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1980 WORLD PRODUCTION AND SALES OF FLUOROCARBONS
FC-11 and FC-12

Submitted by

Chemical Manufacturers Association

1980 WORLD PRODUCTION AND SALES OF FLUOROCARBONS FC-11 AND FC-12
CHEMICAL MANUFACTURERS ASSOCIATION

May 1, 1981

C O N T E N T S

	PAGE
ACCOUNTANTS' LETTER	3
SCHEDULES	
1. LISTING OF REPORTING COMPANIES	5
2. A TABULATION OF THE TOTAL PRODUCTION OF FC-11 ON AN ANNUAL BASIS FOR THE PERIOD 1931 THROUGH 1980 (FROM REPORTING COMPANIES)	7
3. A TABULATION OF THE TOTAL PRODUCTION OF FC-12 ON AN ANNUAL BASIS FOR THE PERIOD 1931 THROUGH 1980 (FROM REPORTING COMPANIES)	8
4. A TABULATION OF THE DEVIATION ESTIMATE OF TOTAL PRODUCTION OF FC-11 AND FC-12 APPLYING THE SUBMITTED ESTIMATE OF PROBABLE ERROR (FROM REPORTING COMPANIES)	9
5. A TABULATION OF THE TOTAL FC-11 AND FC-12 SALES BY CATEGORY FOR YEAR 1980 (FROM REPORTING COMPANIES)	10
6. A TABULATION OF THE TOTAL FC-11 AND FC-12 SALES BY HEMISPHERE FOR THE PERIOD 1931 THROUGH 1980 (FROM REPORTING COMPANIES)	11
7. A TABULATION OF THE TOTAL FC-11 SALES FOR REFRIGERATION AND CLOSED CELL FOAM BLOWING AGENT ON AN ANNUAL BASIS FOR THE PERIOD 1956 THROUGH 1980 (FROM REPORTING COMPANIES)	12
8. A TABULATION OF THE TOTAL FC-12 SALES FOR REFRIGERATION AND CLOSED CELL FOAM BLOWING AGENT ON AN ANNUAL BASIS FOR THE PERIOD 1956 THROUGH 1980 (FROM REPORTING COMPANIES)	13
9. A TABULATION OF THE TOTAL PRODUCTION OF FC-11 AND FC-12 ON AN ANNUAL BASIS FROM FOUR INDIA AND ARGENTINA COMPANIES (NOTE 3)	14
10. A TABULATION OF THE ESTIMATED PRODUCTION OF FC-11 AND FC-12 OF COUNTRIES OTHER THAN THOSE LISTED IN SCHEDULE 1 AND OTHER THAN INDIA AND ARGENTINA COMPANIES (NOTE 4)	15
NOTES TO 1980 WORLD PRODUCTION AND SALES OF FLUOROCARBONS FC-11 AND FC-12	16

Chemical Manufacturers Association

In connection with the fluorocarbon research program being conducted by Chemical Manufacturers Association, we have, at your request, compiled the following schedules of production and sales data from responses furnished to us by participating companies.

- Schedule 1 - Listing of Reporting Companies
- Schedule 2 - A Tabulation of the Total Production of FC-11 on an Annual Basis for the Period 1931 Through 1980 (from Reporting Companies)
- Schedule 3 - A Tabulation of the Total Production of FC-12 on an Annual Basis for the Period 1931 Through 1980 (from Reporting Companies)
- Schedule 4 - A Tabulation of the Deviation Estimate of Total Production of FC-11 and FC-12 Applying the Submitted Estimate of Probable Error (from Reporting Companies)
- Schedule 5 - A Tabulation of the Total FC-11 and FC-12 Sales by Category for Year 1980 (from Reporting Companies)
- Schedule 6 - A Tabulation of the Total FC-11 and FC-12 Sales by Hemisphere for the Period 1931 Through 1980 (from Reporting Companies)
- Schedule 7 - A Tabulation of the Total FC-11 Sales for Refrigeration and Closed Cell Foam Blowing Agent on an Annual Basis for the Period 1956 Through 1980 (from Reporting Companies)
- Schedule 8 - A Tabulation of the Total FC-12 Sales for Refrigeration and Closed Cell Foam Blowing Agent on an Annual Basis for the Period 1956 Through 1980 (from Reporting Companies)

Schedule 9 - A Tabulation of the Total Production of
FC-11 and FC-12 on an Annual Basis
from Four India and Argentina Companies
(note 3)

Schedule 10 - A Tabulation of the Estimated Production
of FC-11 and FC-12 of Countries Other Than
Those Listed in Schedule 1 and Other Than
India and Argentina Companies

We have compiled these tabulations from questionnaires submitted directly to us from the chemical manufacturers solicited by Chemical Manufacturers Association. We made no attempt to independently verify the information submitted in the questionnaires.

Alexander Grant Company

Washington, D. C.
May 1, 1981

LISTING OF REPORTING COMPANIES

The following is a listing of the reporting companies inclusive of any related subsidiaries and/or joint ventures that reported production and release data:

1. Akzo Chemie B.V. (Holland)
2. Allied Chemical Corporation (U.S.)
 - (a) Allied Chemical Canada Limited (Canada)
 - (b) Quimobasicos, S.A. (Mexico)
3. Asahi Glass Co., Ltd. (Japan)
4. Australian Fluorine Chemical Pty. Ltd. (Australia)
5. CHLOE' Chimie (France) (Formerly Rhone-Poulenc Industries)
6. Daikin Kogyo Co., Ltd. (Japan)
7. E.I. du Pont de Nemours & Company, Inc. (U.S.)
 - (a) Du Pont de Nemours (Nederland) N.V.
 - (b) Ducilo S.A. (Argentina)
 - (c) Du Pont do Brasil S.A. (Brazil)
 - (d) Halocarbuos S.A. (Mexico)
8. Du Pont Canada, Inc. (Canada)
9. Essex Chemical Corporation (Racon) (U.S.)
10. Hoechst AG (West Germany)
 - (a) Hoechst Iberica (Spain)
 - (b) Hoechst do Brasil Quimica e Farmaceutica S.A.
11. Imperial Chemical Industries Limited (England)
 - (a) African Explosives & Chemical Industries, Ltd.

12. I.S.C. Chemicals Ltd. (England)
13. Kaiser Aluminum & Chemical Corporation (U.S.)
14. Kali-Chemie Aktiengesellschaft (West Germany)
 - (a) Kali-Chemie Iberia SA (Spain)
15. Mitsui Fluorochemicals Co., Ltd. (Japan)
16. Montedison Intermedi e Ausiliarichimiei per l'Industria (Formerly Montedison S.P.A. (Italy)
17. Pennwalt Corporation (U.S.)
18. ShowaDenko, K.K. (Japan)
19. Ugine Kuhlmann, Produits Chimiques (France)
 - (a) Pacific Chemical Industries Pty. Ltd. (Australia)
 - (b) Ugimica S.A. (Spain)
 - (c) Produven (Venezuela)
20. Union Carbide Corporation (U.S.)
(for years through 1977 only)

A TABULATION OF THE DEVIATION ESTIMATE OF TOTAL PRODUCTION OF
 FC-11 AND FC-12 APPLYING THE SUBMITTED ESTIMATE OF PROBABLE ERROR

(From reporting companies)

(Millions of pounds)

<u>Chemical</u>	<u>Total production</u>	<u>Deviation (note 2)</u>
FC-11	10,677.2 =====	137.5 =====
FC-12	14,898.4 =====	173.6 =====

A TABULATION OF THE TOTAL FC-11 AND FC-12 SALES BY CATEGORY FOR YEAR 1980

(From reporting companies)

(Millions of pounds)

	<u>Refrigeration hermetically sealed</u>	<u>Refrigeration non- hermetically sealed</u>	<u>Blowing agent closed cell foam</u>	<u>Blowing agent open cell foam</u>	<u>Aerosol propellant</u>	<u>All other uses</u>	<u>Total sales</u>
FC-11	10.0	51.0	175.0	106.8	231.7	64.0	638.5
FC-12	<u>133.6</u>	<u>220.5</u>	<u>50.0</u>	<u>24.5</u>	<u>304.5</u>	<u>39.0</u>	<u>772.1</u>
	143.6	271.5	225.0	131.3	536.2	103.0	1,410.6
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A TABULATION OF THE TOTAL FC-11 AND FC-12 SALES BY HEMISPHERE

For the period 1931 through 1980 (from reporting companies)

(Millions of pounds)

	<u>Northern Hemisphere</u>	<u>Southern Hemisphere</u>	<u>Total sales</u>
FC-11	10,203.7 =====	423.9 =====	10,627.6 =====
FC-12	14,098.7 =====	735.0 =====	14,833.7 =====

A TABULATION OF THE TOTAL FC-11 SALES FOR REFRIGERATION
AND CLOSED CELL FOAM BLOWING AGENT ON AN ANNUAL BASIS

For the period 1956 through 1980 (from reporting companies)

(Millions of pounds)

Year	Sales			Total sales (three uses)
	Refrigeration hermetically sealed	Refrigeration non- hermetically sealed	Blowing agent closed cell foam	
1980	10.0	51.0	175.0	236.0
1979	11.2	52.9	165.3	229.4
1978	12.0	48.0	133.4	193.4
1977	10.8	43.7	132.3	186.8
1976	11.5	47.8	114.8	174.1
1975	3.8	32.8	122.3	158.9
1974	3.4	41.9	138.5	183.8
1973	2.9	40.1	136.8	179.8
1972	2.2	35.0	114.0	151.2
1971	1.7	31.0	93.8	126.5
1970	1.4	27.9	75.3	104.6
1969	1.2	25.8	69.8	96.8
1968	.8	22.3	56.0	79.1
1967	.7	21.4	43.5	65.6
1966	.7	20.5	37.1	58.3
1965	.7	16.7	29.6	47.0
1964	.6	15.2	24.6	40.4
1963	.5	14.6	18.2	33.3
1962	.2	13.4	12.5	26.1
1961	.4	12.3	6.1	18.8
1960	.4	10.5	4.6	15.5
1959	.2	8.5	2.1	10.8
1958	.2	7.8	1.4	9.4
1957	.2	6.3	1.3	7.8
1956	.1	4.5	1.0	5.6
Total	77.8	651.9	1,709.3	2,439.0

A TABULATION OF THE TOTAL FC-12 SALES FOR REFRIGERATION
AND CLOSED CELL FOAM BLOWING AGENT ON AN ANNUAL BASIS

For the period 1956 through 1980 (from reporting companies)

(Millions of pounds)

Year	Sales			Total sales (three uses)
	Refrigeration hermetically sealed	Refrigeration non- hermetically sealed	Blowing agent closed cell foam	
1980	133.6	220.5	50.0	404.1
1979	124.5	232.8	37.5	394.8
1978	126.9	220.0	36.7	383.6
1977	144.4	195.7	19.5	359.6
1976	128.2	153.6	14.2	296.0
1975	72.0	156.1	20.9	249.0
1974	73.0	170.7	21.7	265.4
1973	74.7	162.5	19.3	256.5
1972	65.2	147.1	16.0	228.3
1971	57.7	131.7	11.8	201.2
1970	56.2	121.3	11.1	188.6
1969	48.9	114.5	10.3	173.7
1968	45.0	102.5	7.5	155.0
1967	43.3	98.7	6.1	148.1
1966	37.8	93.1	6.1	137.0
1965	34.7	82.9	4.9	122.5
1964	29.0	71.0	5.1	105.1
1963	27.6	68.5	2.6	98.7
1962	25.7	65.2	1.2	92.1
1961	24.8	62.3	.7	87.8
1960	23.5	57.5	.6	81.6
1959	21.4	55.1	.4	76.9
1958	18.9	55.3	.2	74.4
1957	17.4	51.0	.2	68.6
1956	16.8	49.3	.1	66.2
Total	1,471.2	2,938.9	304.7	4,714.8
	=====	=====	=====	=====

A TABULATION OF THE TOTAL PRODUCTION OF FC-11 AND FC-12 ON AN ANNUAL BASIS FROM FOUR INDIA AND ARGENTINA COMPANIES (NOTE 3)

(Millions of pounds)

	<u>FC-11</u>	<u>FC-12</u>
1968	.1	.6
1969	.1	.7
1970	.1	1.0
1971	.2	1.4
1972	.3	1.9
1973	1.3	2.8
1974	1.7	3.7
1975	1.8	3.7
1976	1.8	5.6
1977	4.4	9.0
1978	4.4	9.0
1979	4.4	9.0
	<u>20.6</u>	<u>48.4</u>
	=====	=====

Note: No information received for 1980.

A TABULATION OF THE ESTIMATED PRODUCTION OF FC-11 AND FC-12
OF COUNTRIES OTHER THAN THOSE LISTED IN SCHEDULE 1 AND
OTHER THAN INDIA AND ARGENTINA COMPANIES (NOTE 4)

(Millions of pounds)

	<u>Production</u>
FC-11 (Estimated for the period 1950 - 1980)	484.0 =====
FC-12 (Estimated for the period 1949 - 1980)	789.4 =====

NOTES TO 1980 WORLD PRODUCTION AND SALES OF
FLUOROCARBONS FC-11 AND FC-12

NOTE 1 - PRODUCTION AMOUNTS

These amounts exclude any production of a product used as an intermediate for chemical or plastic production.

NOTE 2 - CALCULATION OF DEVIATION

The deviation presented in Schedule 4 was computed by the square root of the sum of the squares method. A 95% confidence level was used for this calculation.

NOTE 3 - INDIA AND ARGENTINA PRODUCTION AMOUNTS

The amounts included were compiled based on previous years' data for the following companies:

- (1) Tool Research S.A.
- (2) I.R.A., S.A.
- (3) Everest Refrigerents, Ltd.
- (4) Navin Fluorine Industries

NOTE 4 - PRODUCTION OF OTHER COUNTRIES

The data reported as the estimated production of countries other than those listed in Schedule 1 and other than India and Argentina Companies were compiled from averages of the estimates of production by the reporting companies who responded to the questionnaire on production from those countries.

WORLD PRODUCTION AND RELEASE OF
CHLOROFLUOROCARBONS 11 AND 12
THROUGH 1980

CHEMICAL MANUFACTURERS ASSOCIATION
FLUOROCARBON PROGRAM PANEL

July 29, 1981

Calculations by E. I. du Pont de Nemours & Company
from data published by Alexander Grant & Company
report, "1980 World Production and Sales of Fluoro-
carbons FC-11 and FC-12," of May 1, 1981.

WORLD PRODUCTION AND RELEASE OF
CHLOROFLUOROCARBONS 11 AND 12 THROUGH 1980

The world production and release of FC-11 and FC-12 are tabulated through 1980. The 1980 production figures were compiled by Alexander Grant and Company from data reported by the nineteen companies participating in the CMA Fluorocarbon Program.

The procedure used to compute annual and cumulative figures for world production and release is described by McCarthy, Bower, and Jesson (Ref. 1). In order to conserve space, fluorocarbon production and release figures are not printed for the years 1931-1949, although this production is incorporated into the cumulative production and release figures reported for 1950-1980. The figures for 1931-1949 are given in previous editions of this report which are available from CMA.

Russian and Eastern European (CMEA) production is based on published USSR production data for 1968-1975 (Ref. 2). Total production for this region was estimated to be 1.15 times the reported USSR production. Data for 1976-1979 were extrapolated from the 1968-1975 history. For 1980, the production of CMEA countries, Argentina, and India were estimated to be the same as 1979. The CMA is attempting to estimate the CFC 11 and CFC 12 production of China. Accordingly, this report may be revised to include new information. Any revisions are expected to be minor in nature.

DRS:rmc
7/29/81

1. "The Fluorocarbon-Ozone Theory - I. Production and Release - World Production and Release of CCl_3F and CCl_2F_2 (Fluorocarbons 11 and 12) Through 1975", R. L. McCarthy, F. A. Bower, and J. P. Jesson. Atmospheric Environment, Vol. II, pp. 491-497 (1977).
2. "Effect of Freons and Halocarbons on the Ozone Layer of the Atmosphere and Climate", Professor Ye. P. Borisenkov and Candidate of Physical and Mathematical Sciences Yy.Ye. Kazakov (1977).

FC-11

FLUOROCARBON PRODUCTION AND RELEASE - EXPANDED DATA - REPORTING COMPANIES ONLY
MILLION KILOGRAMS

FC-11
CUMULATIVE

MILLION KILOGRAMS

FC-11

YEAR	ANNUAL		TOTAL			REFRIGERATION HERMETICALLY SEALED			REFRIGERATION NON-HERMETIC			BLOWING AGENTS CLOSED CELL FOAM			OPEN CELL+AEROSOLS+ ALL OTHER PRODUCTION		
	PROD	REL	PROD	REL	UNREL	SALES	REL	UNREL	SALES	REL	UNREL	SALES	REL	UNREL	SALES	REL	UNREL
1950	6.6	5.4'	18.6	14.4	4.1'	.1	.0	.1'	3.4	2.5	.9'	.1	.0	.1'	15.0	12.0	3.1'
1951	9.1	7.5'	27.6	21.9	5.7'	.1	.0	.1'	3.9	2.7	1.2'	.2	.0	.2'	23.4	19.2	4.2'
1952	13.6	10.8'	41.2	32.7	8.5'	.1	.0	.1'	4.8	3.0	1.8'	.4	.1	.3'	35.9	29.6	6.3'
1953	17.3	14.7'	58.5	47.4	11.1'	.1	.0	.1'	5.9	3.4	2.5'	.6	.1	.5'	51.8	43.8	8.0'
1954	20.9	18.3'	79.4	65.7	13.7'	.2	.0	.1'	7.2	4.0	3.2'	.9	.2	.7'	71.1	61.4	9.6'
1955	26.3	22.6'	105.6	88.3	17.4'	.2	.0	.2'	8.8	4.8	4.1'	1.3	.3	1.0'	95.3	83.2	12.1'
1956	32.5	28.2'	138.1	116.5	21.6'	.2	.0	.2'	10.9	5.8	5.1'	1.8	.4	1.3'	125.2	110.3	15.0'
1957	33.9	31.6'	172.0	148.1	23.9'	.3	.1	.3'	13.7	7.1	6.7'	2.4	.6	1.8'	155.6	140.4	15.2'
1958	29.5	29.7'	201.6	177.8	23.8'	.4	.1	.4'	17.3	8.7	8.6'	3.0	.8	2.2'	180.9	168.2	12.6'
1959	35.6	30.3'	237.1	208.1	29.0'	.5	.1	.4'	21.1	10.8	10.4'	3.9	1.1	2.9'	211.5	196.2	15.3'
1960	49.7	39.7'	286.9	247.9	39.0'	.7	.1	.6'	25.9	13.3	12.6'	6.0	1.6	4.5'	254.2	232.9	21.3'
1961	60.5	51.2'	347.3	299.0	48.3'	.9	.1	.8'	31.5	16.5	15.0'	8.8	2.2	6.6'	306.2	280.2	26.0'
1962	78.1	64.1'	425.4	363.1	62.3'	1.0	.1	.8'	37.6	20.2	17.3'	14.5	3.5	11.0'	372.4	339.3	33.1'
1963	93.3	78.5'	518.7	441.7	77.0'	1.2	.2	1.0'	44.2	24.6	19.5'	22.7	5.3	17.4'	450.6	411.5	39.1'
1964	111.1	93.2'	629.8	534.9	94.9'	1.5	.2	1.3'	51.1	29.7	21.4'	33.9	8.0	25.9'	543.4	497.0	46.4'
1965	122.8	106.3'	752.6	641.2	111.4'	1.8	.3	1.5'	58.7	35.3	23.3'	47.3	11.5	35.8'	644.9	594.1	50.8'
1966	141.0	119.0'	893.7	760.2	133.4'	2.1	.3	1.8'	68.0	41.6	26.4'	64.1	16.1	48.0'	759.5	702.2	57.3'
1967	159.8	135.1'	1053.4	895.3	158.1'	2.4	.4	2.0'	77.7	48.5	29.1'	83.9	21.9	61.9'	889.5	824.5	65.0'
1968	183.1	153.9'	1236.5	1049.2	187.4'	2.8	.5	2.3'	87.8	56.2	31.6'	109.3	29.5	79.8'	1036.7	963.1	73.6'
1969	217.3	178.4'	1453.8	1227.6	226.2'	3.3	.6	2.8'	99.5	64.6	34.9'	140.9	39.0	101.9'	1210.1	1123.4	86.7'
1970	238.1	202.8'	1691.9	1430.4	261.6'	4.0	.7	3.3'	112.1	73.8	38.3'	175.1	50.4	124.7'	1400.8	1305.4	95.3'
1971	263.2	222.7'	1955.1	1653.1	302.0'	4.7	.9	3.9'	126.2	84.0	42.2'	217.6	64.6	153.0'	1606.6	1503.7	102.9'
1972	306.9	250.8'	2262.0	1903.9	358.0'	5.8	1.0	4.7'	142.1	95.2	46.8'	269.3	82.0	187.3'	1844.8	1725.7	119.1'
1973	349.1	286.8'	2611.1	2190.7	420.3'	7.1	1.3	5.8'	160.3	107.7	52.6'	331.4	103.2	228.1'	2112.3	1978.6	133.8'
1974	369.7	315.4'	2980.8	2506.1	474.7'	8.6	1.5	7.1'	179.3	121.4	57.9'	393.3	127.2	266.1'	2399.6	2256.0	143.6'
1975	314.1	305.5'	3294.8	2811.6	483.2'	10.3	1.8	8.5'	194.1	136.2	58.0'	448.8	153.0	295.7'	2641.6	2520.6	121.0'
1976	339.8	295.8'	3634.7	3107.4	527.3'	15.6	2.2	13.3'	215.8	152.4	63.5'	500.9	180.8	320.1'	2902.4	2772.0	130.4'
1977	320.5	297.2'	3955.1	3404.6	550.6'	20.5	2.7	17.8'	235.6	169.5	66.1'	560.9	212.0	348.8'	3138.2	3020.3	117.9'
1978	308.9	281.0'	4264.0	3685.6	578.4'	25.9	3.3	22.6'	257.4	187.6	69.8'	621.4	246.0	375.4'	3359.3	3248.7	110.6'
1979	289.5	261.9'	4553.5	3947.5	606.0'	31.0	4.0	27.0'	281.4	206.7	74.8'	696.3	284.8	411.5'	3544.7	3452.0	92.7'
1980	289.6	247.5'	4843.1	4195.0	648.1'	35.5	4.8	30.7'	304.5	226.7	77.8'	775.7	327.5	448.3'	3727.3	3636.0	91.3'

FC-12 FLUOROCARBON PRODUCTION AND RELEASE - EXPANDED DATA - REPORTING COMPANIES ONLY
MILLION KILOGRAMS FC-12 MILLION KILOGRAMS FC-12
CUMULATIVE

YEAR	ANNUAL		TOTAL			REFRIGERATION HERMETICALLY SEALED			REFRIGERATION NON-HERMETIC			BLOWING AGENTS CLOSED CELL FOAM			OPEN CELL+AEROSOLS+ ALL OTHER PRODUCTION		
	PROD	REL	PROD	REL	UNREL	SALES	REL	UNREL	SALES	REL	UNREL	SALES	REL	UNREL	SALES	REL	UNREL
1950	34.6	27.1	198.3	129.5	68.8	32.9	5.5	27.4	96.5	64.9	31.7	.0	.0	.0	68.8	59.1	9.7
1951	36.2	30.2	234.5	159.6	74.9	36.9	6.9	30.0	108.3	73.6	34.7	.0	.0	.0	89.2	79.0	10.2
1952	37.2	31.5	271.7	191.1	80.6	41.1	8.6	32.4	120.5	82.8	37.7	.0	.0	.0	110.2	99.7	10.5
1953	46.5	35.5	318.2	226.6	91.6	46.2	10.6	35.6	135.6	92.7	42.9	.0	.0	.0	136.4	123.3	13.1
1954	49.1	40.3	367.4	266.9	100.4	51.7	12.8	38.9	151.6	103.9	47.7	.1	.0	.0	164.0	150.2	13.8
1955	57.6	45.2	425.0	312.1	112.9	58.1	15.3	42.8	170.4	116.5	53.9	.1	.1	.0	196.4	180.2	16.2
1956	68.7	52.6	493.6	364.7	129.0	65.7	18.0	47.6	192.7	130.8	62.0	.1	.1	.0	235.1	215.8	19.3
1957	74.2	59.8	567.8	424.5	143.3	73.6	21.0	52.6	215.9	146.7	69.2	.2	.2	.0	278.1	256.6	21.5
1958	73.4	62.6	641.2	487.1	154.2	82.1	24.2	58.0	240.9	164.6	76.3	.3	.3	.0	317.8	298.0	19.8
1959	87.6	69.6	728.8	556.7	172.1	91.8	27.6	64.2	265.9	184.5	81.4	.5	.4	.1	370.5	344.2	26.4
1960	99.4	83.2	828.3	639.9	188.3	102.5	31.4	71.1	292.0	206.2	85.8	.8	.6	.1	432.9	401.7	31.2
1961	108.5	93.2	936.8	733.2	203.6	113.8	35.4	78.3	320.3	229.5	90.7	1.1	.9	.2	501.6	467.3	34.3
1962	128.1	107.1	1064.9	840.3	224.6	125.4	39.9	85.5	349.9	254.3	95.6	1.6	1.4	.3	587.9	544.8	43.2
1963	146.4	125.8	1211.3	966.1	245.1	137.9	44.8	93.1	380.9	280.3	100.6	2.8	2.2	.6	689.6	638.8	50.8
1964	170.1	146.6	1381.4	1112.7	268.7	151.1	50.3	100.8	413.1	307.7	105.5	5.1	4.0	1.2	812.0	750.8	61.2
1965	190.1	165.6	1571.4	1278.4	293.1	166.8	56.2	110.6	450.7	336.7	114.1	7.4	6.2	1.1	946.5	879.3	67.2
1966	216.2	184.3	1787.6	1462.7	324.9	184.0	62.8	121.2	493.0	367.6	125.3	10.1	8.7	1.4	1100.5	1023.5	77.0
1967	242.8	208.3	2030.4	1670.9	359.4	203.6	70.1	133.5	537.7	401.0	136.8	12.9	11.5	1.4	1276.1	1188.3	87.8
1968	267.5	233.6	2297.9	1904.6	393.3	224.0	78.2	145.9	584.2	437.1	147.1	16.3	14.6	1.7	1473.3	1374.7	98.6
1969	297.3	260.1	2595.1	2164.6	430.5	246.2	87.0	159.2	636.2	476.4	159.7	21.0	18.6	2.3	1691.8	1582.6	109.2
1970	321.1	284.2	2916.2	2448.9	467.4	271.7	96.7	175.0	691.2	519.1	172.1	26.0	23.5	2.5	1927.4	1809.6	117.8
1971	341.6	304.8	3257.8	2753.7	504.1	297.9	107.3	190.6	750.9	565.3	185.7	31.4	28.7	2.7	2177.6	2052.5	125.1
1972	379.9	331.2	3637.7	3084.9	552.8	327.4	118.8	208.6	817.6	615.3	202.4	38.6	35.0	3.6	2454.0	2315.8	138.2
1973	423.3	366.5	4061.0	3451.4	609.6	361.3	131.5	229.9	891.4	669.5	221.9	47.4	43.0	4.4	2761.0	2607.5	153.5
1974	442.8	396.5	4503.8	3847.9	655.9	394.4	145.2	249.3	968.8	728.3	240.5	57.2	52.3	4.9	3083.4	2922.2	161.2
1975	381.0	382.8	4884.8	4230.8	654.0	427.1	160.1	267.0	1039.6	791.3	248.2	66.7	61.9	4.7	3351.4	3217.4	134.0
1976	410.7	363.9	5295.5	4594.6	700.9	485.3	176.9	308.4	1109.3	858.2	251.0	75.4	71.0	4.4	3625.6	3488.5	137.1
1977	382.8	344.9	5678.3	4939.6	738.8	550.7	195.2	355.6	1198.0	929.1	268.9	84.2	79.8	4.4	3845.3	3735.5	109.9
1978	372.1	316.2	6050.4	5255.8	794.6	608.3	215.1	393.2	1297.8	1003.8	294.0	100.9	92.6	8.3	4043.4	3944.4	99.0
1979	357.2	305.8	6407.6	5561.6	846.0	664.8	236.9	427.8	1403.4	1082.8	320.6	117.9	109.4	8.5	4221.5	4132.4	89.0
1980	350.2	300.4	6757.8	5862.0	895.8	725.4	261.0	464.4	1503.4	1166.8	336.6	140.6	129.2	11.3	4388.4	4304.9	83.5

FLUOROCARBON PRODUCTION AND RELEASE - CMEA, ARGENTINA, AND INDIA

MILLION KILOGRAMS

YEAR	FC-11					FC-12				
	ANNUAL		CUMULATIVE			ANNUAL		CUMULATIVE		
	PRODUCTION	RELEASED	PRODUCTION	RELEASED	UNRELEASED	PRODUCTION	RELEASED	PRODUCTION	RELEASED	UNRELEASED
1950	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1951	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1952	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1953	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1954	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1955	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1956	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1957	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1958	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1959	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1960	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968	1.7	.7	1.7	.7	1.0	11.3	4.4	11.3	4.4	6.9
1969	2.6	1.8	4.2	2.5	1.7	14.2	9.9	25.5	14.3	11.1
1970	2.9	2.3	7.2	4.8	2.3	15.8	12.0	41.3	26.3	15.0
1971	3.4	2.7	10.6	7.5	3.1	19.0	14.3	60.3	40.6	19.7
1972	3.6	3.0	14.2	10.5	3.7	21.8	17.1	82.0	57.7	24.3
1973	5.2	3.8	19.4	14.3	5.1	24.2	19.7	106.2	77.4	28.8
1974	7.9	5.6	27.3	19.9	7.4	30.8	23.8	137.0	101.1	35.9
1975	9.4	7.3	36.7	27.2	9.5	37.6	29.2	174.7	130.3	44.3
1976	10.1	8.3	46.8	35.5	11.3	39.1	31.9	213.8	162.2	51.6
1977	11.7	9.2	58.5	44.7	13.8	41.5	31.6	255.3	193.8	61.5
1978	12.3	10.0	70.9	54.7	16.2	42.0	31.4	297.3	225.2	72.1
1979	12.6	10.1	83.4	64.8	18.7	43.1	32.2	340.4	257.4	83.1
1980	12.6	9.9	96.0	74.6	21.4	43.1	33.2	383.6	290.6	93.0

FLUOROCARBON PRODUCTION AND RELEASE SUMMARY - REPORTING COMPANIES ONLY

MILLION KILOGRAMS

YEAR	FC-11					FC-12				
	ANNUAL		CUMULATIVE			ANNUAL		CUMULATIVE		
	PRODUCTION	RELEASED	PRODUCTION	RELEASED	UNRELEASED	PRODUCTION	RELEASED	PRODUCTION	RELEASED	UNRELEASED
1950	6.6	5.4	18.6	14.4	4.1	34.6	27.1	198.3	129.5	68.8
1951	9.1	7.5	27.6	21.9	5.7	36.2	30.2	234.5	159.6	74.9
1952	13.6	10.8	41.2	32.7	8.5	37.2	31.5	271.7	191.1	80.6
1953	17.3	14.7	58.5	47.4	11.1	46.5	35.5	318.2	226.6	91.6
1954	20.9	18.3	79.4	65.7	13.7	49.1	40.3	367.4	266.9	100.4
1955	26.3	22.6	105.6	88.3	17.4	57.6	45.2	425.0	312.1	112.9
1956	32.5	28.2	138.1	116.5	21.6	68.7	52.6	493.6	364.7	129.0
1957	33.9	31.6	172.0	148.1	23.9	74.2	59.8	567.8	424.5	143.3
1958	29.5	29.7	201.6	177.8	23.8	73.4	62.6	641.2	487.1	154.2
1959	35.6	30.3	237.1	208.1	29.0	87.6	69.6	728.8	556.7	172.1
1960	49.7	39.7	286.9	247.9	39.0	99.4	83.2	828.3	639.9	188.3
1961	60.5	51.2	347.3	299.0	48.3	108.5	93.2	936.8	733.2	203.6
1962	78.1	64.1	425.4	363.1	62.3	128.1	107.1	1064.9	840.3	224.6
1963	93.3	78.5	518.7	441.7	77.0	146.4	125.8	1211.3	966.1	245.1
1964	111.1	93.2	629.8	534.9	94.9	170.1	146.6	1381.4	1112.7	268.7
1965	122.8	106.3	752.6	641.2	111.4	190.1	165.6	1571.4	1278.4	293.1
1966	141.0	119.0	893.7	760.2	133.4	216.2	184.3	1787.6	1462.7	324.9
1967	159.8	135.1	1053.4	895.3	158.1	242.8	208.3	2030.4	1670.9	359.4
1968	183.1	153.9	1236.5	1049.2	187.4	267.5	233.6	2297.9	1904.6	393.3
1969	217.3	178.4	1453.8	1227.6	226.2	297.3	260.1	2595.1	2164.6	430.5
1970	238.1	202.8	1691.9	1430.4	261.6	321.1	284.2	2916.2	2448.9	467.4
1971	263.2	222.7	1955.1	1653.1	302.0	341.6	304.8	3257.8	2753.7	504.1
1972	306.9	250.8	2262.0	1903.9	358.0	379.9	331.2	3637.7	3084.9	552.8
1973	349.1	286.8	2611.1	2190.7	420.3	423.3	366.5	4061.0	3451.4	609.6
1974	369.7	315.4	2980.8	2506.1	474.7	442.8	396.5	4503.8	3847.9	655.9
1975	314.1	305.5	3294.8	2811.6	483.2	381.0	382.8	4884.8	4230.8	654.0
1976	339.8	295.8	3634.7	3107.4	527.3	410.7	363.9	5295.5	4594.6	700.9
1977	320.5	297.2	3955.1	3404.6	550.6	382.8	344.9	5678.3	4939.6	738.8
1978	308.9	281.0	4264.0	3685.6	578.4	372.1	316.2	6050.4	5255.8	794.6
1979	289.5	261.9	4553.5	3947.5	606.0	357.2	305.8	6407.6	5561.6	846.0
1980	289.6	247.5	4843.1	4195.0	648.1	350.2	300.4	6757.8	5862.0	895.8

FLUOROCARBON PRODUCTION AND RELEASE SUMMARY - WORLD TOTAL

MILLION KILOGRAMS

YEAR	FC-11					FC-12				
	ANNUAL		CUMULATIVE			ANNUAL		CUMULATIVE		
	PRODUCTION	RELEASED	PRODUCTION	RELEASED	UNRELEASED	PRODUCTION	RELEASED	PRODUCTION	RELEASED	UNRELEASED
1950	6.6	5.4	18.6	14.4	4.1	34.6	27.1	198.3	129.5	68.8
1951	9.1	7.5	27.6	21.9	5.7	36.2	30.2	234.5	159.6	74.9
1952	13.6	10.8	41.2	32.7	8.5	37.2	31.5	271.7	191.1	80.6
1953	17.3	14.7	58.5	47.4	11.1	46.5	35.5	318.2	226.6	91.6
1954	20.9	18.3	79.4	65.7	13.7	49.1	40.3	367.4	266.9	100.4
1955	26.3	22.6	105.6	88.3	17.4	57.6	45.2	425.0	312.1	112.9
1956	32.5	28.2	138.1	116.5	21.6	68.7	52.6	493.6	364.7	129.0
1957	33.9	31.6	172.0	148.1	23.9	74.2	59.8	567.8	424.5	143.3
1958	29.5	29.7	201.6	177.8	23.8	73.4	62.6	641.2	487.1	154.2
1959	35.6	30.3	237.1	208.1	29.0	87.6	69.6	728.8	556.7	172.1
1960	49.7	39.7	286.9	247.9	39.0	99.4	83.2	828.3	639.9	188.3
1961	60.5	51.2	347.3	299.0	48.3	108.5	93.2	936.8	733.2	203.6
1962	78.1	64.1	425.4	363.1	62.3	128.1	107.1	1064.9	840.3	224.6
1963	93.3	78.5	518.7	441.7	77.0	146.4	125.8	1211.3	966.1	245.1
1964	111.1	93.2	629.8	534.9	94.9	170.1	146.6	1381.4	1112.7	268.7
1965	122.8	106.3	752.6	641.2	111.4	190.1	165.6	1571.4	1278.4	293.1
1966	141.0	119.0	893.7	760.2	133.4	216.2	184.3	1787.6	1462.7	324.9
1967	159.8	135.1	1053.4	895.3	158.1	242.8	208.3	2030.4	1670.9	359.4
1968	184.8	154.6	1238.2	1049.9	188.3	278.8	238.0	2309.2	1909.0	400.2
1969	219.8	180.2	1458.0	1230.1	228.0	311.4	270.0	2620.6	2179.0	441.6
1970	241.1	205.1	1699.1	1435.2	263.9	336.9	296.2	2957.5	2475.2	482.3
1971	266.6	225.4	1965.7	1660.6	305.1	360.5	319.1	3318.1	2794.3	523.7
1972	310.5	253.8	2276.2	1914.5	361.7	401.7	348.3	3719.7	3142.6	577.1
1973	354.3	290.6	2630.5	2205.0	425.5	447.5	386.2	4167.2	3528.8	638.4
1974	377.6	320.9	3008.1	2526.0	482.1	473.6	420.3	4640.8	3949.1	691.7
1975	323.5	312.9	3331.6	2838.8	492.7	418.6	412.0	5059.4	4361.1	698.3
1976	349.9	304.1	3681.5	3142.9	538.6	449.8	395.7	5509.3	4756.8	752.4
1977	332.2	306.4	4013.7	3449.3	564.4	424.4	376.5	5933.6	5133.4	800.3
1978	321.2	291.0	4334.9	3740.3	594.6	414.1	347.6	6347.7	5481.0	866.8
1979	302.0	272.0	4636.9	4012.3	624.7	400.3	338.0	6748.0	5818.9	929.1
1980	302.2	257.4	4939.1	4269.7	669.4	393.4	333.7	7141.4	6152.6	988.8