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MICROWAVE SPECTRA OF SOME CHLORINE AND FLUORINE COMPOUNDS

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A computer-controlled microwave (MRR) spectrometer was used to catalog reference spectra for chemical analysis. Tables of absorption frequencies, peak absorption intensities, and integrated intensities were included for 21 organic compounds which contain chlorine, fluorine, or both.

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MICROWAVE SPECTRA OF SOME CHLORINE AND FLUORINE COMPOUNDS

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Langley Research Center

SUMMARY

The Langley Research Center has been engaged in the measurement and tabulation of microwave absorption spectra suitable for use in chemical analysis. Most of the measurements have been made by a computer-controlled, Stark-modulated spectrometer in the frequency range from 26 500 to 40 000 MHz, with a few spectra in the range from 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, and the apparatus and measurement procedures were described in that report. Data on volatile organic compounds were published in NASA TN D-7904, and that report described some modifications to the hardware and software. This report contains tables of data for the following compounds: chlorobenzene, chlorodifluoromethane, chloroethane, chloroethene, chloromethane, 1-chloropropane, 2-chloropropane, chlorotrifluoromethane, dichlorodifluoromethane, 1,1-dichloroethane, 1,2-dichloroethane, cis 1,2-dichloroethene, dichloromethane, 1,1-difluoroethene, fluorobenzene, fluoroethene, 1-fluoro-4-methylbenzene, 1,1,1-trichloroethane, trichloroethene, trichlorofluoromethane, and trichloromethane.

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 main 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 third to present these results. The spectra of 28 sulfur and nitrogen compounds and 26 volatile organic compounds have been previously published. (See refs. 1 and 2.)

This report includes spectra for 21 compounds which contain chlorine, fluorine, or both. The spectra were all measured by a computer-controlled microwave (MRR) spectrometer, and all data handling and processing were performed automatically to improve accuracy and reliability. Reference 1 contained a description of the apparatus, software, and experimental procedures. References 2 and 3 discuss subsequent improvements which were made to the system. No further changes in either hardware or software have been made, and the data in the present report have been obtained on the system as previously described. Some of the data had been measured during an earlier instrumentation and software development stage and this is noted in the remarks section preceding the table.

SYMBOLS

E_S	intensity of Stark modulation square-wave electric field, kV/cm
J	angular momentum quantum number
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

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. 4). It is also used for computer handling of the 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 performed. Also given are pertinent remarks on experimental conditions or results, including the availability of other experimental or theoretical data to verify 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 value for the $J = 2 \leftarrow 3$ transition of carbon oxide sulfide of 36 488.812 MHz, as discussed in reference 1.

The measurements 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, and 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 γ_1. 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 is usually better than 0.1 dB, although the absolute accuracy may not be that good. The reasons for rounding off intensities to the nearest dB 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 distorts the line shape and causes 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 is measured for the variation of intensity with pressure, 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 be 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 I. For many lines, more than one of the code numbers is applicable, and in that case the lower number is normally used.

TABLE I.- DEFINITION OF LINE-TYPE CODE

Code	Meaning
1	No line-width data available. Line is usually broad (for example, 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

TABLE I.- Concluded

Code	Meaning
4	Asymmetric line. Both widths measured but they differ by at least 5 percent; same significance as types 2 or 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 only on the upper half-width; for type 3 lines, the lower half-width. Note that the main difference between these 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 condition does not necessarily imply greater asymmetry for all type 2 and 3 lines, since the classification sometimes depends only on the circumstantial relationship between line widths 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 measurement was made and is usually the value which gave the best signal. Allowable values of voltage were 800 V 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 volt. If a signal loss of 1 percent or more is noted, the line is classified as sensitive, and the field value is followed by an "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 gage is given in the eighth column. All the measurements were made at room temperature; a maximum variation of about 8 K resulted.

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, thermocouple gage measurements may give readings as much as 300 to 400 percent greater than those of the capacitance manometer.

SPECTRAL TABLES

Index to Spectral Tables

Chlorobenzene

Formula: C_6H_5Cl
CAS Registry number: 108-90-7
Synonym: phenyl chloride
NBS identification number: 892.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Fisher B-255. Chromatography using a Chromosorb 102 column showed impurity peaks of 0.01 and 0.02 percent.

Remarks: Many of the observed lines were broadened and distorted by unresolved hyperfine structure.

The sample inlet valve was not fully seated after admitting the first sample, which resulted in a slow overnight increase in pressure to 11.2 millitorr. The following night a decrease in pressure to 9.2 millitorr was experienced, apparently due to sample adsorption.

The sample pressure of 10 millitorr was registered by a thermocouple gage as 40 millitorr.

Sample identity was confirmed by matching seven of the observed lines with calculated transition frequencies from reference 5.

NAME: CHLOROBENZENE								ID NO. 892.00
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
26613.64	.10	66	51	3	3.8	-17	298	10
26614.19	.10	66	51	2	3.8	-17	298	10
27598.086	.02	66	50	4	3.8	-17	297	10
28235.15	.20	67	52	3	3.4S	-17	297	10
28235.73	.20	67	52	2	3.4S	-17	297	10
28239.08	.20	65	51	3	2.1S	-17	297	10
28239.57	.20	67	52	2	3.8S	-17	297	10
28313.854	.02	68	54	4	3.0	-17	297	10
28315.248	.02	66	52	5	3.8	-17	297	10
28352.661	.02	68	53	4	3.4	-17	297	10
28391.071	.02	67	53	5	3.0	-17	297	10
28392.840	.02	67	52	4	3.0	-17	297	10
28459.011	.02	63	48	5	3.8	-17	297	10
28713.88	.10	66	51	2	3.8	-18	297	10
28729.29	.20	68	54	2	2.1S	-18	298	10
28846.348	.02	68	53	4	2.1	-18	298	10
28847.41	.10	68	53	2	2.1	-18	298	10
29639.446	.05	64	48	4	3.0	-17	298	10
30239.203	.05	64	49	4	3.8S	-17	298	10
30803.821	.02	65	51	5	3.8	-17	298	10
30901.749	.02	63	49	4	3.8	-17	298	10
31022.23	.20	67	52	3	3.8S	-17	298	10
31023.06	.20	67	52	2	3.8S	-17	297	10
31027.422	.05	66	52	5	3.8S	-17	297	10
31028.26	.10	67	52	4	3.4S	-17	297	10
31049.90	.20	67	53	3	2.1S	-17	297	10
31050.39	.20	67	52	2	3.8S	-17	297	10
31078.03	.20	68	54	3	3.8S	-17	297	10
31082.37	.20	64	50	3	3.0S	-17	297	10
31085.27	.20	65	50	3	3.8S	-17	297	10
31129.31	.10	66	52	3	3.8	-17	297	10
31129.99	.10	66	52	2	3.8	-17	297	10
31155.97	.20	68	54	3	3.8S	-17	297	10
31225.024	.02	66	52	5	2.1	-18	297	10
31226.352	.02	66	52	4	3.4	-18	297	10
31280.255	.05	64	49	4	2.1S	-18	297	11
31295.649	.02	66	51	4	3.8	-17	296	11
31303.770	.02	66	52	5	2.1	-17	296	11
31305.129	.02	65	51	5	2.1	-17	296	11
31750.429	.02	67	52	4	3.4	-18	296	11
31934.84	.10	67	53	3	3.8	-18	296	11
31935.689	.02	66	51	4	2.6	-18	296	11
32616.080	.02	62	47	4	3.8	-17	296	11
32624.460	.05	66	53	4	3.8S	-17	296	11
32853.055	.02	63	49	5	3.8	-17	296	11
33061.084	.02	68	53	4	3.8	-17	296	11
33062.82	.10	68	53	4	3.4S	-17	296	11
33285.684	.02	64	51	5	3.8	-16	296	11
33351.025	.01	63	50	5	3.8	-17	296	11
33775.38	.10	63	49	2	3.8	-17	296	11

NAME: CHLOROBENZENE CONTINUED ID NO. 892.00

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
33790.948	.02	66	51	4	3.8	-17	296	11
33822.44	.10	67	52	4	3.4S	-17	297	10
33823.45	.10	67	54	4	3.4S	-17	297	10
33828.70	.10	66	52	4	3.4S	-17	297	10
33842.660	.05	67	53	4	3.0S	-17	297	10
33843.443	.05	68	54	4	3.0S	-17	297	10
33858.51	.20	65	51	3	3.0S	-17	297	10
33859.06	.20	64	50	2	3.0S	-17	297	10
33862.50	.10	65	51	3	2.1S	-17	297	10
33863.04	.20	65	51	2	2.1S	-17	297	10
33889.14	.20	65	49	2	3.8S	-17	297	10
33891.94	.10	66	53	3	2.6S	-17	297	10
33918.76	.20	67	52	3	3.8S	-17	297	10
33919.280	.05	67		1	3.8S	-17	297	10
33919.703	.05	67		1	3.8S	-17	297	10
33922.78	.20	66	52	3	3.8S	-17	297	10
33923.171	.05	67		1	3.8S	-17	298	10
33926.66	.10	64	49	3	3.4	-17	298	10
33927.15	.10	65	51	2	3.8	-17	298	10
33936.026	.02	63	47	5	3.8	-17	298	10
33938.285	.02	63	47	5	3.0	-17	298	10
33955.03	.10	68	54	3	3.8	-17	298	10
34012.37	.10	67	52	4	3.0S	-17	298	10
34013.944	.02	67	53	4	2.1	-17	298	10
34019.962	.02	67	53	5	1.7	-17	298	10
34021.556	.02	67	53	5	1.7	-17	298	10
34103.482	.02	64	50	4	1.7	-17	298	10
34104.490	.05	64	49	4	1.7	-17	298	10
34247.151	.02	64	49	4	1.7	-17	295	10
34248.205	.02	63	49	4	1.7	-17	295	10
34610.304	.02	66	52	4	3.8	-17	295	10
35064.51	.10	64	50	3	3.8	-17	295	10
35065.15	.10	65	50	2	3.4	-17	295	10
35102.69	.10	67	53	3	3.8	-17	295	10
35103.35	.20	67	52	2	3.8S	-17	296	10
35440.803	.02	61	48	4	3.8	-16	296	10
35532.476	.01	61	46	5	3.8	-16	296	10
35557.872	.02	67	53	4	3.4	-16	296	10
35757.682	.02	68	52	5	3.8S	-16	296	10
35760.00	.20	68	52	4	3.8S	-16	296	10
35762.713	.02	63	50	4	3.8	-16	296	10
35805.523	.01	61	49	4	3.8	-16	296	10
35845.428	.02	68	52	4	3.8	-16	296	10
35846.805	.05	67	52	4	3.8	-16	296	10
36021.93	.10	68	54	2	2.1	-15	296	10
36216.533	.02	63	49	4	3.8	-15	297	10
36220.50	.10	67	53	3	3.8	-15	297	10
36221.16	.10	68	53	2	1.7S	-15	297	10
36233.017	.02	65	51	5	3.8	-15	297	10
36629.23	.20	68	54	4	3.0S	-15	297	10

NAME: CHLOROBENZENE			CONTINUED					ID NO. 892.00
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
36653.335	.05	66	52	4	3.0S	-15	297	10
36654.04	.20	67	53	2	3.0S	-15	297	10
36658.26	.10	65	51	4	2.1S	-15	297	10
36658.94	.10	65	52	2	2.1S	-15	297	10
36672.23	.20	65	51	3	3.8S	-15	296	10
36672.79	.20	66	50	2	3.8S	-15	296	10
36676.23	.20	65	51	3	3.8S	-15	296	10
36676.75	.20	66	51	2	2.1S	-15	296	10
36692.97	.20	67	52	2	3.8S	-15	296	10
36698.54	.20	63	49	3	3.4S	-15	296	10
36698.86	.20	63	49	2	3.4S	-15	296	10
36700.85	.10	64	49	3	3.8	-15	296	10
36701.221	.05	63		1	3.8	-15	296	10
36701.641	.05	63		1	3.8S	-15	296	10
36709.86	.20	68	54	2	3.8S	-15	296	10
36730.65	.10	66	51	3	3.4	-15	295	10
36730.95	.10	66	52	2	3.4S	-15	295	10
36736.929	.05	64	49	4	2.6	-15	295	10
36739.32	.10	64	49	4	3.0S	-15	295	10
36770.492	.05	66	51	4	3.4	-15	295	9
36772.86	.20	66	51	4	2.6S	-15	295	9
36796.58	.10	63	48	3	2.1	-15	295	9
36796.92	.10	63	48	2	3.8	-15	295	9
36798.39	.10	63	48	3	3.8	-15	295	9
36798.73	.10	63	48	2	2.1	-15	295	9
36891.456	.02	66	52	4	2.1	-15	295	9
36892.706	.02	66	52	5	2.1	-15	295	9
36907.416	.02	66	52	5	3.0S	-15	295	9
36908.672	.02	65	51	5	2.1	-15	295	9
36925.869	.02	68	54	5	3.8	-15	295	9
36927.120	.02	67	53	4	3.0	-15	295	9
36942.251	.02	68	54	4	2.1	-15	295	9
36943.501	.02	68	54	5	2.1S	-15	295	9
36983.035	.05	63	48	4	2.1	-15	295	9
36983.826	.05	63	48	4	2.1	-15	295	9
37229.218	.05	62	47	4	3.8	-15	295	9
37230.070	.05	62	47	4	3.8	-15	295	9
38004.416	.02	60	47	4	3.8	-16	295	10
38214.10	.10	64	50	3	2.1	-16	295	10
38214.62	.10	64	49	2	2.1	-16	295	10
38254.82	.10	66	53	3	3.4	-16	295	10
38255.30	.10	66	52	2	3.0	-16	296	10
38263.992	.02	61	48	4	3.8	-16	296	10
38378.454	.01	59.7	45.3		3.8	-16	296	10
38403.070	.02	66	52	5	3.0	-16	296	10
38475.365	.05	68	53	4	3.0S	-16	296	10
38527.117	.05	67	52	4	1.7S	-16	296	10
38529.10	.10	66	52	4	1.7S	-16	296	10
38569.874	.02	68	54	4	3.4	-16	296	10
38625.767	.02	63	49	4	3.8	-15	296	10

NAME: CHLOROBENZENE Concluded ID NO. 892.00

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
38636.41	.20	68	54	3	1.7S	-15	296	10
38637.57	.10	65	49	4	3.8S	-15	296	10
38638.42	.20	68	54	2	1.7S	-15	296	10
38824.81	.10	66	52	3	2.1	-15	296	10
38825.26	.10	66	52	2	1.7	-15	297	10
39149.31	.10	66	52	3	2.1	-14	297	10
39149.83	.10	66	52	2	2.1	-14	297	10
39439.99	.10	68	52	4	3.8S	-14	297	10
39455.909	.05	67	54	4	1.7S	-14	297	10
39456.681	.05	67	54	5	1.7S	-14	297	10
39461.563	.05	65	51	4	2.1S	-14	297	10
39462.33	.10	67	54	2	2.1S	-14	297	10
39469.34	.10	66	52	3	2.6S	-14	297	10
39469.94	.10	66	53	2	2.6S	-14	297	10
39474.07	.10	67	54	3	2.1S	-14	297	10
39474.70	.10	67	53	2	2.1S	-14	297	10
39479.52	.10	64	49	2	3.8	-14	297	10
39486.75	.10	63	50	3	2.1S	-14	297	10
39487.23	.20	63	49	2	3.4S	-14	297	10
39490.67	.10	63	50	3	1.7S	-14	297	10
39491.15	.20	64	49	2	1.7S	-14	297	10
39509.66	.20	65	50	3	3.0S	-14	297	10
39510.153	.05	64		1	3.0S	-14	297	10
39513.30	.10	64	51	3	3.0S	-14	297	10
39542.786	.02	61	46	4	3.8	-14	296	10
39545.28	.20	61	47	3	3.4S	-14	296	10
39549.10	.10	66	52	3	3.0S	-14	296	10
39579.31	.10	66	51	2	3.4S	-14	296	10
39581.266	.05	64	49	4	2.1S	-14	296	10
39590.569	.01	63	49	5	2.1	-14	296	10
39592.483	.02	62	48	5	3.8S	-14	296	10
39626.775	.05	62	48	4	3.8S	-14	296	10
39628.785	.05	54	51	4	1.7S	-14	296	10
39664.80	.10	63	48	4	1.7S	-14	296	10
39666.156	.02	50	45	6	2.1S	-14	296	10
39667.520	.05	63	48	5	2.1S	-14	296	10
39702.951	.02	67	53	5	2.1S	-14	296	10
39779.441	.02	64	50	5	3.0	-14	296	10
39780.445	.02	64	50	5	3.4	-14	296	10
39810.798	.02	65	51	4	2.6	-14	296	10
39811.811	.02	63	50	4	3.8	-14	296	10
39816.716	.02	66	52	5	3.0S	-14	296	10
39817.714	.02	66	52	4	3.4	-14	296	10
39848.946	.05	65	50	4	3.8	-14	296	10
39849.858	.05	65	49	4	2.6	-14	296	10
39859.56	.10	62	47	3	2.1	-14	296	10
39860.17	.10	62	48	2	3.8	-14	296	10

Chlorodifluoromethane

Formula: $CHClF_2$
CAS Registry number: 75-45-6
Synonym: Freon-22
NBS identification number: 26.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source for the original measurements was Matheson bottled gas, and for the more recent remeasurements the source was duPont Freon-22. Gas chromatography of the latter using a Chromosorb 102 column did not detect any impurities other than an air peak.

Remarks: The original spectral data were taken manually and were later updated on the automated system. All the lines with intensities of 64 or stronger have been completely remeasured, and the intensities of those down to 68.6 have been measured. Lines weaker than that value have not been included in the table.

The sample pressure of 12 millitorr was registered by a thermocouple gage as 20 millitorr.

Sample identity was confirmed by matching eight of the observed lines with calculated transition frequencies. (See ref. 6.)

NAME: CHLORODIFLUOROMETHANE ID NO. 26.00

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
26585.935	.02	64	51	5	2.1	-18	297	12
26587.804	.02	64	51	5	2.1	-18	297	12
26691.16	.05	65		1	2.1	-17	294	12
26692.07	.05	65		1	2.1	-17	294	12
26825.25	.05	67		1	2.1	-17	294	12
27044.49	.05	67		1	2.1	-16	294	12
27046.67	.05	67		1	2.1	-16	294	12
27513.39	.10	68		1	2.1	-17	294	12
27666.273	.01	58.2	44.7		2.1	-16	294	12
27668.485	.01	58.4	44.9		3.0	-16	294	12
27772.96	.05	67		1	2.1	-16	294	12
27773.70	.05	67		1	2.1	-16	294	12
27848.094	.01	59.7	46.7		3.0	-16	294	12
27849.314	.01	60	47	4	3.0	-16	294	12
27901.19	.10	68		1	2.1	-16	294	12
27999.18	.05	67		1	2.1	-16	294	12
28000.79	.05	67		1	2.1	-16	294	12
28039.87	.10	68		1	2.1	-17	294	12
28199.87	.05	67		1	2.1	-17	294	12
28202.46	.05	67		1	2.1	-17	294	12
28333.34	.10	61	48	2	2.1	-17	295	12
28336.60	.10	61	48	2	2.6	-17	295	12
28499.47	.05	67		1	2.1	-17	294	12
28501.71	.10	68		1	2.1	-17	294	12
28624.221	.02	59	45	4	2.1	-17	295	12
28626.870	.01	59.1	45.0		3.0	-17	295	12
28697.78	.10	68		1	2.1	-18	294	12
28701.23	.10	69		1	2.1	-18	294	12
29120.236	.05	64	51	4	2.1	-18	295	12
29121.325	.05	64	51	4	2.1	-18	295	12
29215.864	.01	58.1	45.0		2.1	-18	295	12
29217.486	.01	58.0	44.9		3.0	-18	294	12
29384.699	.02	51	49	5	2.1	-18	295	12
29385.806	.05	61	49	4	2.1	-18	295	12
29607.03	.10	68		1	2.1	-17	294	12
29610.66	.05	67		1	2.1	-17	294	12
30240.30	.05	67		1	2.1	-17	294	12
30244.83	.05	67		1	2.1	-17	294	12
30258.33	.05	67		1	2.1	-17	294	12
30259.73	.05	67		1	2.1	-17	294	12
30555.963	.02	63	50	5	2.1	-17	295	12
30556.971	.02	63	50	4	3.4	-17	295	12
30728.83	.05	67		1	2.1	-16	294	12
30730.52	.05	67		1	2.1	-16	294	12
30893.21	.05	65		1	2.1	-16	294	12
30894.12	.05	65		1	2.1	-16	294	12
31105.06	.10	68		1	2.1	-16	294	12
31145.62	.10	68		1	2.1	-16	294	12
31171.125	.02	65	52	4	2.1	-19	295	12
31195.177	.05	64	50	4	1.7	-19	295	12

NAME: CHLORODIFLUOROMETHANE CONTINUED								ID NO. 26.00
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
31195.938	.05	63	49	4	1.7	-19	295	12
31200.334	.05	64	50	4	3.4	-19	295	12
31201.152	.05	63	50	4	3.4	-19	294	12
31282.445	.02	63	50	5	2.1	-18	294	12
31283.703	.05	63	50	4	2.6	-18	294	12
31432.76	.10	65	52	3	2.6	-17	294	12
31433.66	.10	65	52	2	2.1	-17	294	12
31785.26	.05	67		1	2.1	-17	294	12
31789.29	.10	66	54	3	3.0	-18	294	12
31934.825	.01	59	46	4	2.1	-18	294	12
31936.278	.01	58.4	45.3		3.0	-18	294	12
31974.80	.10	65	51	2	2.1	-19	294	12
31977.41	.10	65	51	4	2.6	-19	294	12
32208.580	.01	57.1	43.9		3.0	-18	294	12
32210.487	.01	57.2	44.1		3.4	-18	297	12
32510.78	.10	68		1	2.1	-18	298	12
32513.41	.10	68		1	2.1	-18	298	12
32581.79	.10	68		1	2.1	-17	298	12
32630.53	.10	68		1	2.1	-17	298	12
32632.50	.05	65		1	2.1	-17	298	12
32637.54	.05	67		1	2.1	-17	298	12
32764.85	.05	67		1	2.1	-17	298	12
32767.86	.05	67		1	2.1	-17	298	12
33016.404	.02	62	49	5	2.1	-20	294	12
33017.838	.02	62	49	4	2.1	-20	294	12
33053.46	.10	68		1	2.1	-17	298	12
33171.53	.10	68		1	2.1	-17	298	12
33342.70	.05	66		1	2.1	-17	298	12
33346.303	.05	65	52	4	2.1	-20	294	12
33527.73	.05	66		1	2.1	-17	298	12
33529.67	.05	66		1	2.1	-17	298	12
33729.587	.02	65	52	5	2.1	-17	294	12
33731.76	.05	65		1	2.1	-17	294	12
33825.421	.02	63	49	4	2.1	-17	294	12
33827.591	.02	63	49	4	3.0	-17	294	12
33962.086	.02	63	50	5	2.1	-18	294	12
33963.116	.02	64	51	4	2.1	-18	294	12
33992.85	.05	67		1	2.1	-17	298	12
33994.37	.05	67		1	2.1	-17	298	12
34006.21	.05	67		1	2.1	-17	298	12
34060.148	.02	66	51	5	3.4	-18	294	12
34075.643	.01	58.9	46.1		2.1	-18	298	12
34076.957	.01	58.9	46.0		3.4	-18	298	12
34144.929	.02	61	48	5	2.1	-17	294	12
34146.552	.02	62	48	5	2.6	-17	294	12
34330.33	.10	68		1	2.1	-17	298	12
34348.776	.02	66	53	4	3.8	-17	294	12
34349.971	.10	66	52	3	3.4	-17	294	12
34352.77	.10	68		1	2.1	-17	298	12
34433.38	.05	64		1	2.1	-17	298	12

NAME: CHLORODIFLUOROMETHANE CONTINUED								ID NO. 26.00
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
34441.81	.05	66		1	2.1	-17	298	12
34479.963	.02	62	48	4	2.1	-17	294	12
34481.841	.02	62	48	5	2.6	-17	294	12
34547.957	.01	56.7	43.4		2.1	-17	298	12
34550.137	.05	55	41	4	3.0	-17	298	12
34553.84	.10	61	48	2	3.8	-17	294	12
34908.65	.05	66		1	2.1	-17	298	12
34911.96	.05	66		1	2.1	-17	298	12
34966.814	.02	65	54	4	1.7	-17	294	12
34967.421	.02	65	54	4	1.3	-17	294	12
35084.41	.10	68		1	2.1	-17	298	12
35085.01	.10	68		1	2.1	-17	298	12
35120.831	.02	66	53	4	2.1	-17	294	12
35121.696	.02	66	53	4	2.1	-17	294	12
35206.537	.05	63	50	4	2.6	-17	294	12
35207.610	.02	62	49	5	3.0	-17	294	12
35212.594	.02	64	51	4	3.8	-17	294	12
35213.682	.02	63	50	4	3.4	-17	294	12
35285.55	.05	67		1	2.1	-17	298	12
35287.89	.10	63	48	3	2.1	-17	294	12
35290.943	.05	66	52	4	2.6	-17	294	12
35342.03	.05	67		1	2.1	-17	298	12
35344.690	.02	64	50	4	2.6	-18	294	12
35475.11	.05	67		1	2.1	-17	298	12
35476.088	.02	65	52	5	3.4	-18	294	12
35479.23	.05	67		1	2.1	-17	298	12
35480.20	.05	66		1	2.1	-17	298	12
35558.07	.10	69		1	2.1	-17	298	12
35562.311	.02	64	51	5	1.7	-17	294	12
35570.16	.10	64	48	2	3.4	-17	294	12
35574.222	.05	64	50	4	3.8	-17	294	12
35596.43	.10	68		1	2.1	-17	298	12
35632.600	.05	65	51	4	1.7	-17	294	12
35634.83	.05	66		1	2.1	-17	298	12
35674.554	.02	65	51	5	2.1	-17	294	12
35677.54	.05	66		1	2.1	-17	298	12
35698.63	.10	68		1	2.1	-16	298	12
35739.366	.01	60.4	47.8		2.1	-16	299	12
35740.567	.02	61	48	4	3.0	-17	294	12
35841.74	.05	66		1	2.1	-16	299	12
35843.57	.05	66		1	2.1	-16	299	12
35866.768	.01	56.9	44.0		2.1	-16	299	12
35868.458	.01	57	44	4	3.0	-16	299	12
35923.511	.01	56.9	43.4		3.0	-16	299	12
35926.088	.01	57.1	43.5		3.4	-16	299	12
35929.717	.01	64	54	5	3.4	-16	294	12
35930.301	.02	64	54	4	3.4	-16	294	12
36025.04	.10	58	44	2	3.0	-16	299	12
36028.09	.10	58	44	2	3.4	-16	299	12
36233.05	.05	66		1	2.1	-16	299	12

NAME: CHLORODIFLUOROMETHANE CONTINUED								ID NO. 26.00
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
36236.03	.05	65		1	2.1	-16	299	12
36481.113	.02	65	53	4	3.8	-17	294	12
36484.18	.05	65		1	2.1	-16	299	12
36527.48	.10	69		1	2.1	-16	299	12
36605.94	.05	67		1	2.1	-16	299	12
36608.98	.05	67		1	2.1	-16	299	12
36728.23	.05	67		1	2.1	-16	299	12
36729.62	.05	67		1	2.1	-16	299	12
36745.57	.05	66		1	2.1	-16	299	12
36747.05	.05	66		1	2.1	-16	299	12
36754.47	.05	66		1	2.1	-16	299	12
36757.05	.05	66		1	2.1	-16	299	12
36841.71	.05	67		1	2.1	-16	299	12
36845.57	.05	67		1	2.1	-16	299	12
36846.623	.05	62	48	4	3.0	-15	298	12
36847.816	.02	62	49	5	3.8	-15	298	12
36894.312	.01	64	53	5	2.1	-15	298	12
36894.873	.02	64	54	4	2.1	-15	298	12
37012.463	.01	62	49	5	3.0	-16	299	12
37013.559	.02	62	50	4	3.8	-16	297	12
37106.802	.02	64	51	5	3.8	-16	296	12
37110.450	.02	64	51	4	3.0	-16	295	12
37530.76	.05	67		1	2.1	-15	295	12
37748.09	.05	65		1	2.1	-15	295	12
37749.83	.05	65		1	2.1	-15	295	12
37860.322	.02	63	53	5	3.0S	-16	295	12
37860.865	.02	64	53	4	3.8S	-16	295	12
37892.74	.10	63	51	2	3.0	-16	295	12
37895.64	.10	64	51	2	3.8	-16	295	12
37935.47	.10	68		1	2.1	-16	295	12
37937.70	.10	68		1	2.1	-16	295	12
37939.76	.10	68		1	2.1	-16	295	12
37942.01	.10	68		1	2.1	-16	295	12
37970.22	.05	65		1	2.1	-16	295	12
37971.25	.05	65		1	2.1	-16	295	12
38058.80	.05	66		1	2.1	-16	295	12
38061.64	.05	65		1	2.1	-16	295	12
38071.452	.01	64	51	5	3.4	-16	295	12
38073.350	.01	64	51	4	3.0	-16	295	12
38228.983	.01	63	51	5	2.6	-16	295	12
38234.74	.05	66		1	2.1	-16	295	12
38236.188	.01	63	50	5	3.8	-16	295	12
38430.81	.05	65		1	2.1	-16	295	12
38432.08	.05	65		1	2.1	-16	295	12
38496.21	.05	66		1	2.1	-16	295	12
38497.53	.05	66		1	2.1	-16	295	12
38629.54	.05	67		1	2.1	-16	295	12
38630.72	.05	66		1	2.1	-16	295	12
38636.54	.05	66		1	2.1	-16	295	12
38637.71	.10	68		1	2.1	-16	295	12

NAME: CHLORODIFLUOROMETHANE Concluded								ID NO. 26.00
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
38657.328	.01	64	51	5	3.8	-16	295	12
38660.666	.01	54	52	4	3.8	-15	295	12
38678.71	.10	68		1	2.1	-15	295	12
38682.16	.05	67		1	2.1	-15	295	12
38794.487	.01	57.3	54.5		2.1	-15	295	12
38796.018	.01	57.3	44.3		3.4	-15	293	12
38797.712	.02	64	50	4	3.8	-15	293	12
38827.524	.01	63	53	4	2.1	-15	293	12
38828.046	.01	63	53	4	2.1	-15	293	12
39240.61	.05	66		1	2.1	-15	293	12
39244.48	.10	64	51	3	3.0	-15	293	12
39369.314	.01	55.7	42.8		2.1	-15	293	12
39371.256	.01	55.8	42.8		3.4	-15	293	12
39393.707	.01	61	48	5	2.1	-14	293	12
39395.024	.02	61	48	5	2.1	-14	293	12
39402.232	.02	64	50	4	2.6	-15	293	12
39406.357	.05	62	49	4	3.0	-15	293	12
39525.71	.10	68		1	2.1	-14	293	12
39641.04	.05	65		1	2.1	-14	293	12
39643.65	.05	65		1	2.1	-14	293	12
39789.56	.05	67		1	2.1	-14	293	12
39795.733	.01	63	53	4	2.1	-14	293	12
39796.239	.05	63	53	2	2.1	-14	293	12

Chloroethane

Formula: CH_3CH_2Cl
CAS Registry number: 75-00-3
Synonym: ethyl chloride
NBS identification number: 156.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Matheson technical grade bottled gas with a stated minimum purity of 99.5 percent. Gas chromatography using a Chromosorb 102 column showed two impurities of 0.06 and 0.3 percent.

Remarks: Most of the lines exhibit asymmetry because of overlaps and unresolved fine structure. The frequencies and intensities are likely to be pressure sensitive for many lines.

The 8-millitorr sample pressure was registered by a thermocouple gage as 24 millitorr.

Sample identity was confirmed by matching 12 of the observed lines with calculated transitions from reference 4.

NAME: CHLOROETHANE ID NO. 156.00

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
28563.486	.05	68		1	2.6	-18	295	8
28864.722	.02	67	52	4	2.1S	-18	295	8
29594.62	.10	67	52	3	2.1	-18	295	8
29595.07	.10	67	52	2	3.0	-18	296	8
29964.29	.10	68	52	3	3.0	-18	296	8
29964.84	.10	66	51	2	3.0	-18	295	8
29967.300	.05	65	50	4	3.4	-18	295	8
30318.649	.01	66	52	5	3.0	-17	295	8
30321.730	.02	68	53	5	3.8S	-17	296	8
30322.935	.02	67	52	5	3.8	-17	296	8
30497.516	.05	67	51	4	3.8	-17	296	8
30500.621	.02	65	50	4	3.8	-17	296	8
30511.561	.02	67	52	4	2.1	-17	296	8
30563.25	.10	63	48	3	3.8	-17	296	8
30564.000	.05	61	45	4	3.8	-17	296	8
30566.37	.10	64	48	3	3.8	-17	296	8
30567.102	.02	60	44	4	3.8	-17	296	8
30706.352	.02	66	51	4	2.6	-17	296	8
30708.743	.02	62	47	5	3.0	-17	296	8
30751.18	.20	67	52	3	3.0S	-17	297	8
30771.586	.02	67	52	5	1.7S	-17	297	8
31256.858	.02	66	51	5	2.1S	-18	298	8
31259.891	.02	62	47	4	3.4	-18	298	8
31289.091	.02	64	49	4	3.0	-18	298	8
31323.341	.02	67	51	5	1.7	-18	297	8
31332.764	.02	60	45	4	2.6	-18	296	8
31333.556	.05	65		1	2.6	-18	296	8
31335.774	.02	57	42	4	3.0	-18	295	8
31359.326	.05	63	48	5	1.7S	-18	295	8
31368.150	.02	65	50	5	2.1	-18	295	8
31371.678	.02	62	46	5	2.1	-18	295	8
31391.798	.02	63	48	5	1.7	-18	295	8
31400.60	.10	65	50	4	1.7S	-18	295	8
31404.082	.02	62	46	4	2.1	-18	295	8
31412.857	.05	68	53	5	1.7S	-18	295	8
31499.82	.10	66	51	3	3.0	-18	296	8
31500.22	.20	67	51	2	3.0S	-18	295	8
31502.257	.05	64	48	4	3.4	-18	295	8
31507.880	.05	66	50	4	2.6	-18	295	8
31549.10	.20	57	50	2	3.4	-18	295	8
31694.40	.10	68	52	3	1.7	-18	295	8
31753.097	.02	68	52	4	2.1	-18	296	8
32071.33	.10	66	51	3	3.8	-18	296	8
32071.91	.10	67	52	2	3.4	-18	296	8
32074.422	.02	64	49	4	3.4	-18	296	8
32083.321	.02	65	49	5	3.4	-18	296	8
32123.655	.02	66	50	4	3.4	-18	296	8
32126.448	.02	66	52	4	3.8	-18	296	8
32127.410	.02	64	50	4	3.0	-18	295	8
32130.505	.02	66	51	4	3.8	-18	296	8

NAME: CHLOROETHANE			Concluded					ID NO. 156.00
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
32131.456	.02	65	51	4	3.8	-18	296	8
32157.83	.10	61	45	3	3.8	-18	294	8
32158.41	.10	62	46	2	3.8	-18	294	8
32160.927	.02	59	43	4	1.7	-18	294	8
32268.99	.10	68	53	2	3.8	-18	294	8
32519.839	.05	67	49	5	3.0S	-18	294	8
33689.07	.20	68	52	2	2.6S	-17	295	8
33712.68	.20	68	52	2	2.6S	-17	295	8
34152.38	.20	67	52	3	2.1S	-17	295	8
34153.10	.10	67	52	2	2.1	-17	295	8
34262.938	.02	64	49	5	2.1	-17	295	8
34322.75	.10	65	51	3	2.6	-17	295	8
34323.506	.02	63	49	4	2.1	-17	295	8
34326.674	.02	65	50	4	2.1	-17	295	8
34327.504	.02	64	50	4	2.1	-17	295	8
34567.128	.05	67	52	4	1.7	-17	295	8
34568.094	.05	67	52	4	3.0S	-17	295	8
34863.703	.02	67	52	5	2.1	-17	295	8
36941.24	.10	64	50	3	3.0	-15	295	8
36941.932	.02	63	48	4	2.1	-15	295	8
36945.196	.05	64	48	4	3.8	-15	295	8
36945.897	.05	63	49	4	3.0	-15	295	8
37071.77	.10	65	50	3	3.8	-16	296	8
37072.62	.10	65	50	2	3.8	-16	296	8
37881.236	.02	67	52	4	3.0	-17	296	8
37883.331	.02	67	52	5	3.8	-17	296	8
38559.89	.10	65	50	3	2.1	-16	296	8
38560.63	.10	66	51	2	2.1	-16	296	8
38967.019	.02	67	52	4	3.0	-15	296	8
39488.84	.10	67	52	2	2.1	-14	296	8
39491.95	.10	67	53	2	3.8	-14	296	8
39859.102	.05	66	49	4	3.8	-14	296	8
39860.05	.10	66	51	2	3.8S	-14	296	8
39944.86	.10	63	48	3	3.8	-14	296	8
39945.64	.10	61	45	3	3.8	-14	296	8
39946.588	.05	61	46	4	3.4	-14	296	8

Chloroethene

Formula: CH_2:CHCl
CAS Registry number: 75-01-4
Synonyms: chloroethylene; vinyl chloride
NBS identification number: 147.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Matheson bottled gas with a stated minimum purity of 99.9 percent. Gas chromatography using a Porapak N column showed an air peak of 0.24 percent and one other impurity of 0.05 percent.

Remarks: The 12-millitorr sample pressure was registered by a thermocouple gage as 29 millitorr.

The sample identity was confirmed by matching eight of the observed line frequencies to theoretical transition frequencies. (See ref. 7.)

NAME: CHLOROETHENE ID NO. 147.00

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
26812.84	.10	66	53	3	3.8	-17	294	12
27504.805	.02	65	53	5	3.0	-17	294	12
27842.381	.05	68	54	4	3.4	-17	294	12
28423.01	.10	67	54	2	3.0	-17	294	12
28736.168	.02	64	51	5	3.4	-18	294	12
30049.18	.10	66	53	3	3.4	-17	294	12
30049.48	.10	66	53	2	3.8	-17	295	12
31647.283	.05	67	53	5	3.0S	-18	295	12
32102.767	.02	64	51	5	3.8	-18	295	12
32251.906	.02	65	51	4	3.0	-18	295	12
32791.94	.10	65	52	2	3.8	-17	295	12
32886.324	.05	62	48	4	3.0	-17	295	12
32889.177	.05	60	47	4	3.8	-17	295	12
33504.90	.10	65	52	2	2.6	-17	295	12
33508.498	.05	64	50	4	3.0	-17	295	12
33535.497	.02	65	53	5	2.6	-17	295	12
33543.37	.10	56	43	2	3.8	-17	295	12
33546.969	.05	55	42	4	3.0	-17	295	12
33548.748	.02	64	50	4	3.8	-17	295	12
33554.584	.01	65	53	5	2.1	-17	295	12
33686.051	.02	66	54	4	3.0	-17	294	12
33713.255	.01	62	50	4	3.4	-17	294	12
33716.043	.01	57.9	45.4		3.8	-17	294	12
33726.996	.05	64	50	4	1.7	-17	294	12
33735.053	.02	66	53	4	1.7	-17	294	12
33738.278	.01	63	51	5	2.1	-17	294	12
33745.529	.02	64	51	5	1.7S	-17	294	12
33753.599	.02	66	53	5	2.1	-17	294	12
33756.806	.02	63	50	5	2.6S	-17	294	12
34374.955	.01	61	49	4	2.6	-17	294	12
34391.597	.01	64	52	5	1.7	-17	294	12
34402.367	.01	56.6	44.2		3.0	-17	294	12
34405.905	.01	52.8	40.3		3.8	-17	294	12
34412.586	.01	63	51	5	3.8	-17	294	12
34416.107	.05	59	45	4	3.4S	-17	294	12
34420.058	.02	66	53	5	1.7S	-17	294	12
34426.314	.01	61	48	5	2.1	-17	294	12
34430.386	.01	57.5	44.5		1.7	-17	294	12
34436.152	.02	59	46	4	2.1	-17	294	12
34440.611	.02	64	51	4	1.7	-17	294	12
34446.372	.01	61	48	5	2.1	-17	294	12
34450.435	.01	57.6	44.8		1.7	-17	294	12
34460.647	.02	64	51	5	1.7S	-17	294	12
34553.768	.02	68	55	5	2.6S	-17	294	12
34567.191	.05	67	54	4	2.1	-17	294	12
34573.239	.01	60.2	47.5		3.8	-17	294	12
34576.053	.01	59.6	46.9		2.1	-17	294	12
34802.069	.02	63	48	4	3.0	-17	294	12
35277.969	.01	62	49	4	3.4	-17	294	13
35290.939	.02	65	52	4	3.0	-17	294	12

NAME: CHLOROETHENE Concluded ID NO. 147.00

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
35297.359	.01	55.1	42.4		3.0	-17	294	12
35300.919	.01	54.4	41.7		2.1	-17	294	12
35301.95	.10	62	49	2	3.4	-17	294	12
35307.361	.02	65	52	5	2.6	-17	294	12
36311.22	.10	65	52	3	3.4	-15	294	12
36311.65	.10	65	52	2	3.8S	-15	294	12
36643.888	.01	61	49	5	3.4	-15	294	12
36850.713	.05	65	50	4	3.8	-15	295	12
36851.58	.10	65	51	2	3.8	-15	295	12
37135.577	.02	66	54	5	2.1	-15	295	12
37323.849	.02	57	54	4	3.8	-16	295	12
37997.79	.20	52	47	3	3.8	-16	295	12
37998.46	.20	62	47	2	3.8	-16	295	12
38063.152	.01	66	55	5	2.1	-16	295	12
39840.031	.05	66	52	4	3.8	-14	295	12

Chloromethane

Formula: CH_3Cl
CAS Registry number: 74-87-3
Synonym: methyl chloride
NBS identification number: 12.00
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. Gas chromatography using a Chromosorb 102 column showed impurity peaks of 0.02, 0.08, and 0.14 percent. The sample was used without further purification.

Remarks: The lines have been observed to have a nonlinear upward shift in frequency with pressure over the range of 2 to 80 millitorr. The magnitude of the shift is about 2 kHz/mtorr for the strongest line and about half that for the other two.

The sample pressure of 15 millitorr was registered by a thermocouple gage as 29 millitorr.

All the lines have been theoretically verified (ref. 4). In addition, four lines corresponding to excited vibrational states have been observed below 26 700 MHz, but the intensities are about an order of magnitude below the threshold value for the automated spectrometer.

NAME: CHLOROMETHANE								ID NO. 12.00
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
26570.765	.02	52	39	4	2.1	-18	294	15
26589.443	.01	50.3	36.6		2.1	-17	294	15
26604.377	.02	55	42	4	2.1	-17	294	15

1-Chloropropane

Formula: $CH_3CH_2CH_2Cl$
CAS Registry number: 540-54-5
Synonym: n-propyl chloride
NBS identification number: 197.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Matheson, Coleman, and Bell CX1300. Chromatography using a Chromosorb 102 column showed impurities of 0.04, 0.04, 0.96, and 0.36 percent. The sample was purified on Chromosorb 102 before use.

Remarks: Most of the observed lines are very broad and asymmetric because of the unresolved hyperfine structure.

The sample pressure of 10 millitorr was registered as 38 millitorr by a thermocouple gage.

Sample identity was confirmed by matching four of the observed lines with calculated transition frequencies from reference 8.

NAME: 1-CHLOROPROPANE ID NO. 197.00

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
27895.04	.10	68	53	2	2.1	-16	297	10
27905.50	.10	67	50	4	2.1S	-16	297	10
27907.14	.10	68		1	3.4	-16	297	10
29625.75	.20	68	51	2	1.7	-17	297	10
30508.22	.20	68	52	2	2.6	-17	297	10
31204.44	.10	68	50	4	3.0	-18	297	10
31962.94	.20	67	51	2	3.0	-18	296	10
32176.20	.10	67	50	4	3.0S	-18	297	10
32538.17	.20	65	48	2	3.8	-17	297	10
32555.77	.20	66	50	3	3.4S	-17	297	10
32556.78	.10	67		1	3.0	-17	297	10
32557.36	.10	67		1	3.8S	-17	297	10
32558.30	.10	68		1	3.0	-17	297	10
32559.03	.10	65		1	3.0S	-17	297	10
32561.30	.10	66	48	4	3.0S	-17	297	10
32563.51	.20	64	46	2	1.7	-17	295	10
32572.41	.20	68	50	2	3.8	-17	295	10
32576.63	.20	66	49	3	3.8S	-17	296	10
32577.59	.20	67	51	2	2.1	-17	296	10
32592.44	.20	66	48	4	3.4S	-17	296	10
32594.718	.05	66	49	4	3.4	-17	296	10
32596.875	.05	66	47	5	3.8S	-17	296	10
32610.02	.20	68	49	3	3.4	-17	296	10
32932.109	.05	66	49	4	2.1	-17	297	10
33250.631	.02	64	49	5	3.0	-17	297	10
33466.63	.10	66	51	3	3.8	-16	297	10
33467.82	.20	65	49	2	3.0	-16	297	10
33545.97	.10	66	51	3	2.1	-16	297	10
33546.78	.10	66	51	2	3.0	-16	297	10
33706.35	.10	67	52	3	3.8	-17	297	10
33707.033	.05	67		1	3.0	-17	297	10
33729.41	.20	68	52	2	3.8	-17	297	10
34118.59	.10	67	52	3	2.1	-17	297	10
34119.52	.10	67	52	2	3.0	-17	297	10
34416.28	.10	66	49	4	2.1	-17	297	10
34417.760	.02	66	51	5	3.4	-17	297	10
35108.165	.02	68	52	5	2.1S	-17	298	10
35109.563	.02	68	52	5	2.1	-17	298	10
35441.80	.20	68	52	3	2.1	-16	298	10
35505.346	.05	65	48	4	2.6	-16	298	10
35907.012	.02	66	51	5	3.8	-16	297	10
35909.084	.02	66	51	4	3.8	-16	298	10
36327.658	.05	68	52	4	3.4	-15	298	10
36356.68	.20	67	52	3	3.0	-15	298	10
36358.10	.10	67		1	3.8S	-15	298	10
36358.57	.20	67	50	2	3.8	-15	298	10
36389.22	.20	66	50	3	3.8S	-15	298	10
36390.35	.20	67	50	2	2.1S	-15	298	10
36421.56	.20	66	50	3	2.6	-15	297	10
36422.20	.20	65	48	2	2.6	-15	297	10

NAME: 1-CHLOROPROPANE			Concluded					ID NO. 197.00
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
36770.82	.10	65	50	2	3.8	-15	297	10
36817.023	.05	67	51	4	2.1	-15	297	10
36967.10	.20	66	51	3	3.4S	-15	297	10
36967.72	.10	66	51	2	2.1	-15	297	10
37143.43	.20	68	50	3	2.1	-15	297	10
37144.60	.20	67	51	2	2.1S	-15	296	10
37169.90	.20	66	49	3	2.6	-15	296	10
37170.990	.05	65	48	4	3.0	-15	296	10
37178.89	.20	64	49	2	3.4S	-15	296	10
37184.30	.10	66		1	3.8S	-15	296	10
37185.52	.20	67	49	2	3.8S	-15	296	10
37205.46	.20	65	49	3	3.8	-15	296	10
37206.03	.10	65		1	3.8S	-15	296	10
37209.30	.10	66		1	3.8S	-15	296	10
37210.58	.10	64		1	3.8S	-15	296	10
37211.86	.10	64		1	3.8	-15	296	10
37214.42	.20	61	44	3	3.0S	-15	296	10
37215.64	.10	61		1	3.4	-15	296	10
37218.17	.10	64	46	4	3.4S	-15	296	10
37219.27	.10	67		1	3.8S	-15	296	10
37237.32	.20	65	49	2	3.8	-15	296	10
37241.226	.05	66	47	5	3.8	-15	296	10
37248.73	.20	66	50	3	2.1S	-15	296	10
37249.99	.10	64		1	3.8S	-15	296	10
37252.54	.20	64	47	3	3.8S	-15	296	10
37253.67	.20	65	48	2	3.0	-15	296	10
37279.22	.20	67	50	2	3.4S	-15	296	10
37514.109	.02	66	51	5	3.8	-16	296	10
37596.903	.01	64	49	5	2.1	-16	296	10
37634.63	.20	63	47	3	3.8	-16	297	10
37659.902	.05	66	51	4	2.1	-16	297	10
37663.92	.10	68	50	4	2.6	-16	297	10
37936.640	.02	68	52	5	1.7	-16	297	10
37991.54	.20	66	47	3	3.8	-16	297	10
38045.956	.02	65	49	4	3.8	-16	297	10
38048.595	.05	65	49	4	3.8	-16	298	10
38157.864	.05	67	50	4	1.7	-16	297	10
38216.41	.10	67	51	4	2.1S	-16	297	10
38295.281	.05	64	47	4	2.1	-16	297	10

2-Chloropropane

Formula: $CH_3CHClCH_3$
CAS Registry number: 75-29-6
Synonym: isopropyl chloride
NBS identification number: 198.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Matheson, Coleman, and Bell 1261. Chromatography using a Chromosorb 102 column showed impurity peaks of 0.05, 2.3, 1.02, 0.09, and 0.29 percent. The sample was chromatographically purified by using a Chromosorb 102 column before use.

Remarks: Most of the lines observed were broad and asymmetric because of the unresolved hyperfine structure.

The sample pressure of 10 millitorr was registered by a thermocouple gage as 38 millitorr.

NAME: 2-CHLOROPROPANE ID NO. 198.00

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
27856.64	.10	67		1	3.8	-16	297	10
27857.85	.20	67	51	2	3.8	-16	297	10
28579.35	.10	68		1	3.4	-18	297	10
28580.52	.20	66	49	3	3.8	-18	298	10
30808.303	.05	68	52	4	3.4	-17	297	10
30810.725	.05	67	51	4	3.8	-17	297	10
30851.451	.02	68	52	5	3.4	-17	297	10
32713.492	.05	67	52	4	3.8S	-17	298	10
32715.567	.02	67	52	5	3.0	-17	298	10
32921.081	.05	68	53	4	3.0	-17	297	10
33016.50	.20	67	51	3	3.4	-17	297	10
33017.516	.05	65		1	3.0	-17	297	10
33018.43	.20	65	49	2	3.8	-17	297	10
33377.640	.02	68	51	5	3.4	-16	297	10
33384.201	.05	67	50	4	3.8	-16	297	10
33477.878	.02	67	52	5	3.4S	-17	297	10
33479.722	.05	67	52	4	3.4	-17	297	10
33819.834	.05	67	49	5	3.8	-17	296	10
34256.69	.20	67	51	2	3.4	-17	296	10
34415.513	.05	67	48	4	3.8	-17	296	10
34415.92	.20	67	51	2	3.8	-17	296	10
34420.207	.05	66	48	5	3.8	-17	296	10
34467.32	.10	67		1	3.8	-17	296	10
34468.23	.20	67	49	2	3.8	-17	296	10
34470.898	.05	62	43	4	3.0	-17	296	10
34807.14	.20	68	51	2	3.0	-17	296	10
34815.77	.20	68	51	3	2.1S	-17	296	10
34816.55	.20	67	50	2	3.0	-17	296	10
34865.91	.20	63	46	3	3.4	-17	296	10
34866.67	.20	62	45	2	3.4	-17	296	10
35111.249	.02	66	51	5	3.8	-17	296	10
35113.488	.02	66	51	4	3.4	-17	296	10
35181.396	.02	67	52	4	3.8	-16	296	10
36069.315	.02	66	51	4	3.4	-15	296	10
36071.670	.02	66	50	5	3.8	-15	296	10
37352.787	.02	66	51	5	3.0	-16	296	10
37354.811	.05	64	48	4	3.4	-16	296	10
37905.483	.05	67	52	4	3.0S	-16	296	10
37907.362	.02	67	52	5	3.8	-16	296	10
38109.91	.20	68	50	2	1.7	-16	296	10
38111.43	.20	68	51	3	2.6S	-16	296	10
38166.736	.02	64	47	5	2.6	-16	296	10
38169.359	.05	63	47	4	2.1	-16	296	10
38413.086	.02	66	51	5	3.0	-16	296	10
38415.148	.05	66	50	4	2.1	-16	296	10
39229.460	.02	66	51	5	2.1	-14	296	10
39539.955	.05	66		1	3.4	-14	296	10
39540.67	.20	65	49	2	3.8	-14	296	10
39584.694	.02	66	49	5	2.1	-14	296	10
39587.04	.20	67	50	3	2.6S	-14	297	10

NAME: 2-CHLOROPROPANE			Concluded					ID NO. 198.00
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
39591.706	.02	65	49	5	3.4	-14	297	10
39606.08	.20	67	50	4	1.7S	-14	297	10

Chlorotrifluoromethane

Formula: $CClF_3$
CAS Registry number: 75-72-9
Synonyms: Freon-13; Genetron-13; Isotron-13
NBS identification number: 20.00
Frequency range: 26 500 to 40 030 MHz

Sample: The sample source was Matheson bottled gas with a stated minimum purity of 99 percent. Gas chromatography using a Porapak N column showed impurity peaks of 0.18, 0.26, and 0.22 percent.

Remarks: The lines are relatively narrow but most suffer some asymmetry because of overlap or unresolved structure.

The scan was extended 30 MHz higher than usual since this molecule is a symmetric top and the strongest lines in this region fall just above the nominal band edge of 40 GHz.

The sample pressure of 20 millitorr was registered by a thermocouple gage as 35 millitorr.

Only the two lowest frequencies could be compared with the theoretically assigned lines in reference 4. However, further evidence of sample identity is found in the fact that all lines are clustered near the approximate frequencies of 33 and 40 GHz which are calculated by ignoring quadrupole splitting.

NAME: CHLOROTRIFLUOROMETHANE ID NO. 20.00

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
26685.214	.01	65	59	5	3.8	-14	300	19
26690.099	.05	67	59	4	2.6	-14	300	18
32515.884	.05	67	59	4	3.8	-14	300	20
33349.936	.02	65	57	5	2.1S	-17	297	20
33352.884	.02	66	58	4	2.1S	-17	297	20
33353.341	.05	66	58	2	3.4	-14	300	20
33353.912	.02	67	59	5	2.1	-14	300	20
33354.735	.05	65	57	4	3.8	-14	300	20
33355.424	.02	64	56	4	1.7	-17	298	20
33356.083	.02	63	56	4	3.8	-17	298	20
33356.371	.05	66	58	2	3.4S	-17	298	20
33357.249	.02	65	58	5	2.1S	-17	298	20
33358.711	.01	64	56	5	2.1S	-17	298	20
33361.639	.05	66	59	4	3.0S	-17	298	20
39015.942	.02	66	58	4	1.7S	-15	298	20
39017.516	.02	67	59	5	2.1S	-15	298	20
39018.059	.02	67	59	4	3.8	-13	300	20
39018.415	.02	67	59	5	1.7S	-15	298	20
39018.773	.05	65	57	4	3.8	-13	300	20
39019.258	.02	67	60	5	2.6S	-15	298	20
39019.907	.02	66	58	5	3.0S	-15	298	20
39020.778	.02	66	59	5	2.1S	-15	298	20
39953.259	.05	65	57	4	1.7S	-14	297	20
39953.997	.02	66	57	4	1.7	-14	297	20
39955.480	.01	66	59	5	3.0	-14	297	20
40020.728	.02	66	59	5	1.7S	-14	298	20
40023.437	.02	61	53	4	3.0S	-14	298	20
40024.549	.02	62	55	5	2.1S	-14	298	20
40025.398	.01	61	54	5	2.6S	-14	298	20
40025.886	.05	64	54	4	1.7	-14	298	20
40026.060	.01	62	55	4	3.8	-14	298	20
40026.538	.01	62	54	4	2.1	-14	298	20
40026.971	.05	61	52	4	3.8	-14	298	20
40027.618	.01	61	54	5	3.0S	-14	297	20
40028.465	.01	61	53	5	2.1S	-14	297	20
40029.583	.02	61	53	5	3.0S	-14	297	20

Dichlorodifluoromethane

Formula: CCl_2F_2
CAS Registry number: 75-71-8
Synonyms: Freon-12; Genetron-12; Isotron-12; Ucon-12
NBS identification number: 224.00
Frequency range: 18 000 to 40 000 MHz

Sample: The sample source was Matheson bottled gas with a stated minimum purity of 99.9 percent. Gas chromatography using a Porapak N column showed two impurity peaks of 0.1 and 0.016 percent.

Remarks: The data below 26 500 MHz do not include information on power level or Stark sensitivity. Further, the frequency and intensity calibrations are less accurate than in the higher frequency range. All lines above 26 500 MHz with $-10 \log \gamma$ of 63 or stronger have been remeasured. The peak intensities of the weaker lines were remeasured, and the frequencies were corrected by 5 kHz to account for the difference in frequency calibration standard.

The lines are relatively narrow and hard to modulate.

The sample pressure of 20 millitorr was registered by a thermocouple gage as 36 millitorr.

NAME: DICHLORODIFLUOROMETHANE ID NO. 224.00

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
18384.913	.02	68	61	5	3.8		301	17
18832.324	.02	70	62	5	2.6		301	17
19073.175	.02	72	64	4	1.7		301	17
19250.034	.02	71	63	5	3.4		300	17
19515.065	.02	69	59	5	3.0		300	17
19929.137	.02	73	65	5	2.1		300	17
19929.881	.02	71	62	5	3.0		300	17
20298.658	.02	71	60	5	3.4		300	17
20305.573	.02	71	62	5	3.0		300	17
20361.617	.02	72	65	4	2.6		300	17
20575.152	.02	69	60	5	3.8		300	17
20727.468	.02	75	67	4	2.1		300	17
20765.983	.02	71	62	4	2.6		300	17
20848.357	.02	75	67	4	3.8		300	17
20957.623	.05	71	63	3	2.1		300	17
20957.914	.05	69	60	2	3.8		300	17
20958.207	.05	72	63	2	3.8		300	17
21099.405	.05	74	66	2	1.7		300	17
21151.379	.02	75	67	4	2.1		300	17
21371.014	.05	68	58	4	3.4		298	17
21371.813	.02	70	62	4	3.4		298	17
21509.419	.02	67	59	5	3.0		298	17
21519.157	.02	71	61	4	3.0		299	17
21565.005	.02	70	63	4	2.6		299	17
22162.160	.02	70	59	4	3.8		299	17
22548.986	.05	72	65	2	3.4		299	17
22626.658	.02	73	65	5	2.1		300	17
22734.411	.02	69	58	5	3.0		300	17
22797.959	.02	72	64	4	1.7		300	17
22798.865	.02	70	61	4	3.4		300	17
22835.728	.02	68	58	5	3.8		300	17
22859.420	.02	71	63	4	3.0		300	17
22859.894	.02	69	61	5	3.4		300	17
22860.379	.02	71	63	4	3.8		300	17
22959.261	.02	69	60	5	3.4		300	17
23029.315	.02	71	59	5	3.0		300	17
23029.539	.05	73	65	2	3.0		300	17
23505.759	.05	74	63	4	3.8		300	17
23552.685	.02	69	61	5	1.7		300	17
23581.212	.02	66	58	5	3.0		300	17
23717.714	.02	72	65	4	2.1		300	17
23755.553	.02	72	64	4	3.4		300	17
23787.872	.02	72	65	5	3.0		300	17
23906.542	.05	73	64	2	3.8		300	17
23947.591	.02	69	59	4	3.8		300	17
24018.237	.02	71	63	4	3.0		300	17
24046.157	.02	70	62	5	3.8		300	17
24311.420	.05	71	62	2	3.4		300	17
24406.613	.05	73	65	3	2.6		299	17
24406.966	.02	69	61	5	3.0		299	17

NAME: DICHLORODIFLUOROMETHANE CONTINUED								ID NO. 224.00
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
24407.316	.05	73	65	2	3.8		299	17
24573.097	.02	71	64	4	1.7		299	17
24588.441	.02	67	57	5	2.6		299	17
24633.551	.02	70	59	4	3.8		299	17
24753.656	.02	72	63	4	3.0		299	17
24825.004	.02	70	60	5	3.8		300	17
24897.614	.05	72	63	3	3.8		300	17
24946.709	.02	72	63	4	3.4		300	17
25064.613	.02	71	64	5	2.6		300	17
25133.385	.02	70	62	4	2.1		300	17
25158.040	.05	72	63	2	3.8		300	17
25321.514	.02	71	64	4	3.8		300	17
25322.161	.02	70	61	4	3.8		300	17
25358.663	.02	72	64	5	3.8		300	17
25637.520	.02	67	59	4	3.4		300	17
25702.141	.05	70	62	3	3.4		300	17
25702.288	.05	70	62	2	3.8		300	17
25734.398	.02	68	59	4	3.4		300	17
25843.082	.02	72	63	4	2.1		300	17
26024.408	.05	71	62	3	3.4		300	17
26024.655	.02	69		1	3.4		300	17
26024.896	.05	71	63	2	3.4		300	17
26034.428	.02	72	64	4	3.8		299	17
26043.433	.02	72	64	4	2.1		299	17
26081.894	.02	72	63	4	3.8		299	17
26125.413	.02	72	64	5	2.6		299	17
26222.210	.02	72	63	4	3.4		299	17
26223.209	.02	70	63	4	1.7		299	17
26486.843	.05	71	61	2	2.6		299	17
26527.269	.01	64	56	5	2.1	-18	299	17
26559.85	.05	65		1	2.1	-17	294	20
26641.45	.05	66		1	2.1	-17	294	20
26739.79	.05	66		1	2.1	-17	294	20
27723.32	.05	65		1	2.1	-16	294	20
27971.114	.05	64	52	4	3.8	-17	299	17
28017.39	.05	67		1	2.1	-16	294	20
28141.39	.05	67		1	2.1	-16	294	20
28332.117	.01	64	56	5	3.4	-16	299	17
28556.469	.01	62	54	5	3.8	-17	294	20
28781.907	.02	66	56	4	3.4	-17	299	17
29204.797	.01	65	55	5	3.8	-16	299	17
29464.238	.02	66	57	4	3.4	-16	299	17
29498.897	.02	66	58	4	3.8	-16	300	17
29511.948	.01	63	54	5	3.4	-18	294	20
29570.53	.05	67		1	2.1	-18	294	20
29734.673	.05	66	55	4	3.8	-16	300	17
29798.233	.02	66	54	4	3.8	-17	300	17
29923.349	.02	66	57	4	3.4	-16	300	17
30644.28	.05	68		1	2.1	-17	294	20
30644.87	.05	66		1	2.1	-17	294	20

NAME: DICHLORODIFLUOROMETHANE CONTINUED								ID NO. 224.00
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
30679.920	.02	65	55	4	2.6	-17	300	17
30956.52	.05	67		1	2.1	-17	294	20
30992.702	.05	65	53	4	2.1	-17	300	17
31041.229	.01	62	54	5	3.4	-17	294	20
31398.033	.01	63	55	5	3.4	-18	294	20
31447.255	.02	66	58	4	2.1	-17	300	17
31511.071	.05	67	55	4	3.0	-17	300	17
31842.66	.05	69		1	2.1	-18	294	20
31879.002	.02	64	53	4	3.4	-16	300	17
31986.010	.05	67	58	4	2.1	-16	300	17
32047.014	.02	68	60	5	3.4	-16	300	17
32047.903	.02	66	59	4	2.1	-16	300	17
32107.433	.02	69	61	4	3.0	-16	300	17
32357.048	.02	65	52	4	3.8	-16	300	17
32357.291	.05	66	58	2	3.4	-16	300	17
32420.820	.02	66	56	4	3.8	-16	300	17
32544.081	.02	66	58	4	1.7	-16	300	17
32544.800	.02	66	58	4	2.6	-16	300	17
32577.911	.05	67	59	2	3.8	-16	300	17
32614.109	.02	65	54	4	2.6	-16	300	17
32899.770	.02	65	53	4	3.4	-16	300	17
32979.647	.02	66	59	4	1.7	-16	300	17
33108.209	.02	66	57	4	3.8	-16	300	17
33146.408	.01	66	56	5	3.4	-16	300	17
33387.504	.01	62	53	5	3.8	-17	295	20
33440.187	.02	66	58	4	2.1	-16	300	17
33762.861	.01	62	54	5	3.8	-17	295	20
33907.748	.05	66	57	4	2.1	-16	300	17
33922.77	.05	67		1	2.1	-17	294	20
33923.48	.05	66		1	2.1	-17	294	20
34338.043	.02	62	53	4	2.6	-17	295	20
34423.515	.05	72	66	5	2.1	-15	300	17
34453.884	.01	66	58	5	2.6	-15	300	17
34457.232	.02	67	58	4	2.6	-15	300	17
34501.568	.02	68	59	4	3.4	-15	300	17
34578.818	.02	64	53	4	3.8	-15	300	17
34600.555	.05	67	59	4	2.1	-15	300	17
34782.798	.02	66	57	4	2.1	-15	300	17
34786.327	.02	66	58	4	2.6	-15	300	17
34895.625	.02	66	58	4	3.4	-15	300	17
34928.739	.02	65	57	4	1.7	-15	300	17
34963.863	.02	68	55	5	3.4	-15	300	17
35021.378	.05	65	55	4	3.8	-15	300	17
35021.606	.05	68	59	2	3.8	-15	300	17
35174.945	.02	66	58	4	3.8	-15	300	17
35216.446	.02	66	56	4	3.8	-15	300	17
35279.205	.02	65	56	5	3.4	-15	300	17
35285.35	.05	68		1	2.1	-18	295	20
35291.265	.01	62	51	4	3.8	-17	295	20
35473.70	.05	67		1	2.1	-17	295	20

NAME: DICHLORODIFLUOROMETHANE CONTINUED ID NO. 224.00

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
35484.555	.02	65	55	4	3.0	-15	300	17
35893.057	.02	65	53	5	3.4	-15	300	17
35912.343	.01	66	58	5	3.8	-15	300	17
36017.735	.02	65	57	4	2.1	-16	300	17
36172.706	.02	64	56	4	3.0	-16	300	17
36220.42	.05	66		1	2.1	-15	295	20
36226.717	.02	66	59	4	2.6	-16	300	17
36346.11	.05	66		1	2.1	-15	295	20
36411.230	.02	66	57	4	2.6	-16	300	17
36412.52	.05	68		1	2.1	-15	295	20
36440.06	.05	67		1	2.1	-15	295	20
36478.59	.05	66		1	2.1	-15	295	20
36494.970	.01	61	53	5	3.8	-15	295	20
36595.56	.05	67		1	2.1	-15	295	20
36603.85	.05	67		1	2.1	-15	295	20
36771.368	.02	64	51	4	3.0	-15	293	15
36867.893	.02	65	57	4	2.1	-16	300	17
37000.66	.05	67		1	2.1	-15	295	20
37042.76	.05	68		1	2.1	-15	295	20
37149.73	.05	65		1	2.1	-15	295	20
37150.91	.05	67		1	2.1	-15	295	20
37300.553	.02	62	51	4	3.8	-16	294	20
37325.45	.05	67		1	2.1	-16	294	20
37332.42	.05	68		1	2.1	-16	294	20
37348.59	.05	67		1	2.1	-16	294	20
37349.89	.05	66		1	2.1	-16	294	20
37350.74	.05	68		1	2.1	-16	294	20
37437.616	.01	65	55	5	3.4	-16	300	17
37613.56	.05	68		1	2.1	-16	294	20
37691.612	.02	65	54	4	3.4	-17	300	17
37722.819	.02	65	56	4	2.6	-17	300	17
37723.04	.05	67		1	2.1	-15	294	20
37809.28	.05	66		1	2.1	-16	294	20
37828.45	.05	66		1	2.1	-16	294	20
37927.585	.02	65	57	4	2.6	-16	300	17
38039.457	.01	62	53	4	3.8	-16	294	20
38071.316	.02	66	57	4	2.6	-16	300	17
38124.607	.01	63	54	5	3.4	-16	294	20
38143.018	.01	62	53	4	3.8	-16	294	20
38184.553	.02	65	58	4	2.6	-16	300	17
38367.149	.02	66	59	4	3.0	-16	300	17
38515.741	.02	68	58	4	2.1	-14	299	17
38595.219	.02	68	60	4	2.1	-14	299	17
38738.209	.02	70	65	5	2.1	-14	299	17
38970.44	.05	67		1	2.1	-15	294	20
39098.139	.01	64	55	5	3.0	-15	299	17
39125.53	.05	65		1	2.1	-14	294	20
39225.07	.05	66		1	2.1	-14	294	20
39235.598	.01	61	53	5	3.8	-15	294	20
39245.57	.05	66		1	2.1	-15	294	20

NAME: DICHLORODIFLUOROMETHANE Concluded ID NO. 224.00

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
39335.78	.05	65		1	2.1	-14	294	20
39355.55	.05	66		1	2.1	-14	294	20
39457.57	.05	66		1	2.1	-14	294	20
39552.59	.05	68		1	2.1	-14	294	20
39553.19	.05	66		1	2.1	-14	294	20
39643.23	.05	66		1	2.1	-14	295	20
39824.59	.05	68		1	2.1	-14	295	20
39870.19	.05	66		1	2.1	-14	295	20
39980.84	.05	66		1	2.1	-14	295	20
39992.63	.05	66		1	2.1	-14	295	20

1,1-Dichloroethane

Formula: CH_3CHCl_2
CAS Registry number: 75-34-3
Synonym: ethylidene chloride
NBS identification number: 85.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Eastman P135. Gas chromatography using a Chromosorb 102 column showed impurity peaks of 0.01, 0.03, and 0.21 percent.

Remarks: Most of the lines observed were actually groups of unresolved or partially resolved fine structure components. The line widths therefore were either not measured or were unusually broad. In some cases there were partially resolved lines which had intensities below the sensitivity threshold. In such a case only the stronger center line is measured, and the width of the set is measured.

The sample pressure of 12 millitorr was registered by a thermocouple gage as 35 millitorr.

NAME: 1,1-DICHLOROETHANE								ID NO. 85.00
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
26767.521	.05	68	50	4	2.1	-17	298	12
26780.45	.10	67	52	3	3.0	-17	298	12
26781.63	.20	64	49	3	3.8	-18	298	12
26782.80	.20	67	51	2	3.4S	-18	298	12
26845.22	.20	63	45	2	1.7	-18	298	12
26939.844	.05	64	46	4	2.1	-18	298	12
27204.15	.10	67	49	4	3.0S	-17	298	12
27237.16	.20	64	48	3	3.8	-17	298	12
27237.79	.10	63		1	1.7	-17	298	12
27244.490	.05	62	44	5	3.8	-17	298	12
27332.509	.05	68	50	5	2.1	-17	298	12
27792.784	.05	66	50	4	3.8S	-17	298	12
28152.089	.05	65	47	5	3.8	-17	298	12
28227.064	.05	66	49	4	3.0	-17	298	12
28294.79	.20	68	51	3	3.4	-17	298	12
28589.486	.05	66	51	4	2.1	-18	298	12
28692.540	.05	63	45	4	2.1	-18	298	12
28861.71	.20	66	50	3	3.8	-18	298	12
28862.56	.10	65		1	3.4S	-18	298	12
28863.35	.20	67	51	2	3.0	-18	298	12
28927.21	.20	65	47	2	2.1	-18	297	12
29076.74	.10	67	50	4	3.4	-18	297	12
29230.37	.20	63	44	2	3.8	-18	297	12
29283.435	.05	67	51	4	1.7	-18	297	12
29627.198	.05	65	47	4	3.0	-18	297	12
29798.05	.20	63	47	3	3.8	-18	297	12
29798.71	.10	61		1	3.8	-18	297	12
29915.072	.05	67	48	5	3.0	-18	296	12
30076.714	.05	67	48	5	3.4	-18	296	12
30258.59	.20	64	46	3	2.1	-17	296	12
30260.92	.20	67	52	2	3.0	-17	296	12
30391.201	.05	65	46	5	3.8	-17	296	12
30391.83	.20	67	51	2	3.0	-17	296	12
30412.002	.05	67	49	4	2.6	-17	296	12
30482.99	.20	65	50	3	3.8S	-17	296	12
30483.93	.20	62	46	2	3.8	-17	296	12
30484.87	.20	65	49	2	3.8	-17	296	12
30498.599	.02	60.4	42.7		3.4	-17	296	12
30632.01	.20	66	48	2	3.4	-17	296	12
30679.88	.10	67		1	1.7	-17	296	12
30680.77	.20	68	51	2	2.1	-16	296	12
30782.826	.02	62	45	5	3.0	-17	296	12
30876.851	.05	65	47	4	1.7	-17	296	12
30881.94	.10	64	47	4	3.0S	-17	296	12
30939.150	.02	59.9	42.1		1.7	-18	296	12
31149.902	.02	66	48	5	1.7	-18	296	12
31191.847	.02	62	45	5	2.1	-18	297	12
31274.286	.02	67	52	5	2.1	-18	297	12
31293.759	.05	68	50	4	3.4	-18	297	12
31352.724	.05	66	48	5	3.0	-18	297	12

NAME: 1,1-DICHLOROETHANE CONTINUED								ID NO. 85.00
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
31454.311	.05	65	48	4	2.1	-18	297	12
31620.48	.10	65		1	3.8	-18	297	12
31621.05	.10	65		1	3.8	-18	297	12
31664.88	.20	68	51	3	2.1S	-18	297	12
31733.073	.05	60.2	42.3		3.0	-18	297	12
31797.86	.20	65	49	3	3.8	-18	297	12
31798.86	.20	63	46	2	3.8	-18	297	12
31799.88	.20	66	49	2	3.0	-18	297	12
31817.952	.05	66	48	4	2.1	-18	298	12
31930.57	.20	65	50	3	2.1	-18	298	12
31931.843	.05	64	48	4	2.1	-18	298	12
31933.15	.20	67	51	2	1.7	-18	298	12
32116.27	.20	68	52	3	1.7	-18	298	12
32118.19	.10	62		1	2.1	-18	298	12
32120.324	.05	61	43	4	3.4	-19	298	12
32600.304	.05	68	51	5	2.1	-18	298	12
32948.587	.05	65	48	4	1.7	-17	298	12
32966.51	.10	67	53	3	2.1	-17	298	12
32967.42	.20	65	49	2	1.7	-17	298	12
32968.32	.10	67	52	2	2.1	-17	298	12
32975.413	.05	67	50	5	2.6S	-17	298	12
32977.356	.02	65	49	5	3.0	-17	298	12
33015.41	.20	66	51	3	1.7	-17	298	12
33017.09	.20	65	49	3	2.6	-17	298	12
33018.66	.20	64	48	2	2.1	-17	298	12
33020.38	.20	66	49	3	3.0	-17	298	12
33022.50	.20	62	45	2	3.0	-17	298	12
33239.778	.05	67	49	4	3.8	-17	297	12
33268.355	.05	59.8	41.4		3.4	-17	297	12
33325.943	.05	64	47	5	2.1	-17	297	12
33395.324	.05	65	47	5	1.7	-17	297	12
33528.24	.20	68	51	3	2.1	-17	297	12
33576.002	.02	66	48	5	2.1	-17	297	12
33584.32	.10	68	51	4	3.8	-17	296	12
33611.244	.05	68	51	4	2.1	-17	296	12
33651.01	.20	68	51	3	1.7	-17	296	12
33656.018	.05	63	46	4	3.0	-17	296	12
33719.32	.20	65	50	3	3.0	-17	296	12
33720.19	.10	64		1	3.0	-17	296	12
33721.13	.20	65	48	2	3.0	-17	296	12
33810.834	.05	66	50	4	2.1	-17	296	12
33855.137	.05	68	51	4	2.6	-17	296	12
33915.081	.05	67	51	4	1.7	-18	296	12
33916.817	.02	64	48	5	1.7	-18	296	12
33918.57	.20	67	51	2	1.7	-18	296	12
33929.521	.05	68	51	4	2.1	-18	296	12
33984.901	.05	62	45	4	3.4	-18	296	12
34004.23	.10	67		1	3.8S	-18	296	12
34013.31	.10	60		1	2.1	-18	296	12
34014.04	.20	63	47	2	3.8	-18	296	12

NAME: 1,1-DICHLOROETHANE			CONTINUED					ID NO. 85.00
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
34081.41	.20	68	52	3	2.1	-18	296	12
34083.44	.20	67	50	3	2.1	-18	296	12
34139.097	.05	67	51	4	1.7	-17	296	12
34140.928	.05	64	49	4	2.1	-17	296	12
34142.818	.05	67	51	4	2.1	-17	296	12
34165.25	.20	63	48	3	3.8	-17	296	12
34258.19	.20	64	46	3	2.6	-17	296	12
34259.75	.10	65		1	3.0	-17	296	12
34326.99	.20	66	51	3	3.0	-17	296	12
34328.314	.02	63	47	5	3.0	-17	296	12
34329.65	.20	65	50	2	2.1	-17	296	12
34377.90	.20	67	51	3	3.8	-17	296	12
34378.68	.10	66		1	3.8	-17	296	12
34379.42	.20	66	49	2	3.0	-17	296	12
34465.52	.20	66	49	2	2.1	-17	296	12
34469.995	.02	65	48	5	3.0	-17	296	12
34505.84	.20	67	50	2	1.7	-17	296	12
34524.167	.02	64	47	5	3.0	-17	296	12
34557.607	.05	65	48	4	2.1	-17	296	12
34567.779	.02	67	50	5	2.6	-17	296	12
34575.599	.02	58.5	41.3		3.0	-17	296	12
34604.923	.02	67	51	5	1.7	-17	297	12
34627.231	.02	58.1	40.7		1.7	-17	297	12
34692.391	.02	60.3	43.5		3.0	-17	297	12
34707.403	.05	65	48	4	3.0	-17	297	12
34811.015	.05	66	51	4	3.4	-17	297	12
34847.966	.02	64	47	5	2.1	-17	297	12
34853.78	.20	66	50	2	3.4	-17	297	12
35075.923	.05	65	50	4	3.0	-17	297	12
35171.143	.02	66	48	5	2.6	-17	297	12
35172.55	.20	68	51	2	3.0	-17	297	12
35225.408	.05	65	47	4	2.1	-17	297	12
35272.312	.02	61	43	5	2.6	-17	297	12
35309.798	.05	67	50	4	2.1	-17	297	12
35338.953	.05	65	48	4	2.6	-17	295	12
35340.16	.20	67	51	2	2.1	-17	295	12
35381.90	.20	66	50	3	2.1	-17	296	12
35383.494	.02	63	47	5	1.7S	-17	296	12
35385.10	.20	66	50	2	1.7	-17	296	12
35480.44	.10	66		1	3.8	-17	296	12
35511.647	.05	67	51	4	2.1	-17	297	12
35514.274	.05	67	50	5	3.8	-17	297	12
35551.200	.02	66	49	5	2.1	-17	297	12
35558.461	.02	60.3	43.1		3.0	-17	297	12
35618.070	.05	67	49	5	1.7	-17	297	12
35624.40	.20	67	51	3	3.0	-17	298	12
35625.43	.10	65		1	3.0	-17	298	12
35626.75	.20	67	52	2	2.6	-17	298	12
35637.380	.02	60.5	43.8		3.0	-17	298	12
35733.051	.02	62	44	5	3.8	-17	298	12

NAME: 1,1-DICHLORDETHANE CONTINUED ID NO. 85.00

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
35773.190	.02	64	47	5	2.1	-16	298	12
35800.46	.20	66	50	2	3.8	-16	298	12
35809.76	.20	63	48	3	2.1	-16	298	12
35810.73	.20	61	44	2	3.0	-16	298	12
35811.71	.20	63	48	2	3.4	-16	298	12
35815.924	.05	66	49	4	3.4	-16	298	12
36063.63	.20	67	52	2	3.8	-16	298	12
36120.262	.02	66	49	5	3.0	-16	298	12
36175.818	.05	67	50	4	2.1	-16	298	12
36194.665	.05	66	51	4	3.8	-16	298	12
36256.058	.02	58.7	41.3		3.8	-16	298	12
36332.785	.02	64	47	5	3.0	-16	298	12
36388.137	.05	66	50	4	3.8	-16	298	12
36389.835	.02	64	48	5	3.4	-16	298	12
36391.546	.05	66	50	4	3.8	-16	298	12
36536.14	.20	67	48	3	2.1	-16	298	12
36626.817	.05	67	50	5	3.0S	-16	298	12
36644.778	.05	65	48	4	3.8	-16	298	12
36678.176	.02	58.3	40.7		3.8	-16	298	12
36717.72	.10	66		1	2.1	-16	298	12
36718.12	.20	66	49	2	2.1	-16	299	12
36719.42	.20	68	53	2	2.1	-16	299	12
36725.632	.02	67	51	5	2.1	-16	299	12
36806.823	.02	64	46	5	2.1	-16	299	12
36920.39	.20	68	51	3	3.8	-16	299	12
36958.20	.20	64	47	3	3.8	-16	299	12
36959.04	.10	64		1	2.1	-16	299	12
36959.72	.20	64	47	2	2.1	-16	299	12
36983.664	.02	65	49	5	3.8	-16	298	12
37010.884	.05	64	47	5	3.8S	-16	298	12
37061.64	.20	68	52	2	2.1	-16	298	12
37140.08	.20	61	42	3	3.0	-16	298	12
37140.86	.20	63	48	2	2.6	-16	298	12
37170.578	.02	64	48	5	2.1	-16	298	12
37190.994	.02	66	51	5	3.0	-16	297	12
37223.10	.10	67		1	3.8	-16	297	12
37272.560	.05	63	48	4	3.8	-16	297	12
37274.361	.05	65	48	4	3.8	-16	297	12
37355.32	.20	68	49	3	1.7	-16	297	12
37398.083	.02	66	48	5	2.1	-16	297	12
37403.987	.02	59.0	40.8		3.0	-16	297	12
37409.10	.20	66	50	3	3.4	-16	297	12
37410.593	.05	63	47	4	3.8	-16	297	12
37412.154	.05	65	50	4	3.8	-16	297	12
37445.99	.20	66	50	3	2.1	-16	297	12
37447.40	.20	67	51	2	2.6	-16	297	12
37455.455	.02	66	49	5	2.6	-16	297	12
37470.57	.20	65	49	3	1.7	-16	297	12
37471.881	.02	62	47	5	2.1	-16	297	12
37473.17	.20	64	49	2	2.1	-16	297	12

NAME: 1,1-DICHLOROETHANE CONTINUED								ID NO. 85.00
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
37500.642	.05	63	47	4	2.1	-17	297	12
37576.860	.02	65	50	4	2.1	-17	297	12
37663.740	.02	66	50	5	2.1	-17	297	12
37674.685	.02	62	46	4	1.7	-17	297	12
37698.906	.05	64	46	4	3.8	-17	297	12
37813.869	.02	64	46	5	3.4	-17	297	12
37839.37	.20	66	50	3	1.7S	-17	297	12
37850.817	.05	64	49	4	2.1	-17	297	12
37852.96	.20	67	51	2	2.1	-17	298	12
37993.074	.05	60	43	4	3.8	-17	298	12
38052.347	.05	67	50	4	2.1	-17	298	12
38140.88	.20	66	50	3	1.7	-17	298	12
38142.31	.20	66	49	3	1.7	-17	298	12
38143.961	.02	63	47	5	1.7	-17	298	12
38145.672	.05	66	50	4	1.7	-17	298	12
38152.07	.20	67	49	3	1.7	-16	298	12
38164.364	.02	64	47	5	2.1	-17	298	12
38235.33	.20	66	50	3	2.1	-16	298	12
38237.870	.02	63	46	5	3.0	-16	298	12
38254.11	.10	67	50	4	3.0S	-16	298	12
38280.389	.05	63	46	4	2.1	-16	298	12
38289.485	.05	61	45	4	3.4	-16	298	12
38322.144	.02	57.5	40.7		2.1	-16	298	12
38363.78	.20	66	49	3	1.7S	-16	298	12
38366.121	.05	60	42	4	2.6	-16	298	12
38372.705	.02	65	49	5	2.6	-16	298	12
38437.126	.02	60.4	43.9		1.7	-16	298	12
38474.70	.20	65	49	2	3.0	-16	298	12
38547.032	.02	63	46	5	1.7	-16	298	12
38560.092	.05	65	50	4	3.8S	-16	298	12
38562.688	.05	64	46	4	3.8	-16	298	12
38581.300	.05	67	49	4	1.7	-16	298	12
38583.853	.05	66	49	4	2.1	-16	298	12
38609.047	.05	66	49	4	1.7	-16	298	12
38683.72	.20	64	49	3	3.4	-16	298	12
38684.36	.10	62		1	3.4	-16	299	12
38689.729	.02	57.2	40.3		3.0	-16	299	12
38694.952	.02	58.9	42.6		3.8	-16	299	12
38734.98	.20	65	48	2	2.6	-16	299	12
38773.08	.20	67	49	2	1.7S	-16	299	12
38797.937	.05	65	49	4	3.0	-16	299	12
38812.05	.20	66	49	3	1.7	-16	299	12
38814.04	.20	60	45	3	2.1	-16	299	12
38815.89	.20	66	49	2	2.6	-16	299	12
38830.261	.02	62	47	4	3.4	-16	298	12
38843.886	.02	65	49	5	3.4	-16	298	12
38920.684	.02	67	50	5	2.6	-15	298	12
38948.60	.20	68	50	3	1.7	-15	298	12
38975.65	.20	66	47	3	2.1	-15	298	12
38977.36	.20	64	47	2	2.1	-15	298	12

NAME: 1,1-DICHLORDETHANE			CONTINUED					ID NO. 85.00
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
38980.311	.05	65	49	4	2.1	-15	298	12
38998.669	.02	65	50	5	2.6	-15	298	12
39039.930	.02	59.1	42.4		3.0	-15	297	12
39127.01	.20	60	44	3	3.8	-15	297	12
39141.422	.05	65	50	4	3.0	-15	297	12
39142.79	.20	67	51	3	2.6S	-15	297	12
39195.199	.05	66	51	4	3.8	-15	298	12
39196.91	.20	67	51	2	3.8	-15	298	12
39273.861	.05	65	50	4	3.8	-15	298	12
39300.502	.05	64	46	4	3.8	-15	298	12
39306.55	.20	65	48	3	3.8	-15	298	12
39307.53	.10	64		1	3.8	-15	298	12
39308.44	.10	65	50	2	2.6	-15	298	12
39326.563	.05	65	48	4	1.7	-15	298	12
39327.83	.20	66	51	2	1.7S	-15	298	12
39360.91	.10	67	52	3	2.6	-15	298	12
39362.235	.02	65	49	5	1.7	-15	298	12
39387.859	.02	67	54	4	3.8	-15	298	12
39409.288	.02	67	51	5	3.4	-15	298	12
39426.93	.10	68		1	2.1S	-15	298	12
39469.53	.10	65		1	2.1	-15	298	12
39471.56	.20	62	46	3	3.8	-14	295	12
39472.37	.10	60		1	3.0	-14	295	12
39473.17	.20	62	47	2	3.0	-14	295	12
39545.906	.05	66	51	4	1.7	-14	296	12
39667.743	.05	65	49	4	1.7	-14	296	12
39710.31	.20	68	50	2	2.6	-14	296	12
39772.88	.10	64		1	3.4	-14	297	12
39773.43	.20	66	48	2	3.4S	-14	297	12
39775.09	.20	68	52	2	2.1	-14	297	12
39778.091	.05	67	51	4	1.7S	-14	297	12
39800.58	.20	64	45	3	3.4	-14	297	12
39801.38	.20	66	50	2	3.8S	-15	298	12
39851.08	.20	67	52	3	2.1	-14	298	12
39852.728	.05	66	48	5	2.1	-14	298	12
39854.10	.10	67		1	2.1	-14	298	12
39871.208	.02	65	48	5	3.0	-15	298	12
39872.39	.20	67	51	2	2.6S	-15	298	12
39914.696	.05	65	48	4	3.4	-15	298	12
39923.50	.20	67	52	3	2.6	-15	298	12
39924.86	.20	66	50	3	3.0	-15	298	12
39941.502	.05	64	49	4	2.6	-15	298	12
39956.63	.20	63	48	3	3.0	-15	298	12
39957.970	.02	62	46	5	3.0	-15	298	12
39959.33	.20	63	47	2	2.6	-14	295	12
39971.67	.20	66	50	3	3.8	-14	296	12
39972.88	.20	64	48	3	2.1S	-14	296	12
39974.11	.10	65		1	2.1	-14	296	12
39978.14	.20	65	49	3	2.1	-14	296	12
39979.562	.02	62	46	5	2.6	-14	297	12

NAME: 1,1-DICHLORDETHANE Concluded ID NO. 85.00

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
39980.00	.20	65	49	2	2.6	-14	297	12
39993.50	.20	67	52	3	1.7	-14	297	12

1,2-Dichloroethane

Formula: CH_2ClCH_2Cl
CAS Registry number: 107-06-2
Synonyms: ethylene chloride; ethylene dichloride
NBS identification number: 600.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Fisher E-175. Gas chromatography using a Chromosorb 102 column showed impurity peaks of 0.02 and 0.15 percent.

Remarks: Some of the measured line widths are unusually broad because of unresolved or partially resolved fine structure.

The sample pressure of 12 millitorr was measured by a thermocouple gage as 35 millitorr.

The microwave power level was slightly higher than normal in order to provide a small increase in sensitivity.

NAME: 1,2-DICHLORDETHANE								ID NO. 600.00
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
27973.340	.02	68	55	5	2.1	-16	298	10
29337.704	.02	68	54	4	1.7	-17	297	10
29737.672	.02	65	51	4	2.1	-17	297	10
29787.669	.01	63	49	5	2.1	-17	297	10
29847.572	.05	68	50	4	1.7	-17	297	10
29884.604	.02	66	52	4	1.7	-17	297	10
30026.861	.02	66	52	4	2.1	-17	298	10
30221.613	.01	65	52	5	3.0	-17	298	10
30276.083	.02	67	53	4	1.7	-17	298	10
30366.187	.02	68	54	5	1.7S	-17	298	10
30635.748	.02	66	52	4	3.0	-17	298	10
30637.43	.10	67	52	2	3.0	-17	298	10
30728.839	.02	67	53	4	3.8	-17	298	10
30827.39	.10	69	55	3	1.7	-17	298	10
30912.650	.02	67	54	5	1.7	-17	298	10
31129.615	.05	68	54	4	3.0S	-17	298	10
31540.635	.05	68	53	4	1.7	-18	298	10
31640.182	.02	66	52	4	3.0	-18	298	10
31737.680	.02	68	55	5	3.8	-18	298	10
32141.485	.05	66	51	4	2.6S	-18	298	10
32271.586	.02	67	53	4	2.1	-18	298	10
32616.190	.02	68	55	5	3.4	-17	297	10
32987.131	.02	68	53	4	3.8	-17	297	10
33054.79	.20	68	52	2	3.0S	-17	297	10
33057.970	.02	66	51	4	3.8	-17	297	10
33061.125	.05	69	54	4	2.6S	-17	297	10
33569.744	.02	67	53	5	2.6	-16	297	10
33640.999	.02	67	53	5	3.8	-17	296	10
33904.367	.02	67	54	4	1.7	-17	296	10
34120.864	.02	68	54	4	3.4	-17	296	10
34721.885	.02	68	55	5	1.7S	-17	296	10
34742.796	.02	67	54	4	2.1	-17	296	10
34897.872	.02	65	51	5	2.6	-17	296	10
35007.015	.02	68	54	5	1.7	-17	296	10
35034.978	.05	67	53	4	3.8S	-17	296	10
35217.999	.05	66	51	4	2.1	-16	296	10
35252.876	.02	68	54	4	3.8	-17	296	10
35645.381	.02	67	54	4	2.1	-16	296	10
35773.174	.02	66	53	4	3.8	-16	296	10
36212.291	.02	68	54	4	3.8	-15	296	10
36250.148	.05	68	51	4	3.8S	-15	296	10
36448.089	.02	67	53	5	1.7	-15	296	10
36564.209	.02	66	53	4	1.7	-15	296	10
36862.168	.02	68	54	5	2.1	-15	296	10
36891.712	.02	67	53	5	2.6	-15	296	10
37153.361	.02	68	52	5	3.8	-15	296	10
37157.800	.02	65	51	5	3.4	-15	296	10
37162.305	.02	65	49	5	3.0	-16	296	10
37195.935	.02	68	54	5	1.7	-15	296	10
37279.472	.02	68	54	5	3.8	-15	296	10

NAME: 1,2-DICHLOROETHANE CONTINUED								ID NO. 600.00
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
37290.356	.02	68	53	5	3.8	-16	296	10
37374.037	.05	66	49	4	3.8	-16	296	10
37413.393	.02	67	52	5	1.7	-16	296	10
37511.814	.05	67	54	4	3.0	-16	296	10
37874.180	.02	66	52	4	3.0	-16	297	10
37938.023	.01	66	53	5	2.6	-16	297	10
37973.314	.05	68	52	4	3.4	-17	297	10
37975.066	.05	66	52	4	2.1	-16	297	10
38177.895	.02	66	53	5	3.4	-16	297	10
38205.361	.02	68	55	5	3.0	-16	297	10
38303.323	.02	68	52	4	2.1	-16	297	10
38498.864	.05	67	53	4	2.6	-16	297	10
38522.994	.05	67	53	5	1.7S	-16	297	10
38679.951	.02	67	54	4	3.8	-15	297	10
39141.301	.02	68	54	4	2.1	-15	297	10
39185.57	.10	66	51	4	2.1S	-15	297	10
39192.356	.02	67	54	4	3.4	-15	297	10
39233.201	.02	68	54	5	3.8	-14	297	10
39300.355	.02	62	48	5	2.1	-14	297	10
39306.518	.02	67	53	5	3.4	-14	297	10
39334.228	.02	66	52	5	2.6S	-14	298	10
39375.301	.02	61	45	4	2.1	-14	298	10
39388.100	.05	66	52	4	3.0	-14	298	10
39420.809	.02	65	47	5	1.7	-14	298	10
39421.26	.10	67	53	2	1.7	-14	298	10
39455.210	.05	62	46	4	1.7	-14	298	10
39499.398	.02	66	53	4	1.7	-14	298	10
39569.023	.02	65	50	5	1.7	-14	298	10
39569.67	.10	67	54	2	3.0	-14	298	10
39574.720	.02	67	52	4	2.6	-14	298	10
39680.96	.10	65	51	3	2.1	-14	298	10
39681.782	.02	62	48	4	2.1	-14	297	10
39682.64	.10	65	51	2	2.1	-14	298	10
39802.45	.10	66	52	2	2.1	-14	297	10
39812.854	.02	69	52	5	2.1	-14	297	10
39818.25	.10	68	52	4	2.1S	-14	297	10
39823.238	.02	65	51	4	2.6	-14	296	10
39858.043	.02	67	53	4	1.7	-14	296	10
39865.485	.05	68	54	4	2.1S	-14	296	10
39875.120	.02	65	51	5	2.1S	-14	296	10
39892.13	.20	67	50	2	3.8	-14	296	10
39894.794	.02	67	54	4	3.0	-14	296	10
39955.971	.02	65	51	4	1.7	-14	296	10
39957.078	.02	63	48	5	1.7	-14	296	10
39958.240	.01	61	47	5	1.7	-14	296	10
39988.944	.05	67	50	4	2.6	-14	296	10
39989.34	.10	69	55	2	2.6	-14	296	10
39957.077	.02	63	48	5	1.7	-14	296	10
39958.238	.02	61	47	5	1.7	-14	296	10
39680.95	.10	65	51	3	2.1	-14	296	10

NAME: 1,2-DICHLOROETHANE			Concluded					ID NO. 600.00
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
39681.780	.02	63	48	4	2.1	-14	297	10
39682.64	.10	66	51	2	2.15	-14	297	10

cis 1,2-Dichloroethene

Formula: HClC:CHCl
CAS Registry number: 540-59-0
Synonyms: 1,2-dichloroethylene; acetylene dichloride
NBS identification number: 141.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Eastman 7082. Chromatography using a Chromosorb 102 column showed impurity peaks of 0.026 and 1.3 percent, and an overlapping peak of 23.0 percent which may have been the transisomer. The sample was purified by chromatography using a Chromosorb 102 column before use.

Remarks: This is an exceptionally rich spectrum. Many of the observed lines are broadened and distorted by unresolved hyperfine structure.

The sample pressure of 10 millitorr was registered by a thermocouple gage as 25 millitorr.

NAME: CIS 1,2-DICHLOROETHENE								ID NO. 141.00
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
26588.95	.20	68	53	3	3.0S	-17	296	10
26590.06	.10	68	53	2	3.4	-17	297	10
26599.088	.05	68	50	5	2.6	-17	297	10
26662.286	.02	67	51	5	2.1	-17	297	10
26753.183	.05	68	52	4	2.1	-17	297	10
26855.137	.02	64	47	5	1.7	-17	297	10
26892.989	.02	66	50	4	1.7	-17	297	10
26900.927	.02	66	50	4	1.7	-17	297	10
26919.007	.02	66	51	5	2.1	-17	297	10
26939.243	.05	65	49	4	3.8	-17	297	10
26969.558	.02	67	53	4	3.4	-12	297	10
26982.518	.02	67	51	5	3.4	-17	297	10
27004.010	.02	65	49	5	1.7	-17	297	10
27015.150	.02	68	52	5	1.7	-17	297	10
27086.885	.05	66	50	4	2.6	-17	297	10
27090.908	.02	65	48	5	3.0	-17	298	10
27159.217	.02	66	53	4	1.7	-17	298	10
27164.646	.01	61	48	5	3.8	-17	298	10
27170.103	.05	67	53	4	3.8	-17	298	10
27208.651	.05	67	52	5	3.0S	-17	298	10
27231.82	.20	68	53	3	2.1S	-17	298	10
27235.20	.20	65	49	2	1.7S	-17	298	10
27237.114	.05	65	52	4	2.1	-17	298	10
27311.30	.10	67	52	2	1.7	-17	298	10
27313.33	.10	66	52	3	1.7S	-17	298	10
27318.842	.02	63	47	5	3.0	-17	297	10
27394.90	.10	68	53	3	1.7	-17	297	10
27395.558	.05	66		1	2.1S	-17	297	10
27396.22	.10	68	53	2	1.7	-17	297	10
27430.56	.10	68	53	3	1.7	-17	297	10
27438.565	.05	68	50	5	1.7S	-17	297	10
27671.079	.05	67	49	4	2.1	-16	297	10
27746.543	.05	66	48	5	1.7S	-16	297	10
27747.09	.20	68	54	2	1.7S	-16	297	10
27807.644	.05	64	47	4	3.0	-16	296	10
28040.157	.02	63	49	5	2.1	-16	296	10
28080.99	.20	67	51	3	3.8	-16	296	10
28110.836	.05	66	48	4	2.1	-16	296	10
28111.30	.10	68	53	2	3.0	-17	296	10
28316.86	.20	64	47	2	3.0	-17	296	10
28318.381	.05	68	53	4	2.1S	-17	296	10
28321.06	.10	68	52	4	2.6	-17	296	10
28362.689	.05	67	53	4	2.1S	-17	296	10
28448.960	.05	67	50	4	3.4	-17	296	10
28459.61	.20	67	51	3	3.8	-17	296	10
28460.106	.05	67		1	3.0	-17	296	10
28460.578	.05	66		1	3.0	-17	296	10
28460.98	.10	68	53	2	3.0	-17	296	10
28721.31	.10	69	54	3	3.8	-17	296	10
28726.16	.10	68	53	3	3.8	-17	296	10

NAME: CIS 1,2-DICHLOROETHENE			CONTINUED					ID NO. 141.00
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
28727.53	.10	67	52	4	3.8	-17	296	10
28732.37	.10	67	52	2	3.8	-18	296	10
28776.70	.20	67	50	2	2.1S	-18	296	10
28781.12	.20	66	48	2	2.1	-17	296	10
28840.23	.20	65	48	3	2.6	-17	296	10
28841.07	.20	65	48	2	2.1	-17	296	10
28875.341	.02	67	52	5	3.0	-17	296	10
29063.878	.05	67	50	4	3.8	-17	296	10
29090.778	.02	67	51	5	2.1	-17	296	10
29186.986	.05	68	52	4	2.6S	-17	296	10
29302.77	.20	67	50	2	2.6	-17	297	10
29330.938	.02	68	52	5	3.0	-17	297	10
29338.546	.02	67	50	5	2.1	-17	297	10
29371.962	.02	67	49	5	3.0	-17	297	10
29374.167	.05	66	48	5	3.0S	-17	297	10
29491.557	.05	65	46	4	1.7	-17	297	10
29492.18	.10	65	51	2	3.8	-17	297	10
29493.18	.20	66	49	2	3.4	-17	297	10
29497.992	.01	62	49	5	3.0	-17	297	10
29499.293	.05	66	53	4	3.8S	-17	298	10
29503.91	.10	65	51	3	3.8	-17	297	10
29504.35	.10	64	49	2	3.8	-17	297	10
29505.14	.10	66	52	2	3.8	-17	297	10
29516.012	.05	67	52	4	3.4S	-17	297	10
29537.107	.02	66	52	5	1.7	-17	297	10
29614.672	.05	66	50	4	1.7S	-17	298	10
29631.522	.02	66	50	5	2.1	-17	298	10
29707.128	.02	65	50	4	3.4	-17	298	10
29713.811	.02	67	51	5	2.1	-17	298	10
29736.783	.02	68	52	5	3.8	-17	298	10
29778.326	.05	68	49	4	3.8	-17	298	10
29789.936	.02	65	51	5	3.8	-17	298	10
29903.833	.05	67	49	4	3.4	-17	298	10
29909.014	.05	67	49	5	2.6	-17	298	10
29914.852	.05	66	49	4	1.7	-17	298	10
29947.954	.05	65	49	4	3.8	-17	297	10
29952.127	.05	68	53	4	3.8	-17	297	10
29956.611	.02	68	55	5	2.1	-17	297	10
30042.38	.10	66	52	3	3.4	-17	297	10
30042.881	.05	65		1	2.1	-17	297	10
30043.40	.10	66	51	2	2.6	-17	297	10
30235.06	.20	63	47	2	3.4	-17	296	10
30425.22	.20	67	51	2	1.7	-16	296	10
30437.072	.05	67	49	5	1.7	-17	296	10
30565.089	.02	64	48	5	2.6	-17	296	10
30568.092	.05	67		1	2.6	-16	296	10
30611.13	.10	69	50	4	3.0S	-17	296	10
30883.35	.10	68	51	4	2.1	-17	296	10
30908.596	.05	68	51	4	2.1	-17	296	10
30934.289	.02	63	47	4	2.1	-17	296	10

NAME: CIS 1,2-DICHLOROETHENE CONTINUED								ID NO. 141.00
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
30944.351	.02	63	50	4	3.4	-17	296	10
31214.238	.05	68	53	4	2.1S	-17	296	10
31232.58	.10	67	52	3	3.4	-17	296	10
31233.260	.05	65		1	3.8	-17	296	10
31233.92	.10	66	52	2	3.8	-17	296	10
31338.973	.05	62	46	4	3.0	-17	296	10
31354.66	.10	67	54	3	2.6	-17	296	10
31355.30	.10	67	53	2	2.6	-17	296	10
31357.724	.05	65	50	4	2.6	-17	296	10
31360.629	.02	68	51	5	2.1	-17	296	10
31400.375	.05	68	49	5	2.1	-17	296	10
31405.95	.10	67	53	3	1.7	-17	296	10
31406.34	.20	69	54	2	3.8S	-17	296	10
31407.57	.10	67	52	4	3.8	-17	296	10
31562.149	.02	66	51	5	2.6	-18	297	10
31563.903	.05	66	48	5	2.1	-18	297	10
31690.948	.02	65	49	5	3.8	-18	297	10
31702.343	.02	64	48	4	3.4	-18	297	10
31711.587	.02	65	49	4	2.1	-18	297	10
31741.926	.02	64	48	5	1.7	-18	297	10
31767.862	.02	65	50	5	3.4	-18	297	10
31774.968	.02	62	46	5	3.0	-18	297	10
31805.568	.02	64	47	5	1.7	-18	297	10
31863.266	.02	66	51	5	2.6	-18	297	10
31888.698	.02	64	47	5	3.8	-18	297	10
31986.198	.05	66	47	4	3.8	-18	297	10
31995.864	.05	65	46	5	3.4	-18	297	10
31996.53	.10	66	52	2	3.4	-18	297	10
32001.117	.02	66	51	5	3.0	-18	297	10
32033.29	.20	69	52	2	3.8S	-18	297	10
32091.486	.05	67	49	4	3.8	-18	298	10
32093.086	.05	66	49	4	3.8	-18	298	10
32197.80	.20	68	50	2	3.0	-18	298	10
32201.80	.10	68	50	4	1.7S	-18	298	10
32238.062	.02	62	45	5	2.1	-18	298	10
32304.57	.20	68	50	2	3.8	-18	298	10
32385.276	.05	67	48	5	2.6	-18	298	10
32389.896	.05	65	50	4	2.1	-18	298	10
32390.567	.05	67		1	2.1	-18	298	10
32397.295	.01	59.6	46.2		3.0	-18	298	10
32401.732	.01	63	50	5	3.8	-18	298	10
32404.685	.05	65	51	4	3.8	-18	298	10
32458.91	.10	68	50	4	2.1	-18	298	10
32470.241	.02	64	51	4	2.1	-18	298	10
32474.108	.02	66	52	4	2.6	-18	298	10
32480.574	.05	67	52	4	2.1	-18	298	10
32544.87	.10	67	52	3	2.1	-17	298	10
32545.491	.05	65		1	1.7	-17	298	10
32546.11	.10	66	52	2	1.7	-17	297	10
32584.674	.05	66	52	4	2.6S	-17	297	10

NAME: CIS 1,2-DICHLOROETHENE CONTINUED ID NO. 141.00

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
32604.090	.05	68	51	4	1.7S	-17	297	10
32619.077	.02	63	48	5	1.7	-17	297	10
32621.292	.02	68	51	5	2.1	-17	297	10
32662.39	.20	68	52	3	3.0S	-17	297	10
32663.318	.02	65	50	5	3.0	-17	297	10
32723.539	.02	62	45	5	2.1	-17	297	10
32774.388	.05	67	52	4	2.6	-17	297	10
32775.671	.02	65	51	5	2.6	-17	297	10
32794.857	.05	67	49	5	1.7S	-17	297	10
32811.207	.05	67	49	5	1.7	-17	297	10
32824.545	.05	66	51	4	3.8S	-17	297	10
32912.386	.02	67	49	5	3.8	-17	297	10
32987.903	.05	65	46	5	3.0	-17	297	10
32988.44	.10	67	52	2	3.0	-17	297	10
33101.517	.05	65	47	4	3.8	-17	297	10
33108.40	.10	67	48	4	3.8S	-16	297	10
33226.209	.05	62	45	4	3.8	-16	297	10
33274.614	.02	67	52	5	2.6	-16	297	10
33336.048	.02	66	51	5	2.1	-17	297	10
33369.249	.02	65	47	5	3.8	-17	297	10
33369.73	.10	66	52	2	3.8	-17	297	10
33414.489	.02	65	50	5	2.1	-16	297	10
33442.74	.10	64	50	2	3.8	-16	297	10
33445.21	.10	68		1	3.8	-16	297	10
33446.09	.20	67	51	2	3.4S	-16	297	10
33589.623	.05	66	50	4	3.4	-16	297	10
33667.404	.05	68	50	4	3.4	-17	297	10
33706.488	.05	65	47	4	2.6	-17	297	10
33724.169	.02	65	48	5	2.6	-17	297	10
33740.29	.20	63	46	2	2.6	-17	297	10
33754.768	.02	67	50	5	1.7	-17	297	10
33774.847	.02	66	50	5	2.1	-17	298	10
33787.10	.20	67	50	3	2.6S	-17	298	10
33787.47	.20	67	52	2	2.1S	-17	298	10
33855.780	.02	67	51	5	3.0S	-17	298	10
33975.456	.02	67	51	5	1.7S	-17	298	10
33994.16	.10	65	49	4	3.8S	-17	298	10
34003.569	.05	66	48	5	3.0	-17	298	10
34010.360	.05	66	49	4	1.7	-17	298	10
34083.786	.02	68	53	5	2.6	-17	298	10
34161.533	.02	65	49	5	3.8	-17	298	10
34219.945	.02	66	51	4	3.0	-17	298	10
34243.641	.02	64	48	5	2.1	-17	298	10
34257.85	.20	64	47	3	3.4S	-17	298	10
34258.28	.10	64		1	3.4	-17	298	10
34259.06	.20	63	45	2	3.8	-17	298	10
34261.761	.05	66	49	4	2.1	-17	298	10
34271.97	.10	68	54	3	2.6	-17	298	10
34272.36	.10	69	55	2	2.1S	-17	298	10
34288.092	.05	67	51	4	3.8	-17	298	10

NAME: CIS 1,2-DICHLOROETHENE CONTINUED								ID NO. 141.00
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
34371.566	.02	65	50	5	2.1	-17	298	10
34470.05	.20	66	49	3	3.4	-17	298	10
34470.393	.05	67		1	3.0	-17	298	10
34470.983	.05	66		1	2.6	-17	298	10
34488.785	.02	68	52	5	3.8	-17	298	10
34509.335	.02	66	52	4	3.8	-17	298	10
34519.096	.02	65	49	5	2.6	-17	298	10
34574.607	.02	64	49	5	2.1	-17	298	10
34615.791	.05	68	54	4	2.1S	-17	298	10
34621.97	.10	67	52	3	3.8	-17	297	10
34623.76	.20	67	52	2	3.8S	-17	297	10
34629.98	.10	67		1	3.8S	-17	297	10
34632.70	.10	65	50	2	3.8	-17	297	10
34723.74	.20	66	49	2	2.6	-17	297	10
34742.584	.05	65	49	4	3.0	-17	297	10
34771.228	.02	65	47	5	3.4	-17	297	10
34774.008	.05	66	48	4	2.6	-17	297	10
34783.51	.10	66	52	2	1.7	-17	297	10
34796.685	.02	66	50	5	2.1	-17	297	10
34815.950	.02	65	48	5	1.7	-17	297	10
34825.731	.02	63	48	5	2.1	-17	297	10
34831.030	.02	66	52	5	3.8	-17	297	10
34916.71	.20	66	47	3	2.6	-17	297	10
34917.207	.05	66		1	2.1	-17	297	10
34933.174	.02	57.0	43.1		3.0	-17	297	10
34937.199	.05	65	47	4	3.8	-17	298	10
34996.629	.02	67	53	5	1.7	-17	298	10
35028.69	.20	67	52	2	3.4S	-17	298	10
35031.772	.05	65	51	4	3.0S	-17	298	10
35076.37	.10	59	45	3	3.0	-17	298	10
35076.960	.05	58		1	3.0	-17	298	10
35077.55	.10	59	45	2	3.0	-17	298	10
35078.84	.10	62	47	3	3.4	-17	298	10
35079.662	.02	61	45	5	3.4	-17	298	10
35080.50	.10	62	49	2	3.0	-17	298	10
35084.515	.02	57	40	4	3.8	-17	298	10
35095.115	.05	64	48	4	3.8	-17	298	10
35121.501	.02	63	48	5	1.7	-17	298	10
35129.14	.20	65	48	2	2.1	-16	294	10
35193.036	.01	60.1	46.7		2.1	-16	295	10
35268.923	.05	55	46	4	3.8	-16	295	10
35275.18	.20	67	50	4	3.0S	-16	295	10
35279.366	.02	62	48	4	2.6	-16	296	10
35280.426	.02	61	45	5	2.1	-16	296	10
35281.467	.05	62	48	4	3.0	-16	296	10
35335.496	.02	50	43	4	3.8	-17	296	10
35346.366	.05	65	50	4	3.8	-17	296	10
35369.77	.10	63	49	3	2.1	-17	296	10
35370.43	.10	61	46	2	2.1	-16	296	10
35371.11	.10	63	49	2	3.4	-16	296	10

NAME: CIS 1,2-DICHLOROETHENE CONTINUED								ID NO. 141.03
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
35377.08	.10	66	53	3	3.4	-16	297	10
35377.93	.10	64	48	3	3.4	-16	297	10
35378.85	.10	66	52	2	3.4	-16	297	10
35392.286	.05	66	52	4	3.4S	-16	297	10
35456.007	.02	63	50	5	3.4	-16	297	10
35458.307	.02	62	47	5	2.1	-16	297	10
35493.76	.10	66	51	3	1.7	-16	297	10
35494.481	.05	65		1	1.7	-16	297	10
35495.393	.05	63	47	4	3.8	-16	297	10
35496.41	.10	66	52	2	3.8	-16	297	10
35534.773	.01	63	48	5	2.1	-16	297	10
35536.421	.02	58	45	4	3.8	-16	297	10
35538.059	.02	63	49	4	3.8	-16	297	10
35590.245	.02	64	48	5	3.0	-16	297	10
35609.825	.02	68	53	4	3.4	-16	297	10
35625.689	.01	59.8	45.3		2.1	-16	297	10
35627.223	.01	58	43	4	2.1	-16	297	10
35628.773	.01	59.9	45.3		3.0	-16	297	10
35649.304	.02	64	49	5	3.8	-16	297	10
35650.84	.20	63	47	3	3.4	-16	297	10
35651.20	.10	63	48	2	3.4	-16	297	10
35652.748	.02	64	50	5	3.4	-16	298	10
35666.285	.02	65	51	5	1.7S	-16	298	10
35676.77	.10	68	55	3	2.1S	-16	298	10
35678.18	.10	68	53	4	2.1S	-16	298	10
35704.68	.10	68	53	3	1.7	-16	298	10
35715.014	.02	67	52	5	2.1S	-16	298	10
35721.981	.02	67	53	5	2.1	-16	298	10
35736.052	.02	68	53	4	2.6	-16	297	10
35748.948	.02	68	54	5	1.7S	-16	297	10
35780.25	.10	66		1	2.6	-16	297	10
35780.94	.20	68	49	2	2.6S	-16	297	10
35818.975	.02	65	52	5	2.1S	-16	297	10
35827.729	.02	63	49	5	3.8	-16	297	10
35829.159	.02	62	47	4	3.8	-16	297	10
35830.610	.02	64	49	5	3.8	-16	297	10
35832.411	.02	62	46	5	3.8	-16	297	10
35839.649	.05	66	52	4	3.8	-16	296	10
35840.422	.02	64	50	4	3.4	-16	296	10
35841.126	.02	65	51	4	3.0	-16	296	10
35846.296	.02	67	53	4	3.4	-16	296	10
35846.993	.01	66	53	5	3.4	-16	296	10
35848.523	.01	59.5	45.6		3.4	-16	296	10
35849.964	.02	65	52	4	3.4	-16	296	10
35855.93	.10	64	50	3	3.8	-16	296	10
35856.571	.05	64		1	3.8	-16	296	10
35857.389	.05	63	48	4	3.8	-16	296	10
35859.38	.10	65	51	2	3.4	-16	296	10
35863.26	.10	65	51	4	3.8S	-16	296	10
35863.879	.05	66		1	3.8S	-16	296	10

NAME: CIS 1,2-DICHLOROETHENE CONTINUED								ID NO. 141.00
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
35864.986	.05	62	47	4	3.8	-16	296	10
35940.32	.20	68	52	3	2.6	-16	296	10
35940.735	.05	67		1	2.1	-16	296	10
35978.905	.02	67	52	4	2.1	-16	296	10
35980.41	.20	66	49	3	3.8	-16	296	10
35980.86	.10	66	51	2	3.0	-16	296	10
36017.835	.02	68	52	5	2.1	-16	296	10
36035.010	.02	67	52	5	2.6	-15	296	10
36036.351	.02	65	50	5	2.6	-15	296	10
36037.690	.02	67	53	5	3.4	-15	296	10
36101.72	.10	68	53	3	3.0	-15	296	10
36102.146	.05	68		1	3.4	-15	296	10
36104.24	.20	68	50	3	3.8	-15	296	10
36104.78	.10	68	52	2	2.1	-15	297	10
36173.859	.02	63	48	5	3.4	-15	296	10
36175.71	.20	62	46	3	3.8	-15	296	10
36176.07	.10	62	46	2	3.4	-15	296	10
36177.849	.02	62	47	4	3.0	-15	296	10
36185.341	.02	63	50	5	3.8	-15	296	10
36194.732	.05	65	50	4	3.8	-15	296	10
36210.568	.05	64	50	4	3.8	-15	297	10
36239.842	.05	61	45	4	3.8	-15	297	10
36248.525	.05	64	49	4	3.8	-15	297	10
36338.689	.02	66	52	5	2.1	-16	297	10
36340.38	.10	65	51	3	2.6	-15	297	10
36342.501	.05	67	52	4	2.1	-15	297	10
36376.546	.05	62	46	4	3.8	-15	297	10
36379.112	.01	59.8	45.4		2.1	-15	297	10
36381.687	.02	62	46	4	3.8	-15	297	10
36394.080	.02	65	50	4	1.7	-15	298	10
36396.373	.05	62	47	4	1.7	-15	298	10
36398.93	.10	66	52	2	1.7	-15	298	10
36426.69	.10	65	50	2	3.8	-15	297	10
36452.83	.10	68	54	2	2.1	-15	297	10
36461.018	.02	65	48	5	2.1	-15	297	10
36472.490	.02	63	47	5	2.1	-15	297	10
36486.038	.02	63	47	5	3.4	-15	298	10
36488.991	.02	63	48	5	2.6	-15	298	10
36513.39	.20	63	45	3	3.8	-15	298	10
36514.02	.10	65	51	2	1.7	-15	298	10
36525.50	.10	62	47	2	2.1	-15	298	10
36539.245	.02	64	49	4	3.8	-15	298	10
36561.492	.02	65	49	4	1.7	-15	298	10
36563.74	.20	65	48	3	1.7S	-15	299	10
36564.31	.20	65	48	2	2.6	-15	299	10
36566.567	.02	65	49	5	3.0	-15	299	10
36586.470	.02	63	47	4	1.7	-15	299	10
36591.348	.02	67	51	4	2.1	-15	299	10
36626.878	.02	63	48	4	2.1	-15	299	10
36638.665	.02	66	52	5	1.7	-15	298	10

NAME: CIS 1,2-DICHLOROETHENE CONTINUED								ID NO. 141.00
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
36664.007	.02	63	47	5	2.1	-15	298	10
36676.419	.02	61	45	4	1.7	-15	298	10
36732.221	.05	66	49	4	2.1	-15	298	10
36734.807	.05	63	49	4	3.4	-15	298	10
36735.376	.05	66		1	3.4	-15	298	10
36737.414	.02	66	50	5	3.0	-15	298	10
36752.784	.05	64	46	4	3.8	-15	298	10
36755.211	.02	60	45	4	1.7	-15	297	10
36757.806	.01	57	44	4	2.1	-15	298	10
36760.423	.01	62	48	5	2.1	-15	298	10
36846.015	.05	66		1	3.0	-15	298	10
36891.241	.05	68	51	4	2.6	-15	298	10
36902.615	.05	66	52	4	1.7	-15	298	10
36905.101	.02	61	47	4	3.8	-15	298	10
36906.05	.20	67	50	2	3.8S	-15	298	10
36907.603	.05	65	50	4	3.8	-15	298	10
36908.295	.05	68		1	3.8	-15	298	10
36974.40	.10	64	48	3	2.6	-15	298	10
36974.874	.05	63		1	2.6	-15	298	10
37015.61	.20	66	48	3	3.8	-15	298	10
37016.70	.20	67	50	2	3.8	-15	298	10
37059.229	.05	64	49	4	3.8	-15	298	10
37069.090	.05	67	50	4	3.8	-15	298	10
37090.64	.10	66	51	3	3.8	-15	298	10
37091.88	.20	68	50	2	3.4	-15	297	10
37137.390	.02	61	45	5	2.1	-15	296	10
37361.52	.10	67	51	3	3.8	-16	296	10
37362.184	.02	64	48	4	3.4	-16	296	10
37362.86	.20	66	50	2	3.8	-16	296	10
37417.563	.02	67	52	4	3.8	-16	296	10
37503.44	.10	65	50	3	3.8	-16	296	10
37506.832	.02	59	45	4	3.8	-16	296	10
37510.278	.02	64	48	4	3.8	-16	296	10
37533.449	.05	65	47	4	3.0	-16	296	10
37578.909	.05	67	49	5	3.8	-16	296	10
37588.562	.05	67	50	5	3.4S	-16	296	10
37605.40	.10	68	53	2	2.6	-16	296	10
37609.944	.02	64	50	5	2.1	-16	296	10
37618.012	.02	61	44	5	3.0	-16	296	10
37657.081	.02	63	48	5	2.1	-16	296	10
37659.63	.10	63	47	3	3.0	-16	296	10
37660.31	.20	63	47	2	2.6	-16	296	10
37662.867	.02	63	48	4	3.4	-16	297	10
37720.046	.05	67	50	4	2.6	-16	297	10
37722.89	.20	65	47	3	2.6	-16	297	10
37723.62	.10	65	50	2	3.8	-16	297	10
37726.441	.02	66	49	4	2.6	-16	297	10
37741.08	.10	67	52	3	2.1	-16	297	10
37766.851	.02	64	48	5	3.0S	-16	297	10
37769.34	.20	65	50	3	2.6	-16	297	10

NAME: CIS 1,2-DICHLOROETHENE CONTINUED								ID NO. 141.00
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
37770.02	.20	66	50	2	3.8	-16	297	10
37772.490	.02	66	51	4	3.8	-16	297	10
37792.583	.02	67	50	5	3.8	-16	297	10
37868.35	.10	68	53	3	3.0	-16	297	10
37881.508	.02	63	49	5	3.4	-16	297	10
37884.52	.20	67	50	3	3.8	-16	297	10
37884.95	.20	66	50	2	3.8S	-16	297	10
37919.111	.05	67	49	4	3.8	-16	296	10
37925.62	.20	63	48	3	3.8S	-16	296	10
37926.24	.20	66	50	2	3.8S	-16	296	10
37936.506	.02	68	54	4	1.7	-16	296	10
37957.092	.02	66	47	5	3.8	-16	296	10
37957.69	.10	68	53	2	3.0	-16	296	10
37986.76	.10	66	47	4	3.8S	-16	296	10
38027.71	.20	67	50	3	3.0	-16	296	10
38028.25	.20	66	48	2	2.6	-16	296	10
38065.861	.05	67	48	5	2.1S	-16	296	10
38066.41	.10	68	53	2	3.4	-16	296	10
38093.11	.20	68	51	2	2.6	-16	296	10
38103.432	.02	67	52	4	1.7	-16	296	10
38112.652	.05	61	44	4	2.1	-16	296	10
38128.58	.20	67	52	2	3.4S	-16	296	10
38200.111	.05	67	52	5	3.4S	-16	296	10
38201.857	.02	66	47	5	3.4	-16	295	10
38255.479	.02	67	53	4	1.7	-16	295	10
38284.007	.02	66	53	4	3.0	-16	295	10
38289.91	.10	67	51	3	3.0	-16	295	10
38290.515	.05	66		1	3.0	-16	295	10
38291.07	.10	68	53	2	3.0	-16	295	10
38314.632	.02	66	51	5	2.1	-16	295	10
38327.35	.10	68	51	4	2.1	-16	295	10
38335.56	.10	64	49	3	3.8	-16	295	10
38336.58	.10	62	47	3	3.8	-16	296	10
38337.346	.05	62		1	3.8	-16	296	10
38348.77	.10	65	50	3	3.8	-16	296	10
38349.30	.10	64	48	2	3.8	-16	296	10
38352.42	.10	66		1	1.7	-16	296	10
38353.00	.10	66	52	2	1.7	-16	296	10
38387.983	.02	67	53	5	3.8	-16	297	10
38389.30	.10	67	54	2	3.4	-16	297	10
38396.669	.05	65	50	4	1.7	-16	297	10
38405.06	.20	66	50	4	2.6S	-16	297	10
38408.787	.05	67	54	4	3.0	-16	297	10
38419.85	.10	68	52	4	2.1	-16	297	10
38468.706	.02	65	50	4	1.7	-16	297	10
38500.31	.20	66	50	3	1.7	-16	297	10
38501.00	.10	68	53	2	1.7	-16	297	10
38509.983	.02	61	45	5	3.8	-16	297	10
38513.557	.02	58	44	4	3.4	-16	297	10
38516.26	.20	66	48	3	3.0	-16	297	10

NAME: CIS 1,2-DICHLOROETHENE CONTINUED								ID NO. 141.00
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
38517.17	.10	60	43	4	3.0	-16	297	10
38518.40	.10	64		1	3.0	-16	297	10
38519.08	.10	66	51	2	3.8	-16	297	10
38561.599	.02	67	51	5	2.1	-16	297	10
38566.069	.02	66	50	4	2.1	-16	297	10
38598.331	.02	64	48	5	3.0	-16	297	10
38601.822	.02	62	47	4	3.0	-16	298	10
38605.30	.10	64	49	3	2.6	-15	297	10
38614.81	.20	61	45	3	2.6	-16	297	10
38622.696	.05	67	50	4	3.4	-16	297	10
38658.637	.02	65	49	5	3.8	-15	297	10
38698.60	.20	64	47	3	3.4	-15	297	10
38699.079	.05	65		1	3.4	-15	298	10
38699.625	.05	64		1	3.4	-15	298	10
38701.954	.05	67	51	4	3.0S	-15	298	10
38726.56	.10	66	50	4	3.0	-15	298	10
38727.995	.02	64	50	5	3.0	-15	298	10
38729.448	.02	66	52	4	1.7	-15	298	10
38745.108	.02	66	50	4	1.7	-15	297	10
38753.206	.02	65	49	4	2.1	-15	298	10
38766.98	.10	66	51	3	2.1	-15	297	10
38767.516	.05	64		1	2.1	-15	297	10
38768.05	.20	65	50	2	2.1S	-15	297	10
38807.91	.10	65	51	3	3.0	-15	297	10
38808.478	.05	64		1	3.8	-15	297	10
38811.54	.10	65	51	3	3.8	-15	297	10
38812.465	.01	61	48	5	2.1	-15	296	10
38813.48	.10	66	52	2	3.0	-15	296	10
38816.08	.10	64	50	3	3.0	-15	296	10
38816.487	.05	64		1	3.0	-15	296	10
38816.95	.10	66	52	2	3.0S	-15	296	10
38880.608	.02	64	48	5	2.1	-15	296	10
38888.059	.02	66	50	5	3.4	-15	296	10
38891.510	.05	67	52	4	3.0	-15	296	10
38941.488	.02	66	51	5	1.7	-14	296	10
38993.912	.02	67	54	5	3.8	-15	296	10
39002.324	.05	65	48	4	2.1	-14	296	10
39011.048	.02	66	50	5	3.4	-15	296	10
39022.359	.05	67	49	4	1.7	-15	295	10
39025.69	.20	65	47	3	3.4	-15	295	10
39026.48	.20	65	50	2	3.4	-15	295	10
39029.04	.20	63	45	3	3.0	-15	295	10
39029.46	.20	63	46	2	2.6	-15	295	10
39055.909	.02	66	51	5	3.4	-15	295	10
39117.06	.20	63	47	3	2.1	-14	295	10
39130.513	.02	64	47	5	2.6	-15	295	10
39198.209	.02	64	50	5	3.8	-14	295	10
39202.206	.05	67	49	5	3.4S	-14	295	10
39216.757	.02	64	49	5	3.0	-14	296	10
39225.712	.05	64	49	4	2.1	-14	296	10

NAME: CIS 1,2-DICHLOROETHENE			Concluded					ID NO. 141.00
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
39235.96	.10	65	51	3	3.8	-14	296	10
39239.24	.10	66	50	3	3.4	-14	296	10
39240.664	.02	60	46	4	2.6	-14	296	10
39241.72	.20	67	50	2	3.4	-14	296	10
39245.376	.02	66	52	4	2.1	-14	296	10
39252.584	.02	67	51	5	3.0	-14	296	10
39264.854	.05	65	49	5	2.6S	-14	296	10
39274.76	.20	66	51	3	2.6S	-14	296	10
39275.158	.05	65		1	2.6	-14	296	10
39403.921	.02	63	45	5	3.4	-14	296	10
39430.835	.01	63	48	5	2.1	-14	296	10
39481.769	.02	67	53	4	1.7	-14	297	10
39490.853	.05	65	48	4	2.1	-14	297	10
39609.77	.20	65	48	3	3.8	-14	297	10
39611.21	.20	64	46	2	3.0	-14	297	10
39665.49	.20	66	50	3	3.4	-14	297	10
39666.94	.20	65	48	2	3.0	-14	297	10
39691.356	.02	63	48	5	3.8	-14	297	10
39695.902	.05	64	47	4	3.8	-14	297	10
39697.815	.02	65	51	4	2.1	-14	295	10
39751.120	.01	62	49	5	3.8	-14	296	10
39754.287	.02	63	48	5	3.0	-14	296	10
39757.572	.05	63	47	4	2.1	-14	296	10
39758.49	.20	63	46	2	2.1	-14	296	10
39761.750	.02	64	49	5	2.1	-14	296	10
39796.56	.20	65	48	3	3.8	-14	297	10
39802.876	.02	64	50	4	3.8	-14	297	10
39805.937	.02	66	50	5	3.0	-14	297	10
39809.25	.10	67	52	3	2.1	-14	297	10
39810.08	.10	65	51	3	2.1	-14	297	10
39811.587	.01	59	45	4	2.1	-14	297	10
39813.07	.20	65	48	2	3.8S	-14	297	10
39820.26	.10	65	51	2	2.1	-14	297	10
39864.20	.10	66	51	4	1.7S	-14	297	10
39869.959	.02	64	49	5	3.8	-14	297	10
39872.160	.02	64	49	5	3.8	-14	297	10
39874.35	.10	65	50	2	3.4	-14	297	10
39875.844	.05	65	48	4	3.4	-14	297	10
39899.643	.02	65	49	5	2.1	-14	297	10
39975.276	.02	65	52	4	3.8	-14	295	10
39977.541	.02	66	52	5	1.7S	-14	295	10
39986.00	.20	64	47	2	3.0	-14	295	10
39987.585	.05	68	51	4	2.6	-14	296	10
39990.36	.10	62	48	2	1.7	-14	296	10
39994.778	.02	62	47	4	2.1	-14	296	10

Dichloromethane

Formula: CH_2Cl_2
CAS Registry number: 75-09-2
Synonym: methylene chloride
NBS identification number: 111.00
Frequency range: 18 000 to 40 004 MHz

Sample: The sample source was Fisher D-37 certified methylene chloride. Gas chromatography using a Chromosorb 102 column showed only two impurity peaks of 0.02 and 0.1 percent.

Remarks: Data in the frequency range below 26 500 MHz are considered to be of lower quality than that in the higher range because of the less accurate calibrations available at the time they were taken.

Observed line-width parameters were typically less than 20 kHz/millitorr, but it was necessary to reduce the pressure to 8 millitorr in order to resolve the numerous lines resulting from the chlorine quadrupole moment. Even at the low pressure used, many lines suffered from overlap interference and some of the frequencies and intensities may be pressure sensitive. In some cases a triplet was measured as a single line since the weaker side components were below the sensitivity threshold programed.

The sample pressure of 8 millitorr was registered by a thermocouple gage as 16 millitorr.

Sample identity was confirmed by matching observed line frequencies with the theoretical values from reference 9. Most of the lines in that paper were reported with low accuracy and the quadrupole splitting was not given. However, sufficient data were available to allow identification of the sample.

NAME: DICHLOROMETHANE								ID NO. 111.00
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
18102.23	.10	65	50	4	2.1		297	10
18142.445	.02	66	52	5	2.1		297	10
18143.273	.05	68	55	4	2.1		297	10
18214.252	.02	67	54	5	2.1		297	10
18218.342	.02	65	52	5	2.6		298	10
18220.140	.02	66	52	5	2.6		298	10
18269.740	.02	65	49	5	2.1		298	10
18341.293	.05	68	55	5	2.6		298	10
18376.222	.02	66	54	4	2.1		298	10
18441.742	.05	69	56	5	2.1		299	10
18564.138	.02	65	51	5	2.1		299	10
18840.378	.02	62	49	5	2.1		299	10
18877.550	.02	67	53	5	3.0		299	10
19163.352	.02	64	51	5	2.1		299	10
19281.138	.02	69	54	5	1.7		299	10
19355.954	.02	67	52	5	2.6		299	10
19645.736	.02	69	56	5	2.6		299	10
19885.494	.02	64	51	5	2.1		299	10
19954.456	.05	70	57	4	2.1		299	10
19956.271	.02	65	52	4	2.1		299	10
19957.246	.05	69	55	4	2.6		299	10
19958.079	.05	69	56	4	3.0		299	10
19960.397	.02	65	52	5	3.0		299	10
20101.585	.05	70	56	4	1.7		299	10
20231.622	.02	65	51	5	2.1		299	10
20259.085	.05	66	53	4	2.1		299	10
20259.904	.02	64	51	5	2.6		299	10
20260.726	.05	66	53	4	2.6		299	10
20299.961	.02	61	48	5	2.1		299	10
20514.086	.02	66	49	5	2.1		299	10
20514.37	.10	67	53	2	1.7		299	10
20719.614	.05	70	54	5	2.1		299	10
20807.16	.10	69	56	3	1.7		299	10
20807.908	.05	67	52	4	2.6		299	10
20808.64	.10	69	56	2	3.0		299	10
20819.555	.02	67	53	5	1.7		299	10
20975.794	.02	70	57	4	2.1		299	10
20978.295	.05	70	56	4	2.6		299	10
20979.012	.02	70	56	5	3.4		299	10
20981.518	.05	70	57	4	3.8		299	10
21008.66	.10	74	60	3	1.7		299	10
21011.356	.05	65	51	4	1.7		299	10
21012.14	.10	70		1	1.7		299	10
21013.00	.10	71	55	2	2.1		299	10
21030.957	.02	68	55	5	1.7		299	10
21032.618	.02	64	51	5	1.7		298	10
21034.267	.05	68	55	5	1.7		298	10
21142.065	.02	66	47	5	1.7		298	10
21167.148	.05	67	54	4	2.6		298	10
21461.359	.05	69	55	4	1.7		298	10

NAME: DICHLOROMETHANE CONTINUED ID NO. 111.00

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
21618.727	.02	69	56	5	2.1		298	10
21642.614	.02	67	50	5	2.6		298	10
21643.00	.10	69	56	2	2.1		298	10
21815.874	.02	70	56	4	2.6		298	10
21858.393	.02	69	56	5	2.1		298	10
21921.229	.05	64	50	4	2.1		298	10
22109.485	.02	68	63	5	2.1		298	10
22302.61	.10	68	55	3	2.1		298	10
22303.320	.02	66	52	5	3.0		298	10
22304.04	.10	69	56	2	3.4		298	10
22308.04	.10	63	49	3	3.0		298	10
22313.144	.02	66	54	5	3.8		298	10
22314.151	.02	68	54	4	3.8		298	10
22357.365	.02	69	55	5	2.1		298	10
22358.71	.10	68	54	3	2.1		298	10
22359.07	.10	68	54	2	2.1		298	10
22360.406	.02	69	56	5	2.6		298	10
22428.054	.02	68	54	5	2.1		298	10
22470.270	.02	70	56	5	1.7		298	10
22532.134	.02	68	53	5	2.1		298	10
22636.615	.02	70	57	5	2.1		298	10
22686.855	.05	71	56	4	2.1		298	10
22745.790	.02	69	56	5	1.7		298	10
22747.18	.10	68	55	3	1.7		298	10
22747.52	.10	68	55	2	2.1		298	10
22748.902	.02	69	56	5	2.1		298	10
22970.706	.05	71	58	5	1.7		298	10
23053.373	.02	66	51	5	2.1		298	10
23219.459	.02	68	55	5	2.1		298	10
23311.424	.05	67	54	4	3.0		298	10
23428.697	.02	72	60	4	2.1		298	10
23446.179	.02	70	57	5	2.1		298	10
23453.101	.05	67	52	4	2.6		298	10
23454.80	.10	65	51	4	3.0		298	10
23456.485	.05	67	53	4	2.6		298	10
23498.300	.02	69	56	5	1.7		298	10
23587.17	.10	71	56	4	2.6		298	10
23720.512	.02	70	57	5	1.7		298	10
23812.815	.02	72	58	5	2.1		298	10
23881.71	.10	69	55	2	1.7		298	10
23898.21	.10	66	53	3	1.7		298	10
23898.683	.05	64		1	2.1		298	10
23899.15	.10	66	53	2	1.7		298	10
23947.318	.02	70	55	5	2.1		298	10
23979.086	.05	71	58	4	1.7		298	10
23985.236	.02	67	53	5	2.1		298	10
23988.62	.10	65	50	3	3.4		298	10
23991.978	.05	67	53	4	2.1		298	10
24028.047	.05	69	56	4	2.1		298	10
24041.337	.02	68	55	4	1.7		298	10

NAME: DICHLOROMETHANE			CONTINUED					ID NO. 111.00
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
24045.302	.02	63	51	5	2.1		298	10
24049.268	.02	69	55	4	2.1		298	10
24100.56	.10	71	56	3	1.7		299	10
24101.237	.05	69	53	4	1.7		299	10
24103.95	.10	69	56	2	3.0		299	10
24337.157	.02	69	56	4	2.1		299	10
24447.384	.02	65	48	5	3.0		299	10
24479.980	.02	63	50	5	2.1		299	10
24577.89	.10	67	53	3	3.0		299	10
24578.642	.02	63	50	5	3.0		299	10
24579.39	.10	67	54	2	3.8		299	10
24637.292	.05	66	51	4	2.1		299	10
24640.20	.10	64	51	3	2.1		299	10
24643.104	.05	66	52	4	3.8		299	10
24808.877	.05	70	56	4	2.6		299	10
24811.563	.02	69	55	5	2.6		299	10
24812.329	.02	69	56	5	3.4		299	10
24815.014	.02	70	56	4	2.6		299	10
24847.908	.02	67	53	5	2.1		299	10
24926.202	.02	65	52	5	2.1		299	10
24982.801	.02	63	49	5	2.1		299	10
25028.893	.02	65	52	5	2.1		297	10
25065.317	.05	65	51	4	2.1		297	10
25066.02	.10	67	52	2	2.1		297	10
25066.89	.10	69	56	2	2.1		297	10
25087.172	.02	63	46	5	2.1		297	10
25110.152	.02	63	49	5	2.1		298	10
25229.335	.02	69	55	5	1.7		298	10
25260.876	.02	64	50	5	2.1		298	10
25271.092	.02	62	49	5	1.7		298	10
25402.791	.02	65	52	5	2.1		298	10
25487.825	.02	70	57	5	1.7		298	10
25529.404	.02	68	56	4	3.0		298	10
25530.270	.02	67	54	5	3.0		298	10
25530.68	.10	70	58	2	2.1		298	10
25532.54	.10	69	56	3	2.6		299	10
25533.03	.10	67	55	2	3.8		299	10
25534.724	.02	69	57	5	3.8		299	10
25535.70	.10	70	58	3	2.1		299	10
25536.03	.10	69	57	2	2.1		299	10
25537.387	.02	69	57	4	3.0		299	10
25599.778	.05	69	56	4	2.6		299	10
25646.477	.02	67	53	5	2.1		299	10
25648.180	.02	65	51	5	2.1		299	10
25649.892	.02	67	54	5	3.0		299	10
25721.566	.05	68	55	4	2.6		299	10
25722.490	.02	64	51	5	2.1		299	10
25723.418	.05	68	55	4	2.1		299	10
25832.755	.02	61	48	5	2.1		299	10
25980.211	.05	68	54	4	1.7		299	10

NAME: DICHLOROMETHANE			CONTINUED					ID NO. 111.00
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
25981.128	.02	64	51	5	1.7		299	10
25982.043	.05	68	55	4	3.4		299	10
26012.957	.02	65	50	5	2.1		299	10
26097.34	.10	69	54	4	2.1		299	10
26278.725	.05	63	50	4	2.1		299	10
26357.21	.10	68	55	4	1.7		299	10
26358.036	.02	67	52	5	2.1		299	10
26358.852	.05	69	55	4	2.1		299	10
26649.53	.10	64	50	3	3.0	-18	295	8
26649.859	.05	62		1	3.0	-17	295	8
26650.182	.05	64	50	2	3.0	-18	295	8
26724.290	.01	60.3	46.9		2.1	-17	295	8
26727.130	.02	67	52	5	3.0S	-17	295	8
26728.44	.10	66	50	3	3.0	-17	295	8
26728.74	.10	66	50	2	3.8	-17	295	8
26730.048	.02	67	52	5	3.8	-17	295	8
26866.479	.01	58	45	4	2.1	-17	295	8
27083.928	.02	65	48	5	3.0	-17	295	8
27084.25	.10	67	53	2	3.0	-17	295	8
27395.678	.01	62	48	5	2.1	-17	295	8
27556.727	.05	67	52	4	1.7	-17	296	8
27657.351	.01	62	48	5	2.1	-17	296	8
27670.252	.02	66	51	4	2.1	-17	296	8
27713.084	.01	59.2	45.1		2.1	-17	296	8
27736.097	.02	65	51	4	2.1	-17	296	8
27739.717	.01	61	48	5	2.1	-17	296	8
27743.330	.05	65	51	4	3.0S	-17	295	8
27874.409	.01	66	51	5	2.1	-17	295	8
27931.290	.01	66	51	5	2.1	-17	295	8
27933.653	.02	65	50	4	3.8	-17	295	8
27934.307	.05	65	50	4	3.0	-17	295	8
27936.647	.02	66	50	4	3.0	-17	295	8
28154.149	.01	66	53	5	2.1	-17	294	8
28187.179	.05	67	50	5	3.0S	-17	294	8
28246.601	.01	65	52	5	1.7	-17	294	8
28283.749	.01	64	50	5	2.1	-17	294	8
28336.044	.01	66	52	5	2.1	-17	294	8
28337.35	.10	65	51	3	2.1	-17	294	8
28337.69	.10	65	51	2	2.1	-17	294	8
28339.000	.02	65	52	4	3.0	-17	294	8
28362.143	.02	67	53	4	1.7	-17	294	8
28371.900	.02	66	51	4	1.7	-17	294	8
28374.762	.02	66	52	4	2.1	-17	294	8
28375.573	.02	66	52	4	3.4	-17	294	8
28378.464	.02	67	52	4	3.8	-17	294	8
28409.37	.10	67	53	2	2.1	-17	294	8
28577.737	.02	67	53	5	1.7	-18	295	8
28622.075	.05	61	47	3	2.1	-18	295	8
28622.463	.02	59		1	2.1	-18	295	8
28622.854	.05	61	47	2	3.8	-18	295	8

NAME: DICHLOROMETHANE CONTINUED								ID NO. 111.00
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
28683.682	.02	66	52	4	2.1	-18	295	8
28701.640	.05	67	54	3	1.7	-18	295	8
28702.117	.05	64	49	3	2.1	-17	293	8
28702.58	.10	66	52	2	1.7S	-18	293	8
28714.386	.01	62	48	5	2.1	-18	294	8
28761.337	.02	66	51	5	3.0	-18	294	8
28838.313	.01	63	49	5	3.8	-18	294	8
28874.417	.01	63	50	5	1.7	-18	294	8
28906.475	.02	63	48	5	3.0	-18	295	8
28930.682	.01	63	50	5	2.6	-18	295	8
28936.666	.02	64	52	4	2.6	-18	295	8
29017.645	.05	66	49	4	1.7S	-18	295	8
29017.96	.10	67	54	2	1.7	-18	295	8
29020.742	.05	66	51	4	2.1	-18	295	8
29021.614	.05	67	51	4	3.0	-18	295	8
29024.744	.05	67	49	4	3.8	-18	295	8
29125.108	.02	66	52	5	3.4	-18	295	8
29187.735	.01	65	52	5	3.8	-18	295	8
29193.503	.02	66	53	5	3.8	-18	295	8
29195.784	.01	62	48	5	3.8	-18	295	8
29197.597	.02	60.1	45.4		3.8	-18	295	8
29199.401	.01	62	48	5	3.8	-18	295	8
29292.723	.05	64	50	3	2.1	-18	295	8
29293.333	.02	62	47	5	2.1	-18	295	8
29293.930	.05	64	51	2	3.0	-18	295	8
29416.948	.05	64	49	4	3.0	-18	295	8
29505.00	.10	66	51	4	1.7	-18	295	8
29505.194	.05	66	51	4	2.1	-18	295	8
29574.147	.02	65	53	4	1.7	-18	295	8
29581.918	.01	60.3	47.7		3.4	-18	295	8
29589.593	.02	67	54	4	2.1	-18	295	8
29599.377	.01	64	49	5	2.1	-18	295	8
29785.581	.02	66	54	5	1.7S	-18	296	8
29917.375	.02	67	54	5	2.1	-18	296	8
29918.396	.01	65	52	5	2.1	-18	295	8
29919.421	.02	67	54	5	2.6	-17	295	8
29999.378	.02	66	54	5	1.7S	-17	295	8
30003.418	.05	66	52	3	2.1	-18	295	8
30003.784	.05	66		1	2.1	-17	295	8
30007.747	.02	67	54	5	2.1	-17	295	8
30076.924	.02	62	45	5	3.8	-17	295	8
30077.219	.05	64	50	2	3.8	-17	295	8
30098.971	.02	64	51	4	1.7	-17	295	8
30100.782	.01	63	50	5	2.1	-17	295	8
30104.795	.02	64	51	4	2.1	-17	295	8
30105.466	.02	64	50	4	2.1	-17	295	8
30109.107	.01	64	52	5	1.7	-17	295	8
30110.156	.01	63	51	5	3.0	-17	295	8
30113.503	.01	65	53	5	3.4	-17	295	8
30118.698	.01	66	51	5	1.7	-17	295	8

NAME: DICHLOROMETHANE			CONTINUED					ID NO. 111.00
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
30188.68	.10	66	53	3	3.0S	-17	295	8
30189.075	.05	65		1	3.8	-17	295	8
30260.665	.02	63	50	4	2.1	-17	295	8
30345.342	.02	66	52	4	1.7	-17	295	8
30346.81	.10	64	51	3	1.7	-17	295	8
30347.224	.05	64		1	2.1	-17	295	8
30348.687	.05	64	50	4	3.8S	-17	295	8
30469.773	.01	65	52	5	2.6	-17	295	8
30490.586	.02	67	53	5	1.7	-17	295	8
30501.270	.01	65	52	5	1.7	-17	295	8
30629.815	.05	67	54	3	1.7	-17	295	8
30631.476	.02	66	53	4	1.7	-17	294	8
30634.914	.05	66	53	3	2.1	-17	294	8
30635.37	.10	65	51	3	2.6	-17	294	8
30635.949	.05	65	51	4	2.1	-17	294	8
30638.294	.02	67	54	5	2.6	-17	294	8
30658.068	.02	66	51	5	1.7	-17	294	8
30699.304	.01	59.7	45.3		1.7	-17	295	8
30763.454	.01	63	50	5	3.8	-17	295	8
30765.011	.02	66	53	4	2.6	-17	295	8
30769.574	.01	58	45	4	2.6	-17	295	8
30775.697	.01	64	51	5	3.8	-17	295	8
30801.433	.02	68	53	5	3.8	-17	295	8
30811.964	.05	66	51	4	3.8	-17	295	8
30902.236	.02	65	50	4	1.7	-17	295	8
30903.700	.01	60.1	46.9		1.7	-17	295	8
30905.162	.02	64	50	4	3.8	-17	295	8
30981.223	.02	64	51	4	2.1	-18	295	8
31136.73	.10	67	52	2	3.0S	-18	295	8
31137.357	.02	67	54	4	3.4	-18	295	8
31139.52	.20	66	49	3	3.0	-18	295	8
31140.16	.10	64	49	2	3.0	-18	295	8
31143.228	.05	66		1	3.8	-18	295	8
31168.808	.05	64	51	3	1.7	-18	295	8
31169.340	.02	61	47	5	2.1	-18	295	8
31169.87	.10	64	50	2	2.1	-18	295	8
31190.151	.02	63	48	4	2.1	-18	295	8
31192.324	.01	60.1	43.7		2.1	-18	295	8
31193.990	.05	61	45	4	3.0	-18	295	8
31197.839	.02	64	48	5	3.0	-18	295	8
31401.047	.05	66	53	3	3.8	-18	295	8
31401.353	.05	66	53	2	3.8	-18	295	8
31402.316	.01	66	53	5	3.8	-18	295	8
31405.831	.05	66	53	3	3.8	-18	295	8
31406.294	.05	65	51	3	3.8	-18	295	8
31406.586	.05	66		1	3.8	-18	295	8
31406.89	.10	64	50	2	1.7	-18	295	8
31408.755	.02	65	52	4	3.4	-18	295	8
31410.510	.05	67	54	3	3.8	-18	296	8
31410.952	.05	67	54	2	3.8	-18	296	8

NAME: DICHLOROMETHANE			CONTINUED					ID NO. 111.00
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
31411.757	.01	66	54	5	3.8	-18	296	8
31412.591	.05	66	52	4	3.8	-18	296	8
31437.884	.02	65	52	5	3.8	-18	296	8
31444.935	.01	64	51	4	3.0	-18	296	9
31446.582	.01	59.6	46.5		3.0	-18	296	8
31448.209	.01	64	51	5	3.0	-18	296	8
31466.004	.02	63	49	4	1.7	-18	296	8
31572.915	.01	60	47	4	2.1	-18	296	8
31573.960	.01	59	45	4	3.8	-18	296	8
31574.431	.05	60		1	3.8	-18	296	8
31574.982	.02	60	46	4	3.8	-18	296	8
31575.671	.02	61	48	4	3.8	-18	295	8
31577.154	.02	65	53	4	3.8	-18	295	8
31579.65	.10	64	51	3	3.8	-18	295	8
31580.06	.10	63	49	3	3.4	-18	295	8
31580.309	.05	62	49	2	3.8	-18	295	8
31582.710	.02	62	49	4	3.8	-18	295	8
31587.197	.01	63	51	5	3.8	-18	295	8
31618.946	.01	59.3	45.6		3.0	-18	295	8
31646.591	.05	66	52	4	3.4S	-18	295	8
31650.582	.02	66	51	4	1.7	-18	295	8
31653.599	.02	66	50	5	1.7	-18	295	8
31657.131	.02	59	44	4	1.7	-18	295	8
31701.662	.02	60	46	4	2.1	-18	295	8
31715.497	.05	60	47	3	3.8	-18	295	8
31716.098	.01	58.7	44.1		3.8	-18	295	8
31716.71	.10	60	47	2	3.8	-18	295	8
31718.731	.01	59.0	45.2		3.8	-18	295	8
31719.571	.02	62	49	4	3.8	-18	295	8
31749.103	.01	62	49	5	2.1	-18	295	8
31782.722	.01	64	50	5	2.6	-18	295	8
31783.57	.10	62	48	3	3.0	-18	295	8
31784.569	.02	64	50	4	3.0	-18	295	8
31797.418	.05	67	54	2	1.7	-18	295	8
31909.584	.01	57.3	42.4		2.1	-18	295	8
31922.644	.01	61	47	5	1.7	-18	295	8
31942.511	.01	57.6	44.1		2.1	-18	295	8
31981.562	.02	66	53	5	2.1	-18	295	8
32003.736	.01	58.1	42.2		2.1	-18	295	8
32088.988	.01	64	52	5	2.1	-18	295	8
32099.223	.01	65	53	5	1.7	-18	295	8
32105.195	.02	66	53	4	3.8	-18	295	8
32192.669	.02	65	52	4	3.0	-18	295	8
32193.625	.02	64	51	4	2.1	-18	295	8
32194.15	.10	67	53	2	3.0S	-18	295	8
32294.872	.05	65	53	3	1.7	-18	295	8
32295.27	.10	63	49	3	2.1S	-18	295	8
32295.628	.05	63	50	2	2.1	-18	295	8
32298.365	.02	65	52	4	2.1	-18	295	8
32299.199	.01	60	47	4	3.0	-18	295	8

NAME: DICHLOROMETHANE			CONTINUED					ID NO. 111.00
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
32300.051	.02	64	51	4	2.6	-18	295	8
32302.75	.10	64	51	3	3.4S	-18	295	8
32303.117	.05	63		1	3.4	-18	295	8
32303.628	.05	64	51	2	3.8	-18	295	8
32317.640	.05	65	52	3	1.7	-18	295	8
32317.867	.05	64	52	2	3.8	-18	295	8
32318.718	.02	64	51	4	3.8	-18	295	8
32321.932	.05	66	54	3	2.1	-18	295	8
32322.315	.05	65		1	2.1	-18	295	8
32322.740	.05	64		1	2.6	-18	295	8
32323.066	.05	65		1	2.6	-18	295	8
32323.38	.10	64	49	2	2.6	-18	295	8
32324.964	.01	65	53	5	2.6	-18	295	8
32327.032	.02	66	53	4	2.6	-18	295	8
32327.515	.02	66	53	5	2.6	-18	295	8
32328.133	.02	66	52	5	3.0	-18	295	8
32328.900	.02	66	53	4	2.6S	-18	295	8
32490.828	.01	57	44	4	3.0	-18	295	8
32535.428	.01	63	50	5	3.4	-18	295	8
32539.365	.01	61	48	5	3.8	-18	295	8
32540.21	.10	64	50	2	3.4	-18	295	8
32544.94	.10	60	44	3	3.4	-18	295	8
32545.44	.10	59	44	2	2.1	-18	295	8
32546.988	.01	64	51	5	3.4	-18	295	8
32550.57	.10	66	51	3	3.4	-18	295	8
32550.971	.01	62	49	4	3.4	-18	295	8
32551.626	.02	66	53	4	3.8	-18	295	8
32573.886	.02	64	51	4	3.4	-17	295	8
32574.73	.10	63	49	3	3.4	-18	295	8
32574.901	.05	63		1	3.4	-18	295	8
32575.727	.02	64	50	4	3.4	-18	295	8
32576.854	.01	65	52	5	3.4	-18	295	8
32593.781	.02	67	52	4	2.6	-17	295	8
32631.282	.01	59.6	44.9		2.1	-18	296	8
32674.108	.01	58	45	4	3.4	-17	296	8
32762.710	.02	67	55	4	3.4	-17	296	8
32764.434	.01	62	50	5	3.8	-17	296	8
32765.196	.02	66	53	4	3.8	-17	296	8
32768.038	.01	57	45	4	2.1	-17	296	8
32768.41	.10	61	48	2	3.8	-17	296	8
32771.658	.01	64	51	5	3.8	-17	296	8
32819.29	.10	62	48	3	3.0	-17	296	8
32819.587	.02	60		1	3.4	-17	296	8
32952.057	.01	66	53	5	2.1	-17	296	8
32960.434	.02	64	47	5	3.4	-17	296	8
33145.883	.02	65	49	5	3.4	-17	296	8
33206.182	.01	58.4	45.1		2.1	-17	296	8
33235.518	.02	62	48	4	2.1	-17	296	8
33238.591	.01	58	45	4	3.0	-17	295	8
33241.660	.02	63	49	5	3.8	-17	295	8

NAME: DICHLOROMETHANE CONTINUED								ID NO. 111.00
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
33254.32	.10	66	52	3	2.6	-17	295	8
33254.90	.10	64	50	2	2.6	-17	295	8
33255.51	.10	66	53	2	2.6S	-17	295	8
33387.47	.10	64	49	4	1.7	-17	295	8
33387.661	.05	64	49	4	3.8	-17	295	8
33388.407	.01	64	52	5	2.1	-17	295	8
33391.816	.05	65	52	3	3.8	-17	295	8
33392.103	.05	64		1	3.8	-17	295	8
33392.496	.05	63		1	3.8	-17	295	8
33393.22	.10	63	48	2	3.8	-17	295	8
33394.566	.01	64	52	5	3.8	-17	295	8
33396.934	.05	66	53	3	3.4	-17	295	8
33397.428	.05	65		1	3.8	-17	295	8
33397.906	.05	65	52	2	3.8	-17	295	8
33398.596	.02	65	52	4	3.0	-17	295	8
33434.732	.01	55.2	41.9		2.1	-17	295	8
33436.503	.01	61	47	5	3.4	-17	295	8
33437.531	.01	59.1	45.5		3.8	-17	295	8
33438.560	.01	61	48	5	3.4	-17	295	8
33625.170	.02	67	53	5	2.1	-17	295	8
33665.004	.01	64	51	4	3.0	-17	295	8
33666.131	.01	60	48	4	1.7	-17	295	8
33667.072	.01	60.1	47.6		3.0	-17	295	8
33669.629	.01	63	50	5	3.8	-17	295	8
33671.75	.10	58	43	2	3.8	-17	295	8
33673.746	.01	61	48	5	3.4	-17	295	8
33676.642	.02	62	49	4	3.4	-17	294	8
33677.226	.01	61	48	5	3.8	-17	295	8
33677.70	.10	65	51	2	3.4	-17	295	8
33678.507	.01	61	48	4	3.8	-17	295	8
33897.312	.02	66	54	4	3.8	-17	295	8
33898.252	.01	66	54	5	3.4	-17	295	8
33903.024	.05	64	51	2	3.4	-17	295	8
33904.911	.01	67	54	5	3.8	-17	295	8
33909.674	.02	67	55	5	3.0	-17	295	8
33923.332	.01	65	51	5	3.8	-17	295	8
33924.69	.10	64	49	2	3.0	-17	295	8
33925.802	.02	65	50	4	3.8	-17	295	8
33946.930	.01	60.0	46.2		2.1	-18	295	8
33997.417	.02	63	48	5	2.1	-18	295	8
34022.553	.01	64	51	5	2.1	-17	295	8
34023.82	.10	64	50	3	2.1	-17	295	8
34024.13	.10	63	50	2	2.6	-17	295	8
34025.385	.01	64	51	5	2.6	-17	295	8
34158.348	.01	59.5	46.1		2.1	-17	295	8
34188.575	.02	67	54	5	1.7	-17	295	8
34286.925	.02	65	52	4	2.1	-17	294	8
34327.901	.01	64	49	5	3.8	-17	294	8
34332.004	.01	59.3	46.1		2.1	-17	294	8
34336.115	.02	64	50	5	1.7S	-17	294	8

NAME: DICHLOROMETHANE CONTINUED ID NO. 111.00

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
34350.259	.02	65	48	5	3.4	-17	294	8
34352.527	.01	63	48	5	3.4	-17	294	8
34408.347	.01	58.4	44.5		2.1	-17	294	8
34606.579	.01	64	51	5	3.4	-17	295	8
34614.994	.02	66	51	5	3.8	-17	295	8
34618.302	.02	63	48	4	3.8	-17	296	8
34619.17	.10	61	47	3	3.8	-17	296	8
34619.969	.02	63	50	4	3.8	-17	296	8
34622.403	.02	62	49	4	3.8	-17	296	8
34623.536	.05	64	50	3	3.8	-17	296	8
34623.774	.05	63		1	3.8	-17	296	8
34624.15	.10	63	48	2	3.8	-17	296	8
34624.609	.05	64		1	3.8	-17	296	8
34624.92	.10	62	48	2	2.6	-17	296	8
34626.121	.01	64	51	5	2.6	-17	296	8
34628.733	.02	65	52	4	3.8	-17	295	8
34629.220	.05	64	51	3	3.0	-17	295	8
34629.615	.05	64	51	2	3.0	-17	295	8
34630.259	.02	64	52	4	2.6	-17	295	8
34636.968	.01	63	50	5	3.4	-17	295	8
34831.677	.02	62	48	4	2.1	-17	295	8
34846.643	.01	65	50	5	2.1	-17	295	8
34865.83	.10	68	55	3	2.1S	-18	295	8
34866.250	.05	66		1	3.8	-17	295	8
34866.568	.05	68		1	2.6	-17	294	8
34866.80	.10	67	54	2	2.1S	-17	295	8
34937.329	.01	62	49	5	1.7	-17	295	8
34947.869	.01	65	52	5	1.7	-17	295	8
34963.801	.02	67	54	4	2.6	-17	295	8
34964.800	.01	59.3	46.8		3.4	-17	295	8
34965.655	.02	64	51	4	2.6	-17	295	8
34968.595	.05	66	52	4	3.8	-17	295	8
34970.00	.10	57	43	3	3.8	-17	295	8
34970.615	.05	54	41	2	3.0	-17	295	8
34972.293	.02	65	53	4	3.0	-17	295	8
34976.460	.01	61	48	4	3.8	-17	295	8
35024.286	.02	65	51	5	1.7S	-17	295	8
35031.057	.02	66	53	5	3.4	-17	295	8
35055.625	.02	68	53	4	2.1	-17	295	8
35066.479	.05	65	52	3	1.7	-17	296	8
35066.894	.05	63		1	1.7	-17	296	8
35067.384	.05	65		1	1.7	-17	296	8
35067.63	.10	64	51	2	2.1	-17	296	8
35126.698	.05	67	54	4	3.4S	-17	296	8
35132.719	.02	65	51	4	3.4	-17	296	8
35204.710	.01	65	53	5	2.1	-17	296	8
35210.517	.02	60	48	4	2.1	-17	296	8
35216.338	.02	66	54	5	3.8	-17	296	8
35344.797	.01	61	48	5	2.1	-17	296	8
35355.193	.01	61	47	5	3.4	-17	296	8

NAME: DICHLOROMETHANE			CONTINUED					ID NO. 111.00
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
35355.768	.05	68		1	3.8S	-17	296	8
35419.432	.01	61	48	5	2.1	-17	296	8
35434.62	.10	68	54	2	1.7	-17	296	8
35437.398	.01	60.5	47.2		2.6	-17	295	8
35451.273	.02	66	54	4	2.1	-17	295	8
35493.144	.02	67	53	4	3.8S	-17	295	8
35515.446	.02	67	54	4	2.1	-17	295	8
35517.833	.01	59.6	44.4		3.0	-17	295	8
35576.842	.02	66	51	5	2.1	-17	295	8
35602.733	.01	64	51	5	3.0	-17	295	8
35615.027	.01	66	53	5	2.1	-17	295	8
35719.041	.01	63	48	5	1.7	-16	295	8
35843.165	.05	64	51	3	3.0	-16	295	8
35843.68	.10	62	47	3	3.8	-16	295	8
35844.200	.05	64	51	2	3.8	-16	295	8
35925.897	.01	63	48	5	3.0	-16	295	8
35993.792	.02	66	52	4	2.1	-16	294	8
36021.263	.02	65	52	4	3.4	-16	294	8
36022.135	.05	62	49	2	3.4	-16	294	8
36022.776	.02	63	50	4	3.0	-16	294	8
36025.463	.05	65	51	4	3.0S	-16	294	8
36026.09	.10	63	49	3	2.1	-16	294	8
36026.68	.20	62	44	2	3.0	-16	294	8
36027.06	.10	62	48	2	3.4	-16	294	8
36027.92	.10	61	45	4	3.4	-16	294	8
36028.964	.01	63	51	5	3.4	-16	294	8
36031.805	.05	64	51	3	3.8	-16	294	8
36032.283	.05	63		1	3.8	-16	294	8
36032.609	.05	63	50	2	3.4	-16	294	8
36033.216	.02	64	51	4	3.4	-16	294	8
36066.504	.02	66	52	4	3.8	-16	295	8
36180.915	.05	62	48	3	3.4	-16	295	8
36181.400	.05	60		1	2.1	-16	295	8
36181.86	.10	62	48	2	3.0	-16	295	8
36269.30	.10	69	53	3	1.7	-16	295	8
36333.647	.01	62	46	5	2.1	-16	295	8
36372.118	.02	63	48	5	2.6	-16	295	8
36374.571	.02	63	47	4	3.8	-16	295	8
36375.256	.02	63	48	4	3.8	-16	295	8
36377.712	.02	63	48	5	3.8	-15	295	8
36444.459	.01	62	49	4	3.8	-15	295	8
36445.376	.01	58.8	46.0		3.8	-15	295	8
36446.167	.01	59.0	46.4		3.4	-15	295	8
36449.440	.01	61	49	4	3.4	-15	295	8
36451.191	.01	56.1	42.1		3.4	-15	295	8
36452.832	.01	60	47	4	2.1	-16	295	8
36456.308	.02	61	48	4	2.6	-16	295	8
36456.874	.05	60	47	3	3.4	-16	295	8
36457.158	.05	63		1	3.0	-16	295	8
36457.898	.01	60.0	47.4		3.4	-16	295	8

NAME: DICHLOROMETHANE CONTINUED								ID NO. 111.00
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
36529.725	.02	64	49	4	2.1	-16	295	8
36530.09	.10	67	53	2	2.1	-16	295	8
36624.948	.02	67	53	5	2.1	-16	294	8
36694.320	.02	68	55	5	3.0S	-15	294	8
36695.230	.02	65	52	4	3.8	-15	294	8
36696.021	.02	65	51	4	1.7	-15	294	8
36701.029	.01	62	48	4	3.4	-15	294	8
36702.665	.02	65	53	4	2.1	-15	295	8
36706.132	.02	66	53	4	3.4	-15	295	8
36706.699	.05	66	53	3	3.0	-16	295	8
36707.719	.01	66	53	5	3.0	-16	296	8
36753.729	.01	64	50	5	1.7	-16	296	8
36774.967	.02	66	52	5	2.1	-16	296	8
36810.641	.02	68	53	5	2.6	-16	297	8
36868.459	.01	58.6	43.8		3.0	-16	297	8
36936.856	.01	63	50	5	2.1	-15	297	8
36962.334	.02	63	50	4	3.0	-15	297	8
36980.420	.02	67	50	5	1.7	-16	297	8
36987.679	.01	65	52	5	3.8	-16	297	8
37022.136	.05	62	49	3	3.4	-16	297	8
37023.268	.01	58	45	4	3.4	-16	297	8
37023.919	.05	65		1	3.8	-16	297	8
37024.401	.01	61	47	4	3.4	-16	297	8
37069.504	.01	62	49	4	3.0	-16	297	8
37070.427	.05	61	48	3	2.1	-16	297	8
37070.63	.10	61	48	2	2.1	-16	297	8
37071.555	.01	62	49	4	3.4	-16	297	8
37113.437	.01	63	51	4	2.6	-16	297	8
37115.013	.05	67	54	3	2.1	-16	297	8
37115.653	.05	66	50	4	2.1	-16	297	8
37116.143	.05	66	54	2	1.7	-16	297	8
37118.05	.10	65	52	3	2.1	-16	296	8
37118.415	.05	66		1	2.1	-16	296	8
37119.14	.10	64	50	3	2.1	-16	296	8
37119.459	.05	65		1	2.1	-16	296	8
37119.877	.05	64	51	2	2.1	-16	296	8
37122.709	.02	63	49	4	3.0	-16	296	8
37130.824	.02	62	47	4	3.8	-16	296	8
37135.185	.02	61	47	4	2.1	-16	296	8
37139.548	.02	62	47	4	2.1	-16	296	8
37151.901	.01	61	45	5	3.0	-16	296	8
37187.408	.02	66	50	4	2.1	-16	296	8
37264.499	.02	64	49	4	3.8	-16	296	8
37267.949	.02	64	50	4	3.8	-16	296	8
37337.599	.01	61	47	5	3.4	-16	296	8
37339.185	.01	59	45	4	3.4	-16	296	8
37340.751	.01	61	47	5	3.4	-16	296	8
37399.722	.02	65	49	5	1.7	-16	296	8
37452.191	.02	66	53	5	3.8S	-16	296	8
37534.475	.01	64	51	5	3.8	-16	296	8

NAME: DICHLOROMETHANE CONTINUED ID NO. 111.00

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
37545.051	.01	62	48	5	2.1	-16	296	8
37547.020	.01	57.2	43.8		2.1	-16	296	8
37548.981	.01	61	48	5	3.0	-16	296	8
37605.373	.02	64	51	4	3.4	-16	296	8
37606.16	.10	61	48	2	3.8	-16	296	8
37606.776	.02	62	49	4	3.8	-16	296	8
37609.705	.02	64	51	4	3.8	-16	296	8
37610.81	.10	61	45	3	3.8	-16	296	8
37611.17	.10	62	48	2	3.8	-16	296	8
37611.729	.05	63		1	3.0	-16	296	8
37612.05	.10	61	47	2	3.8	-16	296	8
37613.033	.01	63	50	4	3.8	-16	296	8
37616.083	.05	63	51	3	3.0	-16	296	8
37616.553	.05	63		1	3.4	-16	296	8
37616.828	.05	62	49	2	3.4	-16	296	8
37617.396	.02	63	50	4	3.8	-16	296	8
37686.98	.10	67	54	3	3.8S	-17	297	8
37687.454	.05	65		1	3.8	-17	297	8
37687.92	.10	67	53	2	3.8	-17	297	8
37738.613	.02	68	54	5	1.7	-17	297	8
37859.20	.10	67	53	3	3.8	-17	297	8
37863.92	.10	67	49	4	3.8	-17	297	8
37865.17	.10	67	52	2	3.0	-17	297	8
37877.910	.01	58.1	42.4		3.0	-17	297	8
37990.178	.01	56.8	41.7		3.4	-17	297	8
38013.70	.10	66	52	3	3.0	-17	297	8
38093.042	.01	62	47	5	2.1	-17	297	8
38117.813	.05	65	51	4	3.0	-17	297	8
38118.664	.01	58	46	4	2.6	-17	297	8
38119.404	.02	63	50	4	1.7	-17	297	8
38122.984	.02	64	51	4	3.4	-17	297	8
38124.667	.01	53	40	4	2.1	-17	297	8
38126.130	.02	63	51	4	3.4	-17	297	8
38129.881	.05	64	52	3	3.4	-17	297	8
38130.690	.05	59	47	2	1.7	-17	297	8
38131.355	.05	64	51	4	1.7S	-17	297	8
38142.809	.02	67	54	4	1.7	-16	297	8
38193.039	.02	65	51	4	3.8	-16	297	8
38193.56	.10	67	52	2	3.8	-16	298	8
38204.966	.02	62	46	4	1.7	-16	298	8
38206.121	.05	60	44	4	1.7	-16	298	8
38207.261	.02	61	46	4	1.7	-16	298	8
38238.345	.02	67	54	4	3.0	-16	298	8
38239.050	.02	64	50	4	3.0	-16	298	8
38239.664	.02	64	52	4	3.0	-16	298	8
38241.87	.10	64	48	3	2.1	-16	298	8
38242.152	.05	64		1	3.0	-16	298	8
38242.55	.10	63	49	2	3.0	-16	298	8
38243.553	.01	65	53	5	3.0	-16	298	8
38244.779	.05	66	54	3	3.0	-16	298	8

NAME: DICHLOROMETHANE		CONTINUED					ID NO. 111.00	
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
38245.109	.05	66		1	3.0	-16	298	8
38245.483	.05	65	53	2	3.0	-16	298	8
38245.983	.05	65	54	2	3.0S	-16	298	8
38267.29	.10	68	54	2	1.7	-16	298	8
38293.558	.01	58.7	45.4		1.7	-16	298	8
38359.869	.05	57	42	4	2.1	-16	298	8
38379.751	.01	64	52	5	2.6	-16	298	8
38383.413	.01	61	48	5	3.0	-16	298	8
38385.743	.01	59	46	4	3.0	-16	298	8
38391.744	.05	65	52	2	3.8	-16	298	8
38416.483	.01	65	52	5	1.7	-16	298	8
38429.813	.01	56.1	42.4		1.7	-16	298	8
38433.353	.01	59.1	45.3		3.0	-16	297	8
38457.848	.02	66	52	4	1.7	-16	297	8
38459.430	.02	65	50	4	1.7	-16	297	8
38461.001	.02	67	53	5	2.1	-16	297	8
38510.178	.01	62	49	4	2.1	-16	297	8
38511.74	.10	62	48	3	2.1	-16	297	8
38512.19	.10	62	48	2	2.1	-16	297	8
38513.755	.01	62	49	5	2.1	-16	297	8
38527.773	.05	61	48	3	1.7	-16	297	8
38528.370	.01	59.0	45.4		2.1	-16	297	8
38528.962	.05	61	47	2	2.1	-16	297	8
38601.366	.01	63	49	5	2.1	-16	297	8
38604.144	.02	66	53	4	3.4	-16	297	8
38609.102	.01	56.8	43.6		3.0	-16	297	8
38647.522	.02	65	52	4	3.0	-16	297	8
38671.762	.01	56.1	42.1		2.1	-16	297	8
38691.566	.01	63	51	5	1.7	-16	297	8
38699.791	.01	62	50	5	1.7	-16	297	8
38750.13	.10	60	47	3	2.1	-16	297	8
38750.591	.01	57.0	43.2		2.1	-16	297	8
38751.05	.10	60	47	2	2.1	-16	297	8
38786.752	.02	68	55	4	2.1	-16	297	8
38789.719	.01	65	52	5	1.7	-15	297	8
38791.463	.02	65	52	5	2.1S	-15	297	8
38798.141	.01	65	53	5	3.4	-15	297	8
38859.020	.01	55.6	39.7		2.1	-15	297	8
39017.035	.01	58.5	41.5		2.1	-15	297	8
39069.009	.01	56.5	43.5		2.1	-15	297	8
39136.730	.01	54.4	41.3		2.1	-15	297	8
39214.355	.01	57.7	43.5		2.1	-15	296	8
39282.102	.05	67	52	4	1.7	-15	296	8
39283.241	.05	65	49	4	1.7	-15	296	8
39284.372	.02	67	52	4	1.7	-15	296	8
39302.348	.02	62	49	4	2.1	-15	297	8
39339.712	.02	67	54	5	1.7	-15	297	8
39380.951	.02	64	51	4	2.1	-15	297	8
39381.689	.02	61	47	4	2.1	-15	297	8
39382.295	.01	62	49	4	2.1	-15	297	8

NAME: DICHLOROMETHANE			Concluded					ID NO. 111.00
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
39385.443	.02	64	51	4	2.6	-15	297	8
39386.47	.10	61	45	3	3.8	-15	297	8
39386.791	.05	61	48	2	3.4	-15	297	8
39387.746	.05	60	47	2	3.8	-15	297	8
39388.646	.01	62	50	5	3.8	-15	297	8
39391.905	.05	63	50	3	2.1	-15	298	8
39392.360	.05	62		1	3.8	-15	298	8
39392.58	.10	62	48	2	3.0	-15	298	8
39393.118	.05	62	50	2	3.8	-15	298	8
39403.195	.02	66	51	4	3.8	-15	298	8
39565.472	.02	65	51	5	1.7S	-14	298	8
39569.144	.05	65	50	4	2.1S	-14	298	8
39570.185	.05	65	50	4	1.7	-14	298	8
39573.846	.02	65	50	4	2.1	-14	298	8
39581.115	.01	63	49	4	1.7	-14	298	8
39585.751	.01	59.1	46.0		1.7	-14	298	8
39590.386	.01	64	49	5	3.0	-14	298	8
39646.563	.02	67	53	4	2.1	-14	298	8
39651.33	.10	67	51	3	3.0	-14	298	8
39651.65	.10	68	55	2	3.4S	-14	298	8
39652.60	.10	67	53	2	3.8	-14	298	8
39676.568	.01	56.8	43.7		2.1	-14	298	8
39794.333	.01	63	49	5	3.4	-14	298	8
39795.57	.10	62	48	3	3.8	-14	298	8
39795.85	.10	62	49	2	3.0	-14	298	8
39797.072	.01	63	50	4	3.8	-14	298	8
39828.252	.02	64	48	5	3.4	-14	298	8
39836.444	.05	64	50	4	3.4	-14	298	8
39874.32	.10	64	50	3	2.6	-14	298	8
39874.615	.05	62		1	3.0	-14	298	8
39874.92	.10	65	51	2	2.1	-14	298	8
39994.918	.01	60	48	4	2.1	-14	296	8
39995.773	.01	58	45	4	2.1	-14	296	8
39996.534	.01	58	45	4	3.0	-14	296	8
40000.388	.01	60	47	4	1.7	-14	297	8
40001.900	.01	52	38	4	2.1	-14	297	8
40003.343	.01	58.3	45.3		3.4	-14	297	8

1,1-Difluoroethene

Formula: $CH_2:CF_2$
CAS Registry number: 75-38-7
Synonyms: 1,1-difluoroethylene; vinylidene fluoride; Genetron-1132A
NBS identification number: 77.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Matheson bottled gas with a stated minimum purity of 99 percent. Gas chromatography using a Chromosorb 102 column showed only a small air peak and one other impurity of 0.03 percent.

Remarks: The sample pressure of 15 millitorr was registered by a thermocouple gage as 34 millitorr.

An attempt was made to confirm sample identity by matching observed frequencies with calculated values from reference 4. Nine lines appeared to match, but the accuracies in the literature were only cited as 0.3 and 1.0 MHz so it was not possible to be certain of the assignments. Many of the frequencies disagreed by more than the stated errors. However, a list of observed lines without theoretical transitions assigned was also given in the reference, and many more lines were found to agree if the assumption was made that the measurement accuracy was not as good as stated.

NAME: 1,1-DIFLUOROETHENE ID NO. 77.00

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
26635.557	.01	51.7	39.4		2.1	-18	295	15
26651.672	.02	61	50	5	3.8S	-18	295	15
26830.689	.02	62	51	4	3.0	-17	295	15
26864.799	.01	55.1	43.7		2.1	-17	295	15
26881.218	.01	58.8	46.9		3.0	-17	295	15
26955.131	.02	67	55	4	2.1	-17	295	15
26992.788	.02	55	43	4	2.1	-17	295	15
27014.946	.02	59	47	4	2.6	-17	295	15
27111.035	.05	65	53	4	2.1S	-17	295	15
27213.612	.02	66	54	5	3.0	-17	295	15
27298.036	.01	54.8	42.8		2.1	-17	295	15
27414.566	.02	66	55	5	3.4	-17	295	15
27483.759	.02	67	55	5	2.1	-17	295	15
27681.725	.02	63	51	5	2.1	-17	295	15
27746.480	.02	67	55	5	2.1	-17	295	15
27819.332	.01	56.3	44.2		2.1	-17	295	15
27974.027	.02	63	51	5	3.0	-17	295	15
28011.424	.02	65	53	5	2.1	-17	295	15
28118.466	.02	66	56	4	2.1	-17	295	15
28149.877	.02	67	54	4	1.7	-17	295	15
28176.574	.01	52	40	4	2.1	-17	295	15
28408.981	.05	63	51	4	2.1	-17	295	15
28438.623	.02	65	53	5	1.7	-17	295	15
28474.589	.02	65	53	4	2.1	-18	295	15
28607.095	.02	67	55	5	1.7S	-18	295	15
28694.416	.01	53.6	41.5		2.1	-18	295	15
28853.770	.02	66	54	5	2.1	-18	295	15
28857.542	.02	66	54	4	3.8	-18	295	15
28895.492	.01	63	51	5	2.6	-18	295	15
28913.723	.02	65	53	5	1.7	-18	295	15
28947.459	.02	63	51	5	3.0	-18	295	15
29164.406	.01	63	52	5	2.1	-18	295	15
29305.209	.01	54.9	43.2		2.1	-18	295	15
29309.900	.01	61	48	5	3.8	-18	295	15
29367.789	.01	60.4	48.0		2.1	-18	294	15
29372.503	.01	56.7	45.7		3.0	-18	294	15
29710.972	.02	67	55	5	2.6	-18	294	15
29812.294	.02	66	54	5	2.6	-18	294	15
30063.996	.01	55.5	43.3		2.1	-17	294	15
30305.533	.01	60.4	48.2		2.1	-17	294	15
30384.200	.01	62	50	5	2.1	-17	294	15
30439.377	.01	53.2	40.8		2.1	-17	294	15
30659.737	.01	51.3	39.1		2.1	-17	294	15
30675.576	.01	53.3	41.0		3.8	-17	294	15
31215.779	.02	64	51	5	3.0	-18	294	15
31272.483	.02	65	53	5	3.8	-18	294	15
31359.764	.01	65	54	5	2.1	-18	294	15
31537.064	.02	65	52	5	2.1	-18	294	15
31592.052	.01	66	55	5	3.4	-18	294	15
31671.523	.02	67	55	5	2.1S	-18	294	15

NAME: 1,1-DIFLUOROETHENE CONTINUED								ID NO. 77.00
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
31811.759	.02	63	51	4	2.6	-18	294	15
31901.869	.01	58.7	47.9		2.1	-18	294	15
32013.960	.02	63	52	4	3.0	-18	294	15
32034.579	.02	64	52	5	3.4	-18	294	15
32083.452	.01	53.0	40.7		2.1	-18	294	15
32312.834	.02	66	54	5	3.0	-18	294	15
32362.692	.01	55.7	44.4		2.1	-18	294	15
32439.914	.02	65	53	5	3.0	-18	294	15
32520.343	.01	62	50	5	3.8	-18	294	15
32549.495	.02	64	52	5	2.1	-18	294	15
32766.961	.02	51	38	4	3.0	-17	294	15
32842.008	.02	65	53	5	2.1	-17	294	15
32880.643	.02	66	54	5	2.1	-17	294	15
32996.957	.02	66	54	4	2.1	-17	294	15
33101.432	.01	62	49	5	2.1	-17	294	15
33169.099	.02	66	53	5	2.1	-17	294	15
33194.073	.01	62	50	5	2.1	-17	294	15
33266.288	.02	62	50	5	3.0	-17	295	15
33509.760	.01	59.8	47.5		2.1	-17	295	15
33988.947	.02	67	55	5	2.1	-17	295	15
34021.787	.01	50.0	37.6		2.1	-18	295	15
34094.045	.02	67	55	5	2.1	-18	295	15
34268.106	.01	58.2	45.9		2.1	-17	295	15
34275.714	.01	59.7	47.4		3.0	-17	295	15
34277.908	.02	66	54	5	3.4	-17	295	15
34410.709	.01	52.8	40.5		3.0	-17	295	15
34443.513	.01	51.4	39.6		2.1	-17	295	15
34510.474	.01	61	51	4	2.1	-17	295	15
34686.428	.02	64	52	5	3.4	-17	295	15
34689.250	.02	63	51	5	3.4	-17	295	15
34881.922	.01	64	53	5	3.8	-17	295	15
34900.689	.01	55.1	42.8		2.1	-17	295	15
35145.586	.01	52.4	40.3		2.1	-17	295	15
35215.889	.02	65	52	4	3.8	-17	295	15
35246.365	.02	67	56	4	2.1	-17	295	15
35357.183	.01	57.2	46.2		2.1	-17	295	15
35361.025	.02	66	54	5	3.8S	-17	295	15
35395.763	.01	61	49	5	2.6	-17	295	15
35561.661	.01	62	50	5	1.7	-17	295	15
35570.708	.01	62	50	5	3.8	-17	295	15
35614.589	.01	50.5	38.3		3.0	-17	295	15
35768.547	.02	62	50	5	3.0	-16	295	15
35793.417	.02	65	53	5	3.4	-16	295	15
36421.982	.02	66	54	4	2.6	-16	295	15
36433.031	.01	52.9	40.9		3.4	-16	295	15
36455.652	.01	60.0	48.0		3.4	-16	295	15
36499.154	.02	64	52	5	3.8	-16	295	15
36515.641	.01	58.6	46.2		3.4	-16	295	15
36539.815	.02	63	51	4	2.6	-16	295	15
36590.577	.01	62	50	5	3.0	-16	295	15

NAME: 1,1-DIFLUOROETHENE			CONTINUED					ID NO. 77.00
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
36616.137	.02	67	54	5	3.4	-16	295	15
36632.100	.01	55.6	43.5		2.1	-16	295	15
36664.889	.02	67	55	5	1.7	-16	295	15
36685.667	.02	66	54	5	3.0S	-16	295	15
36805.922	.02	66	54	4	3.8	-16	295	15
36949.395	.01	51	39	4	3.8	-15	295	15
36958.623	.05	63	51	4	3.8	-15	295	15
37009.475	.02	66	54	4	3.8	-16	295	15
37015.434	.02	63	51	4	3.8	-16	295	15
37129.640	.02	66	55	4	2.1	-16	295	15
37199.402	.01	63	51	5	2.1	-16	295	15
37258.832	.02	64	52	4	3.8	-16	295	15
37262.453	.02	52	39	4	3.4	-16	295	15
37267.030	.02	60	48	4	3.8	-16	295	15
37337.562	.01	59.7	47.6		3.0	-16	295	15
37346.969	.05	67	54	4	3.8	-16	295	15
37373.046	.01	65	54	5	1.7	-16	295	15
37374.786	.02	65	53	5	3.8	-16	295	15
37379.612	.02	66	54	4	1.7	-16	295	15
37384.031	.02	62	50	5	2.1	-16	295	15
37395.53	.10	61	49	2	3.4	-16	295	15
37403.961	.02	67	55	4	3.0	-16	295	15
37414.916	.01	53	41	4	2.1	-16	295	15
37416.425	.01	53.0	41.3		3.0	-16	295	15
37426.299	.02	54	42	4	2.6	-16	295	15
37434.737	.01	60.5	48.4		3.0	-16	294	15
37444.736	.02	52	40	4	3.0	-16	294	15
37446.18	.10	62	49	2	2.6S	-16	294	15
37450.381	.02	66	54	5	1.7S	-16	294	15
37458.461	.01	50.5	38.7		3.8	-16	294	15
37462.318	.01	50.2	38.1		3.8	-16	294	15
37474.341	.01	63	51	5	1.7	-16	294	15
37480.896	.01	55.2	43.4		3.0	-16	294	15
37484.530	.02	66	55	4	2.1	-16	294	15
37486.560	.02	66	54	4	2.6	-16	294	15
37492.153	.02	66	55	5	2.6	-16	294	15
37495.637	.02	65	53	5	2.1	-16	294	15
37498.456	.01	57.8	46.3		3.4	-16	294	15
37514.580	.01	55.6	43.6		3.8	-16	294	15
37521.492	.02	65	54	4	2.6	-16	294	15
37540.867	.02	60	48	4	3.8	-16	294	15
37542.21	.10	63	51	2	3.4	-16	294	15
37556.060	.02	63	51	5	3.0	-16	294	15
37571.487	.01	65	54	5	1.7	-16	294	15
37580.950	.02	63	51	4	3.0	-16	294	15
37587.692	.02	62	50	5	2.6	-16	294	15
37592.627	.02	62	51	4	2.1	-16	294	15
37609.573	.01	52	40	4	3.4	-16	294	15
37627.769	.02	65	53	4	3.4	-16	294	15
37649.398	.02	64	51	4	3.0	-16	294	15

NAME: 1,1-DIFLUOROETHENE Concluded								ID NO. 77.00
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
37759.341	.01	59.3	47.0		3.8	-17	294	15
37792.399	.01	61	49	5	3.4	-16	294	15
37871.247	.02	65	53	5	2.1	-17	294	15
37948.665	.01	49.8	37.5		2.1	-17	294	15
37971.829	.01	61	49	5	3.0	-17	294	15
38010.721	.01	62	50	5	3.0	-17	295	15
38062.140	.01	52.0	40.6		2.1	-17	295	15
38144.449	.01	61	49	5	2.1	-16	295	15
38255.425	.01	62	50	5	2.1	-16	295	15
38330.523	.02	64	51	5	1.7	-16	295	15
38350.782	.01	59.0	48.2		1.7	-16	295	15
38388.777	.02	63	50	5	3.0	-16	295	15
38426.330	.01	62	50	5	2.6	-16	295	15
38522.121	.02	67	55	5	2.1	-16	295	15
38586.469	.01	52.3	39.9		2.1	-16	295	15
38588.53	.20	68	53	2	2.1	-16	295	15
38627.159	.01	53.0	40.6		2.1	-16	295	15
38656.195	.02	67	55	5	2.1	-16	295	15
38859.968	.01	59.0	46.7		2.1	-15	295	15
38944.017	.02	68	55	5	2.1	-15	295	15
39229.047	.02	64	51	5	3.8	-15	295	15
39244.292	.02	61	49	5	3.8	-15	295	15
39366.841	.02	65	52	5	1.7	-14	295	15
39425.968	.01	49.2	36.9		3.0	-14	295	15
39500.233	.01	60.4	47.9		3.0	-14	295	15
39529.375	.02	65	52	4	3.0	-14	295	15
39564.251	.01	52.5	40.5		3.0	-14	295	15
39656.258	.01	49.8	37.4		2.1	-14	295	15
39849.463	.02	65	52	4	3.0	-14	295	15

Fluorobenzene

Formula: C_6H_5F
CAS Registry number: 462-06-6
Synonym: phenyl fluoride
NBS identification number: 68.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Eastman 2793. Gas chromatography using a Chromosorb 102 column showed only a single impurity peak of 0.05 percent.

Remarks: The sample pressure of 15 millitorr was registered as 58 millitorr by a thermocouple gage.

Sample identity was confirmed by matching five of the observed lines with calculated transition frequencies from reference 4.

NAME: FLUOROBENZENE ID NO. 68.00

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
26529.015	.02	64	50	5	2.6	-18	297	15
26605.008	.05	60	47	4	3.8	-18	297	15
26756.447	.02	67	54	5	3.4	-18	297	15
26959.986	.02	64	50	5	3.8	-17	297	15
26966.556	.02	67	53	4	3.4	-17	298	14
27163.057	.02	65	51	5	3.0	-17	298	14
27187.934	.02	67	53	5	3.4	-17	298	14
27608.051	.02	66	53	5	3.0	-17	298	14
27864.088	.02	66	53	5	3.4	-17	298	14
28277.798	.01	62	48	5	2.1	-17	298	16
29354.129	.02	61	48	5	3.8	-18	298	16
29738.917	.02	67	54	5	3.4S	-18	298	16
30029.076	.01	61	49	5	3.8	-18	298	16
30052.036	.02	64	52	5	3.8	-18	298	16
30100.954	.01	58.7	45.4		3.8	-17	297	15
30122.395	.02	66	52	4	3.0	-18	298	16
30395.001	.02	66	53	5	3.0	-17	298	16
30671.17	.10	62	49	2	3.8	-17	298	16
30675.761	.05	65	53	4	3.8S	-17	298	16
30758.348	.05	61	48	5	2.1S	-17	298	16
30803.348	.02	62	48	4	3.8	-17	298	15
30823.197	.02	65	52	4	3.8	-17	298	15
30860.590	.05	66	51	5	3.4S	-17	298	15
30866.302	.05	65	51	5	2.1S	-18	298	15
30996.753	.02	61	47	5	3.4	-18	298	15
31145.146	.02	61	47	5	3.8	-18	298	15
31852.182	.02	68	54	4	3.8	-18	297	15
32205.906	.02	62	49	4	3.8	-18	297	15
32236.516	.05	65	52	4	2.1S	-18	297	15
32970.412	.01	58.7	45.4		3.8	-17	297	15
32979.04	.10	67	54	3	2.1	-17	297	15
32986.983	.05	67	54	4	2.1S	-17	297	15
33147.368	.02	65	52	4	3.8	-17	297	15
33173.905	.01	58.7	45.8		3.8	-17	297	15
33190.902	.02	66	54	5	3.4	-17	297	15
33307.280	.02	67	54	4	3.4	-17	297	15
33548.867	.02	65	52	5	3.8	-17	297	15
33581.040	.02	60	48	4	3.8	-17	297	15
33596.84	.10	66	54	3	3.8	-17	297	15
33607.232	.02	63	50	4	3.8	-17	297	15
33615.173	.02	59	47	4	3.8	-17	297	15
33640.535	.02	66	54	5	3.8	-17	296	15
34070.818	.02	67	54	5	3.0S	-18	296	15
34149.693	.01	60.5	47.7		3.8	-17	296	15
34154.385	.05	64	51	4	3.8	-17	296	15
34160.15	.10	66	53	2	3.8	-17	296	15
34244.577	.02	67	54	5	3.4	-17	296	15
34763.705	.02	67	54	5	3.4S	-17	296	15
35061.468	.05	67	54	4	3.4	-17	296	15
35073.098	.02	61	47	4	3.8	-17	296	15

NAME: FLUOROBENZENE		CONTINUED						ID NO. 68.00
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
35093.846	.02	64	51	5	3.4	-17	296	15
35108.292	.02	65	51	5	3.8	-17	297	15
35139.85	.10	62	49	4	2.1S	-17	297	15
35165.598	.05	65	52	5	2.1S	-17	297	15
35232.218	.02	59	44	4	3.8	-17	297	15
35245.091	.05	68	52	4	3.4	-17	297	15
35258.419	.02	66	51	4	3.8	-17	298	15
35349.492	.02	66	53	5	3.8	-17	298	15
35379.893	.05	62	48	5	3.4S	-17	298	15
35386.35	.20	68	53	3	3.8S	-17	298	15
35402.492	.05	62	48	4	3.0S	-17	298	15
35406.772	.05	65	51	5	3.0S	-17	298	15
35429.891	.05	65	52	5	2.1S	-17	298	15
35520.584	.02	59	45	4	3.8	-17	298	15
35533.141	.02	67	53	5	2.1	-17	298	15
35546.674	.02	67	53	4	3.4	-17	298	15
35557.861	.02	64	51	5	3.8	-17	298	15
35703.970	.02	67	54	5	3.4	-17	298	15
35902.901	.01	58.7	45.0		3.0	-16	297	15
35916.00	.10	66	52	2	3.0	-16	298	15
35934.967	.02	66	53	4	3.0	-16	298	15
35959.729	.02	67	54	5	3.8	-16	298	15
35998.356	.02	64	51	5	3.8	-16	298	15
36585.530	.05	66	53	4	3.4	-16	298	15
36900.573	.02	58	45	4	3.8	-16	298	15
36915.387	.05	66	53	4	3.8	-16	298	15
36918.883	.02	65	52	4	3.8	-15	296	15
37124.238	.02	59	47	4	3.8	-16	296	15
37139.923	.02	57	45	4	3.8	-16	296	15
37153.814	.02	62	50	4	3.8	-16	297	15
37169.068	.02	64	52	4	3.8	-16	297	15
37247.265	.02	65	52	5	3.0	-16	297	15
37332.30	.10	66	53	4	3.8S	-16	297	15
37351.582	.02	60	47	4	3.8	-16	297	15
37385.067	.02	63	50	4	3.0	-16	297	15
37398.273	.01	57.4	44.5		3.8	-16	298	15
37411.291	.05	65	52	4	3.8	-16	298	15
37532.934	.02	60	47	4	3.8	-17	298	15
37540.572	.02	63	50	4	3.8	-16	298	15
38053.550	.02	66	53	4	1.7	-17	298	15
39030.347	.02	67	54	5	3.4	-15	298	15
39219.353	.02	64	51	5	3.8	-15	298	15
39230.963	.01	58.9	45.7		3.8	-15	298	15
39251.915	.02	63	50	4	2.1	-15	298	15
39522.217	.05	59	46	4	3.0S	-14	298	15
39536.874	.05	67	55	5	3.0S	-14	298	15
39548.942	.02	66	53	4	3.8	-14	297	15
39551.127	.05	66	53	4	3.0S	-14	297	15
39589.003	.05	65	52	5	3.0S	-14	297	15
39606.381	.01	58.3	45.5		1.7	-14	295	15

NAME: FLUOROBENZENE Concluded ID NO. 68.00

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
39620.95	.20	67	53	2	3.8S	-14	296	15
39635.737	.02	61	48	5	3.0S	-14	296	15
39737.540	.05	59	45	6	2.1S	-14	296	15
39739.289	.05	66		1	2.1	-14	297	15
39740.35	.10	59	45	4	2.1S	-14	297	15
39752.06	.20	68	53	3	2.1S	-14	297	15
39767.697	.05	64	51	5	3.0S	-14	298	15
39770.47	.10	66	53	4	2.1S	-14	297	15
39916.900	.02	66	53	5	3.8	-14	297	15
39934.908	.02	60.3	46.7		3.8	-14	298	15
39965.550	.02	63	49	4	3.8	-14	298	15
39986.644	.02	66	53	5	3.0S	-14	298	15

Fluoroethene

Formula: CH_2:CHF
CAS Registry number: 75-02-5
Synonyms: fluoroethylene; vinyl fluoride
NBS identification number: 148.00
Frequency range: 18 000 to 40 000 MHz

Sample: The sample source was Matheson bottled gas. Gas chromatography using a Chromosorb 102 column showed an air peak of 0.24 percent and one other impurity of 0.09 percent.

Remarks: Some of the lines may not have been completely modulated at the maximum field of 3.8 kV/cm.

Data in the 18 000- to 26 500-MHz range are considered to be of lower quality because of the less accurate calibrations available at the time.

The sample pressure of 15 millitorr was registered by a thermocouple gage as 36 millitorr.

Sample identity was confirmed by matching seven of the observed lines with calculated transitions from reference 4.

NAME: FLUOROETHENE ID NO. 148.00

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
18723.168	.05	69	57	4	3.8		301	15
19674.388	.02	62	50	5	3.8		301	15
19738.72	.10	69	57	2	3.8		300	15
19754.893	.02	58	45	7	2.1		300	15
19775.437	.05	66	54	4	3.0		300	15
19953.424	.05	62	50	4	3.4		300	15
20102.225	.02	62	49	5	2.1		300	15
20207.269	.02	63	50	5	3.8		300	15
20278.297	.05	64	52	5	3.0		299	15
20795.683	.02	61	48	5	2.6		299	15
21336.574	.02	65	54	5	2.6		299	15
21414.976	.02	63	51	5	3.8		299	15
21744.284	.02	65	53	5	2.1		299	15
22765.898	.02	61	49	5	2.6		299	15
24968.252	.02	61	49	5	3.8		298	15
25006.154	.05	70	59	4	3.8		298	15
25120.156	.02	65	53	5	2.6		298	15
26009.109	.05	71	59	4	3.0		299	15
26243.655	.05	62	49	4	3.8		299	15
26279.966	.05	61	48	4	2.1		299	15
26724.207	.02	64	52	5	3.8	-17	295	15
27203.255	.01	63	51	5	3.8	-17	295	15
27785.083	.01	57.7	45.0		3.8	-16	295	15
27924.655	.01	59.9	47.4		3.8	-17	295	15
27933.683	.01	59.8	47.5		3.4	-17	295	15
28196.461	.01	58.1	45.4		3.0	-17	295	15
28309.079	.01	57.1	44.5		3.0	-17	295	15
28344.514	.01	59.3	47.0		3.0	-17	295	15
28412.979	.02	56	44	4	2.1	-17	295	15
28449.003	.02	67	54	5	2.1	-17	295	15
28685.021	.01	57.4	44.7		3.0	-18	295	15
29318.676	.01	57.8	45.0		2.1	-18	295	15
29367.629	.01	63	51	5	2.1	-18	295	15
29851.567	.05	67	54	5	3.8S	-18	295	15
30038.764	.01	58.7	46.3		3.0	-18	295	15
30090.263	.01	62	51	5	2.1	-17	295	15
30394.303	.01	56.7	43.9		3.0	-17	295	15
31129.801	.01	57.6	45.0		3.4	-18	295	15
31668.238	.01	66	54	5	3.4	-18	295	15
31795.773	.01	57.9	45.4		3.0	-18	295	15
31852.113	.01	57.6	45.4		3.8	-18	295	15
34085.625	.02	67	54	4	3.8	-18	295	15
34275.289	.01	57.0	44.3		3.8	-17	295	15
34479.399	.01	56.6	43.9		3.8	-17	295	15
34630.890	.02	61	49	4	3.8	-17	295	15
34839.771	.02	67	54	4	3.8	-17	295	15
34942.180	.01	62	51	5	3.0	-17	295	15
35469.294	.01	58	45	4	2.1	-17	295	15
35860.208	.01	58.6	46.3		3.8	-16	295	15
36889.327	.01	62	50	5	2.1	-15	294	15

NAME: FLUOROETHENE			Concluded					ID NO. 148.00
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
36987.074	.02	62	50	4	3.8	-15	294	15
37361.059	.01	55.3	42.7		3.4	-16	293	15
37375.482	.02	61	50	4	3.8	-16	293	15
37552.167	.01	57.0	44.6		3.0	-16	294	15
37703.896	.02	65	51	5	3.8	-16	294	15
37839.737	.01	54.3	41.5		3.0	-17	294	15
37952.103	.01	59.6	46.9		3.8	-16	294	15
37989.24	.20	63	48	3	3.8	-16	294	15
37991.258	.01	49.5	36.9		3.8	-17	294	15
38279.69	.20	66	52	3	3.8S	-16	295	15
38280.916	.01	56.9	44.5		3.8	-16	295	15
38328.370	.02	67	54	4	1.7	-16	295	15
38337.766	.02	65	52	5	3.4	-16	295	15
38615.044	.01	63	51	5	2.1	-15	295	15
38871.538	.02	63	51	5	2.1S	-15	295	15
39400.512	.02	67	54	5	3.0S	-14	295	15
39445.338	.02	58	45	4	1.7	-14	295	15
39459.402	.02	63	50	4	3.8	-14	295	15
39477.994	.01	47.9	35.3		2.1	-14	294	15
39712.665	.02	64	53	5	3.8S	-14	294	15

1-Fluoro-4-methylbenzene

Formula: $FC_6H_4CH_3$
CAS Registry number: 352-32-9
Synonym: p-fluorotoluene
NBS identification number: 935.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Eastman 2969. Gas chromatography using a Chromosorb 102 column showed two impurity peaks of 0.03 and 0.02 percent.

Remarks: The lines are wide and distorted by unresolved overlaps. Therefore, the frequencies and intensities may be pressure sensitive.

The sample pressure of 10 millitorr was registered as 47 millitorr by a thermocouple gage.

NAME: 1-FLUORO-4-METHYLBENZENE ID NO. 935.00

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
28387.09	.20	68	49	3	3.4	-17	295	10
30962.60	.20	67	50	2	3.8	-17	295	10
30977.957	.05	67	51	5	3.8S	-17	296	10
30982.13	.20	68	50	2	3.8S	-17	296	10
30986.05	.20	68	51	2	3.8	-17	296	10
33529.96	.20	67	50	3	3.8S	-17	296	10
33539.423	.02	68	51	5	3.4	-16	296	10
33541.80	.20	66	51	3	3.8S	-16	296	10
33549.39	.20	67	51	3	3.4S	-16	296	10
33553.20	.20	67	49	3	3.8	-16	296	10
33556.65	.10	67		1	3.4S	-16	296	10
33571.46	.10	66	48	4	3.8S	-16	296	10
33577.534	.02	66	50	5	3.4	-16	296	10
36107.99	.20	67	51	3	3.8S	-15	296	10
36110.77	.10	65		1	3.8S	-15	296	10
36116.89	.20	67	49	2	3.0S	-15	296	10
36120.35	.10	66		1	3.8	-15	296	10
36121.54	.20	68	49	2	3.8S	-15	296	10
36128.89	.20	67	48	3	3.4	-15	296	10
36129.42	.10	67		1	3.8S	-15	296	10
36137.08	.20	68	51	2	3.0	-15	296	10
36146.26	.10	63	46	4	3.8	-15	296	10
38674.42	.10	65	50	3	3.8	-15	296	10
38682.09	.20	66	48	3	3.8	-15	296	10
38686.17	.20	66	50	4	3.8S	-15	296	10
38689.05	.20	67	50	2	3.8	-15	296	10
38694.47	.10	66		1	3.8S	-15	296	10
38699.27	.10	67		1	3.8	-15	296	10
38704.61	.10	67		1	3.8S	-15	296	10
38705.48	.20	65	49	2	3.8	-15	296	10
38707.77	.20	66	49	2	3.8S	-15	296	10
38710.86	.10	65	47	4	3.8S	-15	297	10
38716.39	.20	67	49	2	3.8S	-15	297	10
38721.72	.20	66	50	3	3.8S	-15	297	10
38722.55	.10	67		1	3.8	-15	297	10
38726.73	.20	66	48	2	3.8S	-15	297	10
38729.70	.20	67	48	3	3.8	-15	297	10
38740.61	.20	67	51	2	3.8S	-15	297	10
38742.069	.02	65	48	5	3.8	-15	297	10
38757.64	.20	66	51	2	3.8S	-15	297	10
38767.33	.20	65	51	3	3.8S	-15	297	10
38783.264	.05	66	51	4	3.0S	-15	297	10

1,1,1-Trichloroethane

Formula: CH_3CCl_3
CAS Registry number: 71-55-6
Synonym: methylchloroform
NBS identification number: 344.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Fisher T-391. Gas chromatography using a Chromosorb 102 column showed impurity peaks of 0.02, 0.71, 0.72, and 3.7 percent. The sample was chromatographically purified by using a Chromosorb 102 column before use.

Remarks: The lines are broad and distorted by unresolved fine structure. Many line widths were not measured, and the frequencies and intensities are likely to be pressure sensitive.

The sample pressure of 10 millitorr was registered as 30 millitorr by a thermocouple gage.

Sample identity was confirmed by matching three of the lines with calculated values by using the rotational constants given in reference 4.

NAME: 1,1,1-TRICHLOROETHANE ID NO. 344.00

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
28466.59	.20	68	48	3	3.4	-17	297	10
33211.16	.20	64	46	3	3.8	-17	298	10
37908.751	.05	65	47	4	3.8	-16	298	10
37915.07	.20	66	48	3	3.8	-17	298	10
37955.48	.20	61	43	3	3.8	-16	298	10

Trichloroethene

Formula: $CHCl{:}CCl_2$
CAS Registry number: 79-01-6
Synonyms: trichloroethylene; ethinyl trichloride
NBS identification number: 343.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Fisher T-341. Gas chromatography using a Chromosorb 102 column showed only a single impurity of 0.09 percent.

Remarks: The microwave power level was slightly higher than normal in order to increase sensitivity. Even so, only two lines were detected. A weaker line was observed on either side of the listed pair.

The sample pressure of 10 millitorr was registered as 25 millitorr by a thermocouple gage.

NAME: TRICHLOROETHENE ID NO. 343.00

ν_0, 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
38328.89	.10	69	58	3	2.15	-15	298	10
38329.25	.10	69	58	2	2.15	-15	298	10

Trichlorofluoromethane

Formula: CCl_3F
CAS Registry number: 75-69-4
Synonyms: Freon-11; Genetron-11; Isotron-11; Ucon-11
NBS identification number: 103.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Matheson, and the stated minimum purity was 99.9 percent. No impurities were detected by gas chromatography using a Chromosorb 102 column.

Remarks: Most of these lines were too weak to detect with the normal operating conditions; therefore, the microwave power level was increased to improve sensitivity. This was also the reason for using the 20-millitorr pressure since some of the fine structure components overlap and provide increased intensity. This overlapping prevents the use of intensities and widths in quantitative measurements unless a calibration curve is first obtained for the pressure variations.

Sample identity was confirmed by use of reference 10. Details of the quadrupole splitting were not given, but the observed lines were located approximately at the frequencies given in the reference for the strongest line of each group.

NAME: TRICHLOROFLUOROMETHANE ID NO. 103.00

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
29589.08	.10	73	63	2	1.7	-14	297	20
29589.885	.05	73	62	4	3.8S	-14	298	20
34520.61	.20	70	55	3	2.1	-14	298	20
34521.152	.05	70		1	3.8	-14	298	20
34521.66	.20	72	58	2	2.6S	-14	298	20
39451.09	.10	71	59	3	3.8	-12	298	20
39451.97	.20	67	53	3	1.7	-12	298	20
39452.377	.05	67		1	3.0	-12	298	20

Trichloromethane

Formula: $CHCl_3$
CAS Registry number: 67-66-3
Synonym: chloroform
NBS identification number: 315.00
Frequency range: 26 500 to 40 000 MHz

Sample: The sample source was Fisher C-298. Gas chromatography using a Chromosorb 102 column showed impurity peaks of 0.02, 0.88, 0.17, and 0.06 percent. The sample was purified by chromatography with a Chromosorb 102 column before use.

Remarks: This spectrum was made with a microwave power level between 2 and 3 dB higher than usual to increase sensitivity. The spectrum consists of a large number of weak overlapping lines. Thus, few widths were measured, and the frequencies and intensities are likely to be pressure sensitive.

The 10-millitorr sample pressure was measured by a thermocouple gage as 22 millitorr.

Individual line frequencies were not matched to the theoretical values because of the complex quadrupole splitting pattern. However, the nature of the observed spectrum indicated that the molecule was a symmetric top with approximately the rotational constants of reference 4.

NAME: TRICHLOROMETHANE ID NO. 315.00

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
33019.51	.20	67	49	3	3.8	-15	298	10
33020.07	.20	68		1	3.8	-15	298	10
33020.67	.20	68		1	3.4	-15	298	10
38961.56	.10	71	56	2	3.8	-12	298	10
39321.728	.05	69	55	4	3.4S	-12	298	10
39322.43	.10	70	57	2	2.6	-12	298	10
39621.33	.20	70	51	3	3.4S	-12	298	10
39621.72	.20	69		1	3.4S	-12	298	10
39622.48	.20	68		1	2.6S	-12	298	10
39623.35	.20	63	46	3	3.8S	-12	298	10
39624.13	.20	63	48	2	3.8S	-12	298	10
39624.98	.20	67	52	2	3.8S	-12	298	10
39626.03	.20	69	52	2	3.0S	-12	298	10
39626.86	.20	70	51	2	3.0S	-12	298	10
39656.02	.20	70	53	4	3.8S	-12	298	10
39661.34	.20	71	54	2	3.4	-12	298	10

CONCLUDING REMARKS

The spectra presented in this report were not represented as being complete, since in most cases 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 was a compromise to allow measurements to be made on a larger number of molecules. At the same time, the information included in the tables was more than adequate to allow qualitative, and in some cases quantitative, analysis of samples containing any of the tabulated molecules, even in a complex mixture. In general, 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 volatile organic compounds and on some inorganic compounds containing sulfur and nitrogen have already been published. This report completes the series of tabulations of data listed by compound name.

Langley Research Center
National Aeronautics and Space Administration
Hampton, Va. 23665
June 6, 1975

REFERENCES

1. White, William F.: Microwave Spectra of Some Sulfur and Nitrogen Compounds. NASA TN D-7450, 1974.

2. White, William F.: Microwave Spectra of Some Volatile Organic Compounds. NASA TN D-7904, 1975.

3. White, William F.: Software and Modifications for Automated Microwave Spectral Measurements on the Hewlett-Packard 8460 Spectrometer. NASA TM X-71993, 1974.

4. Wacker, Paul F.; Mizumshima, Masataka; Petersen, Jean D.; and Ballard, Joe R.: Microwave Spectral Tables – Diatomic Molecules. NBS Monogr. 70, Vol. I, U.S. Dep. Com., Dec. 1, 1964.

   Wacker, Paul F.; and Pratto, Marlene R.: Microwave Spectral Tables – Line Strengths of Asymmetric Rotors. NBS Monogr. 70, Vol. II, U.S. Dep. Com., Dec. 15, 1964.

   Wacker, Paul F.; Cord, Marian S.; Burkhard, Donald G.; Petersen, Jean D.; and Kukol, Raymond F.: Microwave Spectral Tables – Polyatomic Molecules With Internal Rotation. NBS Monogr. 70, Vol. III, U.S. Dep. Com., June 1969.

   Cord, Marian S.; Petersen, Jean D.; Lojko, Matthew S.; and Haas, Rudolph H.: Microwave Spectral Tables – Polyatomic Molecules Without Internal Rotation. NBS Monogr. 70, Vol. IV, U.S. Dep. Com., Oct. 1968.

   Cord, Marian S.; Lojko, Matthew S.; and Petersen, Jean D.: Microwave Spectral Tables – Spectral Line Listing. NBS Monogr. 70, Vol. V, U.S. Dep. Com., June 1968.

5. Poynter, Robert L.: Microwave Spectrum, Quadrupolar Coupling Constants, and Dipole Moment of Chlorobenzene. J. Chem. Phys., vol. 39, no. 8, Oct. 1963, pp. 1962-1966.

6. Beeson, Edward L.; Weatherly, T. L.; and Williams, Quitman: Molecular Constants of Chlorodifluoromethane From Microwave Spectrum Analysis. J. Chem. Phys., vol. 37, no. 12, Dec. 1962, pp. 2926-2929.

7. Savariraj, G. A.: Microwave Spectra of Vinyl Chlorides and Bromides. Ann. Soc. Sci. Bruxelles, ser. I, vol. 80, no. 2, 1966, pp. 88-119.

8. Sarachman, T. N.: Microwave Spectrum of Normal Propyl Chloride. J. Chem. Phys., vol. 39, no. 2, July 1963, pp. 469-473.

9. Myers, Rollie J.; and Gwinn, William D.: The Microwave Spectra, Structure, Dipole Moment, and Chlorine Nuclear Quadrupole Coupling Constants and Methylene Chloride. J. Chem. Phys., vol. 20, no. 9, Sept. 1952, pp. 1420-1427.

10. Long, Maurice W.; Williams, Quitman; and Weatherly, T. L.: Microwave Spectrum of $CFCl_3$. J. Chem. Phys., vol. 33, no. 2, Aug. 1960, pp. 508-516.

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