

Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

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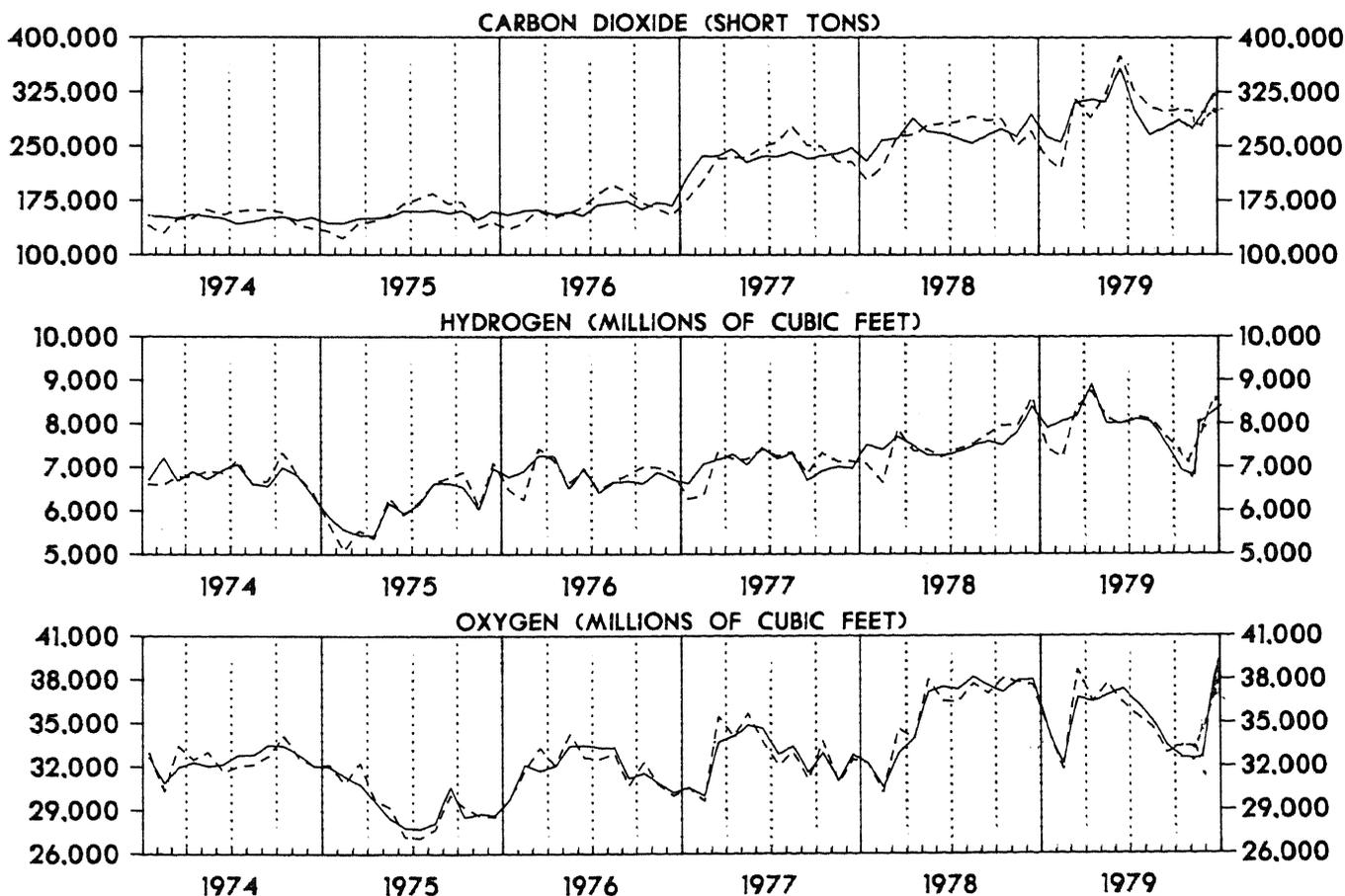
The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 5.

THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES 1974 TO 1979

———— Seasonally Adjusted
- - - - - Not Seasonally Adjusted



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros (301)763-7838.

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Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1977 TO 1979

Month and year	Acetylene (28131 00) (mil. cu. ft.)	Carbon dioxide (28133 11) and (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28134 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28134 40) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28134 50) (mil. cu. ft.)
1979					
December.....	403	324,145	8,454	45,089	39,382
November.....	447	287,142	8,026	38,358	35,698
October.....	448	267,607	6,921	33,226	32,540
September.....	403	275,613	7,539	31,949	33,387
August.....	421	265,726	8,049	33,626	35,138
July.....	443	300,162	8,104	32,743	36,332
June.....	445	356,901	8,017	33,323	37,334
May.....	456	310,746	8,007	33,088	36,892
April.....	463	314,031	8,893	32,053	36,433
March.....	428	310,684	8,165	33,759	36,755
February.....	391	255,508	8,054	31,948	32,157
January.....	451	263,464	7,895	34,289	34,535
1978					
December.....	451	293,645	8,388	31,354	37,962
November.....	462	263,163	7,818	33,281	37,943
October.....	466	273,290	7,505	33,303	37,140
September.....	395	264,522	7,583	32,057	37,555
August.....	442	254,040	7,491	32,470	38,159
July.....	428	260,358	7,347	31,495	37,291
June.....	463	267,873	7,273	32,816	37,464
May.....	446	270,028	7,270	32,188	37,129
April.....	496	288,142	7,488	31,829	33,905
March.....	451	260,368	7,704	32,021	32,907
February.....	444	258,444	7,397	30,245	30,565
January.....	454	229,393	7,516	30,758	32,238
1977					
December.....	441	247,508	6,959	26,763	32,834
November.....	435	239,747	7,005	28,620	30,988
October.....	451	236,625	6,911	28,480	32,959
September.....	441	232,453	6,693	27,270	31,574
August.....	498	242,051	7,315	27,549	33,403
July.....	486	235,480	7,190	26,945	32,843
June.....	520	235,842	7,453	27,975	34,616
May.....	557	227,238	7,046	27,411	34,849
April.....	464	245,813	7,306	26,926	34,096
March.....	566	235,886	7,169	27,368	33,693
February.....	568	235,771	7,070	25,908	29,971
January.....	603	207,308	6,628	26,670	30,574

Note: Data in tables 1A and 1B from January 1977 to September 1979 have been revised as the result of the reconciliation with the 1977 Census of Manufactures and the 1978 annual Current Industrial Report, MA-28C, "Industrial Gases."

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1977 TO 1979

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, liquid and gas (28133 11) (short tons)	Carbon dioxide, solid (28134 31) (short tons)	Hydrogen, high and low purity (100%) (28134 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28134 40) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28134 50) (mil. cu. ft.)
1979						
December.....	416	265,939	32,274	8,665	44,683	38,988
November.....	471	240,052	33,594	8,162	37,706	35,555
October.....	461	244,619	36,904	7,343	33,990	33,353
September.....	434	254,679	42,707	7,705	32,013	32,886
August.....	438	263,354	41,168	8,089	34,601	34,716
July.....	424	284,979	41,597	8,169	32,579	35,496
June.....	443	338,580	36,167	7,969	32,257	36,363
May.....	453	287,153	33,226	8,151	33,617	37,741
April.....	430	265,763	23,460	8,742	31,476	36,433
March.....	409	285,949	28,774	8,353	34,907	38,666
February.....	371	196,039	22,420	7,224	30,095	31,771
January.....	439	211,828	21,865	7,429	34,941	34,535
1978						
December.....	466	244,388	25,766	8,598	31,072	37,582
November.....	487	222,374	27,631	7,951	32,715	37,791
October.....	480	257,935	29,566	7,963	34,069	38,068
September.....	425	251,444	33,975	7,750	32,121	36,992
August.....	460	252,854	38,276	7,529	33,412	37,698
July.....	410	244,671	38,598	7,406	31,338	36,433
June.....	461	242,131	39,136	7,229	31,766	36,490
May.....	443	248,904	29,495	7,401	32,703	37,983
April.....	460	240,436	24,943	7,361	31,256	33,905
March.....	431	239,025	24,728	7,881	33,110	34,618
February.....	421	200,077	20,893	6,635	28,491	30,198
January.....	442	178,063	25,409	7,073	31,342	32,238
1977						
December.....	456	201,162	26,546	7,132	26,522	32,506
November.....	458	200,918	27,561	7,124	28,133	30,864
October.....	465	218,828	30,102	7,333	29,135	33,783
September.....	475	217,846	32,971	6,840	27,325	31,100
August.....	518	238,210	39,181	7,352	28,348	33,002
July.....	465	219,564	36,638	7,248	26,810	32,079
June.....	517	213,429	34,205	7,408	27,080	33,716
May.....	553	204,107	30,175	7,173	27,850	35,651
April.....	435	206,561	27,453	7,189	26,657	34,076
March.....	547	203,370	29,086	7,334	28,326	35,445
February.....	540	176,383	25,201	6,356	24,405	29,611
January.....	574	153,075	23,966	6,270	27,070	30,574

Note: Data in tables 1A and 1B from January 1977 to September 1979 have been revised as the result of the reconciliation with the 1977 Census of Manufactures and the 1978 annual Current Industrial Report, MA-28C, "Industrial Gases."

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	December 1979	November 1979	December 1978
28132 00	Acetylene ¹	Mil. cu. ft....	416	471	466
	Produced for compression, including cylinder and pipeline.....	..do.....	158	156	117
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	258	315	349
28134 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	..do.....	720	653	633
28133 11	Carbon dioxide: Liquid and gas ²	S. tons.....	265,939	^r 240,052	244,388
28133 31	Solid (dry ice).....	..do.....	32,274	33,594	25,766
28134 20	Hydrogen, total ³	Mil. cu. ft....	8,665	8,162	8,598
	Liquid and gas: Produced for cylinder and bulk shipment, and liquid produced for conversion to gas.....	..do.....	859	857	992
	Produced for pipeline and government use.....	..do.....	3,089	2,799	2,981
	Produced for consumption in this plant.....	..do.....	4,717	4,506	4,625
28134 40	Nitrogen, total ⁴.....	..do.....	44,683	^r 37,706	31,072
	Gas: Produced for pipeline shipment.....	..do.....	29,995	24,117	18,729
	Liquid: Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	864	942	803
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	9,487	8,355	7,681
	Produced for consumption in this plant.....	..do.....	4,337	4,292	3,859
28134 50	Oxygen, total.....	..do.....	38,988	^r 35,555	37,582
	Gas: Produced for pipeline shipments.....	..do.....	26,789	25,128	27,251
	Liquid: Produced for bulk delivery shipment to pipeline or to other air separation plants.....	..do.....	1,034	1,146	1,078
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	6,736	5,000	4,766
	Produced for consumption in this plant.....	..do.....	4,429	4,281	4,487

^rRevised by 5 percent or more from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes production of liquid and gas CO₂ converted to and reported as dry ice and also amounts converted from pure CO₂ (liquid or solid) purchased or received from other plants. Also excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use. However, of the total shown for lower purity hydrogen prior to 1969, 70 to 75 percent was accounted for by petroleum refineries with captive hydrogen production. Not all such petroleum refineries were canvassed in this survey.

⁴Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: NOVEMBER 1979

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28134 40	Nitrogen.....	37,706	213	0.6

Note: Detailed export data for industrial gases, other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of Standard Industrial Classification Codes and Schedule B Export Codes:

<u>Domestic output</u>	<u>Exports</u>
28134 40	415.2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, **Production of Industrial Gases**. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities, which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data:

a. *Valuation*—There are different methods of valuation for the three types of data.

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c. i. f. (cost, insurance, and freight), duty, and other charges to the import point.

b. *Duplication in Quantity and Value of Output*—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

c. *Low-Valued Export and Import Transactions*—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$251 effective October 1969 and for shipments valued under \$100 prior to October 1969. This is believed to have only negligible effect on the statistics for most commodities.

d. *Manufacturers' Shipments, Not Specified by Kind*—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

e. *Time Lag Between Output and Exports*—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

f. *"Direct" vs "Total" Commodity Export and Imports*—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

g. *Used Commodities*—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

RELATIONSHIP BETWEEN M28C AND M28C-14 SERIES FOR INDUSTRIAL GASES

The data as shown in table 1 reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report M28C-14. The actual data reported by establishments canvassed on the annual, differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data comprise two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be

useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

The Bureau of the Census also publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	Manufacturers' Shipments, Inventories, and Orders
M28A	Monthly	Inorganic Chemicals
M28B	Monthly	Inorganic Fertilizer Materials
<i>Foreign Trade Reports</i>		
FT-410	Monthly	U.S. Exports
FT-135	Monthly	U.S. General Imports

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
To order a Census Bureau publication	Daisy Williams	(301) 763-7472
To order Census Bureau microfiche	Maria Brown	(301) 763-5511

Industrial Gases



1979

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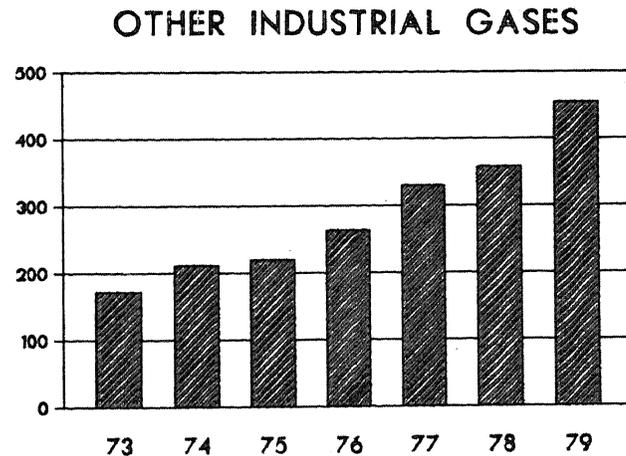
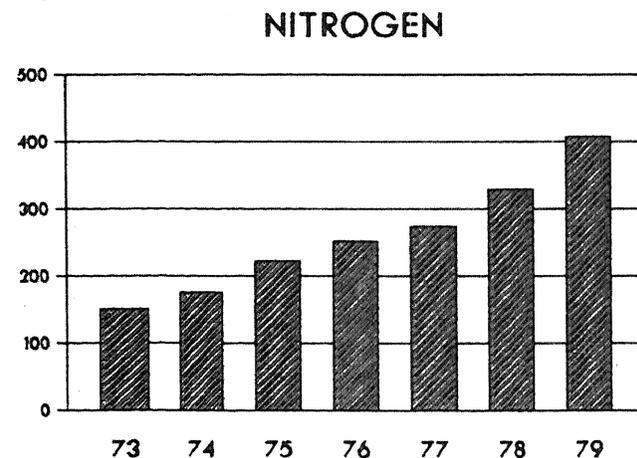
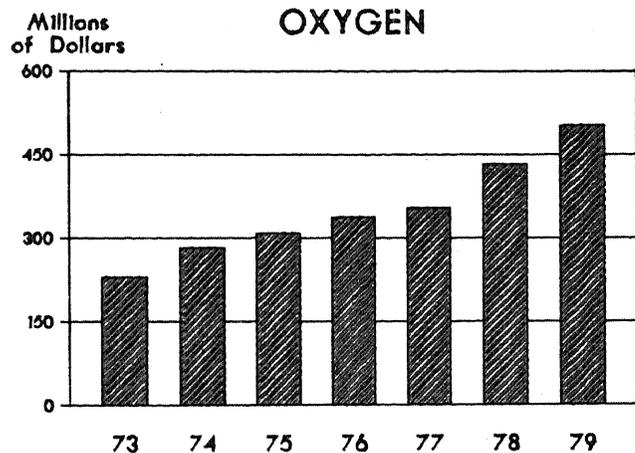
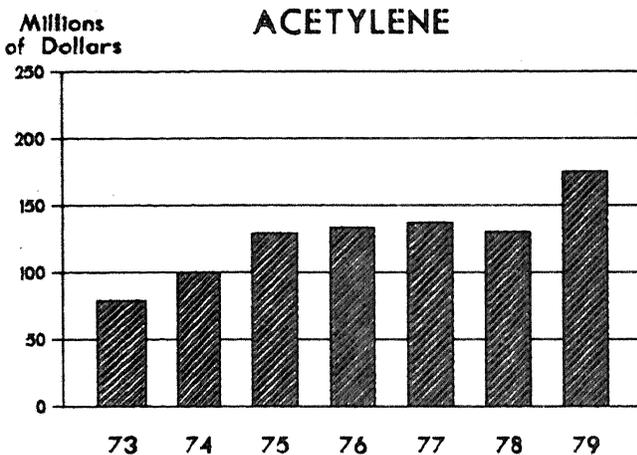
SUMMARY OF FINDINGS

Shipments of industrial gases by primary manufactures in 1979 totaled \$1,594 million, or about 23 percent more than the 1978 figure of \$1,294 million. The 1979 total is composed of \$175 million for acetylene, \$130 million for carbon dioxide, and \$324 million for the product grouping elemental gases and other industrial gases, n.e.c. Compared with 1978, the 1979

totals showed a dollar increase of about 35 percent for acetylene, an increase of 23 percent for carbon dioxide, and an increase of 26 percent for other elemental gases.

In addition to the annual production statistics shown in table 2, monthly statistics for specified gases are shown in table 9. These monthly statistics supersede those which were released earlier in the monthly Current Industrial Reports, Series M28C, *Industrial Gases*, United States Production.

VALUE OF SHIPMENTS OF INDUSTRIAL GASES, 1973 TO 1979



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros, (301) 763-7838.

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Table 1. VALUE OF SHIPMENTS OF SELECTED INDUSTRIAL GASES: 1979 AND 1978
(Millions of dollars)

Product class code	Product	MA-28C	
		1979	1978
28132 --	Acetylene.....	175.2	130.1
28133 --	Carbon dioxide.....	130.4	†106.2
28135 --	Nitrogen.....	407.3	329.1
28136 --	Oxygen.....	502.4	432.4
28137 --	Other elemental compressed and liquified gases, n.e.c.....	323.8	256.2
28130 --	Industrial gases, n.s.k.....	54.6	44.5

n.e.c. Not elsewhere classified. n.s.k. Not specified by kind. †Revised.

Table 2. ANNUAL PRODUCTION AND SHIPMENTS OF INDUSTRIAL GASES: 1975 TO 1979

Code	Product	Unit of measure	Year	Production	Total shipments	
					Quantity	Value (\$1,000)
2813- --	Industrial gases.....		1979	(X)	(X)	¹ 1,593,673
			1978	(X)	(X)	¹ 1,294,175
			1977	(X)	(X)	¹ 1,134,001
			1976	(X)	(X)	¹ 986,289
			1975	(X)	(X)	¹ 879,590
28132 --	Acetylene ²	Mil. cu. ft..	1979	5,741	4,180	175,172
			1978	5,306	3,456	130,152
			1977	6,003	3,830	136,721
			1976	7,111	4,415	133,417
			1975	6,704	4,138	129,100
28132 11	Produced for compression, including cylinder and pipeline.....	..do.....	1979	1,640	1,634	106,093
			1978	1,302	1,302	^r 78,607
28132 21	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	1979	4,101	2,546	69,079
			1978	4,004	2,154	^r 51,545
28133 --	Carbon dioxide ³ :					
28133 01	Gas.....	Short tons...	1979	(⁴)	297,859	3,851
28133 02	Liquid.....	..do.....	1979	(⁴)	2,356,361	92,895
28133 11	Liquid and gas.....	..do.....	1978	(⁴)	2,460,032	^r 80,059
			1977	(⁴)	2,236,208	75,615
			1976	(⁴)	1,561,697	46,644
			1975	(⁴)	1,376,592	41,099
28133 31	Solid (dry ice).....	..do.....	1979	365,295	365,295	33,655
			1978	344,552	345,049	26,153
			1977	363,085	347,298	28,032
			1976	355,873	355,882	28,440
			1975	351,602	351,664	24,784
28135 --	Nitrogen ⁵	Mil. cu. ft..	1979	427,151	383,896	407,319
			1978	378,923	333,892	329,075
			1977	327,661	300,003	273,793
			1976	288,868	265,473	252,006
			1975	252,368	228,266	222,157
28135 11	Gas: Produced for pipeline shipment.....	..do.....	1979	270,178	270,428	135,998
			1978	230,549	230,712	114,134
28135 13	Produced for consumption in this plant.....	..do.....	1979	^r 42,231	(X)	(X)
			1978	^r 44,599	(X)	(X)
28135 21	Liquid: Produced for bulk delivery shipment to pipeline or to other air separation plants.....	..do.....	1979	10,605	10,601	23,051
			1978	9,172	9,172	11,628
28135 23	Produced for consumption in this plant.....	..do.....	1979	1,307	(X)	(X)
			1978	(⁶)	(X)	(X)
28135 41	Liquid and gas, produced for cylinder and bulk delivery shipment..	..do.....	1979	102,830	102,867	248,270
			1978	94,603	94,008	203,313
28136 --	Oxygen ⁵.....	..do.....	1979	456,636	404,423	502,370
			1978	430,041	379,030	432,449
			1977	392,427	340,471	354,127
			1976	388,446	335,774	337,394
			1975	352,554	306,289	308,579
28136 11	Gas, produced for pipeline shipment.....	..do.....	1979	325,858	325,855	283,814
			1978	303,800	303,800	253,680
28136 21	Liquid, produced for bulk shipment to pipeline or to other air separation plants.....	..do.....	1979	13,435	13,434	29,934
			1978	11,507	11,507	17,360
28136 31	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	1979	65,235	65,134	188,622
			1978	63,742	63,723	161,409
28136 41	Produced for consumption in this plant.....	..do.....	1979	52,108	(X)	(X)
			1978	50,992	(X)	(X)

See footnotes at end of table.

Table 2. ANNUAL PRODUCTION AND SHIPMENTS OF INDUSTRIAL GASES: 1975 TO 1979--Continued

Code	Product	Unit of measure	Year	Production	Total shipments	
					Quantity	Value (\$1,000)
28137 --	Elemental gases and other industrial gases, n.e.c.....		1979	(X)	(X)	323,794
			1978	(X)	(X)	256,183
			1977	(X)	(X)	226,813
			1976	(X)	(X)	189,388
			1975	(X)	(X)	153,871
28137 15	Argon, high purity.....	Mil. cu. ft..	1979	8,039	8,048	136,518
			1978	7,089	7,079	95,108
			1977	5,922	5,914	72,567
			1976	5,107	4,941	66,741
			1975	4,457	4,457	63,144
	Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	..do.....	1979	8,039	8,048	136,518
			1978	7,089	7,079	95,108
	Helium ⁷.....	..do.....	1979	1,673	817	(NA)
			1978	1,549	811	(NA)
			1977	1,485	779	(NA)
1976			1,396	634	(NA)	
1975			1,079	601	(NA)	
28137 20	Hydrogen, liquid and gas.....	..do.....	1979	⁸ 99,271	44,912	119,034
			1978	⁸ 90,470	38,718	96,133
			1977	⁸ 84,759	35,165	94,677
			1976	⁸ 82,100	32,357	80,794
			1975	⁸ 73,552	27,662	57,358
28137 21	Produced for cylinder and bulk delivery shipment.....	..do.....	1979	11,874	11,874	71,811
			1978	10,680	10,677	58,612
28137 31	Produced for pipeline shipment and Government use.....	..do.....	1979	^r 33,038	^r 33,038	47,223
			1978	^r 28,041	^r 28,041	37,521
28137 41	Produced for consumption in this plant.....	..do.....	1979	54,359	(X)	(X)
			1978	51,749	(X)	(X)
28137 71	Nitrous oxide.....	1,000 gals... (STP)	1979	(D)	(D)	(⁹)
			1978	(D)	(D)	(⁹)
			1977	(D)	(D)	(⁹)
			1976	1,940,969	1,940,969	9,492
			1975	1,652,298	1,652,298	8,270
28137 98	Other industrial gases, n.e.c., including crude argon, carbon dioxide produced and transferred for further processing, and crude and high purity helium produced in privately owned plants ¹⁰		1979	(X)	(X)	⁹ 68,242
			1978	(X)	(X)	^r 64,942
			1977	(X)	(X)	⁹ 59,569
			1976	(X)	(X)	32,361
			1975	(X)	(X)	25,099
28130 00	As estimated for Current Industrial Report Series MA-28C.....		1979	(X)	(X)	54,617
			1978	(X)	(X)	44,548

Note: N.s.k. represents the value of shipments for establishments which did not provide detailed information by type of product. These establishments, typically with less than 5 employees, are not included on the MA-28C mailing panel. The n.s.k. value has been estimated for series MA-28C based on the rate of change for the reporting establishments applied to the previous year's figure.

(D) Data withheld to avoid disclosing figures for individual companies. (NA) Not available. N.e.c. Not elsewhere classified. ^r Revised. (X) Not applicable.

¹Excludes value for helium produced in Government-owned plants.

²Excludes information from railroad ships, shipyards, welding shops, and small establishments using portable generators.

³Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

⁴Review of liquid and gas production data have shown inconsistencies in reporting. As a result, these figures are being withheld until a more thorough investigation can be made of both the 1979 annual and 1980 monthly data. These corrections, if necessary, will be shown in a future monthly report, Series M28C.

⁵Excludes amounts produced and consumed in the manufacture of synthetic ammonia or ammonia derivatives.

⁶Data for liquid nitrogen produced for consumption in this plant are combined with data for gas nitrogen produced for consumption in this plant. Separate data for years prior to 1979 are not available.

⁷Source: U.S. Department of Interior, Bureau of Mines.

⁸Excludes amounts vented, used as fuel, etc., and amounts produced and consumed in the manufacture of synthetic ammonia and methanol, but includes an unspecified amount produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts produced by the ammonia dissociation process (cracking of ammonia). Also excludes amounts produced in petroleum refineries for captive use.

⁹Data for nitrous oxide, total shipments including transfers value (\$1,000), combined with data for other industrial gases, n.e.c., to avoid disclosing figures for individual companies.

¹⁰Excludes hydrocarbon gases such as propane, butane, and propylene, or halogenated hydrocarbons and cyclopropane, which are reported to the U.S. Tariff Commission. Also, excludes sulfur dioxide and chlorine data, which are shown in Current Industrial Reports Series M28A(79)-1, Inorganic Chemicals.

Table 3. PRODUCTION AND SHIPMENTS OF ACETYLENE, BY GEOGRAPHIC AREA: 1979

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic Area	Production	Total shipments including interplant transfers	
		Quantity	Value
United States ¹	5,741	4,180	175,172
Northeast Region and North Central Region...	727	723	50,750
South Region.....	4,774	3,215	110,856
Mountain Division.....	98	98	5,284
Pacific Division.....	144	144	8,282

¹See table 10 for the number of establishments reporting production by State.

Table 4. PRODUCTION AND SHIPMENTS OF CARBON DIOXIDE, BY DIVISIONS: 1979

(Production and quantity in short tons; value in \$1,000)

Division	Gas			Liquid			Solid (dry ice)						
	Production	Shipments		Production	Shipments		Production	Shipments					
		Quantity	Value		Quantity	Value		Quantity	Value				
United States ¹	(²)	297,859	3,851	(²)	2,356,361	92,895	365,295	365,295	33,655				
New England and Middle Atlantic.....	}	(D)	(D)	}	129,859	4,269	}	189,432	189,432	20,531			
East North Central.....					649,663	28,237							
West North Central.....					343,816	12,107							
South Atlantic and East South Central....					688,588	32,737					38,613	38,613	3,177
West South Central.....					314,852	8,798					33,298	33,298	2,554
Mountain.....					229,583	6,747					103,952	103,952	7,393
Pacific.....													

(D) Data withheld to avoid disclosing figures for individual companies.

¹See table 10 for the number of establishments reporting production by State.²See footnote 4, table 2.

Table 5. SHIPMENTS OF ARGON (HIGH PURITY) BY GEOGRAPHIC AREA: 1979

(Quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Total shipments including interplant transfers	
	Quantity	Value
United States ¹	8,048	136,518
Northeast Region.....	1,293	24,321
North Central Region.....	3,157	60,756
Ohio.....	954	9,630
South Atlantic Division.....	898	15,915
East South Central Division.....	300	6,545
West South Central Division.....	1,412	15,625
West Region.....	988	13,356
California.....	625	8,597

¹See table 10 for the number of establishments reporting production by State.

Table 6. PRODUCTION AND SHIPMENTS OF HYDROGEN (TOTAL) BY GEOGRAPHIC AREA: 1979

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Production	Total shipments including interplant transfer	
		Quantity	Value
United States ¹	99,271	44,912	119,034
Northeast Region.....	8,594	4,223	16,499
North Central Region.....	7,324	3,390	13,694
South Region and West Region.....	83,353	37,299	88,841
East South Central Division.....	4,296	1,722	4,574
West South Central Division.....	65,203	27,231	60,188

¹See table 10 for the number of establishments reporting production by State.

Table 7. PRODUCTION AND SHIPMENTS OF NITROGEN (TOTAL) BY GEOGRAPHIC AREA: 1979

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Production	Total shipments including interplant transfers	
		Quantity	Value
United States ¹	427,151	383,896	407,319
New England Division.....	6,374	6,245	10,505
Middle Atlantic Division.....	44,703	41,108	66,550
New York.....	13,730	11,250	21,587
New Jersey.....	11,322	11,321	16,017
Pennsylvania.....	19,651	18,537	28,946
North Central Region.....	109,933	88,681	108,473
Ohio.....	23,513	22,710	31,982
Illinois.....	14,878	11,880	18,532
South Atlantic Division.....	48,847	41,995	41,219
West Virginia.....	18,729	11,955	10,416
East South Central Division.....	31,125	30,175	25,955
Tennessee.....	7,211	7,192	6,211
Alabama.....	19,470	19,503	17,781
West South Central Division.....	147,579	136,959	95,152
Texas.....	109,668	103,948	66,255
Mountain Division.....	6,225	6,211	10,844
Pacific Division.....	32,365	32,522	48,621
California.....	30,078	30,229	43,326

¹See table 10 for the number of establishments reporting production by State.

Table 8. PRODUCTION AND SHIPMENTS OF OXYGEN (TOTAL) BY GEOGRAPHIC AREAS: 1979

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Production	Total shipments including interplant transfers	
		Quantity	Value
United States ¹	456,636	404,423	502,370
New England Division.....	1,793	1,772	4,988
Middle Atlantic Division.....	57,703	56,363	81,405
New York.....	14,412	14,165	22,562
New Jersey.....	2,611	2,611	6,506
Pennsylvania.....	40,680	39,579	52,337
North Central Region.....	170,226	151,154	180,438
Ohio.....	40,068	40,015	39,324
Michigan.....	25,420	15,569	20,077
South Atlantic Division.....	46,623	46,452	53,282
East South Central Division.....	33,159	32,905	40,582
West South Central Division.....	112,141	82,361	87,509
Texas.....	76,252	60,419	61,048
Mountain Division.....	14,971	14,585	18,144
Pacific Division.....	20,020	18,831	36,022
California.....	16,943	16,324	28,584

¹See table 10 for the number of establishments reporting production by State.

Table 6. PRODUCTION AND SHIPMENTS OF HYDROGEN (TOTAL) BY GEOGRAPHIC AREA: 1979

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Production	Total shipments including interplant transfer	
		Quantity	Value
United States ¹	99,271	44,912	119,034
Northeast Region.....	8,594	4,223	16,499
North Central Region.....	7,324	3,390	13,694
South Region and West Region.....	83,353	37,299	88,841
East South Central Division.....	4,296	1,722	4,574
West South Central Division.....	65,203	27,231	60,188

¹See table 10 for the number of establishments reporting production by State.

Table 7. PRODUCTION AND SHIPMENTS OF NITROGEN (TOTAL) BY GEOGRAPHIC AREA: 1979

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Production	Total shipments including interplant transfers	
		Quantity	Value
United States ¹	427,151	383,896	407,319
New England Division.....	6,374	6,245	10,505
Middle Atlantic Division.....	44,703	41,108	66,550
New York.....	13,730	11,250	21,587
New Jersey.....	11,322	11,321	16,017
Pennsylvania.....	19,651	18,537	28,946
North Central Region.....	109,933	88,681	108,473
Ohio.....	23,513	22,710	31,982
Illinois.....	14,878	11,880	18,532
South Atlantic Division.....	48,847	41,995	41,219
West Virginia.....	18,729	11,955	10,416
East South Central Division.....	31,125	30,175	25,955
Tennessee.....	7,211	7,192	6,211
Alabama.....	19,470	19,503	17,781
West South Central Division.....	147,579	136,959	95,152
Texas.....	109,668	103,948	66,255
Mountain Division.....	6,225	6,211	10,844
Pacific Division.....	32,365	32,522	48,621
California.....	30,078	30,229	43,326

¹See table 10 for the number of establishments reporting production by State.

Table 8. PRODUCTION AND SHIPMENTS OF OXYGEN (TOTAL) BY GEOGRAPHIC AREAS: 1979

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Production	Total shipments including interplant transfers	
		Quantity	Value
United States ¹	456,636	404,423	502,370
New England Division.....	1,793	1,772	4,988
Middle Atlantic Division.....	57,703	56,363	81,405
New York.....	14,412	14,165	22,562
New Jersey.....	2,611	2,611	6,506
Pennsylvania.....	40,680	39,579	52,337
North Central Region.....	170,226	151,154	180,438
Ohio.....	40,068	40,015	39,324
Michigan.....	25,420	15,569	20,077
South Atlantic Division.....	46,623	46,452	53,282
East South Central Division.....	33,159	32,905	40,582
West South Central Division.....	112,141	82,361	87,509
Texas.....	76,252	60,419	61,048
Mountain Division.....	14,971	14,585	18,144
Pacific Division.....	20,020	18,831	36,022
California.....	16,943	16,324	28,584

¹See table 10 for the number of establishments reporting production by State.

Table 9. PRODUCTION OF SPECIFIED INDUSTRIAL GASES, BY MONTHS: 1979 AND 1978

Code	Product	Unit of measure	Year	Total	January	February	March	April	May	June	July	August	September	October	November	December
28132 --	Acetylene.....	Mill. cu. ft.	1979	5,741	488	411	451	478	502	492	471	485	482	506	521	454
			1978	5,306	436	415	424	454	436	454	404	452	419	473	480	459
28132 11	Produced for compression, including cylinder and pipeline.....	..do.	1979	1,640	127	113	138	127	144	130	122	139	129	161	155	155
			1978	1,302	103	104	123	119	121	103	93	99	95	114	113	115
28132 21	Produced for pipeline shipment, (excluding that produced to be compressed) and for consumption in this plant.....	..do.	1979	4,101	F361	F298	F313	F351	F358	F362	F349	F346	F353	F345	F366	F299
			1978	4,004	333	311	301	335	315	351	311	353	324	359	367	344
28133 --	Carbon dioxide.....	Short tons	1979	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
28133 01	Gas.....	..do.	1979	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
28133 02	Liquid.....	..do.	1979	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
28133 31	Solid.....	..do.	1979	365,295	F20,771	F26,658	F21,735	F21,735	F30,782	F33,507	F38,538	F38,140	F39,566	F34,190	F31,123	F30,028
			1978	344,552	24,426	20,085	23,771	23,978	28,354	37,622	37,105	36,795	32,661	28,422	26,564	24,769
28135 00	Nitrogen.....	Mill. cu. ft.	1979	427,151	36,024	31,035	36,016	32,438	34,679	33,323	33,673	35,761	33,151	35,179	38,929	46,923
			1978	378,923	30,929	28,131	32,697	30,883	32,282	31,382	31,018	33,023	31,778	33,716	32,362	30,722
28135 11	Gas: Produced for pipeline shipment.....	..do.	1979	270,178	22,521	18,655	21,717	19,391	20,668	21,079	21,357	22,647	21,939	23,220	25,059	31,925
			1978	230,549	19,136	16,853	19,735	18,855	19,252	18,789	19,066	19,896	19,343	21,048	19,873	18,723
28135 13	Produced for consumption in this plant.....	..do.	1979	243,538	4,983	4,011	4,359	4,263	4,260	3,245	3,023	3,382	1,654	1,811	4,242	4,305
			1978	244,599	4,126	3,594	4,126	3,729	4,210	3,831	3,189	3,861	3,407	3,496	3,515	3,515
28135 21	Liquid: Produced for bulk shipment to pipeline or to other air separation plants.....	..do.	1979	10,605	837	967	986	909	1,040	904	773	660	875	839	945	870
			1978	9,172	366	477	504	761	734	761	1,082	1,036	1,017	990	641	803
28135 23	Produced for consumption in this plant.....	..do.	1979	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
			1978	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
28135 41	Liquid and gas, produced for cylinder and bulk delivery.....	Mill. cu. ft.	1979	102,830	7,683	7,402	8,954	7,895	8,711	8,095	8,520	9,072	8,683	9,309	8,683	9,823
			1978	94,603	7,301	7,207	8,332	7,538	8,086	8,001	7,681	8,230	8,011	8,182	8,333	7,681
28136 00	Oxygen.....	..do.	1979	456,636	F36,664	F33,673	F40,981	F38,673	F40,045	F40,046	F37,678	F36,747	F34,827	F35,328	F37,739	F44,235
			1978	430,041	32,242	30,201	34,622	33,908	37,987	36,494	36,437	37,702	36,996	38,072	37,795	37,585
28136 11	Gas, produced for pipeline shipment.....	..do.	1979	325,858	F26,513	F23,626	F29,203	F27,539	F28,607	F28,623	F27,206	F25,673	F24,125	F24,323	F27,236	F33,184
			1978	303,800	22,967	21,600	24,061	23,818	26,309	25,793	26,127	26,431	25,367	27,068	27,008	27,251
28136 21	Liquid produced for bulk shipment to pipeline or to other air separation plants.....	..do.	1979	13,435	F1,009	F1,067	F1,541	F876	F1,087	F1,097	F1,083	F1,536	F1,124	F989	F1,060	F966
			1978	11,057	522	523	718	764	971	833	1,132	1,213	1,316	1,512	925	1,078
28136 31	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.	1979	65,235	5,066	5,175	5,779	5,733	5,581	5,680	5,305	5,430	5,214	5,523	5,128	5,621
			1978	63,742	5,050	4,718	5,534	4,711	6,133	5,534	4,992	5,413	5,897	5,285	5,706	4,769
28136 41	Produced for consumption in this plant.....	..do.	1979	52,108	4,076	3,805	4,458	4,525	4,770	4,666	4,086	4,108	4,364	4,493	4,315	4,464
			1978	50,992	3,703	3,360	4,309	4,615	4,574	4,334	4,186	4,645	4,416	4,207	4,156	4,487
28137 15	Argon, high purity.....	..do.	1979	8,039	563	621	722	701	750	680	664	616	635	707	666	714
			1978	7,089	521	520	612	568	619	597	566	576	576	645	656	633
28137 20	Produced for cylinder and bulk delivery and pipeline shipments and for consumption in this plant.....	..do.	1979	7,089	521	520	612	568	619	597	566	576	576	707	666	714
			1978	7,089	521	520	612	568	619	597	566	576	576	645	656	633
28137 21	Produced for cylinder and bulk delivery shipment.....	Mill. cu. ft.	1979	99,271	7,690	7,473	8,641	9,044	8,432	8,237	8,454	8,360	7,963	7,586	8,445	8,946
			1978	90,470	7,055	6,608	7,320	7,372	7,372	7,203	7,391	7,311	7,736	7,936	7,935	8,556
28137 31	Produced for pipeline shipment and Government use.....	..do.	1979	11,874	860	845	1,094	1,122	1,102	1,132	858	1,020	982	1,111	1,069	873
			1978	10,680	851	856	981	874	920	840	773	825	1,015	1,175	1,069	992
28137 31	Produced for pipeline shipment and Government use.....	..do.	1979	33,038	2,220	2,458	2,661	2,833	2,596	2,666	3,116	2,966	2,732	2,732	2,871	3,147
			1978	28,041	2,121	2,173	2,504	2,451	2,319	2,250	2,195	2,325	2,389	2,389	2,888	2,814
28137 41	Produced for consumption in this plant.....	..do.	1979	54,359	4,610	4,170	4,886	5,089	4,734	4,333	4,930	4,224	4,015	3,743	4,701	4,924
			1978	51,749	4,083	3,870	4,362	3,995	4,133	4,113	4,423	4,564	4,506	4,372	4,578	4,750

^FRevised.

¹See footnote 4, table 2.

²Data for liquid nitrogen produced for consumption in this plant are combined with data for gas nitrogen produced for consumption in this plant. Separate data for months prior to January 1980 are not available.

Table 10. NUMBER OF ESTABLISHMENTS REPORTING THE PRODUCTION OF SELECTED INDUSTRIAL GASES, BY STATE: 1979

State	Acetylene	Carbon dioxide			Nitrogen	Oxygen	Argon (refined)	Hydrogen	Nitrous oxide
		Gas	Liquid	Solid					
United States.....	191	88	68	40	465	339	92	149	8
New England.....	5	1	1	1	18	7	3	3	-
Maine.....	-	-	-	-	1	-	-	-	-
New Hampshire.....	-	-	-	-	-	-	-	-	-
Vermont.....	-	-	-	-	1	-	-	-	-
Massachusetts.....	3	1	1	1	7	4	2	2	-
Rhode Island.....	1	-	-	-	1	-	-	-	-
Connecticut.....	1	-	-	-	8	3	1	1	-
Middle Atlantic.....	18	7	5	2	71	59	14	13	1
New York.....	5	2	1	-	18	15	3	3	-
New Jersey.....	5	2	1	2	14	6	3	4	1
Pennsylvania.....	8	3	3	-	39	38	8	6	-
East North Central.....	37	14	12	8	94	79	19	30	1
Ohio.....	15	3	3	2	30	31	7	10	1
Indiana.....	7	3	2	1	19	15	5	2	-
Illinois.....	5	7	7	5	27	19	4	11	-
Michigan.....	6	-	-	-	16	13	3	7	-
Wisconsin.....	4	1	-	-	2	1	-	-	-
West North Central.....	18	11	9	3	18	11	1	6	1
Minnesota.....	3	1	-	-	1	4	-	-	-
Iowa.....	4	4	4	2	3	-	-	-	-
Missouri.....	2	2	1	1	12	7	1	3	-
North Dakota.....	-	-	-	-	-	-	-	-	-
South Dakota.....	3	-	-	-	-	-	-	-	-
Nebraska.....	2	-	-	-	-	-	-	1	-
Kansas.....	4	4	4	-	2	-	-	2	1
South Atlantic.....	25	12	10	5	77	37	12	17	1
Delaware.....	-	1	1	-	4	4	1	5	-
Maryland.....	2	-	-	-	10	7	2	-	-
District of Columbia.....	-	-	-	-	-	-	-	-	-
Virginia.....	3	2	2	1	6	2	1	2	-
West Virginia.....	3	-	-	-	21	9	2	6	-
North Carolina.....	4	1	-	-	10	5	1	-	-
South Carolina.....	-	-	-	-	11	2	1	2	-
Georgia.....	4	3	3	1	5	3	2	2	1
Florida.....	9	5	4	3	10	5	2	-	-
East South Central.....	13	6	4	1	42	27	6	18	2
Kentucky.....	3	2	1	-	8	7	1	4	-
Tennessee.....	5	3	2	1	18	5	2	9	1
Alabama.....	3	-	-	-	15	14	3	4	-
Mississippi.....	2	1	1	-	1	1	-	1	1
West South Central.....	38	16	9	5	74	58	19	34	-
Arkansas.....	1	1	1	-	1	1	1	-	-
Louisiana.....	5	4	3	1	19	14	3	7	-
Oklahoma.....	3	1	1	1	5	1	1	-	-
Texas.....	29	10	4	3	49	42	14	27	-
Mountain.....	17	9	8	8	18	22	4	3	-
Montana.....	3	-	-	-	-	4	-	-	-
Idaho.....	1	-	-	-	1	-	-	-	-
Wyoming.....	1	1	-	-	-	-	-	-	-
Colorado.....	3	2	2	2	5	5	1	2	-
New Mexico.....	2	2	2	2	2	2	1	-	-
Arizona.....	3	2	2	2	5	2	-	-	-
Utah.....	3	2	2	2	5	8	2	1	-
Nevada.....	1	-	-	-	-	-	-	-	-
Pacific.....	20	12	10	7	53	39	14	25	2
Washington.....	4	3	2	1	7	7	3	3	-
Oregon.....	4	-	-	-	1	-	-	2	-
California.....	9	8	7	5	41	28	11	15	2
Alaska.....	1	-	-	-	-	-	-	-	-
Hawaii.....	2	1	1	1	4	4	-	5	-

- Represents zero.

DESCRIPTION OF SURVEY

Scope of Survey—This survey includes firms engaged in the manufacture of industrial gases. Excluded from this survey are data for liquefied petroleum gases and organic gases, which are reported to the United States Tariff Commission, and sulfur dioxide and chlorine, which are shown in the Current Industrial Report MA-28A(79)-1, *Inorganic Chemicals*.

Survey Description—The statistics in this publication were collected on Bureau of the Census annual reporting Form MA-28C, *Production of Industrial Gases*. The mailing panel for this survey consisted of all known producers of industrial gases.

Survey Error—The current annual figures may include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are imputed from year-to-year movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with higher than 25 percent imputation rate are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution. The overall imputation rate for this survey is less than 2 percent.

Revision to Previous Period Data—Statistics for the previous year may be revised due to receipt of corrected data from respondents, including late reports for which estimates were made, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end of products.

Quantity and Value of Shipments Including Interplant Transfers—The quantity and net selling value, f.o.b. plant (after discounts and allowances and excluding freight charges which may be absorbed by the company), of all products made in this establishment and physically shipped from it. Included are products shipped on consignment, whether or not sold at the end of the year, and products transferred to other establish-

ments of a company (such as other manufacturing plants, separate sales branches, or retail stores). Their value is the nearest approximation to the commercial selling value, f.o.b. plant, and not the cost of production.

The shipments value of some of the gases, particularly oxygen, reported by companies vary widely not only because of the conditions of sales, including delivery by pipeline or cylinder, but also because plant operations differ. The manufacturing and selling activities of some companies are centralized at the primary production site, while other companies sell or ship liquefied gases to other sites (filling stations or conversion units) where the products are changed in form, packaged, and sold. The values reported for some sites thus include marketing activities and for other sites do not.

Unit of Measure—All figures included in this report are collected in thousand cubic feet, 70° F, at 1 atmosphere pressure, unless otherwise specified.

HISTORICAL NOTES

Monthly and annual statistics for series M28C, *Industrial Gases*, have been issued beginning with January 1941.

Past copies of this report (called Facts for Industry before 1959) can be found in the Federal Depository Library in your area. These libraries keep Current Industrial Reports permanently available. A list of depository libraries may be obtained from the Bureau of the Census regional office in your area:

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RELATIONSHIP BETWEEN M28C (MONTHLY) AND MA-28C (ANNUAL) SERIES FOR INDUSTRIAL GASES

The data as shown in table 2 of this report reflect levels of production as reported by establishments on annual Form MA-28C. The actual data reported by establishments canvassed on the annual differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data are published in two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production. Revisions

to the 1979 monthly series are based on findings from the 1979 annual. These revisions are shown in table 9 of the annual report MA-28C.

RELATED REPORTS

The Bureau of the Census also publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	Manufacturers' Shipments, Inventories, and Orders
M28A	Monthly	Inorganic Chemicals
M28B	Monthly	Inorganic Fertilizer Materials
M28C	Monthly	Industrial Gases
<i>Foreign Trade Reports</i>		
FT-410	Monthly	U.S. Exports
FT-135	Monthly	U.S. General Imports

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7837
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	Chemical Program	(202) 377-5496
To order a Census Bureau publication	Customer Services (DUSD)	(301) 449-1600
To order Census Bureau microfiche	Maria Brown	(301) 763-5511

ACKNOWLEDGMENTS

This report was prepared in the Industry Division, Bureau of the Census, under the direction of Robert J. Nealon, Chief, Current Nondurables Branch, and John H. Ambler, Chief, Chemical and Wood Products Section. Michael Kavros was directly responsible for the review of the data and preparation of the report. Roger H. Bugenhagen, Chief of the Division, and John R. Wikoff, Assistant Chief for Commodity and Special Programs, provided overall direction and coordination to this project.

Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

JANUARY 1980

M28C(80)-1
Issued April 1980

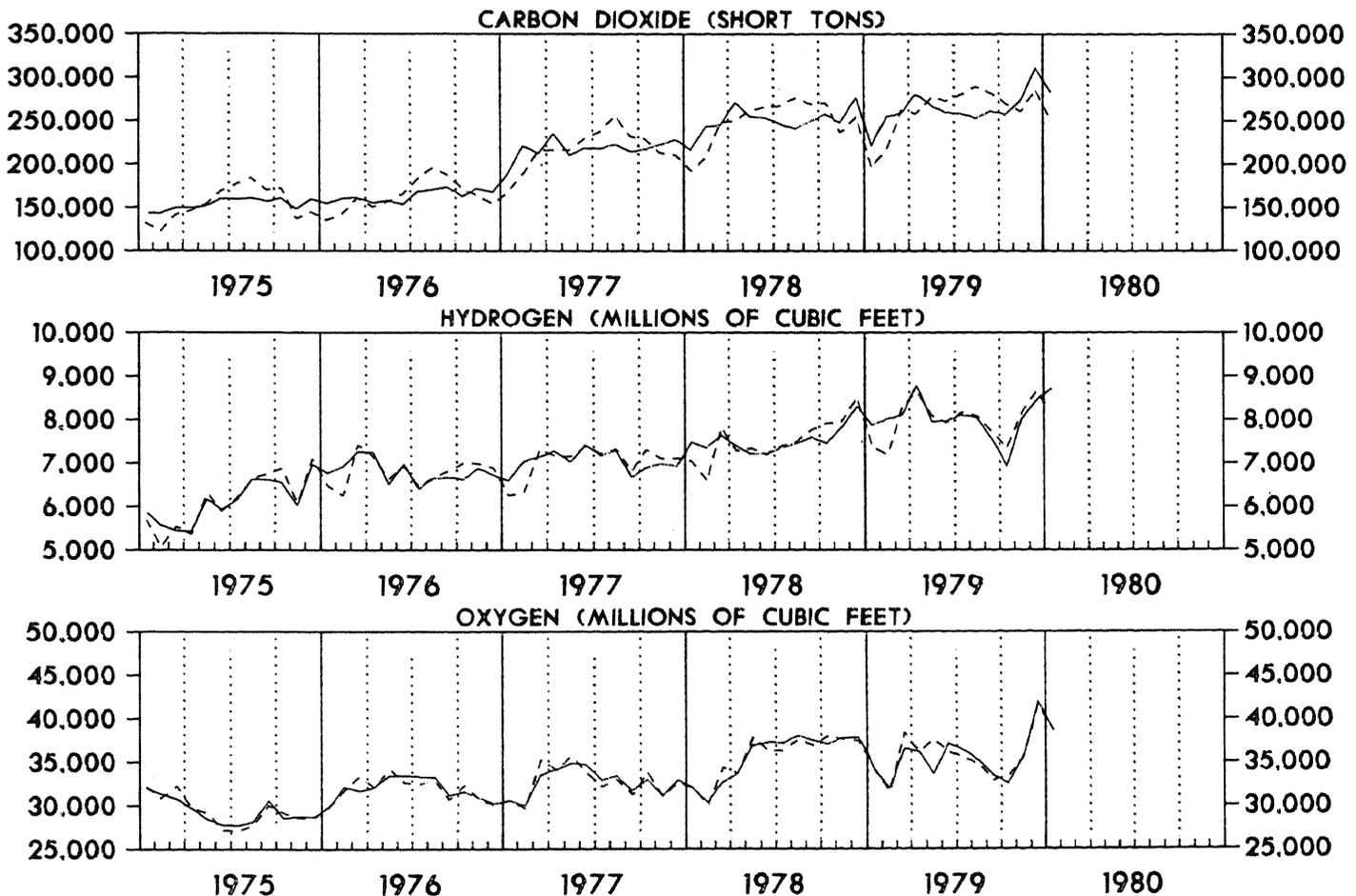
The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 5.

THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES 1975 TO 1980

———— Seasonally Adjusted
- - - - - Not Seasonally Adjusted



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros (301) 763-7838.

For sale by the Subscriber Services Section (Publications), Bureau of the Census, Washington, D.C. 20233, or any U.S. Department of Commerce district office. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. Price 25 cents per copy, \$3.50 per year.

Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1977 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02 and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980					
January.....	492	283,467	8,695	40,298	38,700
1979					
December.....	401	311,071	8,448	45,786	41,989
November.....	447	273,829	8,026	38,358	35,698
October.....	448	257,105	6,921	33,226	32,540
September.....	403	261,077	7,539	31,949	33,387
August.....	421	252,864	8,049	33,626	35,138
July.....	443	257,951	8,104	32,743	36,332
June.....	445	259,826	8,017	33,323	37,334
May.....	456	268,136	8,007	33,088	36,892
April.....	463	280,404	8,893	32,053	36,433
March.....	428	258,967	8,165	33,759	36,755
February.....	391	254,911	8,054	31,948	32,157
January.....	451	220,709	7,895	34,289	34,535
1978					
December.....	451	276,530	8,388	31,354	37,962
November.....	462	247,472	7,818	33,281	37,943
October.....	466	257,419	7,505	33,303	37,140
September.....	395	249,427	7,583	32,057	37,555
August.....	442	241,157	7,491	32,470	38,159
July.....	428	245,894	7,347	31,495	37,291
June.....	463	253,113	7,273	32,816	37,464
May.....	446	254,531	7,270	32,188	37,129
April.....	496	271,223	7,488	31,829	33,905
March.....	451	245,214	7,704	32,021	32,907
February.....	444	243,444	7,397	30,245	30,565
January.....	454	216,406	7,516	30,758	32,238
1977					
December.....	441	228,595	6,959	26,763	32,834
November.....	435	223,134	7,005	28,620	30,988
October.....	451	217,634	6,911	28,480	32,959
September.....	441	214,485	6,693	27,270	31,574
August.....	498	223,323	7,315	27,549	33,403
July.....	486	218,004	7,190	26,945	32,843
June.....	520	218,422	7,453	27,975	34,616
May.....	557	209,796	7,046	27,411	34,849
April.....	464	235,001	7,306	26,926	34,096
March.....	566	212,489	7,169	27,368	33,693
February.....	568	221,165	7,070	25,908	29,971
January.....	603	188,723	6,628	26,670	30,574

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1977 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, total (28133 01, 28133 02, and 28133 31)	Carbon dioxide, liquid and gas ¹ (28133 01 and 28133 02)	Carbon dioxide, solid (28133 31) (short tons)	Carbon dioxide, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980							
January.....	480	251,435	219,754	31,681	8,182	41,064	38,700
1979							
December.....	414	286,185	253,772	32,413	8,659	45,374	41,569
November.....	471	260,959	227,365	33,594	8,162	37,706	35,555
October.....	461	270,474	233,570	36,904	7,343	33,990	33,353
September.....	434	281,702	238,995	42,707	7,705	32,013	32,886
August.....	438	289,782	248,614	41,168	8,089	34,601	34,716
July.....	424	280,651	239,054	41,597	8,169	32,579	35,496
June.....	443	272,817	236,650	36,167	7,969	32,257	36,363
May.....	453	276,448	243,222	33,226	8,151	33,617	37,741
April.....	430	258,252	234,792	23,460	8,742	31,476	36,433
March.....	409	262,334	233,560	28,774	8,353	34,907	38,666
February.....	371	217,949	195,529	22,420	7,224	30,095	31,771
January.....	439	195,769	173,904	21,865	7,429	34,941	34,535
1978							
December.....	466	254,408	228,642	25,766	8,598	31,072	37,582
November.....	487	235,841	208,210	27,631	7,951	32,715	37,791
October.....	480	270,805	241,239	29,566	7,963	34,069	38,068
September.....	425	269,132	235,157	33,975	7,750	32,121	36,992
August.....	460	276,366	238,090	38,276	7,529	33,412	37,698
July.....	410	267,533	228,935	38,598	7,406	31,338	36,433
June.....	461	265,769	226,633	39,136	7,229	31,766	36,490
May.....	443	262,422	232,927	29,495	7,401	32,703	37,983
April.....	460	249,796	224,853	24,943	7,361	31,256	33,905
March.....	431	248,402	223,674	24,728	7,881	33,110	34,618
February.....	421	208,145	187,252	20,893	6,635	28,491	30,198
January.....	442	191,952	166,543	25,409	7,073	31,342	32,238
1977							
December.....	456	210,307	183,761	26,546	7,132	26,522	32,506
November.....	458	212,647	185,086	27,561	7,124	28,133	30,864
October.....	465	228,951	198,849	30,102	7,333	29,135	33,783
September.....	475	231,429	198,458	32,971	6,840	27,325	31,100
August.....	518	255,928	216,747	39,181	7,352	28,348	33,002
July.....	465	237,188	200,550	36,638	7,248	26,810	32,079
June.....	517	229,343	195,138	34,205	7,408	27,080	33,716
May.....	553	216,299	186,125	30,175	7,173	27,850	35,651
April.....	435	216,436	188,983	27,453	7,189	26,657	34,076
March.....	547	215,251	186,165	29,086	7,334	28,326	35,445
February.....	540	189,096	163,895	25,201	6,356	24,405	29,611
January.....	574	167,397	143,431	23,966	6,270	27,070	30,574

¹Data from January 1977 to January 1980 have been revised. These revisions are the result of a reconciliation between this monthly report and the 1978 annual Current Industrial Report, MA-28C, "Industrial Gases."

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	January 1980	December 1979	January 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	480	414	439
	Produced for compression, including cylinder and pipeline.....	..do.....	176	156	128
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant....	..do.....	304	258	311
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	34,981	³ 253,772	³ 173,904
28133 02	Liquid ².....	..do.....	184,773	(³)	(³)
28133 31	Solid (dry ice).....	..do.....	31,681	32,413	21,865
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	Mil. cu. ft.....	639	700	552
28137 20	Hydrogen ⁴.....	..do.....	8,182	8,659	7,429
	Liquid and gas: Produced for cylinder and bulk shipment, and liquid produced for conversion to gas.....	..do.....	994	860	845
	Produced for pipeline and government use.....	..do.....	2,713	3,078	2,165
	Produced for consumption in this plant.....	..do.....	4,475	4,721	4,419
28135 00	Nitrogen ⁵.....	..do.....	41,064	45,374	34,941
	Gas: Produced for pipeline shipment.....	..do.....	28,549	30,724	21,674
	Produced for consumption in this plant.....	..do.....	3,560	⁶ 4,337	⁶ 5,042
	Liquid: Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	753	867	835
	Produced for consumption in this plant.....	..do.....	393	(⁶)	(⁶)
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	7,809	9,446	7,390
28136 00	Oxygen.....	..do.....	38,700	41,569	34,535
	Gas: Produced for pipeline shipments.....	..do.....	28,347	^r 30,617	24,461
	Liquid: Produced for bulk delivery shipment to pipelines or to other air separation plants.....	..do.....	800	1,042	1,091
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	4,808	^r 5,481	4,939
	Produced for consumption in this plant.....	..do.....	4,745	4,429	4,044

^rRevised by 5 percent or more from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Separate data for gas and liquid carbon dioxide for months prior to January 1980 are not available.

⁴Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use. However, of the total shown for lower purity hydrogen prior to 1969, 70 to 75 percent was accounted for by petroleum refineries with captive hydrogen production. Not all such petroleum refineries were canvassed in this survey.

⁵Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

⁶Liquid nitrogen produced for consumption in this plant data are combined with gas nitrogen produced for consumption in this plant data. Separate data for months prior to January 1980 are not available.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: DECEMBER 1979

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28134 40	Nitrogen.....	45,374	431	0.9

Note: Detailed export data for industrial gases, other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of Standard Industrial Classification Codes and Schedule B Export Codes:

<u>Domestic output</u>	<u>Exports</u>
28135 00	415.2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, **Production of Industrial Gases**. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data:

a. *Valuation*—There are different methods of valuation for the three types of data.

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

b. *Duplication in Quantity and Value of Output*—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

c. *Low-Valued Export and Import Transactions*—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$251 effective October 1969 and for shipments valued under \$100 prior to October 1969. This is believed to have only negligible effect on the statistics for most commodities.

d. *Manufacturers' Shipments, Not Specified by Kind*—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

e. *Time Lag Between Output and Exports*—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

f. *"Direct" vs "Total" Commodity Export and Imports*—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

g. *Used Commodities*—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

RELATIONSHIP BETWEEN M28C AND M28C-14 SERIES FOR INDUSTRIAL GASES

The data as shown in table 1 reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report M28C-14. The actual data reported by establishments canvassed on the annual, differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data comprise two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in describing

month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

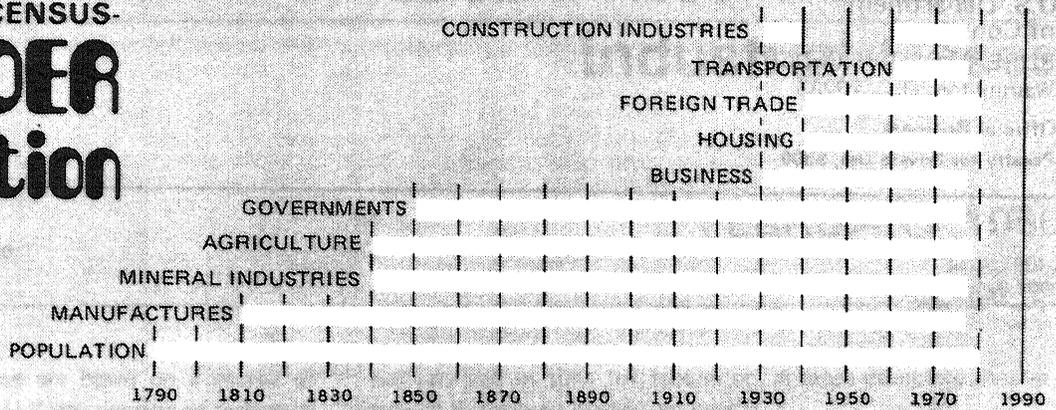
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M28B	Monthly	Inorganic Fertilizer Materials
<i>Foreign Trade Reports</i>		
FT-410	Monthly	U.S. Exports
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CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
To order a Census Bureau publication	Daisy Williams	(301) 763-7472
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Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

FEBRUARY 1980

M28C(80)-2
Issued May 1980

The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 5.

THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

THE GRAPHIC PRESENTATION FOR THIS SURVEY WAS NOT AVAILABLE AT THE TIME OF PUBLICATION.

Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros (301) 763-7838.

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Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1977 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980					
February.....	483	293,135	9,167	41,494	37,313
January.....	483	290,083	8,646	37,553	37,835
1979					
December.....	401	311,071	8,448	45,786	41,989
November.....	447	273,829	8,026	38,358	35,698
October.....	448	257,105	6,921	33,226	32,540
September.....	403	261,077	7,539	31,949	33,387
August.....	421	252,864	8,049	33,626	35,138
July.....	443	257,951	8,104	32,743	36,332
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April.....	463	280,404	8,893	32,053	36,433
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February.....	391	254,911	8,054	31,948	32,157
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December.....	451	276,530	8,388	31,354	37,962
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July.....	428	245,894	7,347	31,495	37,291
June.....	463	253,113	7,273	32,816	37,464
May.....	446	254,531	7,270	32,188	37,129
April.....	496	271,223	7,488	31,829	33,905
March.....	451	245,214	7,704	32,021	32,907
February.....	444	243,444	7,397	30,245	30,565
January.....	454	216,406	7,516	30,758	32,238
1977					
December.....	441	228,595	6,959	26,763	32,834
November.....	435	223,134	7,005	28,620	30,988
October.....	451	217,634	6,911	28,480	32,959
September.....	441	214,485	6,693	27,270	31,574
August.....	498	223,323	7,315	27,549	33,403
July.....	486	218,004	7,190	26,945	32,843
June.....	520	218,422	7,453	27,975	34,616
May.....	557	209,796	7,046	27,411	34,849
April.....	464	235,001	7,306	26,926	34,096
March.....	566	212,489	7,169	27,368	33,693
February.....	568	221,165	7,070	25,908	29,971
January.....	603	188,723	6,628	26,670	30,574

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1977 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, total (28133 01, 28133 02, and 28133 31)	Carbon dioxide, liquid and gas ¹ (28133 01 and 28133 02)	Carbon dioxide, solid (28133 31)	Hydrogen, high and low purity (100%) (28137 20)	Nitrogen, high and low purity (100%) (28135 00)	Oxygen, high and low purity (100%) (28136 00)
			(short tons)	(short tons)	(mil. cu. ft.)	(mil. cu. ft.)	(mil. cu. ft.)
1980							
February.....	470	250,630	225,085	25,545	8,223	39,087	36,865
January.....	470	257,304	228,994	28,310	8,136	38,266	37,835
1979							
December.....	414	286,185	253,772	32,413	8,659	45,374	41,569
November.....	471	260,959	227,365	33,594	8,162	37,706	35,555
October.....	461	270,474	233,570	36,904	7,343	33,990	33,353
September.....	434	281,702	238,995	42,707	7,705	32,013	32,886
August.....	438	289,782	248,614	41,168	8,089	34,601	34,716
July.....	424	280,651	239,054	41,597	8,169	32,579	35,496
June.....	443	272,817	236,650	36,167	7,969	32,257	36,363
May.....	453	276,448	243,222	33,226	8,151	33,617	37,741
April.....	430	258,252	234,792	23,460	8,742	31,476	36,433
March.....	409	262,334	233,560	28,774	8,353	34,907	38,666
February.....	371	217,949	195,529	22,420	7,224	30,095	31,771
January.....	439	195,769	173,904	21,865	7,429	34,941	34,535
1978							
December.....	466	254,408	228,642	25,766	8,598	31,072	37,582
November.....	487	235,841	208,210	27,631	7,951	32,715	37,791
October.....	480	270,805	241,239	29,566	7,963	34,069	38,068
September.....	425	269,132	235,157	33,975	7,750	32,121	36,992
August.....	460	276,366	238,090	38,276	7,529	33,412	37,698
July.....	410	267,533	228,935	38,598	7,406	31,338	36,433
June.....	461	265,769	226,633	39,136	7,229	31,766	36,490
May.....	443	262,422	232,927	29,495	7,401	32,703	37,983
April.....	460	249,796	224,853	24,943	7,361	31,256	33,905
March.....	431	248,402	223,674	24,728	7,881	33,110	34,618
February.....	421	208,145	187,252	20,893	6,635	28,491	30,198
January.....	442	191,952	166,543	25,409	7,073	31,342	32,238
1977							
December.....	456	210,307	183,761	26,546	7,132	26,522	32,506
November.....	458	212,647	185,086	27,561	7,124	28,133	30,864
October.....	465	228,951	198,849	30,102	7,333	29,135	33,783
September.....	475	231,429	198,458	32,971	6,840	27,325	31,100
August.....	518	255,928	216,747	39,181	7,352	28,348	33,002
July.....	465	237,188	200,550	36,638	7,248	26,810	32,079
June.....	517	229,343	195,138	34,205	7,408	27,080	33,716
May.....	553	216,299	186,125	30,175	7,173	27,850	35,651
April.....	435	216,436	188,983	27,453	7,189	26,657	34,076
March.....	547	215,251	186,165	29,086	7,334	28,326	35,445
February.....	540	189,096	163,895	25,201	6,356	24,405	29,611
January.....	574	167,397	143,431	23,966	6,270	27,070	30,574

¹Data from January 1977 to January 1980 have been revised. These revisions are the result of a reconciliation between this monthly report and the 1978 annual Current Industrial Report, MA-28C, "Industrial Gases."

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	February 1980	January 1980	February 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	470	470	371
	Produced for compression, including cylinder and pipeline.....	..do.....	182	177	114
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant....	..do.....	288	293	257
28133 01	Carbon dioxide:				
	Gas ²	S. tons.....	37,917	34,855	195,529
28133 02	Liquid ².....	..do.....	187,168	194,139	
28133 31	Solid (dry ice).....	..do.....	25,545	28,310	
28137 15	Argon, high purity:				
	Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	Mil. cu. ft.....	611	634	609
28137 20	Hydrogen ⁴.....	..do.....	8,223	8,136	7,224
	Liquid and gas:				
	Produced for cylinder and bulk shipment, and liquid produced for conversion to gas.....	..do.....	855	981	830
	Produced for pipeline and government use.....	..do.....	2,666	2,643	2,397
	Produced for consumption in this plant.....	..do.....	4,702	4,512	3,997
28135 00	Nitrogen ⁵.....	..do.....	39,087	38,266	30,095
	Gas:				
	Produced for pipeline shipment.....	..do.....	26,348	26,050	17,953
	Produced for consumption in this plant.....	..do.....	3,072	3,243	4,058
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	835	757	964
	Produced for consumption in this plant.....	..do.....	374	303	(⁶)
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	8,458	7,913	7,120
28136 00	Oxygen.....	..do.....	36,865	37,835	31,771
	Gas:				
	Produced for pipeline shipments.....	..do.....	26,939	28,270	21,798
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to other air separation plants.....	..do.....	1,094	830	1,153
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	4,900	4,694	5,045
	Produced for consumption in this plant.....	..do.....	3,932	4,041	3,775

^rRevised by 5 percent or more from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Separate data for gas and liquid carbon dioxide for months prior to January 1980 are not available.

⁴Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use. However, of the total shown for lower purity hydrogen prior to 1969, 70 to 75 percent was accounted for by petroleum refiners with captive hydrogen production. Not all such petroleum refineries were canvassed in this survey.

⁵Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

⁶Liquid nitrogen produced for consumption in this plant data are combined with gas nitrogen produced for consumption in this plant data. Separate data for months prior to January 1980 are not available.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: JANUARY 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	38,266	1,510	3.9

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of Standard Industrial Classification Codes and Schedule B Export Codes:

Domestic output	Exports
28135 00	415.2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, **Production of Industrial Gases**. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are “imputed” from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced “in process” as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data:

a. *Valuation*—There are different methods of valuation for the three types of data.

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

b. *Duplication in Quantity and Value of Output*—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

c. *Low-Valued Export and Import Transactions*—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$251 effective October 1969 and for shipments valued under \$100 prior to October 1969. This is believed to have only negligible effect on the statistics for most commodities.

d. *Manufacturers' Shipments, Not Specified by Kind*—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

e. *Time Lag Between Output and Exports*—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

f. *"Direct" vs "Total" Commodity Export and Imports*—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

g. *Used Commodities*—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

RELATIONSHIP BETWEEN M28C and M28C-14 SERIES FOR INDUSTRIAL GASES

The data as shown in tables 1A and 1B reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report M28C-14. The actual data reported by establishments canvassed on the annual, differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data comprise two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in

describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

The Bureau of the Census also publishes reports on other related products as follows:

Series	Frequency	Title
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M3-1	Monthly	Manufacturers' Shipments, Inventories, and Orders
M28A	Monthly	Inorganic Chemicals
M28B	Monthly	Inorganic Fertilizer Materials
<i>Foreign Trade Reports</i>		
FT-410	Monthly	U.S. Exports
FT-135	Monthly	U.S. General Imports

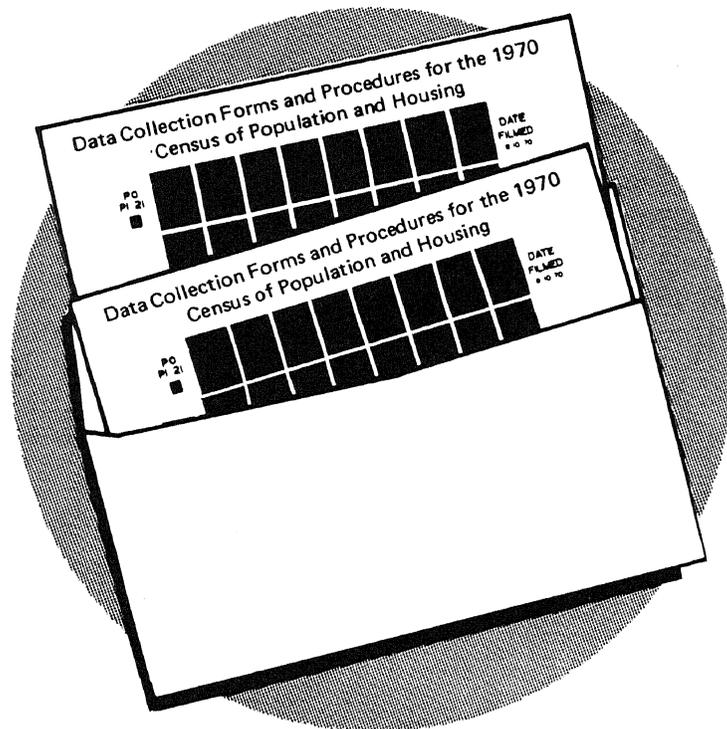
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Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

MARCH 1980

M28C(80)-3
Issued June 1980

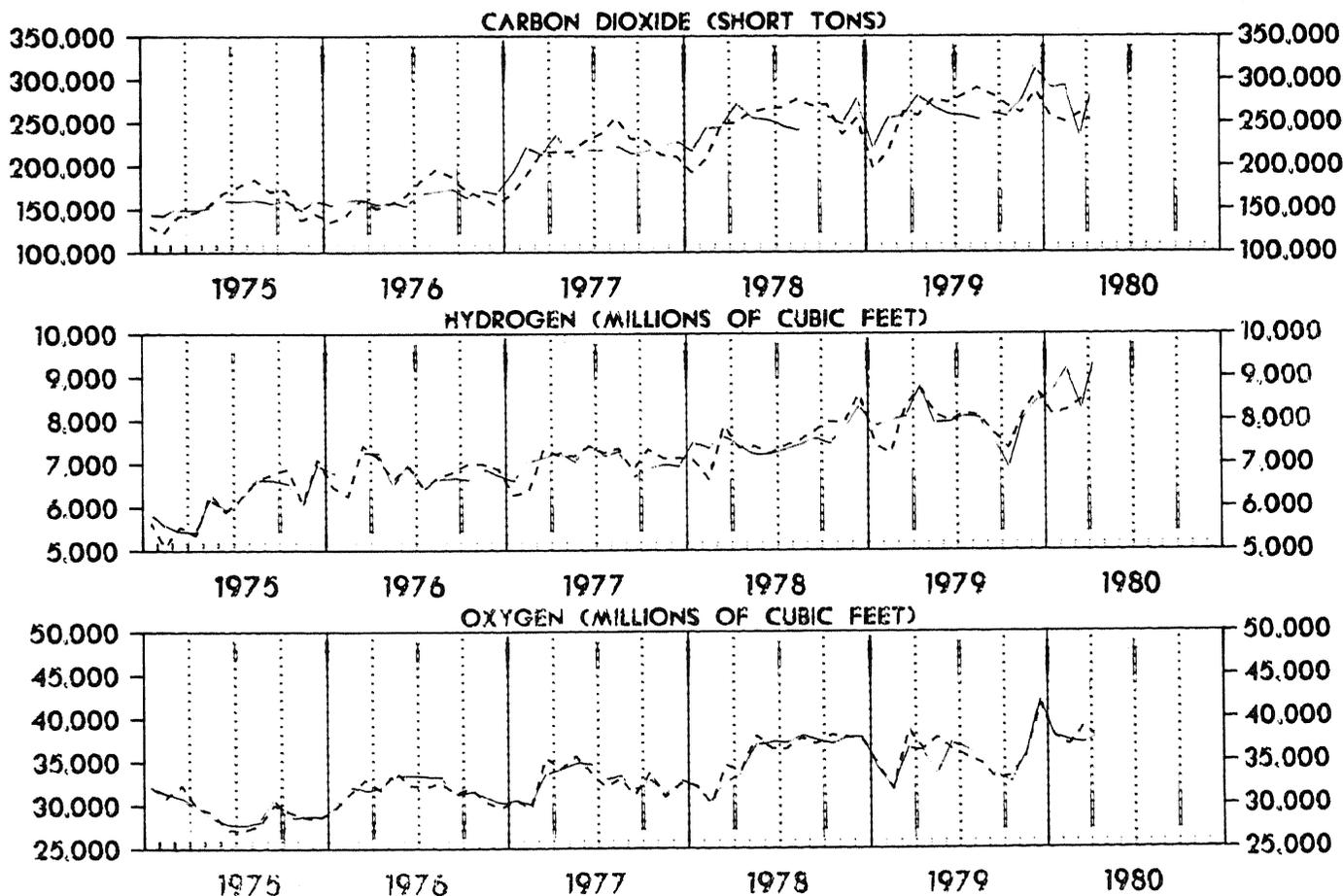
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PRODUCTION OF SELECTED INDUSTRIAL GASES 1975 TO 1980

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- - - - - Not Seasonally Adjusted



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January.....	439	195,769	173,904	21,865	7,429	34,941	34,535
1978							
December.....	466	254,408	228,642	25,766	8,598	31,072	37,582
November.....	487	235,841	208,210	27,631	7,951	32,715	37,791
October.....	480	270,805	241,239	29,566	7,963	34,069	38,068
September.....	425	269,132	235,157	33,975	7,750	32,121	36,992
August.....	460	276,366	238,090	38,276	7,529	33,412	37,698
July.....	410	267,533	228,935	38,598	7,406	31,338	36,433
June.....	461	265,769	226,633	39,136	7,229	31,766	36,490
May.....	443	262,422	232,927	29,495	7,401	32,703	37,983
April.....	460	249,796	224,853	24,943	7,361	31,256	33,905
March.....	431	248,402	223,674	24,728	7,881	33,110	34,618
February.....	421	208,145	187,252	20,893	6,635	28,491	30,198
January.....	442	191,952	166,543	25,409	7,073	31,342	32,238

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	March 1980	February 1980	March 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	452	469	409
	Produced for compression, including cylinder and pipeline.....	..do.....	174	181	139
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant....	..do.....	278	288	270
	Carbon dioxide:	S. tons.....	260,120	250,423	262,334
28133 01	Gas ².....	..do.....	37,578	38,008	323,560
28133 02	Liquid ².....	..do.....	193,840	187,148	
28133 31	Solid (dry ice).....	..do.....	28,702	25,267	28,774
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	Mil. cu. ft.....	628	635	709
28137 20	Hydrogen ³	Mil. cu. ft.....	8,472	8,474	8,353
	Liquid and gas: Produced for cylinder and bulk shipment, and liquid produced for conversion to gas.....	..do.....	1,176	854	1,074
	Produced for pipeline and government use.....	..do.....	2,874	2,879	2,595
	Produced for consumption in this plant.....	..do.....	4,422	4,741	4,684
28135 00	Nitrogen ⁵.....	..do.....	39,901	38,895	34,907
	Gas:				
	Produced for pipeline shipment.....	..do.....	26,526	26,201	20,900
	Produced for consumption in this plant.....	..do.....	3,104	3,074	64,411
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	753	817	983
	Produced for consumption in this plant.....	..do.....	409	374	(⁶)
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	9,109	8,429	8,613
28136 00	Oxygen.....	..do.....	39,059	37,582	38,666
	Gas:				
	Produced for pipeline shipments.....	..do.....	27,972	26,975	26,943
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to other air separation plants.....	..do.....	1,002	1,041	1,666
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	6,079	5,656	5,634
	Produced for consumption in this plant.....	..do.....	4,006	3,910	4,423

^rRevised by 5 percent or more from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Separate data for gas and liquid carbon dioxide for months prior to January 1980 are not available.

⁴Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁵Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

⁶Liquid nitrogen produced for consumption in this plant data are combined with gas nitrogen produced for consumption in this plant data. Separate data for months prior to January 1980 are not available.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: FEBRUARY 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	39,901	10,996	27.5

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of Standard Industrial Classification Codes and Schedule B Export Codes:

Domestic output	Exports
28135 00	415.2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, **Production of Industrial Gases**. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

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EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data:

a. *Valuation*—There are different methods of valuation for the three types of data.

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

b. *Duplication in Quantity and Value of Output*—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

c. *Low-Valued Export and Import Transactions*—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$501, effective March 1979 and for shipments valued under \$251 prior to March 1979. This is believed to have only negligible effect on the statistics for most commodities.

d. *Manufacturers' Shipments, Not Specified by Kind*—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

e. *Time Lag Between Output and Exports*—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

f. *"Direct" vs "Total" Commodity Export and Imports*—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

g. *Used Commodities*—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

h. *Geographic Area of Coverage*—Import and export data reflect the movement of merchandise into and out of the U.S. customs territory (the 50 States, the District of Columbia, and Puerto Rico). They do not include movements between the United States and its possessions. Domestic output (shipments) data exclude Puerto Rico and other outlying areas.

RELATIONSHIP BETWEEN M28C and M28C-14 SERIES FOR INDUSTRIAL GASES

The data as shown in tables 1A and 1B reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report M28C-14. The actual data reported by establishments canvassed on the annual differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and

establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data comprise two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

The Bureau of the Census also publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	Manufacturers' Shipments, Inventories, and Orders
M28A	Monthly	Inorganic Chemicals
M28B	Monthly	Inorganic Fertilizer Materials
<i>Foreign Trade Reports</i>		
FT-410	Monthly	U.S. Exports
FT-135	Monthly	U.S. General Imports

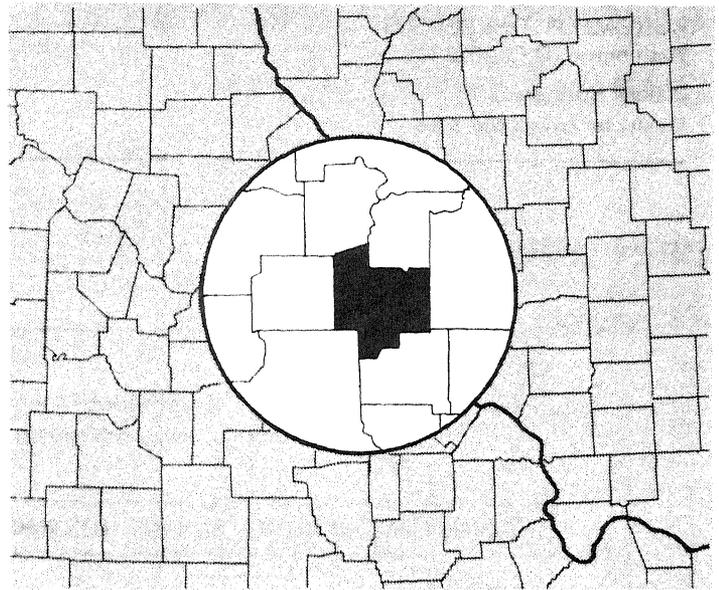
CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Micahel Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
To order a Census Bureau publication	Daisy Williams	(301) 763-7472
To order Census Bureau microfiche	Maria Brown	(301) 763-5511

COUNTY BUSINESS PATTERNS 1978

Now Available

1978 Data on Employment, Payrolls, & Establishments



County Business Patterns presents intercensal data on employment, number and employment size of establishments, and payrolls by 2-, 3-, and 4-digit levels of the Standard Industrial Classification (SIC) for States and counties. This annual series includes a separate paperbound report for the United States, each State, and the District of Columbia.

The individual State reports present for the State, number of establishments, employment, and payroll data by employment-size class to the 4-digit SIC level. Also included, by major industry group, are data on the number of establishments with 1,000 or more employees, by employment-size class.

The U.S. Summary includes data by detailed industry (4-digit SIC) level for the United States and by major group (2-digit SIC) for each State. For the U.S., number of establishments, employment, and payroll data are also provided by employment-size class to the 4-digit SIC level. Also included, by major industry group, are data on the number of

establishments, employees, and payroll of administrative and auxiliary establishments.

The Standard Metropolitan Statistical Area (SMSA) includes the same data items as the State reports by major group (2-digit SIC) for each SMSA. For the New England States, data are published by the New England County Metropolitan Area (NECMA).

CBP is a standard reference source of small-area data for business persons, market researchers, and industrial and civic planners.

CBP data are especially useful for:

- Analyzing market potentials
- Determining location and size of sales territories
- Establishing sales quotas and advertising budgets
- Locating production, marketing, and service facilities.

CBP data are shown in detail for the following broad industry categories: Agricultural services, forestry, and fisheries

- Mining
- Contract construction
- Manufacturing
- Transportation and other public utilities
- Wholesale trade
- Retail trade
- Finance, insurance, and real estate
- Services

Data in Other Formats

Published CBP data, by county and by industry, will be available at cost, on computer tapes. Inquiries should be addressed to Chief, Data User Services Division, Bureau of the Census, Washington, D.C. 20233.

The reports described in this announcement are also available on microfiche. For further information, contact: Subscriber Services Section (Publications), Bureau of the Census, Washington, D.C. 20233

For a descriptive order form, listing all available titles and prices, fill in the request below, and mail to the address shown.

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Please send me an order form for County Business Patterns, 1978

Name _____

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or any U.S. Department of
Commerce district office

Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

APRIL 1980

M28C(80)-4
Issued June 1980

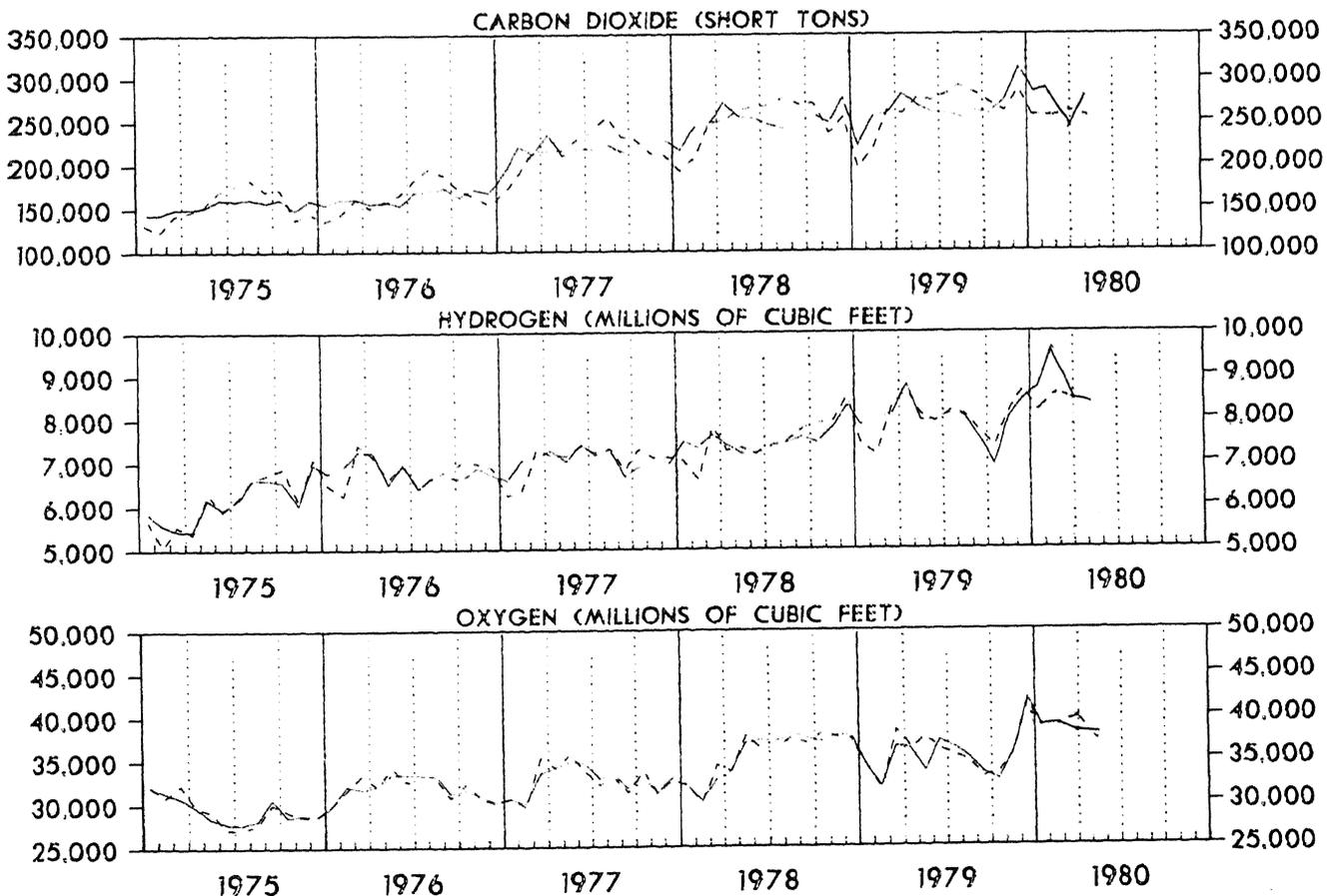
The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 5.

THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES 1975 TO 1980

----- Seasonally Adjusted
- - - - - Not Seasonally Adjusted



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros (301) 763-7838.

For sale by the Subscriber Services Section (Publications), Bureau of the Census, Washington, D.C. 20233, or any U.S. Department of Commerce district office. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. Price 25 cents per copy, \$3.50 per year.

Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00)	Carbon dioxide (28133 01, 28133 02 and 28133 31)	Hydrogen, high and low purity (100%) (28137 20)	Nitrogen, high and low purity (100%) (28135 00)	Oxygen, high and low purity (100%) (28136 00)
	(mil. cu. ft.)	(short tons)	(mil. cu. ft.)	(mil. cu. ft.)	(mil. cu. ft.)
1980					
April.....	484	275,706	8,347	39,626	36,230
March.....	478	255,810	8,243	38,297	36,076
February.....	494	292,892	9,447	41,290	38,038
January.....	483	290,083	8,646	37,553	37,835
1979					
December.....	401	311,071	8,448	45,786	41,989
November.....	447	273,829	8,026	38,358	35,698
October.....	448	257,105	6,921	33,226	32,540
September.....	403	261,077	7,539	31,949	33,387
August.....	421	252,864	8,049	33,626	35,138
July.....	443	257,951	8,104	32,743	36,332
June.....	445	259,826	8,017	33,323	37,334
May.....	456	268,136	8,007	33,088	36,892
April.....	463	280,404	8,893	32,053	36,433
March.....	428	258,967	8,165	33,759	36,755
February.....	391	254,911	8,054	31,948	32,157
January.....	451	220,709	7,895	34,289	34,535
1978					
December.....	451	276,530	8,388	31,354	37,962
November.....	462	247,472	7,818	33,281	37,943
October.....	466	257,419	7,505	33,303	37,140
September.....	395	249,427	7,583	32,057	37,555
August.....	442	241,157	7,491	32,470	38,159
July.....	428	245,894	7,347	31,495	37,291
June.....	463	253,113	7,273	32,816	37,464
May.....	446	254,531	7,270	32,188	37,129
April.....	496	271,223	7,488	31,829	33,905
March.....	451	245,214	7,704	32,021	32,907

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, total (28133 01, 28133 02, and 28133 31)	Carbon dioxide, liquid and gas ¹ (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980							
April.....	449	253,925	224,773	29,152	8,205	38,913	36,230
March.....	457	259,136	230,370	28,766	8,433	39,599	37,952
February.....	469	250,423	225,156	25,267	8,474	38,895	37,582
January.....	470	257,304	228,994	28,310	8,136	38,266	37,835
1979							
December.....	414	286,185	253,772	32,413	8,659	45,374	41,569
November.....	471	260,959	227,365	33,594	8,162	37,706	35,555
October.....	461	270,474	233,570	36,904	7,343	33,990	33,353
September.....	434	281,702	238,995	42,707	7,705	32,013	32,886
August.....	438	289,782	248,614	41,168	8,089	34,601	34,716
July.....	424	280,651	239,054	41,597	8,169	32,579	35,496
June.....	443	272,817	236,650	36,167	7,969	32,257	36,363
May.....	453	276,448	243,222	33,226	8,151	33,617	37,741
April.....	430	258,252	234,792	23,460	8,742	31,476	36,433
March.....	409	262,334	233,560	28,774	8,353	34,907	38,666
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Product code	Chemical and basis	Unit of measure	April 1980	March 1980	April 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	449	457	430
	Produced for compression, including cylinder and pipeline.....	..do.....	164	175	128
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant....	..do.....	285	282	302
28133 01	Carbon dioxide.....	S. tons.....	253,925	259,136	258,252
28133 02	Gas ².....	..do.....	32,537	37,277	234,792
28133 31	Liquid ².....	..do.....	192,236	193,093	
	Solid (dry ice).....	..do.....	29,152	28,766	23,460
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	Mil. cu. ft.....	621	625	687
28137 20	Hydrogen ⁴.....	..do.....	8,205	8,433	8,742
	Liquid and gas: Produced for cylinder and bulk shipment, and liquid produced for conversion to gas.....	..do.....	1,022	1,176	1,102
	Produced for pipeline and government use.....	..do.....	2,637	2,877	2,762
	Produced for consumption in this plant.....	..do.....	4,546	4,380	4,878
28135 00	Nitrogen ⁵.....	..do.....	38,913	39,599	31,476
	Gas: Produced for pipeline shipment.....	..do.....	25,595	26,048	18,662
	Produced for consumption in this plant.....	..do.....	3,115	3,104	64,313
	Liquid: Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	892	758	907
	Produced for consumption in this plant.....	..do.....	425	409	(⁶)
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	8,886	9,280	7,594
28136 00	Oxygen.....	..do.....	36,230	37,952	36,433
	Gas: Produced for pipeline shipments.....	..do.....	26,001	26,860	25,408
	Liquid: Produced for bulk delivery shipment to pipelines or to other air separation plants.....	..do.....	1,073	1,001	947
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	5,636	6,086	5,589
	Produced for consumption in this plant.....	..do.....	3,520	4,005	4,489

^rRevised by 5 percent or more from previously published figures.

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Table 3. PRODUCTION AND EXPORTS OF NITROGEN: MARCH 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28134 40	Nitrogen.....	39,599	5,682	14.3

Note: Detailed export data for industrial gases, other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of Standard Industrial Classification Codes and Schedule B Export Codes:

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Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

MAY 1980

M28C(90)-5
Issued July 1980

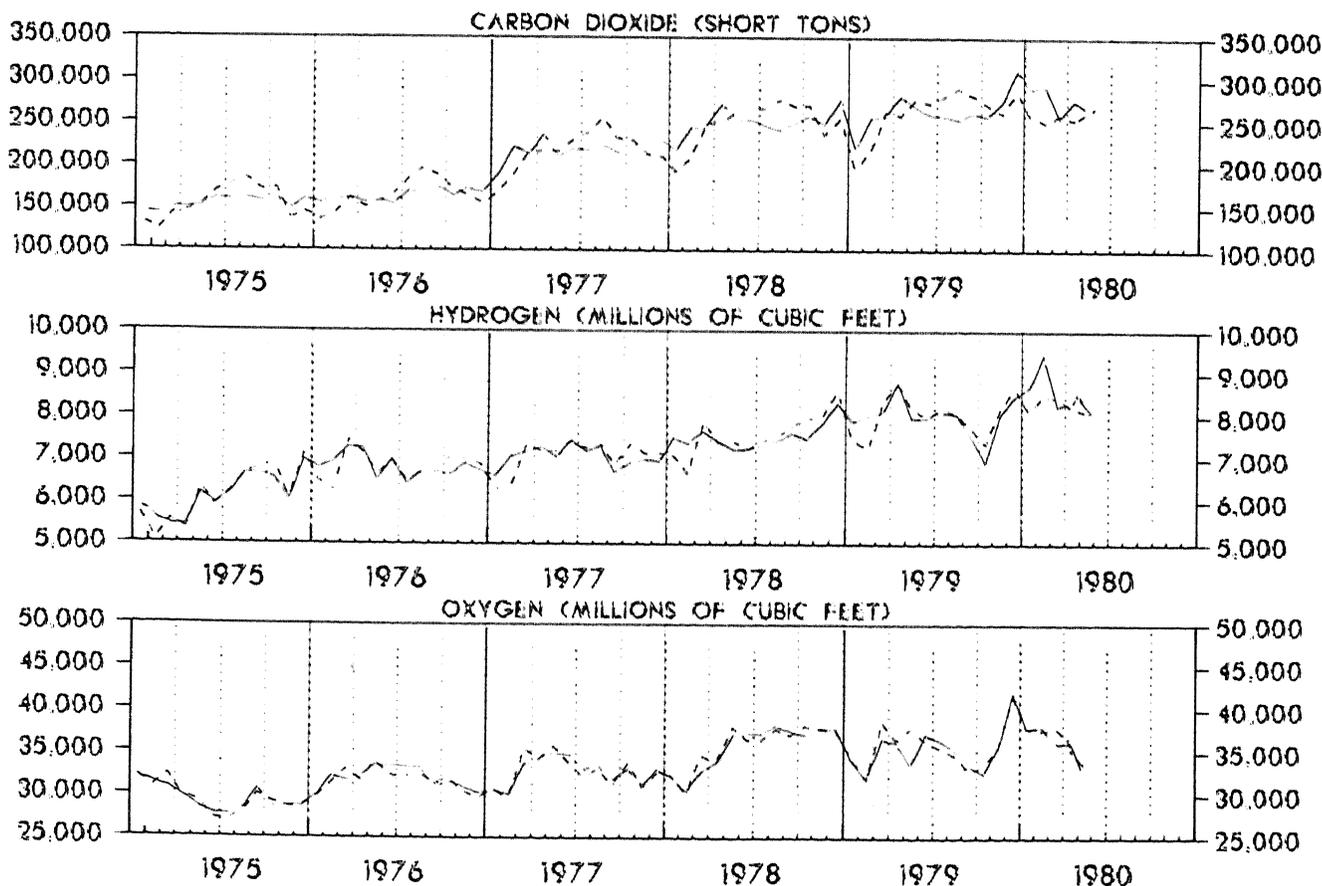
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PRODUCTION OF SELECTED INDUSTRIAL GASES 1975 TO 1980

— Seasonally Adjusted
- - - Not Seasonally Adjusted



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Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
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September.....	395	249,427	7,583	32,057	37,555
August.....	442	241,157	7,491	32,470	38,159
July.....	428	245,894	7,347	31,495	37,291
June.....	463	253,113	7,273	32,816	37,464
May.....	446	254,531	7,270	32,188	37,129
April.....	496	271,223	7,488	31,829	33,905

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, total (28133 01, 28133 02, and 28133 31)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980							
May.....	394	280,351	249,685	30,666	8,051	38,341	31,556
April.....	427	260,341	232,662	27,678	8,365	38,348	36,456
March.....	457	259,136	230,370	28,766	8,433	39,599	37,952
February.....	469	250,423	225,156	25,267	8,474	38,895	37,582
January.....	470	257,304	228,994	28,310	8,136	38,266	37,835
1979							
December.....	414	286,185	253,772	32,413	8,659	45,374	41,569
November.....	471	260,959	227,365	33,594	8,162	37,706	35,555
October.....	461	270,474	233,570	36,904	7,343	33,990	33,353
September.....	434	281,702	238,995	42,707	7,705	32,013	32,886
August.....	438	289,782	248,614	41,168	8,089	34,601	34,716
July.....	424	280,651	239,054	41,597	8,169	32,579	35,496
June.....	443	272,817	236,650	36,167	7,969	32,257	36,363
May.....	453	276,448	243,222	33,226	8,151	33,617	37,741
April.....	430	258,252	234,792	23,460	8,742	31,476	36,433
March.....	409	262,334	233,560	28,774	8,353	34,907	38,666
February.....	371	217,949	195,529	22,420	7,224	30,095	31,771
January.....	439	195,769	173,904	21,865	7,429	34,941	34,535
1978							
December.....	466	254,408	228,642	25,766	8,598	31,072	37,582
November.....	487	235,841	208,210	27,631	7,951	32,715	37,791
October.....	480	270,805	241,239	29,566	7,963	34,069	38,068
September.....	425	269,132	235,157	33,975	7,750	32,121	36,992
August.....	460	276,366	238,090	38,276	7,529	33,412	37,698
July.....	410	267,533	228,935	38,598	7,406	31,338	36,433
June.....	461	265,769	226,633	39,136	7,229	31,766	36,490
May.....	443	262,422	232,927	29,495	7,401	32,703	37,983
April.....	460	249,796	224,853	24,943	7,361	31,256	33,905

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	May 1980	April 1980	May 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	394	427	453
	Produced for compression, including cylinder and pipeline.....	..do.....	132	^r 142	145
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant....	..do.....	262	285	308
	Carbon dioxide:	S. tons.....	280,351	260,340	276,448
28133 01	Gas ².....	..do.....	43,260	^r 34,555	³ 243,222
28133 02	Liquid ².....	..do.....	206,425	198,107	
28133 31	Solid (dry ice).....	..do.....	30,666	27,678		33,246
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	Mil. cu. ft.....	546	635	736,736
28137 20	Hydrogen ⁴.....	..do.....	8,051	8,365	8,151
	Liquid and gas: Produced for cylinder and bulk shipment, and liquid produced for conversion to gas.....	..do.....	1,166	1,039	1,082
	Produced for pipeline and government use.....	..do.....	2,683	2,733	2,531
	Produced for consumption in this plant.....	..do.....	4,202	4,593	4,538
28135 00	Nitrogen ⁵.....	..do.....	38,341	38,348	33,617
	Gas: Produced for pipeline shipment.....	..do.....	25,340	25,573	19,891
	Produced for consumption in this plant.....	..do.....	3,370	3,118	⁶ 4,310
	Liquid: Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	813	900	1,037
	Produced for consumption in this plant.....	..do.....	300	^r 257	(⁶)
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	8,518	8,500	8,379
28136 00	Oxygen.....	..do.....	31,556	36,456	37,741
	Gas: Produced for pipeline shipments.....	..do.....	22,309	26,342	26,393
	Liquid: Produced for bulk delivery shipment to pipeline or to other air separation plants.....	..do.....	734	1,003	1,175
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	5,186	5,589	5,441
	Produced for consumption in this plant.....	..do.....	3,327	3,522	4,732

^rRevised by 5 percent or more from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Separate data for gas and liquid carbon dioxide for months prior to January 1980 are not available.

⁴Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁵Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

⁶Liquid nitrogen produced for consumption in this plant data are combined with gas nitrogen produced for consumption in this plant data. Separate data for months prior to January 1980 are not available.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: APRIL 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	38,348	11,364	29.6

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of Standard Industrial Classification Codes and Schedule B Export Codes:

Domestic output	Exports
28135 00	415.2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, **Production of Industrial Gases**. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

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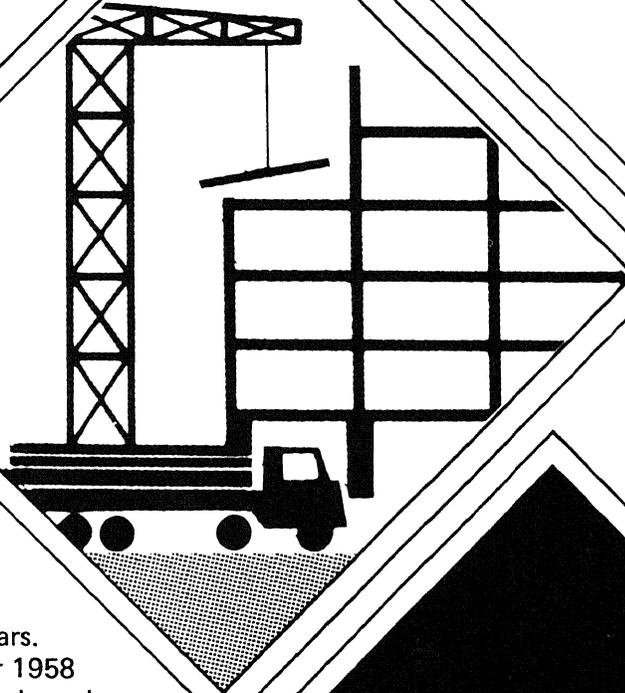
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Value of New Construction Put in Place

Features . . .

- Monthly data for 1958-1974
- Annual data for 1947-1974
- Previously published data from 1915 through 1946

**1947 to
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Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

JUNE 1980

M28C(80)-6
Issued August 1980

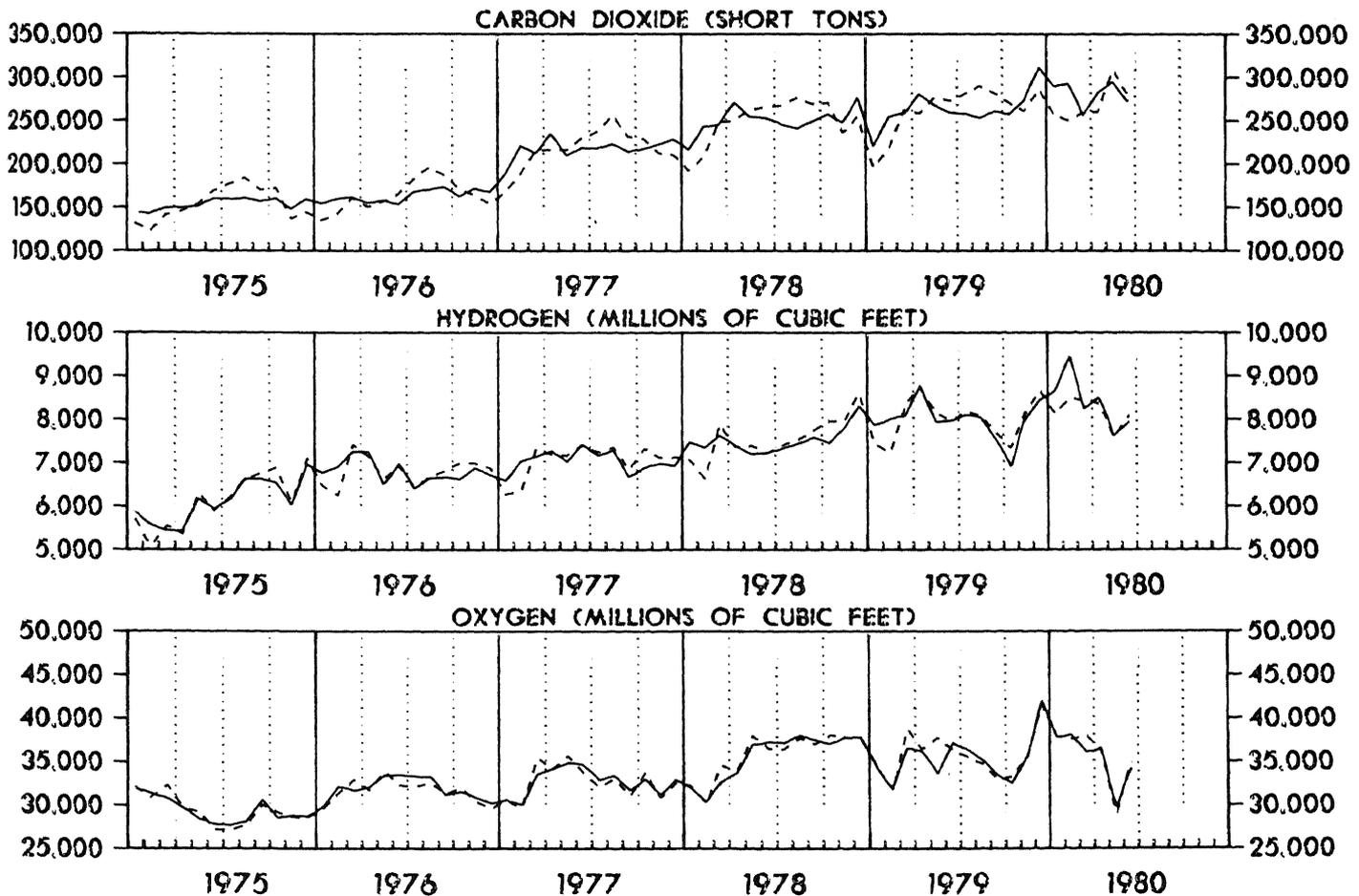
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July.....	428	245,894	7,347	31,495	37,291
June.....	463	253,113	7,273	32,816	37,464
May.....	446	254,531	7,270	32,188	37,129
April.....	496	271,223	7,488	31,829	33,905

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, total (28133 01, 28133 02, and 28133 31)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980							
June.....	388	308,908	271,724	37,184	7,574	35,119	28,986
May.....	393	280,541	250,390	30,151	8,080	40,088	34,916
April.....	427	260,340	232,662	27,678	8,365	38,348	36,456
March.....	457	259,136	230,370	28,766	8,433	39,599	37,952
February.....	469	250,423	225,156	25,267	8,474	38,895	37,582
January.....	470	257,304	228,994	28,310	8,136	38,266	37,835
1979							
December.....	414	286,185	253,772	32,413	8,659	45,374	41,569
November.....	471	260,959	227,365	33,594	8,162	37,706	35,555
October.....	461	270,474	233,570	36,904	7,343	33,990	33,353
September.....	434	281,702	238,995	42,707	7,705	32,013	32,886
August.....	438	289,782	248,614	41,168	8,089	34,601	34,716
July.....	424	280,651	239,054	41,597	8,169	32,579	35,496
June.....	443	272,817	236,650	36,167	7,969	32,257	36,363
May.....	453	276,448	243,222	33,226	8,151	33,617	37,741
April.....	430	258,252	234,792	23,460	8,742	31,476	36,433
March.....	409	262,334	233,560	28,774	8,353	34,907	38,666
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September.....	425	269,132	235,157	33,975	7,750	32,121	36,992
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July.....	410	267,533	228,935	38,598	7,406	31,338	36,433
June.....	461	265,769	226,633	39,136	7,229	31,766	36,490
May.....	443	262,422	232,927	29,495	7,401	32,703	37,983
April.....	460	249,796	224,853	24,943	7,361	31,256	33,905

Industrial Gases



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M28C(80)-7
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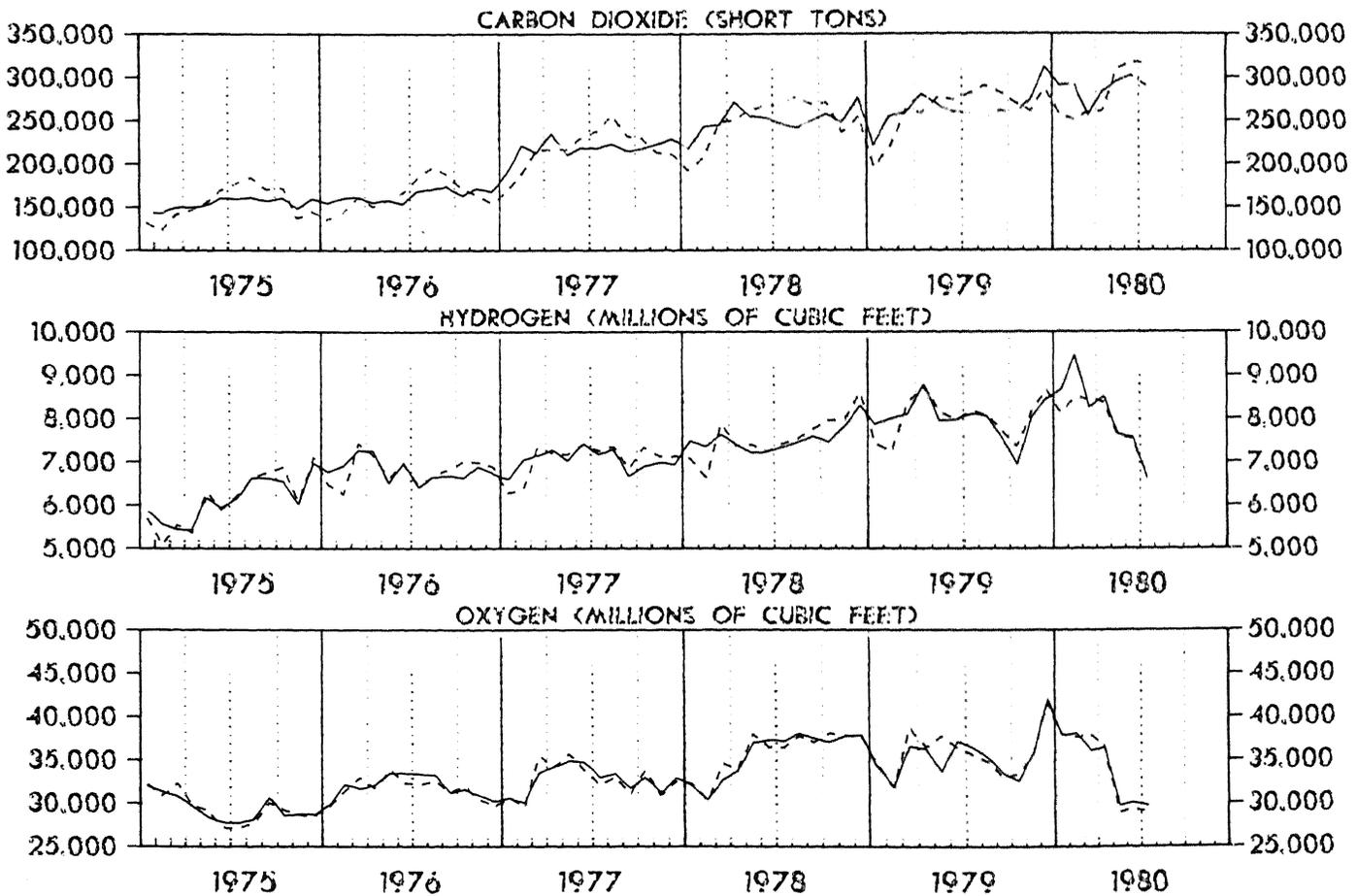
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THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES 1975 TO 1980

— Seasonally Adjusted
- - - Not Seasonally Adjusted



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros (301) 763-7838.

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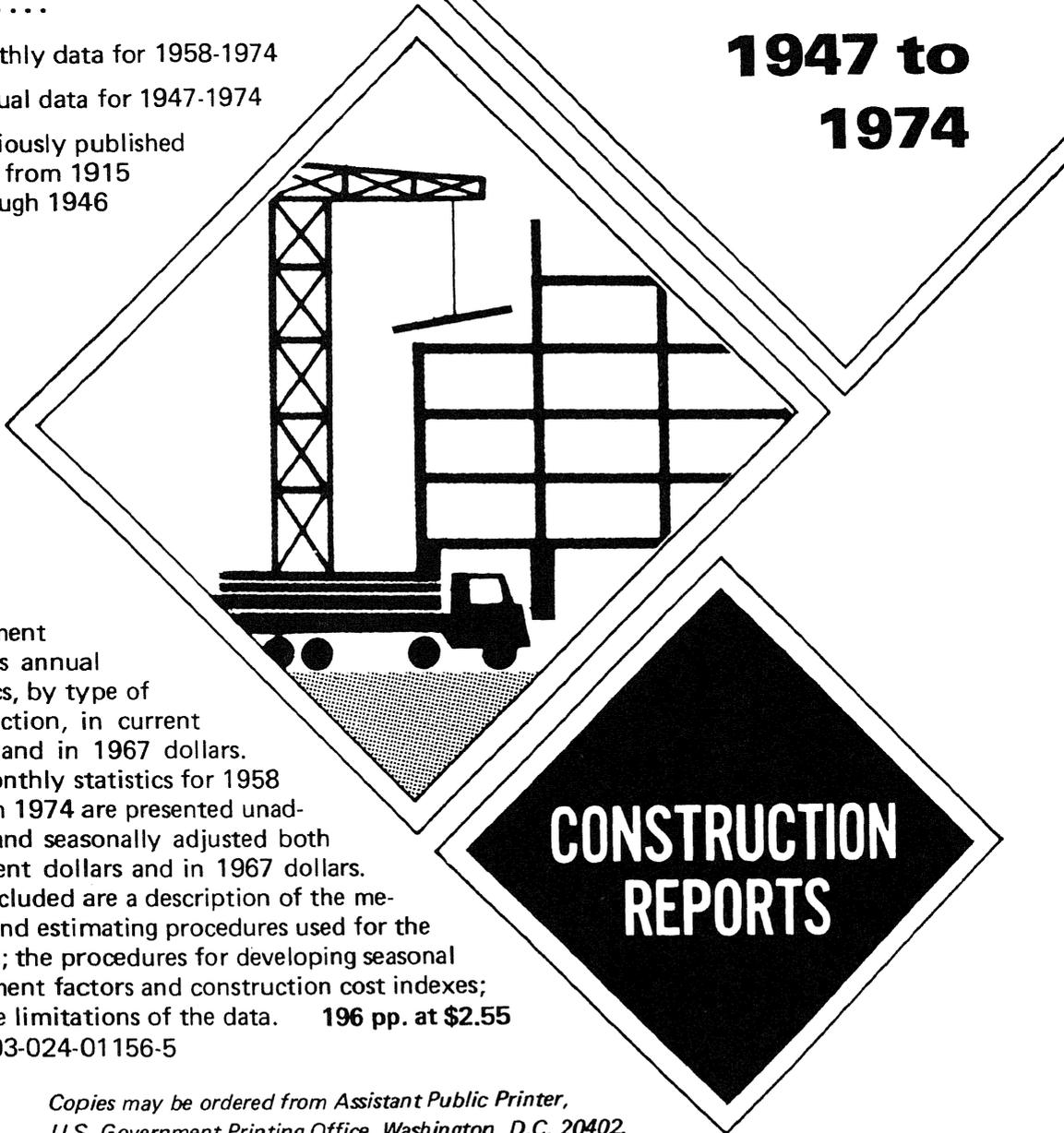
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Features . . .

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- Annual data for 1947-1974
- Previously published data from 1915 through 1946

1947 to 1974



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c. *Low-Valued Export and Import Transactions*—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$501, effective March 1979 and for shipments valued under \$251 prior to March 1979. This is believed to have only negligible effect on the statistics for most commodities.

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M3-1	Monthly	Manufacturers' Shipments, Inventories, and Orders
M28A	Monthly	Inorganic Chemicals
M28B	Monthly	Inorganic Fertilizer Materials
<i>Foreign Trade Reports</i>		
FT-410	Monthly	U.S. Exports
FT-135	Monthly	U.S. General Imports

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
To order a Census Bureau publication	Subscriber Services Section (DUSD)	(301) 449-1600
To order Census Bureau microfiche	Maria Brown	(301) 763-5511

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, *Production of Industrial Gases*. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data:

a. *Valuation*—There are different methods of valuation for the three types of data.

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

b. *Duplication in Quantity and Value of Output*—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	June 1980	May 1980	June 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	388	393	443
	Produced for compression, including cylinder and pipeline.....	..do.....	119	131	131
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant....	..do.....	269	262	312
	Carbon dioxide.....	S. tons.....	308,908	280,541	272,817
28133 01	Gas ².....	..do.....	36,033	39,528	236,650
28133 02	Liquid ².....	..do.....	235,691	210,862	
28133 31	Solid (dry ice).....	..do.....	37,184	30,151		36,167
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	Mil. cu. ft.....	526	r600	667
28137 20	Hydrogen ⁴.....	..do.....	7,574	8,080	7,969
	Liquid and gas: Produced for cylinder and bulk shipment, and liquid produced for conversion to gas.....	..do.....	932	r989	1,112
	Produced for pipeline and government use.....	..do.....	2,674	r2,887	2,703
	Produced for consumption in this plant.....	..do.....	3,968	4,204	4,154
28135 00	Nitrogen ⁵.....	..do.....	35,119	40,088	32,257
	Gas: Produced for pipeline shipment.....	..do.....	22,682	26,524	20,286
	Produced for consumption in this plant.....	..do.....	2,715	3,373	63,283
	Liquid: Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	604	r1,009	902
	Produced for consumption in this plant.....	..do.....	276	307	(⁶)
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	8,842	8,875	7,786
28136 00	Oxygen.....	..do.....	28,986	34,916	37,741
	Gas: Produced for pipeline shipments.....	..do.....	19,964	r25,212	26,408
	Liquid: Produced for bulk delivery shipment to pipeline or to other air separation plants.....	..do.....	905	r1,007	1,186
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	4,817	5,331	5,538
	Produced for consumption in this plant.....	..do.....	3,300	3,366	4,609

¹Revised by 5 percent or more from previously published figures.

²Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

³Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

⁴Separate data for gas and liquid carbon dioxide for months prior to January 1980 are not available.

⁵Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁶Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

⁶Liquid nitrogen produced for consumption in this plant data are combined with gas nitrogen produced for consumption in this plant data. Separate data for months prior to January 1980 are not available.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: MAY 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	40,088	93	0.2

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of Standard Industrial Classification Codes and Schedule B Export Codes:

Domestic output	Exports
28135 00	415.2600

Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980					
July.....	352	289,944	6,616	37,422	29,709
June.....	390	301,401	7,569	35,844	30,080
May.....	396	272,106	7,937	39,457	34,131
April.....	460	282,671	8,510	39,051	36,456
March.....	478	255,810	8,243	38,297	36,076
February.....	494	292,892	9,447	41,290	38,038
January.....	483	290,083	8,646	37,553	37,835
1979					
December.....	401	311,071	8,448	45,786	41,989
November.....	447	273,829	8,026	38,358	35,698
October.....	448	257,105	6,921	33,226	32,540
September.....	403	261,077	7,539	31,949	33,387
August.....	421	252,864	8,049	33,626	35,138
July.....	443	257,951	8,104	32,743	36,332
June.....	445	259,826	8,017	33,323	37,334
May.....	456	268,136	8,007	33,088	36,892
April.....	463	280,404	8,893	32,053	36,433
March.....	428	258,967	8,165	33,759	36,755
February.....	391	254,911	8,054	31,948	32,157
January.....	451	220,709	7,895	34,289	34,535
1978					
December.....	451	276,530	8,388	31,354	37,962
November.....	462	247,472	7,818	33,281	37,943
October.....	466	257,419	7,505	33,303	37,140
September.....	395	249,427	7,583	32,057	37,555
August.....	442	241,157	7,491	32,470	38,159
July.....	428	245,894	7,347	31,495	37,291
June.....	463	253,113	7,273	32,816	37,464
May.....	446	254,531	7,270	32,188	37,129

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Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, total (28133 01, 28133 02, and 28133 31)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980							
July.....	337	315,459	273,186	42,273	6,669	37,235	29,026
June.....	388	316,471	278,184	38,287	7,524	35,665	29,298
May.....	393	280,541	250,390	30,151	8,080	40,088	34,916
April.....	427	260,340	232,662	27,678	8,365	38,348	36,456
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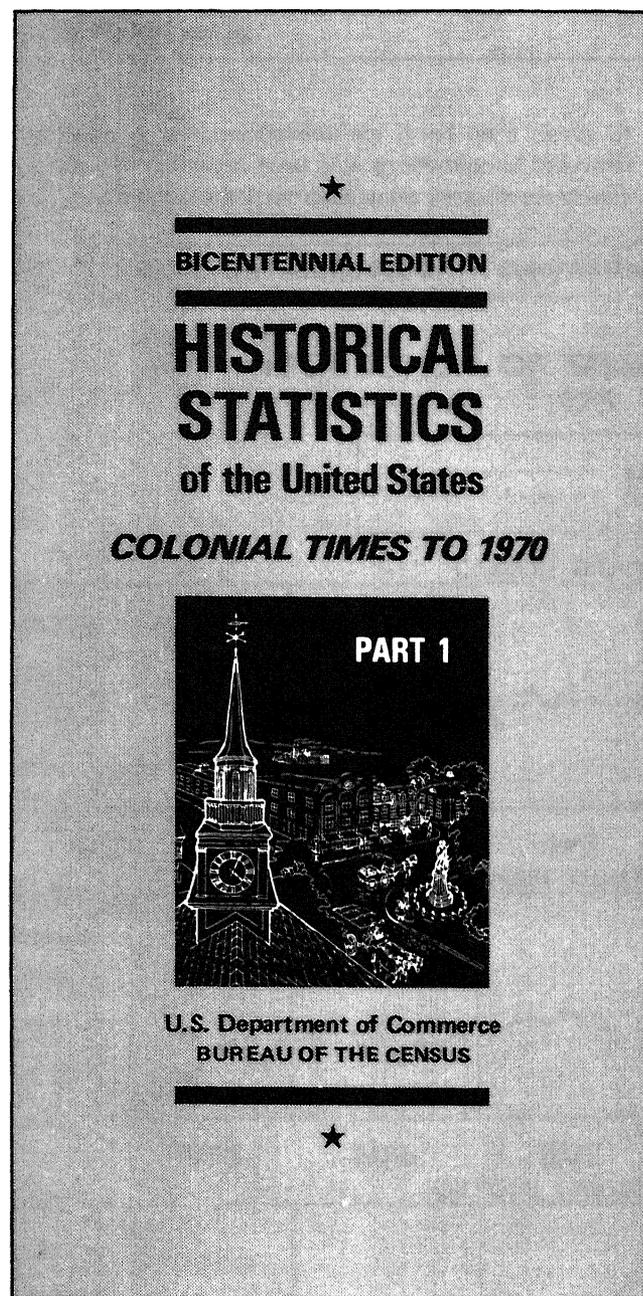
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Industrial Gases



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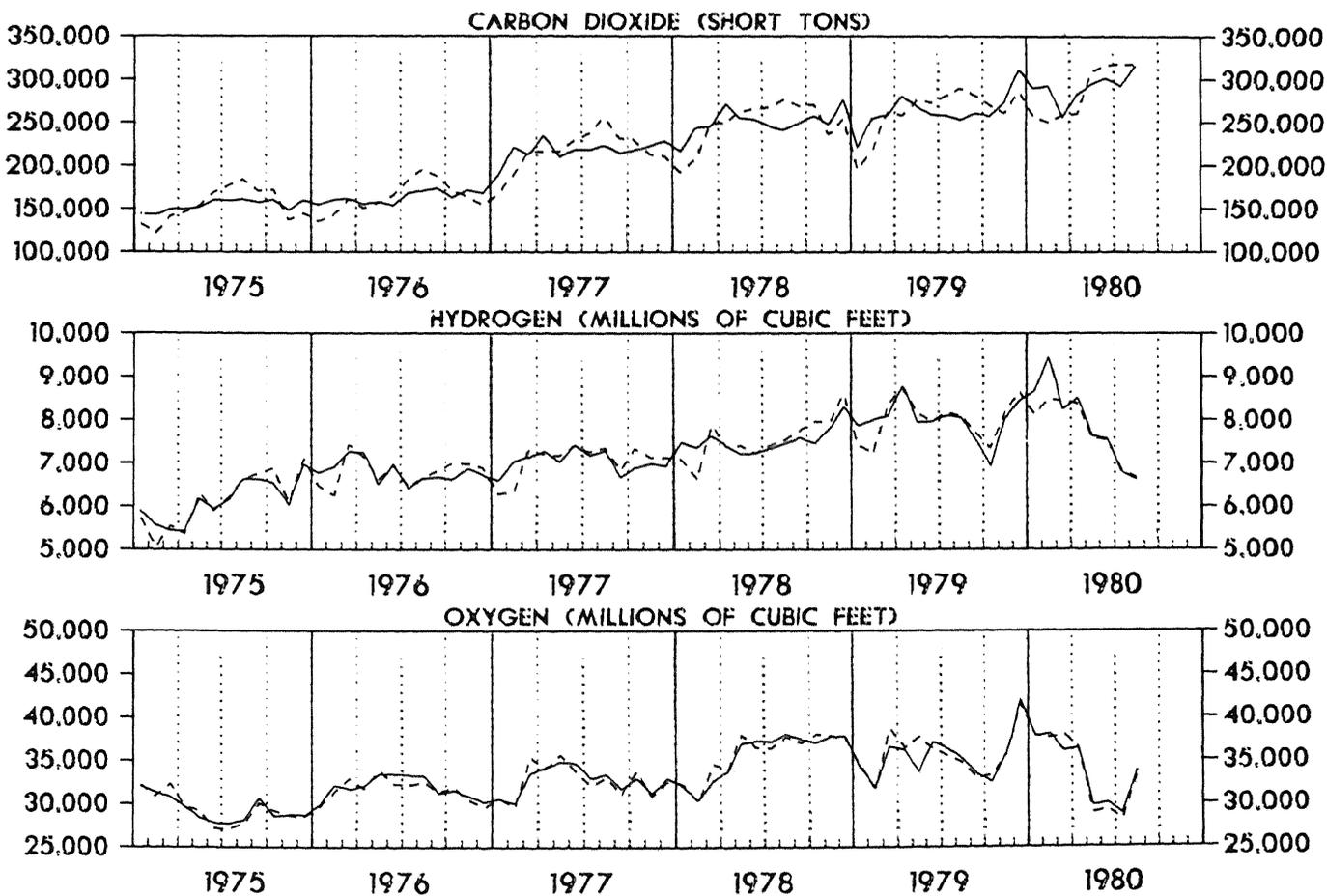
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———— Seasonally Adjusted
----- Not Seasonally Adjusted



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Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980					
August.....	360	315,799	6,626	37,150	33,757
July.....	352	292,246	6,791	37,606	28,826
June.....	390	301,401	7,569	35,844	30,080
May.....	396	272,106	7,937	39,457	34,131
April.....	460	282,671	8,510	39,051	36,456
March.....	478	255,810	8,243	38,297	36,076
February.....	494	292,892	9,447	41,290	38,038
January.....	483	290,083	8,646	37,553	37,835
1979					
December.....	401	311,071	8,448	45,786	41,989
November.....	447	273,829	8,026	38,358	35,698
October.....	448	257,105	6,921	33,226	32,540
September.....	403	261,077	7,539	31,949	33,387
August.....	421	252,864	8,049	33,626	35,138
July.....	443	257,951	8,104	32,743	36,332
June.....	445	259,826	8,017	33,323	37,327
May.....	456	268,136	8,007	33,088	36,892
April.....	463	280,404	8,893	32,053	36,433
March.....	428	258,967	8,165	33,759	36,755
February.....	391	254,911	8,054	31,948	32,157
January.....	451	220,709	7,895	34,289	34,535
1978					
December.....	451	276,530	8,388	31,354	37,962
November.....	462	247,472	7,818	33,281	37,943
October.....	466	257,419	7,505	33,303	37,140
September.....	395	249,427	7,583	32,057	37,555
August.....	442	241,157	7,491	32,470	38,159
July.....	428	245,894	7,347	31,495	37,291
June.....	463	253,113	7,273	32,816	37,464

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980						
August.....	374	280,504	36,874	6,659	38,227	33,352
July.....	337	278,718	39,246	6,845	37,418	28,163
June.....	388	278,184	38,287	7,524	35,665	29,298
May.....	393	250,390	30,151	8,080	40,088	34,916
April.....	427	232,662	27,678	8,365	38,348	36,456
March.....	457	230,370	28,766	8,433	39,599	37,952
February.....	469	225,156	25,267	8,474	38,895	37,582
January.....	470	228,994	28,310	8,136	38,266	37,835
1979						
December.....	414	253,772	32,413	8,659	45,374	41,569
November.....	471	227,365	33,594	8,162	37,706	35,555
October.....	461	233,570	36,904	7,343	33,990	33,353
September.....	434	238,995	42,707	7,705	32,013	32,886
August.....	438	248,614	41,168	8,089	34,601	34,716
July.....	424	239,054	41,597	8,169	32,579	35,496
June.....	443	236,650	36,167	7,969	32,257	36,363
May.....	453	243,222	33,226	8,151	33,617	37,741
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September.....	425	235,157	33,975	7,750	32,121	36,992
August.....	460	238,090	38,276	7,529	33,412	37,698
July.....	410	228,935	38,598	7,406	31,338	36,433
June.....	461	226,633	39,136	7,229	31,766	36,490

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	August 1980	July 1980	August 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	374	337	438
	Produced for compression, including cylinder and pipeline.....	..do.....	116	112	140
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant....	..do.....	258	225	298
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	34,249	35,095	3248,614
28133 02	Liquid ².....	..do.....	246,255	243,623	
28133 31	Solid (dry ice).....	..do.....	36,874	39,246	
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	Mil. cu. ft.....	590	493	604
28137 20	Hydrogen ⁴.....	..do.....	6,659	6,845	8,089
	Liquid and gas: Produced for cylinder and bulk shipment, and liquid produced for conversion to gas.....	..do.....	848	863	1,002
	Produced for pipeline and government use.....	..do.....	2,227	2,476	3,038
	Produced for consumption in this plant.....	..do.....	3,584	3,506	4,049
28135 00	Nitrogen ⁵.....	..do.....	38,227	37,418	34,601
	Gas:				
	Produced for pipeline shipment.....	..do.....	23,575	24,196	21,795
	Produced for consumption in this plant.....	..do.....	3,175	3,061	3,422
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	1,156	856	658
	Produced for consumption in this plant.....	..do.....	326	273	(⁶)
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	9,995	9,032	8,726
28136 00	Oxygen.....	..do.....	33,352	28,163	34,716
	Gas:				
	Produced for pipeline shipments.....	..do.....	23,339	19,371	23,686
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to other air separation plants.....	..do.....	1,269	870	1,660
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	5,417	4,608	5,294
	Produced for consumption in this plant.....	..do.....	3,327	3,314	4,076

¹Revised by 5 percent or more from previously published figures.

²Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

³Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

⁴Separate data for gas and liquid carbon dioxide for months prior to January 1980 are not available.

⁵Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁶Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

⁷Liquid nitrogen produced for consumption in this plant data are combined with gas nitrogen produced for consumption in this plant data. Separate data for months prior to January 1980 are not available.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: JULY 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	37,418	632	1.7

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of Standard Industrial Classification Codes and Schedule B Export Codes:

	<u>Domestic output</u>	<u>Exports</u>
28135 00		415.2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, *Production of Industrial Gases*. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data:

a. *Valuation*—There are different methods of valuation for the three types of data.

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

b. *Duplication in Quantity and Value of Output*—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

c. *Low-Valued Export and Import Transactions*—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$501, effective March 1979 and for shipments valued under \$251 prior to March 1979. This is believed to have only negligible effect on the statistics for most commodities.

d. *Manufacturers' Shipments, Not Specified by Kind*—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

e. *Time Lag Between Output and Exports*—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

f. *"Direct" vs "Total" Commodity Exports and Imports*—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

g. *Used Commodities*—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

h. *Geographic Area of Coverage*—Import and export data reflect the movement of merchandise into and out of the U.S. customs territory (the 50 States, the District of Columbia, and Puerto Rico). They do not include movements between the United States and its possessions. Domestic output (shipments) data exclude Puerto Rico and other outlying areas.

RELATIONSHIP BETWEEN M28C and M28C-14 SERIES FOR INDUSTRIAL GASES

The data as shown in tables 1A and 1B reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report M28C-14. The actual data reported by establishments canvassed on the annual differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and

establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data comprise two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

The Bureau of the Census also publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	Manufacturers' Shipments, Inventories, and Orders
M28A	Monthly	Inorganic Chemicals
M28B	Monthly	Inorganic Fertilizer Materials
<i>Foreign Trade Reports</i>		
FT-410	Monthly	U.S. Exports
FT-135	Monthly	U.S. General Imports

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
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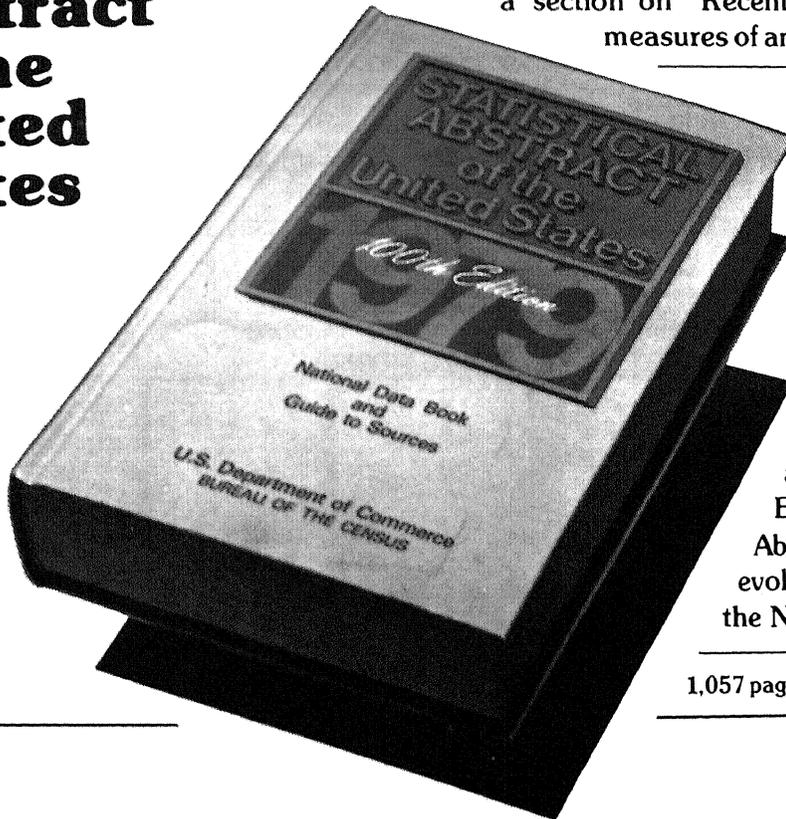
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Industrial Gases



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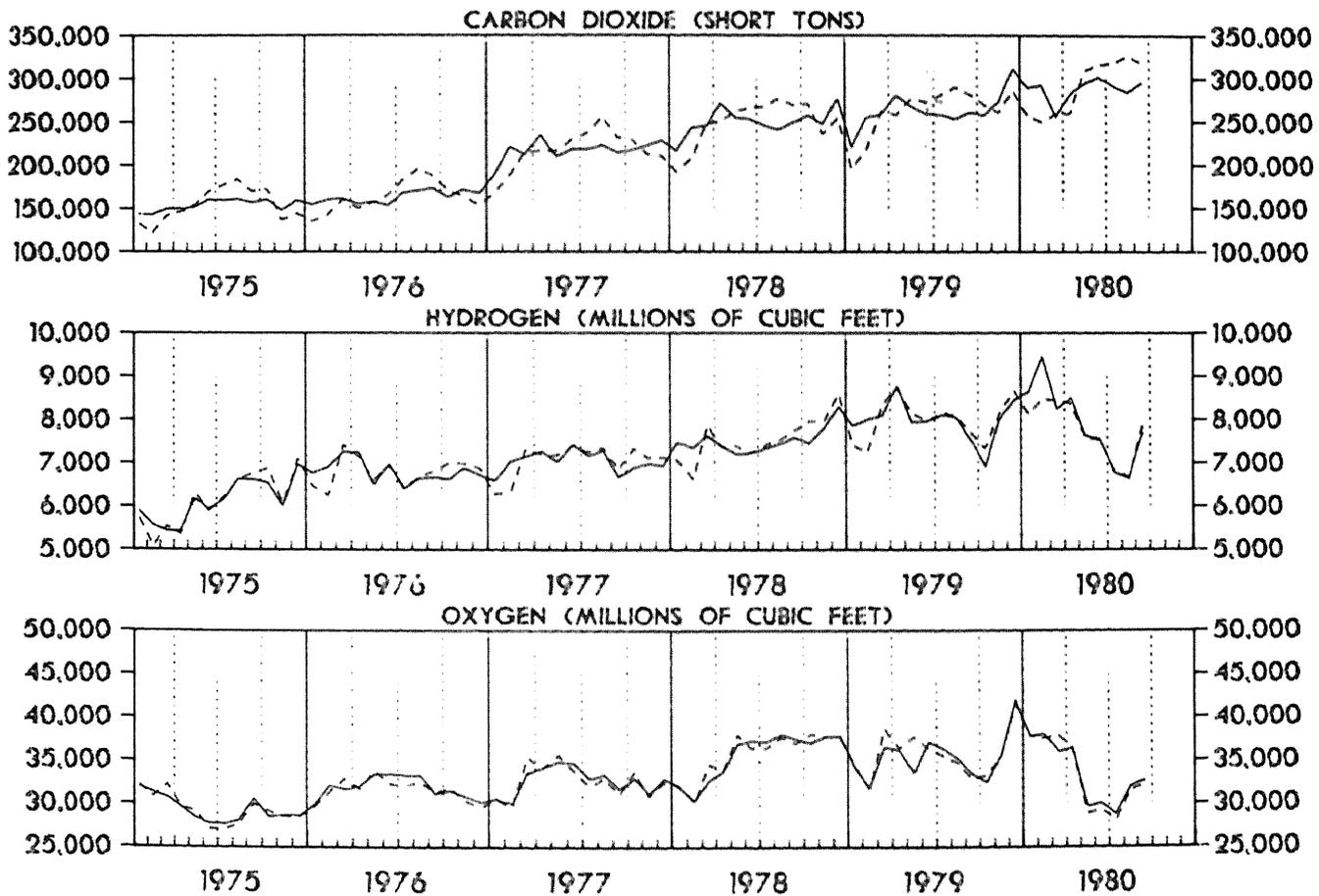
The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 5.

THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES 1975 TO 1980

———— Seasonally Adjusted
- - - - - Not Seasonally Adjusted



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Product code	Chemical and basis	Unit of measure	September 1980	August 1980	September 1979	
28132 00	Acetylene ¹	Mil. cu. ft.....	428	379	434	
	Produced for compression, including cylinder and pipeline.....	do.....	131	115	130	
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	do.....	297	264	304	
28133 01	Carbon dioxide.....	S. tons.....	-	-	-	
	Gas ²	do.....	35,007	34,935	288,995	
	Liquid ²	do.....	244,286	253,102		
Solid (dry ice).....	do.....	39,386	38,116	42,707		
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption.....	Mil. cu. ft.....	629	590	623	
28137 20	Hydrogen ⁴	do.....	7,858	6,678	7,705	
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	do.....	918	848	964	
	Produced for pipeline shipment and government use.....	do.....	2,743	2,237	2,892	
	Produced for consumption in this plant.....	do.....	4,197	3,593	3,849	
28135 00	Nitrogen ⁵	do.....	40,549	35,649	32,013	
	Gas: Produced for pipeline shipment.....	do.....	26,544	20,697	21,114	
	Produced for consumption in this plant.....	do.....	3,406	3,360	61,674	
	Liquid: Produced for bulk delivery shipment to pipeline or to air separation plants.....	do.....	752	983	873	
	Produced for consumption in this plant.....	do.....	308	314	(⁶)	
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	do.....	9,539	10,295	8,352	
	28136 00	Oxygen.....	do.....	32,180	31,637	32,886
		Gas: Produced for pipeline shipment.....	do.....	22,720	22,532	22,258
Liquid: Produced for bulk shipment to pipelines or to other air separation plants.....		do.....	659	843	1,215	
Liquid and gas: Produced for cylinder and bulk delivery shipment.....		do.....	5,050	4,783	5,083	
	Produced for consumption in this plant.....	do.....	3,751	3,479	4,330	

^r Revised by 5 percent or more from previously published figures. - Represents zero.

¹ Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

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⁴ Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁵ Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

⁶ Liquid nitrogen and gas nitrogen produced for consumption in this plant data are combined. Separate data for months prior to January 1980 are not available.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: AUGUST 1980

Product code	Product	Quantity produced (m. c. f.)	Exports of domestic merchandise (m. c. f.)	Percent of exports to production
28135 00	Nitrogen.....	35,649	71	0.2

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of Standard Industrial Classification Codes and Schedule B Export Codes:

Domestic output	Exports
28135 00	415,2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

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g. *Used Commodities*—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

h. *Geographic Area of Coverage*—Import and export data reflect the movement of merchandise into and out of the U.S. customs territory (the 50 States, the District of Columbia, and Puerto Rico). They do not include movements between the United States and its possessions. Domestic output (shipments) data exclude Puerto Rico and other outlying areas.

RELATIONSHIP BETWEEN M28C and M28C-14 SERIES FOR INDUSTRIAL GASES

The data as shown in tables 1A and 1B reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report M28C-14. The actual data reported by establishments canvassed on the annual differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and

establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data comprise two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

The Bureau of the Census also publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	Manufacturers' Shipments, Inventories, and Orders
M28A	Monthly	Inorganic Chemicals
M28B	Monthly	Inorganic Fertilizer Materials and Related Products

Foreign Trade Reports

FT-410	Monthly	U.S. Exports
FT-135	Monthly	U.S. General Imports

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
To order a Census Bureau publication	Customers Services (DUSD)	(301) 449-1600
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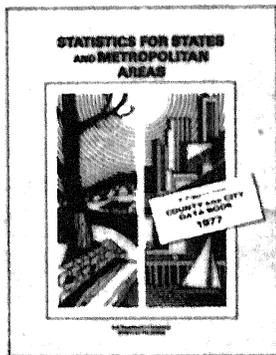
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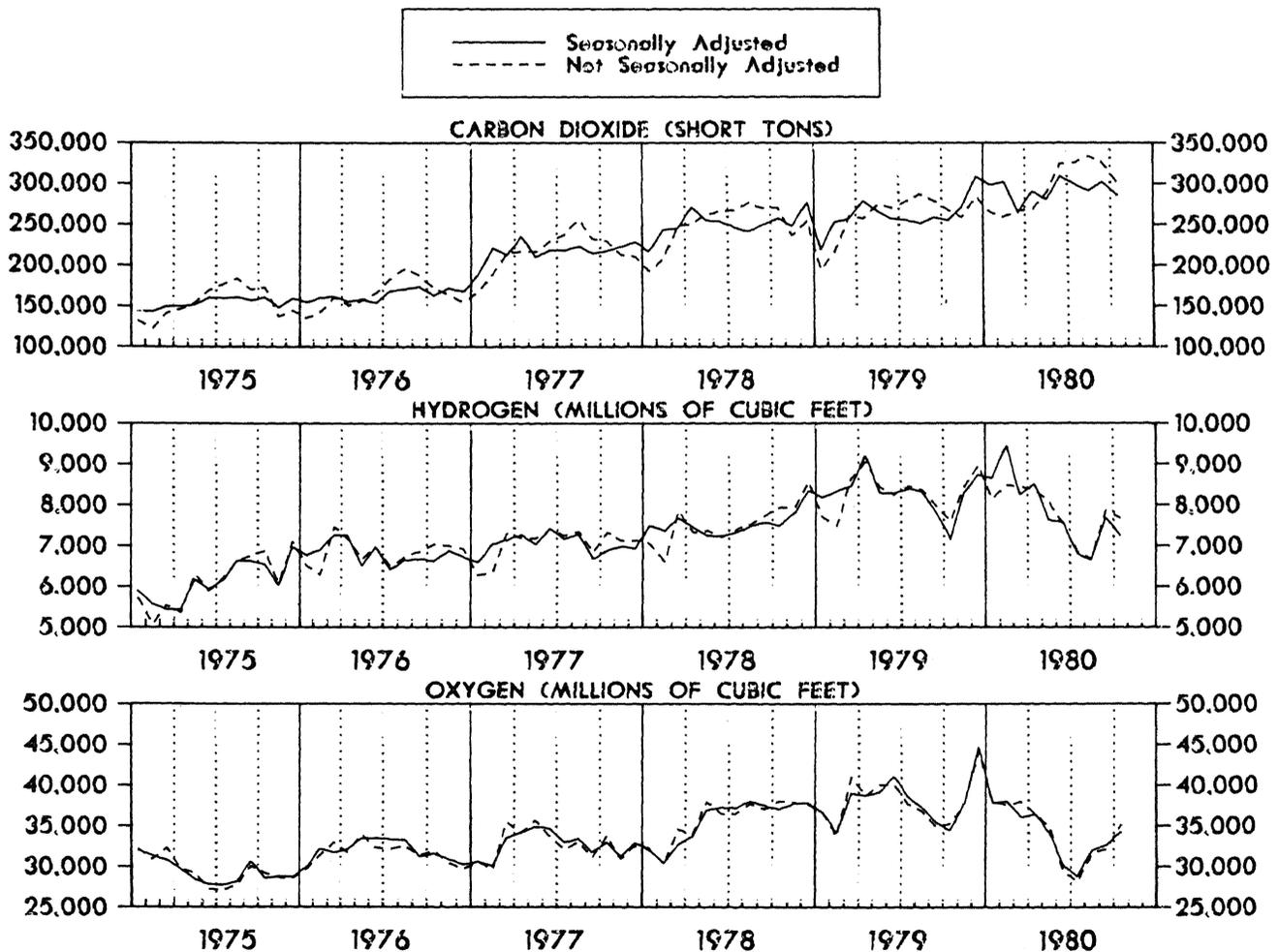
M28C(80)-10
Issued January 1981

The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 6.

THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES
1975 TO 1980



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros (301) 763-7838.

For sale by Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, D.C. 20233, or any U.S. Department of Commerce district office. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. Price, 25 cents per copy, \$3.50 per year.

Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980					
October.....	490	285,396	7,236	42,057	34,287
September.....	^r 448	301,994	7,688	40,471	32,676
August.....	^r 413	291,090	6,645	34,644	32,021
July.....	^r 399	299,112	6,791	37,606	28,826
June.....	^r 441	309,028	7,569	35,844	30,080
May.....	^r 446	280,120	7,937	39,457	34,131
April.....	^r 518	290,657	8,510	39,051	36,456
March.....	^r 535	263,643	8,243	38,297	36,076
February.....	^r 552	302,280	9,447	41,290	38,038
January.....	^r 540	298,448	8,646	37,553	37,835
1979					
December.....	^r 439	311,071	8,728	47,349	^r 44,682
November.....	^r 494	273,829	8,304	39,602	^r 37,891
October.....	^r 491	257,105	7,150	34,388	^r 34,466
September.....	^r 448	261,077	7,792	33,085	^r 35,357
August.....	^r 466	252,864	8,318	34,753	^r 37,193
July.....	^r 492	257,951	8,387	33,842	^r 38,565
June.....	^r 494	259,826	8,287	34,425	^r 41,115
May.....	^r 506	268,136	8,283	34,133	^r 39,145
April.....	^r 515	280,404	9,200	33,053	^r 38,673
March.....	^r 472	258,967	8,447	34,832	^r 38,955
February.....	^r 433	254,911	8,331	32,946	^r 34,082
January.....	^r 501	220,709	8,172	35,352	^r 36,664
1978					
December.....	444	276,530	8,347	31,001	37,965
November.....	455	247,472	7,802	32,922	37,947
October.....	459	257,419	7,480	32,958	37,143
September.....	389	249,427	7,569	31,715	37,559
August.....	435	241,157	7,474	32,092	38,160

Note: Data in tables 1A and 1B have been revised. These revisions are the result of a reconciliation between this monthly report and the 1979 annual Current Industrial Report MA-28C, Industrial Gases. For product detail, see table 9 in the 1979 annual Current Industrial Report MA-28C, Industrial Gases, issued November 1980.

^rRevised by 5 percent or more from previously published figures.

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980						
October.....	505	263,626	36,611	7,677	43,024	35,144
September.....	^r 483	286,465	39,386	7,857	40,552	32,186
August.....	^r 429	295,473	38,116	6,678	35,649	31,637
July.....	^r 382	286,188	39,246	6,845	37,418	28,163
June.....	^r 439	286,192	38,287	7,524	35,665	29,298
May.....	^r 443	258,653	30,151	8,080	40,088	34,916
April.....	^r 481	240,017	27,678	8,365	38,348	36,456
March.....	^r 511	238,304	28,766	8,433	39,599	37,952
February.....	^r 524	233,182	25,267	8,474	38,895	37,582
January.....	^r 526	236,413	28,310	8,136	38,266	37,835
1979						
December.....	^r 454	253,772	^r 30,028	8,946	46,923	^r 44,235
November.....	^r 521	227,365	^r 31,123	8,445	38,929	^r 37,739
October.....	^r 506	233,570	^r 34,190	7,586	35,179	^r 35,328
September.....	^r 482	238,995	^r 39,566	7,963	33,151	^r 34,827
August.....	^r 485	248,614	^r 38,140	8,360	35,761	^r 36,747
July.....	^r 471	239,054	^r 38,538	8,454	33,673	^r 37,678
June.....	^r 492	236,650	^r 33,507	8,237	33,323	^r 40,046
May.....	^r 502	243,222	^r 30,782	8,432	34,679	^r 40,045
April.....	^r 478	234,792	^r 21,735	9,044	32,458	^r 38,673
March.....	^r 451	233,560	^r 26,658	8,641	36,016	^r 40,981
February.....	^r 411	195,529	^r 20,771	7,473	31,035	^r 33,673
January.....	^r 488	173,904	^r 20,257	7,690	36,024	^r 36,664
1978						
December.....	459	228,642	24,769	8,556	30,722	37,585
November.....	480	208,210	26,564	7,935	32,362	37,795
October.....	473	241,239	28,422	7,936	33,716	38,072
September.....	419	235,157	32,661	7,736	31,778	36,996
August.....	452	238,090	36,795	7,511	33,023	37,702

Note: Data in tables 1A and 1B have been revised. These revisions are the result of a reconciliation between this monthly report and the 1979 annual Current Industrial Report MA-28C, Industrial Gases, issued November 1980.

^r Revised by 5 percent or more from previously published figures.

Table 2A. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	October 1980	September 1980	October 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	505	483	506
	Produced for compression, including cylinder and pipeline.....	..do.....	162	132	161
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	343	^r 351	345
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	43,980	^r 42,458	³ 233,570
28133 02	Liquid ².....	..do.....	219,646	244,007	
28133 31	Solid (dry ice).....	..do.....	36,611	39,386	34,190
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption.....	Mil. cu. ft.....	700	629	707
28137 20	Hydrogen ⁴.....	..do.....	7,677	7,857	7,586
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	982	917	1,111
	Produced for pipeline shipment and government use.....	..do.....	2,485	2,743	2,732
	Produced for consumption in this plant.....	..do.....	4,210	4,197	3,743
28135 00	Nitrogen ⁵.....	..do.....	43,024	40,552	35,179
	Gas: Produced for pipeline shipment.....	..do.....	28,052	26,543	23,220
	Produced for consumption in this plant.....	..do.....	3,527	3,406	⁶ 1,811
	Liquid: Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	1,037	752	839
	Produced for consumption in this plant.....	..do.....	283	307	(⁶)
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	10,125	9,544	9,309
28136 00	Oxygen.....	..do.....	35,144	32,186	35,328
	Gas: Produced for pipeline shipment.....	..do.....	24,884	22,726	24,323
	Liquid: Produced for bulk shipment to pipelines or to other air separation plants.....	..do.....	870	659	989
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	5,384	5,050	5,523
	Produced for consumption in this plant.....	..do.....	4,006	3,751	4,493

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¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

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Table 2B. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES: JANUARY TO SEPTEMBER REVISED

Product code	Chemical and basis	Unit of measure	January	February	March	April	May	June	July	August	September
28132 00	Acetylene: Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	Mill. cu. ft..	349 293	343 288	336 282	339 285	312 262	320 269	270 225	314 264	351 297
28133 01	Carbon dioxide: Gas.....	S. tons.....	42,274 34,855	46,034 38,008	45,211 37,277	41,910 34,555	47,791 39,528	45,634 37,626	42,565 35,095	42,371 34,935	42,458 35,007

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Table 3. PRODUCTION AND EXPORTS OF NITROGEN: SEPTEMBER 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	40,552	256	0.6

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

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<u>Domestic output</u>	<u>Exports</u>
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f. *"Direct" vs "Total" Commodity Exports and Imports*—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

g. *Used Commodities*—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

h. *Geographic Area of Coverage*—Import and export data reflect the movement of merchandise into and out of the U.S. customs territory (the 50 States, the District of Columbia, and Puerto Rico). They do not include movements between the United States and its possessions. Domestic output (shipments) data exclude Puerto Rico and other outlying areas.

RELATIONSHIP BETWEEN M28C and M28C-14 SERIES FOR INDUSTRIAL GASES

The data as shown in tables 1A and 1B reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report M28C-14. The actual data reported by establishments canvassed on the annual differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and

establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data comprise two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

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<i>Foreign Trade Reports</i>		
FT-410	Monthly	<i>U.S. Exports</i>
FT-135	Monthly	<i>U.S. General Imports</i>

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
To order a Census Bureau publication	Customers Services (DUSD)	(301) 449-1600
To order Census Bureau microfiche	Maria Brown	(301) 763-5511

Industrial Gases



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M28C(80)-11
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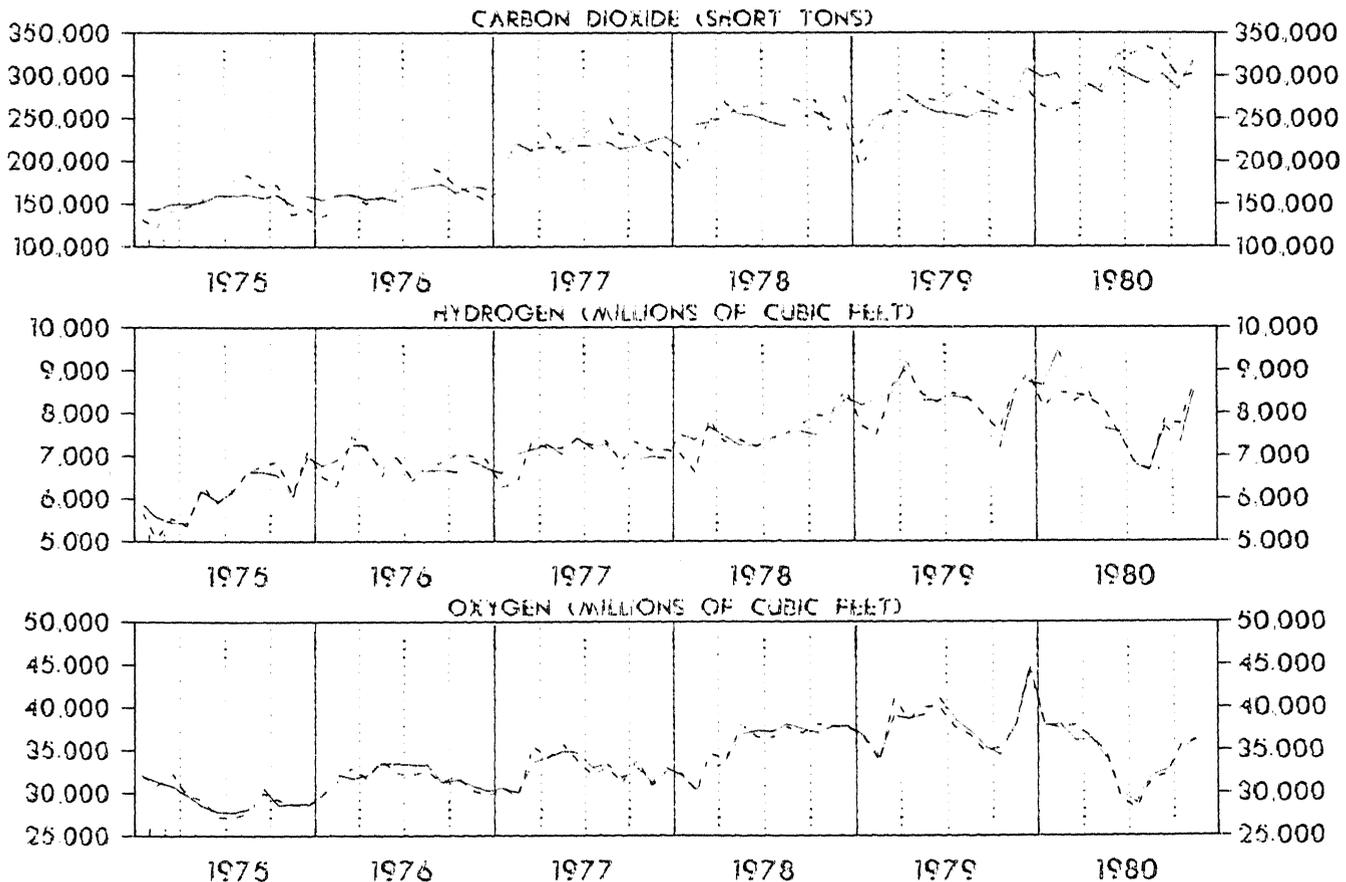
The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 5.

THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES 1975 TO 1980

— Seasonally Adjusted
- - - Not Seasonally Adjusted



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros, (301) 763-7838.

For sale by Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, D.C. 20233, or any U.S. Department of Commerce district office. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be international money order or by a draft on a U.S. bank. Price, 25 cents per copy, \$3.50 per year.

Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1980					
November.....	383	316,888	8,525	44,457	36,502
October.....	491	283,712	7,295	42,482	34,662
September.....	448	301,994	7,688	40,471	32,676
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February.....	552	302,280	9,447	41,290	38,038
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February.....	433	254,911	8,331	32,946	34,082
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1978					
December.....	444	276,530	8,347	31,001	37,965
November.....	455	247,472	7,802	32,922	37,947
October.....	459	257,419	7,480	32,958	37,143

Note: Data in tables 1A and 1B have been revised. These revisions are the result of a reconciliation between this monthly report and the 1979 annual Current Industrial Report, MA-28C, Industrial Gases, issued November 1980.

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1978 TO 1980

Month and year	Acetylene (28132 00)	Carbon dioxide, liquid and gas (28133 01 and 28133 02)	Carbon dioxide, solid (28133 31)	Hydrogen, high and low purity (100%) (28137 20)	Nitrogen, high and low purity (100%) (28135 00)	Oxygen, high and low purity (100%) (28136 00)
	(mil. cu. ft.)	(short tons)	(short tons)	(mil. cu. ft.)	(mil. cu. ft.)	(mil. cu. ft.)
1980						
November.....	404	272,307	29,687	8,670	43,701	36,137
October.....	506	261,855	36,610	7,740	43,459	35,529
September.....	483	286,465	39,386	7,857	40,552	32,186
August.....	429	295,473	38,116	6,678	35,649	31,637
July.....	382	286,188	39,246	6,845	37,418	28,163
June.....	439	286,192	38,287	7,524	35,665	29,298
May.....	443	258,653	30,151	8,080	40,088	34,916
April.....	481	240,017	27,678	8,365	38,348	36,456
March.....	511	238,304	28,766	8,433	39,599	37,952
February.....	524	233,182	25,267	8,474	38,895	37,582
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October.....	506	233,570	34,190	7,586	35,179	35,328
September.....	482	238,995	39,566	7,963	33,151	34,827
August.....	485	248,614	38,140	8,360	35,761	36,747
July.....	471	239,054	38,538	8,454	33,673	37,678
June.....	492	236,650	33,507	8,237	33,323	40,046
May.....	502	243,222	30,782	8,432	34,679	40,045
April.....	478	234,792	21,735	9,044	32,458	38,673
March.....	451	233,560	26,658	8,641	36,016	40,981
February.....	411	195,529	20,771	7,473	31,035	33,673
January.....	488	173,904	20,257	7,690	36,024	36,664
1978						
December.....	459	228,642	24,769	8,556	30,722	37,585
November.....	480	208,210	26,564	7,935	32,362	37,795
October.....	473	241,239	28,422	7,936	33,716	38,072

Note: Data in tables 1A and 1B have been revised. These revisions are the result of a reconciliation between this monthly report and the 1979 annual Current Industrial Report, MA-28C, Industrial Gases. For product detail, see table 9 in the 1979 annual Current Industrial Report MA-28C, Industrial Gases, issued November 1980.

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	November 1980	October 1980	November 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	404	506	521
	Produced for compression, including cylinder and pipeline.....	...do.....	132	163	155
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	...do.....	272	343	366
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	46,283	43,980	3227,365
28133 02	Liquid ².....	...do.....	226,024	217,875	
28133 31	Solid (dry ice).....	...do.....	29,687	36,610	
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption.....	Mil. cu. ft.....	723	701	666
28137 20	Hydrogen ⁴.....	...do.....	8,670	7,740	8,445
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	...do.....	1,031	982	873
	Produced for pipeline shipment and government use.....	...do.....	2,946	2,574	2,871
	Produced for consumption in this plant.....	...do.....	4,693	4,184	4,701
28135 00	Nitrogen ⁵.....	...do.....	43,701	43,459	38,929
	Gas: Produced for pipeline shipment.....	...do.....	29,218	28,453	25,059
	Produced for consumption in this plant.....	...do.....	3,544	3,496	64,242
	Liquid: Produced for bulk delivery shipment to pipeline or to air separation plants.....	...do.....	1,105	1,037	945
	Produced for consumption in this plant.....	...do.....	314	282	(⁶)
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	...do.....	9,520	10,191	8,683
28136 00	Oxygen.....	...do.....	36,137	35,529	37,739
	Gas: Produced for pipeline shipment.....	...do.....	25,265	24,890	27,236
	Liquid: Produced for bulk shipment to pipelines or to other air separation plants.....	...do.....	1,227	^r 1,016	1,060
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	...do.....	5,741	5,607	5,128
	Produced for consumption in this plant.....	...do.....	3,904	4,016	4,315

^rRevised by 5 percent or more from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Separate data for gas and liquid carbon dioxide for months prior to January 1980 are not available.

⁴Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁵Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

⁶Liquid nitrogen and gas nitrogen produced for consumption in this plant data are combined. Separate data for months prior to January 1980 are not available.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: OCTOBER 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	35,529	590	1.7

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of SIC Codes (Domestic Output) and Schedule B Export Codes:

<u>Domestic output</u>	<u>Exports</u>
28135 00	415.2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, Production of Industrial Gases. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data.

Valuation—There are different methods of valuation for the three types of data:

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

Duplication in Quantity and Value of Output—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

Low-Valued Export and Import Transactions—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$501 effective March 1979 and for shipments valued under \$251 prior to March 1979. This is believed to have only negligible effect on the statistics for most commodities.

Manufacturers' Shipments, Not Specified by Kind—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

Time Lag Between Output and Exports—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

"Direct" vs "Total" Commodity Exports and Imports—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

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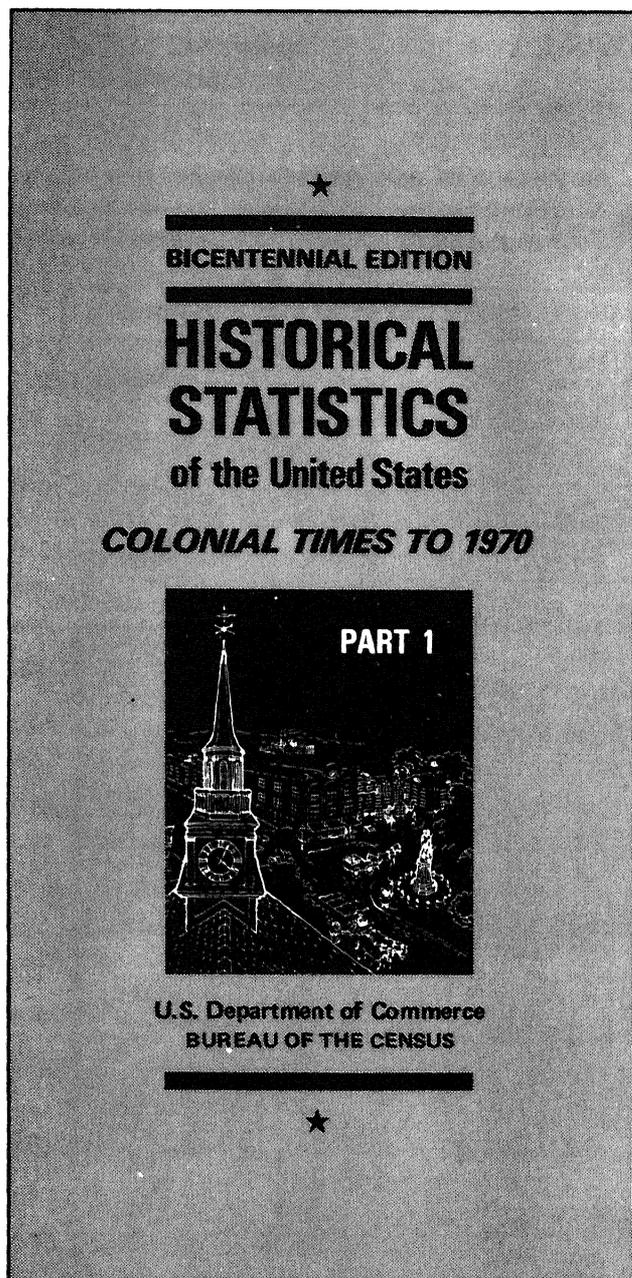
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Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

DECEMBER 1980

M28C(80)-12
Issued February 1981

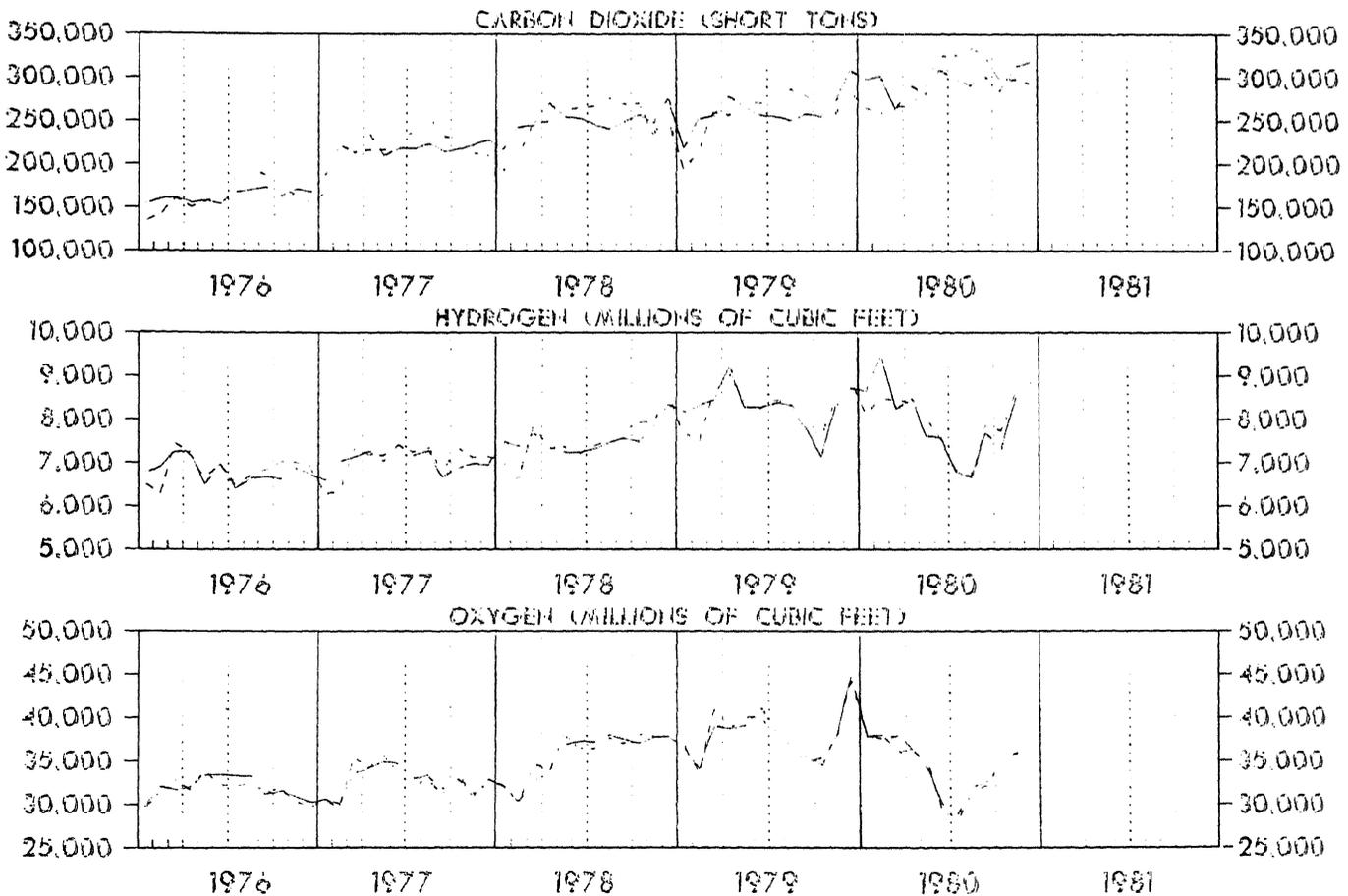
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September.....	482	238,995	39,566	7,963	33,151	34,827
August.....	485	248,614	38,140	8,360	35,761	36,747
July.....	471	239,054	38,538	8,454	33,673	37,678
June.....	492	236,650	33,507	8,237	33,323	40,046
May.....	502	243,222	30,782	8,432	34,679	40,045
April.....	478	234,792	21,735	9,044	32,458	38,673
March.....	451	233,560	26,658	8,641	36,016	40,981
February.....	411	195,529	20,771	7,473	31,035	33,673
January.....	488	173,904	20,257	7,690	36,024	36,664
1978						
December.....	459	228,642	24,769	8,556	30,722	37,585
November.....	480	208,210	26,564	7,935	32,362	37,795

Note: Data in tables 1A and 1B have been revised. These revisions are the result of a reconciliation between this monthly report and the 1979 annual Current Industrial Report MA-28C, Industrial Gases, issued November 1980.

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	December 1980	November 1980	December 1979
28132 00	Acetylene ¹	Mil. cu. ft.....	514	405	454
	Produced for compression, including cylinder and pipeline.....	..do.....	149	132	155
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	365	273	299
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	50,917	46,283	253,772
28133 02	Liquid ².....	..do.....	214,248	221,654	
28133 31	Solid (dry ice).....	..do.....	27,542	30,031		30,028
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption.....	Mil. cu. ft.....	644	717	714
28137 20	Hydrogen ⁴.....	..do.....	9,084	8,632	8,946
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	989	1,031	875
	Produced for pipeline shipment and government use.....	..do.....	2,960	2,946	3,147
	Produced for consumption in this plant.....	..do.....	5,135	4,655	4,924
28135 00	Nitrogen ⁵.....	..do.....	41,425	43,483	46,923
	Gas:				
	Produced for pipeline shipment.....	..do.....	26,807	29,108	31,925
	Produced for consumption in this plant.....	..do.....	3,837	3,544	6,305
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	845	^r 983	870
	Produced for consumption in this plant.....	..do.....	272	309	(⁶)
Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	9,664	9,539	9,823	
28136 00	Oxygen.....	..do.....	37,490	35,966	44,235
	Gas:				
	Produced for pipeline shipment.....	..do.....	26,671	25,222	33,184
	Liquid:				
	Produced for bulk shipment to pipelines or to other air separation plants.....	..do.....	828	^r 1,005	966
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	5,371	5,837	5,621
Produced for consumption in this plant.....	..do.....	4,620	3,902	4,464	

^rRevised by 5 percent or more from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Separate data for gas and liquid carbon dioxide for months prior to January 1980 are not available.

⁴Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁵Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

⁶Liquid nitrogen and gas nitrogen produced for consumption in this plant data are combined. Separate data for months prior to January 1980 are not available.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: NOVEMBER 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	43,483	333	0.8

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of SIC Codes (Domestic Output) and Schedule B Export Codes

Domestic output	Exports
28135 00	415.2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, Production of Industrial Gases. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data:

a. *Valuation*—There are different methods of valuation for the three types of data.

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

b. *Duplication in Quantity and Value of Output*—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

c. *Low-Valued Export and Import Transactions*—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$501, effective March 1979 and for shipments valued under \$251 prior to March 1979. This is believed to have only negligible effect on the statistics for most commodities.

d. *Manufacturers' Shipments, Not Specified by Kind*—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

e. *Time Lag Between Output and Exports*—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

f. *"Direct" vs "Total" Commodity Exports and Imports*—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

g. *Used Commodities*—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

h. *Geographic Area of Coverage*—Import and export data reflect the movement of merchandise into and out of the U.S. customs territory (the 50 States, the District of Columbia, and Puerto Rico). They do not include movements between the United States and its possessions. Domestic output (shipments) data exclude Puerto Rico and other outlying areas.

RELATIONSHIP BETWEEN M28C and M28C-14 SERIES FOR INDUSTRIAL GASES

The data as shown in tables 1A and 1B reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report M28C-14. The actual data reported by establishments canvassed on the annual differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and

establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data comprise two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

The Bureau of the Census also publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	<i>Manufacturers' Shipments, Inventories, and Orders</i>
M28A	Monthly	<i>Inorganic Chemicals</i>
M28B	Monthly	<i>Inorganic Fertilizer Materials and Related Products</i>
<i>Foreign Trade Reports</i>		
FT-410	Monthly	<i>U.S. Exports</i>
FT-135	Monthly	<i>U.S. General Imports</i>

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
To order a Census Bureau publication	Customers Services (DUSD)	(301) 449-1600
To order Census Bureau microfiche	Maria Brown	(301) 763-5511

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Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

1980

MA-28C(80)-1
Issued December 1981

SUMMARY OF FINDINGS

Value of shipments of industrial gases in 1980 totaled \$1,659 million or about 10 percent over the 1979 figure of \$1,504 million. The 1980 total includes \$173 million for acetylene, \$137 million for carbon dioxide, \$448 million for nitrogen, and \$497 million for oxygen. Compared with 1979, the 1980 value of shipments increased 8 percent for acetylene, 5 percent for carbon dioxide, 23 percent for nitrogen, and 7 percent for oxygen.

While value of shipments increased for most gases, quantity of acetylene shipped decreased 3 percent, and oxygen shipments decreased 5 percent. Quantity of nitrogen shipped increased 13 percent while carbon dioxide shipments remained about the same.

Monthly statistics for specified gases for 1979 and 1980 are shown in table 9. These monthly statistics supersede those which were released earlier in the monthly Current Industrial Reports, Series M28C, *Industrial Gases*, United States Production.

Table 1. VALUE OF SHIPMENTS OF SELECTED INDUSTRIAL GASES: 1980 AND 1979

(Millions of dollars)

Product class code	Product	1980 CIR Series MA-28C	1979	
			CIR Series MA-28C ^r	Annual Survey of Manufactures
28132 --	Acetylene.....	173.1	160.2	161.2
28133 --	Carbon dioxide.....	137.3	130.2	130.2
28135 --	Nitrogen.....	448.5	364.5	343.6
28136 --	Oxygen.....	497.2	466.1	483.9
28137 --	Other elemental compressed and liquefied gases, n.e.c.....	346.3	331.8	350.7
28130 --	Industrial gases, n.s.k.....	56.9	51.6	44.9

N.e.c. Not elsewhere classified. N.s.k. Not specified by kind.

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Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros, (301) 763-7838.

For sale by Customer Services (DUSD), Bureau of the Census, Washington, D.C. 20233, or any U.S. Department of Commerce district office. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. Price, 25 cents per copy, \$3.50 per year.

Table 2. PRODUCTION AND SHIPMENTS OF INDUSTRIAL GASES: 1976 TO 1980

Code	Product	Unit of measure	Year	Production	Total shipments	
					Quantity	Value (\$1,000)
2813- --	Industrial gases.....		1980	(X)	(X)	¹ 1,659,368
			1979	(X)	(X)	¹ 1,504,509
			1978	(X)	(X)	¹ 1,294,175
			1977	(X)	(X)	¹ 1,134,001
			1976	(X)	(X)	¹ 986,289
28132 --	Acetylene ²	Mil. cu. ft..	1980	5,493	3,785	173,081
			1979	5,608	^r 3,916	^r 160,238
			1978	5,306	3,456	130,152
			1977	6,003	3,830	136,721
			1976	7,111	4,415	133,417
28132 11	Produced for compression, including cylinder and pipeline.....	..do.....	1980	1,410	1,408	95,094
			1979	^r 1,497	^r 1,497	^r 92,113
28132 21	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	1980	4,083	2,377	77,987
			1979	4,111	2,419	68,125
28133 --	Carbon dioxide: ³					
28133 01	Gas ⁴	Short tons...	1980	^r 768,422	^r 242,761	^r 3,250
			1979	^r 793,175	^r 268,914	^r 2,991
28133 02	Liquid ⁴.....	..do.....	1980	2,603,390	2,496,205	104,034
			1979	2,629,902	2,417,344	96,071
28133 11	Liquid and gas.....	..do.....	1978	2,883,326	2,460,032	^r 80,059
			1977	2,453,453	2,236,208	75,615
			1976	1,707,792	1,561,697	46,644
28133 31	Solid (dry ice).....	..do.....	1980	348,360	348,346	30,049
			1979	356,702	356,702	^r 31,089
			1978	344,552	345,049	26,153
			1977	363,085	347,298	28,032
			1976	355,873	355,882	28,440
28135 --	Nitrogen ⁵	Mil. cu. ft..	1980	478,964	433,572	448,467
			1979	427,107	382,387	^r 364,532
			1978	378,923	333,892	329,075
			1977	327,661	300,003	273,793
			1976	288,868	265,473	252,006
28135 11	Gas: Produced for pipeline shipment.....	..do.....	1980	316,377	313,622	167,850
			1979	269,289	269,552	136,521
28135 13	Produced for consumption in this plant.....	..do.....	1980	39,503	(X)	(X)
			1979	⁶ 44,943	(X)	(X)
28135 21	Liquid: Produced for bulk delivery shipment to pipeline or to other air separation plants.....	..do.....	1980	7,132	7,132	8,770
			^r 1979	(⁷)	(⁷)	(⁷)
28135 23	Produced for consumption in this plant.....	..do.....	1980	3,134	(X)	(X)
			1979	(⁶)	(X)	(X)
28135 41	Liquid and gas, produced for cylinder and bulk delivery shipment...	..do.....	1980	112,818	112,818	271,847
			1979	⁷ 112,875	⁷ 112,835	⁷ 228,011
28136 --	Oxygen ⁵.....	..do.....	1980	430,729	381,025	497,217
			1979	456,244	402,603	^r 466,146
			1978	430,041	379,030	432,449
			1977	392,427	340,471	354,127
			1976	388,446	335,774	337,394
28136 11	Gas, produced for pipeline shipment.....	..do.....	1980	306,933	306,933	306,821
			1979	324,791	324,791	283,510
28136 21	Liquid, produced for bulk shipment to pipeline or to other air separation plants.....	.....	1980	(⁸)	(⁸)	(⁸)
			1979	(⁸)	(⁸)	(⁸)
28136 31	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	.....	1980	⁸ 74,092	⁸ 74,092	⁸ 190,396
			1979	⁸ 77,834	⁸ 77,812	⁸ 182,636
28136 41	Produced for consumption in this plant.....	.....	1980	49,704	(X)	(X)
			1979	53,619	(X)	(X)

See footnotes at end of table.

Table 2. PRODUCTION AND SHIPMENTS OF INDUSTRIAL GASES: 1976 TO 1980--Continued

Code	Product	Unit of measure	Year	Production	Total shipments	
					Quantity	Value (\$1,000)
28137	Elemental gases and other industrial gases, n.e.c.....		1980	(X)	(X)	346,347
			1979	(X)	(X)	331,831
			1978	(X)	(X)	256,183
			1977	(X)	(X)	226,813
			1976	(X)	(X)	189,388
28137 15	Argon, high purity.....	Mil. cu. ft..	1980	7,906	7,906	135,777
			1979	8,129	8,126	137,893
			1978	7,089	7,079	95,108
			1977	5,922	5,914	72,567
			1976	5,107	4,941	66,741
	Produced for cylinder and bulk delivery and pipeline shipments, and for consumption in this plant.....	..do.....	1980	7,906	7,906	135,777
			1979	8,129	8,126	137,893
	Helium ⁹.....	..do.....	1980	1,458	1,161	(NA)
			1979	1,616	1,062	(NA)
			1978	1,470	1,012	(NA)
			1977	1,485	947	(NA)
			1976	1,396	808	(NA)
28137 20	Hydrogen, liquid and gas.....	..do.....	1980	¹⁰ 106,064	50,667	130,818
			1979	¹⁰ 106,456	¹⁰ 51,266	123,687
			1978	¹⁰ 90,470	38,718	96,133
			1977	¹⁰ 84,759	35,165	94,677
			1976	¹⁰ 82,100	32,357	80,794
28137 21	Produced for cylinder and bulk delivery shipment.....	..do.....	1980	11,731	11,708	69,183
			1979	11,870	11,870	71,691
28137 31	Produced for pipeline shipment and Government use.....	..do.....	1980	39,522	38,959	61,635
			1979	¹⁰ 39,396	¹⁰ 39,396	51,996
28137 41	Produced for consumption in this plant.....	..do.....	1980	54,811	(X)	(X)
			1979	55,190	(X)	(X)
28137 71	Nitrous oxide.....	1,000 gals... (STP)	1980	(D)	(D)	(¹¹)
			1979	(D)	(D)	(¹¹)
			1978	(D)	(D)	(¹¹)
			1977	(D)	(D)	(¹¹)
			1976	1,940,969	1,940,969	9,492
28137 98	Other industrial gases, n.e.c., including crude argon, carbon dioxide produced and transferred for further processing, and crude and high purity helium produced in privately owned plants ^{1,2} .		1980	(X)	(X)	1279,752
			1979	(X)	(X)	1270,251
			1978	(X)	(X)	1264,942
			1977	(X)	(X)	1259,569
			1976	(X)	(X)	32,361
28130 00	As estimated for Current Industrial Report Series MA-28C (n.s.k. - see note).....		1980	(X)	(X)	56,923
			1979	(X)	(X)	51,611

Note: N.s.k. represents the value of shipments for establishments which did not provide detailed information by type of product. These establishments, typically with less than 5 employees, are not included on the MA-28C mailing panel. The n.s.k. value has been estimated for Series MA-28C based on the rate of change for the reporting establishments applied to the previous year's figure.

(D) Data withheld to avoid disclosing figures for individual companies. (NA) Not available. N.e.c. Not elsewhere classified. ^RRevised.
(X) Not applicable.

- ¹Excludes value for helium produced in Government-owned plants.
- ²Excludes information from railroad ships, shipyards, welding shops, and small establishments using portable generators.
- ³Excludes quantities produced and consumed in plants manufacturing soda ash or urea.
- ⁴Production and quantity and value of shipments of carbon dioxide gas do not include a substantial amount of gas which is produced and shipped by ammonia plants using the by-product method, petroleum refineries using the hydro-treating method and synthetic natural gas plants. The data for liquid carbon dioxide does include gas purchased from these types of establishments and liquified at establishments covered in this survey. We are currently in the process of increasing our survey coverage to include these producers. The data for gas carbon dioxide that include these producers will be shown in a future monthly report, Series M28C, Industrial Gases.
- ⁵Excludes amounts produced and consumed in the manufacture of synthetic ammonia or ammonia derivatives.
- ⁶Data for gas nitrogen produced for consumption in this plant are combined with liquid nitrogen produced for consumption in this plant to avoid disclosing figures for individual companies.
- ⁷Data for liquid nitrogen produced for bulk delivery shipment are combined with liquid and gas nitrogen produced for cylinder and bulk delivery shipment to avoid disclosing figures for individual companies.
- ⁸Data for liquid oxygen produced for bulk delivery shipment are combined with liquid and gas oxygen produced for cylinder and bulk delivery shipment to avoid disclosing figures for individual companies.
- ⁹Source: U.S. Department of Interior, Bureau of Mines.
- ¹⁰Excludes amounts vented, used as fuel, etc., and amounts produced and consumed in the manufacture of synthetic ammonia and methanol, but includes an unspecified amount produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts produced by the ammonia dissociation process (cracking of ammonia). Also excludes amounts produced in petroleum refineries for captive use.
- ¹¹Data for nitrous oxide, total shipments including transfers value (\$1,000), combined with data for other industrial gases, n.e.c., to avoid disclosing figures for individual companies.
- ¹²Excludes hydrocarbon gases such as propane, butane, and propylene, or halogenated hydrocarbons and cyclopropane, which are reported to the U.S. Tariff Commission. Also, excludes sulfur dioxide and chlorine data, which are shown in Current Industrial Reports Series M28A(80)-1, Inorganic Chemicals.

Table 3. PRODUCTION AND SHIPMENTS OF ACETYLENE, BY GEOGRAPHIC AREA: 1980

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic Area	Production	Total shipments including interplant transfers	
		Quantity	Value
United States ¹	5,493	3,785	173,081
Northeast Region and North Central Region...	650	630	43,364
South Region.....	4,598	2,916	114,562
West Region.....	245	239	15,155

¹See table 10A for the number of establishments reporting production by State.

Table 4. PRODUCTION AND SHIPMENTS OF CARBON DIOXIDE, BY DIVISION: 1980

(Production and quantity in short tons; value in \$1,000)

Division	Gas			Liquid			Solid (dry ice)		
	Production	Shipments		Production	Shipments		Production	Shipments	
		Quantity	Value		Quantity	Value		Quantity	Value
United States ¹	^R 2768,422	242,761	3,250	2,603,390	2,496,205	104,034	^R 348,360	348,346	30,049
New England and Middle Atlantic.....	(D)	(D)	(D)	136,473	127,964	5,413	175,716	175,702	16,024
East North Central.....				646,180	590,554	25,857			
West North Central.....				362,960	363,516	13,344			
South Atlantic and East South Central....				786,502	770,646	37,814			
West South Central.....				326,211	297,645	9,004			
Mountain.....				345,064	345,880	12,602			
Pacific.....							61,922	61,922	5,460

(D) Data withheld to avoid disclosing figures for individual companies. ^RRevised.¹See table 10A for the number of establishments reporting production by State.²See footnote 4, table 2.

Table 5. SHIPMENTS OF ARGON (HIGH PURITY) BY GEOGRAPHIC AREA: 1980

(Quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Total shipments including interplant transfers	
	Quantity	Value
United States ¹	7,906	135,777
Northeast Region.....	1,277	26,595
North Central Region.....	2,762	46,098
Ohio.....	932	13,961
South Atlantic Division.....	916	17,969
East South Central Division.....	373	7,669
West South Central Division.....	1,620	22,016
West Region.....	958	15,430
California.....	586	8,679

¹See table 10A for the number of establishments reporting production by State.

Table 6. PRODUCTION AND SHIPMENTS OF HYDROGEN (TOTAL) BY GEOGRAPHIC AREA: 1980

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Production	Total shipments including interplant transfer	
		Quantity	Value
United States ¹	106,064	50,667	130,818
Northeast Region.....	6,886	3,319	18,254
North Central Region.....	7,238	3,518	8,464
South Region and West Region.....	91,940	43,830	104,100
East South Central Division.....	4,707	1,662	4,481
West South Central Division.....	74,947	34,924	74,089

¹See table 10A for the number of establishments reporting production by State.

Table 7. PRODUCTION AND SHIPMENTS OF NITROGEN (TOTAL) BY GEOGRAPHIC AREA: 1980

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Production	Total shipments including interplant transfers	
		Quantity	Value
United States ¹	478,964	433,572	448,467
New England Division.....	6,835	6,874	12,080
Middle Atlantic Division.....	47,275	44,556	67,335
New York.....	12,777	11,793	21,227
New Jersey.....	11,905	11,886	18,545
Pennsylvania.....	22,593	20,877	27,563
North Central Region.....	102,250	79,060	91,107
Ohio.....	18,661	17,837	24,698
Illinois.....	15,638	12,554	20,664
South Atlantic Division.....	57,057	50,474	46,101
West Virginia.....	18,078	11,613	9,736
East South Central Division.....	32,479	31,375	29,393
Tennessee.....	7,023	6,979	6,958
Alabama.....	18,577	18,489	18,414
West South Central Division.....	189,393	178,323	125,770
Texas.....	142,403	135,804	89,016
Mountain Division.....	8,152	8,131	17,059
Pacific Division.....	35,523	34,779	59,622
California.....	32,870	32,129	52,397

¹See table 10A for the number of establishments reporting production by State.

Table 8. PRODUCTION AND SHIPMENTS OF OXYGEN (TOTAL) BY GEOGRAPHIC AREA: 1980

(Production and quantity in mil. cu. ft.; value in \$1,000)

Geographic area	Production	Total shipments including interplant transfers	
		Quantity	Value
United States ¹	430,729	381,025	497,217
New England Division.....	1,640	1,640	4,920
Middle Atlantic Division.....	47,922	46,914	71,145
New York.....	10,865	10,658	15,664
New Jersey.....	2,870	2,875	7,515
Pennsylvania.....	34,187	33,381	47,966
North Central Region.....	139,236	123,908	171,082
Ohio.....	33,927	33,900	45,838
Michigan.....	19,420	10,912	15,908
South Atlantic Division.....	41,662	40,737	49,851
East South Central Division.....	29,503	26,951	36,674
West South Central Division.....	139,652	110,160	109,457
Texas.....	101,864	84,529	84,242
Mountain Division.....	13,783	13,396	20,683
Pacific Division.....	17,331	17,319	33,405
California.....	14,590	14,578	22,624

¹See table 10A for the number of establishments reporting production by State.

Table 2. PRODUCTION OF SPECIFIED INDUSTRIAL GASES, BY MONTHS: 1980 AND 1979

Code	Product	Unit of measure	Year	Total	January	February	March	April	May	June	July	August	September	October	November	December
28132 --	Acetylene.....	Mil. cu. ft.	1980	5,493	509	507	494	471	433	432	373	422	475	492	494	491
28132 11	Produced for compression, including cylinder and pipeline.....	..do.	1979	5,608	478	401	440	468	490	482	461	474	490	493	508	441
28132 21	Produced for pipeline shipment, (excluding that produced to be compressed) and for consumption in this plant.....	..do.	1980	1,410	144	148	143	116	107	97	91	84	108	133	108	121
		..do.	1979	1,497	116	103	126	116	131	119	111	127	118	147	141	142
28133 01	Carbon Dioxide:	Short tons	1980	7,768,422	60,443	65,820	64,643	59,923	68,332	65,247	60,860	60,582	60,707	62,883	66,176	72,806
	Gas ¹do.	1979	7,795,175	(²)											
28133 02	Liquid.....	..do.	1980	2,603,390	193,078	186,127	192,039	197,025	209,711	239,244	242,292	251,719	242,675	216,685	220,445	212,350
		..do.	1979	2,629,902	215,760	242,589	289,774	291,302	301,761	293,608	296,590	308,451	296,517	289,786	282,088	234,851
28133 31	Solid.....	..do.	1980	348,360	25,324	22,602	25,732	24,759	26,971	34,249	35,107	34,096	35,232	32,749	26,864	24,675
		..do.	1979	356,702	19,780	20,282	26,031	21,223	30,058	32,718	37,631	37,243	38,635	33,386	30,391	29,324
28135 00	Nitrogen.....	Mil. cu. ft.	1980	478,964	38,744	39,359	40,094	38,791	40,523	36,082	37,859	36,007	41,085	43,962	43,997	42,461
		..do.	1979	427,107	36,061	31,028	36,025	32,473	34,677	33,302	33,671	35,792	33,038	35,131	38,927	46,982
28135 11	Gas:	..do.	1980	316,377	26,581	26,735	26,579	26,094	27,065	23,566	24,689	22,572	27,084	29,033	29,130	28,130
	Produced for pipeline shipment.....	..do.	1979	269,289	22,447	18,594	19,327	19,227	20,600	21,009	21,286	21,519	21,519	23,144	24,976	31,822
28135 13	Produced for consumption in this plant.....	..do.	1980	39,503	3,271	3,101	3,131	3,145	3,403	2,740	3,088	3,389	3,436	3,527	3,575	3,697
		..do.	1979	344,943	3,144	3,140	3,450	3,401	3,350	3,350	3,121	3,491	3,170	3,189	3,379	3,444
28135 21	Liquid:	..do.	1980	7,132	518	559	518	615	690	565	585	672	514	709	672	515
	Produced for bulk shipment to pipeline or to other air separation plants.....	..do.	1979	(³)	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})
28135 23	Produced for consumption in this plant.....	..do.	1980	3,134	257	318	347	218	261	230	232	267	261	240	263	240
		..do.	1979	(³)	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})
28136 41	Liquid and gas, produced for cylinder and bulk delivery.....	Mil. cu. ft.	1980	112,818	8,117	8,646	9,519	8,719	9,104	8,981	9,265	10,560	9,790	10,453	9,785	9,879
		..do.	1979	112,875	8,470	8,294	9,880	8,745	9,680	8,943	9,264	9,729	9,464	10,118	9,572	10,716
28136 00	Oxygen.....	..do.	1980	430,729	39,355	39,021	39,419	37,832	36,222	30,416	29,243	32,870	33,508	36,903	37,349	38,591
		..do.	1979	456,244	36,633	40,907	38,669	40,023	40,023	37,637	34,803	36,673	34,803	35,321	37,708	44,210
28136 11	Gas, produced for pipeline shipment.....	..do.	1980	306,933	29,361	28,016	27,896	27,358	26,185	20,994	20,118	23,401	23,604	25,850	26,195	27,955
		..do.	1979	324,791	26,826	23,348	29,107	27,449	28,513	28,529	27,117	25,389	24,046	24,243	27,147	33,077
28136 21	Liquid produced for bulk shipment to pipeline or to other air separation plants.....	..do.	1980	(³)	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})
		..do.	1979	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(^{3})	(³)
28136 31	Liquid and gas:	..do.	1980	574,092	55,490	56,647	57,059	56,549	56,286	55,743	55,432	55,592	55,723	56,577	56,805	56,189
	Produced for cylinder and bulk delivery shipment	..do.	1979	577,834	56,013	56,176	57,213	56,564	56,711	56,318	56,857	56,266	56,455	56,121	56,538	
28136 41	Produced for consumption in this plant.....	..do.	1980	49,704	4,504	4,358	4,464	3,925	3,751	3,679	3,693	3,877	4,181	4,476	4,349	4,447
		..do.	1979	53,619	4,194	3,915	4,587	4,656	4,908	4,781	4,202	4,227	4,227	4,462	4,440	4,595
28137 15	Argon, high purity.....	..do.	1980	7,906	673	675	664	675	637	564	524	627	668	745	782	692
		..do.	1979	8,129	569	628	730	709	758	688	671	623	642	715	673	723
28137 20	Produced for cylinder and bulk delivery and pipeline shipments and for consumption in this plant.....	..do.	1980	7,906	673	675	664	675	637	564	524	627	668	745	782	692
		..do.	1979	8,129	569	628	730	709	758	688	671	623	642	715	673	714
28137 21	Hydrogen.....	Mil. cu. ft.	1980	1,060,064	8,981	9,381	9,322	9,235	8,957	8,340	7,592	7,380	8,703	8,550	9,551	10,072
		..do.	1979	1,064,456	8,187	8,010	9,228	9,066	8,855	8,855	9,042	9,025	8,168	9,069	9,628	
28137 31	Produced for cylinder and bulk delivery shipment.....	..do.	1980	11,731	995	866	1,193	1,054	1,003	896	875	860	930	896	1,046	1,017
		..do.	1979	11,870	860	845	1,094	1,121	1,101	1,131	858	1,020	982	1,110	873	875
28137 41	Produced for pipeline shipment and Government use.....	..do.	1980	39,522	3,202	3,488	3,485	3,311	3,497	3,232	3,000	2,710	3,323	3,118	3,587	3,587
		..do.	1979	39,396	2,647	2,931	3,173	3,378	3,096	3,305	3,179	3,537	3,258	3,423	3,753	3,753
28137 41	Produced for consumption in this plant.....	..do.	1980	54,811	4,784	5,027	4,644	4,870	4,457	4,232	3,717	3,810	4,450	4,436	4,936	5,468
		..do.	1979	55,190	4,680	4,234	4,961	5,167	4,806	4,399	5,005	4,289	4,076	3,800	4,773	5,000

¹Revised.

²See footnote 4, table 2.

³Separate data for gas and liquid carbon dioxide production for months prior to January 1980 were not available. Therefore, the monthly data shown under liquid carbon dioxide represent gas and liquid production data.

⁴Data for gas nitrogen produced for consumption in this plant are combined with liquid nitrogen produced for consumption in this plant to avoid disclosing figures for individual companies.

⁵Data for liquid nitrogen produced for bulk delivery shipment are combined with liquid and gas nitrogen produced for cylinder and bulk delivery shipment to avoid disclosing figures for individual companies.

⁶Data for liquid oxygen produced for bulk delivery shipment are combined with liquid and gas oxygen produced for cylinder and bulk delivery shipment to avoid disclosing figures for individual companies.

Table 10A. NUMBER OF ESTABLISHMENTS REPORTING THE PRODUCTION OF SELECTED INDUSTRIAL GASES, BY STATE: 1980

State	Acetylene	Carbon dioxide			Nitrogen	Oxygen	Argon (refined)	Hydrogen	Nitrous oxide
		Gas	Liquid	Solid					
United States.....	196	21	53	36	323	188	105	117	9
New England.....	5	-	1	1	13	3	3	2	-
Maine.....	-	-	-	-	1	-	-	-	-
New Hampshire.....	-	-	-	-	-	-	-	-	-
Vermont.....	-	-	-	-	1	-	-	-	-
Massachusetts.....	3	-	1	1	4	2	2	1	-
Rhode Island.....	1	-	-	-	1	-	-	-	-
Connecticut.....	1	-	-	-	6	1	1	1	-
Middle Atlantic.....	20	-	3	2	50	30	17	7	1
New York.....	5	-	1	-	11	5	4	1	-
New Jersey.....	5	-	-	2	9	3	2	2	1
Pennsylvania.....	10	-	2	-	30	22	11	4	-
East North Central.....	36	4	9	7	60	40	22	30	1
Ohio.....	13	1	3	2	21	19	10	10	1
Indiana.....	7	1	2	1	8	5	4	3	-
Illinois.....	6	1	4	4	19	10	5	11	-
Michigan.....	6	-	-	-	10	5	3	6	-
Wisconsin.....	4	1	-	-	2	1	-	-	-
West North Central.....	16	2	8	3	15	8	2	5	2
Minnesota.....	2	1	-	-	2	3	1	-	-
Iowa.....	4	-	4	2	3	-	-	-	-
Missouri.....	2	1	1	1	8	4	1	3	1
North Dakota.....	-	-	-	-	-	-	-	-	-
South Dakota.....	3	-	-	-	-	-	-	-	-
Nebraska.....	1	-	-	-	-	-	-	1	-
Kansas.....	4	-	3	-	2	1	-	1	1
South Atlantic.....	30	2	7	5	50	20	12	15	1
Delaware.....	-	-	1	-	2	2	1	4	-
Maryland.....	2	-	-	-	5	2	2	-	-
District of Columbia.....	-	-	-	-	-	-	-	-	-
Virginia.....	3	-	2	1	2	2	-	2	-
West Virginia.....	5	-	-	-	13	4	2	4	-
North Carolina.....	4	1	-	-	8	3	1	1	-
South Carolina.....	2	-	-	-	9	3	2	1	-
Georgia.....	5	-	2	1	4	2	2	3	1
Florida.....	9	1	2	3	7	2	2	-	-
East South Central.....	16	2	5	1	39	19	10	16	2
Kentucky.....	4	1	1	-	10	5	2	5	-
Tennessee.....	7	1	2	1	16	4	3	7	1
Alabama.....	3	-	1	-	11	8	5	3	-
Mississippi.....	2	-	1	-	2	2	-	1	1
West South Central.....	33	8	9	6	50	39	21	26	-
Arkansas.....	1	-	1	-	1	1	1	-	-
Louisiana.....	5	2	1	1	13	10	3	9	-
Oklahoma.....	2	-	1	1	5	2	1	-	-
Texas.....	25	6	6	4	31	26	16	17	-
Mountain.....	18	-	5	5	13	11	5	2	-
Montana.....	3	-	-	-	-	1	-	-	-
Idaho.....	2	-	-	-	1	1	-	-	-
Wyoming.....	1	-	1	-	-	-	-	-	-
Colorado.....	3	-	-	1	3	3	1	1	-
New Mexico.....	2	-	2	2	1	1	1	-	-
Arizona.....	3	-	1	1	4	2	1	-	-
Utah.....	3	-	1	1	4	3	2	1	-
Nevada.....	1	-	-	-	-	-	-	-	-
Pacific.....	22	3	6	6	33	18	13	14	2
Washington.....	4	1	1	1	3	3	3	2	-
Oregon.....	4	-	-	-	2	-	-	1	-
California.....	11	2	4	4	26	13	10	8	2
Alaska.....	1	-	-	-	-	-	-	-	-
Hawaii.....	2	-	1	1	2	2	-	3	-

- Represents zero.

Table 10B. NUMBER OF ESTABLISHMENTS REPORTING THE PRODUCTION OF SELECTED INDUSTRIAL GASES, BY STATE: 1979 REVISED

State	Acetylene	Carbon dioxide			Nitrogen	Oxygen	Argon (refined)	Hydrogen	Nitrous oxide
		Gas	Liquid	Solid					
United States.....	195	22	54	39	288	182	96	120	8
New England.....	5	-	1	1	14	4	3	2	-
Maine.....	-	-	-	-	1	-	-	-	-
New Hampshire.....	-	-	-	-	-	-	-	-	-
Vermont.....	-	-	-	-	-	-	-	-	-
Massachusetts.....	3	-	1	1	5	3	2	1	-
Rhode Island.....	1	-	-	-	1	-	-	-	-
Connecticut.....	1	-	-	-	6	1	1	1	-
Middle Atlantic.....	19	1	4	2	46	30	16	9	1
New York.....	5	-	1	-	11	6	3	2	-
New Jersey.....	5	1	-	2	10	4	3	3	1
Pennsylvania.....	9	-	3	-	25	20	10	4	-
East North Central.....	36	3	9	7	53	38	20	29	1
Ohio.....	13	1	3	2	19	17	9	9	1
Indiana.....	7	1	2	1	8	5	4	3	-
Illinois.....	6	-	4	4	16	10	4	11	-
Michigan.....	6	-	-	-	8	5	3	6	-
Wisconsin.....	4	1	-	-	2	1	-	-	-
West North Central.....	17	4	7	3	14	7	1	5	1
Minnesota.....	3	1	-	-	1	2	-	-	-
Iowa.....	4	-	4	2	3	-	-	-	-
Missouri.....	2	2	-	1	8	4	1	3	-
North Dakota.....	-	-	-	-	-	-	-	-	-
South Dakota.....	3	-	-	-	-	-	-	1	-
Nebraska.....	1	-	-	-	-	-	-	1	-
Kansas.....	4	1	3	-	2	1	-	1	1
South Atlantic.....	29	2	7	5	45	19	11	14	1
Delaware.....	-	-	1	-	2	2	1	4	-
Maryland.....	2	-	-	-	6	3	2	-	-
District of Columbia.....	-	-	-	-	-	-	-	-	-
Virginia.....	3	-	2	1	2	2	-	2	-
West Virginia.....	5	-	-	-	12	4	3	4	-
North Carolina.....	4	1	-	-	7	2	1	1	-
South Carolina.....	1	-	-	-	6	2	1	3	-
Georgia.....	5	-	2	1	4	2	2	3	1
Florida.....	9	1	2	3	6	2	2	-	-
East South Central.....	14	2	4	1	33	17	8	16	2
Kentucky.....	4	1	1	-	8	5	2	5	-
Tennessee.....	5	1	2	1	15	4	3	7	1
Alabama.....	3	-	-	-	9	7	3	3	-
Mississippi.....	2	-	1	-	1	1	-	1	1
West South Central.....	35	7	7	6	42	37	19	27	-
Arkansas.....	1	-	1	-	1	1	1	-	-
Louisiana.....	5	2	1	1	12	10	3	8	-
Oklahoma.....	3	-	1	1	3	1	1	-	-
Texas.....	26	5	4	4	26	25	14	19	-
Mountain.....	18	-	9	7	10	11	4	2	-
Montana.....	3	-	-	-	-	1	-	-	-
Idaho.....	2	-	-	-	1	1	-	-	-
Wyoming.....	1	-	1	-	-	-	-	-	-
Colorado.....	3	-	2	1	3	3	1	1	-
New Mexico.....	2	-	2	2	1	1	-	-	-
Arizona.....	3	-	2	2	3	2	-	-	-
Utah.....	3	-	2	2	2	3	2	1	-
Nevada.....	1	-	-	-	-	-	-	-	-
Pacific.....	22	3	6	7	31	19	14	16	2
Washington.....	4	1	1	1	3	3	3	2	-
Oregon.....	4	-	-	-	1	-	-	1	-
California.....	11	2	4	5	25	14	11	10	2
Alaska.....	1	-	-	-	-	-	-	-	-
Hawaii.....	2	-	1	1	2	2	-	3	-

- Represents zero.

DESCRIPTION OF SURVEY

Scope of Survey—This survey includes firms engaged in the manufacture of industrial gases. Excluded from this survey are data for liquefied petroleum gases and organic gases, which are reported to the United States Tariff Commission, and sulfur dioxide and chlorine, which are shown in the Current Industrial Report MA-28A(79)-1, *Inorganic Chemicals*.

Survey Description—The statistics in this publication were collected on Bureau of the Census annual reporting Form MA-28C, Production of Industrial Gases. The mailing panel for this survey consisted of all known producers of industrial gases.

Survey Error—The current annual figures may include estimates for establishments whose reports were not received in time for tabulation. Such missing figures are imputed from year-to-year movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with higher than 25-percent imputation rate are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution. The overall imputation rate for this survey is less than 2 percent.

Revision to Previous Period Data—Statistics for the previous year may be revised due to receipt of corrected data from respondents, including late reports for which estimates were made, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end of products.

Quantity and Value of Shipments Including Interplant Transfers—The quantity and net selling value, f.o.b. plant (after discounts and allowances and excluding freight charges which may be absorbed by the company), of all products made in this establishment and physically shipped from it. Included are products shipped on consignment, whether or not sold at the end of the year, and products transferred to other establish-

ments of a company (such as other manufacturing plants, separate sales branches, or retail stores). Their value is the nearest approximation to the commercial selling value, f.o.b. plant, and not the cost of production.

The shipments value of some of the gases, particularly oxygen, reported by companies vary widely not only because of the conditions of sales, including delivery by pipeline or cylinder, but also because plant operations differ. The manufacturing and selling activities of some companies are centralized at the primary production site, while other companies sell or ship liquefied gases to other sites (filling stations or conversion units) where the products are changed in form, packaged, and sold. The values reported for some sites thus include marketing activities and for other sites do not.

Unit of Measure—All figures included in this report are collected in thousand cubic feet, 70° F, at 1 atmosphere pressure, unless otherwise specified.

HISTORICAL NOTES

Monthly and annual statistics for Series M28C, *Industrial Gases*, have been issued beginning with January 1941.

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RELATIONSHIP BETWEEN M28C (MONTHLY) AND MA-28C (ANNUAL) SERIES FOR INDUSTRIAL GASES

The data as shown in table 2 of this report reflect levels of production as reported by establishments on annual Form MA-28C. The actual data reported by establishments canvassed on the annual differ by varying amounts from those collected monthly due to receipt of revised data from the respondent and establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data are published in two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production. Revisions

to the 1980 monthly series are based on findings from the 1980 annual. These revisions are shown in table 9 of the annual report MA-28C.

RELATED REPORTS

The Bureau of the Census also publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	<i>Manufacturers' Shipments, Inventories, and Orders</i>
M28A	Monthly	<i>Inorganic Chemicals</i>
M28B	Monthly	<i>Inorganic Fertilizer Materials</i>
M28C	Monthly	<i>Industrial Gases</i>
<i>Foreign Trade Reports</i>		
FT-410	Monthly	<i>U.S. Exports</i>
FT-135	Monthly	<i>U.S. General Imports</i>

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7837
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	Chemical Program	(202) 377-5496
To order a Census Bureau publication	Customer Services (DUSD)	(301) 899-7600
To order Census Bureau microfiche	Maria Brown	(301) 763-5511

ACKNOWLEDGMENTS

This report was prepared in the Industry Division, Bureau of the Census, under the direction of Elinor Champion, Chief, Current Nondurables Branch and John H. Ambler, Chief, Chemicals, Plastics, and Rubber Products Section. Michael Kavros was directly responsible for the review of the data and preparation of the report. Roger H. Bugenhagen, Chief of the Division, and John R. Wikoff, Assistant Chief for Current Industrial Reports, provided overall direction and coordination to this project.

Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

JANUARY 1981

M28C(81)-1
Issued March 1981

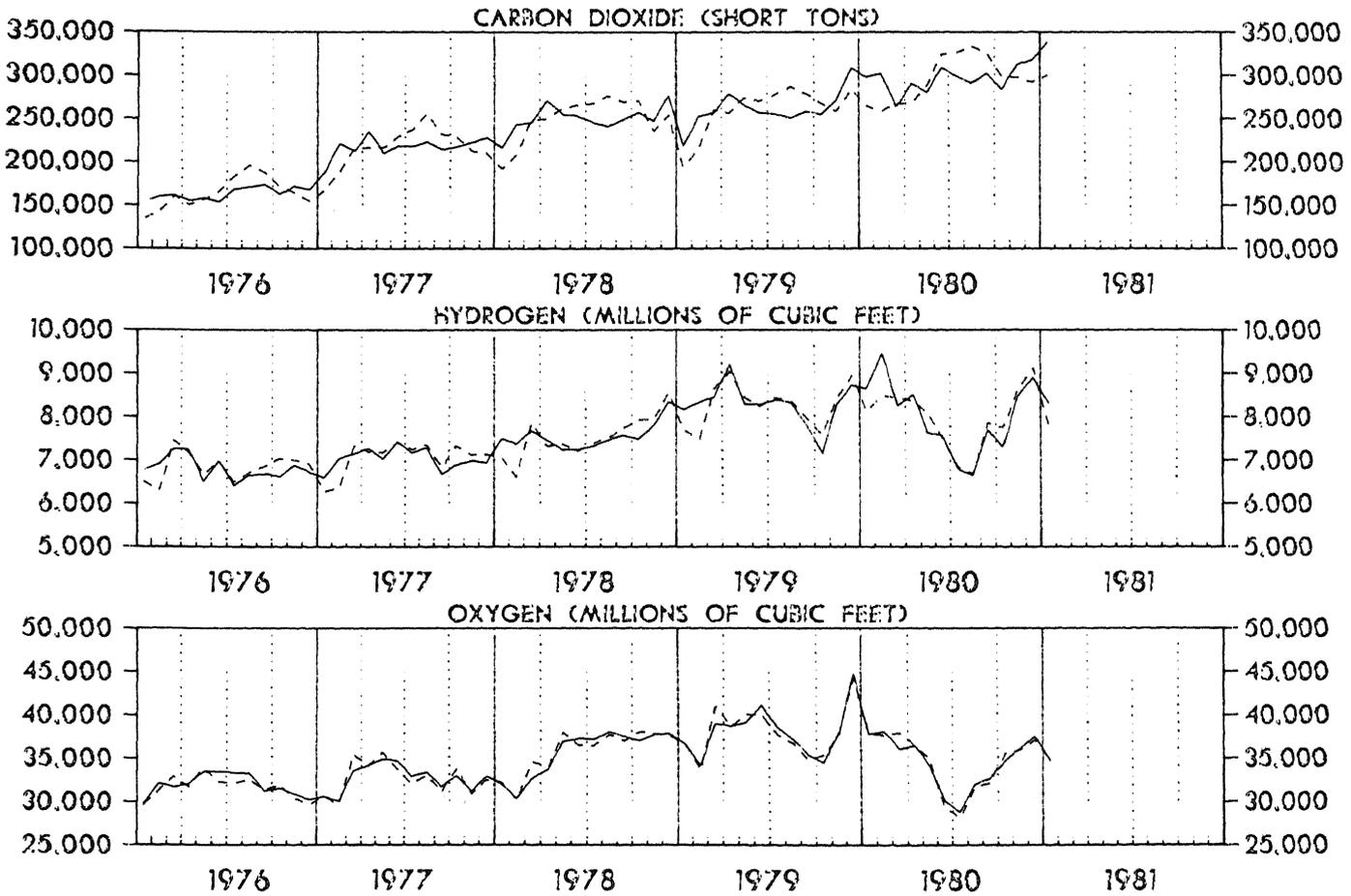
The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 5.

THIS REPORT INCLUDES PRELIMINARY SUMMARY DATA FOR 1980

PRODUCTION OF SELECTED INDUSTRIAL GASES 1976 TO 1981

— Seasonally Adjusted
- - - Not Seasonally Adjusted



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros, (301) 763-7838.

For sale by Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, D.C. 20233, or any U.S. Department of Commerce district office. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. Price, 25 cents per copy, \$3.50 per year.

Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1978 TO 1981

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1981					
January.....	496	338,010	8,325	41,011	34,718
1980					
December.....	488	317,390	8,897	42,281	37,470
November.....	385	312,663	8,488	44,236	36,110
October.....	491	283,712	7,295	42,482	34,662
September.....	448	301,994	7,688	40,471	32,676
August.....	413	291,090	6,645	34,644	32,021
July.....	399	299,112	6,791	37,606	28,826
June.....	441	309,028	7,569	35,844	30,080
May.....	446	280,120	7,937	39,457	34,131
April.....	518	290,657	8,510	39,051	36,456
March.....	535	263,643	8,243	38,297	36,076
February.....	552	302,280	9,447	41,290	38,038
January.....	540	298,448	8,646	37,553	37,835
1979					
December.....	439	311,071	8,728	47,349	44,682
November.....	494	273,829	8,304	39,602	37,891
October.....	491	257,105	7,150	34,388	34,466
September.....	448	261,077	7,792	33,085	35,357
August.....	466	252,864	8,318	34,753	37,193
July.....	492	257,951	8,387	33,842	38,565
June.....	494	259,826	8,287	34,425	41,115
May.....	506	268,136	8,283	34,133	39,145
April.....	515	280,404	9,200	33,053	38,673
March.....	472	258,967	8,447	34,832	38,955
February.....	433	254,911	8,331	32,946	34,082
January.....	501	220,709	8,172	35,352	36,664
1978					
December.....	444	276,530	8,347	31,001	37,965

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1978 TO 1981

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1981						
January.....	483	273,444	26,371	7,834	41,790	34,718
1980						
December.....	504	264,418	27,581	9,119	41,900	37,095
November.....	405	267,937	30,031	8,632	43,483	35,966
October.....	506	261,855	36,610	7,740	43,459	35,529
September.....	483	286,465	39,386	7,857	40,552	32,186
August.....	429	295,473	38,116	6,678	35,649	31,637
July.....	382	286,188	39,246	6,845	37,418	28,163
June.....	439	286,192	38,287	7,524	35,665	29,298
May.....	443	258,653	30,151	8,080	40,088	34,916
April.....	481	240,017	27,678	8,365	38,348	36,456
March.....	511	238,304	28,766	8,433	39,599	37,952
February.....	524	233,182	25,267	8,474	38,895	37,582
January.....	526	236,413	28,310	8,136	38,266	37,835
1979						
December.....	454	253,772	30,028	8,946	46,923	44,235
November.....	521	227,365	31,123	8,445	38,929	37,739
October.....	506	233,570	34,190	7,586	35,179	35,328
September.....	482	238,995	39,566	7,963	33,151	34,827
August.....	485	248,614	38,140	8,360	35,761	36,747
July.....	471	239,054	38,538	8,454	33,673	37,678
June.....	492	236,650	33,507	8,237	33,323	40,046
May.....	502	243,222	30,782	8,432	34,679	40,045
April.....	478	234,792	21,735	9,044	32,458	38,673
March.....	451	233,560	26,658	8,641	36,016	40,981
February.....	411	195,529	20,771	7,473	31,035	33,673
January.....	488	173,904	20,257	7,690	36,024	36,664
1978						
December.....	459	228,642	24,769	8,556	30,722	37,585

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	January 1981	December 1980	January 1980
28132 00	Acetylene ¹	Mil. cu. ft.....	483	504	526
	Produced for compression, including cylinder and pipeline.....	..do.....	152	150	177
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	331	354	349
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	45,133	50,917	42,274
28133 02	Liquid ².....	..do.....	228,311	213,501	194,139
28133 31	Solid (dry ice).....	..do.....	26,371	27,581	28,310
28137 15	Argon, high purity:				
	Produced for cylinder and bulk delivery and pipeline shipments, and for consumption.....	Mil. cu. ft.....	576	653	634
28137 20	Hydrogen ³.....	..do.....	7,834	9,119	8,136
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	915	1,001	981
	Produced for pipeline shipment and government use.....	..do.....	2,602	2,961	2,643
	Produced for consumption in this plant.....	..do.....	4,317	5,157	4,512
28135 00	Nitrogen ⁴.....	..do.....	41,790	41,900	38,266
	Gas:				
	Produced for pipeline shipment.....	..do.....	28,253	27,567	26,050
	Produced for consumption in this plant.....	..do.....	3,288	3,665	3,243
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	907	^r 753	757
	Produced for consumption in this plant.....	..do.....	282	283	303
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	9,060	9,632	7,913
28136 00	Oxygen.....	..do.....	34,718	37,095	37,835
	Gas:				
	Produced for pipeline shipment.....	..do.....	24,678	26,917	28,270
	Liquid:				
	Produced for bulk shipment to pipeline or to other air separation plants.....	..do.....	794	^r 773	830
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	5,250	^r 5,415	4,694
	Produced for consumption in this plant.....	..do.....	3,996	^r 3,990	4,041

^rRevised by 5 percent or more from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁴Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: DECEMBER 1980

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	41,900	671	1.6

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of SIC codes (domestic output) and Schedule B export codes:

Domestic output	Exports
28135 00	415.2600

Table 4. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES, BY MONTHS: 1980

Code	Product	Unit of measure	Total	January	February	March	April	May	June	July	August	September	October	November	December
28132 00	Acetylene ¹ Produced for compression, including cylinder and pipeline..... Produced for pipeline shipment (excluding that produced to be compressed) and for consumption in this plant.....	Ml. cu. ft. ..do. ..do.	5,633 1,729 3,904	526 177 349	524 181 343	511 175 336	481 142 339	443 131 312	439 119 320	382 112 270	429 115 314	483 132 351	506 163 343	405 132 273	504 150 354
28133 01	Carbon dioxide: Gas ²	Short tons	537,428	42,274	46,034	45,211	41,910	47,791	45,634	42,565	42,371	42,459	43,980	46,283	50,917
28133 02	Liquid ³.....	..do.	2,617,669	194,139	187,146	193,093	198,107	210,862	240,558	243,623	253,102	244,007	217,875	221,654	213,501
28133 31	Solid.....	..do.	389,429	28,310	23,267	28,766	27,678	30,131	38,287	39,246	38,116	39,386	36,610	30,031	27,581
28135 00	Nitrogen ³ Gas: Produced for pipeline shipment..... Produced for consumption in this plant..... Liquid: Produced for bulk shipment to pipeline or to other air separation plants..... Produced for consumption in this plant..... Liquid and gas produced for cylinder and bulk delivery.....	Ml. cu. ft. ..do. ..do. ..do. ..do. ..do. ..do.	473,322 310,055 39,160 10,432 3,689 109,986	38,266 26,050 3,243 757 303 7,913	38,895 26,201 3,074 817 374 8,429	39,599 26,048 3,104 758 409 9,280	38,348 25,573 3,118 900 257 8,500	40,088 26,524 3,373 1,009 307 8,875	35,665 23,095 2,716 827 271 8,756	37,418 24,196 3,061 856 273 9,032	35,649 20,697 3,360 983 314 10,295	40,552 26,543 3,406 752 307 9,544	43,459 28,453 3,496 1,037 282 10,191	43,483 29,108 3,544 983 309 9,539	41,900 27,567 3,665 753 283 9,632
28136 00	Oxygen..... Gas produced for pipeline shipment..... Liquid produced for bulk shipment to pipeline or to other air separation plants..... Liquid and gas: Produced for cylinder and bulk delivery shipment..... Produced for consumption in this plant.....	..do. ..do. ..do. ..do. ..do.	434,615 295,531 10,932 63,555 44,597	37,835 28,270 830 4,694 4,041	37,582 26,975 1,041 5,656 3,910	37,952 26,860 1,001 6,086 4,005	36,456 26,342 1,003 5,589 3,522	34,916 25,212 1,007 5,331 3,366	29,298 20,214 884 4,899 3,301	28,163 19,371 870 4,608 3,314	31,637 22,532 843 4,783 3,479	32,186 22,726 659 5,050 3,751	35,529 24,890 1,016 5,607 4,016	35,966 25,222 1,005 5,837 3,902	37,095 26,917 773 5,415 3,990
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments and for consumption in this plant.....	..do.	7,443	634	635	625	635	600	531	493	590	629	701	717	653
28137 20	Hydrogen ⁴ Produced for cylinder and bulk delivery shipment..... Produced for pipeline shipment and Government use..... Produced for consumption in this plant.....	..do. ..do. ..do. ..do.	95,883 11,564 32,624 51,695	8,136 981 2,643 4,512	8,474 854 2,879 4,741	8,433 1,176 2,877 4,380	8,365 1,039 2,733 4,593	8,080 989 2,887 4,204	7,524 883 2,668 3,973	6,845 863 2,476 3,506	6,678 848 2,237 3,593	7,857 917 2,743 4,197	7,740 982 2,574 4,184	8,632 1,031 2,946 4,655	9,119 1,001 2,961 5,157

Note: Annual data for 1980, shown in table 4, are a compilation of the monthly figures which have been appearing in this series. The figures for 1980 should be considered as preliminary and subject to revision based on information collected on Form MA-28C, and published as MA-28C(80)-1, Industrial Gases.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.
²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.
³Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.
⁴Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, Production of Industrial Gases. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data:

a. *Valuation*—There are different methods of valuation for the three types of data.

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

b. *Duplication in Quantity and Value of Output*—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

c. *Low-Valued Export and Import Transactions*—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$501, effective March 1979 and for shipments valued under \$251 prior to March 1979. This is believed to have only negligible effect on the statistics for most commodities.

d. *Manufacturers' Shipments, Not Specified by Kind*—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

e. *Time Lag Between Output and Exports*—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

f. *"Direct" vs "Total" Commodity Exports and Imports*—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

g. *Used Commodities*—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

h. *Geographic Area of Coverage*—Import and export data reflect the movement of merchandise into and out of the U.S. customs territory (the 50 States, the District of Columbia, and Puerto Rico). They do not include movements between the United States and its possessions. Domestic output (shipments) data exclude Puerto Rico and other outlying areas.

RELATIONSHIP BETWEEN M28C AND MA-28C SERIES FOR INDUSTRIAL GASES

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establishments reporting on the annual and not on the monthly. For these reasons, the monthly and annual data comprise two separate series and should be used as such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

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CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
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Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

FEBRUARY 1981

M28C(81)-2
Issued April 1981

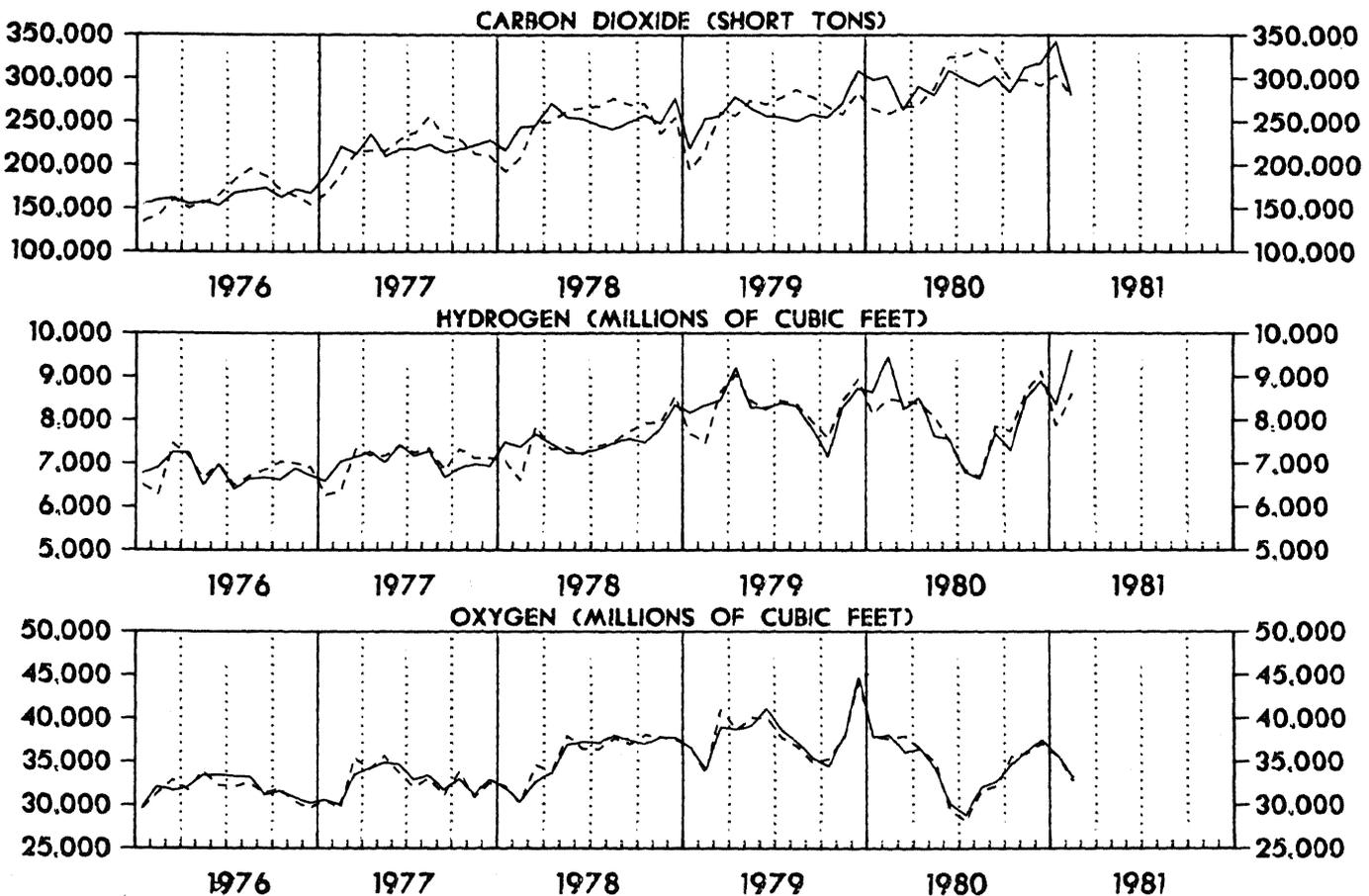
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1980					
December.....	488	317,390	8,897	42,281	37,470
November.....	385	312,663	8,488	44,236	36,110
October.....	491	283,712	7,295	42,482	34,662
September.....	448	301,994	7,688	40,471	32,676
August.....	413	291,090	6,645	34,644	32,021
July.....	399	299,112	6,791	37,606	28,826
June.....	441	309,028	7,569	35,844	30,080
May.....	446	280,120	7,937	39,457	34,131
April.....	518	290,657	8,510	39,051	36,456
March.....	535	263,643	8,243	38,297	36,076
February.....	552	302,280	9,447	41,290	38,038
January.....	540	298,448	8,646	37,553	37,835
1979					
December.....	439	311,071	8,728	47,349	44,682
November.....	494	273,829	8,304	39,602	37,891
October.....	491	257,105	7,150	34,388	34,466
September.....	448	261,077	7,792	33,085	35,357
August.....	466	252,864	8,318	34,753	37,193
July.....	492	257,951	8,387	33,842	38,565
June.....	494	259,826	8,287	34,425	41,115
May.....	506	268,136	8,283	34,133	39,145
April.....	515	280,404	9,200	33,053	38,673
March.....	472	258,967	8,447	34,832	38,955
February.....	433	254,911	8,331	32,946	34,082
January.....	501	220,709	8,172	35,352	36,664

Table IB. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1979 TO 1981

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1981						
February.....	443	257,793	23,144	8,603	38,316	32,805
January.....	509	277,293	26,375	7,879	40,146	35,675
1980						
December.....	504	264,418	27,581	9,119	41,900	37,095
November.....	405	267,937	30,031	8,632	43,483	35,966
October.....	506	261,855	36,610	7,740	43,459	35,529
September.....	483	286,465	39,386	7,857	40,552	32,186
August.....	429	295,473	38,116	6,678	35,649	31,637
July.....	382	286,188	39,246	6,845	37,418	28,163
June.....	439	286,192	38,287	7,524	35,665	29,298
May.....	443	258,653	30,151	8,080	40,088	34,916
April.....	481	240,017	27,678	8,365	38,348	36,456
March.....	511	238,304	28,766	8,433	39,599	37,952
February.....	524	233,182	25,267	8,474	38,895	37,582
January.....	526	236,413	28,310	8,136	38,266	37,835
1979						
December.....	454	253,772	30,028	8,946	46,923	44,235
November.....	521	227,365	31,123	8,445	38,929	37,739
October.....	506	233,570	34,190	7,586	35,179	35,328
September.....	482	238,995	39,566	7,963	33,151	34,827
August.....	485	248,614	38,140	8,360	35,761	36,747
July.....	471	239,054	38,538	8,454	33,673	37,678
June.....	492	236,650	33,507	8,237	33,323	40,046
May.....	502	243,222	30,782	8,432	34,679	40,045
April.....	478	234,792	21,735	9,044	32,458	38,673
March.....	451	233,560	26,658	8,641	36,016	40,981
February.....	411	195,529	20,771	7,473	31,035	33,673
January.....	488	173,904	20,257	7,690	36,024	36,664

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	February 1981	January 1981	February 1980
28132 00	Acetylene ¹	Mil. cu. ft.....	443	509	524
	Produced for compression, including cylinder and pipeline.....	..do.....	155	^r 164	181
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	288	345	343
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	^a 45,849	^r 42,268	46,034
28133 02	Liquid ².....	..do.....	211,944	235,025	187,148
28133 31	Solid (dry ice).....	..do.....	^a 23,144	26,375	25,267
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption.....	Mil. cu. ft.....	624	581	635
28137 20	Hydrogen ³.....	..do.....	8,603	7,879	8,474
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	940	918	854
	Produced for pipeline shipment and government use.....	..do.....	2,738	2,612	2,879
	Produced for consumption in this plant.....	..do.....	4,925	4,349	4,741
28135 00	Nitrogen ⁴.....	..do.....	38,316	40,146	38,895
	Gas:				
	Produced for pipeline shipment.....	..do.....	24,943	^r 26,795	26,201
	Produced for consumption in this plant.....	..do.....	3,004	3,294	3,074
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	^a 760	^r 797	817
	Produced for consumption in this plant.....	..do.....	311	282	374
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	9,298	8,978	8,429
28136 00	Oxygen.....	..do.....	32,805	35,675	37,582
	Gas:				
	Produced for pipeline shipment.....	..do.....	22,008	24,623	26,975
	Liquid:				
	Produced for bulk shipment to pipeline or to other air separation plants.....	..do.....	^a 616	795	1,041
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	5,458	^r 5,348	5,656
	Produced for consumption in this plant.....	..do.....	4,723	^r 4,909	3,910

^aOver 29 percent of this item has been estimated. ^rRevised by over 5 percent from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁴Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: JANUARY 1981

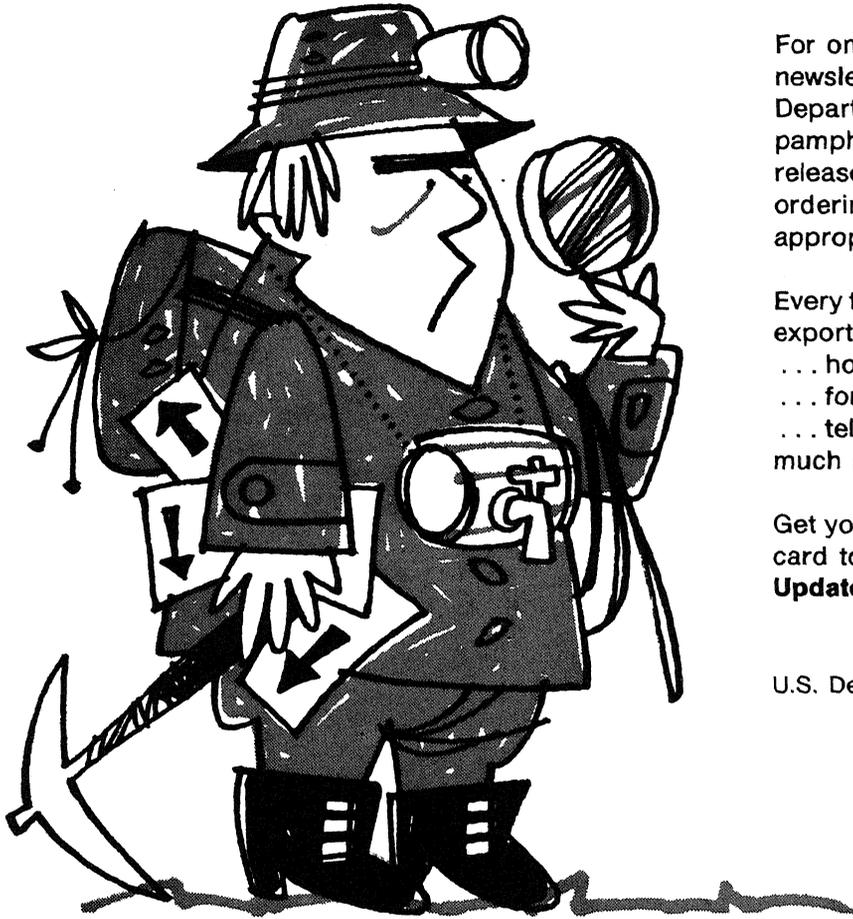
Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	40,146	272	0.7

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of SIC codes (domestic output) and Schedule B export codes:

Domestic output	Exports
28135 00	415.2600

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Industrial Gases



U.S. Department of Commerce
BUREAU OF THE CENSUS

MARCH 1981

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Issued May 1981

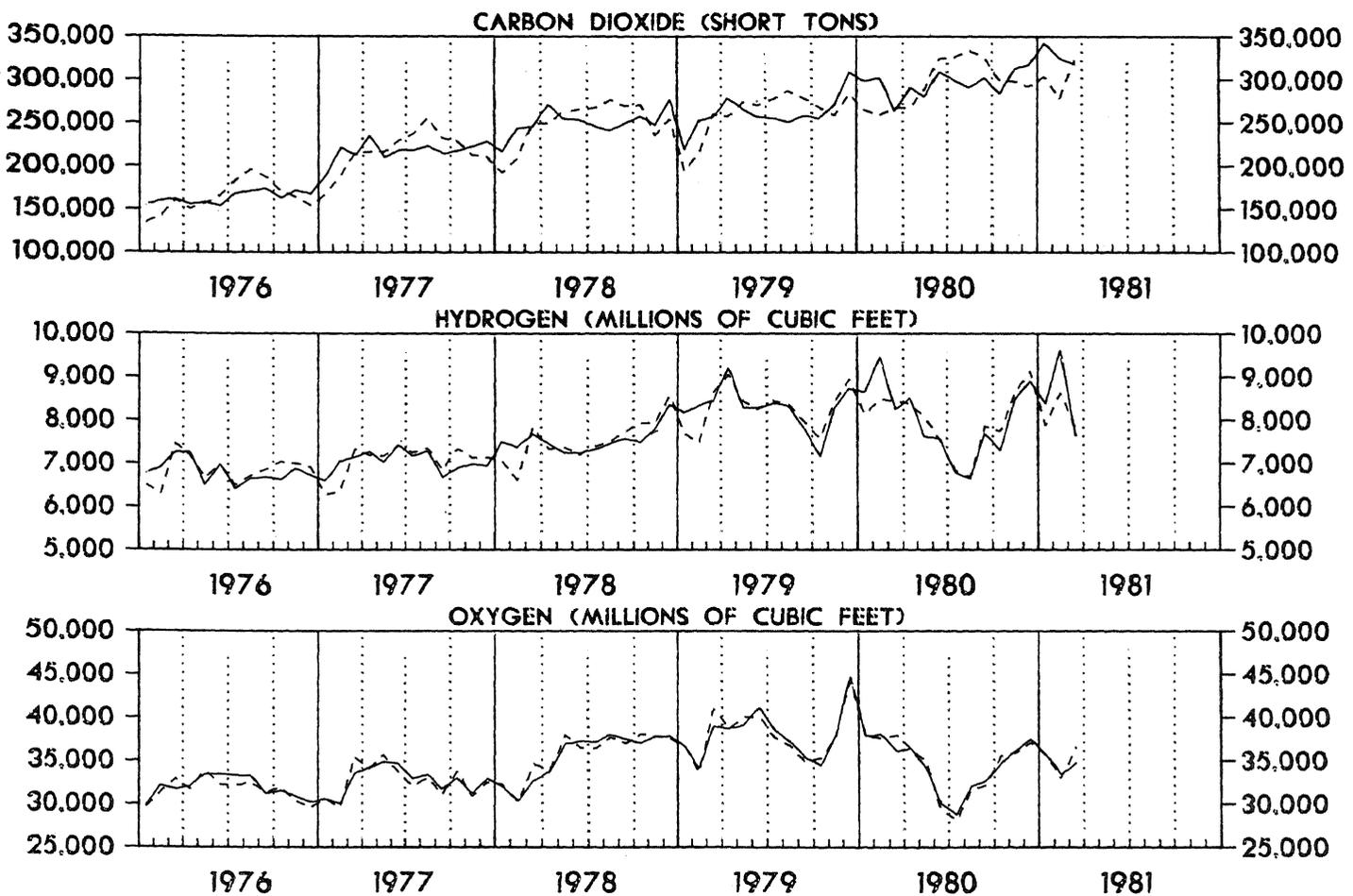
The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 4.

THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES 1976 TO 1981

— Seasonally Adjusted
- - - Not Seasonally Adjusted



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros, (301) 763-7838.

For sale by Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, D.C. 20233, or any U.S. Department of Commerce district office. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. Price, 25 cents per copy, \$3.50 per year.

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, Production of Industrial Gases. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data.

Valuation—There are different methods of valuation for the three types of data:

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

Duplication in Quantity and Value of Output—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

Low-Valued Export and Import Transactions—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$501 effective March 1979 and for shipments valued under \$251 prior to March 1979. This is believed to have only negligible effect on the statistics for most commodities.

Manufacturers' Shipments, Not Specified by Kind—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

Time Lag Between Output and Exports—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

"Direct" vs "Total" Commodity Exports and Imports—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

Used Commodities—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

Geographic Area of Coverage—Import and export data reflect the movement of merchandise into and out of the U.S. customs territory (the 50 States, the District of Columbia, and Puerto Rico). They do not include movements between the United States and its possessions. Domestic output (shipments) data exclude Puerto Rico and other outlying areas.

RELATIONSHIP BETWEEN M28C AND MA-28C SERIES FOR INDUSTRIAL GASES

The data as shown in tables 1A and 1B reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report MA-28C. The actual data reported by establishments canvassed on the annual form differ by varying amounts from data collected monthly due to receipt of revised data from the respondent and establishments reporting on the annual and not on the monthly form. For these reasons, the monthly and annual data comprise two separate series and should be used as

such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

The Bureau of the Census publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	<i>Manufacturers' Shipments, Inventories, and Orders</i>
M28A	Monthly	<i>Inorganic Chemicals</i>
M28B	Monthly	<i>Inorganic Fertilizer Materials and Related Products</i>
<i>Foreign Trade Reports</i>		
FT-410	Monthly	<i>U.S. Exports—Schedule E—Commodity by Country</i>
FT-135	Monthly	<i>U.S. General Imports—Schedule A—Commodity by Country</i>

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
To order a Census Bureau publication	Customer Services (DUSD)	(301) 449-1600
To order Census Bureau microfiche	Maria Brown	(301) 763-5511

Table 1A. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1979 TO 1981

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1981					
March.....	487	318,070	7,651	39,843	34,747
February.....	462	325,086	9,613	40,682	33,384
January.....	523	342,354	8,373	39,397	35,675
1980					
December.....	488	317,390	8,897	42,281	37,470
November.....	385	312,663	8,488	44,236	36,110
October.....	491	283,712	7,295	42,482	34,662
September.....	448	301,994	7,688	40,471	32,676
August.....	413	291,090	6,645	34,644	32,021
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June.....	441	309,028	7,569	35,844	30,080
May.....	446	280,120	7,937	39,457	34,131
April.....	518	290,657	8,510	39,051	36,456
March.....	535	263,643	8,243	38,297	36,076
February.....	552	302,280	9,447	41,290	38,038
January.....	540	298,448	8,646	37,553	37,833
1979					
December.....	439	311,071	8,728	47,349	44,682
November.....	494	273,829	8,304	39,602	37,891
October.....	491	257,105	7,150	34,388	34,466
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July.....	492	257,951	8,387	33,842	38,565
June.....	494	259,826	8,287	34,425	41,115
May.....	506	268,136	8,283	34,133	39,145
April.....	515	280,404	9,200	33,053	38,673
March.....	472	258,967	8,447	34,832	38,955
February.....	433	254,911	8,331	32,946	34,082

Table 1B. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1979 TO 1981

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1981						
March.....	466	297,587	24,618	7,827	41,198	36,554
February.....	438	255,415	22,534	8,623	38,322	32,983
January.....	509	277,293	26,375	7,879	40,146	35,675
1980						
December.....	504	264,418	27,581	9,119	41,900	37,095
November.....	405	267,937	30,031	8,632	43,483	35,966
October.....	506	261,855	36,610	7,740	43,459	35,529
September.....	483	286,465	39,386	7,857	40,552	32,186
August.....	429	295,473	38,116	6,678	35,649	31,637
July.....	382	286,188	39,246	6,845	37,418	28,163
June.....	439	286,192	38,287	7,524	35,665	29,298
May.....	443	258,653	30,151	8,080	40,088	34,916
April.....	481	240,017	27,678	8,365	38,348	36,456
March.....	511	238,304	28,766	8,433	39,599	37,952
February.....	524	233,182	25,267	8,474	38,895	37,582
January.....	526	236,413	28,310	8,136	38,266	37,835
1979						
December.....	454	253,772	30,028	8,946	46,923	44,235
November.....	521	227,365	31,123	8,445	38,929	37,739
October.....	506	233,570	34,190	7,586	35,179	35,328
September.....	482	238,995	39,566	7,963	33,151	34,827
August.....	485	248,614	38,140	8,360	35,761	36,747
July.....	471	239,054	38,538	8,454	33,673	37,678
June.....	492	236,650	33,507	8,237	33,323	40,046
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April.....	478	234,792	21,735	9,044	32,458	38,673
March.....	451	233,560	26,658	8,641	36,016	40,981
February.....	411	195,529	20,771	7,473	31,035	33,673

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	March 1981	February 1981	March 1980
28132 00	Acetylene ¹	Mil. cu. ft.....	466	438	511
	Produced for compression, including cylinder and pipeline.....	..do.....	^a 157	^r 142	175
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	^a 309	296	336
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	^a 50,773	^a 45,849	45,211
28133 02	Liquid ².....	..do.....	246,814	209,566	193,093
28133 31	Solid (dry ice).....	..do.....	24,618	22,534	28,766
28137 15	Argon, high purity:				
	Produced for cylinder and bulk delivery and pipeline shipments, and for consumption.....	Mil. cu. ft.....	729	617	625
28137 20	Hydrogen ³.....	..do.....	7,827	8,623	8,433
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	1,118	931	1,173
	Produced for pipeline shipment and government use.....	..do.....	2,473	2,689	2,877
	Produced for consumption in this plant.....	..do.....	4,236	5,003	4,380
28135 00	Nitrogen ⁴.....	..do.....	41,198	38,322	39,599
	Gas:				
	Produced for pipeline shipment.....	..do.....	26,132	24,805	26,048
	Produced for consumption in this plant.....	..do.....	3,462	2,995	3,104
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	833	771	758
	Produced for consumption in this plant.....	..do.....	267	316	409
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	10,504	9,435	9,280
28136 00	Oxygen.....	..do.....	36,554	32,983	37,952
	Gas:				
	Produced for pipeline shipment.....	..do.....	25,554	22,131	26,860
	Liquid:				
	Produced for bulk shipment to pipeline or to other air separation plants.....	..do.....	925	^r 699	1,001
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	5,959	5,540	6,086
	Produced for consumption in this plant.....	..do.....	4,106	4,613	4,005

^aOver 25 percent of this item has been estimated. ^rRevised by over 5 percent from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁴Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: FEBRUARY 1981

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	38,322	468	1.2

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of SIC codes (domestic output) and Schedule B export codes:

<u>Domestic output</u>	<u>Exports</u>
28135 00	415.2600

DESCRIPTION OF SURVEY

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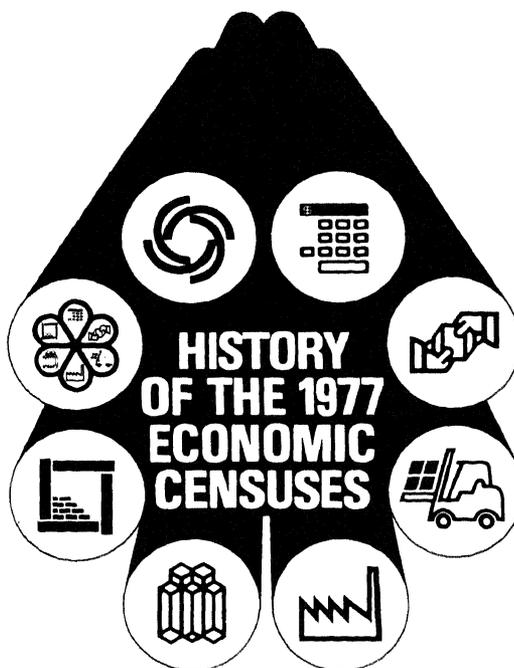
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present specialized reference materials, including a history of previous economic censuses; a roster of key Census personnel; descriptions of geographic areas covered and codes used; a list of questionnaire forms and facsimiles of selected ones; lists of published census reports; provisions of title

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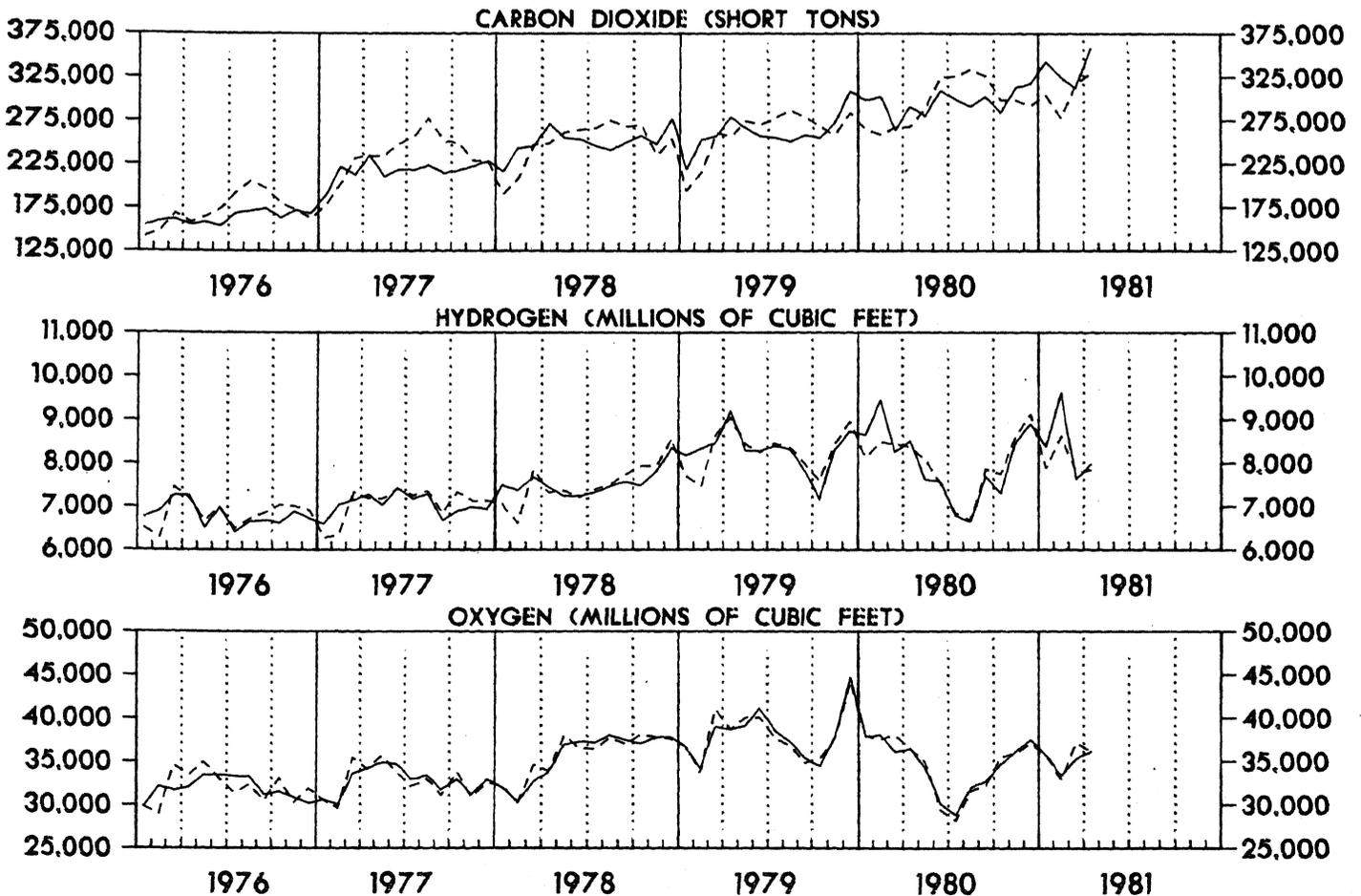
The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

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THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES 1976 TO 1981

— Seasonally Adjusted
- - - Not Seasonally Adjusted



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros, (301) 763-7838.

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Table IA. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1979 TO 1981

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1981					
April.....	448	357,862	7,967	40,358	36,090
March.....	472	312,143	7,630	39,892	35,317
February.....	462	325,086	9,613	40,682	33,384
January.....	523	342,354	8,373	39,397	35,675
1980					
December.....	488	317,390	8,897	42,281	37,470
November.....	385	312,663	8,488	44,236	36,110
October.....	491	283,712	7,295	42,482	34,662
September.....	448	301,994	7,688	40,471	32,676
August.....	413	291,090	6,645	34,644	32,021
July.....	399	299,112	6,791	37,606	28,826
June.....	441	309,028	7,569	35,844	30,080
May.....	446	280,120	7,937	39,457	34,131
April.....	518	290,657	8,510	39,051	36,456
March.....	535	263,643	8,243	38,297	36,076
February.....	552	302,280	9,447	41,290	38,038
January.....	540	298,448	8,646	37,553	37,835
1979					
December.....	439	311,071	8,728	47,349	44,682
November.....	494	273,829	8,304	39,602	37,891
October.....	491	257,105	7,150	34,388	34,466
September.....	448	261,077	7,792	33,085	35,357
August.....	466	252,864	8,318	34,753	37,193
July.....	492	257,951	8,387	33,842	38,565
June.....	494	259,826	8,287	34,425	41,115
May.....	506	268,136	8,283	34,133	39,145
April.....	515	280,404	9,200	33,053	38,673
March.....	472	258,967	8,447	34,832	38,955

Table IB. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1979 TO 1981

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1981						
April.....	416	301,011	28,580	7,832	39,632	36,090
March.....	451	291,583	24,618	7,805	41,248	37,153
February.....	438	255,415	22,534	8,623	38,322	32,983
January.....	509	277,293	26,375	7,879	40,146	35,675
1980						
December.....	504	264,418	27,581	9,119	41,900	37,095
November.....	405	267,937	30,031	8,632	43,483	35,966
October.....	506	261,855	36,610	7,740	43,459	35,529
September.....	483	286,465	39,386	7,857	40,552	32,186
August.....	429	295,473	38,116	6,678	35,649	31,637
July.....	382	286,188	39,246	6,845	37,418	28,163
June.....	439	286,192	38,287	7,524	35,665	29,298
May.....	443	258,653	30,151	8,080	40,088	34,916
April.....	481	240,017	27,678	8,365	38,348	36,456
March.....	511	238,304	28,766	8,433	39,599	37,952
February.....	524	233,182	25,267	8,474	38,895	37,582
January.....	526	236,413	28,310	8,136	38,266	37,835
1979						
December.....	454	253,772	30,028	8,946	46,923	44,235
November.....	521	227,365	31,123	8,445	38,929	37,739
October.....	506	233,570	34,190	7,586	35,179	35,328
September.....	482	238,995	39,566	7,963	33,151	34,827
August.....	485	248,614	38,140	8,360	35,761	36,747
July.....	471	239,054	38,538	8,454	33,673	37,678
June.....	492	236,650	33,507	8,237	33,323	40,046
May.....	502	243,222	30,782	8,432	34,679	40,045
April.....	478	234,792	21,735	9,044	32,458	38,673
March.....	451	233,560	26,658	8,641	36,016	40,981

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	April 1981	March 1981	April 1980
28132 00	Acetylene ¹	Mil. cu. ft.....	416	451	481
	Produced for compression, including cylinder and pipeline.....	..do.....	^a 123	^r 140	142
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	293	311	339
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	^a 45,136	^a 51,935	41,910
28133 02	Liquid ².....	..do.....	255,875	239,648	198,107
28133 31	Solid (dry ice).....	..do.....	28,580	24,618	27,678
28137 15	Argon, high purity:				
	Produced for cylinder and bulk delivery and pipeline shipments, and for consumption.....	Mil. cu. ft.....	628	727	635
28137 20	Hydrogen ³.....	..do.....	7,832	7,805	8,365
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	859	1,117	1,039
	Produced for pipeline shipment and government use.....	..do.....	2,529	2,479	2,733
	Produced for consumption in this plant.....	..do.....	4,444	4,209	4,593
28135 00	Nitrogen ⁴.....	..do.....	39,632	41,248	38,348
	Gas:				
	Produced for pipeline shipment.....	..do.....	25,109	26,171	25,573
	Produced for consumption in this plant.....	..do.....	3,506	3,462	3,118
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	821	^r 727	900
	Produced for consumption in this plant.....	..do.....	331	266	257
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	9,865	10,622	8,500
28136 00	Oxygen.....	..do.....	36,090	37,153	36,456
	Gas:				
	Produced for pipeline shipment.....	..do.....	24,734	25,554	26,342
	Liquid:				
	Produced for bulk shipment to pipeline or to other air separation plants.....	..do.....	775	925	1,003
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	5,772	5,915	5,589
	Produced for consumption in this plant.....	..do.....	4,809	^r 4,759	3,522

^aOver 25 percent of this item has been estimated. ^rRevised by over 5 percent from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁴Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: MARCH 1981

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	41,248	927	2.2

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of SIC codes (domestic output) and Schedule B export codes:

Domestic output	Exports
28135 00	415.2600

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MAY 1981

M28C(81)-5
Issued July 1981

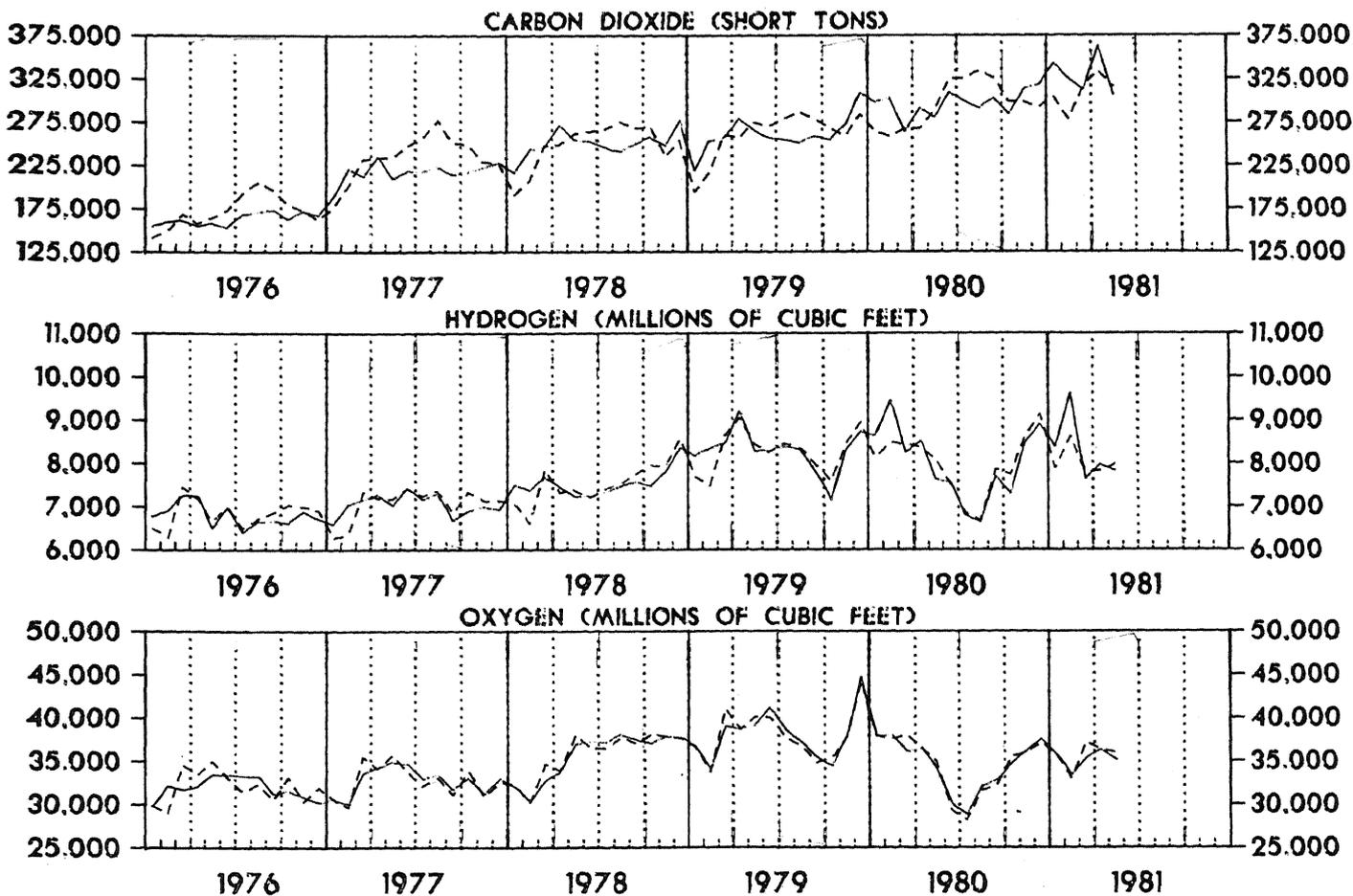
The statistics in this publication are based on a survey of manufacturers and represent total U.S. production of industrial gases. Estimates are included for companies whose reports were

not received in time for tabulation. A more complete description of this survey appears on page 4.

THIS REPORT INCLUDES DATA COMPARING DOMESTIC OUTPUT, EXPORTS, AND IMPORTS

PRODUCTION OF SELECTED INDUSTRIAL GASES 1976 TO 1981

— Seasonally Adjusted
- - - Not Seasonally Adjusted



Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Michael Kavros, (301) 763-7838.

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Table IA. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, SEASONALLY ADJUSTED: 1979 TO 1981

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide (28133 01, 28133 02, and 28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1981					
May.....	406	306,056	7,826	41,103	
April.....	452	362,173	7,959	40,786	35,141
March.....	472	312,143	7,630	39,892	36,281
February.....	462	325,086	9,613	40,682	36,317
January.....	523	342,354	8,373	39,397	35,384
1980					
December.....	488	317,390	8,897	42,281	35,675
November.....	385	312,663	8,488	44,236	
October.....	491	283,712	7,295	44,482	37,470
September.....	448	301,994	7,688	40,471	36,110
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May.....	506	268,136	8,283	34,133	38,565
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					39,145
					38,673

Table IB. SUMMARY OF PRODUCTION OF PRINCIPAL GASES, NOT SEASONALLY ADJUSTED: 1979 TO 1981

Month and year	Acetylene (28132 00) (mil. cu. ft.)	Carbon dioxide, liquid and gas (28133 01 and 28133 02) (short tons)	Carbon dioxide, solid (28133 31) (short tons)	Hydrogen, high and low purity (100%) (28137 20) (mil. cu. ft.)	Nitrogen, high and low purity (100%) (28135 00) (mil. cu. ft.)	Oxygen, high and low purity (100%) (28136 00) (mil. cu. ft.)
1981						
May.....	403	283,539	32,005	7,967	41,761	35,949
April.....	419	304,217	29,344	7,824	40,052	36,281
March.....	451	291,583	24,618	7,805	41,248	37,153
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May.....	502	243,222	30,782	8,432	34,679	40,045
April.....	478	234,792	21,735	9,044	32,458	38,673

Table 2. PRIMARY PRODUCTION (QUANTITY) OF SPECIFIED INDUSTRIAL GASES

Product code	Chemical and basis	Unit of measure	May 1981	April 1981	May 1980
28132 00	Acetylene ¹	Mil. cu. ft.....	403	419	443
	Produced for compression, including cylinder and pipeline.....	..do.....	^a 115	^a 123	131
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	288	296	312
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	^a 34,390	^a 44,965	47,791
28133 02	Liquid ².....	..do.....	249,149	259,252	210,862
28133 31	Solid (dry ice).....	..do.....	32,005	29,344	30,151
28137 15	Argon, high purity:				
	Produced for cylinder and bulk delivery and pipeline shipment, and for consumption in this plant.....	Mil. cu. ft.....	721	634	600
28137 20	Hydrogen ³.....	..do.....	7,967	7,824	8,080
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	1,155	859	989
	Produced for pipeline shipment and Government use.....	..do.....	2,533	2,537	2,887
	Produced for consumption in this plant.....	..do.....	4,279	4,428	4,204
28135 00	Nitrogen ⁴.....	..do.....	41,761	40,052	40,088
	Gas:				
	Produced for pipeline shipment.....	..do.....	25,786	25,220	26,524
	Produced for consumption in this plant.....	..do.....	3,808	3,506	3,373
	Liquid:				
	Produced for bulk delivery shipment to pipeline or to air separation plants.....	..do.....	949	825	1,009
	Produced for consumption in this plant.....	..do.....	336	338	307
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	10,882	10,163	8,875
28136 00	Oxygen.....	..do.....	35,949	36,281	34,916
	Gas:				
	Produced for pipeline shipment.....	..do.....	24,934	24,735	25,212
	Liquid:				
	Produced for bulk shipment to pipelines or to other air separation plants.....	..do.....	779	759	1,007
	Liquid and gas:				
	Produced for cylinder and bulk delivery shipment.....	..do.....	6,309	6,026	5,331
	Produced for consumption in this plant.....	..do.....	3,927	4,761	3,366

^aOver 25 percent of this item has been estimated.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁴Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: APRIL 1981

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	40,052	706	1.8

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of SIC codes (domestic output) and Schedule B export codes:

Domestic output	Exports
28135 00	415,2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, Production of Industrial Gases. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data.

Valuation—There are different methods of valuation for the three types of data:

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

Duplication in Quantity and Value of Output—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

Low-Valued Export and Import Transactions—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$501 effective March 1979 and for shipments valued under \$251 prior to March 1979. This is believed to have only negligible effect on the statistics for most commodities.

Manufacturers' Shipments, Not Specified by Kind—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

Time Lag Between Output and Exports—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

"Direct" vs "Total" Commodity Exports and Imports—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

Used Commodities—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

Geographic Area of Coverage—Import and export data reflect the movement of merchandise into and out of the U.S. customs territory (the 50 States, the District of Columbia, and Puerto Rico). They do not include movements between the United States and its possessions. Domestic output (shipments) data exclude Puerto Rico and other outlying areas.

RELATIONSHIP BETWEEN M28C AND MA-28C SERIES FOR INDUSTRIAL GASES

The data as shown in tables 1A and 1B reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report MA-28C. The actual data reported by establishments canvassed on the annual form differ by varying amounts from data collected monthly due to receipt of revised data from the respondent and establishments reporting on the annual and not on the monthly form. For these reasons, the monthly and annual data comprise two separate series and should be used as

such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

The Bureau of the Census publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	<i>Manufacturers' Shipments, Inventories, and Orders</i>
M28A	Monthly	<i>Inorganic Chemicals</i>
M28B	Monthly	<i>Inorganic Fertilizer Materials and Related Products</i>
<i>Foreign Trade Reports</i>		
FT-410	Monthly	<i>U.S. Exports—Schedule E—Commodity by Country</i>
FT-135	Monthly	<i>U.S. General Imports—Schedule A—Commodity by Country</i>

CONTACTS FOR DATA USERS

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Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
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To order Census Bureau microfiche	Maria Brown	(301) 763-5511

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a report on how the 1977 economic censuses were taken -

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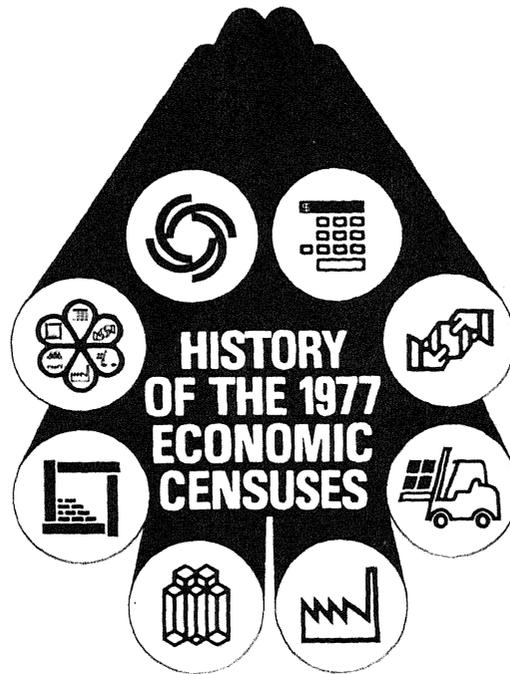
The history covers the censuses of retail trade, wholesale trade, service industries, construction industries, manufactures, mineral industries, transportation, and women-owned businesses; the survey of minority-owned business enterprises and the special survey of women-owned businesses; and the enterprise statistics program. The introduction contains a synopsis of census operations. The publication is illustrated with maps, tables, and charts. Appendixes

present specialized reference materials, including a history of previous economic censuses; a roster of key Census personnel; descriptions of geographic areas covered and codes used; a list of questionnaire forms and facsimiles of selected ones; lists of published census reports; provisions of title

13, United States Code, relating to the 1977 economic censuses; principal advisory committees and conferences on the 1977 censuses; and a glossary of economic terms.

The 1977 history is of special value to users of census data and to students of survey techniques.

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This report on the 1977 economic censuses is part of a continuing program of histories prepared for each major census. Those for the 1978 Census of Agriculture and the 1980 Census of Population and Housing are currently in preparation. The various phases of the 1982 economic and agricultural censuses are being recorded and histories of them will be issued after the census period ends in 1985.

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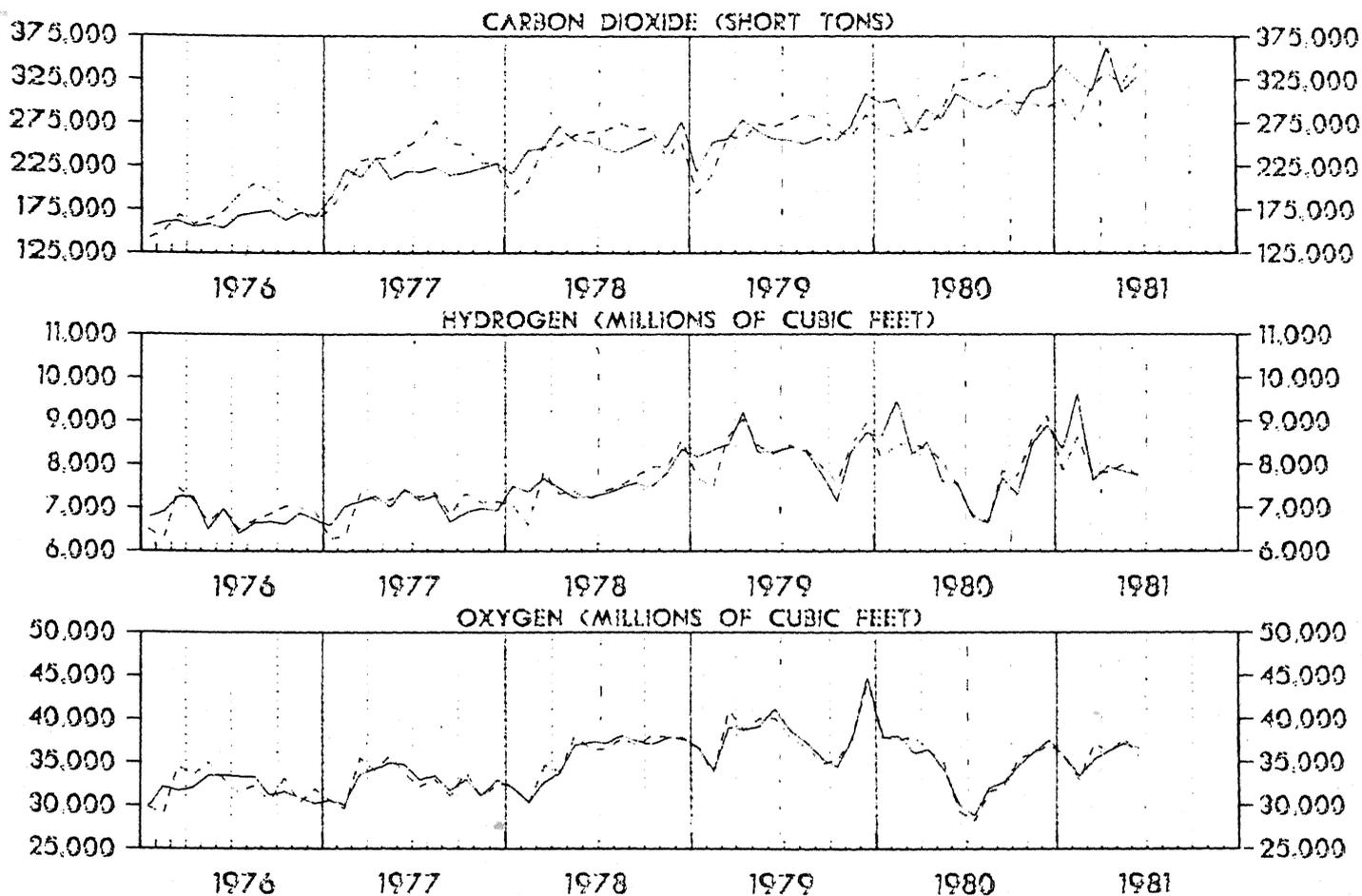
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	Produced for compression, including cylinder and pipeline.....	..do.....	^a 113	^a 116	119
	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in this plant.....	..do.....	276	288	320
	Carbon dioxide:				
28133 01	Gas ²	S. tons.....	^a 42,437	^r ^a 40,102	45,634
28133 02	Liquid ².....	..do.....	265,156	250,365	240,558
28133 31	Solid (dry ice).....	..do.....	36,400	30,437	38,287
28137 15	Argon, high purity: Produced for cylinder and bulk delivery and pipeline shipments, and for consumption.....	Mil. cu. ft.....	660	737	531
28137 20	Hydrogen ³.....	..do.....	7,722	7,994	7,524
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	973	1,155	883
	Produced for pipeline shipment and Government use.....	..do.....	2,638	2,527	2,668
	Produced for consumption in this plant.....	..do.....	4,111	4,312	3,973
28135 00	Nitrogen ⁴.....	..do.....	40,409	41,797	35,665
	Gas:				
	Produced for pipeline shipment.....	..do.....	25,251	25,787	23,095
	Produced for consumption in this plant.....	..do.....	3,434	3,810	2,716
	Liquid:				
	Produced for bulk delivery shipment to pipelines or to air separation plants.....	..do.....	1,210	^r 829	827
	Produced for consumption in this plant.....	..do.....		335	271
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	10,514	11,036	8,756
28136 00	Oxygen.....	..do.....	35,675	37,964	29,298
	Gas:				
	Produced for pipeline shipment.....	..do.....	25,502	^r 26,262	20,214
	Liquid:				
	Produced for bulk shipment to pipeline or to other air separation plants.....	..do.....	688	780	884
	Liquid and gas: Produced for cylinder and bulk delivery shipment.....	..do.....	5,763	^r 6,380	4,899
	Produced for consumption in this plant.....	..do.....	3,722	^r 4,542	3,301

^aOver 25 percent of this item has been estimated.

^rRevised by over 5 percent from previously published figures.

¹Excludes quantities of acetylene produced and consumed by railroad shops, shipyards, and small establishments using portable generators.

²Excludes quantities produced and consumed in plants manufacturing soda ash or urea.

³Excludes quantities produced and consumed in the manufacture of methanol and ammonia, but includes an unspecified amount of hydrogen produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts of hydrogen produced in petroleum refineries for captive use.

⁴Excludes amounts produced and used in the manufacture of ammonia and ammonia derivatives.

Table 3. PRODUCTION AND EXPORTS OF NITROGEN: MAY 1981

Product code	Product	Quantity produced (m.c.f.)	Exports of domestic merchandise (m.c.f.)	Percent of exports to production
28135 00	Nitrogen.....	41,797	748	1.8

Note: Detailed export data for industrial gases other than nitrogen are not available separately. Import data for industrial gases are included in "chemical elements, not specially provided for," and are not separately identified.

Comparison of SIC codes (domestic output) and Schedule B export codes:

Domestic output	Exports
28135 00	415.2600

DESCRIPTION OF SURVEY

Scope of Survey—This survey covers firms engaged in the manufacture of industrial gases. Excluded from this survey are industrial gases vented or used for fuel by the producer.

Survey Description—The statistics in this publication were collected on Bureau of the Census monthly reporting Form M28C, Production of Industrial Gases. The mailing panel for this survey consisted of all known producers of industrial gases, approximately 670 producers of elemental gases, carbon dioxide, and acetylene.

Survey Error—Figures for the current month include estimates for respondents whose reports were not received in time for tabulation. Such missing figures are "imputed" from month-to-month movements shown by reporting firms and are generally limited to a maximum of 25 percent for any one item. Individual items with imputation greater than 25 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual monthly movements for nonrespondents may or may not closely agree with the imputed movements. The probable range of difference between the actual and imputed figures is unknown. The degree of uncertainty regarding the accuracy of the data, however, increases as the percentage of imputation increases. Figures with imputation rates above 25 percent should be used with caution.

Revision to Previous Period Data—Statistics for previous months may be revised due to receipt of corrected data from respondents, including late reports for which imputations were previously made as described above, and other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Reporting Period Adjustment—Since January 1975, the data have been adjusted for number of working days in the reporting period in order to compensate for differences in individual company reporting patterns, i.e., calendar month, 4-week, 5-week periods. Since the calendar month accounting system prevails in this industry, adjustments have been made to those reporting on other than a calendar month basis.

Seasonal Adjustment—This report presents seasonally adjusted data in table 1A for selected series shown in table 1B. The data were seasonally adjusted using the X-11 variant of the Bureau of the Census Method II seasonal adjustment program. This program is a ratio-to-moving average method. It largely eliminates the effect of seasonal variations (intra-year variations repeated constantly from year to year) within the series. The seasonally adjusted data provide a better measure of the month-to-month variations which are due to factors other than seasonal pattern. Additional information concerning seasonal adjustment is available in the seasonal adjustment supplement issued in this series.

EXPLANATION OF TERMS

Production—Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end products.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently and are based on somewhat differing systems of classification. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; whereas, the export and import classification system is more materials oriented. Aside from the differences in the basic commodity classifications, there are additional problems involving import data, since there are a substantial number of imported commodities which are not produced in the United States or which are produced only in very small quantities and which, therefore, have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to those mentioned above, there are also the following problems affecting the comparability of the three sets of data.

Valuation—There are different methods of valuation for the three types of data:

Domestic Output—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

Exports—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance, and other charges to the export point.

Imports—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

Duplication in Quantity and Value of Output—Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

Low-Valued Export and Import Transactions—Commodity information is not shown for individual imports valued under \$251. For exports, commodity information is not reported for shipments individually valued under \$501 effective March 1979 and for shipments valued under \$251 prior to March 1979. This is believed to have only negligible effect on the statistics for most commodities.

Manufacturers' Shipments, Not Specified by Kind—The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

Time Lag Between Output and Exports—There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

"Direct" vs "Total" Commodity Exports and Imports—Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

Used Commodities—With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

Geographic Area of Coverage—Import and export data reflect the movement of merchandise into and out of the U.S. customs territory (the 50 States, the District of Columbia, and Puerto Rico). They do not include movements between the United States and its possessions. Domestic output (shipments) data exclude Puerto Rico and other outlying areas.

RELATIONSHIP BETWEEN M28C AND MA-28C SERIES FOR INDUSTRIAL GASES

The data as shown in tables 1A and 1B reflect levels of production as reported by establishments on monthly Form M28C. These data are revised in the annual publication collected on Form MA-28C and are shown in table 9 of the annual report MA-28C. The actual data reported by establishments canvassed on the annual form differ by varying amounts from data collected monthly due to receipt of revised data from the respondent and establishments reporting on the annual and not on the monthly form. For these reasons, the monthly and annual data comprise two separate series and should be used as

such for analytical purposes. Specifically, the monthly data should be useful in describing month-to-month changes while the annual data provide a better indication of the level of production.

RELATED REPORTS

An annual Current Industrial Report is published in this series. The annual report summarizes monthly figures and incorporates all known revisions in the series for both current and previous year, thus providing a single reference copy to replace the monthly publications. This annual summary provides additional information on the history of this survey.

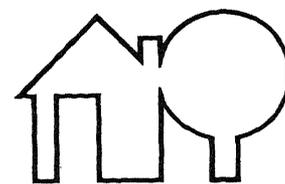
The Bureau of the Census publishes reports on other related products as follows:

Series	Frequency	Title
<i>Current Industrial Reports</i>		
M3-1	Monthly	<i>Manufacturers' Shipments, Inventories, and Orders</i>
M28A	Monthly	<i>Inorganic Chemicals</i>
M28B	Monthly	<i>Inorganic Fertilizer Materials and Related Products</i>
<i>Foreign Trade Reports</i>		
FT-410	Monthly	<i>U.S. Exports—Schedule E—Commodity by Country</i>
FT-135	Monthly	<i>U.S. General Imports—Schedule A—Commodity by Country</i>

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report M28C	Michael Kavros	(301) 763-7838
Foreign Trade publications	Juanita Noone	(301) 763-5140
Bureau of Industrial Economics	David H. Blank	(202) 377-5496
To order a Census Bureau publication	Customer Services (DUSD)	(301) 449-1600
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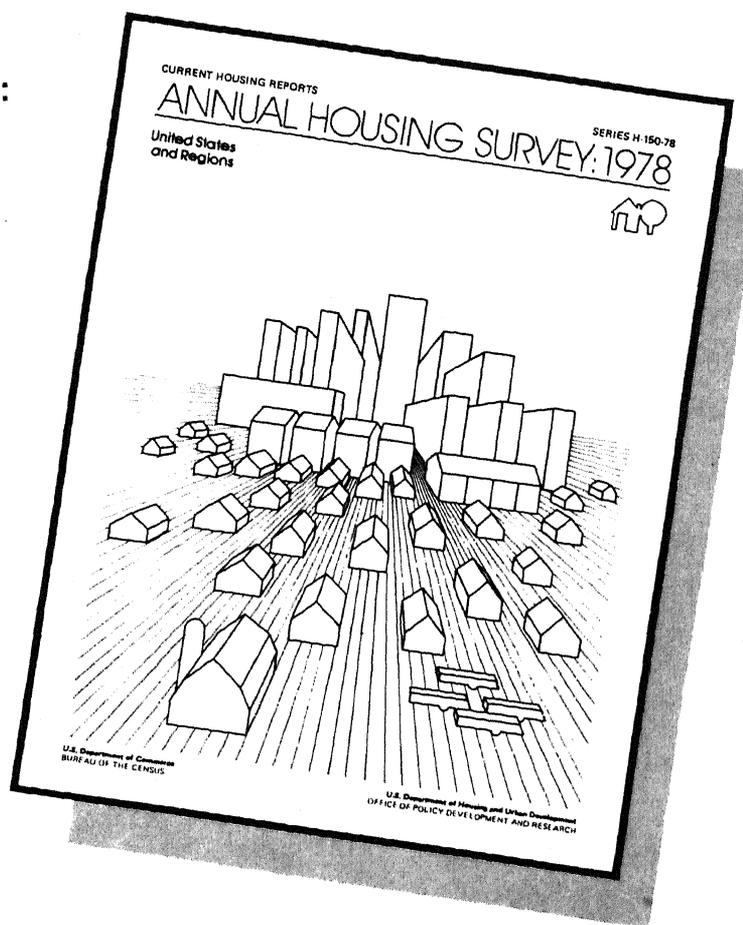
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