	293	15
34843.0	.10	64		1	2.1	-17	293	15
34880.8	.10	65		1	2.1	-17	293	15
35166.82	.05	63		1	2.1	-17	293	15
35175.106	.05	62	48	4	2.6	-17	296	15
35183.48	.05	63		1	2.1	-17	293	15
35298.504	.02	60	46	4	2.1	-17	296	15
35365.8	.10	71		1	2.1	-17	296	15
35392.9	.10	64		1	2.1	-17	296	15
35663.876	.02	61	48	5	3.0	-17	296	15
35675.8	.10	64		1	2.1	-17	296	15
35694.536	.02	61	48	5	1.7	-17	296	15
36064.812	.01	60.2	46.9		2.1	-16	296	15
36099.819	.02	61	48	5	2.1	-16	296	15
36105.596	.02	61	48	5	2.1	-16	296	15
36143.59	.10	61		1	3.4	-16	296	15
36377.568	.01	61	49	5	3.8	-16	296	15
36417.244	.01	54.8	41.4		2.1	-16	295	15
36438.6	.10	64		1	2.1	-16	295	15
36492.1	.10	67		1	2.1	-16	295	15

NAME: ETHANOL		CONTINUED						ID NO. 145.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
36566.213	.01	58.9	45.6		2.1	-16	295	15
36588.07	.05	62		1	2.1	-16	295	15
36821.07	.05	63		1	2.1	-16	295	15
36878.082	.02	57	44	4	3.0	-16	294	15
36896.5	.10	65		1	2.1	-16	295	15
36916.4	.10	64		1	2.1	-16	295	15
37020.42	.05	63		1	2.1	-16	295	15
37026.40	.05	62		1	2.1	-16	295	15
37030.139	.01	61	48	5	3.8	-16	294	15
37053.465	.01	57.5	44.3		2.1	-16	294	15
37088.6	.10	65		1	2.1	-16	294	15
37164.804	.02	61	48	5	2.1	-17	294	15
37170.104	.02	61	48	5	3.8	-16	294	15
37230.4	.10	67		1	2.1	-16	294	15
37266.6	.10	65		1	2.1	-16	294	15
37383.25	.05	62		1	2.1	-16	294	15
37388.504	.02	61	48	5	3.0	-16	294	15
37395.407	.01	61	48	5	3.4	-16	294	15
37458.1	.10	74		1	2.1	-16	294	15
37460.4	.10	67		1	2.1	-16	294	15
37493.2	.10	67		1	2.1	-16	294	15
37525.677	.01	59.5	46.9		3.0	-16	294	15
37566.518	.05	61	48	4	2.1S	-16	294	15
37568.789	.01	61	48	5	3.0	-16	294	15
37654.275	.02	61	48	5	2.1	-17	294	15
37659.833	.02	61	48	4	2.1	-17	294	15
37691.4	.10	64		1	2.1	-17	294	15
37719.20	.05	63		1	2.1	-17	294	15
37725.18	.05	63		1	2.1	-17	294	15
37766.9	.10	64		1	2.1	-17	294	15
37772.9	.10	67		1	2.1	-17	294	15
37780.36	.05	62		1	2.1	-17	294	15
37810.7	.10	68		1	2.1	-17	294	15
37879.394	.02	61	48	5	2.1	-17	294	15
37884.456	.02	61	48	5	3.0	-17	294	15
38045.3	.10	67		1	2.1	-17	294	15
38060.120	.01	61	48	5	2.6	-16	294	15
38063.294	.02	61	48	5	3.0	-16	294	15
38067.1	.10	64		1	2.1	-17	294	15
38090.8	.10	66		1	2.1	-16	294	15
38100.24	.05	63		1	2.1	-16	294	15
38138.18	.10	61	48	3	2.6	-16	294	15
38138.87	.10	61	48	2	2.1	-16	294	15
38263.027	.02	59.7	46.3		3.4	-16	293	15
38528.168	.02	59	45	4	3.0	-16	293	15
38558.6	.10	67		1	2.1	-16	293	15
38563.8	.10	68		1	2.1	-16	293	15
38620.45	.20	60	46	2	3.4	-16	293	15
38674.526	.01	60.3	46.8		2.1	-16	293	15
38742.61	.05	62		1	2.1	-16	293	15

NAME: ETHANOL		CONTINUED						ID NO. 145.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
38797.6	.10	67		1	2.1	-16	293	15
39015.1	.10	64		1	2.1	-15	293	15
39116.63	.05	63		1	2.1	-15	293	15
39178.53	.20	59	44	3	3.8	-15	293	15
39192.7	.10	65		1	2.1	-15	293	15
39234.547	.02	62	49	5	2.1	-15	293	15
39404.15	.10	61	47	3	2.1	-15	293	15
39404.88	.10	61	47	2	3.0	-15	294	15
39452.511	.02	61	48	5	2.1	-15	294	15
39458.724	.02	61	48	5	2.1	-15	294	15
39490.572	.01	58.3	44.9		3.4	-15	294	15
39603.3	.10	68		1	2.1	-15	293	15
39785.2	.10	66		1	2.1	-15	293	15
39801.66	.10	59	46	3	3.0	-15	294	15
39803.24	.10	59	46	2	3.8	-15	294	15
39882.32	.05	63		1	2.1	-15	293	15

Formaldehyde

Formula: HCHO
CAS Registry number: 50-00-0
Synonym: methanal
NBS identification number: 67.00
Frequency range: 18 000 to 40 000 MHz

Sample.- The sample source was Fisher F-79, a methanol-stabilized aqueous solution. Chromatography on a Porapak N column showed a single impurity of less than 1 percent. The sample was held at -95° C while vapors were admitted to the cell, and less than 0.2 percent methanol was found in the cell.

Remarks.- Power was not measured for each line in the frequency range below 26 500 MHz, but was approximately -13 to -16 dBm.

The strongest line (28 974.825 MHz) exhibits a positive frequency shift with pressure variations. The magnitude is approximately 1 kHz/mtorr at pressures up to 20 millitorr. Little asymmetry is shown; therefore, this shift is not reflected in the given measurement uncertainty.

The sample pressure of 15 millitorr was registered as 28 millitorr on a thermocouple gage.

All the reported lines have been verified theoretically (ref. 6).

NAME: FORMALDEHYDE ID NO. 67.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
19595.18	.10	65	54	4	2.1		298	14
22965.626	.02	52	37	7	2.1		299	14
24068.350	.02	51	38	7	2.6		299	14
26358.787	.02	64	53	5	2.1		299	14
27555.706	.02	62	48	4	1.7	-16	294	15
28582.37	.05	68		1	2.1	-17	294	15
28974.825	.01	40.9	27.2		2.1	-17	294	15
30819.21	.05	68		1	2.1	-17	294	15
33270.594	.01	47.0	34.1		3.0	-16	294	15
34100.053	.02	47.2	32.6		3.4	-17	294	15
34982.295	.01	59.9	49.5		2.1	-17	294	15

Formic acid, methyl ester

Formula: $HCOOCH_3$
CAS Registry number: 64-18-6
Synonyms: methyl methanoate, methyl formate
NBS identification number: 608.00
Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Eastman 13093 Spectro Grade methyl formate. Gas chromatography with a Chromosorb 102 column indicated a single impurity of about 4 percent, which was identified by its spectrum as methanol. This was reduced by vacuum distillation to a concentration of 0.3 percent or less in the cell.

Remarks.- Some of the lines are asymmetrical because of apparent unresolved overlaps.

The sample pressure of 11 millitorr was registered by a thermocouple gage as 35 millitorr.

Sample identity was confirmed by comparing two of the lines with calculated transition frequencies (ref. 3). Since there were only two lines calculated in the frequency range used, further verification was obtained by comparing the data with a spectral scan done on a different spectrometer in which a different sample source was used.

NAME: FORMIC ACID, METHYL ESTER								ID NO. 608.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26554.294	.05	68	53	4	3.4S	-18	297	12
27845.770	.02	67	52	5	2.1	-17	295	11
27881.001	.05	68	53	4	3.8S	-17	296	11
28677.219	.02	67	52	5	3.0	-18	296	11
29356.113	.02	67	53	5	3.0	-18	295	11
29401.60	.10	66	52	3	2.6	-18	295	11
29401.95	.10	66	52	2	2.6	-18	295	11
29417.490	.05	68	54	4	2.1	-18	295	11
29729.611	.02	65	51	4	1.7	-18	295	11
30162.775	.02	66	52	5	3.8	-17	295	11
30695.170	.02	67	54	5	2.6	-17	295	11
30973.188	.02	67	52	4	3.0	-17	295	11
31621.639	.05	66	52	5	3.8S	-18	295	11
31712.727	.02	67	52	5	3.4	-18	295	11
32206.006	.02	66	52	5	3.8	-18	295	11
32253.443	.02	66	51	4	3.8	-18	295	11
32724.307	.02	66	51	4	2.1	-17	295	11
33084.492	.05	67	53	4	2.6	-17	295	11
33142.184	.02	68	53	5	3.4	-17	295	11
33758.596	.02	67	52	4	2.6	-17	295	11
33904.167	.02	63	48	4	2.1	-17	295	11
34108.348	.02	65	51	5	3.8	-17	294	11
34156.698	.02	60	45	4	3.8	-17	294	11
34158.073	.02	60	45	4	3.8	-17	294	11
34160.653	.05	63	48	5	2.1S	-17	294	11
34197.437	.02	68	53	5	2.1	-17	294	11
34349.880	.02	68	53	5	1.7	-17	294	11
34426.523	.02	65	51	5	3.8	-17	294	11
34458.787	.02	65	51	5	3.4	-17	294	11
34476.392	.02	65	51	5	3.0	-17	294	11
34523.007	.02	64	49	5	3.0	-17	294	11
34671.768	.02	65	51	5	1.7	-17	294	11
34682.804	.02	64	50	4	2.1	-17	294	11
34765.974	.02	66	52	5	2.1	-17	294	11
34775.650	.02	66	52	5	2.1	-17	294	11
34865.192	.02	66	51	5	2.1	-17	294	11
35159.652	.02	66	52	5	2.6	-17	294	11
35205.137	.02	65	51	5	3.0S	-17	294	11
35543.993	.02	66	52	4	2.6	-17	294	11
35755.200	.05	67	53	5	1.7S	-17	294	11
35761.301	.02	67	53	5	2.6	-17	294	11
35781.710	.02	62	48	5	3.0	-17	294	11
35808.896	.02	67	52	5	2.1	-16	294	11
35843.207	.01	62	47	5	2.1	-16	294	11
35854.55	.10	64	49	2	3.4	-16	294	11
35885.472	.05	67	52	4	1.7S	-16	295	11
35893.879	.05	66	51	4	2.1	-16	295	11
35898.156	.02	64	49	4	3.8	-16	295	11
35974.316	.02	64	49	4	2.1	-16	295	11
35978.769	.02	65	50	5	3.4	-16	295	11

NAME: FORMIC ACID, METHYL ESTER CONTINUED								ID NO. 608.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
35987.671	.02	64	50	5	1.7	-16	295	11
36017.454	.02	64	50	5	3.8	-16	295	11
36102.226	.01	59.4	45.1		3.0	-15	295	11
36104.789	.01	59.1	44.5		3.8	-15	295	11
36147.01	.10	66	51	3	3.0	-15	295	11
36166.176	.05	66	52	4	3.4S	-15	295	11
36289.631	.02	65	50	4	2.1	-15	295	11
36299.946	.02	64	50	5	3.8	-15	295	11
36320.424	.02	65	51	5	3.0	-15	295	11
36426.25	.10	67	53	4	2.1S	-15	295	11
36594.143	.05	64	49	4	2.6S	-16	295	11
36657.451	.02	62	47	4	3.8	-15	295	11
36670.851	.05	64	50	4	2.1S	-15	295	11
36678.573	.05	63	48	5	2.1S	-15	295	11
36711.86	.10	64	50	4	2.1S	-15	295	11
36739.208	.02	67	52	4	3.8	-15	295	11
36792.808	.05	64	49	4	3.8	-15	296	11
36881.31	.10	66	52	2	3.8	-15	296	11
36927.858	.02	66	51	4	3.8	-15	296	11
36936.058	.02	67	53	5	3.4S	-15	296	11
36949.309	.02	66	52	5	3.0	-15	296	11
37110.874	.02	67	52	4	1.7	-15	296	11
37182.106	.05	63	48	5	2.1S	-15	296	11
37209.652	.02	61	46	5	3.8	-16	295	11
37298.56	.10	67	50	4	3.8S	-16	296	11
37471.133	.05	66	51	5	2.1S	-16	296	11
37521.794	.02	67	52	5	1.7	-16	296	11
37673.007	.02	68	52	5	3.8	-16	295	11
38034.711	.05	64	49	5	3.8S	-16	295	11
38046.105	.02	65	49	5	3.8	-16	295	11
38253.269	.02	66	51	5	1.7	-16	295	11
38365.260	.02	66	52	5	2.1	-16	295	11
38508.036	.05	62	47	4	3.8	-16	295	11
38516.678	.05	62	48	4	1.7S	-16	295	11
38545.046	.02	65	50	4	1.7	-16	295	11
38647.043	.05	67	52	4	1.7S	-16	295	11
38663.825	.02	68	53	5	2.1S	-15	294	11
38834.022	.05	65	51	5	2.1S	-15	294	11
38949.50	.20	66	52	2	2.6S	-14	295	11
38958.637	.02	62	48	5	3.8	-14	295	11
38976.05	.10	59	44	2	2.6	-15	295	11
38980.818	.01	59.4	44.8		2.6	-15	295	11
39043.772	.02	66	52	4	1.7	-15	295	11
39090.886	.02	66	52	4	1.7	-15	295	11
39166.537	.02	65	50	5	2.1	-15	295	11
39170.506	.02	65	50	5	3.4	-15	295	11
39519.670	.02	65	51	5	2.1	-14	295	11
39527.223	.02	64	49	4	3.0	-14	295	11
39682.955	.02	67	53	4	3.0	-14	295	11
39744.872	.02	65	51	4	3.8	-14	295	11

NAME: FORMIC ACID, METHYL ESTER CONTINUED								ID NO. 608.00
ν_O, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
39856.363	.02	64	50	5	3.8	-14	295	11
39959.970	.02	66	51	4	3.0	-14	295	11

Furan

Formula: $\underbrace{OCH:CHCH:CH}$

CAS Registry number: 110-00-9

Synonyms: furfuran, oxole

NBS identification number: 69.00

Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Eastman P1943. Gas chromatography with a Chromosorb 102 column showed only a 0.15 percent water impurity. The furan was stated to be stabilized with about 1 percent butylated hydroxytoluene, which, because of its high boiling point, did not show up on the chromatogram and was not expected to be in the vapor-phase sample.

Remarks.- These lines are relatively narrow, with widths in some cases less than 200 kHz at a pressure of 25 millitorr. Many of the lines show slight asymmetry, which may be due in some cases to incomplete modulation.

The sample pressure of 25 millitorr was registered by a thermocouple gage as 75 millitorr.

Sample identity was confirmed by matching five of the observed frequencies with values calculated from the rotational constants given in reference 3.

NAME: FURAN ID NO. 69.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26782.525	.01	56	47	4	3.0	-17	296	25
26892.703	.01	54.9	45.4		3.4	-17	296	25
27307.746	.02	62	52	4	2.1	-17	296	25
27474.027	.01	59.0	49.2		2.1	-17	296	25
28048.727	.01	58.8	49.8		3.0	-17	296	25
28073.683	.01	57	47	4	3.4	-17	296	25
28142.579	.01	63	54	5	2.1	-17	296	25
28786.089	.01	58.0	48.6		3.4	-18	296	25
28821.903	.01	56.7	47.0		2.1	-18	296	25
29099.027	.01	54.6	44.9		3.8	-18	296	25
29247.554	.02	68	58	5	3.4	-18	296	25
29734.812	.02	67	57	4	3.8	-18	296	25
29965.383	.01	56.6	46.9		3.8	-17	296	25
30153.797	.02	64	54	5	2.1	-17	296	25
30464.822	.01	59.1	49.3		2.1	-17	296	25
30530.975	.01	60.2	51.1		3.0	-17	296	25
30676.596	.01	54.3	44.5		3.8	-17	296	25
30679.851	.01	55	46	4	2.1	-17	296	25
31014.710	.02	64	55	4	3.8	-17	295	25
31034.625	.02	67	57	4	3.4	-18	295	25
31243.312	.01	56.4	46.7		3.8	-18	295	25
31618.758	.02	67	58	5	3.4	-18	295	25
31681.508	.01	54	45	4	3.8	-18	295	25
32010.355	.01	57	47	4	3.8	-18	295	25
32249.948	.02	55	46	4	3.8	-18	295	25
32410.991	.01	62	52	5	3.4	-18	295	25
32419.384	.05	60	52	4	3.8	-18	295	25
32425.591	.01	57.1	47.3		2.1	-18	295	25
32439.187	.01	56.9	47.5		3.4	-18	295	25
32509.049	.02	67	58	5	3.0	-18	295	25
32535.797	.05	58	50	4	3.8	-18	295	25
32613.002	.02	59	50	4	3.8	-17	295	25
32636.088	.01	56.8	47.1		3.8	-17	295	25
32641.435	.01	54.8	45.2		3.8	-17	295	25
32647.822	.02	55	45	4	3.8	-17	295	25
32655.688	.02	57	48	4	3.8	-17	295	25
32662.477	.02	57	48	4	3.8	-17	295	25
32673.037	.01	56	46	4	3.8	-18	295	25
32687.540	.01	56.3	46.8		3.0	-17	295	25
32689.766	.02	59	49	4	3.8	-17	295	25
32692.836	.02	60	51	4	3.8	-17	295	25
32697.033	.01	58.7	48.9		3.8	-17	295	25
32703.38	.10	56	47	3	3.8	-17	295	25
32703.69	.1	56		1	3.8	-17	295	25
32710.504	.02	59	50	4	3.8	-17	295	25
32714.126	.02	61	52	4	3.8	-17	295	25
32720.067	.02	67	60	5	2.6	-17	295	25
32720.976	.01	61	52	5	3.8	-17	295	25
32739.857	.02	67	57	5	3.0	-17	295	25
32769.302	.01	54	44	4	3.4	-17	295	25

NAME: FURAN	CONTINUED							ID NO. 69.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
32910.546	.01	56.1	46.3		3.4	-17	295	25
32941.278	.01	58	49	4	3.0	-17	295	25
33025.720	.02	66	56	4	2.1	-17	295	25
33132.308	.01	53.8	44.1		3.0	-17	295	25
33293.115	.02	62	52	5	1.7S	-17	295	25
33459.476	.01	55.7	46.1		3.0	-17	295	25
33652.428	.01	66	57	5	3.0	-17	295	25
33786.945	.05	66	57	4	3.4S	-17	295	25
33866.595	.01	61	52	5	3.0	-17	295	25
33920.695	.01	53.9	44.2		3.0	-17	297	25
33922.27	.10	66	55	2	3.0	-17	296	25
34043.496	.01	53.9	44.5		3.4	-17	295	25
34420.766	.01	66	57	5	2.1	-17	295	25
34548.087	.01	56.0	46.3		3.0	-17	295	25
34718.517	.01	59.3	49.6		1.7	-17	295	25
35140.837	.01	66	57	5	3.8	-17	295	25
35159.967	.02	67	57	4	2.1	-17	295	25
35247.153	.01	58.4	49.3		3.8	-17	295	25
35376.418	.01	53.8	44.2		2.1	-17	295	25
35477.618	.01	55.5	46.1		3.8	-17	295	25
36357.813	.05	67	58	4	2.1	-16	296	25
36441.847	.01	56.2	46.6		2.1	-15	296	25
36592.373	.01	65	56	5	3.8	-15	296	25
36659.580	.01	62	53	5	3.0	-15	296	25
36708.076	.01	64	54	5	2.1	-15	296	25
36733.097	.01	52.9	43.4		3.8	-15	296	25
36850.043	.02	66	56	4	3.8	-15	296	25
37348.679	.01	57.3	47.6		2.1	-16	296	25
37412.128	.02	67	57	4	1.7	-16	296	25
37419.012	.01	55	46	4	3.8	-16	298	25
37496.804	.02	66	57	4	2.1	-16	298	25
37779.907	.01	54.3	44.7		2.1	-16	298	25
37808.983	.01	54.8	45.2		3.8	-17	297	25
38479.925	.02	66	57	4	2.1	-16	297	25
38692.607	.02	68	59	5	2.6	-15	297	25
38711.772	.01	52	43	4	3.8	-16	297	25
39169.963	.05	65	55	4	3.8S	-15	297	25
39356.717	.01	58.6	49.8		3.0	-15	297	25
39423.059	.01	56.5	47.0		2.1	-14	297	25
39431.235	.01	57.0	47.8		3.4	-14	297	25
39454.365	.01	54.4	44.9		3.8	-14	297	25
39763.601	.02	65	55	4	3.8	-14	297	25
39781.045	.02	67	58	4	3.8	-14	297	25

2-Furancarboxaldehyde

Formula: $OCH{:}CHCH{:}CCHO$

CAS Registry number: 98-01-1
Synonyms: 2-furaldehyde, furfural
NBS identification number: 234.00
Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Fisher F-94. Gas chromatography with a Chromosorb 102 column showed impurity peaks of 0.22 and 1.39 percent. The initial sample was purified on a Chromosorb 102 column but was found to be contaminated by column bleed materials because of the high temperature necessary. Another sample was therefore processed by vacuum distillation.

Remarks.- The lines are broader than average, and the initial trial at a sample pressure of 10 millitorr was unsatisfactory. The sample was strongly adsorbed and the initial pressure of 6 millitorr decreased overnight to 5 millitorr. Some of the lines were remeasured at 6 millitorr. Even at this low pressure many lines are distorted by overlaps.

The sample pressure of 6 millitorr was registered by a thermocouple gage as 25 millitorr.

The data agreed qualitatively with a strip-chart recording made on a different spectrometer 5 years earlier.

NAME: 2-FURANCARBOXALDEHYDE ID NO. 234.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26606.78	.10	64	46	4	3.4S	-18	296	6
26618.66	.20	67	48	3	3.4	-17	296	6
26619.14	.20	66	48	2	3.8S	-17	296	6
26915.115	.02	64	46	5	1.7	-17	296	6
27504.351	.02	63	45	5	1.7	-17	295	6
27508.345	.05	67	49	4	2.1	-17	295	6
28060.718	.02	67	48	5	2.1	-17	295	6
28092.789	.02	63	45	4	3.4	-17	295	5
28102.405	.05	66	48	4	2.6	-17	295	5
28113.820	.02	66	49	5	3.8	-17	295	5
29225.486	.02	63	45	5	3.4	-18	295	5
29242.621	.05	66	48	4	3.4	-18	295	5
29525.450	.05	65	49	4	2.1S	-18	295	5
29538.659	.02	61	44	5	2.1S	-18	295	6
29550.54	.10	67	49	4	2.1S	-18	295	5
29555.406	.05	65	48	4	2.1S	-18	295	5
29560.87	.10	62	44	4	2.1S	-18	295	5
29572.88	.20	65	47	3	2.6S	-18	295	5
29573.98	.20	67	49	2	2.1S	-18	295	5
29577.590	.02	65	48	5	2.1S	-18	295	5
29589.08	.20	67	48	3	2.1S	-18	295	5
29595.14	.10	68	50	4	1.7S	-18	295	5
29600.99	.10	65	46	3	2.1	-18	295	5
29605.785	.02	64	45	5	2.6S	-18	295	5
29617.668	.05	66	46	4	3.0	-18	295	5
29632.041	.02	63	45	5	3.8	-18	295	5
29560.87	.10	61	43	4	2.1S	-18	295	5
29644.38	.20	67	47	3	3.4	-18	295	5
29644.992	.05	67		1	3.4S	-18	295	5
29648.236	.02	66	48	5	3.4	-17	295	5
29776.796	.02	64	46	5	2.6	-18	295	5
29788.647	.02	65	48	5	2.1	-18	295	5
29793.542	.02	67	48	4	3.0	-18	295	5
30248.523	.05	66	48	5	2.6S	-17	295	5
30592.460	.02	62	44	5	3.8	-17	295	6
30605.307	.05	66	48	4	3.8S	-17	295	5
30618.821	.02	66	48	4	3.4	-17	295	5
30629.314	.01	62	45	5	3.8	-17	295	5
30635.202	.02	67	50	5	2.1	-17	295	5
30862.068	.02	62	45	5	3.8	-17	296	5
30866.380	.02	66	48	4	3.4	-17	296	5
30881.063	.02	67	50	5	3.0S	-17	296	5
30894.694	.02	65	48	4	3.8	-18	296	5
31326.850	.02	68	50	5	2.6	-18	296	5
31346.938	.02	62	44	5	3.0	-18	296	5
31356.474	.02	66	49	4	2.6	-18	296	5
31367.690	.02	67	50	5	2.6	-18	295	5
31372.375	.05	64	47	4	3.4	-18	295	5
31480.890	.02	66	48	5	2.1	-18	295	5
31942.761	.02	66	48	5	3.8	-18	295	5

NAME: 2-FURANCARBOXALDEHYDE CONTINUED								IO NO. 234.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
32797.322	.02	61	43	5	3.4	-17	293	6
32810.598	.02	65	47	5	3.8S	-17	293	5
32814.031	.05	66	48	5	3.8S	-17	294	5
32816.730	.02	64	46	5	3.4	-17	294	5
33214.429	.02	64	47	5	1.7	-17	294	5
33226.539	.01	61	44	5	1.7	-17	294	5
33239.847	.02	65	47	4	2.1	-17	294	5
33241.426	.02	66	47	5	2.6	-17	294	5
33245.344	.05	59	41	4	2.6S	-17	294	6
33258.682	.05	63	43	5	2.1S	-17	295	6
33260.075	.05	64	46	4	2.1	-17	295	5
33264.149	.02	63	45	5	1.7S	-17	295	5
33265.31	.20	67	49	2	1.7S	-17	295	5
33274.16	.10	67		1	2.1	-17	295	5
33276.969	.02	58	40	4	2.1	-17	295	5
33283.934	.05	65	47	4	1.7	-17	295	5
33290.41	.20	63	44	3	2.1	-17	295	5
33291.58	.10	64	45	2	2.1	-17	295	5
33295.73	.20	62	43	3	3.0S	-17	295	5
33305.65	.20	67	47	3	2.6S	-17	295	5
33306.87	.10	68		1	2.6S	-17	295	5
33308.663	.05	64	43	4	3.4	-17	295	5
33315.436	.05	65	47	5	3.0S	-17	295	5
33327.31	.20	67	46	4	3.8S	-17	295	5
33331.936	.05	62	44	4	3.8S	-17	295	5
33335.98	.20	67	46	3	3.4S	-17	295	5
33343.521	.02	62	44	5	3.8	-17	295	5
33345.49	.20	65	46	3	2.1S	-17	295	5
33346.37	.20	66	46	2	3.8S	-17	295	5
33350.533	.05	64	45	5	3.8S	-17	295	5
33353.323	.01	61	42	5	3.8	-17	295	6
33357.01	.20	64	45	3	3.8	-17	295	5
33362.234	.02	65	46	4	2.1	-17	295	5
33363.53	.20	66	48	2	3.4S	-17	294	5
33367.35	.20	65	46	3	3.8	-17	294	5
33367.96	.20	64	44	2	2.6	-17	294	5
33371.345	.05	64	45	4	3.0	-17	294	5
33381.89	.20	66	47	3	3.4S	-17	294	5
33384.690	.02	67	48	5	3.4	-17	294	5
33515.621	.02	66	48	5	3.8	-17	294	5
33612.721	.02	62	44	4	1.7	-17	294	5
33625.84	.10	64	46	2	1.7	-17	294	5
33631.606	.02	65	47	5	3.8S	-17	294	5
33996.67	.20	66	48	3	2.1S	-17	294	5
34017.652	.05	65	47	5	2.1S	-17	294	5
34053.14	.20	64	45	3	2.6	-17	294	5
34053.86	.20	66	47	2	2.6S	-17	294	5
34058.936	.05	67	48	4	2.6	-17	294	5
34089.383	.02	67	48	5	2.1	-17	294	5
34114.011	.02	67	48	5	3.0	-17	294	5

NAME: 2-FURANCARBOXALDEHYDE CONTINUED								ID NO. 234.00
ν_0, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
34128.744	.02	66	46	5	3.0	-17	294	5
34130.740	.02	65	46	5	3.0	-17	294	5
34202.438	.02	60	42	4	3.0	-17	294	5
34206.982	.02	64	46	5	3.8	-17	294	5
34223.772	.02	65	48	4	2.1	-17	294	5
34239.093	.02	64	47	5	3.0	-17	294	5
34280.891	.02	61	43	4	3.4	-17	294	5
34287.567	.02	64	48	5	3.0	-17	294	5
34297.434	.02	66	50	5	3.0	-17	294	5
34303.096	.02	64	47	4	3.0	-17	294	5
34438.605	.02	66	48	4	1.7	-17	294	5
34583.229	.02	60	44	4	3.8	-17	294	5
34586.410	.01	61	44	5	3.0	-17	294	5
34592.424	.02	65	49	4	3.8	-17	294	5
34597.664	.02	66	49	4	2.1	-17	294	5
34599.122	.02	64	46	4	1.7	-17	294	5
34603.706	.02	65	48	5	1.7	-17	294	5
34612.72	.10	66	49	3	3.4	-17	294	5
34613.580	.02	63	45	4	3.4	-17	295	5
34645.441	.02	66	48	4	2.1	-17	295	5
34882.894	.02	64	46	5	1.7	-17	295	5
34935.791	.02	67	49	5	2.1S	-17	295	5
35041.135	.05	66	48	4	2.1	-17	295	5
35237.983	.02	62	44	4	3.8	-17	295	5
35285.182	.02	65	47	4	1.7	-17	295	5
35441.861	.02	67	49	4	3.8	-17	295	5
35465.923	.02	65	47	5	3.0	-17	295	5
36342.251	.02	59.8	42.1		3.0	-15	295	6
36356.934	.02	65	47	4	2.6	-15	295	5
36361.230	.05	65	48	4	3.4	-15	295	5
36364.040	.02	63	45	4	3.0	-15	295	6
36387.145	.02	67	49	5	3.8	-15	295	5
36903.399	.05	63	47	4	1.7S	-15	295	5
36914.754	.05	60	43	6	2.1S	-15	295	6
36924.54	.10	66	50	4	2.6S	-15	295	5
36929.48	.20	64	46	3	3.4S	-15	295	5
36931.31	.10	58	40	4	2.6S	-15	295	5
36935.817	.02	63	46	5	1.7S	-15	295	5
36946.13	.20	63	45	3	3.0S	-15	295	5
36947.81	.20	63	44	3	3.0S	-15	295	5
36949.95	.20	66	47	3	3.8S	-15	295	6
36952.304	.05	62	45	5	2.1S	-15	295	6
36957.010	.05	58	40	4	2.1S	-15	296	6
36964.95	.20	65	46	3	3.0S	-15	296	6
36966.48	.20	64	44	3	3.8S	-15	296	6
36967.29	.20	65	46	2	3.8S	-15	296	6
36971.884	.05	61	44	5	2.6S	-15	295	6
36973.39	.20	63	44	3	3.4S	-15	295	6
36974.35	.20	63	45	2	3.4S	-15	295	6
36977.94	.10	61	43	4	2.1S	-15	295	6

NAME: 2-FURANCARBOXALDEHYDE CONTINUED ID NO. 234.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
36984.33	.10	65	47	4	3.0S	-15	295	6
36990.45	.10	65		1	3.4S	-15	295	6
36992.18	.20	63	42	3	3.4S	-15	295	6
36992.75	.20	64	45	2	3.4S	-15	295	6
37000.48	.10	58	38	4	3.8	-15	295	6
37013.33	.20	65	45	2	3.8S	-15	295	6
37015.49	.20	62	42	3	3.8	-15	295	6
37016.54	.20	63	43	2	3.8	-15	295	6
37021.388	.02	62	43	5	3.8	-15	295	6
37022.73	.20	66	48	2	3.8S	-15	295	6
37035.731	.05	64	44	5	2.1	-15	295	6
37043.250	.05	65	45	4	3.4	-15	295	6
37056.300	.05	66	46	5	3.0	-15	295	6
37069.729	.01	59.0	40.4		3.8	-15	295	6
37071.974	.02	60	42	4	3.0	-15	295	6
37092.543	.02	64	46	4	2.6	-15	294	6
37085.55	.20	62	44	3	3.8	-15	295	6
37086.07	.10	62		1	3.8	-15	295	6
37087.13	.10	63		1	3.8	-15	294	6
37089.422	.05	63	45	4	3.0	-16	294	6
37096.891	.02	60.5	42.1		3.8	-15	294	6
37102.42	.20	67	47	3	3.0S	-15	295	6
37103.70	.10	66		1	3.0	-15	295	6
37104.45	.20	63	44	2	3.0	-15	295	6
37106.948	.05	64	45	4	3.0	-15	295	6
37110.27	.20	65	45	2	3.8	-15	295	6
37111.86	.20	64	45	3	3.8	-15	295	6
37112.44	.20	64	45	2	3.8	-15	295	6
37117.66	.10	63	45	2	3.0	-15	295	6
37124.195	.02	66	46	5	3.4	-16	295	6
37127.34	.20	66	47	3	3.8	-16	295	6
37128.957	.05	63	44	4	3.8	-15	295	6
37131.957	.05	64	45	4	3.8S	-16	295	6
37139.47	.20	66	47	3	3.4S	-16	295	6
37140.76	.20	65	46	2	3.4	-15	295	6
37500.007	.02	60	42	4	1.7	-16	295	6
37514.577	.05	64	46	4	3.8	-16	295	6
37521.043	.02	63	46	4	2.6	-16	295	6
37527.735	.02	58	40	4	2.6	-16	295	6
37532.434	.02	61	44	5	2.1	-16	295	6
37535.02	.20	64	46	3	3.4	-16	295	6
37535.675	.05	65		1	3.4	-16	295	6
37551.427	.02	64	46	4	2.1	-16	295	6
37557.146	.02	68	51	4	2.1	-16	295	6
37568.551	.05	62	44	4	3.4	-16	295	6
37573.416	.02	66	49	4	1.7	-16	295	6
37591.195	.02	66	49	4	2.6	-16	295	6
37610.30	.10	65	48	3	3.0	-16	295	6
37770.072	.05	65	47	5	1.7S	-16	295	6
37788.608	.05	63	44	5	3.0S	-17	295	6

NAME: 2-FURANCARBOXALDEHYDE CONTINUED								ID NO. 234.00
ν_o, MHz	U, MHz	$-10 \log \gamma$	$-10 \log \frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
37810.420	.05	66	47	5	3.4S	-16	295	6
37815.405	.02	58	40	4	3.4	-17	295	6
37817.32	.20	62	43	2	3.8S	-17	295	6
37823.946	.02	62	44	4	2.6	-17	295	6
37828.92	.20	66	48	3	1.7S	-17	294	6
37840.752	.02	63	46	4	3.4	-17	294	6
37850.15	.20	65	47	3	2.6	-17	294	6
37850.959	.02	61	43	5	2.1S	-17	294	6
37858.610	.02	59	41	4	3.8	-17	294	6
37866.122	.05	60	41	4	3.0	-17	295	6
37875.041	.05	62	44	4	2.1	-17	294	6
37878.158	.02	64	47	4	3.0	-17	294	6
37883.343	.02	64	47	5	3.4	-17	294	6
37884.710	.02	65	48	4	3.8	-17	294	6
37888.01	.20	64	47	2	3.8S	-17	294	6
37931.154	.05	63	44	4	3.8	-17	294	6
37944.596	.05	64	44	4	3.8	-17	294	6
37970.351	.05	67	48	4	3.8	-16	294	6
37976.31	.20	65	46	3	3.4	-17	294	6
38098.288	.02	66	49	5	2.6	-16	294	6
38263.948	.02	67	49	4	3.8	-16	294	6
38269.355	.02	63	45	5	1.7	-16	294	6
38327.927	.02	66	48	5	1.7	-16	294	6
38439.275	.02	64	46	5	1.7	-16	294	6
38531.982	.02	63	45	4	2.1	-16	294	6
38564.686	.01	60.1	42.2		3.4	-16	294	6
38576.84	.10	62	45	3	1.7	-16	294	6
38577.64	.10	64	47	2	2.1	-16	294	6
38585.37	.10	63	45	3	2.1	-16	294	6
38588.036	.05	66	48	4	1.7	-16	294	6
38671.991	.02	64	46	5	3.4	-15	294	6
38699.443	.02	67	49	4	3.8	-15	294	6
38745.674	.02	66	48	4	2.1	-15	294	6
38861.168	.02	66	48	4	3.4	-15	294	6
39311.127	.02	66	48	5	1.7	-14	294	6
39534.655	.02	64	45	4	3.0	-14	295	6
39567.623	.02	67	48	5	1.7	-14	295	6
39581.668	.05	66	47	4	1.7	-14	295	6
39858.772	.02	58	41	4	3.8	-14	295	6
39874.776	.02	63	46	4	3.0	-14	295	6
39880.121	.02	64	47	4	3.4	-14	295	6
39882.973	.02	62	45	4	3.8	-14	295	6
39898.267	.05	67	50	4	3.0S	-14	295	6
39908.689	.02	65	48	4	3.0	-14	295	6

Methanol

Formula: CH_3OH
CAS Registry number: 67-56-1
Synonym: methyl alcohol
NBS identification number: 13.00
Frequency range: 18 000 to 40 000 MHz

Sample.- The sample source was Fisher A-408 Certified Spectranalyzed methanol. Gas chromatography with a Porapak N column showed a single impurity of 0.2 percent water. This was further reduced by vacuum distillation.

Remarks.- No information is included about power levels or Stark sensitivity below 26 500 MHz. However, many of the lines above that frequency have been observed to have sensitive first-order Stark effects, and it may be assumed that such will be the case in the lower frequency range. A small constant dc error in Stark modulator zero basing will cause many of these lines to appear as doublets.

The sample pressure of 10 millitorr was registered by a thermocouple gage as 21 millitorr.

Sample identity was confirmed by matching 23 lines with calculated transition frequencies (ref. 7).

NAME: METHANOL								ID NO. 13.00
ν_o, MHz	U, MHz	$-10 \log \gamma$	$-10 \log \frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
18161.37	.05	67	56	7	2.6		298	15
18220.23	.05	61	49	7	2.1		298	15
19140.85	.05	69	58	7	2.1		298	15
19390.11	.05	67	54	7	2.1		298	15
19967.39	.05	61	48	7	2.1		299	15
20171.10	.05	57	44	7	2.6		299	15
20346.83	.05	61	48	7	2.1		299	15
20908.85	.05	58	46	4	3.0		299	16
20970.65	.05	57	45	7	2.1		299	16
21146.74	.05	72	59	7	2.1		299	16
21244.21	.05	70	58	7	2.6		299	16
21550.28	.05	57	45	7	2.1		299	16
21708.64	.05	64	52	7	2.1		299	16
23121.02	.05	56	43	7	2.1		299	16
23346.95	.05	66	54	7	2.6		299	15
23444.78	.05	55	42	7	2.1		299	15
23854.24	.05	62	49	7	2.1		299	15
24928.70	.05	55	42	7	2.1		299	15
24933.47	.10	54	40	4	2.1		299	15
24934.33	.10	57	42	2	2.1		299	15
24959.07	.05	53	39	7	1.7		299	15
25018.12	.05	52	39	7	2.1		299	15
25124.87	.05	52	38	7	1.7		299	15
25294.41	.05	51	38	7	1.7		299	15
25329.96	.05	64	52	7	1.7		298	15
25541.39	.05	51	37	7	1.7		298	15
25787.12	.05	61	48	7	2.1		298	15
26550.253	.05	60	47	6	2.1S	-18	295	10
26847.232	.05	48	35	6	2.1S	-17	295	10
27283.145	.02	56	43	6	2.1S	-17	295	10
27470.978	.05	56	42	6	2.6S	-17	295	10
27472.531	.02	47.9	34.3		2.6S	-17	295	10
27581.63	.20	68		1	2.1S	-17	295	10
27700.174	.01	53.9	41.1		2.1	-17	295	10
27817.437	.02	59	46	6	2.1S	-17	295	10
27820.841	.01	57	44	6	2.6S	-16	295	10
27880.02	.20	68		1	2.1S	-16	295	10
28169.463	.02	47.9	34.2		2.1S	-17	295	10
28267.75	.20	68		1	2.1S	-17	295	10
28316.066	.01	54	41	6	2.1S	-18	295	10
28874.403	.02	55	42	6	2.1S	-19	295	10
28905.809	.02	47.8	34.3		2.1S	-19	296	10
28969.953	.01	51.8	38.7		3.0	-19	296	10
29113.798	.05	58	45	6	2.1S	-19	296	10
29315.19	.20	67		1	2.1S	-19	295	10
29636.940	.02	48	34	6	2.1S	-19	296	10
29889.40	.10	63	51	5	2.1S	-19	296	10
29955.69	.20	67		1	2.1S	-19	296	10
29973.043	.02	53	40	6	2.1S	-19	296	10
30010.52	.20	63	51	5	2.1	-19	296	10

NAME: METHANOL		CONTINUED					ID NO. 13.00	
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
30193.44	.20	62		1	2.1S	-19	296	10
30308.030	.05	48	35	6	2.1S	-18	296	10
30429.891	.02	59	45	6	2.1S	-17	296	10
30678.69	.10	64	51	5	2.1	-18	296	10
30752.215	.05	52	39	6	2.1S	-18	296	10
30858.301	.02	49	35	6	2.1S	-18	296	10
31209.775	.02	51	38	6	2.1S	-18	296	10
31226.753	.05	49	36	6	1.7S	-18	296	10
31342.31	.20	68		1	2.1S	-18	296	10
31358.406	.02	49.9	36.6		2.1S	-18	295	10
31757.41	.10	59	45	6	2.1S	-18	296	10
31977.790	.01	53.9	40.9		2.6	-18	296	10
32004.38	.20	68		1	2.1S	-17	295	10
32379.396	.01	54.7	42.2		2.1	-18	296	10
32575.53	.20	68		1	2.1S	-16	295	10
32998.89	.20	69		1	2.1S	-16	295	10
33088.906	.02	59	45	6	1.7S	-15	295	10
33414.10	.10	63	51	5	2.1	-17	295	10
33564.07	.20	67		1	2.1S	-17	295	10
33568.26	.20	67		1	2.1S	-16	295	10
33691.663	.01	56.2	43.3		2.1	-16	295	10
34003.457	.01	56.1	43.3		2.1	-16	295	10
34207.97	.20	66		1	2.1S	-16	295	10
34236.946	.01	52	38	6	2.1S	-17	295	10
34417.835	.02	59	45	6	1.7S	-17	295	10
35161.56	.20	66		1	2.1	-16	295	10
35478.56	.20	65		1	2.1S	-16	295	10
35738.214	.02	59	45	6	1.7S	-16	295	10
36169.255	.02	49.6	36.3		2.1S	-15	294	10
36248.144	.01	53	40	6	3.0S	-15	295	10
37044.666	.05	59	45	6	1.7S	-15	295	10
37052.66	.20	65		1	2.1S	-15	295	10
37233.52	.20	66		1	2.1S	-14	295	10
37410.512	.01	61	48	5	3.0	-14	295	10
37501.90	.10	64	52	5	2.1	-14	295	10
37589.31	.20	67		1	2.1S	-14	295	10
37703.704	.01	51	37	6	2.1S	-14	295	10
38293.300	.02	55	41	6	2.1S	-14	295	10
38332.262	.05	60	46	6	2.1S	-14	295	10
38452.682	.05	55	41	6	2.1S	-14	295	10
39596.474	.05	60	46	6	1.7S	-12	295	10

2-Methylfuran

Formula: $\underline{OCH{:}CHCH{:}C}CH_3$

CAS Registry number: 534-22-5

Synonym: sylvan

NBS identification number: 853.00

Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Eastman P6987. Gas chromatography with a Chromosorb 102 column showed four impurity peaks of 0.02, 0.02, 0.64, and 0.27 percent. Vacuum distillation of the sample increased line intensities by between 0.5 and 1 percent.

Remarks.- The first line measured had a width of only 183 kHz at 19 millitorr, and the sample pressure was increased to 25 millitorr. However, during the course of the run it decreased to 23 millitorr. Since there were no lines with intensity above the threshold level, several of the stronger lines were remeasured with a fresh sample to check for repeatability, and the type 5 classification was removed.

The sample pressure was initially 20 millitorr, which was registered by a thermocouple gage as 76 millitorr.

Sample identity was confirmed by matching seven of the observed frequencies with calculated values (ref. 8).

NAME: 2-METHYLFURAN ID NO. 853.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
28503.122	.02	67	58	5	3.0	-18	294	19
28513.958	.05	67	58	4	3.0	-17	295	25
28998.414	.02	68	58	5	3.4	-18	295	24
29350.837	.02	67	57	4	3.4	-18	295	24
29358.109	.02	67	57	5	2.6	-18	295	24
31704.191	.02	66	56	5	3.4	-18	296	24
31707.507	.05	66	57	4	3.8	-18	296	24
32765.782	.05	66	56	4	3.8	-17	296	24
35134.562	.02	65	55	5	3.8	-17	296	24
35147.725	.02	65	55	5	3.4	-17	296	24
35589.99	.10	65	54	3	3.8	-17	295	24
35590.47	.10	65	55	2	3.8	-17	295	24
35688.244	.02	65	55	4	3.8	-16	295	24
35705.691	.02	65	55	5	3.0	-16	295	24
36107.238	.02	64.0	54.3		3.4	-15	294	23
36115.122	.02	64	55	4	3.0	-15	294	23
36486.286	.02	67	57	5	3.0	-15	294	23
37457.637	.02	65	55	4	3.0	-16	294	23
37477.739	.02	65	55	4	3.8	-16	294	23
38653.597	.01	66	56	5	3.8	-15	294	23
38760.986	.01	63.3	53.6		3.4	-15	294	23
38763.270	.02	63.9	54.5		3.8	-15	294	23
38938.208	.02	66	56	5	2.1	-14	294	23
39052.880	.02	67	57	5	2.1	-15	294	23
39072.455	.02	67	57	4	3.0	-15	294	23
39997.091	.02	64	54	4	3.0	-14	294	23

Methyloxirane

Formula: $\underbrace{OCH_2}CHCH_3$

CAS Registry number: 75-56-9

Synonyms: propylene oxide; 1,2-epoxypropane; propene oxide

NBS identification number: 222.00

Frequency range: 18 000 to 40 000 MHz

Sample.- The sample source was Eastman 2068. Gas chromatography with a Porapak N column showed two impurity peaks of 0.01 and 0.13 percent.

Remarks.- No information on power level is included in the data below 26 500 MHz, and the original data did not include information about Stark sensitivity. However, all the lines above 26 500 MHz with $-10 \log \gamma$ of 60 or less have been rerun and none of them exhibited sensitive Stark effects.

The sample pressure of 10 millitorr was registered by a thermocouple gage as 35 millitorr.

Sample identity was confirmed by matching 29 lines with calculated transition frequencies below 26 500 MHz and 78 lines above that frequency (ref. 3).

NAME: METHYLOXIRANE ID NO. 222.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
18045.525	.05	69	55	5	2.1		300	10
18048.920	.05	69	54	5	1.7		300	10
18103.616	.02	62	47	5	2.1		300	10
18573.344	.05	70	54	5	2.1		300	10
18682.99	.20	68	53	3	2.1		300	10
18683.65	.20	69	51	2	3.0		301	10
19659.47	.10	70	54	4	1.7		301	10
20235.90	.20	71		1	2.6		301	10
20545.773	.05	69	52	5	2.6		301	10
20645.07	.20	67	52	3	2.1		301	10
20995.990	.05	71	57	4	2.1		301	10
21018.06	.10	71	57	3	1.7		301	10
21018.85	.10	71		1	2.1		300	10
21019.61	.10	71	56	2	3.0		300	10
21029.535	.05	67	52	5	2.1		300	10
21031.942	.02	67	52	5	2.1		300	10
21115.171	.02	60	45	7	2.1		300	10
21347.097	.05	68	53	5	2.1		300	10
21568.62	.20	70	54	3	3.0		300	10
21569.47	.20	70	54	2	1.7		300	10
21611.28	.20	70	56	3	2.1		300	10
21611.89	.20	70	56	2	3.4		300	10
21626.445	.05	68	53	4	1.7		300	10
21858.163	.05	70	55	5	2.1		300	10
24106.655	.05	71	57	5	2.1		300	10
24484.87	.20	70	55	3	1.7		300	10
24485.63	.10	67	52	4	2.1		300	10
24536.248	.05	69	54	5	2.1		300	10
24570.306	.05	65	50	4	2.1		300	10
24571.11	.20	69	54	2	1.7		300	10
24663.449	.05	70	56	5	2.1		300	10
24677.99	.20	69	55	3	2.1		300	10
24678.45	.20	69		1	2.1		300	10
24746.234	.05	70	55	4	1.7		300	10
24748.955	.05	66	51	4	1.7		300	10
24750.190	.05	66	51	4	1.7		300	10
24868.735	.02	59	44	7	2.1		300	10
25222.422	.02	67	52	5	2.1		300	10
25232.815	.02	67	53	5	2.1		300	10
25370.08	.10	69	54	4	1.7		300	10
25479.48	.20	71	55	3	1.7		300	10
25480.29	.20	71	56	2	1.7		300	10
25561.255	.05	69	54	4	2.1		300	10
25622.30	.20	70	53	3	1.7		300	10
25623.74	.10	65	49	4	2.1		300	10
25997.725	.02	69	54	5	2.6		300	10
26205.52	.20	69	55	3	2.1		300	10
26206.21	.20	69	55	2	3.4		300	10
26451.84	.20	70	55	3	2.1		300	10
26452.66	.10	67	52	4	2.1		300	10

NAME: METHYLOXIRANE			CONTINUED					ID NO. 222.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta \nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26533.24	.20	62	46	3	3.0	-18	299	12
27118.966	.02	61	46	5	2.1	-18	299	12
27576.24	.20	62	46	2	1.7	-18	299	12
28417.54	.20	64	48	2	2.6	-17	298	12
28496.35	.20	62	46	3	2.1	-17	298	12
28938.176	.05	65	48	4	2.1	-17	298	12
29082.403	.02	64	49	5	1.7	-17	298	12
29172.203	.05	64	48	4	1.7	-17	298	12
29173.704	.02	64	49	4	2.6	-17	298	12
29213.50	.20	66	51	2	1.7	-17	298	12
29220.864	.01	59.1	44.2		2.1	-18	293	10
29240.292	.05	65	50	4	2.1	-17	298	12
29241.987	.02	65	50	5	2.6	-17	298	12
29289.757	.02	61	46	5	1.7	-17	298	12
29301.525	.02	54	38	4	2.1	-18	293	10
29380.308	.01	54.8	40.0		2.1	-18	293	10
29435.246	.01	54.6	38.8		3.0	-18	293	10
29438.291	.02	62	47	5	1.7	-17	298	12
29452.385	.02	62	48	5	2.1	-17	298	12
29498.912	.02	65	50	5	2.1	-17	298	12
29530.52	.20	62	46	3	1.7	-17	298	12
29531.32	.20	62	46	2	1.7	-17	298	12
29601.216	.02	65	51	5	1.7	-17	298	12
29604.468	.02	65	51	4	1.7	-17	298	12
29684.196	.02	65	51	5	1.7	-17	298	12
29730.103	.01	59.9	45.0		3.0	-18	293	10
29731.865	.02	63	48	5	2.1	-17	295	12
29733.09	.20	63	48	2	3.0	-17	295	12
29740.679	.02	60.4	45.6		2.1	-18	293	10
29764.751	.01	53.1	37.8		2.1	-18	293	10
29873.865	.02	63	48	4	2.1	-17	295	12
29888.134	.02	64	49	5	2.6	-18	296	12
29978.581	.02	65	50	5	2.1	-17	296	12
29981.381	.05	64	49	4	2.1	-17	296	12
30038.248	.01	55.4	39.5		2.1	-17	293	10
30048.755	.05	63	49	4	1.7	-17	296	12
30064.330	.05	64	50	4	2.1	-17	296	12
30379.95	.20	64	48	2	2.1	-17	296	12
30459.622	.05	63	45	4	2.6	-17	296	12
30717.793	.02	65	50	5	2.1	-17	297	12
30834.97	.20	66	50	3	2.6	-17	297	12
30835.42	.20	66	51	2	2.6	-17	297	12
30864.096	.01	59	45	4	2.1	-17	294	10
30869.571	.02	63	48	5	2.6	-17	297	12
30872.449	.01	59.5	44.5		3.8	-17	294	10
30930.209	.01	52.6	37.2		2.1	-17	294	10
30956.421	.02	64	49	4	2.6	-17	297	12
30961.081	.01	56.4	40.3		3.8	-17	294	10
30972.998	.02	64	49	5	1.7	-17	297	12
30990.355	.02	64	50	4	1.7	-17	297	12

NAME: METHYLOXIRANE CONTINUED								ID NO. 222.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
31025.90	.20	63	48	3	1.7	-17	297	12
31026.80	.20	63	48	2	1.7	-17	297	12
31031.826	.02	64	49	5	1.7	-17	297	12
31034.149	.02	64	50	5	1.7	-17	297	12
31129.84	.20	66	51	3	1.7	-17	297	12
31167.70	.20	66	51	3	1.7	-17	297	12
31168.42	.20	66	52	2	1.7	-17	297	12
31253.240	.02	67	52	5	2.1	-17	297	12
31300.07	.20	64	48	3	1.7	-17	297	12
31465.08	.20	67		1	2.1	-17	298	12
31466.093	.05	64	49	4	2.6	-17	298	12
31487.21	.20	61	46	3	2.6	-17	298	12
31487.842	.20	62		1	2.6	-17	298	12
32041.662	.01	57.3	41.2		2.1	-18	294	10
32050.523	.02	64	49	5	1.7	-16	298	12
32071.442	.02	64	49	4	2.6	-16	298	12
32134.35	.10	68	54	3	1.7	-16	298	12
32332.675	.05	68	54	4	1.7	-16	298	12
32338.83	.20	65		1	2.1	-16	298	12
32339.44	.20	64	49	2	2.1	-16	298	12
32347.487	.02	63	47	4	2.1	-16	296	12
32422.94	.20	62	45	4	2.6	-16	296	12
32745.003	.02	63	48	4	2.1	-16	296	12
32750.728	.05	68	53	5	3.0	-16	296	12
32777.103	.02	59	44	4	3.8	-17	294	10
32782.895	.01	59	44	4	2.1	-17	294	10
32789.188	.05	63	48	4	2.6	-16	296	12
32846.443	.02	63	48	5	2.1	-16	296	12
32848.207	.05	63	48	4	2.1	-16	296	12
32883.560	.01	51.6	36.6		2.1	-17	295	10
32994.95	.20	66	51	2	2.1	-16	297	12
33018.57	.20	64	49	2	1.7	-16	297	12
33120.960	.01	58.8	42.8		2.1	-17	295	10
33124.359	.02	65	50	5	2.6	-16	297	12
33140.60	.20	61	46	3	2.1	-16	297	12
33141.03	.20	61	46	2	2.1	-16	297	12
33247.93	.20	64	50	3	2.6	-16	297	12
33248.76	.20	64	49	2	2.1	-16	297	12
33272.990	.05	63	46	5	1.7	-16	297	12
33298.844	.02	63	47	4	2.1	-16	297	12
33444.86	.10	60	45	3	3.0	-16	293	10
34025.35	.20	65	49	3	2.1	-16	298	12
34026.25	.20	66	51	2	3.0	-16	298	12
34059.018	.02	61	45	4	2.6	-16	298	12
34120.16	.20	66	52	3	2.1	-16	298	12
34120.83	.20	66	51	2	1.7	-16	298	12
34200.001	.02	62	48	4	1.7	-16	298	12
34201.778	.02	65	50	4	2.1	-16	298	12
34294.62	.20	65	49	3	2.1	-15	298	12
34295.45	.20	64	49	2	2.1	-15	298	12

NAME: METHYLOXIRANE		CONTINUED				ID NO. 222.00		
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
34386.24	.20	62	46	4	1.7	-15	298	12
34407.57	.20	61	46	3	2.6	-15	298	12
34408.71	.20	61	46	2	2.6	-15	298	12
34498.268	.05	66	50	5	2.1	-15	298	12
34571.12	.20	64	48	2	1.7	-15	298	12
34611.268	.01	53.6	38.6		2.1	-17	293	10
34724.731	.05	64	49	4	2.1	-15	298	12
34726.896	.05	65	49	5	2.1	-15	298	12
34912.41	.20	68	53	3	2.6	-15	298	12
34913.97	.20	65	49	3	3.8	-15	298	12
34950.826	.05	66	51	4	2.1	-15	298	12
34961.630	.02	65	51	5	2.1	-15	298	12
35243.75	.20	62	45	4	2.1	-15	298	12
35254.024	.02	63	47	5	2.6	-15	298	12
35356.623	.02	67	53	4	1.7	-15	298	12
35373.500	.02	66	52	4	1.7	-15	298	12
35401.12	.20	68	54	3	1.7	-15	295	12
35401.65	.20	67		1	1.7	-15	295	12
35403.13	.10	59	43	3	3.0	-17	293	10
35453.101	.02	61	46	4	2.1	-15	296	12
35474.889	.02	62	48	4	1.7	-15	296	12
35489.27	.20	62	47	3	1.7	-15	296	12
35490.40	.20	62	47	2	1.7	-15	296	12
35534.804	.01	57.2	42.2		1.7	-16	293	10
35537.740	.01	57	42	4	3.8	-17	293	10
35623.838	.05	68	54	4	1.7	-15	296	12
35646.87	.20	68	53	3	3.0	-15	296	12
35647.89	.20	68	53	2	2.6	-15	296	12
35690.361	.01	49.9	34.9		2.1	-16	293	10
35751.31	.10	69	54	3	2.1	-15	297	12
35751.99	.10	68	54	2	2.1	-15	297	12
35845.086	.02	65	50	5	1.7	-15	297	12
35850.914	.02	66	51	5	1.7	-15	297	12
35877.964	.02	57	42	4	3.8	-16	293	10
35924.868	.02	66	51	5	2.6	-15	297	12
35933.355	.02	66	51	5	3.4	-15	297	12
36104.09	.20	64	49	3	2.1	-15	297	12
36140.017	.01	58.8	43.5		2.1	-15	293	10
36216.973	.02	61	45	5	2.6	-15	297	12
36246.29	.20	65	50	3	2.6	-15	297	12
36247.14	.20	66	50	2	2.6	-15	297	12
36349.506	.05	62	47	4	2.6	-15	297	12
36381.77	.20	65	50	3	2.1	-15	297	12
36382.54	.20	65	50	2	2.6	-15	297	12
36540.82	.20	66	49	3	2.6	-16	297	12
36542.286	.05	63	47	5	2.6	-16	297	12
36563.87	.20	65	49	3	2.1	-16	298	12
36565.30	.20	63	47	2	2.6	-16	298	12
36783.330	.01	60.1	45.4		2.1	-15	293	10
37212.119	.05	61	45	4	2.6	-16	298	12

NAME: METHYLOXIRANE		CONTINUED						ID NO. 222.00
ν_O, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
37333.919	.01	58.5	42.4		2.1	-16	293	10
37361.715	.02	59	43	4	3.0	-16	293	10
37545.092	.02	66	51	5	1.7	-16	298	12
37710.60	.20	66	49	4	1.7	-16	298	12
37764.099	.01	59.4	44.4		3.0	-16	294	10
37900.261	.02	62	47	4	2.6	-16	295	12
38036.442	.02	62	48	5	2.1	-15	295	12
38086.08	.20	63	48	3	2.6	-15	295	12
38312.75	.20	62	48	2	2.1	-16	295	12
38480.68	.20	63	46	3	1.7	-15	296	12
38482.83	.20	62		1	2.6	-16	296	12
38483.579	.05	60		1	2.1	-16	294	10
38792.000	.02	65	50	5	2.6	-15	296	12
38795.241	.02	64	49	5	2.1	-15	296	12
38803.754	.05	64	49	5	1.7	-14	296	12
38826.388	.02	66	52	5	2.1	-15	296	12
38834.138	.01	56.8	40.8		2.1	-15	294	10
38837.051	.05	66	51	4	1.7	-15	297	12
38871.85	.20	65	50	2	2.1	-15	297	12
38910.981	.02	64	49	4	1.7	-15	297	12
38974.507	.01	59.6	44.7		3.0	-15	294	10
38989.582	.02	61	47	5	2.1	-15	297	12
39002.68	.10	61	44	4	3.0	-15	297	12
39097.817	.02	61	46	5	1.7	-15	297	12
39176.092	.01	54.3	39.0		2.1	-15	294	10
39177.76	.20	61	46	2	2.6	-16	297	12
39320.469	.02	59	43	4	2.1	-15	294	10
39388.508	.01	49.9	34.8		2.1	-14	294	10
39948.247	.02	62	47	4	2.1	-17	297	12

Oxetane

Formula: $\underbrace{OCH_2CH_2}CH_2$

CAS Registry number: 503-30-0

Synonyms: 1,3-epoxypropane; trimethylene oxide

NBS identification number: 3.00

Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Aldrich T7,620-1 trimethylene oxide, with a stated minimum purity of 97 percent. The sample was analyzed by gas chromatography and infrared spectroscopy by the manufacturer. Chromatography with a Chromosorb 102 column showed 0.18 percent water and three other impurities of 0.11, 0.25, and 0.47 percent.

Remarks.- Many of the lines are distorted by unresolved overlaps.

The sample pressure of 12 millitorr was registered by a thermocouple gage as 40 millitorr.

Sample identity was confirmed by matching 27 of the lines with calculated transition frequencies (ref. 3).

NAME: OXETANE								ID NO. 3.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
26533.975	.05	67	54	4	1.7S	-17	295	12
26543.757	.02	61	46	4	1.7	-17	295	12
26587.034	.02	63	48	5	2.6	-17	295	12
26629.880	.01	59.0	44.4		2.1	-17	295	12
26666.008	.01	58.3	43.5		3.8	-17	295	12
26724.292	.01	55.8	40.9		2.1	-17	295	12
26726.691	.02	60	45	4	2.1	-17	295	12
27087.082	.01	61	46	5	2.1	-17	295	12
27191.855	.02	66	52	4	3.4	-17	295	12
27227.055	.01	56.5	41.9		3.4	-17	295	12
27289.898	.01	57.6	43.0		3.4	-17	295	12
27303.141	.01	57.1	42.1		3.8	-17	295	12
27332.427	.01	56.8	42.0		1.7	-17	295	12
27337.260	.01	59.9	45.0		1.7	-17	295	12
27341.205	.02	66	51	5	2.1	-17	295	12
27344.972	.05	61	45	4	2.1	-17	295	12
27345.83	.20	64	49	2	2.1	-17	295	12
27384.774	.01	59.9	46.0		2.1	-16	295	12
27477.198	.02	63	49	5	2.1	-17	295	12
27561.256	.02	63	48	4	2.1	-17	295	12
27673.028	.01	60.2	45.8		2.1	-17	295	12
27699.157	.02	61	48	4	2.1	-17	295	12
27769.223	.02	57	43	4	2.1	-17	295	12
27783.901	.01	55.2	40.5		3.0	-17	295	12
27921.963	.02	64	49	4	2.1	-17	295	12
27967.428	.02	65	50	5	1.7	-17	295	12
28110.952	.02	65	52	4	3.8	-17	295	12
28125.192	.01	55.3	40.6		3.0	-17	295	12
28279.094	.01	57.8	43.2		3.0	-17	295	12
28330.983	.01	56.2	41.5		3.4	-17	295	12
28342.014	.01	58.7	44.1		3.4	-17	295	12
28421.318	.02	62	47	5	2.1	-17	295	12
28450.870	.02	63	49	5	3.8	-17	295	12
28484.786	.02	64	49	5	1.7	-18	295	12
28489.198	.02	66	52	5	1.7	-18	295	12
28537.752	.05	67	53	4	3.0S	-18	295	12
28727.645	.02	64	51	5	2.1	-18	294	12
28864.653	.01	62	48	5	2.1	-18	294	12
28972.768	.01	59.4	44.7		2.1	-18	294	12
28995.808	.02	59	44	4	1.7	-18	294	12
29094.927	.01	58.8	44.9		1.7	-18	294	12
29252.582	.01	56.4	41.7		2.1	-18	294	11
29271.476	.02	68	54	4	2.1	-18	294	11
29344.518	.02	68	53	5	1.7	-18	294	11
29366.682	.02	66	53	5	1.7	-18	294	11
29450.724	.02	62	48	5	3.8	-18	294	11
29557.370	.01	53.7	38.9		3.0	-18	294	11
29567.804	.01	58.0	43.5		3.4	-18	294	11
29575.977	.01	56.8	42.3		2.6	-18	294	11
29717.448	.01	59.8	45.1		2.1	-18	294	11

NAME: OXETANE			CONTINUED					ID NO. 3.00
ν_o, MHz	U, MHz	$-10 \log \gamma$	$-10 \log \frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
29737.298	.02	65	51	4	3.0	-18	294	11
29759.201	.01	62	48	5	2.6	-18	293	11
29820.086	.01	57.8	44.0		1.7	-18	294	11
29893.295	.01	61	46	5	2.1	-18	293	11
29969.049	.01	54.3	39.9		2.1	-17	293	11
30001.288	.01	61	47	5	1.7	-17	293	11
30040.805	.01	65	50	5	2.1	-17	293	11
30055.161	.01	54.6	39.8		2.1	-17	294	12
30092.722	.01	55.4	40.8		2.1	-17	294	12
30156.792	.01	61	47	5	2.1	-17	294	12
30170.941	.02	67	52	5	3.0	-17	294	12
30506.505	.01	60.4	45.9		2.1	-17	294	12
30508.02	.10	65	51	2	3.8	-17	294	12
30606.161	.01	59.8	45.1		3.0	-17	294	12
30727.673	.02	63	49	5	2.1	-17	294	12
30749.739	.01	55.2	40.4		2.1	-17	294	12
30833.518	.02	66	53	4	2.6	-17	294	12
30849.496	.01	60.0	46.0		2.1	-17	294	12
31102.64	.20	61	45	3	3.0	-18	294	12
31104.492	.02	54	40	4	3.8	-18	294	12
31114.130	.01	56.3	41.7		3.4	-18	295	12
31227.430	.02	64	50	4	3.8	-18	295	12
31293.344	.01	57.4	42.7		2.1	-18	295	12
31309.452	.02	64	49	4	1.7	-18	295	12
31425.915	.02	62	49	4	3.8	-18	295	12
31506.249	.01	60.2	46.8		2.1	-18	295	12
31528.231	.02	55	41	4	3.0	-18	295	12
31536.025	.01	58.6	43.9		3.8	-18	295	12
31579.70	.20	66	51	2	2.6S	-18	295	12
31585.082	.02	62	47	5	2.1	-18	295	12
31731.773	.01	56.8	42.3		2.1	-18	295	12
31823.528	.02	68	55	5	2.1	-18	295	12
31835.678	.01	62	47	5	2.1	-18	295	12
31925.932	.01	56.9	42.4		2.1	-18	295	12
31965.282	.01	58.5	43.9		2.1	-18	295	12
32043.108	.01	59.2	44.8		2.1	-18	295	12
32085.951	.01	59.9	45.3		2.1	-18	295	12
32090.346	.02	63	49	5	2.1	-18	295	12
32139.093	.02	62	47	5	1.7	-18	295	12
32148.077	.02	66	52	5	3.4	-18	295	12
32181.874	.02	65	50	5	3.0	-18	295	12
32195.818	.01	62	48	5	3.4	-18	295	12
32223.226	.01	57.6	43.3		2.1	-18	294	12
32304.277	.02	64	51	5	1.7	-18	294	12
32344.320	.02	61	47	5	3.4	-18	294	12
32358.424	.01	57.7	43.3		3.4	-18	294	12
32391.471	.01	57.1	42.5		2.1	-18	294	12
32407.350	.02	53	38	4	3.4	-18	294	12
32408.98	.10	61	47	2	3.8	-18	294	12
32471.289	.02	62	48	5	1.7	-18	294	12

NAME: OXETANE		CONTINUED						ID NO. 3.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
32502.342	.01	56.5	42.5		3.4	-18	294	12
32521.70	.10	66	52	2	3.0S	-18	294	12
32565.804	.02	67	53	4	2.1	-18	294	12
32571.840	.01	54.7	40.2		2.1	-18	294	12
32677.376	.02	57	42	4	2.1	-17	294	12
32728.229	.02	61	46	5	3.4	-17	294	12
32736.64	.20	61	46	3	3.4	-17	295	12
32737.741	.01	53.8	39.1		3.4	-17	295	12
32739.970	.01	56	41	4	3.4	-17	295	12
32793.228	.02	66	51	5	2.1	-17	295	12
33046.901	.01	59.3	44.8		2.1	-17	295	12
33129.137	.01	55.3	41.4		2.1	-17	295	12
33161.140	.01	58.7	44.2		3.8	-17	295	12
33344.520	.02	64	49	5	3.8	-17	295	12
33401.331	.01	55.8	41.2		3.0	-17	295	12
33462.686	.01	53.6	38.9		3.0	-17	295	12
33493.950	.01	56.3	41.7		2.1	-17	295	12
33599.950	.01	62	47	5	3.0	-17	295	12
33688.869	.02	55	40	4	3.0	-17	295	12
33689.87	.10	58	44	2	3.4	-17	295	12
33716.585	.02	63	50	5	1.7	-17	295	12
33752.799	.02	60.4	45.7		1.7	-17	295	12
33801.359	.02	67	52	5	2.6	-17	295	12
33860.788	.01	59.6	44.8		2.1	-17	295	12
33867.785	.01	58.4	43.8		2.1	-17	295	12
33918.466	.02	65	50	4	3.4	-17	295	12
34012.830	.02	65	50	5	2.6	-17	295	12
34163.662	.01	56.9	42.4		3.0	-17	295	12
34183.212	.02	63	49	4	2.1	-17	295	12
34232.336	.01	61	46	5	2.6	-17	295	12
34241.325	.01	57.6	43.6		1.7	-17	295	12
34271.117	.01	57.1	42.5		3.8	-17	295	12
34282.871	.01	52.5	37.9		3.0	-17	295	12
34311.275	.02	61	46	5	1.7	-17	295	12
34403.829	.01	53.9	39.3		3.0	-17	295	12
34461.281	.01	59.2	44.7		3.8	-17	295	12
34474.997	.02	64	50	5	2.6	-17	295	12
34555.219	.02	66	52	5	1.7	-17	295	12
34668.861	.01	62	48	5	3.8	-17	295	12
34695.572	.02	65	50	5	2.1	-17	295	12
34712.781	.01	55.9	41.4		3.8	-17	295	12
34717.404	.01	61	47	5	3.4	-17	294	12
34778.882	.02	66	52	4	2.6	-17	294	12
34870.172	.02	59	44	4	3.4	-17	294	12
34893.821	.01	53.6	39.0		3.0	-17	294	12
34917.376	.02	55	41	4	3.4	-17	294	12
34952.223	.02	67	52	4	3.4	-17	294	12
34955.724	.02	62	48	4	3.8	-17	294	12
34985.314	.01	52.8	38.2		3.0	-17	294	12
35041.143	.02	67	52	5	2.1	-17	294	12

NAME: OXETANE		CONTINUED						ID NO. 3.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
35081.368	.05	67	52	4	2.6	-17	293	12
35085.349	.01	55.1	40.3		2.1	-17	293	12
35090.358	.01	57.2	42.8		3.8	-17	293	12
35095.033	.02	65	51	5	2.1	-17	293	12
35100.416	.02	65	50	5	2.6	-17	293	12
35113.370	.02	66	52	5	1.7	-17	293	12
35135.130	.02	64	50	4	3.8	-17	293	12
35138.78	.10	60	46	3	3.8	-18	293	12
35143.860	.05	62	47	4	3.8S	-17	293	12
35153.673	.02	64	49	5	2.1	-17	293	12
35161.395	.02	66	52	4	3.8	-17	293	12
35163.350	.02	67	52	5	3.0S	-17	293	12
35177.584	.01	53.8	39.3		2.1	-17	293	12
35241.548	.02	63	49	5	3.0	-17	293	12
35250.403	.01	62	48	5	3.4	-17	293	12
35252.292	.02	61	46	4	3.0	-17	293	12
35256.893	.01	64	51	5	2.1	-17	293	12
35270.050	.02	54	39	4	3.0	-17	293	12
35288.643	.02	66	52	4	3.4	-17	293	12
35295.51	.10	64	50	3	2.6	-17	293	12
35297.878	.01	62	47	5	1.7	-17	293	12
35301.007	.02	65	50	4	3.8	-17	293	12
35306.872	.01	59.7	45.8		3.8	-17	293	12
35318.959	.02	64	49	4	2.6	-17	293	12
35330.050	.01	52.6	38.0		3.8	-17	293	12
35338.302	.02	58	44	4	3.8	-17	293	12
35389.688	.02	60	46	4	2.1	-17	293	12
35406.767	.01	61	48	5	3.8	-17	294	12
35409.104	.02	59	44	4	3.0	-17	294	12
35410.736	.01	58.6	44.1		2.6	-17	294	12
35418.661	.01	60.5	46.1		1.7	-16	294	12
35431.077	.02	61	46	4	3.4	-17	294	12
35445.122	.05	67	53	3	2.6	-17	294	12
35446.777	.01	58	43	4	2.1	-17	294	12
35462.709	.01	61	47	5	3.0	-17	294	12
35456.524	.01	59.7	45.3		3.0	-17	294	12
35462.709	.01	61	47	5	3.0	-17	294	12
35479.275	.02	62	48	5	3.0	-17	294	12
35491.783	.02	66	52	4	1.7	-17	294	12
35493.662	.02	58	44	4	3.8	-17	294	12
35495.911	.02	64	49	5	3.0	-17	294	12
35501.668	.05	57	43	4	3.8	-17	294	12
35549.841	.02	63	48	5	3.0	-17	294	12
35552.804	.01	58.8	44.2		2.1	-17	294	12
35579.69	.10	56	41	3	3.4	-16	294	12
35580.32	.10	58	43	2	3.0	-16	294	12
35585.021	.05	57	42	4	3.8	-16	294	12
35586.16	.10	58	43	2	3.8	-16	294	12
35606.259	.02	57	42	4	3.4	-16	294	12
35608.888	.01	56.7	42.1		2.1	-16	294	12

NAME: OXETANE		CONTINUED					ID NO.	3.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
35628.751	.02	54	40	4	3.8	-16	294	12
35631.261	.02	60	46	4	1.7	-16	294	12
35638.108	.01	60.5	46.4		3.0	-16	294	12
35656.254	.02	61	46	4	2.1	-16	294	12
35665.208	.01	62	48	5	3.8	-16	294	12
35668.936	.02	62	48	4	2.1	-16	294	12
35698.865	.02	56	41	4	2.1	-16	294	12
35711.772	.02	60	46	4	1.7	-16	294	12
35720.327	.01	55	41	4	1.7	-16	294	12
35728.515	.01	54.5	40.0		2.1	-16	294	12
35733.742	.01	57.0	42.8		3.4	-16	294	12
35742.874	.01	53.7	39.2		1.7	-16	294	12
35750.472	.01	55.9	41.5		3.4	-16	294	12
35765.673	.01	57.9	43.1		1.7	-16	294	12
35775.168	.01	55.7	41.3		3.0	-16	294	12
35782.618	.01	57.1	42.8		3.0	-16	294	12
35796.406	.01	58	44	4	2.1	-16	294	12
35805.506	.01	57	43	4	1.7	-16	294	12
35808.223	.02	61	47	4	3.4S	-16	295	12
35811.652	.02	60	45	4	3.8	-16	295	12
35820.292	.02	55	40	4	3.0	-16	295	12
35884.592	.01	56.5	41.9		2.1	-16	295	12
35923.449	.05	66	51	4	2.1	-16	295	12
35948.114	.01	54.8	40.5		3.8	-16	295	12
35984.759	.01	53.4	38.7		2.1	-16	295	12
35998.050	.02	53	38	4	1.7	-16	295	12
36008.677	.01	53.6	39.0		3.0	-16	295	12
36010.610	.01	54.1	39.5		3.0	-16	295	12
36021.892	.01	54.7	40.6		2.6	-16	295	12
36032.761	.01	53.8	39.4		3.8	-16	294	12
36055.778	.02	56	42	4	3.4	-15	294	12
36062.143	.02	52	37	4	3.4	-15	294	12
36063.52	.10	55	40	2	3.0	-15	294	12
36074.857	.01	55.8	41.4		3.0	-15	294	12
36085.458	.01	58.2	43.9		3.8	-15	294	12
36088.268	.01	59.3	45.1		3.0	-15	294	12
36134.288	.01	58.7	44.0		2.1	-15	294	12
36135.64	.20	67	50	2	1.7S	-15	293	12
36184.825	.01	53.2	38.5		3.8	-15	293	12
36210.719	.01	55.3	40.6		2.1	-15	293	12
36224.972	.01	57.7	42.9		1.7	-15	293	12
36260.111	.02	63	49	5	3.8	-15	293	12
36277.516	.01	54.5	39.8		3.0	-15	293	12
36311.679	.02	65	52	4	3.0	-15	293	12
36332.896	.01	55.5	41.5		2.1	-15	293	12
36410.713	.01	52	38	4	2.1	-15	293	12
36462.655	.02	67	52	4	2.1	-15	293	12
36563.558	.01	55.6	41.0		2.1	-15	293	12
36589.932	.02	61	48	5	1.7	-15	293	12
36688.057	.02	64	49	5	3.0S	-15	293	12

NAME: OXETANE		CONTINUED						ID NO. 3.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
36704.228	.02	62	47	4	3.4	-15	293	12
36718.478	.02	58	44	4	2.6	-15	293	12
36727.643	.02	62	48	4	3.8	-15	293	12
36732.048	.01	56.4	41.8		3.8	-15	293	12
36736.878	.01	58.7	44.0		3.4	-15	293	12
36749.358	.01	53.5	38.8		1.7	-15	293	12
36782.090	.01	53.2	38.5		2.1	-15	293	12
36964.581	.02	61	47	4	3.0	-15	293	12
37166.966	.01	53.6	39.0		2.1	-15	293	12
37349.621	.01	52.2	37.4		2.1	-16	293	12
37360.747	.01	54.3	39.7		2.1	-16	293	12
37362.25	.20	61	46	2	3.8	-16	293	12
37460.599	.01	54.4	39.7		1.7	-16	293	12
37478.574	.01	61	48	5	3.8	-16	293	12
37486.245	.01	58.4	44.3		3.8	-16	293	12
37513.253	.01	55.6	40.9		1.7	-16	293	12
37515.39	.20	67	52	2	3.4	-16	293	12
37588.25	.10	58	43	3	2.1	-16	293	12
37588.81	.10	58	44	2	2.1	-16	293	12
37653.429	.02	60.4	45.6		3.4	-16	293	12
37712.080	.02	63	48	5	3.8	-16	293	12
37719.322	.05	57	42	4	3.0	-16	293	12
37762.760	.02	66	51	4	3.0	-16	293	12
37895.606	.02	64	49	4	1.7	-16	294	12
37957.332	.02	62	47	5	3.4	-16	294	12
38006.760	.01	56.3	41.1		3.8	-16	294	12
38009.10	.20	64	49	2	3.8	-16	294	12
38068.000	.02	68	53	5	1.7	-16	295	12
38128.106	.01	62	49	5	3.8	-16	295	12
38171.997	.01	53.2	38.4		2.1	-16	295	12
38293.163	.02	63	49	5	2.1	-16	295	12
38476.71	.10	68	53	3	1.7	-16	294	12
38479.788	.02	53.4	38.7		2.1	-16	294	12
38538.541	.02	63	50	5	1.7	-16	294	12
38571.382	.02	56	41	4	3.0	-16	294	12
38627.235	.01	56.6	41.8		3.0	-15	294	12
38821.575	.01	57.8	43.1		1.7	-15	294	12
38892.576	.01	59.7	45.6		2.1	-15	294	12
38901.988	.01	59.5	45.0		3.4	-15	294	12
38935.555	.01	54.6	40.5		2.1	-14	294	12
38993.195	.01	62	47	5	1.7	-15	294	12
39085.241	.01	51.7	37.0		3.0	-15	294	12
39103.181	.01	57.7	44.3		1.7	-15	294	12
39151.526	.02	63	49	5	2.1	-15	294	12
39257.945	.01	52.7	38.1		3.4	-15	294	12
39281.213	.02	60	47	4	2.1	-14	294	12
39314.046	.01	52	37	4	2.1	-14	294	12
39356.164	.02	64	50	5	1.7	-14	294	12
39369.267	.01	53.9	39.6		2.1	-14	297	12
39505.176	.02	66	51	5	2.1	-14	297	11

NAME: OXETANE		CONTINUED						ID NO. 3.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
39512.125	.01	56.7	41.7		2.1	-14	296	12
39549.265	.01	57.8	42.9		3.0	-14	296	12
39653.576	.02	62	47	5	2.1	-14	296	12
39706.872	.02	63	50	5	2.1	-14	296	12
39880.634	.02	55.1	40.0		2.1	-14	296	12
39996.639	.01	62	47	5	2.1	-14	296	12

Oxirane

Formula: OCH_2CH_2

CAS Registry number: 75-21-8
Synonyms: ethylene oxide; 1,2-epoxyethane
NBS identification number: 70.00
Frequency range: 18 000 to 40 000 MHz

Sample.- The sample source was Matheson bottled gas with a stated minimum purity of 99.7 percent. Chromatography with a Chromosorb 102 column showed a single impurity of less than 0.1 percent.

Remarks.- No information on power levels or Stark sensitivity was included in the data below 26 500 MHz. In addition, no information on Stark sensitivity was included in the original data above that frequency, but all those lines with $-10 \log \gamma$ of 65 or less were rerun and no sensitive Stark effects were observed.

Sample identity was confirmed by matching four lines below 26 500 MHz and nine lines above that frequency with calculated transition frequencies (ref. 3).

NAME: OXIRANE								ID NO. 70.00
ν_o, MHz	U, MHz	-10 log γ	-10*log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
21692.28	.05	68	54	4	2.1		298	12
23134.21	.05	53	39	4	2.1		299	14
23278.45	.02	67	54	5	2.1		299	14
23561.05	.02	67	54	5	2.1		299	14
23610.38	.02	51	38	7	2.1		299	14
24361.15	.05	66	53	5	2.6		299	14
24834.26	.02	48	34	7	2.1		299	14
24923.65	.02	52	39	7	2.1		299	14
25002.37	.02	67	54	5	2.1		299	14
25211.11	.05	68	54	4	1.7		299	14
25247.82	.02	66	52	5	1.7		299	14
28512.246	.01	61	47	5	1.7	-17	294	12
29687.039	.01	45.5	31.8		2.1	-18	294	12
30155.753	.01	60.4	46.7		1.7	-17	294	12
31407.339	.01	61	47	5	2.1	-18	294	12
34147.722	.01	45.2	31.3		3.0	-17	294	12
34156.985	.01	50.9	37.0		2.1	-17	294	12
34327.66	.02	66	52	5	2.6		301	13
34397.55	.05	67	53	4	2.6		301	13
34407.918	.02	60	46	4	2.1	-17	294	12
34781.89	.02	66	53	5	2.6		301	13
34883.73	.05	65	51	4	2.6		301	14
34919.22	.02	64	50	5	2.6		301	14
35337.938	.01	59.0	45.1		2.1	-17	294	12
35406.82	.02	61	48	5	2.6		301	14
35560.94	.05	63	49	4	2.6		301	14
35790.550	.01	41.2	27.4		2.1	-16	294	12
35796.51	.10	59	44	3	3.8	-16	294	12
36462.909	.01	59.9	46.1		2.1	-16	294	12
36549.62	.02	64	51	5	2.6		301	14
36859.06	.10	64	51	4	2.6		301	14
36967.47	.02	61	47	5	2.6		301	14
37052.10	.05	63	50	4	2.6		301	14
37328.837	.01	42.4	28.5		2.1	-17	294	12
37492.10	.02	63	50	5	2.6		301	14
37613.572	.01	59.2	45.4		3.4	-16	294	12
37669.221	.01	57.6	43.8		1.7	-17	294	12
37680.900	.01	57	44	4	2.6	-17	294	12
37780.702	.01	44.4	30.6		3.4	-17	294	12
38061.898	.01	61	47	5	3.0	-16	294	12
38541.538	.01	57.8	44.0		2.1	-16	294	12
38701.079	.01	41.4	27.5		2.1	-16	294	12
39574.33	.05	61	47	4	2.6		301	14
39581.589	.01	46.5	32.8		2.1	-15	294	12
39680.088	.01	46.1	32.0		2.1	-14	294	12

2-Oxo-propanal

Formula: CH_3COCHO
CAS Registry number: 78-98-8
Synonyms: methylglyoxal, pyruvaldehyde, pyruvic aldehyde
NBS identification number: 963.00
Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Aldrich 13,836-3 pyruvic aldehyde. This is a 40 percent aqueous solution which was analyzed by the manufacturer using elemental and infrared methods. Gas chromatography with a Chromosorb 102 column showed about 70 percent water and two impurity peaks of 6.8 and 0.2 percent. The sample was purified on a Chromosorb 102 column before use.

Remarks.- Line widths were in the range of 165 to 215 kHz at 10 millitorr, and a relatively small proportion of the lines were asymmetric.

The sample pressure of 10 millitorr was registered by a thermocouple gage as 37 millitorr.

NAME: 2-OXO-PROPANAL ID NO. 963.00

ν_O, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
32630.743	.02	67	55	5	3.0	-18	296	10
32899.691	.02	68	56	4	3.8	-17	296	10
32934.637	.02	67	55	5	1.7	-17	295	10
33487.343	.02	68	56	5	2.1S	-17	295	10
33560.882	.02	68	56	5	2.1	-17	295	10
34596.901	.02	66	54	5	1.7	-17	295	10
34635.450	.02	67	55	4	3.0	-17	295	10
34967.660	.05	68	56	4	3.0S	-17	294	10
35019.577	.02	68	55	5	3.4	-17	294	10
37885.347	.02	68	55	4	2.1	-17	294	10
38303.755	.02	68	56	5	2.1	-16	294	10
38444.884	.02	65	53	5	2.1	-16	294	10
38457.566	.01	65	53	5	2.1	-16	294	10
38977.547	.02	66	53	4	1.7	-15	294	10
39064.507	.02	64	51	4	3.8	-15	294	10
39242.612	.02	65	53	5	3.8	-15	294	10
39293.867	.01	66	53	5	2.1	-15	294	10
39417.57	.10	67	54	2	3.8	-14	294	10
39474.949	.02	67	54	4	2.1	-14	294	10
39537.956	.02	67	55	5	3.8	-14	294	10
39721.950	.02	67	54	5	3.4	-14	294	10
39782.697	.02	67	54	5	1.7S	-14	294	10
39891.529	.02	66	53	5	3.4	-14	294	10

Oxybismethane

Formula: CH_3OCH_3
CAS Registry number: 115-10-6
Synonyms: dimethyl ether, methyl ether, methoxymethane
NBS identification number: 325.00
Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Matheson bottled gas with a stated minimum purity of 99.5 percent. Typical impurities are given as 0.2 percent each of methanol and water. Chromatography on a Chromosorb 102 column showed two impurities of about 0.2 percent and one of 0.37 percent.

Remarks.- This spectrum contains a number of triplets with spacing of 1 MHz or less.

Sample identity was confirmed by matching 11 of the lines with calculated transition frequencies (ref. 3).

NAME: OXYBISMETHANE								ID NO. 325.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26564.802	.02	66	54	4	3.8	-18	294	15
26568.520	.02	61	49	4	3.4	-18	294	15
26823.28	.10	67	54	3	3.0	-18	294	15
26823.903	.02	64	52	5	3.4	-18	294	15
26824.55	.10	66	55	2	3.4	-18	294	15
27029.084	.05	67	55	4	1.7	-17	294	15
28198.07	.10	67	55	2	3.4S	-17	294	15
28198.94	.10	67	54	3	3.4	-17	294	15
28199.28	.10	67	56	2	3.4	-17	294	15
28754.635	.01	65	54	5	3.0	-18	294	15
28870.718	.01	64	53	5	3.0	-18	294	15
28890.850	.02	66	55	5	3.0	-18	294	15
29091.300	.05	62	49	4	3.8	-18	294	15
29092.092	.01	59.5	47.6		3.0	-18	294	15
29092.889	.02	61	49	4	3.0	-18	294	15
29900.485	.01	60	47	4	2.1	-18	294	15
29901.392	.01	58.2	46.5		2.1	-18	294	15
29902.289	.02	60	48	4	2.1	-18	294	15
29926.234	.01	64	52	5	3.0	-18	294	15
29929.970	.05	65	53	5	3.8S	-18	294	15
29957.065	.01	63	51	5	1.7	-18	295	15
29977.912	.02	67	56	5	3.8	-18	295	15
30460.059	.02	67	56	5	2.1	-17	295	15
30510.633	.05	66	55	5	2.1S	-17	295	15
30543.52	.10	67	55	2	3.0	-18	294	15
30778.642	.02	67	56	5	2.1	-18	293	15
30911.814	.05	67	56	5	2.1S	-18	293	15
30912.78	.10	66	55	3	3.4	-18	293	15
30913.14	.10	66	54	2	3.8	-18	292	15
30973.143	.01	64	53	5	3.8	-18	292	15
31055.552	.02	64	53	4	3.8	-18	292	15
31079.954	.01	61	50	5	3.8	-18	292	15
31102.35	.10	65	53	2	3.4S	-18	292	15
31105.224	.01	60	48	4	3.8	-18	292	15
31106.144	.01	56	45	4	3.8	-18	292	15
31107.060	.01	61	50	4	3.8	-18	292	15
31121.937	.05	65	54	5	2.1S	-18	292	15
31135.505	.05	65	54	5	3.0S	-18	292	15
31147.420	.01	60.1	49.2		1.7	-18	292	15
31172.490	.02	66	55	4	2.1	-18	292	15
31174.936	.02	66	56	4	3.8	-18	292	15
31288.561	.02	66	54	4	2.1	-18	292	15
31454.019	.02	67	57	4	2.1	-18	293	15
31459.084	.05	67	56	4	2.1S	-18	292	15
31584.756	.02	64	53	4	2.1	-18	292	15
31692.433	.02	65	54	4	2.6	-18	292	15
31787.170	.05	65	54	5	2.1S	-18	292	15
31827.131	.02	67	56	5	2.1	-18	292	15
31996.114	.01	62	50	5	2.1	-18	292	15
31999.360	.01	59.8	48.2		3.4	-18	293	15

NAME: OXYBISMETHANE			CONTINUED					ID NO. 325.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
32359.636	.02	68	57	4	3.8	-18	293	15
32404.27	.10	64	53	3	2.1S	-18	293	15
32404.990	.05	63	49	4	3.0	-18	293	15
32405.77	.10	66	52	2	3.4	-18	293	15
32650.034	.05	66	54	4	3.0	-18	293	15
32848.272	.01	64	53	5	2.1	-18	293	15
32872.887	.01	59.1	47.9		2.1	-17	292	15
32887.363	.02	66	54	4	1.7	-17	293	15
32898.386	.01	66	54	5	3.8	-17	293	15
32924.529	.02	67	56	5	3.8	-17	294	15
32973.397	.01	60.3	49.0		2.6	-17	294	15
32977.283	.01	56	44	4	1.7	-17	293	15
32978.227	.01	53.8	42.1		2.1	-17	293	15
32979.177	.01	56	44	4	2.6	-17	293	15
32994.138	.01	65	53	5	3.4	-17	293	15
32999.110	.01	58	47	4	3.8	-17	293	15
33023.835	.01	62	51	5	2.1	-17	293	15
33025.769	.01	64	53	5	2.1	-17	293	15
33146.814	.01	66	55	5	2.6	-17	293	15
33311.172	.05	63	51	4	1.7S	-17	293	15
33321.44	.10	65	53	2	3.4	-17	293	15
33324.328	.01	62	51	4	3.8	-17	293	15
33336.83	.10	65	53	3	2.1S	-17	293	15
33337.612	.02	63	50	4	2.1	-17	293	15
33344.210	.02	63	51	5	2.1	-17	293	15
33345.150	.05	65	53	4	2.1S	-17	293	15
33392.759	.02	67	55	5	1.7	-17	293	15
33397.465	.05	63	50	4	3.4	-17	293	15
33399.69	.10	64	51	4	3.8S	-17	293	15
33569.020	.01	64	53	5	3.8	-17	293	15
33586.786	.02	67	56	5	2.1	-17	293	15
33601.669	.02	65	53	4	2.6	-17	293	15
33608.215	.01	62	51	5	3.0	-17	293	15
33614.927	.02	66	54	4	3.0	-17	293	15
33655.006	.02	66	55	4	1.7	-17	294	15
33894.95	.10	58	46	3	3.0	-18	294	15
33932.378	.02	67	55	5	2.1	-18	294	15
33943.127	.02	62	50	4	2.1	-18	294	15
33943.93	.10	63	51	2	3.0	-18	294	15
34237.847	.05	67	54	4	3.8	-18	294	15
34238.46	.10	68	56	2	3.0	-18	294	15
34242.701	.01	65	53	5	3.8	-18	294	15
34258.612	.05	65	53	4	3.0S	-18	294	15
34351.171	.02	67	54	4	3.8	-18	294	15
34356.599	.02	67	55	5	1.7	-18	294	15
34682.544	.02	67	55	5	2.1	-17	294	15
34730.397	.02	67	55	5	2.1	-18	294	15
34946.271	.02	66	55	5	1.7	-18	294	15
34959.48	.10	66	54	5	3.8S	-18	294	15
34999.694	.01	62	50	5	2.1	-18	294	15

NAME: OXYBISMETHANE		CONTINUED						ID NO. 325.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
35006.07	.10	64	52	3	2.1	-17	294	15
35006.856	.02	62	50	4	2.6	-17	293	15
35053.399	.02	68	56	5	3.0	-17	293	15
35128.305	.05	63	51	4	3.8S	-17	293	15
35129.11	.10	64	52	2	3.4	-17	293	15
35135.510	.02	59	47	4	2.1	-17	293	15
35144.158	.02	67	56	4	2.1	-17	292	15
35194.672	.01	65	53	5	2.6	-17	292	15
35210.063	.02	67	55	5	3.8	-17	292	15
35235.719	.01	65	53	5	3.0	-17	292	15
35348.408	.01	59.7	48.3		2.1	-17	292	15
35373.754	.01	57.6	46.2		3.0	-17	292	15
35384.753	.02	57	43	4	3.0	-17	292	15
35398.548	.01	62	51	5	2.1	-17	292	15
35399.582	.01	64	52	4	3.4	-17	292	15
35401.792	.01	63	52	5	3.8	-17	292	15
35510.902	.02	68	57	5	2.1	-17	292	15
35558.543	.01	61	50	5	2.1	-17	292	15
35574.088	.02	67	56	5	3.8	-17	292	15
35585.042	.01	56.9	45.3		3.8	-17	292	15
35592.43	.10	56	45	3	3.8	-17	292	15
35593.406	.01	52.4	40.8		3.4	-17	292	15
35594.382	.05	57	45	2	3.8	-17	292	15
35611.025	.02	65	54	4	3.8	-17	292	15
35612.064	.01	63	51	5	3.8	-17	292	15
35639.346	.05	62	50	5	2.1S	-17	292	15
35824.197	.02	66	55	5	3.0	-16	292	15
35840.210	.01	61	49	5	2.6	-16	292	15
35916.947	.01	65	54	5	2.1	-16	292	15
36019.221	.02	67	55	4	3.8	-16	292	15
36034.493	.01	63	52	5	3.0	-16	292	15
36036.574	.02	63	52	4	3.8	-16	292	15
36043.618	.02	67	56	4	2.6	-16	292	15
36053.591	.02	66	54	4	2.6	-16	292	15
36074.748	.01	63	52	5	3.0	-16	292	15
36135.871	.01	65	54	5	1.7	-16	292	15
36229.688	.02	64	52	4	2.6	-16	292	15
36241.533	.02	66	54	4	2.1	-16	292	15
36280.059	.01	66	55	5	2.6	-16	293	15
36285.297	.01	61	50	5	2.1	-16	293	15
36290.835	.02	66	54	5	3.4	-16	293	15
36298.236	.02	65	53	5	3.0	-16	293	15
36442.64	.10	66	54	3	3.0S	-16	293	15
36454.787	.05	60	47	6	3.4S	-16	293	15
36458.37	.10	61	49	3	3.8	-16	293	15
36458.99	.10	61	49	2	3.4	-16	293	15
36481.318	.01	61	49	5	3.4	-16	293	15
36482.983	.02	63	51	5	3.8	-16	293	15
36484.890	.02	61	47	4	3.8	-16	293	15
36527.228	.02	66	54	4	3.0	-16	293	15

NAME: OXYBISMETHANE		CONTINUED						ID NO. 825.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
36551.171	.02	65	53	5	3.8	-16	293	15
36610.284	.05	65	52	4	3.8	-16	293	15
36875.11	.10	63	50	3	3.4	-16	293	15
36875.564	.05	63		1	3.4	-16	293	15
36876.572	.05	57	44	4	3.4	-16	293	15
36933.145	.02	68	56	5	3.8	-16	294	15
36955.777	.01	63	51	5	2.1	-16	294	15
37000.557	.02	64	52	5	3.8	-16	294	15
37073.104	.02	63	50	4	2.6	-16	294	15
37107.012	.05	68	56	5	3.0S	-16	294	15
37142.165	.05	63	51	5	3.8S	-16	294	15
37149.965	.02	66	54	5	2.6	-16	294	15
37182.42	.10	68	57	4	3.8S	-16	294	15
37219.519	.02	66	54	4	3.4	-16	294	15
37261.223	.02	63	51	4	3.8	-16	294	15
37263.863	.02	61	49	4	3.4	-16	294	15
37266.497	.02	62	51	4	3.8	-16	294	15
37417.928	.05	68	57	4	3.8S	-16	294	15
37517.998	.05	67	56	4	2.1S	-16	294	15
37533.679	.01	63	51	5	3.4	-17	294	15
37535.793	.01	58.6	46.9		3.0	-17	294	15
37537.919	.05	63	50	4	3.8S	-17	294	15
37571.152	.02	67	55	4	3.0	-17	294	15
37629.751	.01	63	51	5	3.0	-17	294	15
37667.494	.01	64	52	5	3.4	-17	294	15
37724.241	.01	65	54	5	2.1	-17	294	15
37738.646	.05	64	51	4	3.0	-17	294	15
37813.760	.02	67	54	4	2.1	-17	295	15
37815.355	.02	63	51	5	3.8	-17	295	15
37846.859	.02	65	53	5	2.1	-17	295	15
37852.353	.02	65	52	4	2.1	-17	295	15
37854.183	.05	59	46	4	3.0	-17	295	15
37855.483	.05	63	51	4	3.8	-17	295	15
37858.667	.02	63	51	4	1.7	-17	295	15
37859.99	.10	58	45	3	2.1	-17	295	15
37894.847	.02	65	53	5	2.1	-17	295	15
37896.742	.02	63	52	5	3.4	-17	295	15
37929.187	.02	63	51	5	3.4	-17	295	15
37997.788	.02	63	51	5	3.0	-17	294	15
38007.620	.02	67	55	5	1.7	-17	294	15
38080.016	.02	68	56	5	3.8	-16	293	15
38321.632	.02	66	54	5	3.4	-16	293	15
38335.901	.02	64	52	4	3.0	-16	293	15
38354.472	.01	60.1	48.3		3.4	-16	293	15
38357.591	.01	58.1	46.4		3.4	-16	293	15
38368.695	.01	62	50	5	2.6	-16	293	15
38370.132	.05	62	50	4	3.0	-16	293	15
38371.420	.01	61	50	5	3.4	-16	293	15
38377.843	.02	67	55	4	2.1	-16	293	15
38379.241	.02	61	50	5	2.6	-16	293	15

NAME: OXYBISMETHANE		CONTINUED						ID NO. 325.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
38380.76	.10	60	47	2	3.0	-16	293	15
38381.558	.05	64		1	3.4S	-16	293	15
38381.96	.10	62	50	2	3.4	-16	293	15
38400.289	.05	63	51	4	3.0	-16	293	15
38477.857	.02	66	54	4	3.4	-16	293	15
38582.020	.01	62	50	5	3.0	-16	293	15
38644.495	.01	61	49	4	3.4	-16	293	15
38670.952	.01	56.4	44.9		1.7	-16	293	15
38697.09	.10	65	53	3	1.7S	-16	293	15
38697.67	.10	62	51	2	3.8	-16	293	15
38769.182	.05	63	52	4	2.1S	-16	293	15
38771.255	.02	66	54	5	3.0	-16	293	15
38787.079	.05	60	48	6	3.0S	-16	293	15
38794.224	.05	64	52	5	2.1S	-16	293	15
38866.675	.02	67	55	5	3.4	-16	293	15
38885.011	.02	67	56	5	2.1	-16	293	15
38914.158	.01	65	54	5	1.7	-15	293	15
38954.758	.01	64	53	5	2.1	-15	293	15
38971.055	.01	57.4	46.0		2.1	-15	293	15
38978.349	.02	65	53	4	3.4	-15	292	15
38998.748	.01	55.7	44.2		3.0	-15	292	15
39026.14	.10	59	48	3	1.7	-15	292	15
39026.72	.10	61	49	2	1.7	-15	293	15
39046.265	.02	53	41	4	2.1	-15	293	15
39047.299	.01	51.1	39.4		3.0	-15	293	15
39048.333	.02	53	41	4	2.1	-15	292	15
39128.681	.02	64	52	4	3.0	-15	293	15
39189.595	.01	60	48	4	1.7	-15	293	15
39198.467	.05	67	55	5	1.7S	-15	293	15
39203.12	.10	68	56	2	2.1	-15	293	15
39231.913	.02	62	49	4	3.8	-15	293	15
39233.07	.10	59	46	3	3.4	-15	293	15
39234.300	.05	61		1	3.4	-15	293	15
39235.00	.10	59	47	2	3.4	-15	293	15
39241.424	.02	64	53	4	1.7	-15	293	15
39261.077	.02	65	53	4	3.0	-15	293	15
39358.133	.02	66	54	5	3.4	-15	293	15
39381.469	.02	66	54	4	3.8	-15	293	15
39486.78	.10	67	55	5	2.1S	-15	293	15
39521.109	.01	61	50	5	2.6	-15	293	15
39526.040	.02	67	55	5	3.4	-15	293	15
39591.996	.01	63	52	5	1.7	-14	293	15
39610.191	.01	63	51	5	2.1	-15	293	15
39611.71	.10	66	54	4	3.0S	-15	293	15
39614.983	.01	66	54	5	1.7	-15	293	15
39623.258	.02	67	55	4	3.0	-14	293	15
39627.929	.02	65	53	4	2.1	-14	293	15
39673.345	.05	67	55	4	1.7S	-15	293	15
39686.339	.02	63	51	5	3.0	-15	293	15
39779.203	.01	66	54	5	3.8	-15	293	15

NAME: OXYBISMETHANE			CONTINUED					ID NO. 325.00
ν_o, MHz	U, MHz	$-10 \log \gamma$	$-10 \log \frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
39802.400	.02	63	51	4	3.0	-15	293	15
39818.670	.01	62	50	5	2.1	-15	293	15
39822.114	.01	60	49	4	2.1	-15	293	15
39825.961	.01	63	51	4	3.8	-15	293	15
39860.47	.10	67	54	3	3.4	-15	294	15
39862.05	.10	59	46	3	3.4	-15	293	15
39862.599	.05	57		1	3.8	-15	294	15
39870.386	.01	64	52	5	2.6	-15	293	15
39916.91	.10	61	47	3	3.4	-15	294	15
39917.677	.01	57.6	45.2		3.4	-15	293	15

Propanal

Formula: CH_3CH_2CHO

CAS Registry number: 123-38-6

Synonym: propionaldehyde

NBS identification number: 71.00

Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Eastman 653. Gas chromatography showed four impurities of 1.96, 5.54, 7.06, and 2.95 percent. The sample was therefore purified on a Chromosorb 102 column before use.

Remarks.- The lines are broader than average, with typical widths of 350 kHz at a pressure of 8 millitorr. Many of the lines are affected by unresolved or partially resolved overlaps.

The sample pressure of 8 millitorr was registered by a thermocouple gage as 33 millitorr.

Sample identity was confirmed by matching five of the observed lines with calculated frequencies (ref. 9).

NAME: PROPANAL								ID NO. 71.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
27142.01	.20	67	49	3	2.1	-17	297	8
28528.518	.02	62	45	4	2.1	-18	296	8
28660.737	.05	67	49	4	1.7	-18	296	8
28662.464	.05	67	50	4	1.7	-18	296	8
28672.397	.02	62	46	5	3.8	-18	296	8
28889.765	.05	68	51	4	2.1	-18	296	8
29469.512	.02	66	49	5	3.0	-18	296	8
29482.930	.02	65	48	4	1.7	-18	296	8
29485.320	.02	66	49	5	1.7S	-18	295	8
29488.136	.02	60.5	43.4		1.7	-18	295	8
29618.918	.02	64	47	5	2.1	-18	295	8
29896.251	.05	64	46	4	3.8	-18	295	8
30466.567	.05	66	50	4	3.0S	-17	295	8
31002.137	.02	65	48	4	2.1	-18	295	8
31043.078	.02	65	48	5	2.1	-18	295	8
31330.690	.05	68	50	4	3.8	-18	295	7
31477.362	.02	67	50	5	1.7	-18	294	7
31584.006	.02	65	49	4	2.1	-18	294	7
31587.291	.02	65	49	5	2.6	-18	294	7
31601.614	.02	67	51	5	3.4	-18	294	7
31668.500	.02	68	52	4	2.1	-18	294	7
31739.49	.10	67	49	4	1.7S	-18	294	7
31783.130	.01	59.7	42.4		2.1	-18	295	8
31911.141	.05	67	50	5	2.1S	-18	294	7
32864.709	.05	68	50	4	2.6	-17	294	7
32897.827	.02	64	47	4	2.1	-17	294	7
33346.850	.02	65	48	4	3.4	-17	294	7
33410.145	.05	66	48	4	3.8	-17	294	7
33506.668	.02	67	50	4	1.7	-17	294	7
33643.014	.05	68	50	4	2.1	-17	294	7
33839.255	.05	66	48	4	3.8	-17	294	7
33840.355	.05	66	48	4	3.8	-17	294	7
33856.44	.20	68	50	2	2.1S	-17	294	7
33864.58	.10	64		1	1.7S	-17	294	7
33953.87	.10	67	50	3	3.8	-17	294	7
34192.564	.02	66	49	4	3.8	-17	294	7
34196.260	.05	66	49	4	3.8S	-17	294	7
34302.501	.05	68	50	4	3.4	-17	294	7
34403.07	.20	67	49	2	3.0	-17	294	7
34616.17	.20	67	50	2	2.1	-17	294	7
34918.773	.02	67	50	5	2.1S	-17	294	7
35080.96	.20	66	48	3	2.6	-17	294	7
35132.130	.05	67	49	4	1.7	-17	294	7
35133.830	.02	64	47	5	2.6	-17	294	8
35138.420	.05	64	47	4	3.8	-17	294	8
35142.225	.02	67	50	5	3.8	-17	294	8
35293.751	.02	65	48	5	3.4	-17	295	8
35308.740	.02	66	49	5	2.1	-17	295	8
35368.048	.02	66	50	5	3.4S	-17	295	8
35378.256	.05	66	50	4	2.1S	-17	295	8

NAME: PROPANAL	CONTINUED							ID NO. 71.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
35582.546	.02	59.3	41.3		2.1	-16	295	8
35946.27	.20	67	50	2	3.8S	-16	295	8
36138.63	.20	67	50	2	3.0S	-15	295	8
36211.504	.05	68	50	4	3.4	-15	295	8
36481.975	.05	67	50	4	3.8S	-15	295	8
36731.93	.20	65	48	2	2.1	-15	295	8
36755.11	.20	65	47	3	2.1	-15	295	8
37088.92	.10	66	49	4	2.1S	-15	295	8
37176.59	.20	62	45	3	3.8	-16	295	8
37494.78	.10	67	51	2	2.1	-16	295	8
37660.18	.20	66	49	2	1.7	-16	295	8
37789.409	.05	67	49	4	3.8	-16	295	8
38219.320	.05	64	47	5	1.7S	-16	295	8
38401.834	.02	66	48	5	1.7	-16	295	8
38437.00	.20	65	47	3	1.7	-16	295	8
38437.55	.20	65	47	2	1.7	-16	295	8
39011.11	.20	67	49	2	2.1	-15	295	8
39049.053	.05	66	47	4	1.7	-15	295	8
39061.021	.02	62	45	4	3.8	-15	295	8
39092.80	.10	65	47	4	1.7S	-15	295	8
39098.87	.20	66	48	2	3.0	-15	295	8
39177.130	.02	61	45	4	1.7	-15	295	8
39181.86	.20	66	48	2	3.8S	-15	295	8
39400.777	.02	66	49	5	2.1	-14	295	8
39505.98	.20	67	49	2	1.7	-14	295	8
39846.289	.05	68	51	4	2.1	-14	295	8

1-Propanol

Formula: $CH_3CH_3CH_2OH$
CAS Registry number: 71-23-8
Synonym: n-propyl alcohol
NBS identification number: 203.00
Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Fisher A-414. Gas chromatography with a Chromosorb 102 column showed 5.7 percent water, 0.23 percent 2-propanol, and 2.5 percent 2-butanol. The sample was therefore purified on a Chromosorb 102 column before use.

Remarks.- The sample pressure of 15 millitorr was registered on a thermocouple gage as 62 millitorr.

NAME: 1-PROPANOL IO NO. 203.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
27204.95	.05	68		1	2.1	-16	293	15
28180.50	.05	68		1	2.1	-16	293	15
29983.86	.02	68		1	2.1	-17	293	15
30406.75	.05	69		1	2.1	-16	293	15
31371.86	.05	68		1	2.1	-17	293	15
32171.73	.05	68		1	2.1	-18	293	15
33184.48	.02	69		1	2.1	-16	293	15
33661.45	.10	68		1	2.1	-16	293	15
34391.63	.02	67		1	2.1	-17	293	15
35038.77	.02	69		1	2.1	-17	293	15
35346.88	.02	68		1	2.1	-16	293	15
35431.20	.02	68		1	2.1	-16	293	15
35443.88	.10	69		1	2.1	-16	293	15
35533.463	.02	66	54	5	2.1S	-16	293	16
35541.35	.05	68		1	2.1	-16	293	15
36235.148	.02	65	52	5	2.1	-15	293	15
36279.32	.10	67		1	2.1	-15	293	15
36482.89	.10	69		1	2.1	-15	293	15
36484.800	.02	65	52	5	3.0	-15	293	15
36515.453	.02	65	51	4	2.6	-15	293	15
36523.115	.05	66	53	4	3.4	-15	293	15
36696.38	.05	68		1	2.1	-15	293	15
36719.467	.02	66	52	5	3.8S	-15	293	15
36747.21	.05	67		1	2.1	-15	293	15
37089.66	.05	69		1	2.1	-15	293	15
37143.415	.02	65	51	5	3.0	-15	293	15
37239.96	.05	68		1	2.1	-15	293	15
37574.47	.05	67		1	2.1	-16	293	15
37674.02	.02	69		1	2.1	-16	293	15
37684.498	.05	65	51	4	3.4	-16	293	15
37685.483	.05	66		1	3.4	-16	293	15
37783.94	.05	69		1	2.1	-16	293	15
37885.364	.05	66	53	4	2.1	-16	294	15
38284.566	.02	66	53	5	2.6	-15	294	15
38688.021	.02	66	53	4	3.4	-15	294	15
38771.40	.05	69		1	2.1	-15	294	15
38813.623	.02	64	51	5	3.8	-15	294	15
39178.510	.02	66	54	4	3.0	-14	294	15
39441.249	.02	66	53	5	3.0	-14	294	15

2-Propanol

Formula: $CH_3CHOHCH_3$
CAS Registry number: 67-63-0
Synonym: isopropyl alcohol
NBS identification number: 146.00
Frequency range: 18 000 to 40 000 MHz

Sample.- The sample source was Fisher A-432 Certified 2-propanol. Gas chromatography with a Chromosorb 102 column showed a single impurity of about 1 percent water. This was further reduced by vacuum distillation.

Remarks.- A number of the lines exhibit asymmetry due to unresolved overlaps.

The data below 26 500 MHz do not contain information on power levels or Stark sensitivities. In addition, the original data above that frequency did not include Stark sensitivity. However, all the lines in the upper frequency range with $-10 \log \gamma$ of 60 or less have been remeasured, and no sensitive Stark effects were indicated.

The sample pressure of 13 millitorr was registered by a thermocouple gage as 52 millitorr.

Data were compared with earlier measurements made on different spectrometers and sample sources and were consistent within the error limits of the earlier data.

NAME: 2-PROPANOL								ID NO. 146.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
18407.81	.20	69	55	2	2.1		298	14
18705.69	.02	69	56	5	2.1		298	14
19156.23	.02	69	56	5	1.7		298	14
19288.21	.05	70	56	4	1.7		298	14
19410.46	.05	70	56	4	1.7		298	14
19598.92	.10	68	55	4	3.8		298	14
19807.40	.02	69	55	5	1.7		298	14
20032.90	.05	68	55	4	2.1		298	14
20456.85	.05	68	54	5	1.7		298	14
20614.64	.05	69	56	4	2.1		298	14
20629.94	.02	68	55	5	2.1		298	14
20689.64	.05	70	57	4	2.1		298	14
20869.43	.05	68	53	4	2.6		298	14
20908.54	.05	71	59	5	2.6		298	14
20986.27	.10	70	57	4	1.7		298	14
21268.84	.20	68	52	5	2.1		298	14
21593.11	.02	67	54	5	2.1		298	14
21597.99	.02	67	54	5	3.4		298	14
21652.06	.20	71	57	3	2.1		298	14
21653.07	.20	70		1	1.7		298	14
21653.68	.20	70	57	2	1.7		298	14
21740.22	.05	71	57	5	2.1		298	14
22078.69	.02	69	57	5	1.7		299	14
22192.46	.05	71	57	5	1.7		299	14
22231.52	.05	68	54	4	2.6		299	14
22298.61	.10	71	56	4	2.1		299	14
22317.76	.02	68	54	5	2.1		299	14
22364.41	.02	70	56	5	2.1		299	14
22399.81	.02	70	56	5	3.8		299	14
22445.71	.05	69	56	5	2.1		299	14
22460.18	.02	69	57	5	2.1		299	14
22496.18	.20	67	53	3	1.7		299	14
22588.05	.02	68	53	5	1.7		299	14
22675.45	.02	69	55	5	2.1		299	14
22758.41	.02	68	54	5	1.7		299	14
22837.10	.02	65	52	5	2.1		298	14
22866.35	.05	69	56	4	3.4		298	14
22911.52	.05	68	54	4	2.1		298	14
22980.96	.20	69	56	3	2.6		298	14
22981.61	.20	68	54	2	3.0		298	14
23047.47	.05	68	54	4	1.7		298	14
23057.42	.05	68	55	4	2.1		298	14
23108.88	.05	67	53	4	2.1		298	14
23165.71	.05	67	53	4	2.1		298	14
23209.20	.02	68	56	5	1.7		298	14
23217.68	.05	67	53	4	2.1		298	14
23264.45	.05	67	53	4	2.1		298	14
23305.52	.05	67	53	4	2.1		298	14
23340.21	.10	66	52	4	1.7		298	14
23341.25	.20	67	54	2	2.1		298	14

NAME: 2-PROPANOL			CONTINUED					ID NO. 146.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
23367.55	.10	65	50	4	2.1		298	14
23374.31	.05	66	53	5	2.1		298	14
23386.28	.20	66	52	3	2.1		297	14
23389.54	.05	68	53	5	3.0		297	14
23394.44	.02	67	53	5	2.1		298	14
23511.10	.20	70	56	3	2.1		298	14
23576.23	.02	67	54	5	2.1		298	14
23587.03	.10	66	52	4	2.6		298	14
23630.40	.05	71	58	4	1.7		298	14
23678.90	.10	71	58	5	1.7		298	14
23749.70	.05	71	58	4	2.6		298	14
23810.86	.20	70	56	3	1.7		298	14
23811.50	.20	70	56	2	2.1		299	14
23817.48	.02	67	53	5	2.1		299	14
23937.79	.02	67	54	5	2.1		299	14
24293.47	.02	66	53	5	2.1		299	14
24521.32	.05	70	57	4	1.7		299	14
24531.11	.10	70	56	4	1.7		299	14
24642.71	.02	66	53	5	2.1		299	14
24703.46	.02	68	55	5	1.7		299	14
24735.02	.02	68	54	5	2.1		299	14
24758.30	.05	69	56	4	1.7		299	14
24879.73	.02	69	56	5	1.7		299	14
24984.88	.02	66	53	5	1.7		299	14
25016.22	.02	69	56	5	3.4		299	14
25155.15	.02	69	56	5	2.6		299	14
25280.61	.10	69	55	4	2.1		299	14
25319.20	.02	65	52	5	2.6		299	14
25445.15	.02	67	53	5	2.1		299	14
25644.71	.02	65	52	5	2.1		299	14
25723.20	.02	70	57	5	1.7		299	14
25748.26	.02	69	56	5	1.7		299	14
25754.47	.05	70	56	4	2.1		299	14
25796.33	.02	67	54	5	2.1		299	14
25855.96	.02	67	54	5	3.0		299	14
25960.25	.05	65	52	4	2.1		299	14
26075.96	.02	67	54	5	2.1		299	14
26172.86	.02	70	56	5	2.1		300	14
26208.70	.10	68	55	4	2.1		300	14
26264.37	.02	64	51	5	2.1		298	14
26267.71	.10	71	58	4	2.1		298	14
26479.44	.10	73	59	4	2.6		298	14
26525.90	.05	66		1	2.1	-18	295	13
26555.383	.02	62	48	5	1.7	-17	298	14
26831.00	.20	61	47	2	2.1	-18	298	14
26897.582	.01	64	50	5	2.1	-18	298	14
26962.15	.05	66		1	2.1	-18	293	13
26980.334	.02	64	50	4	2.1	-17	298	14
27088.782	.05	63	47	4	2.1	-17	298	14
27205.41	.10	67		1	2.1	-18	293	13

NAME: 2-PROPANOL		CONTINUED					ID NO. 146.00	
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
27294.30	.10	69		1	2.1	-18	293	13
27325.06	.10	64		1	1.7	-16	298	14
27357.12	.05	67		1	2.1	-18	293	13
27379.75	.10	66		1	2.1	-18	293	13
27430.20	.05	68		1	2.1	-18	293	13
27468.68	.05	65		1	2.1	-18	293	13
27481.10	.05	67		1	2.1	-18	293	13
27535.72	.10	65		1	2.1	-17	298	14
27536.57	.10	64		1	2.1	-17	298	14
27537.12	.10	65		2	1.7	-17	298	14
27584.13	.05	66		1	2.1	-18	293	13
27593.10	.05	67		1	2.1	-18	293	13
27644.00	.10	68		1	2.1	-18	293	13
27715.17	.05	67		1	2.1	-18	293	13
27853.71	.05	67		1	2.1	-18	293	13
27917.539	.02	65	51	4	2.1	-16	298	14
27933.30	.05	67		1	2.1	-18	293	13
27944.50	.05	67		1	2.1	-18	293	13
27949.20	.10	67		1	2.1	-18	293	13
27955.75	.10	67		1	2.1	-18	293	13
27960.323	.02	64	50	4	2.1	-16	298	14
27972.30	.10	68		1	2.1	-18	293	13
27981.03	.05	67		1	2.1	-18	293	13
27994.25	.05	67		1	2.1	-18	293	13
28181.98	.05	67		1	2.1	-18	293	13
28385.88	.10	64	50	3	2.6	-16	298	14
28408.67	.05	68		1	2.1	-18	293	13
28443.326	.02	66	53	4	1.7	-16	298	14
28701.732	.05	66	52	4	1.7	-16	298	14
28704.531	.02	65	52	5	1.7	-16	298	14
28741.948	.05	65	50	4	2.1	-16	298	14
28912.724	.02	67	53	5	2.1	-16	298	14
28943.569	.01	66	53	5	3.8	-16	298	14
28957.071	.05	63	50	4	1.7	-16	298	14
29002.819	.01	64	50	5	2.6	-16	298	14
29006.955	.02	64	51	4	3.4	-16	298	14
29188.730	.01	66	52	5	2.6	-15	298	14
29197.655	.02	66	53	4	2.1	-15	298	14
29209.337	.02	65	52	4	2.6	-15	298	14
29254.610	.02	65	51	4	3.4	-15	298	14
29360.341	.02	64	50	5	2.1	-15	298	14
29421.090	.01	64	50	5	1.7	-16	298	14
29422.988	.05	66	51	4	3.0	-16	298	14
29458.342	.01	65	51	5	1.7	-16	298	14
29464.072	.02	64	51	5	2.6	-16	298	14
29472.933	.05	66	51	4	2.6	-16	298	14
29516.148	.02	66	53	5	2.1	-17	298	13
29618.526	.01	65	52	5	2.6	-17	298	13
29634.992	.01	65	52	5	1.7	-17	298	13
29703.986	.01	64	50	5	2.6	-17	298	13

NAME: 2-PROPANOL	CONTINUED							ID NO. 146.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
29946.077	.02	63	50	4	2.6	-17	298	13
29988.376	.02	65	51	5	2.6	-17	298	13
30104.164	.01	64	50	5	2.1	-17	298	13
30176.186	.05	64	49	4	2.6	-17	298	13
30184.383	.02	63	49	4	3.0	-17	298	13
30257.512	.02	64	50	5	1.7	-17	298	13
30276.665	.05	66	52	5	1.7	-17	298	13
30410.658	.02	66	53	5	1.7	-16	298	13
30418.630	.01	62	49	5	2.6	-16	298	13
30439.79	.05	66		1	2.1	-18	295	13
30447.506	.02	64	51	4	3.8	-16	298	13
30460.730	.01	66	52	5	1.7	-16	298	13
30504.681	.05	65	51	4	2.1	-16	298	13
30610.018	.02	65	51	5	2.1	-16	298	13
30639.46	.10	67	52	4	2.1	-16	298	13
30648.486	.01	62	48	5	2.1	-16	298	13
30713.652	.02	66	52	4	1.7	-16	298	13
30808.699	.02	65	51	4	1.7	-16	298	13
30873.520	.02	61	47	4	2.1	-16	299	13
30898.656	.02	65	52	4	1.7	-16	299	13
30907.124	.02	65	51	4	2.1	-16	299	13
30908.308	.05	66	52	4	2.1	-16	299	13
30957.07	.10	65	51	3	2.1	-16	299	13
30958.02	.10	65	50	2	2.1	-16	299	13
31000.308	.02	66	52	4	1.7	-16	299	13
31021.124	.01	64	51	5	2.1	-16	299	13
31049.339	.02	67	54	5	3.8	-16	299	13
31052.030	.02	66	52	4	3.4	-16	299	13
31093.212	.01	61	47	5	2.1	-18	298	13
31116.48	.05	67		1	2.1	-18	295	13
31159.54	.05	66		1	2.1	-18	295	13
31281.533	.02	64	50	4	3.0	-18	298	13
31306.13	.10	64	50	3	2.6	-18	298	13
31306.947	.02	60	47	4	3.4	-18	295	13
31331.940	.02	65	51	4	2.6	-18	298	13
31400.984	.02	65	51	4	2.1	-18	298	13
31417.52	.05	67		1	2.1	-18	295	13
31496.872	.05	65	51	4	1.7	-17	298	13
31513.983	.01	60.0	46.7		2.1	-18	296	13
31550.512	.02	67	54	4	2.1	-17	298	13
31589.573	.02	68	54	5	2.1	-17	298	13
31599.728	.02	65	52	4	1.7	-17	298	13
31705.152	.01	63	50	5	2.1	-17	298	13
31713.400	.01	59.9	46.6		1.7	-18	296	13
31727.524	.02	64	51	5	3.0	-17	298	13
31750.531	.02	67	53	4	3.0	-17	298	13
31795.619	.02	67	53	4	2.1	-17	298	13
31797.240	.02	64	50	4	2.1	-17	298	13
31838.869	.02	63	49	4	1.7	-17	298	13
31896.956	.01	63	50	5	1.7	-16	298	13

NAME: 2-PROPANOL		CONTINUED						ID NO. 146.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
31899.53	.10	68		1	2.1	-16	298	13
31900.464	.02	63	49	4	3.0	-16	298	13
31904.054	.01	59.6	46.2		3.8	-18	296	13
31919.479	.02	67	54	4	2.1	-16	298	13
31928.569	.02	64	51	4	2.6	-16	298	13
31955.312	.05	68	54	4	1.7	-16	298	13
31960.385	.01	65	51	5	1.7	-16	298	13
31969.484	.01	66	52	5	2.1	-16	298	13
32004.197	.01	66	53	5	1.7	-16	298	13
32017.493	.02	68	55	4	2.1	-16	298	13
32053.978	.05	64	50	4	1.7	-16	298	13
32084.559	.01	59	45	4	2.1	-18	294	13
32140.047	.02	65	50	5	1.7	-16	298	13
32189.698	.02	68	54	5	1.7	-16	298	13
32226.01	.10	67	53	2	3.0	-16	298	13
32253.273	.01	58.8	45.2		2.1	-18	294	13
32296.96	.10	65	52	2	1.7	-16	298	13
32321.608	.01	66	53	5	2.1	-16	298	13
32325.677	.02	65	51	5	2.1	-16	298	13
32330.599	.02	64	50	5	2.1	-16	298	13
32345.275	.01	64	51	5	2.6	-16	298	13
32350.207	.02	66	53	4	2.6	-16	298	13
32392.602	.02	64	50	4	2.1	-16	298	13
32408.002	.01	59	45	4	2.1	-18	294	13
32457.341	.05	64	51	4	1.7	-16	298	13
32483.08	.10	67		1	2.1	-18	294	13
32516.974	.02	67	53	4	2.6	-16	298	13
32546.149	.01	58.5	44.8		3.4	-18	294	13
32589.440	.01	66	51	5	1.7	-16	298	13
32592.073	.01	64	50	5	1.7	-16	298	13
32598.886	.02	64	51	5	1.7	-16	298	13
32601.499	.02	66	53	4	3.8	-16	298	13
32616.36	.10	64	51	2	2.1	-16	298	13
32626.976	.05	65	50	5	1.7	-16	298	13
32664.329	.01	58.4	44.4		2.1	-17	294	13
32716.915	.02	64	51	5	1.7	-16	298	13
32748.484	.02	65	51	4	2.6	-16	298	13
32749.855	.01	64	50	5	2.1	-16	298	13
32753.028	.02	64	50	5	2.1	-16	298	13
32754.406	.02	65	51	5	2.1	-16	298	13
32758.285	.01	58.7	44.1		3.4	-17	294	13
32822.544	.05	60	43	4	2.1	-17	294	13
32828.86	.10	64	50	3	2.1	-16	298	13
32829.55	.10	63	49	2	2.1	-16	298	13
32831.04	.20	63	49	3	2.1	-16	298	13
32831.74	.20	64	49	2	2.1	-16	298	13
32849.29	.20	62	45	3	3.0	-16	298	13
32850.03	.20	62	46	2	2.6	-16	298	13
33047.582	.02	63	49	4	2.1	-17	298	13
33058.180	.02	65	52	4	1.7	-17	298	13

NAME: 2-PROPANOL			CONTINUED					ID NO. 146.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
33096.065	.02	64	50	5	3.0	-17	299	13
33213.166	.05	64	51	4	2.1	-17	299	13
33264.583	.02	63	50	4	2.6	-16	299	13
33294.147	.02	65	52	4	3.0	-16	299	13
33301.426	.02	64	50	5	3.8	-16	299	13
33418.634	.02	63	49	4	2.1	-16	299	13
33451.220	.02	64	51	4	3.0	-16	299	13
33474.30	.10	67		1	2.1	-18	294	13
33547.987	.02	63	49	4	2.1	-17	299	13
33549.654	.02	63	49	4	3.0	-17	299	13
33647.714	.02	65	51	4	2.1	-17	299	13
33709.293	.02	65	52	4	1.7	-16	299	13
33737.340	.02	64	50	5	2.1	-16	299	13
33788.74	.05	67		1	2.1	-18	294	13
33809.546	.05	65	49	5	2.1	-16	299	13
33930.973	.02	66	52	5	3.4	-16	299	13
33981.007	.02	64	51	5	2.1	-16	299	13
34021.184	.01	66	53	5	3.0	-16	299	13
34136.360	.01	66	53	5	2.1	-16	299	13
34295.80	.10	65	52	3	3.8	-16	299	13
34299.306	.01	66	52	5	2.1	-16	298	13
34412.44	.20	66	50	3	1.7	-16	298	13
34467.481	.02	64	51	4	3.8	-16	298	13
34490.184	.02	63	50	5	2.6	-16	298	13
34494.128	.01	66	53	5	3.4	-16	298	13
34614.099	.02	64	49	4	1.7	-16	298	13
34622.108	.02	67	53	5	1.7	-16	298	13
34741.180	.01	63	49	5	2.1	-16	298	13
34817.809	.02	63	49	4	3.0	-16	298	13
34821.070	.01	64	51	5	3.8	-16	298	13
34982.002	.02	65	52	4	3.4	-15	298	13
35018.387	.02	67	52	5	2.1	-15	298	13
35020.122	.01	67	54	5	1.7	-15	298	13
35112.769	.02	66	53	5	2.6	-15	298	13
35122.663	.02	66	52	4	2.1	-15	298	13
35126.754	.02	63	49	5	2.6	-15	298	13
35165.466	.01	63	49	5	2.1	-16	298	13
35169.555	.02	66	53	5	2.6	-16	298	13
35226.90	.20	67		1	2.1	-18	294	13
35239.32	.05	67		1	2.1	-18	294	13
35293.45	.10	68		1	2.1	-18	294	13
35304.42	.10	67		1	2.1	-18	294	13
35556.169	.02	62	48	4	3.0	-16	298	13
35645.168	.01	62	49	5	2.1	-15	298	13
35753.14	.10	63	49	2	2.6	-15	298	13
35776.908	.01	62	49	5	2.1	-16	298	13
35892.17	.10	64	51	3	3.8	-16	298	13
35892.76	.10	66	53	2	3.8	-16	298	13
35950.33	.05	67		1	2.1	-18	294	13
36159.420	.01	65	51	5	2.6	-16	298	13

NAME: 2-PROPANOL		CONTINUED					ID NO. 146.00	
ν_0, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
36161.633	.02	62	49	5	2.6	-16	298	13
36178.100	.01	62	49	5	2.1	-16	298	13
36180.333	.02	65	52	4	2.1	-16	298	13
36230.752	.01	63	49	5	2.1	-16	298	13
36392.891	.02	63	49	4	3.8	-16	298	13
36398.014	.01	64	51	5	2.1	-16	298	13
36437.422	.02	64	51	4	2.1	-16	298	13
36470.479	.05	65	52	4	3.8	-16	298	13
36549.654	.02	63	49	4	1.7	-17	298	13
36587.85	.05	68		1	2.1	-17	294	13
36603.30	.05	67		1	2.1	-17	294	13
36658.519	.02	63	49	4	2.6	-17	298	13
36674.98	.05	68		1	2.1	-17	298	13
36746.976	.02	64	51	5	2.1	-17	298	13
36775.935	.02	64	50	4	2.6	-17	298	13
36842.254	.02	64	51	5	2.1	-17	298	13
36844.525	.01	64	50	5	2.1	-16	298	13
36847.902	.01	64	51	5	3.4	-16	298	13
36885.508	.02	63	51	4	2.1	-16	298	13
36886.966	.05	64	49	4	2.6	-16	298	13
36888.153	.02	62	48	5	2.6	-16	298	13
36895.116	.02	62	48	4	1.7	-16	298	13
36896.30	.10	64	51	2	1.7	-16	298	13
37005.45	.05	66		1	2.1	-17	294	13
37019.11	.10	64	50	3	2.1	-16	299	13
37064.442	.02	65	51	5	2.6	-17	299	13
37100.731	.02	62	48	4	2.6	-17	299	13
37103.971	.02	62	49	4	2.1	-17	299	13
37105.464	.02	62	49	4	3.4	-17	298	13
37108.964	.01	63	49	5	2.1	-17	298	13
37141.285	.02	63	49	4	2.1	-17	298	13
37188.436	.02	63	50	5	1.7	-17	298	13
37204.273	.02	63	50	4	2.1	-17	298	13
37230.938	.02	62	47	4	2.1	-17	298	13
37272.369	.02	63	50	5	1.7	-17	298	13
37347.44	.05	66		1	2.1	-16	294	13
37355.758	.02	62	49	4	1.7	-17	298	13
37359.692	.01	63	49	5	2.1	-17	298	13
37401.09	.10	61	46	3	2.1	-17	298	13
37401.59	.10	60	46	2	3.8	-16	294	13
37404.60	.10	61	47	3	2.1	-17	298	13
37405.16	.10	62	47	2	3.0	-17	298	13
37438.514	.01	62	49	5	1.7	-17	298	13
37507.945	.02	63	49	4	2.1	-17	298	13
37509.961	.02	62	48	5	2.1	-17	298	13
37512.086	.02	65	51	5	2.1	-17	298	13
37519.20	.05	66		1	2.1	-16	294	13
37520.576	.01	61	48	5	1.7	-17	298	13
37536.890	.02	62	49	4	1.7	-17	298	13
37540.397	.02	63	50	5	2.1	-17	298	13

NAME: 2-PROPANOL		CONTINUED						ID NO. 146.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
37550.983	.02	64	50	4	2.1	-17	298	13
37565.057	.02	63	51	5	3.8	-17	298	13
37601.807	.02	60	47	4	3.8	-16	294	13
37674.11	.05	68		1	2.1	-16	295	13
37682.067	.02	60	47	4	3.8	-16	295	13
37718.921	.02	62	48	5	2.1	-17	298	13
37722.775	.02	64	50	5	1.7	-17	298	13
37761.249	.01	59.7	46.1		3.0	-16	295	13
37766.18	.10	60	45	2	2.1	-17	295	13
37767.527	.05	60	44	4	3.0	-16	294	13
37808.57	.05	65		1	2.1	-16	293	13
37823.658	.02	64	51	4	2.1	-17	298	13
37839.078	.01	59.4	46.1		2.1	-16	293	13
37842.314	.01	63	50	5	2.1	-17	298	13
37890.981	.02	64	50	4	1.7	-17	298	13
37915.316	.01	58.3	44.6		2.1	-16	293	13
37941.812	.02	63	50	4	2.1	-16	298	13
37989.663	.01	58.4	44.7		3.0	-16	293	13
37994.055	.05	64	50	4	1.7	-16	298	13
38024.91	.20	58	43	3	2.6	-16	293	13
38025.44	.20	58	43	2	2.6	-16	293	13
38055.322	.02	63	50	5	1.7	-16	298	13
38059.831	.05	63	48	4	1.7	-16	298	13
38061.750	.01	58.0	44.4		1.7	-16	293	13
38131.129	.01	57.8	44.4		2.1	-16	293	13
38197.248	.01	57.6	44.1		2.1	-16	293	13
38206.793	.02	56.4	41.4		3.8	-16	293	13
38259.449	.01	57.4	43.8		2.1	-16	293	13
38316.922	.01	56.6	42.8		3.8	-16	293	13
38331.523	.01	56	42	4	3.4	-16	293	13
38368.600	.01	56.6	43.0		1.7	-16	294	13
38413.387	.01	53.1	39.2		2.1	-16	293	13
38449.709	.02	57	43	4	3.4	-16	294	13
38462.202	.01	55.8	42.2		3.4	-16	294	13
38475.588	.01	56.1	42.6		2.1	-16	294	13
38485.468	.02	56	42	4	3.8	-16	294	13
38486.34	.20	62	47	2	3.4	-16	298	13
38488.544	.01	56	42	4	3.4	-16	294	13
38589.470	.05	63	48	2	1.7	-16	298	13
38717.06	.05	66		1	2.1	-16	294	13
38793.826	.02	63	50	5	3.0	-16	298	13
38815.447	.02	62	49	5	3.8	-16	299	13
38829.506	.02	62	49	5	2.1	-17	299	13
38852.434	.01	62	48	5	2.1	-17	299	13
38897.510	.02	62	48	4	2.6	-17	299	12
39084.012	.02	63	49	5	3.0	-17	299	12
39133.88	.05	68		1	2.1	-16	294	13
39138.081	.02	62	48	4	2.1	-16	299	12
39144.32	.10	67		1	2.1	-16	294	13
39181.87	.05	66		1	2.1	-16	294	13

NAME: 2-PROPANOL		CONTINUED						ID NO. 146.00
ν_O, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
39222.66	.05	69		1	2.1	-16	294	13
39246.35	.05	66		1	2.1	-16	294	13
39253.475	.02	61	47	4	2.1	-16	299	12
39308.64	.05	67		1	2.1	-16	294	13
39329.77	.05	68		1	2.1	-16	294	13
39361.76	.05	67		1	2.1	-16	294	13
39541.878	.02	63	50	4	2.1	-16	299	12
39549.40	.10	64		1	2.1	-15	294	13
39569.45	.05	67		1	2.1	-15	294	13
39598.76	.05	64		1	2.1	-15	294	13
39922.70	.10	67		1	2.1	-15	294	13
39926.54	.05	65		1	2.1	-15	294	13

2-Propanone

Formula: CH_3COCH_3
CAS Registry number: 67-64-1
Synonyms: acetone, dimethyl ketone
NBS identification number: 1.00
Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Fisher A-20 Certified acetone. Gas chromatography with a Porapak N column showed only 0.13 percent water impurity.

Remarks.- The lines were relatively broad, with pressure broadening parameters of the order of 50 kHz/mtorr. In addition, many of the lines show asymmetry due to unresolved overlaps. Earlier scans on different spectrometers detected over 800 lines, but more than half of these were weaker than the programed sensitivity limit of about 68.5. All the lines with $-10 \log \gamma$ of 61 or less have been remeasured with the new calibration.

The sample pressure of 8 millitorr was registered on a thermocouple gage as 25 millitorr.

Sample identity was confirmed by matching eight lines with calculated transition frequencies (ref. 10).

NAME: 2-PROPANONE								ID NO. 1.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26550.16	.20	65		1	2.1S	-17	295	8
26643.53	.10	67		1	2.1	-17	295	8
26652.52	.20	66		1	2.1S	-17	295	8
26658.757	.05	63	46	4	2.1	-17	295	8
26661.959	.05	62	45	5	2.1	-17	295	8
26679.73	.20	68		1	2.1S	-17	295	8
26794.59	.10	64		1	2.1	-17	295	8
26922.37	.10	67		1	2.1	-17	295	8
26932.408	.02	60.5	43.4		3.0	-17	295	8
26975.23	.20	65		1	2.1S	-17	295	8
27021.26	.10	66		1	2.1	-17	295	8
27053.61	.10	64		1	2.1	-17	295	8
27403.02	.10	68		1	2.1	-17	295	8
27577.59	.20	63		1	2.1S	-17	295	8
27627.77	.20	67		1	2.1S	-17	295	8
28050.29	.10	65		1	2.1	-17	295	8
28051.22	.10	65		1	2.1	-17	295	8
28182.88	.20	66		1	2.1S	-17	295	8
28218.22	.10	66		1	2.1	-17	295	8
28329.31	.10	67		1	2.1	-17	295	8
28338.419	.05	62	44	5	2.1	-17	295	8
28407.692	.05	63	46	4	2.1	-17	295	8
28448.48	.10	68		1	2.1	-17	295	8
28487.56	.10	67		1	2.1	-17	295	8
28518.48	.20	68		1	2.1S	-17	295	8
28596.75	.20	66		1	2.1S	-17	295	8
28620.929	.05	59	42	4	3.0S	-18	295	8
28660.40	.10	68		1	2.1	-17	294	8
28686.48	.10	67		1	2.1	-17	294	8
28755.703	.02	64	48	5	2.1	-17	294	8
28845.55	.20	66		1	2.1S	-17	294	8
28947.703	.05	63	47	4	2.1	-17	294	8
28968.73	.20	67		1	2.1S	-17	294	8
29324.82	.20	67		1	2.1S	-18	294	8
29549.25	.10	67		1	2.1	-18	294	8
29758.23	.20	67		1	2.1S	-18	295	8
30006.037	.02	59	42	4	2.1	-17	295	8
30099.928	.05	62	46	4	2.1	-17	295	8
30145.60	.10	67		1	2.1	-18	295	8
30300.47	.20	66		1	2.1S	-18	295	8
30417.66	.20	67		1	2.1S	-17	295	8
30428.08	.20	68		1	2.1S	-17	295	8
30428.94	.10	68		1	2.1	-17	295	8
30468.45	.10	65		1	2.1	-17	295	8
30516.15	.10	66		1	2.1	-17	295	8
30636.595	.05	63	47	5	2.1	-17	295	8
30676.17	.20	65		1	2.1S	-17	295	8
30714.45	.10	66		1	2.1	-17	295	8
30779.27	.10	67		1	2.1	-17	295	8
30940.460	.05	65	48	4	2.1	-17	295	8

NAME: 2-PROPANONE		CONTINUED					ID NO.	1.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
30971.447	.05	66	49	4	2.1	-17	295	8
31019.871	.05	64	48	5	2.1	-17	295	8
31101.978	.05	66	49	4	2.1	-17	295	8
31186.326	.02	67	50	5	2.1	-17	295	8
31238.91	.10	64	46	4	2.1S	-17	295	8
31299.842	.01	59.1	42.0		3.8	-18	295	8
31306.674	.02	62	45	5	2.1	-18	295	8
31430.67	.10	68		1	2.1	-18	295	8
31455.05	.20	67		1	2.1S	-17	295	8
31477.15	.10	65	47	4	2.1S	-17	295	8
31510.32	.20	68		1	2.1S	-17	295	8
31553.058	.05	63	46	4	2.1S	-18	295	8
31555.43	.20	67	49	2	2.1S	-18	295	8
31575.732	.02	66	49	5	2.1	-18	295	8
31593.092	.02	63	46	5	2.1	-17	295	8
31598.478	.05	65	49	5	2.1S	-17	295	8
31629.70	.20	66		1	2.1S	-18	295	8
31637.588	.05	67	50	4	2.1	-18	295	8
31719.62	.10	65	47	3	2.1	-18	295	8
31721.14	.20	63		1	2.1S	-18	295	8
31722.41	.20	64		1	2.1S	-18	295	8
31723.53	.20	63	46	2	2.1	-18	295	8
31739.531	.02	62	45	5	2.1	-17	295	8
31740.98	.20	66	49	2	2.1	-18	295	8
31762.840	.05	65	46	5	2.1S	-18	295	8
32028.38	.20	67		1	2.1S	-19	295	8
32034.98	.10	68	50	4	2.1S	-19	295	8
32058.019	.02	65	48	5	2.1	-18	294	8
32067.40	.20	64	47	3	2.1	-18	294	8
32190.929	.02	63	46	5	2.1	-18	294	8
32197.004	.02	68	51	5	2.1	-17	294	8
32309.75	.20	67	50	3	2.1	-17	294	8
32355.958	.05	63	46	5	2.1S	-17	294	8
32360.84	.10	65	47	4	2.1	-18	294	8
32368.679	.05	65	47	5	2.1S	-18	294	8
32433.192	.05	65	48	4	2.1	-18	294	8
32447.700	.05	61	44	5	2.1S	-17	295	8
32467.175	.05	60	42	4	3.0S	-18	295	8
32503.324	.02	66	49	5	2.1	-18	295	8
32525.01	.10	67		1	2.1	-17	295	8
32539.263	.02	61	44	5	2.1	-17	295	8
32620.934	.05	62	44	5	2.1S	-17	295	8
32715.22	.10	65	48	4	2.1	-17	295	8
32837.335	.05	61	44	4	2.1	-17	295	8
32856.101	.05	64	47	4	2.1	-17	295	8
32873.168	.01	59.4	42.6		2.1	-17	295	8
32899.889	.05	64	47	4	2.1	-17	295	8
32921.53	.20	66		1	2.1S	-17	295	8
33044.47	.10	65	47	4	2.1	-17	295	8
33200.593	.05	65	48	4	2.1S	-17	295	8

NAME: 2-PROPANONE		CONTINUED					ID NO.	1.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
33360.169	.05	61	44	5	2.1S	-17	295	8
33446.403	.05	64	47	4	2.1	-17	295	8
33562.114	.02	63	47	5	2.1	-17	295	8
33582.04	.10	66		1	2.1	-16	295	8
33888.37	.10	67		1	2.1	-17	295	8
33942.521	.02	63	47	5	2.1	-17	295	8
34030.021	.05	65	49	4	2.1	-17	295	8
34050.80	.20	66		1	2.1S	-17	295	8
34092.97	.20	64	49	2	2.1	-17	295	8
34166.518	.05	66	49	4	2.1	-17	295	8
34181.21	.10	65	46	4	2.1S	-17	295	8
34192.13	.10	67		1	2.1	-17	295	8
34212.69	.20	62	45	2	2.1	-17	295	8
34288.58	.10	64	45	4	2.1S	-17	295	8
34304.52	.20	65	47	2	2.1	-17	295	8
34316.97	.20	68		1	2.1S	-17	295	8
34392.578	.05	61	44	5	2.1S	-17	295	8
34410.83	.10	64	46	4	2.1	-17	295	8
34478.68	.20	67		1	2.1S	-17	295	8
34520.65	.20	62	45	3	2.1	-17	295	8
34630.107	.05	64	47	4	2.1S	-17	295	8
34663.671	.05	64	47	5	2.1S	-17	295	8
34687.86	.20	68		1	2.1S	-17	295	8
34790.530	.05	61	43	4	3.4S	-17	295	8
34802.28	.10	66		1	2.1	-17	295	8
34834.72	.20	64	45	3	2.1S	-17	295	8
34836.13	.20	65		1	2.1S	-17	295	8
34873.520	.02	66	48	5	2.1	-17	295	8
34971.200	.02	66	50	4	2.1	-17	295	8
35125.26	.10	67		1	2.1	-17	295	8
35159.38	.10	66		1	2.1	-17	295	8
35164.70	.10	66		1	2.1	-17	295	8
35219.953	.05	65	48	4	2.1S	-17	295	8
35274.886	.05	64	47	4	2.1S	-16	294	8
35283.307	.01	59.7	42.5		3.4	-16	294	8
35303.090	.02	64	47	5	2.1	-17	294	8
35381.289	.05	65	48	4	2.1	-17	294	8
35385.427	.02	63	45	5	2.1	-17	294	8
35391.74	.10	67		1	2.1	-17	294	8
35400.12	.20	66		1	2.1S	-16	294	8
35468.13	.20	68		1	2.1S	-17	294	8
35474.32	.10	67		1	2.1	-16	294	8
35517.71	.20	67		1	2.1S	-16	294	8
35552.252	.05	65	48	4	2.1	-16	294	8
35574.987	.02	62	45	4	2.1	-17	294	8
35582.68	.10	67		1	2.1	-16	294	8
35684.35	.10	67		1	2.1	-16	294	8
35834.574	.05	62	44	4	2.1S	-16	294	8
35861.914	.01	59.0	41.7		3.0	-16	294	8
35883.01	.10	66		1	2.1	-16	294	8

NAME: 2-PROPANONE	CONTINUED						ID NO.	1.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
35920.85	.20	65		1	2.1S	-15	295	8
35957.35	.10	65		1	2.1	-16	295	8
35963.60	.20	65		1	2.1S	-15	295	8
35968.176	.05	64	47	4	2.1	-15	295	8
36004.67	.10	67		1	2.1	-16	295	8
36017.43	.10	62	44	4	2.1S	-16	295	8
36038.13	.20	64	47	2	2.1	-16	295	8
36053.625	.02	58	41	4	3.8	-15	295	8
36080.396	.02	60	43	4	3.8	-15	295	8
36179.764	.02	64	47	5	2.1	-15	295	8
36213.901	.05	65	48	5	2.1S	-15	295	8
36223.889	.02	59.4	42.4		3.0	-15	295	8
36239.53	.20	66		1	2.1S	-15	295	8
36253.67	.20	61	43	4	1.7S	-15	295	8
36278.459	.05	65	48	4	2.1	-16	295	8
36284.30	.10	64	46	4	2.1	-16	295	8
36344.138	.02	64	47	5	2.1	-15	295	8
36346.746	.02	65	48	5	2.1	-15	295	8
36407.33	.10	67		1	2.1	-15	295	8
36439.260	.05	66	50	4	2.1S	-15	295	8
36492.73	.20	67		1	2.1S	-15	295	8
36507.96	.20	67		1	2.1S	-15	295	8
36596.29	.10	68		1	2.1	-15	295	8
36625.154	.05	63	46	4	2.1	-15	295	8
36706.284	.02	64	47	5	2.1	-15	295	8
36737.021	.01	58.1	40.9		3.8	-15	295	8
36742.45	.10	65		1	2.1	-15	295	8
36756.93	.10	66		1	2.1	-15	295	8
36768.32	.10	68		1	2.1	-15	295	8
36774.431	.05	64	47	4	2.1S	-15	295	8
36797.081	.05	62	45	4	2.1S	-15	295	8
36816.824	.05	64	47	5	2.1S	-15	295	8
36838.07	.10	67		1	2.1	-15	295	8
36852.955	.02	63	46	5	2.1	-15	295	8
36857.24	.10	68		1	2.1	-15	295	8
36869.119	.02	63	46	5	2.1	-15	295	8
36876.238	.05	64	47	4	2.1	-15	295	8
36897.870	.05	63	47	4	2.1	-15	295	8
36933.762	.01	58.1	40.8		3.8	-15	295	8
36951.89	.10	68		1	2.1	-15	295	8
36973.76	.10	65	47	4	2.1S	-15	295	8
36977.212	.05	64	48	4	2.1	-15	295	8
36987.478	.05	63	46	4	2.1	-16	295	8
37010.63	.20	67		1	2.1S	-16	295	8
37029.017	.02	65	48	5	2.1	-15	295	8
37058.38	.20	67		1	2.1S	-16	295	8
37100.14	.10	68		1	2.1	-16	299	8
37131.571	.02	62	45	5	3.0	-16	299	8
37145.05	.20	67		1	2.1	-16	298	8
37157.24	.10	64		1	2.1S	-16	298	8

NAME: 2-PROPANONE		CONTINUED					ID NO.	1.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
37220.04	.20	65	48	3	2.1S	-15	298	8
37223.315	.02	64	47	5	2.1	-16	298	8
37260.480	.05	63	45	4	2.1S	-16	298	8
37268.86	.10	63	45	4	2.1S	-16	297	8
37272.63	.20	65		1	2.1S	-16	297	8
37352.690	.05	59.7	42.3		2.1S	-16	295	8
37372.915	.02	64	47	4	3.4	-16	296	8
37402.18	.10	67		1	2.1	-15	296	8
37411.362	.05	65	48	4	2.1S	-15	296	8
37429.70	.20	68		1	2.1S	-16	296	8
37432.84	.10	66		1	2.1	-16	296	8
37474.36	.20	67		1	2.1S	-16	296	8
37493.427	.05	66	49	4	2.6	-16	296	8
37555.681	.02	59.6	42.1		2.1S	-16	295	8
37586.08	.10	66	—	1	2.1	-16	296	8
37635.88	.10	67		1	2.1	-16	296	8
37668.62	.10	67		1	2.1	-16	296	8
37725.452	.05	65	49	4	2.1	-16	296	8
37761.80	.10	63	46	4	2.1S	-16	296	8
37772.83	.10	67		1	2.1	-16	296	8
37789.864	.05	65		1	2.1	-16	296	8
37793.240	.05	63	47	5	2.1S	-16	295	8
37847.90	.10	66		1	2.1	-16	295	8
37849.45	.10	66		1	2.1	-16	295	8
37903.386	.02	65	48	4	2.1	-16	295	8
37999.509	.02	63	46	5	2.1	-16	295	8
38011.477	.05	66	49	4	2.1	-16	295	8
38069.835	.05	62	45	5	2.1S	-16	294	8
38081.628	.05	65	46	5	2.1S	-16	294	8
38100.86	.20	67		1	2.1S	-16	294	8
38118.78	.20	66		1	2.1S	-16	294	8
38153.79	.20	65	47	3	2.1S	-16	294	8
38155.498	.05	64	47	4	2.1	-16	294	8
38158.89	.20	67		1	2.1S	-16	294	8
38176.46	.10	68		1	2.1	-16	294	8
38203.735	.05	64	46	5	2.1S	-16	294	8
38231.406	.05	67	51	5	2.1	-16	294	8
38248.698	.02	63	46	5	2.1S	-16	294	8
38261.357	.05	65	47	5	2.1S	-16	294	8
38284.613	.05	64	47	5	2.1S	-16	295	8
38294.300	.02	67	50	5	2.1	-16	295	8
38308.40	.10	64	46	4	2.1S	-16	295	8
38336.550	.05	67	50	5	2.1S	-16	295	8
38349.482	.02	57.5	40.1		3.8S	-16	295	8
38411.82	.10	67	50	4	2.1S	-16	295	8
38430.646	.05	67	50	5	2.1S	-16	295	8
38437.89	.10	65	48	4	2.1	-16	295	8
38440.09	.10	63	45	4	2.1S	-16	295	8
38453.548	.05	62	45	4	2.1S	-16	295	8
38472.89	.10	68		1	2.1	-16	295	8

NAME: 2-PROPANONE		CONTINUED					ID NO.	1.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
38504.36	.20	66	48	3	2.1	-16	295	8
38515.501	.05	64	48	4	2.1S	-16	295	8
38539.009	.02	66	49	5	2.1	-16	295	8
38570.526	.05	60	42	4	3.4S	-16	295	8
38610.150	.05	66	48	4	2.1S	-16	295	8
38631.95	.20	68		1	2.1S	-15	295	8
38637.53	.20	67	49	2	2.1	-16	295	8
38652.303	.05	64	47	5	2.1S	-16	295	8
38719.679	.05	64	47	4	2.1	-16	295	8
38723.70	.20	68		1	2.1S	-16	295	8
38785.47	.20	67		1	2.1S	-15	295	8
38792.247	.05	66	48	4	2.1	-15	295	8
38868.52	.10	65	47	4	2.1S	-15	295	8
38877.82	.20	66		1	2.1S	-15	295	8
38897.23	.10	66	49	4	2.1S	-15	295	8
38949.29	.20	66		1	2.1S	-15	295	8
38950.98	.20	67		1	2.1S	-15	295	8
38970.772	.05	63	44	4	2.1S	-15	295	8
38979.42	.10	66		1	2.1	-15	295	8
38980.983	.05	62	44	5	2.1S	-15	295	8
39000.831	.05	67	51	5	2.1S	-15	295	8
39039.398	.05	64	47	4	2.1S	-15	293	8
39052.32	.10	66		1	2.1	-15	294	8
39071.183	.05	67	50	5	2.1S	-15	294	8
39107.143	.05	64	46	5	2.1S	-15	294	8
39144.809	.05	60.4	42.9		3.4S	-15	294	8
39149.75	.20	68		1	2.1S	-14	294	8
39176.48	.20	67		1	2.1S	-15	294	8
39232.04	.20	64		1	2.1S	-15	294	8
39233.22	.20	62	45	2	2.1S	-15	294	8
39242.72	.20	68		1	2.1S	-15	294	8
39250.10	.20	65	47	3	2.1	-15	294	8
39250.92	.20	64	46	2	2.1S	-15	294	8
39314.51	.20	68		1	2.1S	-14	294	8
39337.88	.20	68		1	2.1S	-14	294	8
39352.717	.05	61	43	4	2.1	-14	295	8
39364.613	.05	66	49	5	2.1S	-14	295	8
39390.678	.05	66	48	4	2.1S	-14	295	8
39457.98	.20	68		1	2.1S	-14	295	8
39470.63	.10	63	44	4	2.1S	-14	295	8
39480.955	.05	62	44	5	2.1S	-14	295	8
39516.847	.02	64	47	5	2.1	-14	295	8
39550.433	.02	60.1	42.8		2.1S	-14	295	8
39599.82	.20	67		1	2.1S	-14	295	8
39612.36	.20	67		1	2.1S	-14	295	8
39663.72	.20	68		1	2.1S	-14	295	8
39697.49	.20	65		1	2.1S	-14	295	8
39755.64	.20	64		1	2.1S	-14	295	8
39757.82	.10	68		1	2.1	-14	295	8
39764.10	.20	67		1	2.1S	-14	295	8

NAME: 2-PROPANONE		CONTINUED					ID NO. 1.00	
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
39773.350	.05	64	47	4	2.1	-14	295	8
39847.274	.05	62	44	4	2.1S	-14	295	8
39867.02	.10	65		1	2.1	-14	295	8
39902.93	.20	68		1	2.1S	-14	295	8
39918.91	.20	63		1	2.1S	-14	295	8
39952.04	.20	64		1	2.1S	-14	295	8
39960.75	.20	67		1	2.1S	-14	295	8
39989.94	.20	65		1	2.1S	-14	295	8

2-Propenal

Formula: CH_2:CHCHO

CAS Registry number: 107-02-8

Synonyms: acrolein, acrylaldehyde

NBS identification number: 177.00

Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Aldrich 11,022-1 acrolein with a stated minimum purity of 97 percent. The sample was analyzed by the manufacturer using gas chromatography and infrared spectroscopy. Gas chromatography with a Chromosorb 102 column showed two peaks of 0.1 and 0.03 percent in addition to 2.2 percent water.

Remarks.- These lines are broader than average and a large number of them are distorted by overlaps.

The sample pressure of 5 millitorr was registered by a thermocouple gage as 28 millitorr.

Sample identity was confirmed by matching 11 of the observed lines with the calculated frequencies for s-trans-acrolein (ref. 3).

NAME: 2-PROPENAL ID NO. 177.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26693.04	.10	60	42	3	3.8	-17	295	5
26694.306	.02	55	37	4	3.0	-17	295	5
26704.59	.20	64	45	2	1.7S	-17	295	5
26706.70	.10	58	40	4	1.7S	-17	295	5
26716.51	.20	65	46	4	2.6S	-18	295	5
26718.805	.05	58	40	6	1.7S	-17	294	5
26764.12	.10	65	47	3	3.8	-17	294	5
26765.499	.01	58.2	40.3		3.8	-17	294	5
26777.73	.10	62	43	4	1.7S	-17	295	5
26789.70	.10	62	43	4	1.7S	-17	295	5
26824.838	.01	62	44	5	1.7	-17	295	5
26837.84	.10	65	47	4	1.7S	-17	295	5
26849.60	.10	65	47	4	1.7S	-17	295	5
26895.159	.02	65	47	5	1.7	-17	295	5
27329.776	.01	55.3	37.5		2.1	-17	295	5
27331.14	.10	61	43	2	3.4	-17	295	5
27385.572	.02	59	41	4	2.1	-17	295	5
27432.884	.01	62	44	5	3.0	-17	295	5
27487.708	.02	66	48	5	2.1	-17	295	5
28125.391	.02	66	48	5	2.1	-17	295	5
30939.659	.02	67	49	4	3.8	-17	295	5
32434.578	.02	66	49	5	3.8	-18	295	5
32789.403	.02	65	48	5	2.1	-17	295	5
33144.903	.02	67	50	5	3.8	-17	295	5
33595.767	.02	65	48	5	2.6	-17	297	5
34731.336	.05	65	48	4	3.8S	-17	297	5
34757.657	.02	64	47	5	3.8	-17	297	5
34762.818	.02	59	41	4	2.1	-17	297	5
34768.961	.02	53	36	4	3.4	-17	297	5
34777.611	.02	66	48	5	2.6	-17	297	5
34880.697	.02	62	45	4	3.4	-17	297	5
34884.111	.01	55	38	4	3.4	-17	297	5
34939.264	.02	66	48	5	3.0	-17	297	5
34979.605	.02	59	43	4	3.8	-17	297	5
35093.309	.02	62	45	5	2.1	-17	297	5
35207.988	.05	65	48	5	2.6S	-17	297	5
35539.542	.02	63	46	4	1.7	-17	297	5
35558.837	.02	64	46	5	3.8	-17	297	5
35576.646	.02	57	38	4	2.1	-17	297	5
35578.130	.02	51	34	4	3.0	-17	297	5
35586.833	.02	66	48	5	2.1	-17	297	5
35591.728	.02	64	46	5	3.4	-17	297	5
35595.773	.05	65	49	5	2.1S	-17	297	5
35597.977	.05	65	47	5	3.8S	-17	297	5
35603.677	.05	60	41	4	3.0S	-17	296	5
35606.426	.01	53.0	35.1		2.1	-16	294	5
35612.347	.05	59	40	6	3.0S	-17	296	5
35615.200	.02	51	34	6	2.1S	-16	295	5
35617.24	.20	64	44	2	1.7	-17	296	5
35633.530	.02	59	40	6	3.0S	-17	296	5

NAME: 2-PROPENAL			CONTINUED					ID NO. 177.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
35636.751	.02	53	35	4	2.1	-17	295	5
35646.676	.05	67	49	4	2.1S	-18	295	5
35653.46	.10	66	48	4	1.7S	-17	295	5
35669.50	.20	65	47	3	2.1S	-16	295	5
35670.461	.05	65		1	3.8	-16	295	5
35671.604	.05	61	43	4	3.8	-16	295	5
35673.207	.01	54.6	37.4		3.4	-16	296	5
35698.420	.02	64	46	4	1.7	-16	296	5
35701.162	.02	56	38	4	1.7	-16	296	5
35706.238	.05	63	44	5	3.0S	-16	296	5
35709.829	.05	55	38	6	2.1S	-16	296	5
35719.908	.02	65	48	5	2.6	-16	296	5
35727.888	.05	63	45	5	3.8S	-16	296	5
35731.138	.02	56	38	6	2.1S	-16	296	5
35752.495	.01	57.5	40.1		3.4	-16	296	5
35760.941	.05	66	48	5	2.6S	-16	296	5
35779.62	.20	66	47	4	3.0S	-16	296	5
35781.297	.01	59.7	41.8		2.1	-16	296	5
35790.952	.05	59	41	6	2.6S	-16	296	5
35810.837	.05	60	42	4	3.0S	-16	296	5
35846.518	.01	61	44	5	3.8	-16	296	5
35874.324	.05	64	46	4	3.8S	-16	296	5
35883.582	.05	63	45	4	2.1S	-16	296	5
35903.335	.02	63	45	5	3.8S	-16	296	5
35941.008	.02	64	47	5	3.8	-16	296	5
36396.392	.01	64	46	5	1.7	-16	296	5
36435.998	.01	51.3	33.8		2.1	-16	296	5
36437.845	.02	58	39	4	3.4	-16	296	5
36509.54	.10	60	42	3	2.1	-15	296	5
36510.437	.01	54.7	37.1		2.1	-16	296	5
36512.42	.20	67	47	2	3.8	-16	296	5
36573.549	.01	58.1	40.7		3.4	-16	296	5
36646.695	.02	61	44	5	1.7	-16	296	5
36719.866	.02	65	47	4	1.7	-16	296	5
37892.356	.02	64	47	5	2.1	-17	295	5

2-Propen-1-ol

Formula: $CH_2{:}CHCH_2OH$
CAS Registry number: 107-18-6
Synonym: allyl alcohol
NBS identification number: 72.00
Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Fisher A-391 Certified allyl alcohol. Gas chromatography with a Chromosorb 102 column showed impurity peaks of 2.3, 0.05, and 0.19 percent. The sample was therefore purified on a Chromosorb 102 column before use.

Remarks.- Many of the lines show asymmetry due to unresolved overlaps or, in some cases, possibly incomplete Stark modulation.

The sample was adsorbed in the cell, and even after conditioning, the initial sample pressure of 15 millitorr dropped to 14 millitorr overnight.

The sample pressure of 15 millitorr was registered as 59 millitorr by a thermocouple gage.

Sample identity was confirmed by matching 12 of the observed lines with calculated transition frequencies (ref. 11).

NAME: 2-PROPEN-1-OL ID NO. 72.00

ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26739.408	.02	66	53	4	3.4	-17	294	15
26747.269	.02	67	54	4	3.8	-17	294	15
26758.107	.05	67	54	4	3.8	-17	295	15
26847.24	.10	68	55	4	2.1S	-17	295	15
26913.21	.10	67	53	4	1.7S	-17	295	15
27069.069	.02	66	53	4	3.8	-17	295	15
27084.799	.02	66	53	5	2.1S	-17	295	15
27204.314	.02	67	54	5	2.1	-17	295	15
27217.981	.02	66	53	4	3.0	-17	295	15
27243.467	.02	66	53	4	3.0	-17	295	15
27272.133	.05	66	53	4	3.0	-17	295	15
27286.058	.02	66	53	4	1.7	-17	295	15
27317.589	.02	67	54	5	1.7	-17	295	15
27331.239	.02	67	54	4	1.7	-17	295	15
27332.943	.02	67	54	4	1.7	-17	295	15
27409.546	.02	67	54	5	2.1	-17	295	15
27422.344	.02	67	55	5	2.6S	-17	295	15
27910.305	.02	66	54	5	3.0	-17	295	15
28097.028	.02	66	53	4	3.0	-17	295	15
28101.662	.02	66	53	5	3.0	-17	295	15
28304.228	.02	66	53	4	2.1	-17	295	15
28477.720	.02	66	53	4	3.0	-17	293	15
28484.582	.05	67	54	4	2.1	-17	293	15
28594.842	.02	66	53	4	2.6	-17	294	15
28853.183	.02	68	55	5	2.1	-18	294	15
29033.312	.02	66	53	5	3.8	-18	294	15
29475.181	.02	65	52	5	3.8	-18	294	15
29523.077	.02	67	53	5	2.6	-18	294	15
29576.961	.02	65	52	5	1.7	-18	294	15
30108.577	.02	65	52	5	2.6	-17	294	15
30303.208	.02	67	54	5	3.4	-17	295	15
30627.996	.02	64	51	5	3.4	-17	295	15
30751.108	.05	65	52	5	2.1S	-17	295	15
30856.045	.02	65	52	5	2.1	-17	295	15
30913.891	.05	67	53	5	2.1S	-17	295	15
31122.915	.02	67	54	5	2.6S	-18	295	15
31135.070	.02	64	52	5	1.7	-18	295	15
31194.306	.02	63	50	5	2.1	-18	295	15
31215.080	.02	62.3	48.8		3.0	-18	295	15
31257.718	.02	62	49	5	3.8	-18	295	15
31377.38	.10	60	46	3	2.1	-18	295	15
31538.170	.01	62	49	5	2.1	-18	295	15
31629.645	.02	64	51	5	1.7	-18	295	15
31665.923	.02	67	54	4	3.0	-18	295	15
31731.821	.01	62	48	5	2.1	-18	295	15
31816.51	.10	65	53	3	2.1	-18	295	15
31817.30	.10	65	51	2	2.1	-18	295	15
31953.237	.02	61.9	48.7		2.6	-18	295	15
32111.509	.05	64	51	4	2.1	-18	295	15
32170.283	.05	66	52	4	2.1	-18	295	15

NAME: 2-PROPEN-1-OL		CONTINUED						1D NO. 72.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
32198.18	.20	67	51	3	2.1	-18	295	15
32199.369	.02	62	49	5	2.1	-18	295	15
32240.494	.02	63	49	4	2.1	-18	295	15
32468.418	.02	62	49	4	1.7	-18	295	15
32507.429	.02	65	52	5	3.8S	-18	295	15
32580.535	.02	64	51	5	1.7	-18	295	15
32759.284	.01	62	49	5	2.1	-17	295	15
32891.287	.02	66	52	5	2.6	-17	295	15
32893.768	.02	66	52	5	3.0	-17	295	15
33000.100	.02	66	53	4	2.6	-17	295	15
33030.035	.05	67	54	4	2.1S	-17	295	14
33036.425	.02	64	51	4	3.8	-17	295	14
33071.527	.01	62	49	5	3.4	-17	295	14
33119.832	.02	65	52	5	1.7	-17	295	14
33122.375	.05	63	49	4	1.7	-17	295	14
33123.864	.05	66	52	4	2.1	-17	295	14
33215.32	.10	65	51	3	2.1	-17	295	14
33215.95	.10	65	52	2	2.6	-17	295	14
33249.299	.02	66	53	5	3.4	-17	295	14
33254.058	.02	66	53	5	1.7S	-17	295	14
33290.062	.02	66	53	4	2.1	-17	295	14
33374.20	.10	64	49	4	2.1	-17	295	14
33405.010	.01	62.2	49.1		1.7	-17	295	15
33478.967	.01	63	50	5	2.1	-17	295	14
33585.523	.02	63	49	5	2.1	-17	295	14
33591.285	.02	66	53	5	3.0	-17	295	14
33601.020	.02	66	53	5	3.8	-17	295	14
33624.524	.02	64	52	5	1.7	-17	295	14
33636.298	.02	65	52	5	1.7	-17	295	14
33724.213	.02	65	52	5	3.8	-17	295	14
33759.902	.02	62	49	5	1.7	-17	295	14
33840.279	.02	63	49	4	2.1	-17	295	14
33907.876	.02	63	50	5	2.1	-17	295	14
34014.460	.02	62	49	5	2.1	-17	295	14
34109.918	.02	65	51	5	3.8	-17	295	14
34133.339	.02	63	49	4	2.1	-17	295	14
34136.592	.01	62.2	49.1		3.0	-17	295	15
34190.587	.02	67	54	5	1.7	-17	295	14
34202.016	.02	62	50	4	3.0	-17	295	14
34207.442	.02	63	50	5	2.6	-17	295	14
34210.63	.10	63	49	3	2.1	-17	295	14
34211.34	.20	62	49	2	2.1S	-17	295	14
34292.430	.05	65	52	4	3.0	-17	295	15
34297.693	.05	65	51	4	2.6S	-17	295	15
34300.73	.20	65	52	3	2.6S	-17	295	15
34301.59	.20	64	51	2	2.6S	-17	295	15
34310.338	.02	66	53	4	2.1	-17	295	15
34322.842	.02	63	50	5	2.1	-17	295	15
34329.734	.02	66	53	4	3.8	-17	295	15
34331.646	.02	66	53	5	3.8	-17	295	15

NAME: 2-PROPEN-1-OL	CONTINUED						ID NO.	72.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
34380.47	.10	67	53	4	3.0S	-17	295	15
34392.006	.02	67	54	5	2.1	-17	295	15
34395.954	.01	62.0	49.0		3.8	-17	295	15
34461.359	.01	62	49	5	3.4	-17	295	15
34481.044	.02	64	52	5	3.8	-17	295	15
34521.426	.02	66	53	5	1.7	-17	295	15
34535.646	.01	62.2	49.1		3.8	-17	295	15
34557.996	.02	67	54	4	3.0	-17	295	15
34723.516	.01	63	50	5	2.1	-17	295	14
34822.358	.02	62	49	5	2.1	-17	295	15
34957.808	.01	62	49	5	3.0	-17	295	15
34997.671	.02	66	54	5	1.7S	-17	295	15
35004.699	.02	64	51	5	3.4	-17	295	15
35109.498	.02	63	50	5	1.7	-17	295	15
35135.032	.02	66	53	5	3.8	-17	295	15
35154.615	.02	66	53	5	1.7	-17	295	15
35158.291	.02	66	53	5	1.7S	-17	295	15
35196.715	.02	66	53	5	2.1	-17	295	15
35215.234	.01	63	49	5	2.6	-17	295	15
35235.262	.05	64	51	4	3.4	-17	295	15
35248.133	.02	66	53	5	3.8	-17	295	15
35258.719	.02	65	52	5	1.7	-17	295	15
35304.47	.20	67	52	2	1.7	-17	295	15
35345.680	.02	66	53	4	1.7	-17	295	15
35403.961	.02	62	49	5	2.1	-17	295	15
35423.094	.02	66	53	5	3.4	-17	295	15
35425.084	.02	66	53	4	3.4	-17	295	15
35432.361	.02	66	53	5	3.8	-17	295	15
35480.321	.02	62	50	4	2.1	-17	295	15
35539.75	.10	68	55	2	2.1	-17	295	15
35561.200	.02	67	54	5	1.7	-17	295	15
35569.870	.02	67	54	4	2.1	-17	295	15
35639.597	.02	62	49	4	2.1	-17	295	15
35686.675	.02	66	53	4	2.1	-16	294	15
35690.744	.02	66	53	4	2.1	-16	294	15
35748.370	.05	66	52	4	2.1S	-16	294	15
35760.817	.02	66	53	5	2.1	-16	294	15
35778.497	.02	66	53	5	2.1	-16	294	15
35801.639	.02	66	53	4	2.6	-16	294	15
35812.161	.02	66	53	5	1.7	-16	294	15
35835.494	.01	62.4	49.7		2.1	-16	294	15
35875.047	.02	63	50	4	3.4	-16	294	15
35948.255	.02	66	53	4	3.0	-16	294	15
36008.682	.02	66	53	4	3.4	-17	294	15
36010.973	.02	66	53	5	3.0	-16	294	15
36095.533	.05	62	49	4	1.7	-16	294	15
36174.345	.02	63	50	4	3.0	-15	294	15
36372.298	.02	62.4	41.5		3.4	-15	294	15
36377.388	.02	63	50	4	3.4	-15	294	15
36384.07	.20	65	52	3	3.8	-15	294	15

NAME: 2-PROPEN-1-OL		CONTINUED					ID NO.	72.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
36385.38	.20	65	52	2	3.8	-15	294	15
36403.037	.02	65	52	5	3.8	-15	294	15
36496.239	.02	63	51	5	3.4	-15	294	15
36583.480	.02	63	50	4	1.7	-15	294	15
36699.444	.05	66	53	5	3.0S	-15	294	15
36800.304	.02	61.6	48.8		3.8	-15	294	15
36808.56	.20	65	52	3	3.4	-15	293	15
36809.19	.20	65	52	2	3.8	-15	293	15
36896.842	.02	63	50	5	3.0	-15	293	15
36906.692	.02	66	54	5	3.0	-16	293	15
36965.68	.10	65	52	3	3.8	-15	294	15
36989.731	.02	66	53	5	3.8S	-15	294	15
37037.818	.02	65	51	5	2.1	-15	294	15
37085.493	.02	62	49	4	3.8	-15	294	15
37095.857	.05	65	51	4	2.1	-15	294	15
37104.290	.02	63	50	5	2.1	-15	294	15
37279.66	.20	64	50	2	2.1	-16	295	15
37281.592	.02	66	52	5	3.8	-16	294	15
37326.695	.05	66	51	4	2.1	-16	294	15
37350.49	.10	64	49	4	1.7	-16	295	15
37403.64	.10	67	53	4	3.8S	-16	295	15
37438.07	.10	66	50	4	1.7S	-16	295	15
37450.136	.01	62.1	49.0		2.1	-16	295	15
37532.25	.20	68	54	3	3.4	-16	295	15
37533.05	.10	66	52	2	3.4	-16	295	15
37594.15	.10	65	52	3	3.4	-16	295	15
37594.84	.10	65	52	2	3.8	-16	295	15
37599.049	.05	67	53	4	3.4	-16	295	15
37658.99	.10	62	49	3	1.7	-17	295	15
37739.181	.02	63	50	5	2.1	-16	295	15
37749.06	.10	66	53	3	2.1	-17	295	15
37775.589	.02	67	54	5	3.8	-17	295	15
37786.337	.02	67	55	5	3.8	-17	295	15
37795.568	.02	64	50	4	2.1	-17	295	15
37814.377	.02	65	51	4	3.8	-17	295	15
37815.754	.05	65	52	4	3.8	-17	295	15
37857.635	.05	67	53	4	1.7S	-17	295	15
37868.899	.02	67	54	5	2.1	-17	295	15
38009.031	.02	64	51	5	3.4	-17	295	15
38011.600	.02	65	51	5	3.4	-17	295	15
38033.600	.02	63	50	5	3.8	-17	295	15
38112.571	.05	67	54	4	2.1S	-16	295	15
38175.124	.02	65	53	5	2.1	-16	295	15
38179.960	.02	65	53	4	3.8	-16	295	15
38191.28	.10	67	54	3	2.1S	-16	295	15
38219.561	.02	67	54	4	1.7	-16	295	15
38222.437	.02	66	53	4	2.1	-16	295	15
38248.832	.02	63	50	4	2.1	-16	295	15
38308.821	.02	65	53	4	2.1	-16	295	15
38317.880	.02	65	52	4	2.1	-16	295	15

NAME: 2-PROPEN-1-OL		CONTINUED						ID NO. 72.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
38356.30	.10	62	49	3	1.7	-16	295	15
38361.19	.20	67	54	3	2.1S	-16	295	15
38372.881	.02	68	55	5	2.6	-16	295	15
38376.818	.05	66	54	5	2.6	-16	294	15
38404.905	.02	65	52	4	1.7	-16	294	15
38421.800	.02	66	53	4	2.1	-16	294	15
38431.237	.02	66	53	4	3.0	-16	294	15
38451.989	.05	66	54	4	1.7	-16	294	15
38456.115	.02	65	53	4	1.7	-16	294	15
38484.940	.02	66	54	5	1.7	-16	294	15
38487.559	.02	65	52	4	1.7	-16	294	15
38510.355	.02	66	53	4	3.4	-16	294	15
38547.853	.02	67	53	4	1.7	-16	294	15
38562.202	.02	67	53	4	2.1	-16	294	15
38573.203	.02	67	54	4	2.6	-16	294	15
38605.131	.02	67	54	5	1.7	-16	294	15
38637.21	.20	66	53	3	2.1S	-16	294	15
38648.869	.02	63	50	5	2.1	-16	295	15
38673.310	.05	67	54	4	2.1S	-15	295	15
38777.813	.02	65	52	5	1.7	-15	295	15
38875.375	.02	63	50	5	2.1	-15	295	15
38878.55	.10	66	53	2	2.1	-15	295	15
38901.049	.02	64	51	5	3.0	-15	295	15
38962.137	.02	62	49	4	2.1	-15	295	15
38976.66	.10	65	51	3	2.1	-15	295	15
38977.39	.10	64	51	2	2.1	-15	295	15
39007.372	.02	67	54	5	2.6	-15	295	15
39071.693	.02	67	54	5	1.7	-15	295	15
39078.819	.02	66	53	5	3.0S	-15	295	15
39086.922	.02	63	50	4	3.0	-15	295	15
39097.398	.02	66	54	5	1.7	-15	295	15
39144.590	.02	68	55	4	1.7	-15	295	15
39163.27	.20	67	53	2	3.8	-15	295	15
39253.758	.05	66	53	4	1.7S	-15	296	15
39297.673	.01	63	50	5	1.7	-15	296	15
39341.528	.05	67	53	4	2.1	-15	296	15
39540.333	.02	63	50	5	2.1	-14	295	15
39613.902	.02	63	50	4	2.1	-14	295	15
39649.517	.02	67	54	4	3.8	-14	295	15
39660.321	.02	67	54	4	3.0	-14	295	15
39728.952	.02	67	54	4	2.1	-14	295	15
39751.536	.02	66	53	4	2.1	-14	295	15
39981.847	.02	63	50	5	1.7	-14	295	15

Propyne

Formula: $CH{:}CCH_3$
CAS Registry number: 74-99-7
Synonym: methylacetylene
NBS identification number: 170.00
Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Matheson bottled gas, with a stated minimum purity of 98 percent. Most of the remainder is typically nitrogen, which was removed by vacuum distillation.

Remarks.- The original data did not include Stark sensitivity. However, all the lines with $-10 \log \gamma$ of 65 or less have been remeasured and do include information on Stark sensitivity.

All the observed lines have been theoretically verified (ref. 3). The weaker lines are due to molecules containing the C^{13} isotopic species.

NAME: PROPYNE								ID NO. 170.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
33160.92	.05	70		1	2.1	-17	296	15
33252.28	.10	71		1	2.1	-17	296	15
33252.89	.05	69		1	2.1	-17	296	15
34168.59	.05	71		1	2.1	-17	296	15
34169.23	.10	68		1	2.1	-17	296	15
34182.77	.20	51	40	3	2.6S	-17	296	15
34183.415	.01	49	39	4	2.1	-17	296	15
34246.312	.01	58.2	47.6		2.6	-17	296	15
34277.19	.10	58	48	6	2.1S	-17	296	15
34279.134	.01	57.1	46.6		3.8	-17	296	15
34313.415	.01	58	48	4	1.7	-17	296	15

2-Propyn-1-ol

Formula: $CH{:}CCH_2OH$

CAS Registry number: 107-19-7

Synonyms: propargyl alcohol, propiolic alcohol

NBS identification number: 176.00

Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Eastman P6567. Gas chromatography with a Chromosorb 102 column showed three impurity peaks of 0.19, 0.12, and 0.13 percent.

Remarks.- The sample was slowly and continuously adsorbed in the cell. Remeasurement of the stronger lines on a fresh sample gave, for most of them, slightly higher intensities than measured during the initial search.

The sample pressure of 16 millitorr was registered by a thermocouple gage as 59 millitorr.

Sample identity was confirmed by matching 50 of the observed lines with calculated transition frequencies (ref. 12).

NAME: 2-PROPYN-1-OL ID NO. 176.00

ν_0, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
26713.800	.02	65	53	4	2.1	-17	296	15
26773.658	.02	64	51	4	2.6	-17	296	15
26798.486	.02	66	53	4	2.6	-17	296	15
26821.888	.02	66	54	5	3.0S	-17	296	15
26866.280	.02	65	54	4	2.1	-17	296	15
27214.077	.05	66	54	5	2.1S	-17	296	15
27255.618	.02	66	55	5	3.4	-17	296	15
27259.83	.10	67	55	4	2.6S	-17	296	16
27314.627	.02	65	53	5	1.7	-17	296	16
27379.519	.05	65	53	5	2.1S	-17	296	16
27417.201	.02	66	54	5	3.8	-17	296	16
27455.575	.05	65	52	5	2.1S	-17	296	16
27495.712	.02	64	52	5	3.0S	-17	295	16
27543.903	.05	65	52	5	2.1S	-17	296	16
27627.569	.01	59.6	47.2		3.0	-17	296	16
27645.636	.05	64	52	5	2.1S	-17	296	16
27657.149	.02	64	53	5	2.6S	-17	296	16
27732.293	.02	64	53	5	2.1	-17	296	16
27761.897	.05	65	52	5	2.1S	-17	296	16
27893.850	.05	65	52	5	2.1S	-17	295	16
28006.514	.02	63	51	4	2.1	-17	295	16
28042.612	.05	65	52	5	2.1S	-17	295	16
28120.817	.01	58	47	4	3.4	-17	295	16
28209.33	.10	65	53	4	1.7S	-17	295	16
28395.08	.10	66	53	4	2.1S	-17	295	16
28478.315	.02	64	52	5	2.1S	-18	295	16
28600.99	.10	66	53	4	1.7S	-18	295	16
28665.274	.02	67	56	5	2.1	-18	295	16
28814.573	.01	59	47	4	2.1	-18	295	16
28828.040	.05	66	54	5	2.1S	-18	295	16
28918.361	.02	65	53	5	2.1	-18	296	16
29077.240	.05	66	54	5	1.7S	-18	296	16
29286.901	.01	63	51	5	2.1	-18	296	16
29328.087	.02	63	51	5	2.1S	-18	296	16
29349.56	.10	67	54	4	1.7S	-18	296	16
29423.584	.02	66	54	5	3.0	-18	296	16
29645.812	.05	67	54	5	2.1S	-18	296	16
29957.763	.02	65	53	5	3.0	-18	296	16
30168.100	.02	63	51	5	3.4	-17	296	16
30204.904	.02	63	51	5	2.1S	-17	296	16
30210.530	.01	63	51	5	2.1	-17	295	16
30590.856	.02	64	52	5	3.0	-17	295	16
30685.706	.05	65	52	4	3.0	-17	295	16
30853.918	.01	58	46	6	2.1S	-17	295	16
31107.357	.05	63	51	5	2.1S	-18	295	16
31308.670	.01	57.6	45.6		2.1	-18	295	16
31337.084	.01	63	51	5	3.0	-18	295	16
31396.226	.02	65	53	5	3.4S	-18	295	16
31615.951	.01	62	50	5	3.0	-18	295	16
31626.273	.02	64	53	4	2.1	-18	295	16

NAME: 2-PROPYN-1-OL			CONTINUED					ID NO. 176.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
32034.155	.02	62	50	5	2.1S	-18	295	16
32401.428	.02	64	52	4	3.0	-18	295	16
32984.127	.02	61	49	5	2.1S	-17	295	16
33181.500	.02	65	53	5	3.4	-17	295	16
33188.781	.02	64	53	5	3.0	-17	295	16
33549.480	.01	56.7	45.2		3.0	-17	295	16
33884.106	.02	64	52	5	3.8	-17	295	16
33940.910	.01	57.4	45.3		2.6	-17	295	16
33956.237	.05	61	49	4	1.7S	-17	295	16
34114.789	.02	62	50	5	2.1	-17	295	16
34235.051	.02	66	55	5	3.4	-17	295	16
34287.071	.02	63	51	5	3.0	-17	295	16
34438.994	.02	61	49	5	3.0	-17	295	16
34540.611	.02	62	51	5	3.8	-17	295	16
34724.842	.01	62	50	5	3.4	-17	295	16
34752.981	.05	67	55	4	3.4S	-17	295	16
34782.124	.01	60.1	48.2		3.0	-17	295	16
34793.148	.02	64	52	5	3.4	-17	295	16
34810.750	.02	64	53	4	2.1	-15	295	16
34887.716	.02	66	54	5	3.8S	-17	295	16
34935.780	.02	65	53	5	1.7	-17	295	16
34949.533	.02	61	49	5	1.7S	-17	295	16
35019.004	.01	60.4	48.4		2.1	-17	295	16
35178.845	.01	63	51	5	3.8	-17	295	16
35334.623	.02	63	51	5	3.4	-17	295	16
35592.304	.01	61	50	5	2.1	-17	295	16
35617.271	.02	67	55	5	3.4	-16	295	16
35645.463	.01	63	51	5	3.8	-16	295	16
35663.517	.02	63	50	5	3.8S	-16	295	16
35670.625	.05	60	47	4	2.6	-16	295	16
35700.767	.02	63	51	5	3.0	-16	295	16
35709.733	.01	63	52	5	3.8	-16	295	16
35724.26	.20	66	53	3	3.0S	-16	295	16
35726.432	.02	62	50	4	2.1	-16	296	16
35729.69	.10	66	53	4	1.7S	-16	296	16
35745.042	.02	61	48	5	3.0S	-16	295	16
35766.865	.02	65	54	4	2.6	-16	295	16
35775.270	.02	64	51	5	2.6S	-16	295	16
35781.10	.10	65	53	3	3.0	-16	295	16
35784.889	.02	62	49	5	2.1	-16	295	16
35785.76	.20	65	52	2	3.8S	-16	295	16
35789.84	.10	67	55	3	3.8	-16	295	16
35790.47	.20	66	54	2	2.1S	-16	295	16
35792.784	.02	65	53	5	3.0	-16	295	16
35804.062	.02	61	48	5	3.4S	-16	295	16
35806.852	.05	61	49	4	2.1S	-16	295	16
35822.384	.02	66	54	4	3.0	-16	295	16
35826.855	.02	65	53	5	3.0	-16	295	16
35963.149	.02	61	49	5	2.1S	-16	295	16
36120.100	.02	66	55	5	2.1	-16	295	16

NAME: 2-PROPYN-1-OL			CONTINUED					ID NO. 176.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
36147.554	.02	67	54	5	3.0	-16	295	16
36227.355	.01	63	52	5	3.0	-15	295	16
36314.218	.02	63	51	5	2.1	-15	295	16
36467.376	.02	65	53	5	2.1	-16	295	16
36549.318	.01	61	49	5	3.0	-15	295	16
36569.889	.02	67	56	4	2.6	-16	295	16
36623.303	.02	65	54	4	3.0	-16	295	15
36653.582	.05	60	48	4	3.0	-16	295	15
36705.586	.02	63	51	5	3.0	-15	295	15
36711.985	.02	61	49	4	3.8	-16	295	15
36996.314	.05	60	48	5	2.1S	-15	295	15
37077.166	.02	57	44	4	3.4	-15	294	15
37247.632	.01	55.7	44.0		3.4	-16	294	15
37310.518	.02	62	49	5	3.4	-16	294	15
37504.194	.02	63	51	4	3.4	-16	294	15
37807.950	.02	65	54	5	3.8	-16	294	15
38024.649	.02	66	53	5	3.8	-16	293	16
38048.332	.05	60	48	4	2.6S	-16	293	16
38146.781	.01	60.4	48.5		1.7	-16	293	16
38173.142	.01	56.1	43.9		2.1	-16	293	16
38184.188	.02	62	50	5	2.6	-16	294	16
38383.461	.01	62	50	5	3.8	-16	294	16
38467.226	.02	62	50	5	2.1	-16	294	16
38638.119	.02	63	51	5	3.8	-15	294	16
38802.511	.02	67	55	4	1.7	-15	294	16
38949.680	.01	61	49	5	2.1	-14	294	16
38990.881	.02	67	55	4	2.6	-15	294	16
39118.551	.05	60	47	6	2.1S	-15	294	16
39315.463	.02	65	54	4	3.0	-14	294	16
39497.627	.01	60.2	48.1		2.1	-14	294	16
39506.998	.01	64	52	5	3.8	-14	294	16
39597.325	.01	60.0	47.8		2.1	-14	294	16
39620.203	.01	61	49	5	3.0	-14	294	16
39645.851	.02	63	51	5	2.6	-14	294	16
39656.990	.01	60.2	48.0		2.1	-14	294	16
39976.875	.02	65	53	4	2.1	-14	294	16

Tetrahydrofuran

Formula: $\underbrace{OCH_2CH_2CH_2}CH_2$

CAS Registry number: 109-99-9

Synonyms: 1,4-epoxybutane, tetramethylene oxide

NBS identification number: 801.00

Frequency range: 26 500 to 40 000 MHz

Sample.- The sample source was Fisher T-397 Certified. Chromatography with a Chromosorb 102 column showed only one impurity peak of about 0.07 percent.

Remarks.- This spectrum is very rich in lines with $-10 \log \gamma$ of 68 or less. The scan was originally begun with a threshold detectable intensity of 68.5. After approximately the first 1 000 MHz of the spectrum was run, the range setting was changed so that only lines stronger than $-10 \log \gamma = 66$ were detected in order to speed up the measurements.

Because of the large number of lines, the spectrum contains many partially resolved overlaps and some very distorted line shapes due to unresolved overlaps. Some distortion was also caused by incomplete Stark modulation of some lines.

The sample pressure of 10 millitorr was registered by a thermocouple gage as 24 millitorr.

To provide some lines for quantitative use, a few of the strongest symmetric lines were remeasured to check the accuracy, and the type 5 classification was removed. However, because of the crowded spectrum, quantitative data should be used only if the observed line widths are of the same magnitude as the cataloged values. All the lines which were remeasured had widths slightly larger than 1/4 MHz at a pressure of 10 millitorr. It is possible that because of overlaps, $\gamma \Delta\nu$ may not be linear with pressure at values which produce a significantly different line width.

NAME: TETRAHYDROFURAN								ID NO. 801.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
26504.353	.02	67	53	5	2.6S	-17	294	10
26512.276	.02	67	52	4	3.0	-17	294	10
26556.759	.02	65	51	4	3.8	-17	294	10
26571.172	.02	66	52	5	3.0	-17	294	10
26740.695	.05	68	54	4	3.4	-17	294	10
26757.474	.05	67	53	4	2.6S	-17	294	10
26827.448	.02	68	54	5	2.1	-17	294	10
26881.35	.20	66	48	3	3.8	-17	294	10
26881.817	.05	65		1	3.8	-17	294	10
26882.19	.10	64	49	2	3.4	-17	295	10
26913.979	.02	64	50	4	3.8	-17	295	10
27033.409	.02	67	53	5	3.8	-17	295	10
27042.928	.02	66	51	4	3.4	-17	295	10
27045.698	.05	67	52	4	2.6	-17	293	10
27046.37	.10	69	55	2	1.7	-17	293	10
27114.15	.10	67	52	4	3.4S	-17	294	10
27183.003	.02	65	51	4	3.4	-17	294	10
27211.92	.20	65	48	2	3.8	-17	294	10
27217.355	.02	65	51	4	3.4	-17	294	10
27218.12	.10	66	53	2	3.8	-17	294	10
27219.43	.10	66	53	2	2.1	-17	294	10
27231.153	.02	64	49	5	2.6	-17	294	10
27240.344	.05	67	52	4	2.1	-17	295	10
27242.208	.02	67	53	4	1.7	-17	295	10
27247.056	.02	66	51	5	2.6S	-17	295	10
27264.514	.05	66	51	4	3.8	-17	295	10
27277.755	.05	66	52	4	3.0S	-17	295	10
27284.21	.10	67	53	2	3.4	-17	295	10
27290.827	.02	67	52	4	2.6	-17	295	10
27299.958	.02	65	51	5	3.8	-17	295	10
27302.056	.05	66	52	4	3.4	-17	295	10
27369.959	.02	66	52	5	3.0	-17	295	10
27476.759	.02	67	54	4	1.7	-17	295	10
27489.409	.02	68	54	4	2.1	-17	295	10
27495.413	.05	66	51	4	1.7	-17	295	10
27864.879	.05	66	49	4	3.4	-16	294	10
30559.593	.02	64	49	4	3.0	-17	294	10
30592.81	.10	65	51	2	3.4	-17	294	10
30934.87	.10	65	50	3	3.4	-17	295	10
30935.28	.10	66	52	2	3.4	-17	295	10
31067.531	.02	65	51	4	2.6	-17	295	10
31288.882	.02	64	50	5	3.8	-18	295	10
31719.708	.02	63	48	4	3.0	-18	295	10
31853.341	.05	64	49	4	3.8	-18	295	10
31886.636	.02	63	48	4	3.4	-18	295	10
31890.680	.02	65	51	5	3.8	-18	295	10
32048.232	.02	64	50	4	3.0	-18	295	10
32146.457	.05	65	51	4	2.1S	-18	295	10
32179.030	.02	64	50	5	2.1	-18	295	10
32224.651	.02	65	50	5	2.1	-18	295	10

NAME: TETRAHYDROFURAN			CONTINUED					ID NO. 801.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
32225.61	.10	69	55	2	3.4	-18	295	10
32251.454	.02	64	50	4	3.0	-18	295	10
32306.99	.10	63	49	3	3.4	-18	294	10
32307.62	.10	64	50	2	3.0	-18	294	10
32358.547	.02	65	51	4	2.6	-18	294	10
32364.332	.02	63	49	5	3.8S	-18	295	10
32425.805	.02	61	47	4	2.1	-18	295	10
32533.790	.02	64	49	5	3.8	-18	295	10
32579.061	.02	64	51	5	3.0	-17	295	10
32720.986	.02	64	51	4	3.0	-17	295	10
32752.86	.10	64	49	3	3.8	-17	296	10
32753.27	.10	63	49	2	3.8	-17	296	10
32762.700	.02	64	51	5	2.1	-17	296	10
32800.850	.02	64	50	5	2.1	-17	296	10
32849.821	.05	64	49	4	3.4	-17	296	10
32864.643	.02	62	48	4	3.8	-17	296	10
32872.207	.02	64	50	4	3.0	-17	296	10
32922.792	.02	63	49	4	3.8	-17	296	10
32935.601	.05	64	49	4	3.4	-17	296	10
32936.333	.05	67		1	2.6S	-17	296	10
32936.66	.10	67	53	2	2.1	-17	296	10
32982.045	.02	65	50	5	2.1	-17	296	10
32985.875	.05	64	49	4	3.0	-17	294	10
32991.66	.10	64	49	2	3.8	-17	294	10
33037.44	.10	62	48	2	3.0	-17	294	10
33112.446	.02	63	49	4	3.0	-17	294	10
33122.752	.02	63	49	5	2.6	-17	295	10
33156.09	.10	64	50	2	3.8	-17	295	10
33175.38	.10	65	50	2	3.8	-17	295	10
33185.266	.05	63	48	4	3.8	-17	295	10
33187.410	.02	63	49	5	3.0	-17	295	10
33210.767	.01	62.5	48.3		3.4	-17	295	10
33214.532	.02	64	49	4	3.0	-17	295	10
33217.730	.02	63	49	4	3.0	-17	295	10
33232.93	.10	63	49	2	3.8	-17	295	10
33247.848	.02	64	51	4	3.0	-17	295	10
33252.137	.02	64	50	4	3.0	-17	295	10
33274.386	.05	65	49	4	3.0	-17	295	10
33289.073	.01	63	49	5	3.0	-17	295	10
33303.34	.10	64	50	2	3.4	-17	295	10
33313.763	.05	64	50	4	2.6	-17	295	10
33320.880	.05	62	47	4	3.4	-17	295	10
33325.435	.01	64	52	5	2.1	-17	295	10
33327.82	.10	61	45	3	3.8	-17	295	10
33328.45	.10	63	48	2	2.6	-17	295	10
33713.457	.02	64	51	5	3.8	-17	295	10
33848.739	.02	65	51	5	2.1	-17	294	10
33961.816	.02	64	48	4	3.8	-17	294	10
34541.550	.02	65	51	5	2.1	-17	294	10
34549.59	.10	65	50	2	3.8	-17	294	10

NAME: TETRAHYDROFURAN		CONTINUED						ID NO. 801.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
35010.447	.05	64	48	4	3.8	-17	295	10
35015.00	.10	65	49	4	3.0	-17	295	10
35076.748	.02	64	49	5	3.4S	-17	295	10
35084.269	.05	64	49	4	3.8S	-17	295	10
35091.983	.02	62	48	4	3.8	-17	295	10
35586.669	.02	64	50	5	3.0	-16	295	10
35621.108	.02	64	50	4	3.8	-16	295	10
35676.220	.05	65	50	4	3.4	-16	295	10
36132.84	.10	64	49	3	2.6	-15	295	10
36394.517	.05	65	50	4	3.4S	-15	295	10
36732.900	.01	62.6	48.5		3.0	-15	295	10
36744.591	.02	64	49	4	2.6	-15	295	10
36787.793	.02	65	51	4	2.1	-15	295	10
36933.472	.02	64	50	5	3.8	-15	295	10
36976.15	.10	64	50	3	1.7	-15	295	10
37029.775	.02	64	50	4	3.8	-15	295	10
37150.086	.02	64	51	5	2.1	-16	295	10
37168.759	.02	64	50	4	3.8	-16	296	10
37221.022	.02	64	50	5	3.4	-16	296	10
37345.43	.10	64	49	2	3.8	-16	296	10
37423.371	.02	64	49	5	3.0	-16	296	10
37485.763	.02	64	50	4	3.8	-16	296	10
37604.759	.02	65	51	4	3.8	-16	296	10
37663.038	.05	65	51	4	3.0	-16	296	10
37704.590	.02	62	47	4	3.8	-16	296	10
37710.841	.02	64	49	4	3.8	-16	296	10
37832.543	.02	64	50	4	2.6	-17	296	10
37866.429	.05	63	48	4	3.8	-16	293	10
37898.08	.10	64	49	2	3.8	-16	293	10
37900.932	.02	64	49	5	3.8	-16	294	10
37956.07	.10	63	50	2	3.4	-16	294	10
37995.430	.05	61	45	4	3.8	-16	294	10
38012.422	.02	63	48	5	3.8	-16	294	10
38057.157	.05	65	52	4	2.1S	-16	294	10
38074.615	.02	64	49	5	3.8	-16	294	10
38084.15	.10	62	47	3	3.8	-16	295	10
38133.232	.02	64	50	4	2.1	-16	295	10
38214.995	.02	64	51	4	2.1	-16	295	10
38263.849	.02	63	48	5	3.8	-16	295	10
38294.35	.10	62	46	2	3.8	-16	295	10
38323.39	.10	64	50	2	3.4	-16	295	10
38351.701	.05	64	49	4	3.0S	-16	295	10
38368.186	.02	63	49	4	3.4	-16	295	10
38374.160	.05	65	50	4	3.0	-16	295	10
38377.871	.02	64	50	4	3.8	-16	295	10
38384.765	.02	63	50	4	3.8	-16	295	10
38397.890	.02	64	51	4	3.0	-16	295	10
38408.14	.10	63	49	2	3.8	-16	295	10
38414.956	.05	65	52	4	2.6	-16	295	10
38456.597	.05	65	52	4	2.1S	-16	295	10

NAME: TETRAHYDROFURAN			CONTINUED					ID NO. 801.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_s, kV/cm	P, dBm	T, K	p, mtorr
38467.646	.02	64	50	4	1.7	-16	295	10
38533.687	.02	64	51	4	3.0	-16	295	10
38543.002	.01	63	50	5	2.6	-16	295	10
38549.781	.02	65	52	4	2.6	-16	295	10
38600.616	.05	63	48	4	3.8	-16	295	10
38610.365	.02	66	52	5	1.7	-16	295	10
38638.459	.02	63	49	4	3.8	-16	295	10
38730.207	.02	64	50	4	3.0	-15	295	10
38808.745	.02	65	51	5	2.1	-15	295	10
38816.547	.02	64	51	4	2.6	-15	295	10
38854.090	.02	64	50	5	3.0	-15	295	10
38867.83	.10	65	51	2	2.1	-15	295	10
38881.991	.02	63	50	4	3.0	-15	295	10
38896.371	.02	63	48	4	3.4	-15	295	10
38930.662	.02	63	50	4	3.4	-15	295	10
38939.656	.05	61	46	4	3.8	-15	295	10
38944.112	.05	62	48	4	3.8	-14	295	10
38948.347	.05	63	49	4	3.8	-14	294	10
38969.190	.02	61	47	4	3.8	-15	294	10
39004.503	.02	64	50	4	3.0	-15	294	10
39023.493	.05	63	49	4	3.4	-15	294	10
39034.593	.02	63	49	4	3.4	-15	294	10
39039.927	.02	64	50	4	3.0	-15	294	10
39058.687	.02	63	48	5	3.8	-16	294	10
39081.892	.05	62	48	4	3.8	-15	294	10
39092.860	.02	64	52	4	2.1	-15	294	10
39104.117	.05	61	46	4	3.8	-15	294	10
39143.99	.10	60	45	2	3.8	-15	294	10
39178.600	.02	60	46	4	3.4	-15	294	10
39184.88	.10	63	48	2	3.8	-14	294	10
39188.599	.02	63	49	4	3.8	-15	294	10
39201.56	.10	62	47	4	3.4S	-14	294	10
39208.952	.02	61	47	4	3.8	-14	294	10
39212.139	.05	62	46	4	3.8	-14	294	10
39231.369	.02	63	49	4	3.4	-14	294	10
39235.248	.02	60	46	4	3.8	-14	293	10
39243.075	.05	62	48	4	3.4	-14	293	10
39257.97	.10	61	48	3	3.8	-14	293	10
39258.48	.10	63	50	2	3.8	-14	293	10
39272.954	.05	62	47	4	3.8	-14	293	10
39277.517	.02	61	47	4	3.8	-14	293	10
39287.10	.10	63	50	2	3.0	-14	293	10
39294.292	.02	60	46	4	3.8	-14	293	10
39308.639	.01	63	51	4	2.1	-14	293	10
39309.85	.10	61	46	2	3.8	-14	294	10
39318.773	.02	64	51	5	2.1S	-14	294	10
39320.831	.02	61	47	5	3.8	-14	294	10
39328.502	.01	60.4	46.3		3.0	-14	293	10
39331.127	.02	61	47	4	3.8	-14	293	10
39343.574	.05	60	45	4	3.8	-14	294	10

NAME: TETRAHYDROFURAN		CONTINUED						ID NO. 801.00
ν_o, MHz	U, MHz	-10 log γ	-10 log $\frac{\gamma \Delta\nu}{p}$	Line-type code	E_S, kV/cm	P, dBm	T, K	p, mtorr
39355.341	.02	61	46	4	3.8	-14	294	10
39364.362	.02	60.7	46.5		3.8	-14	294	10
39371.005	.01	60	46	5	3.4	-14	294	10
39375.732	.05	60	45	4	3.4	-14	294	10
39378.750	.02	64	51	4	2.1	-14	295	10
39381.171	.02	62	47	4	3.0	-14	295	10
39398.617	.05	64	49	4	3.8	-14	295	10
39470.870	.02	63	50	4	3.8	-14	295	10
39496.799	.05	64	49	4	3.8	-14	295	10
39511.530	.02	64	50	5	3.8	-14	295	10
39612.528	.02	64	50	4	1.7	-14	295	10
39760.658	.02	63	49	5	3.8	-14	295	10
39781.299	.02	62	48	4	3.8	-14	295	10
39880.268	.01	62	48	5	3.8	-14	295	10
39880.271	.01	62	48	5	3.8	-14	296	10
39924.854	.05	63	50	4	2.6S	-14	296	10

CONCLUDING REMARKS

The spectra presented in this report are not represented as being complete, since the spectrometer was programed to detect only lines with intensities of about 2×10^{-7} cm^{-1} or greater. Although it would be desirable to include all detectable lines in a catalog intended for analytical use, the amount of time required for such an undertaking precluded doing so. The intensity cutoff limit used is a compromise to allow measurements to be made on a larger number of molecules. At the same time, the information included in the tables is more than adequate to allow qualitative, and in most cases quantitative, analysis of samples containing any of the tabulated molecules, even in a complex mixture. In general, though, because of the incomplete nature of the tabulations, it will not be possible to identify all the observed spectral lines in a scan at high sensitivity, even though the sample may be a pure compound.

Spectral data on organic and inorganic compounds containing sulfur and nitrogen have been previously published. Data are presently being compiled for compounds containing chlorine, fluorine, and a combination of the two.

Langley Research Center,
National Aeronautics and Space Administration,
Hampton, Va., February 21, 1975.

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